White Shrimp Harvests in Galveston Bay: A Regression Analysis

Harvest vs. Freshwater Inflows

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Summary Report

Description of the Problem

Bimonthly freshwater inflows into Galveston Bay were recorded for the years 1959 to 1987. These variables, and various transformations of them, were used to construct a model for the annual harvest of white shrimp.

Constructing Models—General Discussion

Stability of coefficient estimates and accuracy of predicted values are primary goals in constructing models for prediction. To this end, the data must be examined from three points of view: individual observations (to detect outliers or influential points); variables, individually and in groups (to select an optimal set of predictors); and the interaction of these two, which produces the overall structure of the data set (to determine whether multicollinearity is present or not). The first two of these were examined by both graphic and quantitative means; the third by quantitative means only.

Detecting Influential Points and Outliers

The structures of individual variables were examined via box plots and histograms, as well as by all the usual numerical measures. For each pair of variables, 99% prediction ellipses were plotted in a further effort to look for unusual points. For example, suppose large values of Variable A are generally associated with large values of Variable B. If an observation consisted of a large value for Variable A but a small value for Variable B, that point would be considered unusual, even though it was well within the range of data for both variables and could not be considered an outlier.

In addition, a number of residual analysis techniques were employed. A large *residual* indicates a point not well-fit by the model. The *deleted residual*, however, is somewhat more useful in the search for influential points. The model is fitted without a given observation, and the predicted response and corresponding residual are calculated for that observation. The *Studentized deleted residual* is scaled to have a Student's t distribution. Histograms and normal P-P plots of the residuals were also examined.

Other quantities, such as the Mahalanobis distance, Cook's distance, the leverage value, standardized values for the Dffits (to measure the influence of a given observation on the predicted response) and the Dfbetas (to measure the influence of a given observation on the calculated coefficients) were also used to build a general picture of the influence of individual points. Plots were made of the standardized Dffits value for each model against the Dfbeta values for each predictor in the model. Points which were extreme indicated observations which had strong effects on both predicted values and coefficient estimates.

Variable Selection

For each regression, residuals were plotted against each of the independent variables to look for nonlinear relationships between the response variable and individual predictors. Partial residual plots were employed to examine the overall relationship between the response and individual predictors. A partial residual is a corollary to the deleted residual. That is, the model is fitted without a given variable and the predicted response and corresponding residual are calculated for each observation. This seeks to answer the question, "What is the relationship of this predictor to the response variable, taking all other variables into account?" Thus, it examines the marginal relationship of a given predictor to the response.

Numerous measures have been developed over the years to assess the adequacy of a given model. We examined a number of these, including R^2 and mean squared error (MSE), and several others which directly incorporate penalties for having too many predictors in the model, such as adjusted R^2, C_p, AIC, and SBC. It is well-established that too many predictors in a model can lead to bad prediction, just as too few can, and these measures are used as part of the attempt to find an optimal model.

Multicollinearity

Multicollinearity arises when one or more variables are closely approximated by linear combinations of the remaining variables, resulting in unstable coefficient estimates. The variance inflation factor (VIF) was calculated for each coefficient estimate to measure this instability, which is not usually considered profound for VIF's less that 10. Additionally, the condition index (a ratio of eigenvalues of the covariance matrix, with the largest eigenvalue always on top) was calculated. A ratio greater than 30 is considered cause for concern.

Other Procedures

Several other miscellaneous diagnostics, including the Durbin-Watson test for serial autocorrelation, were performed, and no general problems were detected. The Box-Cox procedure, used to find a transformation to normality, was also performed.

How the Final Model Was Chosen

Selecting the Data Set Used. First, the variables were explored thoroughly, individually and in pairs, in a first effort to detect influential points. The SAS® programming language allows a number of diagnostics to be calculated for a group of models on a given data set without actually performing a formal regression, thus allowing one to examine a large number of models quite efficiently. In addition to the untransformed data, three transformed data sets were selected for this procedure, based on prior experience. Before we proceeded, the Box-Cox procedure was performed to find if a transformation to normality was suggested. No transformation was suggested. At this point, there were four data sets for which the diagnostic series was calculated:

1. Untransformed data
2. Natural log of inflow variables; harvest untransformed

3. Natural log of harvest; inflows untransformed
4. Natural log of all variables

Selecting the Points to be Omitted. Data sets 1 and 3 (with maximum R^2 of 0.45 and 0.42, respectively) seemed more promising than sets 3 and 4 (with maximum R^2 of 0.30 and 0.32), so full regressions were performed for two models, each of which contained all variables in its corresponding data set. All diagnostics were generated, and influential points were determined for each model. Because so many points were flagged, a large number of subsets of those two data sets were analyzed. Each subset was obtained by deleting various combinations of the potentially troublesome points. In each case, one subset was chosen as optimal; those results are presented in the section on subset analysis.

The observations flagged as potentially influential are given in the summary table below. Those which were ultimately deleted in fitting the final candidate models are indicated with an asterisk. The abbreviation key and a similar summary table for points designated as potentially influential by box plots appear on the next page. A point was not considered to be a potential problem unless it garnered multiple flags.

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	Total
Data Set 1									
1961	1								1
***1964**			1				1	1	3
1966							1		1
***1967**			1				1	1	3
1973	1								1
1974	1								1
1975	1								1
1977							1		1
1979	2								2
1983	1								1
Data Set 3									
***1959**	1						1		2
1961	1								1
***1966**	1						1		2
***1967**	2	1	1				1	1	6
***1971**	2								2
1976	1								1
1983							1		1

Summary of points flagged by diagnostic measures

Key to Abbreviations:

BOX	Box plot
SRE	Studentized residual
SDR	Studentized deleted residual
LEV	Leverage value
MAH	Mahalanobis distance
COO	Cook's distance
SDF	Standardized Dffits value
SDB	Standardized Dfbeta value

Year	Variable
1959	Ln(White Shrimp Harvest)
1961	Ln(White Shrimp Harvest) January-February Inflows
1966	Ln(White Shrimp Harvest)
1967	Ln(White Shrimp Harvest) Ln(January-February Inflows)
1971	Ln(January-February Inflows) Ln(May-June Inflows)
1973	March-April Inflows
1974	September-October Inflows
1975	November-December Inflows
1976	Ln(January-February Inflows)
1979	March-April Inflows July-August Inflows
1983	July-August Inflows

Summary of points flagged by boxplots

Selecting the Final Candidate Models. After the subset analysis led us to two subsets (untransformed data, 1964 and 1967 omitted; and logged harvest, 1959, 1966, 1967, and 1971 omitted), further examination led us to consider the following two models:

1964 and 1967 Omitted:

1a. Harvest regressed on January-February, March-April, July-August, and November-December inflows

1959, 1966, 1967, and 1971 Omitted:

3a. Natural log of harvest regressed on January-February, March-April, July-August, and November-December inflows

Selecting the Final Model. To put these models on a common ground for testing, the observations corresponding to the years 1959, 1964, 1966, 1967, and 1971 were deleted. Regression was performed using each of these two models, and the deleted residuals were calculated. In the models where the prediction was for the natural log of harvest, the prediction was transformed back to the original scale before the deleted residual was calculated. Various descriptive statistics were calculated for the square of these deleted residuals. This was repeated for the entire data set of 29 observations, and the results of both of these procedures appear below. Clearly, model 1a performs better from the point of view of prediction, and is therefore our final choice.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
1a	24	1837.7451	2026866.2804	311168.890001	464418.298290
3a	24	4929.2933	2080393.8296	370338.440932	502880.360329
1a	29	22.5214	5727551.1302	713058.512080	1293245.463846
3a	29	469.2938	5847464.8998	815586.372789	1375688.585535

Model

White Shrimp Harvest = 3212.037 − 0.691*(January-February Inflows)
+ 0.273*(March-April Inflows)
− 0.325*(July-August Inflows)
+ 0.505*(November-December Inflows)

Notes on the final model: There is no evidence of serial autocorrelation, based on the Durbin-Watson results. Neither the variance inflation factors (VIF) nor the condition index indicates problems with multicollinearity.

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	November-December Inflows, July-August Inflows, March-April Inflows, January-February Inflows[c,d]	.	.799	.638	.572	584.3514	1.976

a. Dependent Variable: White Shrimp Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, July-August Inflows, March-April Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13253724.491	4	3313431.123	9.704	.000[b]
	Residual	7512264.385	22	341466.563		
	Total	20765988.876	26			

a. Dependent Variable: White Shrimp Harvest

b. Independent Variables: (Constant), November-December Inflows, July-August Inflows, March-April Inflows, January-February Inflows

Coefficients[a]

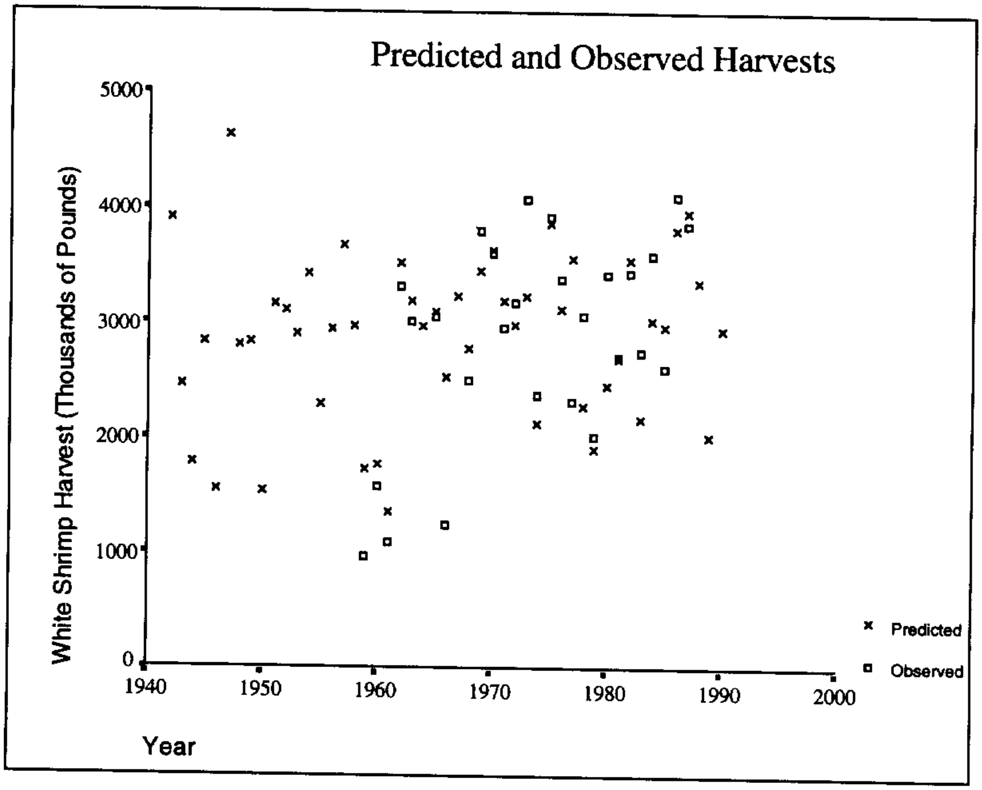
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	3212.037	280.221		11.462	.000	2630.893	3793.181		
	January-February Inflows	-.691	.137	-.832	-5.041	.000	-.975	-.406	.604	1.657
	March-April Inflows	.273	.095	.415	2.890	.009	.077	.470	.797	1.255
	July-August Inflows	-.325	.162	-.285	-2.013	.057	-.661	.010	.819	1.221
	November-December Inflows	.505	.113	.697	4.484	.000	.271	.738	.680	1.470

a. Dependent Variable: White Shrimp Harvest

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	January-February Inflows	March-April Inflows	July-August Inflows	November-December Inflows
1	1	4.140	1.000	.01	.01	.01	.01	.01
	2	.408	3.187	.00	.02	.21	.11	.27
	3	.224	4.295	.01	.00	.43	.81	.00
	4	.126	5.740	.98	.08	.19	.02	.13
	5	.102	6.374	.00	.90	.16	.04	.59

a. Dependent Variable: White Shrimp Harvest


Predicted and Observed Harvests
White Shrimp Harvest (Thousands of Pounds)
5000
4000
3000
2000
1000
0
1940
1950
1960
1970
1980
1990
2000
Year
× Predicted
□ Observed

Exploring the Data

Listing of Data

YEAR	WHITE_SH	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL	ND_INFL
1959	982.00	2088.38	2234.80	1954.20	2282.80	2054.00	207.00
1960	1596.40	2838.00	799.80	1831.80	1208.18	1091.60	1409.60
1961	1106.70	5180.00	1440.10	1977.30	1437.95	1154.04	3586.10
1962	3324.40	728.40	649.90	1036.80	532.90	2163.94	1621.10
1963	3027.30	1102.10	356.90	796.10	201.78	978.50	1417.60
1964	4700.70	851.95	1061.50	445.80	215.41	126.83	276.50
1965	3066.20	1466.60	1035.80	2334.80	243.99	588.62	1398.70
1966	1260.00	2126.40	1977.80	5402.30	1220.70	260.65	1288.40
1967	1038.80	257.53	583.93	749.10	383.91	529.50	336.49
1968	2516.80	2129.20	3236.90	6258.00	929.20	515.10	920.20
1969	3809.60	1663.10	4102.00	4023.50	489.22	556.89	862.74
1970	3620.60	752.30	2674.30	1624.80	402.78	395.35	702.30
1971	2962.80	134.30	306.18	273.04	448.98	1627.41	280.35
1972	3188.40	2042.19	715.60	1966.77	442.44	748.44	2250.95
1973	4077.70	2190.55	5382.71	5752.84	1597.24	565.19	1165.62
1974	2392.40	3342.00	947.02	1514.33	566.48	4222.20	2309.20
1975	3927.20	3138.98	2242.47	3911.76	1251.90	1972.37	5217.90
1976	3402.10	300.41	774.04	1891.54	958.01	568.55	451.20
1977	2336.20	2017.84	3210.59	1381.78	412.79	716.23	2019.79
1978	3075.60	2120.06	606.39	673.68	390.93	472.81	1017.47
1979	2028.70	2872.02	4744.84	3937.29	3019.84	418.13	740.91
1980	3441.60	2483.63	1718.35	2028.90	382.89	2799.02	1261.47
1981	2722.40	331.86	393.91	4583.43	1656.01	1004.49	300.79
1982	3456.40	1380.97	1586.83	3551.50	1489.26	2326.50	2674.10
1983	2762.90	2666.53	1887.04	2520.25	3116.05	339.35	2584.78
1984	3604.30	1259.48	1283.67	822.10	524.19	2011.59	1017.37
1985	2623.20	2468.30	2670.78	1760.81	626.87	2025.67	1873.57
1986	4108.30	1651.33	771.37	4515.98	841.81	1356.07	3585.61
1987	3865.50	1905.62	1955.75	3070.28	1274.76	1591.52	3886.93

WHITE_SH	White shrimp harvest (thousands of pounds)
JF_INFL	Lagged January-February inflows (thousands of acre-feet)
MA_INFL	Lagged March-April inflows (thousands of acre-feet)
MJ_INFL	Lagged May-June inflows (thousands of acre-feet)
JA_INFL	Lagged July-August inflows (thousands of acre-feet)
SO_INFL	Lagged September-October inflows (thousands of acre-feet)
ND_INFL	Lagged November-December inflows (thousands of acre-feet)

Summary Information for Individual Variables

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
White Shrimp Harvest	.113	29	.200*	.946	29	.222
Ln(White Shrimp Harvest)	.176	29	.022	.850	29	.010*
January-February Inflows	.101	29	.200*	.946	29	.230
March-April Inflows	.151	29	.091	.876	29	.010*
May-June Inflows	.198	29	.005	.916	29	.032
July-August Inflows	.194	29	.007	.826	29	.010*
September-October Inflows	.173	29	.026	.867	29	.010*
November-December Inflows	.182	29	.015	.888	29	.010*
Ln(January-February Inflows)	.188	29	.010	.870	29	.010*
Ln(March-April Inflows)	.091	29	.200*	.973	29	.667
Ln(May-June Inflows)	.107	29	.200*	.954	29	.330
Ln(July-August Inflows)	.125	29	.200*	.955	29	.353
Ln(September-October Inflows)	.116	29	.200*	.972	29	.659
Ln(November-December Inflows)	.096	29	.200*	.956	29	.359

*. This is a lower bound of the true significance.

**. This is an upper bound of the true significance.

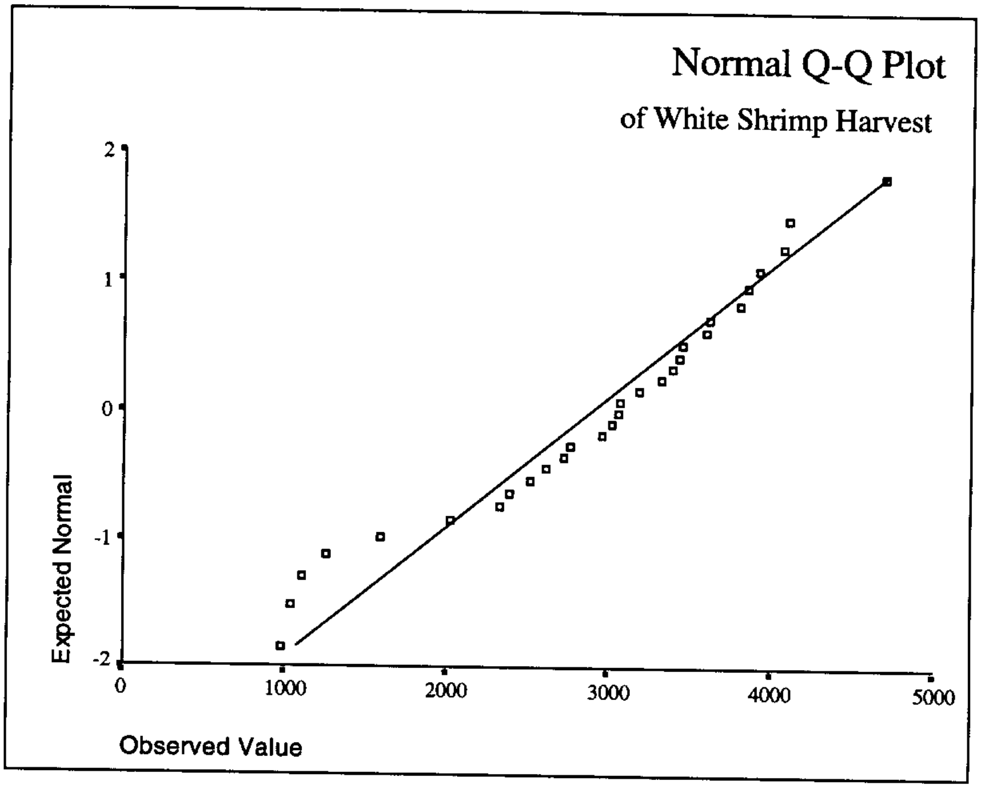
a. Lilliefors Significance Correction

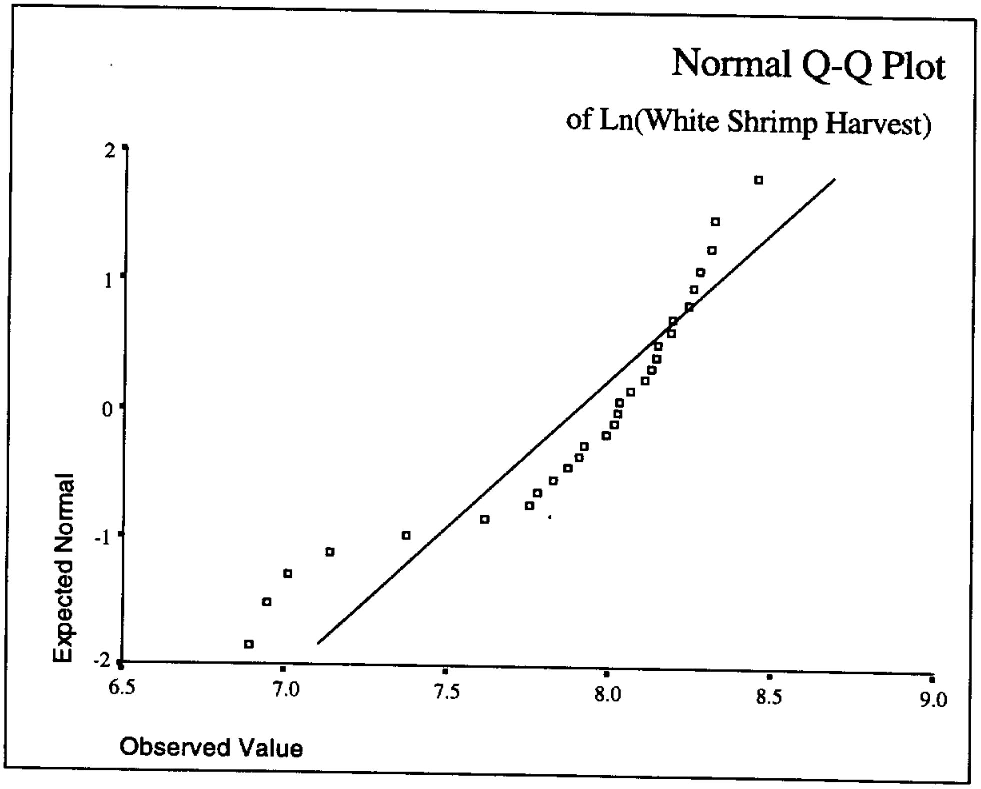
Descriptives

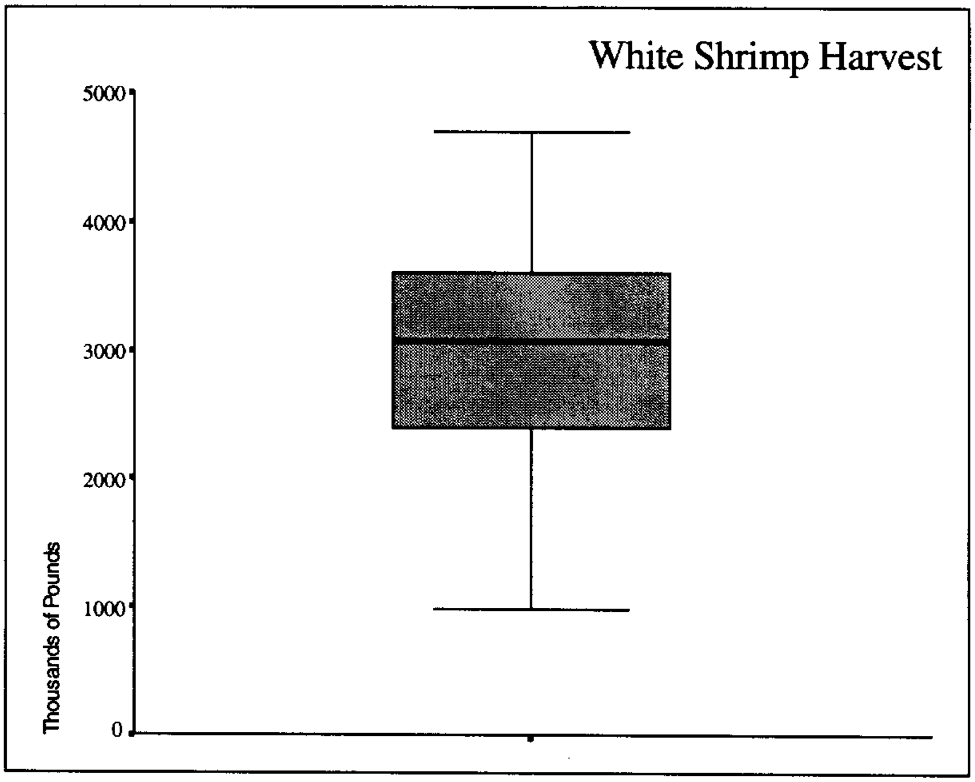
			Statistic	Std. Error
White Shrimp Harvest	Mean		*2897.4207*	*183.9375*
	95% Confidence Interval for Mean	*Lower Bound*	*2520.6419*	
		Upper Bound	*3274.1995*	
	5% Trimmed Mean		*2912.8852*	
	Median		*3066.2000*	
	Variance		*981156.766*	
	Std. Deviation		*990.5336*	
	Minimum		*982.00*	
	Maximum		*4700.70*	
	Range		*3718.70*	
	Interquartile Range		*1248.1500*	
	Skewness		*-.532*	*.434*
	Kurtosis		*-.377*	*.845*

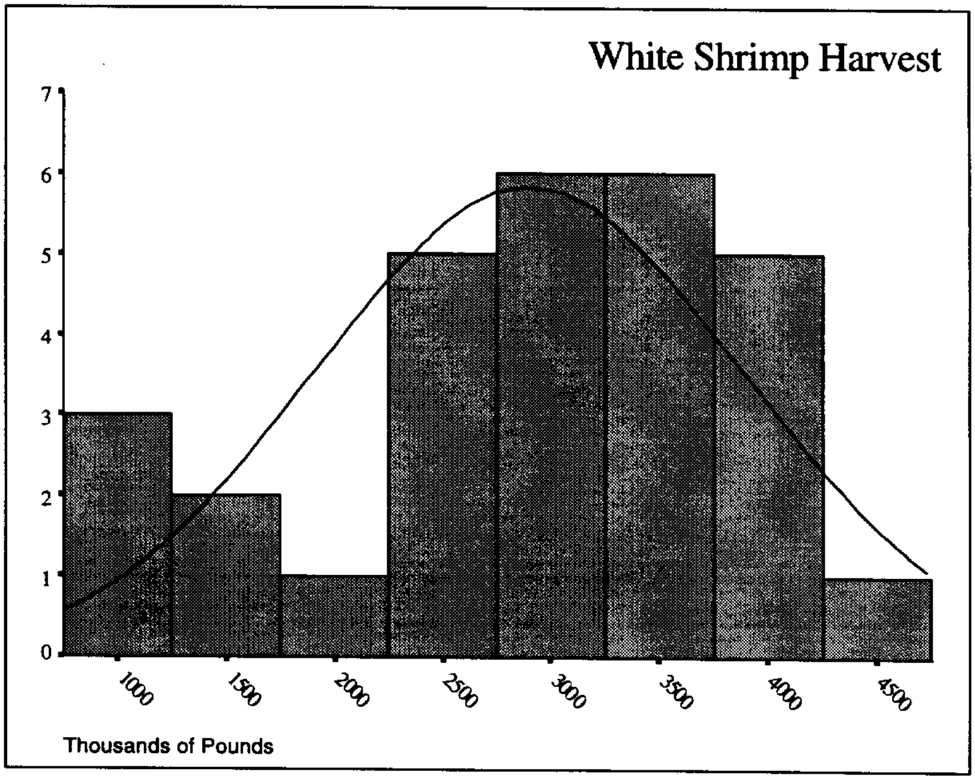
Extreme Values

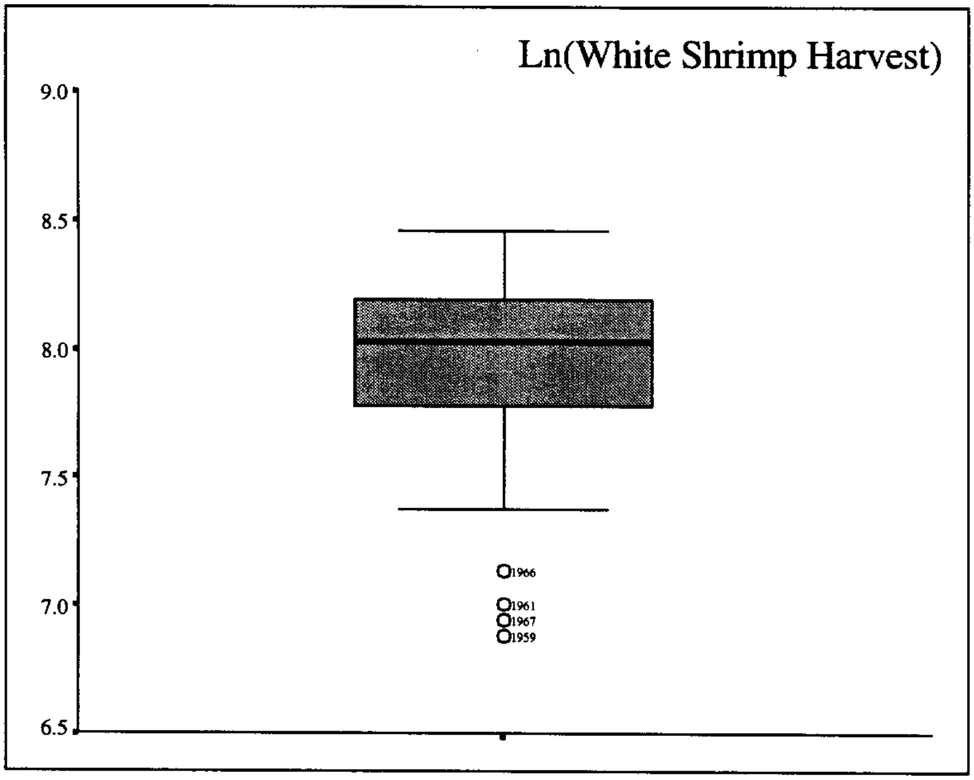
			Case Number	Year	Value
White Shrimp Harvest	Highest	1	*6*	*1964*	*4700.70*
		2	*28*	*1986*	*4108.30*
		3	*15*	*1973*	*4077.70*
		4	*17*	*1975*	*3927.20*
		5	*29*	*1987*	*3865.50*
	Lowest	1	*1*	*1959*	*982.00*
		2	*9*	*1967*	*1038.80*
		3	*3*	*1961*	*1106.70*
		4	*8*	*1966*	*1260.00*
		5	*2*	*1960*	*1596.40*


Normal Q-Q Plot
of White Shrimp Harvest
Expected Normal
2
1
0
-1
-2
0
1000
2000
3000
4000
5000
Observed Value


Normal Q-Q Plot
of Ln(White Shrimp Harvest)
Expected Normal
2
1
0
-1
-2
6.5
7.0
7.5
8.0
8.5
9.0
Observed Value


White Shrimp Harvest
5000
4000
3000
2000
1000
0
Thousands of Pounds


White Shrimp Harvest
7
6
5
4
3
2
1
0
1000
1500
2000
2500
3000
3500
4000
4500
Thousands of Pounds

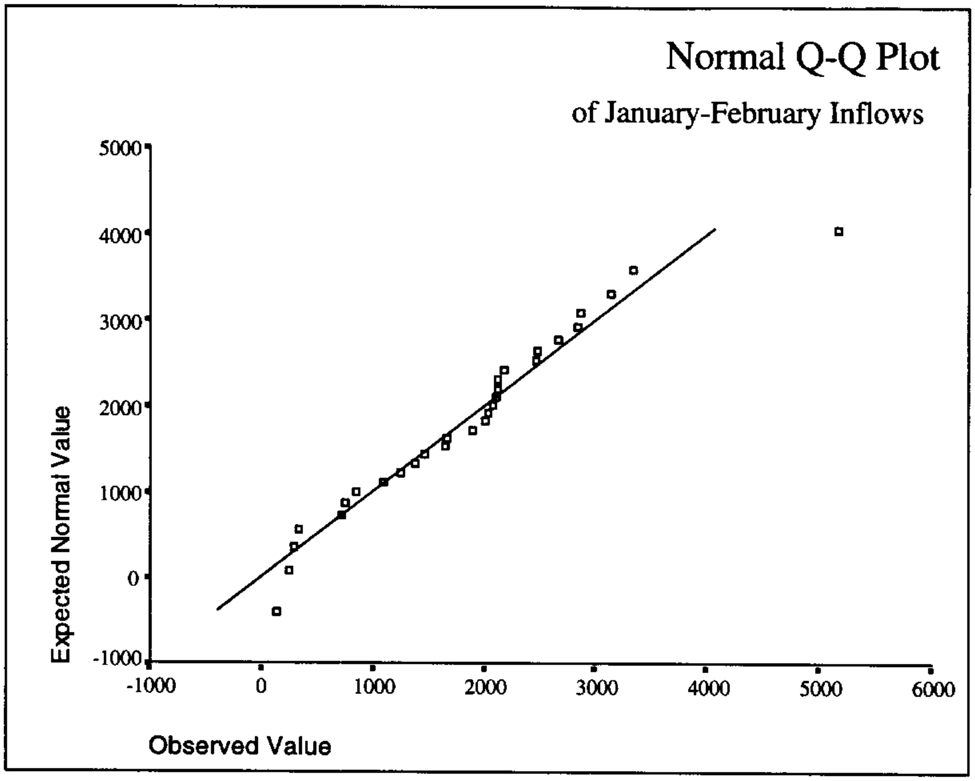

Ln(White Shrimp Harvest)
9.0
8.5
8.0
7.5
7.0
6.5
1966
1961
1967
1959

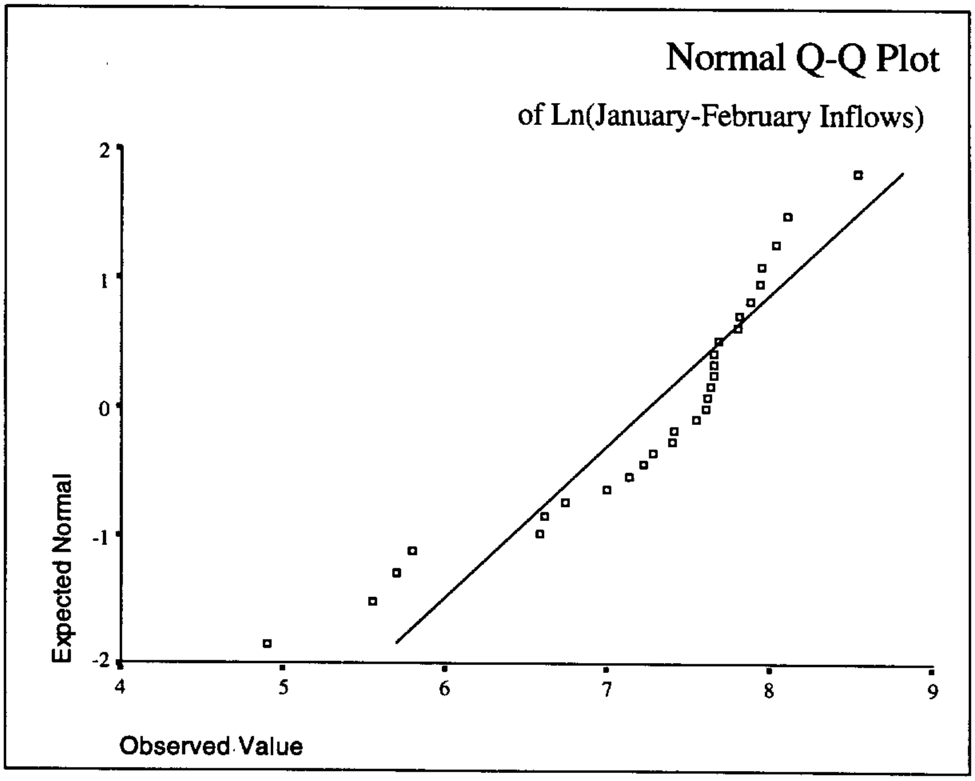
Descriptives

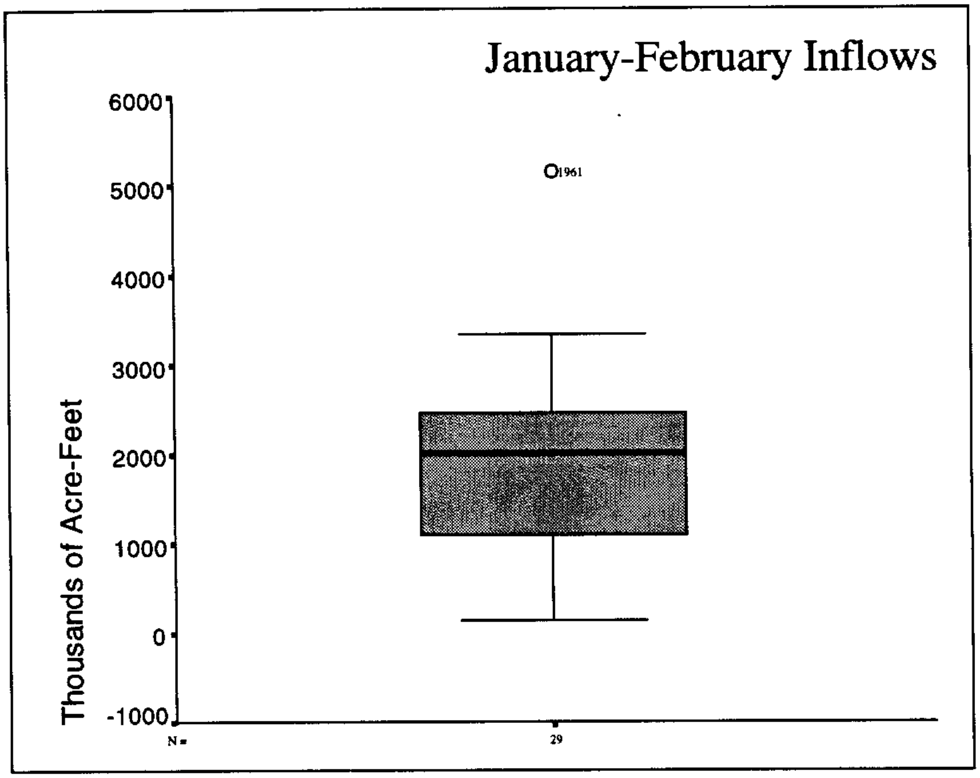
			Statistic	Std. Error
JF_INFL	Mean		*1844.4838*	*204.3525*
	95% Confidence Interval for Mean	*Lower Bound*	*1425.8868*	
		Upper Bound	*2263.0808*	
	5% Trimmed Mean		*1783.7525*	
	Median		*2017.8400*	
	Variance		*1211038*	
	Std. Deviation		*1100.4717*	
	Minimum		*134.30*	
	Maximum		*5180.00*	
	Range		*5045.70*	
	Interquartile Range		*1498.9400*	
	Skewness		*.729*	*.434*
	Kurtosis		*1.622*	*.845*

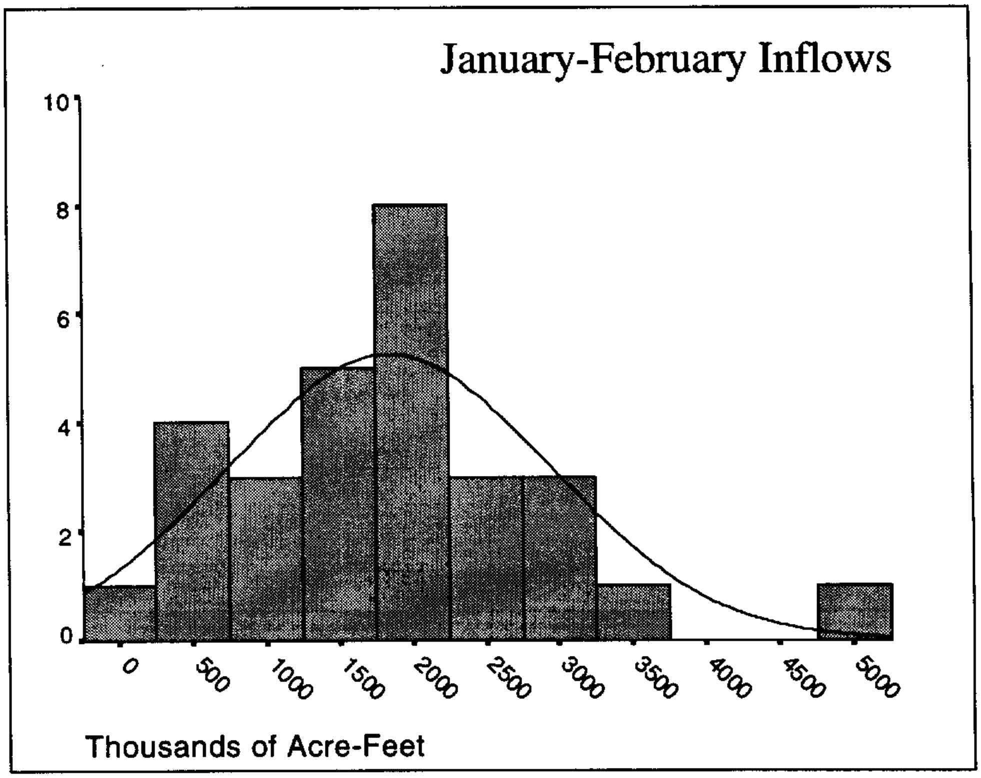
Extreme Values

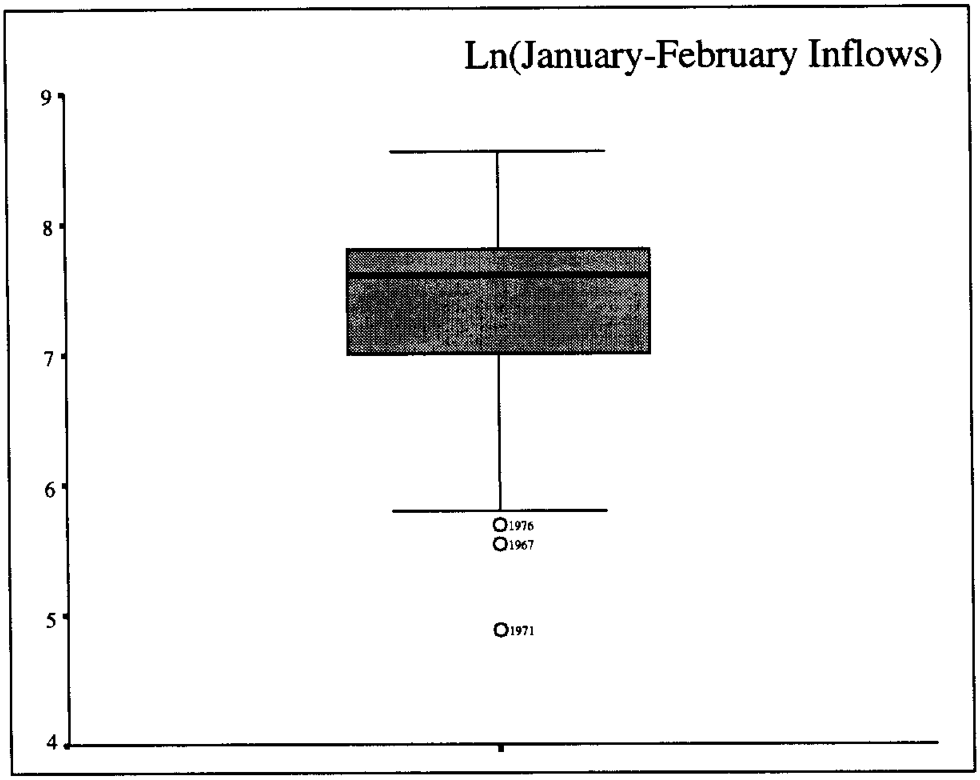
			Case Number	YEAR	Value
JF_INFL	Highest	1	*3*	*1961*	*5180.00*
		2	*16*	*1974*	*3342.00*
		3	*17*	*1975*	*3138.98*
		4	*21*	*1979*	*2872.02*
		5	*2*	*1960*	*2838.00*
	Lowest	1	*13*	*1971*	*134.30*
		2	*9*	*1967*	*257.53*
		3	*18*	*1976*	*300.41*
		4	*23*	*1981*	*331.86*
		5	*4*	*1962*	*728.40*


Normal Q-Q Plot
of January-February Inflows
Expected Normal Value
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000
Observed Value


Normal Q-Q Plot
of Ln(January-February Inflows)
Expected Normal
2
1
0
-1
-2
4
5
6
7
8
9
Observed Value


January-February Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
O1961
N =
29


January-February Inflows
10
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Thousands of Acre-Feet

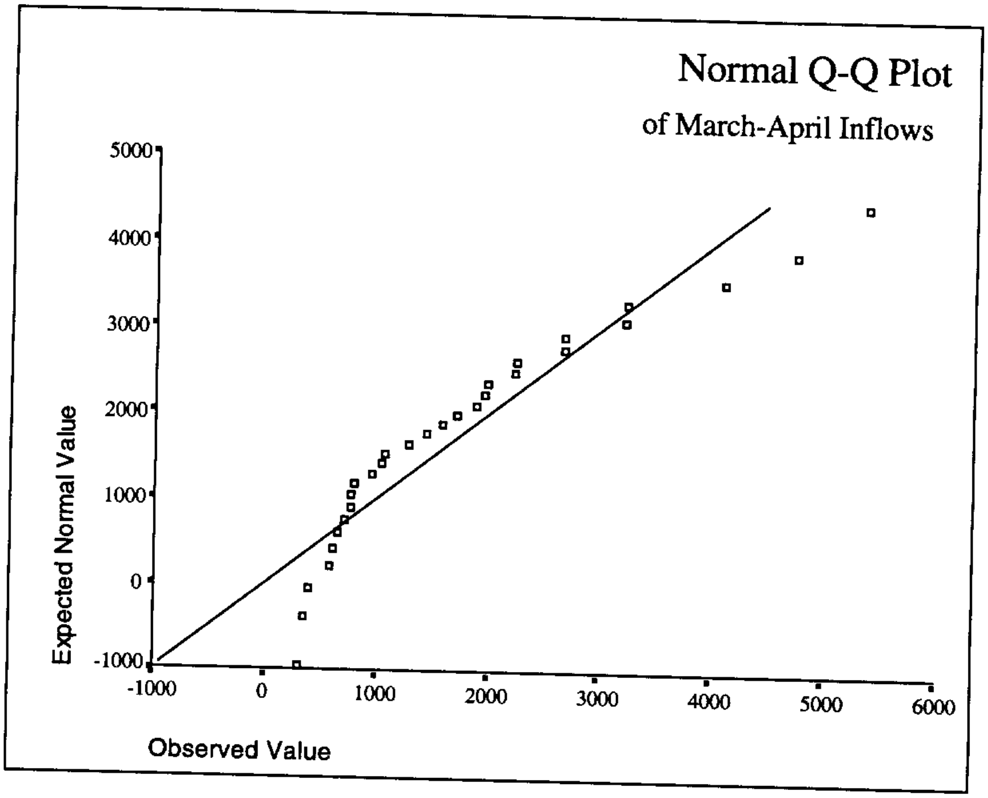

Ln(January-February Inflows)
9
8
7
6
5
4
1976
1967
1971

Descriptives

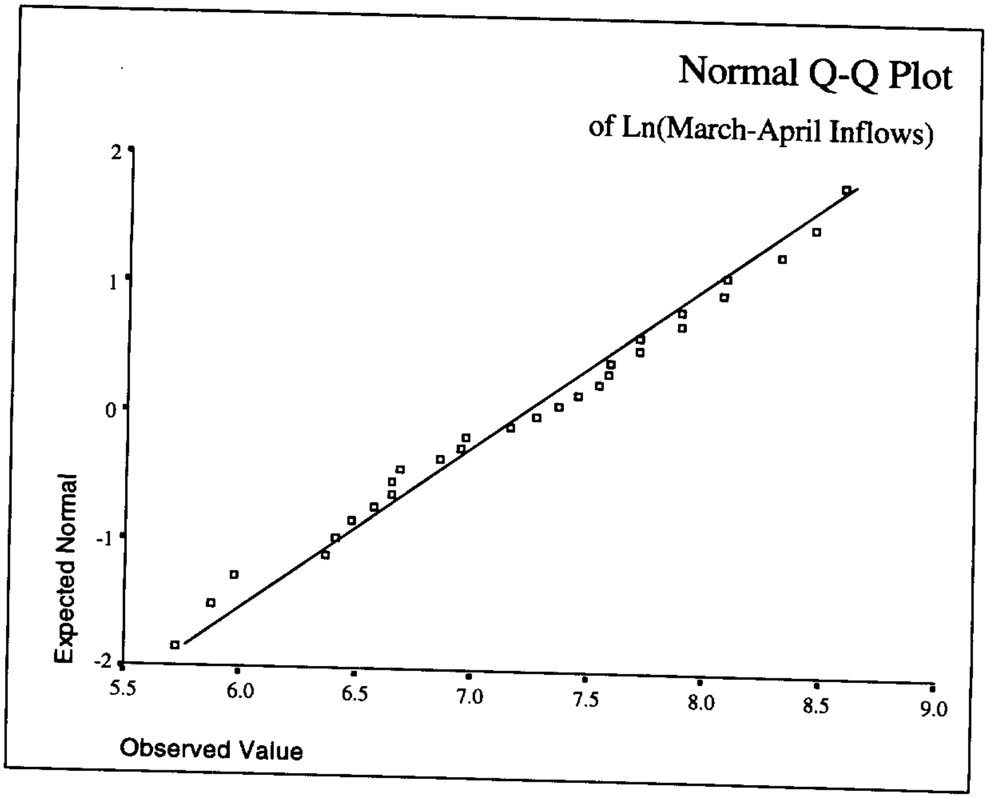
			Statistic	Std. Error
MA_INFL	Mean		*1770.7334*	*247.9403*
	95% Confidence Interval for Mean	*Lower Bound*	*1262.8507*	
		Upper Bound	*2278.6162*	
	5% Trimmed Mean		*1661.5554*	
	Median		*1440.1000*	
	Variance		*1782758*	
	Std. Deviation		*1335.1995*	
	Minimum		*306.18*	
	Maximum		*5382.71*	
	Range		*5076.53*	
	Interquartile Range		*1713.1400*	
	Skewness		*1.211*	*.434*
	Kurtosis		*.982*	*.845*

Extreme Values

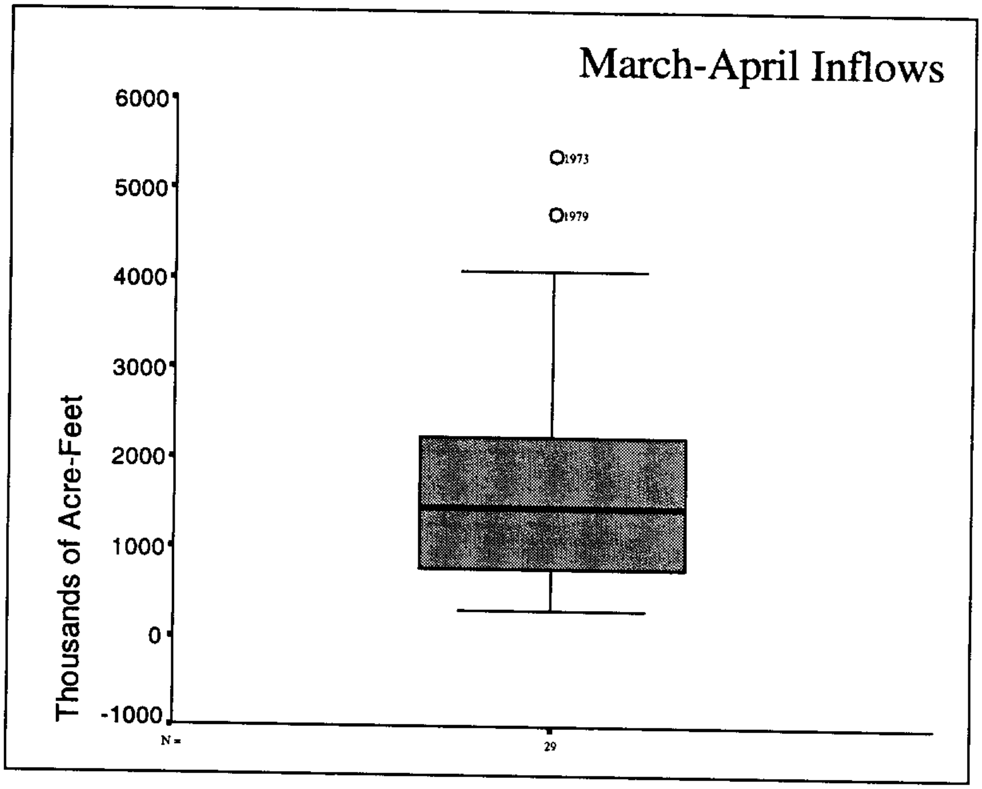
			Case Number	YEAR	Value
MA_INFL	Highest	1	*15*	*1973*	*5382.71*
		2	*21*	*1979*	*4744.84*
		3	*11*	*1969*	*4102.00*
		4	*10*	*1968*	*3236.90*
		5	*19*	*1977*	*3210.59*
	Lowest	1	*13*	*1971*	*306.18*
		2	*5*	*1963*	*356.90*
		3	*23*	*1981*	*393.91*
		4	*9*	*1967*	*583.93*
		5	*20*	*1978*	*606.39*

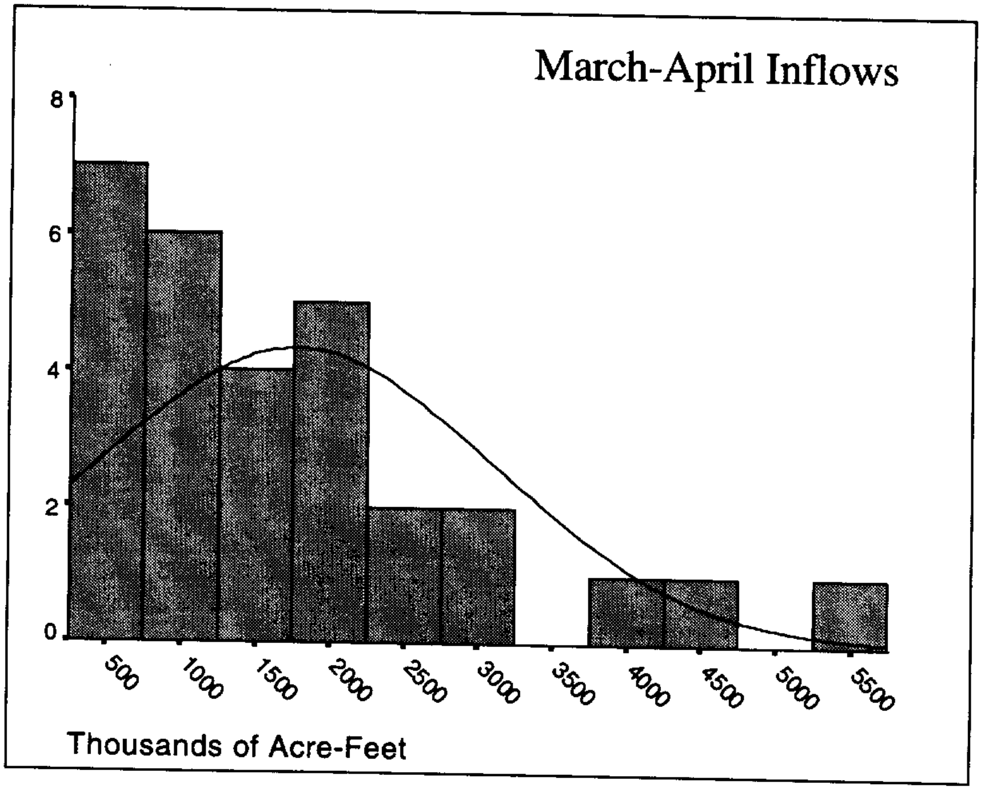


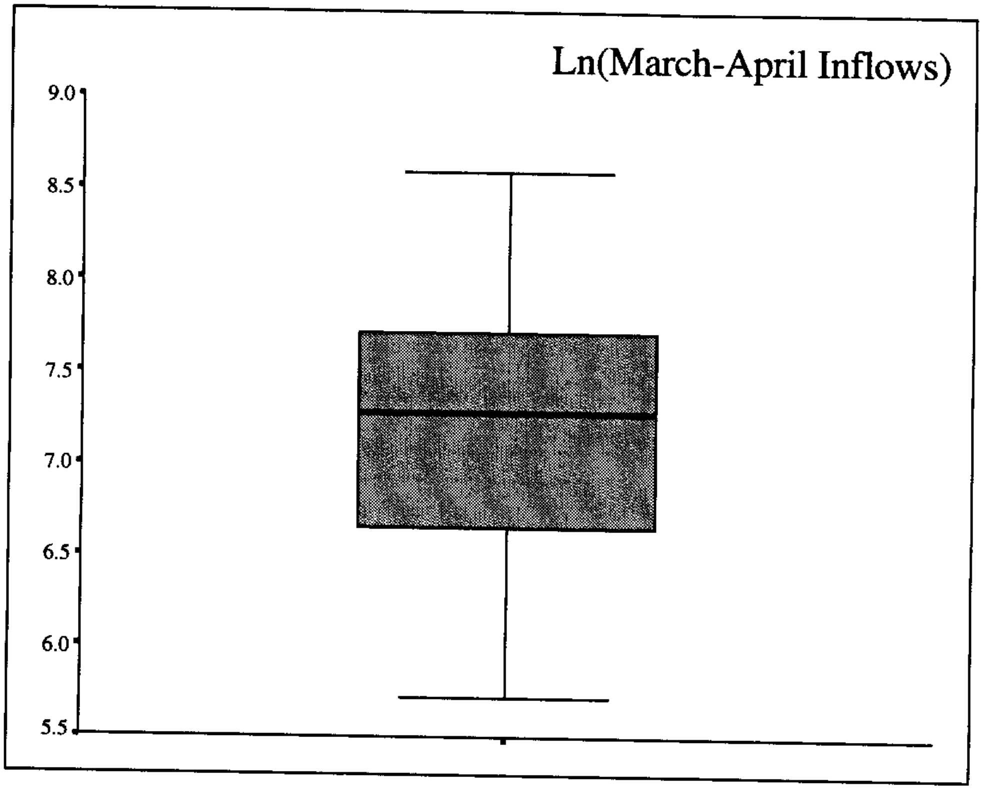
Normal Q-Q Plot
of March-April Inflows
5000
4000
3000
2000
1000
0
-1000
Expected Normal Value
-1000
0
1000
2000
3000
4000
5000
6000
Observed Value



Normal Q-Q Plot
of Ln(March-April Inflows)
2
1
0
-1
-2
Expected Normal
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Observed Value


March-April Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1973
1979
N =
29


March-April Inflows
8
6
4
2
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
Thousands of Acre-Feet

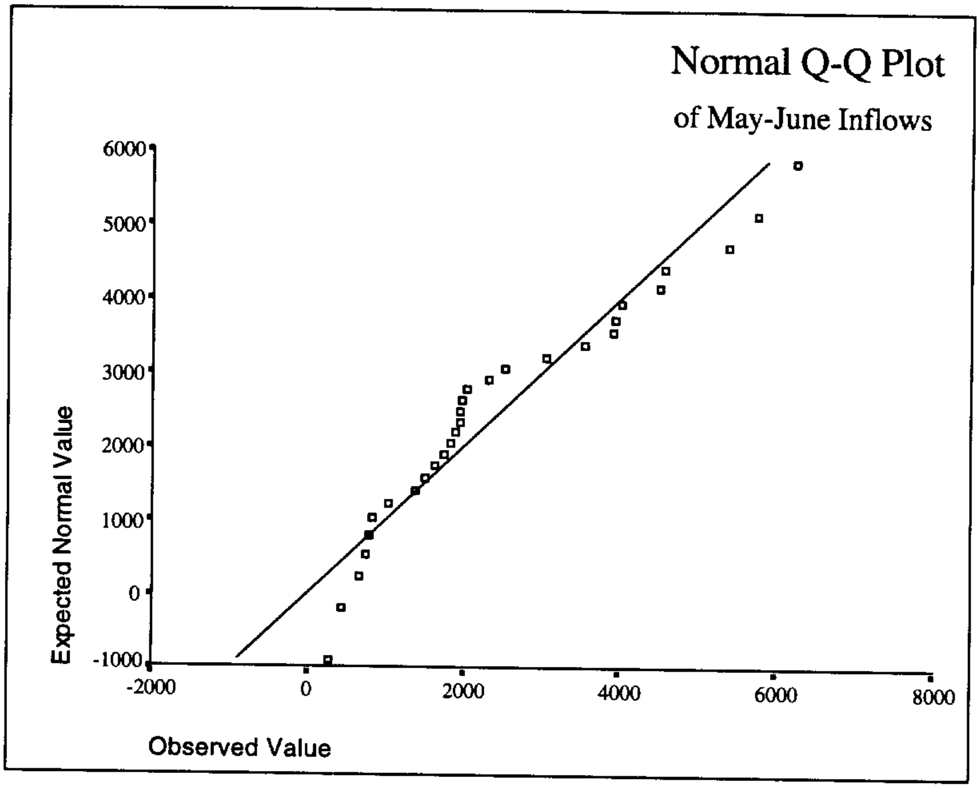

Ln(March-April Inflows)
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5

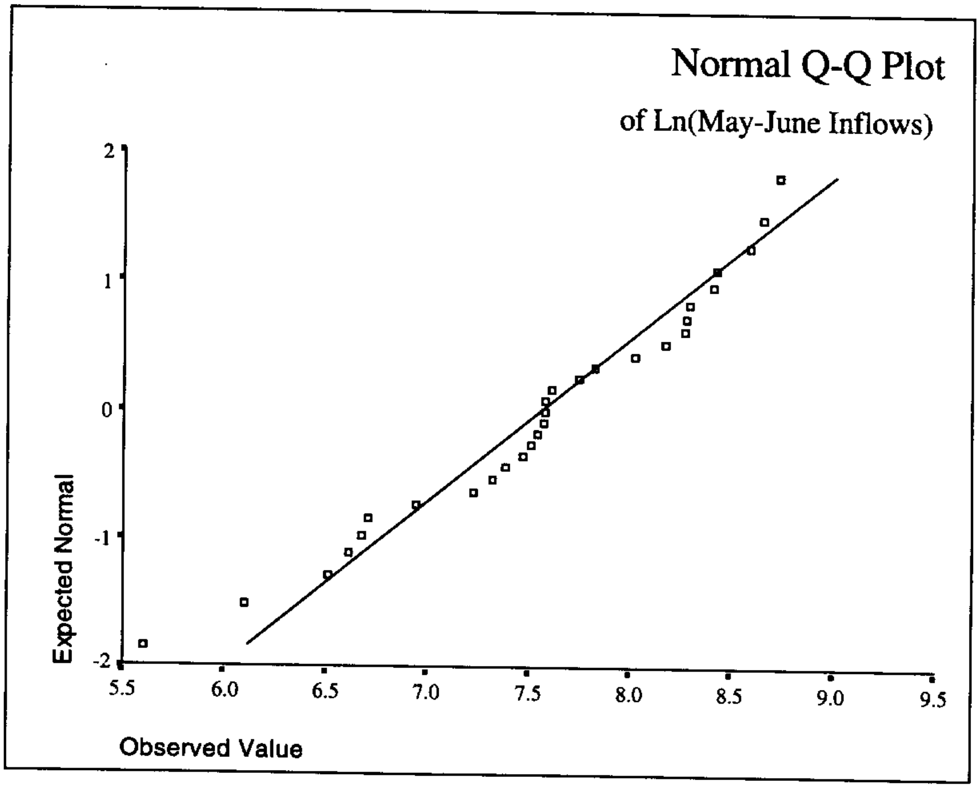
Descriptives

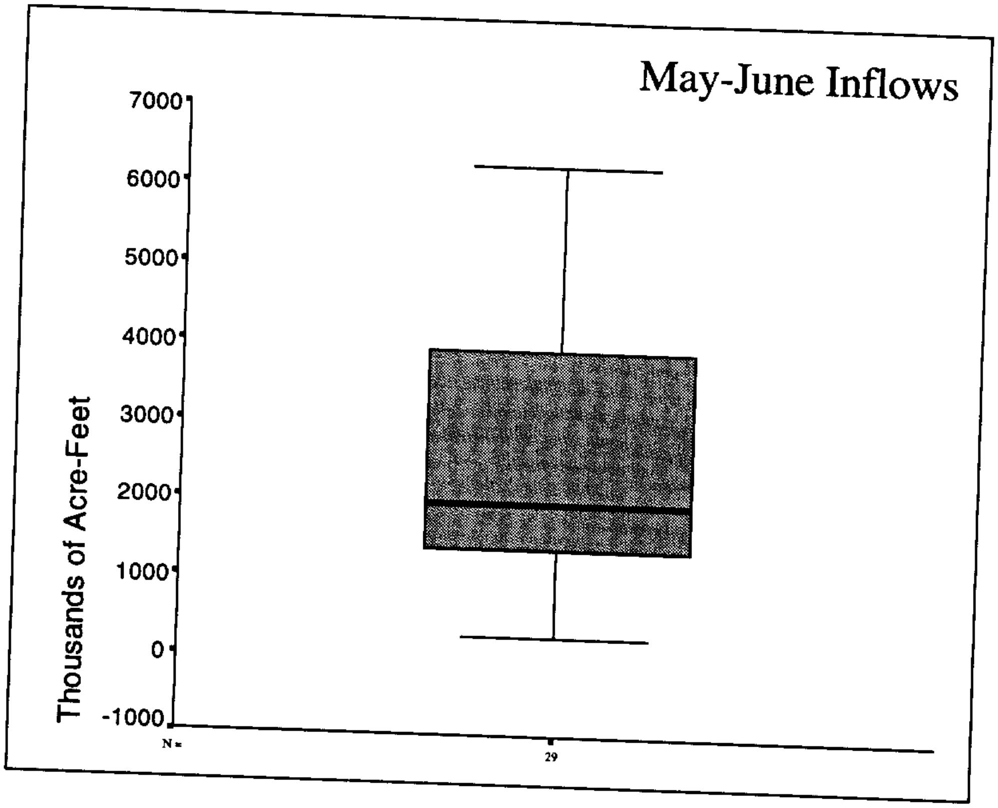
			Statistic	Std. Error
MJ_INFL	Mean		*2503.1303*	*310.4068*
	95% Confidence Interval for Mean	*Lower Bound*	*1867.2908*	
		Upper Bound	*3138.9699*	
	5% Trimmed Mean		*2424.1514*	
	Median		*1966.7700*	
	Variance		*2794219*	
	Std. Deviation		*1671.5918*	
	Minimum		*273.04*	
	Maximum		*6258.00*	
	Range		*5984.96*	
	Interquartile Range		*2715.2350*	
	Skewness		*.744*	*.434*
	Kurtosis		*-.406*	*.845*

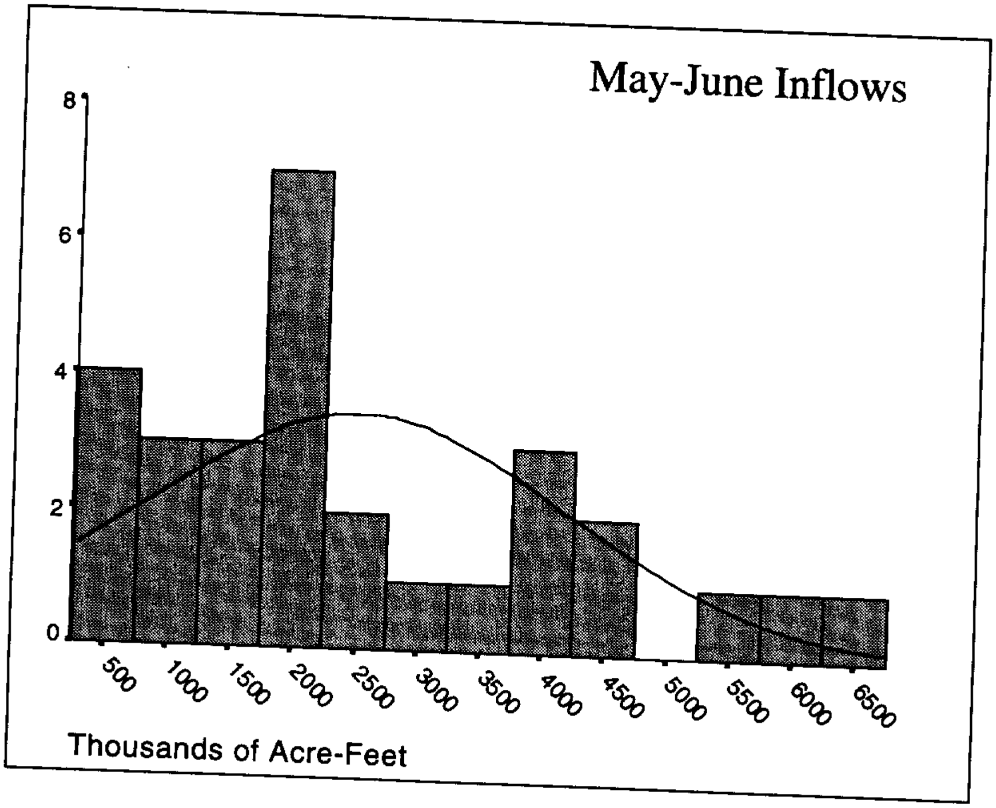
Extreme Values

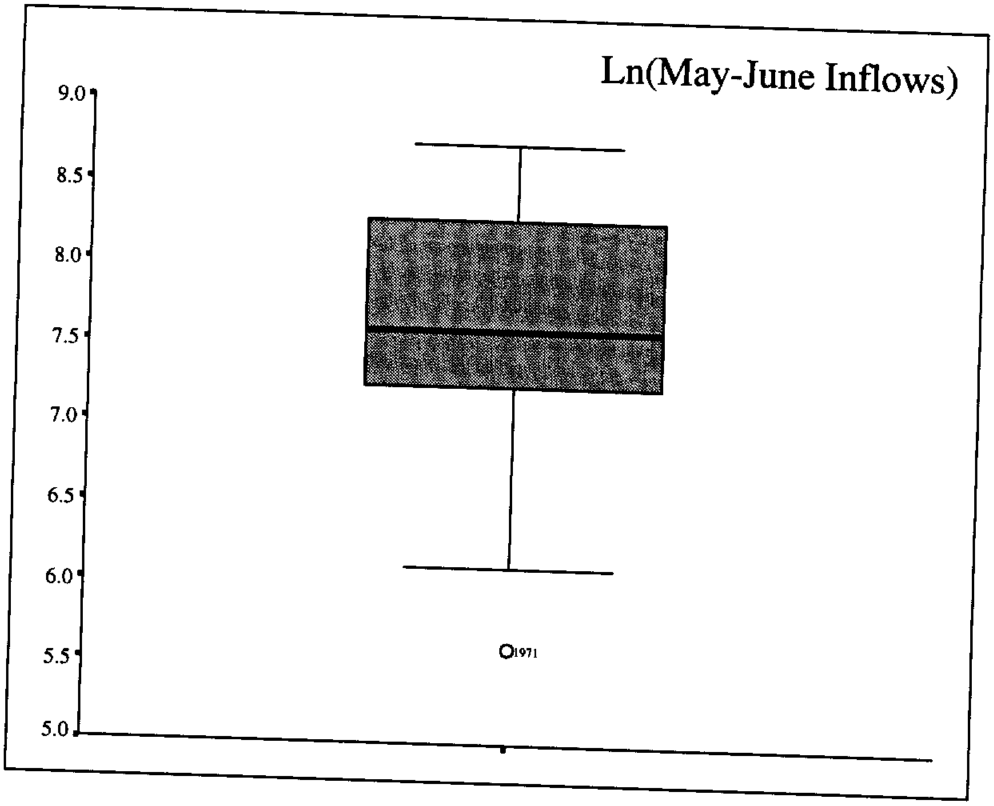
			Case Number	YEAR	Value
MJ_INFL	Highest	1	*10*	*1968*	*6258.00*
		2	*15*	*1973*	*5752.84*
		3	*8*	*1966*	*5402.30*
		4	*23*	*1981*	*4583.43*
		5	*28*	*1986*	*4515.98*
	Lowest	1	*13*	*1971*	*273.04*
		2	*6*	*1964*	*445.80*
		3	*20*	*1978*	*673.68*
		4	*9*	*1967*	*749.10*
		5	*5*	*1963*	*796.10*


Normal Q-Q Plot
of May-June Inflows
Expected Normal Value
6000
5000
4000
3000
2000
1000
0
-1000
-2000
0
2000
4000
6000
8000
Observed Value


Normal Q-Q Plot
of Ln(May-June Inflows)
Expected Normal
2
1
0
-1
-2
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5
Observed Value


May-June Inflows
7000
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
N =
29


May-June Inflows
8
6
4
2
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
Thousands of Acre-Feet

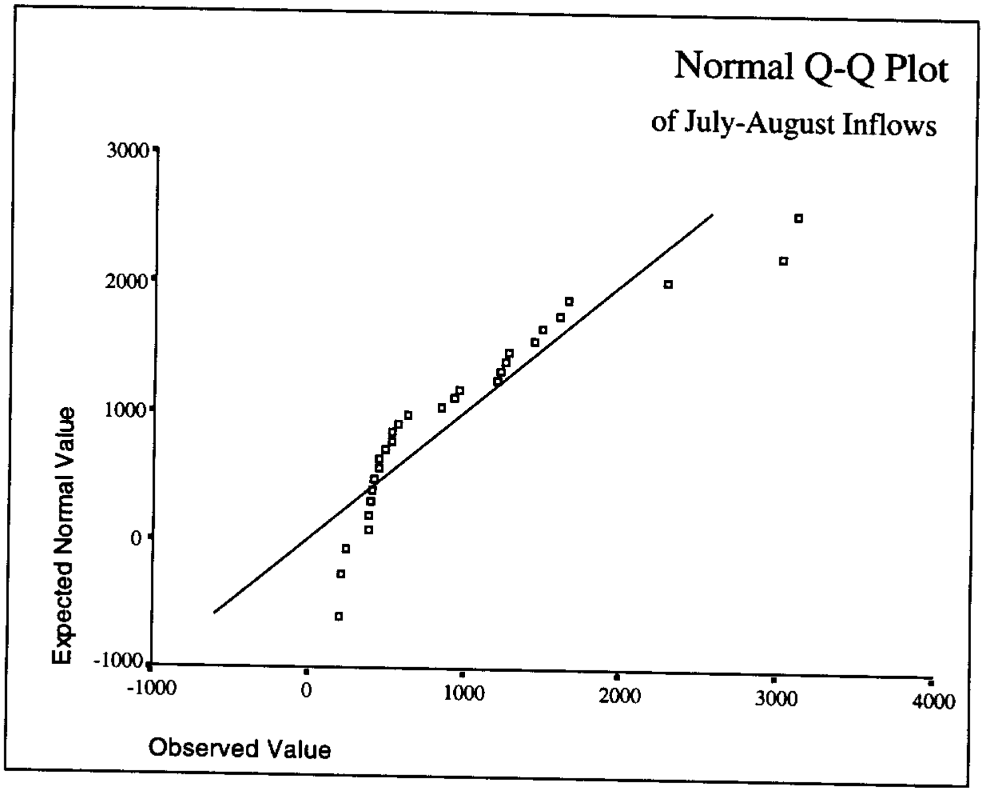

Ln(May-June Inflows)
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
1971

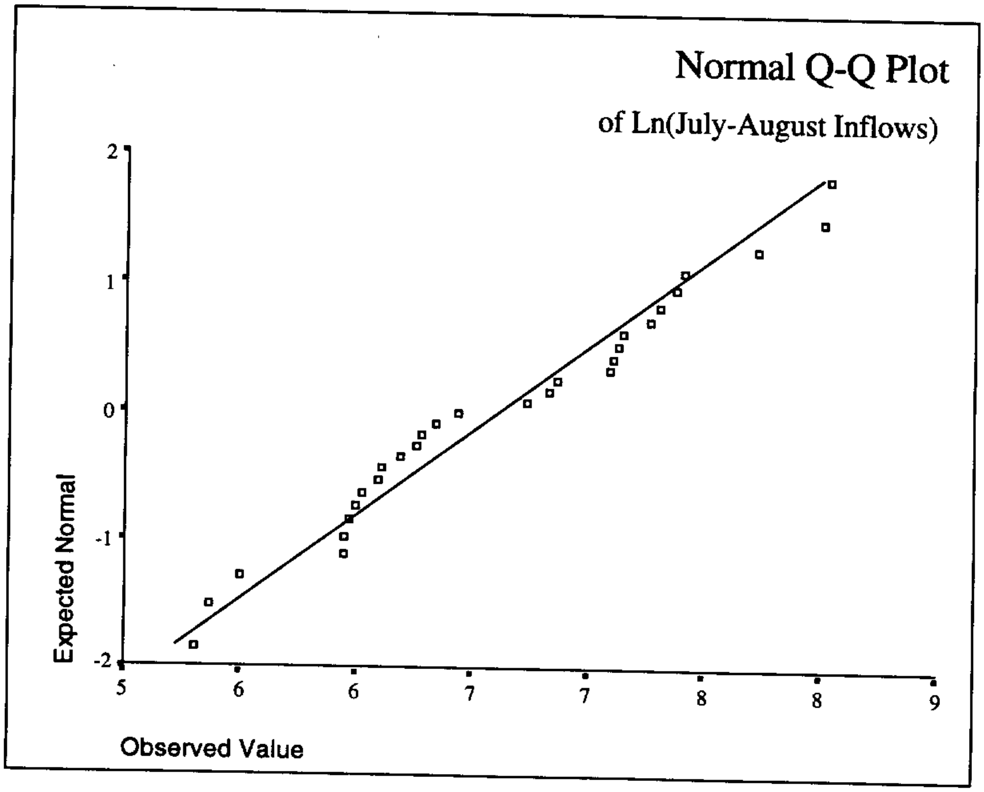
Descriptives

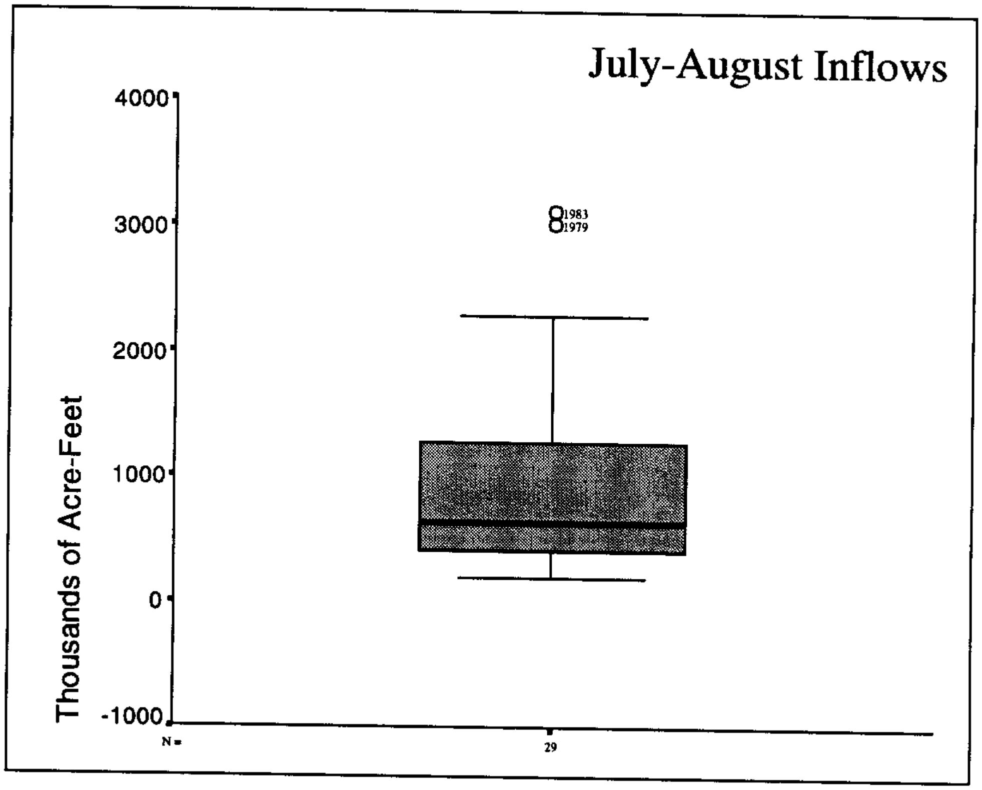
			Statistic	Std. Error
JA_INFL	Mean		984.4576	144.6129
	95% Confidence Interval for Mean	Lower Bound	688.2314	
		Upper Bound	1280.6837	
	5% Trimmed Mean		910.9417	
	Median		626.8700	
	Variance		606474.1	
	Std. Deviation		778.7645	
	Minimum		201.78	
	Maximum		3116.05	
	Range		2914.27	
	Interquartile Range		948.5700	
	Skewness		1.463	.434
	Kurtosis		1.838	.845

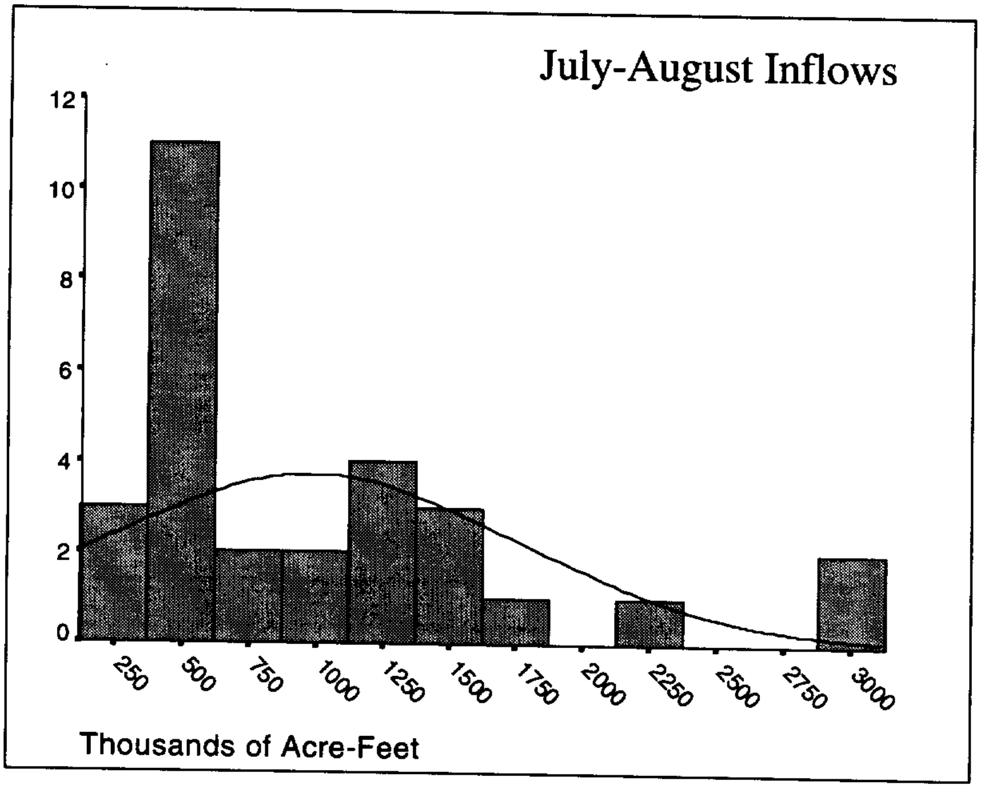
Extreme Values

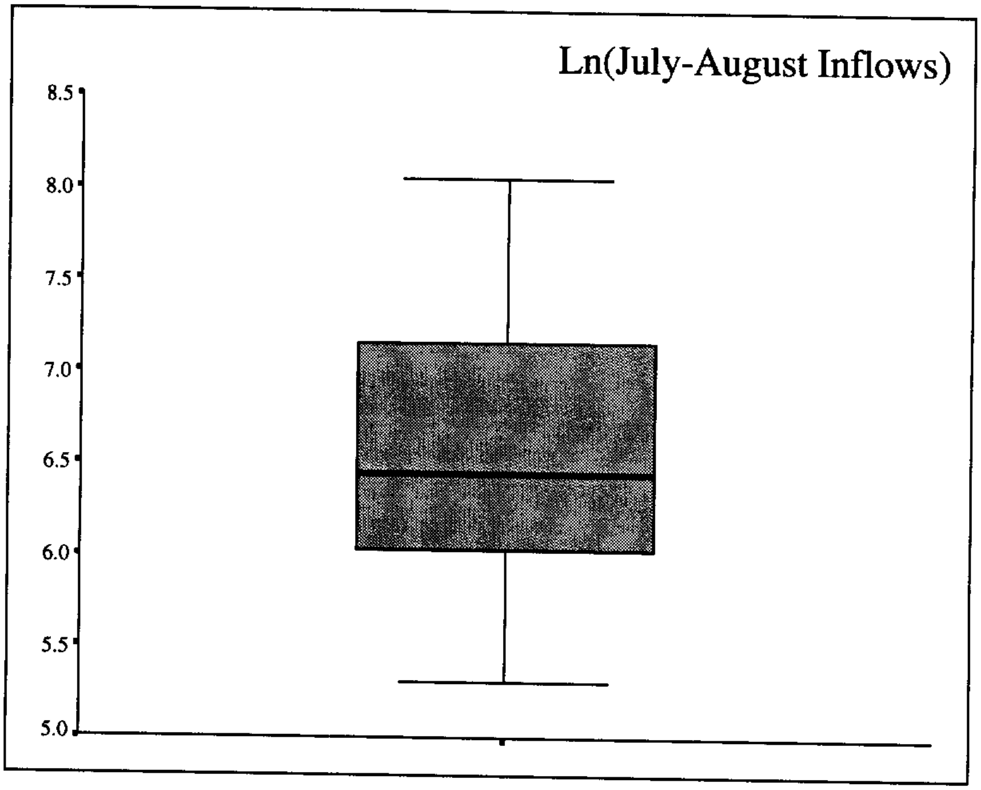
			Case Number	YEAR	Value
JA_INFL	Highest	1	25	1983	3116.05
		2	21	1979	3019.84
		3	1	1959	2282.80
		4	23	1981	1656.01
		5	15	1973	1597.24
	Lowest	1	5	1963	201.78
		2	6	1964	215.41
		3	7	1965	243.99
		4	22	1980	382.89
		5	9	1967	383.91


Normal Q-Q Plot
of July-August Inflows
3000
2000
1000
0
-1000
Expected Normal Value
-1000
0
1000
2000
3000
4000
Observed Value


Normal Q-Q Plot
of Ln(July-August Inflows)
2
1
0
-1
-2
Expected Normal
5
6
6
7
7
8
8
9
Observed Value


July-August Inflows
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1983
1979
N =
29


July-August Inflows
12
10
8
6
4
2
0
250
500
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
Thousands of Acre-Feet

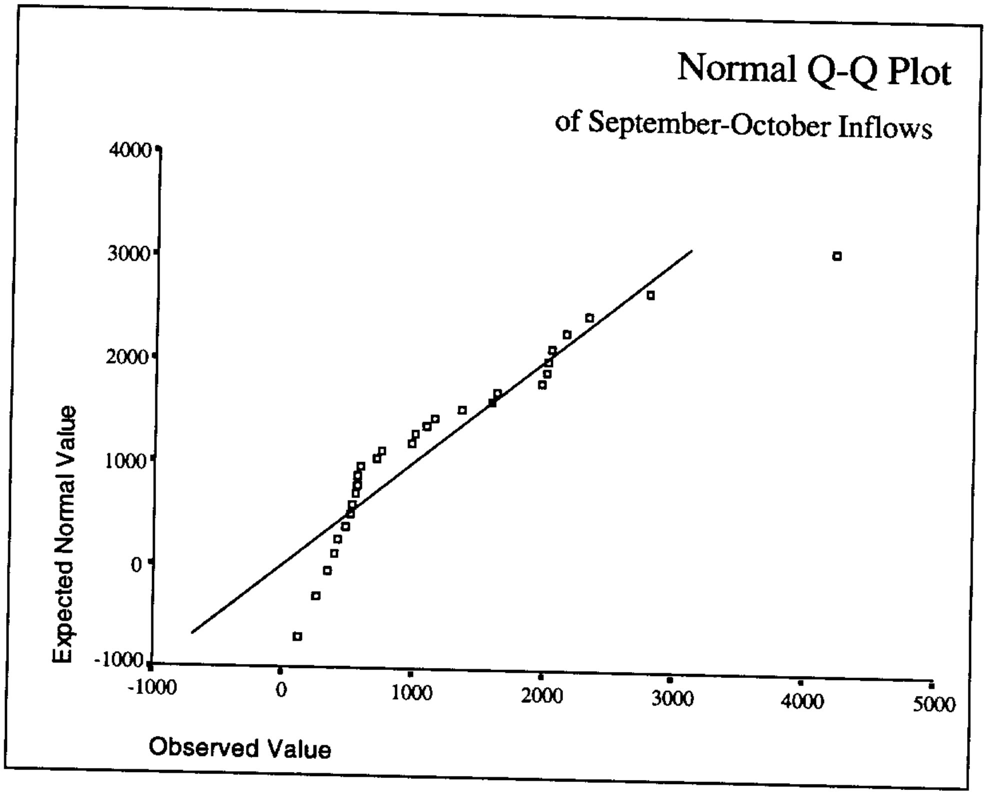

Ln(July-August Inflows)
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0

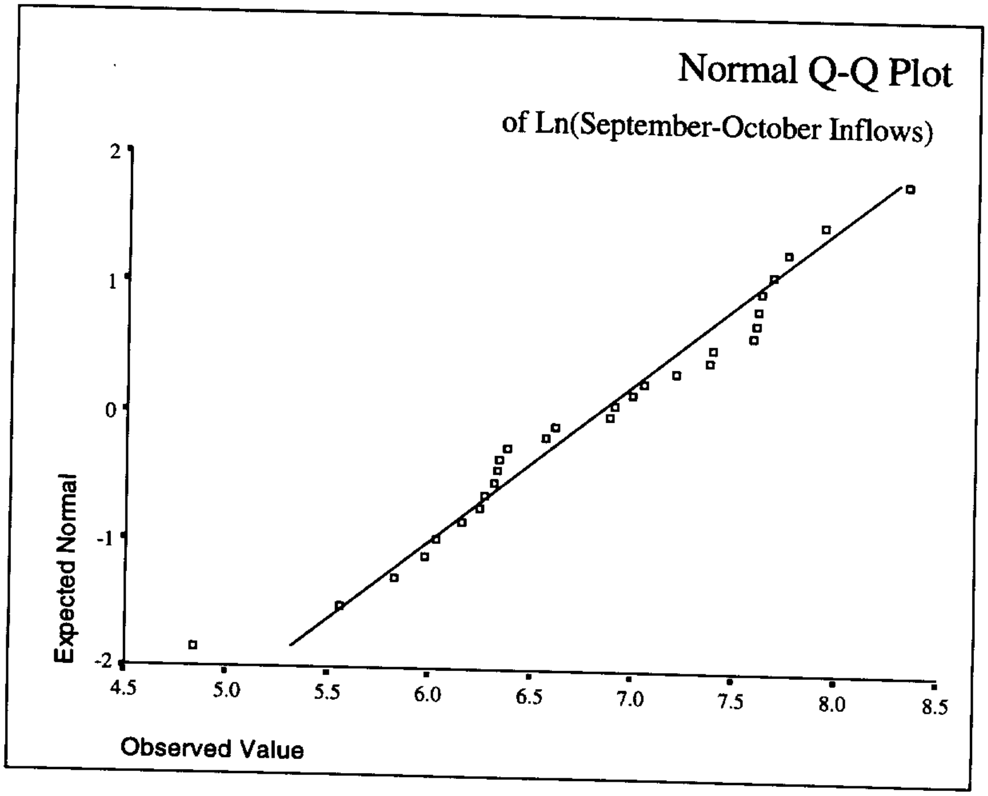
Descriptives

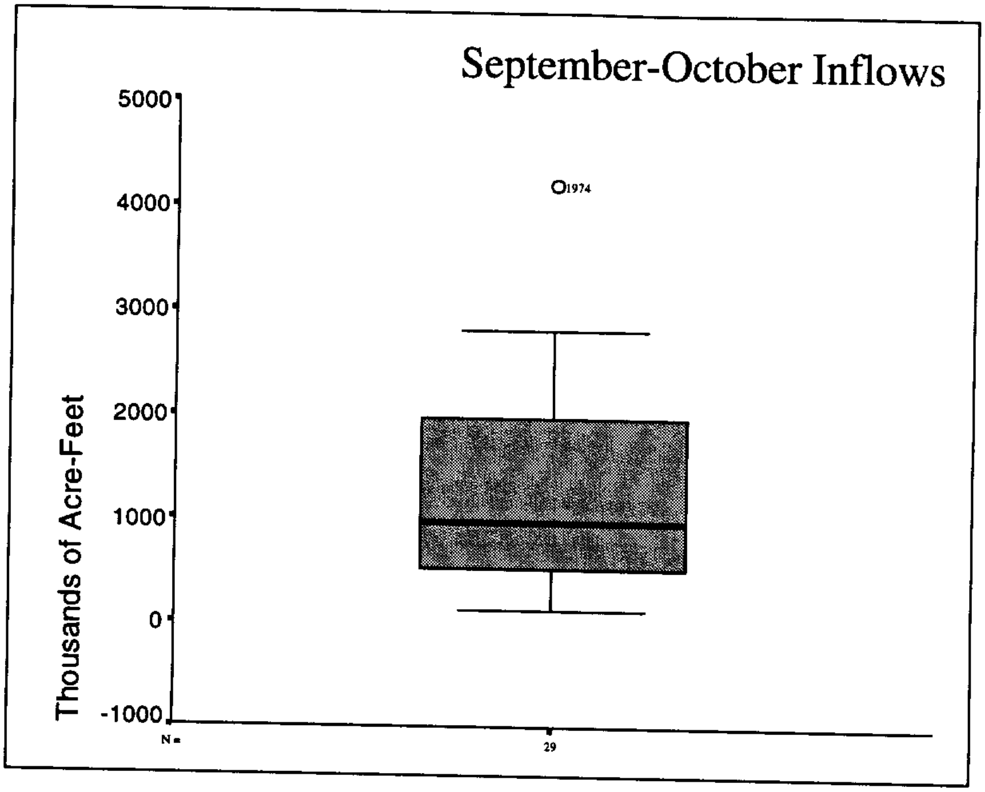
			Statistic	Std. Error
SO_INFL	Mean		*1213.1228*	*173.7714*
	95% Confidence Interval for Mean	*Lower Bound*	*857.1681*	
		Upper Bound	*1569.0774*	
	5% Trimmed Mean		*1128.5317*	
	Median		*978.5000*	
	Variance		*875698.8*	
	Std. Deviation		*935.7878*	
	Minimum		*126.83*	
	Maximum		*4222.20*	
	Range		*4095.37*	
	Interquartile Range		*1469.6800*	
	Skewness		*1.378*	*.434*
	Kurtosis		*2.282*	*.845*

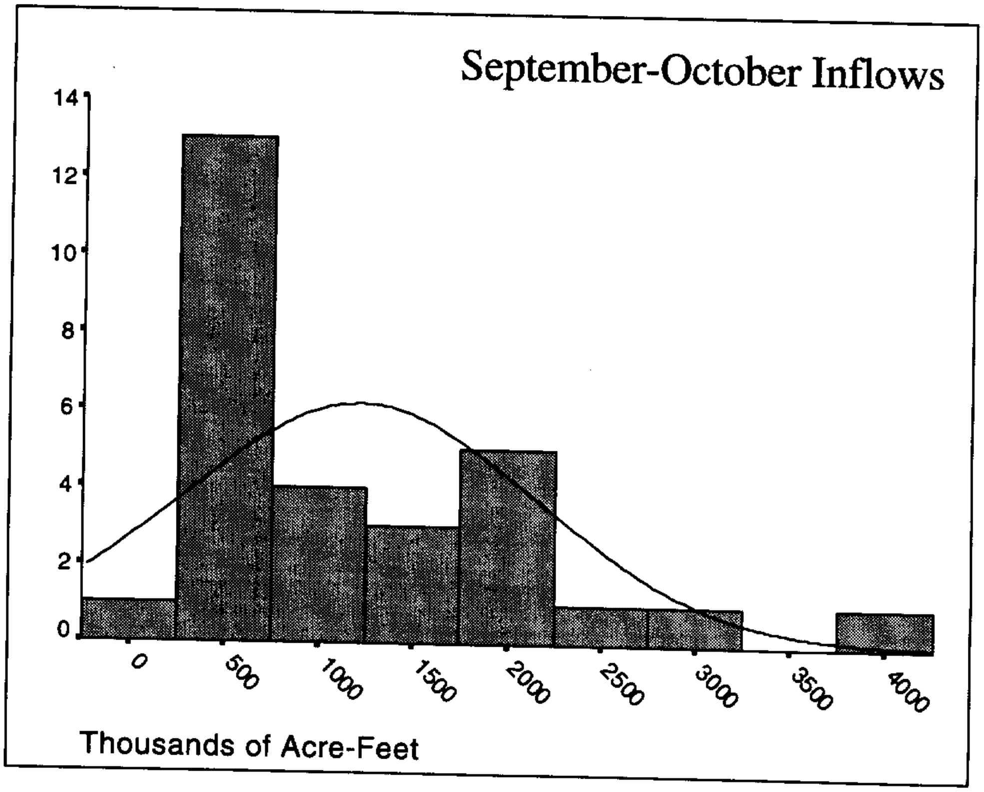
Extreme Values

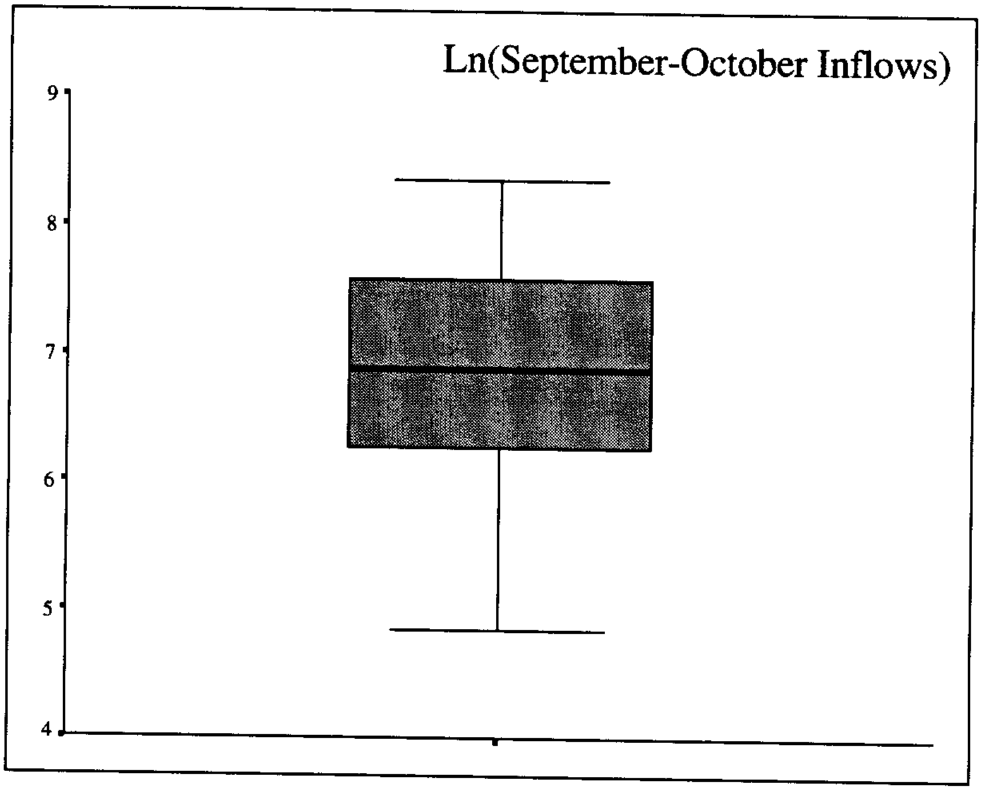
			Case Number	YEAR	Value
SO_INFL	Highest	1	*16*	*1974*	*4222.20*
		2	*22*	*1980*	*2799.02*
		3	*24*	*1982*	*2326.50*
		4	*4*	*1962*	*2163.94*
		5	*1*	*1959*	*2054.00*
	Lowest	1	*6*	*1964*	*126.83*
		2	*8*	*1966*	*260.65*
		3	*25*	*1983*	*339.35*
		4	*12*	*1970*	*395.35*
		5	*21*	*1979*	*418.13*


Normal Q-Q Plot
of September-October Inflows
Expected Normal Value
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
Observed Value


Normal Q-Q Plot
of Ln(September-October Inflows)
Expected Normal
2
1
0
-1
-2
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
Observed Value


September-October Inflows


September-October Inflows

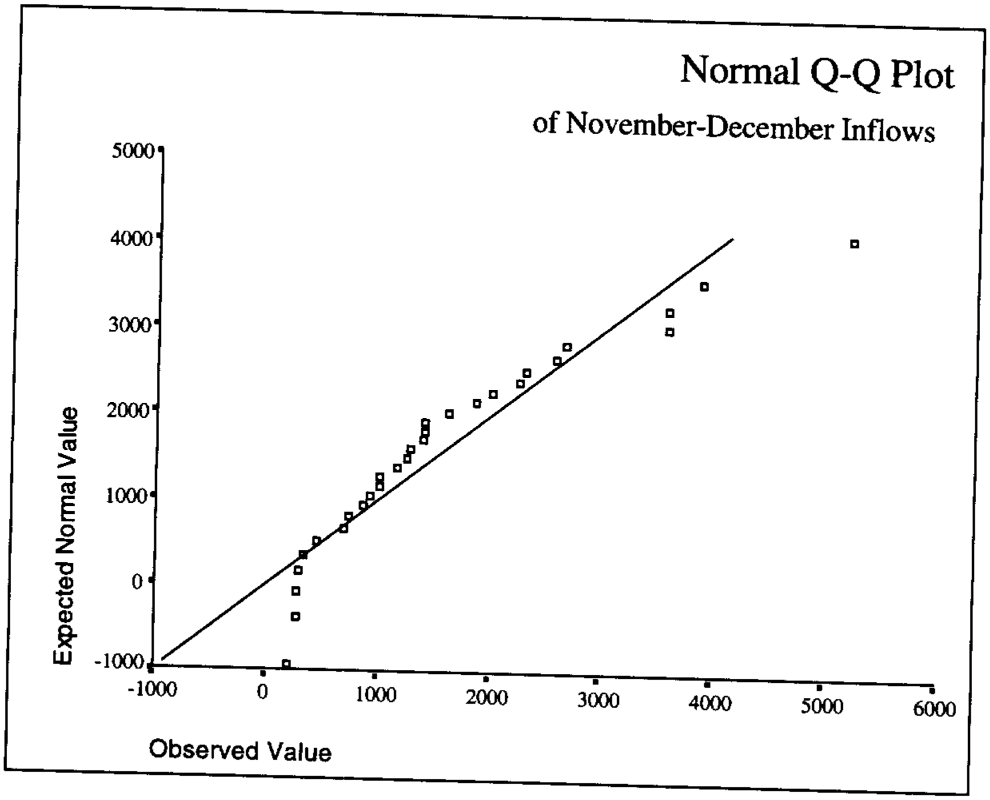

Ln(September-October Inflows)
9
8
7
6
5
4

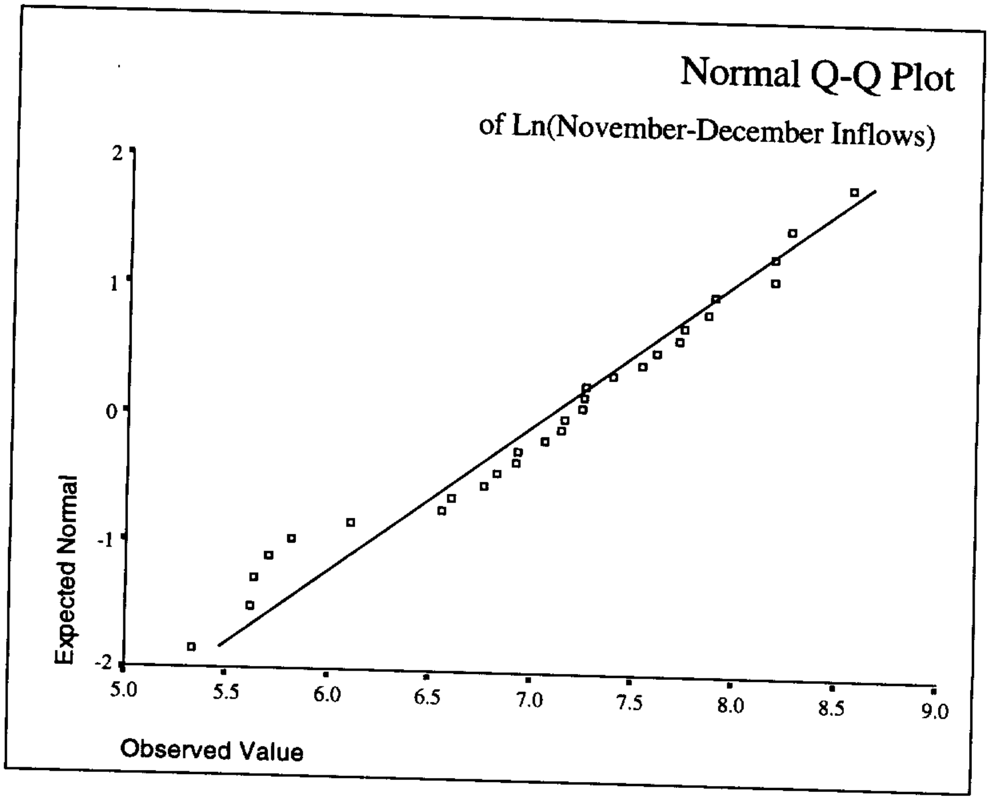
Descriptives

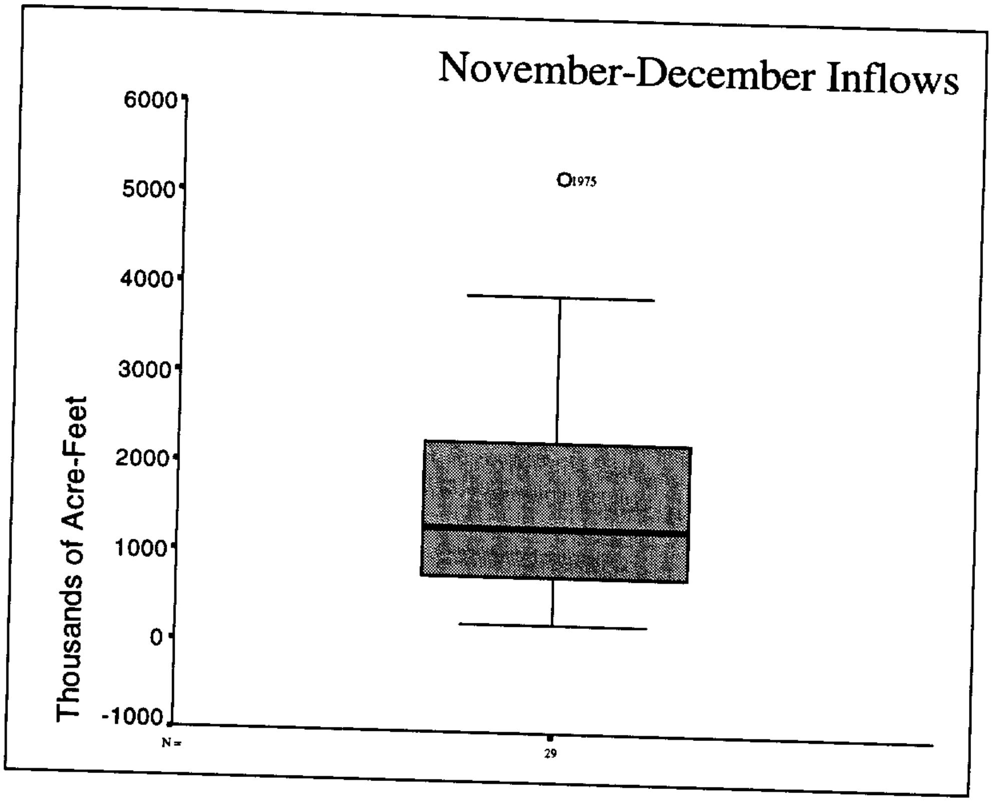
			Statistic	Std. Error
ND_INFL	Mean		*1609.1290*	*230.8751*
	95% Confidence Interval for Mean	*Lower Bound*	*1136.2027*	
		Upper Bound	*2082.0552*	
	5% Trimmed Mean		*1508.2872*	
	Median		*1288.4000*	
	Variance		*1545796*	
	Std. Deviation		*1243.3005*	
	Minimum		*207.00*	
	Maximum		*5217.90*	
	Range		*5010.90*	
	Interquartile Range		*1558.4700*	
	Skewness		*1.218*	*.434*
	Kurtosis		*1.267*	*.845*

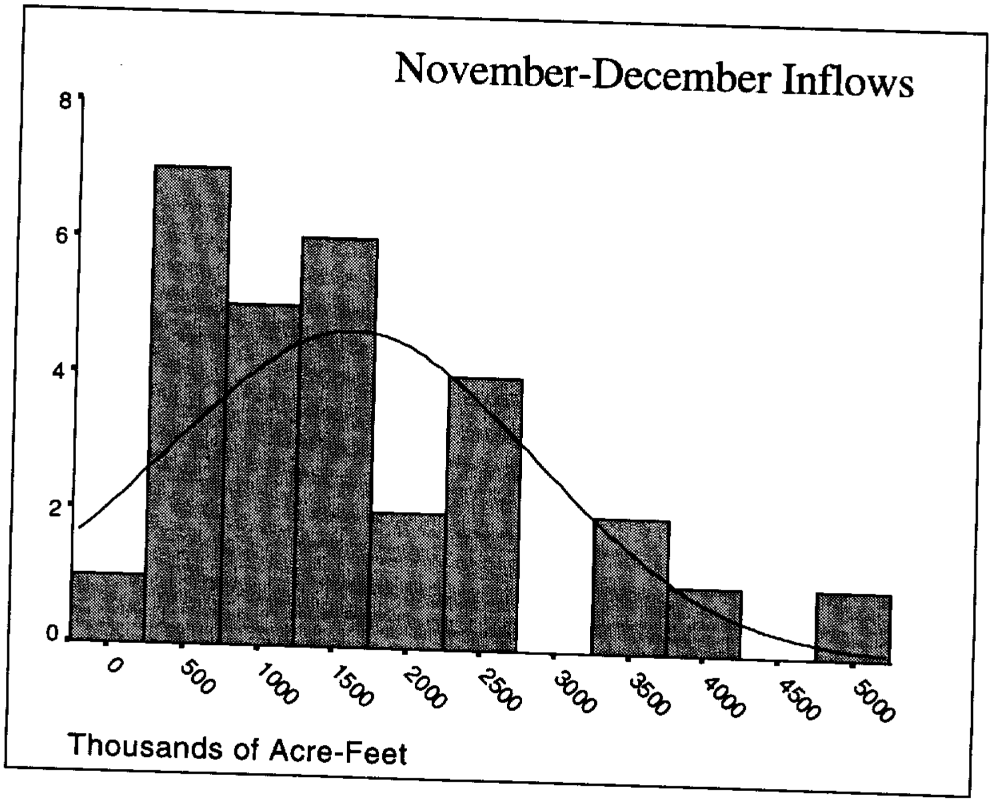
Extreme Values

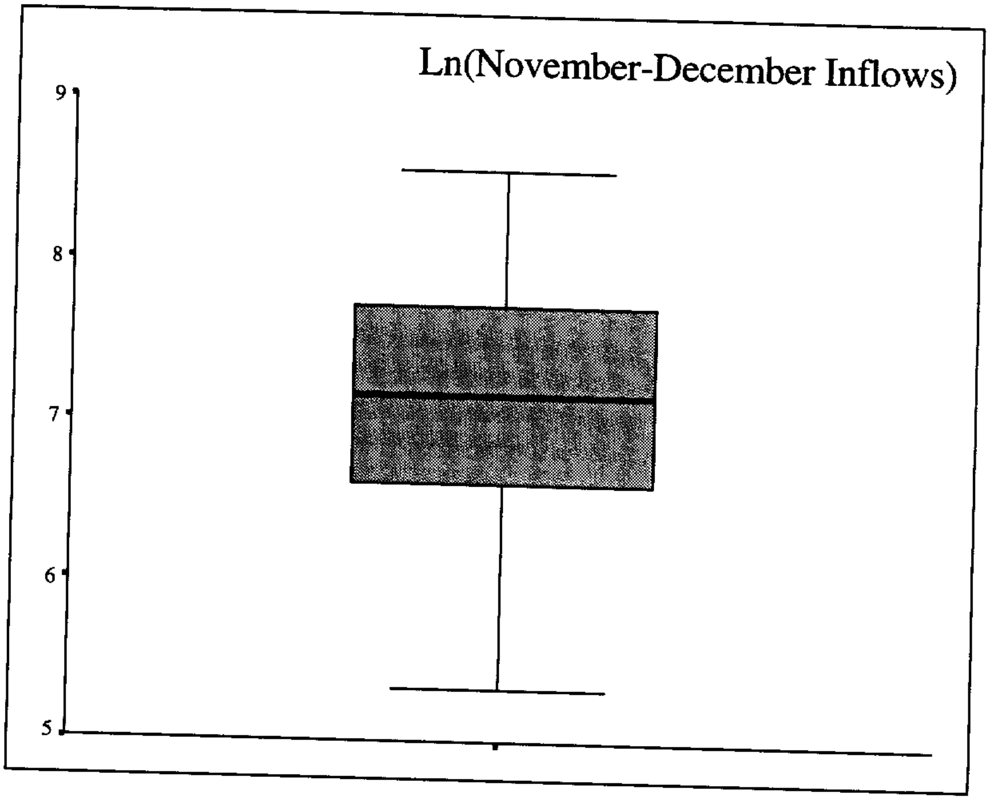
			Case Number	YEAR	Value
ND_INFL	Highest	1	*17*	*1975*	*5217.90*
		2	*29*	*1987*	*3886.93*
		3	*3*	*1961*	*3586.10*
		4	*28*	*1986*	*3585.61*
		5	*24*	*1982*	*2674.10*
	Lowest	1	*1*	*1959*	*207.00*
		2	*6*	*1964*	*276.50*
		3	*13*	*1971*	*280.35*
		4	*23*	*1981*	*300.79*
		5	*9*	*1967*	*336.49*


Normal Q-Q Plot
of November-December Inflows
Expected Normal Value
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000
Observed Value


Normal Q-Q Plot
of Ln(November-December Inflows)
Expected Normal
2
1
0
-1
-2
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Observed Value


November-December Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1975
N =
29

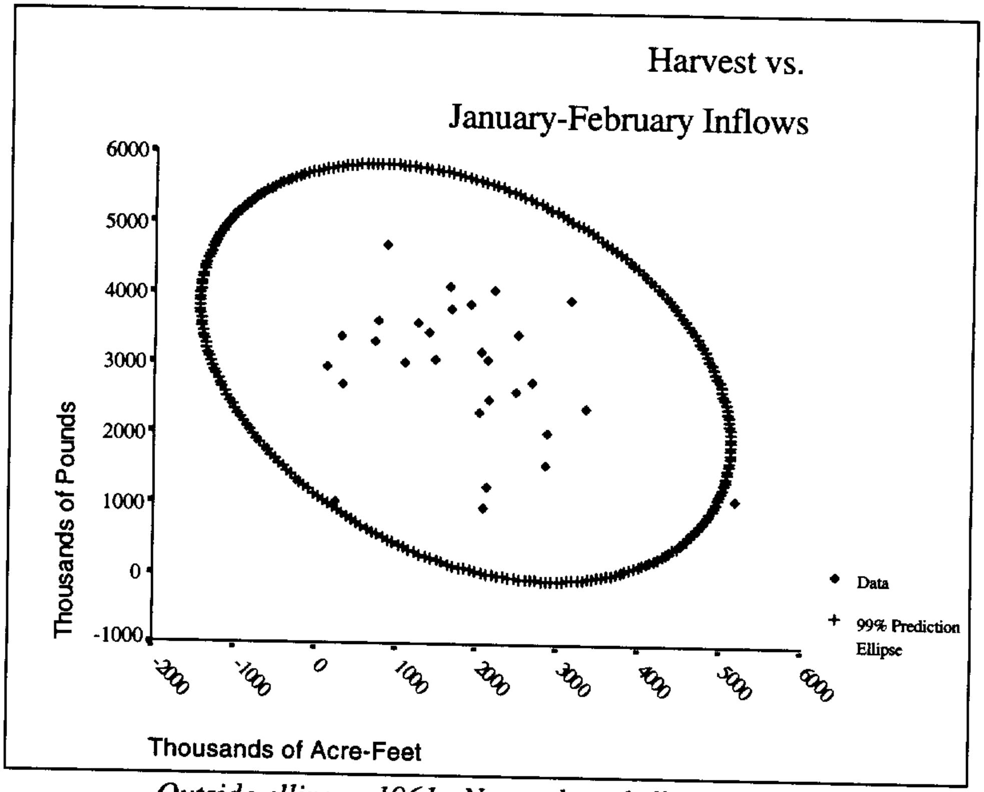

November-December Inflows
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Thousands of Acre-Feet


Ln(November-December Inflows)
9
8
7
6
5

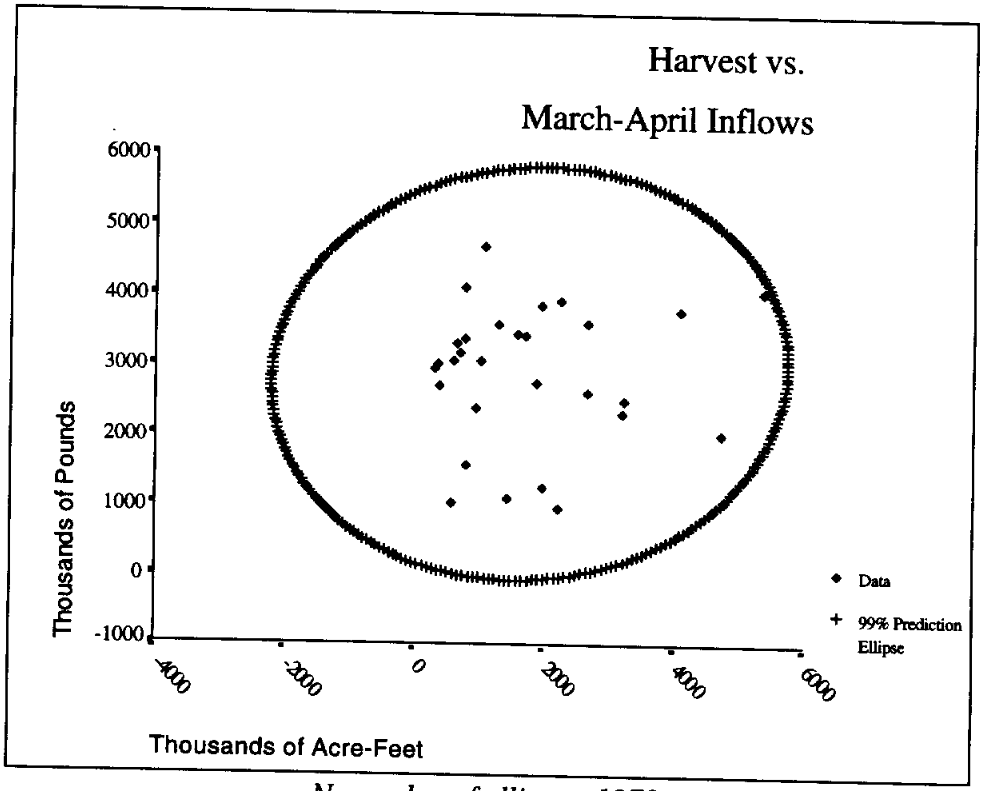
Percentiles

		Percentiles						
		5	10	25	50	75	90	95
Weighted Average (Definition 1)	White Shrimp Harvest	1010.4000	1106.7000	2364.3000	3066.2000	3612.4500	4077.7000	4404.5000
	Ln(White Shrimp Harvest)	6.917706	7.009138	7.768167	8.028194	8.192139	8.313288	8.388116
	January-February Inflows	195.9150	300.4100	977.0250	2017.8400	2475.9650	3138.9800	4261.0000
	March-April Inflows	331.5400	393.9100	743.4850	1440.1000	2456.6250	4102.0000	5063.7750
	May-June Inflows	359.4200	673.6800	1209.2900	1966.7700	3924.5250	5402.3000	6005.4200
	July-August Inflows	208.5950	243.9900	407.7850	626.8700	1356.3550	2282.8000	3067.9450
	September-October Inflows	193.7400	339.3500	522.3000	978.5000	1991.9800	2326.5000	3510.6100
	November-December Inflows	241.7500	280.3500	721.6050	1288.4000	2280.0750	3586.1000	4552.4150
	Ln(January-February Inflows)	5.2256	5.7051	6.8763	7.6098	7.8144	8.0517	8.3334
	Ln(March-April Inflows)	5.8008	5.9761	6.6106	7.2725	7.8027	8.3192	8.5279
	Ln(May-June Inflows)	5.8547	6.5128	7.0875	7.5841	8.2750	8.5946	8.6995
	Ln(July-August Inflows)	5.3399	5.4971	6.0107	6.4407	7.2107	7.7332	8.0286
	Ln(September-October Inflows)	5.2030	5.8270	6.2581	6.8860	7.5968	7.7521	8.1426
	Ln(November-December Inflows)	5.4775	5.6360	6.5811	7.1612	7.7319	8.1848	8.4126
Tukey's Hinges	White Shrimp Harvest			2392.4000	3066.2000	3604.3000		
	Ln(White Shrimp Harvest)			7.780052	8.028194	8.189883		
	January-February Inflows			1102.1000	2017.8400	2468.3000		
	March-April Inflows			771.3700	1440.1000	2242.4700		
	May-June Inflows			1381.7800	1966.7700	3911.7600		
	July-August Inflows			412.7900	626.8700	1274.7600		
	September-October Inflows			529.5000	978.5000	1972.3700		
	November-December Inflows			740.9100	1288.4000	2250.9500		
	Ln(January-February Inflows)			7.0050	7.6098	7.8113		
	Ln(March-April Inflows)			6.6482	7.2725	7.7153		
	Ln(May-June Inflows)			7.2311	7.5841	8.2717		
	Ln(July-August Inflows)			6.0229	6.4407	7.1505		
	Ln(September-October Inflows)			6.2719	6.8860	7.5870		
	Ln(November-December Inflows)			6.6079	7.1612	7.7191		

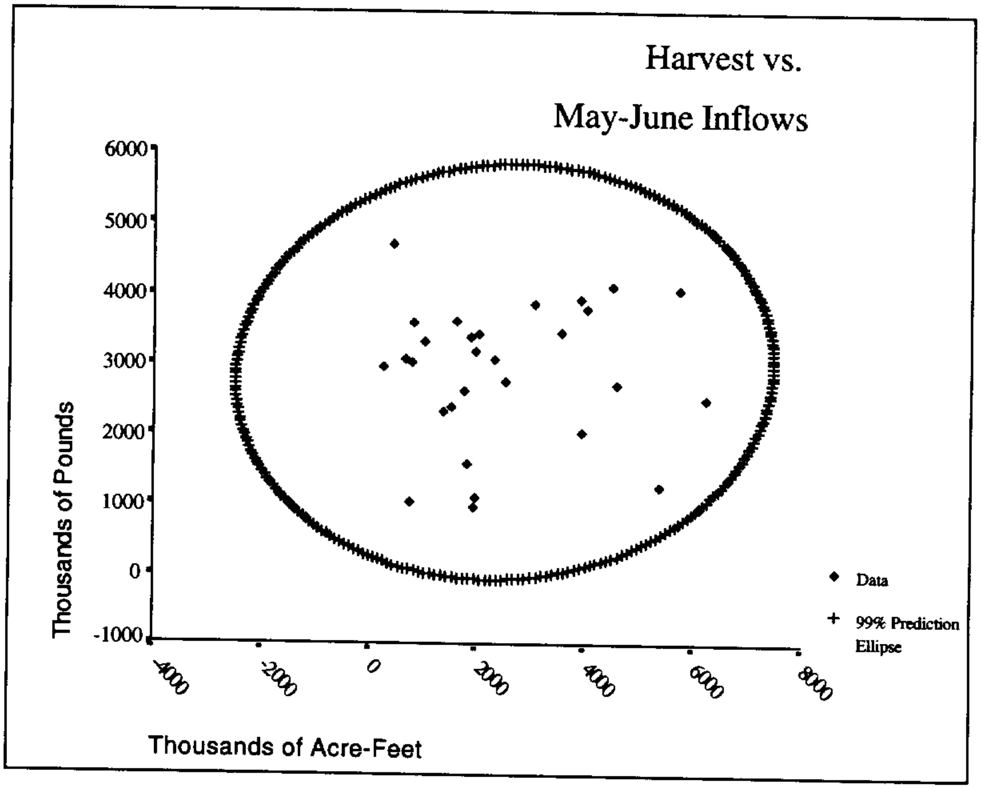
99% Prediction Ellipses

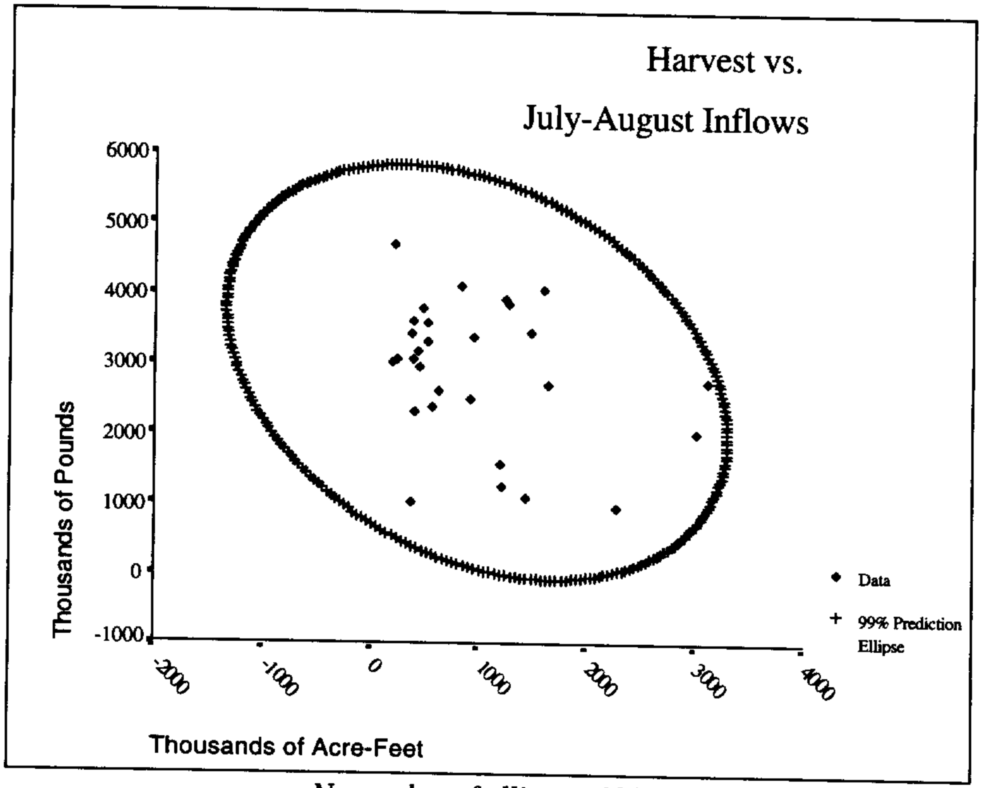


Outside ellipse: 1961. Near edge of ellipse: 1967.

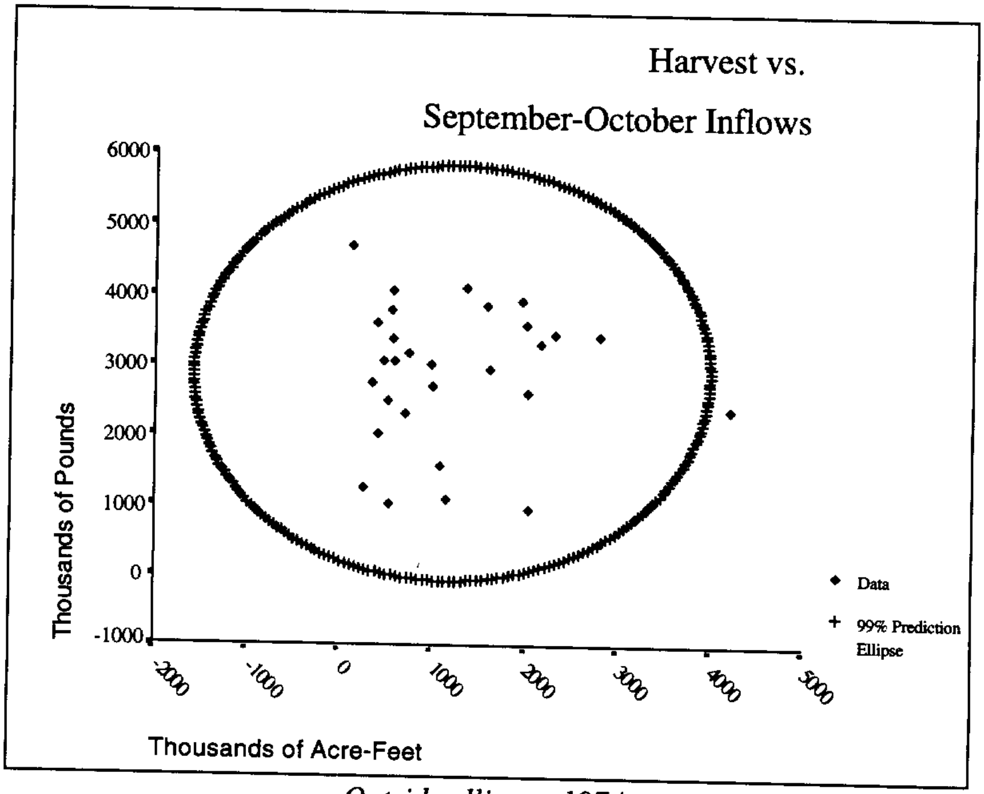


Near edge of ellipse: 1973.

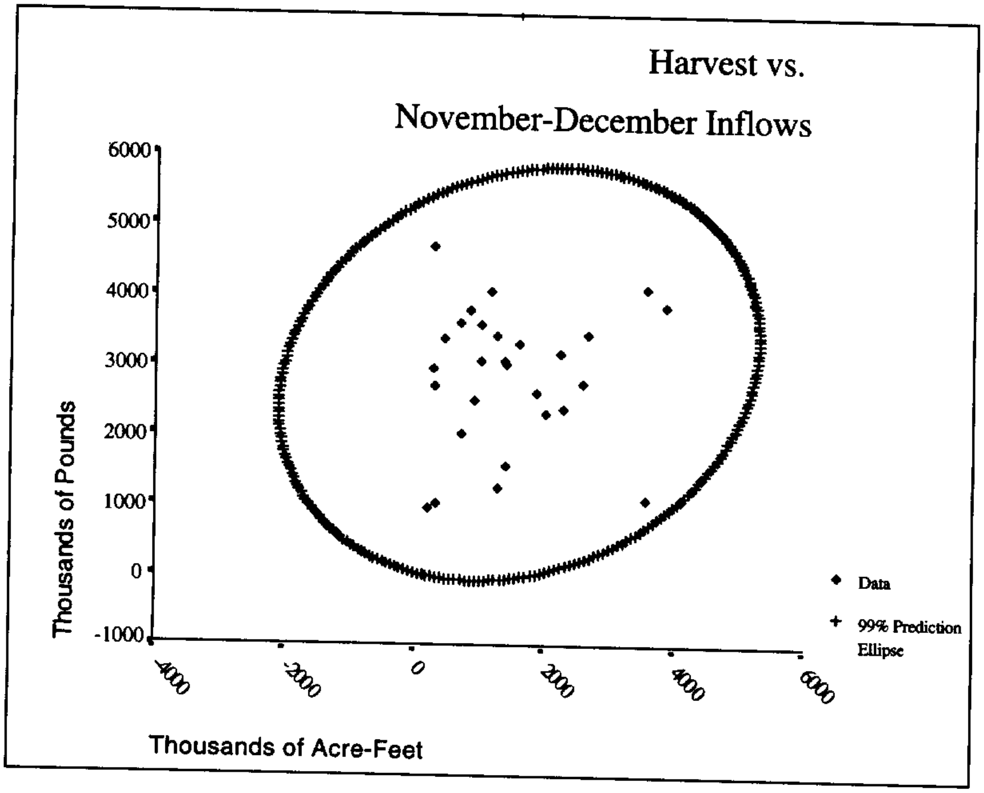


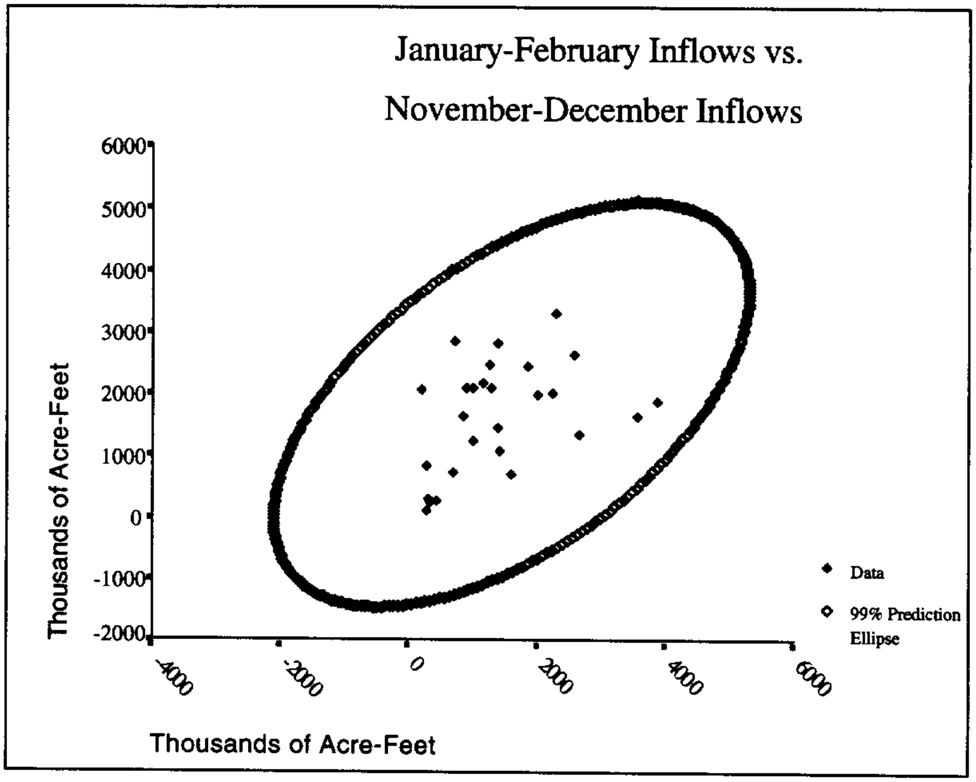


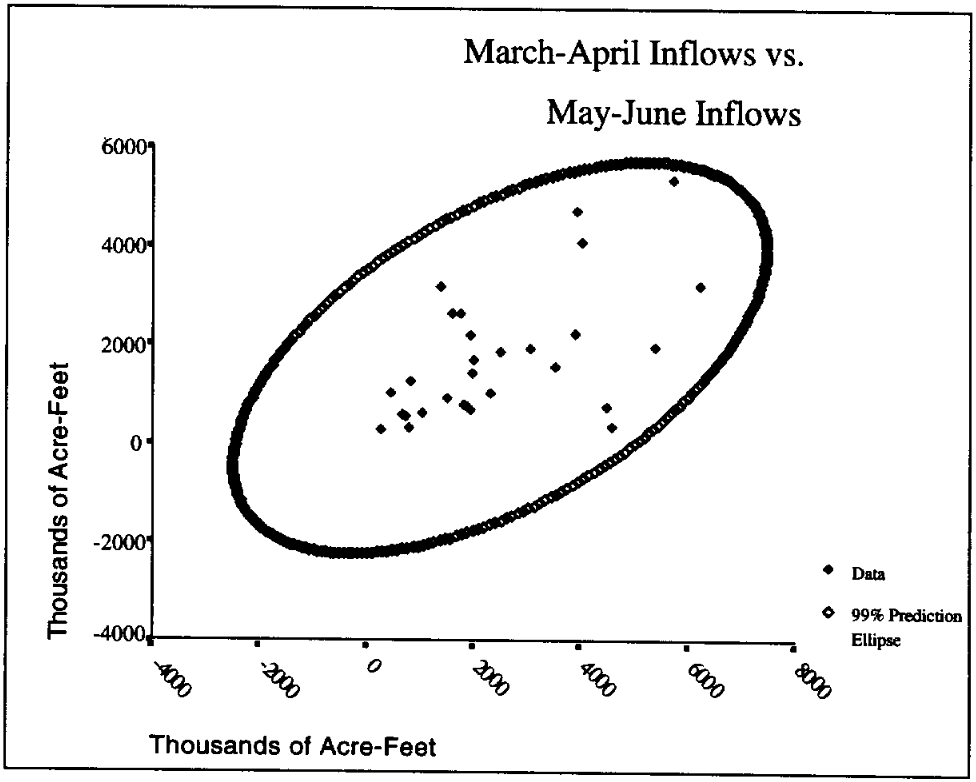
Near edge of ellipse: 1983.



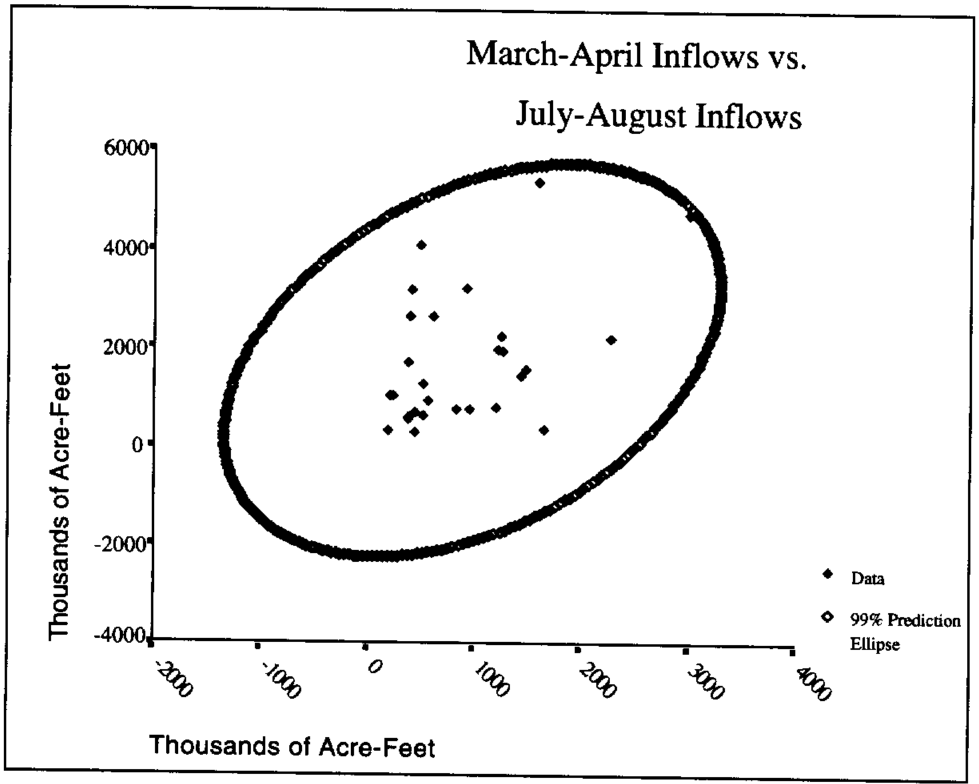
Outside ellipse: 1974.



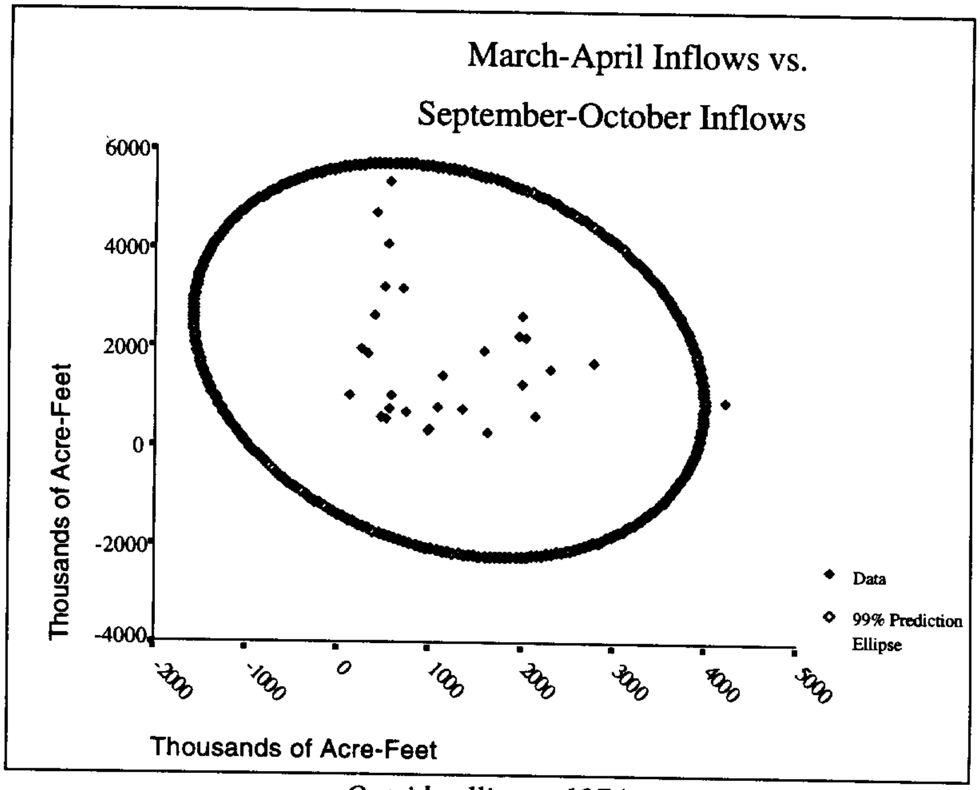

January-February Inflows vs.
November-December Inflows


March-April Inflows vs.
May-June Inflows

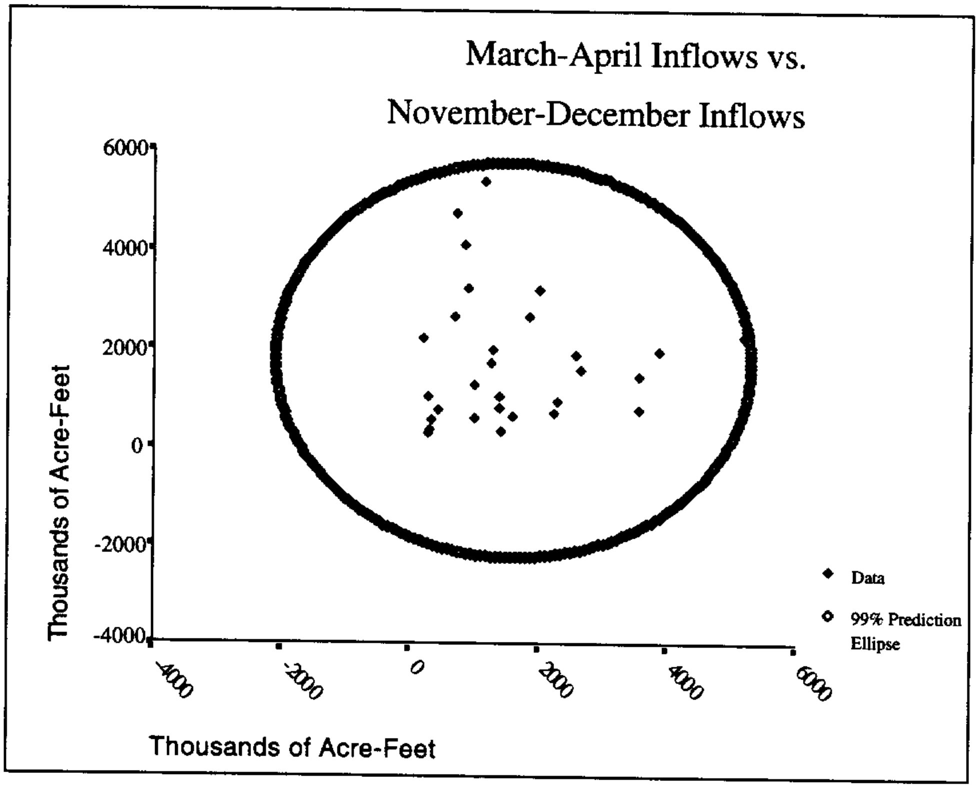
Outside ellipse: 1973.



Near edge of ellipse: 1973, 1979.

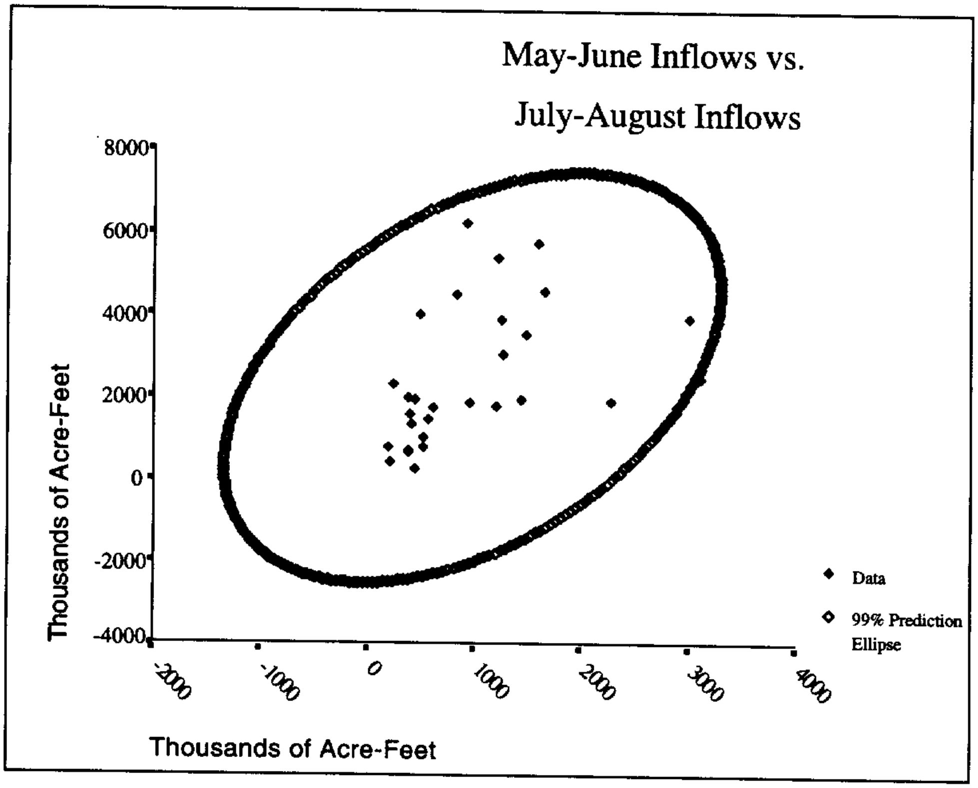


Outside ellipse: 1974.

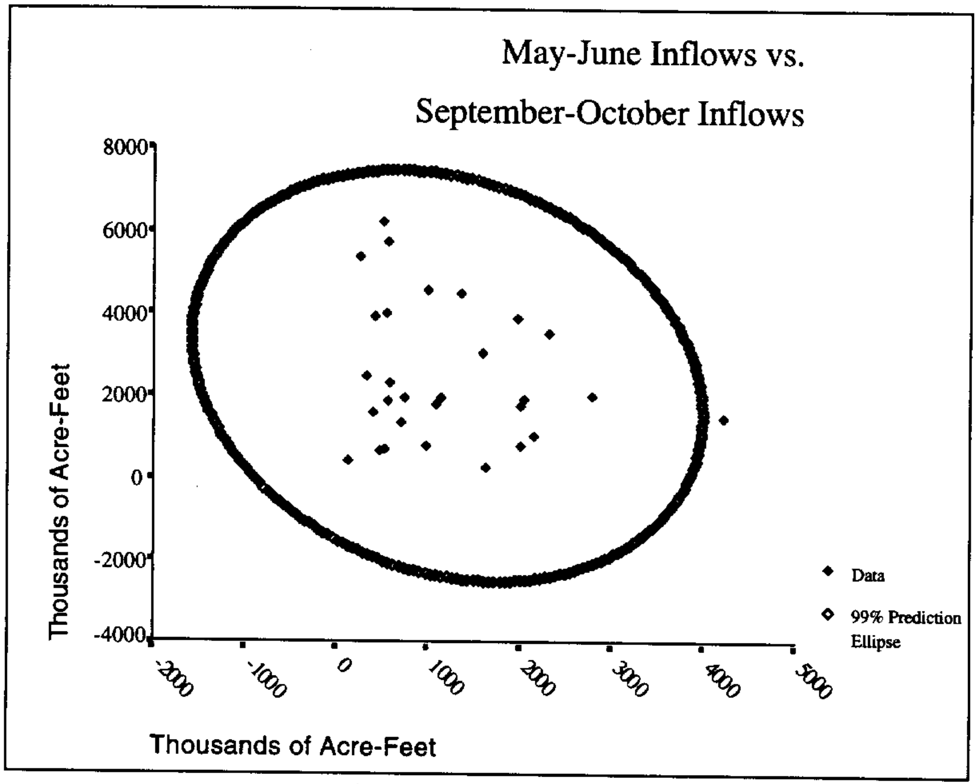


March-April Inflows vs.
November-December Inflows

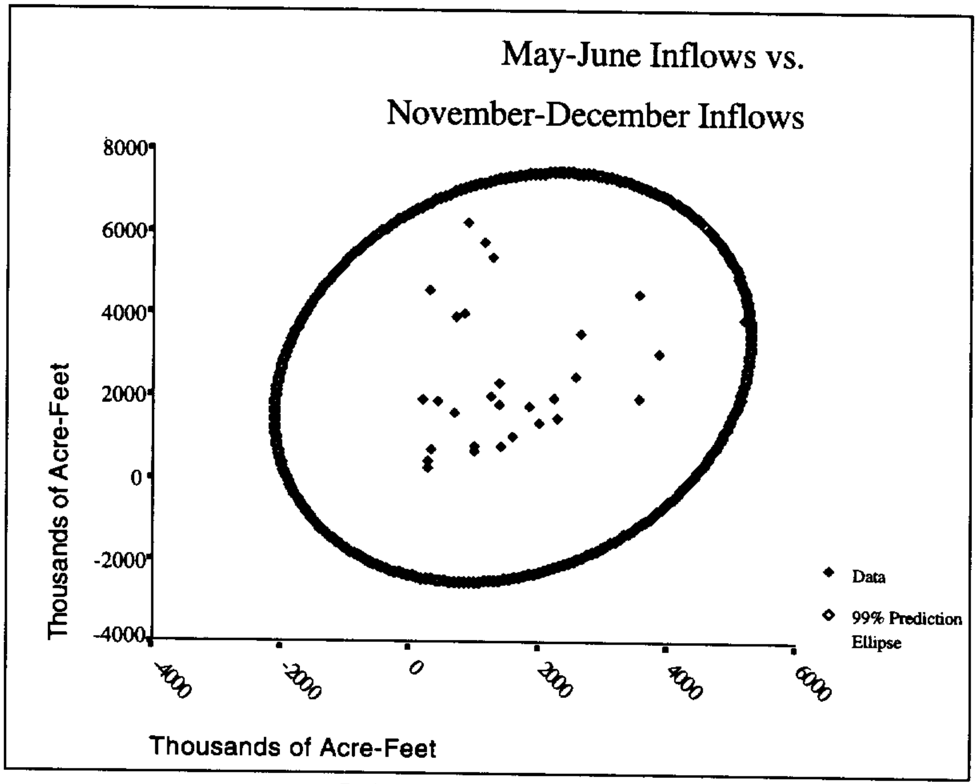
Lying on ellipse: 1975.



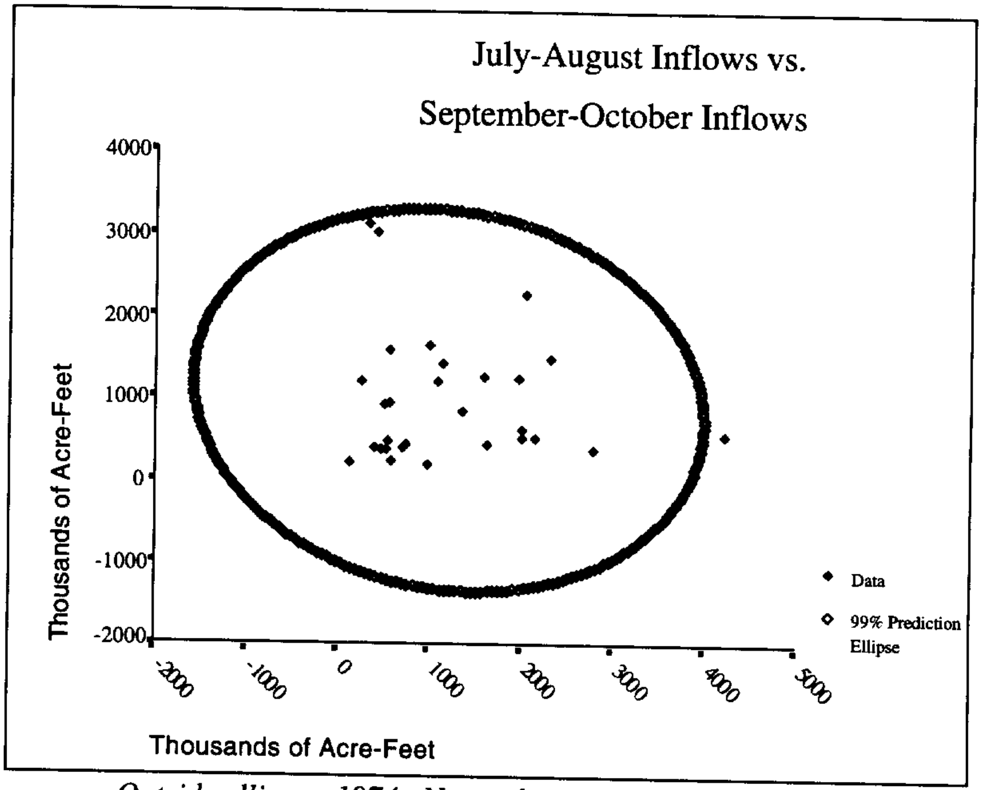
May-June Inflows vs.
July-August Inflows



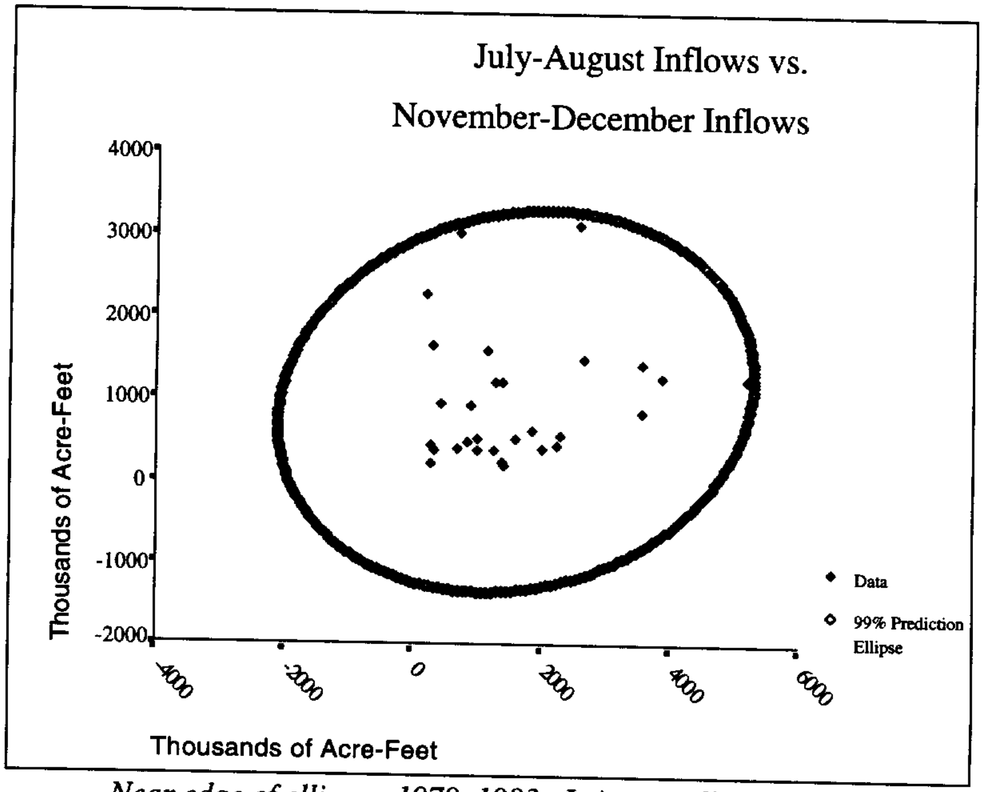
Outside ellipse: 1974.



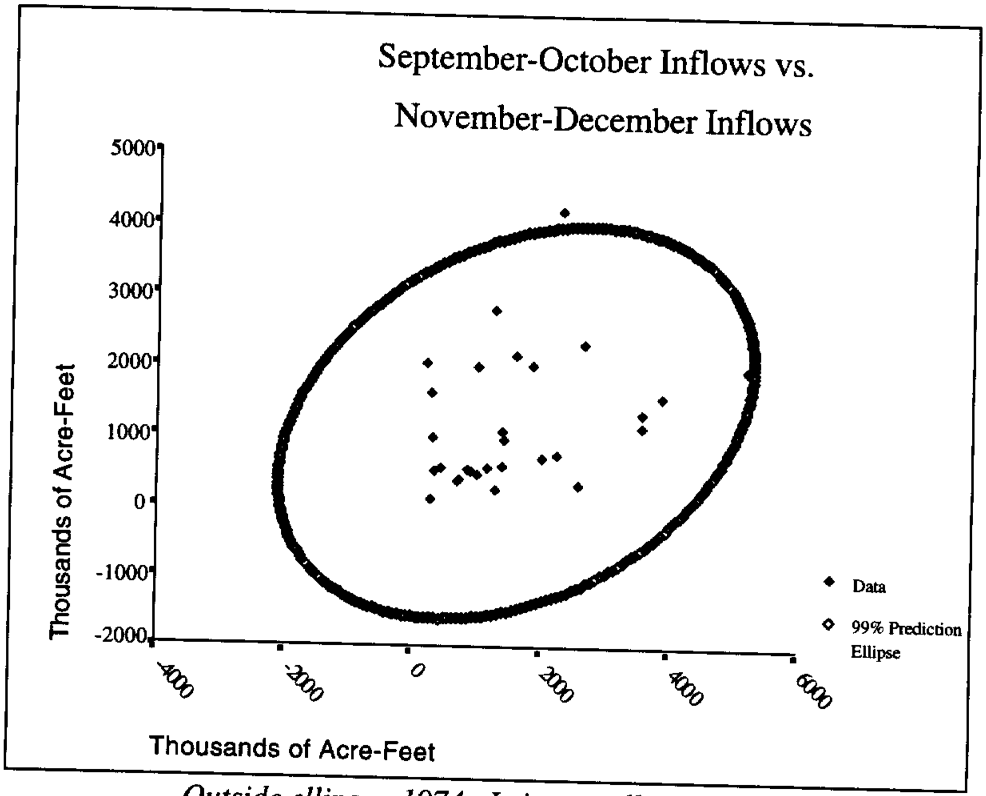
Lying on ellipse: 1975.



Outside ellipse: 1974. Near edge of ellipse: 1979, 1983.



Near edge of ellipse: 1979, 1983. Lying on ellipse: 1975.



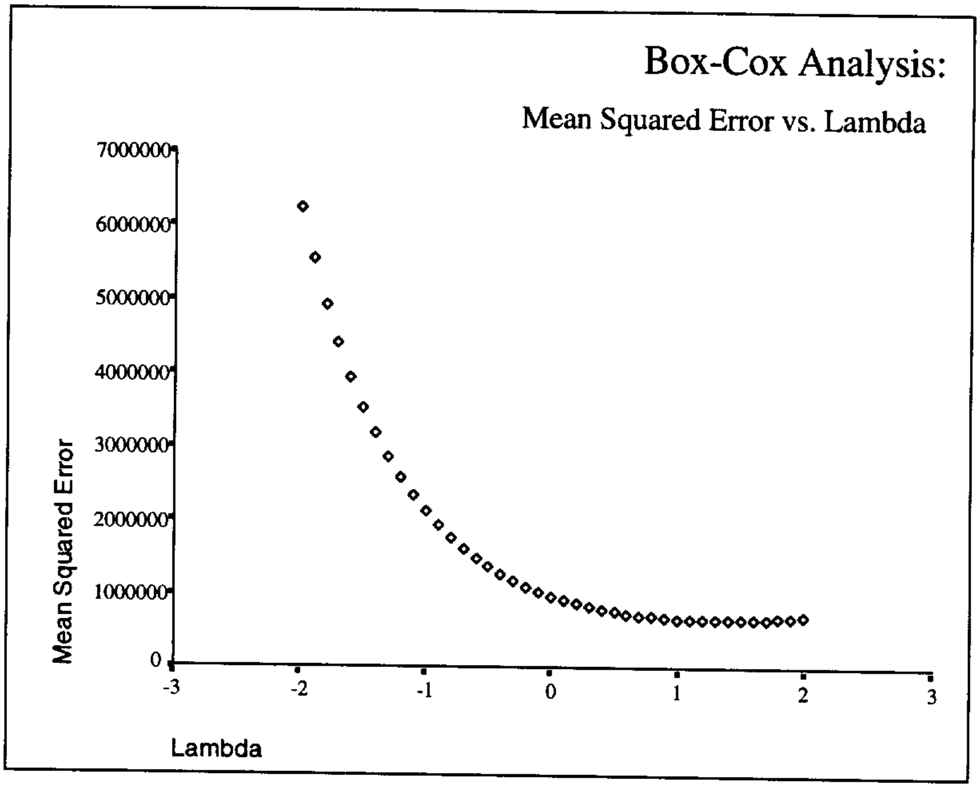
Outside ellipse: 1974. Lying on ellipse: 1975.

Box–Cox Analysis

Numerical Results

Lambda	MSE
-2.0	6254160
-1.9	5560274
-1.8	4953536
-1.7	4422453
-1.6	3957114
-1.5	3548967
-1.4	3190634
-1.3	2875716
-1.2	2598712
-1.1	2354841
-1.0	2139965
-0.9	1950499
-0.8	1783332
-0.7	1635764
-0.6	1505451
-0.5	1390354
-0.4	1288702
-0.3	1198950
-0.2	1119759
-0.1	1049958
0.0	988530
0.1	934589
0.2	887364
0.3	846185
0.4	810466
0.5	779704
0.6	753460
0.7	731355
0.8	713065
0.9	698311
1.0	686857
1.1	678504
1.2	673088
1.3	670475
1.4	670559
1.5	673260
1.6	678522
1.7	686311
1.8	696616
1.9	709445
2.0	724824

Plots



Box-Cox Analysis:
Mean Squared Error vs. Lambda
7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
Mean Squared Error
-3
-2
-1
0
1
2
3
Lambda

Model Choice Diagnostics

Untransformed Data

```
N = 29      Regression Models for Dependent Variable: WHSHRIMP

        Rsq     Adj    C(p)     AIC     MSE     SBC Variables in Model
 In             Rsq

  1 0.1082 0.0752  10.67   399.8 907383   402.5 JF_INFL
  1 0.0944 0.0609  11.22   400.2 921446   402.9 JA_INFL
  1 0.0318 -.0041  13.73   402.1 985160   404.9 ND_INFL
  1 0.0033 -.0336  14.87   403.0 1.01E6   405.7 MA_INFL
-------------------------------------------------------------
  2 0.3013 0.2475  4.947   394.7 738290   398.8 JF_INFL ND_INFL
  2 0.1488 0.0833  11.05   400.4 899434   404.5 JF_INFL JA_INFL
  2 0.1434 0.0775  11.26   400.6 905094   404.7 JA_INFL ND_INFL
  2 0.1371 0.0707  11.51   400.8 911746   404.9 JF_INFL MA_INFL
---------------------------------------------------------------------
  3 0.3821 0.3080  3.714   393.1 679009   398.6 JF_INFL MA_INFL ND_INFL
  3 0.3274 0.2467  5.901   395.6 739084   401.0 JF_INFL JA_INFL ND_INFL
  3 0.3076 0.2245  6.695   396.4 760908   401.9 JF_INFL MJ_INFL ND_INFL
  3 0.3015 0.2177  6.938   396.7 767571   402.1 JF_INFL SO_INFL ND_INFL
----------------------------------------------------------------------------
  4 0.4484 0.3565  3.061   391.8 631377   398.7 JF_INFL MA_INFL JA_INFL
                                                ND_INFL
  4 0.3924 0.2911  5.303   394.6 695519   401.5 JF_INFL MA_INFL MJ_INFL
                                                ND_INFL
  4 0.3863 0.2840  5.548   394.9 702527   401.8 JF_INFL MA_INFL SO_INFL
                                                ND_INFL
  4 0.3529 0.2451  6.882   396.5 740722   403.3 JF_INFL MJ_INFL JA_INFL
                                                ND_INFL
-------------------------------------------------------------------------------
  5 0.4496 0.3299  5.015   393.8 657433   402.0 JF_INFL MA_INFL JA_INFL
                                                SO_INFL ND_INFL
  5 0.4490 0.3292  5.039   393.8 658162   402.0 JF_INFL MA_INFL MJ_INFL
                                                JA_INFL ND_INFL
  5 0.3948 0.2632  7.208   396.5 722934   404.7 JF_INFL MA_INFL MJ_INFL
                                                SO_INFL ND_INFL
  5 0.3530 0.2124  8.878   398.5 772805   406.7 JF_INFL MJ_INFL JA_INFL
                                                SO_INFL ND_INFL
-------------------------------------------------------------------------------
  6 0.4500 0.3000  7.000   395.7 686857   405.3 JF_INFL MA_INFL MJ_INFL
                                                JA_INFL SO_INFL ND_INFL
-------------------------------------------------------------------------------
```

```
OBS  _MODEL_   _TYPE_   _DEPVAR_    _RMSE_   INTERCEP   JF_INFL   MA_INFL

  1  MODEL1    PARMS    WHSHRIMP    952.57   3443.58   -0.29610      .
  2  MODEL1    PARMS    WHSHRIMP    959.92   3282.14       .         .
  3  MODEL1    PARMS    WHSHRIMP    992.55   2668.88       .         .
  4  MODEL1    PARMS    WHSHRIMP   1007.05   2822.16       .      0.04251
  5  MODEL1    PARMS    WHSHRIMP    859.24   3258.54   -0.56513      .
  6  MODEL1    PARMS    WHSHRIMP    948.38   3583.72   -0.22532      .
  7  MODEL1    PARMS    WHSHRIMP    951.36   3033.19       .         .
  8  MODEL1    PARMS    WHSHRIMP    954.85   3302.23   -0.34709   0.13293
  9  MODEL1    PARMS    WHSHRIMP    824.02   2985.25   -0.69621   0.22906
 10  MODEL1    PARMS    WHSHRIMP    859.70   3377.84   -0.49892      .
 11  MODEL1    PARMS    WHSHRIMP    872.30   3169.66   -0.57589      .
 12  MODEL1    PARMS    WHSHRIMP    876.11   3271.60   -0.56413      .
 13  MODEL1    PARMS    WHSHRIMP    794.59   3107.35   -0.62265   0.29345
 14  MODEL1    PARMS    WHSHRIMP    833.98   3055.85   -0.71204   0.28603
 15  MODEL1    PARMS    WHSHRIMP    838.17   2909.76   -0.70906   0.24375
 16  MODEL1    PARMS    WHSHRIMP    860.65   3234.68   -0.49330      .
```

```
OBS  MJ_INFL   JA_INFL    SO_INFL   ND_INFL  WHSHRIMP  _IN_  _P_  _EDF_

  1      .          .          .          .        -1      1    2    27
  2      .    -0.39079         .          .        -1      1    2    27
  3      .          .          .    0.14203        -1      1    2    27
  4      .          .          .          .        -1      1    2    27
  5      .          .          .    0.42337        -1      2    3    26
  6      .    -0.27497         .          .        -1      2    3    26
  7      .    -0.42883         .    0.17799        -1      2    3    26
  8      .          .          .          .        -1      2    3    26
  9      .          .          .    0.49140        -1      3    4    25
 10      .    -0.22175         .    0.40900        -1      3    4    25
 11  0.04834        .          .    0.41574        -1      3    4    25
 12      .          .   -0.016873   0.42683        -1      3    4    25
 13      .    -0.36977         .    0.48657        -1      4    5    24
 14 -0.07537        .          .    0.52022        -1      4    5    24
 15      .          .    0.074885   0.48042        -1      4    5    24
 16  0.10663  -0.32006         .    0.38580        -1      4    5    24

OBS     _MSE_        _RSQ_     _ADJRSQ_      _CP_      _AIC_      _SBC_

  1   907382.72    0.10822     0.07519    10.6688    399.759    402.494
  2   921445.72    0.09440     0.06086    11.2216    400.205    402.940
  3   985159.83    0.03178    -0.00408    13.7261    402.144    404.878
  4  1014155.74    0.00328    -0.03363    14.8660    402.985    405.720
  5   738290.25    0.30128     0.24753     4.9469    394.684    398.786
  6   899433.70    0.14877     0.08329    11.0468    400.409    404.511
  7   905093.97    0.14341     0.07752    11.2611    400.591    404.693
  8   911745.61    0.13712     0.07074    11.5128    400.804    404.905
  9   679008.77    0.38210     0.30795     3.7143    393.119    398.588
 10   739083.61    0.32743     0.24672     5.9009    395.578    401.047
 11   760907.95    0.30757     0.22448     6.6953    396.422    401.891
 12   767570.65    0.30151     0.21769     6.9378    396.674    402.144
 13   631377.05    0.44843     0.35650     3.0614    391.826    398.663
 14   695518.77    0.39239     0.29112     5.3027    394.632    401.468
 15   702527.40    0.38627     0.28398     5.5476    394.923    401.759
 16   740722.15    0.35290     0.24505     6.8821    396.458    403.295


OBS  _MODEL_   _TYPE_   _DEPVAR_    _RMSE_   INTERCEP    JF_INFL    MA_INFL

 17  MODEL1    PARMS    WHSHRIMP    810.82   3065.17    -0.63067    0.30025
 18  MODEL1    PARMS    WHSHRIMP    811.27   3121.00    -0.62870    0.30547
 19  MODEL1    PARMS    WHSHRIMP    850.26   2992.61    -0.72059    0.29271
 20  MODEL1    PARMS    WHSHRIMP    879.09   3247.45    -0.49186        .
 21  MODEL1    PARMS    WHSHRIMP    828.77   3079.58    -0.63502    0.30960

OBS  MJ_INFL   JA_INFL    SO_INFL   ND_INFL  WHSHRIMP  _IN_  _P_  _EDF_

 17      .    -0.36389   0.039913   0.48079       -1      5    6    23
 18 -0.01843  -0.35885       .      0.49376       -1      5    6    23
 19 -0.06937       .     0.057166   0.50954       -1      5    6    23
 20  0.10502  -0.32134  -0.011810   0.38839       -1      5    6    23
 21 -0.01511  -0.35538   0.036871   0.48713       -1      6    7    22

OBS     _MSE_        _RSQ_     _ADJRSQ_      _CP_      _AIC_      _SBC_

 17   657433.26    0.44959     0.32994     5.0147    393.765    401.968
 18   658162.43    0.44898     0.32920     5.0391    393.797    402.001
 19   722933.73    0.39476     0.26318     7.2081    396.519    404.723
 20   772805.39    0.35300     0.21235     8.8781    398.453    406.657
 21   686856.88    0.44996     0.29995     7.0000    395.745    405.316
```

Logged Inflows

```
N = 29     Regression Models for Dependent Variable: WHSHRIMP

        Rsq     Adj    C(p)     AIC     MSE     SBC Variables in Model
  In            Rsq

   1 0.0954 0.0619  3.382  400.2 920377  402.9 LGJAINFL
   1 0.0284 -.0076  5.487  402.2 988646  405.0 LGNDINFL
   1 0.0172 -.0192  5.838  402.6    1E6  405.3 LGJFINFL
   1 0.0011 -.0359  6.343  403.0 1.02E6  405.8 LGSOINFL
-------------------------------------------------------------
   2 0.1463 0.0807  3.786  400.5 902023  404.6 LGMJINFL LGJAINFL
   2 0.1411 0.0750  3.951  400.7 907582  404.8 LGJAINFL LGNDINFL
   2 0.1312 0.0643  4.261  401.0 918037  405.1 LGJFINFL LGNDINFL
   2 0.1234 0.0560  4.504  401.3 926222  405.4 LGMAINFL LGJAINFL
----------------------------------------------------------------------
   3 0.1952 0.0986  4.252  400.8 884391  406.3 LGJFINFL LGJAINFL LGNDINFL
   3 0.1840 0.0861  4.603  401.2 896670  406.7 LGJFINFL LGMAINFL LGNDINFL
   3 0.1663 0.0662  5.159  401.8 916161  407.3 LGMJINFL LGJAINFL LGNDINFL
   3 0.1629 0.0624  5.267  401.9 919927  407.4 LGJFINFL LGMJINFL LGJAINFL
-------------------------------------------------------------------------------
   4 0.2902 0.1719  3.271  399.1 812484  406.0 LGJFINFL LGMAINFL LGJAINFL
                                               LGNDINFL
   4 0.2371 0.1100  4.936  401.2 873224  408.1 LGJFINFL LGMJINFL LGJAINFL
                                               LGNDINFL
   4 0.2096 0.0779  5.799  402.3 904732  409.1 LGJFINFL LGJAINFL LGSOINFL
                                               LGNDINFL
   4 0.1943 0.0600  6.280  402.8 922266  409.7 LGJFINFL LGMAINFL LGMJINFL
                                               LGNDINFL
--------------------------------------------------------------------------------
   5 0.2977 0.1450  5.036  400.8 838873  409.0 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGNDINFL
   5 0.2922 0.1383  5.208  401.1 845418  409.3 LGJFINFL LGMAINFL LGJAINFL
                                               LGSOINFL LGNDINFL
   5 0.2432 0.0787  6.746  403.0 903956  411.2 LGJFINFL LGMJINFL LGJAINFL
                                               LGSOINFL LGNDINFL
   5 0.2033 0.0301  7.999  404.5 951671  412.7 LGJFINFL LGMAINFL LGMJINFL
                                               LGSOINFL LGNDINFL
--------------------------------------------------------------------------------
   6 0.2988 0.1076  7.000  402.8 875567  412.4 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGSOINFL LGNDINFL
--------------------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_    _RMSE_  INTERCEP  LGJFINFL  LGMAINFL

  1  MODEL1   PARMS   WHSHRIMP    959.36   5568.29      .         .
  2  MODEL1   PARMS   WHSHRIMP    994.31   1543.54      .         .
  3  MODEL1   PARMS   WHSHRIMP   1000.01   4001.78  -152.044      .
  4  MODEL1   PARMS   WHSHRIMP   1008.17   3170.21      .         .
  5  MODEL1   PARMS   WHSHRIMP    949.75   4381.47      .         .
  6  MODEL1   PARMS   WHSHRIMP    952.67   4094.25      .         .
  7  MODEL1   PARMS   WHSHRIMP    958.14   2880.45  -493.458      .
  8  MODEL1   PARMS   WHSHRIMP    962.40   4526.99      .      231.017
  9  MODEL1   PARMS   WHSHRIMP    940.42   4568.40  -374.437      .
 10  MODEL1   PARMS   WHSHRIMP    946.93   1419.00  -753.606   370.668
 11  MODEL1   PARMS   WHSHRIMP    957.16   3624.51      .         .
 12  MODEL1   PARMS   WHSHRIMP    959.13   4950.83  -168.617      .
 13  MODEL1   PARMS   WHSHRIMP    901.38   3102.73  -696.253   515.471
 14  MODEL1   PARMS   WHSHRIMP    934.46   4029.91  -435.703      .
 15  MODEL1   PARMS   WHSHRIMP    951.17   5302.47  -404.697      .
 16  MODEL1   PARMS   WHSHRIMP    960.35   1763.94  -755.981   458.837
```

```
OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  WHSHRIMP  _IN_  _P_  _EDF_

  1      .     -403.728      .         .         -1       1    2     27
  2      .         .         .      191.647      -1       1    2     27
  3      .         .         .         .         -1       1    2     27
  4      .         .      -40.061      .         -1       1    2     27
  5   361.113  -637.485      .         .         -1       2    3     26
  6      .     -443.043      .      245.472      -1       2    3     26
  7      .         .         .      509.758      -1       2    3     26
  8      .     -497.802      .         .         -1       2    3     26
  9      .     -349.196      .      475.454      -1       3    4     25
 10      .         .         .      606.256      -1       3    4     25
 11   272.934  -608.324      .      174.317      -1       3    4     25
 12   442.068  -631.041      .         .         -1       3    4     25
 13      .     -466.436      .      598.132      -1       4    5     24
 14   357.962  -550.612      .      419.762      -1       4    5     24
 15      .     -336.150  -157.299   542.057      -1       4    5     24
 16  -163.955      .         .      645.655      -1       4    5     24

OBS     _MSE_        _RSQ_      _ADJRSQ_      _CP_       _AIC_      _SBC_

  1    920377.20    0.09545     0.06195     3.38181    400.171    402.906
  2    988646.27    0.02835    -0.00763     5.48703    402.246    404.981
  3   1000018.18    0.01718    -0.01922     5.83771    402.578    405.313
  4   1016398.95    0.00108    -0.03592     6.34285    403.049    405.784
  5    902022.96    0.14632     0.08065     3.78560    400.493    404.595
  6    907581.67    0.14106     0.07499     3.95067    400.671    404.773
  7    918036.58    0.13117     0.06433     4.26113    401.003    405.105
  8    926221.75    0.12342     0.05599     4.50419    401.260    405.362
  9    884390.60    0.19520     0.09862     4.25193    400.783    406.252
 10    896669.74    0.18403     0.08611     4.60254    401.183    406.652
 11    916161.21    0.16629     0.06624     5.15907    401.806    407.275
 12    919926.55    0.16286     0.06241     5.26659    401.925    407.394
 13    812483.86    0.29021     0.17191     3.27083    399.140    405.976
 14    873224.33    0.23715     0.11001     4.93578    401.230    408.067
 15    904732.46    0.20962     0.07789     5.79944    402.258    409.095
 16    922265.66    0.19430     0.06002     6.28004    402.815    409.652


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_  INTERCEP  LGJFINFL  LGMAINFL

 17  MODEL1   PARMS   WHSHRIMP   915.90   3037.56  -684.205   450.773
 18  MODEL1   PARMS   WHSHRIMP   919.47   3439.86  -695.884   496.232
 19  MODEL1   PARMS   WHSHRIMP   950.77   4562.16  -450.653      .
 20  MODEL1   PARMS   WHSHRIMP   975.54   2550.08  -752.857   427.118
 21  MODEL1   PARMS   WHSHRIMP   935.72   3298.53  -684.535   439.356

OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  WHSHRIMP  _IN_  _P_  _EDF_

 17   165.608  -544.904      .      556.970      -1       5    6     23
 18      .     -457.041   -60.519   619.178      -1       5    6     23
 19   327.979  -525.084  -104.388   468.626      -1       5    6     23
 20  -168.499      .     -126.664   690.453      -1       5    6     23
 21   157.195  -533.738   -46.252   575.145      -1       6    7     22

OBS     _MSE_        _RSQ_      _ADJRSQ_      _CP_       _AIC_      _SBC_

 17    838873.06    0.29769     0.14502     5.03609    400.832    409.036
 18    845417.55    0.29221     0.13835     5.20801    401.058    409.262
 19    903955.92    0.24320     0.07868     6.74573    402.999    411.203
 20    951671.35    0.20326     0.03005     7.99915    404.491    412.695
 21    875567.28    0.29884     0.10762     7.00000    402.785    412.356
```

Logged Harvest

```
 N = 29     Regression Models for Dependent Variable: LWHSHRMP

         Rsq     Adj   C(p)     AIC     MSE     SBC Variables in Model
  In             Rsq

   1 0.1034 0.0702  9.172 -48.89 0.1734 -46.16 JF_INFL
   1 0.0914 0.0578  9.630 -48.51 0.1757 -45.77 JA_INFL
   1 0.0283 -.0076  12.03 -46.56 0.1879 -43.83 ND_INFL
   1 0.0026 -.0344  13.02 -45.80 0.1929 -43.07 MA_INFL
-------------------------------------------------------
   2 0.2819 0.2266  4.371 -53.33 0.1442 -49.23 JF_INFL ND_INFL
   2 0.1431 0.0771  9.662 -48.20 0.1721 -44.10 JF_INFL JA_INFL
   2 0.1358 0.0694  9.937 -47.96 0.1735 -43.86 JA_INFL ND_INFL
   2 0.1323 0.0655  10.07 -47.84 0.1742 -43.74 MJ_INFL JA_INFL
---------------------------------------------------------------
   3 0.3551 0.2777  3.580 -54.45 0.1347 -48.98 JF_INFL MA_INFL ND_INFL
   3 0.3078 0.2247  5.384 -52.39 0.1446 -46.92 JF_INFL JA_INFL ND_INFL
   3 0.2880 0.2026  6.136 -51.58 0.1487 -46.11 JF_INFL MJ_INFL ND_INFL
   3 0.2821 0.1959  6.363 -51.34 0.1499 -45.87 JF_INFL SO_INFL ND_INFL
-----------------------------------------------------------------------
   4 0.4188 0.3220  3.151 -55.46 0.1264 -48.63 JF_INFL MA_INFL JA_INFL
                                               ND_INFL
   4 0.3637 0.2577  5.252 -52.84 0.1384 -46.00 JF_INFL MA_INFL MJ_INFL
                                               ND_INFL
   4 0.3636 0.2575  5.257 -52.83 0.1384 -45.99 JF_INFL MA_INFL SO_INFL
                                               ND_INFL
   4 0.3329 0.2217  6.428 -51.46 0.1451 -44.63 JF_INFL MJ_INFL JA_INFL
                                               ND_INFL
-------------------------------------------------------------------------
   5 0.4227 0.2972  5.002 -53.66 0.1310 -45.46 JF_INFL MA_INFL JA_INFL
                                               SO_INFL ND_INFL
   5 0.4191 0.2928  5.141 -53.48 0.1319 -45.27 JF_INFL MA_INFL MJ_INFL
                                               JA_INFL ND_INFL
   5 0.3698 0.2328  7.020 -51.12 0.1430 -42.91 JF_INFL MA_INFL MJ_INFL
                                               SO_INFL ND_INFL
   5 0.3333 0.1884  8.410 -49.48 0.1513 -41.28 JF_INFL MJ_INFL JA_INFL
                                               SO_INFL ND_INFL
-------------------------------------------------------------------------
   6 0.4228 0.2654  7.000 -51.66 0.1370 -42.09 JF_INFL MA_INFL MJ_INFL
                                               JA_INFL SO_INFL ND_INFL
-------------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP    JF_INFL     MA_INFL

  1  MODEL1   PARMS   LWHSHRMP  0.41636   8.12830  -.00012620    .
  2  MODEL1   PARMS   LWHSHRMP  0.41914   8.06058   .            .
  3  MODEL1   PARMS   LWHSHRMP  0.43344   7.80144   .            .
  4  MODEL1   PARMS   LWHSHRMP  0.43915   7.86638   .           .00001646
  5  MODEL1   PARMS   LWHSHRMP  0.37973   8.05075  -.00023894    .
  6  MODEL1   PARMS   LWHSHRMP  0.41481   8.18867  -.00009570    .
  7  MODEL1   PARMS   LWHSHRMP  0.41655   7.95728   .            .
  8  MODEL1   PARMS   LWHSHRMP  0.41741   7.96898   .            .
  9  MODEL1   PARMS   LWHSHRMP  0.36697   7.93735  -.00029333   .00009504
 10  MODEL1   PARMS   LWHSHRMP  0.38020   8.10250  -.00021022    .
 11  MODEL1   PARMS   LWHSHRMP  0.38558   8.01236  -.00024359    .
 12  MODEL1   PARMS   LWHSHRMP  0.38719   8.04507  -.00023938    .
 13  MODEL1   PARMS   LWHSHRMP  0.35555   7.98953  -.00026190   .00012256
 14  MODEL1   PARMS   LWHSHRMP  0.37203   7.96551  -.00029964   .00011776
 15  MODEL1   PARMS   LWHSHRMP  0.37207   7.89042  -.00030132   .00010418
 16  MODEL1   PARMS   LWHSHRMP  0.38094   8.04054  -.00020779    .
```

```
OBS     MJ_INFL        JA_INFL      SO_INFL      ND_INFL    LWHSHRMP   _IN_   _P_

  1   .                .           .            .               -1       1     2
  2   .              -.00016765    .            .               -1       1     2
  3   .                .           .           .00005847        -1       1     2
  4   .                .           .            .               -1       1     2
  5   .                .           .           .00017742        -1       2     3
  6   .              -.00011846    .            .               -1       2     3
  7   .              -.00018344    .           .00007385        -1       2     3
  8  0.000058103     -.00022235    .            .               -1       2     3
  9   .                .           .           .00020565        -1       3     4
 10   .              -.00009619    .           .00017119        -1       3     4
 11  0.000020880       .           .           .00017413        -1       3     4
 12   .                .          .000007340   .00017592        -1       3     4
 13   .              -.00015800    .           .00020359        -1       4     5
 14  -.000030051       .           .           .00021714        -1       4     5
 15   .                .          .000046558   .00019882        -1       4     5
 16  0.000046144     -.00013873    .           .00016115        -1       4     5

OBS   _EDF_    _MSE_      _RSQ_     _ADJRSQ_      _CP_      _AIC_      _SBC_

  1    27     0.17335    0.10344    0.07024     9.1718    -48.8928   -46.1582
  2    27     0.17568    0.09143    0.05778     9.6297    -48.5067   -45.7722
  3    27     0.18787    0.02834   -0.00764    12.0342    -46.5600   -43.8254
  4    27     0.19285    0.00259   -0.03435    13.0158    -45.8014   -43.0668
  5    26     0.14419    0.28187    0.22663     4.3713    -53.3281   -49.2262
  6    26     0.17207    0.14305    0.07713     9.6622    -48.2030   -44.1012
  7    26     0.17351    0.13584    0.06936     9.9371    -47.9600   -43.8581
  8    26     0.17423    0.13229    0.06555    10.0722    -47.8413   -43.7394
  9    25     0.13467    0.35509    0.27770     3.5803    -54.4470   -48.9778
 10    25     0.14455    0.30776    0.22469     5.3844    -52.3930   -46.9238
 11    25     0.14867    0.28804    0.20261     6.1358    -51.5786   -46.1094
 12    25     0.14991    0.28210    0.19595     6.3626    -51.3373   -45.8681
 13    24     0.12642    0.41882    0.32196     3.1512    -55.4645   -48.6280
 14    24     0.13841    0.36371    0.25766     5.2521    -52.8368   -46.0004
 15    24     0.13844    0.36358    0.25750     5.2570    -52.8309   -45.9945
 16    24     0.14512    0.33286    0.22167     6.4276    -51.4641   -44.6277


OBS  _MODEL_   _TYPE_   _DEPVAR_    _RMSE_   INTERCEP    JF_INFL     MA_INFL

 17  MODEL1    PARMS    LWHSHRMP   0.36198   7.95590   -.00026829   .00012799
 18  MODEL1    PARMS    LWHSHRMP   0.36312   7.99360   -.00026370   .00012615
 19  MODEL1    PARMS    LWHSHRMP   0.37821   7.92131   -.00030562   .00012243
 20  MODEL1    PARMS    LWHSHRMP   0.38900   8.02876   -.00020912   .
 21  MODEL1    PARMS    LWHSHRMP   0.37009   7.95846   -.00026906   .00012965

OBS     MJ_INFL        JA_INFL      SO_INFL      ND_INFL    LWHSHRMP   _IN_   _P_

 17   .              -.00015332   .000031823   .00019898        -1       5     6
 18  -.000005497     -.00015475    .           .00020573        -1       5     6
 19  -.000025864       .          .000039952   .00020968        -1       5     6
 20  0.000047622     -.00013755   .000010897   .00015876        -1       5     6
 21  -.000002686     -.00015180   .000031282   .00020011        -1       6     7

OBS   _EDF_    _MSE_      _RSQ_     _ADJRSQ_      _CP_      _AIC_      _SBC_

 17    23     0.13103    0.42273    0.29724     5.0023    -53.6601   -45.4563
 18    23     0.13186    0.41909    0.29280     5.1413    -53.4775   -45.2737
 19    23     0.14305    0.36978    0.23278     7.0204    -51.1152   -42.9114
 20    23     0.15132    0.33332    0.18839     8.4102    -49.4841   -41.2803
 21    22     0.13697    0.42279    0.26537     7.0000    -51.6632   -42.0921
```

All Variables Logged

```
 N = 29      Regression Models for Dependent Variable: LWHSHRMP

          Rsq     Adj    C(p)     AIC     MSE     SBC Variables in Model
  In              Rsq

  1 0.0959 0.0624   4.157 -48.65 0.1748 -45.91 LGJAINFL
  1 0.0434 0.0080   5.851 -47.01 0.1850 -44.28 LGNDINFL
  1 0.0153 -.0212   6.757 -46.17 0.1904 -43.44 LGJFINFL
  1 0.0001 -.0370   7.247 -45.73 0.1933 -42.99 LGMAINFL
------------------------------------------------------------
  2 0.1627 0.0983   4.002 -48.88 0.1681 -44.78 LGJFINFL LGNDINFL
  2 0.1604 0.0958   4.077 -48.80 0.1686 -44.69 LGJAINFL LGNDINFL
  2 0.1525 0.0873   4.331 -48.53 0.1702 -44.42 LGMJINFL LGJAINFL
  2 0.1163 0.0483   5.500 -47.31 0.1774 -43.21 LGMAINFL LGJAINFL
------------------------------------------------------------------------
  3 0.2263 0.1334   3.952 -49.17 0.1616 -43.70 LGJFINFL LGJAINFL LGNDINFL
  3 0.2062 0.1109   4.601 -48.42 0.1658 -42.95 LGJFINFL LGMAINFL LGNDINFL
  3 0.1849 0.0870   5.288 -47.65 0.1702 -42.18 LGMJINFL LGJAINFL LGNDINFL
  3 0.1762 0.0774   5.566 -47.35 0.1720 -41.88 LGJFINFL LGSOINFL LGNDINFL
------------------------------------------------------------------------------------
  4 0.3079 0.1925   3.321 -50.40 0.1506 -43.56 LGJFINFL LGMAINFL LGJAINFL
                                               LGNDINFL
  4 0.2691 0.1473   4.572 -48.82 0.1590 -41.98 LGJFINFL LGMJINFL LGJAINFL
                                               LGNDINFL
  4 0.2356 0.1082   5.650 -47.52 0.1663 -40.68 LGJFINFL LGJAINFL LGSOINFL
                                               LGNDINFL
  4 0.2138 0.0827   6.356 -46.70 0.1710 -39.86 LGJFINFL LGMAINFL LGMJINFL
                                               LGNDINFL
------------------------------------------------------------------------------------
  5 0.3176 0.1693   5.006 -48.81 0.1549 -40.61 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGNDINFL
  5 0.3086 0.1582   5.299 -48.43 0.1569 -40.22 LGJFINFL LGMAINFL LGJAINFL
                                               LGSOINFL LGNDINFL
  5 0.2719 0.1137   6.480 -46.93 0.1653 -38.73 LGJFINFL LGMJINFL LGJAINFL
                                               LGSOINFL LGNDINFL
  5 0.2194 0.0497   8.174 -44.91 0.1772 -36.71 LGJFINFL LGMAINFL LGMJINFL
                                               LGSOINFL LGNDINFL
------------------------------------------------------------------------------------
  6 0.3178 0.1318   7.000 -46.82 0.1619 -37.25 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGSOINFL LGNDINFL
------------------------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_    _RMSE_   INTERCEP  LGJFINFL   LGMAINFL

  1  MODEL1   PARMS   LWHSHRMP   0.41811   9.06250         .          .
  2  MODEL1   PARMS   LWHSHRMP   0.43008   7.16547         .          .
  3  MODEL1   PARMS   LWHSHRMP   0.43635   8.34938  -0.06248          .
  4  MODEL1   PARMS   LWHSHRMP   0.43970   7.86093         .    0.00480
  5  MODEL1   PARMS   LWHSHRMP   0.41002   7.79340  -0.23177          .
  6  MODEL1   PARMS   LWHSHRMP   0.41059   8.29838         .          .
  7  MODEL1   PARMS   LWHSHRMP   0.41251   8.51658         .          .
  8  MODEL1   PARMS   LWHSHRMP   0.42124   8.67506         .    0.08595
  9  MODEL1   PARMS   LWHSHRMP   0.40196   8.52642  -0.18008          .
 10  MODEL1   PARMS   LWHSHRMP   0.40715   7.21603  -0.33454    0.14644
 11  MODEL1   PARMS   LWHSHRMP   0.41257   8.09668         .          .
 12  MODEL1   PARMS   LWHSHRMP   0.41475   8.12862  -0.24262          .
 13  MODEL1   PARMS   LWHSHRMP   0.38802   7.93439  -0.31007    0.20821
 14  MODEL1   PARMS   LWHSHRMP   0.39874   8.28933  -0.20705          .
 15  MODEL1   PARMS   LWHSHRMP   0.40776   8.78415  -0.19070          .
 16  MODEL1   PARMS   LWHSHRMP   0.41355   7.34542  -0.33543    0.17951
```

```
OBS  LGMJINFL  LGJAINFL   LGSOINFL  LGNDINFL  LWHSHRMP  _IN_  _P_  _EDF_

  1      .     -0.17640       .          .       -1       1     2     27
  2      .         .          .      0.10334     -1       1     2     27
  3      .         .          .          .       -1       1     2     27
  4      .         .          .          .       -1       1     2     27
  5      .         .          .      0.25275     -1       2     3     26
  6      .     -0.19678       .      0.12725     -1       2     3     26
  7   0.16611  -0.28392       .          .       -1       2     3     26
  8      .     -0.21140       .          .       -1       2     3     26
  9      .     -0.15164       .      0.23785     -1       3     4     25
 10      .         .          .      0.29087     -1       3     4     25
 11   0.11719  -0.26775       .      0.09670     -1       3     4     25
 12      .         .     -0.066150   0.28022     -1       3     4     25
 13      .     -0.19900       .      0.28741     -1       4     5     24
 14   0.15760  -0.24032       .      0.21334     -1       4     5     24
 15      .     -0.14706  -0.055229   0.26124     -1       4     5     24
 16  -0.06150      .          .      0.30565     -1       4     5     24

OBS   _MSE_      _RSQ_     _ADJRSQ_      _CP_       _AIC_       _SBC_

  1  0.17481    0.09589    0.06240    4.15743    -48.6494    -45.9148
  2  0.18496    0.04338    0.00795    5.85064    -47.0124    -44.2778
  3  0.19040    0.01527   -0.02121    6.75744    -46.1723    -43.4377
  4  0.19334    0.00008   -0.03696    7.24735    -45.7283    -42.9937
  5  0.16811    0.16274    0.09833    4.00158    -48.8770    -44.7751
  6  0.16859    0.16039    0.09580    4.07734    -48.7958    -44.6939
  7  0.17016    0.15253    0.08734    4.33069    -48.5257    -44.4238
  8  0.17745    0.11626    0.04828    5.50029    -47.3105    -43.2086
  9  0.16157    0.22629    0.13344    3.95213    -49.1662    -43.6970
 10  0.16577    0.20615    0.11089    4.60147    -48.4211    -42.9520
 11  0.17022    0.18486    0.08705    5.28795    -47.6538    -42.1846
 12  0.17202    0.17624    0.07739    5.56606    -47.3486    -41.8794
 13  0.15056    0.30786    0.19251    3.32131    -50.3973    -43.5608
 14  0.15899    0.26907    0.14725    4.57225    -48.8159    -41.9795
 15  0.16627    0.23564    0.10825    5.65043    -47.5189    -40.6825
 16  0.17102    0.21376    0.08272    6.35606    -46.7005    -39.8640


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

 17  MODEL1   PARMS   LWHSHRMP  0.39355   7.90192  -0.30407   0.17598
 18  MODEL1   PARMS   LWHSHRMP  0.39616   8.02122  -0.30998   0.20326
 19  MODEL1   PARMS   LWHSHRMP  0.40652   8.44868  -0.21153      .
 20  MODEL1   PARMS   LWHSHRMP  0.42093   7.61730  -0.33435   0.16854
 21  MODEL1   PARMS   LWHSHRMP  0.40234   7.94838  -0.30413   0.17395

OBS  LGMJINFL  LGJAINFL   LGSOINFL  LGNDINFL  LWHSHRMP  _IN_  _P_  _EDF_

 17   0.08250  -0.23809       .      0.26690     -1       5     6     23
 18      .     -0.19658  -0.015587   0.29283     -1       5     6     23
 19   0.14862  -0.23268  -0.031252   0.22796     -1       5     6     23
 20  -0.06307      .     -0.043806   0.32115     -1       5     6     23
 21   0.08101  -0.23610  -0.008235   0.27014     -1       6     7     22

OBS   _MSE_      _RSQ_     _ADJRSQ_      _CP_       _AIC_       _SBC_

 17  0.15488    0.31763    0.16929    5.00619    -48.8096    -40.6058
 18  0.15694    0.30856    0.15825    5.29877    -48.4266    -40.2228
 19  0.16526    0.27193    0.11365    6.48012    -46.9295    -38.7257
 20  0.17718    0.21940    0.04970    8.17434    -44.9090    -36.7053
 21  0.16188    0.31782    0.13178    7.00000    -46.8177    -37.2467
```

Regression—Untransformed Data

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	*November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows*[c,d]	.	*.671*	*.450*	*.300*	*828.7683*	*1.700*

[a] Dependent Variable: White Shrimp Harvest

[b] Method: Enter

[c] Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

[d] All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*12361537.983*	*6*	*2060256.331*	*3.000*	*.027*[b]
	Residual	*15110851.464*	*22*	*686856.885*		
	Total	*27472389.448*	*28*			

[a] Dependent Variable: White Shrimp Harvest

[b] Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3079.584	421.836		7.300	.000	2204.749	3954.419
	January-February Inflows	-.635	.199	-.705	-3.189	.004	-1.048	-.222
	March-April Inflows	.310	.157	.417	1.969	.062	-.016	.636
	May-June Inflows	-1.511E-02	.125	-.026	-.121	.905	-.273	.243
	July-August Inflows	-.355	.239	-.279	-1.486	.151	-.851	.141
	September-October Inflows	3.687E-02	.186	.035	.198	.845	-.350	.423
	November-December Inflows	.487	.168	.611	2.906	.008	.140	.835

a. Dependent Variable: White Shrimp Harvest

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	January-February Inflows	.511	1.957
	March-April Inflows	.557	1.796
	May-June Inflows	.566	1.767
	July-August Inflows	.707	1.414
	September-October Inflows	.807	1.240
	November-December Inflows	.565	1.770

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	January-February Inflows	March-April Inflows
1	1	5.541	1.000	.00	.00	.00
	2	.608	3.019	.00	.00	.07
	3	.266	4.562	.04	.03	.07
	4	.230	4.904	.00	.00	.12
	5	.171	5.698	.01	.26	.23
	6	.106	7.244	.89	.01	.13
	7	7.785E-02	8.437	.05	.69	.38

a. Dependent Variable: White Shrimp Harvest

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		May-June Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	.00	.01	.01	.01
	2	.03	.05	.20	.05
	3	.00	.02	.33	.35
	4	.06	.80	.03	.05
	5	.42	.01	.01	.02
	6	.05	.03	.43	.02
	7	.43	.09	.00	.50

a. Dependent Variable: White Shrimp Harvest

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1484.5918	3927.6738	2897.4207	664.4422	29
Std. Predicted Value	-2.126	1.551	.000	1.000	29
Standard Error of Predicted Value	266.9057	576.4986	396.3361	94.9831	29
Adjusted Predicted Value	1565.7291	4034.1616	2891.3560	685.6245	29
Residual	-2093.7151	1777.4014	5.488E-13	734.6246	29
Std. Residual	-2.526	2.145	.000	.886	29
Stud. Residual	-2.733	2.361	.003	.999	29
Deleted Residual	-2450.0974	2154.2524	6.0647	940.1981	29
Stud. Deleted Residual	-3.285	2.670	-.011	1.094	29
Mahal. Distance	1.939	12.583	5.793	3.236	29
Cook's Distance	.000	.182	.040	.058	29
Centered Leverage Value	.069	.449	.207	.116	29

a. Dependent Variable: White Shrimp Harvest

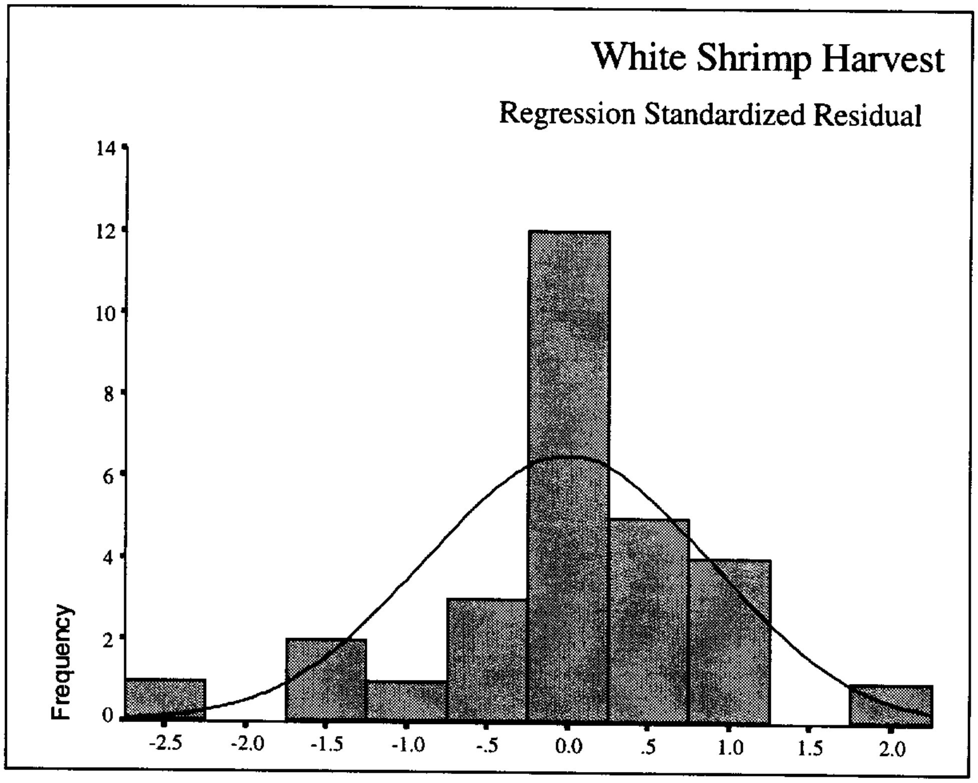
Case Values for Residuals Diagnostics

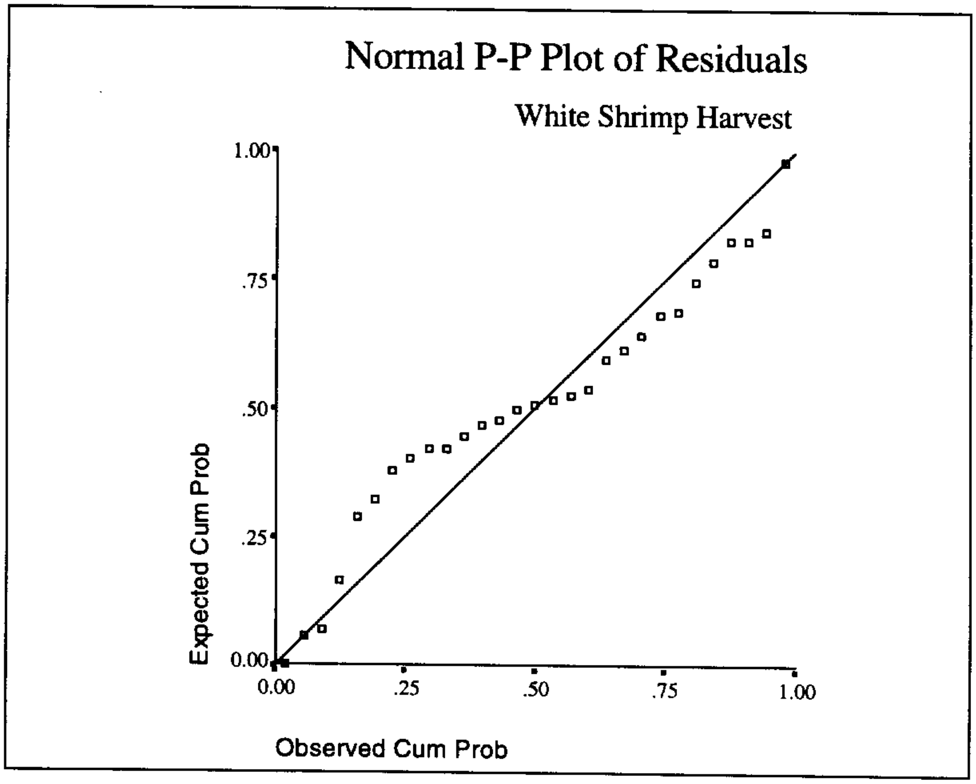
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1959	1781.09536	-799.09536	-1157.40312	2139.40312	-1.68009	-.96420	-1.16040	-1.17010
1960	1794.88297	-198.48297	-236.16541	1832.56541	-1.65934	-.23949	-.26124	-.25563
1961	1484.59175	-377.89175	-732.16632	1838.86632	-2.12634	-.45597	-.63468	-.62584
1962	3482.66698	-158.26698	-185.22946	3509.62946	.88081	-.19097	-.20659	-.20204
1963	3133.12011	-105.82011	-118.45241	3145.75241	.35473	-.12768	-.13509	-.13204
1964	2923.29860	1777.40140	2154.25242	2546.44758	.03895	2.14463	2.36106	*2.66968
1965	3050.00766	16.19234	18.06610	3048.13390	.22965	.01954	.02064	.02016
1966	2463.38379	-1203.38379	-1596.74751	2856.74751	-.65323	-1.45201	-1.67258	-1.74911
1967	3132.51513	-2093.71513	-2450.09743	3488.89743	.35382	-2.52630	-2.73286	*-3.28528
1968	2772.10491	-255.30491	-380.15049	2896.95049	-.18860	-.30805	-.37590	-.36844
1969	3499.59831	310.00169	402.17603	3407.42397	.90629	.37405	.42605	.41798
1970	3618.81443	1.78557	2.15354	3618.44646	1.08571	.00215	.00237	.00231
1971	3121.98088	-159.18088	-193.55801	3156.35801	.33797	-.19207	-.21180	-.20714
1972	2941.44900	246.95100	279.15835	2909.24165	.06626	.29797	.31681	.31023
1973	3289.11074	788.58926	1165.89782	2911.80218	.58950	.95152	1.15697	1.16641
1974	2306.90844	85.49156	161.48396	2230.91604	-.88873	.10315	.14177	.13858
1975	3891.04057	36.15943	56.67604	3870.52396	1.49542	.04363	.05462	.05337
1976	3000.17371	401.92629	462.58174	2939.51826	.15465	.48497	.52028	.51147
1977	3634.94279	-1298.74279	-1697.96169	4034.16169	1.10999	-1.56708	-1.79181	-1.89429
1978	2285.00990	790.59010	966.88407	2108.71593	-.92169	.95393	1.05494	1.05779
1979	1968.44450	60.25550	100.96461	1927.73539	-1.39813	.07270	.09411	.09197
1980	2585.40542	856.19458	1093.45191	2348.14809	-.46959	1.03309	1.16749	1.17771
1981	2516.58465	205.81535	336.87811	2385.52189	-.57317	.24834	.31772	.31113
1982	3499.41318	-43.01318	-54.02081	3510.42081	.90601	-.05190	-.05816	-.05683
1983	2096.68202	666.21798	1197.17083	1565.72917	-1.20513	.80387	1.07759	1.08175
1984	3048.26526	556.03474	623.02454	2981.27546	.22702	.67092	.71018	.70195
1985	3077.01390	-453.81390	-522.08054	3145.28054	.27029	-.54758	-.58732	-.57837
1986	3699.02121	409.27879	560.24050	3548.05950	1.20643	.49384	.57778	.56883
1987	3927.67382	-62.17382	-81.15071	3946.65071	1.55055	-.07502	-.08571	-.08375

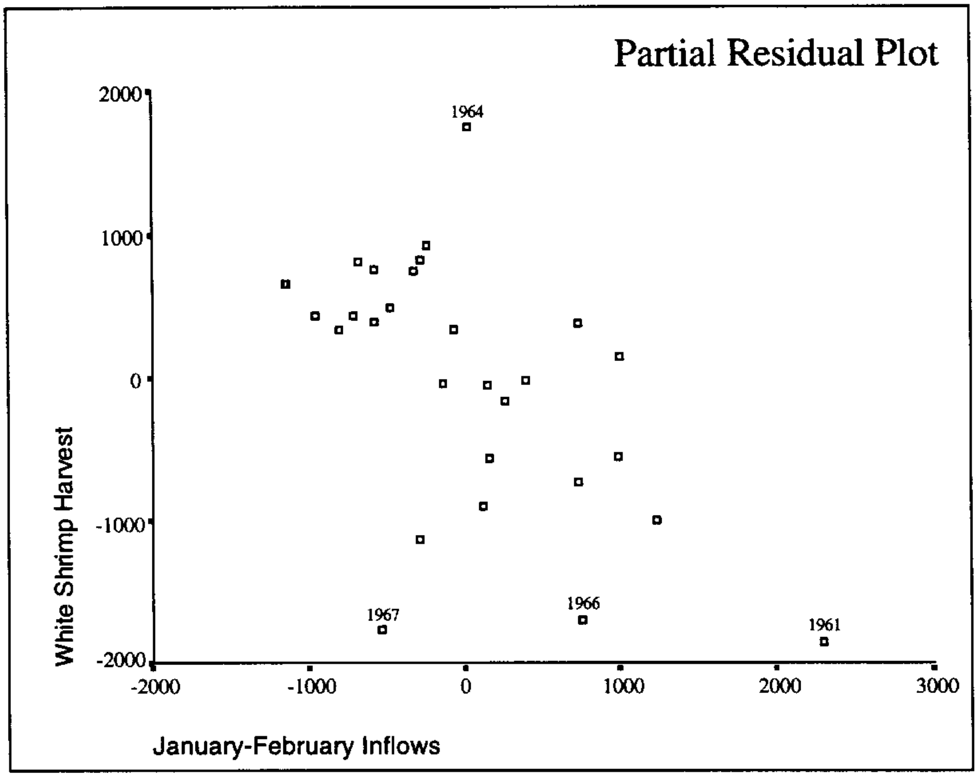
PRE_1	Predicted value of harvest
RES_1	Ordinary residual; observed harvest minus predicted harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

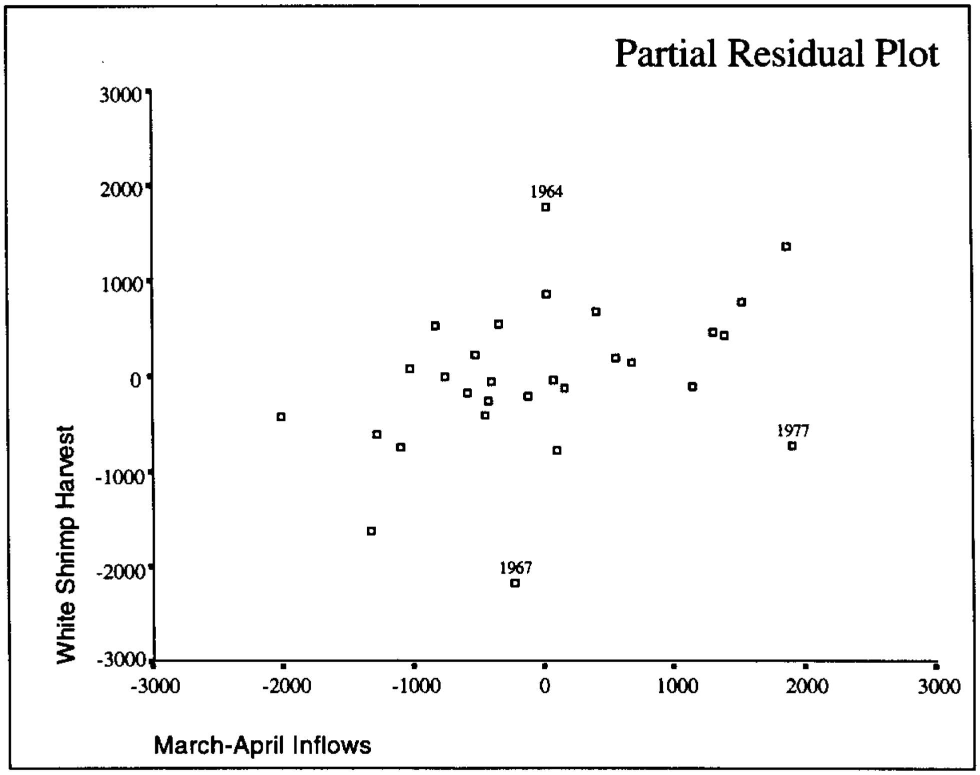
[1] Values greater than 3 are flagged.

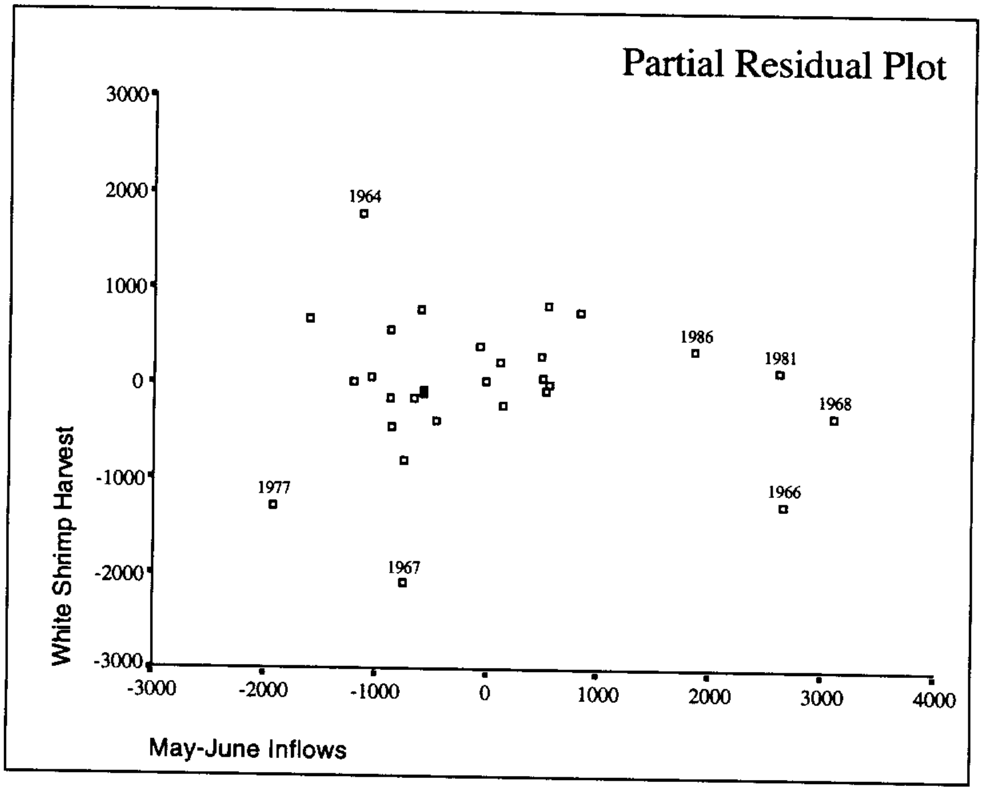
[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{21,0.01} = 2.518$.


White Shrimp Harvest
Regression Standardized Residual
Frequency
14
12
10
8
6
4
2
0
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
2.0

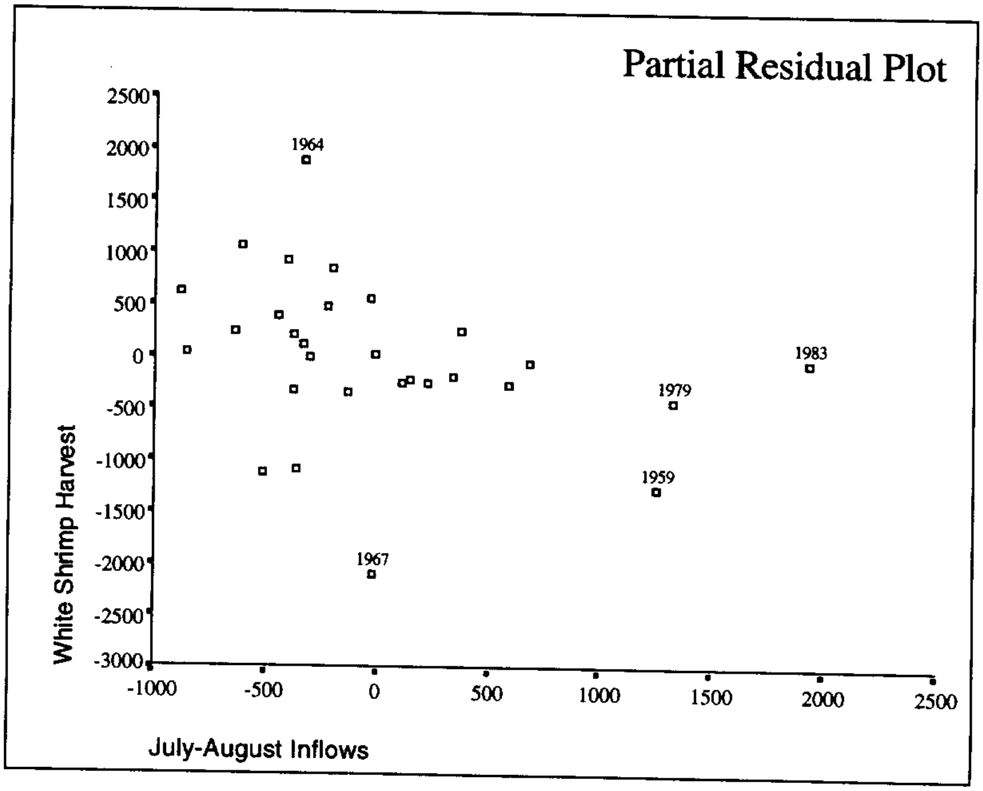

Normal P-P Plot of Residuals
White Shrimp Harvest
Expected Cum Prob
1.00
.75
.50
.25
0.00
0.00
.25
.50
.75
1.00
Observed Cum Prob


Partial Residual Plot
White Shrimp Harvest
2000
1000
0
-1000
-2000
-2000
-1000
0
1000
2000
3000
January-February Inflows
1964
1967
1966
1961

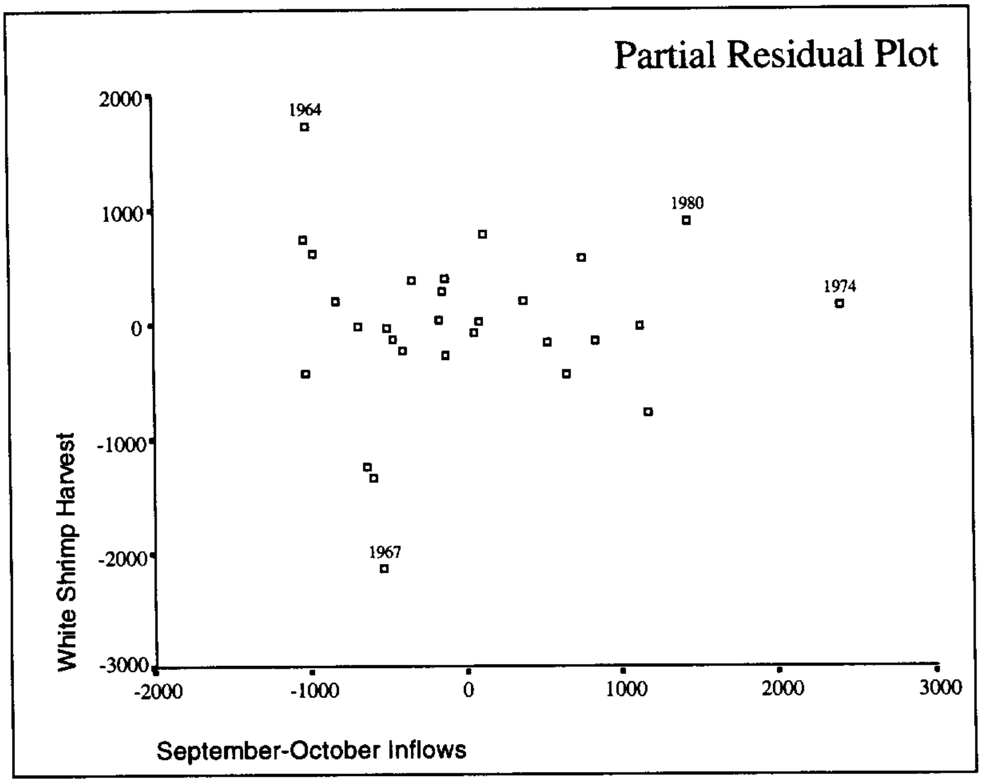

Partial Residual Plot
White Shrimp Harvest
3000
2000
1000
0
-1000
-2000
-3000
-3000
-2000
-1000
0
1000
2000
3000
March-April Inflows
1964
1977
1967

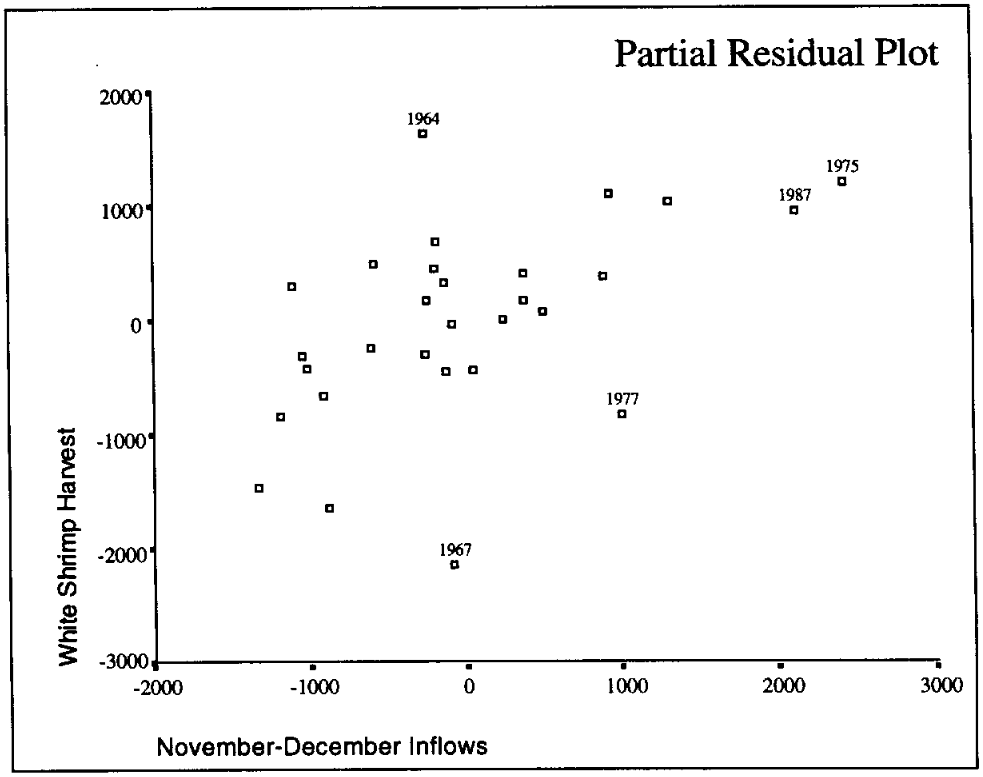


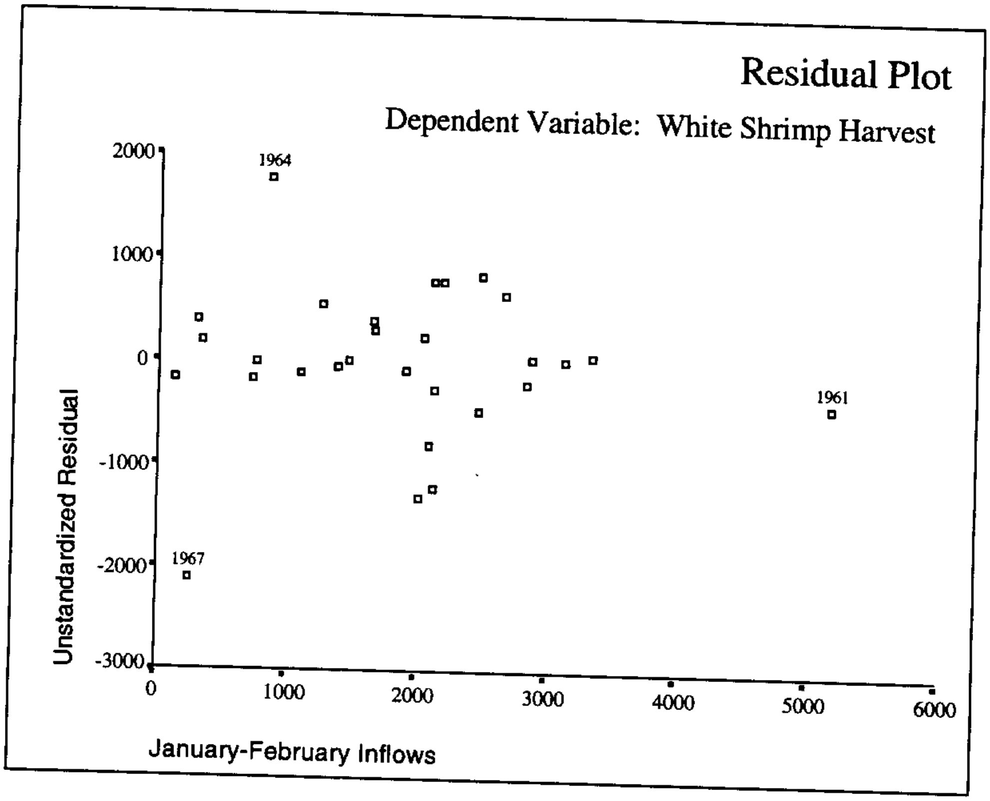
Partial Residual Plot
White Shrimp Harvest
3000
2000
1000
0
-1000
-2000
-3000
-3000
-2000
-1000
0
1000
2000
3000
4000
May-June Inflows
1964
1986
1981
1968
1977
1966
1967



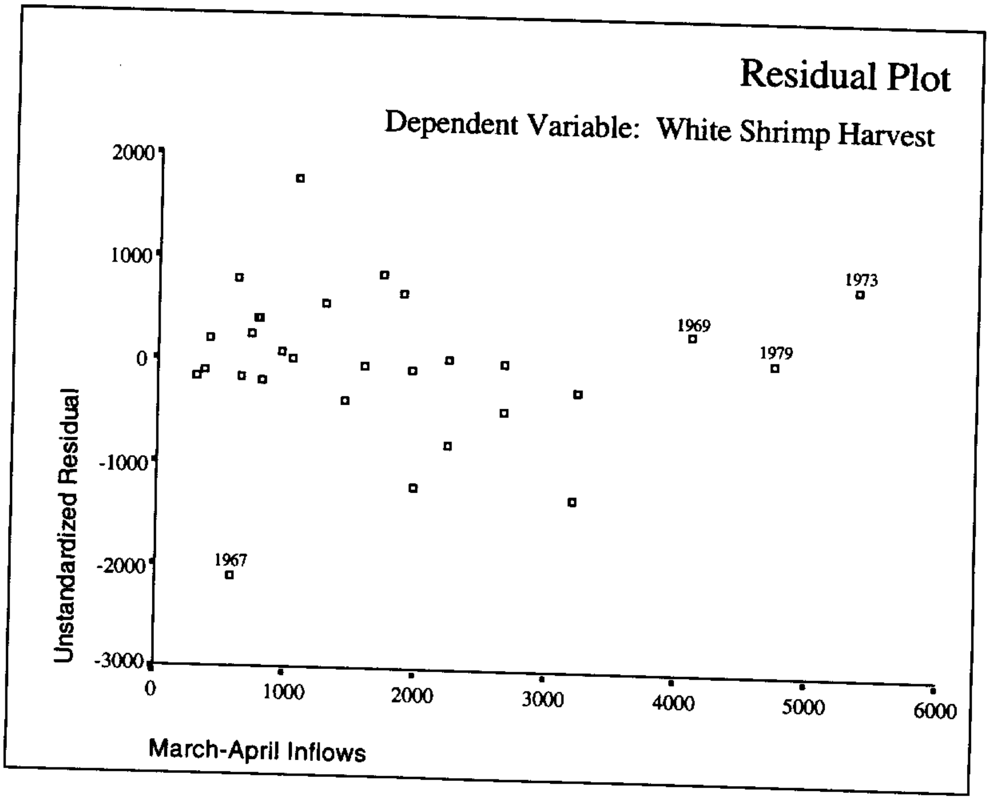
Partial Residual Plot
White Shrimp Harvest
2500
2000
1500
1000
500
0
-500
-1000
-1500
-2000
-2500
-3000
-1000
-500
0
500
1000
1500
2000
2500
July-August Inflows
1964
1983
1979
1959
1967


Partial Residual Plot
White Shrimp Harvest
2000
1000
0
-1000
-2000
-3000
-2000
-1000
0
1000
2000
3000
September-October Inflows
1964
1980
1974
1967

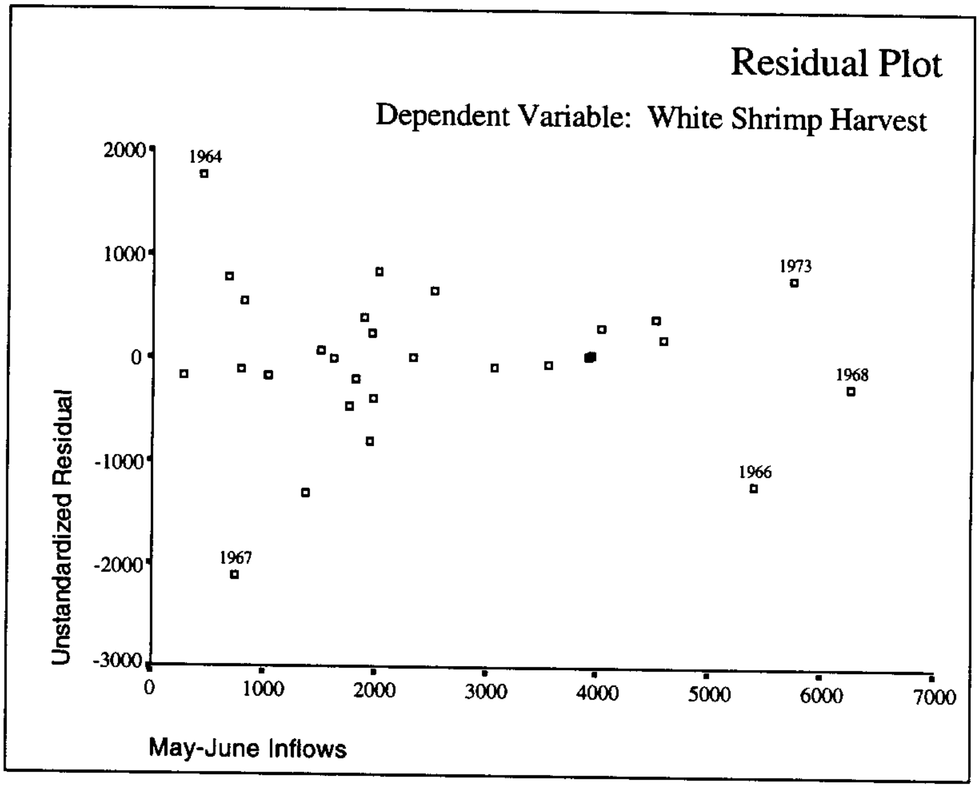

Partial Residual Plot
White Shrimp Harvest
2000
1000
0
-1000
-2000
-3000
-2000
-1000
0
1000
2000
3000
November-December Inflows
1964
1975
1987
1977
1967

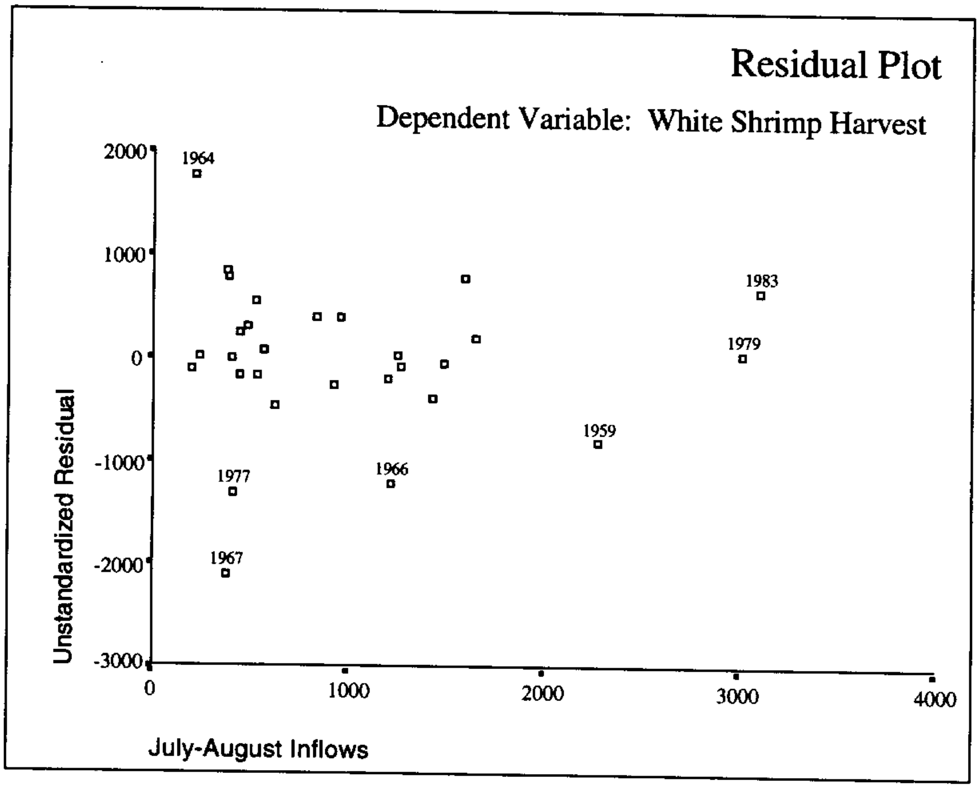


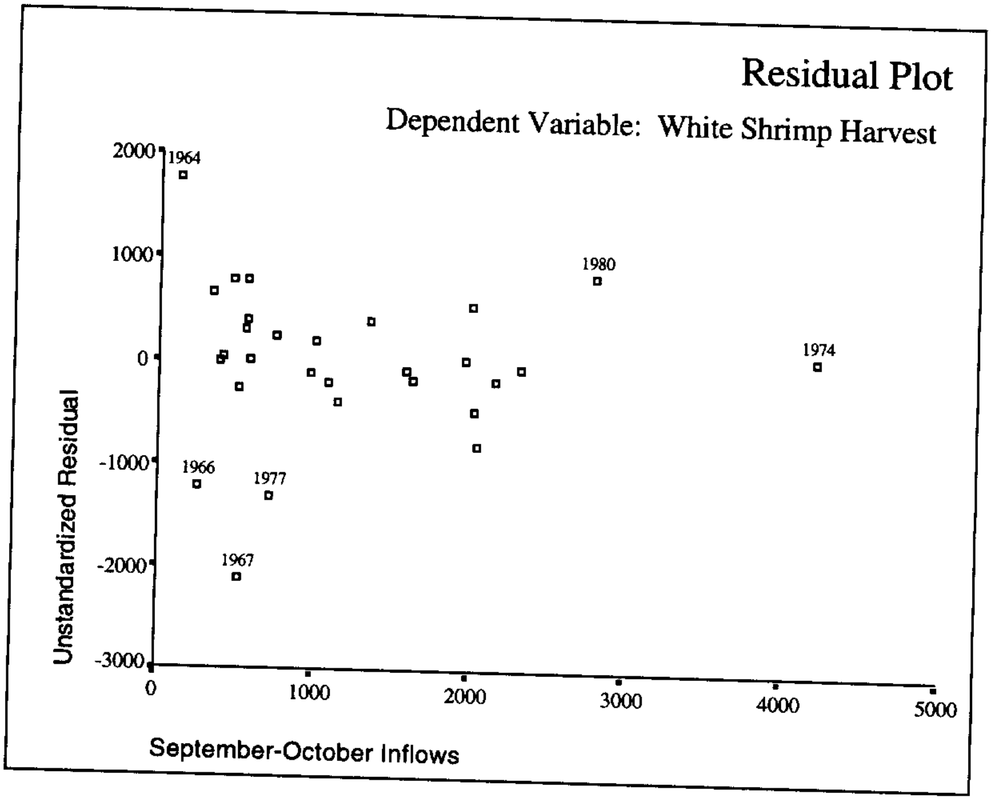
Residual Plot
Dependent Variable: White Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
-3000
1964
1967
1961
0
1000
2000
3000
4000
5000
6000
January-February Inflows

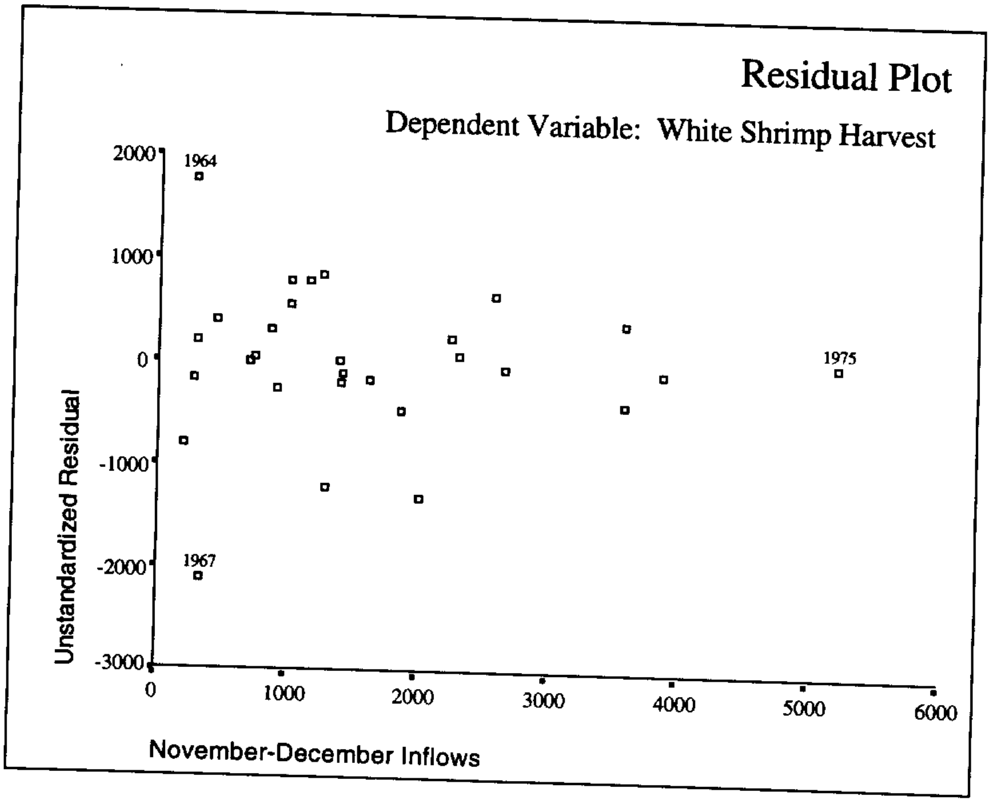


Residual Plot
Dependent Variable: White Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
-3000
1967
1969
1979
1973
0
1000
2000
3000
4000
5000
6000
March-April Inflows


Residual Plot
Dependent Variable: White Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
-3000
1964
1967
1973
1968
1966
0
1000
2000
3000
4000
5000
6000
7000
May-June Inflows


Residual Plot
Dependent Variable: White Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
-3000
1964
1983
1979
1959
1977
1966
1967
0
1000
2000
3000
4000
July-August Inflows


Residual Plot
Dependent Variable: White Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
-3000
0
1000
2000
3000
4000
5000
September-October Inflows
1964
1980
1974
1966
1977
1967


Residual Plot
Dependent Variable: White Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
-3000
0
1000
2000
3000
4000
5000
6000
November-December Inflows
1964
1975
1967

Prediction Intervals for White Shrimp Harvest

YEAR	WHSHRIMP	LICI_1	UICI_1
1959	982.00	-892.25870	4454.44942
1960	1596.40	-720.69130	4310.45725
1961	1106.70	-1361.10619	4330.28968
1962	3324.40	982.32141	5983.01254
1963	3027.30	675.61356	5590.62667
1964	4700.70	391.10287	5455.49434
1965	3066.20	595.75390	5504.26143
1966	1260.00	-144.63774	5071.40532
1967	1038.80	632.28549	5632.74476
1968	2516.80	79.59791	5464.61191
1969	3809.60	909.59712	6089.59950
1970	3620.60	1091.00112	6146.62774
1971	2962.80	586.90662	5657.05514
1972	3188.40	474.26982	5408.62818
1973	4077.70	601.46279	5976.75870
1974	2392.40	-526.02334	5139.84021
1975	3927.20	1164.70791	6617.37323
1976	3402.10	515.63549	5484.71193
1977	2336.20	1038.70424	6231.18133
1978	3075.60	-255.14590	4825.16570
1979	2028.70	-798.82012	4735.70913
1980	3441.60	8.29894	5162.51191
1981	2722.40	-236.69112	5269.86041
1982	3456.40	936.33568	6062.49069
1983	2762.90	-710.04366	4903.40769
1984	3604.30	589.78286	5506.74767
1985	2623.20	592.87650	5561.15130
1986	4108.30	1066.93616	6331.10625
1987	3865.50	1332.76944	6522.57821

WHSHRIMP	White shrimp harvest
LICI_1	Lower limit for 99% prediction interval for white shrimp harvest
UICI_1	Upper limit for 99% prediction interval for white shrimp harvest

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1959	-.78352	.08897	-.04264	-.02848
1960	-.11138	-.02855	-.08251	.06756
1961	-.60597	.05567	-.48122	.18138
1962	-.08339	-.02788	.04985	-.00693
1963	-.04562	-.03951	.00437	.01113
1964	*1.22928	*1.14666	.02362	.02052
1965	.00686	.00468	.00135	-.00234
1966	*-1.00003	-.05529	-.36746	.50692
1967	*-1.35541	*-1.30076	.45782	.14810
1968	-.25765	.03098	-.07888	.03803
1969	.22792	.01149	-.00722	.13893
1970	.00105	.00061	-.00043	.00067
1971	-.09626	-.06331	.04358	.00469
1972	.11204	.06208	.03168	-.04675
1973	.80682	-.23798	-.08112	.50586
1974	.13065	-.04666	.04530	-.01409
1975	.04020	-.01361	-.00925	.00719
1976	.19869	.15355	-.08945	-.05341
1977	*-1.05024	-.27323	.14909	-.78498
1978	.49951	.34335	.28083	-.18234
1979	.07559	-.01519	.00427	.02974
1980	.61996	-.11048	.23474	.01028
1981	.24828	.04169	-.04518	-.15166
1982	-.02875	.00704	.01733	-.00100
1983	.96571	.04344	-.09572	-.09107
1984	.24365	.08719	-.05663	.05965
1985	-.22432	.02437	-.02377	-.13545
1986	.34547	-.00565	-.09176	-.12910
1987	-.04627	.00480	.02644	-.01254

SDFFITS	Standardized dffits value
SDFBETA_0	Standardized dfbeta for the intercept term
SDFBETA_1	Standardized dfbeta for January-February inflows
SDFBETA_2	Standardized dfbeta for March-April inflows

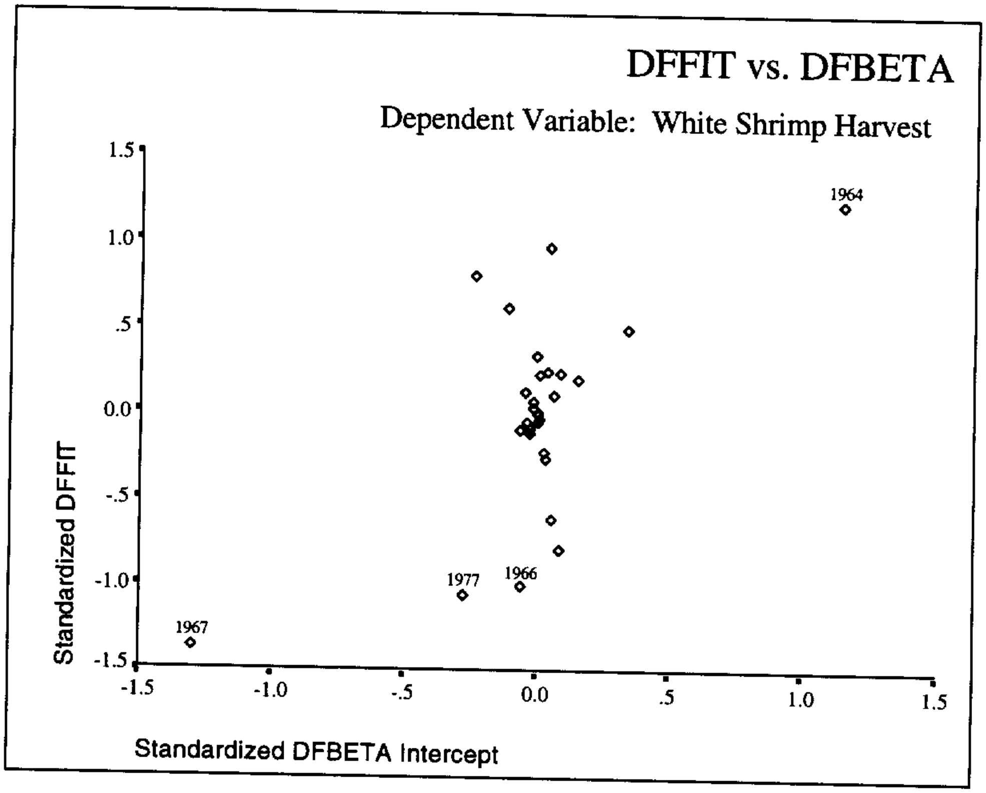
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

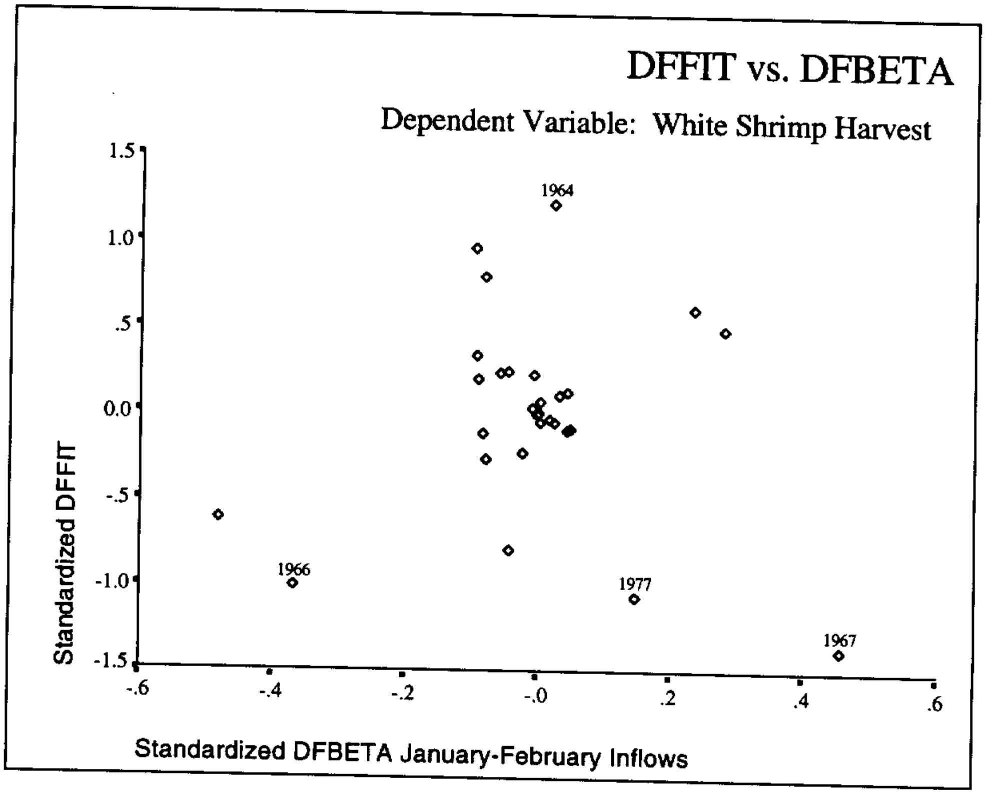
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1959	0.15654	-.51241	-.37237	.37761
1960	-0.00620	-.00914	.02533	.05164
1961	0.06001	.03328	.20137	.02143
1962	0.02146	-.00942	-.04130	-.02225
1963	0.01202	.01216	.01439	-.00701
1964	-0.49954	-.27845	-.66961	-.15358
1965	0.00178	-.00392	-.00330	-.00037
1966	-0.80592	.20859	.28867	.35753
1967	0.39643	.01385	.42332	.05648
1968	-0.21008	.11029	.01280	.10786
1969	0.03479	-.12076	-.01499	-.02333
1970	-0.00046	-.00024	-.00029	.00019
1971	0.03000	-.01491	-.02731	.01187
1972	0.00573	-.04223	-.06166	.02490
1973	0.17606	-.08321	.04031	-.05383
1974	0.01427	-.02047	.10305	-.03898
1975	-0.00022	-.00021	.00140	.03280
1976	-0.00566	.05958	-.04203	-.01533
1977	0.62236	.32069	.28927	-.43671
1978	-0.10494	-.13666	-.27140	-.13916
1979	-0.01881	.04560	-.00433	-.01457
1980	0.10913	-.23503	.42912	-.29710
1981	0.15702	.07916	.03419	-.08423
1982	-0.00500	-.01095	-.01608	-.01151
1983	-0.34944	.81061	-.31797	.27285
1984	-0.09826	-.00671	.12636	-.02860
1985	0.08068	.06698	-.09185	-.00639
1986	0.18559	-.04286	-.01851	.17598
1987	0.00822	-.00954	-.00123	-.04086

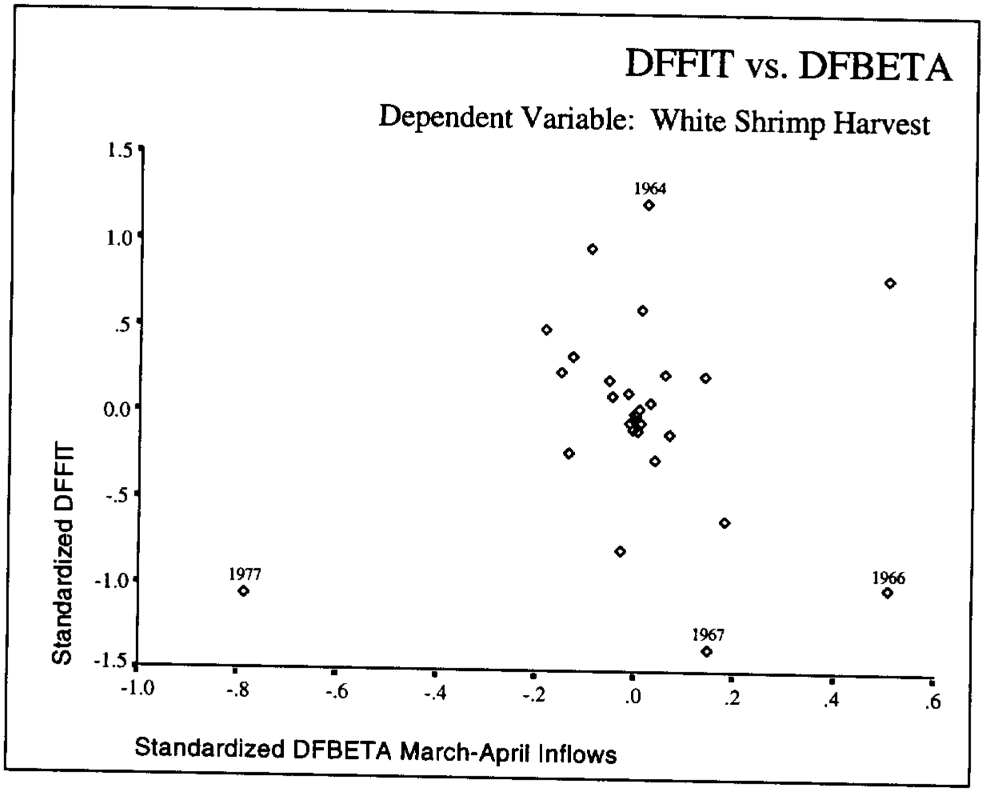
SDFBETA_3	Standardized dfbeta for May-June inflows
SDFBETA_4	Standardized dfbeta for July-August inflows
SDFBETA_5	Standardized dfbeta for September-October inflows
SDFBETA_6	Standardized dfbeta for November-December inflows

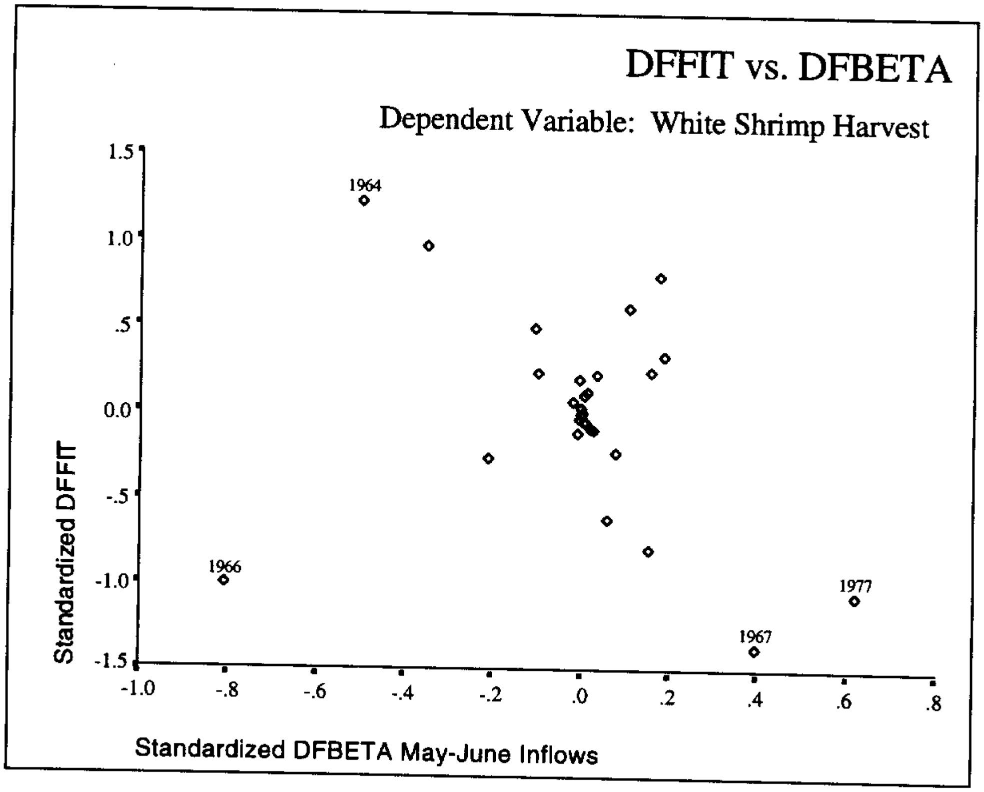
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

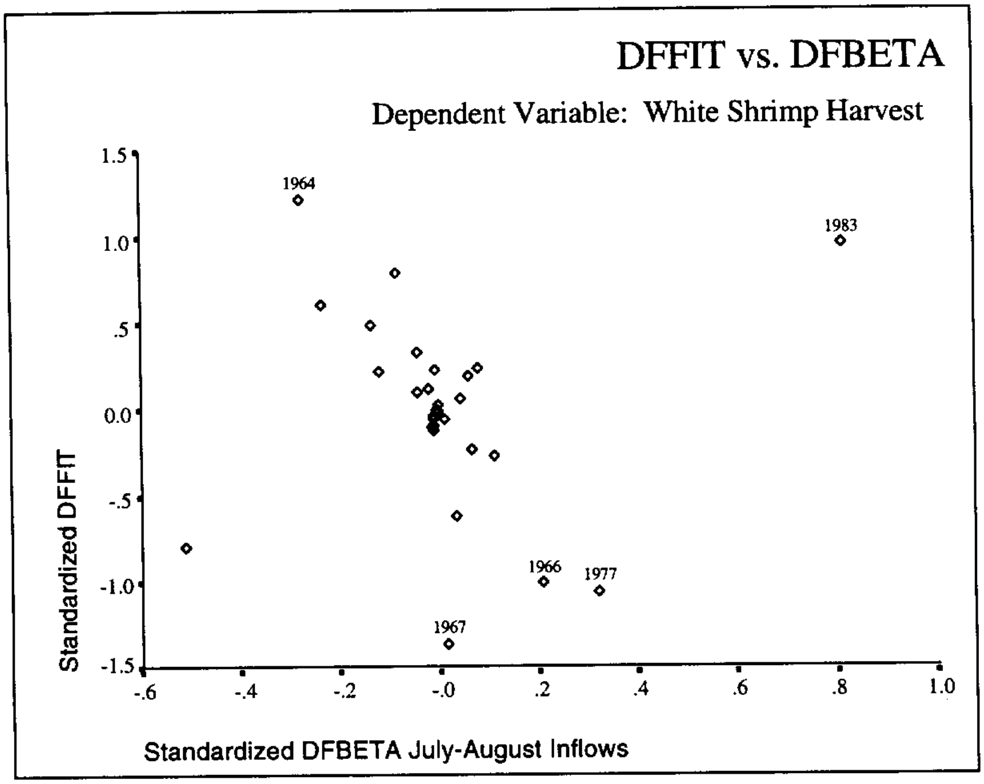
Graphics


DFFIT vs. DFBETA
Dependent Variable: White Shrimp Harvest
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
Standardized DFFIT
1964
1977
1966
1967
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
Standardized DFBETA Intercept


DFFIT vs. DFBETA
Dependent Variable: White Shrimp Harvest
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
Standardized DFFIT
1964
1966
1977
1967
-.6
-.4
-.2
-.0
.2
.4
.6
Standardized DFBETA January-February Inflows

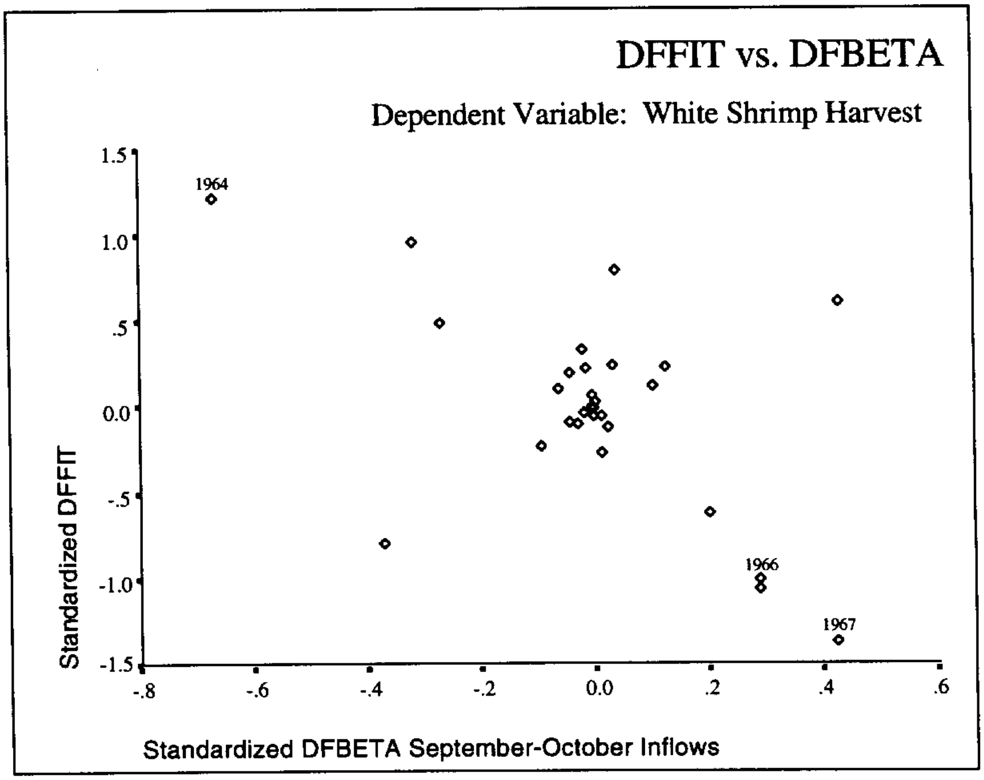

DFFIT vs. DFBETA
Dependent Variable: White Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Standardized DFBETA March-April Inflows
1964
1977
1966
1967


DFFIT vs. DFBETA
Dependent Variable: White Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
.8
Standardized DFBETA May-June Inflows
1964
1966
1977
1967



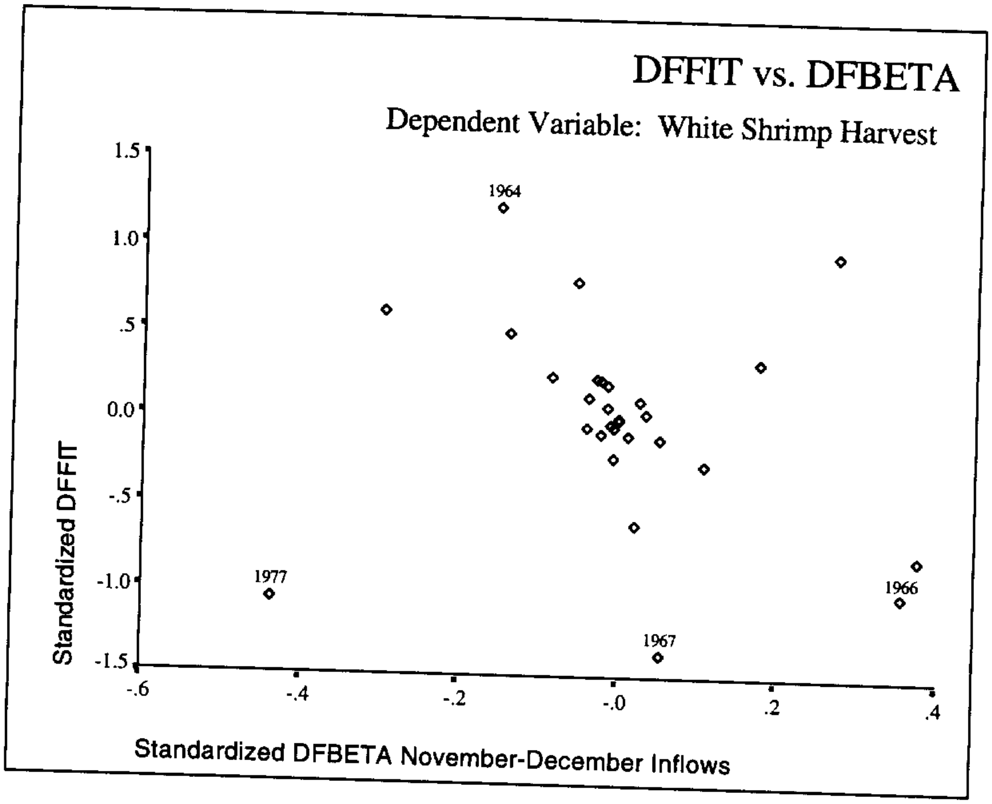
DFFIT vs. DFBETA

Dependent Variable: White Shrimp Harvest



DFFIT vs. DFBETA

Dependent Variable: White Shrimp Harvest


DFFIT vs. DFBETA
Dependent Variable: White Shrimp Harvest
1964
1977
1966
1967
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
Standardized DFFIT
-.6
-.4
-.2
-.0
.2
.4
Standardized DFBETA November-December Inflows

Regression—Logged Harvest

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	*November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows*[c,d]	.	*.650*	*.423*	*.265*	*.370089*	*1.462*

[a] Dependent Variable: Ln(White Shrimp Harvest)

[b] Method: Enter

[c] Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

[d] All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*2.207*	*6*	*.368*	*2.686*	*.041*[b]
	Residual	*3.013*	*22*	*.137*		
	Total	*5.220*	*28*			

[a] Dependent Variable: Ln(White Shrimp Harvest)

[b] Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	7.958	.188		42.249	.000	7.568	8.349		
	January-February Inflows	-2.691E-04	.000	-.686	-3.026	.006	.000	.000	.511	1.957
	March-April Inflows	1.296E-04	.000	.401	1.847	.078	.000	.000	.557	1.796
	May-June Inflows	-2.688E-06	.000	-.010	-.048	.962	.000	.000	.566	1.767
	July-August Inflows	-1.518E-04	.000	-.274	-1.421	.169	.000	.000	.707	1.414
	September-October Inflows	3.127E-05	.000	.068	.376	.711	.000	.000	.807	1.240
	November-December Inflows	2.001E-04	.000	.576	2.674	.014	.000	.000	.565	1.770

a. Dependent Variable: Ln(White Shrimp Harvest)

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	January-February Inflows	.511	1.957
	March-April Inflows	.557	1.796
	May-June Inflows	.566	1.767
	July-August Inflows	.707	1.414
	September-October Inflows	.807	1.240
	November-December Inflows	.565	1.770

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	January-February Inflows	March-April Inflows
1	1	5.541	1.000	.00	.00	.00
	2	.608	3.019	.00	.00	.07
	3	.266	4.562	.04	.03	.07
	4	.230	4.904	.00	.00	.12
	5	.171	5.698	.01	.26	.23
	6	.106	7.244	.89	.01	.13
	7	7.785E-02	8.437	.05	.69	.38

a. Dependent Variable: Ln(White Shrimp Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions May-June Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	.00	.01	.01	.01
	2	.03	.05	.20	.05
	3	.00	.02	.33	.35
	4	.06	.80	.03	.05
	5	.42	.01	.01	.02
	6	.05	.03	.43	.02
	7	.43	.09	.00	.50

a. Dependent Variable: Ln(White Shrimp Harvest)

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	7.281519	8.325120	7.895521	.280766	29
Std. Predicted Value	-2.187	1.530	.000	1.000	29
Standard Error of Predicted Value	.119187	.257437	.176985	4.24150E-02	29
Adjusted Predicted Value	7.222637	8.345042	7.892987	.297031	29
Residual	-1.042662	.563215	1.89886E-15	.328048	29
Std. Residual	-2.817	1.522	.000	.886	29
Stud. Residual	-3.048	1.675	.003	1.011	29
Deleted Residual	-1.220140	.701399	2.53426E-03	.431375	29
Stud. Deleted Residual	-3.917	1.753	-.033	1.131	29
Mahal. Distance	1.939	12.583	5.793	3.236	29
Cook's Distance	.000	.228	.046	.072	29
Centered Leverage Value	.069	.449	.207	.116	29

a. Dependent Variable: Ln(White Shrimp Harvest)

Case Values for Residuals Diagnostics

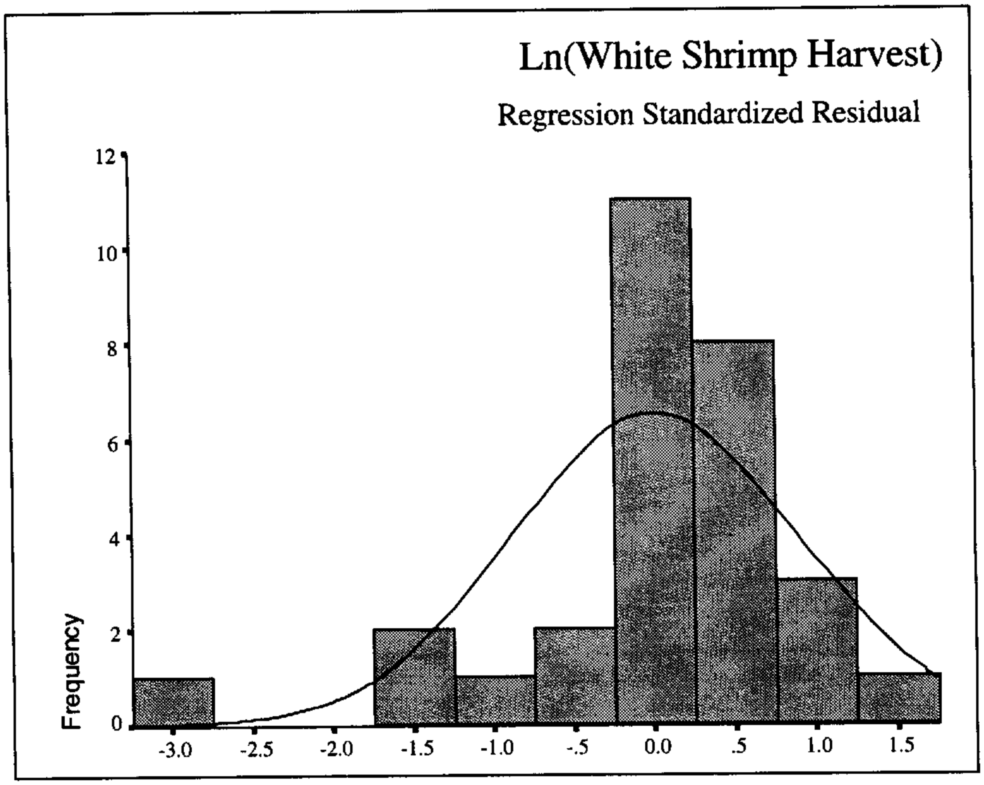
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1959	7.44016	-.55057	-.79745	7.68704	-1.62184	-1.48768	-1.79041	-1.89255
1960	7.42644	-.05093	-.06060	7.43611	-1.67073	-.13762	-.15012	-.14674
1961	7.28152	-.27238	-.52774	7.53688	-2.18689	-.73599	-1.02445	-1.02566
1962	8.15514	-.04609	-.05394	8.16299	.92466	-.12454	-.13473	-.13169
1963	7.98971	.02572	.02879	7.98664	.33547	.06948	.07351	.07183
1964	7.89225	.56321	.68263	7.77284	-.01164	1.52184	1.67542	1.75252
1965	7.95313	.07506	.08375	7.94445	.20519	.20282	.21424	.20953
1966	7.70889	-.57002	-.75635	7.89522	-.66473	-1.54023	-1.77419	-1.87253
1967	7.98848	-1.04266	-1.22014	8.16596	.33110	-2.81733	*-3.04769	*-3.91725
1968	7.84759	-.01685	-.02509	7.85583	-.17071	-.04553	-.05555	-.05428
1969	8.14776	.09752	.12652	8.11876	.89840	.26350	.30013	.29383
1970	8.19015	.00425	.00512	8.18927	1.04937	.01148	.01260	.01231
1971	8.00014	-.00625	-.00760	8.00149	.37261	-.01688	-.01862	-.01819
1972	7.90316	.16412	.18552	7.88175	.02719	.44346	.47149	.46299
1973	8.05990	.25339	.37462	7.93867	.58548	.68466	.83249	.82648
1974	7.68611	.09395	.17745	7.60260	-.74587	.25385	.34888	.34181
1975	8.30990	-.03421	-.05363	8.32931	1.47588	-.09245	-.11574	-.11312
1976	7.93555	.19660	.22626	7.90588	.14258	.53121	.56989	.56094
1977	8.19197	-.43569	-.56962	8.32590	1.05587	-1.17726	-1.34610	-1.37290
1978	7.62388	.40737	.49821	7.53304	-.96749	1.10074	1.21730	1.23151
1979	7.49319	.12196	.20436	7.41079	-1.43298	.32954	.42658	.41851
1980	7.78937	.35432	.45250	7.69119	-.37806	.95739	1.08193	1.08636
1981	7.74815	.16111	.26371	7.64556	-.52487	.43534	.55696	.54804
1982	8.16489	-.01690	-.02123	8.16921	.95940	-.04568	-.05119	-.05002
1983	7.53371	.39032	.70140	7.22264	-1.28865	1.05468	1.41380	1.44868
1984	7.97072	.21916	.24557	7.94432	.26784	.59219	.62684	.61798
1985	7.97896	-.10681	-.12288	7.99503	.29719	-.28861	-.30956	-.30310
1986	8.23417	.08660	.11854	8.20223	1.20615	.23399	.27376	.26792
1987	8.32512	-.06527	-.08520	8.34504	1.53010	-.17637	-.20150	-.19705

PRE_1	Predicted value of the natural log of harvest
RES_1	Ordinary residual; observed log harvest minus predicted log harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of the log of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of the log of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{21,0.01} = 2.518$.

Graphics


Ln(White Shrimp Harvest)
Regression Standardized Residual
Frequency
12
10
8
6
4
2
0
-3.0
-2.5
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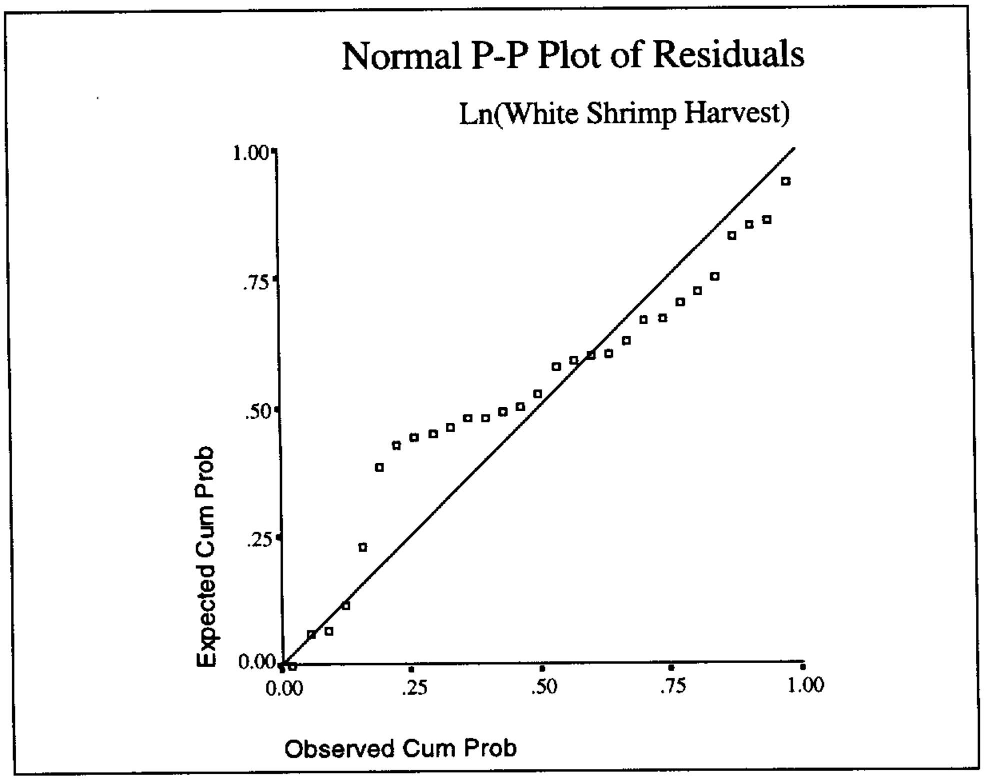
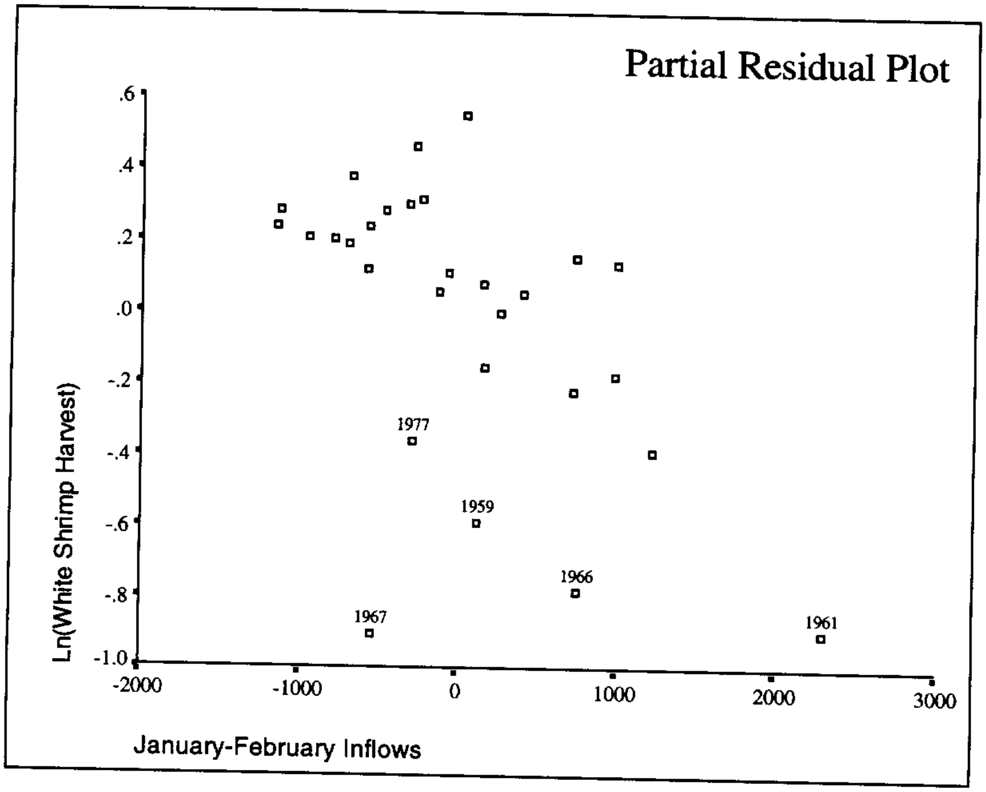
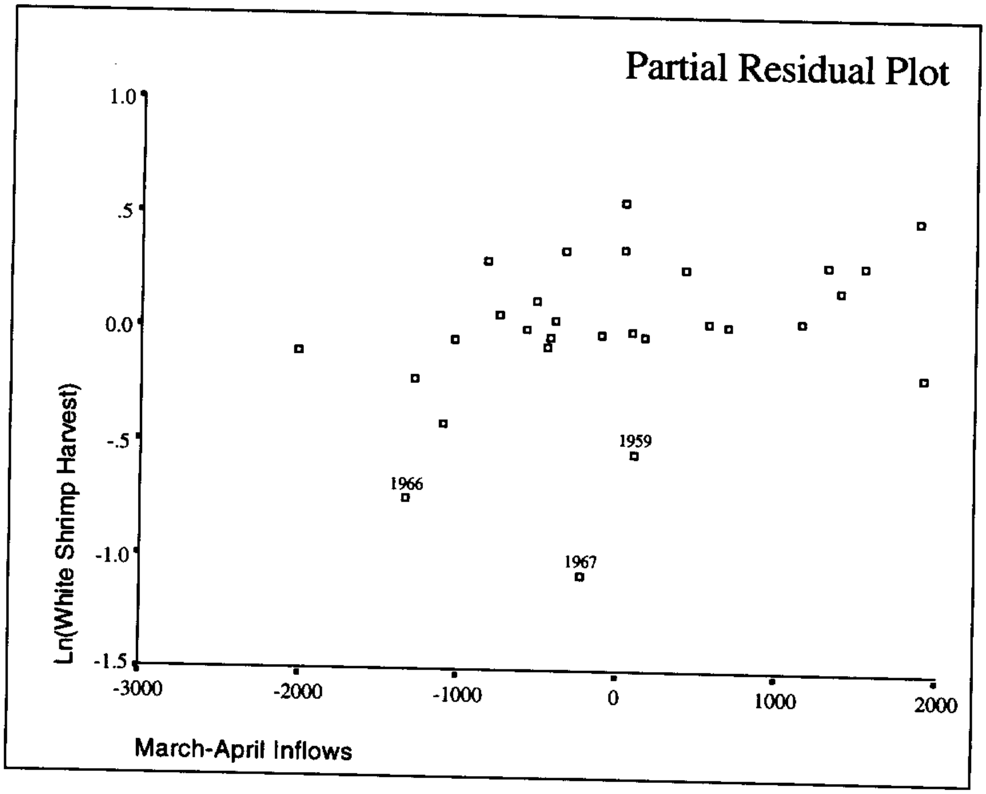
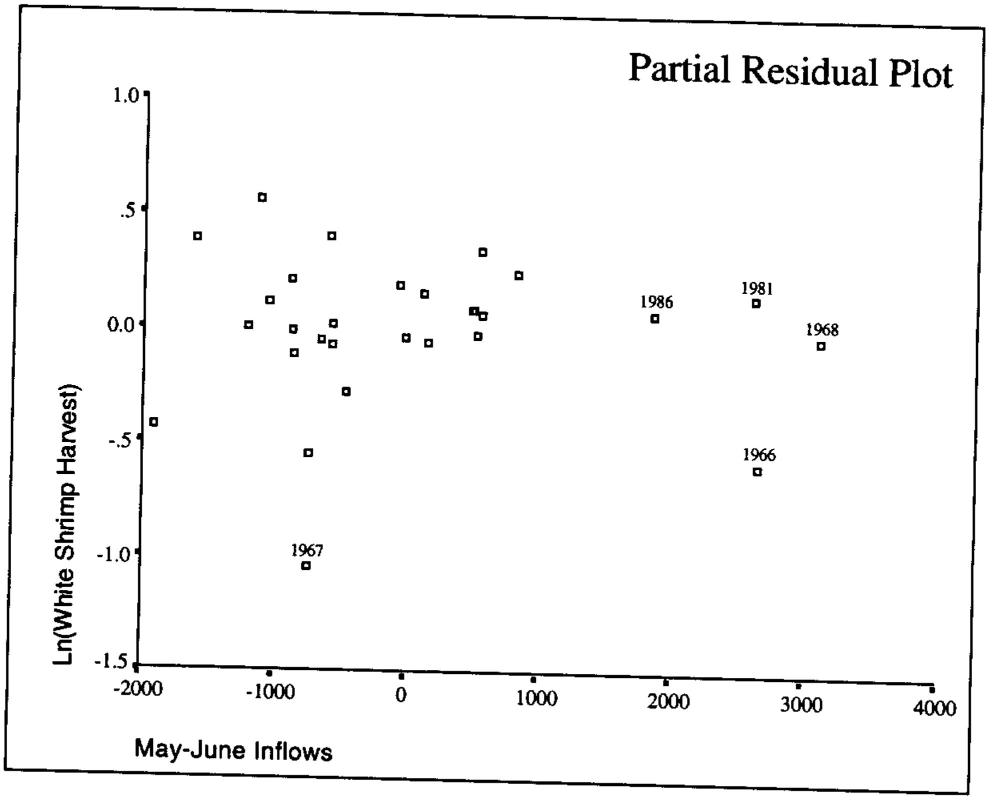
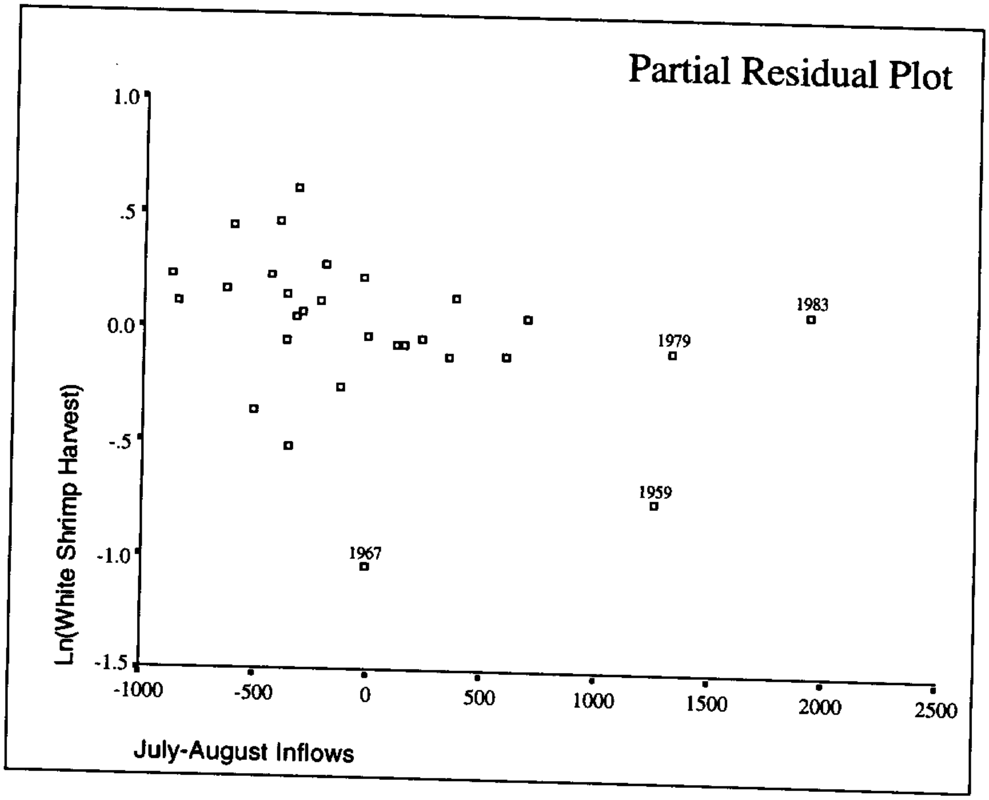
-1.0
-.5
0.0
.5
1.0
1.5

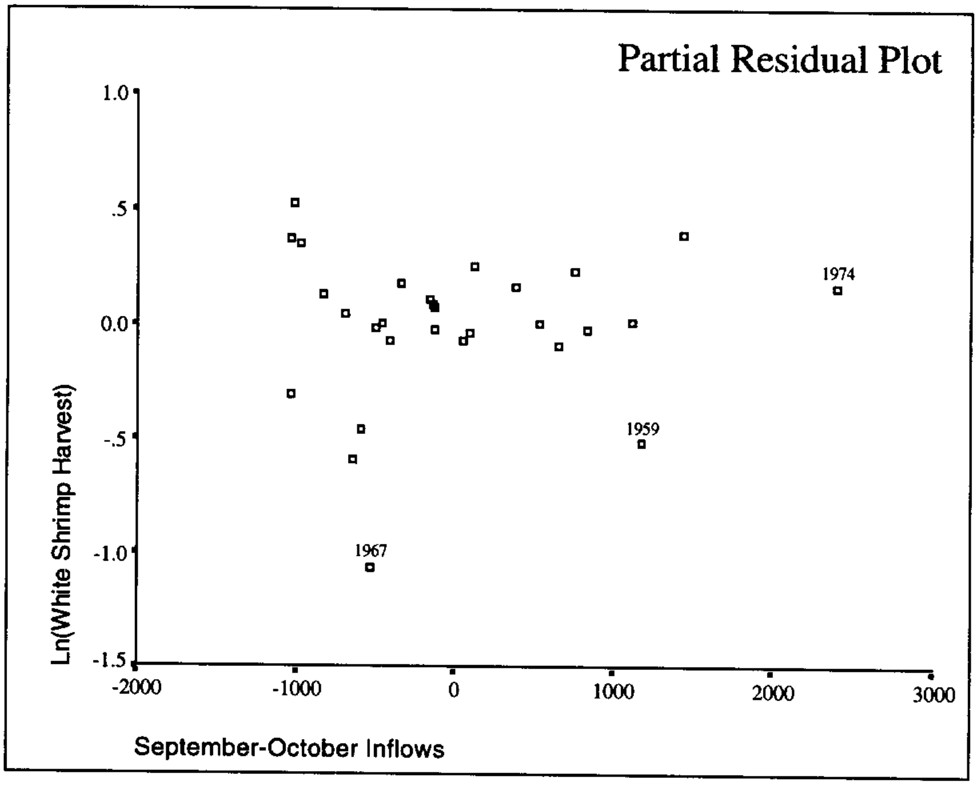

Normal P-P Plot of Residuals
Ln(White Shrimp Harvest)
Expected Cum Prob
1.00
.75
.50
.25
0.00
0.00
.25
.50
.75
1.00
Observed Cum Prob

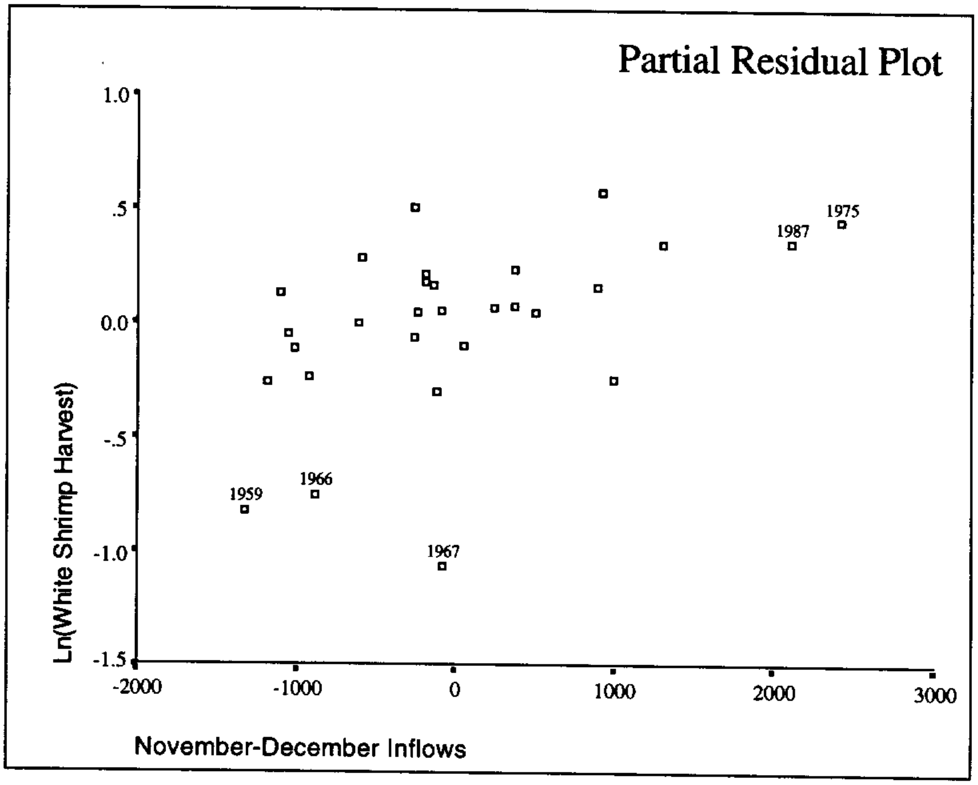

Partial Residual Plot
.6
.4
.2
.0
-.2
-.4
-.6
-.8
-1.0
Ln(White Shrimp Harvest)
1977
1959
1966
1967
1961
-2000
-1000
0
1000
2000
3000
January-February Inflows

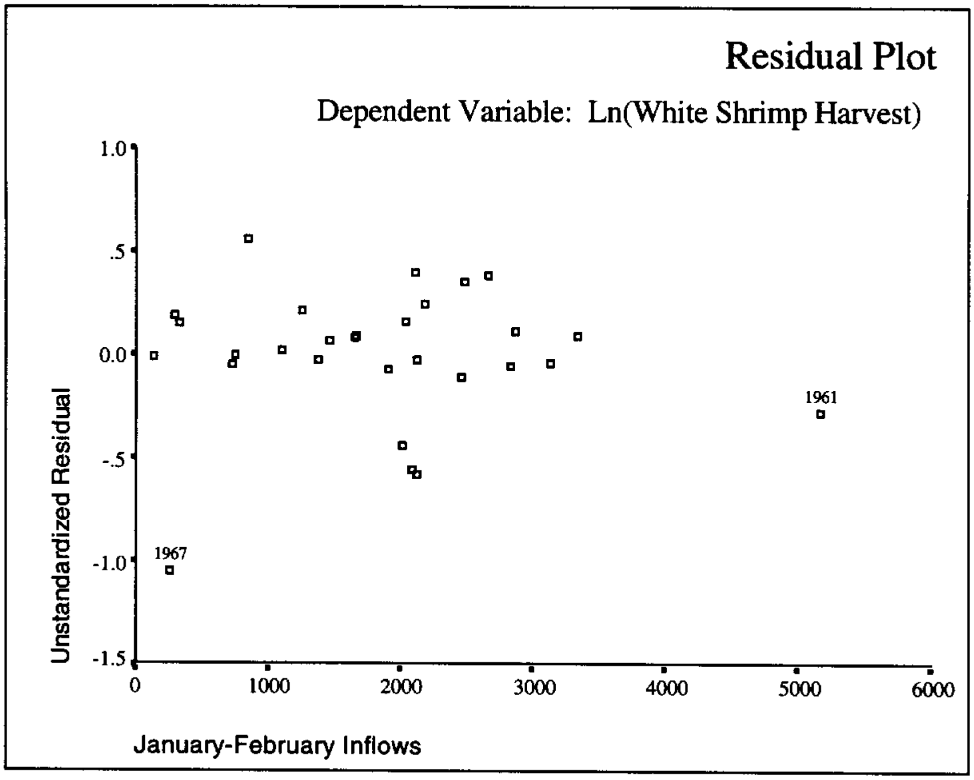

Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
Ln(White Shrimp Harvest)
1959
1966
1967
-3000
-2000
-1000
0
1000
2000
March-April Inflows

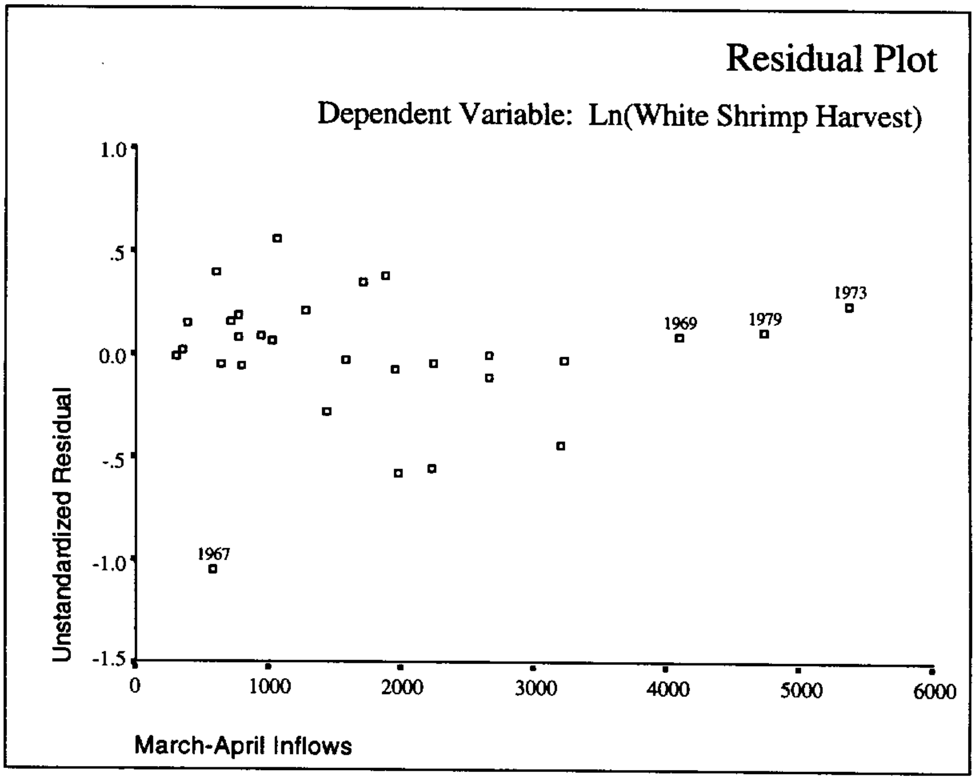

Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
Ln(White Shrimp Harvest)
-2000
-1000
0
1000
2000
3000
4000
May-June Inflows
1986
1981
1968
1966
1967

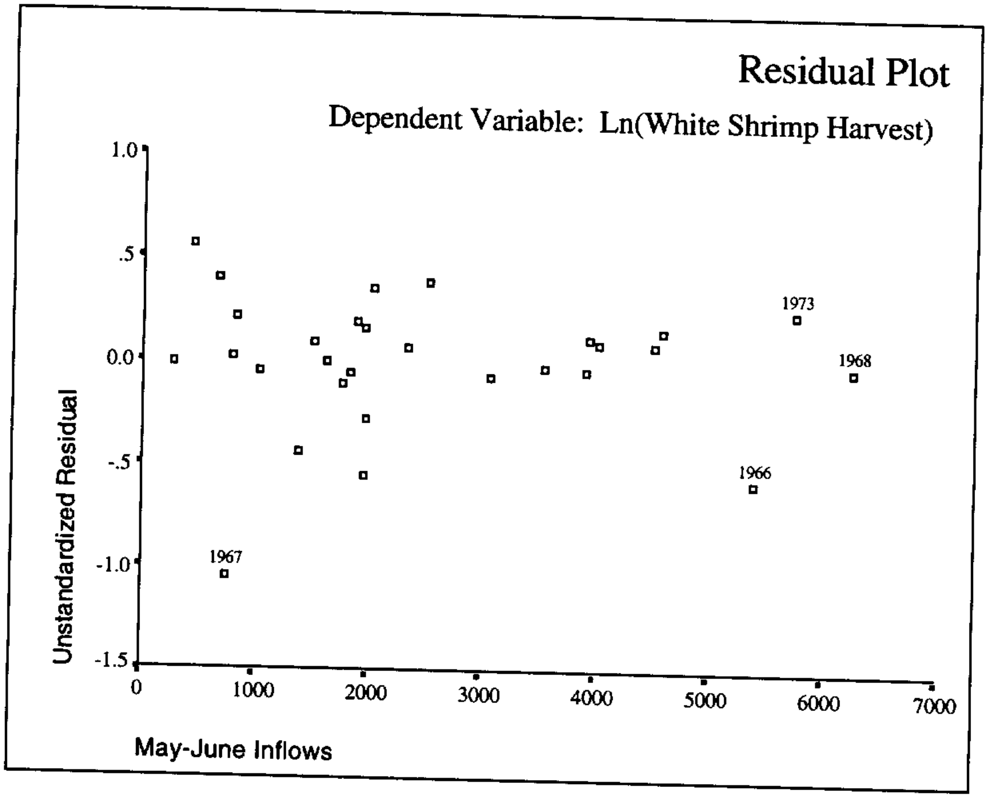

Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
Ln(White Shrimp Harvest)
-1000
-500
0
500
1000
1500
2000
2500
July-August Inflows
1983
1979
1959
1967

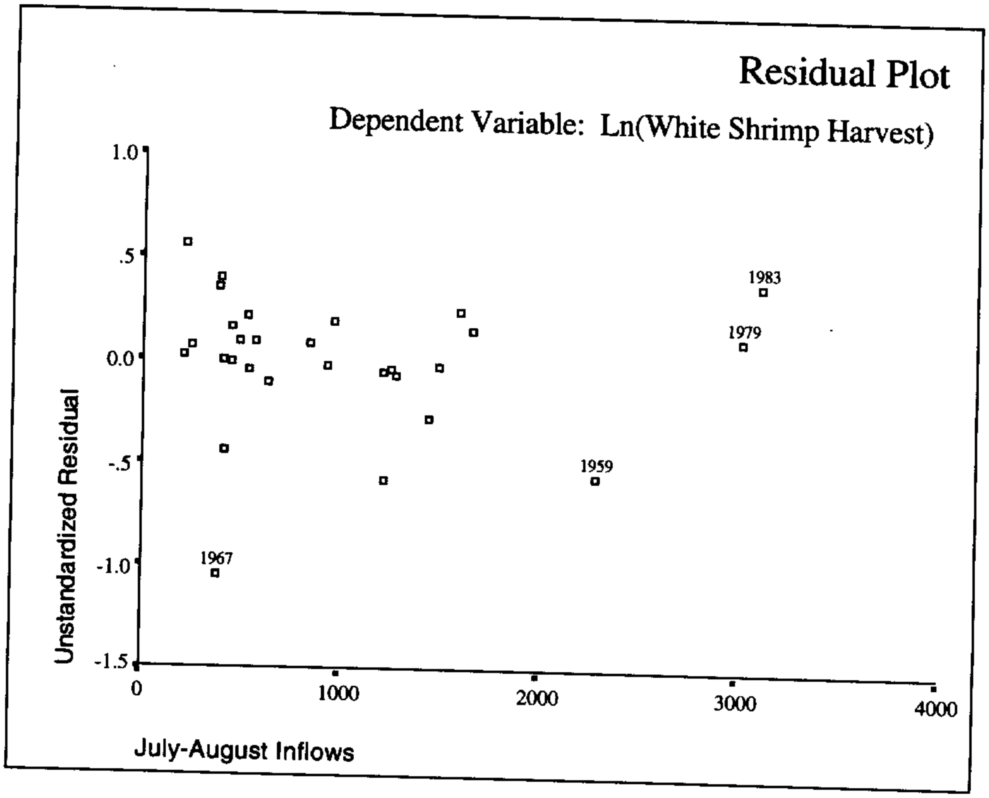

Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
Ln(White Shrimp Harvest)
-2000
-1000
0
1000
2000
3000
September-October Inflows
1974
1959
1967

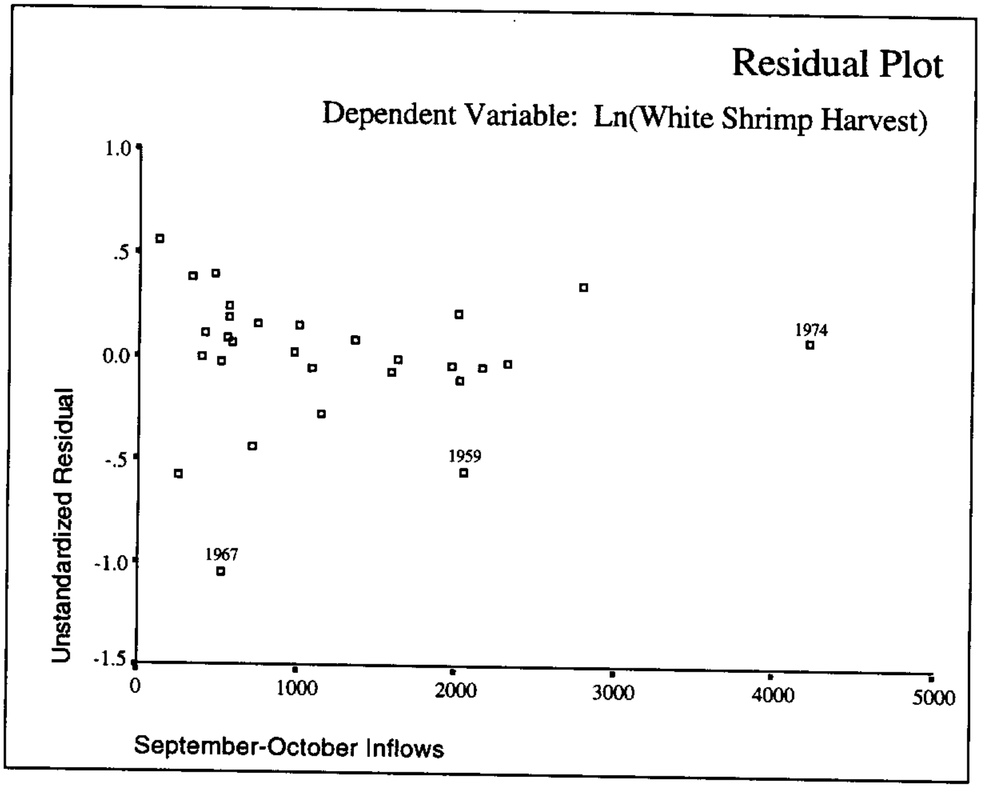

Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
Ln(White Shrimp Harvest)
-2000
-1000
0
1000
2000
3000
November-December Inflows
1975
1987
1966
1959
1967

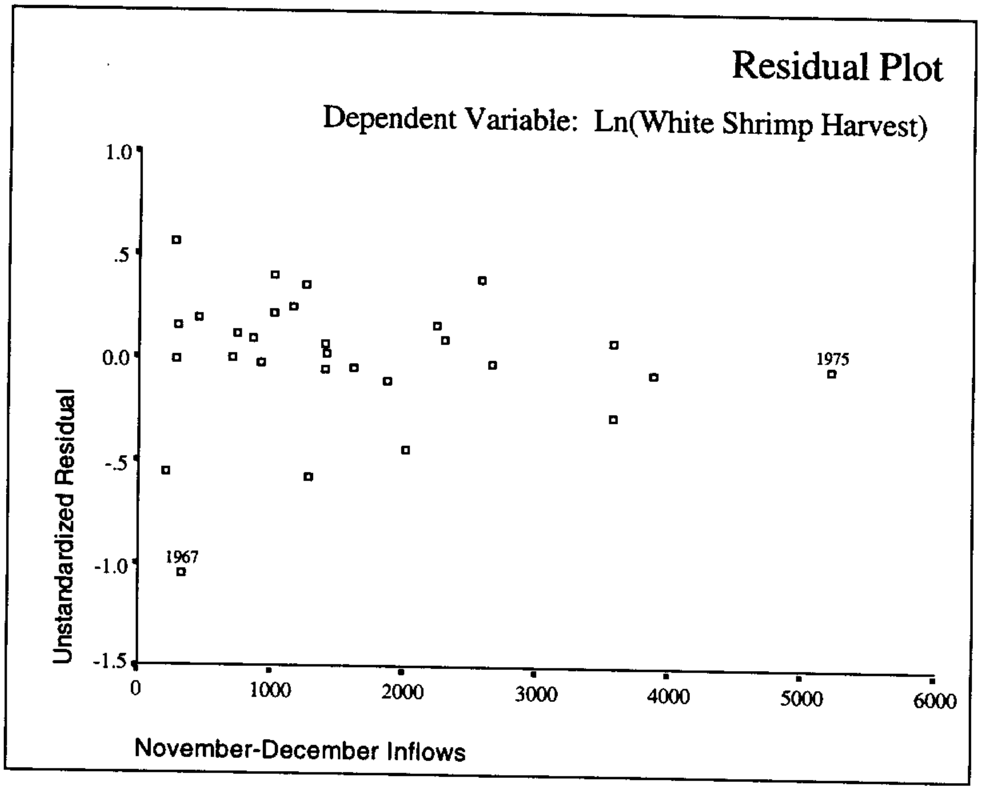

Residual Plot
Dependent Variable: Ln(White Shrimp Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
0
1000
2000
3000
4000
5000
6000
January-February Inflows
1967
1961


Residual Plot
Dependent Variable: Ln(White Shrimp Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
0
1000
2000
3000
4000
5000
6000
March-April Inflows
1967
1969
1979
1973


Residual Plot
Dependent Variable: Ln(White Shrimp Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
0
1000
2000
3000
4000
5000
6000
7000
May-June Inflows
1967
1966
1973
1968


Residual Plot
Dependent Variable: Ln(White Shrimp Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
0
1000
2000
3000
4000
July-August Inflows
1967
1959
1979
1983


Residual Plot
Dependent Variable: Ln(White Shrimp Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
1974
1959
1967
0
1000
2000
3000
4000
5000
September-October Inflows


Residual Plot
Dependent Variable: Ln(White Shrimp Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
1975
1967
0
1000
2000
3000
4000
5000
6000
November-December Inflows

Prediction Intervals for the Natural Log of White Shrimp Harvest

YEAR	LWSHRIMP	LICI_1	UICI_1
1959	6.8896	6.24637	8.63396
1960	7.3755	6.30310	8.54977
1961	7.0091	6.01077	8.55227
1962	8.1090	7.03860	9.27167
1963	8.0154	6.89231	9.08712
1964	8.4555	6.76149	9.02301
1965	8.0282	6.85718	9.04908
1966	7.1389	6.54427	8.87351
1967	6.9458	6.87200	9.10497
1968	7.8307	6.64525	9.04994
1969	8.2453	6.99119	9.30433
1970	8.1944	7.06135	9.31895
1971	7.9939	6.86809	9.13218
1972	8.0673	6.80143	9.00488
1973	8.3133	6.85973	9.26008
1974	7.7801	6.42105	8.95116
1975	8.2757	7.09245	9.52735
1976	8.1321	6.82608	9.04503
1977	7.7563	7.03262	9.35133
1978	8.0313	6.48957	8.75820
1979	7.6152	6.25746	8.72892
1980	8.1437	6.63856	8.94019
1981	7.9093	6.51867	8.97764
1982	8.1480	7.02034	9.30944
1983	7.9240	6.28036	8.78706
1984	8.1899	6.87288	9.06856
1985	7.8722	6.86966	9.08826
1986	8.3208	7.05880	9.40953
1987	8.2598	7.16636	9.48388

LWSHRIMP	Natural log of white shrimp harvest
LICI_1	Lower limit for 99% prediction interval for the natural log of white shrimp harvest
UICI_1	Upper limit for 99% prediction interval for the natural log of white shrimp harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1959	7.70270	.20534	.27510	.3595	.0193
1960	3.50215	.00061	.12508	.8350	.0000
1961	12.58289	.14056	.44939	.0829	.0063
1962	3.11024	.00044	.11108	.8746	.0000
1963	2.02053	.00009	.07216	.9587	.0000
1964	3.93262	.08502	.14045	.7875	.0013
1965	1.93856	.00076	.06923	.9632	.0000
1966	5.93237	.14699	.21187	.5477	.0073
1967	3.10726	.22586	.11097	.8749	.0252
1968	8.22999	.00022	.29393	.3128	.0000
1969	5.45178	.00383	.19471	.6050	.0000
1970	3.81885	.00000	.13639	.8004	.0000
1971	4.00746	.00001	.14312	.7789	.0000
1972	2.26493	.00414	.08089	.9437	.0000
1973	8.09586	.04737	.28914	.3242	.0002
1974	12.21094	.01546	.43611	.0938	.0000
1975	9.17043	.00109	.32752	.2407	.0000
1976	2.70595	.00700	.09664	.9108	.0000
1977	5.61775	.07957	.20063	.5850	.0011
1978	4.13978	.04720	.14785	.7635	.0002
1979	10.32413	.01756	.36872	.1709	.0000
1980	5.10993	.04634	.18250	.6466	.0002
1981	9.92791	.02822	.35457	.1927	.0000
1982	4.73994	.00010	.16928	.6917	.0000
1983	11.45266	.22757	.40902	.1201	.0257
1984	2.04514	.00676	.07304	.9573	.0000
1985	2.69573	.00206	.09628	.9117	.0000
1986	6.57933	.00395	.23498	.4740	.0000
1987	5.58221	.00177	.19936	.5893	.0000

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

---

[1] This is flagged if it exceeds (2p + 1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 − F(MAH_1), where F is the CDF of a Chi-squared random variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with p + 1 numerator degrees of freedom and n − p − 1 denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1959	*-1.26729	.14391	-.06897	-.04607
1960	-.06394	-.01639	-.04736	.03878
1961	-.99310	.09123	-.78864	.29726
1962	-.05435	-.01817	.03249	-.00452
1963	.02482	.02150	-.00238	-.00606
1964	.80696	.75273	.01550	.01347
1965	.07128	.04864	.01406	-.02430
1966	*-1.07059	-.05919	-.39339	.54269
1967	*-1.61614	*-1.55097	.54588	.17659
1968	-.03796	.00456	-.01162	.00560
1969	.16022	.00808	-.00508	.09767
1970	.00559	.00323	-.00228	.00358
1971	-.00845	-.00556	.00383	.00041
1972	.16720	.09265	.04728	-.06977
1973	.57168	-.16862	-.05748	.35843
1974	.32226	-.11509	.11173	-.03476
1975	-.08521	.02885	.01960	-.01524
1976	.21791	.16841	-.09810	-.05857
1977	-.76117	-.19802	.10805	-.56892
1978	.58154	.39974	.32695	-.21229
1979	.34399	-.06913	.01943	.13532
1980	.57187	-.10191	.21653	.00949
1981	.43733	.07343	-.07957	-.26714
1982	-.02530	.00619	.01525	-.00088
1983	*1.29328	.05817	-.12818	-.12196
1984	.21450	.07676	-.04985	.05251
1985	-.11756	.01277	-.01246	-.07099
1986	.16272	-.00266	-.04322	-.06081
1987	-.10886	.01130	.06221	-.02949

SDFFITS	Standardized dffits value
SDFBETA_0	Standardized dfbeta for the intercept term
SDFBETA_1	Standardized dfbeta for logged January-February inflows
SDFBETA_2	Standardized dfbeta for logged March-April inflows

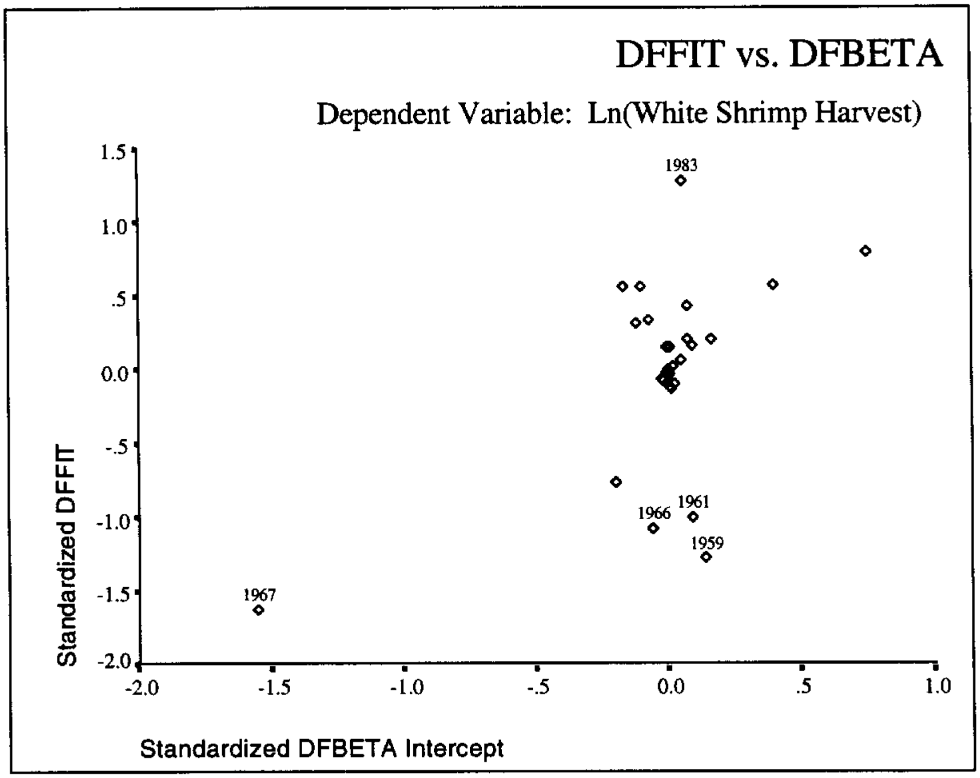
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

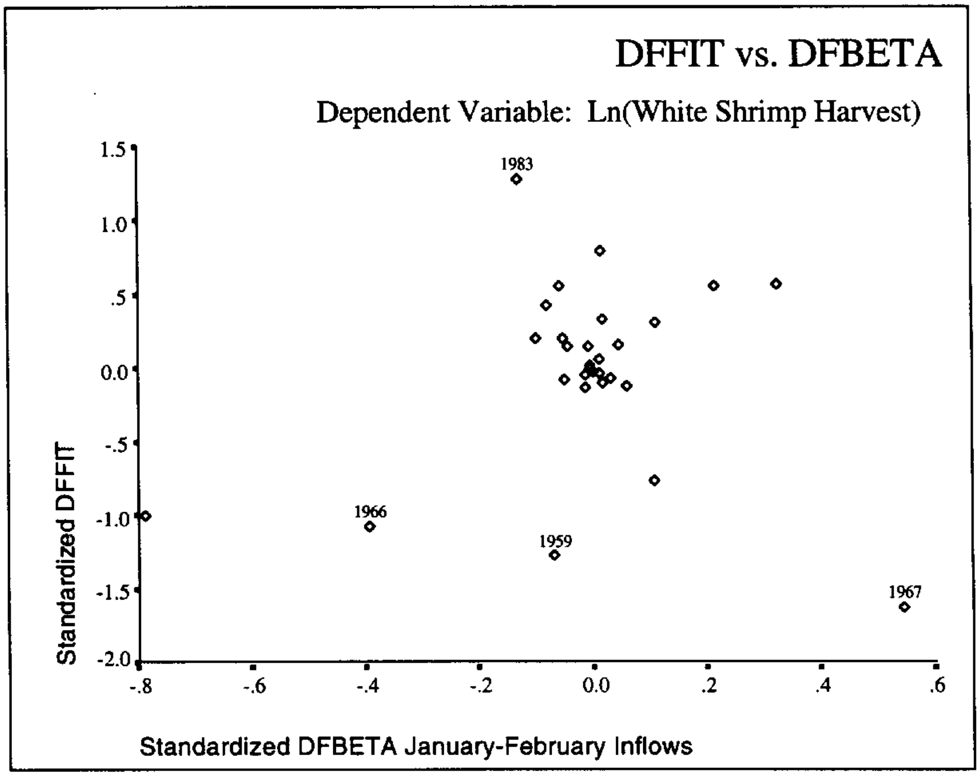
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1959	.25319	-.82879	-.60228	.61076
1960	-.00356	-.00525	.01454	.02965
1961	.09834	.05455	.33001	.03513
1962	.01399	-.00614	-.02692	-.01450
1963	-.00654	-.00661	-.00783	.00381
1964	-.32792	-.18279	-.43956	-.10082
1965	.01852	-.04073	-.03429	-.00380
1966	-.86279	.22331	.30904	.38275
1967	.47269	.01652	.50475	.06735
1968	-.03095	.01625	.00189	.01589
1969	.02446	-.08489	-.01054	-.01640
1970	-.00245	-.00129	-.00152	.00103
1971	.00263	-.00131	-.00240	.00104
1972	.00855	-.06302	-.09201	.03716
1973	.12475	-.05896	.02856	-.03814
1974	.03521	-.05049	.25418	-.09615
1975	.00046	.00044	-.00296	-.06952
1976	-.00621	.06534	-.04610	-.01682
1977	.45106	.23242	.20965	-.31651
1978	-.12217	-.15910	-.31596	-.16201
1979	-.08561	.20753	-.01972	-.06629
1980	.10066	-.21679	.39583	-.27406
1981	.27659	.13943	.06023	-.14837
1982	-.00440	-.00964	-.01415	-.01013
1983	-.46796	1.08556	-.42583	.36540
1984	-.08651	-.00591	.11125	-.02518
1985	.04228	.03510	-.04814	-.00335
1986	.08741	-.02019	-.00872	.08289
1987	.01935	-.02244	-.00290	-.09612

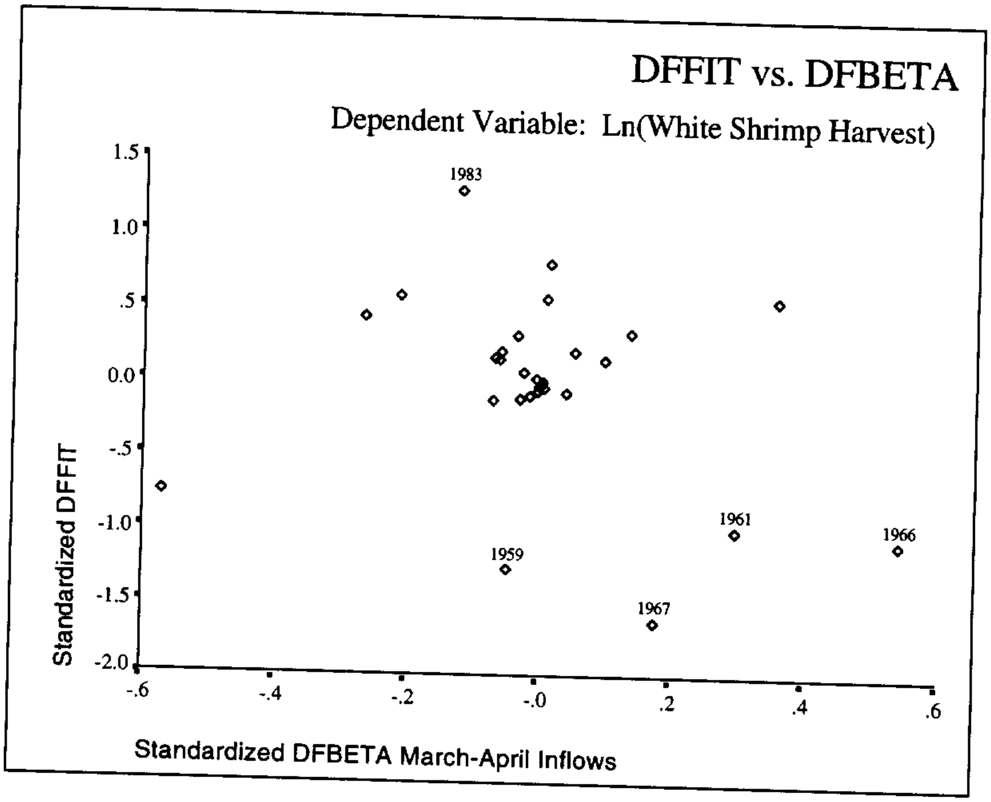
SDFBETA_3	Standardized dfbeta for logged May-June inflows
SDFBETA_4	Standardized dfbeta for logged July-August inflows
SDFBETA_5	Standardized dfbeta for logged September-October inflows
SDFBETA_6	Standardized dfbeta for logged November-December inflows

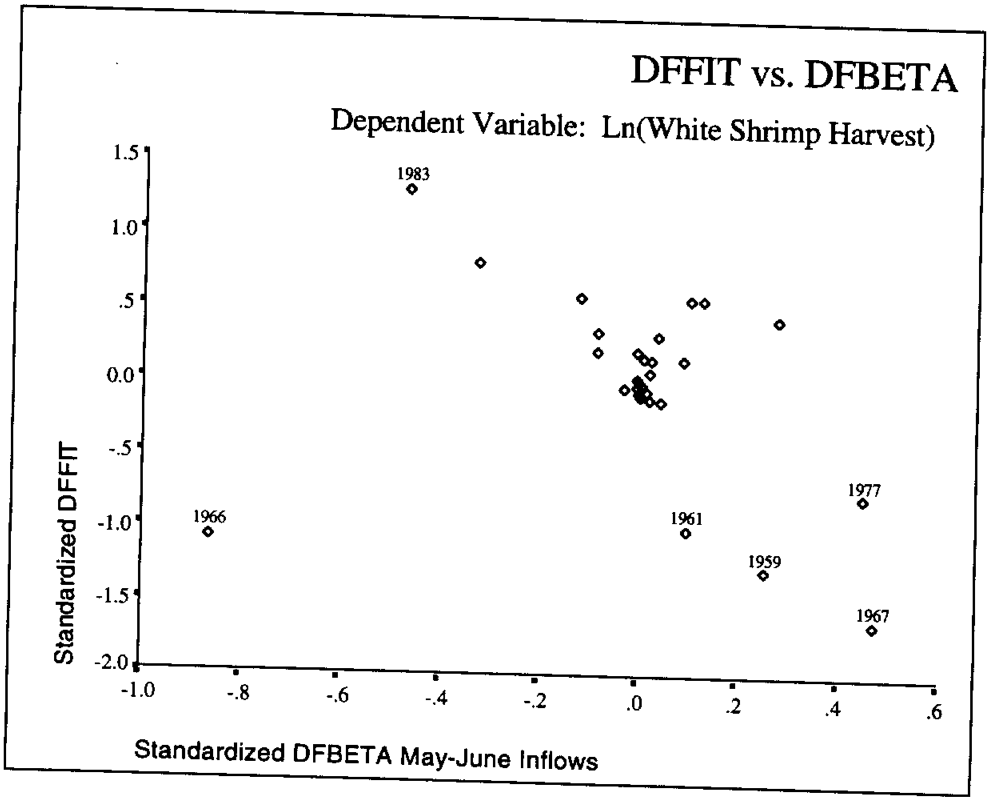
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

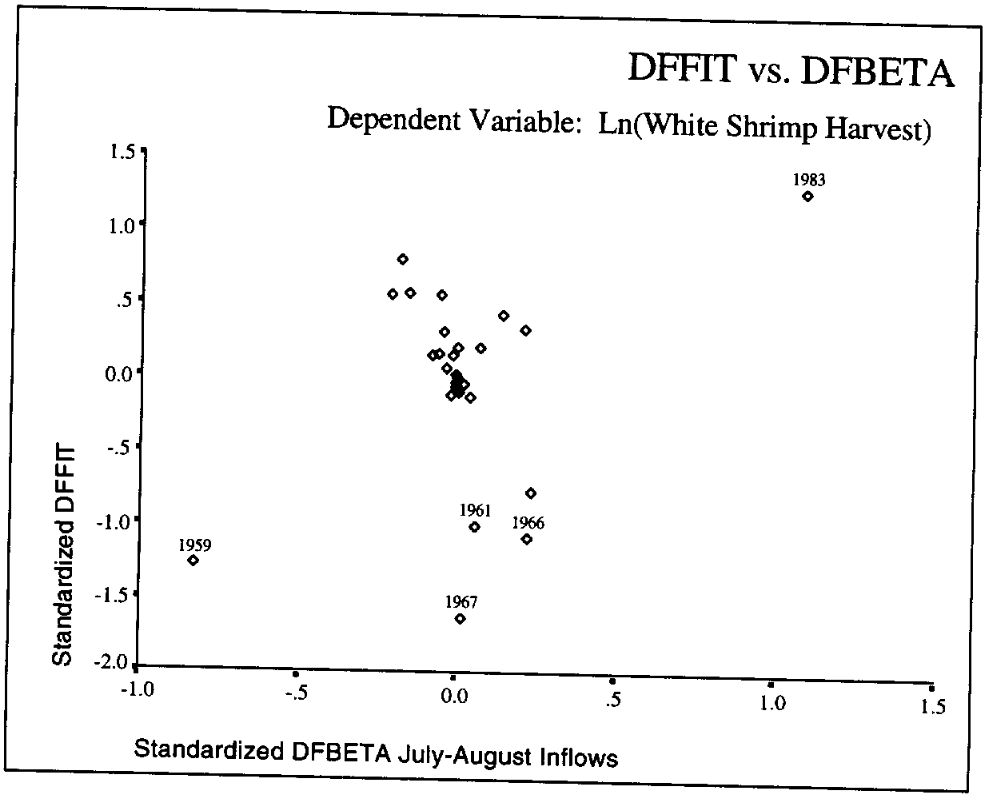
Graphics

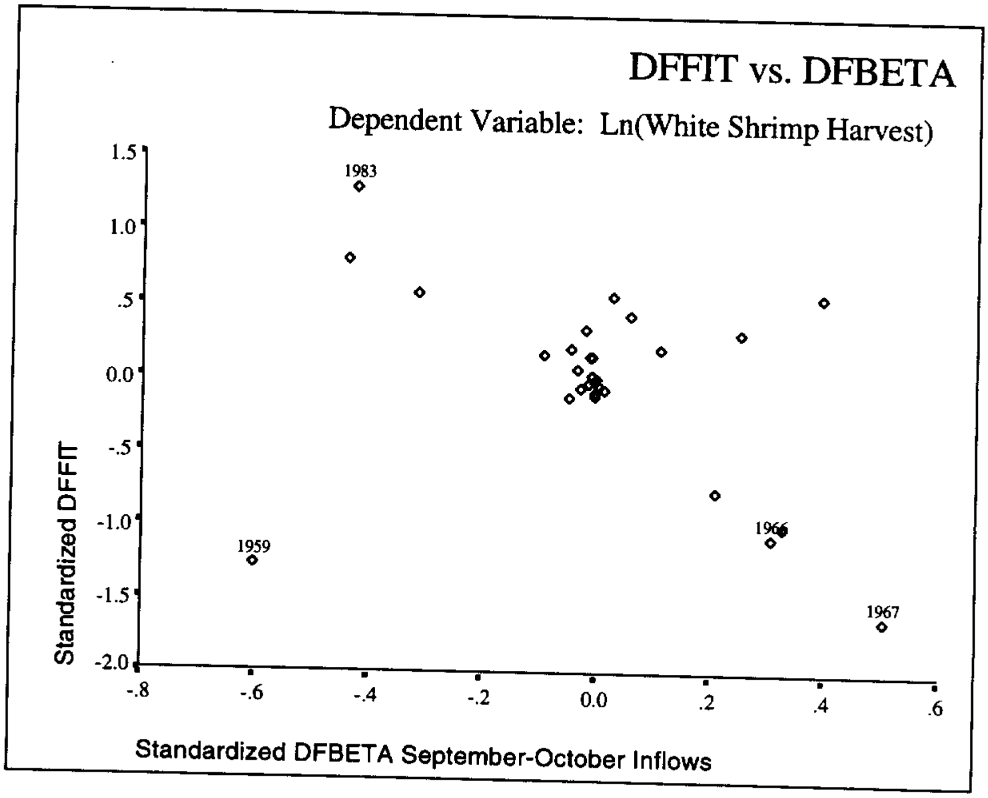

DFFIT vs. DFBETA
Dependent Variable: Ln(White Shrimp Harvest)
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA Intercept
1983
1961
1966
1959
1967

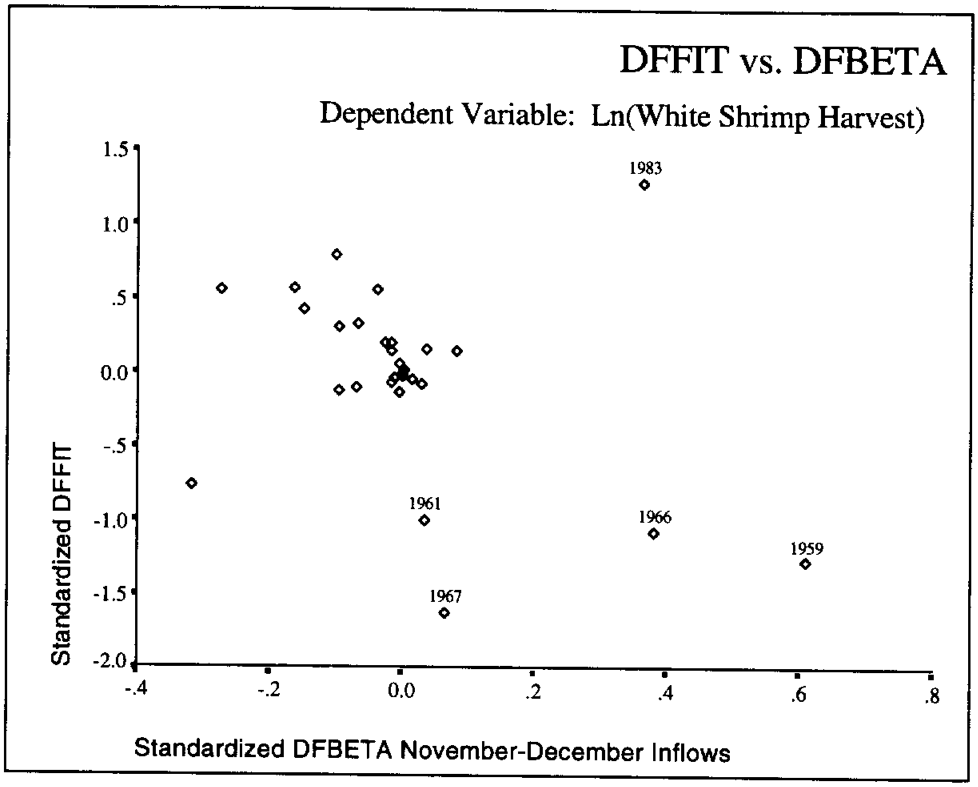

DFFIT vs. DFBETA
Dependent Variable: Ln(White Shrimp Harvest)
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA January-February Inflows
1983
1966
1959
1967


DFFIT vs. DFBETA
Dependent Variable: Ln(White Shrimp Harvest)
1983
1961
1966
1959
1967
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.6
-.4
-.2
-.0
.2
.4
.6
Standardized DFBETA March-April Inflows


DFFIT vs. DFBETA
Dependent Variable: Ln(White Shrimp Harvest)
1983
1977
1966
1961
1959
1967
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Standardized DFBETA May-June Inflows


DFFIT vs. DFBETA
Dependent Variable: Ln(White Shrimp Harvest)
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1.0
-.5
0.0
.5
1.0
1.5
Standardized DFBETA July-August Inflows
1983
1961
1966
1959
1967


DFFIT vs. DFBETA
Dependent Variable: Ln(White Shrimp Harvest)
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA September-October Inflows
1983
1959
1966
1967


DFFIT vs. DFBETA
Dependent Variable: Ln(White Shrimp Harvest)
1983
1961
1966
1959
1967
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.4
-.2
0.0
.2
.4
.6
.8
Standardized DFFIT
Standardized DFBETA November-December Inflows

Examining Subsets of the Data

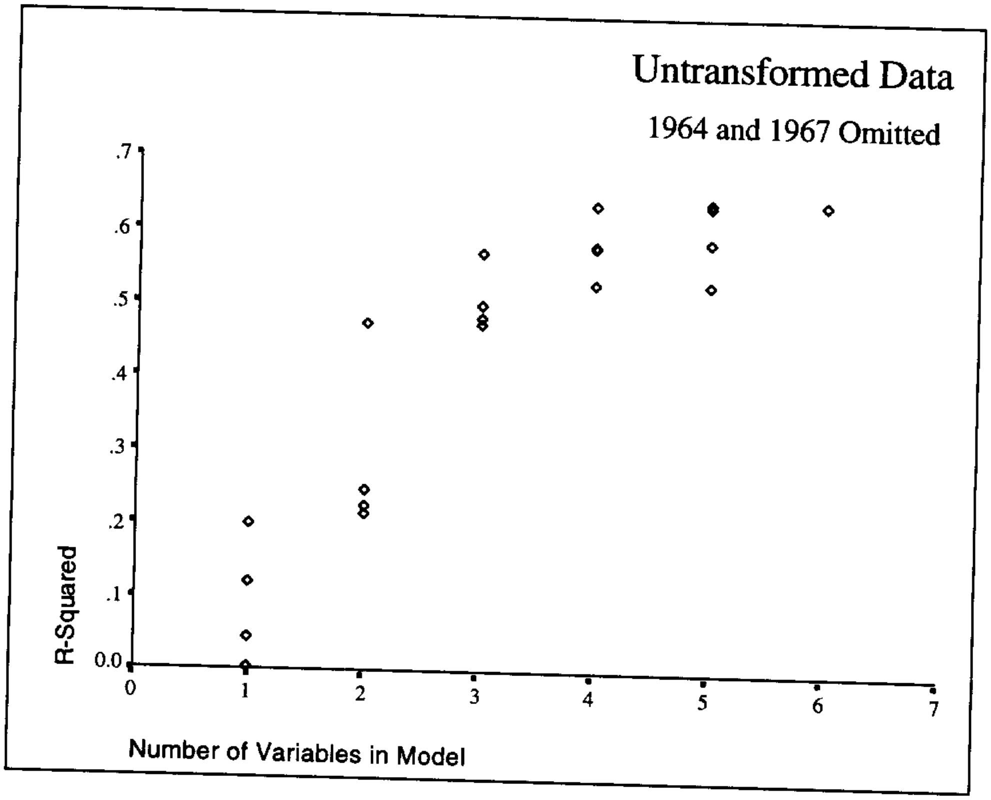
Untransformed Data: 1964 and 1967 Omitted

```
N = 27     Regression Models for Dependent Variable: WHSHRIMP

          Rsq     Adj    C(p)     AIC     MSE     SBC Variables in Model
  In              Rsq

   1 0.2005 0.1685  21.80   363.9 664102   366.5 JF_INFL
   1 0.1224 0.0873  26.17   366.4 728994   369.0 JA_INFL
   1 0.0464 0.0083  30.43   368.6 792100   371.2 ND_INFL
   1 0.0052 -.0346  32.74   369.8 826332   372.4 MJ_INFL
-----------------------------------------------------------------
   2 0.4753 0.4315  8.401   354.5 454024   358.4 JF_INFL ND_INFL
   2 0.2491 0.1865  21.07   364.2 649706   368.1 JF_INFL JA_INFL
   2 0.2275 0.1632  22.28   365.0 668363   368.8 JF_INFL MA_INFL
   2 0.2171 0.1519  22.86   365.3 677378   369.2 JF_INFL MJ_INFL
-------------------------------------------------------------------------
   3 0.5716 0.5157  5.003   351.0 386784   356.2 JF_INFL MA_INFL ND_INFL
   3 0.5009 0.4358  8.962   355.2 450583   360.3 JF_INFL JA_INFL ND_INFL
   3 0.4844 0.4172  9.887   356.0 465489   361.2 JF_INFL MJ_INFL ND_INFL
   3 0.4753 0.4069  10.40   356.5 473698   361.7 JF_INFL SO_INFL ND_INFL
-------------------------------------------------------------------------
   4 0.6382 0.5725  3.269   348.5 341467   355.0 JF_INFL MA_INFL JA_INFL
                                                  ND_INFL
   4 0.5834 0.5076  6.343   352.3 393242   358.8 JF_INFL MA_INFL SO_INFL
                                                  ND_INFL
   4 0.5805 0.5042  6.505   352.5 395970   359.0 JF_INFL MA_INFL MJ_INFL
                                                  ND_INFL
   4 0.5301 0.4447  9.327   355.5 443524   362.0 JF_INFL MJ_INFL JA_INFL
                                                  ND_INFL
-------------------------------------------------------------------------
   5 0.6430 0.5580  5.004   350.1 353037   357.9 JF_INFL MA_INFL JA_INFL
                                                  SO_INFL ND_INFL
   5 0.6387 0.5527  5.244   350.4 357287   358.2 JF_INFL MA_INFL MJ_INFL
                                                  JA_INFL ND_INFL
   5 0.5885 0.4905  8.057   354.0 406922   361.7 JF_INFL MA_INFL MJ_INFL
                                                  SO_INFL ND_INFL
   5 0.5306 0.4188  11.30   357.5 464170   365.3 JF_INFL MJ_INFL JA_INFL
                                                  SO_INFL ND_INFL
-------------------------------------------------------------------------
   6 0.6430 0.5360  7.000   352.1 370623   361.2 JF_INFL MA_INFL MJ_INFL
                                                  JA_INFL SO_INFL ND_INFL
-------------------------------------------------------------------------
```

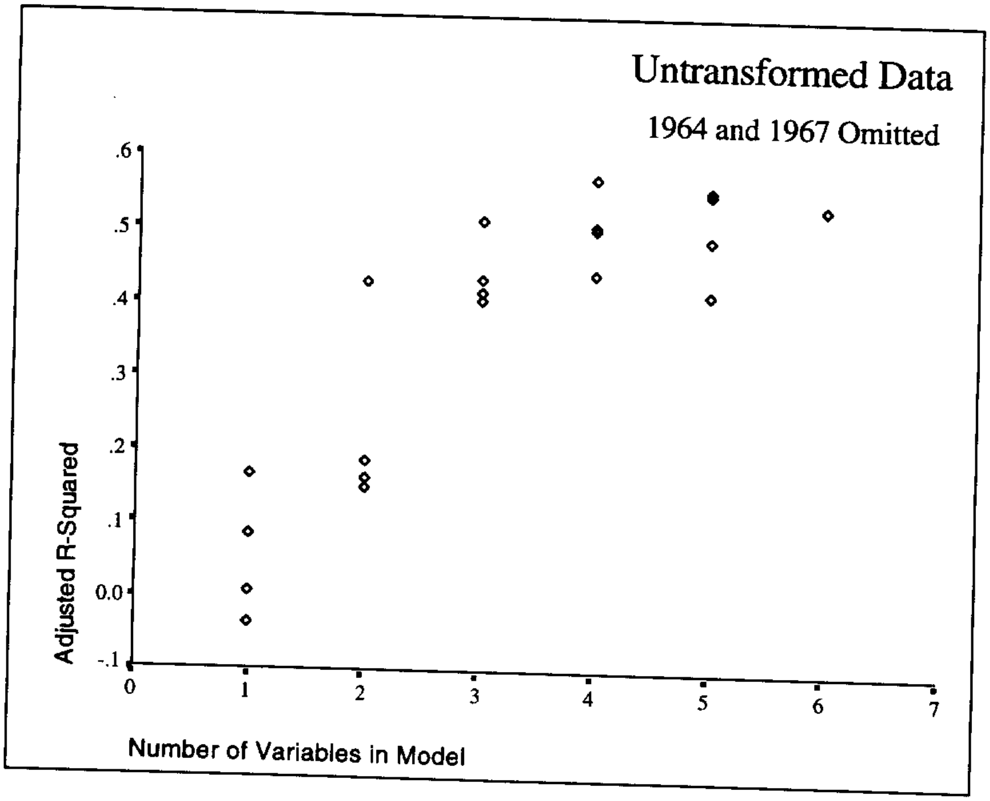
```
OBS  _MODEL_   _TYPE_   _DEPVAR_    _RMSE_   INTERCEP   JF_INFL    MA_INFL

  1  MODEL1    PARMS    WHSHRIMP   814.924   3620.29   -0.37155      .
  2  MODEL1    PARMS    WHSHRIMP   853.812   3312.54     .           .
  3  MODEL1    PARMS    WHSHRIMP   890.000   2633.54     .           .
  4  MODEL1    PARMS    WHSHRIMP   909.028   2796.04     .           .
  5  MODEL1    PARMS    WHSHRIMP   673.813   3375.84   -0.63590      .
  6  MODEL1    PARMS    WHSHRIMP   806.044   3777.23   -0.31111      .
  7  MODEL1    PARMS    WHSHRIMP   817.535   3487.27   -0.40973    0.11249
  8  MODEL1    PARMS    WHSHRIMP   823.030   3459.73   -0.38503      .
  9  MODEL1    PARMS    WHSHRIMP   621.919   3077.32   -0.75232    0.21973
 10  MODEL1    PARMS    WHSHRIMP   671.255   3499.49   -0.58215      .
 11  MODEL1    PARMS    WHSHRIMP   682.268   3259.27   -0.64284      .
 12  MODEL1    PARMS    WHSHRIMP   688.257   3368.09   -0.63614      .
 13  MODEL1    PARMS    WHSHRIMP   584.351   3212.04   -0.69051    0.27338
 14  MODEL1    PARMS    WHSHRIMP   627.090   2940.63   -0.76858    0.24438
 15  MODEL1    PARMS    WHSHRIMP   629.262   3154.60   -0.76799    0.26487
 16  MODEL1    PARMS    WHSHRIMP   665.976   3329.19   -0.57160      .
```

```
OBS   MJ_INFL    JA_INFL   SO_INFL   ND_INFL   WHSHRIMP   _IN_   _P_   _EDF_

  1     .          .         .         .          -1        1     2      25
  2     .       -0.39903     .         .          -1        1     2      25
  3     .          .         .       0.15591      -1        1     2      25
  4   0.03912      .         .         .          -1        1     2      25
  5     .          .         .       0.44400      -1        2     3      24
  6     .       -0.26488     .         .          -1        2     3      24
  7     .          .         .         .          -1        2     3      24
  8   0.07061      .         .         .          -1        2     3      24
  9     .          .         .       0.51428      -1        3     4      23
 10     .       -0.19382     .       0.42800      -1        3     4      23
 11   0.05252      .         .       0.43881      -1        3     4      23
 12     .          .       0.00846   0.44247      -1        3     4      23
 13     .       -0.32543     .       0.50458      -1        4     5      22
 14     .          .       0.11268   0.50183      -1        4     5      22
 15  -0.06245      .         .       0.53488      -1        4     5      22
 16   0.10157   -0.28027     .       0.41084      -1        4     5      22

OBS     _MSE_        _RSQ_      _ADJRSQ_       _CP_       _AIC_       _SBC_

  1   664101.68     0.20049     0.16851     21.7963     363.889     366.481
  2   728994.25     0.12237     0.08726     26.1735     366.406     368.998
  3   792100.12     0.04640     0.00825     30.4303     368.648     371.240
  4   826331.50     0.00519    -0.03461     32.7393     369.790     372.382
  5   454024.22     0.47527     0.43154      8.4007     354.519     358.407
  6   649706.46     0.24911     0.18654     21.0722     364.195     368.083
  7   668363.42     0.22755     0.16318     22.2804     364.960     368.847
  8   677378.20     0.21713     0.15189     22.8641     365.321     369.209
  9   386783.56     0.57161     0.51573      5.0029     351.043     356.226
 10   450583.09     0.50094     0.43585      8.9621     355.165     360.348
 11   465489.45     0.48443     0.41719      9.8872     356.044     361.227
 12   473698.30     0.47534     0.40691     10.3966     356.516     361.699
 13   341466.56     0.63824     0.57247      3.2693     348.478     354.957
 14   393241.80     0.58339     0.50764      6.3426     352.289     358.769
 15   395970.23     0.58050     0.50423      6.5046     352.476     358.955
 16   443523.50     0.53012     0.44469      9.3273     355.538     362.017


OBS   _MODEL_    _TYPE_    _DEPVAR_      _RMSE_    INTERCEP     JF_INFL    MA_INFL

 17   MODEL1     PARMS     WHSHRIMP     594.169     3118.51    -0.70357    0.28694
 18   MODEL1     PARMS     WHSHRIMP     597.735     3226.79    -0.69568    0.28261
 19   MODEL1     PARMS     WHSHRIMP     637.905     3021.82    -0.77826    0.27569
 20   MODEL1     PARMS     WHSHRIMP     681.300     3297.08    -0.57365     .
 21   MODEL1     PARMS     WHSHRIMP     608.788     3126.28    -0.70525    0.29017

OBS   MJ_INFL    JA_INFL   SO_INFL   ND_INFL   WHSHRIMP   _IN_   _P_   _EDF_

 17     .       -0.31163   0.07238   0.49700      -1        5     6      21
 18  -0.01458   -0.31746     .       0.50963      -1        5     6      21
 19  -0.04858      .       0.09531   0.51978      -1        5     6      21
 20   0.10555   -0.27712   0.02323   0.40652      -1        5     6      21
 21  -0.00558   -0.30889   0.07074   0.49910      -1        6     7      20

OBS     _MSE_        _RSQ_      _ADJRSQ_       _CP_       _AIC_       _SBC_

 17   353036.72     0.64298     0.55798      5.0035     350.121     357.896
 18   357286.71     0.63869     0.55266      5.2443     350.444     358.219
 19   406922.40     0.58849     0.49051      8.0568     353.957     361.732
 20   464170.34     0.53060     0.41884     11.3005     357.511     365.286
 21   370623.32     0.64305     0.53596      7.0000     352.117     361.187
```

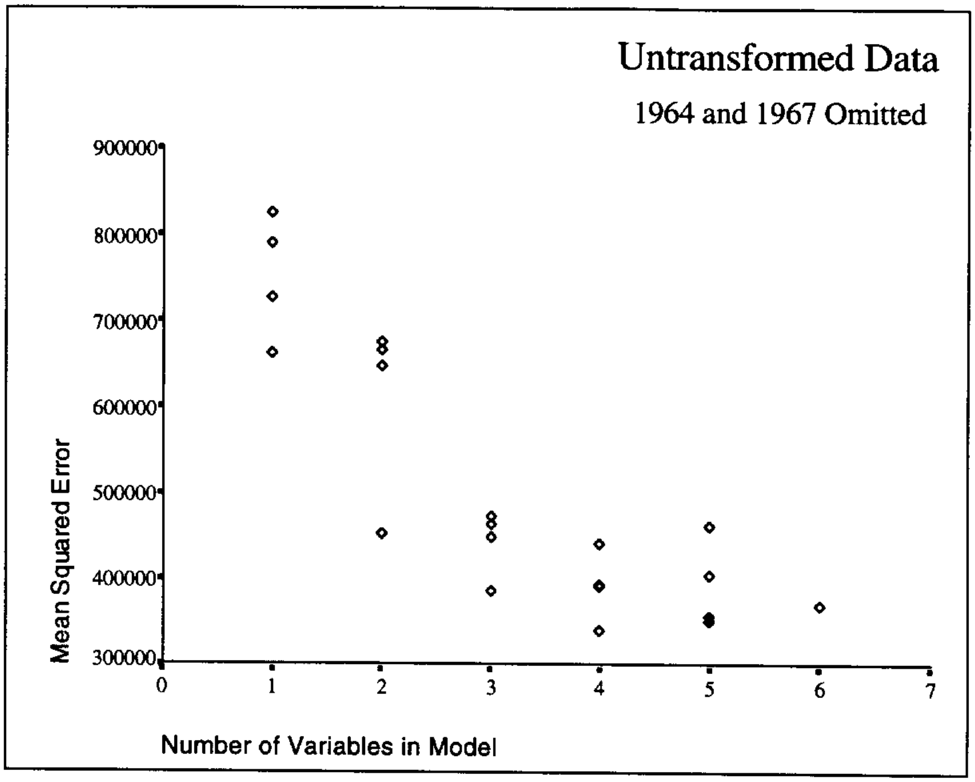
Scree Plots



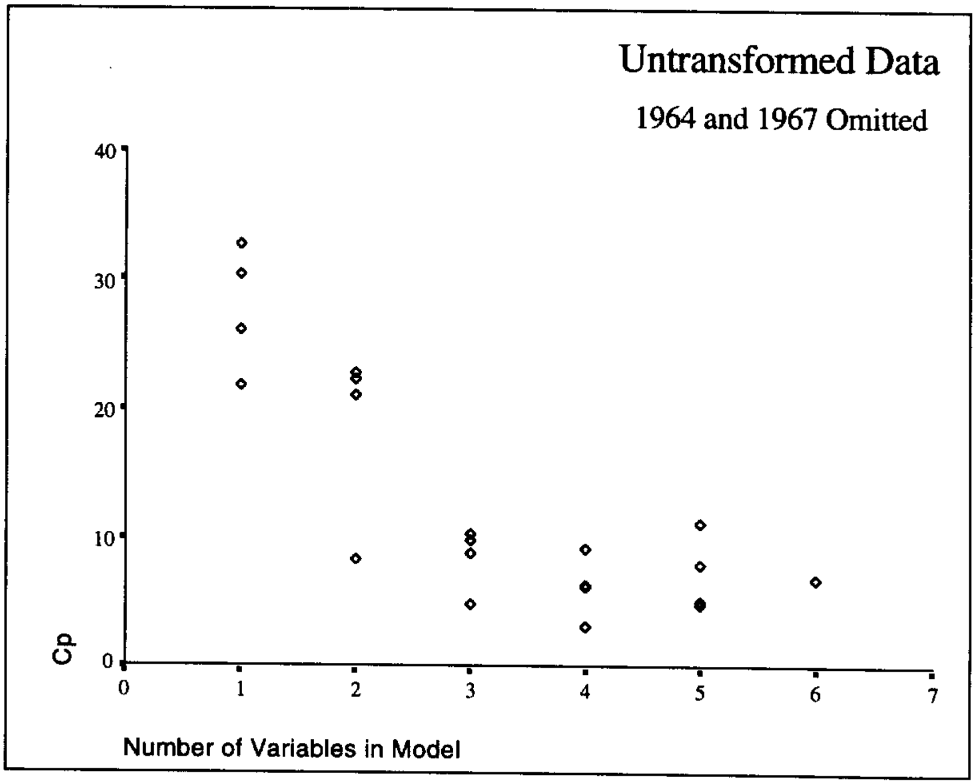
Untransformed Data
1964 and 1967 Omitted
R-Squared
.7
.6
.5
.4
.3
.2
.1
0.0
0
1
2
3
4
5
6
7
Number of Variables in Model



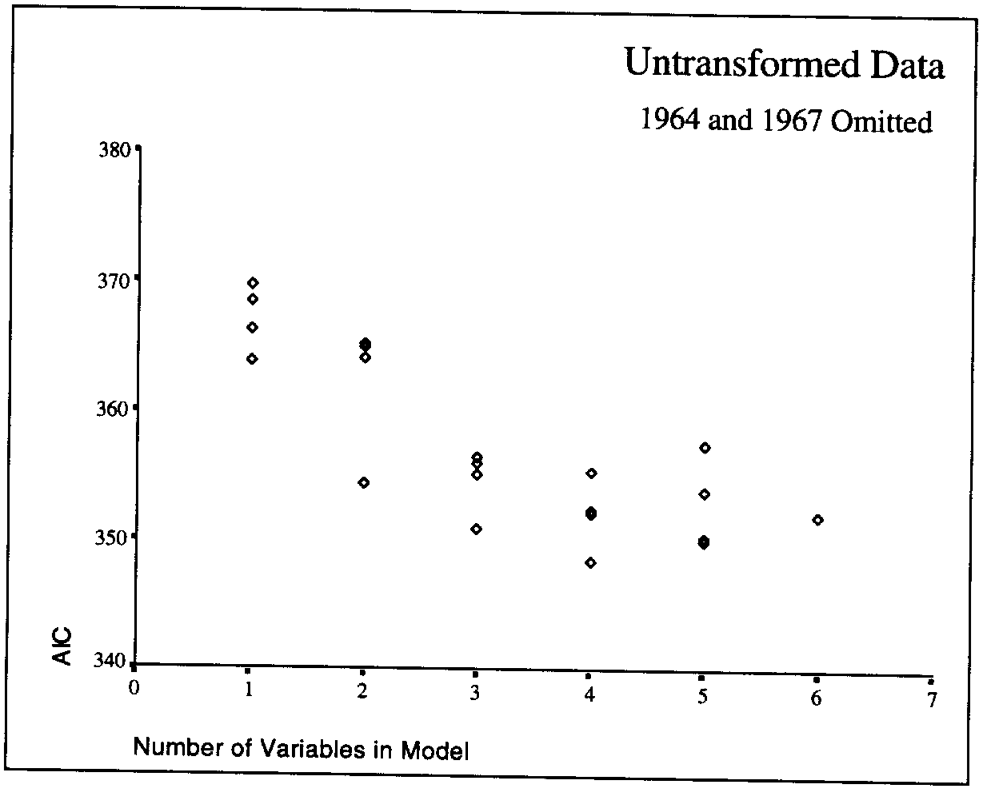
Untransformed Data
1964 and 1967 Omitted
Adjusted R-Squared
.6
.5
.4
.3
.2
.1
0.0
-.1
0
1
2
3
4
5
6
7
Number of Variables in Model

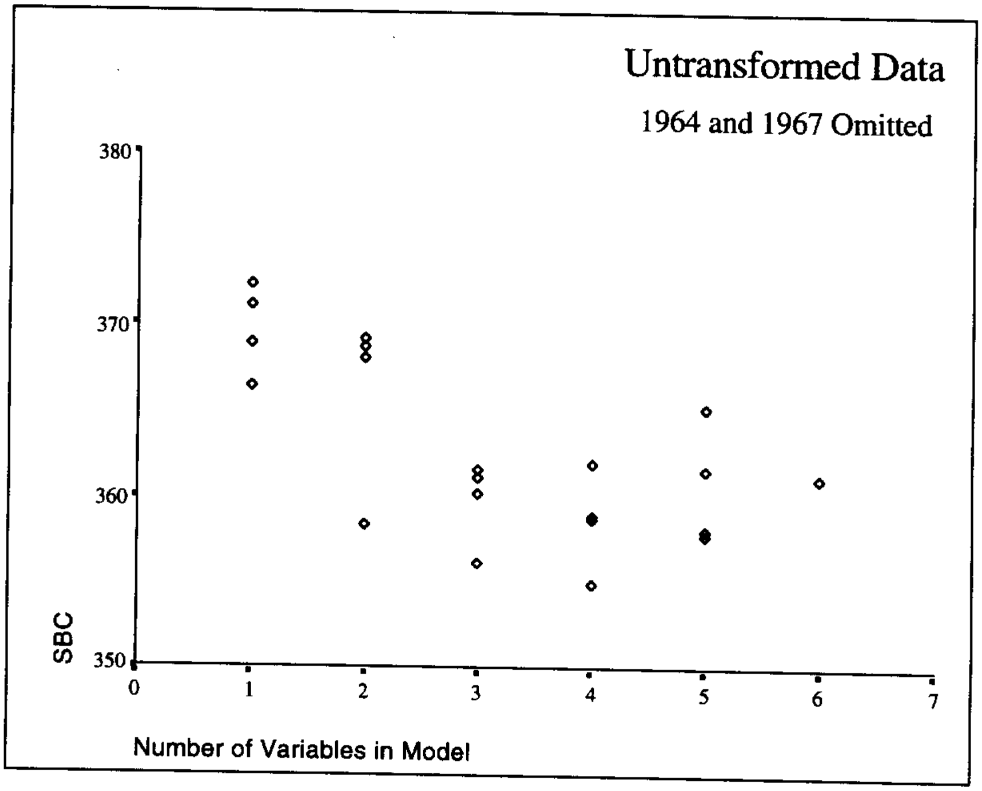


Untransformed Data
1964 and 1967 Omitted
Mean Squared Error
900000
800000
700000
600000
500000
400000
300000
0
1
2
3
4
5
6
7
Number of Variables in Model



Untransformed Data
1964 and 1967 Omitted
Cp
40
30
20
10
0
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1964 and 1967 Omitted
380
370
360
350
340
AIC
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1964 and 1967 Omitted
380
370
360
350
SBC
0
1
2
3
4
5
6
7
Number of Variables in Model

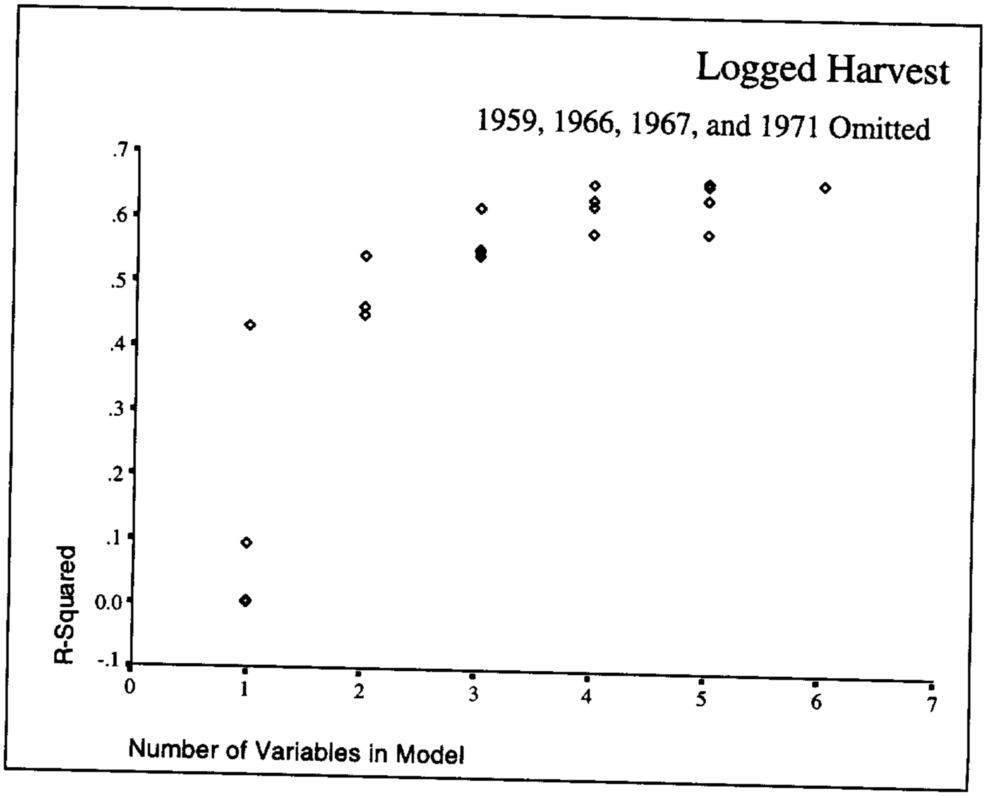
Logged Harvest: 1959, 1966, 1967, and 1971 Omitted

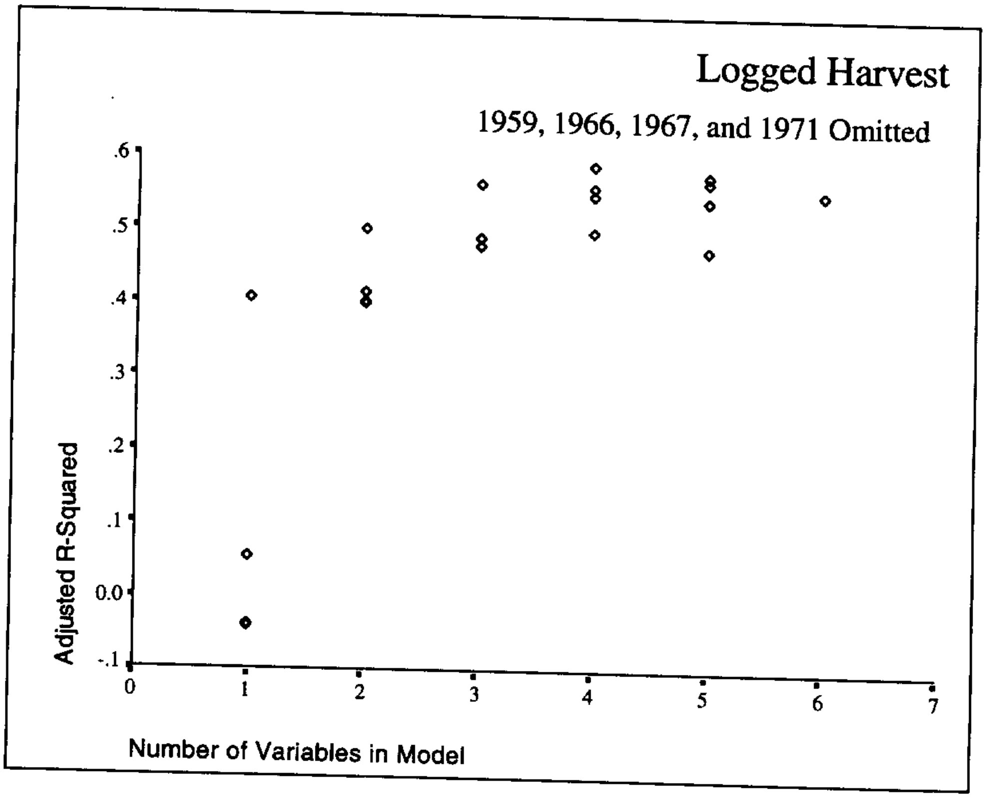
```
 N = 25     Regression Models for Dependent Variable: LWHSHRMP

            Rsq     Adj   C(p)     AIC     MSE     SBC Variables in Model
   In               Rsq

    1 0.4324 0.4077  9.519 -68.21 0.0605 -65.78 JF_INFL
    1 0.0945 0.0551  27.68 -56.54 0.0965 -54.10 JA_INFL
    1 0.0069 -.0363  32.40 -54.23 0.1058 -51.79 MJ_INFL
    1 0.0047 -.0386  32.51 -54.17 0.1061 -51.74 ND_INFL
-------------------------------------------------------
    2 0.5441 0.5026  5.514 -71.69 0.0508 -68.04 JF_INFL ND_INFL
    2 0.4646 0.4159  9.786 -67.68 0.0597 -64.02 JF_INFL MA_INFL
    2 0.4520 0.4021  10.47 -67.09 0.0611 -63.44 JF_INFL SO_INFL
    2 0.4516 0.4017  10.49 -67.07 0.0611 -63.42 JF_INFL MJ_INFL
---------------------------------------------------------------
    3 0.6190 0.5646  3.484 -74.18 0.0445 -69.31 JF_INFL MA_INFL ND_INFL
    3 0.5550 0.4914  6.927 -70.30 0.0519 -65.42 JF_INFL MJ_INFL ND_INFL
    3 0.5546 0.4910  6.946 -70.28 0.0520 -65.40 JF_INFL JA_INFL ND_INFL
    3 0.5460 0.4811  7.410 -69.80 0.0530 -64.92 JF_INFL SO_INFL ND_INFL
-----------------------------------------------------------------------
    4 0.6588 0.5906  3.343 -74.94 0.0418 -68.85 JF_INFL MA_INFL JA_INFL
                                                ND_INFL
    4 0.6342 0.5610  4.670 -73.20 0.0448 -67.10 JF_INFL MA_INFL SO_INFL
                                                ND_INFL
    4 0.6241 0.5489  5.210 -72.52 0.0461 -66.42 JF_INFL MA_INFL MJ_INFL
                                                ND_INFL
    4 0.5840 0.5007  7.369 -69.98 0.0510 -63.89 JF_INFL MJ_INFL JA_INFL
                                                ND_INFL
---------------------------------------------------------------------------
    5 0.6652 0.5771  5.000 -73.41 0.0432 -66.10 JF_INFL MA_INFL JA_INFL
                                                SO_INFL ND_INFL
    5 0.6588 0.5691  5.343 -72.94 0.0440 -65.63 JF_INFL MA_INFL MJ_INFL
                                                JA_INFL ND_INFL
    5 0.6381 0.5428  6.459 -71.47 0.0467 -64.15 JF_INFL MA_INFL MJ_INFL
                                                SO_INFL ND_INFL
    5 0.5849 0.4757  9.317 -68.04 0.0535 -60.73 JF_INFL MJ_INFL JA_INFL
                                                SO_INFL ND_INFL
---------------------------------------------------------------------------
    6 0.6652 0.5536  7.000 -71.41 0.0456 -62.88 JF_INFL MA_INFL MJ_INFL
                                                JA_INFL SO_INFL ND_INFL
---------------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP    JF_INFL      MA_INFL

  1  MODEL1   PARMS   LWHSHRMP  0.24596   8.38036  -.00019448   .
  2  MODEL1   PARMS   LWHSHRMP  0.31065   8.12214   .           .
  3  MODEL1   PARMS   LWHSHRMP  0.32534   7.95758   .           .
  4  MODEL1   PARMS   LWHSHRMP  0.32569   8.03144   .           .
  5  MODEL1   PARMS   LWHSHRMP  0.22539   8.32129  -.00025689   .
  6  MODEL1   PARMS   LWHSHRMP  0.24424   8.32600  -.00020699  .000042605
  7  MODEL1   PARMS   LWHSHRMP  0.24711   8.34182  -.00020486   .
  8  MODEL1   PARMS   LWHSHRMP  0.24720   8.31575  -.00019794   .
  9  MODEL1   PARMS   LWHSHRMP  0.21088   8.22282  -.00029009  .000067181
 10  MODEL1   PARMS   LWHSHRMP  0.22792   8.27424  -.00025748   .
 11  MODEL1   PARMS   LWHSHRMP  0.22801   8.34403  -.00024665   .
 12  MODEL1   PARMS   LWHSHRMP  0.23021   8.31102  -.00025779   .
 13  MODEL1   PARMS   LWHSHRMP  0.20448   8.24545  -.00027720  .000083503
 14  MODEL1   PARMS   LWHSHRMP  0.21175   8.18042  -.00029690  .000075719
 15  MODEL1   PARMS   LWHSHRMP  0.21464   8.24387  -.00029595  .000080047
 16  MODEL1   PARMS   LWHSHRMP  0.22581   8.27679  -.00023885   .
```

```
OBS    MJ_INFL        JA_INFL       SO_INFL       ND_INFL      LWHSHRMP   _IN_   _P_

  1    .              .             .             .               -1        1      2
  2    .              -.00012603    .             .               -1        1      2
  3    0.000016547    .             .             .               -1        1      2
  4    .              .             .             -.00001760      -1        1      2
  5    .              .             .             0.00010162      -1        2      3
  6    .              .             .             .               -1        2      3
  7    .              .             .000047892    .               -1        2      3
  8    0.000027788    .             .             .               -1        2      3
  9    .              .             .             0.00012357      -1        3      4
 10    0.000021063    .             .             0.00009831      -1        3      4
 11    .              -.00004451    .             0.00010182      -1        3      4
 12    .              .             .000015726    0.00009753      -1        3      4
 13    .              -.00009111    .             0.00012929      -1        4      5
 14    .              .             .000045763    0.00011443      -1        4      5
 15    -.000017864    .             .             0.00013058      -1        4      5
 16    0.000038938    -.00008313    .             0.00009586      -1        4      5

OBS   _EDF_    _MSE_      _RSQ_     _ADJRSQ_      _CP_       _AIC_       _SBC_

  1    23     0.06050    0.43235    0.40767      9.5191    -68.2138    -65.7761
  2    23     0.09650    0.09451    0.05514     27.6831    -56.5394    -54.1016
  3    23     0.10584    0.00686   -0.03632     32.3957    -54.2294    -51.7916
  4    23     0.10607    0.00468   -0.03859     32.5125    -54.1748    -51.7370
  5    22     0.05080    0.54405    0.50260      5.5136    -71.6919    -68.0353
  6    22     0.05965    0.46459    0.41592      9.7858    -67.6756    -64.0189
  7    22     0.06106    0.45195    0.40213     10.4654    -67.0922    -63.4356
  8    22     0.06111    0.45155    0.40169     10.4870    -67.0739    -63.4173
  9    21     0.04447    0.61901    0.56458      3.4839    -74.1817    -69.3062
 10    21     0.05195    0.55497    0.49139      6.9270    -70.2975    -65.4220
 11    21     0.05199    0.55462    0.49099      6.9458    -70.2778    -65.4023
 12    21     0.05299    0.54599    0.48113      7.4098    -69.7981    -64.9226
 13    20     0.04181    0.65883    0.59060      3.3427    -74.9419    -68.8475
 14    20     0.04484    0.63415    0.56098      4.6696    -73.1958    -67.1014
 15    20     0.04607    0.62411    0.54893      5.2097    -72.5185    -66.4242
 16    20     0.05099    0.58395    0.50074      7.3686    -69.9812    -63.8869

OBS   _MODEL_   _TYPE_   _DEPVAR_    _RMSE_    INTERCEP    JF_INFL       MA_INFL

 17   MODEL1    PARMS    LWHSHRMP   0.20783    8.21510   -.00028294    .000087667
 18   MODEL1    PARMS    LWHSHRMP   0.20980    8.24537   -.00027716    .000083455
 19   MODEL1    PARMS    LWHSHRMP   0.21608    8.20050   -.00030181    .000086720
 20   MODEL1    PARMS    LWHSHRMP   0.23141    8.26584   -.00024033    .
 21   MODEL1    PARMS    LWHSHRMP   0.21352    8.21523   -.00028299    .000087748

OBS    MJ_INFL        JA_INFL       SO_INFL       ND_INFL      LWHSHRMP   _IN_   _P_

 17    .              -.00008261    .000030481    0.00012267      -1        5      6
 18    0.000000080    -.00009116    .             0.00012926      -1        5      6
 19    -.000015713    .             .000044068    0.00012093      -1        5      6
 20    0.000039624    -.00007966    .000011696    0.00009269      -1        5      6
 21    -.000000133    -.00008252    .000030483    0.00012272      -1        6      7

OBS   _EDF_    _MSE_      _RSQ_     _ADJRSQ_      _CP_       _AIC_       _SBC_

 17    19     0.04319    0.66521    0.57710      5.0000    -73.4133    -66.1001
 18    19     0.04401    0.65883    0.56905      5.3426    -72.9419    -65.6287
 19    19     0.04669    0.63808    0.54283      6.4586    -71.4655    -64.1522
 20    19     0.05355    0.58492    0.47569      9.3165    -68.0394    -60.7262
 21    18     0.04559    0.66521    0.55361      7.0000    -71.4134    -62.8812
```

Scree Plots


Logged Harvest
1959, 1966, 1967, and 1971 Omitted
R-Squared
.7
.6
.5
.4
.3
.2
.1
0.0
-.1
0
1
2
3
4
5
6
7
Number of Variables in Model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1959, 1966, 1967, and 1971 Omitted
Adjusted R-Squared
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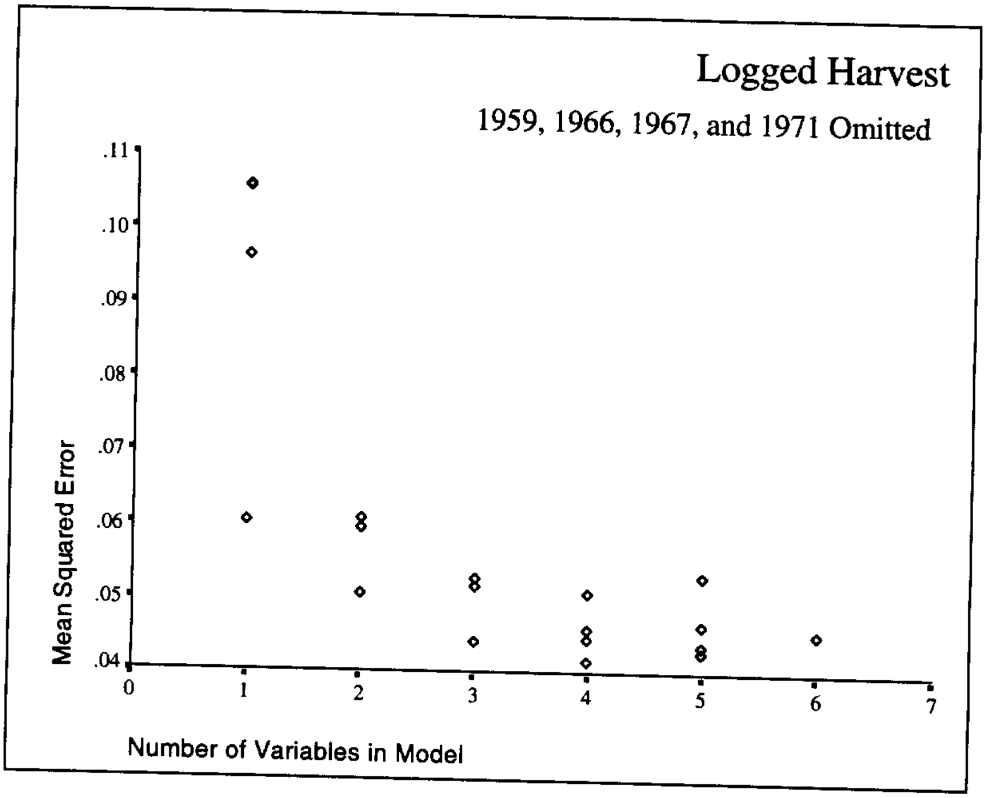
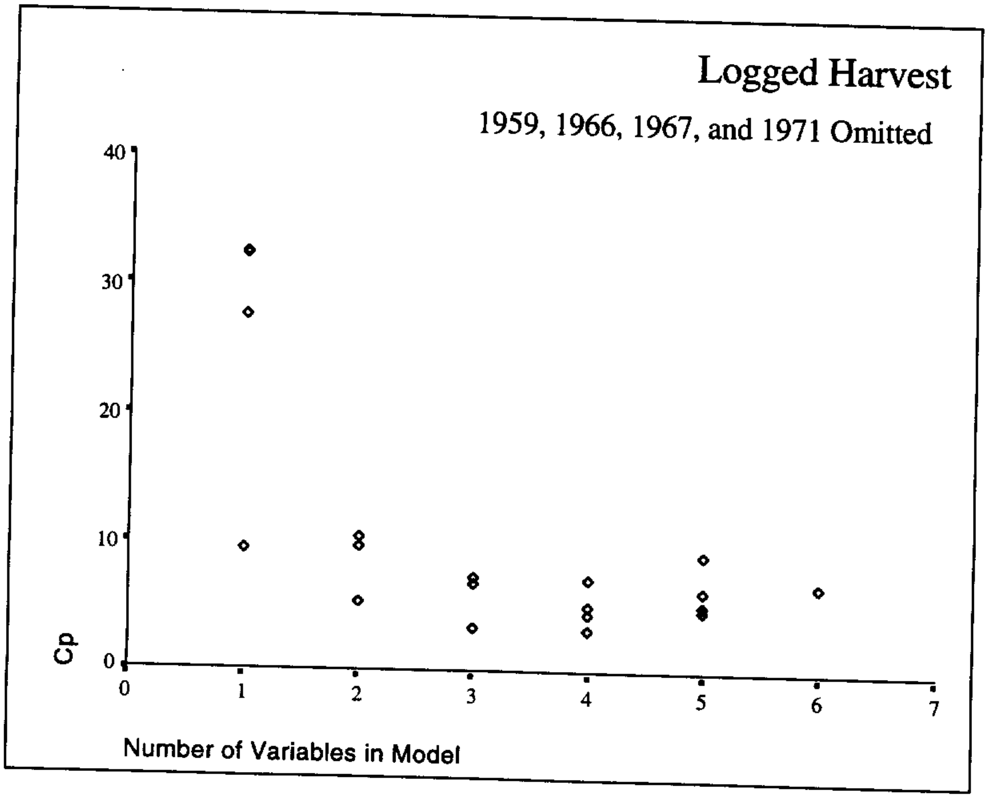
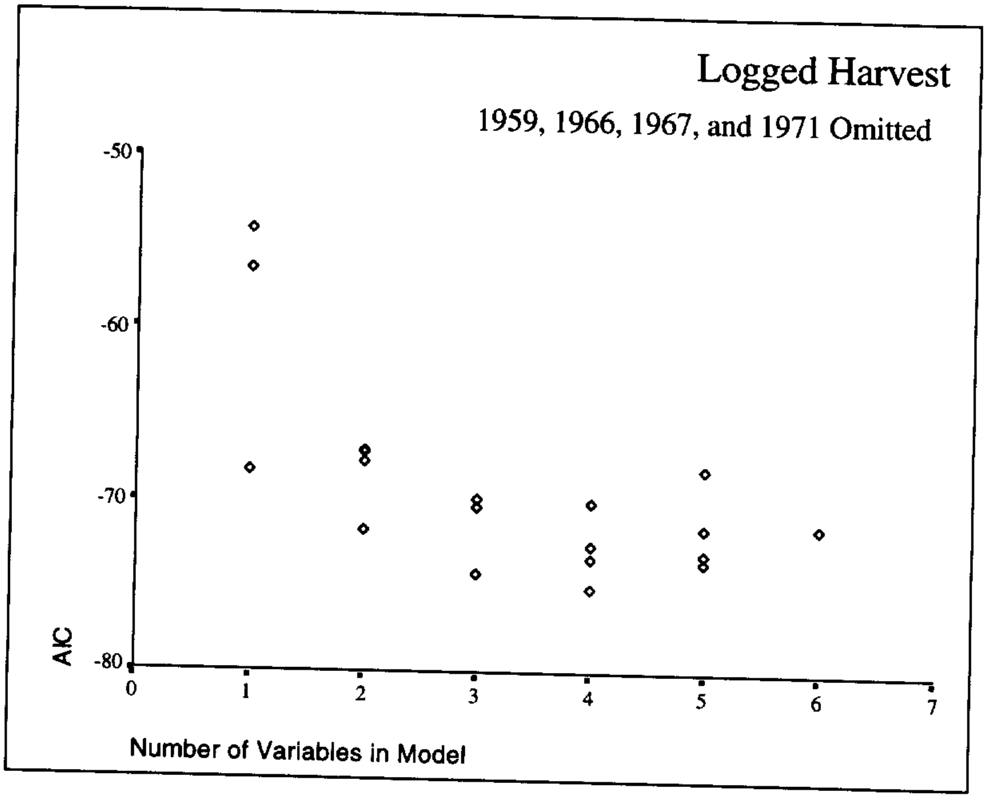
.5
.4
.3
.2
.1
0.0
-.1
0
1
2
3
4
5
6
7
Number of Variables in Model



Logged Harvest
1959, 1966, 1967, and 1971 Omitted
.11
.10
.09
.08
.07
.06
.05
.04
Mean Squared Error
0
1
2
3
4
5
6
7
Number of Variables in Model



Logged Harvest
1959, 1966, 1967, and 1971 Omitted
40
30
20
10
0
Cp
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Harvest
1959, 1966, 1967, and 1971 Omitted
AIC
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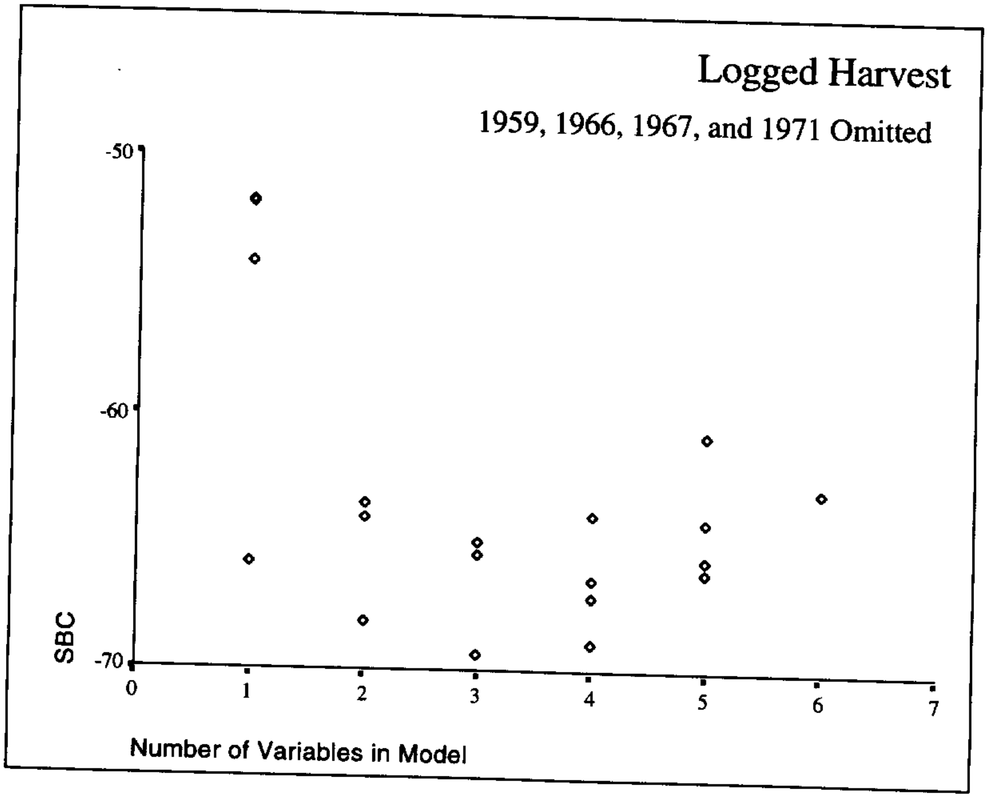
-60
-70
-80
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Harvest
1959, 1966, 1967, and 1971 Omitted
SBC
-50
-60
-70
0
1
2
3
4
5
6
7
Number of Variables in Model

Brown Shrimp Harvests in Galveston Bay: A Regression Analysis

Harvest vs. Freshwater Inflows

F. Michael Speed
Jacqueline Kiffe

Department of Statistics
Texas A&M University

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Table of Contents

Summary Report

Description of the Problem

Bimonthly freshwater inflows into Galveston Bay were recorded for the years 1959 to 1987. These variables, and various transformations of them, were used to construct a model for the annual harvest of brown shrimp.

Constructing Models—General Discussion

Stability of coefficient estimates and accuracy of predicted values are primary goals in constructing models for prediction. To this end, the data must be examined from three points of view: individual observations (to detect outliers or influential points); variables, individually and in groups (to select an optimal set of predictors); and the interaction of these two, which produces the overall structure of the data set (to determine whether multicollinearity is present or not). The first two of these were examined by both graphic and quantitative means; the third by quantitative means only.

Detecting Influential Points and Outliers

The structures of individual variables were examined via box plots and histograms, as well as by all the usual numerical measures. For each pair of variables, 99% prediction ellipses were plotted in a further effort to look for unusual points. For example, suppose large values of Variable A are generally associated with large values of Variable B. If an observation consisted of a large value for Variable A but a small value for Variable B, that point would be considered unusual, even though it was well within the range of data for both variables and could not be considered an outlier.

In addition, a number of residual analysis techniques were employed. A large *residual* indicates a point not well-fit by the model. The *deleted residual*, however, is somewhat more useful in the search for influential points. The model is fitted without a given observation, and the predicted response and corresponding residual are calculated for that observation. The *Studentized deleted residual* is scaled to have a Student's t distribution. Histograms and normal P-P plots of the residuals were also examined.

Other quantities, such as the Mahalanobis distance, Cook's distance, the leverage value, standardized values for the Dffits (to measure the influence of a given observation on the predicted response) and the Dfbetas (to measure the influence of a given observation on the calculated coefficients) were also used to build a general picture of the influence of individual points. Plots were made of the standardized Dffits value for each model against the Dfbeta values for each predictor in the model. Points which were extreme indicated observations which had strong effects on both predicted values and coefficient estimates.

Variable Selection

For each regression, residuals were plotted against each of the independent variables to look for nonlinear relationships between the response variable and individual predictors. Partial residual plots were employed to examine the overall relationship between the response and individual predictors. A partial residual is a corollary to the deleted residual. That is, the model is fitted without a given variable and the predicted response and corresponding residual are calculated for each observation. This seeks to answer the question, "What is the relationship of this predictor to the response variable, taking all other variables into account?" Thus, it examines the marginal relationship of a given predictor to the response.

Numerous measures have been developed over the years to assess the adequacy of a given model. We examined a number of these, including R^2 and mean squared error (MSE), and several others which directly incorporate penalties for having too many predictors in the model, such as adjusted R^2, C_p, AIC, and SBC. It is well-established that too many predictors in a model can lead to bad prediction, just as too few can, and these measures are used as part of the attempt to find an optimal model.

Multicollinearity

Multicollinearity arises when one or more variables are nearly closely approximated by linear combinations of the remaining variables, resulting in unstable coefficient estimates. The variance inflation factor (VIF) was calculated for each coefficient estimate to measure this instability, which is not usually considered profound for VIF's less that 10. No problems were found with this data. Additionally, the condition index (a ratio of eigenvalues of the covariance matrix, with the largest eigenvalue always on top) was calculated. A ratio greater than 30 is considered cause for concern. Again, no evidence of multicollinearity was found.

Other Procedures

Several other miscellaneous diagnostics, including the Durbin-Watson test for serial autocorrelation, were performed, and no general problems were detected. The Box-Cox procedure, used to find a transformation to normality, was also performed.

How the Final Model Was Chosen

Selecting the Data Set Used. First, the variables were explored thoroughly, individually and in pairs, in a first effort to detect outliers. The SAS® programming language allows a number of diagnostics to be calculated for a group of models on a given data set without actually performing a formal regression, thus allowing one to examine a large number of models quite efficiently. In addition to the untransformed data, three transformed data sets were selected for this procedure, based on prior experience. Before we proceeded, the Box-Cox procedure was performed to find if a transformation to normality was suggested. The recommended transformation was the square root of harvest. At this point, there were five data sets for which the diagnostic series was calculated:

1. Untransformed data
2. Square root of harvest; remaining variables untransformed
3. Natural log of inflow variables; harvest untransformed
4. Natural log of harvest; inflows untransformed
5. Natural log of all variables

Selecting the Points to be Omitted. Data sets 1, 2, and 5 (maximum $R^2 = 0.43$, 0.42, and 0.43 respectively) showed somewhat more promise than sets 3 and 4 (maximum $R^2 = 0.39$ and 0.37 respectively), so full regressions were performed for three models, each of which contained all variables in its corresponding data set. All diagnostics were generated, and influential points were determined for each model. Because so many points were flagged, a large number of subsets of those three data sets were analyzed. Each subset was obtained by deleting various combinations of the potentially troublesome points. In each case, one subset was chosen as optimal; those results are presented in the section on subset analysis.

The observations flagged as potentially influential are given in the summary table on the next page. Those which were ultimately deleted in fitting the model are indicated with an asterisk. The abbreviation key and a similar summary table for points designated as potentially influential by box plots also appear on the following pages. A point was not considered to be a potential problem unless it garnered multiple flags.

The results from this part of the analysis point out an unfortunate truth in the search for influential points: The various measures of an observation's influence are only general rules of thumb. The only way actually to ascertain the effect an observation has on the model is to remove it and refit the model without it. Unfortunately, this itself is inadequate; many points have a profound influence on the fit of the model *only* in the presence of another particular point. Only by removing both points is the true effect discovered. Unfortunately, there are no tests for detecting such relationships, only graphical procedures and experience.

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	Total
Data Set 1									
***1959**			1				1	1	3
1961	1								1
1973	1								1
1974	1								1
***1975**	1						1		2
1976								1	1
1979	2								2
1980							1		1
1983	1								1
Data Set 2									
***1959**			1				1	3	5
1961	1								1
1973	1								1
1974	1								1
***1975**	1						1	1	3
***1979**	2								2
1983	1						1		2
Data Set 5									
1959	1			1	1		1	1	5
***1960**	1	1	1				1	2	6
1961	1								1
1967	1								1
1971	2								2
1976	1								1
1981							1		1
1983							1		1

Summary of points flagged by diagnostic measures

Key to Abbreviations:

BOX	Box plot
SRE	Studentized residual
SDR	Studentized deleted residual
LEV	Leverage value
MAH	Mahalanobis distance
COO	Cook's distance
SDF	Standardized Dffits value
SDB	Standardized Dfbeta value

Year	Variable
1959	Ln(Brown Shrimp Harvest)
1960	Ln(Brown Shrimp Harvest)
1961	Ln(Brown Shrimp Harvest) January-February Inflows
1967	Ln(January-February Inflows)
1971	Ln(January-February Inflows) Ln(May-June Inflows)
1973	March-April Inflows
1974	September-October Inflows
1975	November-December Inflows
1976	Ln(January-February Inflows)
1979	March-April Inflows July-August Inflows
1983	July-August Inflows

Summary of points flagged by boxplots

Selecting the Final Candidate Models. After the subset analysis led us to three subsets (untransformed data, 1959 and 1975 omitted; square root of harvest, 1959, 1975, and 1979 omitted; all variables logged, 1960 omitted), further examination led us to consider the following two models:

<u>1959 and 1975 Omitted:</u>

1a. Harvest regressed on January-February, July-August, September-October, and November-December inflows

<u>1959, 1975, and 1979 Omitted:</u>

2a. Square root of harvest regressed on January-February, July-August, September-October, and November-December inflows

Selecting the Final Model. To put these models on a common ground for testing, the observations corresponding to the years 1959, 1975, and 1979 were deleted. Regression was performed using each of these two models, and the deleted residuals were calculated. In the models where the prediction was for the square root of harvest, the prediction was transformed back to the original scale before the residual was calculated. Various descriptive statistics were calculated for the square of these deleted residuals. This was repeated for the entire data set of 29 observations, and the results of both of these procedures appear on the next page. Clearly, model 1a performs better from the point of view of prediction, and is therefore our final choice.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
1a	*26*	*1478.5364*	*2817860.1621*	*436334.715067*	*678819.215235*
2a	*26*	*2.4352*	*3805727.4392*	*517870.251210*	*867047.913709*
1a	*29*	*33.6001*	*3476037.4098*	*642356.264167*	*992028.977915*
2a	*29*	*1104.4258*	*3288921.8390*	*727235.407397*	*1026733.316183*

Model

$$\begin{aligned}\text{Brown Shrimp Harvest} = 1019.833 &- 0.578*(\text{January-February Inflows})\\ &+ 0.419*(\text{July-August Inflows})\\ &+ 0.406*(\text{September-October Inflows})\\ &+ 0.353*(\text{November-December Inflows})\end{aligned}$$

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	*November-December Inflows, July-August Inflows, September-October Inflows, January-February Inflows*[c,d]	.	*.756*	*.571*	*.493*	*582.7584*	*1.125*

a. Dependent Variable: Brown Shrimp Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, July-August Inflows, September-October Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*9954495.256*	*4*	*2488623.814*	*7.328*	*.001*[b]
	Residual	*7471362.011*	*22*	*339607.364*		
	Total	*17425857.267*	*26*			

a. Dependent Variable: Brown Shrimp Harvest

b. Independent Variables: (Constant), November-December Inflows, July-August Inflows, September-October Inflows, January-February Inflows

Coefficients[a]

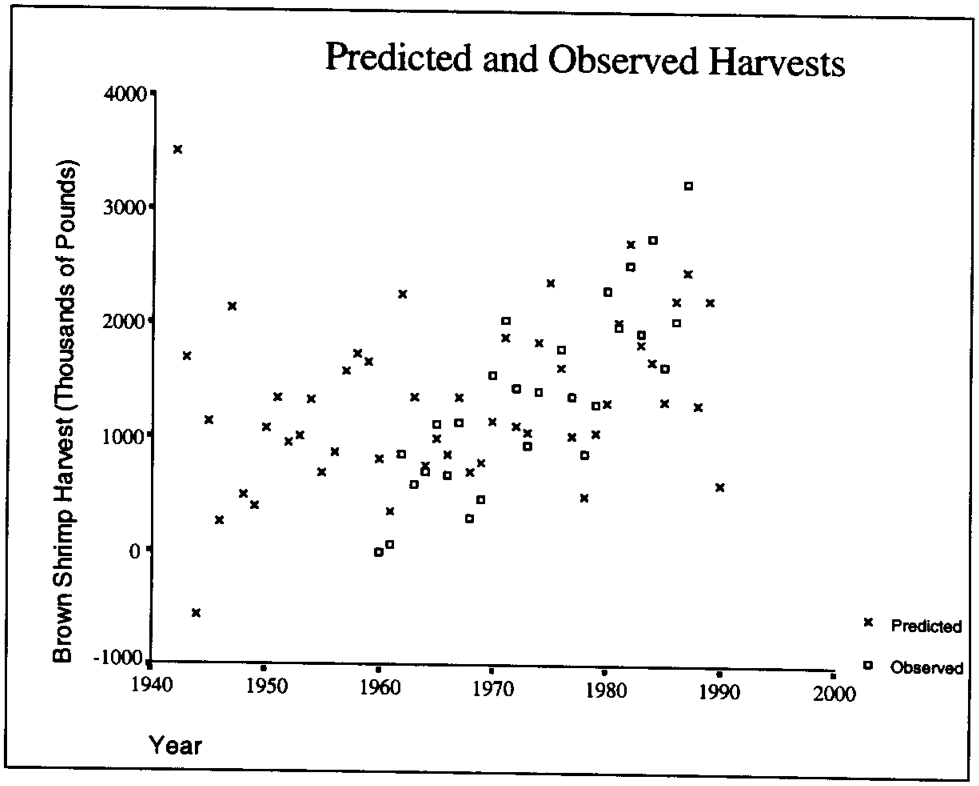
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1019.833	268.170		3.803	.001	463.682	1575.985		
	January-February Inflows	-.578	.132	-.784	-4.386	.000	-.851	-.305	.610	1.640
	July-August Inflows	.419	.168	.391	2.493	.021	.071	.768	.794	1.260
	September-October Inflows	.406	.134	.468	3.022	.006	.127	.685	.813	1.230
	November-December Inflows	.353	.140	.449	2.529	.019	.064	.643	.619	1.616

a. Dependent Variable: Brown Shrimp Harvest

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	January-February Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	4.068	1.000	.01	.01	.01	.01	.01
	2	.475	2.928	.00	.00	.32	.33	.00
	3	.208	4.420	.09	.14	.23	.25	.36
	4	.134	5.508	.76	.05	.43	.33	.09
	5	.115	5.957	.14	.80	.00	.08	.54

a. Dependent Variable: Brown Shrimp Harvest



Exploring the Data

Listing of Data

YEAR	BRSHRIMP	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL	ND_INFL
1959	23.30	2088.38	2234.80	1954.20	2282.80	2054.00	207.00
1960	8.60	2838.00	799.80	1831.80	1208.18	1091.60	1409.60
1961	82.90	5180.00	1440.10	1977.30	1437.95	1154.04	3586.10
1962	868.50	728.40	649.90	1036.80	532.90	2163.94	1621.10
1963	600.80	1102.10	356.90	796.10	201.78	978.50	1417.60
1964	717.10	851.95	1061.50	445.80	215.41	126.83	276.50
1965	1132.20	1466.60	1035.80	2334.80	243.99	588.62	1398.70
1966	681.10	2126.40	1977.80	5402.30	1220.70	260.65	1288.40
1967	1148.50	257.53	583.93	749.10	383.91	529.50	336.49
1968	307.80	2129.20	3236.90	6258.00	929.20	515.10	920.20
1969	475.50	1663.10	4102.00	4023.50	489.22	556.89	862.74
1970	1556.00	752.30	2674.30	1624.80	402.78	395.35	702.30
1971	2050.10	134.30	306.18	273.04	448.98	1627.41	280.35
1972	1453.00	2042.19	715.60	1966.77	442.44	748.44	2250.95
1973	955.40	2190.55	5382.71	5752.84	1597.24	565.19	1165.62
1974	1422.70	3342.00	947.02	1514.33	566.48	4222.20	2309.20
1975	828.40	3138.98	2242.47	3911.76	1251.90	1972.37	5217.90
1976	1798.00	300.41	774.04	1891.54	958.01	568.55	451.20
1977	1381.50	2017.84	3210.59	1381.78	412.79	716.23	2019.79
1978	883.20	2120.06	606.39	673.68	390.93	472.81	1017.47
1979	1315.00	2872.02	4744.84	3937.29	3019.84	418.13	740.91
1980	2314.50	2483.63	1718.35	2028.90	382.89	2799.02	1261.47
1981	1991.90	331.86	393.91	4583.43	1656.01	1004.49	300.79
1982	2535.30	1380.97	1586.83	3551.50	1489.26	2326.50	2674.10
1983	1940.80	2666.53	1887.04	2520.25	3116.05	339.35	2584.78
1984	2771.00	1259.48	1283.67	822.10	524.19	2011.59	1017.37
1985	1651.00	2468.30	2670.78	1760.81	626.87	2025.67	1873.57
1986	2047.40	1651.33	771.37	4515.98	841.81	1356.07	3585.61
1987	3261.40	1905.62	1955.75	3070.28	1274.76	1591.52	3886.93

BRSHRIMP	Brown shrimp harvest (thousands of pounds)
JF_INFL	Lagged January-February inflows (thousands of acre-feet)
MA_INFL	Lagged March-April inflows (thousands of acre-feet)
MJ_INFL	Lagged May-June inflows (thousands of acre-feet)
JA_INFL	Lagged July-August inflows (thousands of acre-feet)
SO_INFL	Lagged September-October inflows (thousands of acre-feet)
ND_INFL	Lagged November-December inflows (thousands of acre-feet)

Summary Information for Individual Variables

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Brown Shrimp Harvest	.082	29	.200*	.974	29	.703
Square Root of Brown Shrimp Harvest	.090	29	.200*	.957	29	.372
Ln(Brown Shrimp Harvest)	.229	29	.000	.738	29	.010**
January-February Inflows	.101	29	.200*	.946	29	.230
March-April Inflows	.151	29	.091	.876	29	.010**
May-June Inflows	.198	29	.005	.916	29	.032
July-August Inflows	.194	29	.007	.826	29	.010**
September-October Inflows	.173	29	.026	.867	29	.010**
November-December Inflows	.182	29	.015	.888	29	.010**
Ln(January-February Inflows)	.188	29	.010	.870	29	.010**
Ln(March-April Inflows)	.091	29	.200*	.973	29	.667
Ln(May-June Inflows)	.107	29	.200*	.954	29	.330
Ln(July-August Inflows)	.125	29	.200*	.955	29	.353
Ln(September-October Inflows)	.116	29	.200*	.972	29	.659
Ln(November-December Inflows)	.096	29	.200*	.956	29	.359

*. This is a lower bound of the true significance.

**. This is an upper bound of the true significance.

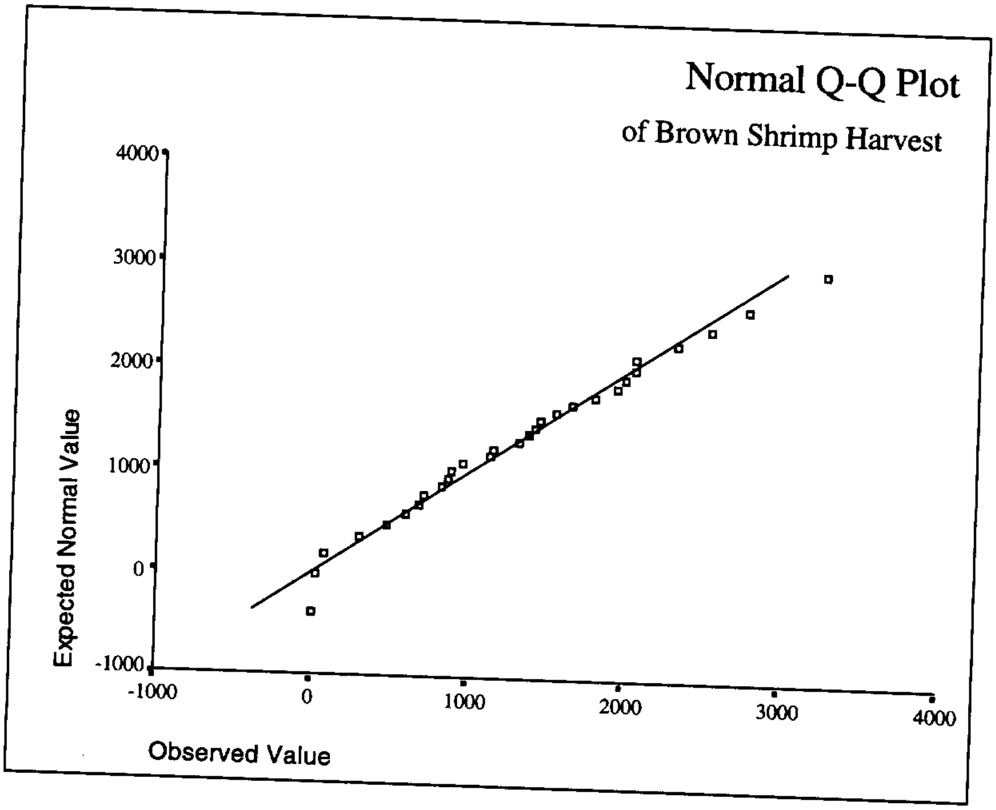
a. Lilliefors Significance Correction

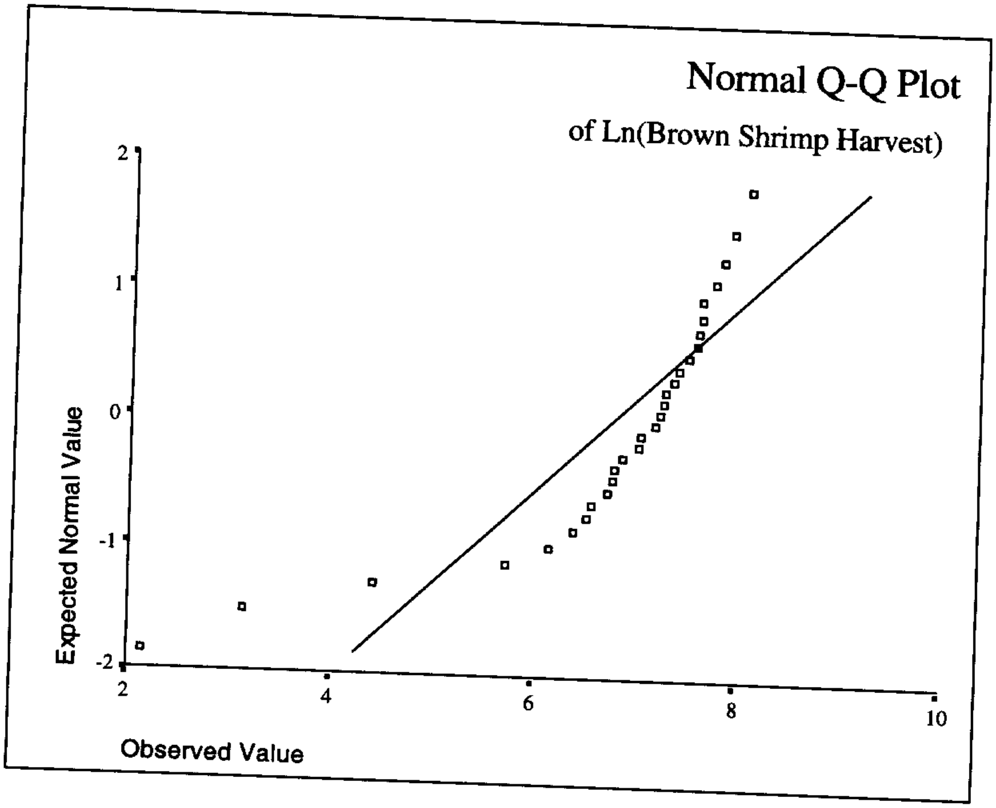
Descriptives

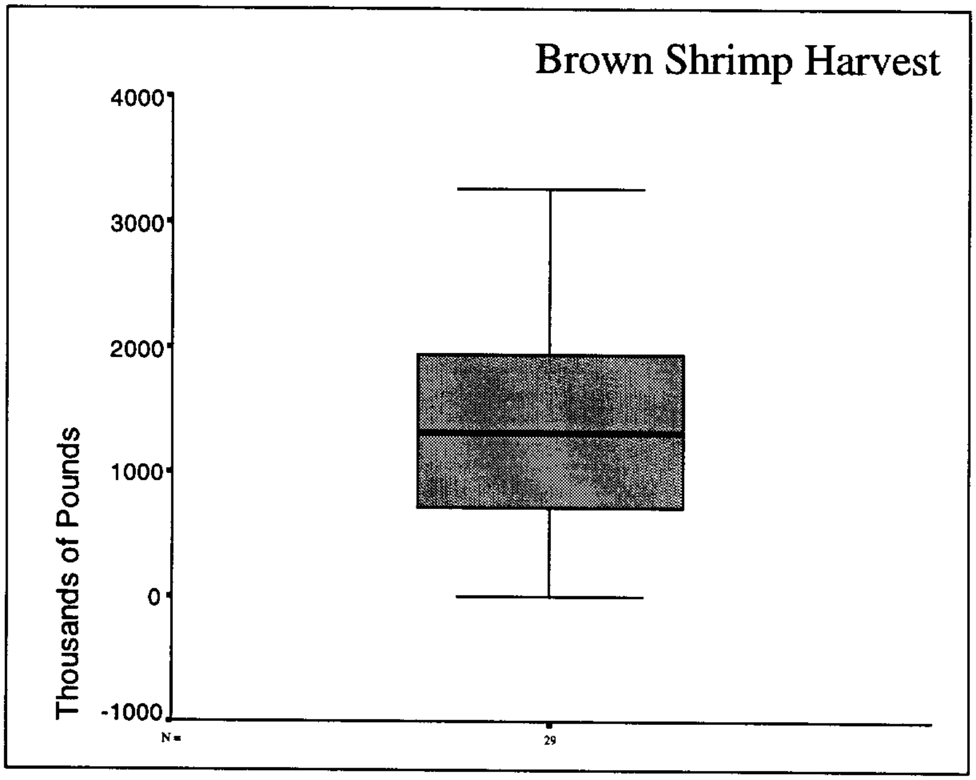
			Statistic	Std. Error
BROWN_SH	Mean		*1317.3414*	*154.7969*
	95% Confidence Interval for Mean	*Lower Bound*	*1000.2543*	
		Upper Bound	*1634.4284*	
	5% Trimmed Mean		*1290.2477*	
	Median		*1315.0000*	
	Variance		*694900.2*	
	Std. Deviation		*833.6067*	
	Minimum		*8.60*	
	Maximum		*3261.40*	
	Range		*3252.80*	
	Interquartile Range		*1267.2500*	
	Skewness		*.372*	*.434*
	Kurtosis		*-.303*	*.845*

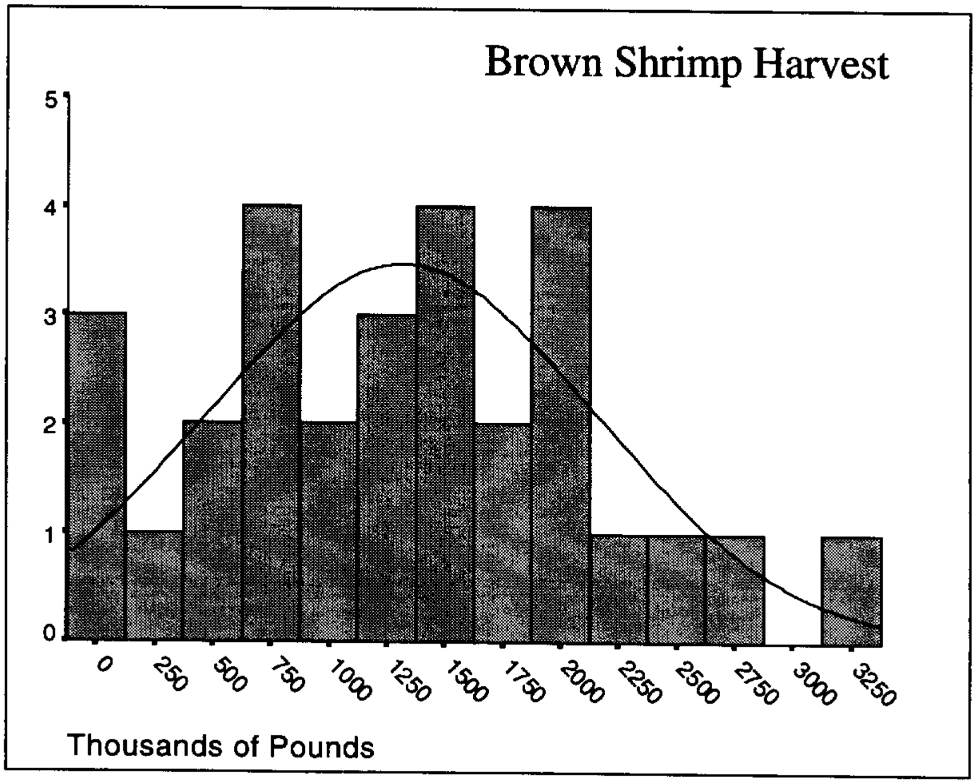
Extreme Values

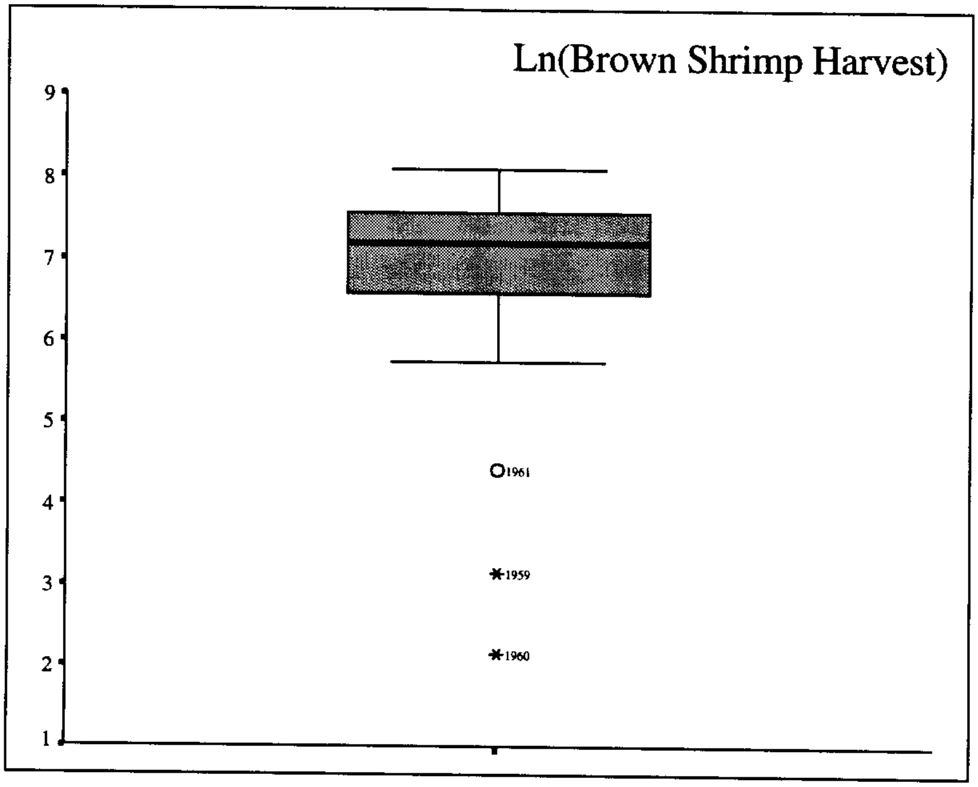
			Case Number	YEAR	Value
BROWN_SH	Highest	1	*29*	*1987*	*3261.40*
		2	*26*	*1984*	*2771.00*
		3	*24*	*1982*	*2535.30*
		4	*22*	*1980*	*2314.50*
		5	*13*	*1971*	*2050.10*
	Lowest	1	*2*	*1960*	*8.60*
		2	*1*	*1959*	*23.30*
		3	*3*	*1961*	*82.90*
		4	*10*	*1968*	*307.80*
		5	*11*	*1969*	*475.50*

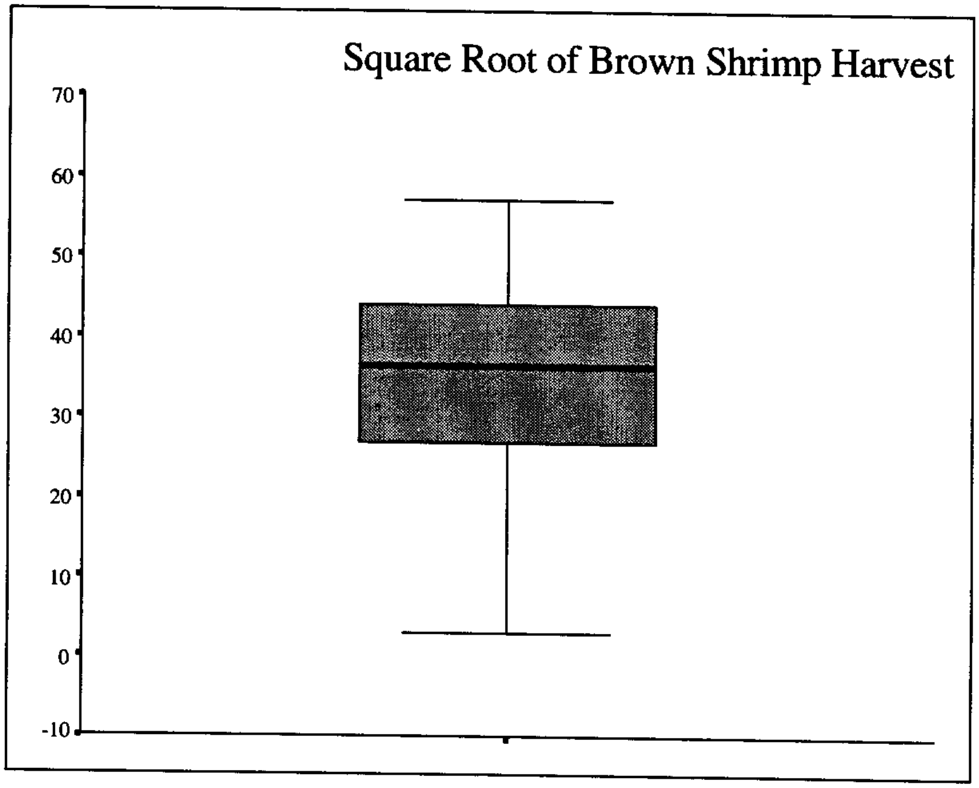

Normal Q-Q Plot
of Brown Shrimp Harvest
Expected Normal Value
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
Observed Value


Normal Q-Q Plot
of Ln(Brown Shrimp Harvest)
Expected Normal Value
2
1
0
-1
-2
2
4
6
8
10
Observed Value


Brown Shrimp Harvest
4000
3000
2000
1000
0
-1000
Thousands of Pounds
N=
29


Brown Shrimp Harvest
5
4
3
2
1
0
0
250
500
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
3250
Thousands of Pounds


Ln(Brown Shrimp Harvest)
9
8
7
6
5
4
3
2
1
1961
1959
1960

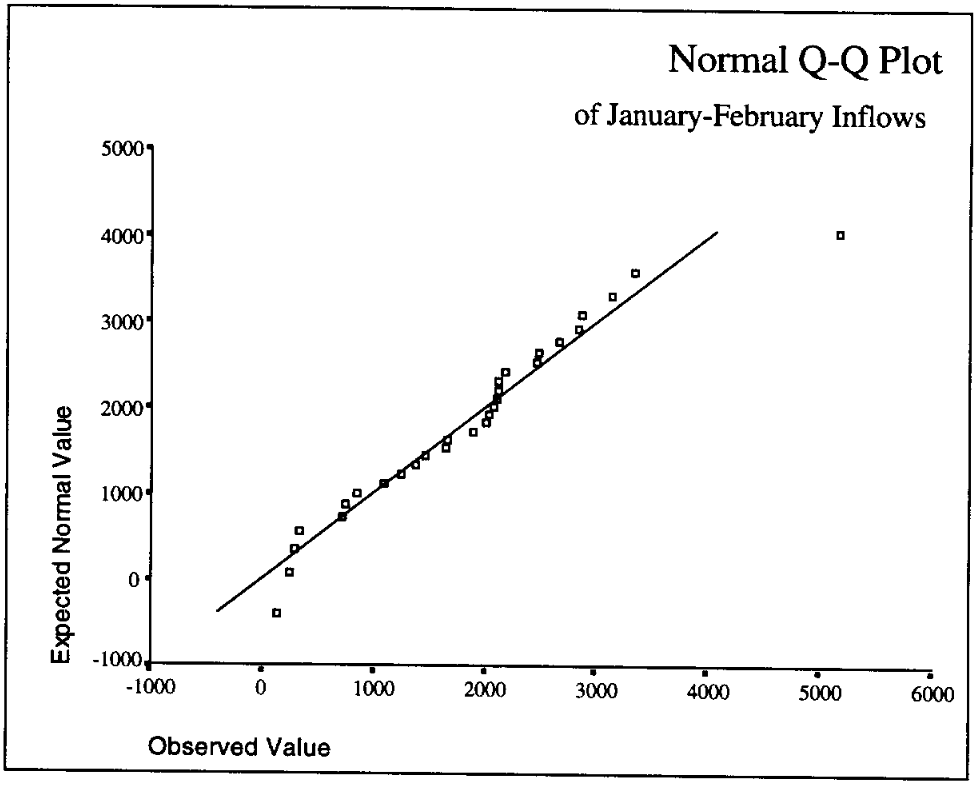

Square Root of Brown Shrimp Harvest
70
60
50
40
30
20
10
0
-10

Descriptives

			Statistic	Std. Error
JF_INFL	Mean		*1844.4838*	*204.3525*
	95% Confidence Interval for Mean	*Lower Bound*	*1425.8868*	
		Upper Bound	*2263.0808*	
	5% Trimmed Mean		*1783.7525*	
	Median		*2017.8400*	
	Variance		*1211038*	
	Std. Deviation		*1100.4717*	
	Minimum		*134.30*	
	Maximum		*5180.00*	
	Range		*5045.70*	
	Interquartile Range		*1498.9400*	
	Skewness		*.729*	*.434*
	Kurtosis		*1.622*	*.845*

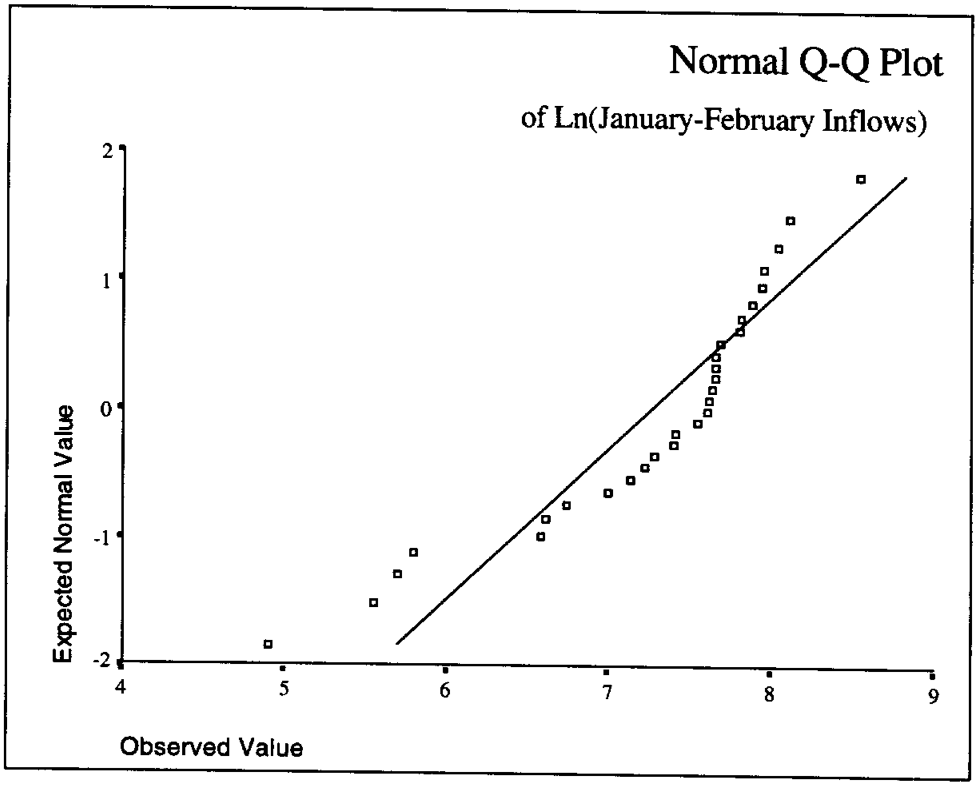
Extreme Values

			Case Number	YEAR	Value
JF_INFL	Highest	1	*3*	*1961*	*5180.00*
		2	*16*	*1974*	*3342.00*
		3	*17*	*1975*	*3138.98*
		4	*21*	*1979*	*2872.02*
		5	*2*	*1960*	*2838.00*
	Lowest	1	*13*	*1971*	*134.30*
		2	*9*	*1967*	*257.53*
		3	*18*	*1976*	*300.41*
		4	*23*	*1981*	*331.86*
		5	*4*	*1962*	*728.40*



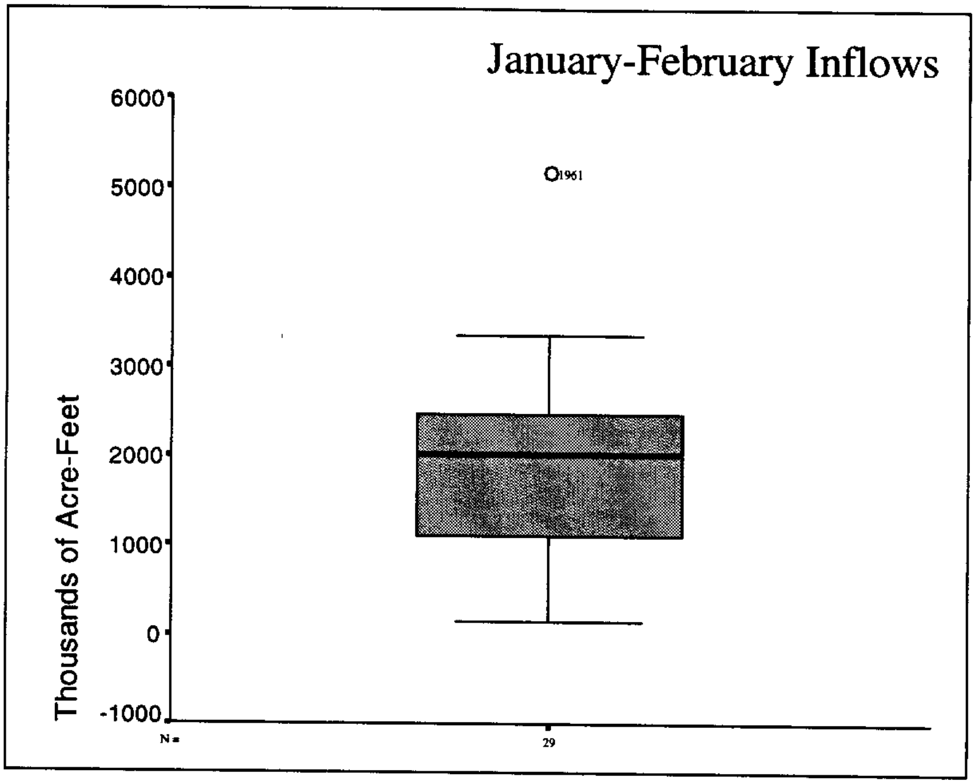
Normal Q-Q Plot

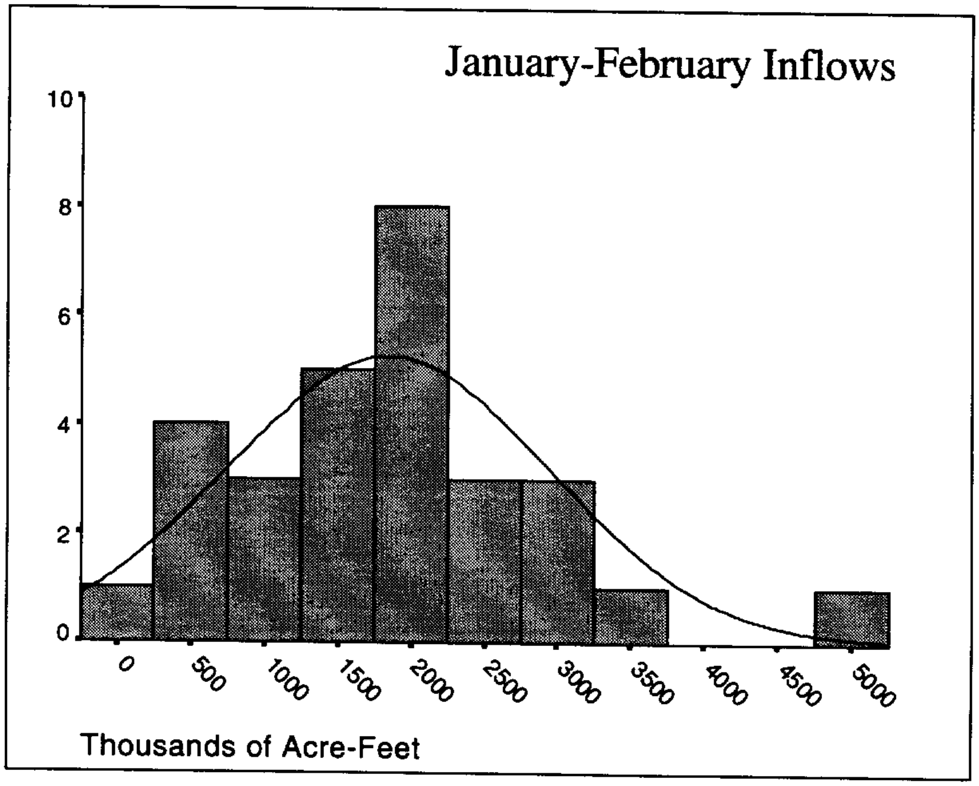
of January-February Inflows

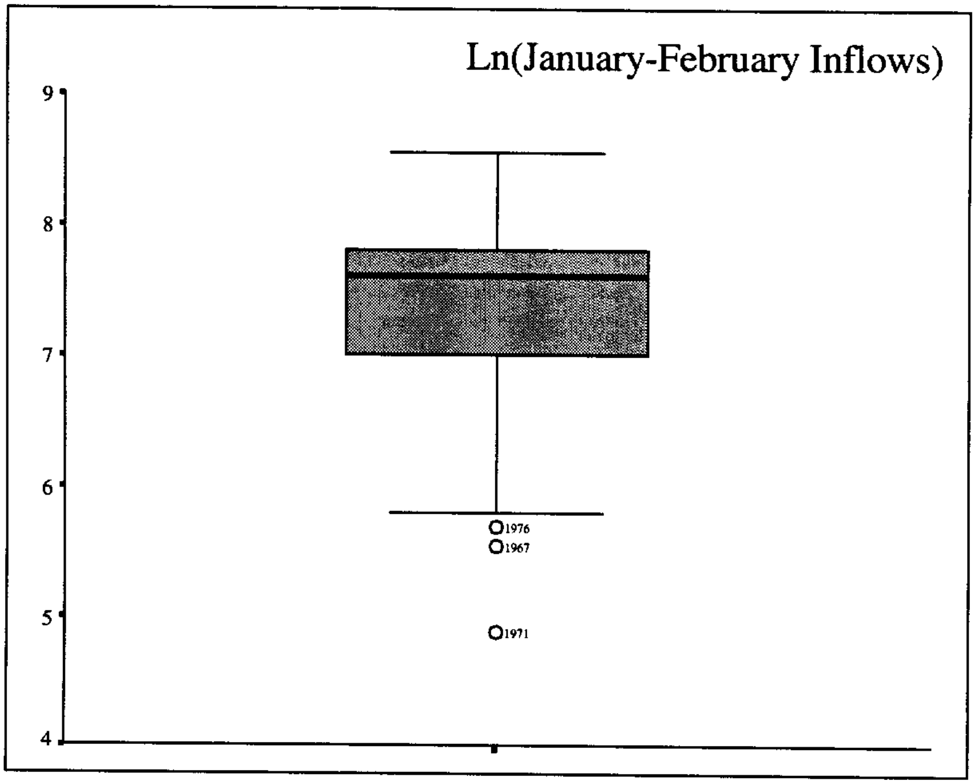


Normal Q-Q Plot

of Ln(January-February Inflows)


January-February Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1961
N =
29


January-February Inflows
10
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Thousands of Acre-Feet

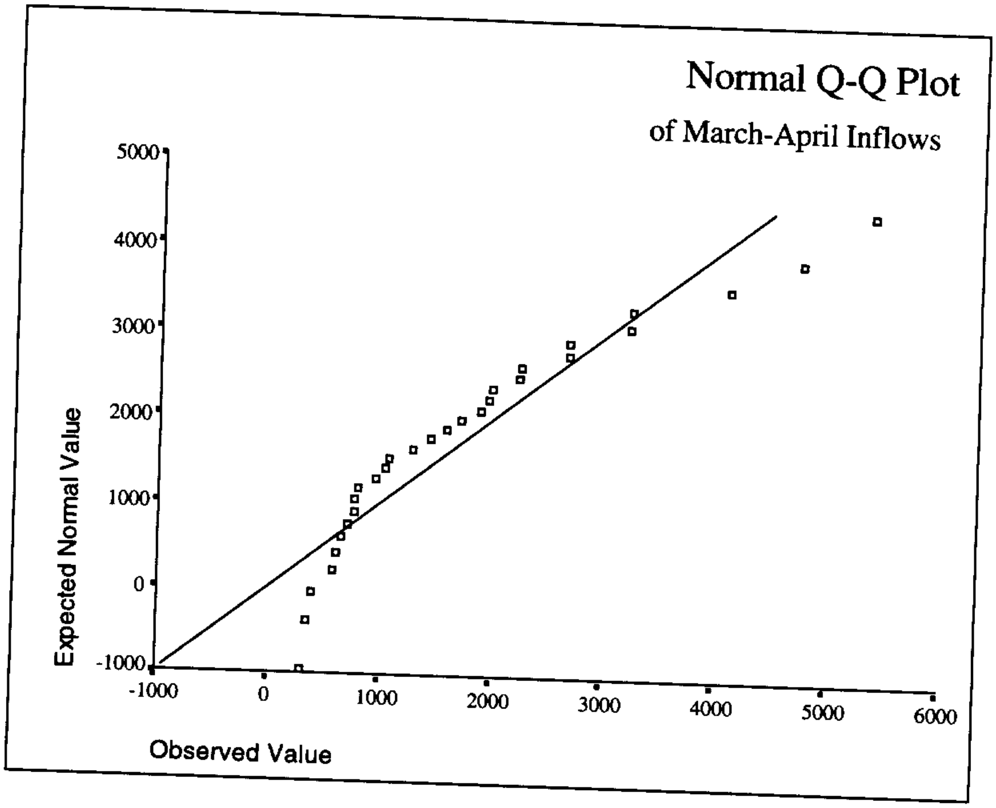

Ln(January-February Inflows)
9
8
7
6
5
4
1976
1967
1971

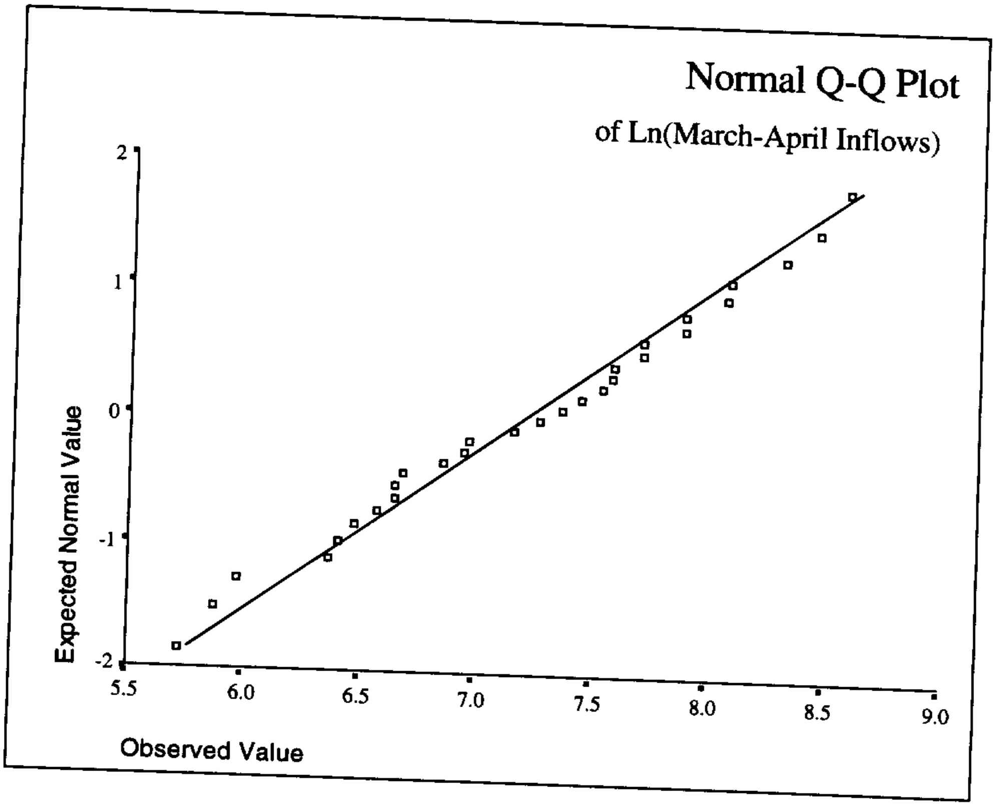
Descriptives

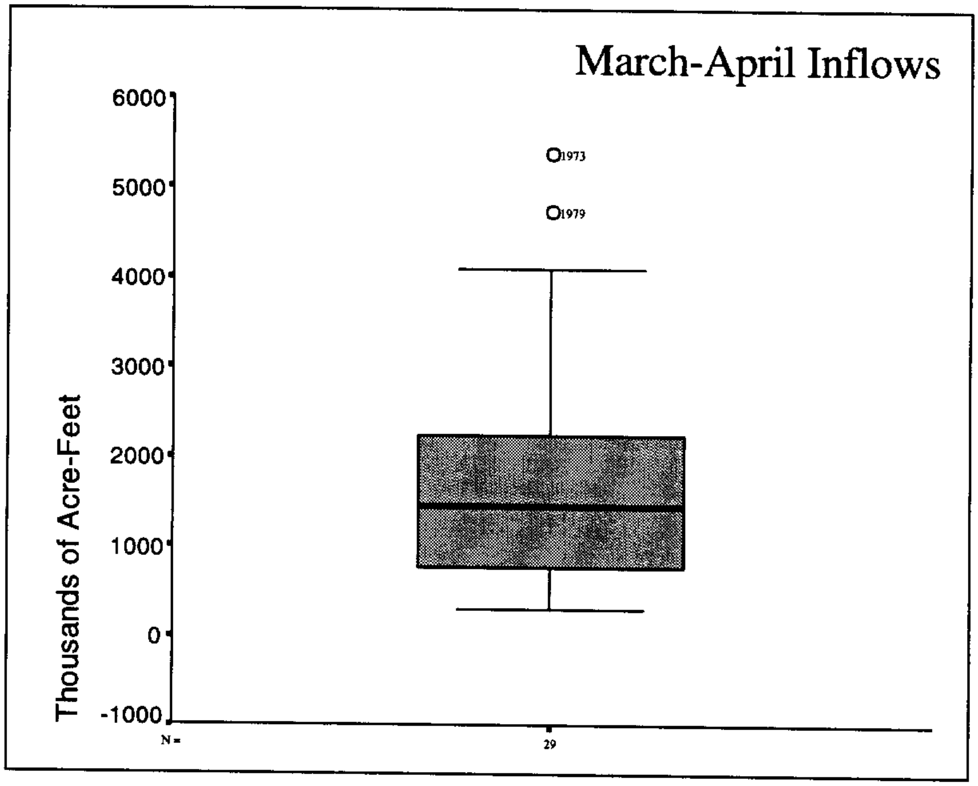
			Statistic	Std. Error
MA_INFL	Mean		*1770.7334*	*247.9403*
	95% Confidence Interval for Mean	*Lower Bound*	*1262.8507*	
		Upper Bound	*2278.6162*	
	5% Trimmed Mean		*1661.5554*	
	Median		*1440.1000*	
	Variance		*1782758*	
	Std. Deviation		*1335.1995*	
	Minimum		*306.18*	
	Maximum		*5382.71*	
	Range		*5076.53*	
	Interquartile Range		*1713.1400*	
	Skewness		*1.211*	*.434*
	Kurtosis		*.982*	*.845*

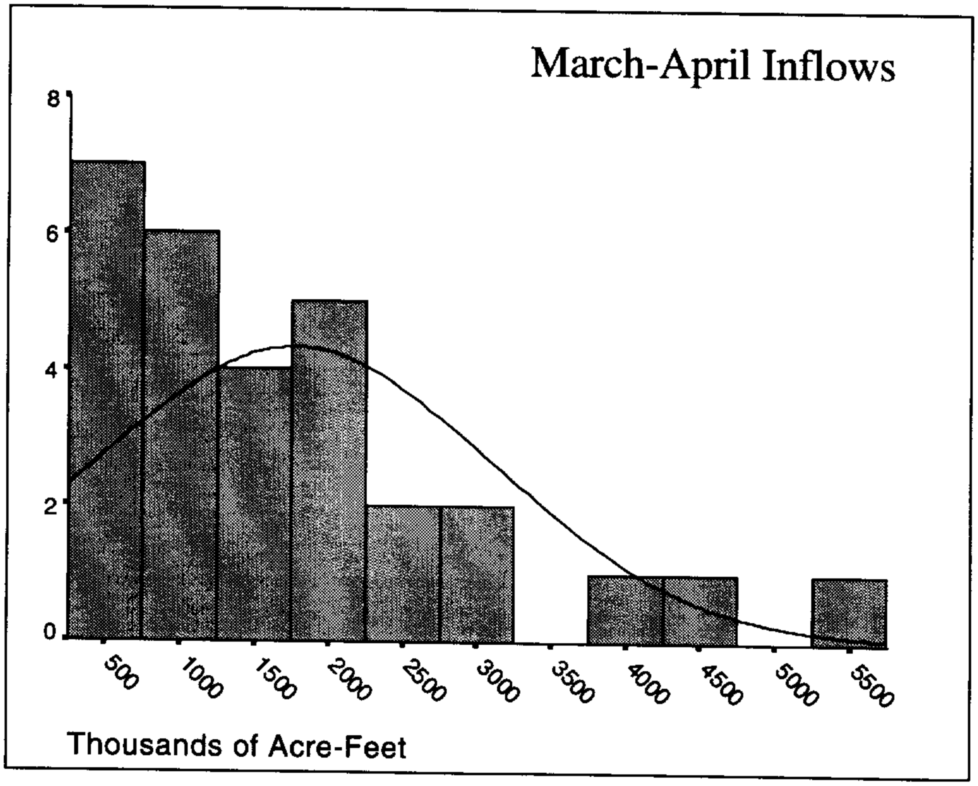
Extreme Values

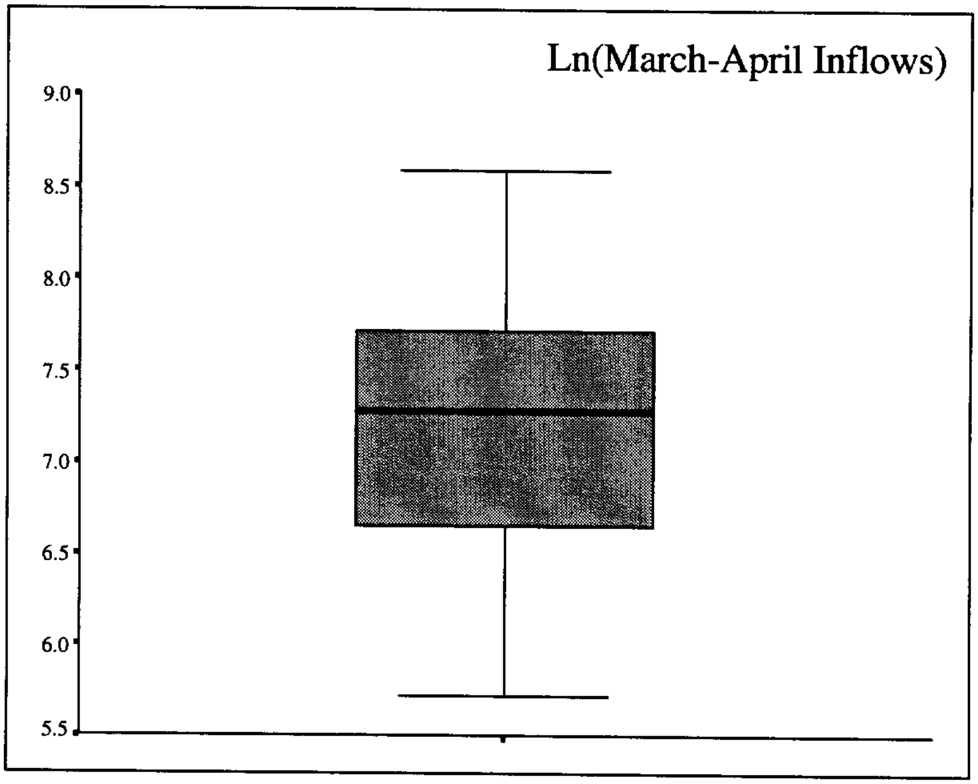
			Case Number	YEAR	Value
MA_INFL	Highest	1	*15*	*1973*	*5382.71*
		2	*21*	*1979*	*4744.84*
		3	*11*	*1969*	*4102.00*
		4	*10*	*1968*	*3236.90*
		5	*19*	*1977*	*3210.59*
	Lowest	1	*13*	*1971*	*306.18*
		2	*5*	*1963*	*356.90*
		3	*23*	*1981*	*393.91*
		4	*9*	*1967*	*583.93*
		5	*20*	*1978*	*606.39*


Normal Q-Q Plot
of March-April Inflows
5000
4000
3000
2000
1000
0
-1000
Expected Normal Value
-1000
0
1000
2000
3000
4000
5000
6000
Observed Value


Normal Q-Q Plot
of Ln(March-April Inflows)
2
1
0
-1
-2
Expected Normal Value
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Observed Value


March-April Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1973
1979
N =
29


March-April Inflows
8
6
4
2
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
Thousands of Acre-Feet

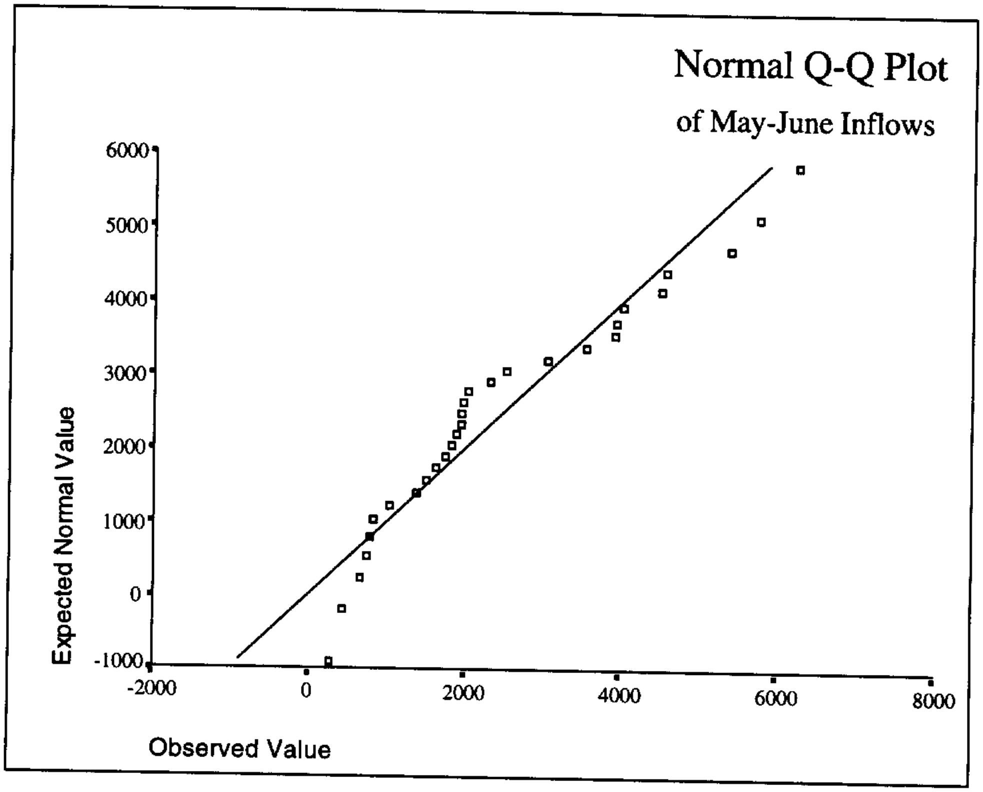

Ln(March-April Inflows)
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5

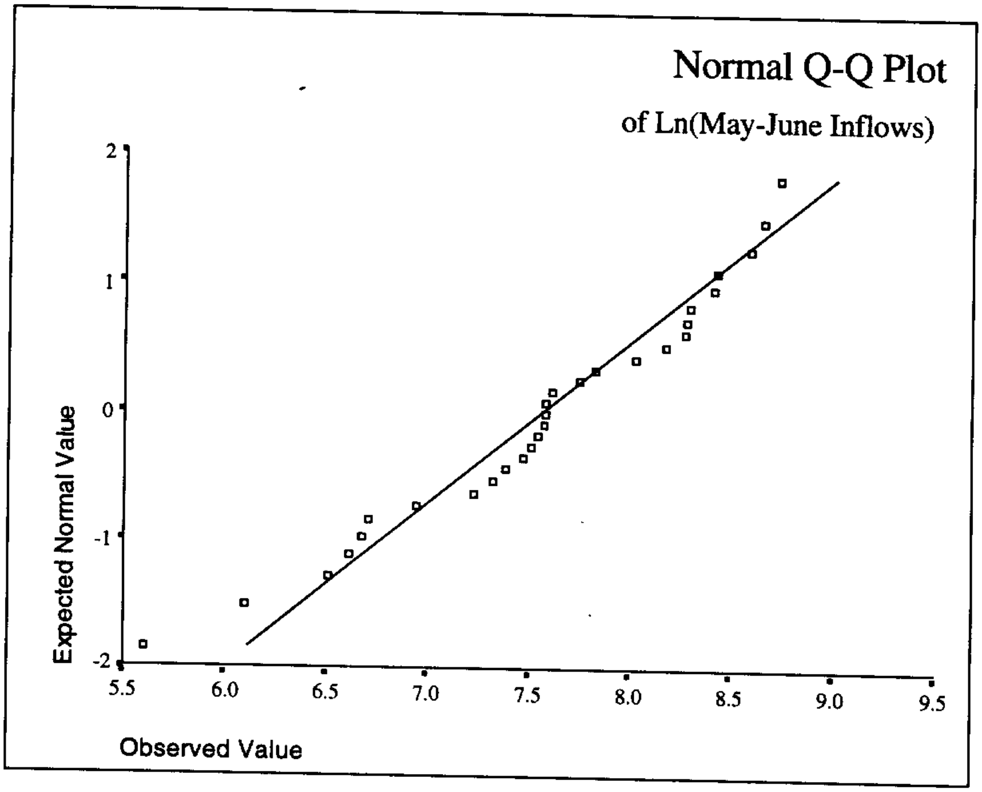
Descriptives

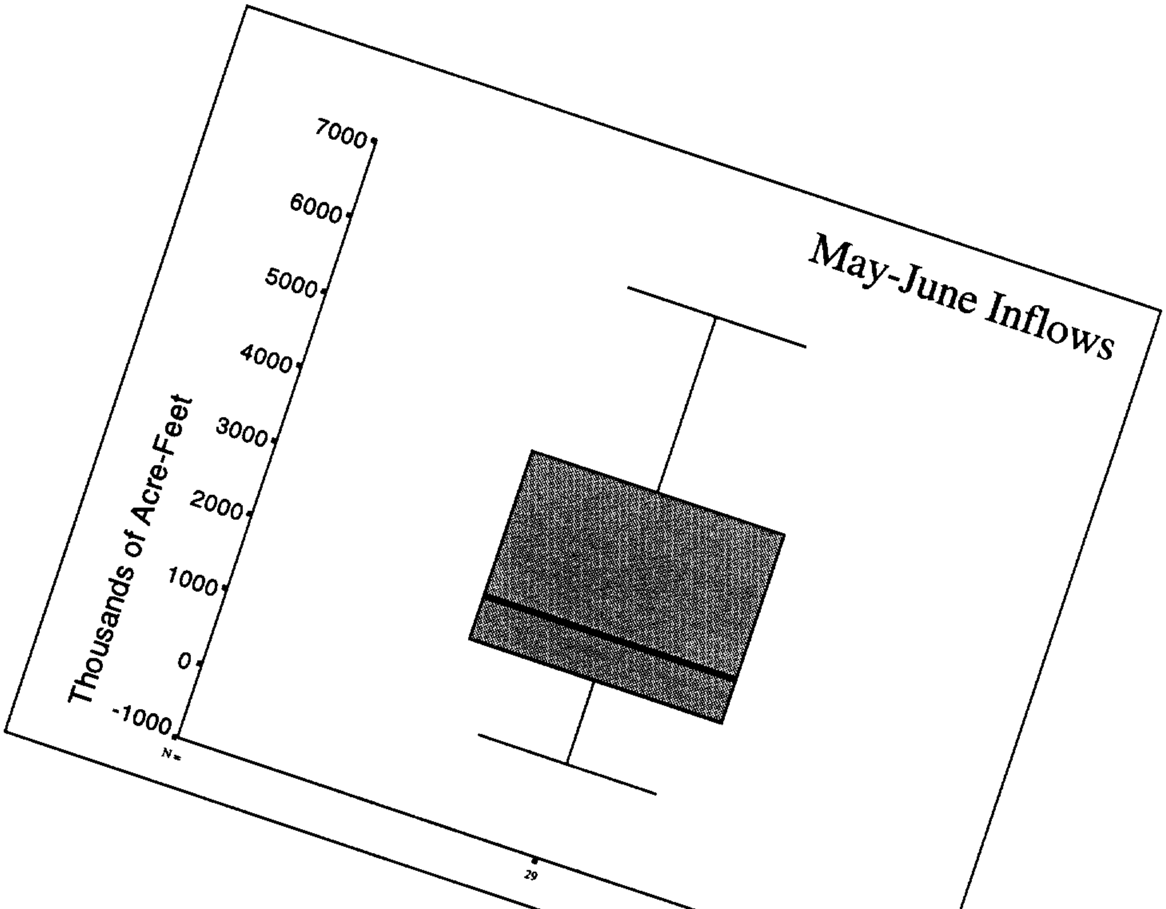
			Statistic	Std. Error
MJ_INFL	Mean		*2503.1303*	*310.4068*
	95% Confidence Interval for Mean	*Lower Bound*	*1867.2908*	
		Upper Bound	*3138.9699*	
	5% Trimmed Mean		*2424.1514*	
	Median		*1966.7700*	
	Variance		*2794219*	
	Std. Deviation		*1671.5918*	
	Minimum		*273.04*	
	Maximum		*6258.00*	
	Range		*5984.96*	
	Interquartile Range		*2715.2350*	
	Skewness		*.744*	*.434*
	Kurtosis		*-.406*	*.845*

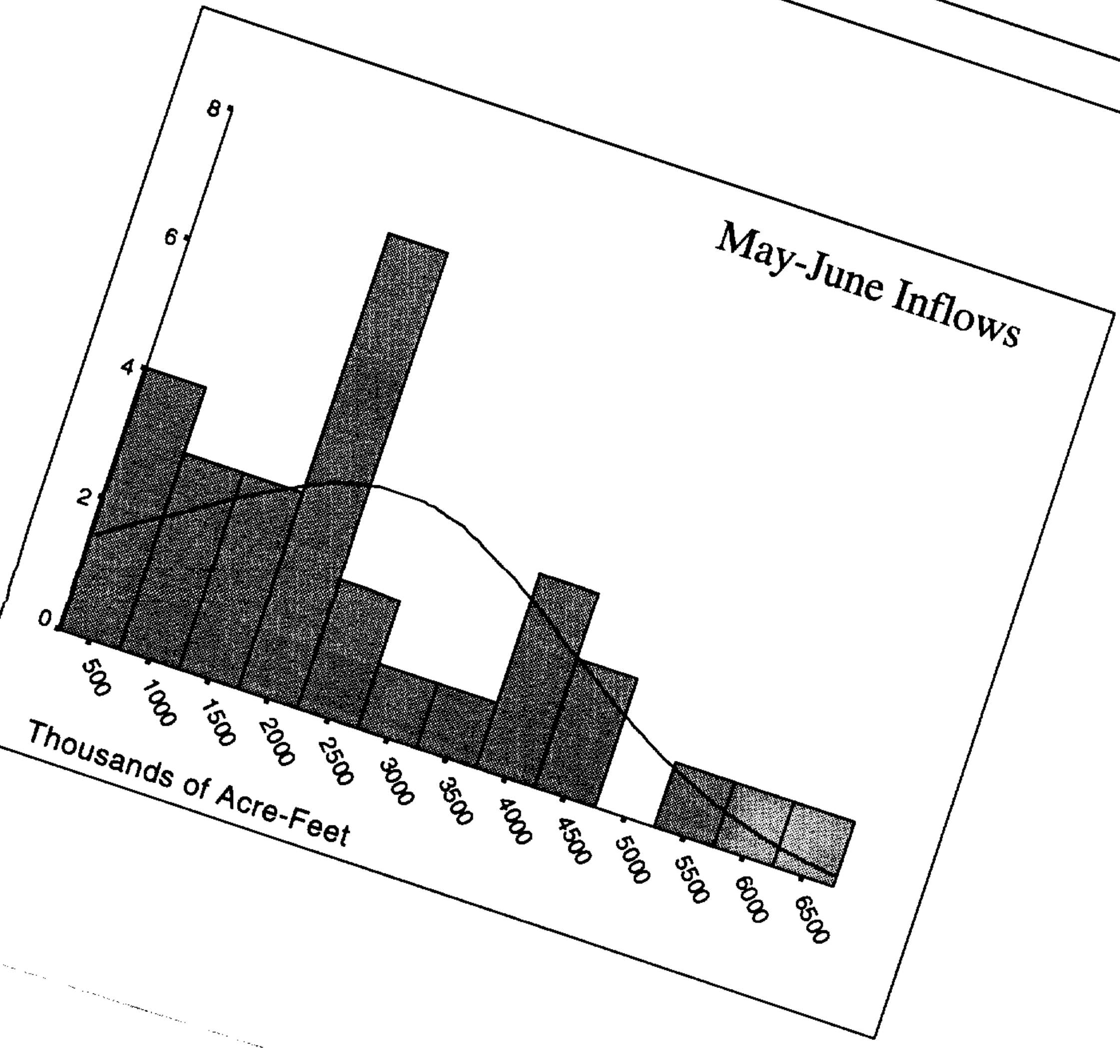
Extreme Values

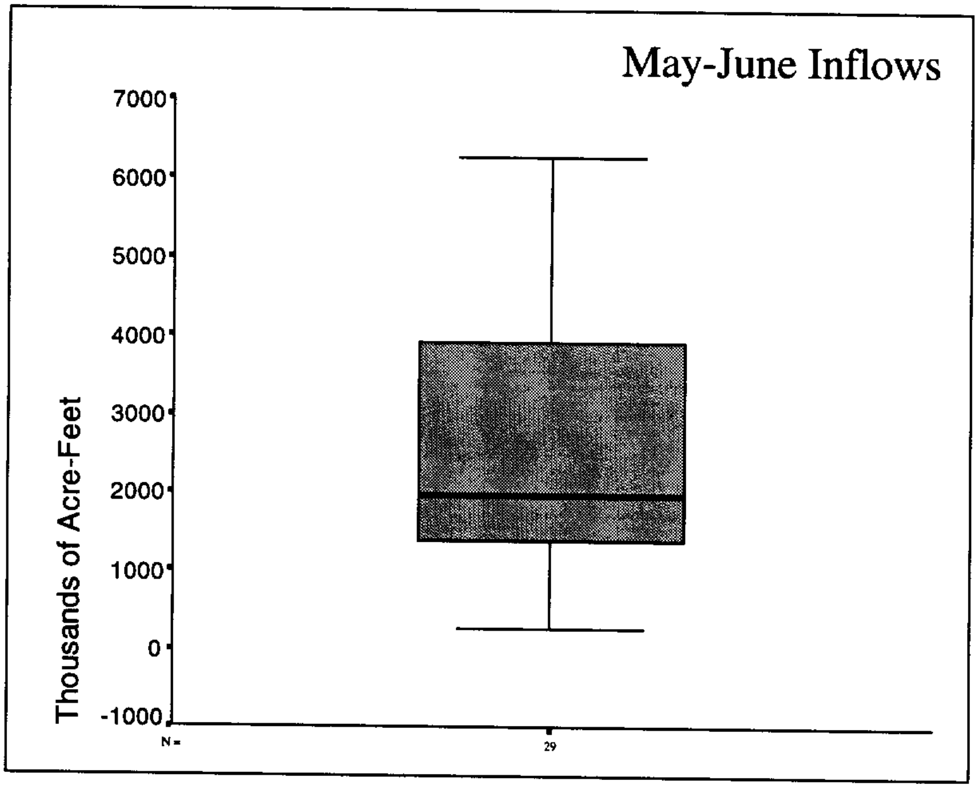
			Case Number	YEAR	Value
MJ_INFL	Highest	1	*10*	*1968*	*6258.00*
		2	*15*	*1973*	*5752.84*
		3	*8*	*1966*	*5402.30*
		4	*23*	*1981*	*4583.43*
		5	*28*	*1986*	*4515.98*
	Lowest	1	*13*	*1971*	*273.04*
		2	*6*	*1964*	*445.80*
		3	*20*	*1978*	*673.68*
		4	*9*	*1967*	*749.10*
		5	*5*	*1963*	*796.10*

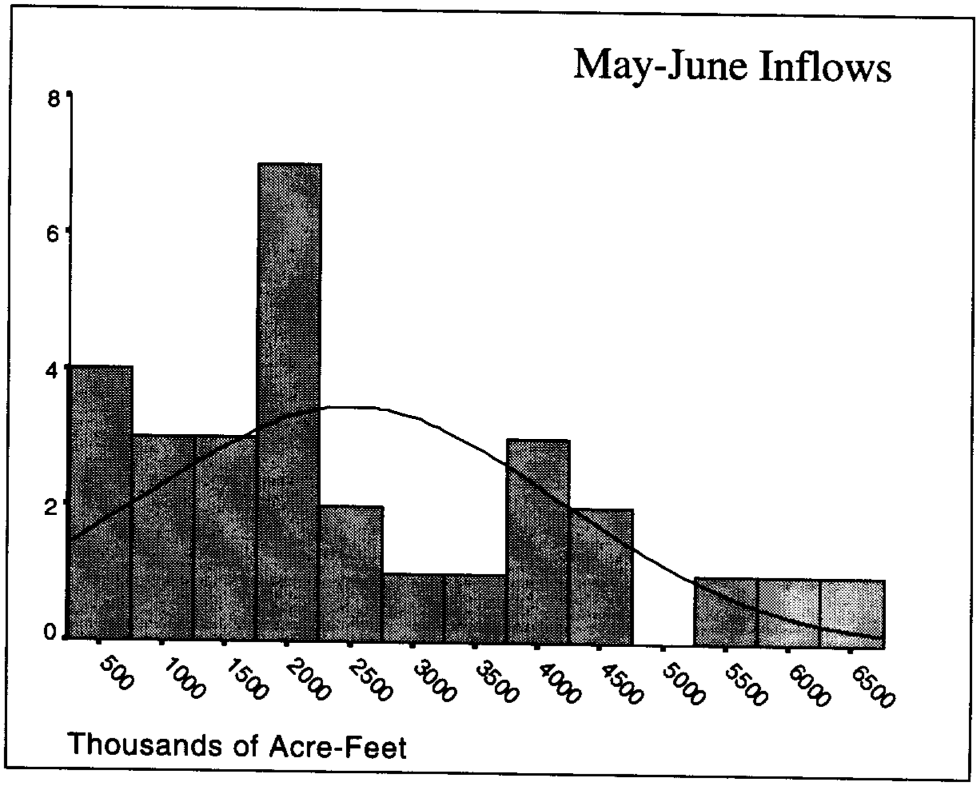

Normal Q-Q Plot
of May-June Inflows
Expected Normal Value
6000
5000
4000
3000
2000
1000
0
-1000
-2000
0
2000
4000
6000
8000
Observed Value

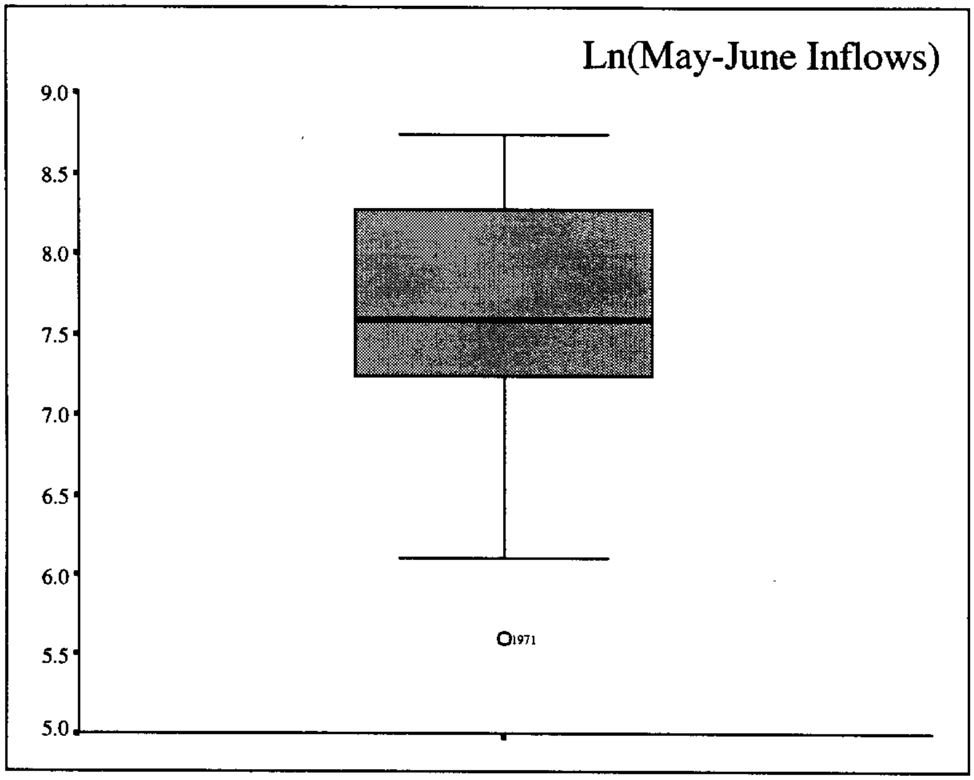

Normal Q-Q Plot
of Ln(May-June Inflows)
Expected Normal Value
2
1
0
-1
-2
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5
Observed Value


May-June Inflows
7000
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
N =
29


May-June Inflows
8
6
4
2
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
Thousands of Acre-Feet


May-June Inflows
7000
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
N =
29


May-June Inflows
8
6
4
2
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
Thousands of Acre-Feet

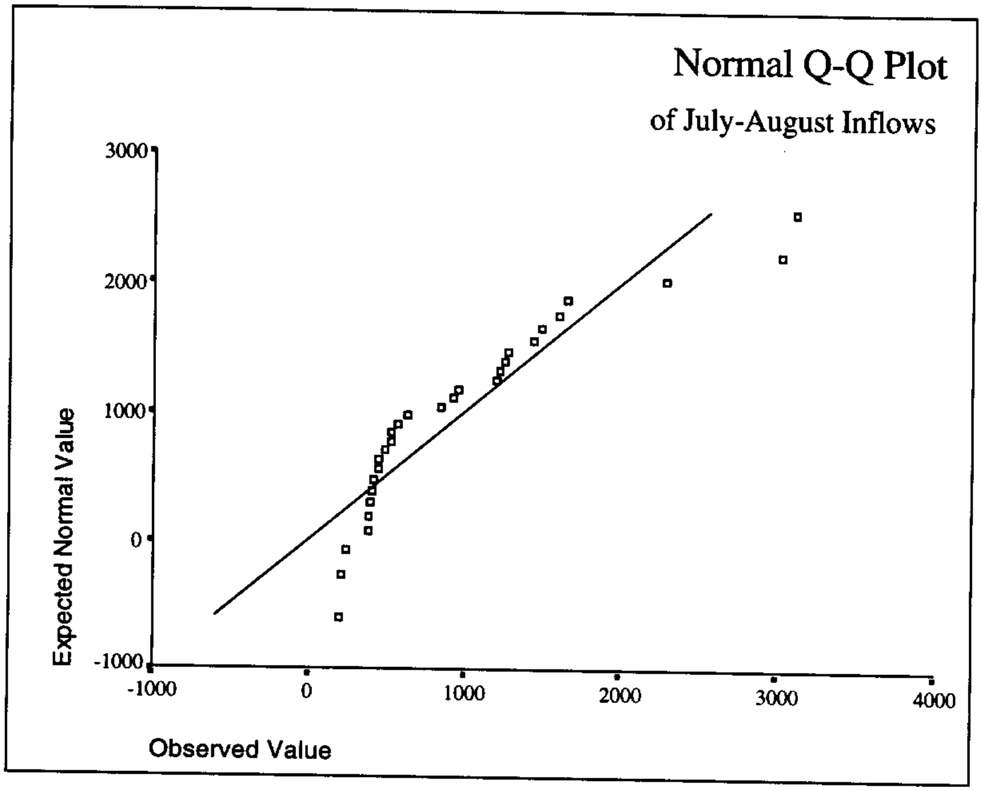

Ln(May-June Inflows)
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
1971

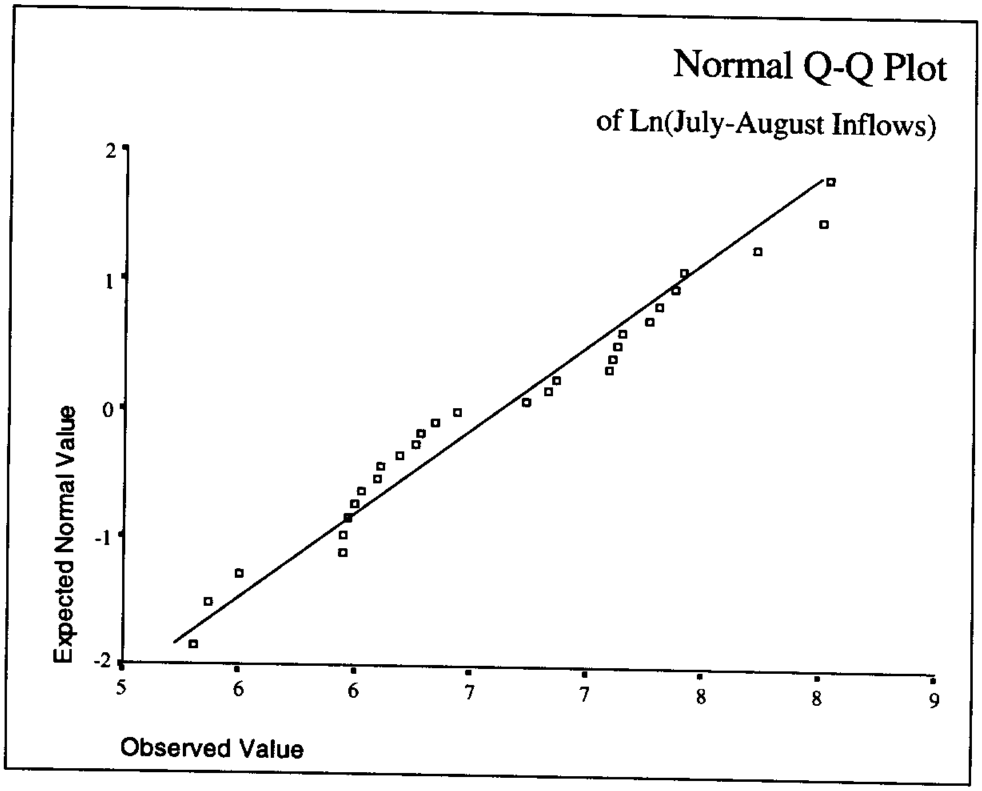
Descriptives

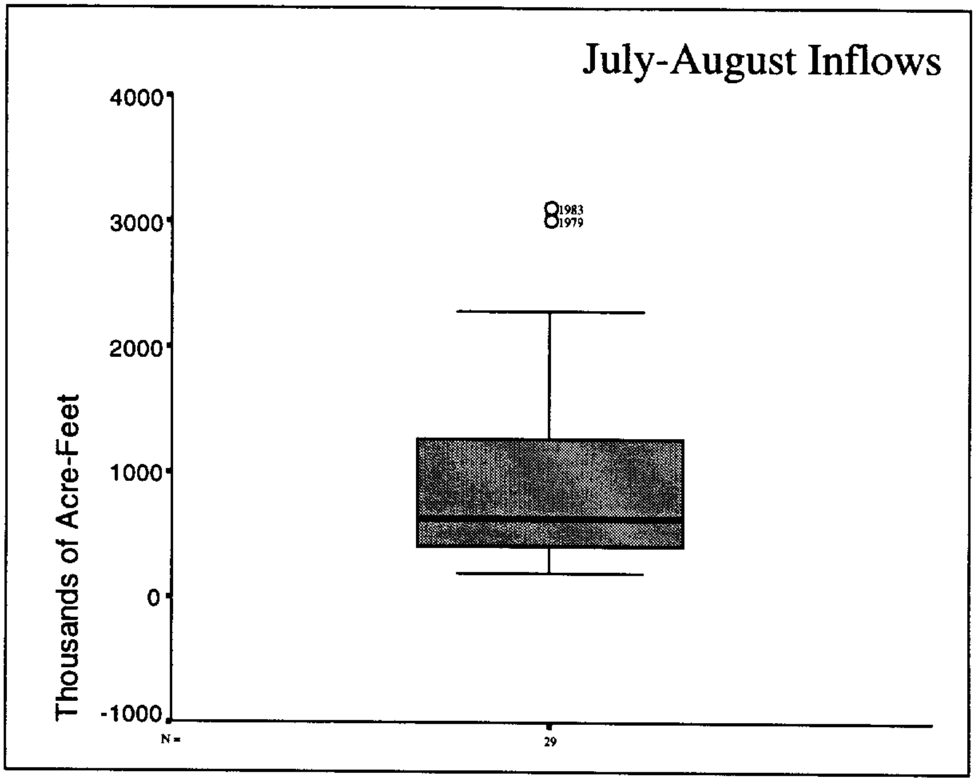
			Statistic	Std. Error
JA_INFL	Mean		*984.4576*	*144.6129*
	95% Confidence Interval for Mean	*Lower Bound*	*688.2314*	
		Upper Bound	*1280.6837*	
	5% Trimmed Mean		*910.9417*	
	Median		*626.8700*	
	Variance		*606474.1*	
	Std. Deviation		*778.7645*	
	Minimum		*201.78*	
	Maximum		*3116.05*	
	Range		*2914.27*	
	Interquartile Range		*948.5700*	
	Skewness		*1.463*	*.434*
	Kurtosis		*1.838*	*.845*

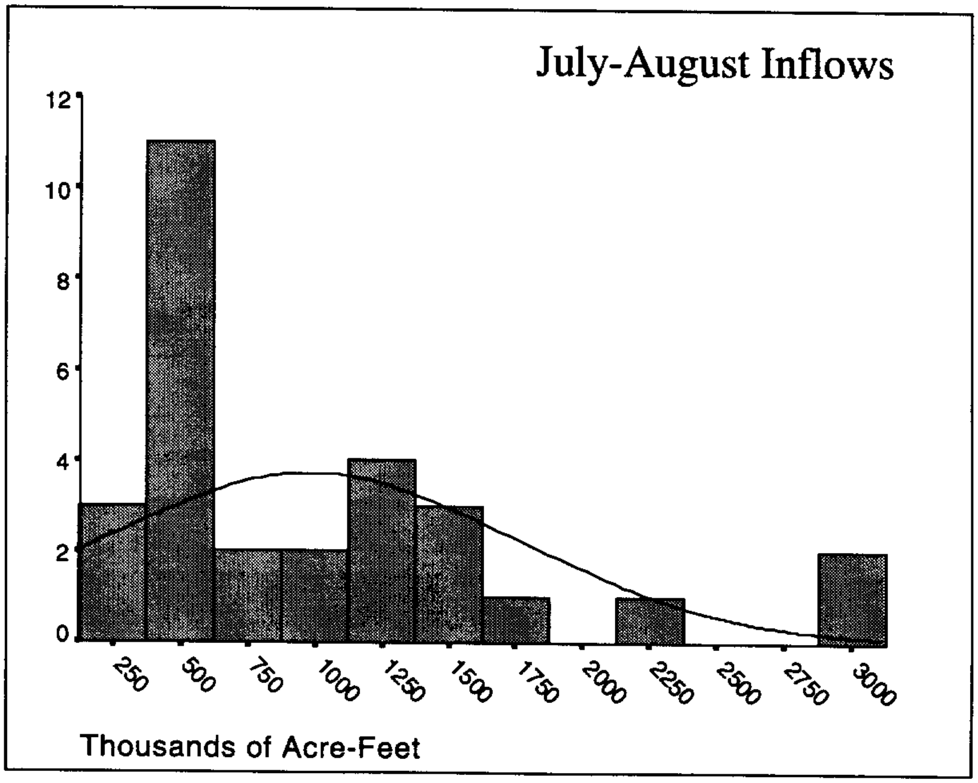
Extreme Values

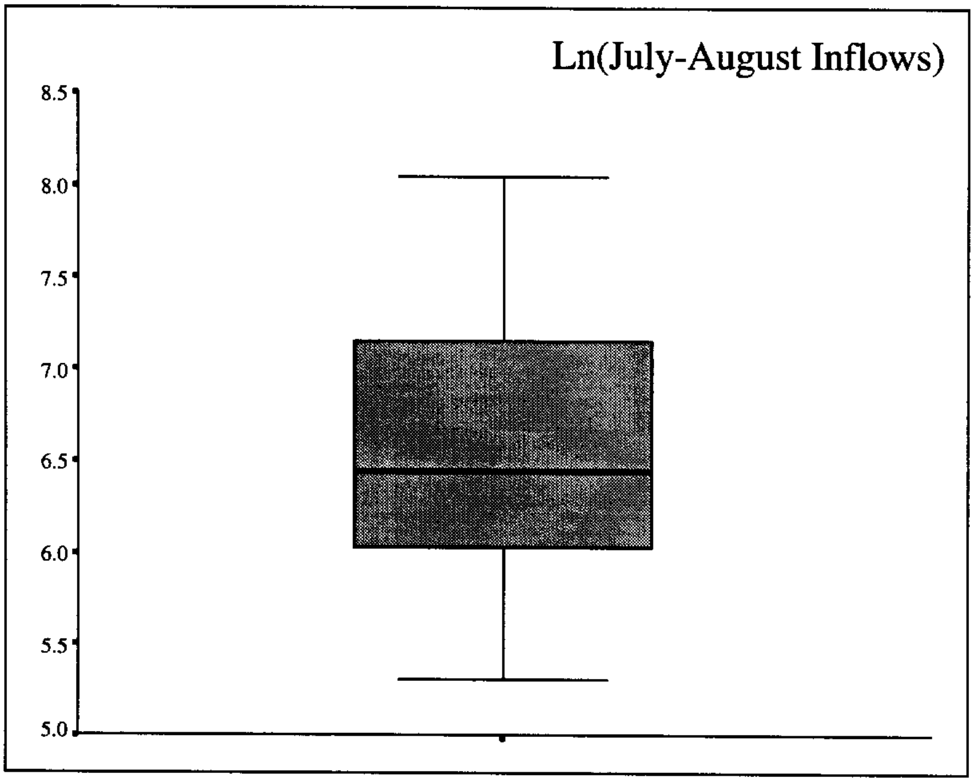
			Case Number	YEAR	Value
JA_INFL	Highest	1	*25*	*1983*	*3116.05*
		2	*21*	*1979*	*3019.84*
		3	*1*	*1959*	*2282.80*
		4	*23*	*1981*	*1656.01*
		5	*15*	*1973*	*1597.24*
	Lowest	1	*5*	*1963*	*201.78*
		2	*6*	*1964*	*215.41*
		3	*7*	*1965*	*243.99*
		4	*22*	*1980*	*382.89*
		5	*9*	*1967*	*383.91*


Normal Q-Q Plot
of July-August Inflows
Expected Normal Value
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
Observed Value


Normal Q-Q Plot
of Ln(July-August Inflows)
Expected Normal Value
2
1
0
-1
-2
5
6
6
7
7
8
8
9
Observed Value


July-August Inflows
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1983
1979
N =
29


July-August Inflows
12
10
8
6
4
2
0
250
500
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
Thousands of Acre-Feet

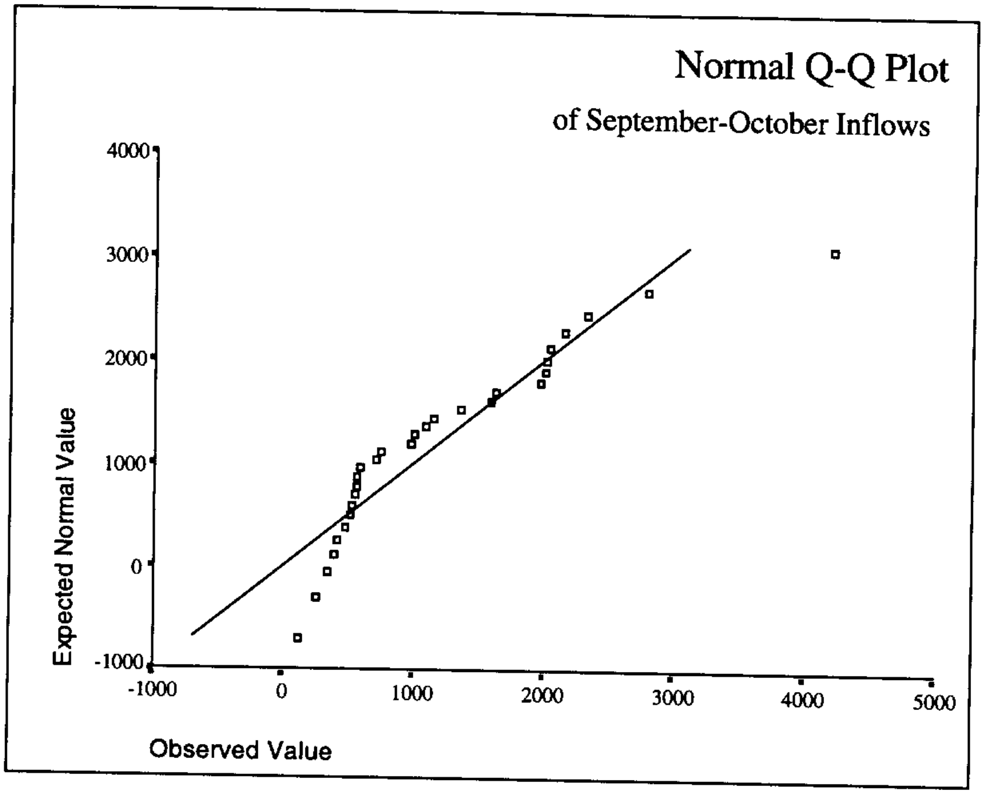

Ln(July-August Inflows)
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0

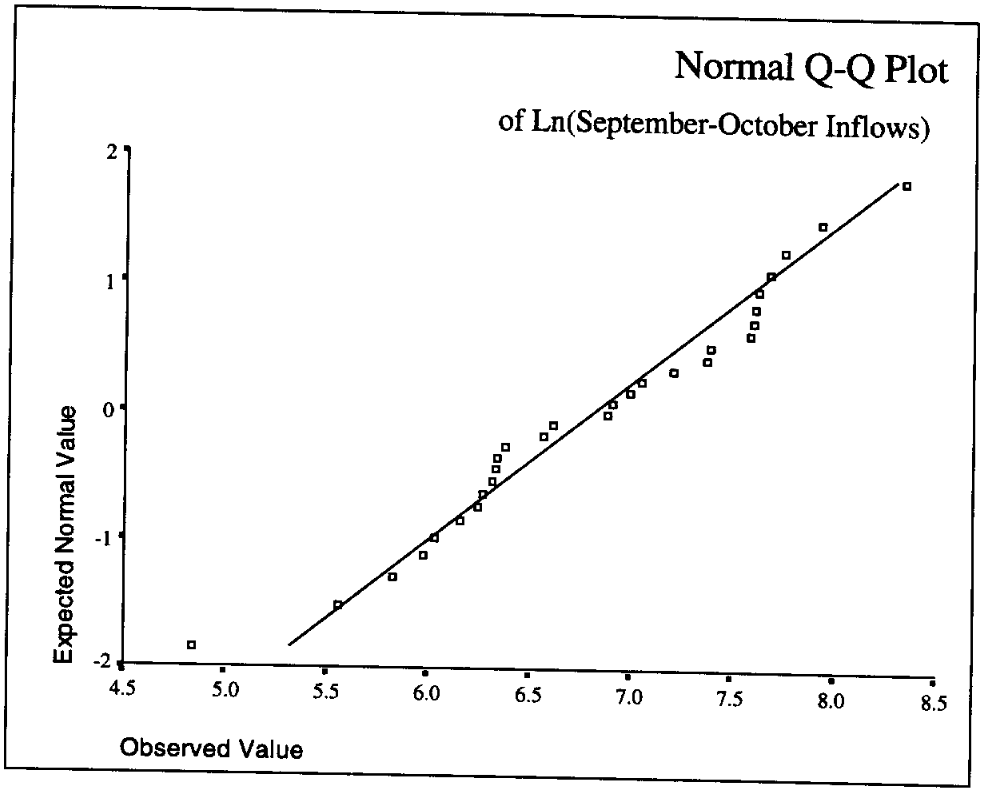
Descriptives

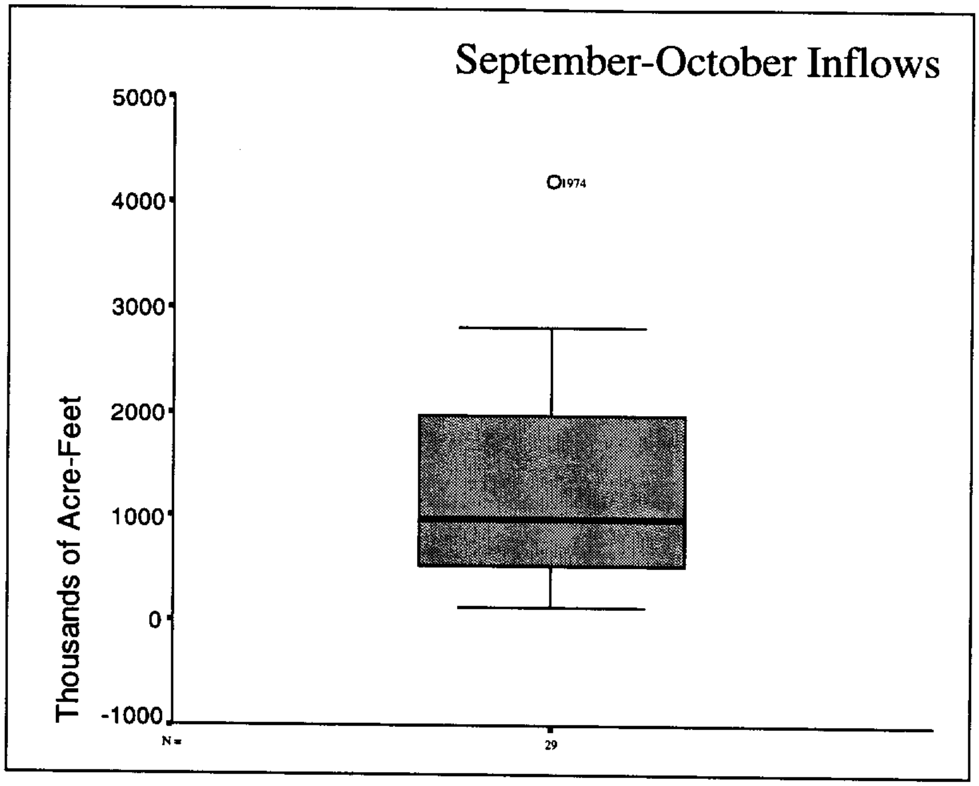
			Statistic	Std. Error
SO_INFL	Mean		*1213.1228*	*173.7714*
	95% Confidence Interval for Mean	*Lower Bound*	*857.1681*	
		Upper Bound	*1569.0774*	
	5% Trimmed Mean		*1128.5317*	
	Median		*978.5000*	
	Variance		*875698.8*	
	Std. Deviation		*935.7878*	
	Minimum		*126.83*	
	Maximum		*4222.20*	
	Range		*4095.37*	
	Interquartile Range		*1469.6800*	
	Skewness		*1.378*	*.434*
	Kurtosis		*2.282*	*.845*

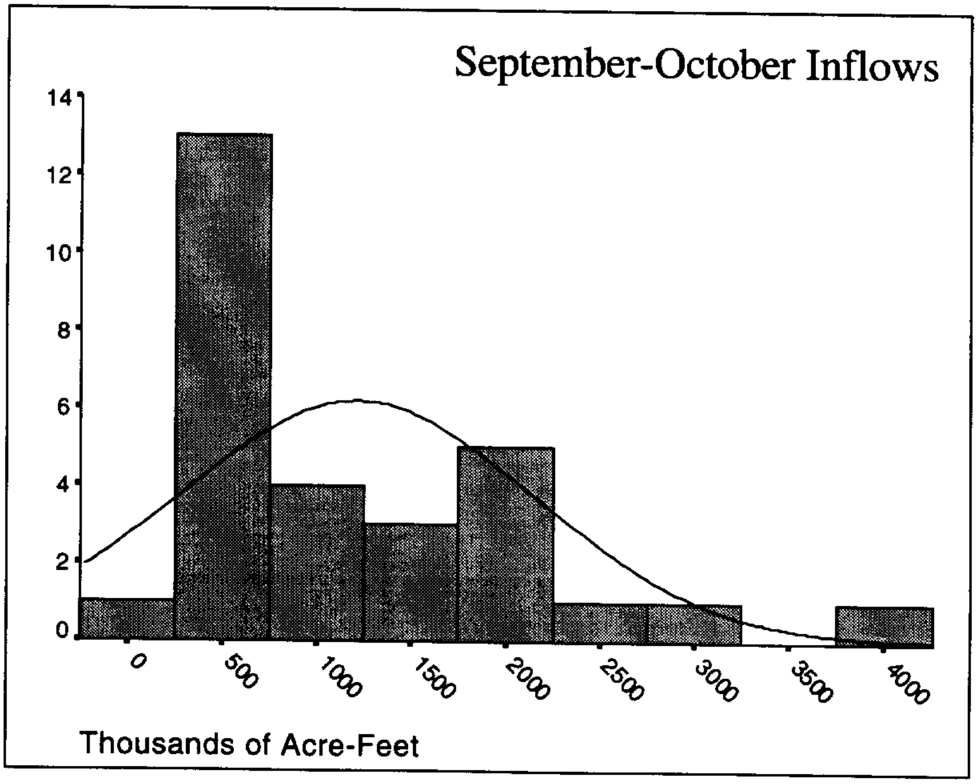
Extreme Values

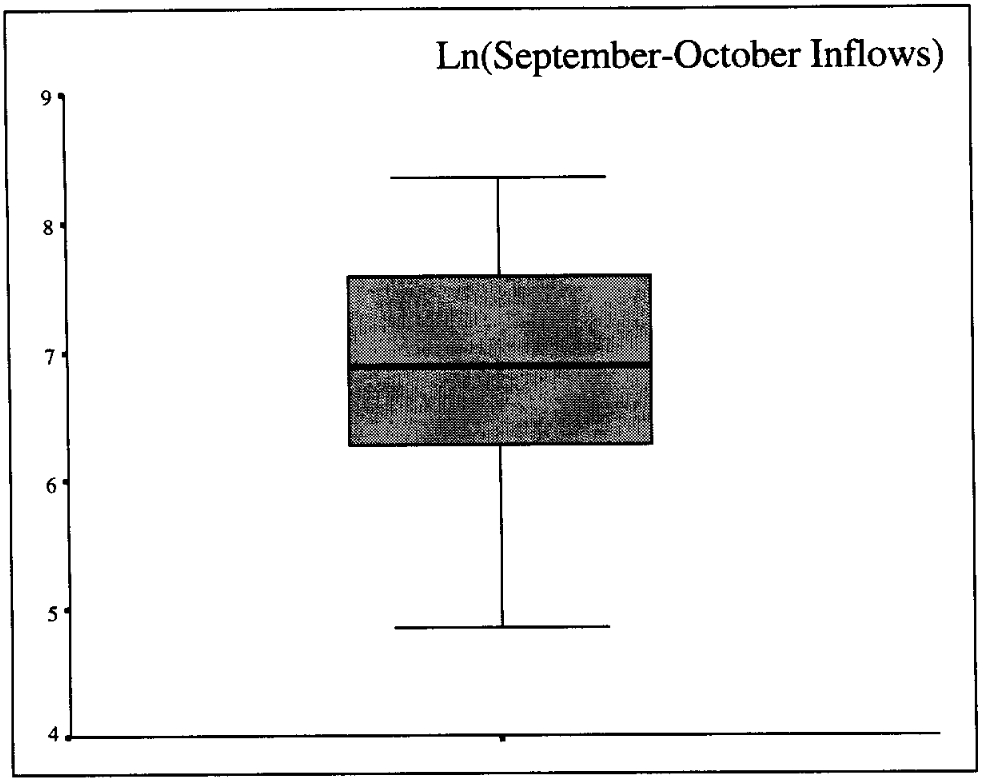
			Case Number	YEAR	Value
SO_INFL	Highest	1	*16*	*1974*	*4222.20*
		2	*22*	*1980*	*2799.02*
		3	*24*	*1982*	*2326.50*
		4	*4*	*1962*	*2163.94*
		5	*1*	*1959*	*2054.00*
	Lowest	1	*6*	*1964*	*126.83*
		2	*8*	*1966*	*260.65*
		3	*25*	*1983*	*339.35*
		4	*12*	*1970*	*395.35*
		5	*21*	*1979*	*418.13*


Normal Q-Q Plot
of September-October Inflows
Expected Normal Value
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
Observed Value


Normal Q-Q Plot
of Ln(September-October Inflows)
Expected Normal Value
2
1
0
-1
-2
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
Observed Value


September-October Inflows
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1974
N =
29


September-October Inflows
14
12
10
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
Thousands of Acre-Feet

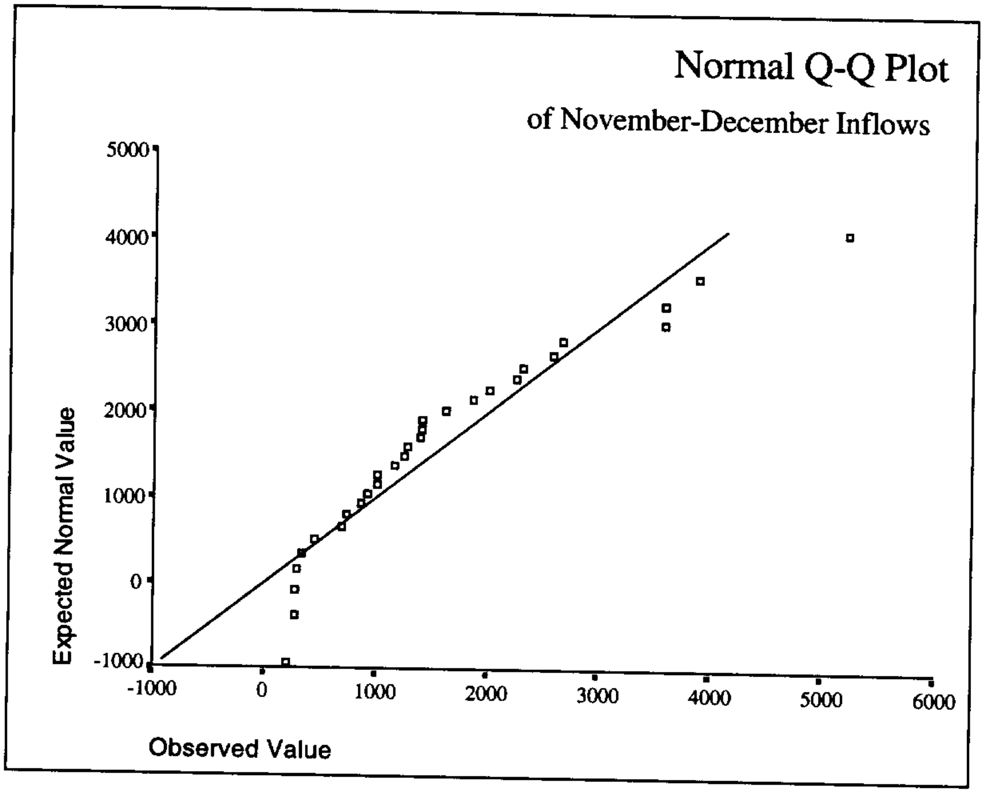

Ln(September-October Inflows)
9
8
7
6
5
4

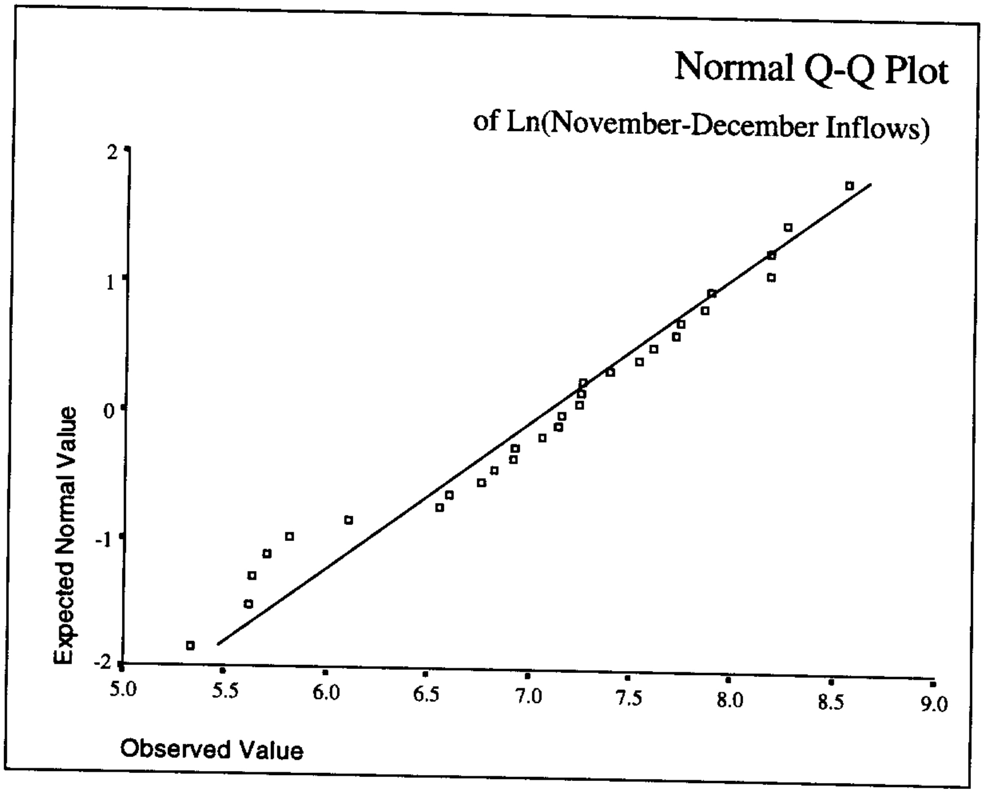
Descriptives

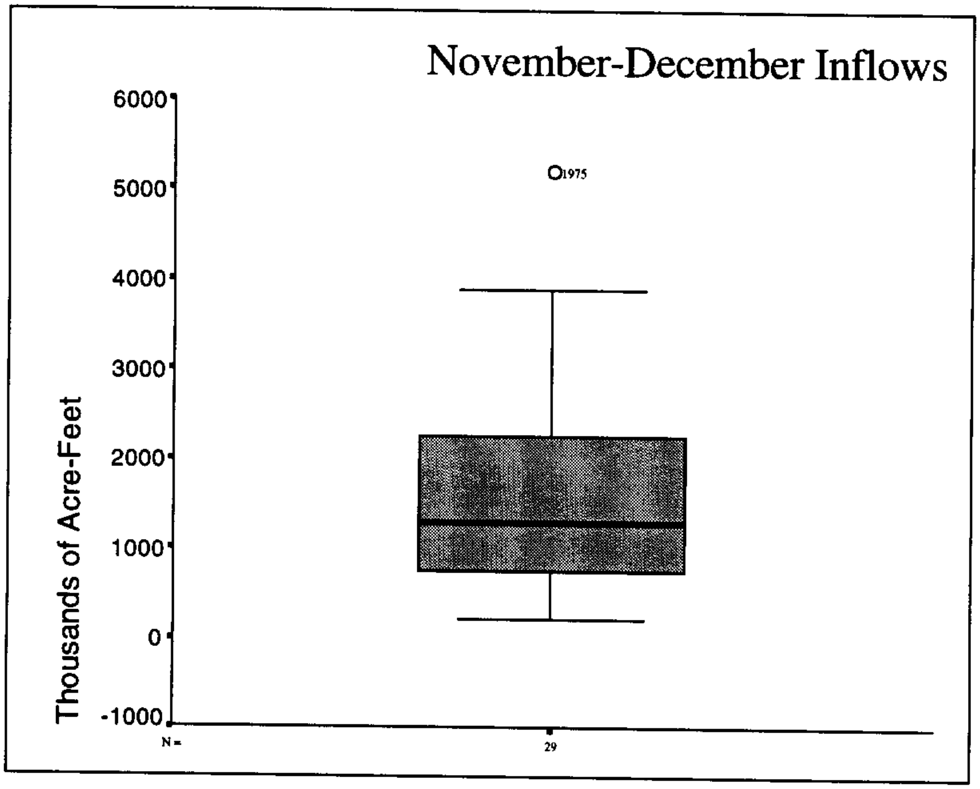
			Statistic	Std. Error
ND_INFL	Mean		*1609.1290*	*230.8751*
	95% Confidence Interval for Mean	*Lower Bound*	*1136.2027*	
		Upper Bound	*2082.0552*	
	5% Trimmed Mean		*1508.2872*	
	Median		*1288.4000*	
	Variance		*1545796*	
	Std. Deviation		*1243.3005*	
	Minimum		*207.00*	
	Maximum		*5217.90*	
	Range		*5010.90*	
	Interquartile Range		*1558.4700*	
	Skewness		*1.218*	*.434*
	Kurtosis		*1.267*	*.845*

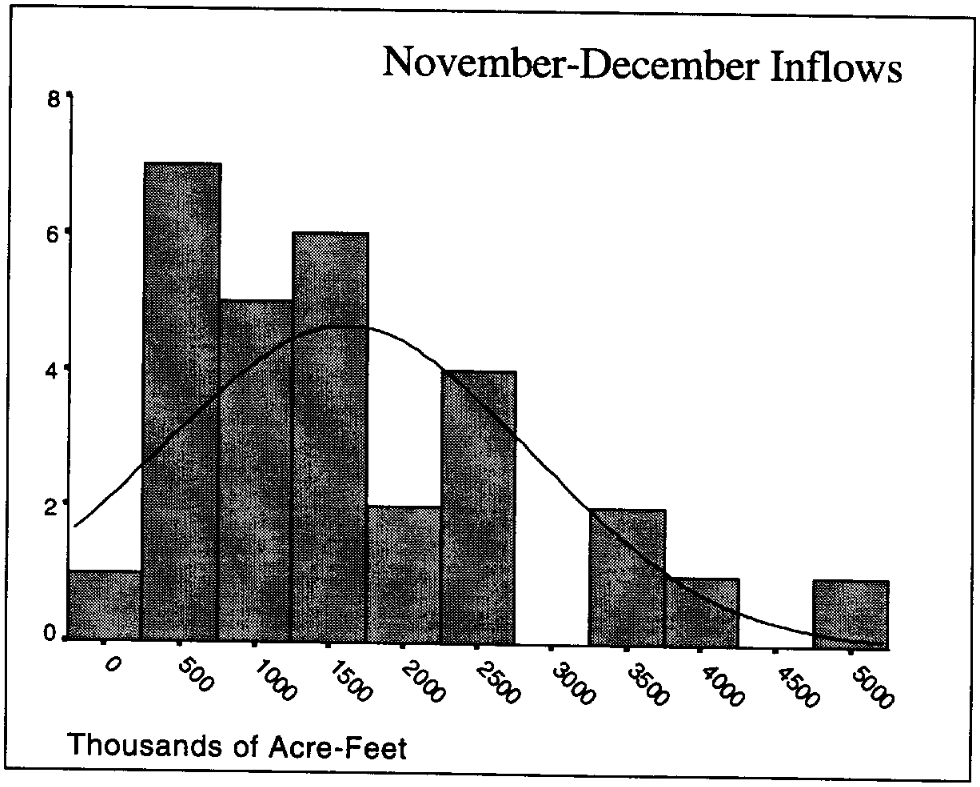
Extreme Values

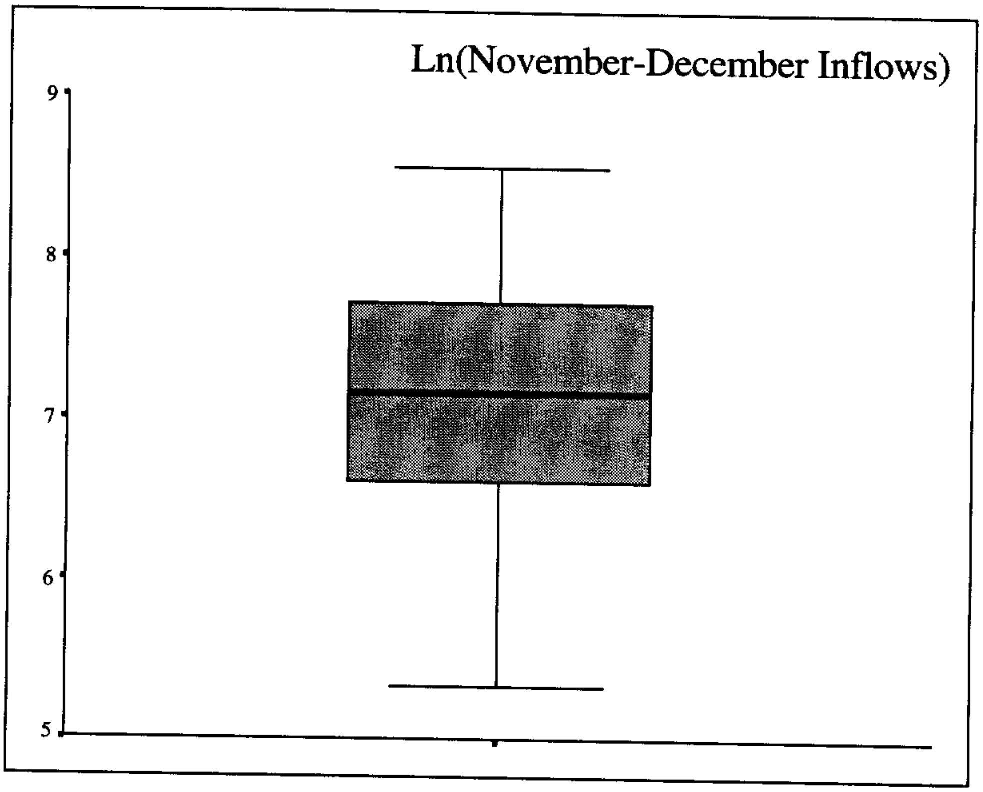
			Case Number	YEAR	Value
ND_INFL	Highest	1	*17*	*1975*	*5217.90*
		2	*29*	*1987*	*3886.93*
		3	*3*	*1961*	*3586.10*
		4	*28*	*1986*	*3585.61*
		5	*24*	*1982*	*2674.10*
	Lowest	1	*1*	*1959*	*207.00*
		2	*6*	*1964*	*276.50*
		3	*13*	*1971*	*280.35*
		4	*23*	*1981*	*300.79*
		5	*9*	*1967*	*336.49*


Normal Q-Q Plot
of November-December Inflows
Expected Normal Value
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000
Observed Value


Normal Q-Q Plot
of Ln(November-December Inflows)
Expected Normal Value
2
1
0
-1
-2
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Observed Value


November-December Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1975
N =
29

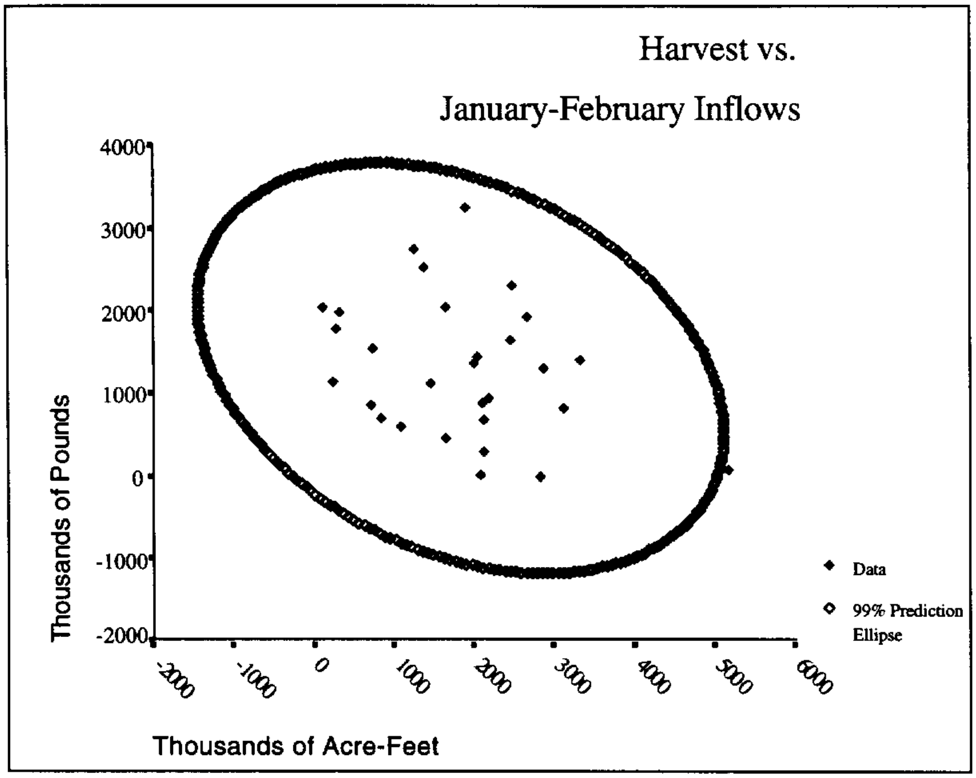

November-December Inflows
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Thousands of Acre-Feet


Ln(November-December Inflows)
9
8
7
6
5

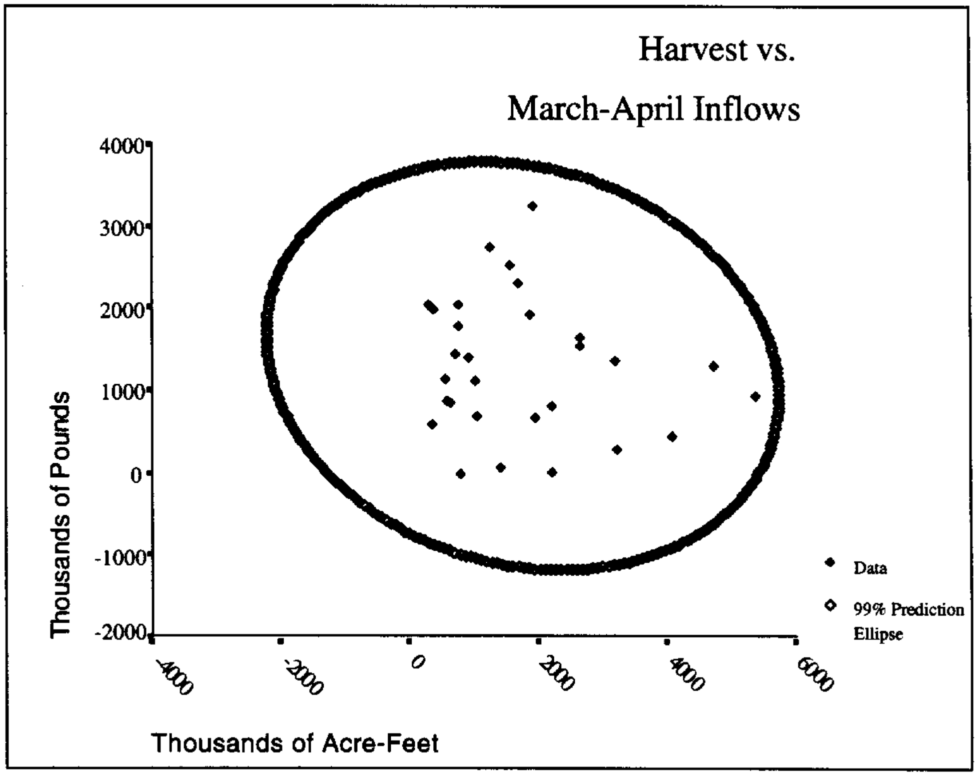
Percentiles

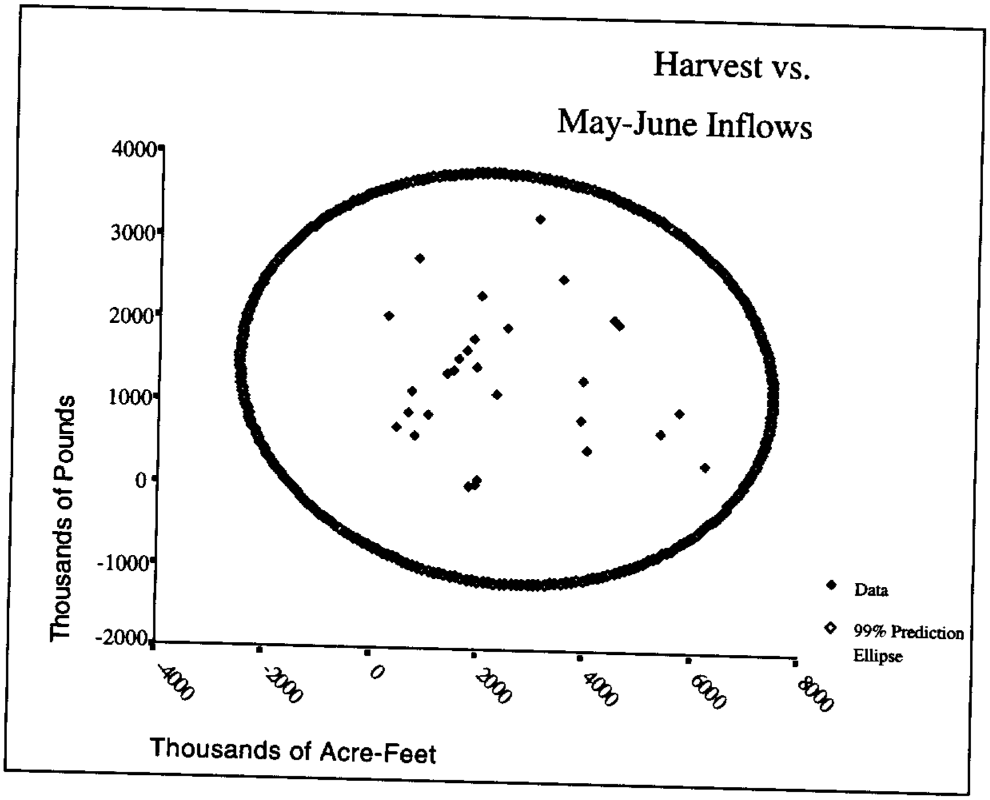
		Percentiles						
		5	10	25	50	75	90	95
Weighted Average (Definition 1)	Brown Shrimp Harvest	*15.9500*	*82.9000*	*699.1000*	*1315.0000*	*1966.3500*	*2535.3000*	*3016.2000*
	Ln(Brown Shrimp Harvest)	*2.6501*	*4.4176*	*6.5495*	*7.1816*	*7.5838*	*7.8381*	*8.0084*
	Square Root of Brown Shrimp Harvest	*3.879792*	*9.104944*	*26.438308*	*36.262929*	*44.342609*	*50.351763*	*54.874479*
	January-February Inflows	*195.9150*	*300.4100*	*977.0250*	*2017.8400*	*2475.9650*	*3138.9800*	*4261.0000*
	March-April Inflows	*331.5400*	*393.9100*	*743.4850*	*1440.1000*	*2456.6250*	*4102.0000*	*5063.7750*
	May-June Inflows	*359.4200*	*673.6800*	*1209.2900*	*1966.7700*	*3924.5250*	*5402.3000*	*6005.4200*
	July-August Inflows	*208.5950*	*243.9900*	*407.7850*	*626.8700*	*1356.3550*	*2282.8000*	*3067.9450*
	September-October Inflows	*193.7400*	*339.3500*	*522.3000*	*978.5000*	*1991.9800*	*2326.5000*	*3510.6100*
	November-December Inflows	*241.7500*	*280.3500*	*721.6050*	*1288.4000*	*2280.0750*	*3586.1000*	*4552.4150*
	Ln(January-February Inflows)	*5.2256*	*5.7051*	*6.8763*	*7.6098*	*7.8144*	*8.0517*	*8.3334*
	Ln(March-April Inflows)	*5.8008*	*5.9761*	*6.6106*	*7.2725*	*7.8027*	*8.3192*	*8.5279*
	Ln(May-June Inflows)	*5.8547*	*6.5128*	*7.0875*	*7.5841*	*8.2750*	*8.5946*	*8.6995*
	Ln(July-August Inflows)	*5.3399*	*5.4971*	*6.0107*	*6.4407*	*7.2107*	*7.7332*	*8.0286*
	Ln(September-October Inflows)	*5.2030*	*5.8270*	*6.2581*	*6.8860*	*7.5968*	*7.7521*	*8.1426*
	Ln(November-December Inflows)	*5.4775*	*5.6360*	*6.5811*	*7.1612*	*7.7319*	*8.1848*	*8.4126*
Tukey's Hinges	Brown Shrimp Harvest			*717.1000*	*1315.0000*	*1940.8000*		
	Ln(Brown Shrimp Harvest)			*6.5752*	*7.1816*	*7.5709*		
	Square Root of Brown Shrimp Harvest			*26.778723*	*36.262929*	*44.054512*		
	January-February Inflows			*1102.1000*	*2017.8400*	*2468.3000*		
	March-April Inflows			*771.3700*	*1440.1000*	*2242.4700*		
	May-June Inflows			*1381.7800*	*1966.7700*	*3911.7600*		
	July-August Inflows			*412.7900*	*626.8700*	*1274.7600*		
	September-October Inflows			*529.5000*	*978.5000*	*1972.3700*		
	November-December Inflows			*740.9100*	*1288.4000*	*2250.9500*		
	Ln(January-February Inflows)			*7.0050*	*7.6098*	*7.8113*		
	Ln(March-April Inflows)			*6.6482*	*7.2725*	*7.7153*		
	Ln(May-June Inflows)			*7.2311*	*7.5841*	*8.2717*		
	Ln(July-August Inflows)			*6.0229*	*6.4407*	*7.1505*		
	Ln(September-October Inflows)			*6.2719*	*6.8860*	*7.5870*		
	Ln(November-December Inflows)			*6.6079*	*7.1612*	*7.7191*		

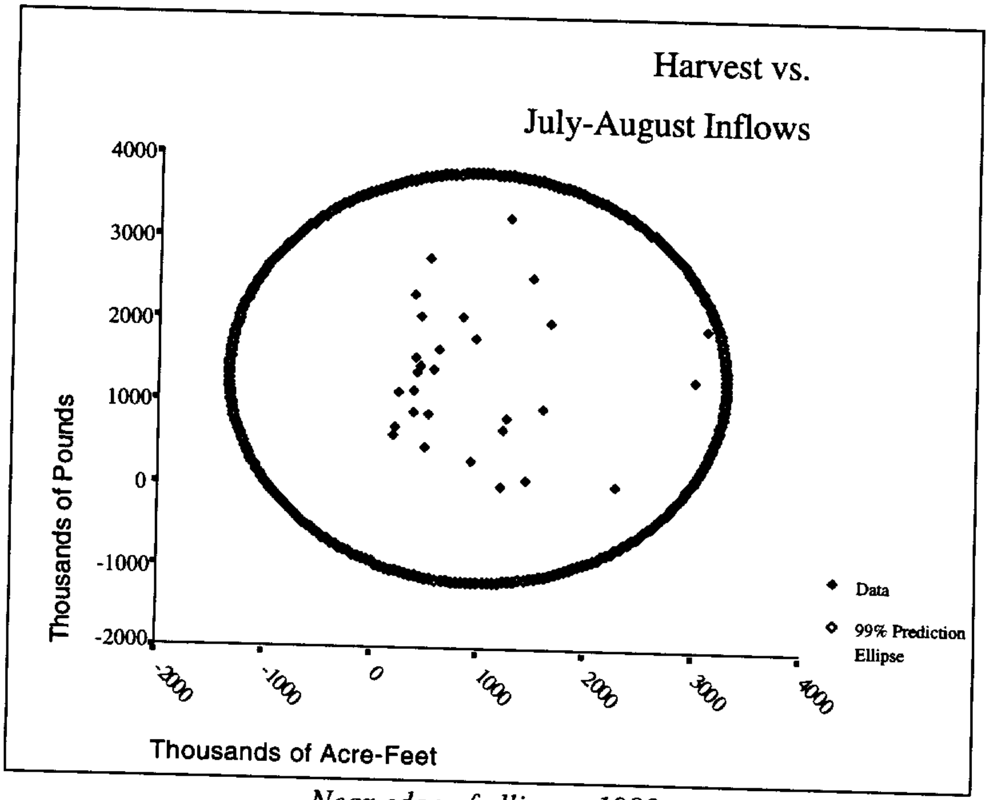
99% Prediction Ellipses



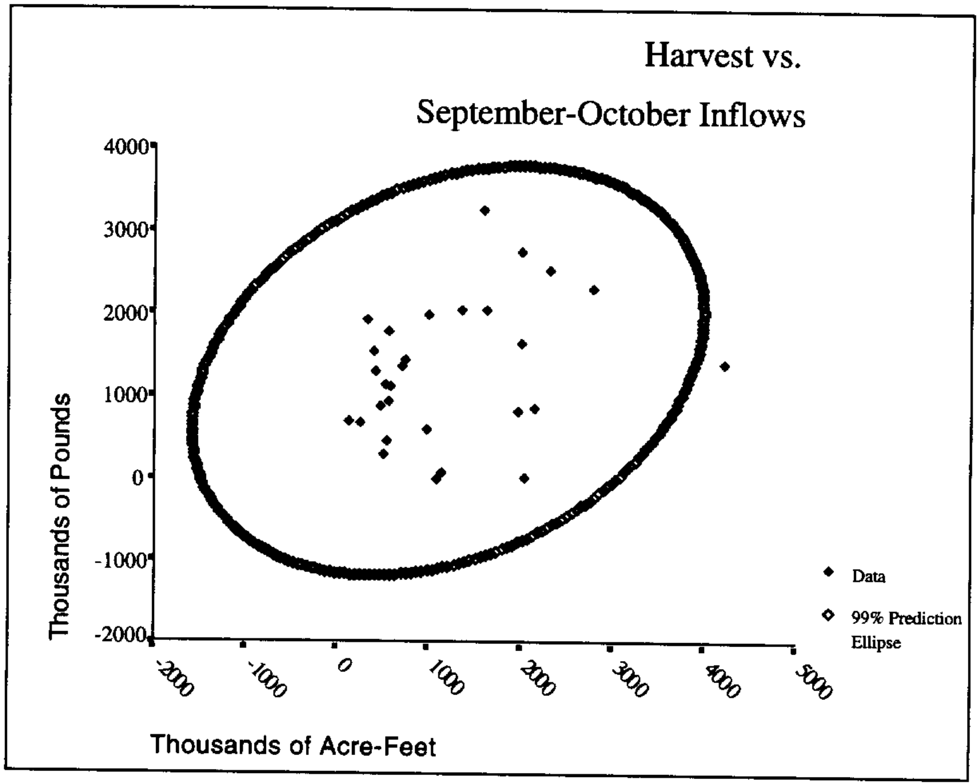
Outside ellipse: 1961.



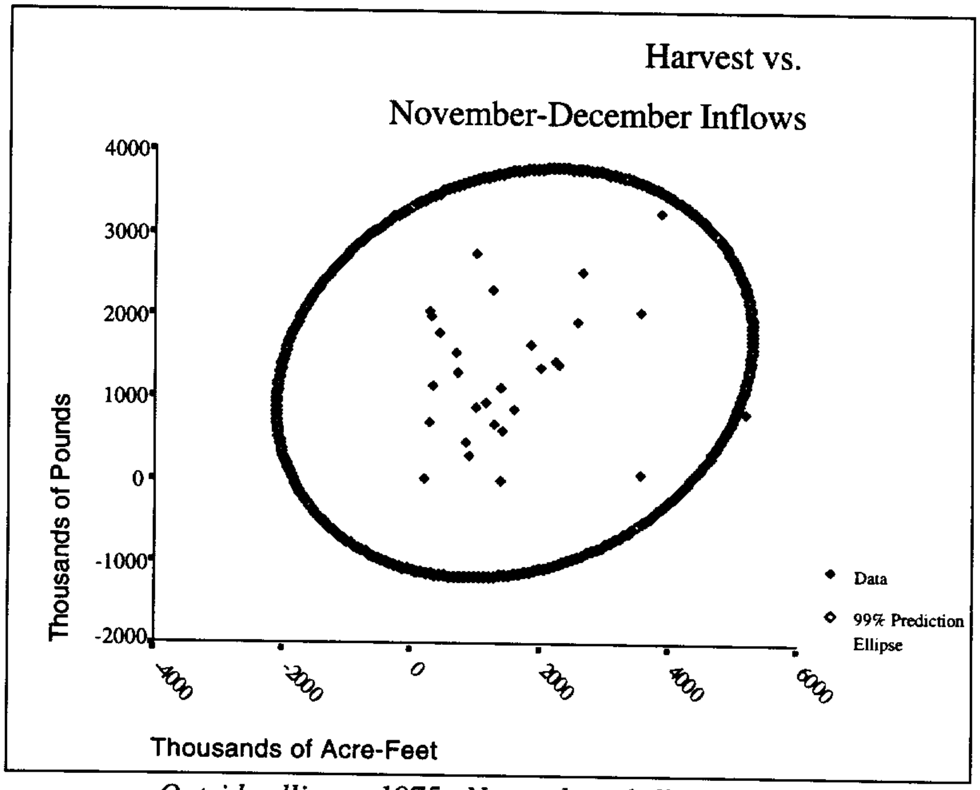




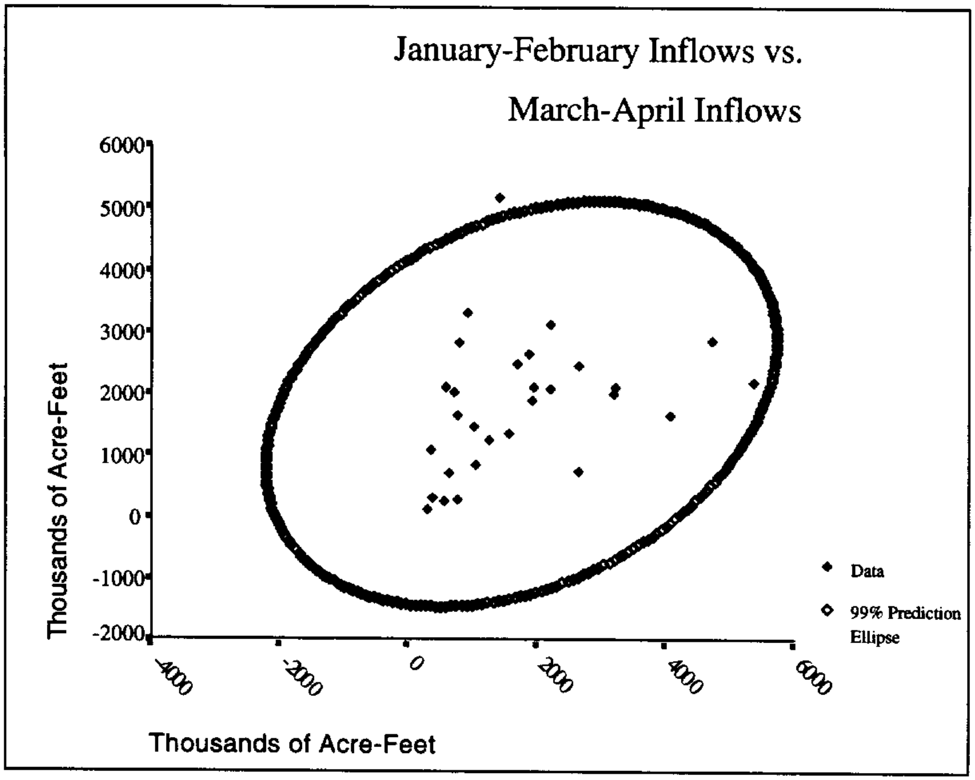
Near edge of ellipse: 1983.



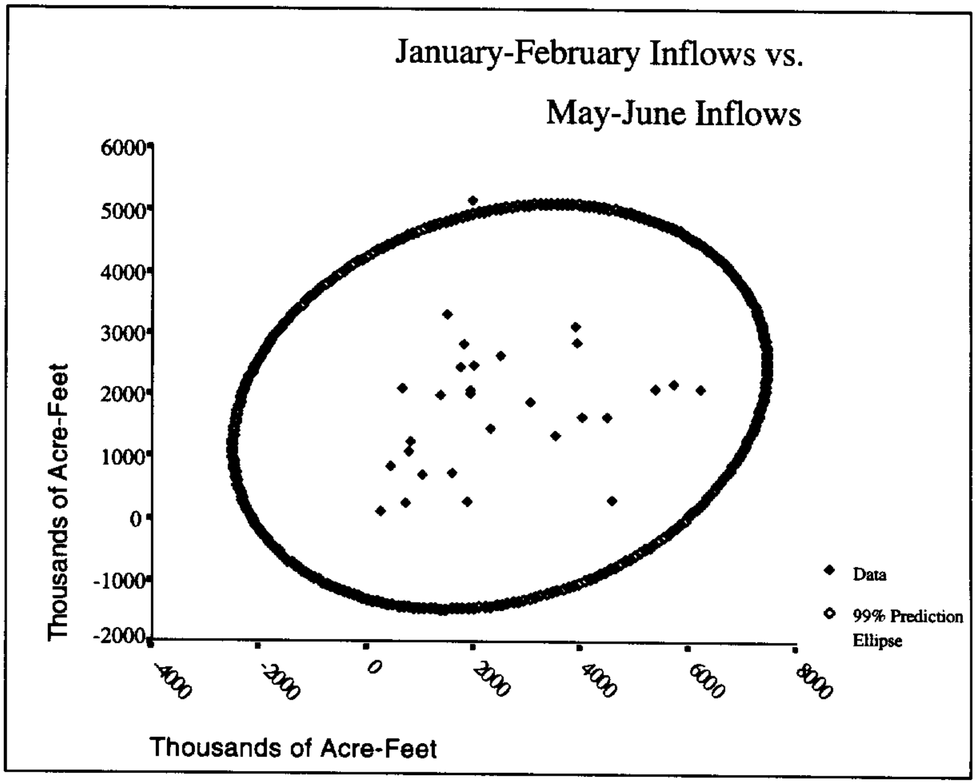
Outside ellipse: 1974.



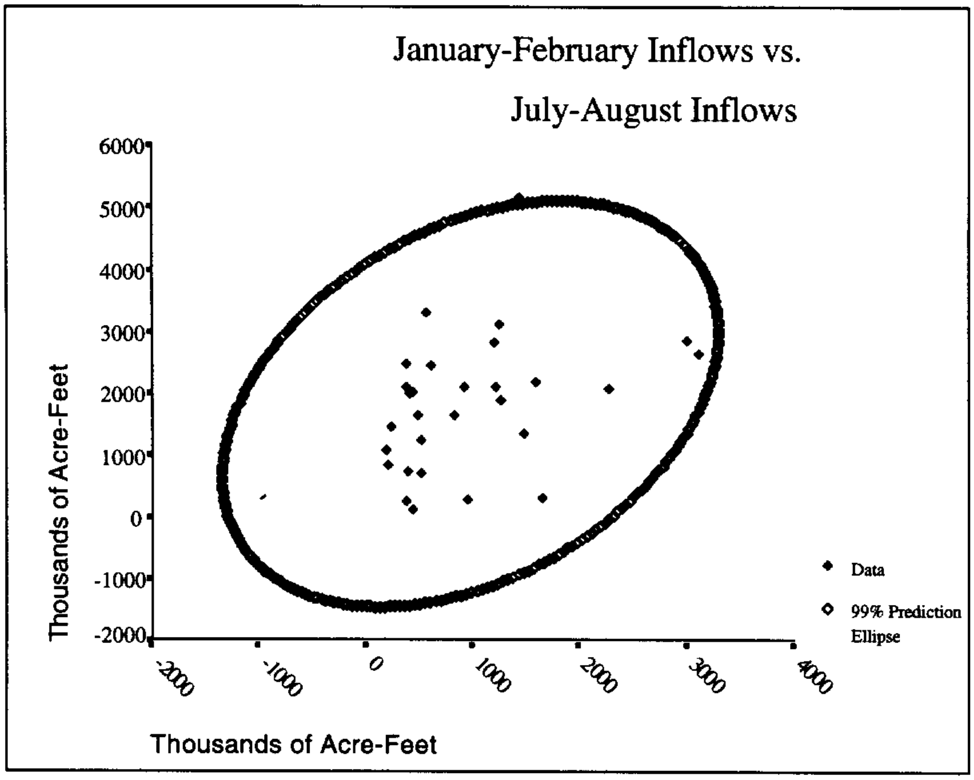
Outside ellipse: 1975. Near edge of ellipse: 1973.



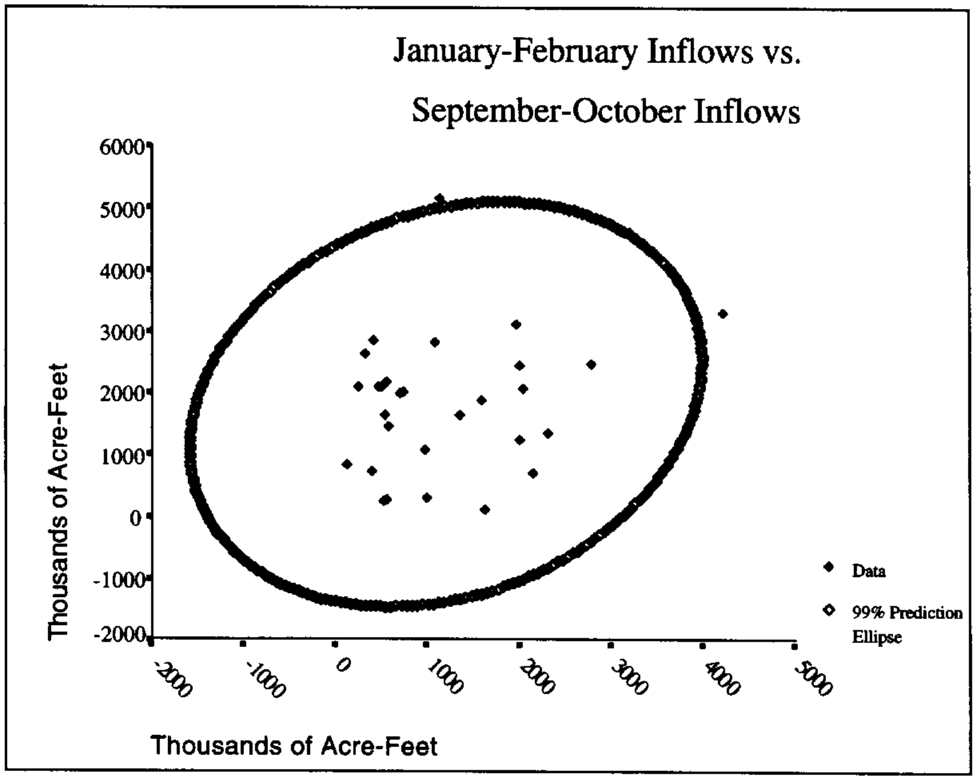
Outside ellipse: 1961. Near edge of ellipse: 1973.



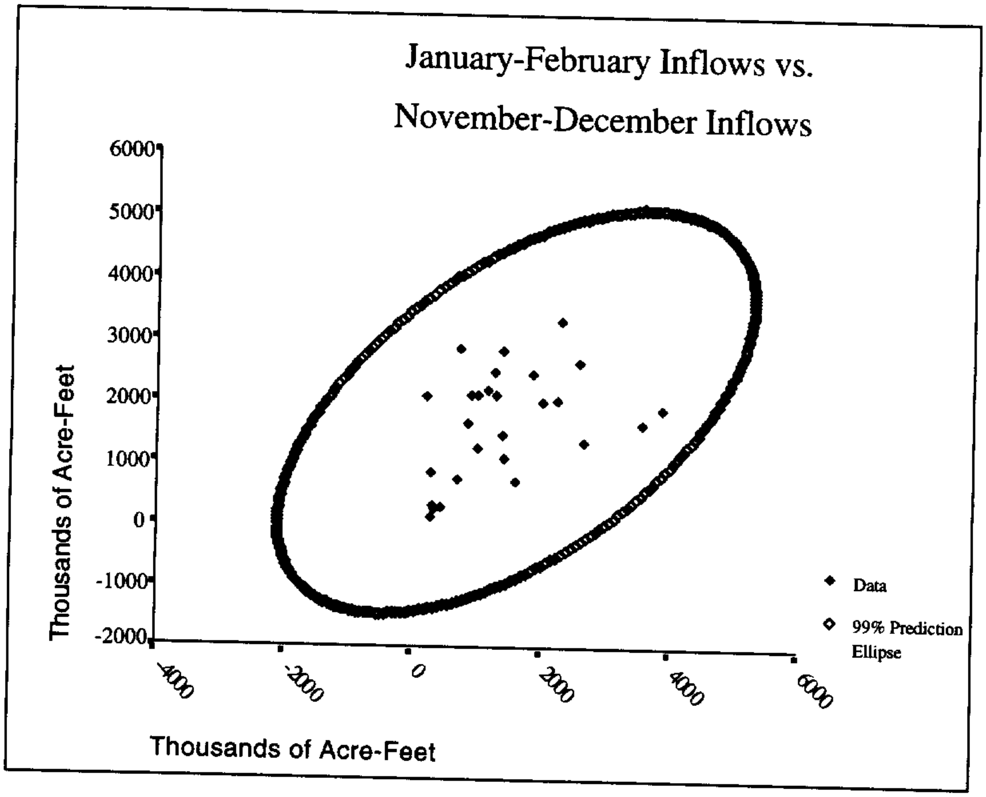
Outside ellipse: 1961.

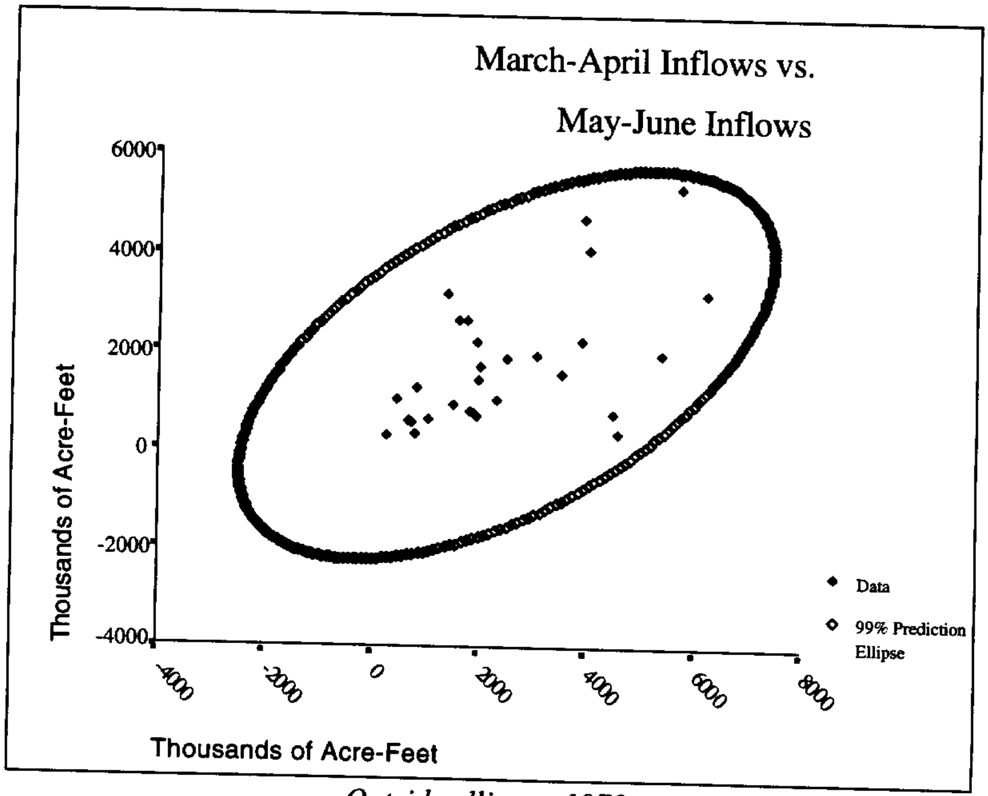


Outside ellipse: 1961. Near edge of ellipse: 1979, 1983.

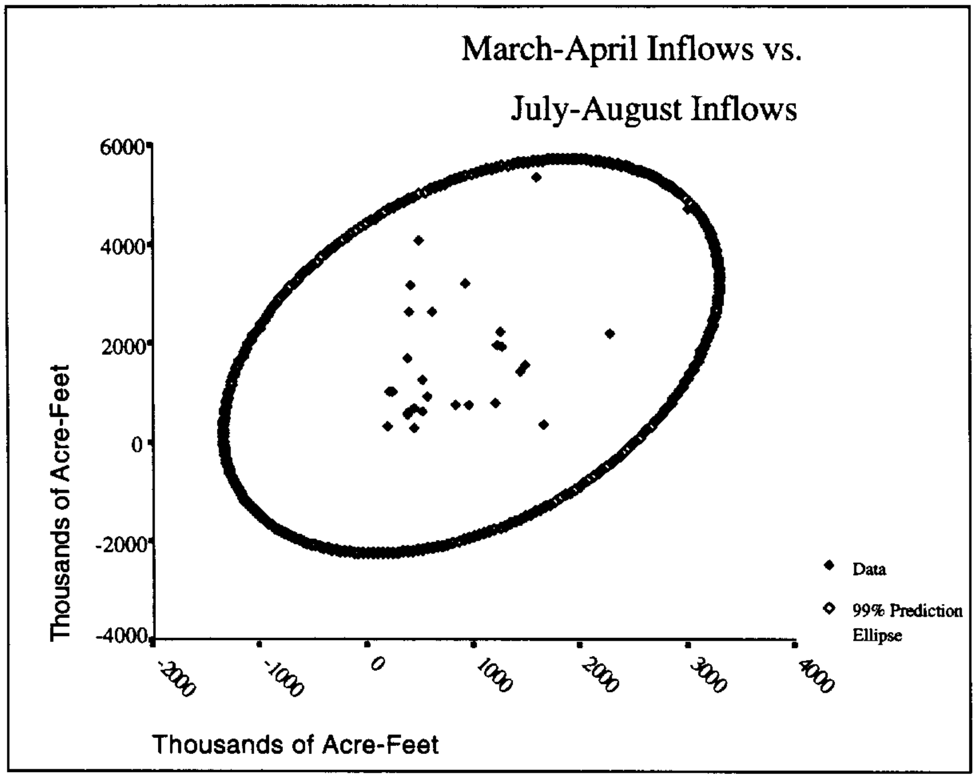


Outside ellipse: 1961, 1974.

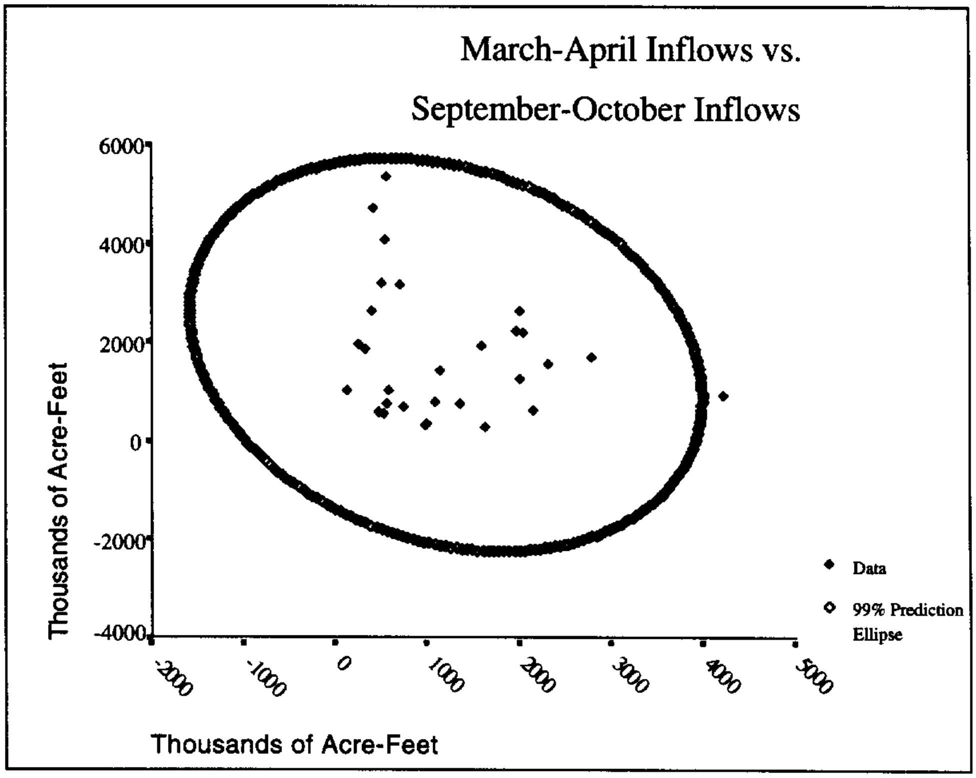




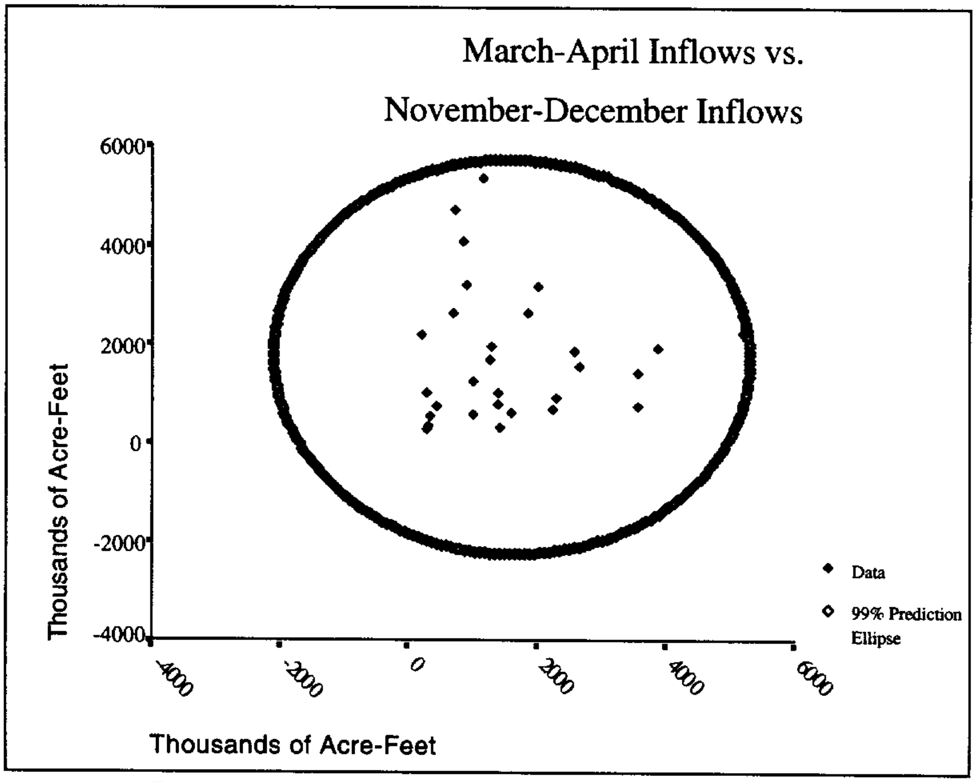
Outside ellipse: 1973.



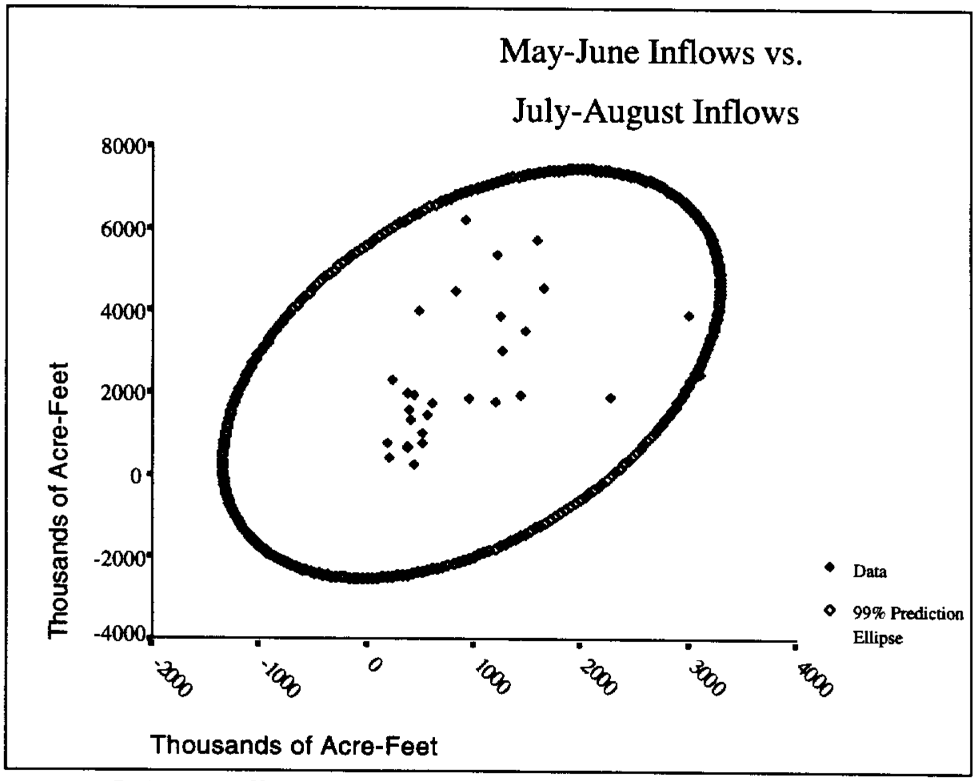
Near edge of ellipse: 1973, 1979.



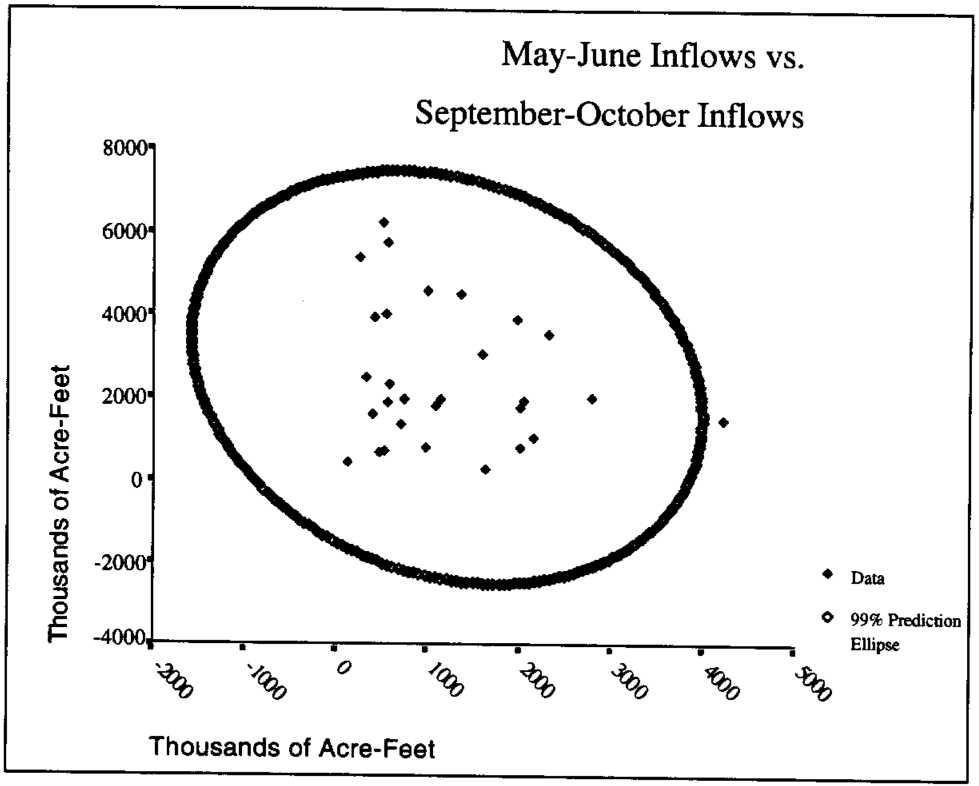
Outside ellipse: 1974. Near edge of ellipse: 1973.



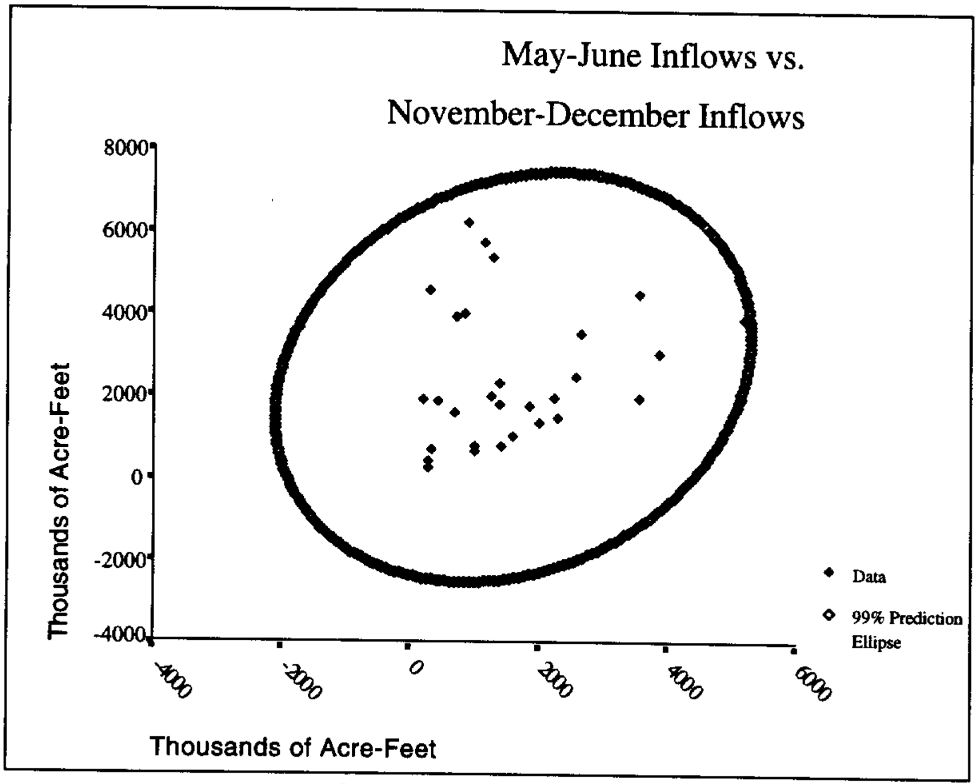
Lying on ellipse: 1975. Near edge of ellipse: 1973.



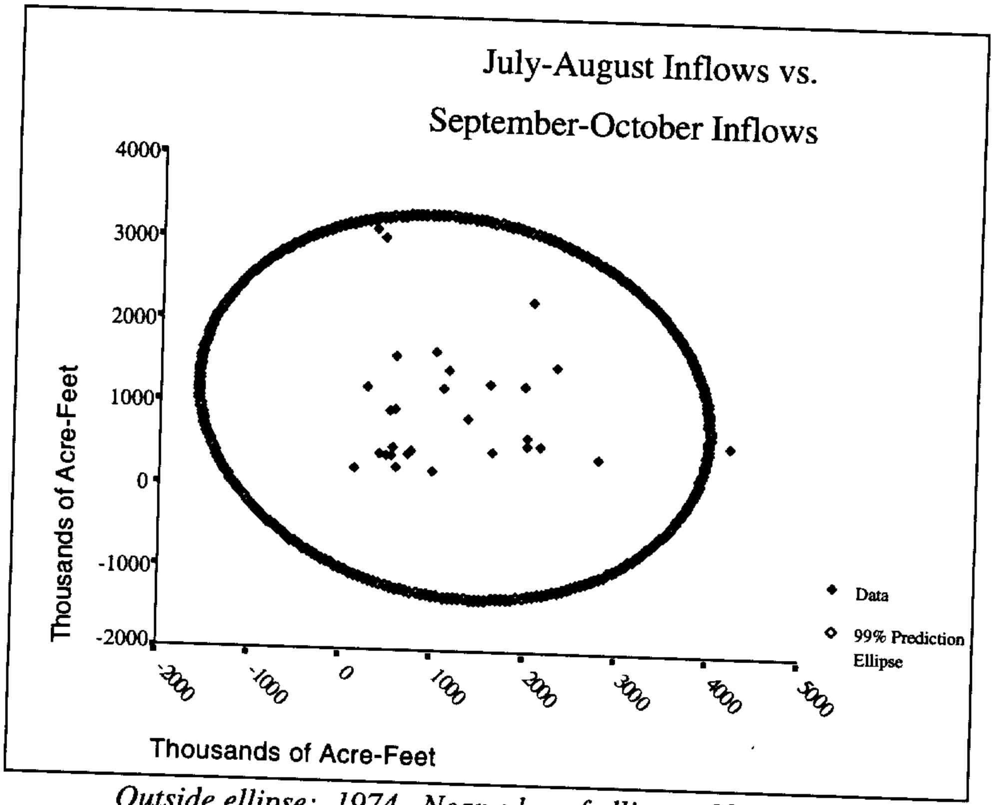
Lying on ellipse: 1983. Near edge of ellipse: 1968, 1979.



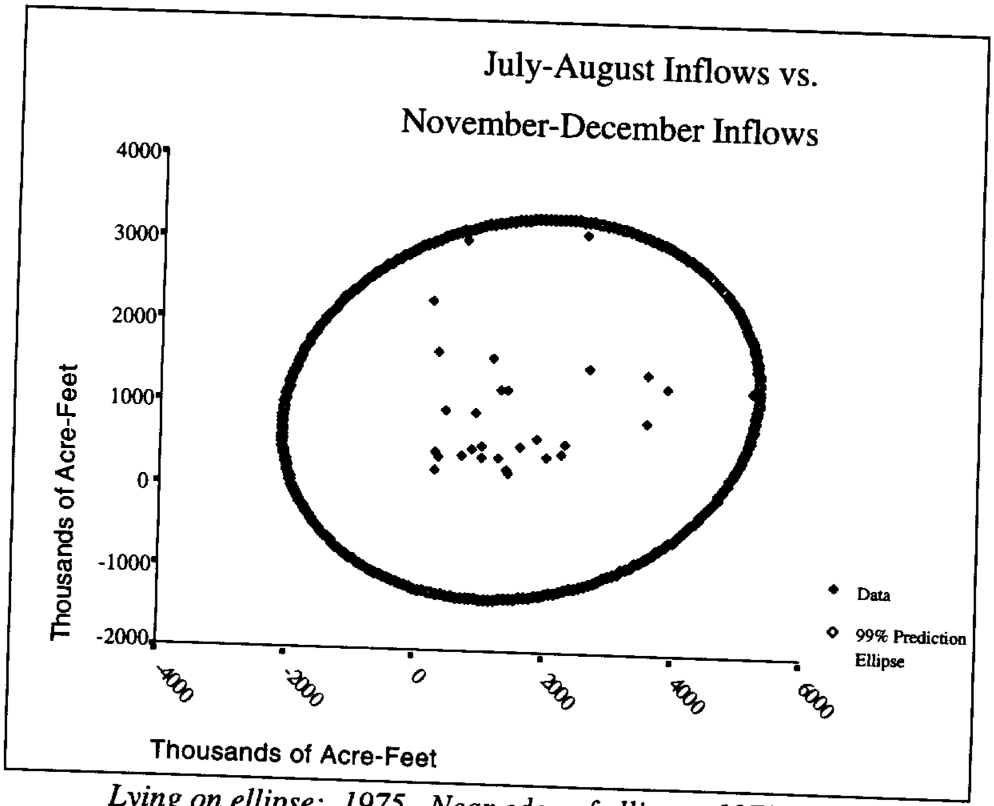
Outside ellipse: 1974.



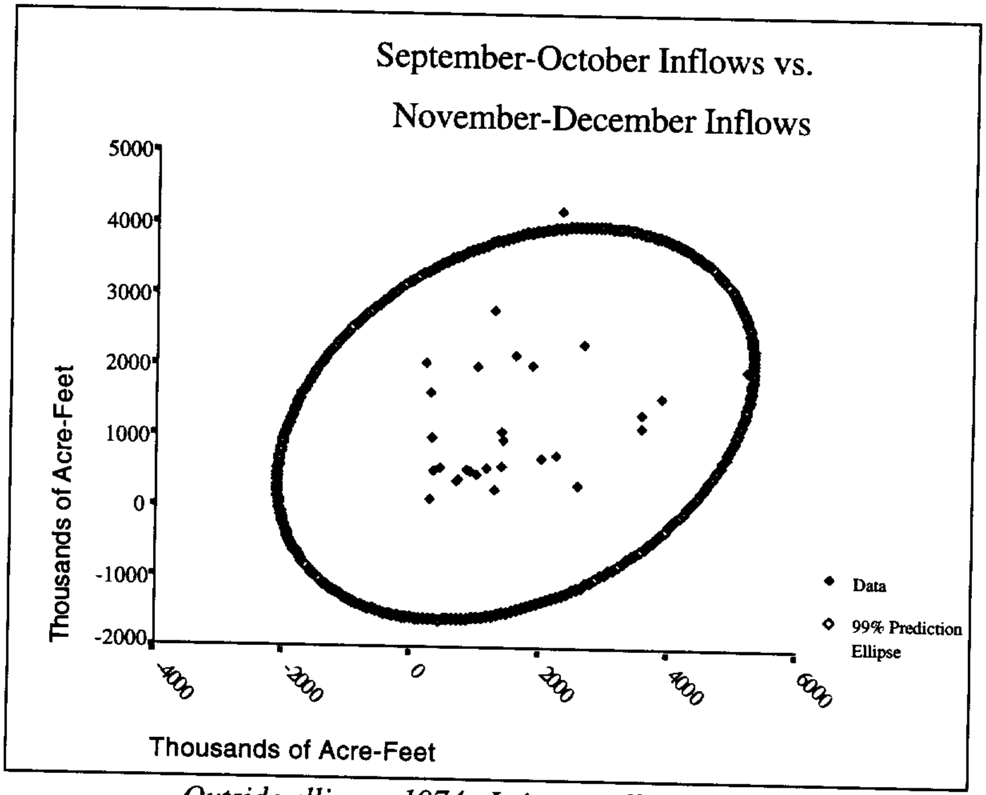
Lying on ellipse: 1975.



Outside ellipse: 1974. Near edge of ellipse: 1979, 1983.



Lying on ellipse: 1975. Near edge of ellipse: 1979, 1983.



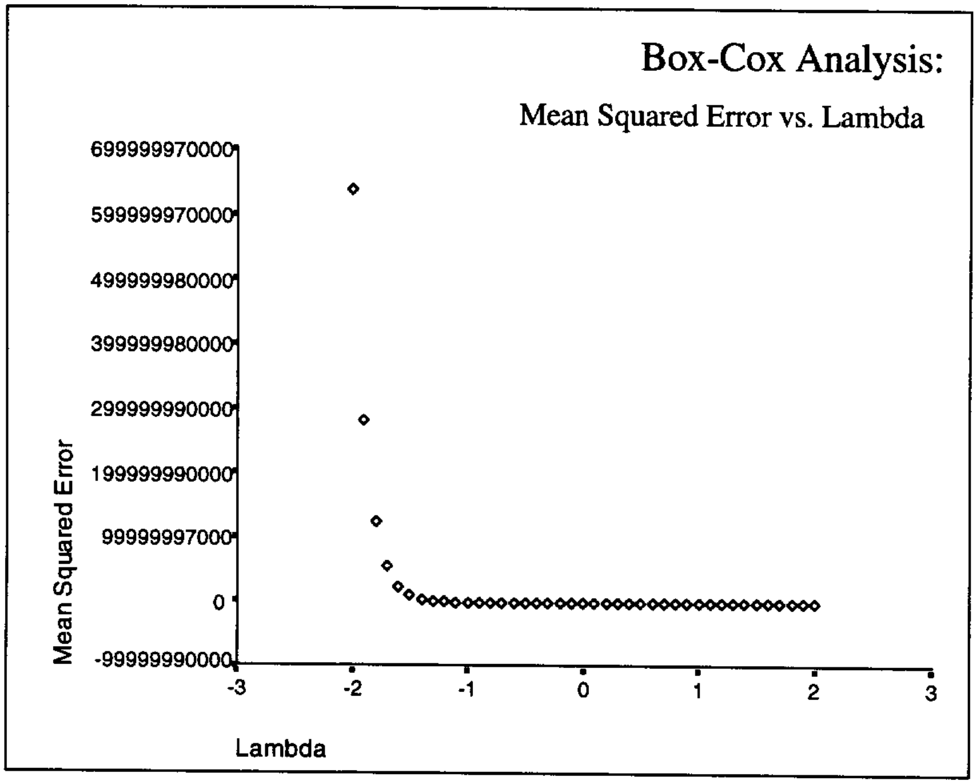
Outside ellipse: 1974. Lying on ellipse: 1975.

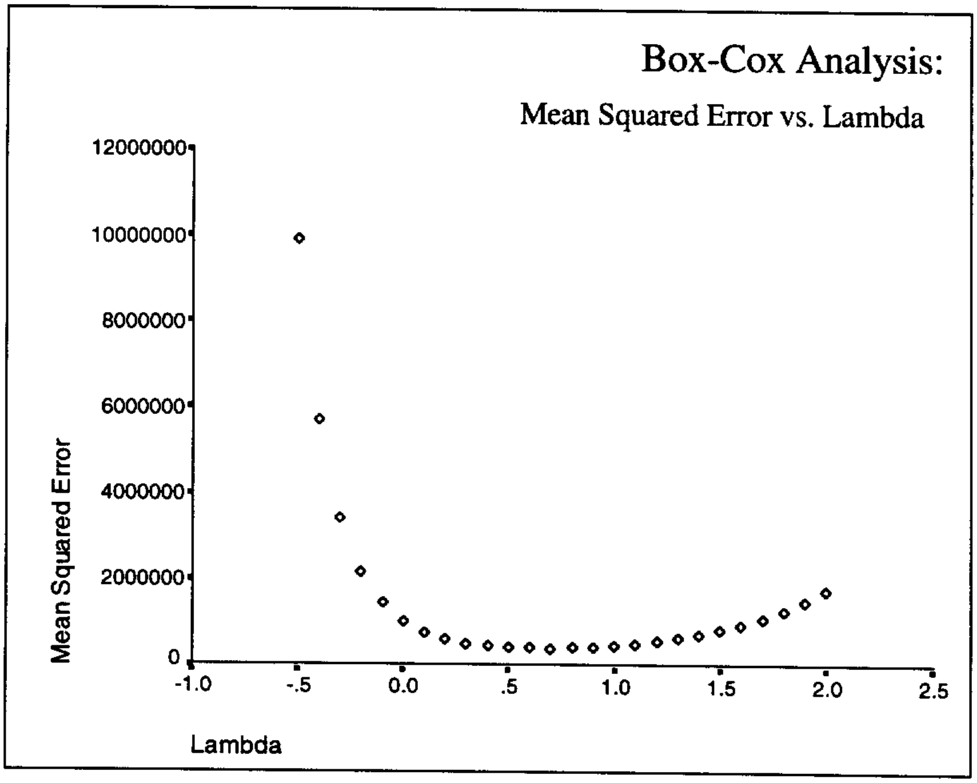
Box–Cox Analysis

Numerical Results

Lambda	Mean Squared Error
-2.00	640000000000.00
-1.90	283000000000.00
-1.80	126000000000.00
-1.70	56300000000.00
-1.60	25300000000.00
-1.50	11500000000.00
-1.40	5280000000.00
-1.30	2440000000.00
-1.20	1150000000.00
-1.10	545000000.00
-1.00	263000000.00
-0.90	130000000.00
-0.80	65280622.00
-0.70	33759912.00
-0.60	18007616.00
-0.50	9958246.00
-0.40	5741047.00
-0.30	3469977.00
-0.20	2210326.00
-0.10	1490052.00
0.00	1065774.00
0.10	809161.30
0.20	650924.70
0.30	552734.90
0.40	492891.70
0.50	458865.10
0.60	443335.80
0.70	442051.30
0.80	452643.60
0.90	473970.20
1.00	505746.20
1.10	548346.30
1.20	602708.60
1.30	670306.20
1.40	753166.60
1.50	853930.80
1.60	975948.40
1.70	1123410.00
1.80	1301521.00
1.90	1516728.00
2.00	1776994.00

Plots


Box-Cox Analysis:
Mean Squared Error vs. Lambda
699999970000
599999970000
499999980000
399999980000
299999990000
199999990000
99999997000
0
-99999990000
Mean Squared Error
-3
-2
-1
0
1
2
3
Lambda


Box-Cox Analysis:
Mean Squared Error vs. Lambda
12000000
10000000
8000000
6000000
4000000
2000000
0
Mean Squared Error
-1.0
-.5
0.0
.5
1.0
1.5
2.0
2.5
Lambda

Model Choice Diagnostics

Untransformed Data

```
N = 29     Regression Models for Dependent Variable: BRSHRIMP


      Rsq     Adj  C(p)    AIC     MSE    SBC Variables in Model
 In           Rsq

  1 0.1000 0.0666  9.627  390.0 648605  392.8 JF_INFL
  1 0.0848 0.0510  10.21  390.5 659492  393.2 SO_INFL
  1 0.0323 -.0035  12.23  392.1 697327  394.9 ND_INFL
  1 0.0222 -.0140  12.62  392.4 704653  395.2 MA_INFL
------------------------------------------------------
  2 0.2871 0.2322  4.427  385.3 533511  389.4 JF_INFL ND_INFL
  2 0.2377 0.1790  6.329  387.2 570495  391.3 JF_INFL SO_INFL
  2 0.1141 0.0460  11.08  391.6 662956  395.7 JF_INFL JA_INFL
  2 0.1026 0.0336  11.52  391.9 671556  396.0 JF_INFL MA_INFL
--------------------------------------------------------------
  3 0.3648 0.2885  3.439  383.9 494392  389.4 JF_INFL SO_INFL ND_INFL
  3 0.3125 0.2300  5.450  386.2 535081  391.7 JF_INFL JA_INFL ND_INFL
  3 0.2900 0.2048  6.314  387.1 552563  392.6 JF_INFL MA_INFL ND_INFL
  3 0.2889 0.2036  6.358  387.2 553446  392.7 JF_INFL MJ_INFL ND_INFL
----------------------------------------------------------------------
  4 0.4115 0.3135  3.640  383.7 477080  390.5 JF_INFL JA_INFL SO_INFL
                                              ND_INFL
  4 0.3830 0.2802  4.737  385.1 500204  391.9 JF_INFL MA_INFL SO_INFL
                                              ND_INFL
  4 0.3662 0.2606  5.382  385.8 513796  392.7 JF_INFL MJ_INFL SO_INFL
                                              ND_INFL
  4 0.3265 0.2142  6.913  387.6 546054  394.5 JF_INFL MJ_INFL JA_INFL
                                              ND_INFL
-------------------------------------------------------------------------
  5 0.4182 0.2918  5.382  385.4 492157  393.6 JF_INFL MA_INFL JA_INFL
                                              SO_INFL ND_INFL
  5 0.4137 0.2863  5.555  385.6 495971  393.8 JF_INFL MJ_INFL JA_INFL
                                              SO_INFL ND_INFL
  5 0.3846 0.2509  6.675  387.0 520582  395.2 JF_INFL MA_INFL MJ_INFL
                                              SO_INFL ND_INFL
  5 0.3328 0.1878  8.667  389.3 564393  397.5 JF_INFL MA_INFL MJ_INFL
                                              JA_INFL ND_INFL
-------------------------------------------------------------------------
  6 0.4282 0.2722  7.000  386.9 505746  396.4 JF_INFL MA_INFL MJ_INFL
                                              JA_INFL SO_INFL ND_INFL
-------------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP   JF_INFL    MA_INFL

  1  MODEL1   PARMS   BRSHRIMP  805.360   1759.08  -0.23949      .
  2  MODEL1   PARMS   BRSHRIMP  812.091   1002.56    .           .
  3  MODEL1   PARMS   BRSHRIMP  835.061   1123.30    .           .
  4  MODEL1   PARMS   BRSHRIMP  839.436   1481.99    .        -0.09298
  5  MODEL1   PARMS   BRSHRIMP  730.418   1605.76  -0.46240      .
  6  MODEL1   PARMS   BRSHRIMP  755.311   1466.25  -0.30376      .
  7  MODEL1   PARMS   BRSHRIMP  814.221   1689.39  -0.27469      .
  8  MODEL1   PARMS   BRSHRIMP  819.485   1795.21  -0.22646   -0.03398
  9  MODEL1   PARMS   BRSHRIMP  703.130   1403.17  -0.47792      .
 10  MODEL1   PARMS   BRSHRIMP  731.492   1506.82  -0.51731      .
 11  MODEL1   PARMS   BRSHRIMP  743.346   1561.89  -0.48344    0.03677
 12  MODEL1   PARMS   BRSHRIMP  743.939   1645.84  -0.45755      .
 13  MODEL1   PARMS   BRSHRIMP  690.710   1236.02  -0.55614      .
 14  MODEL1   PARMS   BRSHRIMP  707.251   1261.91  -0.53450    0.09516
 15  MODEL1   PARMS   BRSHRIMP  716.795   1357.10  -0.48313      .
 16  MODEL1   PARMS   BRSHRIMP  738.955   1596.03  -0.52082      .
```

```
OBS   MJ_INFL    JA_INFL   SO_INFL   ND_INFL   BRSHRIMP   _IN_   _P_   _EDF_

  1      .          .         .         .          -1        1     2     27
  2      .          .      0.25948      .          -1        1     2     27
  3      .          .         .      0.12059       -1        1     2     27
  4      .          .         .         .          -1        1     2     27
  5      .          .         .      0.35079       -1        2     3     26
  6      .          .      0.33910      .          -1        2     3     26
  7      .       0.13673      .         .          -1        2     3     26
  8      .          .         .         .          -1        2     3     26
  9      .          .      0.26177   0.29713       -1        3     4     25
 10      .       0.18393      .      0.36270       -1        3     4     25
 11      .          .         .      0.36171       -1        3     4     25
 12  -0.021795      .         .      0.35423       -1        3     4     25
 13      .       0.25418   0.30105   0.30555       -1        4     5     24
 14      .          .      0.29759   0.31805       -1        4     5     24
 15   0.020550      .      0.27248   0.29169       -1        4     5     24
 16  -0.066446   0.24519      .      0.37716       -1        4     5     24

OBS     _MSE_        _RSQ_       _ADJRSQ_       _CP_        _AIC_        _SBC_

  1   648605.12     0.09996      0.06662       9.6267     390.022      392.757
  2   659491.69     0.08485      0.05095      10.2079     390.505      393.240
  3   697326.51     0.03235     -0.00349      12.2278     392.123      394.858
  4   704652.69     0.02218     -0.01403      12.6189     392.426      395.161
  5   533510.76     0.28709      0.23225       4.4274     385.263      389.365
  6   570495.14     0.23767      0.17903       6.3287     387.207      391.309
  7   662956.11     0.11411      0.04597      11.0820     391.563      395.665
  8   671555.63     0.10262      0.03359      11.5241     391.936      396.038
  9   494392.06     0.36477      0.28854       3.4387     383.917      389.386
 10   535081.15     0.31249      0.22999       5.4501     386.211      391.680
 11   552562.73     0.29003      0.20483       6.3142     387.143      392.612
 12   553445.80     0.28889      0.20356       6.3579     387.189      392.659
 13   477080.19     0.41153      0.31346       3.6397     383.700      390.536
 14   500203.52     0.38301      0.28018       4.7370     385.072      391.909
 15   513795.64     0.36625      0.26062       5.3820     385.850      392.686
 16   546053.80     0.32646      0.21420       6.9128     387.616      394.452


OBS   _MODEL_   _TYPE_    _DEPVAR_    _RMSE_    INTERCEP    JF_INFL     MA_INFL

 17   MODEL1    PARMS     BRSHRIMP   701.539    1164.37    -0.58370    0.05970
 18   MODEL1    PARMS     BRSHRIMP   704.252    1281.88    -0.55620       .
 19   MODEL1    PARMS     BRSHRIMP   721.513    1292.36    -0.53874    0.11316
 20   MODEL1    PARMS     BRSHRIMP   751.261    1571.37    -0.55020    0.06628
 21   MODEL1    PARMS     BRSHRIMP   711.158    1227.36    -0.60269    0.10054

OBS   MJ_INFL    JA_INFL   SO_INFL   ND_INFL   BRSHRIMP   _IN_   _P_   _EDF_

 17      .       0.22838   0.31954   0.31782       -1        5     6     23
 18  -0.027036   0.27663   0.29043   0.31345       -1        5     6     23
 19  -0.025501      .      0.29108   0.32876       -1        5     6     23
 20  -0.093578   0.23677      .      0.40058       -1        5     6     23
 21  -0.066050   0.26557   0.30624   0.34551       -1        6     7     22

OBS     _MSE_        _RSQ_       _ADJRSQ_       _CP_        _AIC_        _SBC_

 17   492157.41     0.41823      0.29176       5.3820     385.368      393.572
 18   495971.04     0.41372      0.28627       5.5555     385.592      393.795
 19   520581.60     0.38463      0.25085       6.6747     386.996      395.200
 20   564393.07     0.33284      0.18781       8.6671     389.339      397.543
 21   505746.21     0.42816      0.27220       7.0000     386.869      396.440
```

Square Root of Harvest (Box-Cox Transformation)

```
N = 29     Regression Models for Dependent Variable: SQRTBRSH

         Rsq      Adj    C(p)     AIC      MSE     SBC Variables in Model
 In               Rsq

  1 0.1432 0.1115   7.559   149.7    163.1   152.4 JF_INFL
  1 0.0457 0.0104   11.26   152.8    181.7   155.5 SO_INFL
  1 0.0199 -.0164   12.25   153.6    186.6   156.3 ND_INFL
  1 0.0128 -.0237   12.51   153.8    187.9   156.5 MA_INFL
------------------------------------------------------------
  2 0.3263 0.2745   2.602   144.7    133.2   148.8 JF_INFL ND_INFL
  2 0.2368 0.1781   6.004   148.3    150.9   152.4 JF_INFL SO_INFL
  2 0.1467 0.0811   9.425   151.5    168.7   155.6 JF_INFL JA_INFL
  2 0.1440 0.0781   9.530   151.6    169.2   155.7 JF_INFL MJ_INFL
--------------------------------------------------------------------
  3 0.3716 0.2962   2.881   144.7    129.2   150.1 JF_INFL SO_INFL ND_INFL
  3 0.3391 0.2598   4.114   146.1    135.9   151.6 JF_INFL MA_INFL ND_INFL
  3 0.3361 0.2564   4.230   146.3    136.5   151.7 JF_INFL JA_INFL ND_INFL
  3 0.3265 0.2457   4.593   146.7    138.5   152.2 JF_INFL MJ_INFL ND_INFL
------------------------------------------------------------------------------
  4 0.4032 0.3037   3.680   145.2    127.8   152.0 JF_INFL MA_INFL SO_INFL
                                                  ND_INFL
  4 0.3917 0.2904   4.115   145.7    130.3   152.6 JF_INFL JA_INFL SO_INFL
                                                  ND_INFL
  4 0.3738 0.2695   4.795   146.6    134.1   153.4 JF_INFL MJ_INFL SO_INFL
                                                  ND_INFL
  4 0.3486 0.2400   5.755   147.7    139.5   154.6 JF_INFL MA_INFL MJ_INFL
                                                  ND_INFL
------------------------------------------------------------------------------
  5 0.4130 0.2855   5.305   146.7    131.2   154.9 JF_INFL MA_INFL JA_INFL
                                                  SO_INFL ND_INFL
  5 0.4064 0.2773   5.558   147.0    132.7   155.2 JF_INFL MA_INFL MJ_INFL
                                                  SO_INFL ND_INFL
  5 0.3918 0.2596   6.113   147.7    135.9   155.9 JF_INFL MJ_INFL JA_INFL
                                                  SO_INFL ND_INFL
  5 0.3592 0.2200   7.350   149.2    143.2   157.4 JF_INFL MA_INFL MJ_INFL
                                                  JA_INFL ND_INFL
------------------------------------------------------------------------------
  6 0.4211 0.2632   7.000   148.3    135.3   157.9 JF_INFL MA_INFL MJ_INFL
                                                  JA_INFL SO_INFL ND_INFL
------------------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP   JF_INFL     MA_INFL

  1  MODEL1   PARMS   SQRTBRSH  12.7715   42.3599   -0.004660      .
  2  MODEL1   PARMS   SQRTBRSH  13.4787   30.0096       .          .
  3  MODEL1   PARMS   SQRTBRSH  13.6601   31.2943       .          .
  4  MODEL1   PARMS   SQRTBRSH  13.7091   35.7995       .       -.0011488
  5  MODEL1   PARMS   SQRTBRSH  11.5408   39.8952   -0.008243      .
  6  MODEL1   PARMS   SQRTBRSH  12.2837   38.4370   -0.005521      .
  7  MODEL1   PARMS   SQRTBRSH  12.9881   41.7957   -0.004945      .
  8  MODEL1   PARMS   SQRTBRSH  13.0090   41.9237   -0.004733      .
  9  MODEL1   PARMS   SQRTBRSH  11.3670   37.3812   -0.008436      .
 10  MODEL1   PARMS   SQRTBRSH  11.6568   38.4061   -0.008957   0.0012481
 11  MODEL1   PARMS   SQRTBRSH  11.6835   38.8965   -0.008797      .
 12  MODEL1   PARMS   SQRTBRSH  11.7674   40.1253   -0.008215      .
 13  MODEL1   PARMS   SQRTBRSH  11.3059   34.3590   -0.009646   0.0020358
 14  MODEL1   PARMS   SQRTBRSH  11.4138   35.5976   -0.009271      .
 15  MODEL1   PARMS   SQRTBRSH  11.5805   36.4549   -0.008540      .
 16  MODEL1   PARMS   SQRTBRSH  11.8118   39.3315   -0.009165   0.0019948
```

```
OBS   MJ_INFL     JA_INFL    SO_INFL    ND_INFL   SQRTBRSH  _IN_  _P_  _EDF_

  1   .           .          .          .            -1       1    2     27
  2   .           .          .0030958   .            -1       1    2     27
  3   .           .          .          .0015356     -1       1    2     27
  4   .           .          .          .            -1       1    2     27
  5   .           .          .          .0056393     -1       2    3     26
  6   .           .          .0045429   .            -1       2    3     26
  7   .           .0011070   .          .            -1       2    3     26
  8   0.0002287   .          .          .            -1       2    3     26
  9   .           .          .0032484   .0049735     -1       3    4     25
 10   .           .          .          .0060100     -1       3    4     25
 11   .           .0018565   .          .0057596     -1       3    4     25
 12   -.0001251   .          .          .0056591     -1       3    4     25
 13   .           .          .0040148   .0054211     -1       4    5     24
 14   .           .0027123   .0036676   .0050633     -1       4    5     24
 15   0.0004132   .          .0034637   .0048642     -1       4    5     24
 16   -.0009879   .          .          .0063877     -1       4    5     24

OBS    _MSE_      _RSQ_     _ADJRSQ_      _CP_      _AIC_      _SBC_

  1   163.111    0.14323    0.11150     7.5588    149.666    152.401
  2   181.676    0.04572    0.01037    11.2646    152.792    155.527
  3   186.599    0.01986   -0.01645    12.2474    153.568    156.302
  4   187.939    0.01282   -0.02375    12.5149    153.775    156.510
  5   133.191    0.32630    0.27448     2.6018    144.695    148.797
  6   150.888    0.23679    0.17808     6.0036    148.313    152.415
  7   168.690    0.14675    0.08111     9.4253    151.547    155.649
  8   169.234    0.14399    0.07815     9.5300    151.640    155.742
  9   129.208    0.37158    0.29617     2.8810    144.677    150.146
 10   135.882    0.33913    0.25982     4.1145    146.138    151.607
 11   136.505    0.33610    0.25643     4.2296    146.270    151.739
 12   138.472    0.32653    0.24571     4.5933    146.685    152.154
 13   127.824    0.40319    0.30372     3.6801    145.181    152.017
 14   130.275    0.39174    0.29036     4.1151    145.732    152.568
 15   134.108    0.37384    0.26948     4.7952    146.573    153.409
 16   139.519    0.34858    0.24001     5.7553    147.720    154.556


OBS  _MODEL_   _TYPE_   _DEPVAR_    _RMSE_    INTERCEP    JF_INFL      MA_INFL

 17  MODEL1    PARMS    SQRTBRSH   11.4533    33.5201   -0.010069   0.0017308
 18  MODEL1    PARMS    SQRTBRSH   11.5181    35.0549   -0.009743   0.0024471
 19  MODEL1    PARMS    SQRTBRSH   11.6589    35.7033   -0.009271    .
 20  MODEL1    PARMS    SQRTBRSH   11.9667    38.9446   -0.009660   0.0018793
 21  MODEL1    PARMS    SQRTBRSH   11.6302    34.4410   -0.010347   0.0023279

OBS   MJ_INFL     JA_INFL    SO_INFL    ND_INFL   SQRTBRSH  _IN_  _P_  _EDF_

 17   .           .0019644   .0042036   .0054191     -1       5    6     23
 18   -.0005827   .          .0038659   .0056658     -1       5    6     23
 19   -.0000623   .0027641   .0036431   .0050815     -1       5    6     23
 20   -.0013260   .0021311   .          .0065449     -1       5    6     23
 21   -.0009657   .0025081   .0040092   .0058239     -1       6    7     22

OBS    _MSE_      _RSQ_     _ADJRSQ_      _CP_      _AIC_      _SBC_

 17   131.177    0.41305    0.28545     5.3053    146.698    154.901
 18   132.666    0.40639    0.27734     5.5585    147.025    155.229
 19   135.929    0.39178    0.25956     6.1134    147.730    155.933
 20   143.201    0.35925    0.21995     7.3499    149.241    157.445
 21   135.262    0.42108    0.26320     7.0000    148.298    157.869
```

Logged Inflows

```
N = 29     Regression Models for Dependent Variable: BRSHRIMP

       Rsq     Adj    C(p)     AIC     MSE     SBC Variables in Model
  In           Rsq

   1 0.0942 0.0607   7.608   390.2 652749   392.9 LGSOINFL
   1 0.0701 0.0356   8.477   391.0 670148   393.7 LGJFINFL
   1 0.0296 -.0063   9.934   392.2 699309   394.9 LGNDINFL
   1 0.0105 -.0262   10.62   392.8 713103   395.5 LGMAINFL
---------------------------------------------------------------
   2 0.2807 0.2254   2.895   385.5 538294   389.6 LGJFINFL LGNDINFL
   2 0.1864 0.1239   6.288   389.1 608835   393.2 LGJFINFL LGSOINFL
   2 0.0997 0.0305   9.409   392.0 673710   396.1 LGSOINFL LGNDINFL
   2 0.0969 0.0275   9.509   392.1 675803   396.2 LGMAINFL LGSOINFL
------------------------------------------------------------------------
   3 0.3198 0.2381   3.488   385.9 529426   391.4 LGJFINFL LGSOINFL LGNDINFL
   3 0.3174 0.2355   3.572   386.0 531230   391.5 LGJFINFL LGMAINFL LGNDINFL
   3 0.3049 0.2215   4.022   386.5 540967   392.0 LGJFINFL LGJAINFL LGNDINFL
   3 0.2848 0.1990   4.747   387.4 556631   392.8 LGJFINFL LGMJINFL LGNDINFL
---------------------------------------------------------------------------------
   4 0.3777 0.2740   3.403   385.3 504528   392.2 LGJFINFL LGMAINFL LGSOINFL
                                                   LGNDINFL
   4 0.3395 0.2294   4.777   387.0 535462   393.9 LGJFINFL LGJAINFL LGSOINFL
                                                   LGNDINFL
   4 0.3292 0.2174   5.147   387.5 543797   394.3 LGJFINFL LGMAINFL LGJAINFL
                                                   LGNDINFL
   4 0.3279 0.2159   5.194   387.6 544865   394.4 LGJFINFL LGMJINFL LGSOINFL
                                                   LGNDINFL
---------------------------------------------------------------------------------
   5 0.3831 0.2490   5.207   387.1 521857   395.3 LGJFINFL LGMAINFL LGJAINFL
                                                   LGSOINFL LGNDINFL
   5 0.3782 0.2431   5.384   387.3 526004   395.5 LGJFINFL LGMAINFL LGMJINFL
                                                   LGSOINFL LGNDINFL
   5 0.3403 0.1969   6.750   389.0 558101   397.2 LGJFINFL LGMAINFL LGMJINFL
                                                   LGJAINFL LGNDINFL
   5 0.3396 0.1960   6.775   389.0 558690   397.2 LGJFINFL LGMJINFL LGJAINFL
                                                   LGSOINFL LGNDINFL
---------------------------------------------------------------------------------
   6 0.3889 0.2222   7.000   388.8 540486   398.4 LGJFINFL LGMAINFL LGMJINFL
                                                   LGJAINFL LGSOINFL LGNDINFL
---------------------------------------------------------------------------------

OBS  _MODEL_   _TYPE_   _DEPVAR_    _RMSE_   INTERCEP   LGJFINFL   LGMAINFL

  1  MODEL1    PARMS    BRSHRIMP   807.929    -828.64          .          .
  2  MODEL1    PARMS    BRSHRIMP   818.626    3194.35   -258.418          .
  3  MODEL1    PARMS    BRSHRIMP   836.247     153.24          .          .
  4  MODEL1    PARMS    BRSHRIMP   844.454    2103.59          .   -109.180
  5  MODEL1    PARMS    BRSHRIMP   733.685    1911.55   -648.996          .
  6  MODEL1    PARMS    BRSHRIMP   780.279    1084.10   -298.650          .
  7  MODEL1    PARMS    BRSHRIMP   820.798   -1179.47          .          .
  8  MODEL1    PARMS    BRSHRIMP   822.072    -359.18          .    -56.691
  9  MODEL1    PARMS    BRSHRIMP   727.617     810.92   -613.355          .
 10  MODEL1    PARMS    BRSHRIMP   728.855     886.15   -831.524    260.071
 11  MODEL1    PARMS    BRSHRIMP   735.505    1037.72   -710.612          .
 12  MODEL1    PARMS    BRSHRIMP   746.077    1587.34   -676.853          .
 13  MODEL1    PARMS    BRSHRIMP   710.301    -808.43   -838.485    334.617
 14  MODEL1    PARMS    BRSHRIMP   731.753      80.92   -671.171          .
 15  MODEL1    PARMS    BRSHRIMP   737.426     413.76   -847.615    219.445
 16  MODEL1    PARMS    BRSHRIMP   738.150     284.22   -650.850          .
```

```
OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  BRSHRIMP  _IN_  _P_  _EDF_

  1      .         .     315.153       .        -1       1     2     27
  2      .         .         .         .        -1       1     2     27
  3      .         .         .     164.783      -1       1     2     27
  4      .         .         .         .        -1       1     2     27
  5      .         .         .     583.163      -1       2     3     26
  6      .         .     352.821       .        -1       2     3     26
  7      .         .     288.278    75.566      -1       2     3     26
  8      .         .     306.166       .        -1       2     3     26
  9      .         .     217.190   492.970      -1       3     4     25
 10      .         .         .     650.869      -1       3     4     25
 11      .     180.775       .     600.921      -1       3     4     25
 12    76.752      .         .     575.464      -1       3     4     25
 13      .         .     276.396   555.497      -1       4     5     24
 14      .     163.770   205.027   514.109      -1       4     5     24
 15      .     130.864       .     653.148      -1       4     5     24
 16   109.162      .     230.130   476.647      -1       4     5     24

OBS    _MSE_       _RSQ_     _ADJRSQ_      _CP_      _AIC_      _SBC_

  1  652749.15   0.09421    0.06066     7.6081    390.207    392.942
  2  670148.45   0.07006    0.03562     8.4773    390.970    393.705
  3  699308.67   0.02960   -0.00634     9.9340    392.205    394.940
  4  713102.76   0.01046   -0.02619    10.6231    392.772    395.506
  5  538294.19   0.28070    0.22536     2.8946    385.522    389.624
  6  608835.46   0.18643    0.12385     6.2880    389.093    393.195
  7  673709.70   0.09974    0.03049     9.4087    392.029    396.131
  8  675802.67   0.09695    0.02748     9.5094    392.119    396.221
  9  529426.20   0.31976    0.23813     3.4884    385.903    391.372
 10  531230.13   0.31744    0.23553     3.5719    386.001    391.471
 11  540967.40   0.30493    0.22152     4.0223    386.528    391.997
 12  556630.55   0.28480    0.19898     4.7468    387.356    392.825
 13  504527.87   0.37768    0.27396     3.4033    385.322    392.158
 14  535462.40   0.33952    0.22944     4.7769    387.048    393.884
 15  543797.22   0.32924    0.21745     5.1470    387.496    394.332
 16  544864.81   0.32792    0.21591     5.1945    387.552    394.389


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

 17  MODEL1   PARMS   BRSHRIMP  722.397  -1058.03  -849.226   303.436
 18  MODEL1   PARMS   BRSHRIMP  725.261   -736.84  -838.926   351.482
 19  MODEL1   PARMS   BRSHRIMP  747.061    480.39  -859.931   285.587
 20  MODEL1   PARMS   BRSHRIMP  747.455     53.82  -672.853      .
 21  MODEL1   PARMS   BRSHRIMP  735.177   -947.18  -858.126   348.042

OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  BRSHRIMP  _IN_  _P_  _EDF_

 17      .      89.848   264.206   561.268      -1       5     6     23
 18   -31.752      .     275.616   563.396      -1       5     6     23
 19  -169.306  211.084       .     695.230      -1       5     6     23
 20    12.006  156.855   206.964   511.421      -1       5     6     23
 21  -123.284  149.999   253.017   595.802      -1       6     7     22

OBS    _MSE_       _RSQ_     _ADJRSQ_      _CP_      _AIC_      _SBC_

 17  521856.87   0.38312    0.24902     5.2073    387.067    395.271
 18  526003.81   0.37822    0.24305     5.3837    387.297    395.500
 19  558100.81   0.34028    0.19686     6.7496    389.014    397.218
 20  558689.62   0.33958    0.19601     6.7747    389.045    397.249
 21  540485.73   0.38888    0.22221     7.0000    388.795    398.366
```

Logged Harvest

```
  N = 29      Regression Models for Dependent Variable: LBSHRIMP

            Rsq     Adj    C(p)     AIC     MSE     SBC Variables in Model
   In               Rsq

    1 0.1525 0.1211   4.702   16.09   1.630   18.83 JF_INFL
    1 0.0331 -.0027   8.888   19.92   1.859   22.65 JA_INFL
    1 0.0109 -.0257   9.665   20.57   1.902   23.31 ND_INFL
    1 0.0066 -.0302   9.817   20.70   1.910   23.44 SO_INFL
 ------------------------------------------------------------------
    2 0.3062 0.2529   1.315   12.29   1.385   16.39 JF_INFL ND_INFL
    2 0.1823 0.1194   5.658   17.06   1.633   21.16 JF_INFL SO_INFL
    2 0.1628 0.0984   6.343   17.74   1.672   21.84 JF_INFL MA_INFL
    2 0.1607 0.0961   6.416   17.81   1.676   21.91 JF_INFL MJ_INFL
 --------------------------------------------------------------------------
    3 0.3469 0.2685   1.889   12.54   1.356   18.01 JF_INFL MA_INFL ND_INFL
    3 0.3134 0.2310   3.065   13.99   1.426   19.46 JF_INFL SO_INFL ND_INFL
    3 0.3089 0.2260   3.221   14.18   1.435   19.65 JF_INFL MJ_INFL ND_INFL
    3 0.3063 0.2230   3.313   14.29   1.441   19.76 JF_INFL JA_INFL ND_INFL
 ---------------------------------------------------------------------------
    4 0.3678 0.2625   3.157   13.59   1.368   20.43 JF_INFL MA_INFL SO_INFL
                                                    ND_INFL
    4 0.3529 0.2451   3.679   14.27   1.400   21.11 JF_INFL MA_INFL MJ_INFL
                                                    ND_INFL
    4 0.3518 0.2437   3.719   14.32   1.402   21.16 JF_INFL MA_INFL JA_INFL
                                                    ND_INFL
    4 0.3196 0.2062   4.847   15.73   1.472   22.56 JF_INFL MJ_INFL SO_INFL
                                                    ND_INFL
 ------------------------------------------------------------------------------
    5 0.3708 0.2340   5.052   15.46   1.420   23.66 JF_INFL MA_INFL MJ_INFL
                                                    SO_INFL ND_INFL
    5 0.3706 0.2338   5.059   15.47   1.421   23.67 JF_INFL MA_INFL JA_INFL
                                                    SO_INFL ND_INFL
    5 0.3553 0.2151   5.597   16.16   1.456   24.37 JF_INFL MA_INFL MJ_INFL
                                                    JA_INFL ND_INFL
    5 0.3201 0.1723   6.830   17.71   1.535   25.91 JF_INFL MJ_INFL JA_INFL
                                                    SO_INFL ND_INFL
 ------------------------------------------------------------------------------
    6 0.3723 0.2011   7.000   17.39   1.482   26.96 JF_INFL MA_INFL MJ_INFL
                                                    JA_INFL SO_INFL ND_INFL
 ------------------------------------------------------------------------------


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP    JF_INFL     MA_INFL

  1  MODEL1   PARMS   LBSHRIMP  1.27664   7.63453  -.00048330   .
  2  MODEL1   PARMS   LBSHRIMP  1.36363   7.05628    .          .
  3  MODEL1   PARMS   LBSHRIMP  1.37918   6.55892    .          .
  4  MODEL1   PARMS   LBSHRIMP  1.38219   6.59973    .          .
  5  MODEL1   PARMS   LBSHRIMP  1.17707   7.40754  -.00081332   .
  6  MODEL1   PARMS   LBSHRIMP  1.27788   7.41203  -.00053213   .
  7  MODEL1   PARMS   LBSHRIMP  1.29307   7.51884  -.00052503  .00010881
  8  MODEL1   PARMS   LBSHRIMP  1.29467   7.49083  -.00050762   .
  9  MODEL1   PARMS   LBSHRIMP  1.16467   7.14103  -.00094115  .00022338
 10  MODEL1   PARMS   LBSHRIMP  1.19421   7.30741  -.00082100   .
 11  MODEL1   PARMS   LBSHRIMP  1.19807   7.32795  -.00082296   .
 12  MODEL1   PARMS   LBSHRIMP  1.20034   7.41446  -.00080949   .
 13  MODEL1   PARMS   LBSHRIMP  1.16951   6.90866  -.00098070  .00026861
 14  MODEL1   PARMS   LBSHRIMP  1.18320   7.21524  -.00095779  .00028326
 15  MODEL1   PARMS   LBSHRIMP  1.18425   7.18647  -.00091378  .00024734
 16  MODEL1   PARMS   LBSHRIMP  1.21330   7.15275  -.00083848   .
```

```
OBS    MJ_INFL        JA_INFL      SO_INFL      ND_INFL     LBSHRIMP   _IN_   _P_

  1       .              .            .            .           -1        1      2
  2       .          -.00031812       .            .           -1        1      2
  3       .              .            .        .00011446       -1        1      2
  4       .              .        .00011818        .           -1        1      2
  5       .              .            .        .00051936       -1        2      3
  6       .              .        .00025766        .           -1        2      3
  7       .              .            .            .           -1        2      3
  8   0.000075331        .            .            .           -1        2      3
  9       .              .            .        .00058571       -1        3      4
 10       .              .        .00012939    .00049284       -1        3      4
 11   0.000043289        .            .        .00051253       -1        3      4
 12       .          -.00001286       .        .00051853       -1        3      4
 13       .              .        .00023050    .00055190       -1        4      5
 14   -.000079222        .            .        .00061600       -1        4      5
 15       .          -.00013762       .        .00058391       -1        4      5
 16   0.000068983        .        .00016534    .00047459       -1        4      5

OBS  _EDF_    _MSE_     _RSQ_     _ADJRSQ_     _CP_      _AIC_      _SBC_

  1    27    1.62980   0.15253    0.12115    4.70210   16.0929    18.8275
  2    27    1.85949   0.03310   -0.00271    8.88816   19.9165    22.6511
  3    27    1.90214   0.01092   -0.02571    9.66537   20.5741    23.3087
  4    27    1.91046   0.00660   -0.03020    9.81696   20.7006    23.4352
  5    26    1.38550   0.30625    0.25288    1.31472   12.2890    16.3909
  6    26    1.63298   0.18233    0.11943    5.65790   17.0550    21.1569
  7    26    1.67202   0.16278    0.09838    6.34306   17.7402    21.8421
  8    26    1.67618   0.16070    0.09614    6.41595   17.8122    21.9141
  9    25    1.35645   0.34691    0.26854    1.88944   12.5372    18.0064
 10    25    1.42615   0.31336    0.23096    3.06547   13.9901    19.4593
 11    25    1.43537   0.30892    0.22599    3.22116   14.1772    19.6464
 12    25    1.44082   0.30629    0.22305    3.31309   14.2870    19.7562
 13    24    1.36775   0.36782    0.26245    3.15680   13.5938    20.4303
 14    24    1.39995   0.35293    0.24509    3.67854   14.2687    21.1052
 15    24    1.40246   0.35177    0.24374    3.71908   14.3205    21.1570
 16    24    1.47209   0.31959    0.20619    4.84712   15.7258    22.5623


OBS  _MODEL_   _TYPE_   _DEPVAR_    _RMSE_   INTERCEP    JF_INFL      MA_INFL

 17  MODEL1    PARMS    LBSHRIMP   1.19184   6.97623   -.00099011   .00030854
 18  MODEL1    PARMS    LBSHRIMP   1.19201   6.95357   -.00095805   .00028493
 19  MODEL1    PARMS    LBSHRIMP   1.20647   7.23341   -.00093455   .00028869
 20  MODEL1    PARMS    LBSHRIMP   1.23895   7.16521   -.00082637       .
 21  MODEL1    PARMS    LBSHRIMP   1.21718   6.99585   -.00097080   .00031235

OBS    MJ_INFL        JA_INFL      SO_INFL      ND_INFL     LBSHRIMP   _IN_   _P_

 17  -.000056578         .        .00021605    .00057565      -1        5      6
 18       .          -.00010515   .00022040    .00055201      -1        5      6
 19  -.000063344     -.00010007       .        .00060862      -1        5      6
 20  0.000076868     -.00004584   .00016236    .00047098      -1        5      6
 21  -.000044335     -.00008018   .00021147    .00057059      -1        6      7

OBS  _EDF_    _MSE_     _RSQ_     _ADJRSQ_     _CP_      _AIC_      _SBC_

 17    23    1.42047   0.37080    0.23402    5.05211   15.4564    23.6602
 18    23    1.42090   0.37062    0.23379    5.05876   15.4652    23.6689
 19    23    1.45557   0.35526    0.21510    5.59693   16.1642    24.3680
 20    23    1.53499   0.32008    0.17227    6.83000   17.7050    25.9088
 21    22    1.48153   0.37229    0.20110    7.00000   17.3878    26.9589
```

All Variables Logged

```
N = 29     Regression Models for Dependent Variable: LBSHRIMP

        Rsq     Adj   C(p)     AIC     MSE     SBC Variables in Model
  In            Rsq

   1 0.1024 0.0691  9.791  17.76  1.726  20.49 LGJFINFL
   1 0.0455 0.0101  12.00  19.54  1.836  22.28 LGJAINFL
   1 0.0201 -.0162  12.98  20.30  1.884  23.04 LGNDINFL
   1 0.0033 -.0336  13.63  20.80  1.917  23.53 LGMAINFL
-------------------------------------------------------------
   2 0.3204 0.2682  3.339  11.69  1.357  15.79 LGJFINFL LGNDINFL
   2 0.1266 0.0594  10.85  18.97  1.744  23.07 LGJFINFL LGMAINFL
   2 0.1178 0.0499  11.19  19.26  1.762  23.36 LGJFINFL LGMJINFL
   2 0.1168 0.0488  11.23  19.29  1.764  23.39 LGJFINFL LGJAINFL
-----------------------------------------------------------------------
   3 0.4054 0.3340  2.048  9.819  1.235  15.29 LGJFINFL LGMAINFL LGNDINFL
   3 0.3314 0.2512  4.913  13.22  1.389  18.69 LGJFINFL LGSOINFL LGNDINFL
   3 0.3269 0.2461  5.089  13.41  1.398  18.88 LGJFINFL LGMJINFL LGNDINFL
   3 0.3266 0.2458  5.100  13.43  1.399  18.89 LGJFINFL LGJAINFL LGNDINFL
------------------------------------------------------------------------------
   4 0.4315 0.3368  3.033  10.51  1.230  17.35 LGJFINFL LGMAINFL LGJAINFL
                                               LGNDINFL
   4 0.4097 0.3113  3.880  11.61  1.277  18.44 LGJFINFL LGMAINFL LGMJINFL
                                               LGNDINFL
   4 0.4071 0.3083  3.979  11.73  1.283  18.57 LGJFINFL LGMAINFL LGSOINFL
                                               LGNDINFL
   4 0.3505 0.2423  6.172  14.38  1.405  21.21 LGJFINFL LGMJINFL LGJAINFL
                                               LGNDINFL
-------------------------------------------------------------------------------
   5 0.4321 0.3087  5.010  12.48  1.282  20.69 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGNDINFL
   5 0.4319 0.3084  5.019  12.49  1.283  20.70 LGJFINFL LGMAINFL LGJAINFL
                                               LGSOINFL LGNDINFL
   5 0.4116 0.2837  5.804  13.51  1.328  21.71 LGJFINFL LGMAINFL LGMJINFL
                                               LGSOINFL LGNDINFL
   5 0.3551 0.2149  7.997  16.17  1.456  24.38 LGJFINFL LGMJINFL LGJAINFL
                                               LGSOINFL LGNDINFL
-------------------------------------------------------------------------------
   6 0.4324 0.2776  7.000  14.47  1.340  24.04 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGSOINFL LGNDINFL
-------------------------------------------------------------------------------


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

  1  MODEL1   PARMS   LBSHRIMP  1.31387   10.4498  -0.51032      .
  2  MODEL1   PARMS   LBSHRIMP  1.35489    9.2772    .           .
  3  MODEL1   PARMS   LBSHRIMP  1.37277    5.1762    .           .
  4  MODEL1   PARMS   LBSHRIMP  1.38449    7.4642    .        -0.10013
  5  MODEL1   PARMS   LBSHRIMP  1.16498    8.3176  -1.15951      .
  6  MODEL1   PARMS   LBSHRIMP  1.32069    9.3292  -0.68570   0.33250
  7  MODEL1   PARMS   LBSHRIMP  1.32738    9.3759  -0.61424      .
  8  MODEL1   PARMS   LBSHRIMP  1.32812   11.4967  -0.44796      .
  9  MODEL1   PARMS   LBSHRIMP  1.11134    5.7709  -1.61283   0.64591
 10  MODEL1   PARMS   LBSHRIMP  1.17839    9.2718  -1.19041      .
 11  MODEL1   PARMS   LBSHRIMP  1.18238    7.6528  -1.21662      .
 12  MODEL1   PARMS   LBSHRIMP  1.18264    9.0378  -1.10872      .
 13  MODEL1   PARMS   LBSHRIMP  1.10901    6.9202  -1.57368   0.74475
 14  MODEL1   PARMS   LBSHRIMP  1.13011    6.0788  -1.61495   0.72461
 15  MODEL1   PARMS   LBSHRIMP  1.13255    6.2474  -1.61087   0.62495
 16  MODEL1   PARMS   LBSHRIMP  1.18538    8.4785  -1.17235      .
```

```
OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  LBSHRIMP  _IN_  _P_  _EDF_

  1      .          .         .         .        -1       1    2     27
  2      .     -0.38305       .         .        -1       1    2     27
  3      .          .         .      0.22181     -1       1    2     27
  4      .          .         .         .        -1       1    2     27
  5      .          .         .      0.96929     -1       2    3     26
  6      .          .         .         .        -1       2    3     26
  7   0.24161       .         .         .        -1       2    3     26
  8      .     -0.22671       .         .        -1       2    3     26
  9      .          .         .      1.13744     -1       3    4     25
 10      .          .    -0.18829    1.04748     -1       3    4     25
 11   0.15737       .         .      0.95350     -1       3    4     25
 12      .     -0.14900       .      0.95465     -1       3    4     25
 13      .     -0.31839       .      1.13190     -1       4    5     24
 14  -0.14635       .         .      1.17261     -1       4    5     24
 15      .          .    -0.07771    1.16426     -1       4    5     24
 16   0.37179  -0.35820       .      0.89681     -1       4    5     24

OBS   _MSE_      _RSQ_     _ADJRSQ_     _CP_      _AIC_      _SBC_

  1  1.72625    0.10238     0.06913     9.7910    17.7603    20.4949
  2  1.83571    0.04546     0.01011    11.9972    19.5433    22.2779
  3  1.88450    0.02009    -0.01620    12.9804    20.3039    23.0385
  4  1.91680    0.00330    -0.03362    13.6315    20.7968    23.5314
  5  1.35717    0.32043     0.26816     3.3395    11.6898    15.7917
  6  1.74423    0.12662     0.05944    10.8514    18.9663    23.0681
  7  1.76193    0.11776     0.04990    11.1949    19.2590    23.3609
  8  1.76389    0.11678     0.04884    11.2331    19.2914    23.3933
  9  1.23507    0.40536     0.33400     2.0479     9.8185    15.2877
 10  1.38861    0.33143     0.25121     4.9131    13.2165    18.6857
 11  1.39802    0.32690     0.24613     5.0888    13.4125    18.8817
 12  1.39864    0.32660     0.24579     5.1004    13.4254    18.8946
 13  1.22990    0.43153     0.33679     3.0333    10.5130    17.3494
 14  1.27716    0.40969     0.31130     3.8800    11.6064    18.4429
 15  1.28267    0.40714     0.30833     3.9787    11.7314    18.5678
 16  1.40512    0.35054     0.24230     6.1725    14.3756    21.2121


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

 17  MODEL1   PARMS   LBSHRIMP  1.13226    6.8947   -1.56897   0.71944
 18  MODEL1   PARMS   LBSHRIMP  1.13250    7.1167   -1.57346   0.73354
 19  MODEL1   PARMS   LBSHRIMP  1.15251    6.5839   -1.61294   0.70423
 20  MODEL1   PARMS   LBSHRIMP  1.20664    9.1113   -1.19012      .
 21  MODEL1   PARMS   LBSHRIMP  1.15744    7.0633   -1.56918   0.71207

OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  LBSHRIMP  _IN_  _P_  _EDF_

 17   0.06478  -0.34909       .      1.11580     -1       5    6     23
 18      .     -0.31292  -0.03526    1.14416     -1       5    6     23
 19  -0.14927       .    -0.08138    1.20139     -1       5    6     23
 20   0.33614  -0.32785  -0.12410    0.95490     -1       5    6     23
 21   0.05935  -0.34187  -0.02987    1.12754     -1       6    7     22

OBS   _MSE_      _RSQ_     _ADJRSQ_     _CP_      _AIC_      _SBC_

 17  1.28200    0.43214     0.30869     5.0098    12.4820    20.6858
 18  1.28256    0.43189     0.30839     5.0194    12.4946    20.6984
 19  1.32827    0.41164     0.28374     5.8042    13.5102    21.7140
 20  1.45599    0.35507     0.21487     7.9969    16.1727    24.3765
 21  1.33968    0.43239     0.27759     7.0000    14.4691    24.0401
```

Regression—Untransformed Data

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	*November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows[c,d]*	.	*.654*	*.428*	*.272*	*711.1584*	*.959*

a. Dependent Variable: Brown Shrimp Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*8330789.178*	*6*	*1388464.863*	*2.745*	*.038[b]*
	Residual	*11126416.612*	*22*	*505746.210*		
	Total	*19457205.790*	*28*			

a. Dependent Variable: Brown Shrimp Harvest

b. Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1227.362	361.974		3.391	.003	476.675	1978.050
	January-February Inflows	-.603	.171	-.796	-3.528	.002	-.957	-.248
	March-April Inflows	.101	.135	.161	.745	.464	-.179	.380
	May-June Inflows	-6.605E-02	.107	-.132	-.618	.543	-.288	.156
	July-August Inflows	.266	.205	.248	1.294	.209	-.160	.691
	September-October Inflows	.306	.160	.344	1.915	.069	-.025	.638
	November-December Inflows	.346	.144	.515	2.402	.025	.047	.644

a. Dependent Variable: Brown Shrimp Harvest

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	January-February Inflows	.511	1.957
	March-April Inflows	.557	1.796
	May-June Inflows	.566	1.767
	July-August Inflows	.707	1.414
	September-October Inflows	.807	1.240
	November-December Inflows	.565	1.770

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	January-February Inflows	March-April Inflows
1	1	5.541	1.000	.00	.00	.00
	2	.608	3.019	.00	.00	.07
	3	.266	4.562	.04	.03	.07
	4	.230	4.904	.00	.00	.12
	5	.171	5.698	.01	.26	.23
	6	.106	7.244	.89	.01	.13
	7	7.785E-02	8.437	.05	.69	.38

[a] Dependent Variable: Brown Shrimp Harvest

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Variance Proportions			
			May-June Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	5.541	.00	.01	.01	.01
	2	.608	.03	.05	.20	.05
	3	.266	.00	.02	.33	.35
	4	.230	.06	.80	.03	.05
	5	.171	.42	.01	.01	.02
	6	.106	.05	.03	.43	.02
	7	7.785E-02	.43	.09	.00	.50

[a] Dependent Variable: Brown Shrimp Harvest

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	93.9599	2351.9456	1317.3414	545.4614	29
Std. Predicted Value	-2.243	1.897	.000	1.000	29
Standard Error of Predicted Value	229.0293	494.6881	340.0924	81.5041	29
Adjusted Predicted Value	104.3286	2730.5278	1320.7135	599.3845	29
Residual	-1347.8309	1150.5192	-2.2737E-13	630.3745	29
Std. Residual	-1.895	1.618	.000	.886	29
Stud. Residual	-2.281	1.828	-.002	1.018	29
Deleted Residual	-1952.1873	1469.3358	-3.3721	838.4705	29
Stud. Deleted Residual	-2.550	1.940	-.017	1.080	29
Mahal. Distance	1.939	12.583	5.793	3.236	29
Cook's Distance	.000	.370	.049	.092	29
Centered Leverage Value	.069	.449	.207	.116	29

[a] Dependent Variable: Brown Shrimp Harvest

Case Values for Residuals Diagnostics

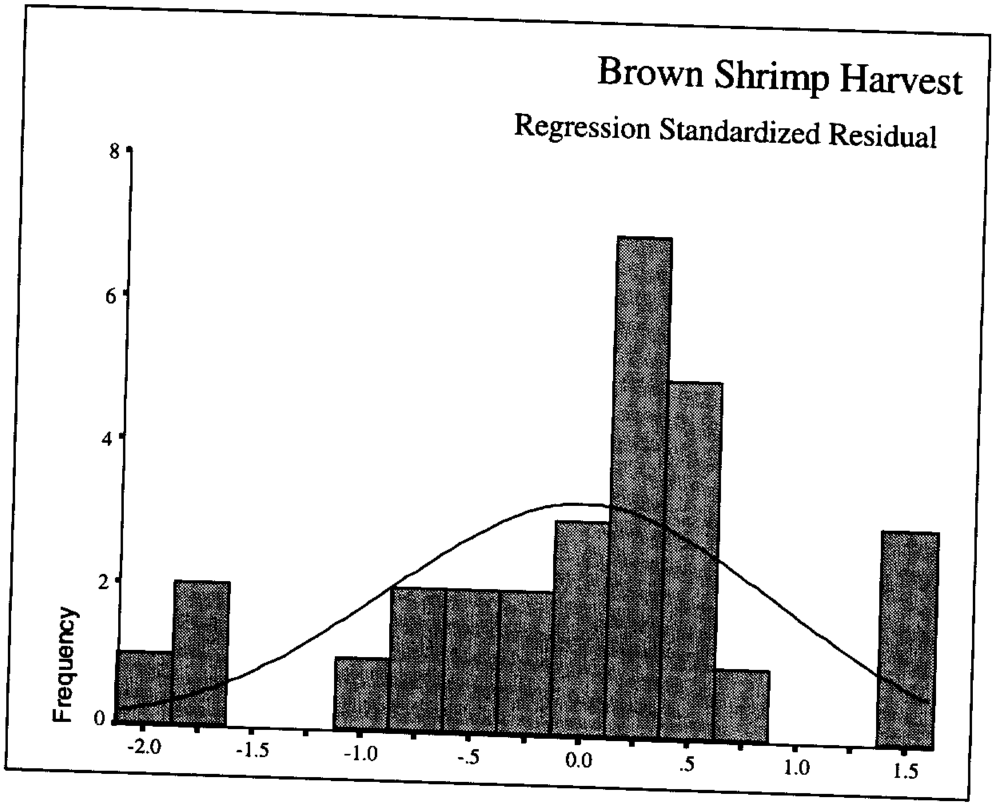
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1959	1371.13097	-1347.83097	-1952.18725	1975.48725	.09861	-1.89526	-2.28093	*-2.55036
1960	618.54251	-609.94251	-725.74147	734.34147	-1.28112	-.85767	-.93555	-.93279
1961	93.95991	-11.05991	-21.42862	104.32862	-2.24284	-.01555	-.02165	-.02115
1962	2149.54826	-1281.04826	-1499.28862	2367.78862	1.52569	-1.80135	-1.94876	-2.09317
1963	1389.48229	-788.68229	-882.83140	1483.63140	.13226	-1.10901	-1.17334	-1.18401
1964	982.76379	-265.66379	-321.99078	1039.09078	-.61338	-.37356	-.41126	-.40336
1965	1021.71030	110.48970	123.27545	1008.92455	-.54198	.15537	.16411	.16043
1966	636.99763	44.10237	58.51861	622.58139	-1.24728	.06201	.07144	.06980
1967	1461.75605	-313.25605	-366.57702	1515.07702	.26476	-.44049	-.47650	-.46797
1968	578.67496	-270.87496	-403.33438	711.13438	-1.35420	-.38089	-.46478	-.45634
1969	970.25448	-494.75448	-641.86230	1117.36230	-.63632	-.69570	-.79241	-.78548
1970	1406.21396	149.78604	180.65451	1375.34549	.16293	.21062	.23131	.22627
1971	1873.65477	176.44523	214.55081	1835.54919	1.01989	.24811	.27359	.26776
1972	1063.03226	389.96774	440.82732	1012.17268	-.46623	.54836	.58302	.57407
1973	1068.35930	-112.95930	-167.00583	1122.40583	-.45646	-.15884	-.19313	-.18885
1974	1449.68509	-26.98509	-50.97180	1473.67180	.24263	-.03795	-.05215	-.05095
1975	2041.96140	-1213.56140	-1902.12772	2730.52772	1.32845	-1.70646	-2.13641	-2.34463
1976	1583.62640	214.37360	246.72512	1551.27488	.48818	.30144	.32339	.31671
1977	1269.59158	111.90842	146.30781	1235.19219	-.08754	.15736	.17993	.17592
1978	566.25979	316.94021	387.61482	495.58518	-1.37697	.44567	.49286	.48421
1979	899.45765	415.54235	696.28623	618.71377	-.76611	.58432	.75637	.74878
1980	1163.98089	1150.51911	1469.33577	845.16423	-.28116	1.61781	1.82827	1.93966
1981	1615.55794	376.34206	615.99584	1375.90416	.54672	.52920	.67704	.66847
1982	2351.94560	183.35440	230.27715	2305.02285	1.89675	.25782	.28894	.28283
1983	1468.07303	472.72697	849.47411	1091.32589	.27634	.66473	.89107	.88674
1984	1649.80960	1121.19040	1256.26888	1514.73112	.60952	1.57657	1.66884	1.74463
1985	1326.13588	324.86412	373.73301	1277.26699	.01612	.45681	.48997	.48133
1986	1889.11385	158.28615	216.66970	1830.73030	1.04824	.22258	.26041	.25481
1987	2241.61984	1019.78016	1331.04066	1930.35934	1.69449	1.43397	1.63826	1.70818

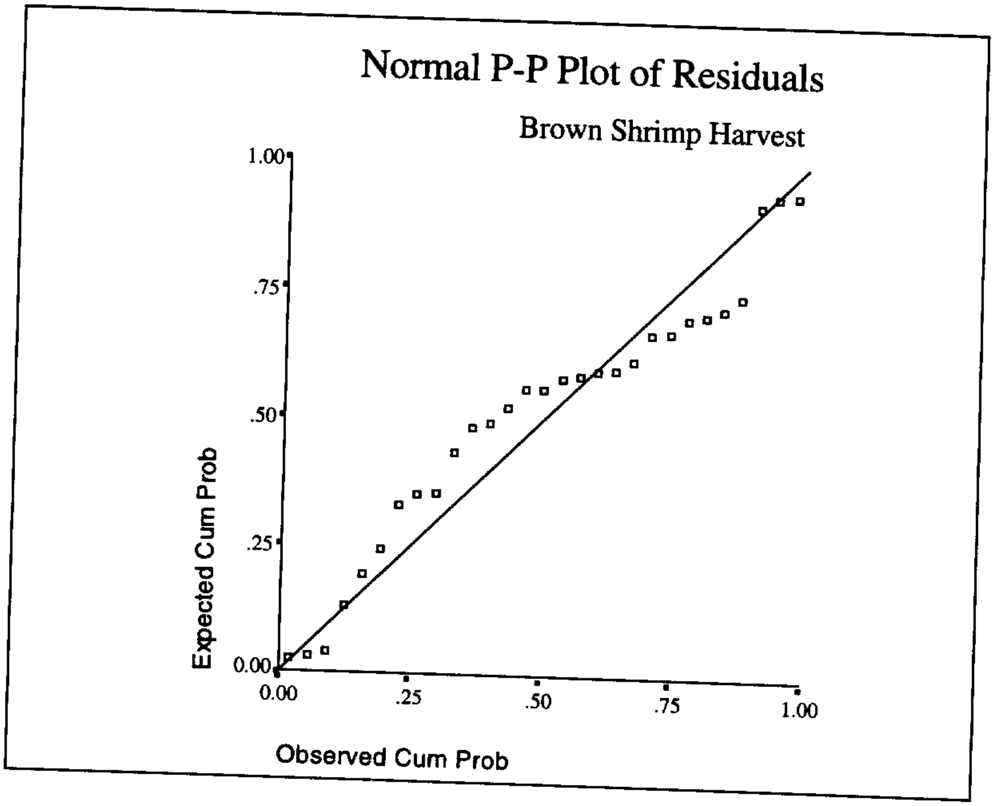
PRE_1	Predicted value of harvest
RES_1	Ordinary residual; observed harvest minus predicted harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

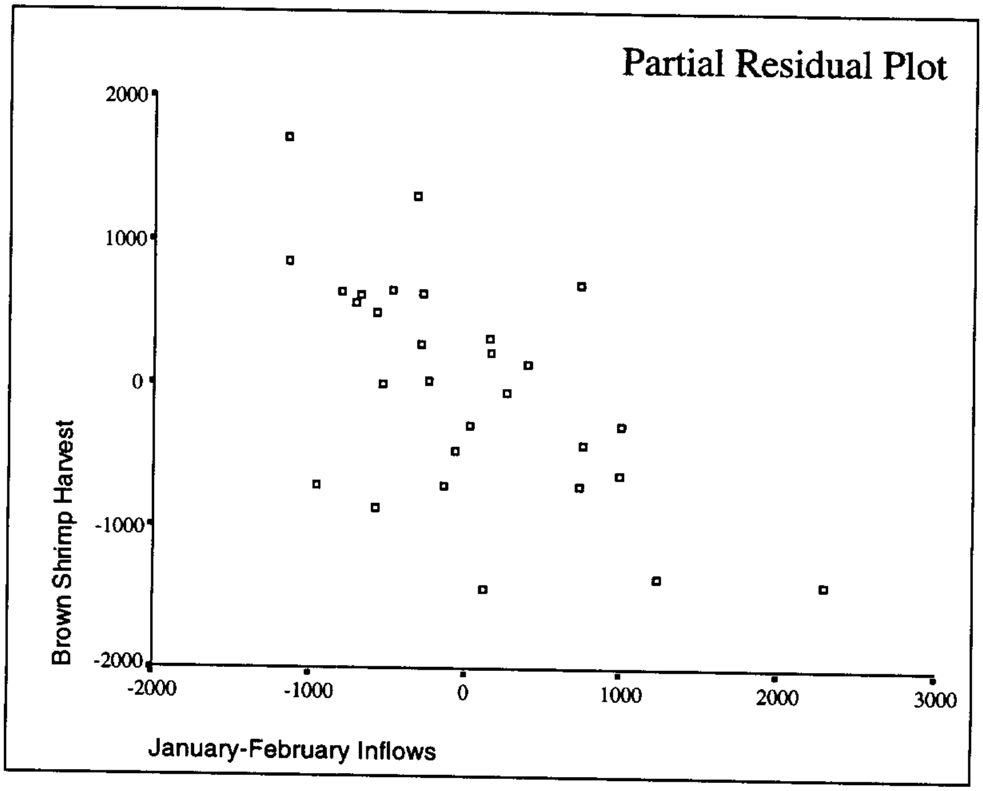
[1] Values greater than 3 are flagged.

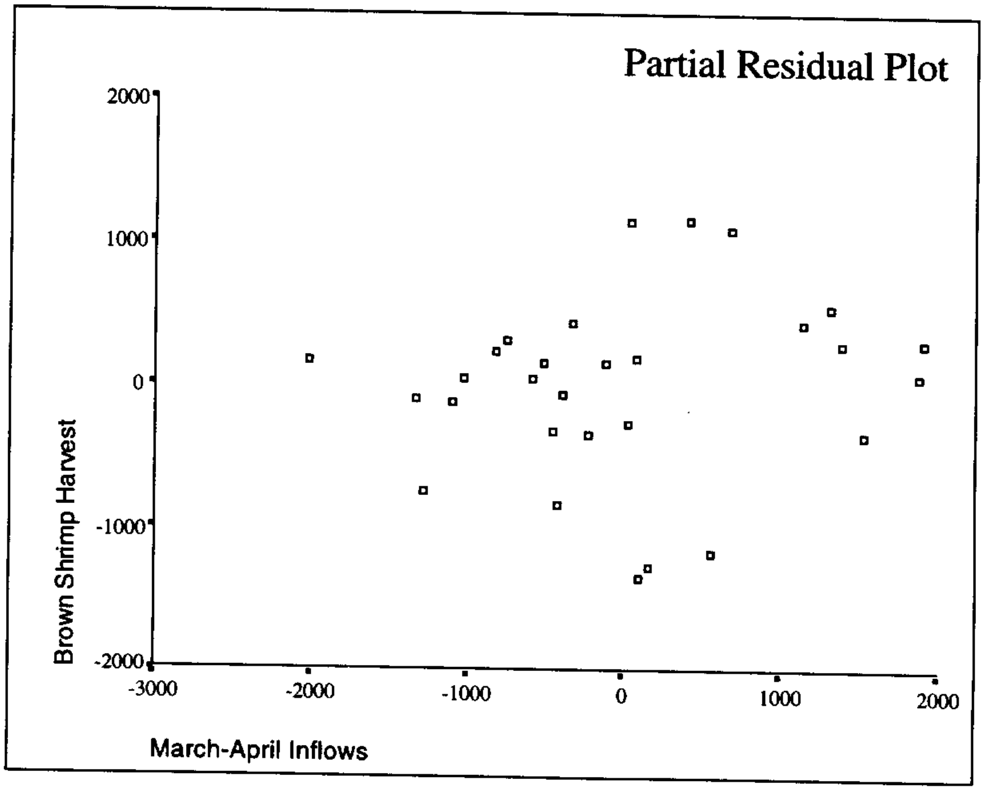
[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{21,0.01} = 2.518$.

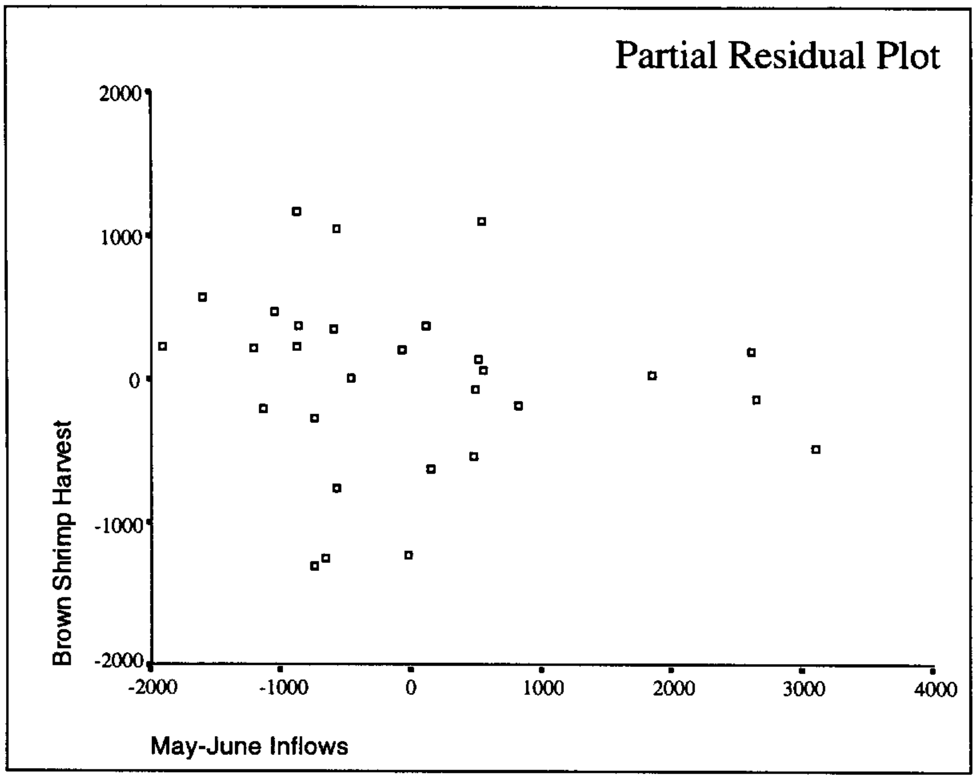
Graphics

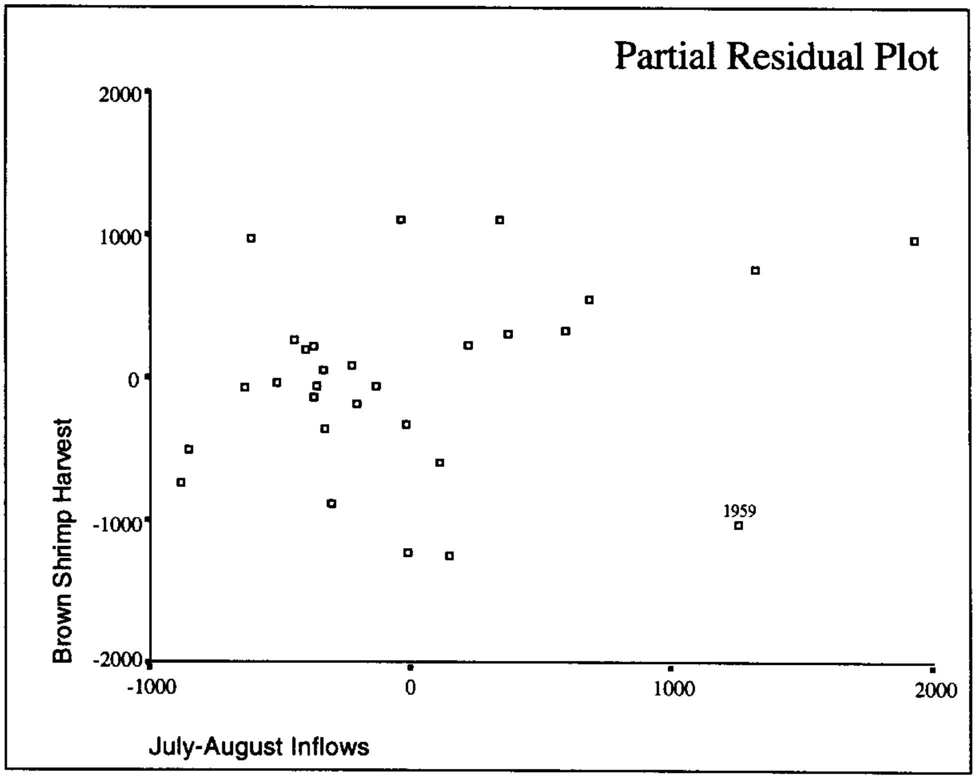

Brown Shrimp Harvest
Regression Standardized Residual
Frequency
8
6
4
2
0
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5

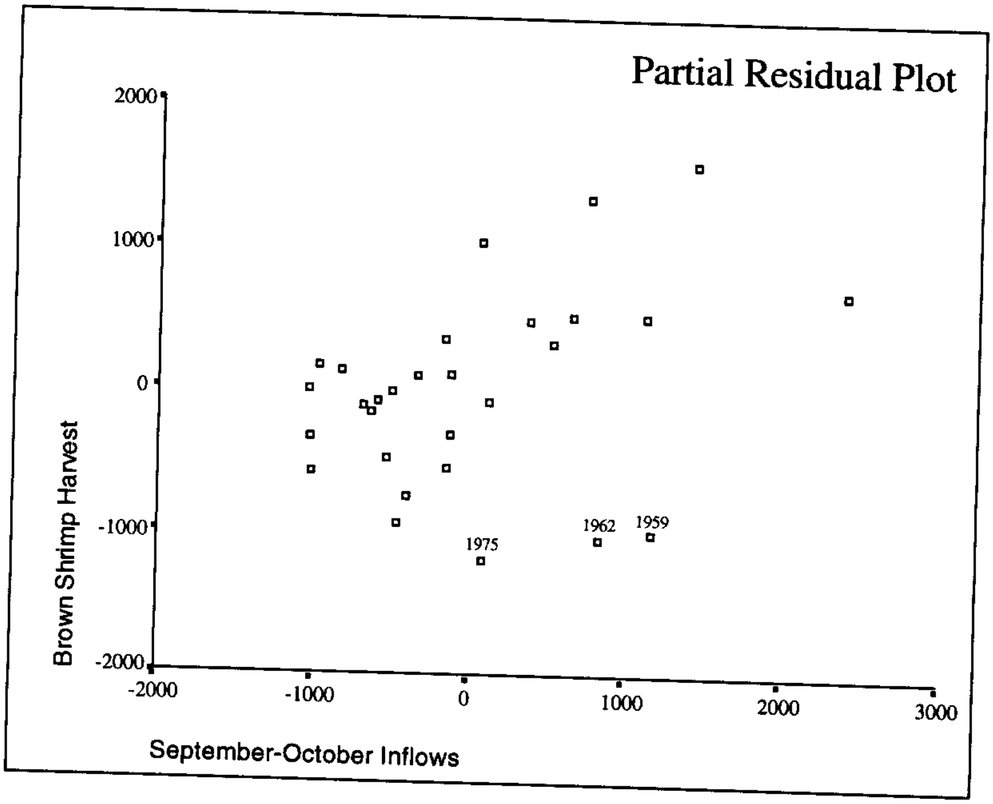

Normal P-P Plot of Residuals
Brown Shrimp Harvest
Expected Cum Prob
1.00
.75
.50
.25
0.00
0.00
.25
.50
.75
1.00
Observed Cum Prob

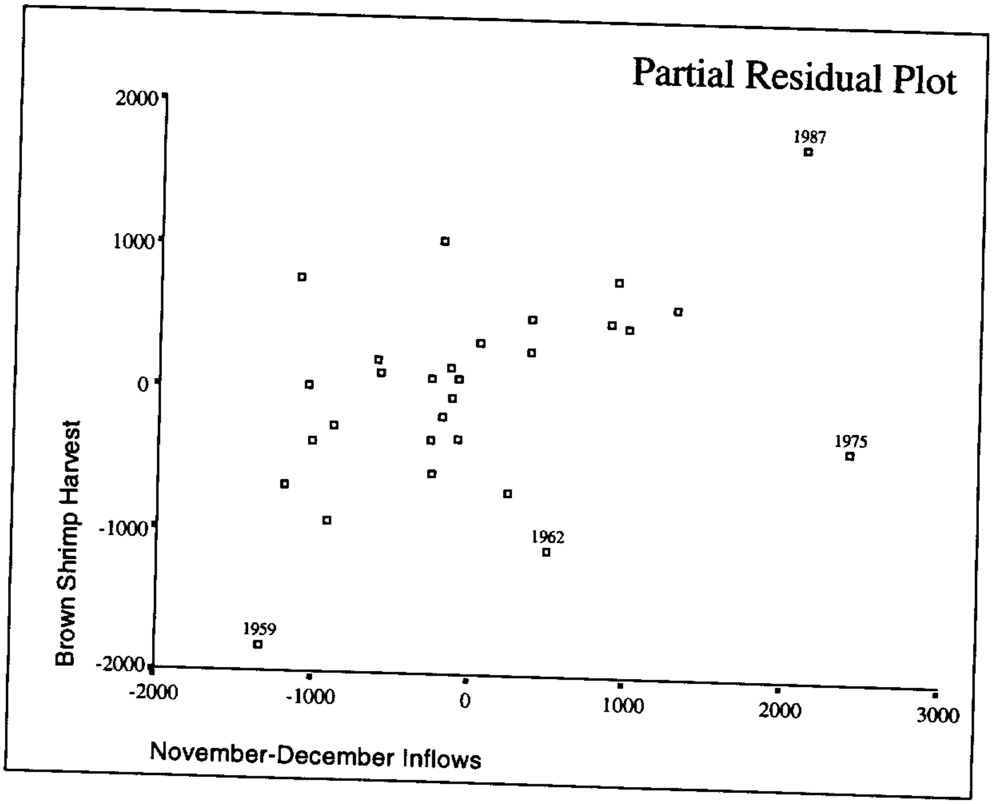

Partial Residual Plot
2000
1000
0
-1000
-2000
Brown Shrimp Harvest
-2000
-1000
0
1000
2000
3000
January-February Inflows

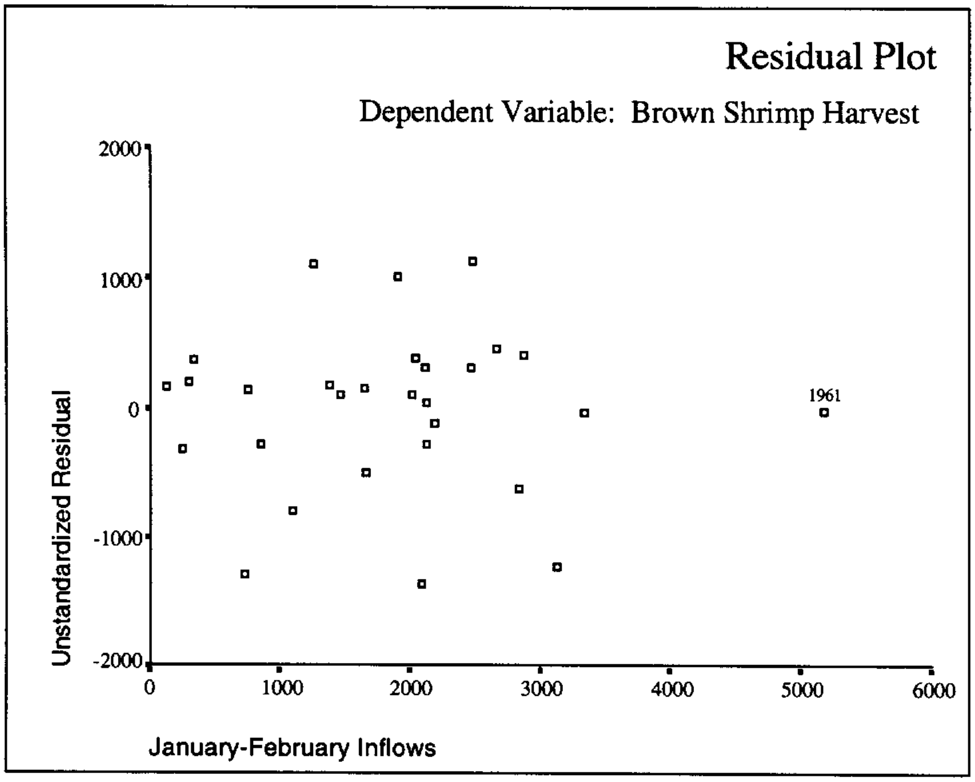

Partial Residual Plot
2000
1000
0
-1000
-2000
Brown Shrimp Harvest
-3000
-2000
-1000
0
1000
2000
March-April Inflows

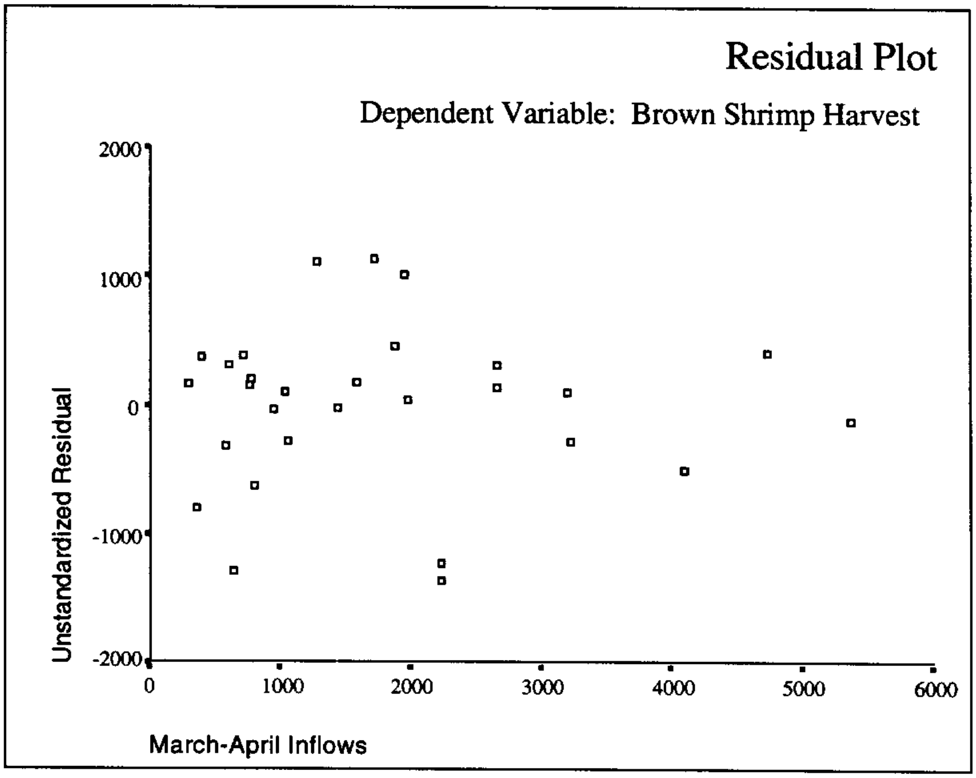

Partial Residual Plot
2000
1000
0
-1000
-2000
Brown Shrimp Harvest
-2000
-1000
0
1000
2000
3000
4000
May-June Inflows

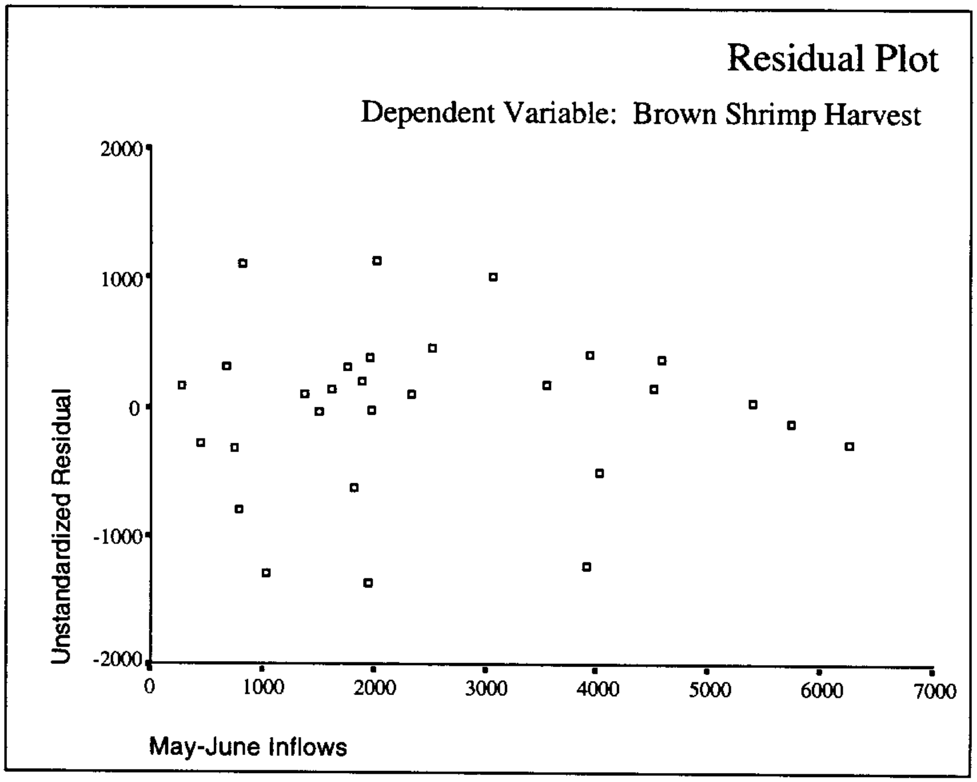

Partial Residual Plot
2000
1000
0
-1000
-2000
Brown Shrimp Harvest
1959
-1000
0
1000
2000
July-August Inflows

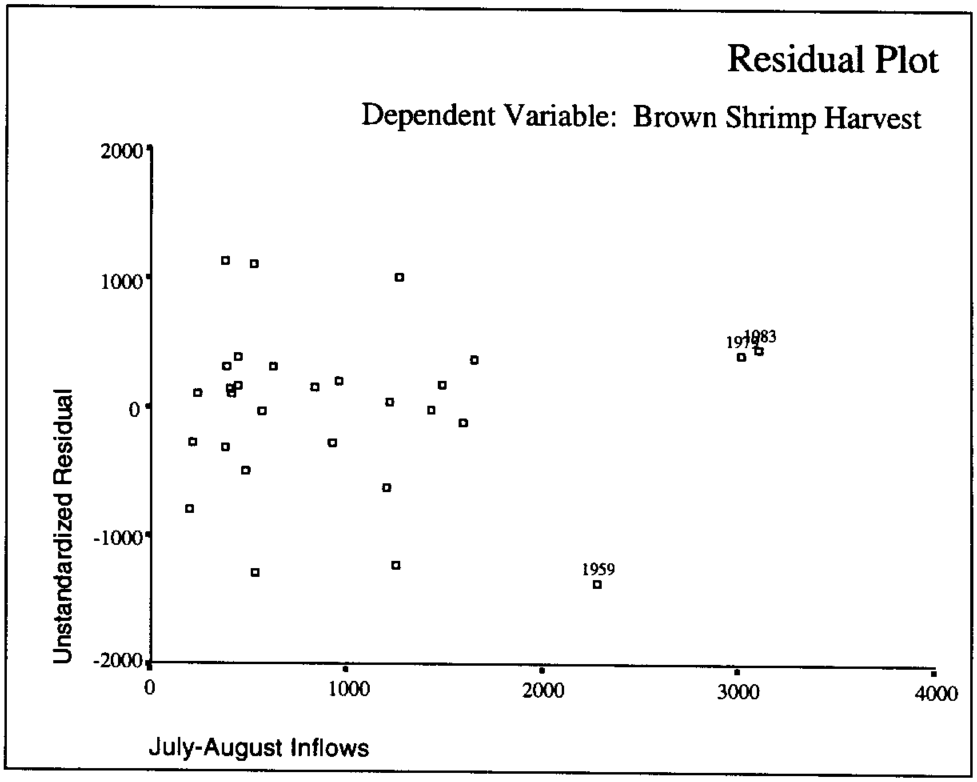

Partial Residual Plot
2000
1000
0
-1000
-2000
Brown Shrimp Harvest
-2000
-1000
0
1000
2000
3000
September-October Inflows
1975
1962
1959

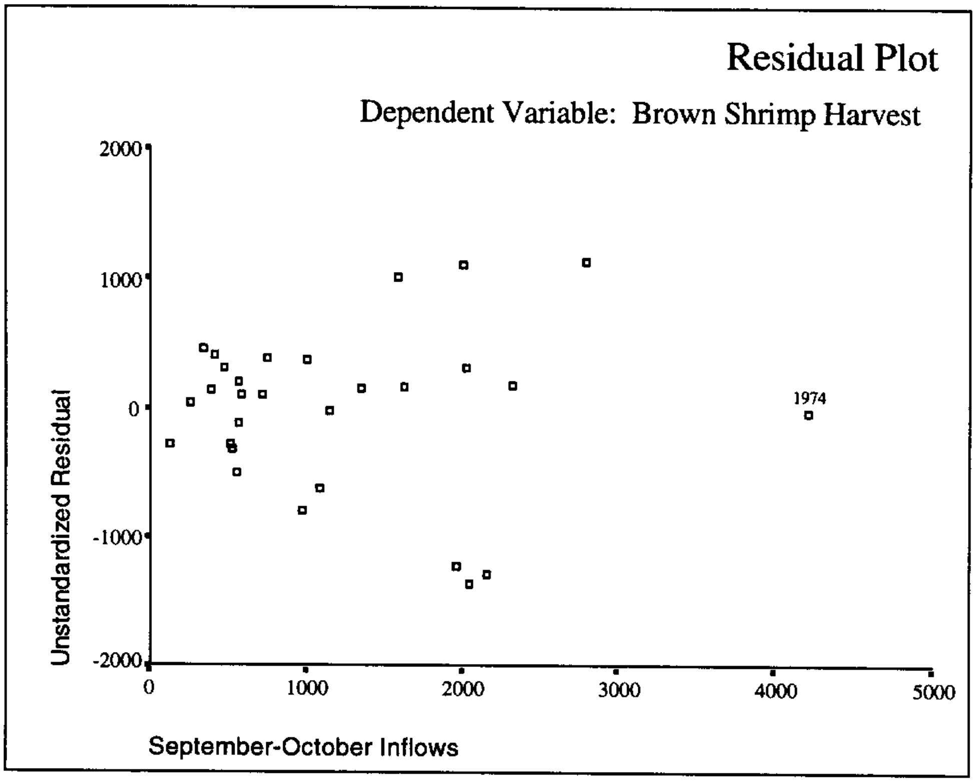

Partial Residual Plot
2000
1000
0
-1000
-2000
Brown Shrimp Harvest
-2000
-1000
0
1000
2000
3000
November-December Inflows
1987
1975
1962
1959

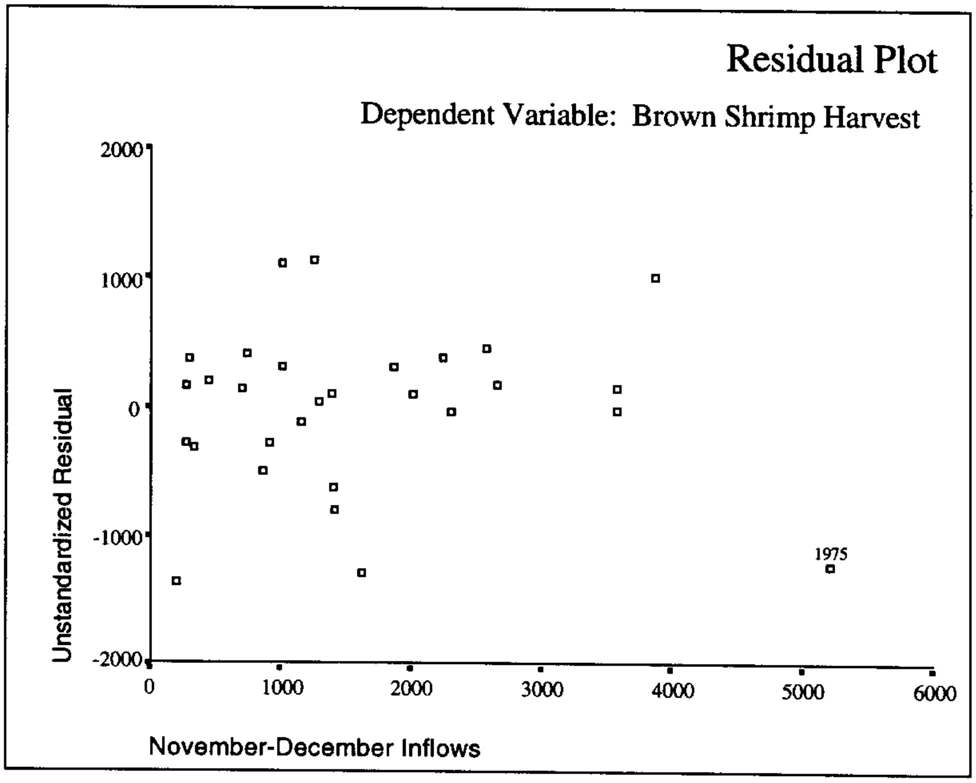

Residual Plot
Dependent Variable: Brown Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
0
1000
2000
3000
4000
5000
6000
1961
January-February Inflows


Residual Plot
Dependent Variable: Brown Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
0
1000
2000
3000
4000
5000
6000
March-April Inflows


Residual Plot
Dependent Variable: Brown Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
0
1000
2000
3000
4000
5000
6000
7000
May-June Inflows


Residual Plot
Dependent Variable: Brown Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
0
1000
2000
3000
4000
1979
1983
1959
July-August Inflows


Residual Plot
Dependent Variable: Brown Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
0
1000
2000
3000
4000
5000
September-October Inflows
1974


Residual Plot
Dependent Variable: Brown Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
0
1000
2000
3000
4000
5000
6000
November-December Inflows
1975

Prediction Intervals for Brown Shrimp Harvest

YEAR	BRSHRIMP	LICI_1	UICI_1
1959	23.30	-922.84926	3665.11121
1960	8.60	-1540.04836	2777.13337
1961	82.90	-2347.90699	2535.82682
1962	868.50	4.02501	4295.07151
1963	600.80	-719.28120	3498.24579
1964	717.10	-1190.08980	3155.61738
1965	1132.20	-1084.26201	3127.68261
1966	681.10	-1600.92137	2874.91662
1967	1148.50	-683.66772	3607.17982
1968	307.80	-1731.74024	2889.09015
1969	475.50	-1252.20142	3192.71039
1970	1556.00	-762.87911	3575.30703
1971	2050.10	-301.66886	4048.97839
1972	1453.00	-1054.03122	3180.09575
1973	955.40	-1237.88639	3374.60499
1974	1422.70	-981.22729	3880.59747
1975	828.40	-297.47927	4381.40208
1976	1798.00	-548.33271	3715.58552
1977	1381.50	-958.21654	3497.39970
1978	883.20	-1613.42426	2745.94383
1979	1315.00	-1475.10636	3274.02167
1980	2314.50	-1047.41019	3375.37197
1981	1991.90	-747.00237	3978.11824
1982	2535.30	152.59266	4551.29855
1983	1940.80	-940.35214	3876.49821
1984	2771.00	-459.79127	3759.41046
1985	1651.00	-805.47930	3457.75106
1986	2047.40	-369.45383	4147.68152
1987	3261.40	14.95655	4468.28313

BRSHRIMP	Brown shrimp harvest
LICI_1	Lower limit for 99% prediction interval for brown shrimp harvest
UICI_1	Upper limit for 99% prediction interval for brown shrimp harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1959	7.70270	.33326	.27510	.3595	.0699
1960	3.50215	.02374	.12508	.8350	.0000
1961	12.58289	.00006	.44939	.0829	.0000
1962	3.11024	.09243	.11108	.8746	.0017
1963	2.02053	.02348	.07216	.9587	.0000
1964	3.93262	.00512	.14045	.7875	.0000
1965	1.93856	.00045	.06923	.9632	.0000
1966	5.93237	.00024	.21187	.5477	.0000
1967	3.10726	.00552	.11097	.8749	.0000
1968	8.22999	.01509	.29393	.3128	.0000
1969	5.45178	.02667	.19471	.6050	.0000
1970	3.81885	.00158	.13639	.8004	.0000
1971	4.00746	.00231	.14312	.7789	.0000
1972	2.26493	.00633	.08089	.9437	.0000
1973	8.09586	.00255	.28914	.3242	.0000
1974	12.21094	.00035	.43611	.0938	.0000
1975	9.17043	.36996	.32752	.2407	.0900
1976	2.70595	.00225	.09664	.9108	.0000
1977	5.61775	.00142	.20063	.5850	.0000
1978	4.13978	.00774	.14785	.7635	.0000
1979	10.32413	.05522	.36872	.1709	.0003
1980	5.10993	.13232	.18250	.6466	.0053
1981	9.92791	.04170	.35457	.1927	.0001
1982	4.73994	.00305	.16928	.6917	.0000
1983	11.45266	.09040	.40902	.1201	.0016
1984	2.04514	.04793	.07304	.9573	.0002
1985	2.69573	.00516	.09628	.9117	.0000
1986	6.57933	.00357	.23498	.4740	.0000
1987	5.58221	.11703	.19936	.5893	.0036

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p + 1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with p + 1 numerator degrees of freedom and n – p – 1 denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFBETA_0	SDFBETA_1	SDFBETA_2
1959	*-1.70777	.19393	-.09294	-.06208
1960	-.40643	-.10419	-.30107	.24651
1961	-.02048	.00188	-.01626	.00613
1962	-.86395	-.28879	.51649	-.07183
1963	-.40908	-.35432	.03917	.09982
1964	-.18573	-.17325	-.00357	-.00310
1965	.05458	.03724	.01077	-.01861
1966	.03991	.00221	.01466	-.02023
1967	-.19307	-.18529	.06521	.02110
1968	-.31912	.03837	-.09770	.04710
1969	-.42831	-.02160	.01357	-.26109
1970	.10272	.05941	-.04196	.06579
1971	.12443	.08184	-.05633	-.00606
1972	.20732	.11487	.05863	-.08651
1973	-.13063	.03853	.01313	-.08190
1974	-.04804	.01716	-.01666	.00518
1975	*-1.76610	.59806	.40619	-.31594
1976	.12303	.09508	-.05539	-.03307
1977	.09754	.02537	-.01385	.07290
1978	.22865	.15717	.12855	-.08347
1979	.61546	-.12368	.03476	.24211
1980	*1.02105	-.18196	.38661	.01694
1981	.53344	.08957	-.09706	-.32585
1982	.14308	-.03502	-.08625	.00498
1983	.79162	.03561	-.07846	-.07465
1984	.60556	.21671	-.14074	.14825
1985	.18669	-.02028	.01978	.11273
1986	.15476	-.00253	-.04111	-.05783
1987	.94372	-.09792	-.53929	.25568

SDFFITS	Standardized dffits value
SDFBETA_0	Standardized dfbeta for the intercept term
SDFBETA_1	Standardized dfbeta for January-February inflows
SDFBETA_2	Standardized dfbeta for March-April inflows

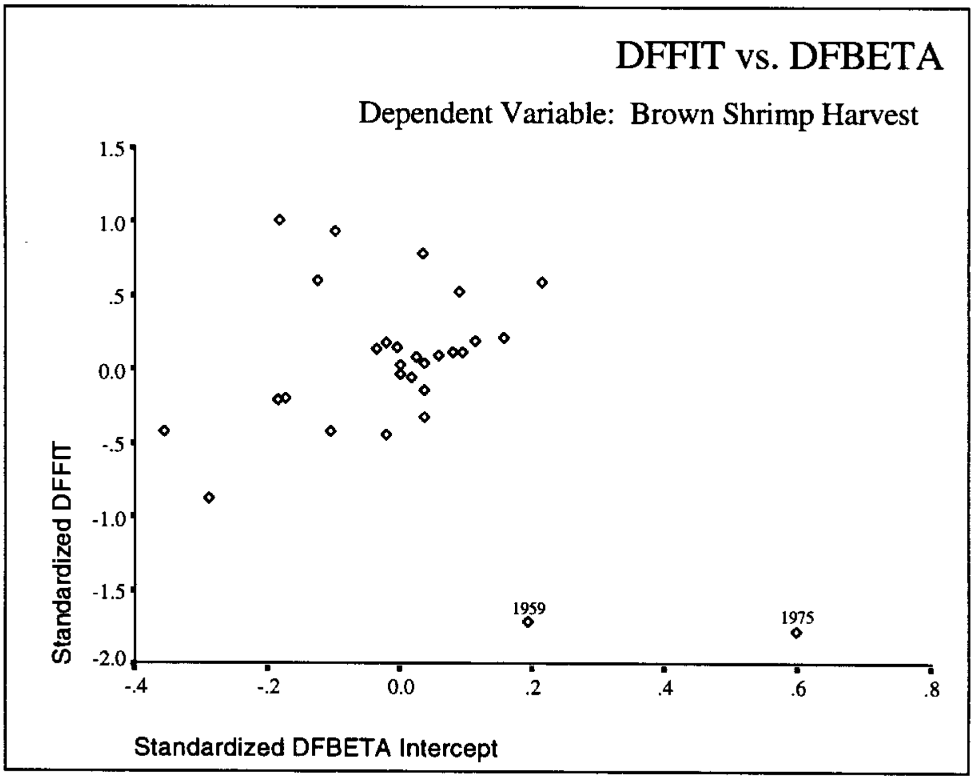
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

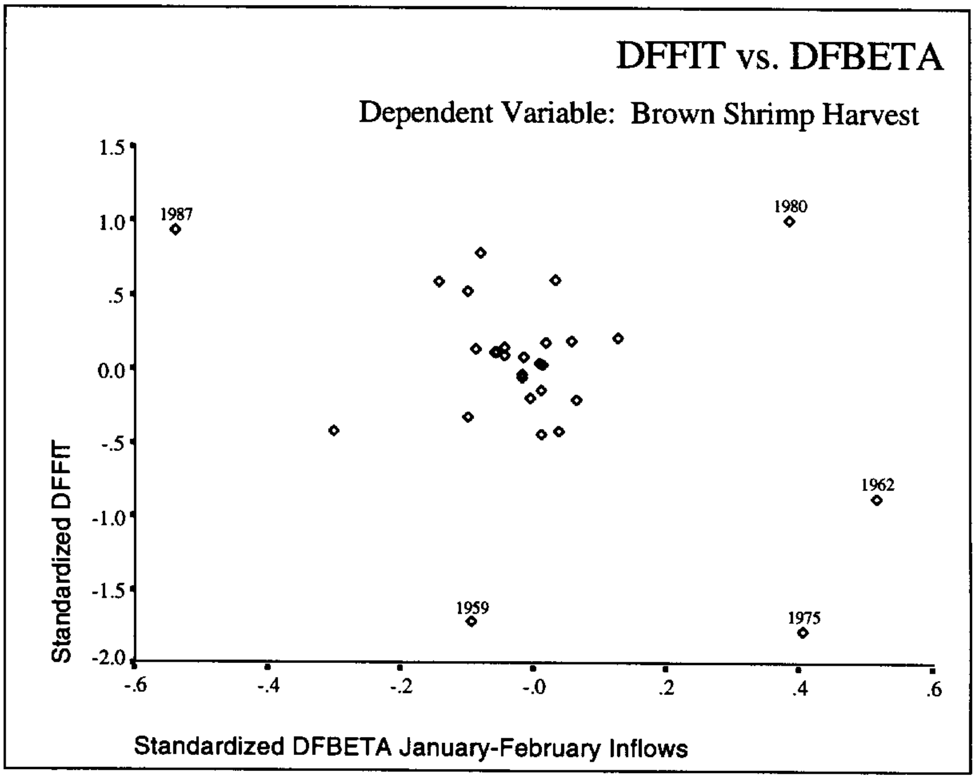
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1959	.34119	*-1.11686	-.81161	.82304
1960	-.02262	-.03335	.09241	.18845
1961	.00203	.00112	.00681	.00072
1962	.22237	-.09762	-.42789	-.23049
1963	.10775	.10902	.12907	-.06282
1964	.07548	.04207	.10117	.02320
1965	.01418	-.03119	-.02625	-.00291
1966	.03216	-.00832	-.01152	-.01427
1967	.05647	.00197	.06030	.00805
1968	-.26020	.13661	.01585	.13359
1969	-.06538	.22694	.02816	.04385
1970	-.04511	-.02376	-.02794	.01895
1971	-.03878	.01928	.03530	-.01534
1972	.01060	-.07814	-.11409	.04608
1973	-.02851	.01347	-.00653	.00871
1974	-.00525	.00753	-.03789	.01433
1975	.00952	.00914	-.06137	*-1.44095
1976	-.00350	.03689	-.02603	-.00950
1977	-.05780	-.02978	-.02686	.04056
1978	-.04804	-.06256	-.12423	-.06370
1979	-.15317	.37131	-.03529	-.11860
1980	.17973	-.38708	.70675	-.48932
1981	.33737	.17008	.07347	-.18097
1982	.02487	.05450	.08000	.05728
1983	-.28644	.66447	-.26065	.22366
1984	-.24422	-.01669	.31407	-.07107
1985	-.06714	-.05574	.07644	.00532
1986	.08314	-.01920	-.00829	.07883
1987	-.16772	.19455	.02515	.83329

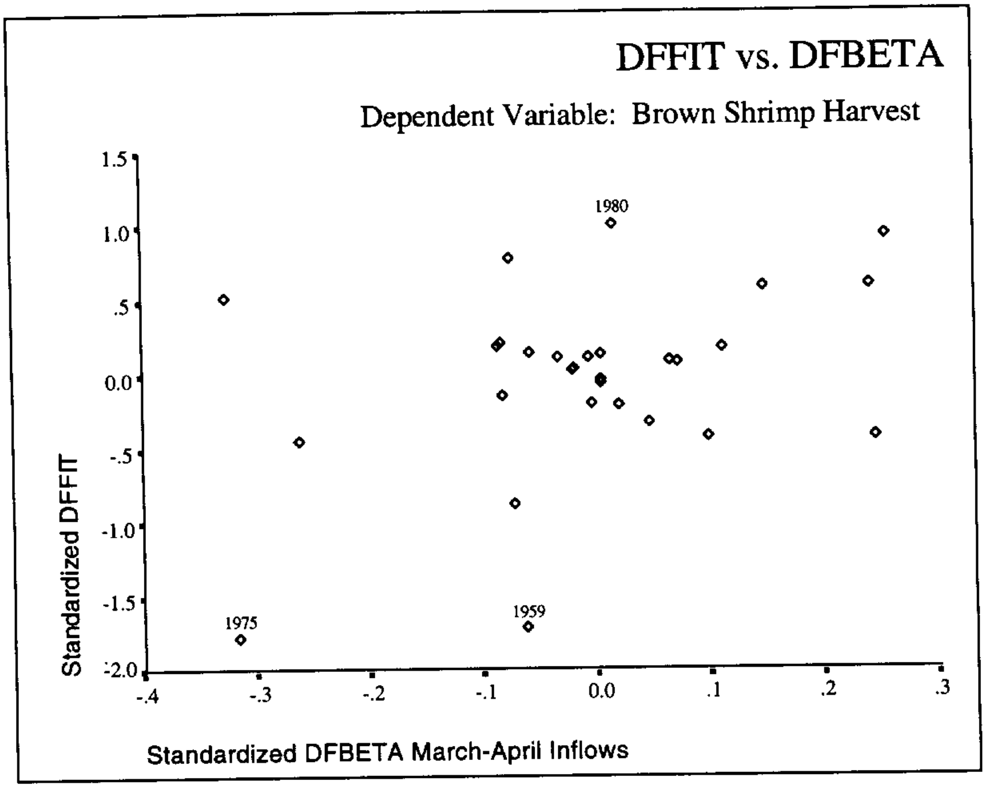
SDFBETA_3	Standardized dfbeta for May-June inflows
SDFBETA_4	Standardized dfbeta for July-August inflows
SDFBETA_5	Standardized dfbeta for September-October inflows
SDFBETA_6	Standardized dfbeta for November-December inflows

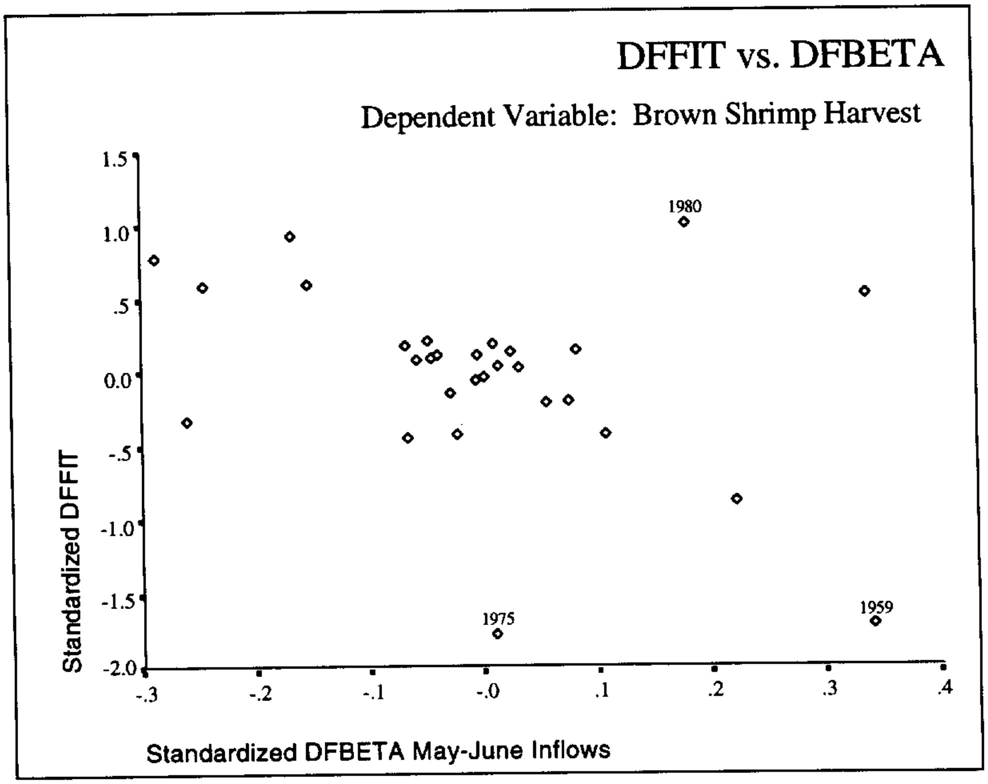
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

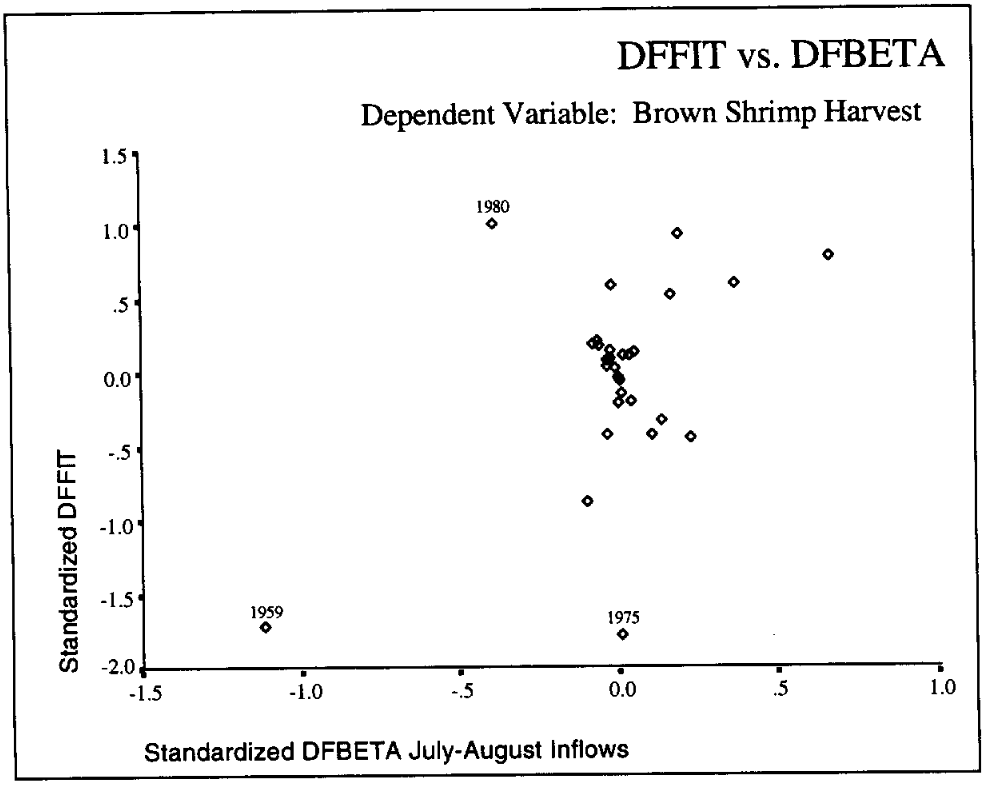
Graphics

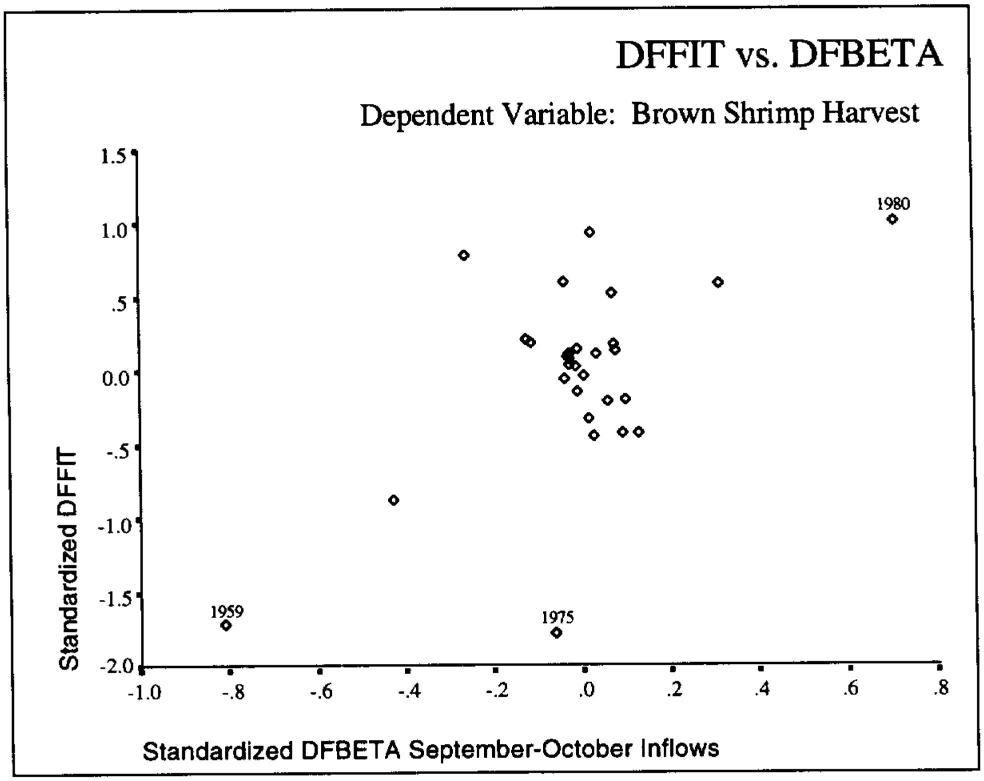

DFFIT vs. DFBETA
Dependent Variable: Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1959
1975
-.4
-.2
0.0
.2
.4
.6
.8
Standardized DFBETA Intercept

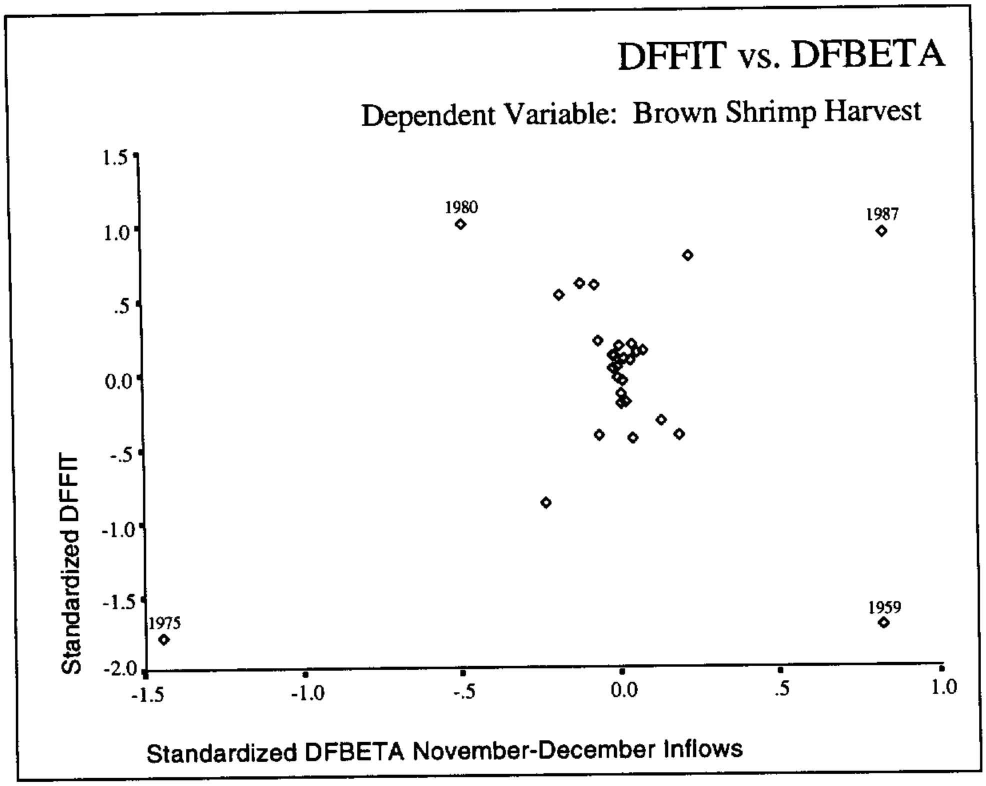

DFFIT vs. DFBETA
Dependent Variable: Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1987
1980
1962
1959
1975
-.6
-.4
-.2
-.0
.2
.4
.6
Standardized DFBETA January-February Inflows


DFFIT vs. DFBETA
Dependent Variable: Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1980
1975
1959
-.4
-.3
-.2
-.1
0.0
.1
.2
.3
Standardized DFBETA March-April Inflows


DFFIT vs. DFBETA
Dependent Variable: Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1980
1975
1959
-.3
-.2
-.1
-.0
.1
.2
.3
.4
Standardized DFBETA May-June Inflows


DFFIT vs. DFBETA
Dependent Variable: Brown Shrimp Harvest
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Standardized DFFIT
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA July-August Inflows
1980
1959
1975


DFFIT vs. DFBETA
Dependent Variable: Brown Shrimp Harvest
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Standardized DFFIT
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
.8
Standardized DFBETA September-October Inflows
1980
1959
1975


DFFIT vs. DFBETA
Dependent Variable: Brown Shrimp Harvest
Standardized DFFIT
Standardized DFBETA November-December Inflows
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1980
1987
1975
1959

Regression—Square Root of Harvest (Box–Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	*November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows*[c,d]	.	*.649*	*.421*	*.263*	*11.630239*	*.780*

a. Dependent Variable: Square Root of Brown Shrimp Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*2164.467*	*6*	*360.744*	*2.667*	*.042*[b]
	Residual	*2975.774*	*22*	*135.262*		
	Total	*5140.241*	*28*			

a. Dependent Variable: Square Root of Brown Shrimp Harvest

b. Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	34.441	5.920		5.818	.000	22.164	46.718
	January-February Inflows	-1.035E-02	.003	-.840	-3.703	.001	-.016	-.005
	March-April Inflows	2.328E-03	.002	.229	1.055	.303	-.002	.007
	May-June Inflows	-9.657E-04	.002	-.119	-.553	.586	-.005	.003
	July-August Inflows	2.508E-03	.003	.144	.747	.463	-.004	.009
	September-October Inflows	4.009E-03	.003	.277	1.533	.140	-.001	.009
	November-December Inflows	5.824E-03	.002	.534	2.476	.021	.001	.011

a. Dependent Variable: Square Root of Brown Shrimp Harvest

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	January-February Inflows	.511	1.957
	March-April Inflows	.557	1.796
	May-June Inflows	.566	1.767
	July-August Inflows	.707	1.414
	September-October Inflows	.807	1.240
	November-December Inflows	.565	1.770

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	January-February Inflows	March-April Inflows
1	1	5.541	1.000	.00	.00	.00
	2	.608	3.019	.00	.00	.07
	3	.266	4.562	.04	.03	.07
	4	.230	4.904	.00	.00	.12
	5	.171	5.698	.01	.26	.23
	6	.106	7.244	.89	.01	.13
	7	7.785E-02	8.437	.05	.69	.38

a. Dependent Variable: Square Root of Brown Shrimp Harvest

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		May-June Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	.00	.01	.01	.01
	2	.03	.05	.20	.05
	3	.00	.02	.33	.35
	4	.06	.80	.03	.05
	5	.42	.01	.01	.02
	6	.05	.03	.43	.02
	7	.43	.09	.00	.50

a. Dependent Variable: Square Root of Brown Shrimp Harvest

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	11.404783	49.052925	33.765244	8.792178	29
Std. Predicted Value	-2.543	1.739	.000	1.000	29
Standard Error of Predicted Value	3.745531	8.090097	5.561849	1.332914	29
Adjusted Predicted Value	13.560889	53.952686	33.625028	9.796531	29
Residual	-26.486700	17.796707	3.92024E-15	10.309105	29
Std. Residual	-2.277	1.530	.000	.886	29
Stud. Residual	-2.741	1.729	.004	1.031	29
Deleted Residual	-38.363117	22.728296	.140216	14.083108	29
Stud. Deleted Residual	-3.300	1.818	-.020	1.106	29
Mahal. Distance	1.939	12.583	5.793	3.236	29
Cook's Distance	.001	.481	.056	.101	29
Centered Leverage Value	.069	.449	.207	.116	29

a. Dependent Variable: Square Root of Brown Shrimp Harvest

Case Values for Residuals Diagnostics

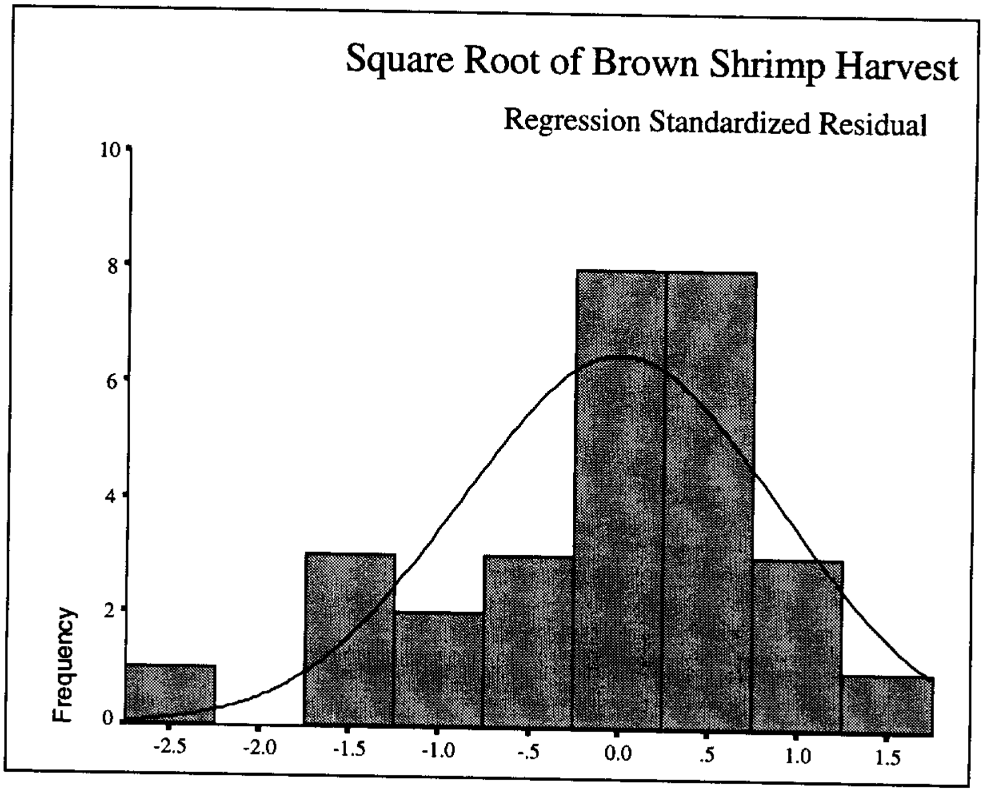
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1959	31.31371	-26.48670	-38.36312	43.19012	-.27883	-2.27740	-2.74083	*-3.29982
1960	20.78512	-17.85254	-21.24189	24.17446	-1.47633	-1.53501	-1.67440	-1.75129
1961	11.40478	-2.29984	-4.45595	13.56089	-2.54322	-.19775	-.27525	-.26939
1962	46.86934	-17.39902	-20.36313	49.83345	1.49043	-1.49602	-1.61844	-1.68470
1963	35.78469	-11.27347	-12.61925	37.13047	.22969	-.96932	-1.02555	-1.02682
1964	30.32554	-3.54682	-4.29883	31.07755	-.39122	-.30497	-.33574	-.32887
1965	30.54047	3.10771	3.46733	30.18084	-.36678	.26721	.28225	.27626
1966	23.43665	2.66124	3.53115	22.56674	-1.17475	.22882	.26358	.25793
1967	37.45778	-3.56825	-4.17562	38.06515	.41998	-.30681	-.33189	-.32508
1968	23.65713	-6.11290	-9.10214	26.64637	-1.14967	-.52560	-.64137	-.63256
1969	31.38095	-9.57499	-12.42197	34.22793	-.27118	-.82328	-.93773	-.93504
1970	37.99895	1.44721	1.74546	37.70070	.48153	.12444	.13666	.13357
1971	42.78393	2.49410	3.03273	42.24530	1.02576	.21445	.23647	.23133
1972	30.29671	7.82152	8.84161	29.27663	-.39450	.67252	.71503	.70685
1973	31.81112	-.90157	-1.33294	32.24248	-.22226	-.07752	-.09426	-.09211
1974	32.40037	5.31833	10.04572	27.67297	-.15524	.45728	.62848	.61961
1975	44.84093	-16.05899	-25.17075	53.95269	1.25972	-1.38080	-1.72870	-1.81685
1976	38.61798	3.78485	4.35603	38.04680	.55194	.32543	.34913	.34205
1977	35.37200	1.79654	2.34877	34.81977	.18275	.15447	.17662	.17269
1978	22.06747	7.65121	9.35735	20.36133	-1.33047	.65787	.72753	.71951
1979	25.53312	10.72981	17.97896	18.28397	-.93630	.92258	1.19423	1.20654
1980	30.31254	17.79671	22.72830	25.38096	-.39270	1.53021	1.72928	1.81756
1981	37.43063	7.20008	11.78507	32.84564	.41689	.61908	.79204	.78510
1982	49.05292	1.29884	1.63123	48.72053	1.73878	.11168	.12515	.12232
1983	33.03898	11.01553	19.79454	24.25998	-.08260	.94715	1.26966	1.28857
1984	38.90819	13.73210	15.38651	37.25378	.58495	1.18072	1.24983	1.26690
1985	34.02352	6.60898	7.60316	33.02934	.02938	.56826	.60950	.60058
1986	43.21988	2.02833	2.77647	42.47173	1.07535	.17440	.20405	.19954
1987	48.52666	8.58201	11.20144	45.90723	1.67893	.73790	.84303	.83728

PRE_1	Predicted value of harvest
RES_1	Ordinary residual; observed harvest minus predicted harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{21,0.01} = 2.518$.

Graphics


Square Root of Brown Shrimp Harvest
Regression Standardized Residual
Frequency
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6
4
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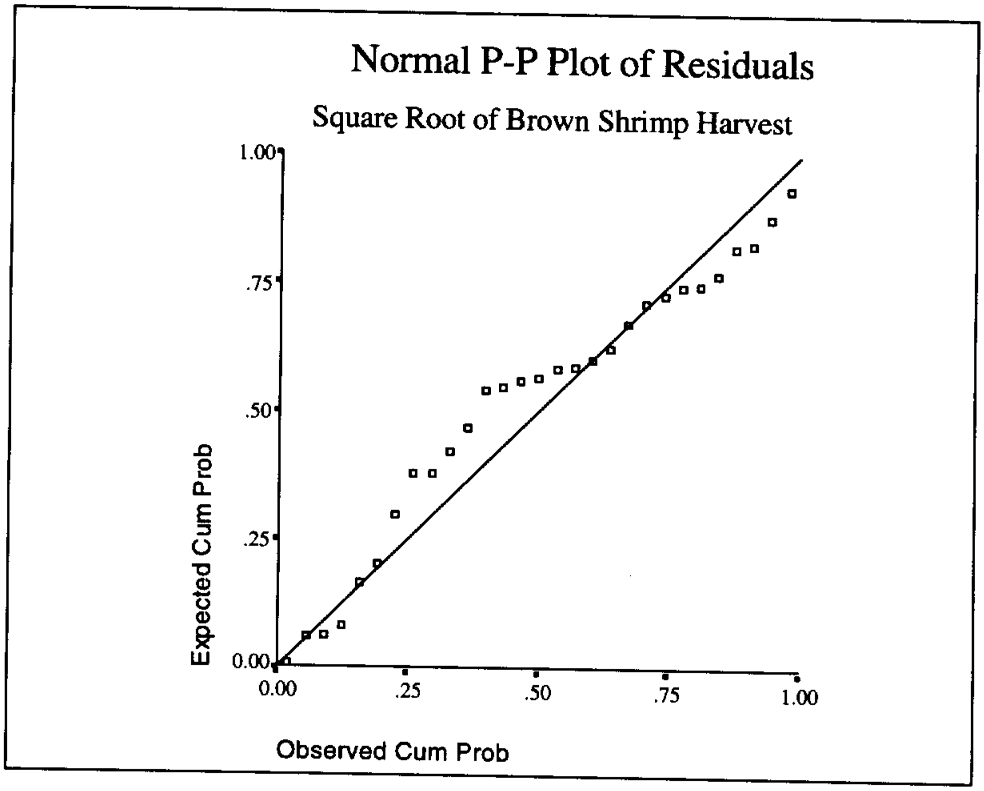
-1.0
-.5
0.0
.5
1.0
1.5


Normal P-P Plot of Residuals
Square Root of Brown Shrimp Harvest
Expected Cum Prob
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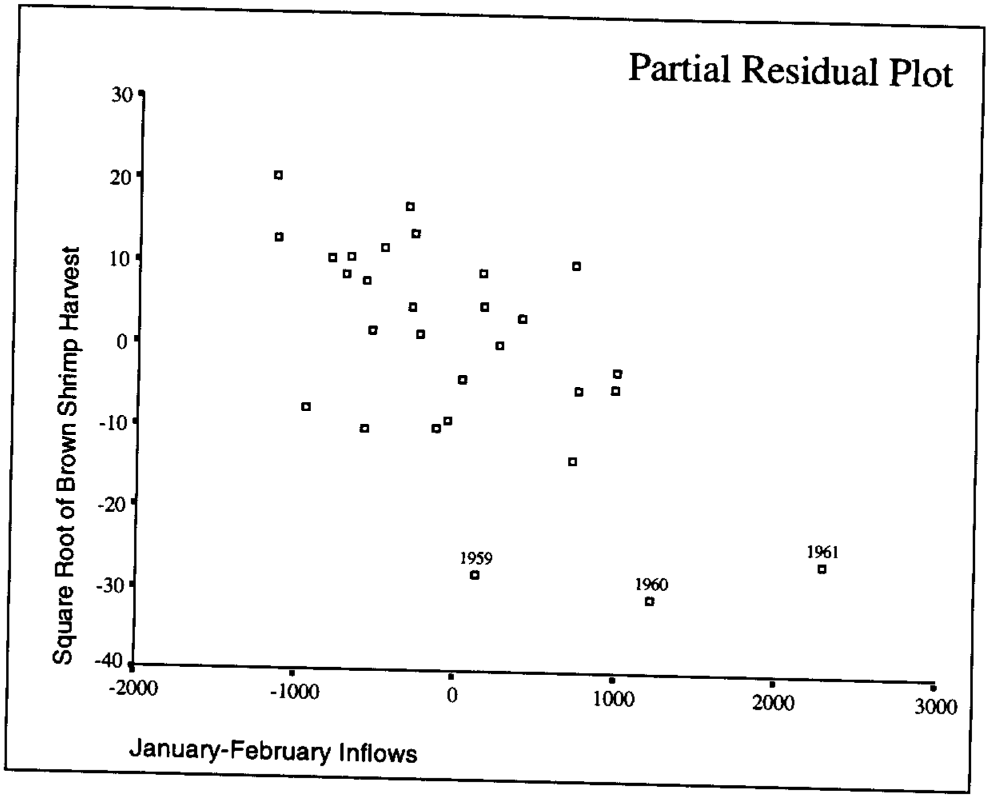
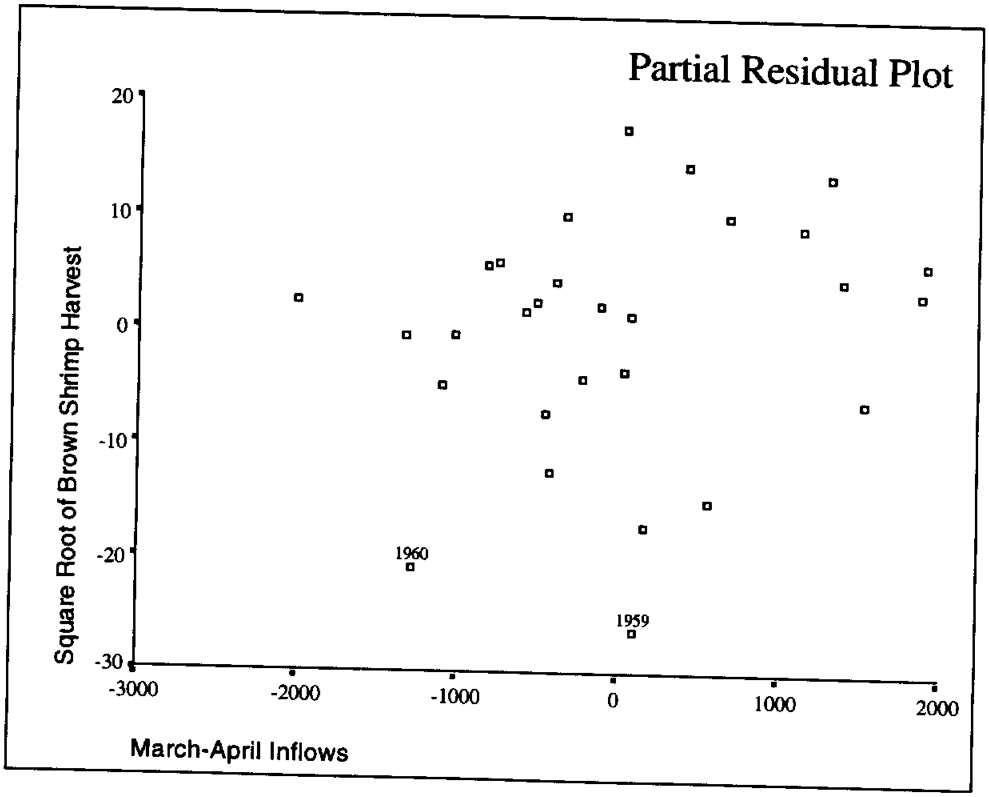
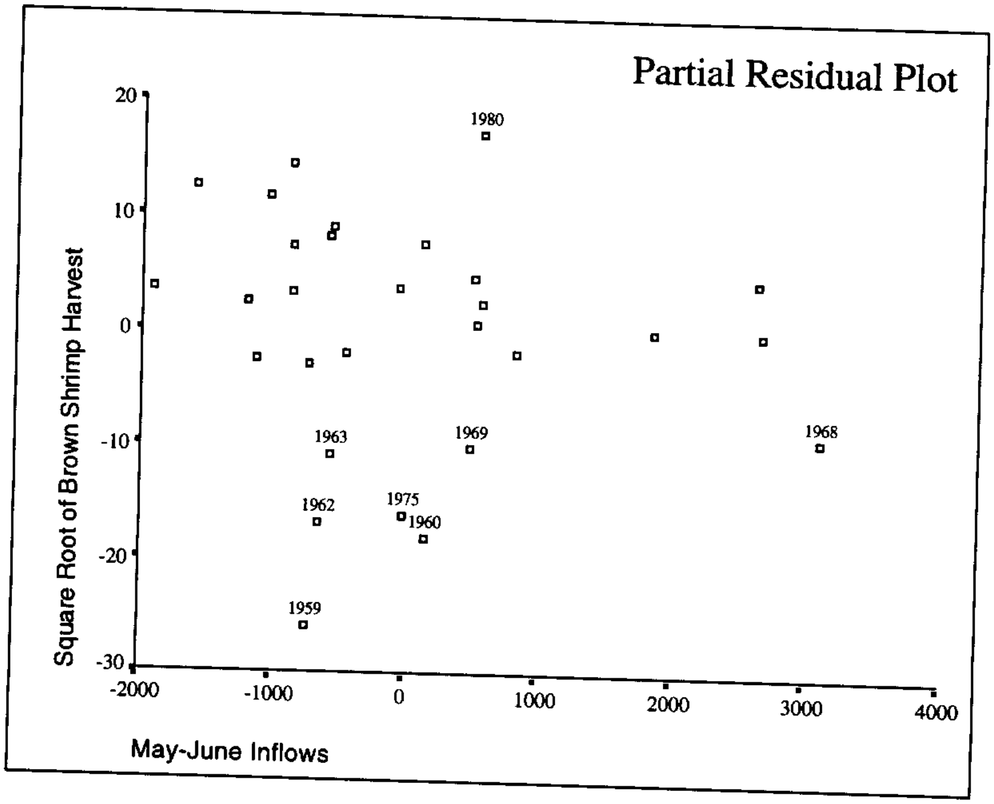
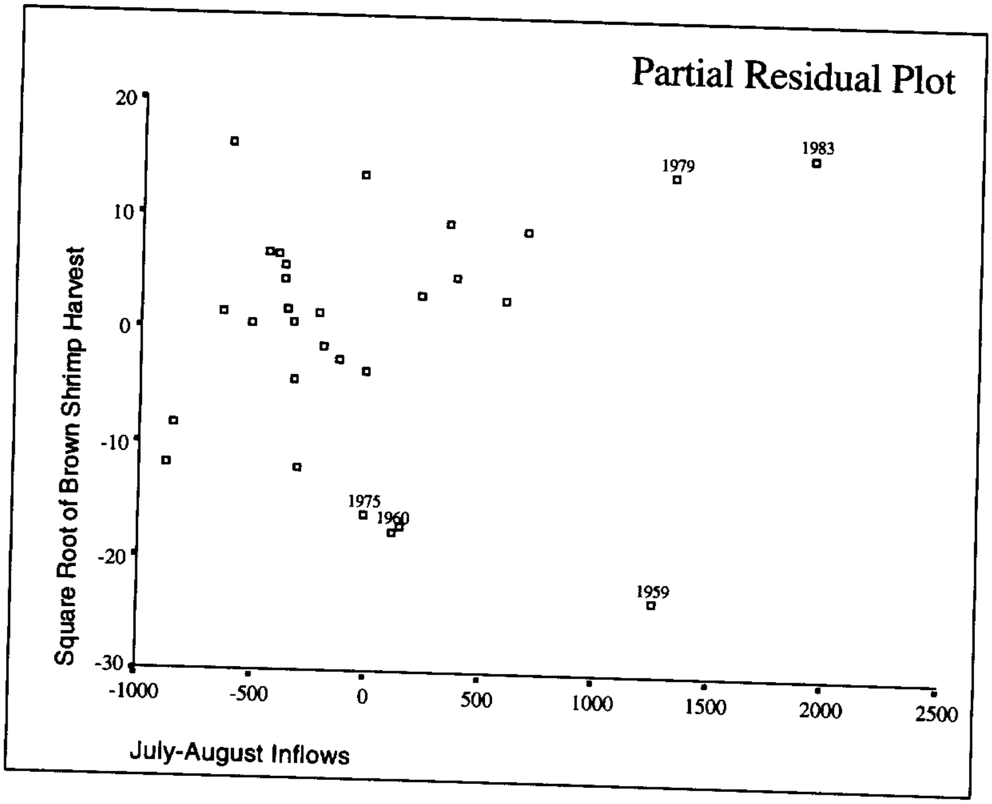
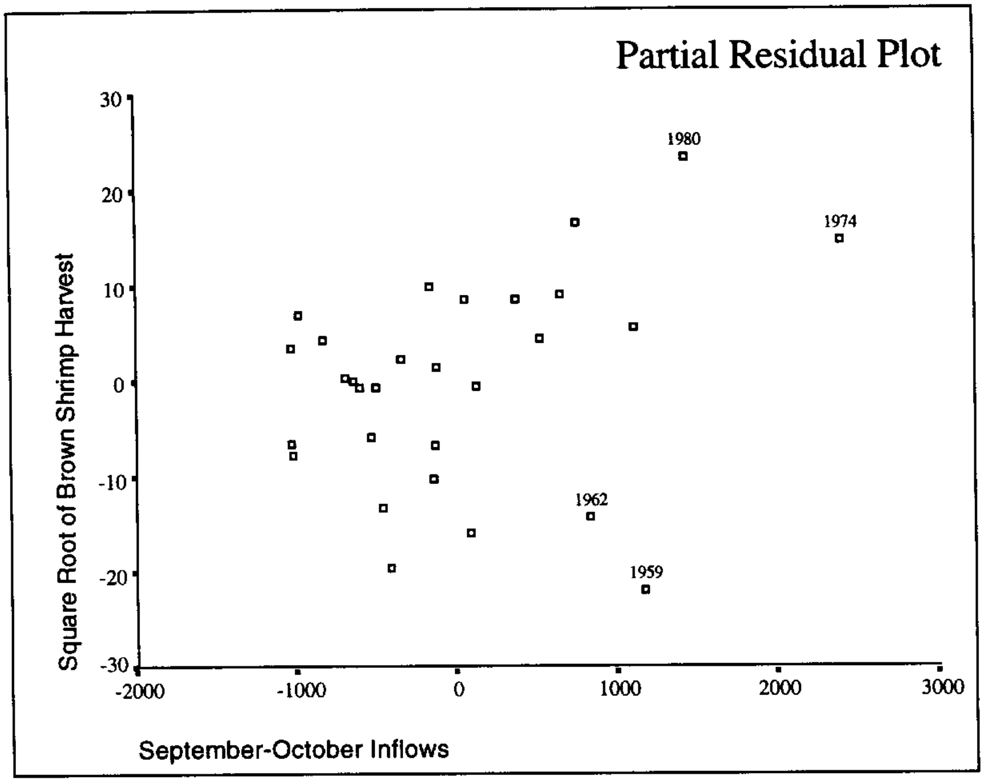
.50
.25
0.00
0.00
.25
.50
.75
1.00
Observed Cum Prob

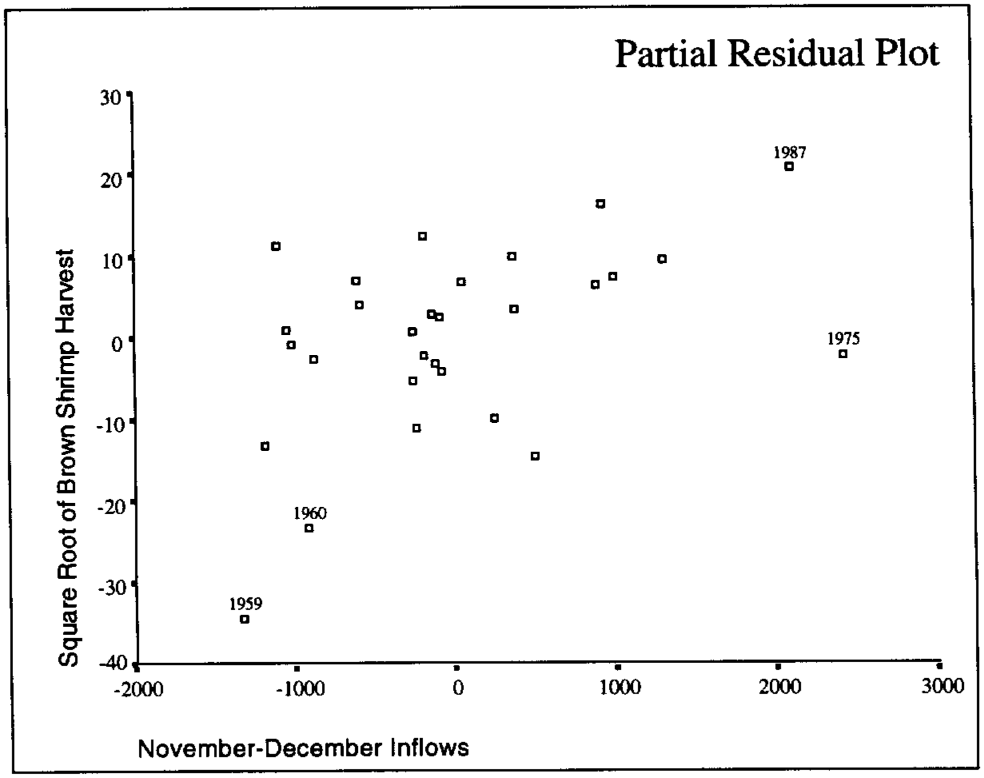

Partial Residual Plot
Square Root of Brown Shrimp Harvest
30
20
10
0
-10
-20
-30
-40
-2000
-1000
0
1000
2000
3000
January-February Inflows
1959
1960
1961

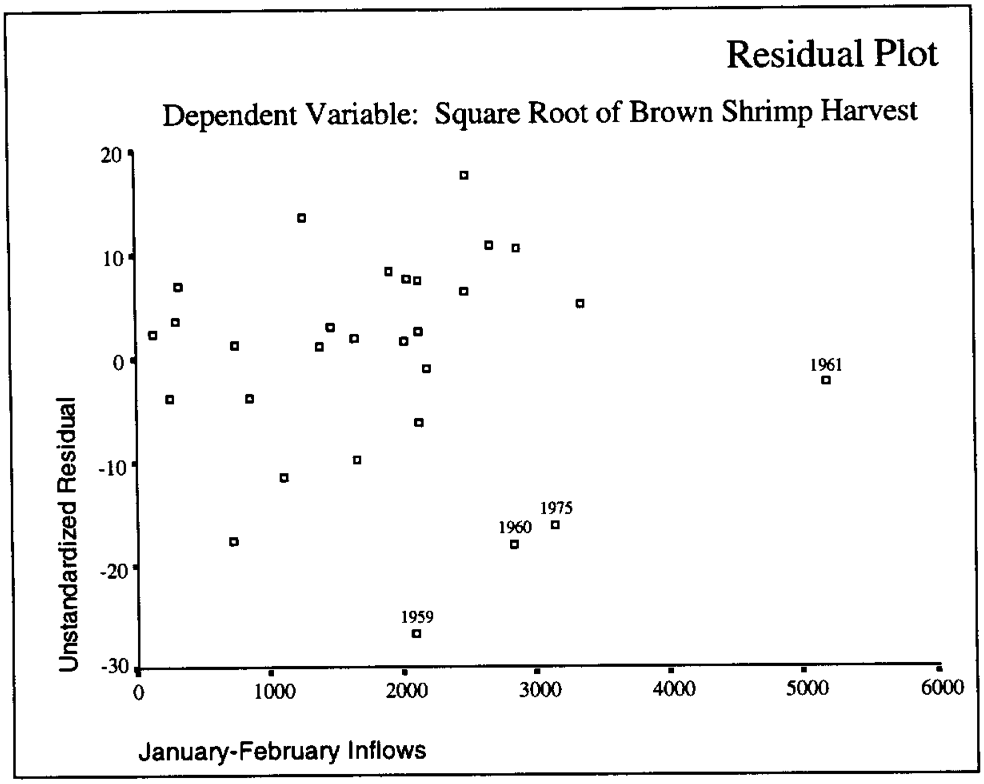

Partial Residual Plot
Square Root of Brown Shrimp Harvest
20
10
0
-10
-20
-30
-3000
-2000
-1000
0
1000
2000
March-April Inflows
1960
1959

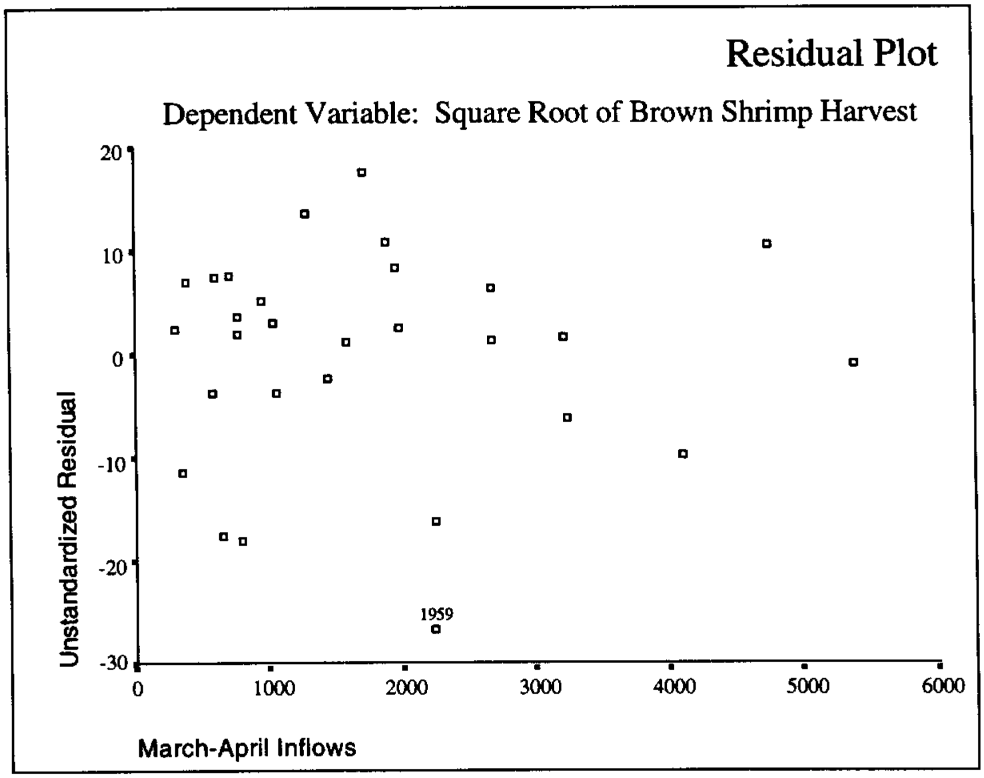

Partial Residual Plot
Square Root of Brown Shrimp Harvest
20
10
0
-10
-20
-30
-2000
-1000
0
1000
2000
3000
4000
May-June Inflows
1980
1963
1969
1968
1962
1975
1960
1959

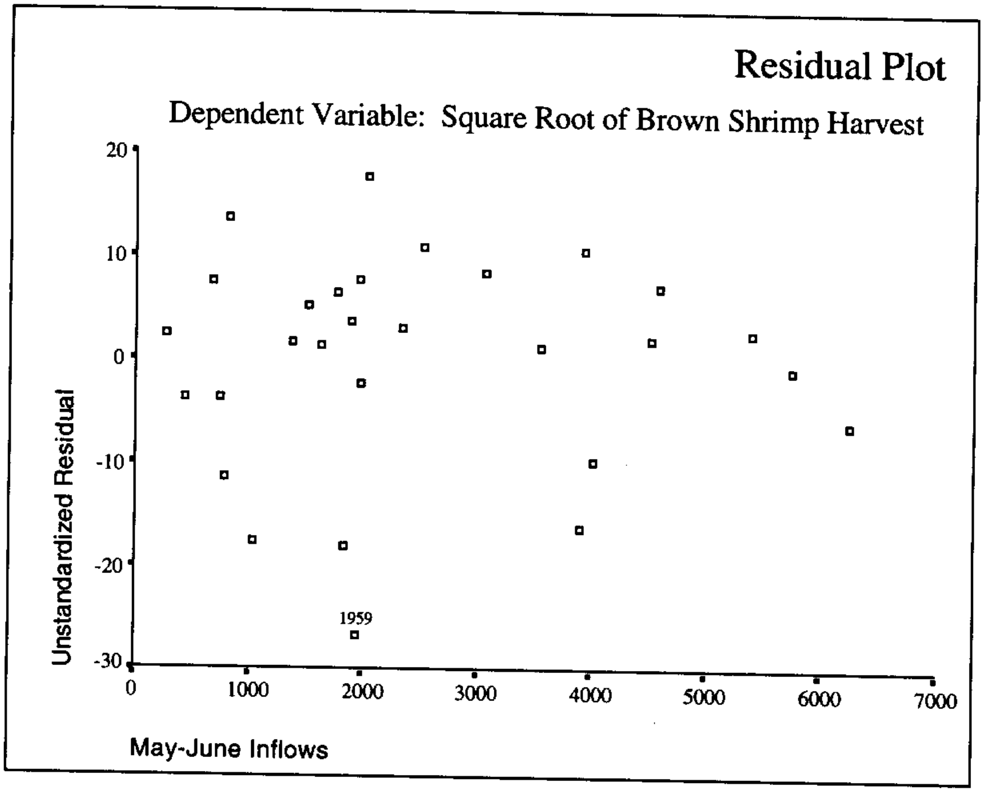

Partial Residual Plot
Square Root of Brown Shrimp Harvest
20
10
0
-10
-20
-30
-1000
-500
0
500
1000
1500
2000
2500
July-August Inflows
1983
1979
1975
1960
1959

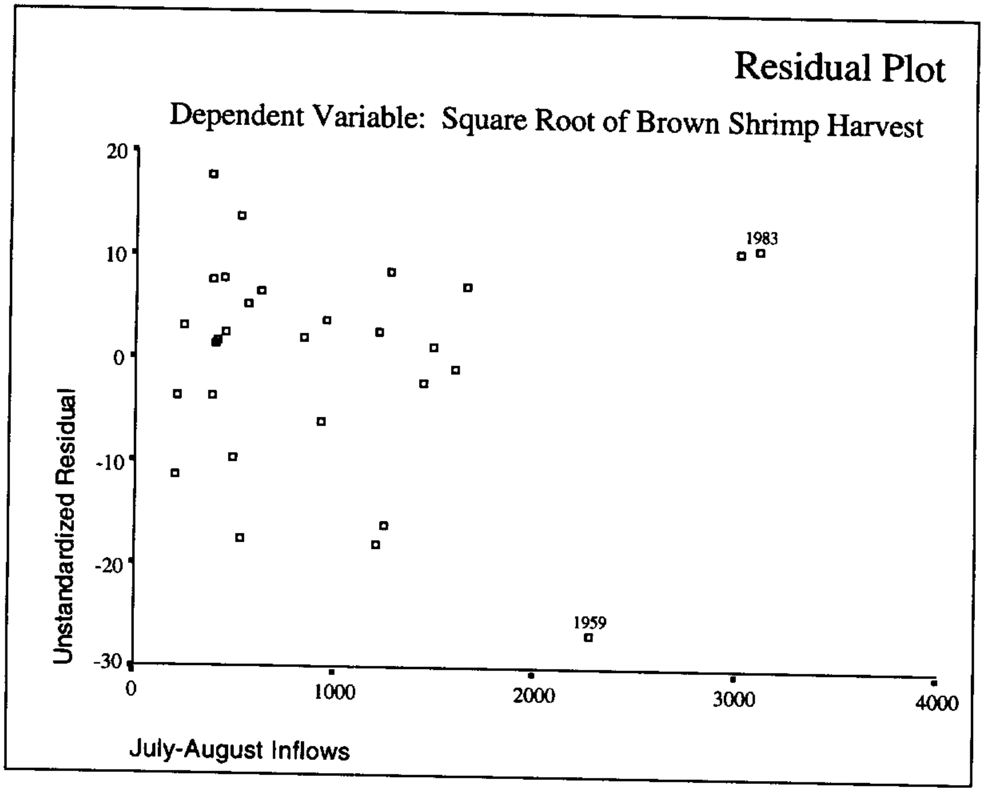

Partial Residual Plot
Square Root of Brown Shrimp Harvest
30
20
10
0
-10
-20
-30
-2000
-1000
0
1000
2000
3000
September-October Inflows
1980
1974
1962
1959

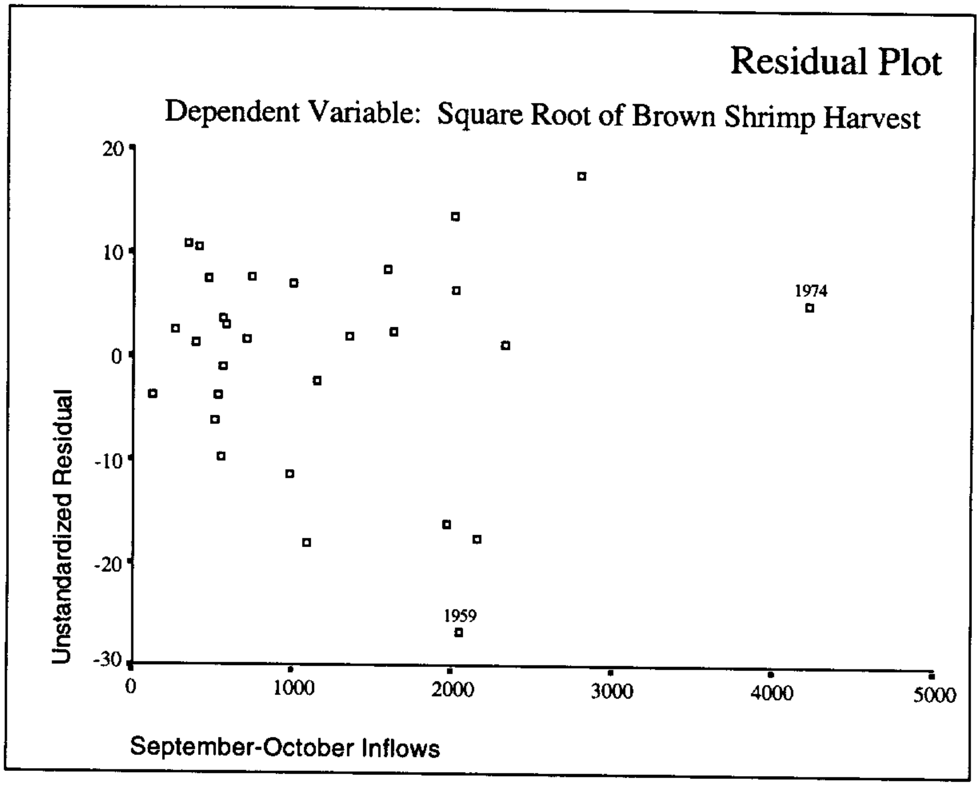

Partial Residual Plot
Square Root of Brown Shrimp Harvest
30
20
10
0
-10
-20
-30
-40
-2000
-1000
0
1000
2000
3000
November-December Inflows
1987
1975
1960
1959

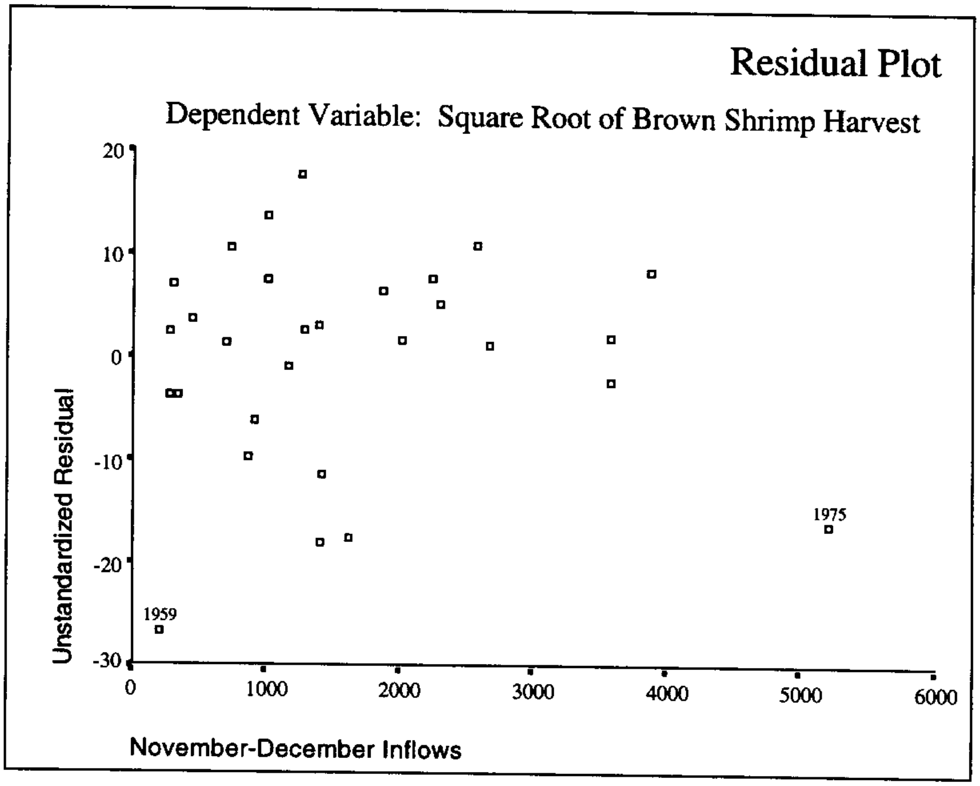

Residual Plot
Dependent Variable: Square Root of Brown Shrimp Harvest
Unstandardized Residual
20
10
0
-10
-20
-30
0
1000
2000
3000
4000
5000
6000
January-February Inflows
1961
1975
1960
1959


Residual Plot
Dependent Variable: Square Root of Brown Shrimp Harvest
Unstandardized Residual
20
10
0
-10
-20
-30
0
1000
2000
3000
4000
5000
6000
March-April Inflows
1959


Residual Plot
Dependent Variable: Square Root of Brown Shrimp Harvest
Unstandardized Residual
20
10
0
-10
-20
-30
1959
0
1000
2000
3000
4000
5000
6000
7000
May-June Inflows


Residual Plot
Dependent Variable: Square Root of Brown Shrimp Harvest
Unstandardized Residual
20
10
0
-10
-20
-30
1983
1959
0
1000
2000
3000
4000
July-August Inflows


Residual Plot
Dependent Variable: Square Root of Brown Shrimp Harvest
Unstandardized Residual
20
10
0
-10
-20
-30
1974
1959
0
1000
2000
3000
4000
5000
September-October Inflows


Residual Plot
Dependent Variable: Square Root of Brown Shrimp Harvest
Unstandardized Residual
20
10
0
-10
-20
-30
1975
1959
0
1000
2000
3000
4000
5000
6000
November-December Inflows

Prediction Intervals for the Square Root of Brown Shrimp Harvest

YEAR	SQRTBRSH	LICI_1	UICI_1
1959	4.8270	-6.20190	68.82932
1960	2.9326	-14.51634	56.08658
1961	9.1049	-28.52936	51.33892
1962	29.4703	11.78159	81.95709
1963	24.5112	1.29811	70.27128
1964	26.7787	-5.20917	65.86026
1965	33.6482	-3.90047	64.98141
1966	26.0979	-13.16214	60.03544
1967	33.8895	2.37165	72.54391
1968	17.5442	-14.12726	61.44151
1969	21.8060	-4.96495	67.72686
1970	39.4462	2.52574	73.47216
1971	45.2780	7.20883	78.35904
1972	38.1182	-4.32561	64.91904
1973	30.9095	-5.90508	69.52732
1974	37.7187	-7.35462	72.15536
1975	28.7819	6.58186	83.09999
1976	42.4028	3.75205	73.48391
1977	37.1685	-1.06143	71.80543
1978	29.7187	-13.57894	57.71389
1979	36.2629	-13.30035	64.36659
1980	48.1093	-5.85241	66.47750
1981	44.6307	-1.20653	76.06780
1982	50.3518	13.08484	85.02100
1983	44.0545	-6.34826	72.42621
1984	52.6403	4.40791	73.40847
1985	40.6325	-.83678	68.88382
1986	45.2482	6.28340	80.15635
1987	57.1087	12.11194	84.94137

SQRTBRSH	Square root of brown shrimp harvest
LICI_1	Lower limit for 99% prediction interval for the square root of brown shrimp harvest
UICI_1	Upper limit for 99% prediction interval for the square root of brown shrimp harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1959	7.70270	.48120	.27510	.3595	.1621
1960	3.50215	.07604	.12508	.8350	.0009
1961	12.58289	.01015	.44939	.0829	.0000
1962	3.11024	.06375	.11108	.8746	.0005
1963	2.02053	.01794	.07216	.9587	.0000
1964	3.93262	.00341	.14045	.7875	.0000
1965	1.93856	.00132	.06923	.9632	.0000
1966	5.93237	.00324	.21187	.5477	.0000
1967	3.10726	.00268	.11097	.8749	.0000
1968	8.22999	.02874	.29393	.3128	.0000
1969	5.45178	.03735	.19471	.6050	.0001
1970	3.81885	.00055	.13639	.8004	.0000
1971	4.00746	.00173	.14312	.7789	.0000
1972	2.26493	.00953	.08089	.9437	.0000
1973	8.09586	.00061	.28914	.3242	.0000
1974	12.21094	.05016	.43611	.0938	.0002
1975	9.17043	.24223	.32752	.2407	.0305
1976	2.70595	.00263	.09664	.9108	.0000
1977	5.61775	.00137	.20063	.5850	.0000
1978	4.13978	.01686	.14785	.7635	.0000
1979	10.32413	.13765	.36872	.1709	.0060
1980	5.10993	.11838	.18250	.6466	.0038
1981	9.92791	.05707	.35457	.1927	.0004
1982	4.73994	.00057	.16928	.6917	.0000
1983	11.45266	.18353	.40902	.1201	.0140
1984	2.04514	.02688	.07304	.9573	.0000
1985	2.69573	.00798	.09628	.9117	.0000
1986	6.57933	.00219	.23498	.4740	.0000
1987	5.58221	.03099	.19936	.5893	.0000

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p + 1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with p + 1 numerator degrees of freedom and n – p – 1 denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1959	*-2.20963	.25092	-.12026	-.08032
1960	-.76307	-.19562	-.56525	.46282
1961	-.26083	.02396	-.20713	.07807
1962	-.69535	-.23244	.41570	-.05781
1963	-.35477	-.30728	.03397	.08657
1964	-.15143	-.14125	-.00291	-.00253
1965	.09398	.06413	.01854	-.03204
1966	.14747	.00815	.05419	-.07475
1967	-.13412	-.12871	.04530	.01465
1968	-.44234	.05319	-.13543	.06529
1969	-.50986	-.02571	.01615	-.31081
1970	.06064	.03507	-.02477	.03883
1971	.10750	.07070	-.04867	-.00523
1972	.25527	.14144	.07219	-.10653
1973	-.06371	.01879	.00641	-.03995
1974	.58418	-.20863	.20254	-.06302
1975	*-1.36855	.46344	.31476	-.24482
1976	.13288	.10269	-.05982	-.03572
1977	.09574	.02491	-.01359	.07156
1978	.33977	.23355	.19102	-.12403
1979	.99172	-.19929	.05601	.39013
1980	.95678	-.17051	.36228	.01587
1981	.62651	.10520	-.11400	-.38270
1982	.06188	-.01515	-.03730	.00215
1983	*1.15035	.05174	-.11402	-.10848
1984	.43974	.15736	-.10220	.10766
1985	.23294	-.02530	.02468	.14066
1986	.12119	-.00198	-.03219	-.04529
1987	.46257	-.04800	-.26434	.12532

SDFFITS	Standardized dffits value
SDFBETA_0	Standardized dfbeta for the intercept term
SDFBETA_1	Standardized dfbeta for January-February inflows
SDFBETA_2	Standardized dfbeta for March-April inflows

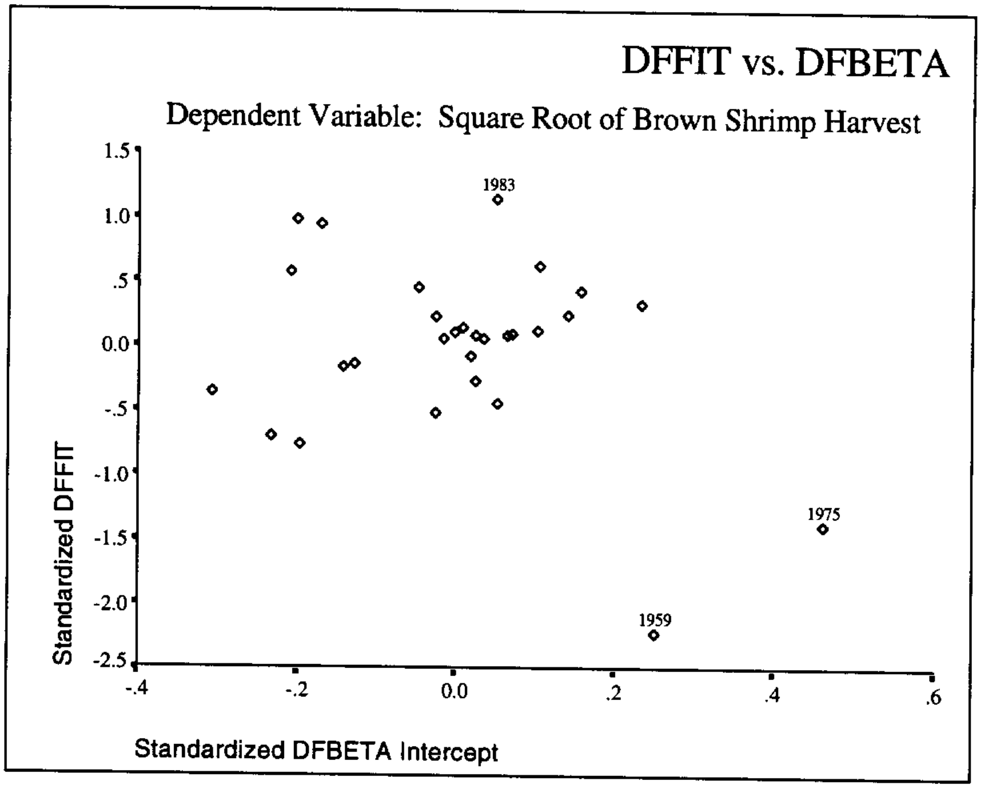
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

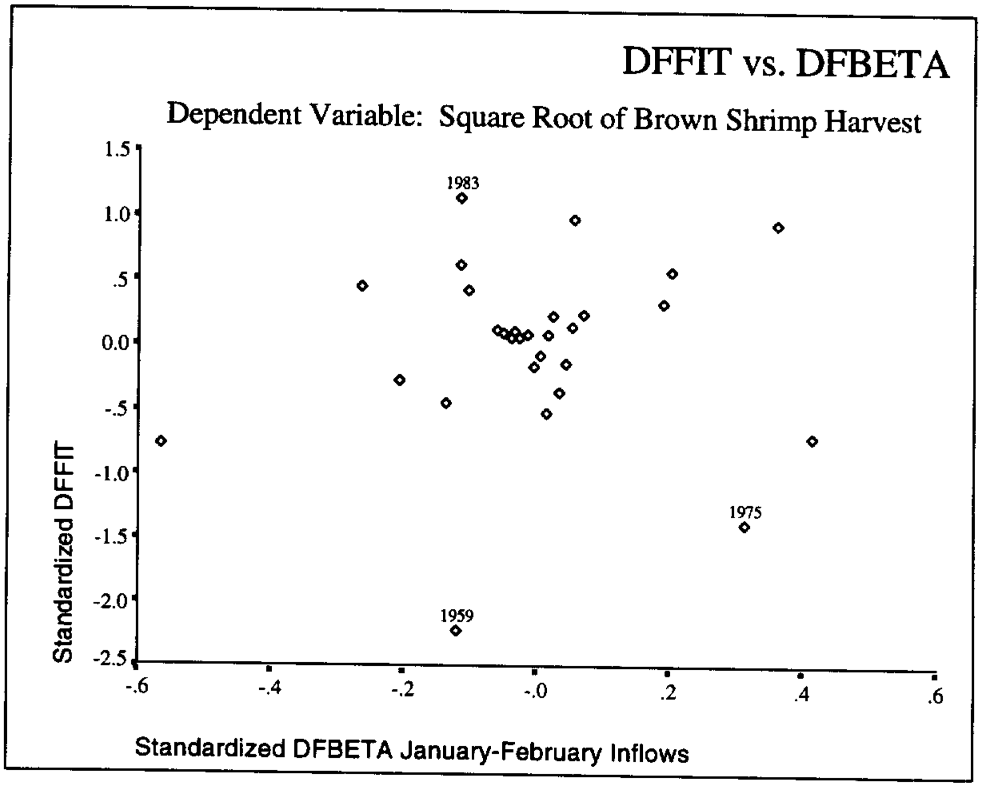
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1959	.44146	*-1.44507	*-1.05012	*1.06491
1960	-.04247	-.06262	.17350	.35381
1961	.02583	.01433	.08668	.00923
1962	.17897	-.07857	-.34439	-.18551
1963	.09345	.09454	.11193	-.05448
1964	.06154	.03430	.08249	.01892
1965	.02442	-.05371	-.04520	-.00500
1966	.11884	-.03076	-.04257	-.05272
1967	.03923	.00137	.04189	.00559
1968	-.36067	.18936	.02197	.18518
1969	-.07782	.27015	.03353	.05219
1970	-.02663	-.01403	-.01649	.01119
1971	-.03351	.01666	.03050	-.01326
1972	.01305	-.09622	-.14048	.05674
1973	-.01390	.00657	-.00318	.00425
1974	.06382	-.09153	.46077	-.17430
1975	.00738	.00709	-.04755	*-1.11659
1976	-.00378	.03984	-.02811	-.01025
1977	-.05674	-.02923	-.02637	.03981
1978	-.07138	-.09296	-.18460	-.09466
1979	-.24681	.59830	-.05686	-.19110
1980	.16842	-.36271	.66226	-.45852
1981	.39623	.19975	.08628	-.21255
1982	.01076	.02357	.03460	.02477
1983	-.41625	.96559	-.37877	.32502
1984	-.17735	-.01212	.22806	-.05161
1985	-.08378	-.06955	.09538	.00664
1986	.06510	-.01503	-.00649	.06173
1987	-.08221	.09536	.01233	.40845

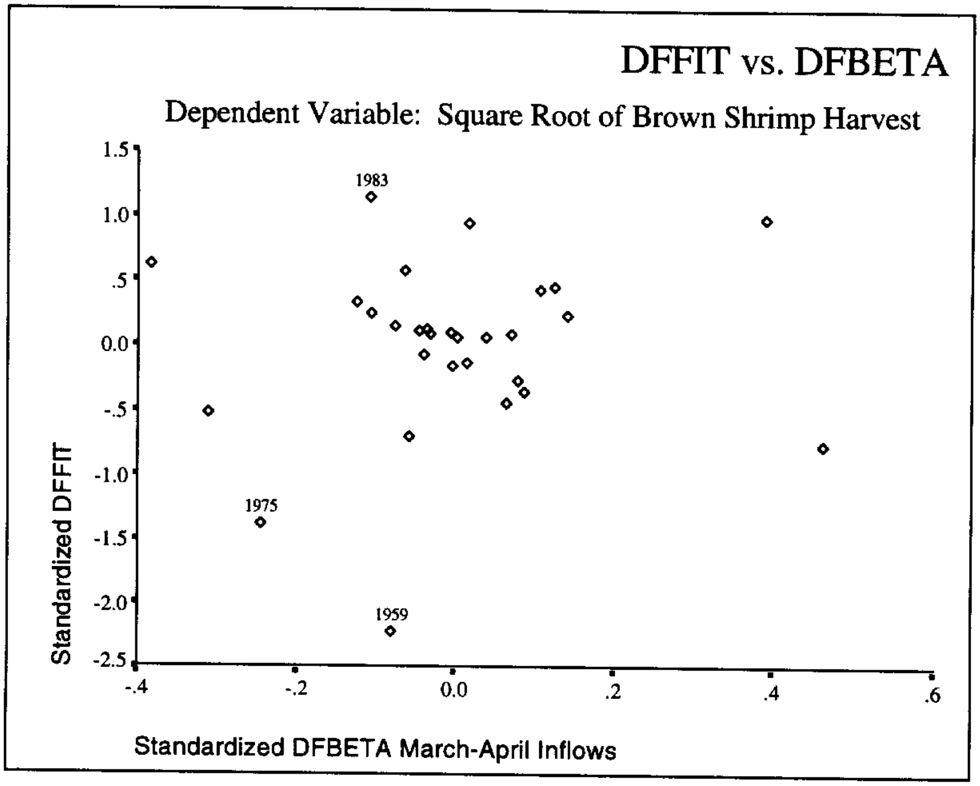
SDFBETA_3	Standardized dfbeta for May-June inflows
SDFBETA_4	Standardized dfbeta for July-August inflows
SDFBETA_5	Standardized dfbeta for September-October inflows
SDFBETA_6	Standardized dfbeta for November-December inflows

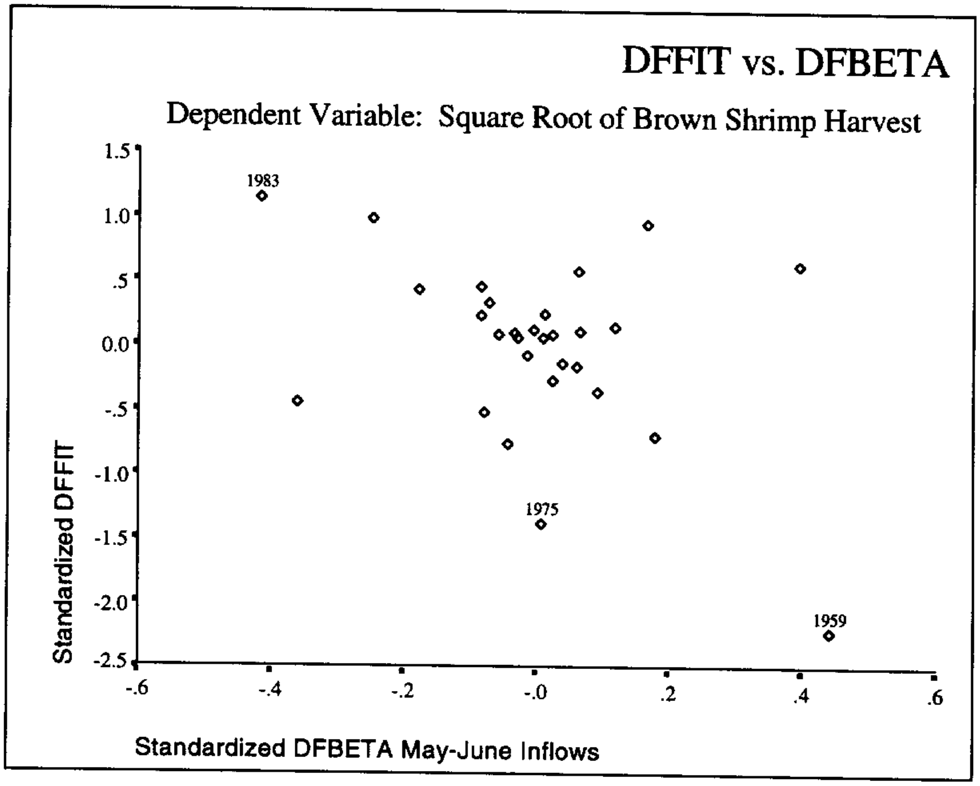
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

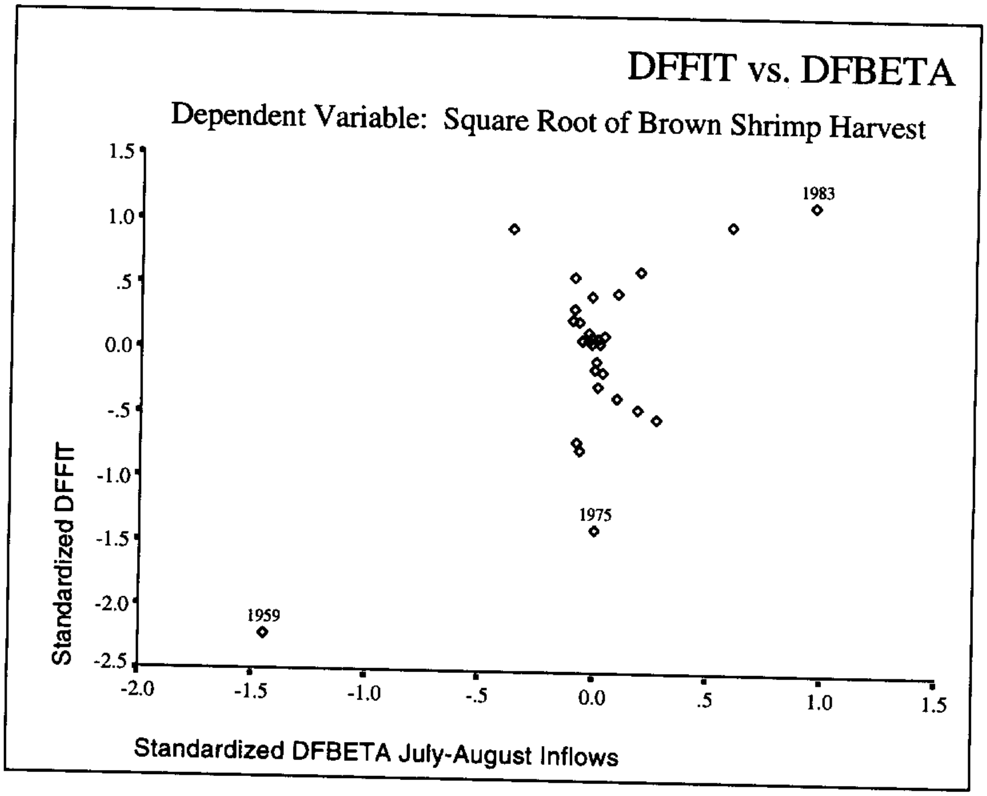
Graphics

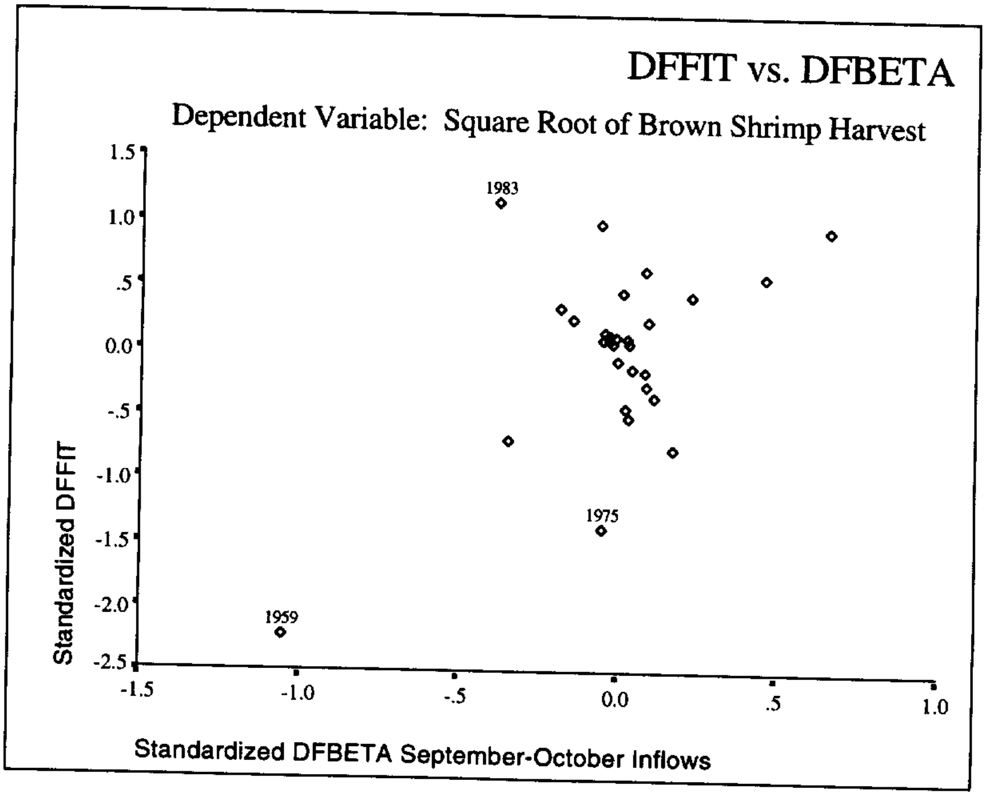

DFFIT vs. DFBETA
Dependent Variable: Square Root of Brown Shrimp Harvest
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.5
Standardized DFFIT
1983
1975
1959
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA Intercept

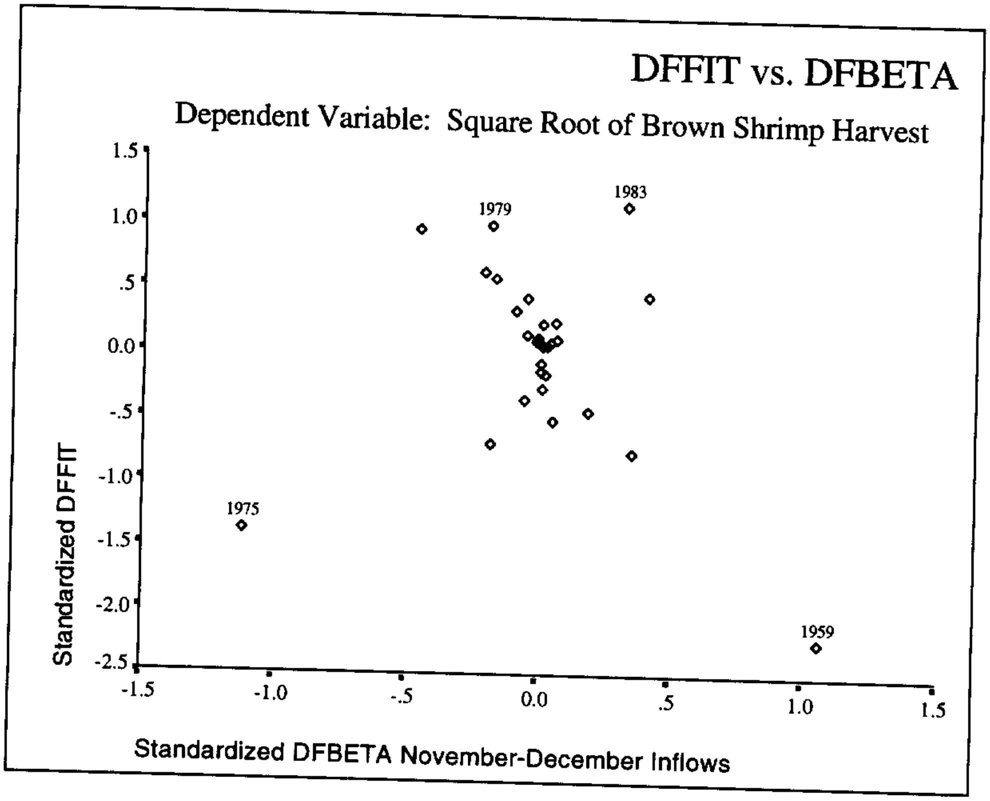

DFFIT vs. DFBETA
Dependent Variable: Square Root of Brown Shrimp Harvest
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.5
Standardized DFFIT
1983
1975
1959
-.6
-.4
-.2
-.0
.2
.4
.6
Standardized DFBETA January-February Inflows


DFFIT vs. DFBETA
Dependent Variable: Square Root of Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.5
1983
1975
1959
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA March-April Inflows


DFFIT vs. DFBETA
Dependent Variable: Square Root of Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.5
1983
1975
1959
-.6
-.4
-.2
-.0
.2
.4
.6
Standardized DFBETA May-June Inflows


DFFIT vs. DFBETA
Dependent Variable: Square Root of Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.5
1983
1975
1959
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
Standardized DFBETA July-August Inflows


DFFIT vs. DFBETA
Dependent Variable: Square Root of Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.5
1983
1975
1959
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA September-October Inflows



DFFIT vs. DFBETA

Dependent Variable: Square Root of Brown Shrimp Harvest

Regression—All Variables Logged

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	*Ln(November-December Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(May-June Inflows), Ln(January-February Inflows)[c,d]*	.	*.657*	*.431*	*.276*	*1.1585*	*.756*

a. Dependent Variable: Ln(Brown Shrimp Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(May-June Inflows), Ln(January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*22.386*	*6*	*3.731*	*2.780*	*.036[b]*
	Residual	*29.529*	*22*	*1.342*		
	Total	*51.915*	*28*			

a. Dependent Variable: Ln(Brown Shrimp Harvest)

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(May-June Inflows), Ln(January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	*7.065*	*3.203*		*2.206*	*.038*	*.423*	*13.707*
	Ln(January-February Inflows)	*-1.567*	*.425*	*-.983*	*-3.687*	*.001*	*-2.448*	*-.685*
	Ln(March-April Inflows)	*.708*	*.411*	*.406*	*1.721*	*.099*	*-.145*	*1.560*
	Ln(May-June Inflows)	*6.161E-02*	*.427*	*.036*	*.144*	*.887*	*-.824*	*.947*
	Ln(July-August Inflows)	*-.340*	*.381*	*-.189*	*-.890*	*.383*	*-1.130*	*.451*
	Ln(September-October Inflows)	*-3.080E-02*	*.302*	*-.018*	*-.102*	*.920*	*-.656*	*.595*
	Ln(November-December Inflows)	*1.126*	*.381*	*.720*	*2.953*	*.007*	*.335*	*1.916*

a. Dependent Variable: Ln(Brown Shrimp Harvest)

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln(January-February Inflows)	*.364*	*2.750*
	Ln(March-April Inflows)	*.465*	*2.152*
	Ln(May-June Inflows)	*.422*	*2.370*
	Ln(July-August Inflows)	*.573*	*1.746*
	Ln(September-October Inflows)	*.800*	*1.249*
	Ln(November-December Inflows)	*.435*	*2.298*

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Ln(January-February Inflows)	Ln(March-April Inflows)
1	1	6.952	1.000	.00	.00	.00
	2	1.827E-02	19.504	.00	.00	.05
	3	1.305E-02	23.083	.01	.09	.00
	4	6.725E-03	32.152	.08	.00	.28
	5	4.421E-03	39.656	.18	.35	.00
	6	3.353E-03	45.531	.62	.01	.09
	7	2.293E-03	55.059	.11	.54	.57

a. Dependent Variable: Ln(Brown Shrimp Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		Ln(May-June Inflows)	Ln(July-August Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	.00	.00	.00	.00
	2	.02	.03	.32	.03
	3	.00	.14	.10	.15
	4	.05	.26	.05	.16
	5	.23	.25	.10	.12
	6	.34	.14	.45	.02
	7	.36	.18	.00	.52

a. Dependent Variable: Ln(Brown Shrimp Harvest)

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.1547	7.8852	6.7430	.8942	29
Std. Predicted Value	-2.895	1.277	.000	1.000	29
Standard Error of Predicted Value	.4327	.8711	.5570	.1190	29
Adjusted Predicted Value	5.0799	8.0215	6.7151	.9415	29
Residual	-3.1865	1.5606	-6.7379E-16	1.0269	29
Std. Residual	-2.750	1.347	.000	.886	29
Stud. Residual	-3.027	1.563	.011	1.027	29
Deleted Residual	-3.8605	2.4105	2.792E-02	1.4064	29
Stud. Deleted Residual	-3.872	1.620	-.013	1.133	29
Mahal. Distance	2.939	14.864	5.793	3.185	29
Cook's Distance	.000	.323	.058	.094	29
Centered Leverage Value	.105	.531	.207	.114	29

a. Dependent Variable: Ln(Brown Shrimp Harvest)

Case Values for Residuals Diagnostics

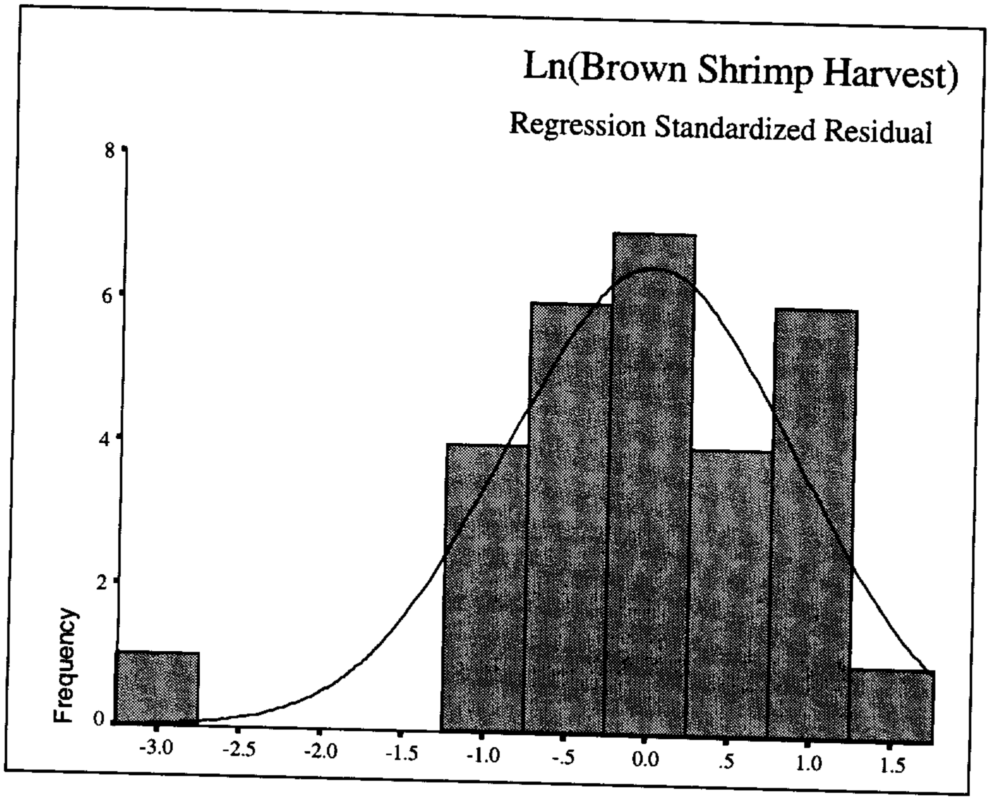
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1959	4.15473	-1.00628	-2.31516	5.46362	-2.89462	-.86858	-1.31747	-1.34117
1960	5.33828	-3.18652	-3.86052	6.01229	-1.57097	-2.75047	*-3.02741	*-3.87246
1961	5.80674	-1.38911	-1.75456	6.17220	-1.04705	-1.19902	-1.34754	-1.37451
1962	7.70145	-.93468	-1.08847	7.85524	1.07194	-.80678	-.87062	-.86565
1963	6.81542	-.41716	-.53686	6.93512	.08103	-.36007	-.40848	-.40061
1964	6.15495	.42027	.72038	5.85484	-.65763	.36276	.47494	.46641
1965	7.12397	-.09206	-.11602	7.14794	.42611	-.07946	-.08920	-.08717
1966	6.43723	.08648	.10736	6.41635	-.34194	.07465	.08317	.08127
1967	7.61937	-.57316	-.70761	7.75382	.98015	-.49473	-.54970	-.54079
1968	6.48556	-.75611	-.92355	6.65300	-.28789	-.65264	-.72129	-.71319
1969	7.15586	-.99150	-1.27990	7.44426	.46177	-.85582	-.97235	-.97109
1970	7.88519	-.53532	-.67163	8.02150	1.27743	-.46206	-.51756	-.50877
1971	7.82722	-.20158	-.37217	7.99781	1.21260	-.17400	-.23642	-.23128
1972	6.65918	.62220	.72808	6.55331	-.09371	.53706	.58096	.57201
1973	6.87508	-.01295	-.01570	6.87783	.14775	-.01118	-.01231	-.01202
1974	5.96117	1.29914	1.69286	5.56745	-.87435	1.12136	1.28006	1.29997
1975	7.39969	-.68020	-.81747	7.53696	.73446	-.58712	-.64364	-.63485
1976	7.65211	-.15768	-.19721	7.69164	1.01676	-.13610	-.15221	-.14879
1977	7.62127	-.39035	-.48838	7.71930	.98227	-.33693	-.37687	-.36940
1978	5.57964	1.20391	1.60957	5.17398	-1.30104	1.03917	1.20155	1.21445
1979	5.62098	1.56061	2.10169	5.07990	-1.25481	1.34705	1.56323	1.61990
1980	6.33085	1.41610	1.86028	5.88667	-.46091	1.22232	1.40096	1.43422
1981	6.41281	1.18403	2.41055	5.18630	-.36924	1.02201	1.45824	1.49900
1982	7.61895	.21911	.26302	7.57505	.97968	.18913	.20721	.20265
1983	6.45986	1.11100	1.86000	5.71085	-.31663	.95896	1.24080	1.25706
1984	6.79415	1.13282	1.31641	6.61056	.05723	.97780	1.05406	1.05686
1985	6.93175	.47738	.55814	6.85100	.21113	.41206	.44555	.43728
1986	7.38377	.24056	.30599	7.31833	.71665	.20764	.23418	.22909
1987	7.73890	.35101	.42043	7.66949	1.11382	.30298	.33159	.32478

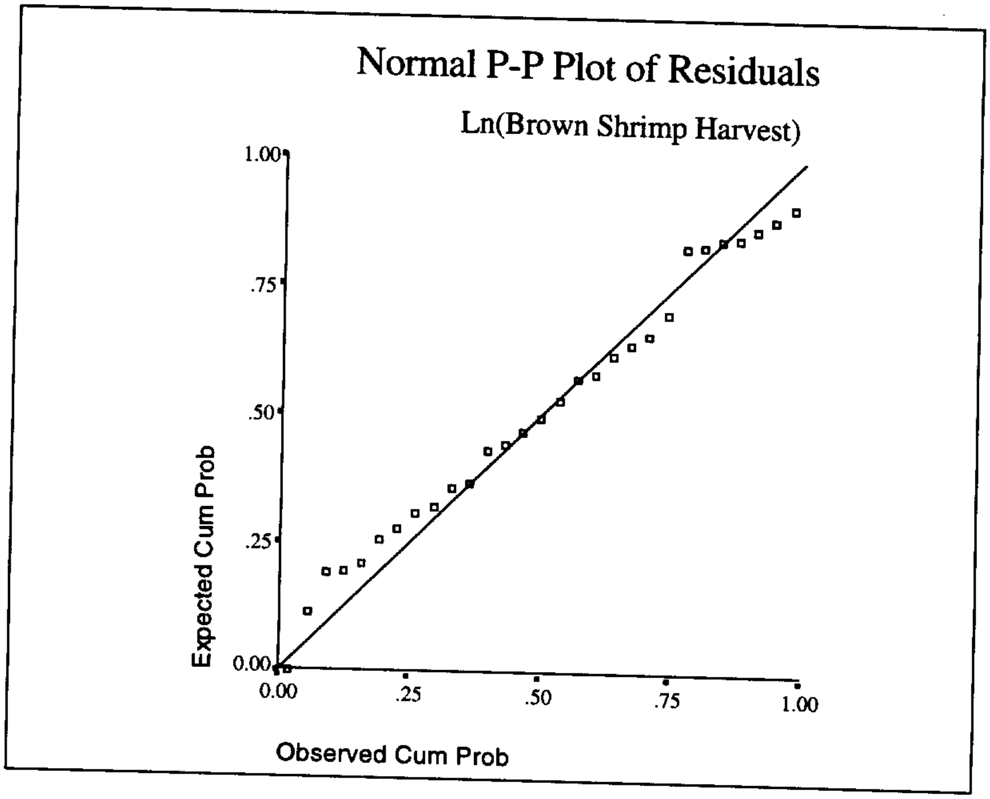
PRE_1	Predicted value of the natural log of harvest
RES_1	Ordinary residual; observed log harvest minus predicted log harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of the log of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of the log of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

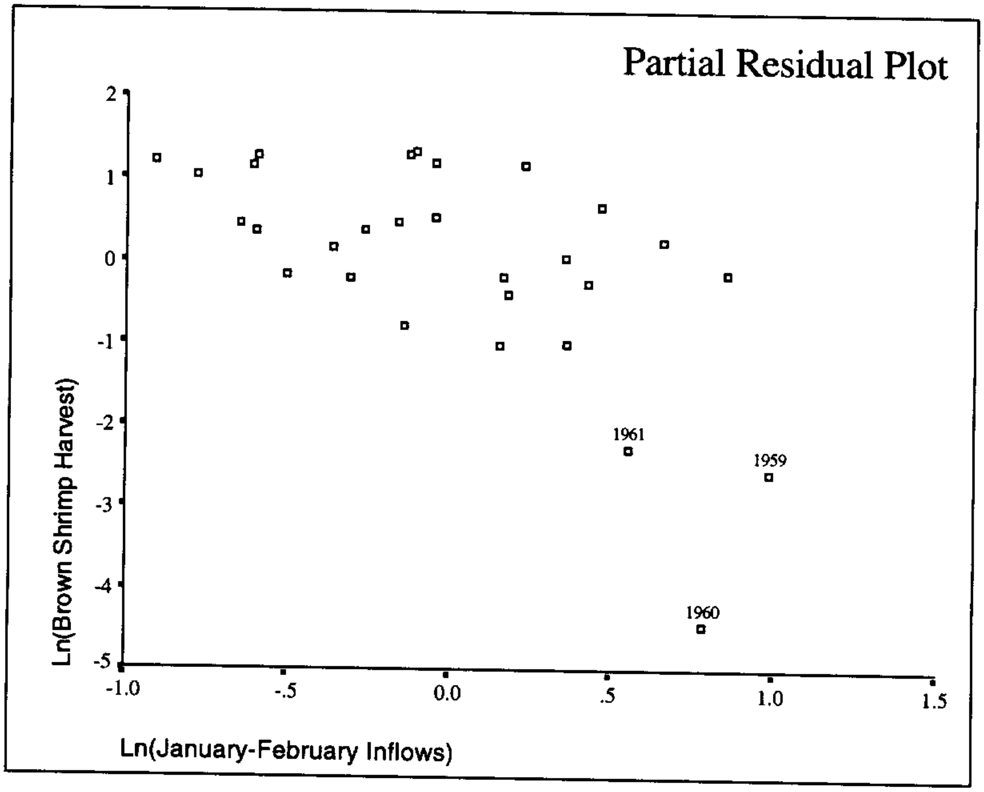
[1] Values greater than 3 are flagged.

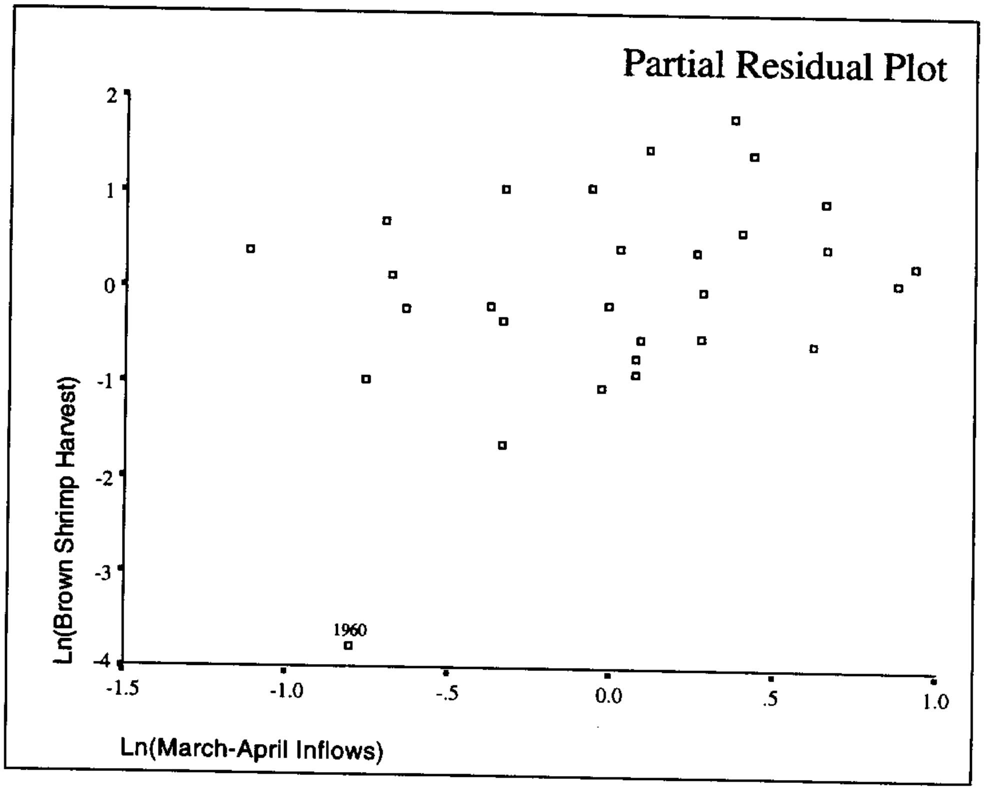
[2] This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{21,0.01} = 2.518$.

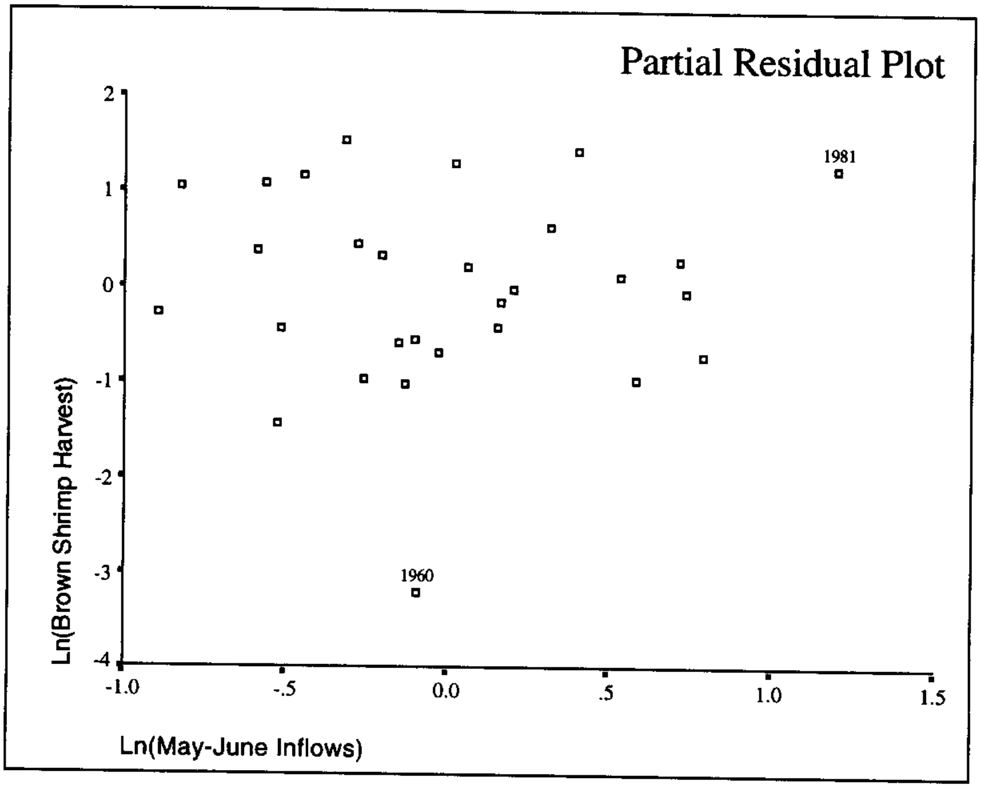
Graphics

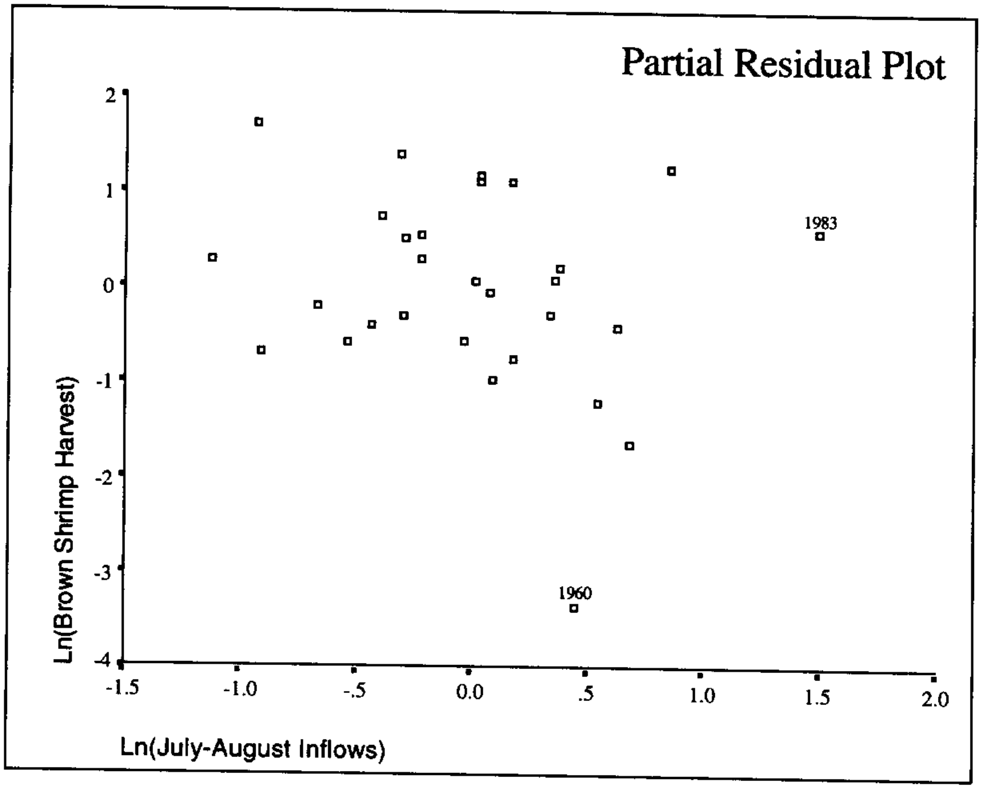

Ln(Brown Shrimp Harvest)
Regression Standardized Residual
Frequency
8
6
4
2
0
-3.0
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5

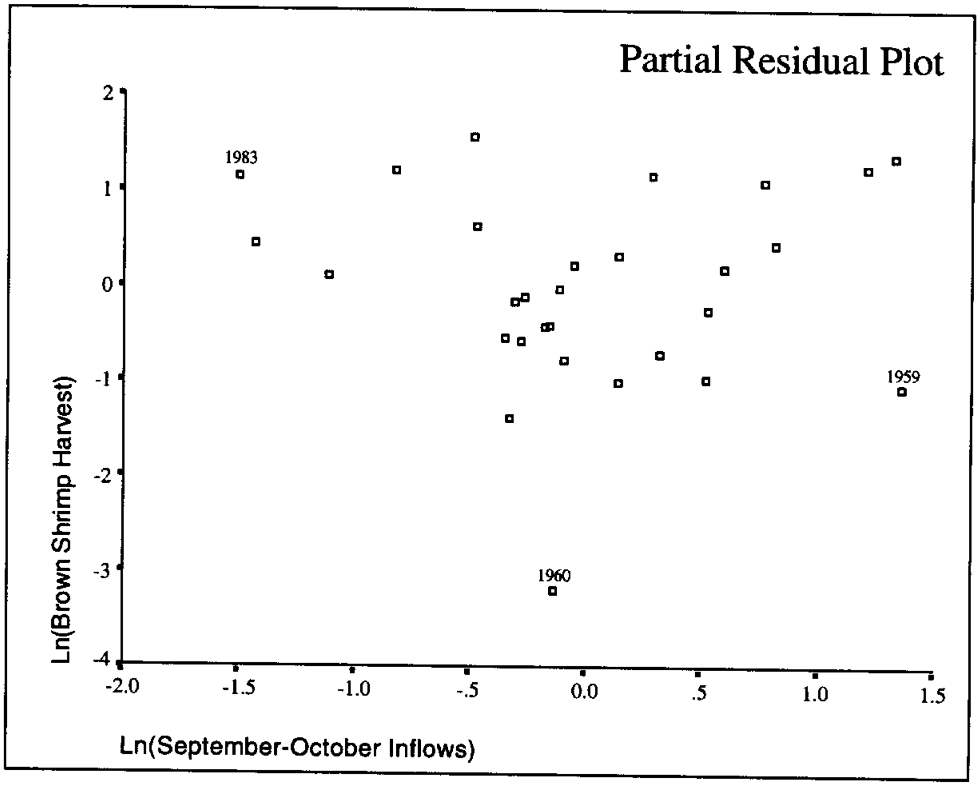

Normal P-P Plot of Residuals
Ln(Brown Shrimp Harvest)
Expected Cum Prob
1.00
.75
.50
.25
0.00
0.00
.25
.50
.75
1.00
Observed Cum Prob

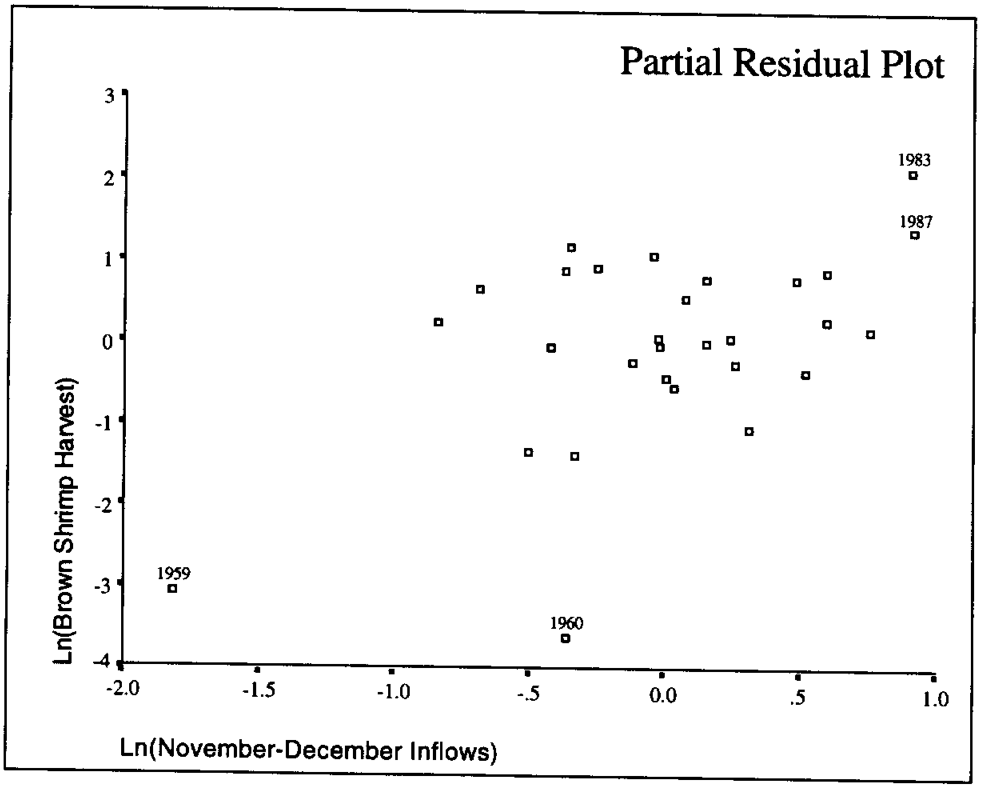

Partial Residual Plot
2
1
0
-1
-2
-3
-4
-5
Ln(Brown Shrimp Harvest)
1961
1959
1960
-1.0
-.5
0.0
.5
1.0
1.5
Ln(January-February Inflows)

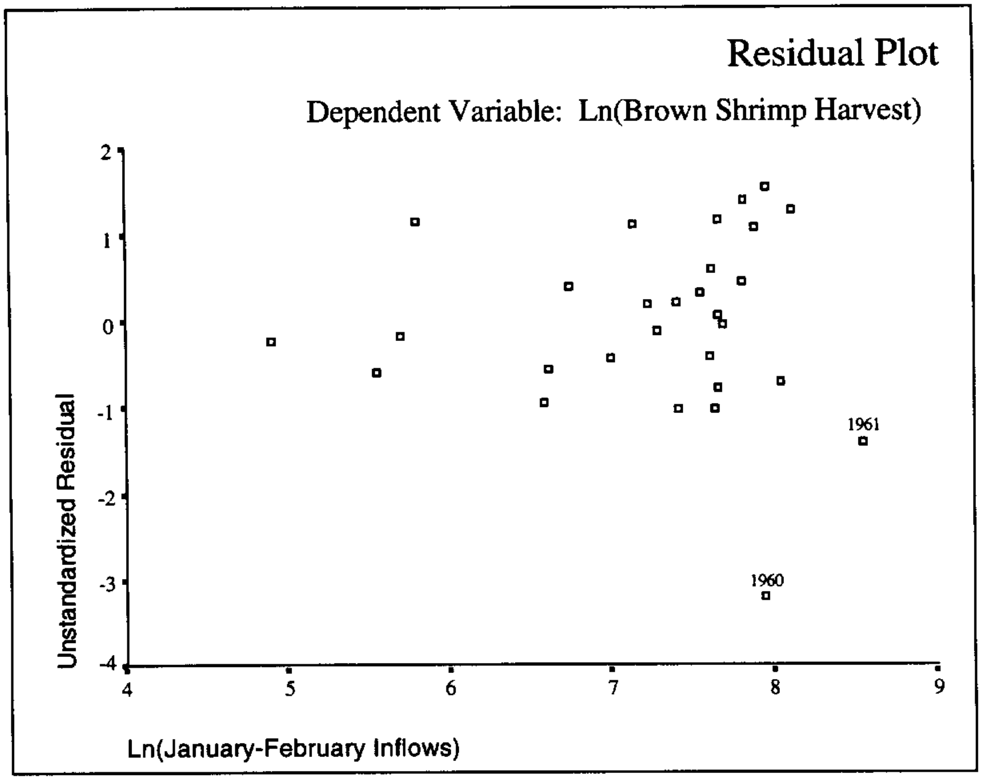

Partial Residual Plot
2
1
0
-1
-2
-3
-4
Ln(Brown Shrimp Harvest)
1960
-1.5
-1.0
-.5
0.0
.5
1.0
Ln(March-April Inflows)

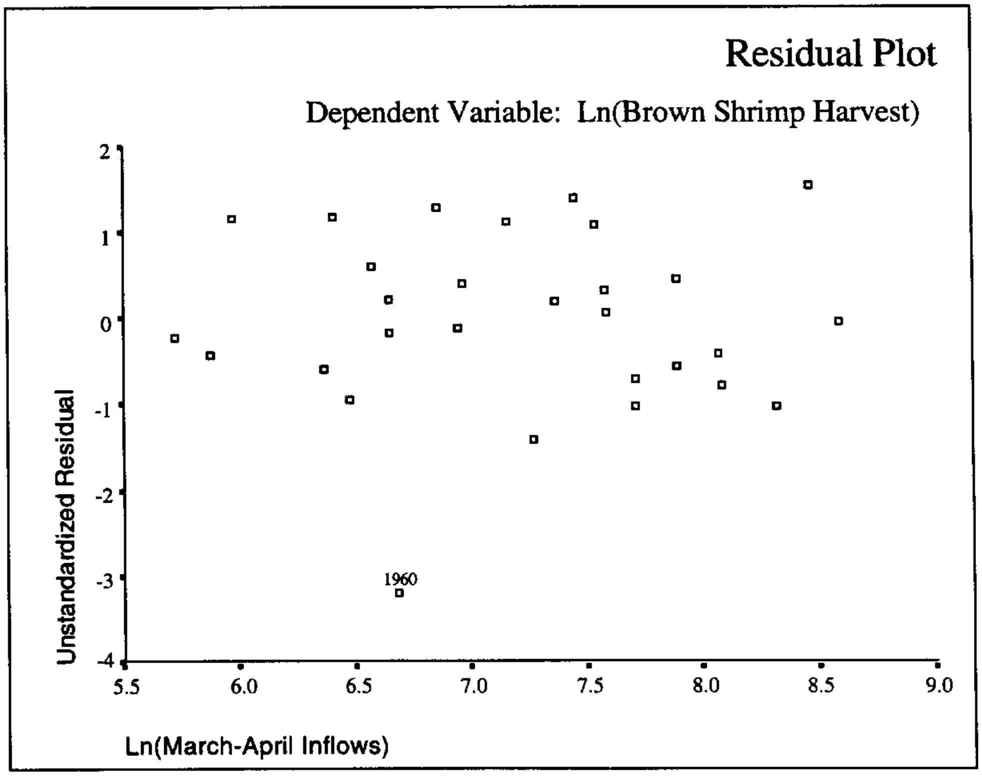

Partial Residual Plot
Ln(Brown Shrimp Harvest)
2
1
0
-1
-2
-3
-4
-1.0
-.5
0.0
.5
1.0
1.5
Ln(May-June Inflows)
1981
1960

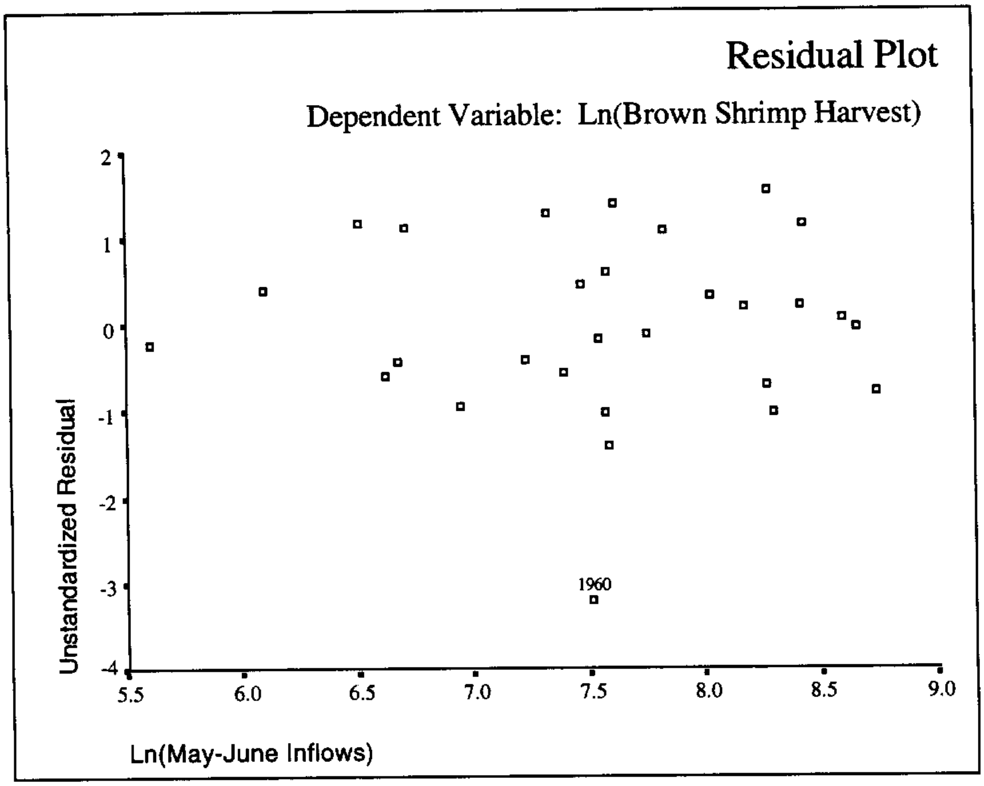

Partial Residual Plot
Ln(Brown Shrimp Harvest)
2
1
0
-1
-2
-3
-4
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
2.0
Ln(July-August Inflows)
1983
1960

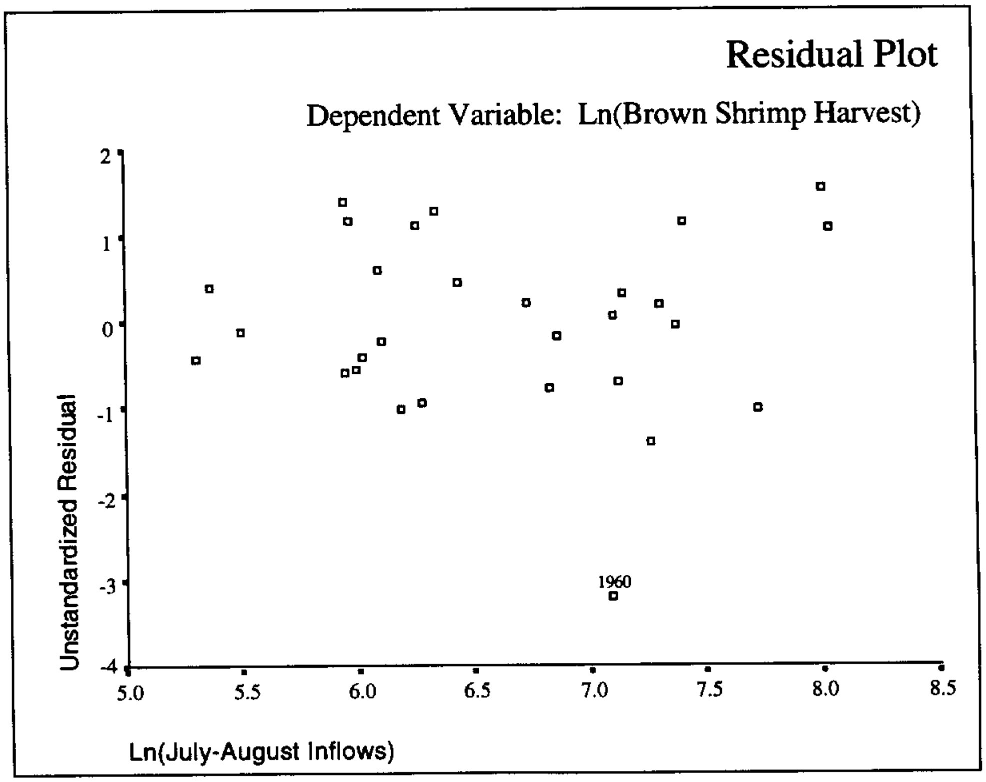

Partial Residual Plot
Ln(Brown Shrimp Harvest)
Ln(September-October Inflows)
2
1
0
-1
-2
-3
-4
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
1983
1959
1960

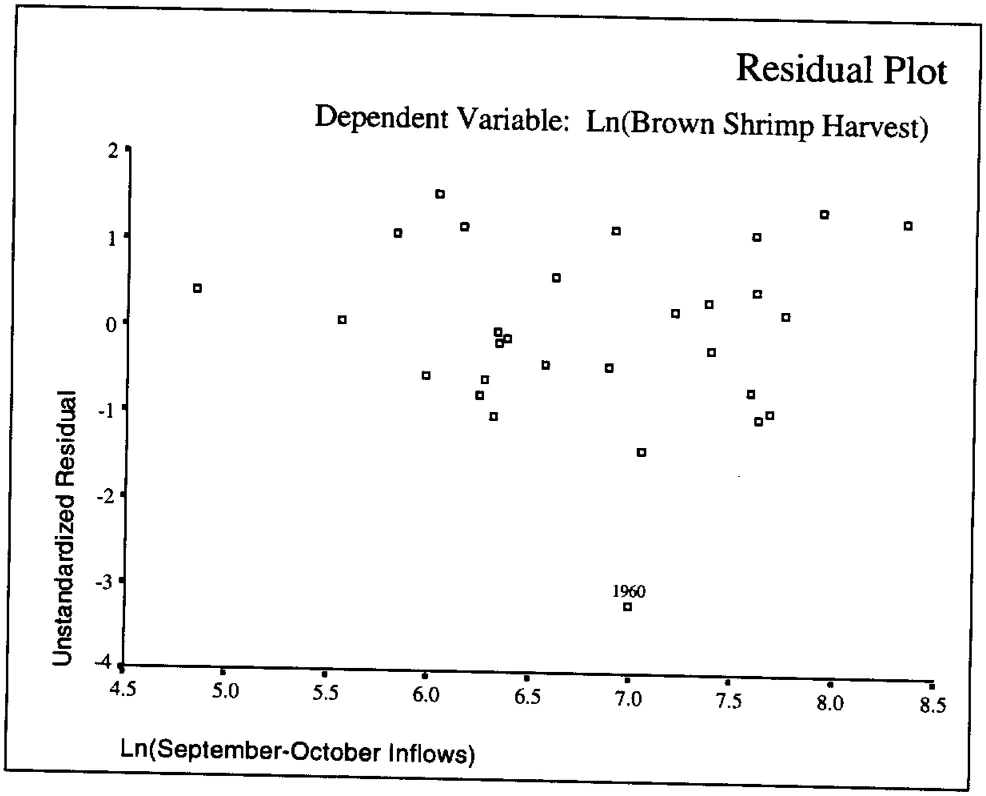

Partial Residual Plot
Ln(Brown Shrimp Harvest)
Ln(November-December Inflows)
3
2
1
0
-1
-2
-3
-4
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1983
1987
1959
1960

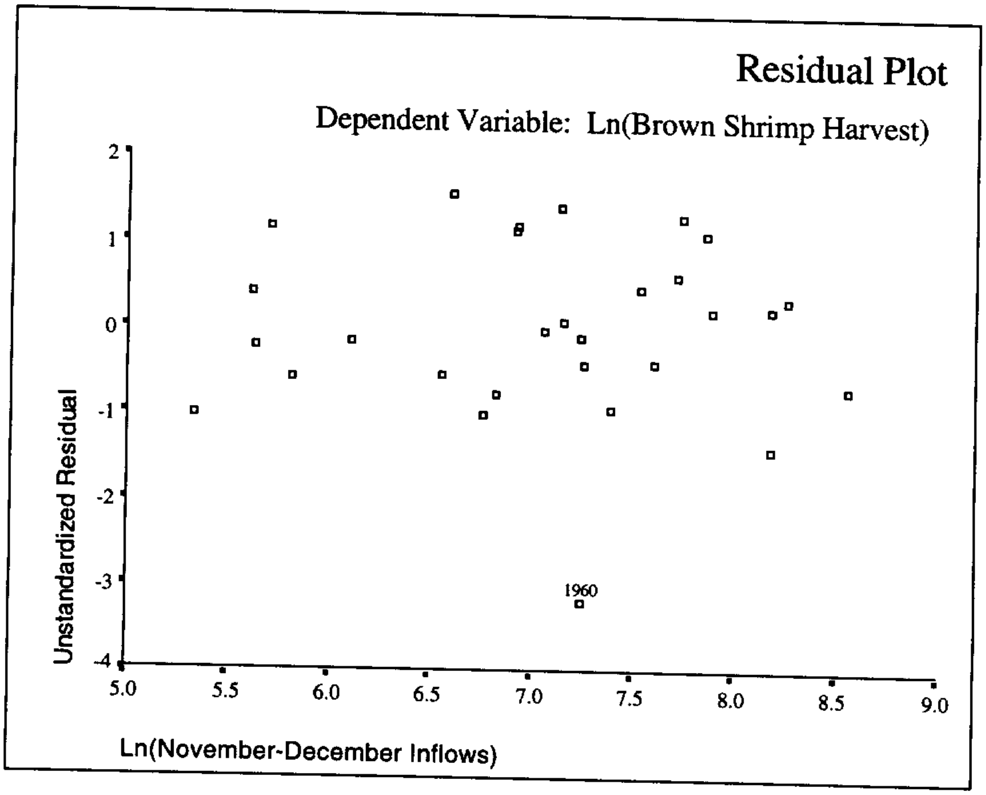

Residual Plot
Dependent Variable: Ln(Brown Shrimp Harvest)
Unstandardized Residual
2
1
0
-1
-2
-3
-4
4
5
6
7
8
9
1961
1960
Ln(January-February Inflows)


Residual Plot
Dependent Variable: Ln(Brown Shrimp Harvest)
Unstandardized Residual
2
1
0
-1
-2
-3
-4
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
1960
Ln(March-April Inflows)


Residual Plot
Dependent Variable: Ln(Brown Shrimp Harvest)
Unstandardized Residual
2
1
0
-1
-2
-3
-4
1960
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Ln(May-June Inflows)


Residual Plot
Dependent Variable: Ln(Brown Shrimp Harvest)
Unstandardized Residual
2
1
0
-1
-2
-3
-4
1960
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
Ln(July-August Inflows)


Residual Plot
Dependent Variable: Ln(Brown Shrimp Harvest)
Unstandardized Residual
2
1
0
-1
-2
-3
-4
1960
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
Ln(September-October Inflows)


Residual Plot
Dependent Variable: Ln(Brown Shrimp Harvest)
Unstandardized Residual
2
1
0
-1
-2
-3
-4
1960
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Ln(November-December Inflows)

Prediction Intervals for the Natural Log of Brown Shrimp Harvest

YEAR	LBSHRIMP	LICI_1	UICI_1
1959	3.15	.06897	8.24050
1960	2.15	1.79904	8.87753
1961	4.42	2.21709	9.39640
1962	6.77	4.21274	11.19016
1963	6.40	3.20403	10.42681
1964	6.58	2.26816	10.04174
1965	7.03	3.53692	10.71103
1966	6.52	2.86822	10.00623
1967	7.05	4.05697	11.18177
1968	5.73	2.93621	10.03490
1969	6.16	3.54098	10.77075
1970	7.35	4.30347	11.46692
1971	7.63	3.88356	11.77089
1972	7.28	3.16416	10.15420
1973	6.86	3.33500	10.41516
1974	7.26	2.33561	9.58672
1975	6.72	3.87051	10.92887
1976	7.49	4.07414	11.23009
1977	7.23	4.04286	11.19968
1978	6.78	1.92559	9.23369
1979	7.18	1.95902	9.28293
1980	7.75	2.69619	9.96550
1981	7.60	2.40151	10.42411
1982	7.84	4.09127	11.14664
1983	7.57	2.59220	10.32752
1984	7.93	3.30822	10.28007
1985	7.41	3.43785	10.42566
1986	7.62	3.78586	10.98168
1987	8.09	4.21398	11.26382

LBSHRIMP	Natural log of brown shrimp harvest
LICI_1	Lower limit for 99% prediction interval for the natural log of brown shrimp harvest
UICI_1	Upper limit for 99% prediction interval for the natural log of brown shrimp harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1959	14.86434	.32253	*.53087	.0378	.0644
1960	3.92296	.27694	.14011	.7886	.0436
1961	4.86651	.06825	.17380	.6762	.0006
1962	2.99049	.01782	.10680	.8859	.0000
1963	5.27754	.00684	.18848	.6261	.0000
1964	10.69927	.02301	.38212	.1523	.0000
1965	4.81750	.00030	.17205	.6822	.0000
1966	4.47835	.00024	.15994	.7233	.0000
1967	4.35469	.01013	.15552	.7381	.0000
1968	4.11096	.01646	.14682	.7669	.0000
1969	5.34374	.03929	.19085	.6181	.0001
1970	4.71720	.00974	.16847	.6944	.0000
1971	11.86852	.00676	.42388	.1050	.0000
1972	3.10623	.00820	.11094	.8750	.0000
1973	3.93854	.00000	.14066	.7868	.0000
1974	5.54663	.07094	.19809	.5936	.0007
1975	3.73624	.01194	.13344	.8096	.0000
1976	4.64673	.00083	.16595	.7030	.0000
1977	4.65497	.00510	.16625	.7020	.0000
1978	6.09129	.06949	.21755	.5291	.0007
1979	6.24310	.12104	.22297	.5117	.0040
1980	5.72005	.08795	.20429	.5728	.0015
1981	13.28118	.31468	.47433	.0655	.0606
1982	3.70842	.00123	.13244	.8127	.0000
1983	10.30985	.14828	.36821	.1717	.0075
1984	2.93943	.02572	.10498	.8905	.0000
1985	3.08575	.00480	.11021	.8770	.0000
1986	5.02228	.00213	.17937	.6572	.0000
1987	3.65725	.00311	.13062	.8183	.0000

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2] MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SBDBETA_1	SDFBETA_2
1959	*-1.52959	.29789	-.73793	.02161
1960	*-1.78098	-.15345	*-1.22906	*1.21146
1961	-.70501	.13980	-.31607	.18231
1962	-.35113	-.00546	.17210	-.02555
1963	-.21460	-.12417	-.06060	.12207
1964	.39414	.30652	.09535	.00581
1965	-.04447	-.01486	-.00654	.01165
1966	.03993	.00591	.00557	-.01201
1967	-.26192	-.17751	.13227	-.01887
1968	-.33562	.05568	-.04488	-.02115
1969	-.52373	.06582	.05594	-.24408
1970	-.25673	-.05037	.13577	-.17758
1971	-.21276	-.08048	.10501	-.03144
1972	.23596	.07911	.08093	-.14937
1973	-.00554	.00246	.00128	-.00310
1974	.71565	-.21053	.35865	-.17396
1975	-.28519	.18917	.07878	-.06828
1976	-.07450	-.02454	.04756	.00058
1977	-.18512	.01595	.05447	-.13685
1978	.70496	.42562	.44136	-.34908
1979	.95383	-.22621	.15849	.24932
1980	.80325	-.22042	.28069	.06826
1981	*1.52565	.22922	-.08338	-.84698
1982	.09071	-.05364	-.04934	.02056
1983	*1.03215	-.01342	-.07448	-.03536
1984	.42546	-.03521	-.01939	.17563
1985	.17985	-.08748	-.00785	.11054
1986	.11948	-.01579	-.01511	-.05840
1987	.14442	-.07511	-.07748	.05031

SDFFITS	Standardized dffits value
SDFBETA_0	Standardized dfbeta for the intercept term
SDFBETA_1	Standardized dfbeta for logged January-February inflows
SDFBETA_2	Standardized dfbeta for logged March-April inflows

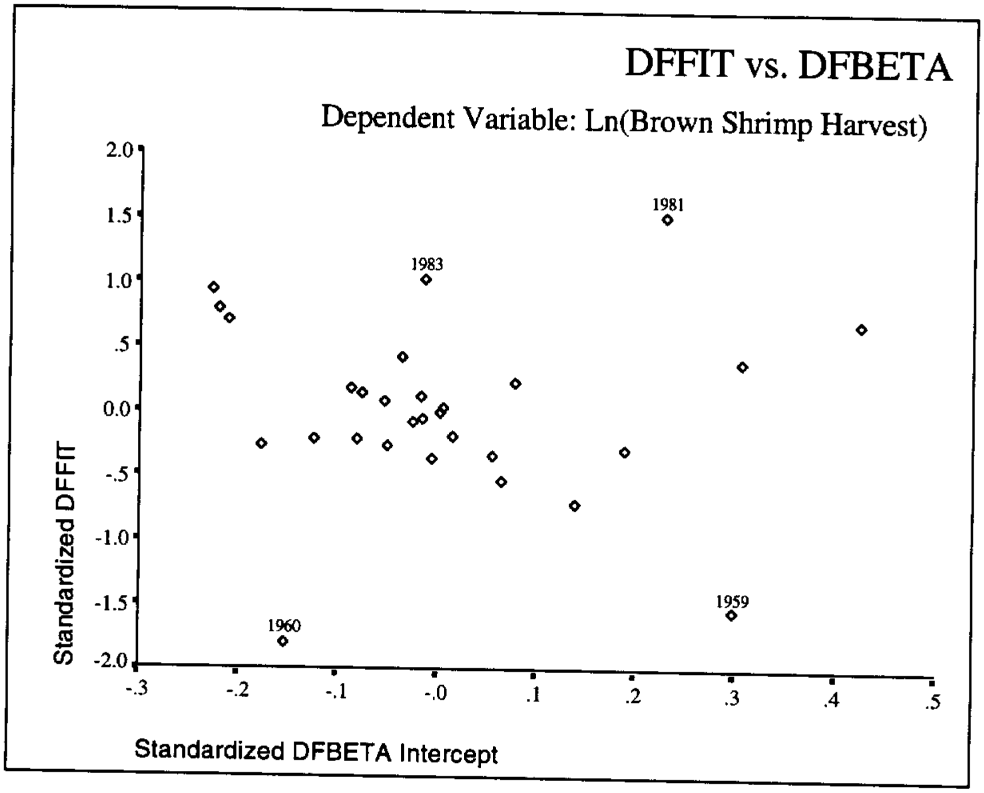
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

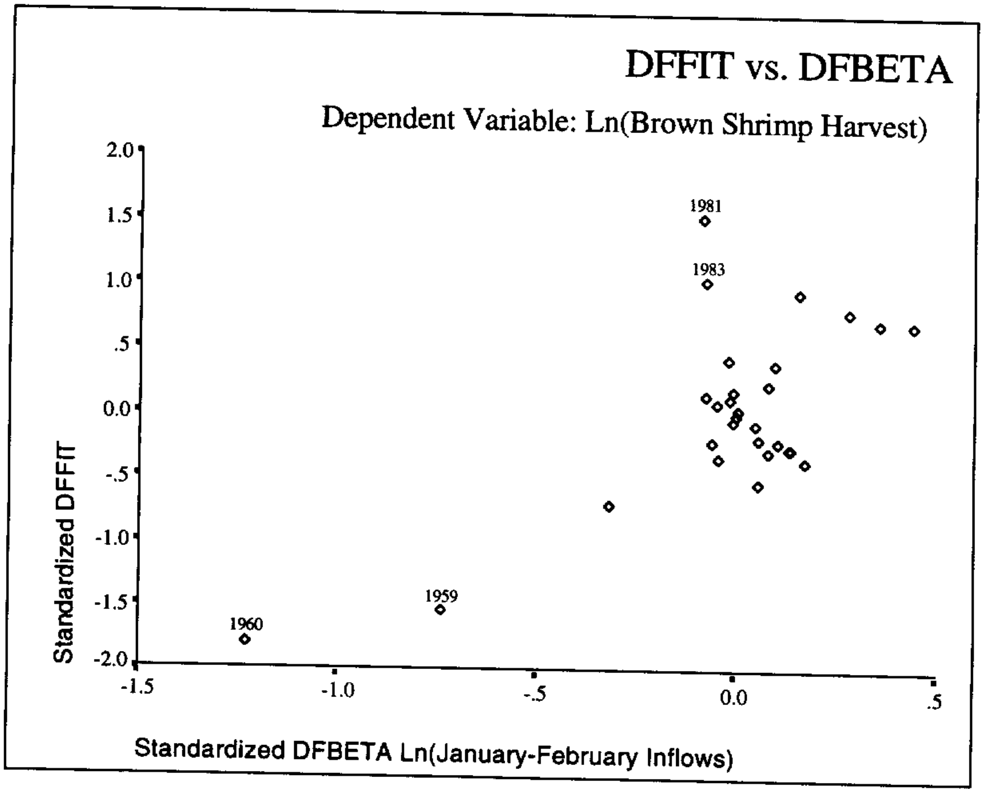
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1959	.09751	-.36748	-.72139	*1.21485
1960	.14296	-.63466	.14964	.50523
1961	.29931	-.34757	.13082	-.16067
1962	.08966	-.02734	-.12751	-.16130
1963	-.02657	.10008	.02062	-.00137
1964	-.13282	-.05865	-.22720	-.08348
1965	-.02658	.03625	.00666	.00376
1966	.01783	.00040	-.02631	-.00058
1967	.03263	.00695	.04375	-.00775
1968	-.23068	.13954	.01808	.12917
1969	-.23882	.33026	-.04173	.11861
1970	.02120	.08076	.05159	-.04944
1971	.10347	-.06499	-.04319	-.02516
1972	.07296	-.07970	-.07600	.03155
1973	-.00101	-.00033	.00038	.00006
1974	.01265	-.15156	.46909	-.17847
1975	.00697	-.04190	-.05900	-.17463
1976	-.01026	-.01863	.01319	-.00874
1977	.07820	.04044	.01632	-.08130
1978	-.23174	.01593	-.30149	-.11434
1979	-.22025	.53221	-.23669	-.21247
1980	.24463	-.50168	.57068	-.36913
1981	.94749	.12389	.16107	-.59039
1982	.00497	.02621	.03481	.04396
1983	-.49383	.80346	-.63596	.48936
1984	-.23762	.01358	.22806	-.01347
1985	-.04844	-.03461	.10066	.01234
1986	.06849	-.01857	-.00319	.04172
1987	-.02637	.04500	.01298	.10769

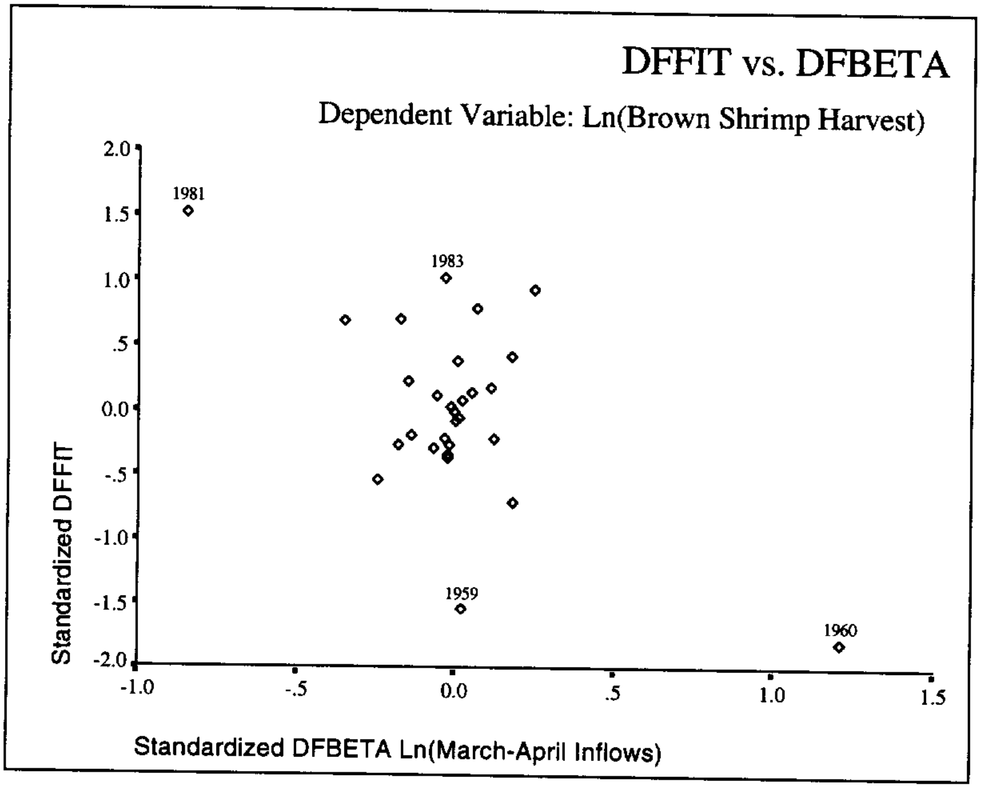
SDFBETA_3	Standardized dfbeta for logged May-June inflows
SDFBETA_4	Standardized dfbeta for logged July-August inflows
SDFBETA_5	Standardized dfbeta for logged September-October inflows
SDFBETA_6	Standardized dfbeta for logged November-December inflows

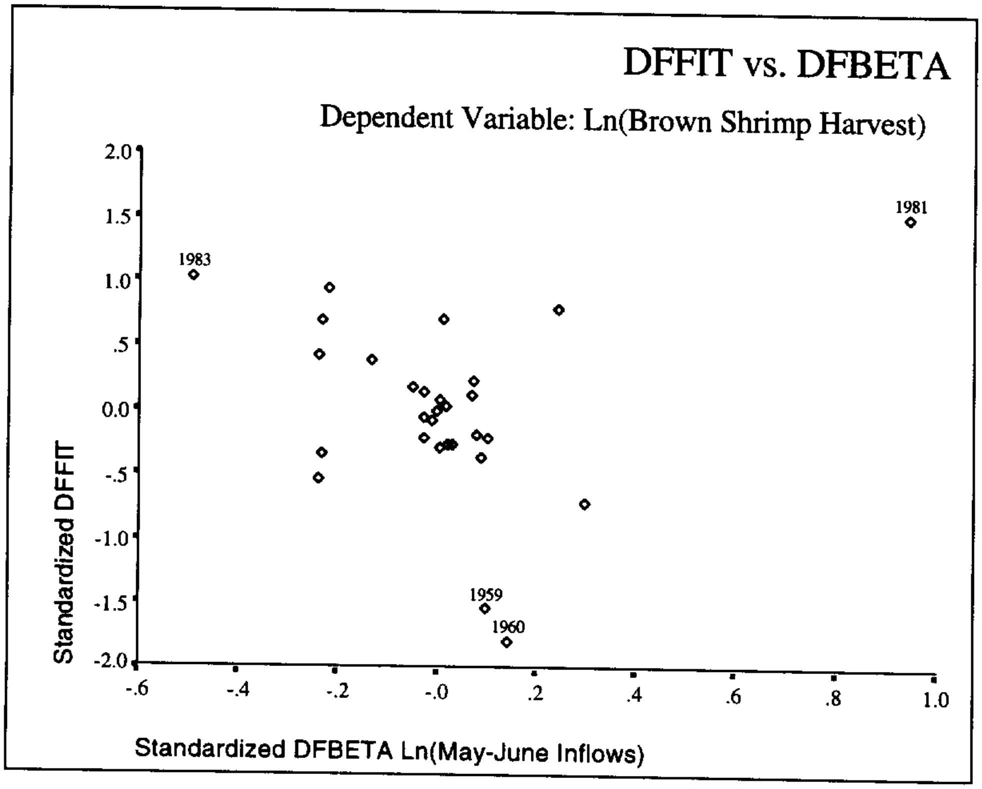
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

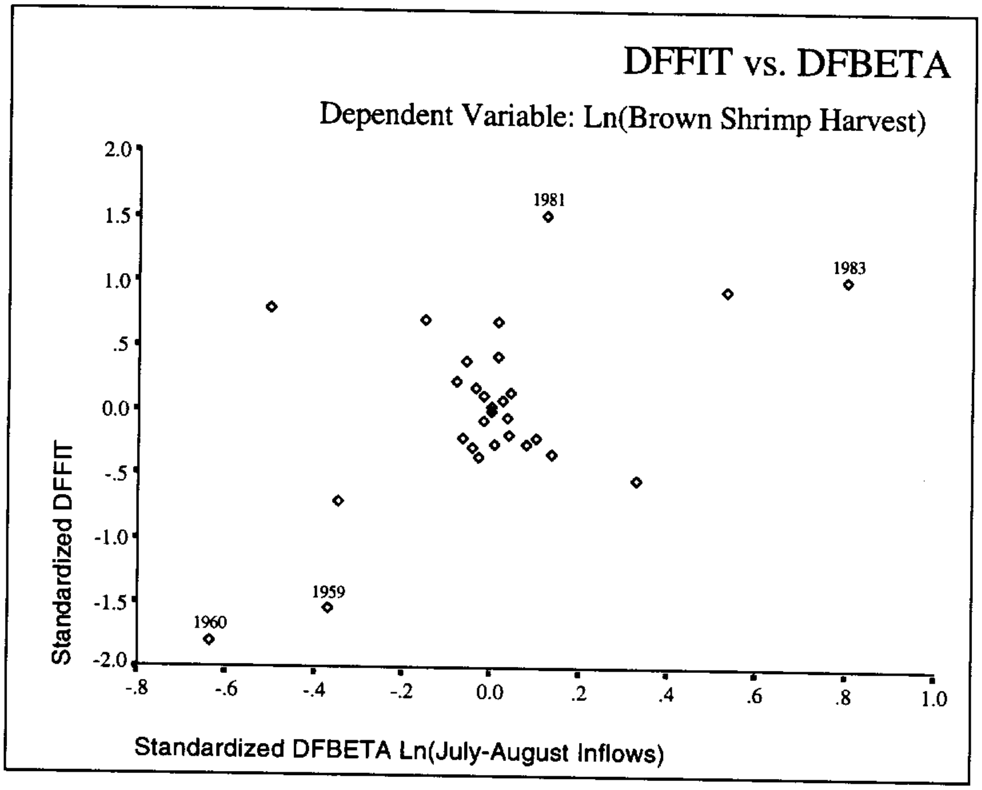
Graphics

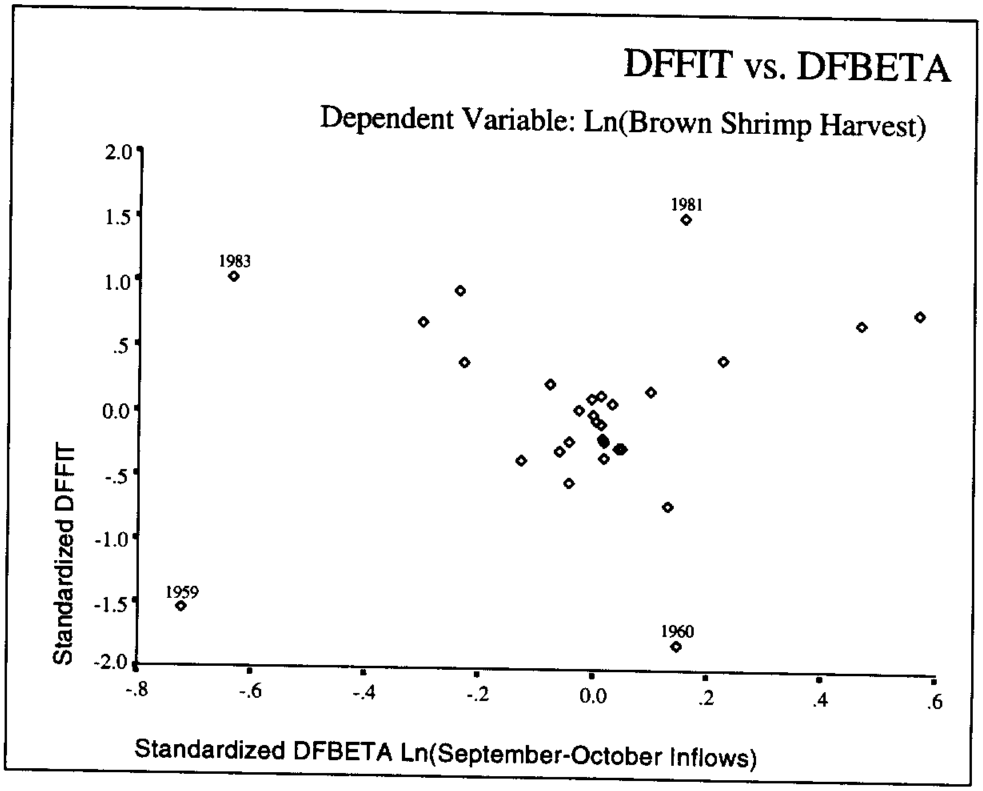

DFFIT vs. DFBETA
Dependent Variable: Ln(Brown Shrimp Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1981
1983
1959
1960
-.3
-.2
-.1
-.0
.1
.2
.3
.4
.5
Standardized DFBETA Intercept

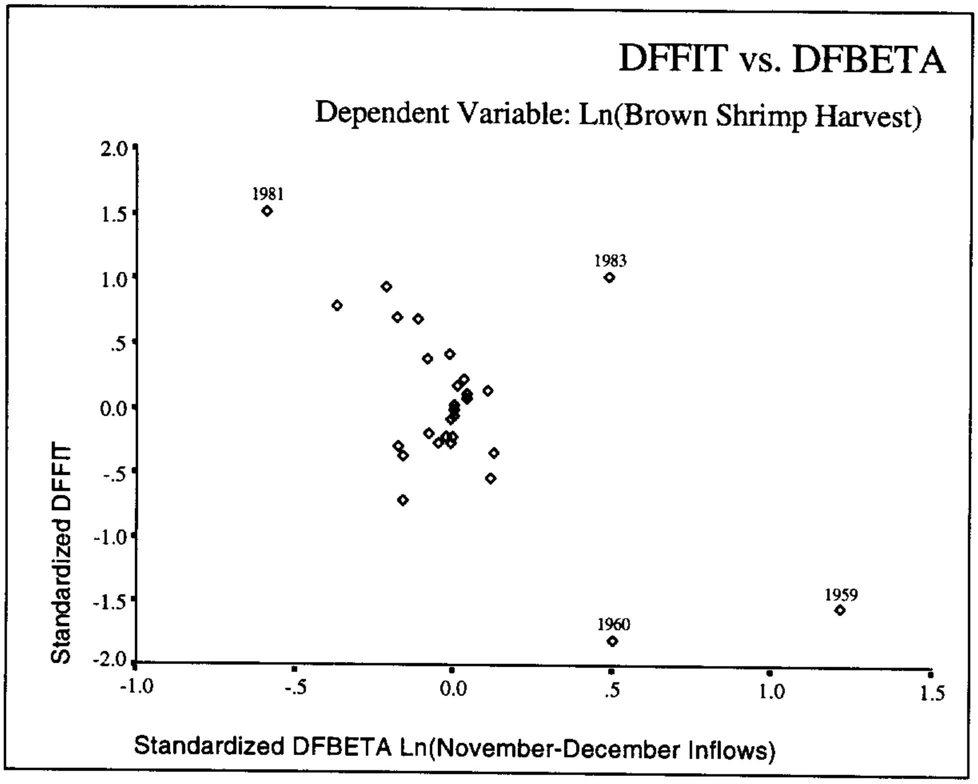

DFFIT vs. DFBETA
Dependent Variable: Ln(Brown Shrimp Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1981
1983
1959
1960
-1.5
-1.0
-.5
0.0
.5
Standardized DFBETA Ln(January-February Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Brown Shrimp Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1.0
-.5
0.0
.5
1.0
1.5
Standardized DFBETA Ln(March-April Inflows)
1981
1983
1959
1960


DFFIT vs. DFBETA
Dependent Variable: Ln(Brown Shrimp Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.6
-.4
-.2
-.0
.2
.4
.6
.8
1.0
Standardized DFBETA Ln(May-June Inflows)
1981
1983
1959
1960


DFFIT vs. DFBETA
Dependent Variable: Ln(Brown Shrimp Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
.8
1.0
1981
1983
1959
1960
Standardized DFBETA Ln(July-August Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Brown Shrimp Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
1981
1983
1959
1960
Standardized DFBETA Ln(September-October Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Brown Shrimp Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1.0
-.5
0.0
.5
1.0
1.5
1981
1983
1960
1959
Standardized DFBETA Ln(November-December Inflows)

Examining Subsets of the Data

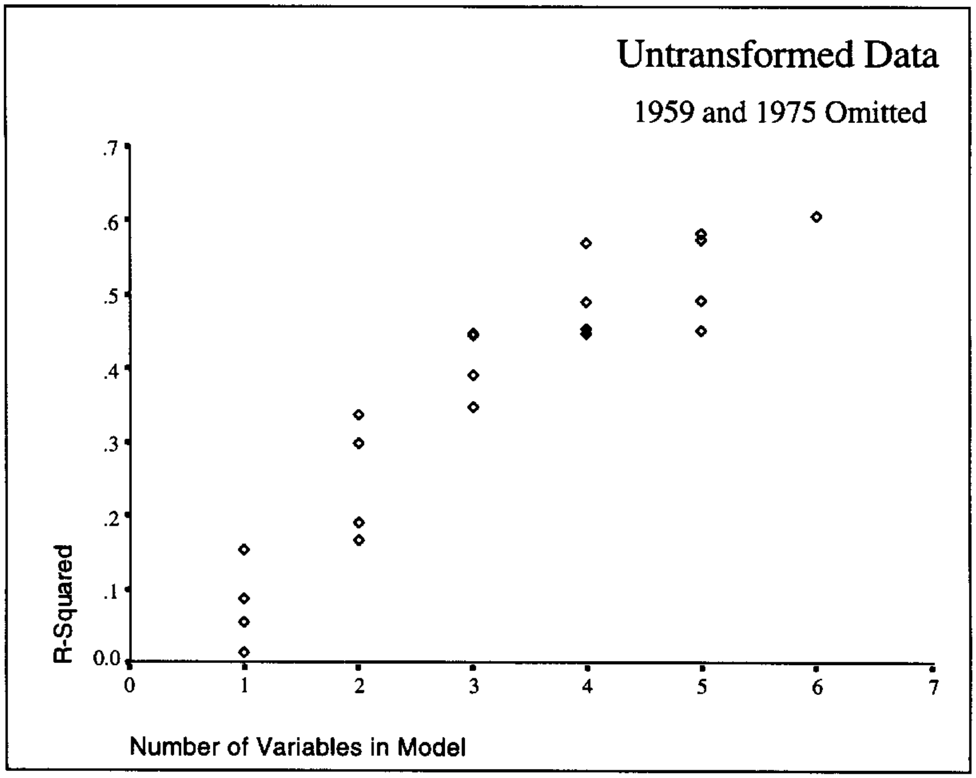
Untransformed Data: 1959 and 1975 Omitted

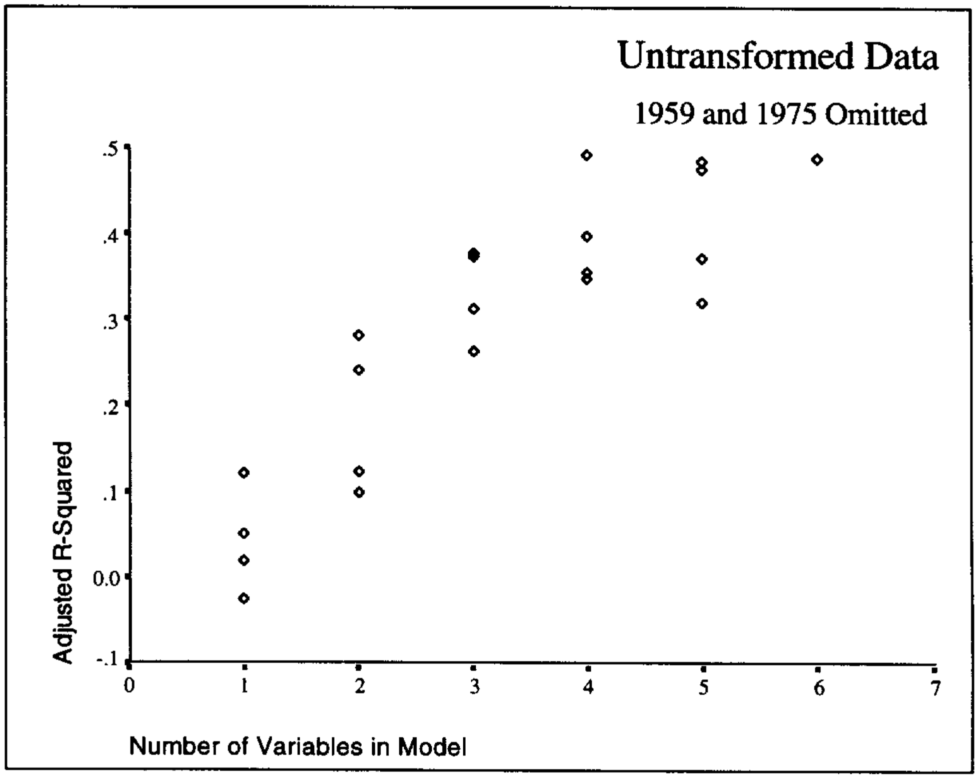
```
N = 27     Regression Models for Dependent Variable: BRSHRIMP

       Rsq    Adj    C(p)     AIC    MSE     SBC Variables in Model
  In          Rsq

   1 0.1558 0.1221  20.05   360.6 588407   363.2 SO_INFL
   1 0.0894 0.0530  23.44   362.7 634708   365.3 JF_INFL
   1 0.0577 0.0200  25.06   363.6 656838   366.2 ND_INFL
   1 0.0163 -.0230  27.17   364.8 685667   367.3 MA_INFL
-------------------------------------------------------------
   2 0.3384 0.2833  12.74   356.0 480359   359.9 JF_INFL ND_INFL
   2 0.3006 0.2423  14.67   357.5 507826   361.4 JF_INFL SO_INFL
   2 0.1924 0.1251  20.19   361.4 586370   365.3 JA_INFL SO_INFL
   2 0.1693 0.1000  21.37   362.2 603189   366.1 SO_INFL ND_INFL
---------------------------------------------------------------------
   3 0.4501 0.3784  9.045   353.0 416626   358.2 JF_INFL SO_INFL ND_INFL
   3 0.4466 0.3745  9.222   353.2 419259   358.4 JF_INFL JA_INFL SO_INFL
   3 0.3933 0.3141  11.94   355.7 459696   360.9 JF_INFL JA_INFL ND_INFL
   3 0.3497 0.2649  14.17   357.6 492701   362.8 JF_INFL MA_INFL ND_INFL
----------------------------------------------------------------------------
   4 0.5712 0.4933  4.866   348.3 339607   354.8 JF_INFL JA_INFL SO_INFL
                                                 ND_INFL
   4 0.4922 0.3998  8.900   352.9 402250   359.4 JF_INFL MA_INFL SO_INFL
                                                 ND_INFL
   4 0.4551 0.3560  10.79   354.8 431625   361.3 JF_INFL MJ_INFL SO_INFL
                                                 ND_INFL
   4 0.4492 0.3490  11.09   355.1 436304   361.6 JF_INFL MJ_INFL JA_INFL
                                                 SO_INFL
-------------------------------------------------------------------------------
   5 0.5851 0.4863  6.161   349.4 344302   357.2 JF_INFL MA_INFL JA_INFL
                                                 SO_INFL ND_INFL
   5 0.5769 0.4762  6.576   350.0 351053   357.7 JF_INFL MJ_INFL JA_INFL
                                                 SO_INFL ND_INFL
   5 0.4942 0.3738  10.79   354.8 419688   362.6 JF_INFL MA_INFL MJ_INFL
                                                 SO_INFL ND_INFL
   5 0.4527 0.3224  12.91   356.9 454141   364.7 JF_INFL MA_INFL MJ_INFL
                                                 JA_INFL SO_INFL
-------------------------------------------------------------------------------
   6 0.6078 0.4902  7.000   349.9 341685   359.0 JF_INFL MA_INFL MJ_INFL
                                                 JA_INFL SO_INFL ND_INFL
-------------------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP   JF_INFL   MA_INFL

  1  MODEL1   PARMS   BRSHRIMP  767.077    988.10      .          .
  2  MODEL1   PARMS   BRSHRIMP  796.686   1777.29   -0.22037      .
  3  MODEL1   PARMS   BRSHRIMP  810.456   1094.60      .          .
  4  MODEL1   PARMS   BRSHRIMP  828.050   1514.99      .      -0.07581
  5  MODEL1   PARMS   BRSHRIMP  693.079   1502.46   -0.47488      .
  6  MODEL1   PARMS   BRSHRIMP  712.619   1425.18   -0.28552      .
  7  MODEL1   PARMS   BRSHRIMP  765.748    757.65      .          .
  8  MODEL1   PARMS   BRSHRIMP  776.652    881.25      .          .
  9  MODEL1   PARMS   BRSHRIMP  645.466   1289.09   -0.47497      .
 10  MODEL1   PARMS   BRSHRIMP  647.502   1118.43   -0.41535      .
 11  MODEL1   PARMS   BRSHRIMP  678.009   1373.38   -0.54108      .
 12  MODEL1   PARMS   BRSHRIMP  701.927   1412.63   -0.51696    0.06899
 13  MODEL1   PARMS   BRSHRIMP  582.758   1019.83   -0.57796      .
 14  MODEL1   PARMS   BRSHRIMP  634.232   1071.66   -0.55946    0.13850
 15  MODEL1   PARMS   BRSHRIMP  656.981   1206.73   -0.48445      .
 16  MODEL1   PARMS   BRSHRIMP  660.533   1166.50   -0.41285      .
```

```
OBS   MJ_INFL    JA_INFL   SO_INFL   ND_INFL   BRSHRIMP   _IN_   _P_   _EDF_

  1   .          .         0.34257   .            -1       1     2      25
  2   .          .         .         .            -1       1     2      25
  3   .          .         .         0.18906      -1       1     2      25
  4   .          .         .         .            -1       1     2      25
  5   .          .         .         0.47779      -1       2     3      24
  6   .          .         0.40608   .            -1       2     3      24
  7   .          0.20898   0.37449   .            -1       2     3      24
  8   .          .         0.30725   0.09663      -1       2     3      24
  9   .          .         0.30739   0.38536      -1       3     4      23
 10   .          0.45839   0.50500   .            -1       3     4      23
 11   .          0.26958   .         0.47626      -1       3     4      23
 12   .          .         .         0.50743      -1       3     4      23
 13   .          0.41928   0.40607   0.35332      -1       4     5      22
 14   .          .         0.36085   0.42879      -1       4     5      22
 15   0.035820   .         0.32624   0.37819      -1       4     5      22
 16  -0.027883   0.48532   0.49756   .            -1       4     5      22

OBS     _MSE_       _RSQ_      _ADJRSQ_      _CP_       _AIC_       _SBC_

  1   588407.29    0.15584     0.12208     20.0519     360.622     363.213
  2   634707.94    0.08942     0.05299     23.4396     362.667     365.259
  3   656838.35    0.05767     0.01997     25.0588     363.592     366.184
  4   685667.42    0.01631    -0.02304     27.1681     364.752     367.344
  5   480358.71    0.33842     0.28329     12.7405     356.042     359.929
  6   507826.49    0.30059     0.24230     14.6698     357.543     361.431
  7   586369.52    0.19241     0.12512     20.1867     361.426     365.313
  8   603188.59    0.16925     0.10002     21.3681     362.189     366.077
  9   416626.38    0.45010     0.37838      9.0446     353.049     358.233
 10   419259.19    0.44663     0.37445      9.2218     353.219     358.403
 11   459695.54    0.39326     0.31412     11.9437     355.705     360.889
 12   492700.86    0.34970     0.26487     14.1654     357.578     362.761
 13   339607.36    0.57125     0.49329      4.8662     348.330     354.809
 14   402250.12    0.49216     0.39983      8.8996     352.901     359.380
 15   431624.60    0.45508     0.35600     10.7909     354.804     361.283
 16   436303.76    0.44917     0.34902     11.0922     355.095     361.574


OBS   _MODEL_   _TYPE_   _DEPVAR_    _RMSE_    INTERCEP    JF_INFL     MA_INFL

 17   MODEL1    PARMS    BRSHRIMP   586.772     915.41    -0.61869    0.08233
 18   MODEL1    PARMS    BRSHRIMP   592.498    1090.48    -0.57666     .
 19   MODEL1    PARMS    BRSHRIMP   647.833    1104.11    -0.56400    0.15778
 20   MODEL1    PARMS    BRSHRIMP   673.900    1142.06    -0.42649    0.04533
 21   MODEL1    PARMS    BRSHRIMP   584.538    1002.91    -0.64448    0.14045

OBS   MJ_INFL    JA_INFL   SO_INFL   ND_INFL   BRSHRIMP   _IN_   _P_   _EDF_

 17   .          0.38062   0.42875   0.38209      -1       5     6      21
 18  -0.041846   0.45910   0.39342   0.35865      -1       5     6      21
 19  -0.027278   .         0.35394   0.44030      -1       5     6      21
 20  -0.044495   0.48183   0.51006   .            -1       5     6      21
 21  -0.095494   0.44419   0.41590   0.41458      -1       6     7      20

OBS     _MSE_       _RSQ_      _ADJRSQ_      _CP_       _AIC_       _SBC_

 17   344301.81    0.58508     0.48629      6.1608     349.445     357.220
 18   351053.45    0.57694     0.47622      6.5758     349.969     357.744
 19   419688.21    0.49423     0.37381     10.7941     354.791     362.566
 20   454140.73    0.45271     0.32241     12.9116     356.921     364.696
 21   341684.69    0.60784     0.49019      7.0000     349.922     358.992
```

Scree Plots


Untransformed Data
1959 and 1975 Omitted
R-Squared
.7
.6
.5
.4
.3
.2
.1
0.0
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1959 and 1975 Omitted
Adjusted R-Squared
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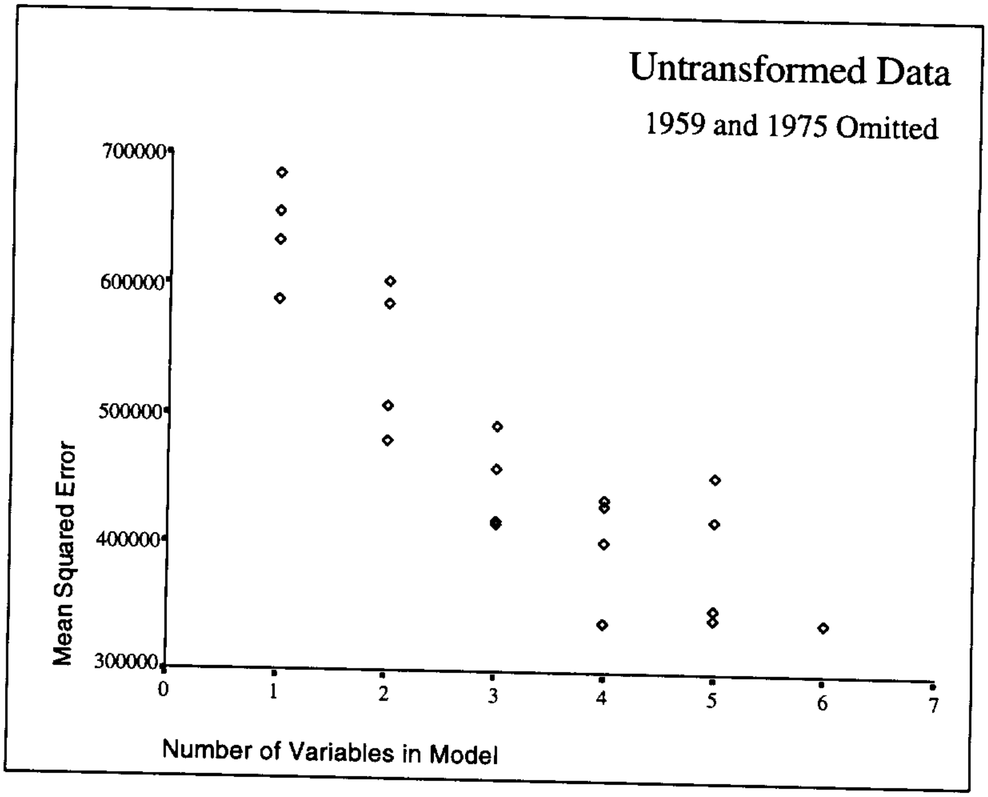
.4
.3
.2
.1
0.0
-.1
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1959 and 1975 Omitted
Mean Squared Error
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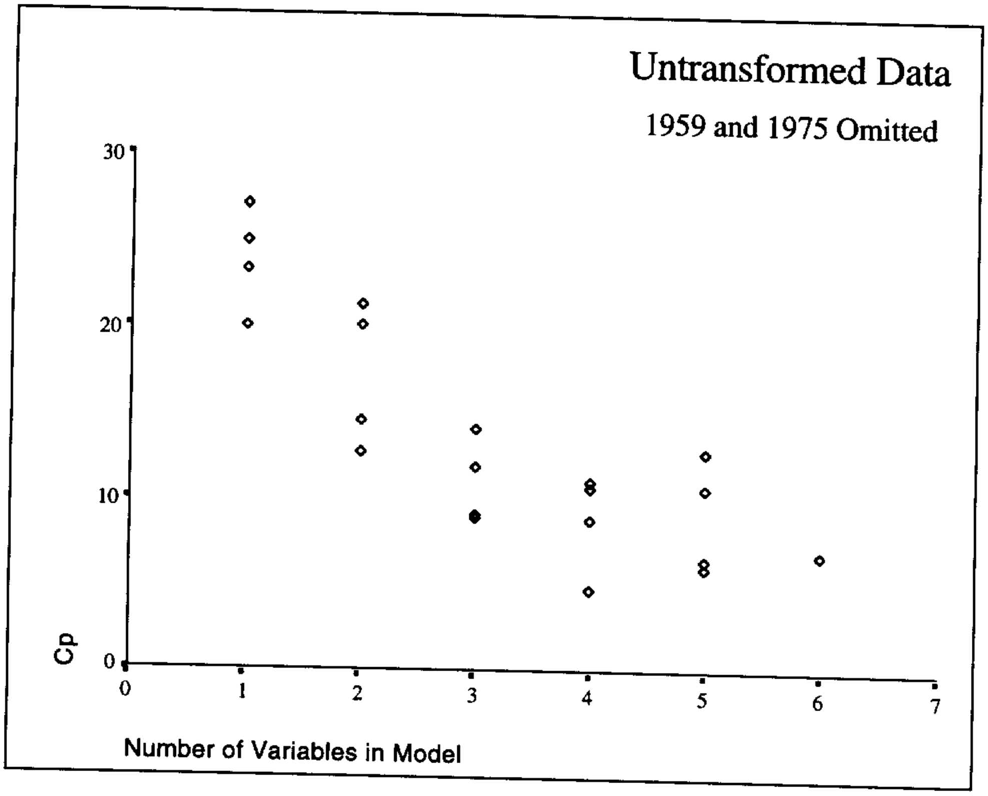
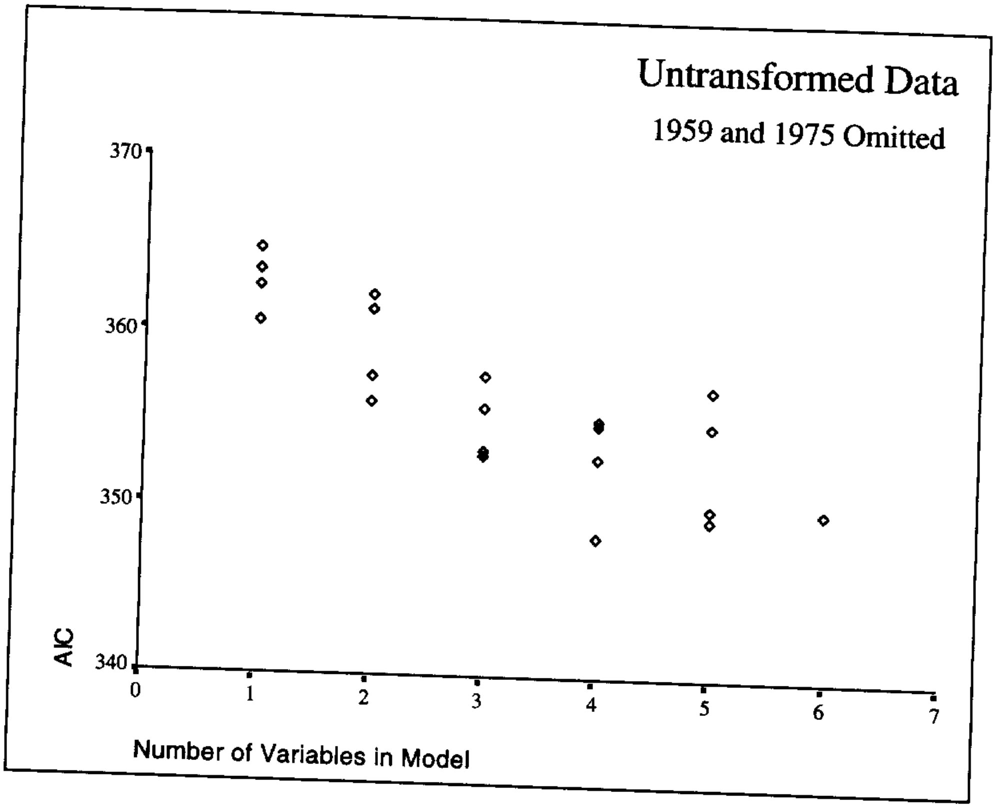
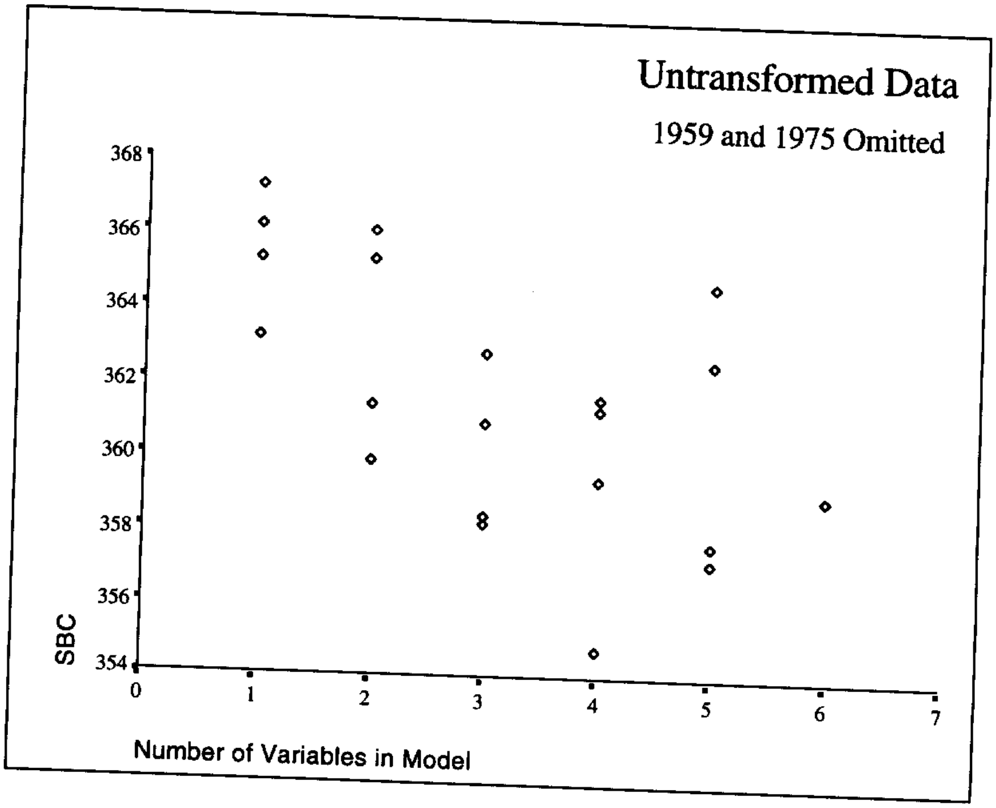
600000
500000
400000
300000
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1959 and 1975 Omitted
Cp
30
20
10
0
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1959 and 1975 Omitted
AIC
370
360
350
340
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1959 and 1975 Omitted
SBC
368
366
364
362
360
358
356
354
0
1
2
3
4
5
6
7
Number of Variables in Model

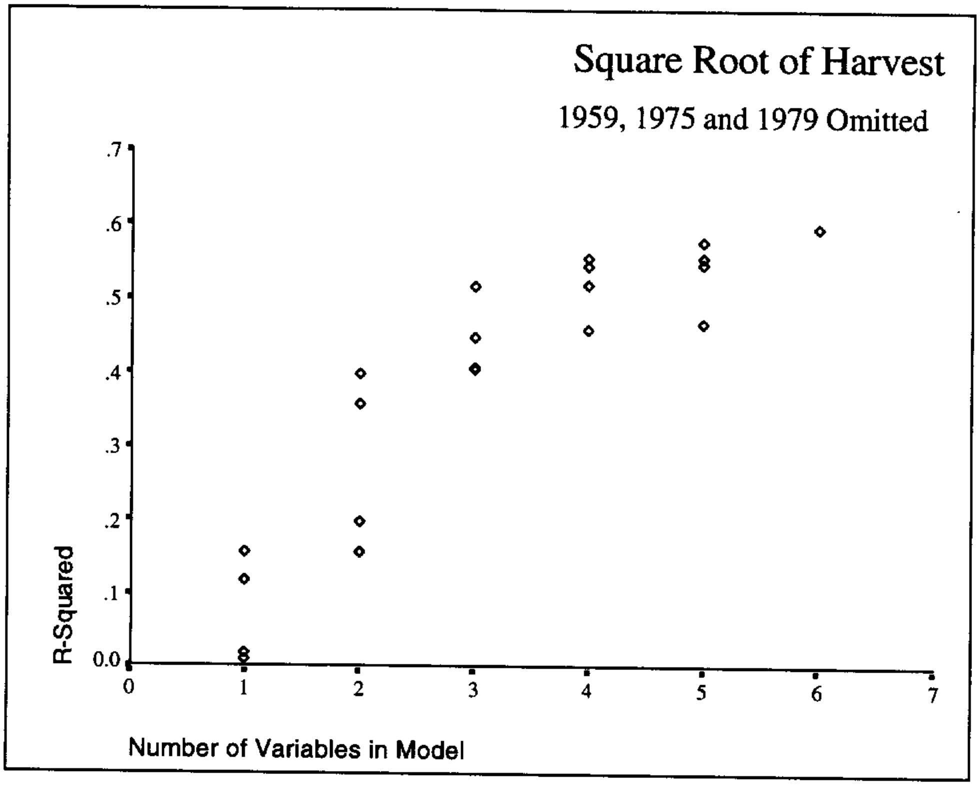
Square Root of Harvest (Box–Cox Transformation): 1959, 1975, and 1979 Omitted

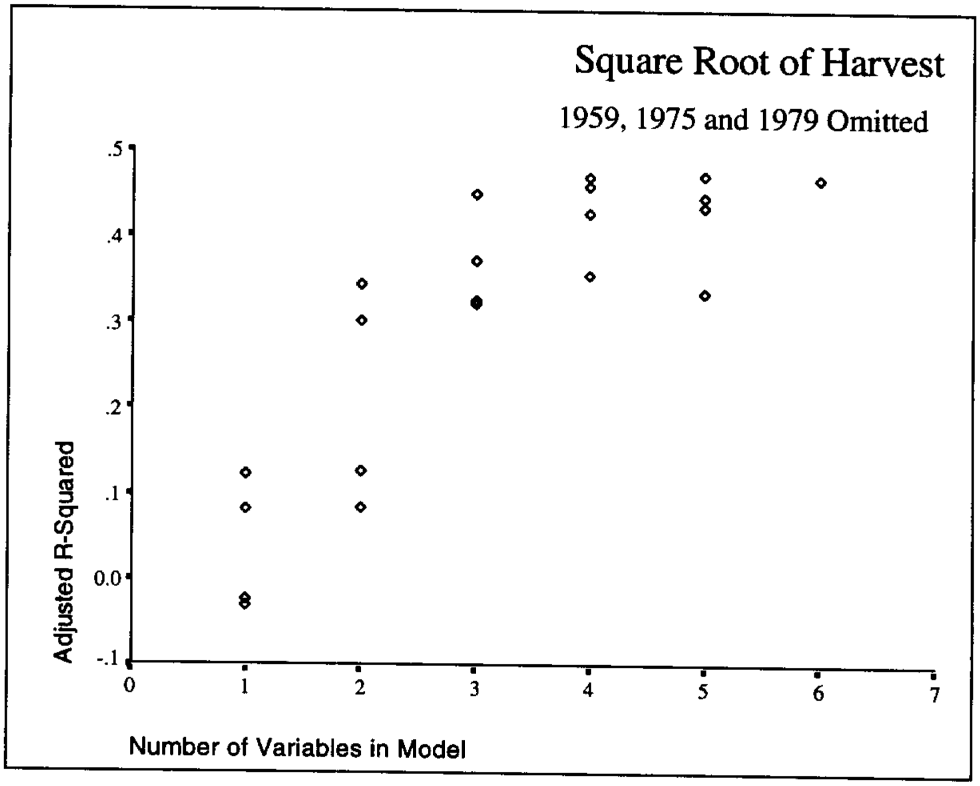
```
 N = 26     Regression Models for Dependent Variable: SQRTBRSH

        Rsq     Adj    C(p)     AIC     MSE    SBC Variables in Model
 In             Rsq

  1 0.1586 0.1235  17.68   131.9   148.4   134.4 JF_INFL
  1 0.1197 0.0831  19.51   133.1   155.3   135.6 SO_INFL
  1 0.0195 -.0213  24.24   135.9   173.0   138.4 ND_INFL
  1 0.0116 -.0296  24.61   136.1   174.4   138.6 MA_INFL
--------------------------------------------------------------
  2 0.3989 0.3467  8.345   125.2   110.6   129.0 JF_INFL ND_INFL
  2 0.3591 0.3034  10.22   126.8   118.0   130.6 JF_INFL SO_INFL
  2 0.1982 0.1284  17.81   132.7   147.6   136.4 JF_INFL JA_INFL
  2 0.1588 0.0857  19.67   133.9   154.8   137.7 JF_INFL MJ_INFL
----------------------------------------------------------------------
  3 0.5177 0.4519  4.745   121.5    92.8   126.5 JF_INFL SO_INFL ND_INFL
  3 0.4493 0.3742  7.967   124.9   106.0   129.9 JF_INFL JA_INFL SO_INFL
  3 0.4077 0.3269  9.930   126.8   114.0   131.8 JF_INFL JA_INFL ND_INFL
  3 0.4050 0.3238  10.06   126.9   114.5   131.9 JF_INFL MA_INFL ND_INFL
------------------------------------------------------------------------------
  4 0.5562 0.4717  4.929   121.3    89.5   127.6 JF_INFL JA_INFL SO_INFL
                                                 ND_INFL
  4 0.5461 0.4596  5.406   121.9    91.5   128.2 JF_INFL MA_INFL SO_INFL
                                                 ND_INFL
  4 0.5195 0.4280  6.660   123.4    96.9   129.6 JF_INFL MJ_INFL SO_INFL
                                                 ND_INFL
  4 0.4594 0.3565  9.491   126.4   109.0   132.7 JF_INFL MA_INFL JA_INFL
                                                 SO_INFL
---------------------------------------------------------------------------------
  5 0.5782 0.4727  5.892   122.0    89.3   129.5 JF_INFL MA_INFL JA_INFL
                                                 SO_INFL ND_INFL
  5 0.5577 0.4471  6.857   123.2    93.6   130.8 JF_INFL MJ_INFL JA_INFL
                                                 SO_INFL ND_INFL
  5 0.5489 0.4361  7.272   123.7    95.5   131.3 JF_INFL MA_INFL MJ_INFL
                                                 SO_INFL ND_INFL
  5 0.4692 0.3365  11.03   127.9   112.4   135.5 JF_INFL MA_INFL MJ_INFL
                                                 JA_INFL SO_INFL
---------------------------------------------------------------------------------
  6 0.5971 0.4698  7.000   122.8    89.8   131.6 JF_INFL MA_INFL MJ_INFL
                                                 JA_INFL SO_INFL ND_INFL
---------------------------------------------------------------------------------
```

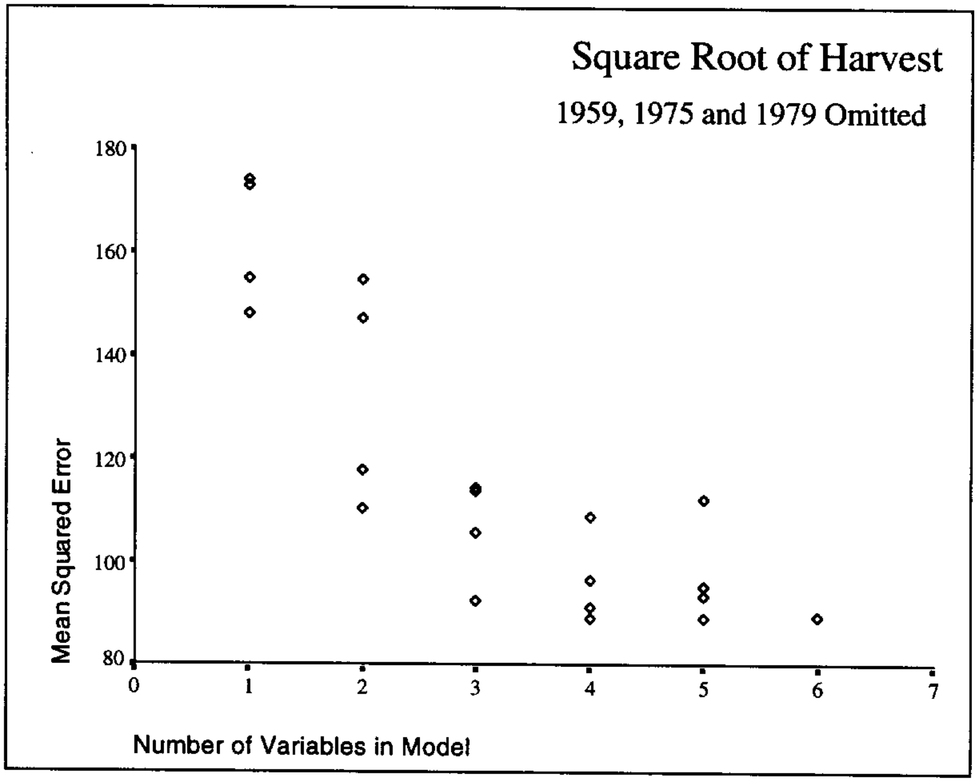
```
OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP   JF_INFL     MA_INFL

 1   MODEL1   PARMS   SQRTBRSH  12.1831   43.1167  -0.004664      .
 2   MODEL1   PARMS   SQRTBRSH  12.4614   29.3726       .         .
 3   MODEL1   PARMS   SQRTBRSH  13.1515   32.2715       .         .
 4   MODEL1   PARMS   SQRTBRSH  13.2049   36.7650       .         .
 5   MODEL1   PARMS   SQRTBRSH  10.5188   38.9330  -0.009171   -.0011054
 6   MODEL1   PARMS   SQRTBRSH  10.8614   37.8027  -0.005883      .
 7   MODEL1   PARMS   SQRTBRSH  12.1490   40.9057  -0.005426      .
 8   MODEL1   PARMS   SQRTBRSH  12.4435   43.3478  -0.004636      .
 9   MODEL1   PARMS   SQRTBRSH   9.6345   35.4246  -0.009388      .
10   MODEL1   PARMS   SQRTBRSH  10.2942   33.6168  -0.007237      .
11   MODEL1   PARMS   SQRTBRSH  10.6762   38.0445  -0.009345      .
12   MODEL1   PARMS   SQRTBRSH  10.7008   37.8761  -0.009536   0.0008397
13   MODEL1   PARMS   SQRTBRSH   9.4592   32.9176  -0.009804      .
14   MODEL1   PARMS   SQRTBRSH   9.5664   32.6239  -0.010232   0.0018763
15   MODEL1   PARMS   SQRTBRSH   9.8426   34.6553  -0.009450      .
16   MODEL1   PARMS   SQRTBRSH  10.4395   32.1227  -0.007604   0.0011135
```

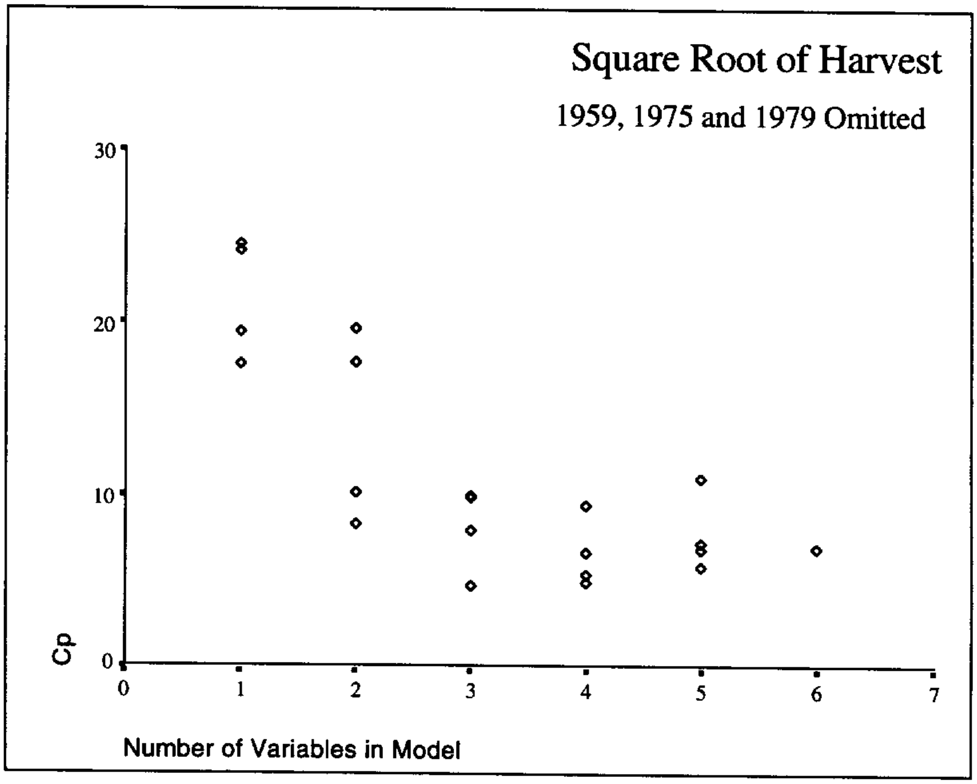
```
OBS   MJ_INFL     JA_INFL    SO_INFL    ND_INFL    SQRTBRSH  _IN_  _P_  _EDF_

  1    .           .          .          .             -1      1    2     24
  2    .           .         .0047382    .             -1      1    2     24
  3    .           .          .         .0017349       -1      1    2     24
  4    .           .          .          .             -1      1    2     24
  5    .           .          .         .0077366       -1      2    3     23
  6    .           .         .0062954    .             -1      2    3     23
  7    .          .0041864    .          .             -1      2    3     23
  8   -.0001163    .          .          .             -1      2    3     23
  9    .           .         .0049770   .0064556       -1      3    4     22
 10    .          .0064668   .0072084    .             -1      3    4     22
 11    .          .0020227    .         .0074042       -1      3    4     22
 12    .           .          .         .0079512       -1      3    4     22
 13    .          .0044039   .0057892   .0055228       -1      4    5     21
 14    .           .         .0056000   .0067748       -1      4    5     21
 15   0.0003405    .         .0051466   .0063619       -1      4    5     21
 16    .          .0063151   .0075954    .             -1      4    5     21

OBS   _MSE_     _RSQ_     _ADJRSQ_     _CP_      _AIC_     _SBC_

  1  148.429   0.15860    0.12354    17.6774   131.922   134.438
  2  155.286   0.11973    0.08305    19.5104   133.096   135.612
  3  172.962   0.01953   -0.02132    24.2355   135.899   138.415
  4  174.368   0.01156   -0.02963    24.6114   136.109   138.625
  5  110.645   0.39892    0.34665     8.3448   125.177   128.951
  6  117.969   0.35913    0.30340    10.2211   126.843   130.618
  7  147.598   0.19817    0.12845    17.8113   132.669   136.443
  8  154.840   0.15883    0.08568    19.6666   133.915   137.689
  9   92.823   0.51766    0.45189     4.7453   121.455   126.487
 10  105.971   0.44934    0.37425     7.9672   124.899   129.931
 11  113.982   0.40771    0.32695     9.9301   126.794   131.826
 12  114.508   0.40498    0.32384    10.0589   126.913   131.946
 13   89.476   0.55619    0.47165     4.9287   121.290   127.581
 14   91.515   0.54607    0.45961     5.4055   121.876   128.167
 15   96.876   0.51948    0.42795     6.6595   123.356   129.647
 16  108.983   0.45943    0.35647     9.4912   126.418   132.708


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP   JF_INFL     MA_INFL

 17  MODEL1   PARMS   SQRTBRSH    9.4496   30.6444  -0.010517  0.0016604
 18  MODEL1   PARMS   SQRTBRSH    9.6762   33.4666  -0.009778   .
 19  MODEL1   PARMS   SQRTBRSH    9.7719   33.2083  -0.010305  0.0022399
 20  MODEL1   PARMS   SQRTBRSH   10.6000   32.8678  -0.007729  0.0017776
 21  MODEL1   PARMS   SQRTBRSH    9.4753   31.6213  -0.010820  0.0026130

OBS   MJ_INFL     JA_INFL    SO_INFL    ND_INFL    SQRTBRSH  _IN_  _P_  _EDF_

 17    .          .0040436   .0062740   .0058816       -1      5    6     20
 18   -.0003387   .0047838   .0056905   .0055356       -1      5    6     20
 19   -.0004989    .         .0054722   .0069739       -1      5    6     20
 20   -.0010067   .0073679   .0075427    .             -1      5    6     20
 21   -.0014078   .0054161   .0061423   .0061403       -1      6    7     19

OBS   _MSE_     _RSQ_     _ADJRSQ_     _CP_      _AIC_     _SBC_

 17   89.295   0.57818    0.47272     5.8917   121.969   129.518
 18   93.630   0.55770    0.44713     6.8573   123.202   130.750
 19   95.490   0.54891    0.43614     7.2716   123.713   131.262
 20  112.360   0.46922    0.33652    11.0297   127.943   135.492
 21   89.781   0.59709    0.46985     7.0000   122.777   131.583
```

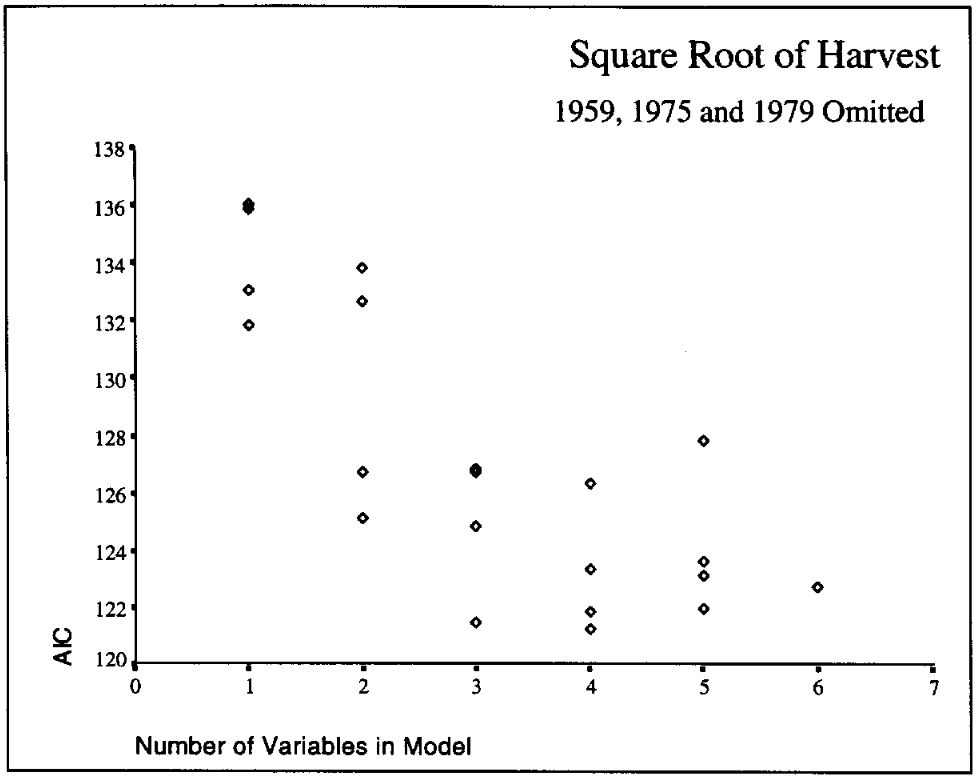
Scree Plots

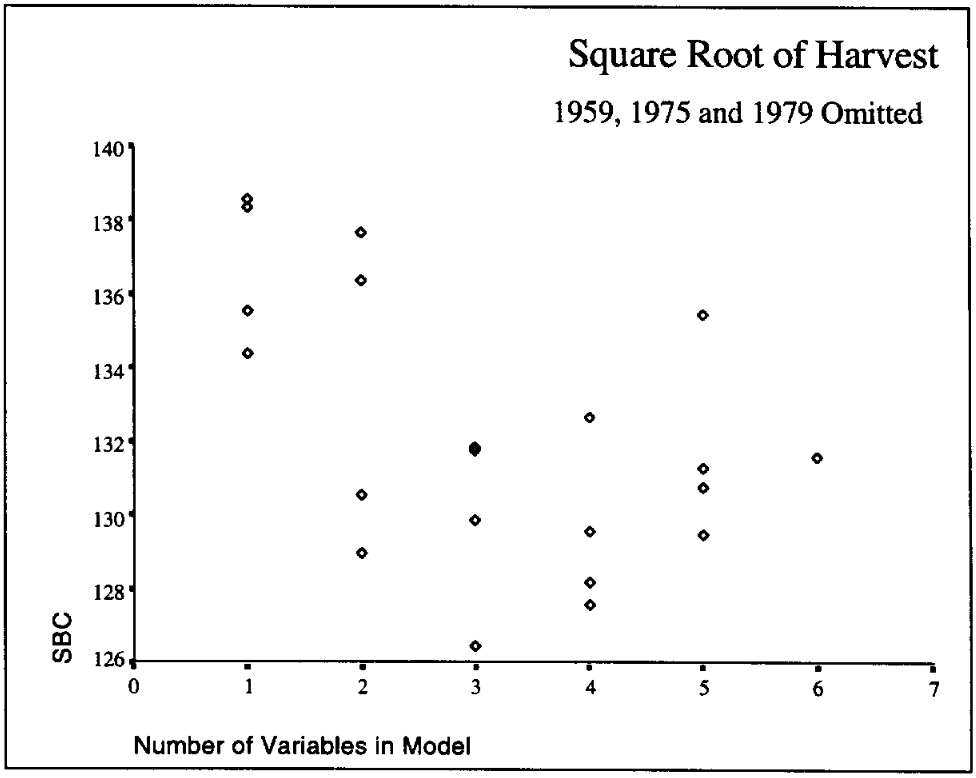

Square Root of Harvest
1959, 1975 and 1979 Omitted
R-Squared
.7
.6
.5
.4
.3
.2
.1
0.0
0
1
2
3
4
5
6
7
Number of Variables in Model


Square Root of Harvest
1959, 1975 and 1979 Omitted
Adjusted R-Squared
.5
.4
.3
.2
.1
0.0
-.1
0
1
2
3
4
5
6
7
Number of Variables in Model


Square Root of Harvest
1959, 1975 and 1979 Omitted
Mean Squared Error
180
160
140
120
100
80
0
1
2
3
4
5
6
7
Number of Variables in Model


Square Root of Harvest
1959, 1975 and 1979 Omitted
Cp
30
20
10
0
0
1
2
3
4
5
6
7
Number of Variables in Model


Square Root of Harvest
1959, 1975 and 1979 Omitted
AIC
138
136
134
132
130
128
126
124
122
120
0
1
2
3
4
5
6
7
Number of Variables in Model


Square Root of Harvest
1959, 1975 and 1979 Omitted
SBC
140
138
136
134
132
130
128
126
0
1
2
3
4
5
6
7
Number of Variables in Model

All Variables Logged: 1960 Omitted

```
N = 28     Regression Models for Dependent Variable: LBSHRIMP

        Rsq     Adj    C(p)     AIC     MSE     SBC Variables in Model
  In            Rsq

   1 0.0853 0.0502  9.567  3.504  1.058   6.168 LGJFINFL
   1 0.0490 0.0124  10.90  4.594  1.100   7.259 LGNDINFL
   1 0.0348 -.0024  11.42  5.011  1.117   7.675 LGMAINFL
   1 0.0312 -.0060  11.55  5.113  1.121   7.778 LGJAINFL
-------------------------------------------------------------
   2 0.3884 0.3395  0.444 -5.767  0.736 -1.770 LGJFINFL LGNDINFL
   2 0.1073 0.0359  10.76  4.823  1.074   8.819 LGMAINFL LGNDINFL
   2 0.0952 0.0228  11.21  5.200  1.088   9.197 LGJFINFL LGSOINFL
   2 0.0942 0.0218  11.24  5.230  1.090   9.227 LGJFINFL LGJAINFL
----------------------------------------------------------------------
   3 0.4150 0.3419  1.468 -5.012  0.733   0.317 LGJFINFL LGMAINFL LGNDINFL
   3 0.3973 0.3220  2.118 -4.177  0.755   1.152 LGJFINFL LGSOINFL LGNDINFL
   3 0.3908 0.3146  2.358 -3.875  0.763   1.454 LGJFINFL LGJAINFL LGNDINFL
   3 0.3898 0.3135  2.394 -3.830  0.765   1.499 LGJFINFL LGMJINFL LGNDINFL
------------------------------------------------------------------------------
   4 0.4256 0.3257  3.080 -3.522  0.751   3.139 LGJFINFL LGMAINFL LGJAINFL
                                                LGNDINFL
   4 0.4188 0.3177  3.330 -3.192  0.760   3.469 LGJFINFL LGMAINFL LGSOINFL
                                                LGNDINFL
   4 0.4171 0.3157  3.394 -3.109  0.762   3.552 LGJFINFL LGMAINFL LGMJINFL
                                                LGNDINFL
   4 0.3991 0.2945  4.054 -2.258  0.786   4.404 LGJFINFL LGJAINFL LGSOINFL
                                                LGNDINFL
-------------------------------------------------------------------------------
   5 0.4278 0.2977  5.001 -1.628  0.782   6.366 LGJFINFL LGMAINFL LGJAINFL
                                                LGSOINFL LGNDINFL
   5 0.4257 0.2952  5.076 -1.529  0.785   6.465 LGJFINFL LGMAINFL LGMJINFL
                                                LGJAINFL LGNDINFL
   5 0.4210 0.2894  5.250 -1.298  0.792   6.695 LGJFINFL LGMAINFL LGMJINFL
                                                LGSOINFL LGNDINFL
   5 0.4031 0.2675  5.904 -0.448  0.816   7.545 LGJFINFL LGMJINFL LGJAINFL
                                                LGSOINFL LGNDINFL
-------------------------------------------------------------------------------
   6 0.4278 0.2643  7.000  0.371  0.819   9.696 LGJFINFL LGMAINFL LGMJINFL
                                                LGJAINFL LGSOINFL LGNDINFL
-------------------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

  1  MODEL1   PARMS   LBSHRIMP  1.02859    9.5052  -0.35890      .
  2  MODEL1   PARMS   LBSHRIMP  1.04882    5.0448      .         .
  3  MODEL1   PARMS   LBSHRIMP  1.05665    8.7091      .      -0.24958
  4  MODEL1   PARMS   LBSHRIMP  1.05858    8.5136      .         .
  5  MODEL1   PARMS   LBSHRIMP  0.85774    7.6390  -0.95188      .
  6  MODEL1   PARMS   LBSHRIMP  1.03628    6.9767      .      -0.33146
  7  MODEL1   PARMS   LBSHRIMP  1.04329    8.7375  -0.37297      .
  8  MODEL1   PARMS   LBSHRIMP  1.04385   10.1425  -0.32292      .
  9  MODEL1   PARMS   LBSHRIMP  0.85618    6.5477  -1.16891   0.28873
 10  MODEL1   PARMS   LBSHRIMP  0.86904    8.2980  -0.97458      .
 11  MODEL1   PARMS   LBSHRIMP  0.87374    7.9819  -0.92891      .
 12  MODEL1   PARMS   LBSHRIMP  0.87444    7.4078  -0.97296      .
 13  MODEL1   PARMS   LBSHRIMP  0.86666    7.0909  -1.16137   0.34658
 14  MODEL1   PARMS   LBSHRIMP  0.87178    7.0742  -1.16640   0.26531
 15  MODEL1   PARMS   LBSHRIMP  0.87307    6.7050  -1.17190   0.33130
 16  MODEL1   PARMS   LBSHRIMP  0.88645    8.5711  -0.95409      .
```

```
OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  LBSHRIMP  _IN_  _P_  _EDF_

  1      .          .         .         .        -1      1     2     26
  2      .          .         .      0.26386     -1      1     2     26
  3      .          .         .         .        -1      1     2     26
  4      .      -0.24347      .         .        -1      1     2     26
  5      .          .         .      0.87260     -1      2     3     25
  6      .          .         .      0.32921     -1      2     3     25
  7      .          .      0.12782      .        -1      2     3     25
  8      .      -0.13606      .         .        -1      2     3     25
  9      .          .         .      0.95447     -1      3     4     24
 10      .          .     -0.12906   0.92690     -1      3     4     24
 11      .      -0.07026      .      0.86616     -1      3     4     24
 12   0.05548       .         .      0.86747     -1      3     4     24
 13      .      -0.15613      .      0.95655     -1      4     5     23
 14      .          .     -0.08577   0.98392     -1      4     5     23
 15  -0.07635       .         .      0.97359     -1      4     5     23
 16      .      -0.06042  -0.12480   0.91957     -1      4     5     23

OBS    _MSE_      _RSQ_     _ADJRSQ_     _CP_      _AIC_      _SBC_

  1   1.05801    0.08534    0.05016     9.5675    3.50381    6.16822
  2   1.10003    0.04901    0.01244    10.9006    4.59432    7.25872
  3   1.11651    0.03476   -0.00236    11.4236    5.01078    7.67519
  4   1.12060    0.03123   -0.00603    11.5533    5.11313    7.77754
  5   0.73571    0.38843    0.33950     0.4443   -5.76680   -1.77019
  6   1.07388    0.10732    0.03591    10.7607    4.82264    8.81925
  7   1.08845    0.09521    0.02283    11.2051    5.19991    9.19652
  8   1.08963    0.09424    0.02177    11.2410    5.23017    9.22679
  9   0.73304    0.41503    0.34191     1.4681   -5.01183    0.31699
 10   0.75523    0.39732    0.32199     2.1179   -4.17692    1.15190
 11   0.76342    0.39078    0.31463     2.3578   -3.87485    1.45397
 12   0.76464    0.38981    0.31353     2.3938   -3.82988    1.49893
 13   0.75110    0.42559    0.32569     3.0805   -3.52206    3.13896
 14   0.76000    0.41878    0.31770     3.3304   -3.19202    3.46900
 15   0.76226    0.41706    0.31567     3.3937   -3.10907    3.55195
 16   0.78580    0.39905    0.29454     4.0544   -2.25751    4.40352


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

 17  MODEL1   PARMS   LBSHRIMP  0.88447    7.4580   -1.15995   0.32467
 18  MODEL1   PARMS   LBSHRIMP  0.88603    7.0817   -1.15993   0.33775
 19  MODEL1   PARMS   LBSHRIMP  0.88969    7.2496   -1.16945   0.30909
 20  MODEL1   PARMS   LBSHRIMP  0.90329    8.3155   -0.97368      .
 21  MODEL1   PARMS   LBSHRIMP  0.90526    7.4477   -1.15927   0.32072

OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  LBSHRIMP  _IN_  _P_  _EDF_

 17      .     -0.14551  -0.06583   0.97902     -1      5     6     22
 18   0.02320  -0.16722      .      0.95089     -1      5     6     22
 19  -0.07945      .     -0.08769   1.00448     -1      5     6     22
 20   0.12120  -0.13126  -0.10599   0.89396     -1      5     6     22
 21   0.01130  -0.15108  -0.06479   0.97590     -1      6     7     21

OBS    _MSE_      _RSQ_     _ADJRSQ_     _CP_      _AIC_      _SBC_

 17   0.78228    0.42775    0.29770     5.0011   -1.62763    6.36560
 18   0.78505    0.42572    0.29521     5.0756   -1.52859    6.46464
 19   0.79155    0.42097    0.28938     5.2499   -1.29793    6.69530
 20   0.81593    0.40314    0.26749     5.9044   -0.44850    7.54473
 21   0.81949    0.42778    0.26429     7.0000    0.37084    9.69627
```

Seatrout Harvests in Galveston Bay:
A Regression Analysis

Harvest vs. Freshwater Inflows

F. Michael Speed
Jacqueline Kiffe

Department of Statistics
Texas A&M University

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Department of Statistics
Texas A&M University

Table of Contents

Variable Selection

For each regression, residuals were plotted against each of the independent variables to look for nonlinear relationships between the response variable and individual predictors. Partial residual plots were employed to examine the overall relationship between the response and individual predictors. A partial residual is a corollary to the deleted residual. That is, the model is fitted without a given variable and the predicted response and corresponding residual are calculated for each observation. This seeks to answer the question, "What is the relationship of this predictor to the response variable, taking all other variables into account?" Thus, it examines the marginal relationship of a given predictor to the response.

Numerous measures have been developed over the years to assess the adequacy of a given model. We examined a number of these, including R^2 and mean squared error (MSE), and several others which directly incorporate penalties for having too many predictors in the model, such as adjusted R^2, C_p, AIC, and SBC. It is well-established that too many predictors in a model can lead to bad prediction, just as too few can, and these measures are used as part of the attempt to find an optimal model.

Multicollinearity

Multicollinearity arises when one or more variables are closely approximated by linear combinations of the remaining variables, resulting in unstable coefficient estimates. The variance inflation factor (VIF) was calculated for each coefficient estimate to measure this instability, which is not usually considered profound for VIF's less that 10. Additionally, the condition index (a ratio of eigenvalues of the covariance matrix, with the largest eigenvalue always on top) was calculated. A ratio greater than 30 is considered cause for concern.

Other Procedures

Several other miscellaneous diagnostics, including the Durbin-Watson test for serial autocorrelation, were performed, and no general problems were detected. The Box-Cox procedure, used to find a transformation to normality, was also performed.

How the Final Model Was Chosen

Selecting the Data Set Used. First, the variables were explored thoroughly, individually and in pairs, in a first effort to detect outliers. The SAS® programming language allows a number of diagnostics to be calculated for a group of models on a given data set without actually performing a formal regression, thus allowing one to examine a large number of models quite efficiently. In addition to the untransformed data, three transformed data sets were selected for this procedure, based on prior experience. Before we proceeded, the Box-Cox procedure was performed to find if a transformation to normality was suggested. The recommended transformation was the square root of harvest. At this point, there were five data sets for which the diagnostic series was calculated:

1. Untransformed data
2. Square root of harvest; remaining variables untransformed

3. Natural log of inflow variables; harvest untransformed
4. Natural log of harvest; inflows untransformed
5. Natural log of all variables

Selecting the Points to be Omitted. The results were quite poor for each of these five data sets; the highest value of R^2 was 0.21, which occurred with the fifth data set. The next highest value of R^2 was only 0.17, and this occurred with the fourth data set. Sometimes removing one or two outliers can have a dramatic impact on measures of fit. To this end, full regressions were performed on models from the last three data sets (which yielded the three highest values for R^2). Each model contained all predictors in the given data set. A number of diagnostics were employed to determine potentially influential points; the results are summarized in the table below. (An asterisk indicates that the observation year was deleted for subsequent analysis.) The abbreviation key and a similar summary table for points designated as potentially influential by box plots appear on the next page. A point was not considered to be a potential problem unless it garnered multiple flags.

	BOX	SDR	LEV	MAH	COO	SDF	SDB	Total
Data Set 3								
1962						1		1
1965	1							1
***1977**						1	1	2
1978						1		1
1979			1					1
1981			1					1
Data Set 4								
***1962**	1	1				1	2	5
***1977**			1			1	1	3
1979			1					1
1981	1		1					2
Data Set 5								
***1962**	1	1				1	2	5
1965	1							1
***1977**						1		1
1979			1					1
1981			1					1

Summary of points flagged by diagnostic measures

Key to Abbreviations:

BOX	Box plot
SDR	Studentized deleted residual
LEV	Leverage value
MAH	Mahalanobis distance
COO	Cook's distance
SDF	Standardized Dffits value
SDB	Standardized Dfbeta value

Year	**Variable**
1962	Natural log of Seatrout Harvest
1965	Natural log of July-August Inflows
1981	July-August Inflows

Summary of points flagged by box plots

Selecting the Final Candidate Models. After removing the flagged points, regression diagnostics were again run for twenty-one models for each of four data subsets: data set 3 without 1977, data set 4 without 1962 or 1977, data set 5 without 1962, and data set 5 without 1962 or 1977. The improvement in fit for the best models of each size was considerable, with the last data subset showing marked superiority to its nearest competitor. Thus, we limit our examination to the two best models from the data set with all variables logged, with 1962 and 1977 omitted.

1962 and 1977 Omitted:

5a. The natural log of harvest regressed on the natural logs of January-February, September-October, and November-December inflows

5b. The natural log of harvest regressed on the natuaral logs of January-February, March-April, September-October, and November-December inflows

Selecting the Final Model. These two models were tested on both the full data set and the subset with 1962 and 1977 omitted. In each case, the regression was performed and the set of adjusted predicted values obtained. (The adjusted predicted value for each observation is obtained by fitting the model without the given observation, then using that fitted model to make a prediction for that observation.) Each adjusted predicted value was translated back to the original units by exponentiating, and then the squared difference between this value and the observed harvest value was calculated. Various descriptive statistics were calculated for these squared differences. (See tabular results.) Model 5a clearly performs better than model 5b in both cases, whether using all 20 data points or the reduced set of 18 data points. The poorer results from the model with the larger number of predictors shows the danger of overfitting the model. Thus, we recommend model 5a as our final choice.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
5a	*18*	*134.3940*	*27671.9095*	*7600.531010*	*8740.136938*
5b	*18*	*59.2452*	*43018.0262*	*9503.882514*	*12603.945495*
5a	*20*	*1.5388*	*37284.0090*	*10581.852541*	*12466.057805*
5b	*20*	*11.7978*	*78363.5812*	*15711.217201*	*20358.251791*

Final Model

Ln(Seatrout Harvest) = 2.935 – 0.612*Ln(January-February Inflows)
– 0.430*Ln(September-October Inflows)
+ 1.348*Ln(November-December Inflows)

Notes on the results. There is no evidence of serial autocorrelation from examining the Durbin-Watson results. The relatively small variance inflation factors (VIF's) indicate no serious multicollinearity, while the condition index *does*. This apparent contradiction is caused by the presence of the intercept term. When the standardized data are analyzed via principal components, the apparent multicollinearity disappears. (See BMDP® output section.) We can get a more accurate version of the condition index (the ratio of largest to smallest eigenvalues) from this output: 2.22099/0.26815 = 8.2826, which is considerably smaller than the 67.493 indicated in the standard regression. (See the shaded area of the BMDP® output for the source of these values.) It is interesting to note that the principal components fitted model is extremely close to our least-squares model. This is the principal components model:

Ln(Seatrout Harvest) = 2.924 – 0.608*Ln(January-February Inflows)
– 0.432*Ln(September-October Inflows)
+ 1.348*Ln(November-December Inflows)

Full regression results for the ordinary least-squares model (at the top of the page) appear beginning on the next page.

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*Ln(November-December Inflows), Ln(January-February Inflows), Ln(September-October Inflows)*[c,d]	.	*.692*	*.479*	*.367*	*.4355*	*1.964*

a. Dependent Variable: Ln(Seatrout Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(January-February Inflows), Ln(September-October Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*2.441*	*3*	*.814*	*4.289*	*.024*[b]
	Residual	*2.655*	*14*	*.190*		
	Total	*5.096*	*17*			

a. Dependent Variable: Ln(Seatrout Harvest)

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(January-February Inflows), Ln(September-October Inflows)

Coefficients[a]

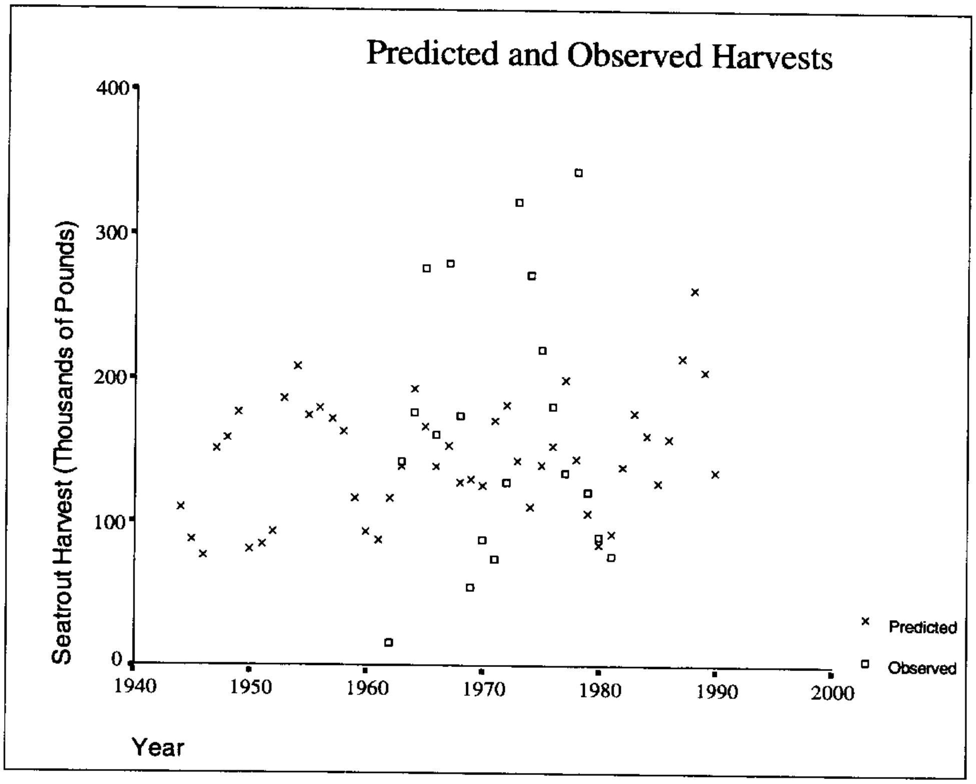
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	*2.935*	*2.122*		*1.383*	*.188*		
	Ln(January-February Inflows)	*-.612*	*.377*	*-.419*	*-1.624*	*.127*	*.559*	*1.789*
	Ln(September-October Inflows)	*-.430*	*.241*	*-.468*	*-1.785*	*.096*	*.541*	*1.848*
	Ln(November-December Inflows)	*1.348*	*.378*	*1.087*	*3.565*	*.003*	*.400*	*2.500*

a. Dependent Variable: Ln(Seatrout Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	Ln(January-February Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	3.994	1.000	.00	.00	.00	.00
	2	4.005E-03	31.579	.17	.03	.61	.00
	3	1.422E-03	53.001	.63	.10	.32	.41
	4	8.767E-04	67.493	.20	.87	.06	.59

a. Dependent Variable: Ln(Seatrout Harvest)



```
BMDP4R - REGRESSION ON PRINCIPAL COMPONENTS AND RIDGE REGRESSION

VARIABLES TO BE USED
     1 year          2 lgstrout     3 lgjfinfl     4 lgsoinfl     5 lgndinfl

  DEPENDENT VARIABLE. . . . .    2
INDEPENDENT VARIABLE(S) . . .    3    4    5
    MODEL SPECIFICATION . . . WITH INTERCEPT

  COMPUTATION BASED ON CORRELATION MATRIX OF INDEPENDENT VARIABLES.
  PRINCIPAL COMPONENTS ARE ENTERED IN ORDER OF
  MAGNITUDE OF CORRELATIONS WITH DEPENDENT VARIABLE.

  MAXIMUM NUMBER OF COMPONENTS TO ENTER . . . .        3
  NUMBER OF COMPONENTS TO ENTER LIMITED BY
  MAGNITUDE OF CORRELATION GREATER THAN . . . .  0.0100


NUMBER OF CASES READ. . . . . . . . . . . . . .       18
```

```
CORRELATION MATRIX


                 lgstrout   lgjfinfl   lgsoinfl   lgndinfl
                     2          3          4          5

lgstrout    2     1.0000
lgjfinfl    3     0.0712     1.0000
lgsoinfl    4     0.0608     0.4894     1.0000
lgndinfl    5     0.4941     0.6615     0.6751     1.0000


EIGENVALUES

     2.22099     0.51086     0.26815

CUMULATIVE PROPORTION OF TOTAL VARIANCE OF INDEPENDENT VARIABLES

     0.74033     0.91062     1.00000


EIGENVECTORS
                    1          2          3
  3 lgjfinfl     0.5567    -0.7222    -0.4105
  4 lgsoinfl     0.5616     0.6913    -0.4546
  5 lgndinfl     0.6121     0.0226     0.7904


DEPENDENT VARIABLE    2 lgstrout

TOTAL SUM OF SQUARES           5.096161
  DEGREES OF FREEDOM        17
         MEAN SQUARE           0.299774


CORRELATION BETWEEN PRINCIPAL COMPONENTS AND DEPENDENT VARIABLE
                 0.25245      0.00250      0.64436

REGRESSION COEFFICIENTS OF PRINCIPAL COMPONENTS
  CONSTANT       COMPONENTS
 (MEAN OF Y)
   5.04637       0.09275      0.00191      0.68130


COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION

 INDEX OF   RESIDUAL        F-VALUES
COMPONENTS   SUM  OF REGRESSION COMPONENT
 ENTERING    SQUARES    MODEL   TO ENTER  R2        CONSTANT     VARIABLES
                                                              3 lgjfinfl
    3        2.98024     11.36     11.36  0.4152      5.4369     -0.7456
    1*       2.65546      6.89      1.83  0.4789      2.9237     -0.6079
    2        2.65542      4.29      0.00  0.4789      2.9352     -0.6116


COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION
(CONTINUED)
          4 lgsoinfl  5 lgndinfl
    3       -0.51948     1.21949
    1*      -0.43213     1.34806
    2       -0.42991     1.34815


-----------------------------------------------------------------------
   * PREDICTED AND RESIDUAL VALUES ARE CALCULATED USING THE
     COEFFICIENTS BASED ON THESE   2 COMPONENTS, SINCE
     THOSE LISTED BELOW DO NOT PASS THE ENTRANCE LIMITS.
-----------------------------------------------------------------------
```

Exploring the Data

Listing of Data

YEAR	SEATROUT	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL	ND_INFL
1962	17.00	2915.47	963.27	1615.30	1059.68	1469.86	2205.60
1963	142.90	2336.83	815.63	1270.07	724.21	1432.16	2208.27
1964	176.90	894.15	689.43	759.57	316.70	1089.76	1105.07
1965	277.00	1140.22	818.07	1192.23	220.39	564.65	1030.93
1966	161.70	1481.65	1358.37	2727.63	560.03	325.37	987.87
1967	280.40	1283.51	1199.18	2828.73	616.20	459.59	1007.86
1968	174.20	1504.38	1932.88	4136.47	844.60	435.08	848.36
1969	55.70	1349.94	2640.94	3676.87	600.78	533.83	706.48
1970	89.20	1514.87	3337.73	3968.77	607.07	489.11	828.41
1971	75.90	849.90	2360.83	1973.78	446.99	859.88	615.13
1972	128.40	976.26	1232.03	1288.20	431.40	923.73	1077.87
1973	323.80	1455.68	2134.83	2664.22	829.55	980.35	1232.31
1974	272.90	2524.91	2348.44	3077.98	868.72	1845.28	1908.59
1975	221.00	2890.51	2857.40	3726.31	1138.54	2253.25	2897.57
1976	181.50	2260.46	1321.18	2439.21	925.46	2254.37	2659.43
1977	134.90	1819.08	2075.70	2395.03	874.23	1085.72	2562.96
1978	344.20	1479.44	1530.34	1315.67	587.24	585.86	1162.82
1979	122.10	2336.64	2853.94	1997.58	1274.52	535.72	1259.39
1980	90.60	2491.90	2356.53	2213.29	1264.55	1229.99	1006.62
1981	77.80	1895.84	2285.70	3516.54	1686.25	1407.21	767.72

SEATROUT	Seatrout harvest (thousands of pounds)
JF_INFL	Lagged January-February inflows (thousands of acre-feet)
MA_INFL	Lagged March-April inflows (thousands of acre-feet)
MJ_INFL	Lagged May-June inflows (thousands of acre-feet)
JA_INFL	Lagged July-August inflows (thousands of acre-feet)
SO_INFL	Lagged September-October inflows (thousands of acre-feet)
ND_INFL	Lagged November-December inflows (thousands of acre-feet)

Examination of Individual Variables

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Seatrout Harvest	.140	20	.200*	.951	20	.423
Ln(Seatrout Harvest)	.131	20	.200*	.908	20	.059
Square Root of Seatrout Harvest	.112	20	.200*	.974	20	.793
January-February Inflows	.203	20	.030	.930	20	.205
March-April Inflows	.137	20	.200*	.948	20	.387
May-June Inflows	.115	20	.200*	.955	20	.455
July-August Inflows	.138	20	.200*	.962	20	.555
September-October Inflows	.178	20	.096	.897	20	.039
November-December Inflows	.280	20	.000	.832	20	.010*
Ln(January-February Inflows)	.144	20	.200*	.945	20	.361
Ln(March-April Inflows)	.171	20	.127	.929	20	.196
Ln(May-June Inflows)	.116	20	.200*	.940	20	.309
Ln(July-August Inflows)	.120	20	.200*	.971	20	.743
Ln(September-October Inflows)	.164	20	.162	.949	20	.402
Ln(November-December Inflows)	.198	20	.039	.911	20	.069

*. This is a lower bound of the true significance.

**. This is an upper bound of the true significance.

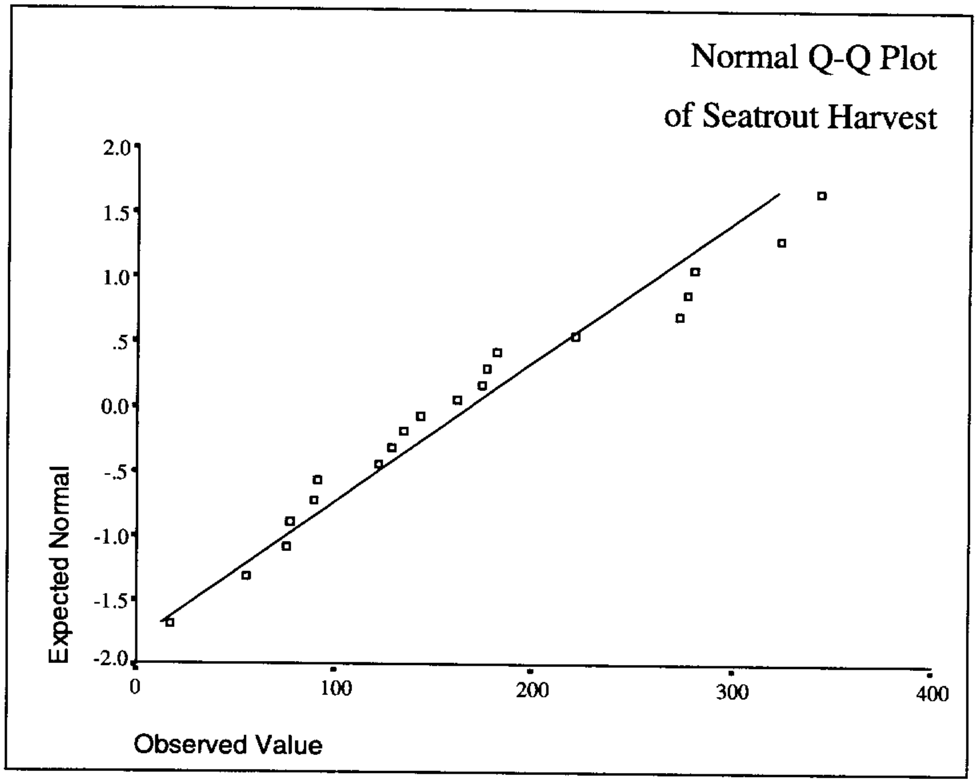
a. Lilliefors Significance Correction

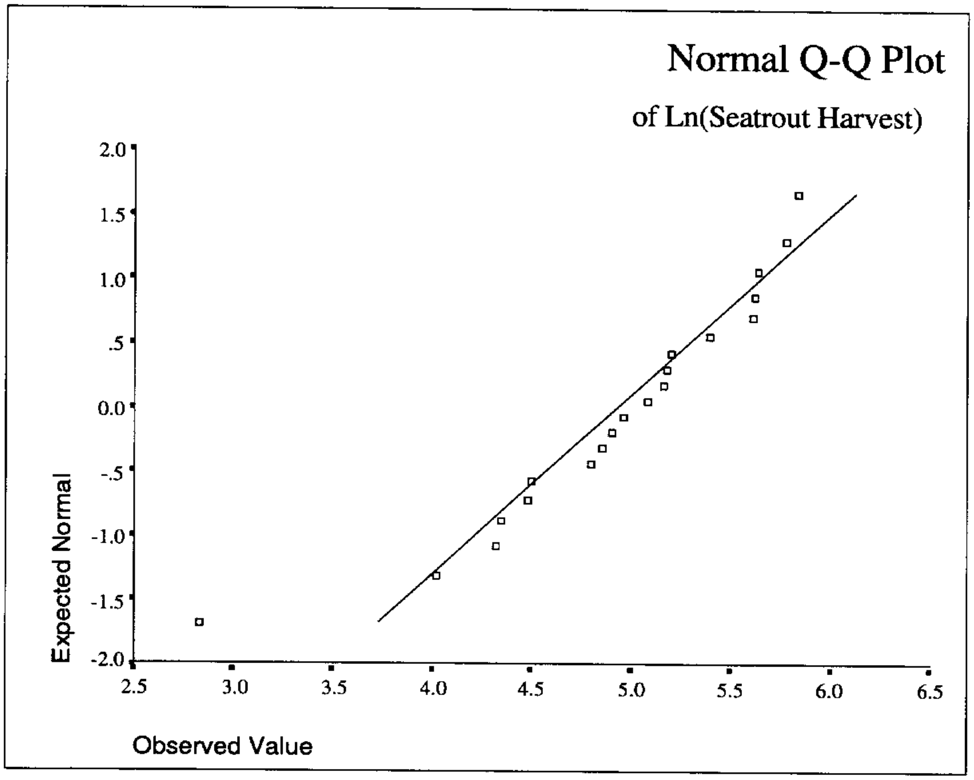
Descriptives

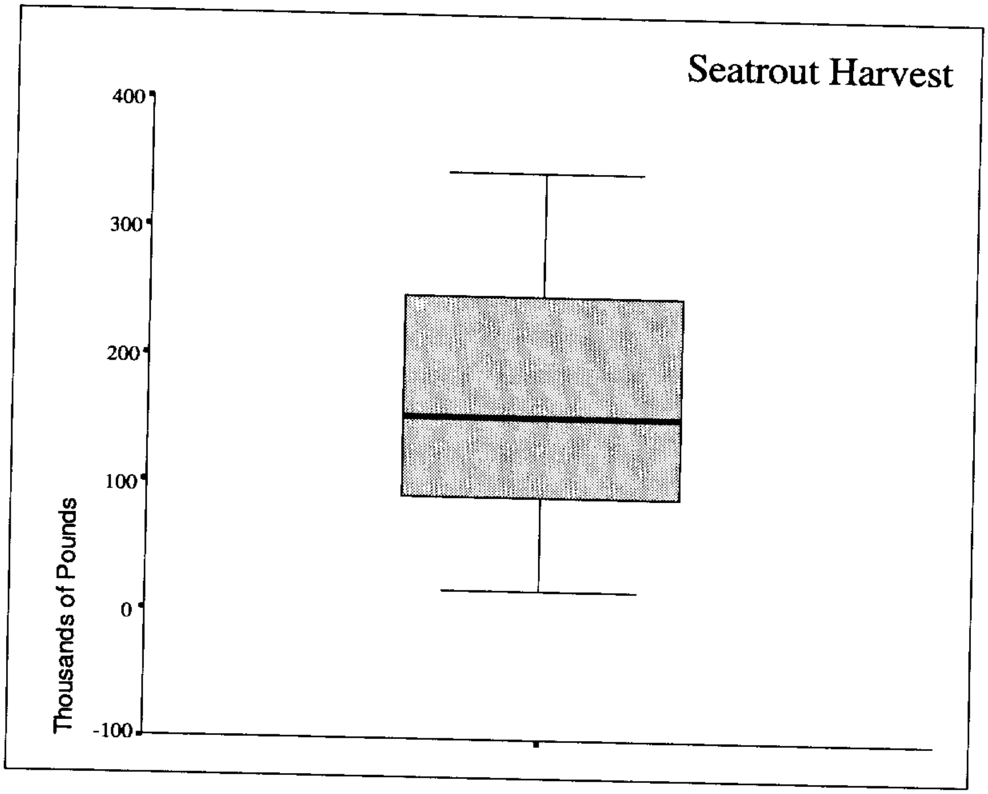
			Statistic	Std. Error
Seatrout Harvest	Mean		*167.4050*	*20.7499*
	95% Confidence Interval for Mean	Lower Bound	*123.9750*	
		Upper Bound	*210.8350*	
	5% Trimmed Mean		*165.9389*	
	Median		*152.3000*	
	Variance		*8611.152*	
	Std. Deviation		*92.7963*	
	Minimum		*17.00*	
	Maximum		*344.20*	
	Range		*327.20*	
	Interquartile Range		*170.3750*	
	Skewness		*.441*	*.512*
	Kurtosis		*-.717*	*.992*

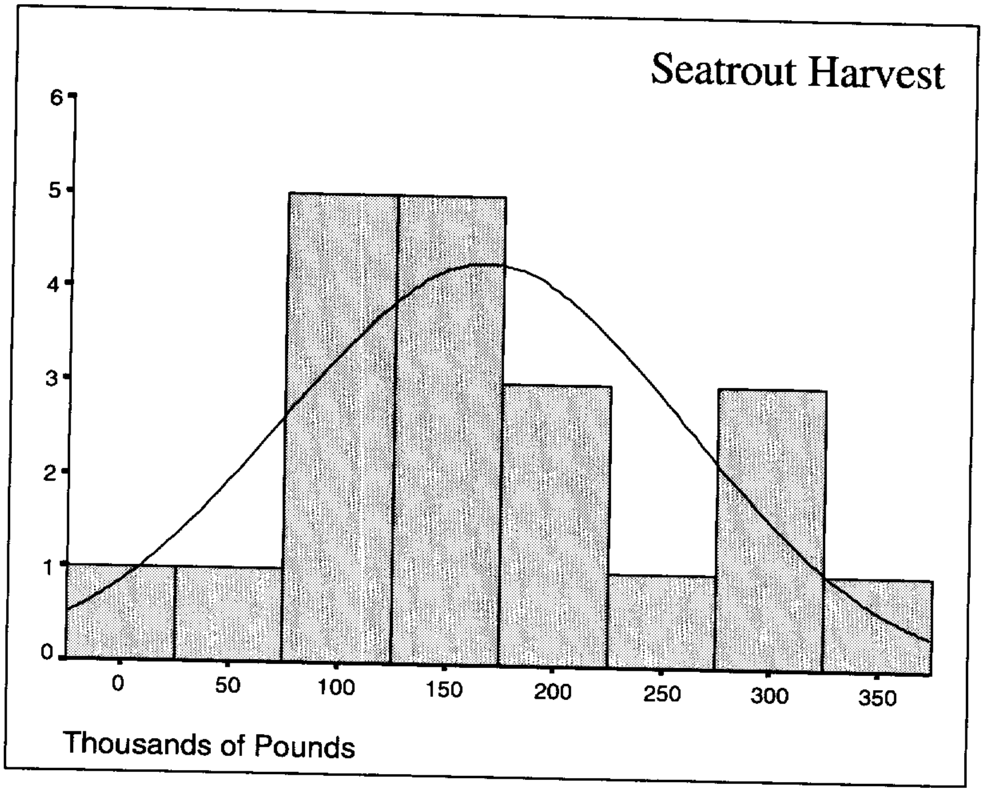
Extreme Values

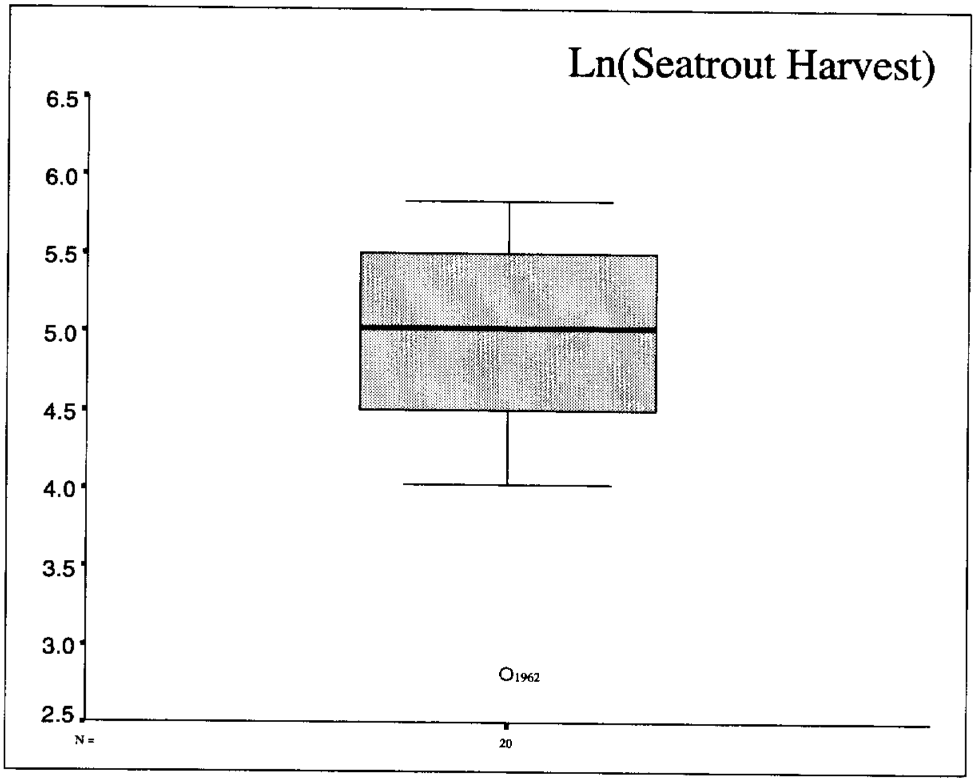
			Case Number	Year	Value
Seatrout Harvest	Highest	1	*17*	*1978*	*344.20*
		2	*12*	*1973*	*323.80*
		3	*6*	*1967*	*280.40*
		4	*4*	*1965*	*277.00*
		5	*13*	*1974*	*272.90*
	Lowest	1	*1*	*1962*	*17.00*
		2	*8*	*1969*	*55.70*
		3	*10*	*1971*	*75.90*
		4	*20*	*1981*	*77.80*
		5	*9*	*1970*	*89.20*

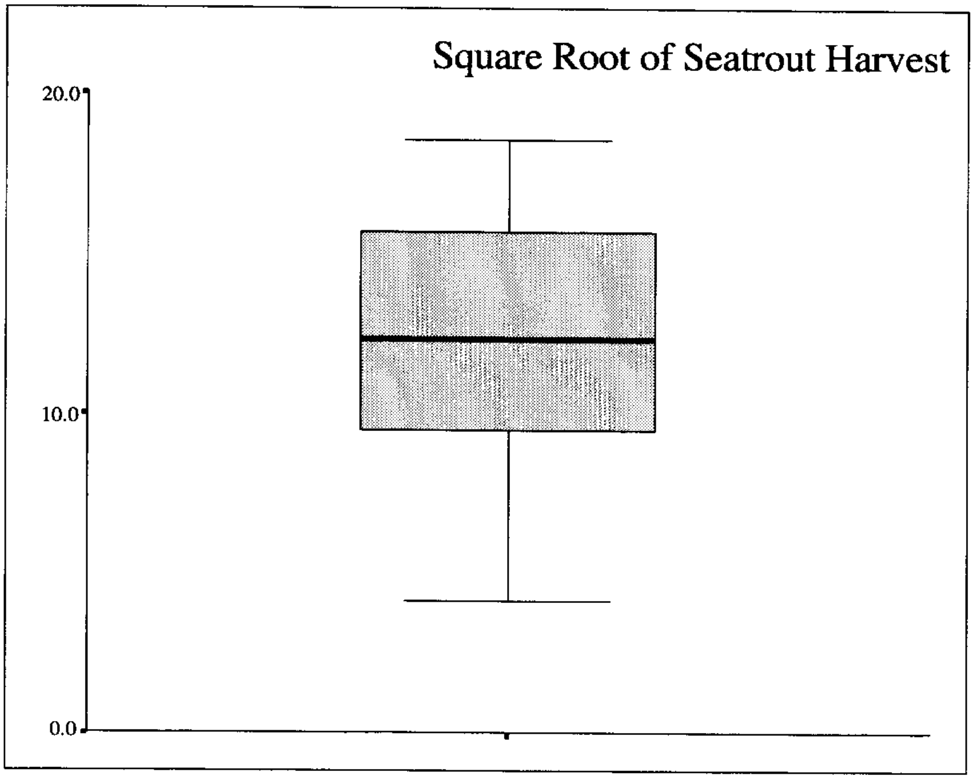

Normal Q-Q Plot
of Seatrout Harvest
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
0
100
200
300
400
Observed Value


Normal Q-Q Plot
of Ln(Seatrout Harvest)
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
Observed Value


Seatrout Harvest
400
300
200
100
0
-100
Thousands of Pounds


Seatrout Harvest
6
5
4
3
2
1
0
0
50
100
150
200
250
300
350
Thousands of Pounds


Ln(Seatrout Harvest)
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
1962
N =
20

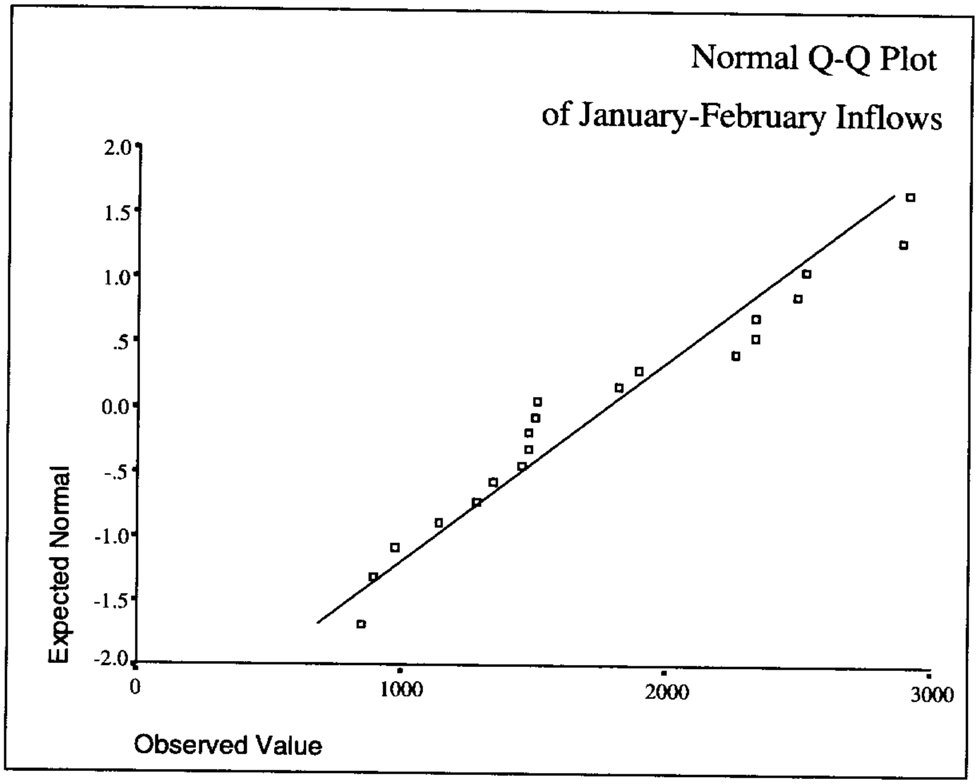

Square Root of Seatrout Harvest
20.0
10.0
0.0

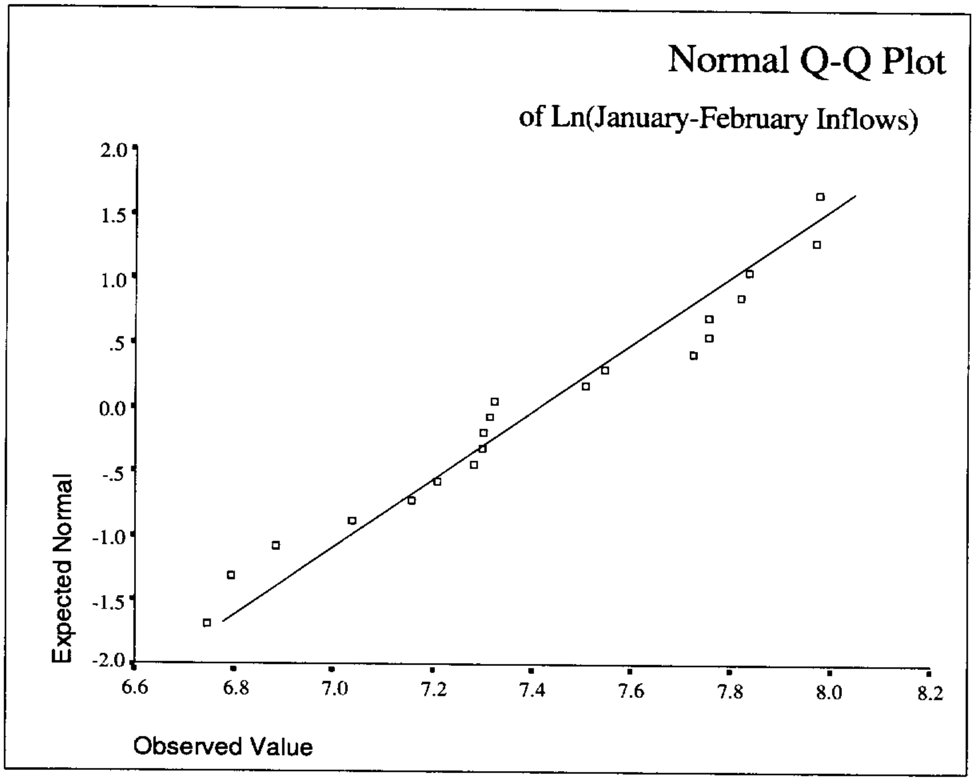
Descriptives

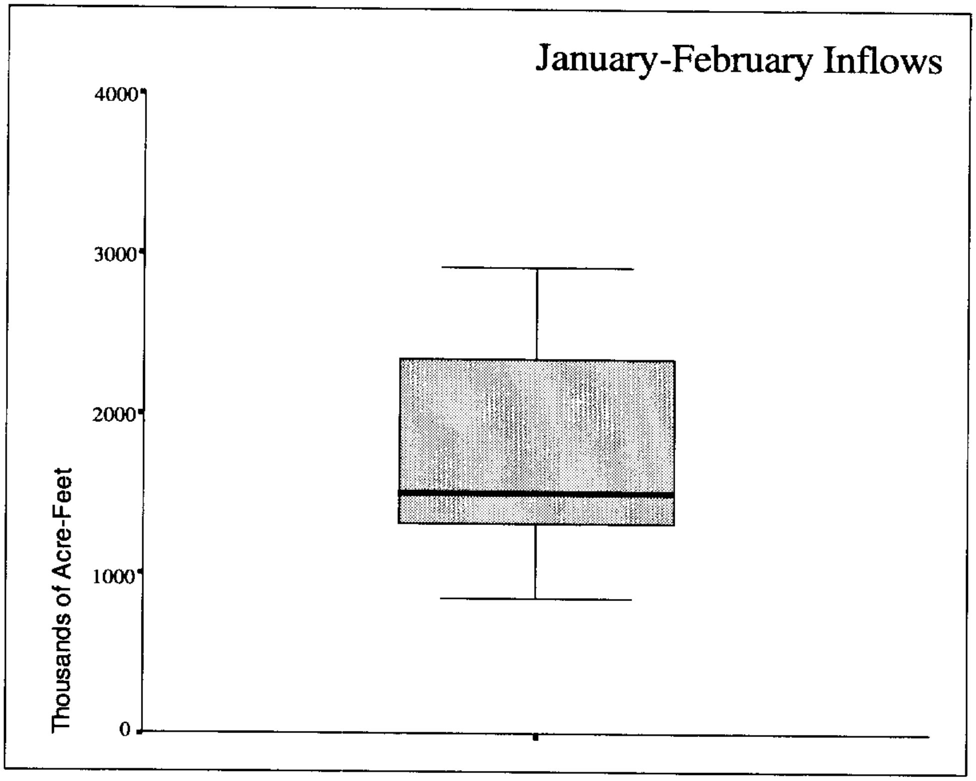
			Statistic	Std. Error
January-February Inflows	Mean		*1770.0820*	*145.2342*
	95% Confidence Interval for Mean	Lower Bound	*1466.1034*	
		Upper Bound	*2074.0606*	
	5% Trimmed Mean		*1757.5706*	
	Median		*1509.6250*	
	Variance		*421859.203*	
	Std. Deviation		*649.5069*	
	Minimum		*849.90*	
	Maximum		*2915.47*	
	Range		*2065.57*	
	Interquartile Range		*1036.6650*	
	Skewness		*.361*	*.512*
	Kurtosis		*-1.048*	*.992*

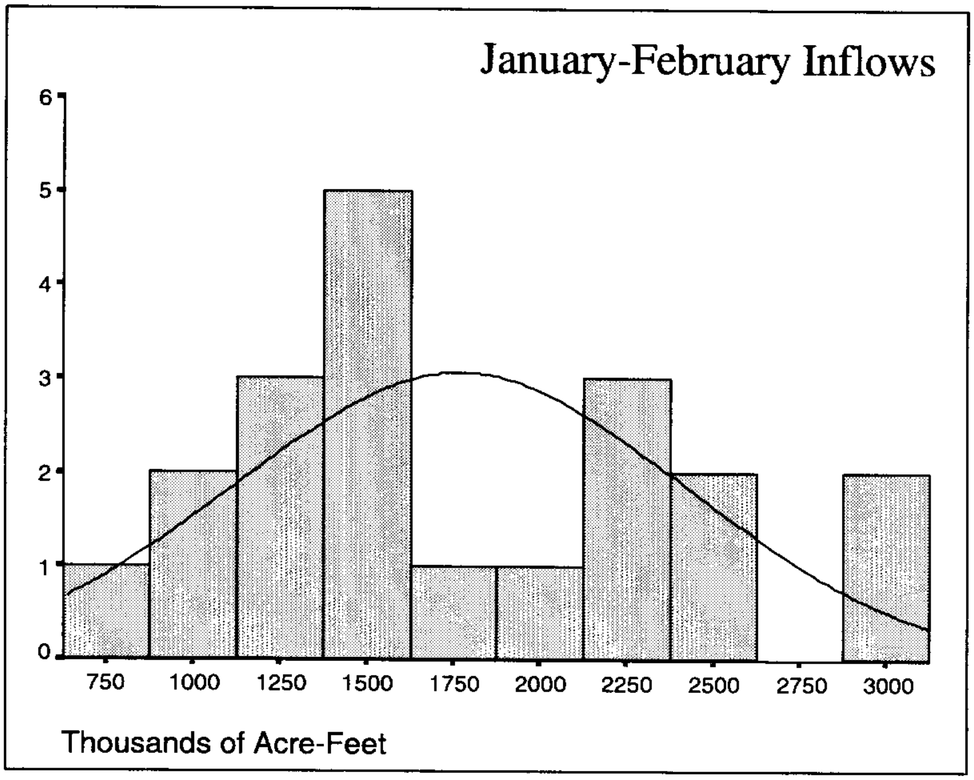
Extreme Values

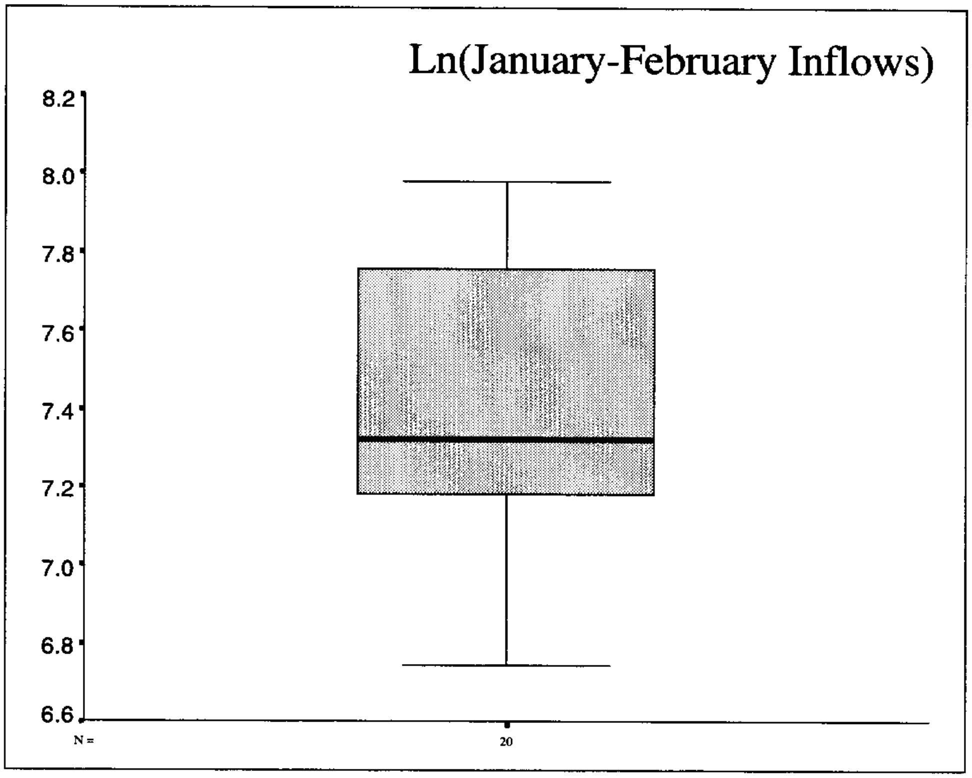
			Case Number	Year	Value
January-February Inflows	Highest	1	*1*	*1962*	*2915.47*
		2	*14*	*1975*	*2890.51*
		3	*13*	*1974*	*2524.91*
		4	*19*	*1980*	*2491.90*
		5	*2*	*1963*	*2336.83*
	Lowest	1	*10*	*1971*	*849.90*
		2	*3*	*1964*	*894.15*
		3	*11*	*1972*	*976.26*
		4	*4*	*1965*	*1140.22*
		5	*6*	*1967*	*1283.51*


Normal Q-Q Plot
of January-February Inflows
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
0
1000
2000
3000
Observed Value


Normal Q-Q Plot
of Ln(January-February Inflows)
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Observed Value


January-February Inflows
Thousands of Acre-Feet
4000
3000
2000
1000
0


January-February Inflows
6
5
4
3
2
1
0
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
Thousands of Acre-Feet

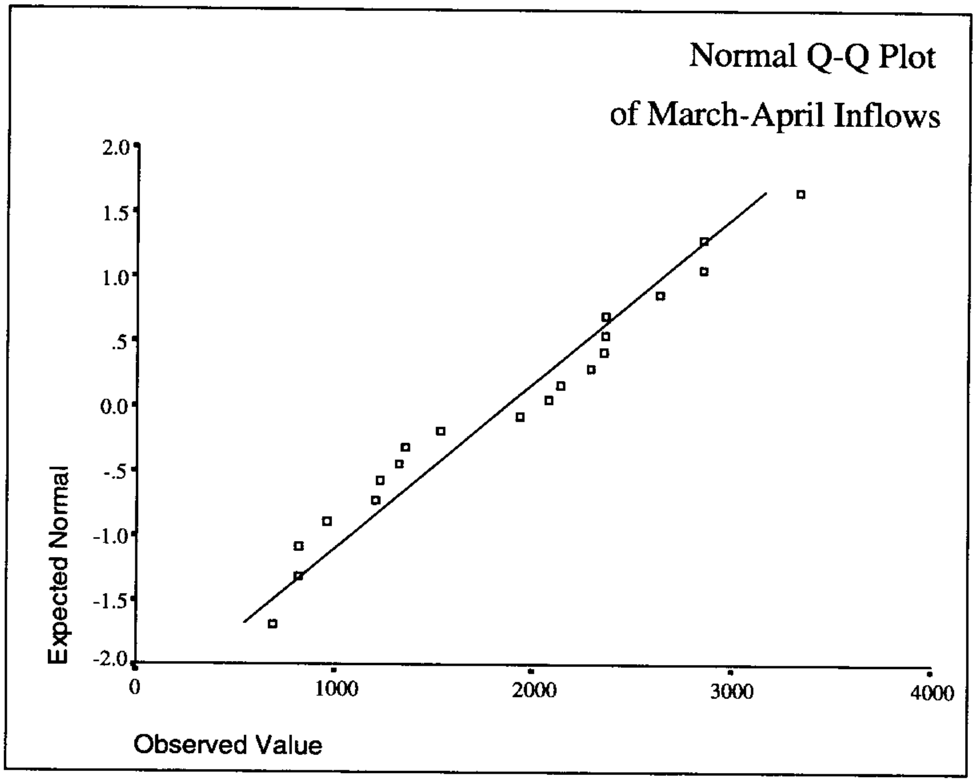

Ln(January-February Inflows)
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
6.6
N =
20

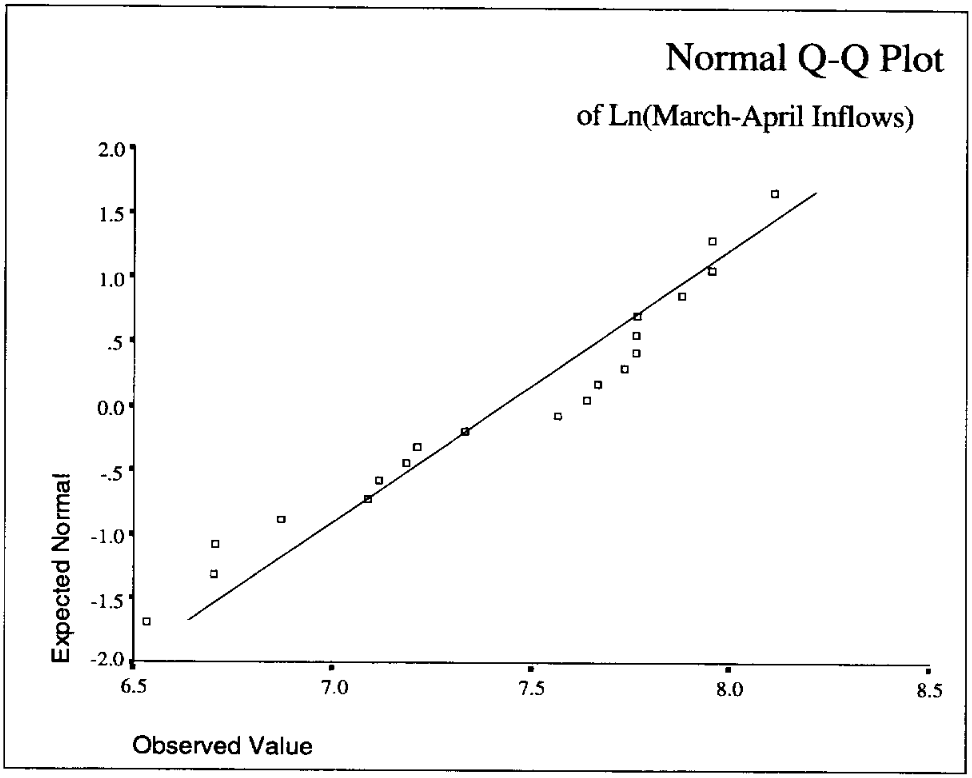
Descriptives

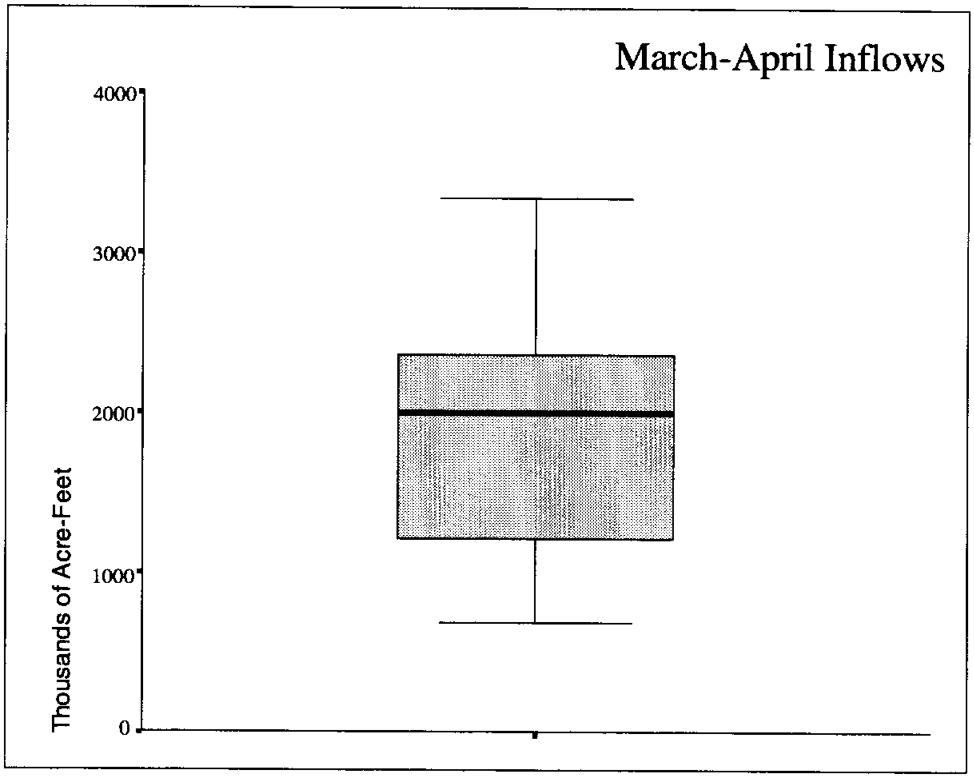
			Statistic	Std. Error
March-April Inflows	Mean		*1855.6210*	*175.1148*
	95% Confidence Interval for Mean	Lower Bound	*1489.1014*	
		Upper Bound	*2222.1406*	
	5% Trimmed Mean		*1838.0700*	
	Median		*2004.2900*	
	Variance		*613304.209*	
	Std. Deviation		*783.1374*	
	Minimum		*689.43*	
	Maximum		*3337.73*	
	Range		*2648.30*	
	Interquartile Range		*1152.3625*	
	Skewness		*.104*	*.512*
	Kurtosis		*-1.093*	*.992*

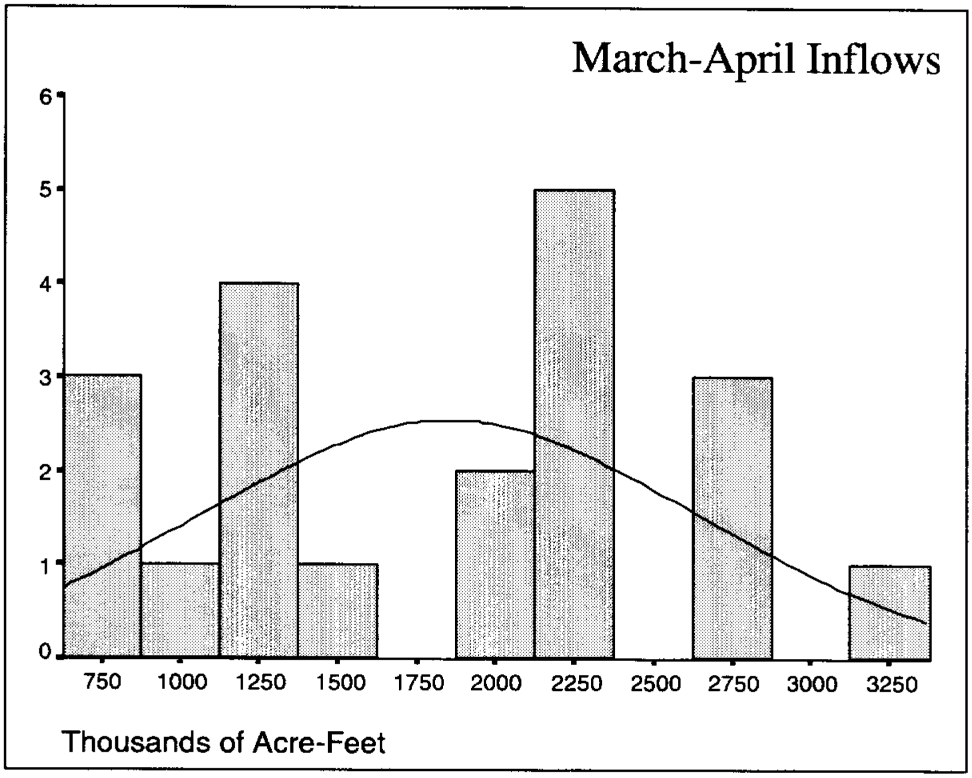
Extreme Values

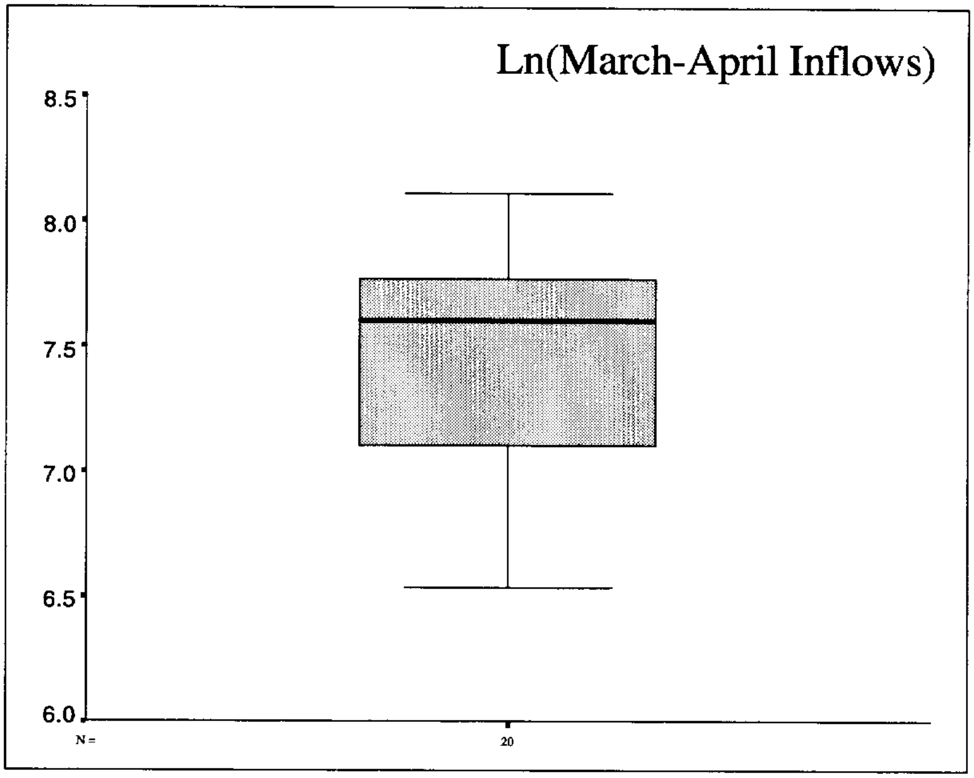
			Case Number	Year	Value
March-April Inflows	Highest	1	*9*	*1970*	*3337.73*
		2	*14*	*1975*	*2857.40*
		3	*18*	*1979*	*2853.94*
		4	*8*	*1969*	*2640.94*
		5	*10*	*1971*	*2360.83*
	Lowest	1	*3*	*1964*	*689.43*
		2	*2*	*1963*	*815.63*
		3	*4*	*1965*	*818.07*
		4	*1*	*1962*	*963.27*
		5	*6*	*1967*	*1199.18*


Normal Q-Q Plot
of March-April Inflows
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
0
1000
2000
3000
4000
Observed Value


Normal Q-Q Plot
of Ln(March-April Inflows)
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.5
7.0
7.5
8.0
8.5
Observed Value


March-April Inflows
4000
3000
2000
1000
0
Thousands of Acre-Feet


March-April Inflows
6
5
4
3
2
1
0
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
3250
Thousands of Acre-Feet

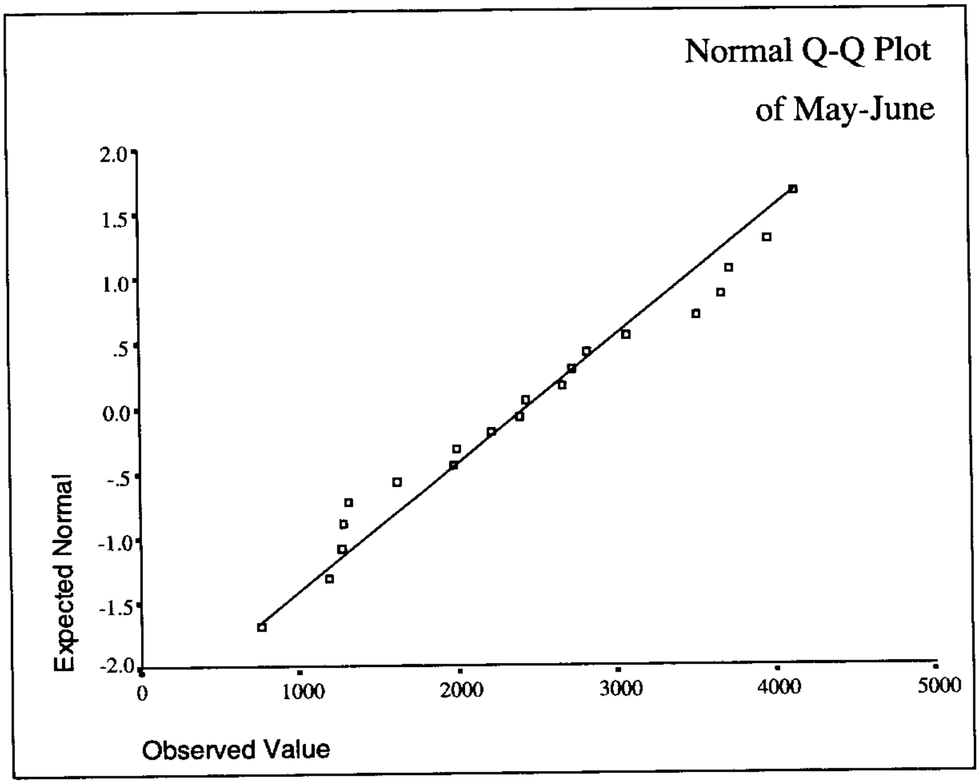

Ln(March-April Inflows)
8.5
8.0
7.5
7.0
6.5
6.0
N =
20

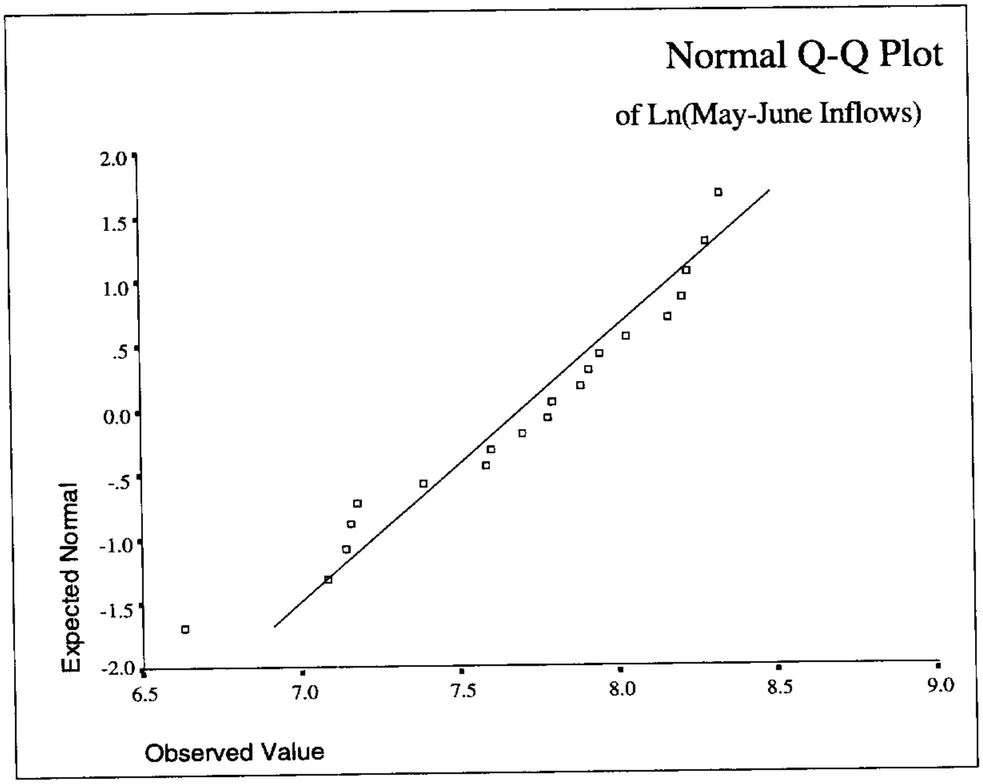
Descriptives

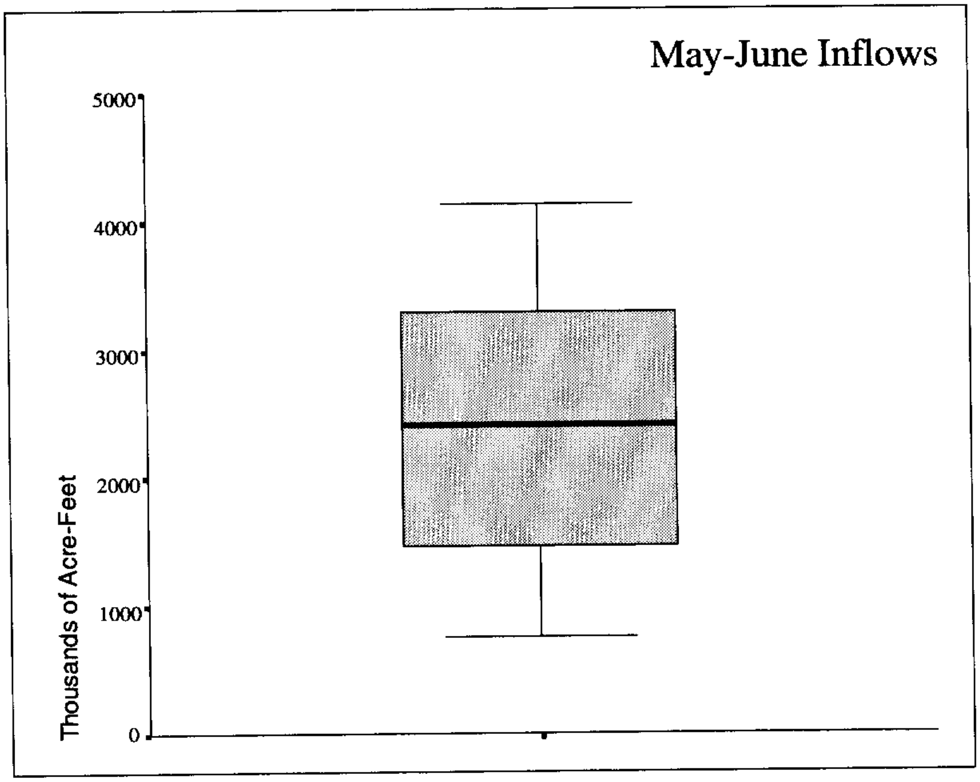
			Statistic	Std. Error
May-June Inflows	Mean		*2439.1725*	*227.8998*
	95% Confidence Interval for Mean	Lower Bound	*1962.1727*	
		Upper Bound	*2916.1723*	
	5% Trimmed Mean		*2438.1894*	
	Median		*2417.1200*	
	Variance		*1038766.743*	
	Std. Deviation		*1019.1991*	
	Minimum		*759.57*	
	Maximum		*4136.47*	
	Range		*3376.90*	
	Interquartile Range		*2016.3225*	
	Skewness		*.117*	*.512*
	Kurtosis		*-1.092*	*.992*

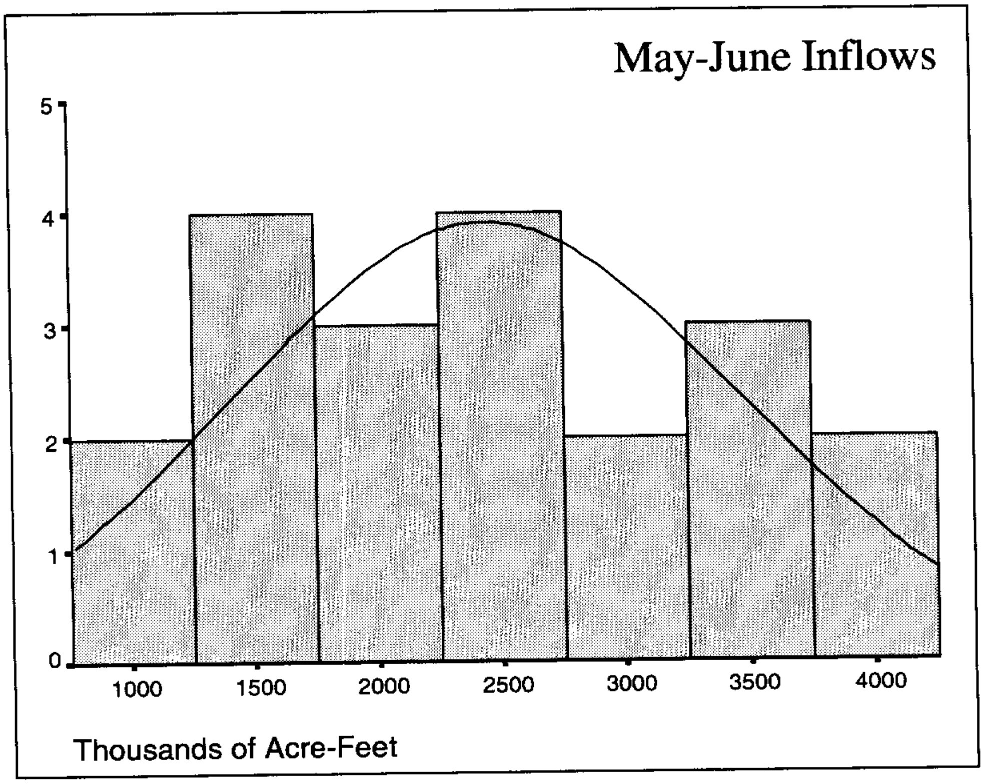
Extreme Values

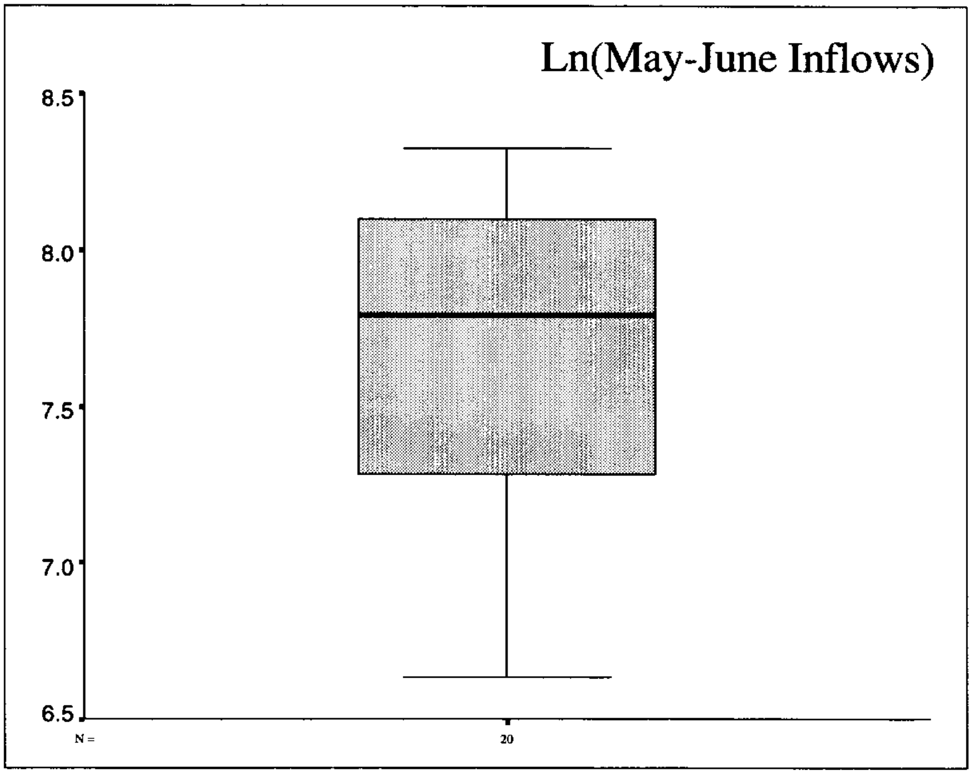
			Case Number	Year	Value
May-June Inflows	Highest	1	*7*	*1968*	*4136.47*
		2	*9*	*1970*	*3968.77*
		3	*14*	*1975*	*3726.31*
		4	*8*	*1969*	*3676.87*
		5	*20*	*1981*	*3516.54*
	Lowest	1	*3*	*1964*	*759.57*
		2	*4*	*1965*	*1192.23*
		3	*2*	*1963*	*1270.07*
		4	*11*	*1972*	*1288.20*
		5	*17*	*1978*	*1315.67*


Normal Q-Q Plot
of May-June
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
0
1000
2000
3000
4000
5000
Observed Value


Normal Q-Q Plot
of Ln(May-June Inflows)
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.5
7.0
7.5
8.0
8.5
9.0
Observed Value


May-June Inflows
5000
4000
3000
2000
1000
0
Thousands of Acre-Feet


May-June Inflows
5
4
3
2
1
0
1000
1500
2000
2500
3000
3500
4000
Thousands of Acre-Feet

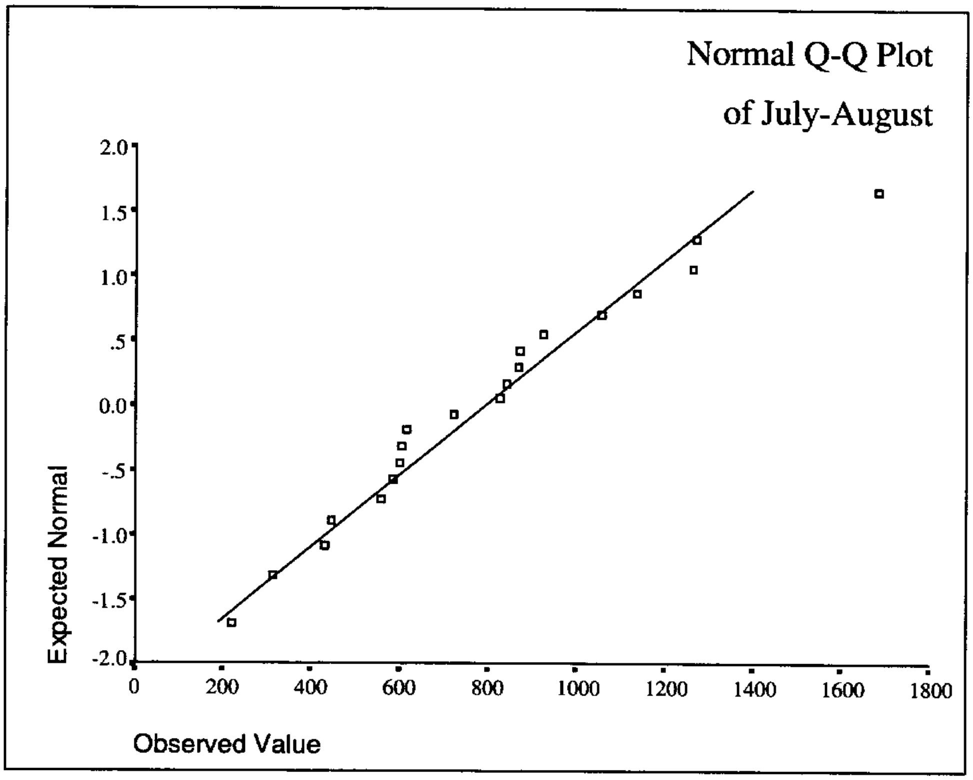

Ln(May-June Inflows)
8.5
8.0
7.5
7.0
6.5
N =
20

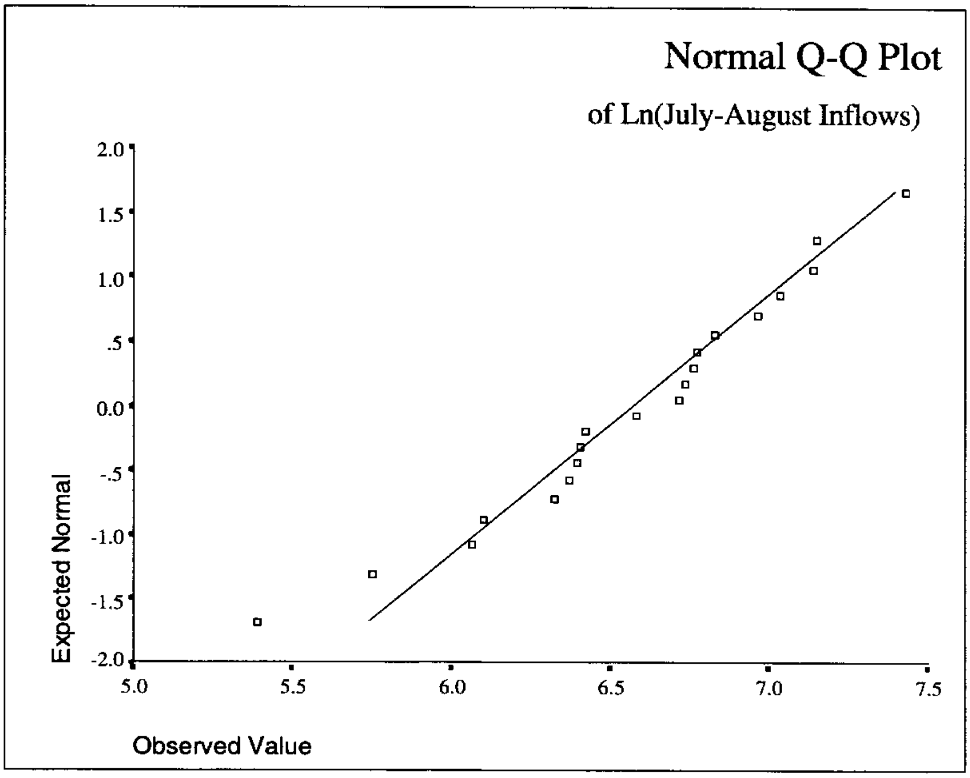
Descriptives

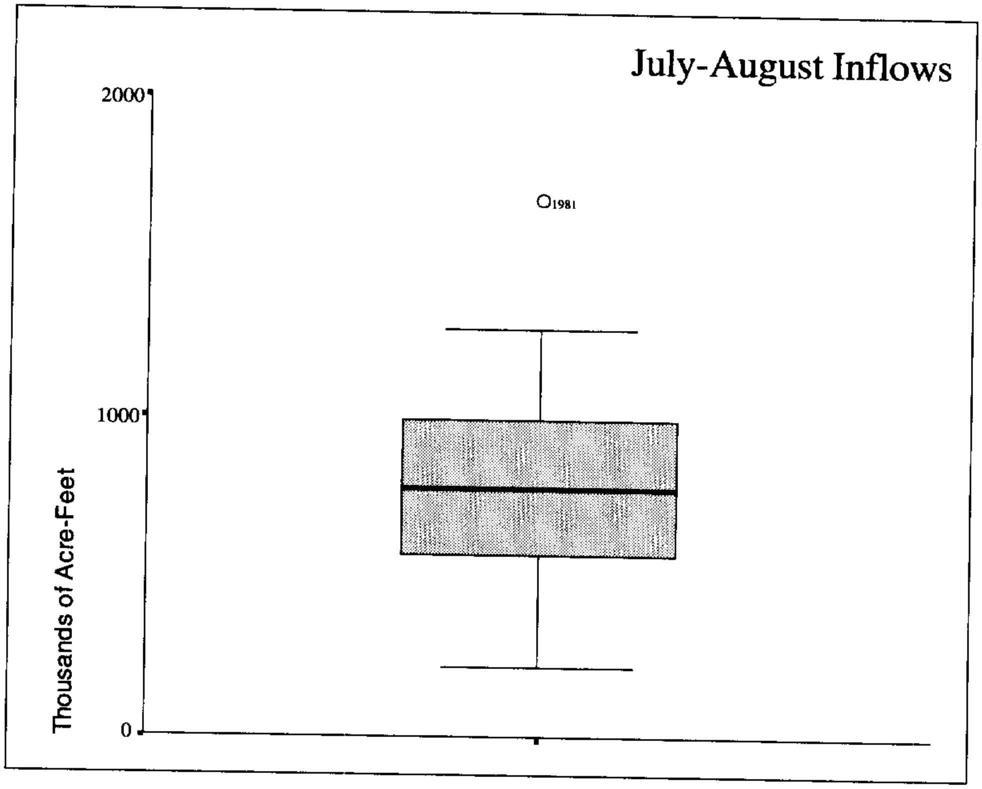
			Statistic	Std. Error
July-August Inflows	Mean		*793.8555*	*80.8806*
	95% Confidence Interval for Mean	Lower Bound	*624.5704*	
		Upper Bound	*963.1406*	
	5% Trimmed Mean		*776.1372*	
	Median		*776.8800*	
	Variance		*130833.488*	
	Std. Deviation		*361.7091*	
	Minimum		*220.39*	
	Maximum		*1686.25*	
	Range		*1465.86*	
	Interquartile Range		*459.2925*	
	Skewness		*.694*	*.512*
	Kurtosis		*.497*	*.992*

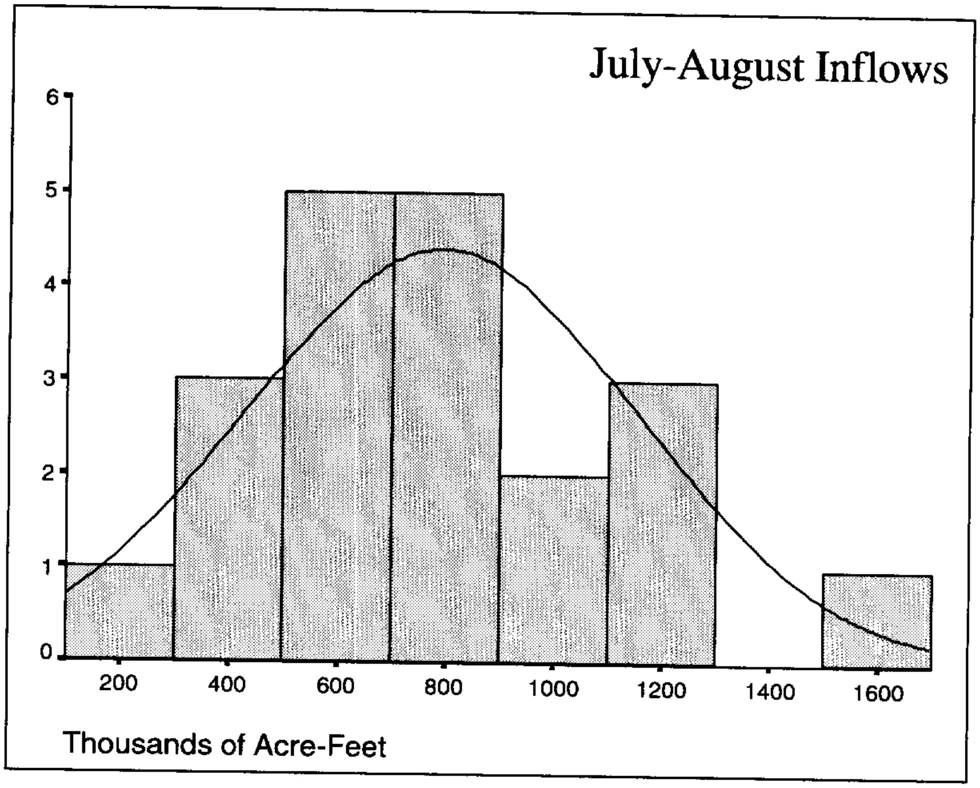
Extreme Values

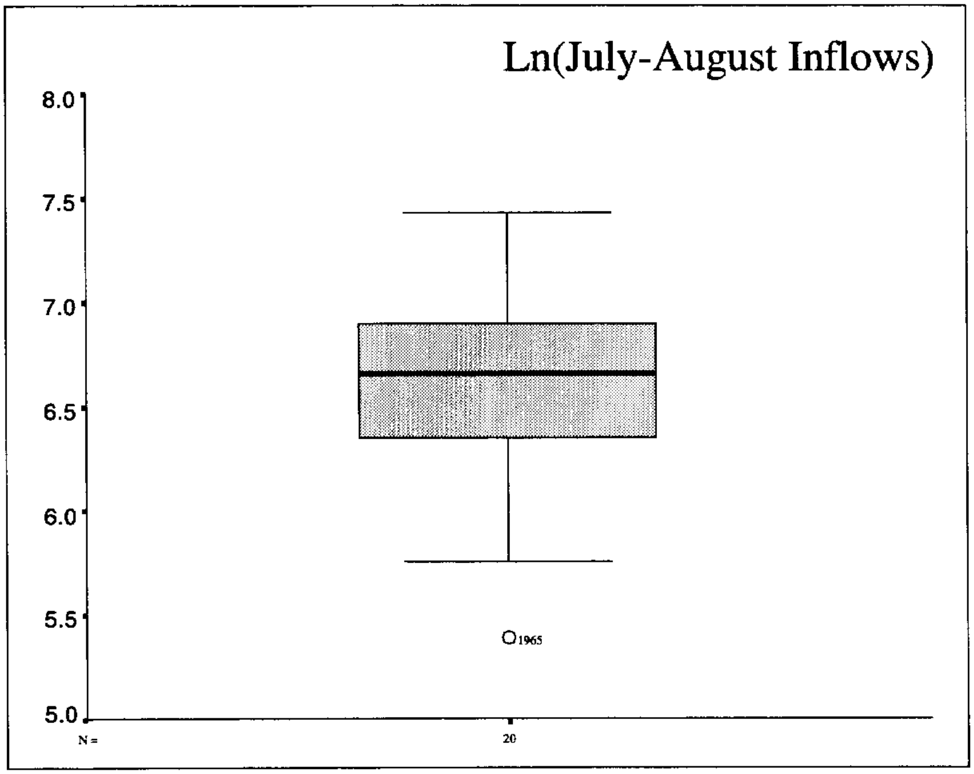
			Case Number	Year	Value
July-August Inflows	Highest	1	*20*	*1981*	*1686.25*
		2	*18*	*1979*	*1274.52*
		3	*19*	*1980*	*1264.55*
		4	*14*	*1975*	*1138.54*
		5	*1*	*1962*	*1059.68*
	Lowest	1	*4*	*1965*	*220.39*
		2	*3*	*1964*	*316.70*
		3	*11*	*1972*	*431.40*
		4	*10*	*1971*	*446.99*
		5	*5*	*1966*	*560.03*


Normal Q-Q Plot
of July-August
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
0
200
400
600
800
1000
1200
1400
1600
1800
Observed Value


Normal Q-Q Plot
of Ln(July-August Inflows)
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
5.0
5.5
6.0
6.5
7.0
7.5
Observed Value


July-August Inflows
2000
1000
0
Thousands of Acre-Feet
1981


July-August Inflows
6
5
4
3
2
1
0
200
400
600
800
1000
1200
1400
1600
Thousands of Acre-Feet

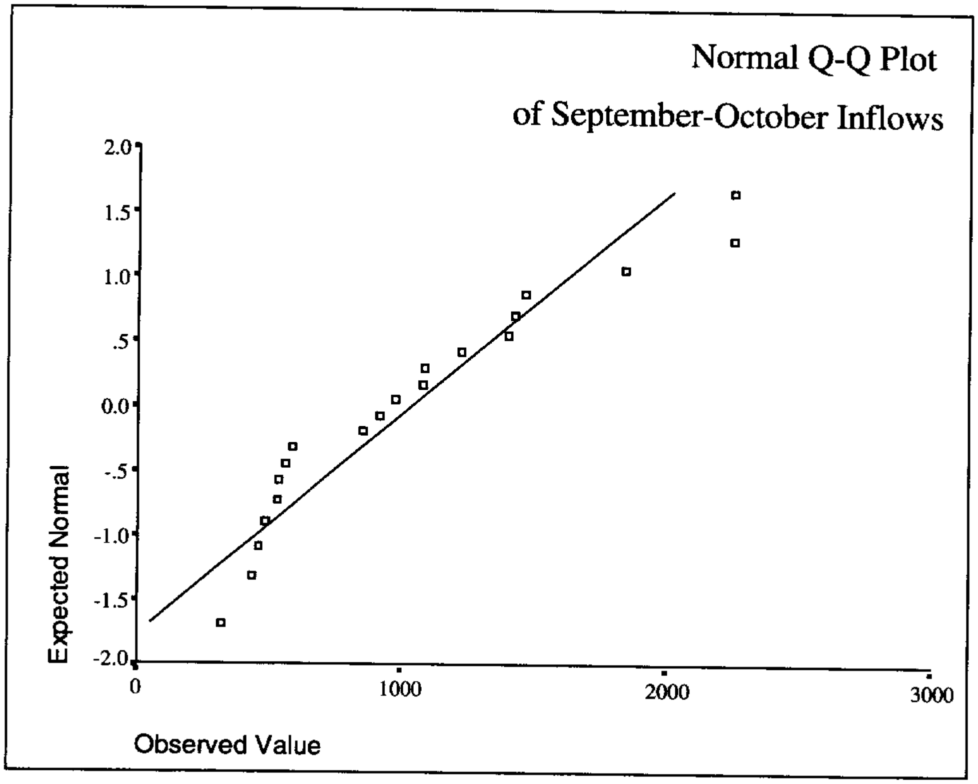

Ln(July-August Inflows)
8.0
7.5
7.0
6.5
6.0
5.5
5.0
1965
N =
20

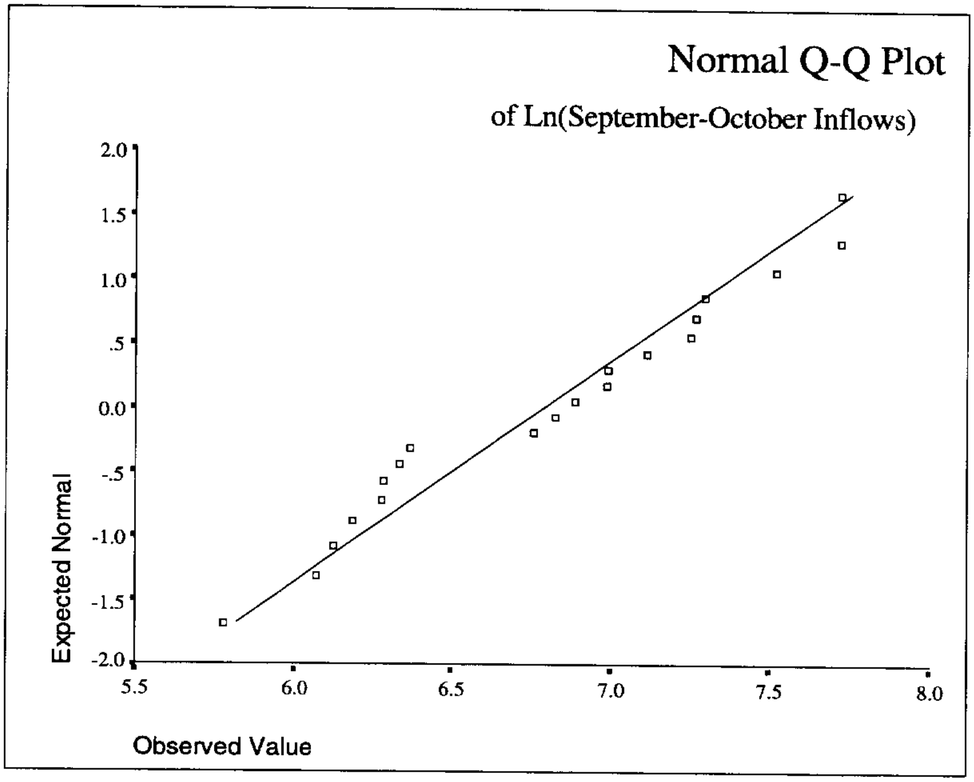
Descriptives

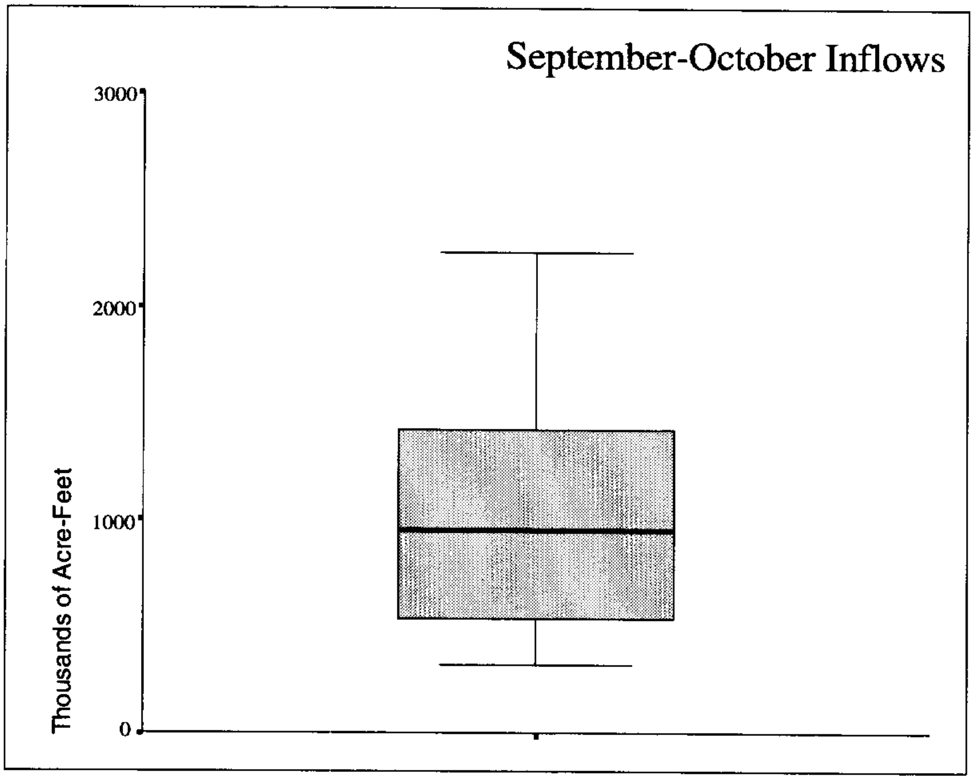
			Statistic	Std. Error
September-October Inflows	Mean		1038.0385	131.9724
	95% Confidence Interval for Mean	Lower Bound	761.8171	
		Upper Bound	1314.2599	
	5% Trimmed Mean		1010.0572	
	Median		952.0400	
	Variance		348334.255	
	Std. Deviation		590.1985	
	Minimum		325.37	
	Maximum		2254.37	
	Range		1929.00	
	Interquartile Range		891.6200	
	Skewness		.830	.512
	Kurtosis		-.153	.992

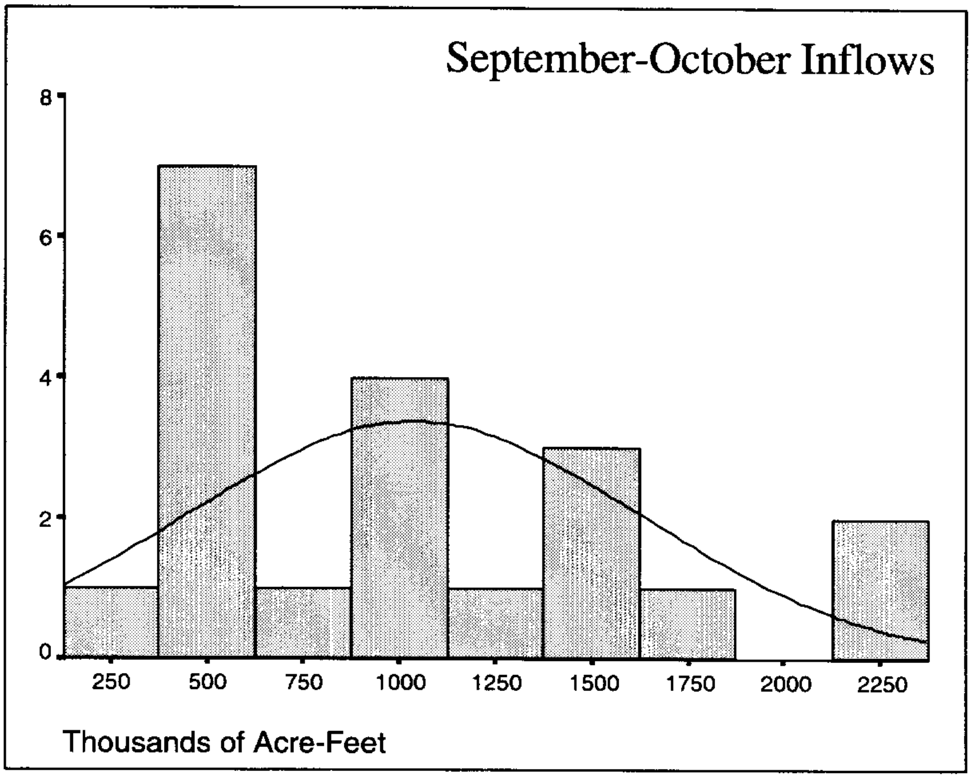
Extreme Values

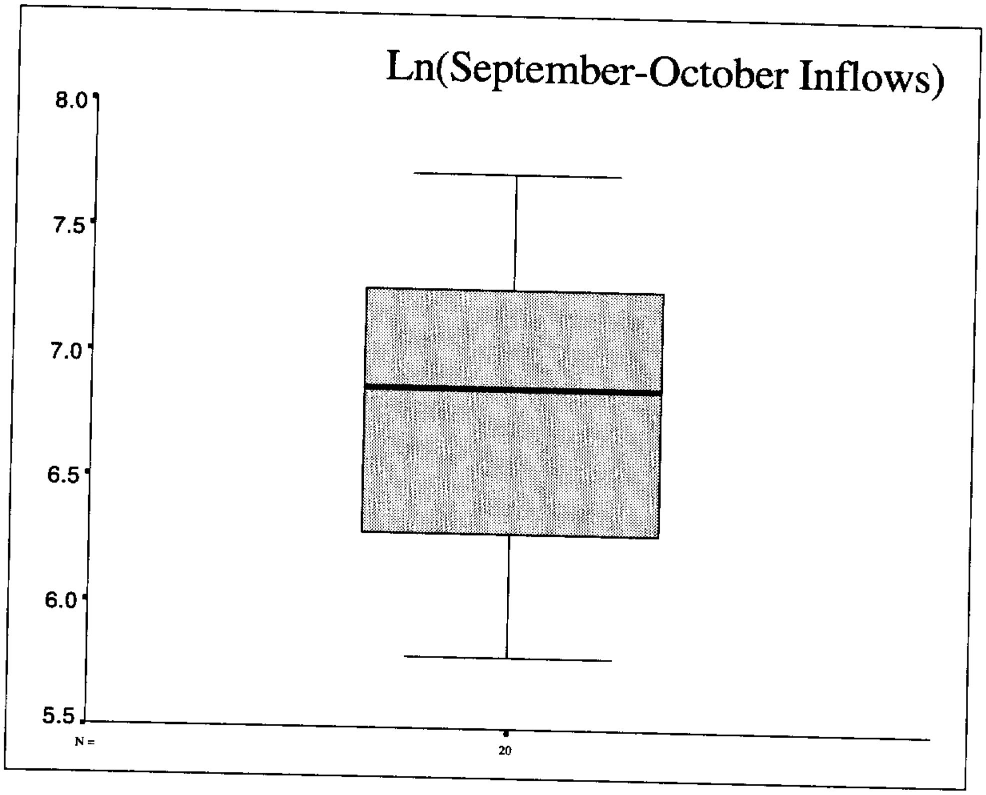
			Case Number	Year	Value
September-October Inflows	Highest	1	15	1976	2254.37
		2	14	1975	2253.25
		3	13	1974	1845.28
		4	1	1962	1469.86
		5	2	1963	1432.16
	Lowest	1	5	1966	325.37
		2	7	1968	435.08
		3	6	1967	459.59
		4	9	1970	489.11
		5	8	1969	533.83


Normal Q-Q Plot
of September-October Inflows
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
0
1000
2000
3000
Expected Normal
Observed Value


Normal Q-Q Plot
of Ln(September-October Inflows)
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
5.5
6.0
6.5
7.0
7.5
8.0
Expected Normal
Observed Value


September-October Inflows
3000
2000
1000
0
Thousands of Acre-Feet


September-October Inflows
8
6
4
2
0
250
500
750
1000
1250
1500
1750
2000
2250
Thousands of Acre-Feet

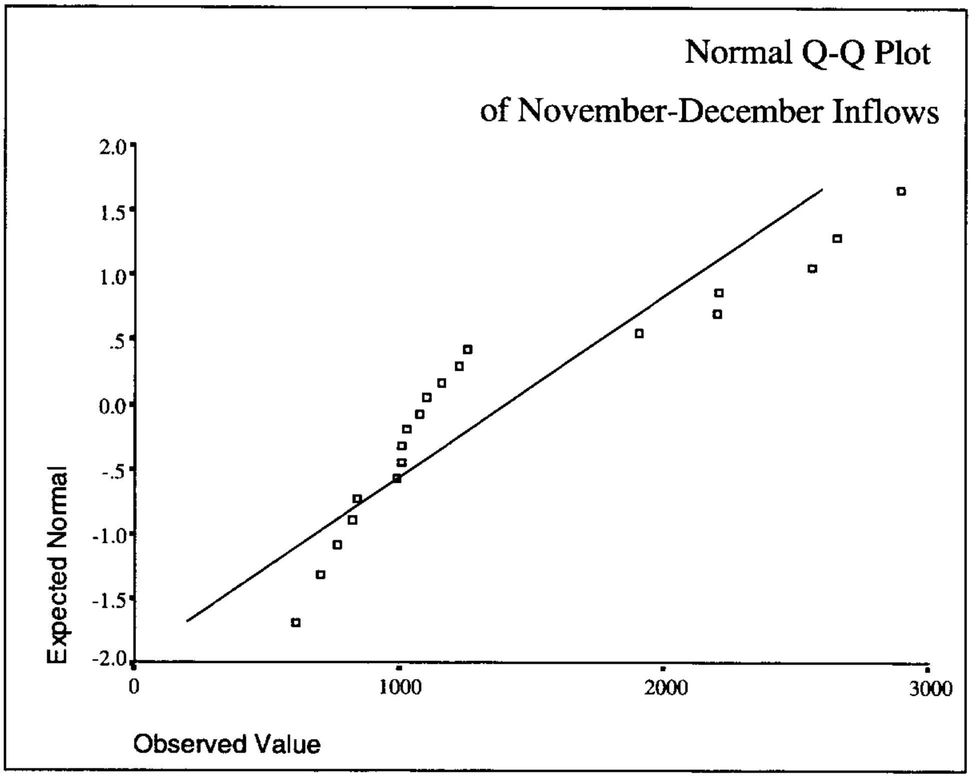

Ln(September-October Inflows)
8.0
7.5
7.0
6.5
6.0
5.5
N =
20

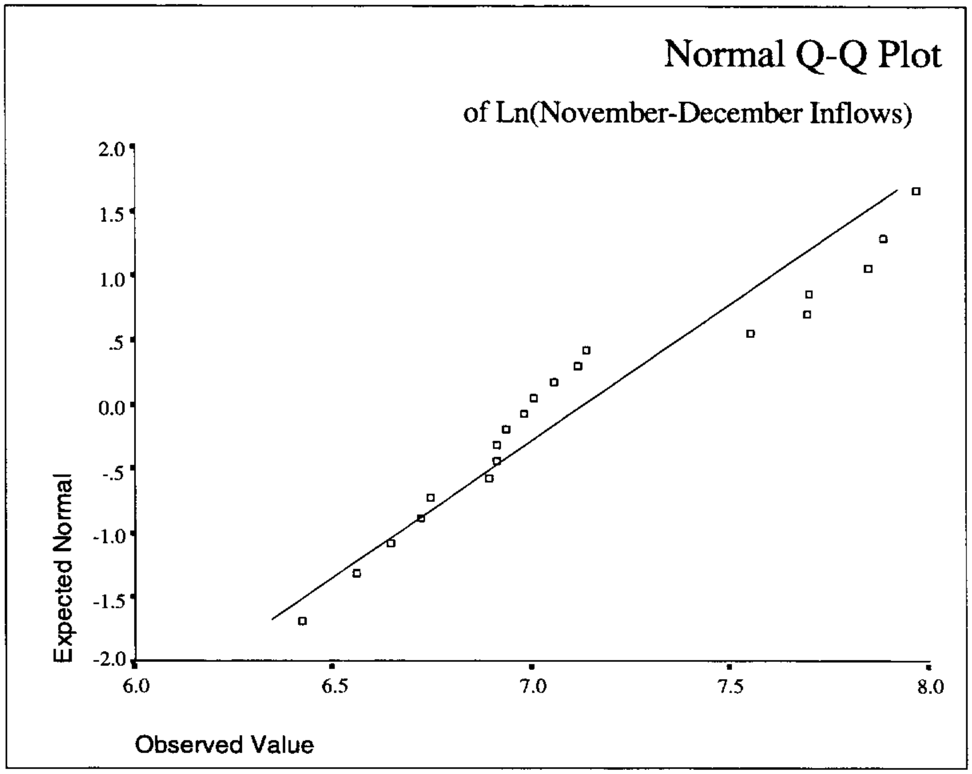
Descriptives

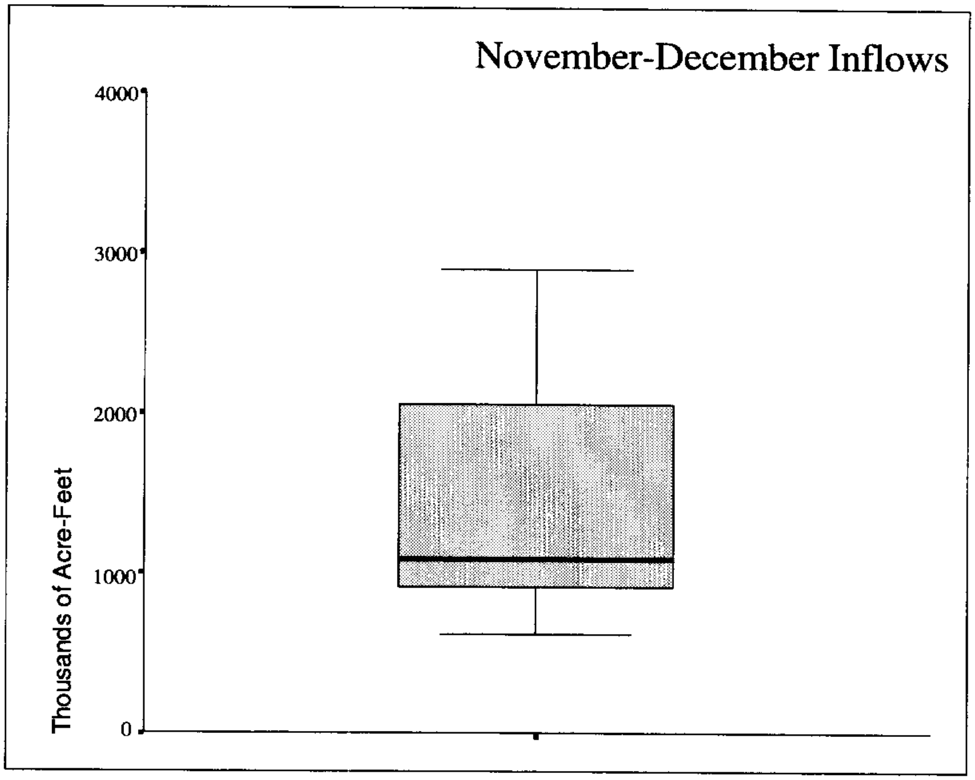
			Statistic	Std. Error
November-December Inflows	Mean		*1403.9630*	*160.4211*
	95% Confidence Interval for Mean	Lower Bound	*1068.1978*	
		Upper Bound	*1739.7282*	
	5% Trimmed Mean		*1364.8089*	
	Median		*1091.4700*	
	Variance		*514698.435*	
	Std. Deviation		*717.4249*	
	Minimum		*615.13*	
	Maximum		*2897.57*	
	Range		*2282.44*	
	Interquartile Range		*1248.1100*	
	Skewness		*.990*	*.512*
	Kurtosis		*-.464*	*.992*

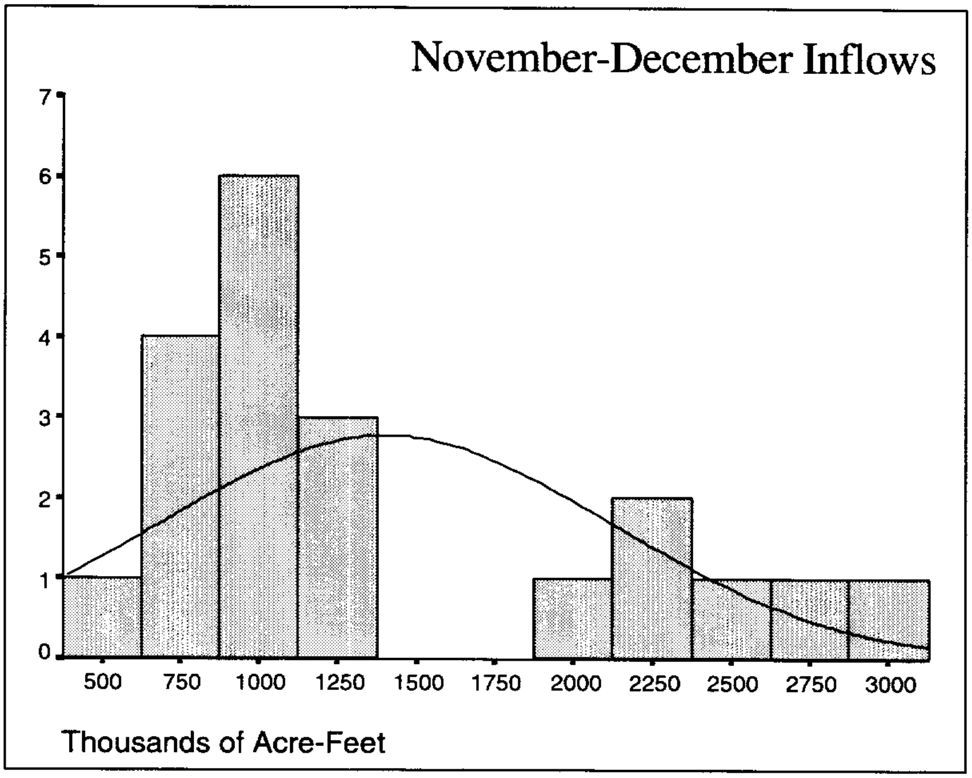
Extreme Values

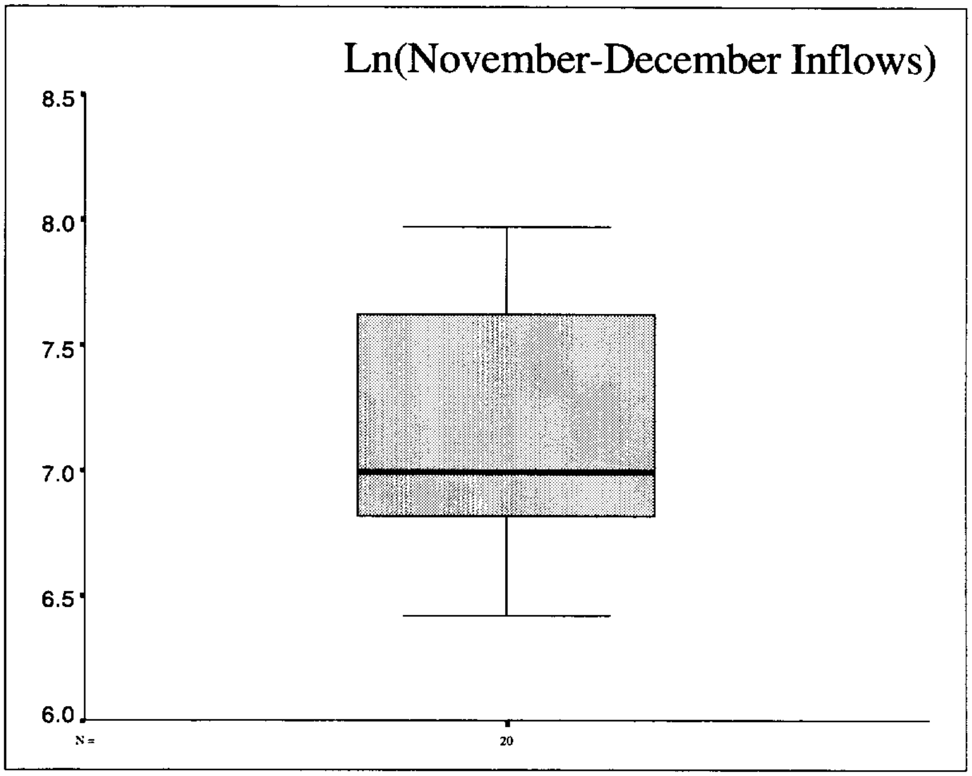
			Case Number	Year	Value
November-December Inflows	Highest	1	*14*	*1975*	*2897.57*
		2	*15*	*1976*	*2659.43*
		3	*16*	*1977*	*2562.96*
		4	*2*	*1963*	*2208.27*
		5	*1*	*1962*	*2205.60*
	Lowest	1	*10*	*1971*	*615.13*
		2	*8*	*1969*	*706.48*
		3	*20*	*1981*	*767.72*
		4	*9*	*1970*	*828.41*
		5	*7*	*1968*	*848.36*


Normal Q-Q Plot
of November-December Inflows
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
0
1000
2000
3000
Observed Value


Normal Q-Q Plot
of Ln(November-December Inflows)
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.0
6.5
7.0
7.5
8.0
Observed Value


November-December Inflows
4000
3000
2000
1000
0
Thousands of Acre-Feet

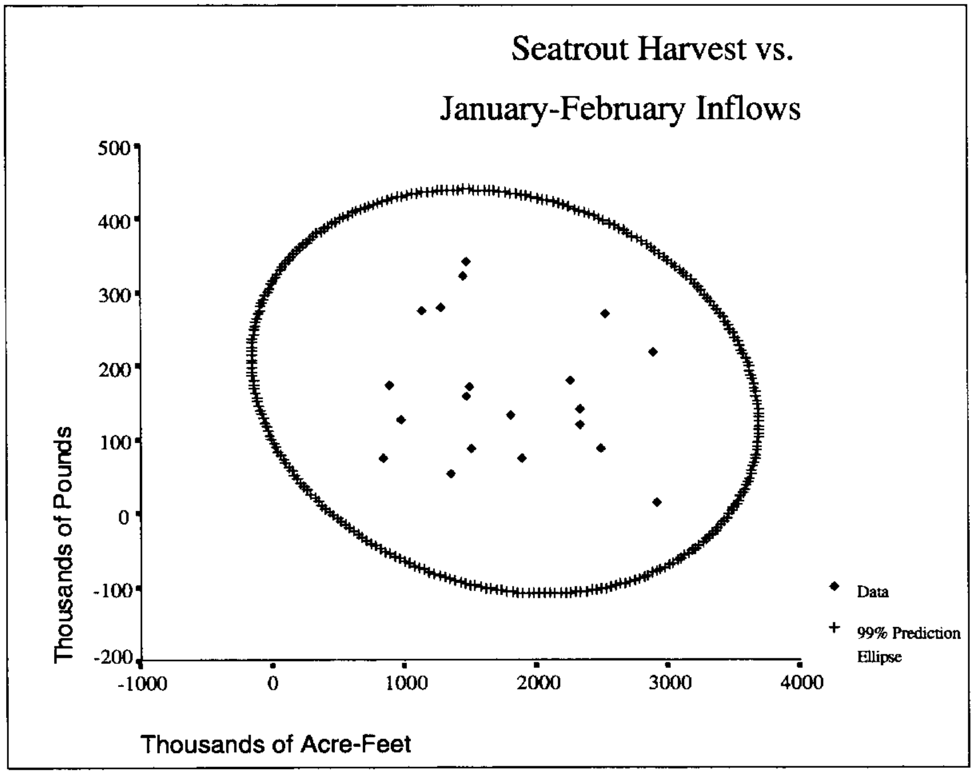

November-December Inflows
7
6
5
4
3
2
1
0
500
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
Thousands of Acre-Feet

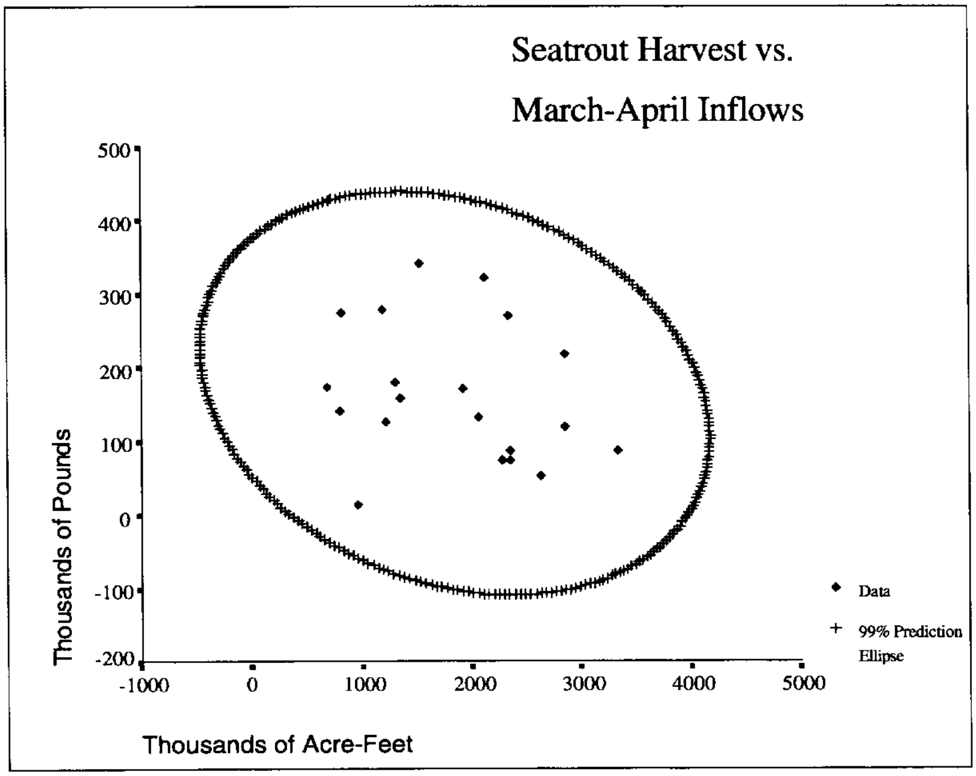

Ln(November-December Inflows)
8.5
8.0
7.5
7.0
6.5
6.0
N =
20

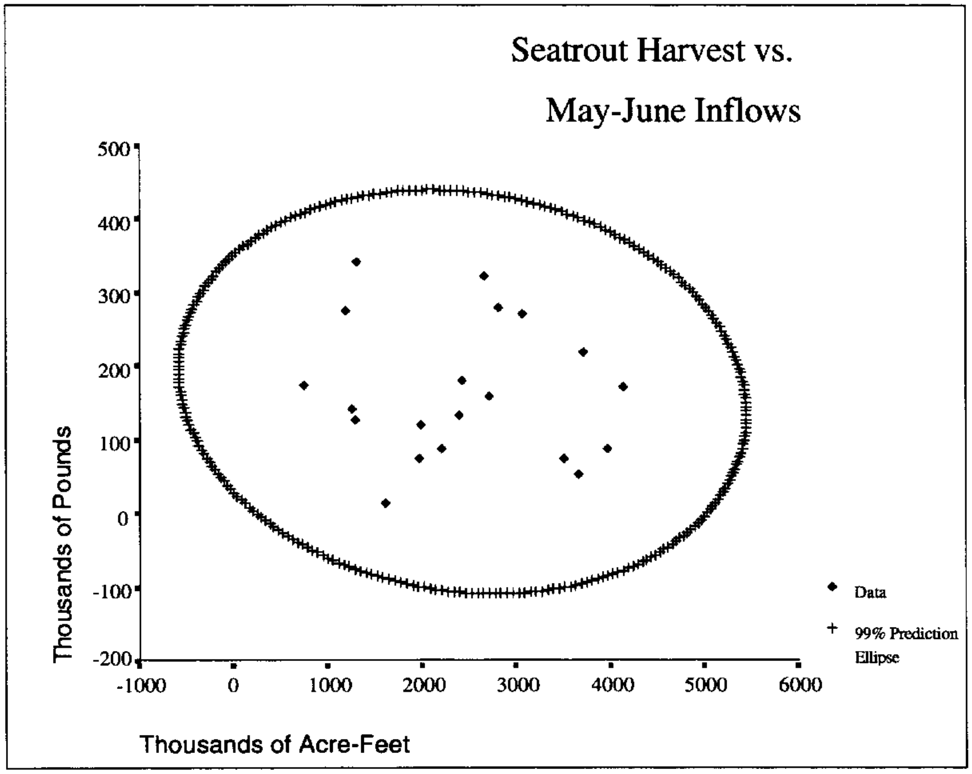
Percentiles

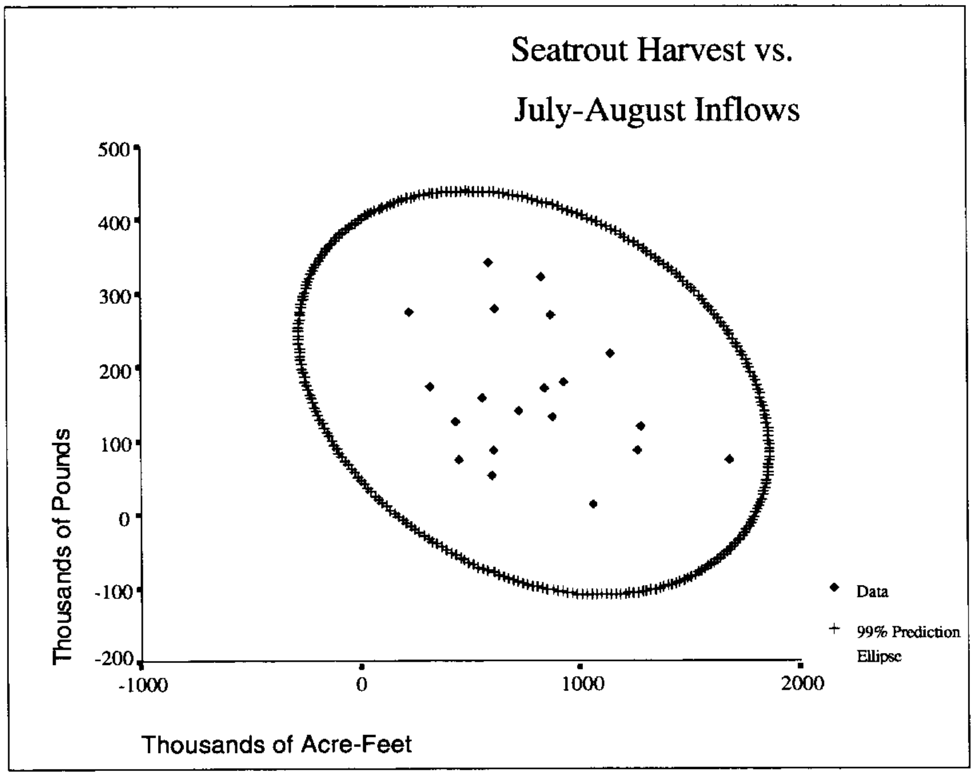
		Percentiles						
		5	10	25	50	75	90	95
Weighted Average (Definition 1)	Seatrout Harvest	*18.9350*	*57.7200*	*89.5500*	*152.3000*	*259.9250*	*319.4600*	*343.1800*
	Ln(Seatrout Harvest)	*2.8926*	*4.0509*	*4.4948*	*5.0239*	*5.5564*	*5.7657*	*5.8382*
	Square Root of Seatrout Harvest	*4.2901*	*7.5881*	*9.4630*	*12.3351*	*16.1063*	*17.8695*	*18.5247*
	January-February Inflows	*852.1125*	*902.3610*	*1300.1175*	*1509.6250*	*2336.7825*	*2853.9500*	*2914.2220*
	March-April Inflows	*695.7400*	*815.8740*	*1207.3925*	*2004.2900*	*2359.7550*	*2857.0540*	*3313.7135*
	May-June Inflows	*781.2030*	*1200.0140*	*1390.5775*	*2417.1200*	*3406.9000*	*3944.5240*	*4128.0850*
	July-August Inflows	*225.2055*	*328.1700*	*566.8325*	*776.8800*	*1026.1250*	*1273.5230*	*1665.6635*
	September-October Inflows	*330.8555*	*437.5310*	*534.3025*	*952.0400*	*1425.9225*	*2212.4530*	*2254.3140*
	November-December Inflows	*619.6975*	*712.6040*	*883.2375*	*1091.4700*	*2131.3475*	*2649.7830*	*2885.6630*
	Ln(January-February Inflows)	*6.7477*	*6.8047*	*7.1700*	*7.3196*	*7.7565*	*7.9557*	*7.9774*
	Ln(March-April Inflows)	*6.5443*	*6.7043*	*7.0961*	*7.6024*	*7.7663*	*7.9575*	*8.1053*
	Ln(May-June Inflows)	*6.6553*	*7.0899*	*7.2334*	*7.7903*	*8.1319*	*8.2799*	*8.3255*
	Ln(July-August Inflows)	*5.4135*	*5.7889*	*6.3399*	*6.6530*	*6.9319*	*7.1495*	*7.4163*
	Ln(September-October Inflows)	*5.7995*	*6.0810*	*6.2810*	*6.8582*	*7.2625*	*7.7002*	*7.7206*
	Ln(November-December Inflows)	*6.4288*	*6.5686*	*6.7814*	*6.9952*	*7.6626*	*7.8822*	*7.9673*
Tukey's Hinges	Seatrout Harvest			*89.9000*	*152.3000*	*246.9500*		
	Ln(Seatrout Harvest)			*4.4987*	*5.0239*	*5.5036*		
	Square Root of Seatrout Harvest			*9.4815*	*12.3351*	*15.6929*		
	January-February Inflows			*1316.7250*	*1509.6250*	*2336.7350*		
	March-April Inflows			*1215.6050*	*2004.2900*	*2358.6800*		
	May-June Inflows			*1465.4850*	*2417.1200*	*3297.2600*		
	July-August Inflows			*573.6350*	*776.8800*	*992.5700*		
	September-October Inflows			*534.7750*	*952.0400*	*1419.6850*		
	November-December Inflows			*918.1150*	*1091.4700*	*2057.0950*		
	Ln(January-February Inflows)			*7.1826*	*7.3196*	*7.7565*		
	Ln(March-April Inflows)			*7.1029*	*7.6024*	*7.7659*		
	Ln(May-June Inflows)			*7.2847*	*7.7903*	*8.0986*		
	Ln(July-August Inflows)			*6.3517*	*6.6530*	*6.8980*		
	Ln(September-October Inflows)			*6.2818*	*6.8582*	*7.2582*		
	Ln(November-December Inflows)			*6.8194*	*6.9952*	*7.6264*		

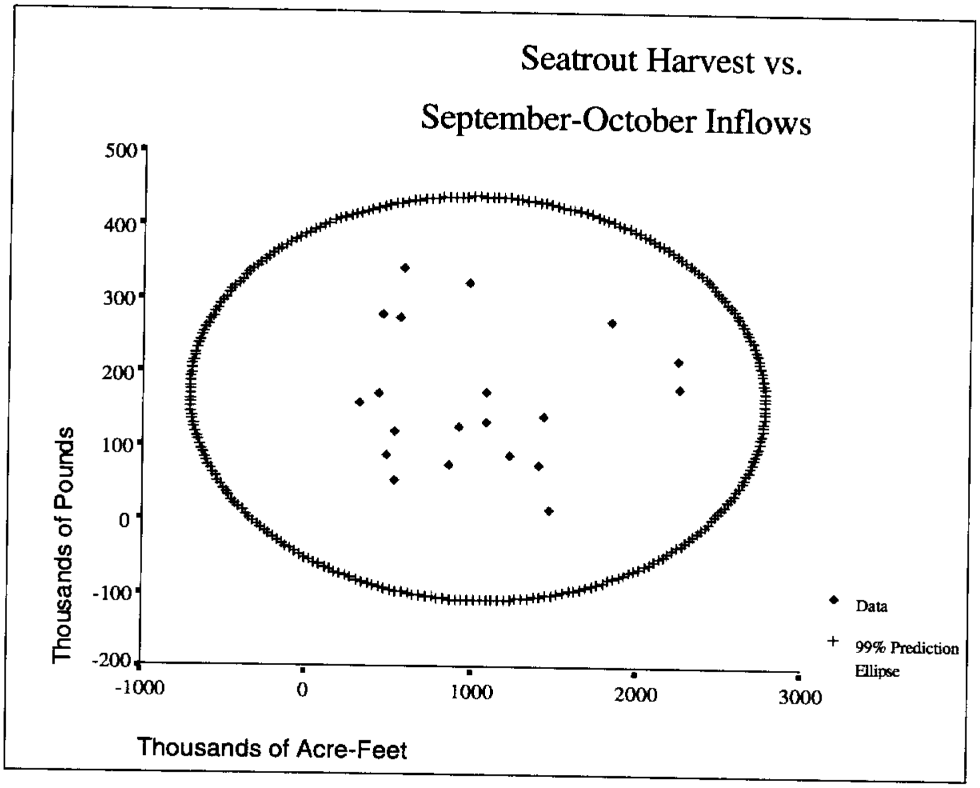
99% Prediction Ellipses



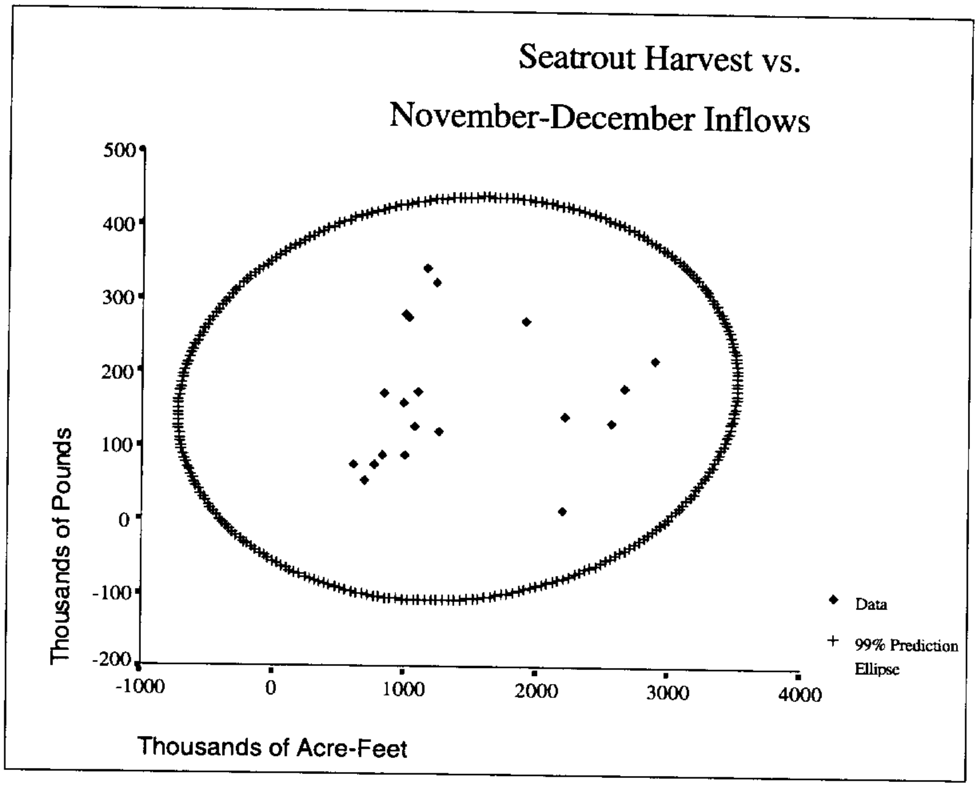



Seatrout Harvest vs.
May-June Inflows
Thousands of Pounds
500
400
300
200
100
0
-100
-200
-1000
0
1000
2000
3000
4000
5000
6000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

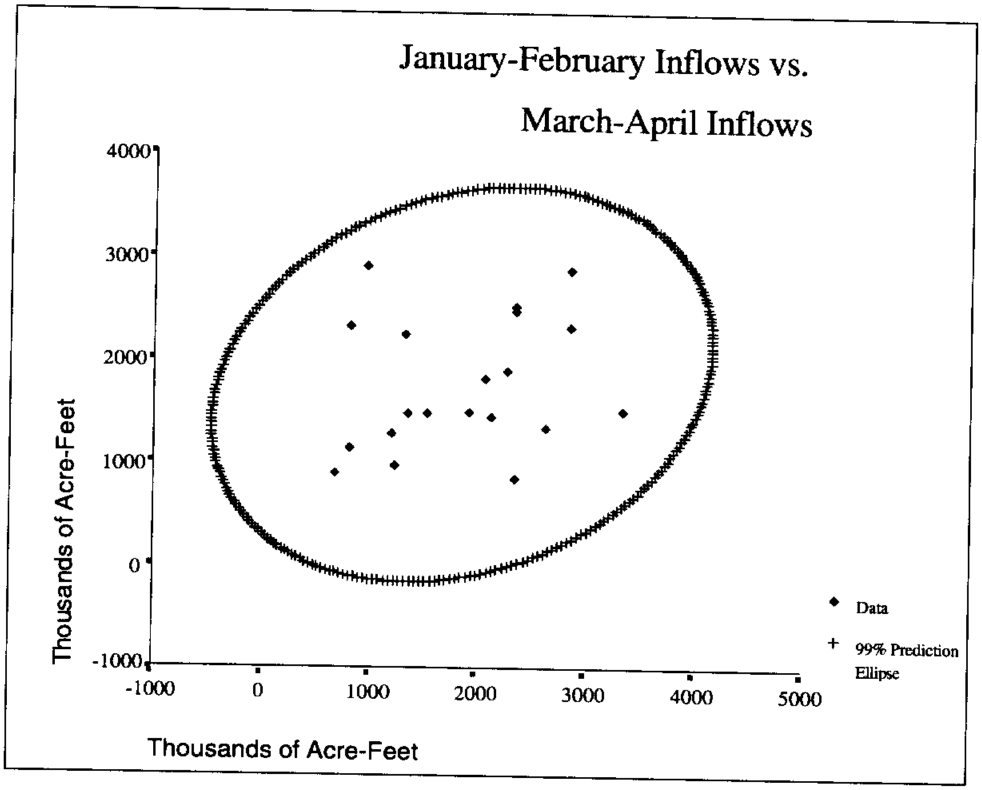

Seatrout Harvest vs.
July-August Inflows
Thousands of Pounds
500
400
300
200
100
0
-100
-200
-1000
0
1000
2000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

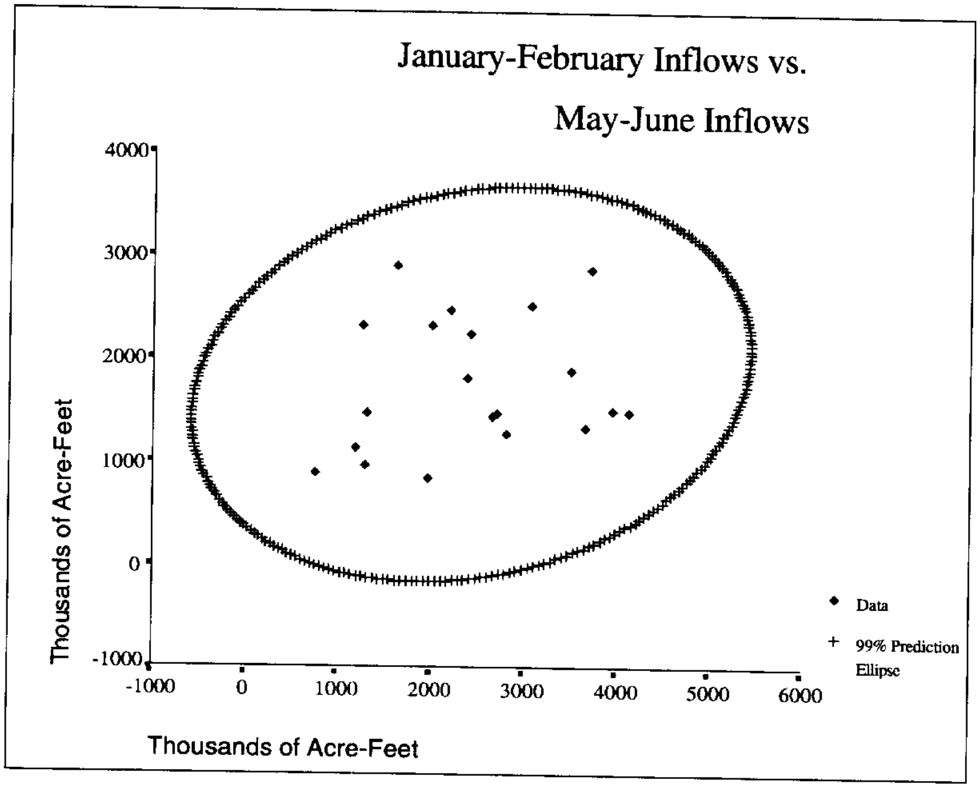


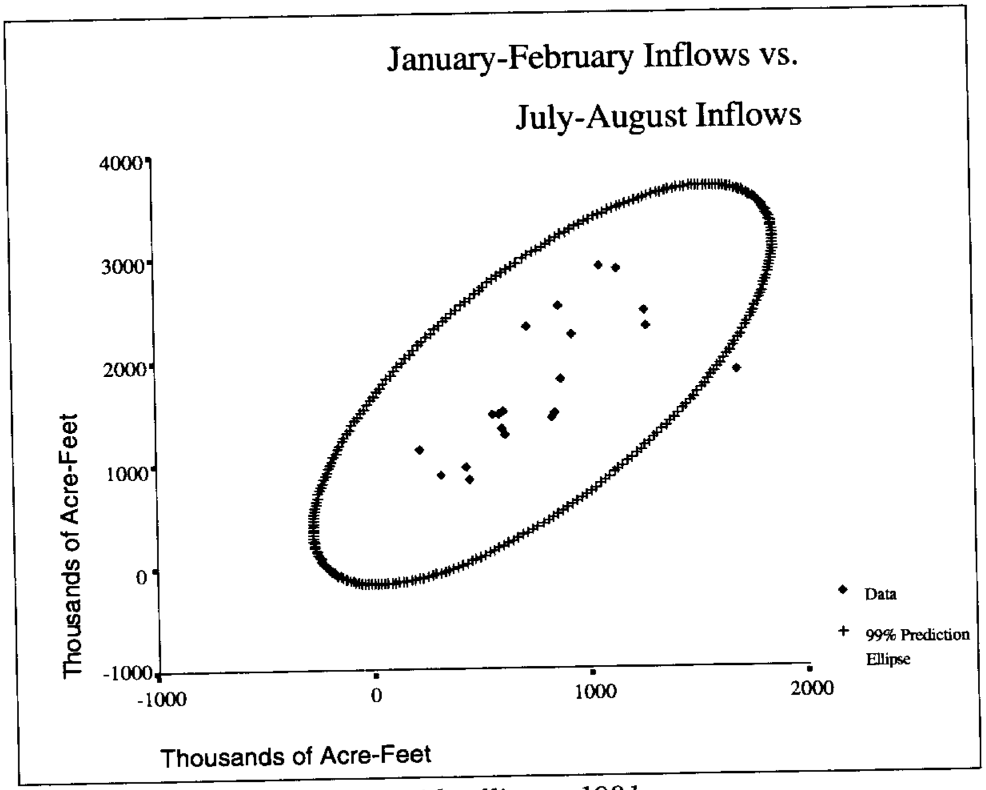
Seatrout Harvest vs.
September-October Inflows
Thousands of Pounds
500
400
300
200
100
0
-100
-200
-1000
0
1000
2000
3000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse



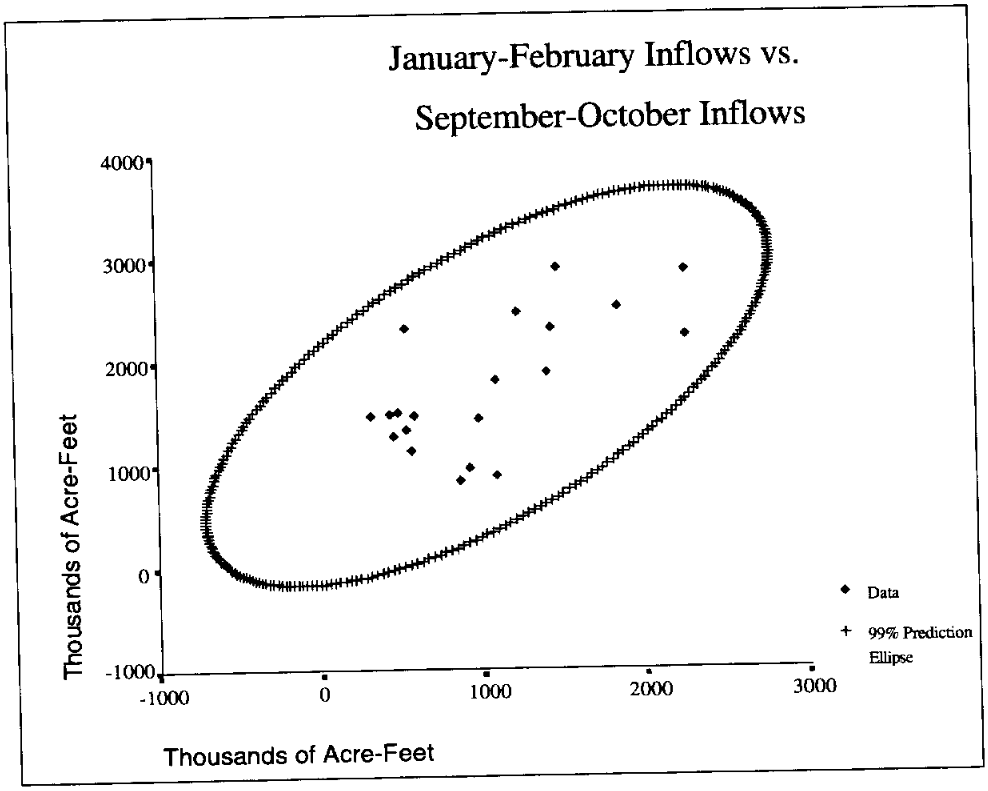
Seatrout Harvest vs.
November-December Inflows
Thousands of Pounds
500
400
300
200
100
0
-100
-200
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

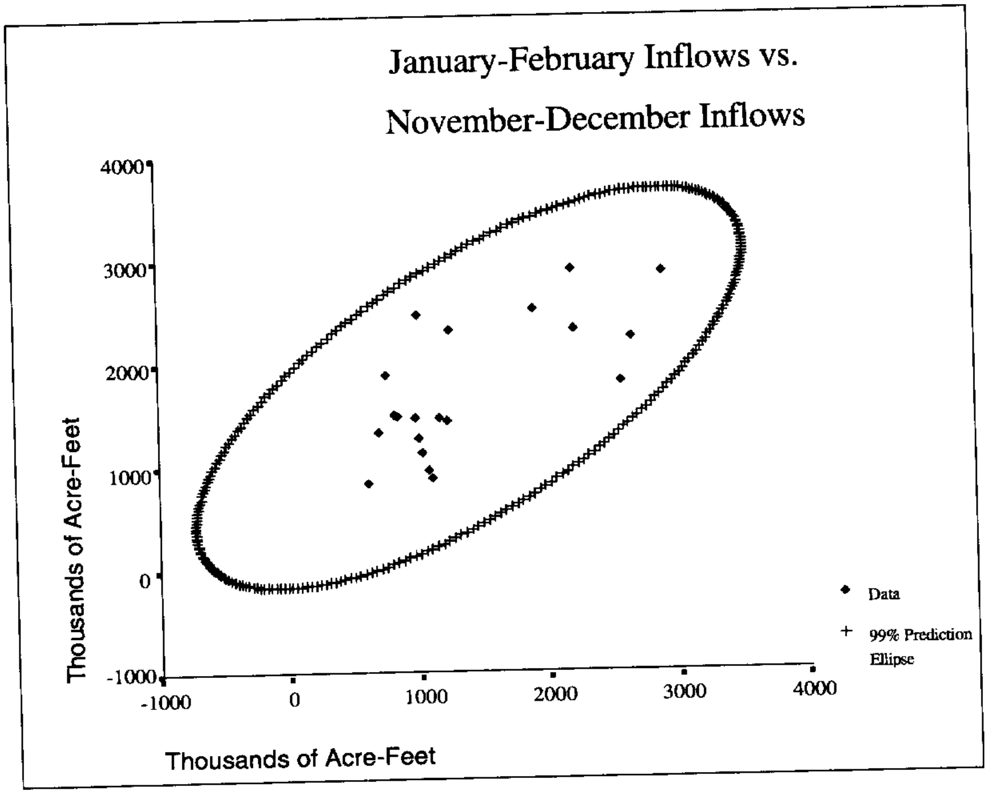

January-February Inflows vs.
March-April Inflows
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
Thousands of Acre-Feet
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

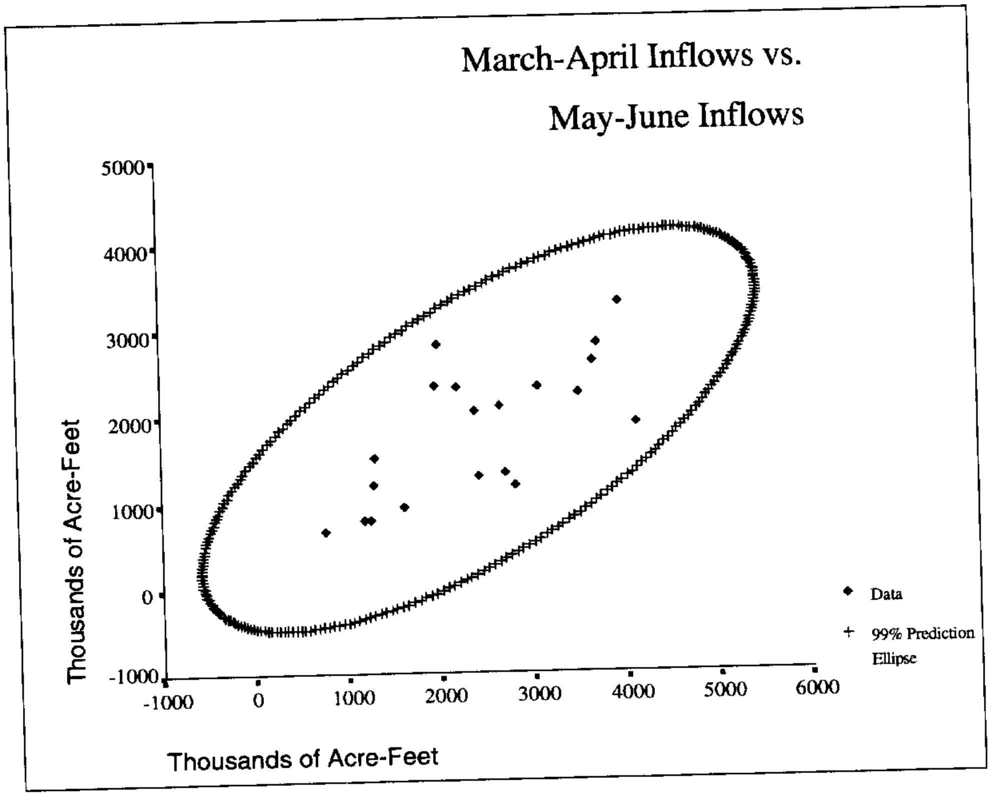

January-February Inflows vs.
May-June Inflows
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000
Thousands of Acre-Feet
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

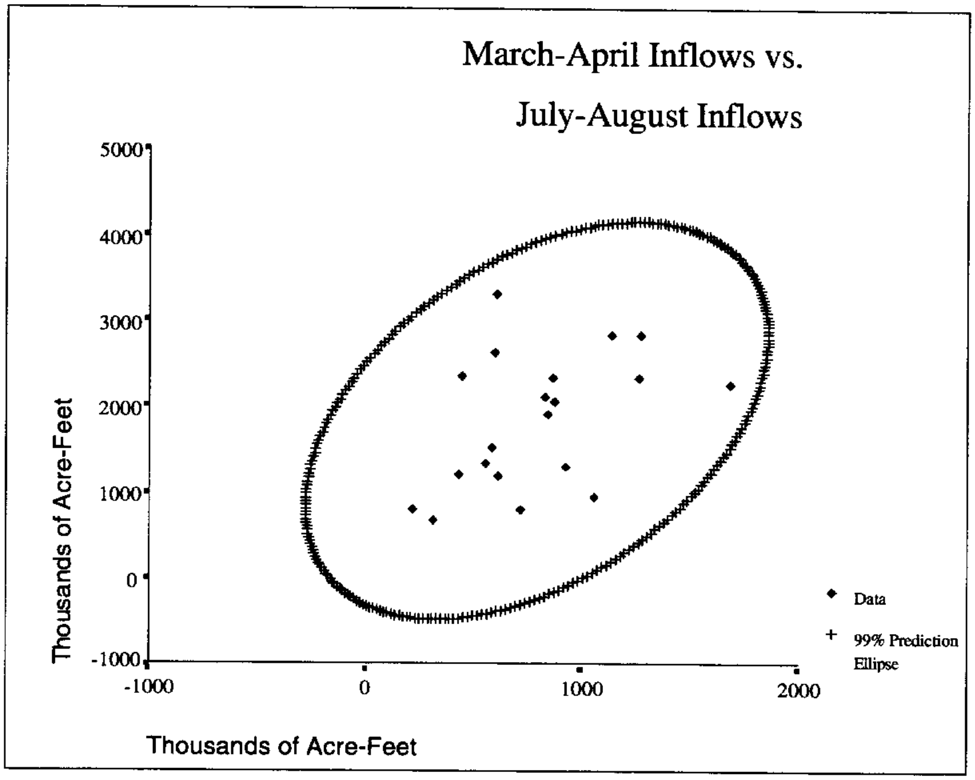

January-February Inflows vs. July-August Inflows

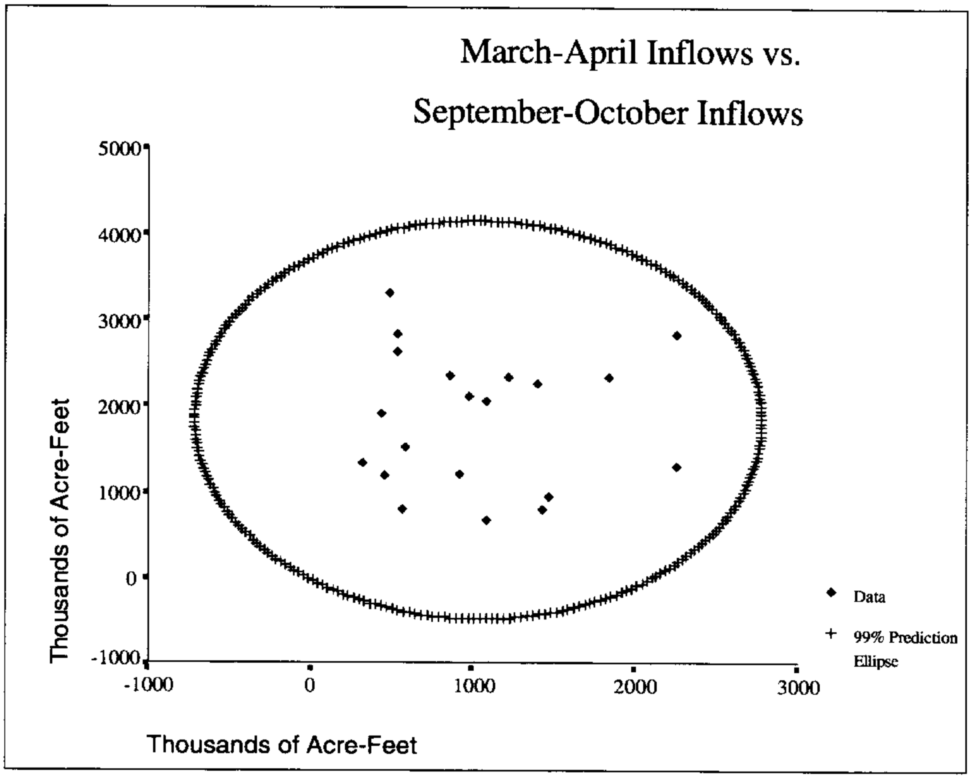
Outside ellipse: 1981.

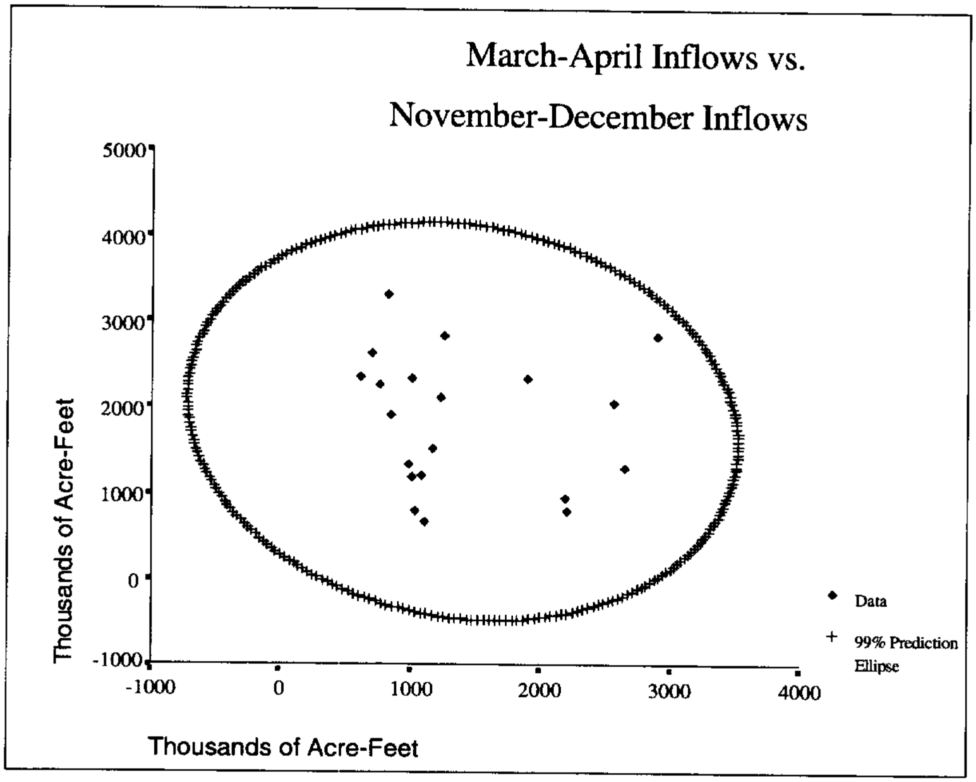

January-February Inflows vs. September-October Inflows

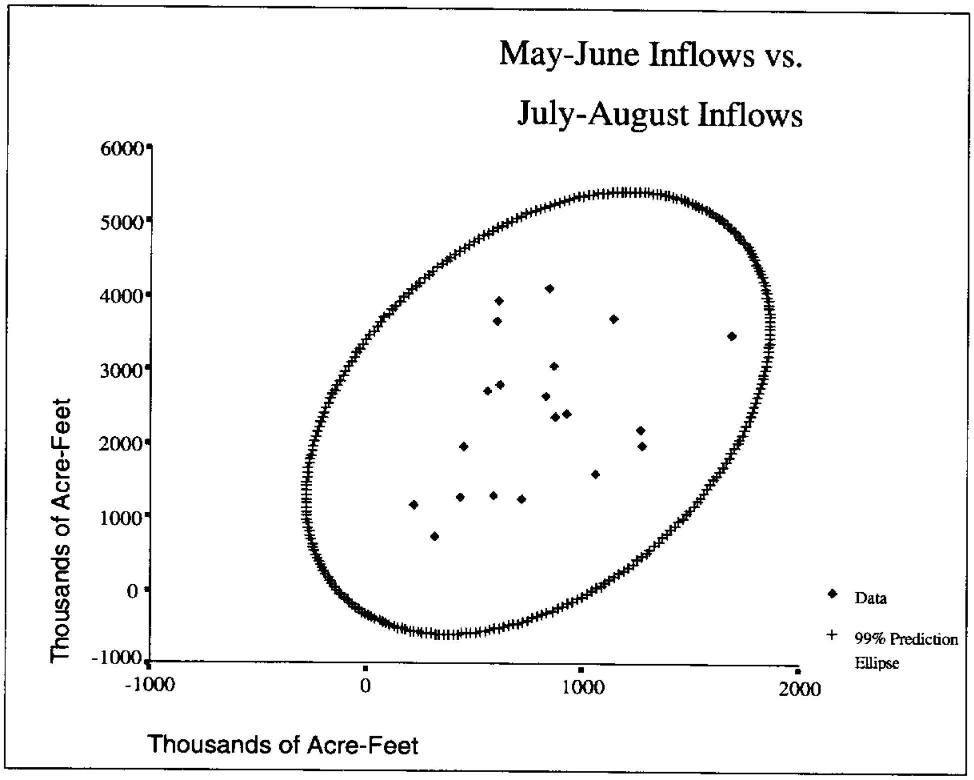

January-February Inflows vs.
November-December Inflows
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

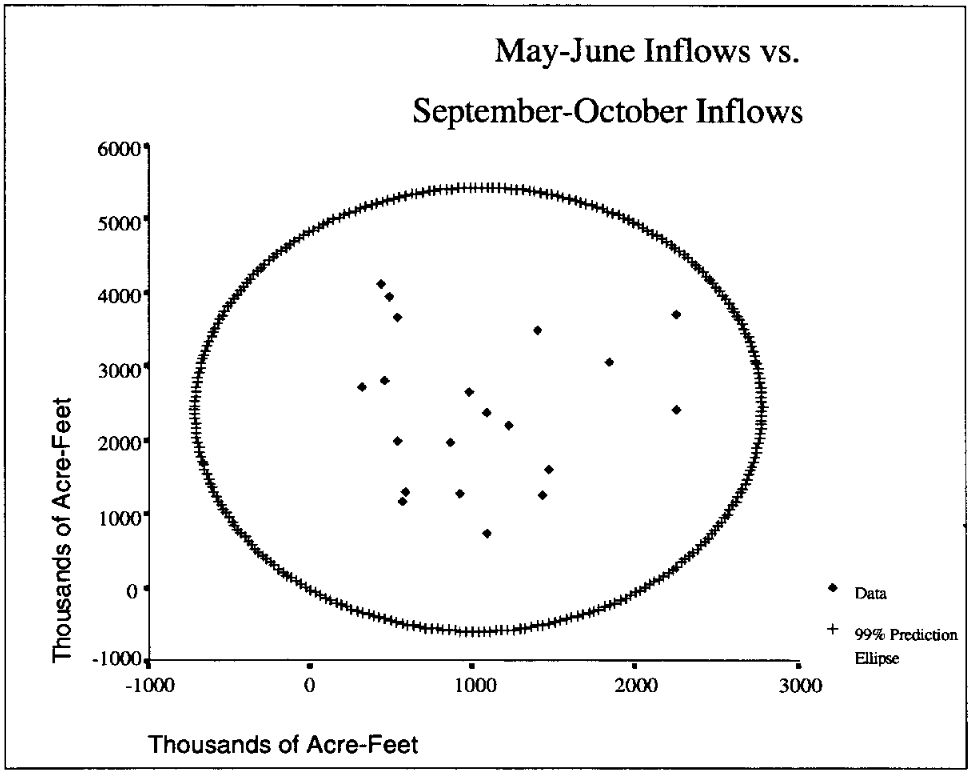

March-April Inflows vs.
May-June Inflows
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
5000
6000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

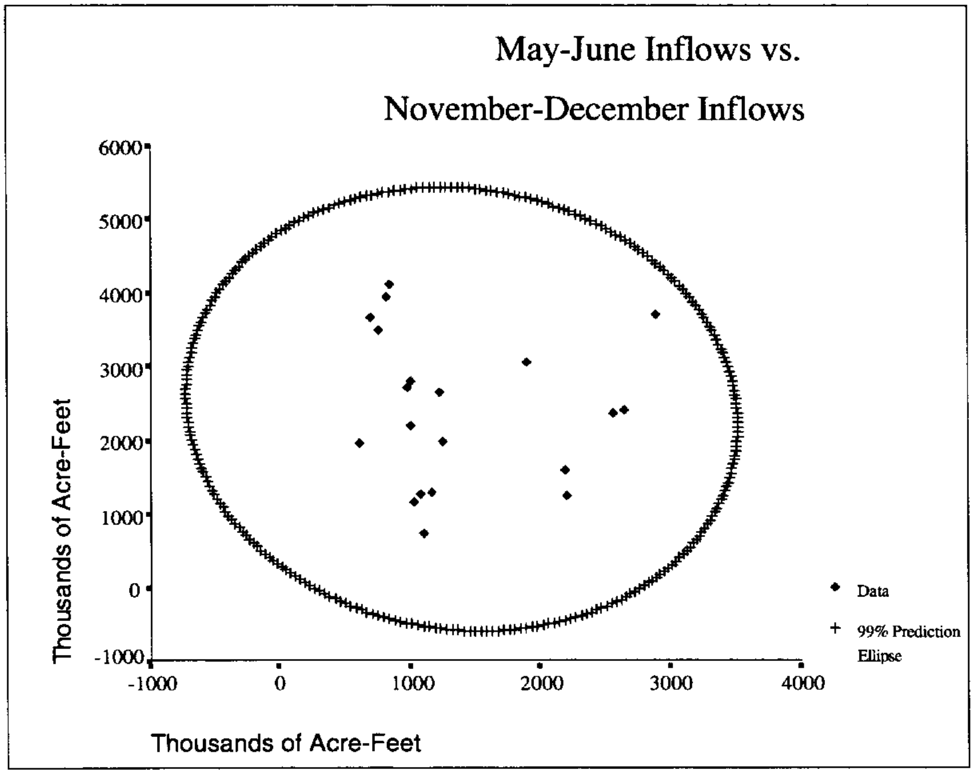

March-April Inflows vs. July-August Inflows

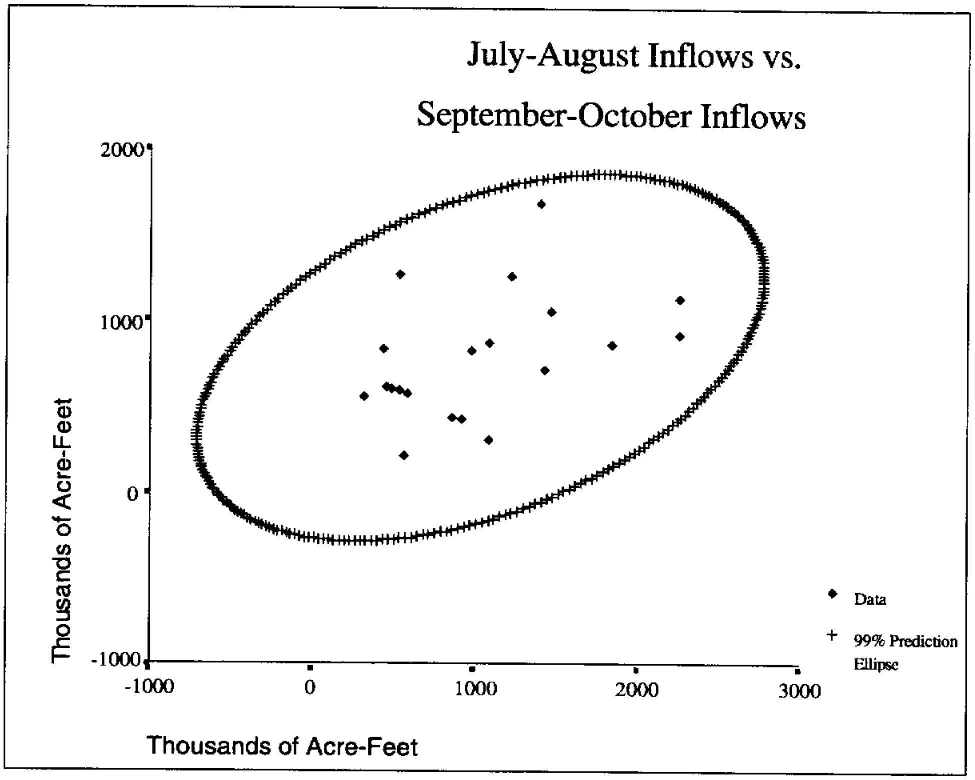

March-April Inflows vs. September-October Inflows


March-April Inflows vs.
November-December Inflows
Thousands of Acre-Feet
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

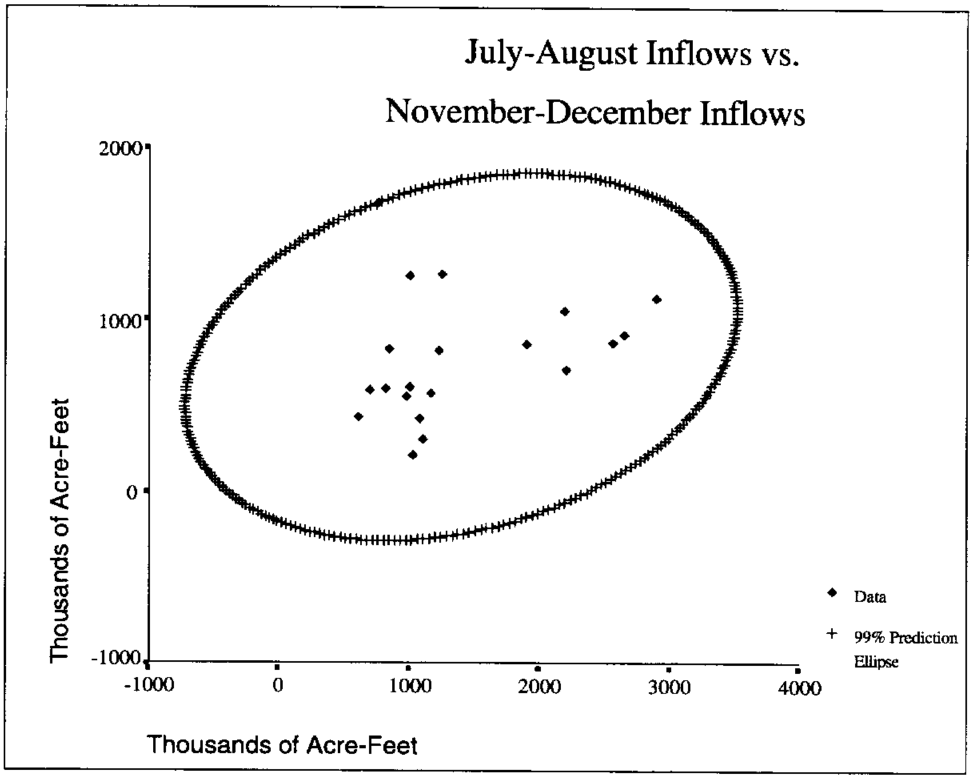

May-June Inflows vs.
July-August Inflows
Thousands of Acre-Feet
6000
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse


May-June Inflows vs.
September-October Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

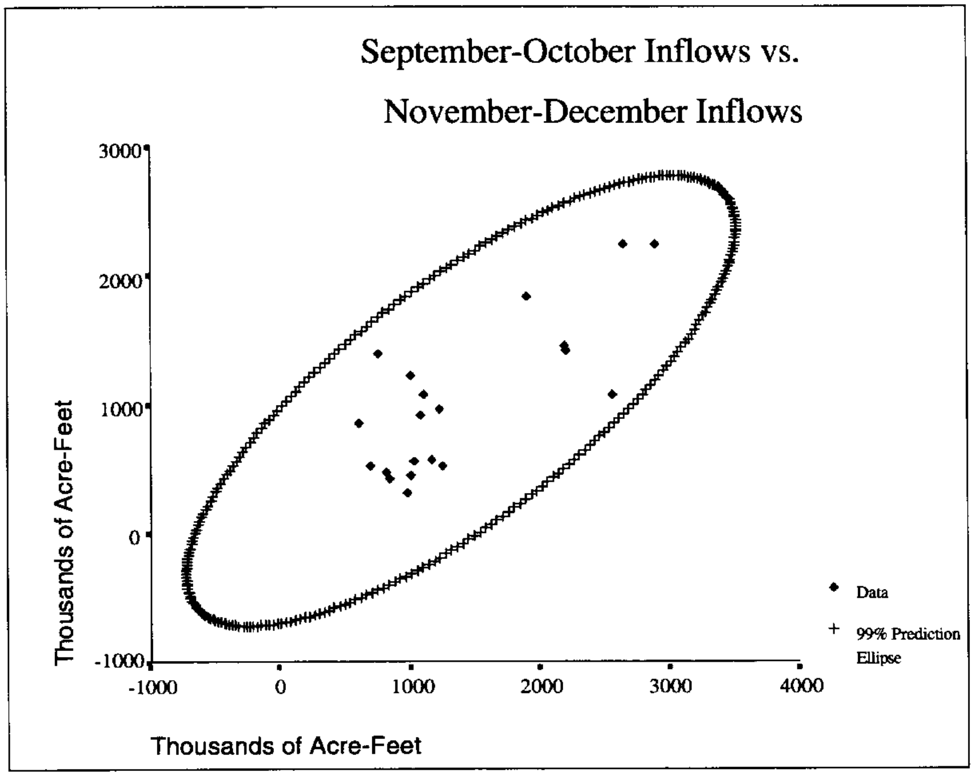

May-June Inflows vs.
November-December Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse



July-August Inflows vs.
September-October Inflows
2000
1000
0
-1000
-1000
0
1000
2000
3000
Thousands of Acre-Feet
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse



July-August Inflows vs.
November-December Inflows
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

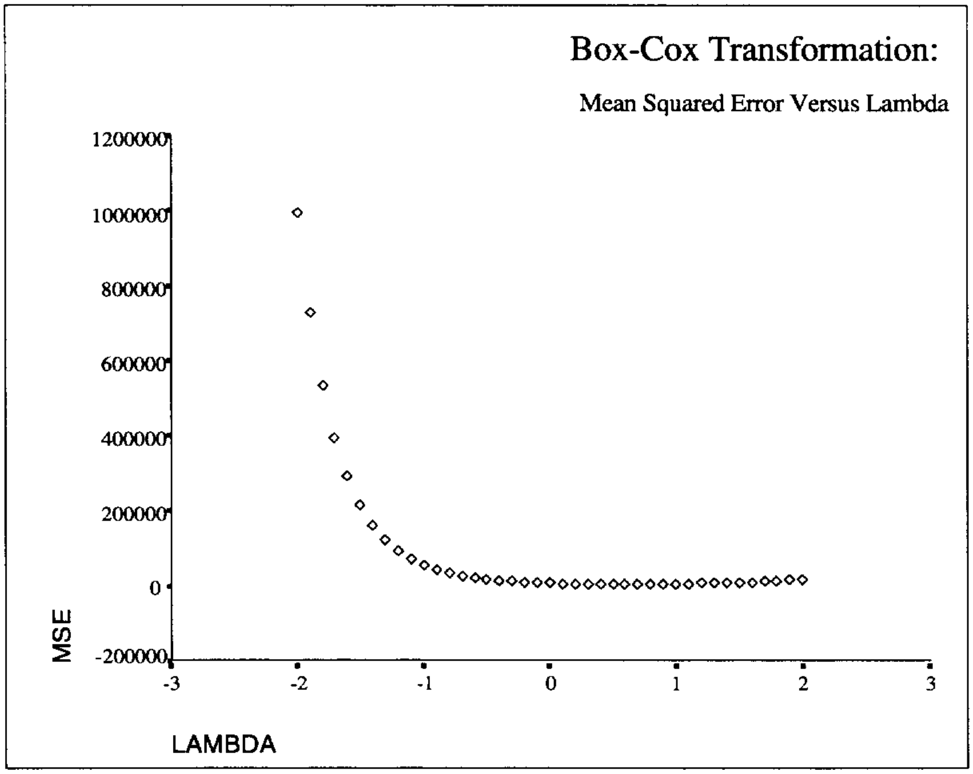

September-October Inflows vs.
November-December Inflows
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

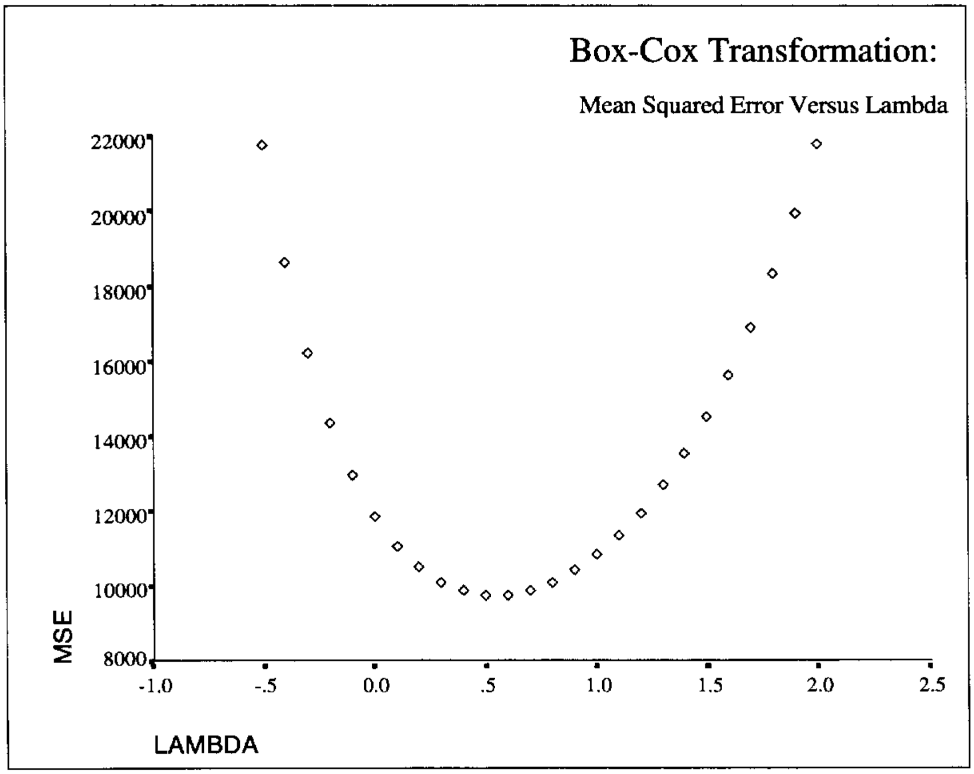
Box–Cox Analysis

Numerical Results

Lambda	**Error MS**
-2.0	1001168.1210
-1.9	731693.8471
-1.8	537693.9180
-1.7	397500.5854
-1.6	295783.3182
-1.5	221668.4757
-1.4	167423.4363
-1.3	127534.0948
-1.2	98056.9266
-1.1	76163.0012
-1.0	59816.4221
-0.9	47547.0696
-0.8	38289.6280
-0.7	31269.2903
-0.6	25920.4043
-0.5	21828.4133
-0.4	18688.3095
-0.3	16274.8194
-0.2	14420.9447
-0.1	13002.4725
0.0	11926.7582
0.1	11124.5801
0.2	10544.2050
0.3	10147.0546
0.4	9904.5336
0.5	9795.7031
0.6	9805.5760
0.7	9923.8680
0.8	10144.0887
0.9	10462.8866
1.0	10879.5859
1.1	11395.8721
1.2	12015.5929
1.3	12744.6532
1.4	13590.9867
1.5	14564.5950
1.6	15677.6474
1.7	16944.6362
1.8	18382.5897
1.9	20011.3406
2.0	21853.8567

Plots


Box-Cox Transformation:
Mean Squared Error Versus Lambda
1200000
1000000
800000
600000
400000
200000
0
-200000
MSE
-3
-2
-1
0
1
2
3
LAMBDA


Box-Cox Transformation:
Mean Squared Error Versus Lambda
22000
20000
18000
16000
14000
12000
10000
8000
MSE
-1.0
-.5
0.0
.5
1.0
1.5
2.0
2.5
LAMBDA

Model Choice Diagnostics

Untransformed Data

```
N = 20     Regression Models for Dependent Variable: SEATROUT

      R-square      Adj     C(p)       AIC       MSE       SBC Variables in Model
  In                Rsq

    1 0.084351 0.033482  -2.2301     182.4   8322.83     184.4 JA_INFL
    1 0.049281 -.003537  -1.7027     183.2   8641.61     185.2 MA_INFL
    1 0.025964 -.028149  -1.3520     183.7   8853.55     185.7 JF_INFL
    1 0.012554 -.042304  -1.1504     183.9   8975.44     185.9 MJ_INFL
----------------------------------------------------------------------
    2 0.115099 0.010993  -0.6925     183.7   8516.49     186.7 JA_INFL ND_INFL
    2 0.106141 0.000981  -0.5578     183.9   8602.70     186.9 JF_INFL ND_INFL
    2 0.099193 -.006785  -0.4533     184.1   8669.57     187.1 JA_INFL SO_INFL
    2 0.095524 -.010885  -0.3981     184.2   8704.88     187.2 MA_INFL JA_INFL
------------------------------------------------------------------------------
    3 0.124378 -.039802   1.1680     185.5   8953.89     189.5 JF_INFL JA_INFL ND_INFL
    3 0.118785 -.046442   1.2521     185.7   9011.07     189.6 MA_INFL JA_INFL ND_INFL
    3 0.116503 -.049153   1.2864     185.7   9034.42     189.7 MJ_INFL JA_INFL ND_INFL
    3 0.115378 -.050488   1.3033     185.7   9045.91     189.7 JA_INFL SO_INFL ND_INFL
--------------------------------------------------------------------------------------
    4 0.127887 -.104676   3.1152     187.5   9512.54     192.4 MA_INFL MJ_INFL JA_INFL ND_INFL
    4 0.127354 -.105352   3.1232     187.5   9518.35     192.4 JF_INFL MA_INFL JA_INFL ND_INFL
    4 0.125642 -.107521   3.1490     187.5   9537.03     192.5 JF_INFL MJ_INFL JA_INFL ND_INFL
    4 0.124743 -.108659   3.1625     187.5   9546.83     192.5 JF_INFL JA_INFL SO_INFL ND_INFL
----------------------------------------------------------------------------------------------
    5 0.135197 -.173661   5.0053     189.3  10106.58     195.3 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                               ND_INFL
    5 0.128165 -.183204   5.1110     189.4  10188.75     195.4 MA_INFL MJ_INFL JA_INFL SO_INFL
                                                               ND_INFL
    5 0.127867 -.183609   5.1155     189.5  10192.23     195.4 JF_INFL MA_INFL JA_INFL SO_INFL
                                                               ND_INFL
    5 0.125914 -.186259   5.1449     189.5  10215.06     195.5 JF_INFL MJ_INFL JA_INFL SO_INFL
                                                               ND_INFL
----------------------------------------------------------------------------------------------------
    6 0.135548 -.263430   7.0000     191.3  10879.59     198.2 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                               SO_INFL ND_INFL
----------------------------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_ INTERCEP    JF_INFL    MA_INFL    MJ_INFL    JA_INFL    SO_INFL

  1 MODEL1  PARMS  SEATROUT  91.230  226.556      .          .          .      -0.074510      .
  2 MODEL1  PARMS  SEATROUT  92.960  216.216      .      -0.026305      .          .          .
  3 MODEL1  PARMS  SEATROUT  94.093  208.155  -0.023021      .          .          .          .
  4 MODEL1  PARMS  SEATROUT  94.739  192.288      .          .      -0.010201      .          .
  5 MODEL1  PARMS  SEATROUT  92.285  203.414      .          .          .      -0.086984      .
  6 MODEL1  PARMS  SEATROUT  92.751  205.909  -0.062185      .          .          .          .
  7 MODEL1  PARMS  SEATROUT  93.111  216.594      .          .          .      -0.089870   0.021342
  8 MODEL1  PARMS  SEATROUT  93.300  241.936      .      -0.013925      .      -0.061336      .
  9 MODEL1  PARMS  SEATROUT  94.625  211.312  -0.029935      .          .      -0.056186      .
 10 MODEL1  PARMS  SEATROUT  94.927  214.828      .      -0.008306      .      -0.077918      .
 11 MODEL1  PARMS  SEATROUT  95.050  196.522      .          .       0.003783  -0.091709      .
 12 MODEL1  PARMS  SEATROUT  95.110  202.949      .          .          .      -0.085136  -0.004484
 13 MODEL1  PARMS  SEATROUT  97.532  206.606      .      -0.018567   0.012256  -0.082020      .
 14 MODEL1  PARMS  SEATROUT  97.562  221.298  -0.028828  -0.007479      .      -0.049161      .
 15 MODEL1  PARMS  SEATROUT  97.658  204.712  -0.029715      .       0.003591  -0.060896      .
 16 MODEL1  PARMS  SEATROUT  97.708  210.819  -0.030082      .          .      -0.053920  -0.005127
 17 MODEL1  PARMS  SEATROUT 100.531  213.166  -0.026705  -0.017094   0.011411  -0.055097      .
 18 MODEL1  PARMS  SEATROUT 100.939  206.409      .      -0.018641   0.012164  -0.079976  -0.004487
 19 MODEL1  PARMS  SEATROUT 100.957  220.979  -0.028973  -0.007678      .      -0.046283  -0.006089
 20 MODEL1  PARMS  SEATROUT 101.070  204.515  -0.029850      .       0.003466  -0.058771  -0.004441
 21 MODEL1  PARMS  SEATROUT 104.305  212.979  -0.026846  -0.017168   0.011303  -0.052659  -0.005042
```

```
OBS  ND_INFL  SEATROUT  _IN_  _P_  _EDF_    _MSE_     _RSQ_   _ADJRSQ_    _CP_      _AIC_    _SBC_

  1  .           -1       1    2     18    8322.83 0.08435   0.03348 -2.23008 182.428 184.419
  2  .           -1       1    2     18    8641.61 0.04928  -0.00354 -1.70267 183.180 185.171
  3  .           -1       1    2     18    8853.55 0.02596  -0.02815 -1.35202 183.664 185.656
  4  .           -1       1    2     18    8975.44 0.01255  -0.04230 -1.15036 183.938 185.929
  5 0.023537     -1       2    3     17    8516.49 0.11510   0.01099 -0.69248 183.745 186.732
  6 0.050976     -1       2    3     17    8602.70 0.10614   0.00098 -0.55777 183.946 186.933
  7  .           -1       2    3     17    8669.57 0.09919  -0.00678 -0.45327 184.101 187.088
  8  .           -1       2    3     17    8704.88 0.09552  -0.01088 -0.39810 184.182 187.170
  9 0.038237     -1       3    4     16    8953.89 0.12438  -0.03980  1.16799 185.534 189.517
 10 0.021257     -1       3    4     16    9011.07 0.11879  -0.04644  1.25208 185.661 189.644
 11 0.024544     -1       3    4     16    9034.42 0.11650  -0.04915  1.28641 185.713 189.696
 12 0.026137     -1       3    4     16    9045.91 0.11538  -0.05049  1.30332 185.738 189.721
 13 0.021704     -1       4    5     15    9512.54 0.12789  -0.10468  3.11521 187.454 192.432
 14 0.035641     -1       4    5     15    9518.35 0.12735  -0.10535  3.12323 187.466 192.445
 15 0.039085     -1       4    5     15    9537.03 0.12564  -0.10752  3.14898 187.505 192.484
 16 0.041284     -1       4    5     15    9546.83 0.12474  -0.10866  3.16249 187.526 192.504
 17 0.034998     -1       5    6     14   10106.58 0.13520  -0.17366  5.00528 189.285 195.260
 18 0.024262     -1       5    6     14   10188.75 0.12817  -0.18320  5.11102 189.447 195.422
 19 0.039190     -1       5    6     14   10192.23 0.12787  -0.18361  5.11551 189.454 195.429
 20 0.041694     -1       5    6     14   10215.06 0.12591  -0.18626  5.14488 189.499 195.473
 21 0.037942     -1       6    7     13   10879.59 0.13555  -0.26343  7.00000 191.277 198.247
```

Square Root of Harvest (Box–Cox Transformation)

```
 N = 20     Regression Models for Dependent Variable: SQRTSTRT

       R-square      Adj     C(p)      AIC      MSE      SBC Variables in Model
   In                Rsq

     1 0.087733 0.037051  -2.0034  54.3577  13.7804  56.3491 JA_INFL
     1 0.038329 -.015097  -1.2455  55.4125  14.5266  57.4039 MA_INFL
     1 0.037364 -.016116  -1.2307  55.4325  14.5412  57.4240 JF_INFL
     1 0.008068 -.047039  -0.7812  56.0321  14.9837  58.0236 ND_INFL
--------------------------------------------------------------------
     2 0.134796 0.033007  -0.7255  55.2983  13.8382  58.2855 JF_INFL ND_INFL
     2 0.118478 0.014770  -0.4752  55.6720  14.0992  58.6592 JA_INFL ND_INFL
     2 0.103549 -.001915  -0.2461  56.0079  14.3380  58.9951 JA_INFL SO_INFL
     2 0.093173 -.013513  -0.0869  56.2380  14.5040  59.2252 MA_INFL JA_INFL
----------------------------------------------------------------------------
     3 0.143214 -.017433   1.1453  57.1028  14.5601  61.0857 JF_INFL JA_INFL ND_INFL
     3 0.136704 -.025164   1.2452  57.2542  14.6707  61.2371 JF_INFL MA_INFL ND_INFL
     3 0.136330 -.025609   1.2509  57.2628  14.6771  61.2458 JF_INFL SO_INFL ND_INFL
     3 0.135879 -.026144   1.2579  57.2733  14.6847  61.2562 JF_INFL MJ_INFL ND_INFL
------------------------------------------------------------------------------------
     4 0.147280 -.080112   3.0829  59.0076  15.4570  63.9863 JF_INFL MJ_INFL JA_INFL ND_INFL
     4 0.143515 -.084881   3.1407  59.0957  15.5253  64.0744 JF_INFL MA_INFL JA_INFL ND_INFL
     4 0.143427 -.084992   3.1421  59.0978  15.5269  64.0765 JF_INFL JA_INFL SO_INFL ND_INFL
     4 0.143332 -.085113   3.1435  59.1000  15.5286  64.0787 JF_INFL MA_INFL MJ_INFL ND_INFL
--------------------------------------------------------------------------------------------
     5 0.152553 -.150106   5.0020  60.8836  16.4587  66.8580 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                             ND_INFL
     5 0.147378 -.157130   5.0814  61.0053  16.5592  66.9797 JF_INFL MJ_INFL JA_INFL SO_INFL
                                                             ND_INFL
     5 0.144794 -.160636   5.1211  61.0658  16.6094  67.0402 JF_INFL MA_INFL MJ_INFL SO_INFL
                                                             ND_INFL
     5 0.143763 -.162037   5.1369  61.0900  16.6294  67.0644 JF_INFL MA_INFL JA_INFL SO_INFL
                                                             ND_INFL
-------------------------------------------------------------------------------------------------
     6 0.152686 -.238382   7.0000  62.8804  17.7220  69.8506 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                             SO_INFL ND_INFL
-------------------------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_ INTERCEP  JF_INFL    MA_INFL   MJ_INFL   JA_INFL    SO_INFL

  1 MODEL1  PARMS  SQRTSTRT 3.71219  14.8612  .         .         .         -.0030978  .
  2 MODEL1  PARMS  SQRTSTRT 3.81138  14.1569  .        -.00094570 .          .         .
  3 MODEL1  PARMS  SQRTSTRT 3.81329  14.3948 -.0011258  .         .          .         .
  4 MODEL1  PARMS  SQRTSTRT 3.87088  11.7371  .         .         .          .         .
  5 MODEL1  PARMS  SQRTSTRT 3.71998  14.2939 -.0028858  .         .          .         .
  6 MODEL1  PARMS  SQRTSTRT 3.75489  13.9178  .         .         .         -.0036063  .
  7 MODEL1  PARMS  SQRTSTRT 3.78655  14.4420  .         .         .         -.0037442 0.00089818
  8 MODEL1  PARMS  SQRTSTRT 3.80841  15.2987  .        -.00039610 .         -.0027230  .
  9 MODEL1  PARMS  SQRTSTRT 3.81576  14.4435 -.0019925  .         .         -.0015563  .
 10 MODEL1  PARMS  SQRTSTRT 3.83023  14.6264 -.0027255 -.00023324 .          .         .
 11 MODEL1  PARMS  SQRTSTRT 3.83106  14.2718 -.0027932  .         .          .        -.00041187
 12 MODEL1  PARMS  SQRTSTRT 3.83206  14.0403 -.0029751  .         .00012914  .         .
 13 MODEL1  PARMS  SQRTSTRT 3.93154  13.9610 -.0019764  .         .00026255 -.0019007  .
 14 MODEL1  PARMS  SQRTSTRT 3.94021  14.5729 -.0019782 -.00009689 .         -.0014653  .
 15 MODEL1  PARMS  SQRTSTRT 3.94041  14.4282 -.0019971  .         .         -.0014858 -.00015952
 16 MODEL1  PARMS  SQRTSTRT 3.94063  14.3332 -.0027590 -.00060981 .00042263  .         .
 17 MODEL1  PARMS  SQRTSTRT 4.05693  14.2170 -.0018853 -.00051766 .00049935 -.0017251  .
 18 MODEL1  PARMS  SQRTSTRT 4.06930  13.9562 -.0019797  .         .00025951 -.0018489 -.00010817
 19 MODEL1  PARMS  SQRTSTRT 4.07546  14.3052 -.0026717 -.00060537 .00042271  .        -.00040226
 20 MODEL1  PARMS  SQRTSTRT 4.07792  14.5639 -.0019823 -.00010253 .         -.0013838 -.00017237
 21 MODEL1  PARMS  SQRTSTRT 4.20975  14.2124 -.0018888 -.00051952 .00049666 -.0016640 -.00012634
```

```
OBS  ND_INFL   SQRTSTRT  _IN_  _P_  _EDF_    _MSE_     _RSQ_   _ADJRSQ_     _CP_      _AIC_     _SBC_

  1 .             -1       1    2     18    13.7804  0.08773   0.03705  -2.00345   54.3577   56.3491
  2 .             -1       1    2     18    14.5266  0.03833  -0.01510  -1.24547   55.4125   57.4039
  3 .             -1       1    2     18    14.5412  0.03736  -0.01612  -1.23066   55.4325   57.4240
  4 .0004736      -1       1    2     18    14.9837  0.00807  -0.04704  -0.78118   56.0321   58.0236
  5 .0022908      -1       2    3     17    13.8382  0.13480   0.03301  -0.72552   55.2983   58.2855
  6 .0009595      -1       2    3     17    14.0992  0.11848   0.01477  -0.47516   55.6720   58.6592
  7 .             -1       2    3     17    14.3380  0.10355  -0.00192  -0.24612   56.0079   58.9951
  8 .             -1       2    3     17    14.5040  0.09317  -0.01351  -0.08691   56.2380   59.2252
  9 .0019380      -1       3    4     16    14.5601  0.14321  -0.01743   1.14532   57.1028   61.0857
 10 .0021602      -1       3    4     16    14.6707  0.13670  -0.02516   1.24520   57.2542   61.2371
 11 .0024943      -1       3    4     16    14.6771  0.13633  -0.02561   1.25095   57.2628   61.2458
 12 .0023597      -1       3    4     16    14.6847  0.13588  -0.02614   1.25786   57.2733   61.2562
 13 .0019999      -1       4    5     15    15.4570  0.14728  -0.08011   3.08294   59.0076   63.9863
 14 .0019043      -1       4    5     15    15.5253  0.14352  -0.08488   3.14071   59.0957   64.0744
 15 .0020327      -1       4    5     15    15.5269  0.14343  -0.08499   3.14205   59.0978   64.0765
 16 .0021747      -1       4    5     15    15.5286  0.14333  -0.08511   3.14352   59.1000   64.0787
 17 .0018762      -1       5    6     14    16.4587  0.15255  -0.15011   5.00204   60.8836   66.8580
 18 .0020635      -1       5    6     14    16.5592  0.14738  -0.15713   5.08144   61.0053   66.9797
 19 .0023760      -1       5    6     14    16.6094  0.14479  -0.16064   5.12108   61.0658   67.0402
 20 .0020048      -1       5    6     14    16.6294  0.14376  -0.16204   5.13691   61.0900   67.0644
 21 .0019499      -1       6    7     13    17.7220  0.15269  -0.23838   7.00000   62.8804   69.8506
```

Logged Inflows

```
N = 20     Regression Models for Dependent Variable: SEATROUT

     R-square      Adj      C(p)       AIC       MSE       SBC Variables in Model
  In               Rsq

   1 0.070178 0.018522  -1.0363    182.7   8451.66     184.7 LGJAINFL
   1 0.031502 -.022303  -0.4138    183.6   8803.21     185.5 LGMAINFL
   1 0.028834 -.025119  -0.3709    183.6   8827.46     185.6 LGNDINFL
   1 0.014662 -.040079  -0.1428    183.9   8956.28     185.9 LGJFINFL
-------------------------------------------------------------------------------
   2 0.143462 0.042693  -0.2156    183.1   8243.51     186.1 LGJAINFL LGNDINFL
   2 0.130274 0.027954  -0.00339   183.4   8370.44     186.4 LGJFINFL LGNDINFL
   2 0.091634 -.015233   0.6185    184.3   8742.33     187.3 LGJFINFL LGJAINFL
   2 0.091293 -.015614   0.6239    184.3   8745.61     187.3 LGSOINFL LGNDINFL
---------------------------------------------------------------------------------------
   3 0.174724 0.019984   1.2813    184.3   8439.06     188.3 LGJFINFL LGSOINFL LGNDINFL
   3 0.170665 0.015165   1.3466    184.4   8480.56     188.4 LGJAINFL LGSOINFL LGNDINFL
   3 0.163982 0.007229   1.4541    184.6   8548.90     188.6 LGMJINFL LGJAINFL LGNDINFL
   3 0.151702 -.007354   1.6518    184.9   8674.48     188.9 LGMAINFL LGJAINFL LGNDINFL
-----------------------------------------------------------------------------------------------
   4 0.181546 -.036708   3.1715    186.2   8927.25     191.2 LGMJINFL LGJAINFL LGSOINFL LGNDINFL
   4 0.180667 -.037822   3.1856    186.2   8936.84     191.2 LGJFINFL LGJAINFL LGSOINFL LGNDINFL
   4 0.178772 -.040222   3.2161    186.3   8957.51     191.2 LGJFINFL LGMJINFL LGSOINFL LGNDINFL
   4 0.176989 -.042481   3.2448    186.3   8976.96     191.3 LGMAINFL LGJAINFL LGSOINFL LGNDINFL
-----------------------------------------------------------------------------------------------------
   5 0.191983 -.096595   5.0035    187.9   9442.95     193.9 LGJFINFL LGMJINFL LGJAINFL LGSOINFL
                                                           LGNDINFL
   5 0.186551 -.103967   5.0909    188.1   9506.43     194.0 LGJFINFL LGMAINFL LGJAINFL LGSOINFL
                                                           LGNDINFL
   5 0.181948 -.110213   5.1650    188.2   9560.21     194.1 LGMAINFL LGMJINFL LGJAINFL LGSOINFL
                                                           LGNDINFL
   5 0.178917 -.114328   5.2138    188.2   9595.64     194.2 LGJFINFL LGMAINFL LGMJINFL LGSOINFL
                                                           LGNDINFL
-------------------------------------------------------------------------------------------------------
   6 0.192202 -.180628   7.0000    189.9  10166.57     196.9 LGJFINFL LGMAINFL LGMJINFL LGJAINFL
                                                           LGSOINFL LGNDINFL
-------------------------------------------------------------------------------------------------------


 OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_  INTERCEP LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL

   1 MODEL1  PARMS  SEATROUT  91.933  493.415      .        .        .     -49.6215     .
   2 MODEL1  PARMS  SEATROUT  93.825  425.721      .    -34.7757     .         .        .
   3 MODEL1  PARMS  SEATROUT  93.955  -70.868      .        .        .         .        .
   4 MODEL1  PARMS  SEATROUT  94.638  386.521  -29.562      .        .         .        .
   5 MODEL1  PARMS  SEATROUT  90.794  206.314      .        .        .     -67.0660     .
   6 MODEL1  PARMS  SEATROUT  91.490  301.644 -105.186      .        .         .        .
   7 MODEL1  PARMS  SEATROUT  93.500  292.897   58.766      .        .     -85.4008     .
   8 MODEL1  PARMS  SEATROUT  93.518  -22.507      .        .        .         .    -54.2428
   9 MODEL1  PARMS  SEATROUT  91.864  310.910  -96.187      .        .         .    -46.1400
  10 MODEL1  PARMS  SEATROUT  92.090  201.745      .        .        .     -57.9426 -37.1673
  11 MODEL1  PARMS  SEATROUT  92.460   -4.802      .        .     35.9351 -89.4211     .
  12 MODEL1  PARMS  SEATROUT  93.137   61.003      .     23.6404     .     -82.1477     .
  13 MODEL1  PARMS  SEATROUT  94.484   43.422      .        .     27.0800 -76.3258 -30.9063
  14 MODEL1  PARMS  SEATROUT  94.535  289.743  -58.816      .        .     -28.0016 -41.0361
  15 MODEL1  PARMS  SEATROUT  94.644  231.887 -109.963      .     14.9610     .    -44.5134
  16 MODEL1  PARMS  SEATROUT  94.747   74.291      .     20.7602     .     -71.4927 -35.9210
  17 MODEL1  PARMS  SEATROUT  97.175  130.165  -60.094      .     27.6216 -46.1021 -34.7340
  18 MODEL1  PARMS  SEATROUT  97.501  164.828  -57.532  20.0338     .     -41.7311 -39.7490
  19 MODEL1  PARMS  SEATROUT  97.776   26.290      .      6.6070  23.0723 -77.9176 -31.4363
  20 MODEL1  PARMS  SEATROUT  97.957  239.965 -109.119  -3.8612  17.6110     .    -43.9911
  21 MODEL1  PARMS  SEATROUT 100.829  116.856  -59.644   4.8824  24.6560 -47.5047 -35.0969
```

```
OBS LGNDINFL SEATROUT _IN_ _P_ _EDF_    _MSE_    _RSQ_  _ADJRSQ_    _CP_     _AIC_   _SBC_

  1      .       -1      1    2    18    8451.66 0.07018  0.01852 -1.03626 182.735 184.727
  2      .       -1      1    2    18    8803.21 0.03150 -0.02230 -0.41384 183.550 185.542
  3   33.391     -1      1    2    18    8827.46 0.02883 -0.02512 -0.37091 183.605 185.597
  4      .       -1      1    2    18    8956.28 0.01466 -0.04008 -0.14283 183.895 185.886
  5   56.295     -1      2    3    17    8243.51 0.14346  0.04269 -0.21563 183.093 186.080
  6   90.448     -1      2    3    17    8370.44 0.13027  0.02795 -0.00339 183.399 186.386
  7      .       -1      2    3    17    8742.33 0.09163 -0.01523  0.61846 184.268 187.255
  8   78.228     -1      2    3    17    8745.61 0.09129 -0.01561  0.62394 184.276 187.263
  9  123.705     -1      3    4    16    8439.06 0.17472  0.01998  1.28128 184.350 188.333
 10   83.902     -1      3    4    16    8480.56 0.17067  0.01516  1.34659 184.448 188.431
 11   67.673     -1      3    4    16    8548.90 0.16398  0.00723  1.45414 184.608 188.591
 12   65.936     -1      3    4    16    8674.48 0.15170 -0.00735  1.65177 184.900 188.883
 13   87.825     -1      4    5    15    8927.25 0.18155 -0.03671  3.17148 186.184 191.162
 14  108.778     -1      4    5    15    8936.84 0.18067 -0.03782  3.18563 186.205 191.184
 15  131.392     -1      4    5    15    8957.51 0.17877 -0.04022  3.21613 186.251 191.230
 16   91.442     -1      4    5    15    8976.96 0.17699 -0.04248  3.24482 186.295 191.273
 17  113.321     -1      5    6    14    9442.95 0.19198 -0.09659  5.00352 187.927 193.901
 18  115.512     -1      5    6    14    9506.43 0.18655 -0.10397  5.09094 188.061 194.035
 19   89.644     -1      5    6    14    9560.21 0.18195 -0.11021  5.16501 188.174 194.148
 20  130.045     -1      5    6    14    9595.64 0.17892 -0.11433  5.21380 188.248 194.222
 21  114.474     -1      6    7    13   10166.57 0.19220 -0.18063  7.00000 189.922 196.892
```

```
OBS LGNDINFL SEATROUT _IN_ _P_ _EDF_    _MSE_    _RSQ_  _ADJRSQ_    _CP_    _AIC_   _SBC_

  1      .        -1      1   2   18   8451.66 0.07018  0.01852 -1.03626 182.735 184.727
  2      .        -1      1   2   18   8803.21 0.03150 -0.02230 -0.41384 183.550 185.542
  3   33.391      -1      1   2   18   8827.46 0.02883 -0.02512 -0.37091 183.605 185.597
  4      .        -1      1   2   18   8956.28 0.01466 -0.04008 -0.14283 183.895 185.886
  5   56.295      -1      2   3   17   8243.51 0.14346  0.04269 -0.21563 183.093 186.080
  6   90.448      -1      2   3   17   8370.44 0.13027  0.02795 -0.00339 183.399 186.386
  7      .        -1      2   3   17   8742.33 0.09163 -0.01523  0.61846 184.268 187.255
  8   78.228      -1      2   3   17   8745.61 0.09129 -0.01561  0.62394 184.276 187.263
  9  123.705      -1      3   4   16   8439.06 0.17472  0.01998  1.28128 184.350 188.333
 10   83.902      -1      3   4   16   8480.56 0.17067  0.01516  1.34659 184.448 188.431
 11   67.673      -1      3   4   16   8548.90 0.16398  0.00723  1.45414 184.608 188.591
 12   65.936      -1      3   4   16   8674.48 0.15170 -0.00735  1.65177 184.900 188.883
 13   87.825      -1      4   5   15   8927.25 0.18155 -0.03671  3.17148 186.184 191.162
 14  108.778      -1      4   5   15   8936.84 0.18067 -0.03782  3.18563 186.205 191.184
 15  131.392      -1      4   5   15   8957.51 0.17877 -0.04022  3.21613 186.251 191.230
 16   91.442      -1      4   5   15   8976.96 0.17699 -0.04248  3.24482 186.295 191.273
 17  113.321      -1      5   6   14   9442.95 0.19198 -0.09659  5.00352 187.927 193.901
 18  115.512      -1      5   6   14   9506.43 0.18655 -0.10397  5.09094 188.061 194.035
 19   89.644      -1      5   6   14   9560.21 0.18195 -0.11021  5.16501 188.174 194.148
 20  130.045      -1      5   6   14   9595.64 0.17892 -0.11433  5.21380 188.248 194.222
 21  114.474      -1      6   7   13  10166.57 0.19220 -0.18063  7.00000 189.922 196.892
```

Logged Harvest

```
N = 20     Regression Models for Dependent Variable: LGSTROUT

        R-square      Adj       C(p)       AIC        MSE       SBC Variables in Model
   In                 Rsq

    1 0.082989 0.032044  -1.7043 -12.1286 0.496054 -10.1372 JA_INFL
    1 0.061518 0.009380  -1.3695 -11.6657 0.507669  -9.6743 JF_INFL
    1 0.015010 -.039712  -0.6445 -10.6984 0.532827  -8.7069 MA_INFL
    1 0.002280 -.053149  -0.4461 -10.4416 0.539713  -8.4501 ND_INFL
-------------------------------------------------------------------------
    2 0.155504 0.056152  -0.8347 -11.7762 0.483699  -8.7890 JF_INFL ND_INFL
    2 0.099743 -.006170   0.0346 -10.4974 0.515637  -7.5102 JA_INFL ND_INFL
    2 0.093039 -.013662   0.1391 -10.3490 0.519477  -7.3618 JA_INFL SO_INFL
    2 0.090844 -.016116   0.1733 -10.3007 0.520735  -7.3135 JF_INFL SO_INFL
---------------------------------------------------------------------------------
    3 0.163739 0.006940   1.0369  -9.9722 0.508919  -5.9893 JF_INFL MJ_INFL ND_INFL
    3 0.157798 -.000114   1.1295  -9.8306 0.512534  -5.8477 JF_INFL MA_INFL ND_INFL
    3 0.155821 -.002463   1.1603  -9.7837 0.513738  -5.8008 JF_INFL JA_INFL ND_INFL
    3 0.155556 -.002777   1.1645  -9.7774 0.513899  -5.7945 JF_INFL SO_INFL ND_INFL
------------------------------------------------------------------------------------------
    4 0.166001 -.056399   3.0016  -8.0264 0.541379  -3.0477 JF_INFL MJ_INFL JA_INFL ND_INFL
    4 0.163972 -.058969   3.0333  -7.9778 0.542696  -2.9991 JF_INFL MA_INFL MJ_INFL ND_INFL
    4 0.163812 -.059171   3.0357  -7.9739 0.542800  -2.9953 JF_INFL MJ_INFL SO_INFL ND_INFL
    4 0.158917 -.065372   3.1121  -7.8572 0.545977  -2.8785 JF_INFL MA_INFL JA_INFL ND_INFL
-----------------------------------------------------------------------------------------------
    5 0.166081 -.131747   5.0004  -6.0283 0.579993  -0.0539 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                             ND_INFL
    5 0.166027 -.131820   5.0012  -6.0270 0.580030  -0.0526 JF_INFL MJ_INFL JA_INFL SO_INFL
                                                             ND_INFL
    5 0.164041 -.134516   5.0322  -5.9794 0.581412 -0.00502 JF_INFL MA_INFL MJ_INFL SO_INFL
                                                             ND_INFL
    5 0.158918 -.141469   5.1120  -5.8572 0.584975   0.1172 JF_INFL MA_INFL JA_INFL SO_INFL
                                                             ND_INFL
---------------------------------------------------------------------------------------------------------
    6 0.166105 -.218770   7.0000  -4.0289 0.624590   2.9413 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                             SO_INFL ND_INFL
---------------------------------------------------------------------------------------------------------
```

```
                                         I
                        _                N
       _                D                T           J            M            M            J
       M        _       E        _       E           F            A            J            A
       O        T       P        R       R           _            _            _            _
       D        Y       V        M       C           I            I            I            I
 O     E        P       A        S       E           N            N            N            N
 B     L        E       R        E       P           F            F            F            F
 S     _        _       _        _                   L            L            L            L

  1  MODEL1  PARMS  LGSTROUT  0.70431  5.38124   .            .            .            -.00057015
  2  MODEL1  PARMS  LGSTROUT  0.71251  5.41251   -.00027337   .            .            .
  3  MODEL1  PARMS  LGSTROUT  0.72995  5.13644   .            -.00011199   .            .
  4  MODEL1  PARMS  LGSTROUT  0.73465  4.86172   .            .            .            .
  5  MODEL1  PARMS  LGSTROUT  0.69548  5.39375   -.00060048   .            .            .
  6  MODEL1  PARMS  LGSTROUT  0.71808  5.24945   .            .            .            -.00064118
  7  MODEL1  PARMS  LGSTROUT  0.72075  5.31800   .            .            .            -.00066765
  8  MODEL1  PARMS  LGSTROUT  0.72162  5.42135   -.00044149   .            .            .
  9  MODEL1  PARMS  LGSTROUT  0.71339  5.26143   -.00064708   .            .000067375   .
 10  MODEL1  PARMS  LGSTROUT  0.71591  5.32477   -.00063373   0.00004839   .            .
 11  MODEL1  PARMS  LGSTROUT  0.71676  5.39924   -.00056772   .            .            -.00005708
 12  MODEL1  PARMS  LGSTROUT  0.71687  5.39299   -.00059726   .            .            .
 13  MODEL1  PARMS  LGSTROUT  0.73578  5.25475   -.00056290   .            .000078620   -.00016021
 14  MODEL1  PARMS  LGSTROUT  0.73668  5.27123   -.00063985   -.00002039   .000077188   .
 15  MODEL1  PARMS  LGSTROUT  0.73675  5.26034   -.00064332   .            .000067469   .
 16  MODEL1  PARMS  LGSTROUT  0.73890  5.32067   -.00057643   0.00005884   .            -.00011235
 17  MODEL1  PARMS  LGSTROUT  0.76157  5.26071   -.00056078   -.00001205   .000084132   -.00015612
 18  MODEL1  PARMS  LGSTROUT  0.76160  5.25523   -.00056257   .            .000078918   -.00016529
 19  MODEL1  PARMS  LGSTROUT  0.76250  5.27008   -.00063627   -.00002021   .000077191   .
```

```
                              L                                  _
          S           N       G                                  A
          O           D       S                                  D
          _           _       T         _     _        _         J                   _         _
          I           I       R  _      E     M        R         R         _         A         S
 O        N           N       O  I  _   D     S        S         S         C         I         B
 B        F           F       U  N  P   F     E        Q         Q         P         C         C
 S        L           L       T  _  _   _     _        _         _         _         _         _

  1       .       .          -1  1  2  18  0.49605  0.08299   0.03204  -1.70427  -12.1286  -10.1372
  2       .       .          -1  1  2  18  0.50767  0.06152   0.00938  -1.36954  -11.6657   -9.6743
  3       .       .          -1  1  2  18  0.53283  0.01501  -0.03971  -0.64451  -10.6984   -8.7069
  4       .       .00004765  -1  1  2  18  0.53971  0.00228  -0.05315  -0.44606  -10.4416   -8.4501
  5       .       .00042577  -1  2  3  17  0.48370  0.15550   0.05615  -0.83474  -11.7762   -8.7890
  6       .       .00013403  -1  2  3  17  0.51564  0.09974  -0.00617   0.03455  -10.4974   -7.5102
  7   0.00013548  .          -1  2  3  17  0.51948  0.09304  -0.01366   0.13906  -10.3490   -7.3618
  8   0.00027816  .          -1  2  3  17  0.52073  0.09084  -0.01612   0.17328  -10.3007   -7.3135
  9       .       .00046171  -1  3  4  16  0.50892  0.16374   0.00694   1.03688   -9.9722   -5.9893
 10       .       .00045287  -1  3  4  16  0.51253  0.15780  -0.00011   1.12949   -9.8306   -5.8477
 11       .       .00041283  -1  3  4  16  0.51374  0.15582  -0.00246   1.16033   -9.7837   -5.8008
 12   -.00001432  .00043285  -1  3  4  16  0.51390  0.15556  -0.00278   1.16445   -9.7774   -5.7945
 13       .       .00043139  -1  4  5  15  0.54138  0.16600  -0.05640   3.00162   -8.0264   -3.0477
 14       .       .00045553  -1  4  5  15  0.54270  0.16397  -0.05897   3.03326   -7.9778   -2.9991
 15   -.00001700  .00047016  -1  4  5  15  0.54280  0.16381  -0.05917   3.03575   -7.9739   -2.9953
 16       .       .00043326  -1  4  5  15  0.54598  0.15892  -0.06537   3.11206   -7.8572   -2.8785
 17       .       .00042851  -1  5  6  14  0.57999  0.16608  -0.13175   5.00038   -6.0283   -0.0539
 18   0.00001061  .00042515  -1  5  6  14  0.58003  0.16603  -0.13182   5.00121   -6.0270   -0.0526
 19   -.00001651  .00046379  -1  5  6  14  0.58141  0.16404  -0.13452   5.03218   -5.9794   -0.0050


                       _                  I
       _               D                  N         J           M           M           J
       M       _       E         _        T         F           A           J           A
       O       T       P         R        E         _           _           _           _
       D       Y       V         M        R         I           I           I           I
 O     E       P       A         S        C         N           N           N           N
 B     L       E       R         E        E         F           F           F           F
 S     _       _       _         _        P         L           L           L           L

 20  MODEL1  PARMS  LGSTROUT  0.76484  5.32079  -.00057637  0.00005892      .       -.00011348
 21  MODEL1  PARMS  LGSTROUT  0.79031  5.26109  -.00056049  -.00001190  .000084349  -.00016105


                              L                                  _
          S           N       G                                  A
          O           D       S                                  D
          _           _       T         _     _        _         J                   _         _
          I           I       R  _      E     M        R         R         _         A         S
 O        N           N       O  I  _   D     S        S         S         C         I         B
 B        F           F       U  N  P   F     E        Q         Q         P         C         C
 S        L           L       T  _  _   _     _        _         _         _         _         _

 20   0.00000238  .00043187  -1  5  6  14  0.58497  0.15892  -0.14147   5.11204   -5.8572    0.1172
 21   0.00001020  .00042255  -1  6  7  13  0.62459  0.16611  -0.21877   7.00000   -4.0289    2.9413
```

Logged Harvest and Inflows

```
N = 20     Regression Models for Dependent Variable: LGSTROUT

      R-square     Adj      C(p)       AIC      MSE      SBC Variables in Model
 In                Rsq

   1 0.074724 0.023319  -0.7091 -11.9492 0.500525  -9.9577 LGJAINFL
   1 0.038664 -.014743  -0.1132 -11.1845 0.520031  -9.1931 LGJFINFL
   1 0.011346 -.043579   0.3382 -10.6241 0.534809  -8.6327 LGNDINFL
   1 0.010434 -.044542   0.3533 -10.6057 0.535302  -8.6142 LGSOINFL
-------------------------------------------------------------------------------
   2 0.143139 0.042332   0.1603 -11.4855 0.490782  -8.4983 LGJFINFL LGNDINFL
   2 0.117442 0.013612   0.5849 -10.8945 0.505500  -7.9073 LGJAINFL LGNDINFL
   2 0.086262 -.021237   1.1002 -10.2001 0.523359  -7.2129 LGMJINFL LGJAINFL
   2 0.079382 -.028926   1.2139 -10.0501 0.527300  -7.0629 LGMAINFL LGJAINFL
-------------------------------------------------------------------------------
   3 0.179425 0.025568   1.5606 -10.3509 0.499373  -6.3680 LGJFINFL LGSOINFL LGNDINFL
   3 0.172928 0.017852   1.6680 -10.1932 0.503327  -6.2102 LGJFINFL LGMJINFL LGNDINFL
   3 0.162716 0.005725   1.8367  -9.9477 0.509542  -5.9648 LGJFINFL LGMAINFL LGNDINFL
   3 0.155050 -.003378   1.9634  -9.7655 0.514207  -5.7825 LGMJINFL LGJAINFL LGNDINFL
-------------------------------------------------------------------------------
   4 0.202707 -.009904   3.1759  -8.9266 0.517551  -3.9479 LGJFINFL LGMAINFL LGSOINFL LGNDINFL
   4 0.202383 -.010315   3.1812  -8.9184 0.517762  -3.9398 LGJFINFL LGMJINFL LGSOINFL LGNDINFL
   4 0.187423 -.029264   3.4284  -8.5468 0.527473  -3.5681 LGJFINFL LGMJINFL LGJAINFL LGNDINFL
   4 0.179480 -.039325   3.5597  -8.3523 0.532629  -3.3736 LGJFINFL LGJAINFL LGSOINFL LGNDINFL
-------------------------------------------------------------------------------
   5 0.207185 -.075963   5.1019  -7.0392 0.551405  -1.0648 LGJFINFL LGMAINFL LGJAINFL LGSOINFL
                                                           LGNDINFL
   5 0.206888 -.076366   5.1068  -7.0317 0.551611  -1.0573 LGJFINFL LGMAINFL LGMJINFL LGSOINFL
                                                           LGNDINFL
   5 0.206325 -.077131   5.1161  -7.0175 0.552003  -1.0431 LGJFINFL LGMJINFL LGJAINFL LGSOINFL
                                                           LGNDINFL
   5 0.192206 -.096292   5.3494  -6.6649 0.561823  -0.6905 LGJFINFL LGMAINFL LGMJINFL LGJAINFL
                                                           LGNDINFL

-------------------------------------------------------------------------------
   6 0.213348 -.149722   7.0000  -5.1953 0.589204   1.7748 LGJFINFL LGMAINFL LGMJINFL LGJAINFL
                                                           LGSOINFL LGNDINFL

-------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_ INTERCEP LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL

  1 MODEL1  PARMS  LGSTROUT 0.70748  7.52378   .         .        .      -0.39501   .
  2 MODEL1  PARMS  LGSTROUT 0.72113  7.67360 -0.37033    .        .        .        .
  3 MODEL1  PARMS  LGSTROUT 0.73131  3.77558   .         .        .        .        .
  4 MODEL1  PARMS  LGSTROUT 0.73164  5.78652   .         .        .        .      -0.12635
  5 MODEL1  PARMS  LGSTROUT 0.70056  7.05116 -0.92492    .        .        .        .
  6 MODEL1  PARMS  LGSTROUT 0.71099  5.83278   .         .        .      -0.49775   .
  7 MODEL1  PARMS  LGSTROUT 0.72344  6.69647   .         .      0.19419 -0.49676   .
  8 MODEL1  PARMS  LGSTROUT 0.72615  7.02713   .       0.12212    .     -0.45748   .
  9 MODEL1  PARMS  LGSTROUT 0.70666  7.11575 -0.86220    .        .        .      -0.32161
 10 MODEL1  PARMS  LGSTROUT 0.70946  5.41547 -1.20467    .      0.31096    .        .
 11 MODEL1  PARMS  LGSTROUT 0.71382  5.60542 -1.14254  0.25234    .        .        .
 12 MODEL1  PARMS  LGSTROUT 0.71708  3.62794   .         .      0.37530 -0.73122   .
 13 MODEL1  PARMS  LGSTROUT 0.71941  5.53919 -1.09674  0.27576    .        .      -0.33833
 14 MODEL1  PARMS  LGSTROUT 0.71956  5.66405 -1.11528    .      0.27484    .      -0.29172
 15 MODEL1  PARMS  LGSTROUT 0.72627  4.71147 -0.80615    .      0.39728 -0.34753   .
 16 MODEL1  PARMS  LGSTROUT 0.72981  7.13146 -0.88994    .        .      0.02079 -0.32539
 17 MODEL1  PARMS  LGSTROUT 0.74257  5.04046 -0.86845  0.33536    .     -0.20904 -0.30385
 18 MODEL1  PARMS  LGSTROUT 0.74271  5.31623 -1.15162  0.16625  0.16074    .      -0.31421
 19 MODEL1  PARMS  LGSTROUT 0.74297  5.23537 -0.90512    .      0.32820 -0.19428 -0.25051
 20 MODEL1  PARMS  LGSTROUT 0.74955  4.20703 -0.78487  0.17507  0.29452 -0.40578   .
 21 MODEL1  PARMS  LGSTROUT 0.76760  4.65396 -0.88546  0.21329  0.19864 -0.25555 -0.26637
```

```
OBS LGNDINFL LGSTROUT _IN_ _P_ _EDF_  _MSE_    _RSQ_   _ADJRSQ_    _CP_      _AIC_     _SBC_

  1    .        -1      1   2    18  0.50053 0.07472  0.02332 -0.70913 -11.9492 -9.95770
  2    .        -1      1   2    18  0.52003 0.03866 -0.01474 -0.11322 -11.1845 -9.19307
  3  0.16159    -1      1   2    18  0.53481 0.01135 -0.04358  0.33824 -10.6241 -8.63266
  4    .        -1      1   2    18  0.53530 0.01043 -0.04454  0.35331 -10.6057 -8.61422
  5  0.66330    -1      2   3    17  0.49078 0.14314  0.04233  0.16026 -11.4855 -8.49830
  6  0.33157    -1      2   3    17  0.50550 0.11744  0.01361  0.58492 -10.8945 -7.90733
  7    .        -1      2   3    17  0.52336 0.08626 -0.02124  1.10019 -10.2001 -7.21294
  8    .        -1      2   3    17  0.52730 0.07938 -0.02893  1.21390 -10.0501 -7.06290
  9  0.89511    -1      3   4    16  0.49937 0.17943  0.02557  1.56060 -10.3509 -6.36799
 10  0.84744    -1      3   4    16  0.50333 0.17293  0.01785  1.66798 -10.1932 -6.21024
 11  0.82927    -1      3   4    16  0.50954 0.16272  0.00573  1.83673  -9.9477 -5.96482
 12  0.45040    -1      3   4    16  0.51421 0.15505 -0.00338  1.96342  -9.7655 -5.78253
 13  1.08854    -1      4   5    15  0.51755 0.20271 -0.00990  3.17585  -8.9266 -3.94791
 14  1.03632    -1      4   5    15  0.51776 0.20238 -0.01032  3.18122  -8.9184 -3.93977
 15  0.75894    -1      4   5    15  0.52747 0.18742 -0.02926  3.42844  -8.5468 -3.56813
 16  0.90619    -1      4   5    15  0.53263 0.17948 -0.03932  3.55969  -8.3523 -3.37360
 17  1.01891    -1      5   6    14  0.55140 0.20719 -0.07596  5.10185  -7.0392 -1.06482
 18  1.09431    -1      5   6    14  0.55161 0.20689 -0.07637  5.10676  -7.0317 -1.05733
 19  0.96017    -1      5   6    14  0.55200 0.20632 -0.07713  5.11607  -7.0175 -1.04313
 20  0.78984    -1      5   6    14  0.56182 0.19221 -0.09629  5.34940  -6.6649 -0.69047
 21  1.01055    -1      6   7    13  0.58920 0.21335 -0.14972  7.00000  -5.1953  1.77483
```

Regression—Logged Inflows

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	*Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)*[c,d]	.	*.438*	*.192*	*-.181*	*100.8294*	*1.709*

a. Dependent Variable: Seatrout Harvest

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*31446.484*	*6*	*5241.081*	*.516*	*.787*[b]
	Residual	*132165.405*	*13*	*10166.570*		
	Total	*163611.889*	*19*			

a. Dependent Variable: Seatrout Harvest

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	*116.856*	*634.627*		*.184*	*.857*	*-1254.172*	*1487.883*
	Ln(January-February Inflows)	*-59.644*	*146.830*	*-.244*	*-.406*	*.691*	*-376.850*	*257.562*
	Ln(March-April Inflows)	*4.882*	*82.236*	*.025*	*.059*	*.954*	*-172.778*	*182.542*
	Ln(May-June Inflows)	*24.656*	*81.760*	*.126*	*.302*	*.768*	*-151.976*	*201.288*
	Ln(July-August Inflows)	*-47.505*	*102.738*	*-.254*	*-.462*	*.651*	*-269.458*	*174.448*
	Ln(September-October Inflows)	*-35.097*	*59.194*	*-.219*	*-.593*	*.563*	*-162.978*	*92.784*
	Ln(November-December Inflows)	*114.474*	*93.614*	*.582*	*1.223*	*.243*	*-87.766*	*316.715*

a. Dependent Variable: Seatrout Harvest

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln(January-February Inflows)	*.172*	*5.821*
	Ln(March-April Inflows)	*.353*	*2.835*
	Ln(May-June Inflows)	*.357*	*2.801*
	Ln(July-August Inflows)	*.207*	*4.841*
	Ln(September-October Inflows)	*.456*	*2.193*
	Ln(November-December Inflows)	*.274*	*3.647*

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Ln(January-February Inflows)	Ln(March-April Inflows)
1	1	6.984	1.000	.00	.00	.00
	2	9.020E-03	27.826	.00	.00	.03
	3	2.966E-03	48.524	.14	.00	.00
	4	2.173E-03	56.697	.00	.03	.09
	5	9.164E-04	87.299	.53	.01	.00
	6	7.542E-04	96.232	.16	.00	.87
	7	2.920E-04	154.662	.17	.96	.01

a. Dependent Variable: Seatrout Harvest

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		Ln(May-June Inflows)	Ln(July-August Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	.00	.00	.00	.00
	2	.03	.00	.12	.02
	3	.00	.19	.04	.03
	4	.00	.04	.63	.09
	5	.52	.08	.01	.19
	6	.45	.01	.10	.19
	7	.00	.67	.10	.47

a. Dependent Variable: Seatrout Harvest

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*58.8819*	*229.7141*	*167.4050*	*40.6827*	*20*
Std. Predicted Value	*-2.668*	*1.532*	*.000*	*1.000*	*20*
Standard Error of Predicted Value	*38.0616*	*76.8184*	*58.8688*	*9.8814*	*20*
Adjusted Predicted Value	*33.2190*	*308.7792*	*170.0063*	*57.7205*	*20*
Residual	*-134.1600*	*168.3340*	*7.141E-14*	*83.4031*	*20*
Std. Residual	*-1.331*	*1.669*	*.000*	*.827*	*20*
Stud. Residual	*-1.620*	*1.917*	*-.011*	*.984*	*20*
Deleted Residual	*-198.9370*	*222.0210*	*-2.6013*	*119.2813*	*20*
Stud. Deleted Residual	*-1.743*	*2.175*	*.003*	*1.038*	*20*
Mahal. Distance	*1.757*	*10.078*	*5.700*	*2.212*	*20*
Cook's Distance	*.001*	*.193*	*.059*	*.063*	*20*
Centered Leverage Value	*.092*	*.530*	*.300*	*.116*	*20*

a. Dependent Variable: Seatrout Harvest

Case Values for Residuals Diagnostics

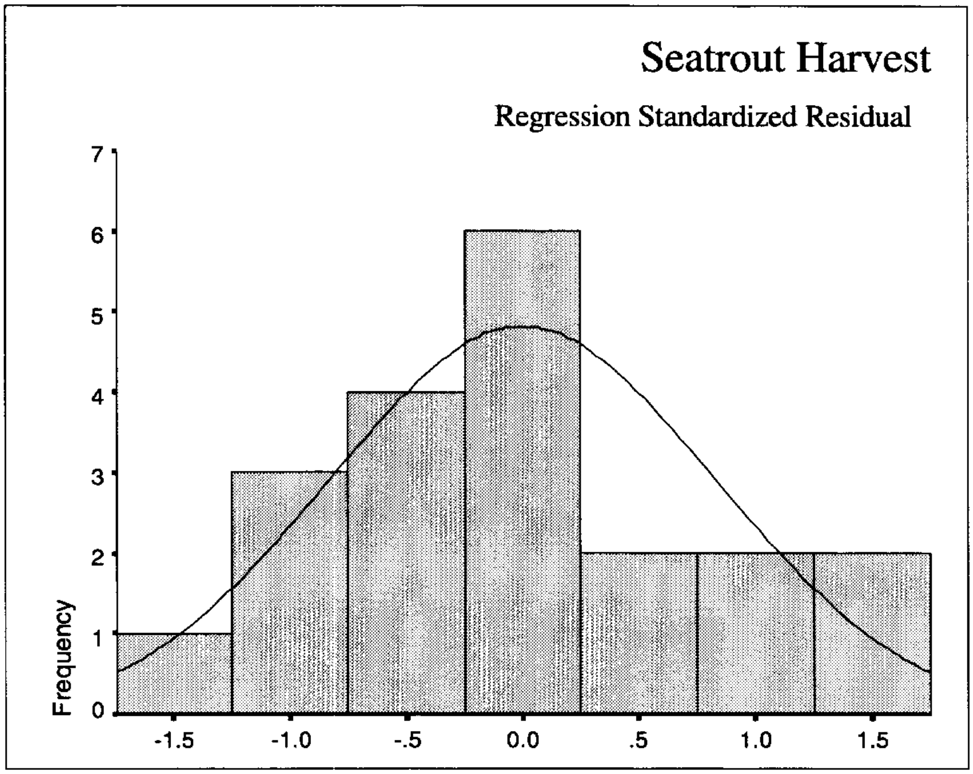
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	151.16003	-134.16003	-198.93698	215.93698	-.39931	-1.33056	-1.62025	-1.74254
1963	176.74720	-33.84720	-46.62496	189.52496	.22964	-.33569	-.39399	-.38081
1964	190.18106	-13.28106	-22.73931	199.63931	.55985	-.13172	-.17235	-.16578
1965	219.98205	57.01795	118.68368	158.31632	1.29237	.56549	.81586	.80472
1966	197.40096	-35.70096	-51.57221	213.27221	.73732	-.35407	-.42556	-.41174
1967	191.88331	88.51669	130.91061	149.48939	.60169	.87789	1.06761	1.07388
1968	161.33742	12.86258	18.23383	155.96617	-.14914	.12757	.15189	.14606
1969	154.47079	-98.77079	-127.11500	182.81500	-.31793	-.97958	-1.11128	-1.12233
1970	171.42418	-82.22418	-119.18225	208.38225	.09879	-.81548	-.98179	-.98032
1971	147.64685	-71.74685	-120.37705	196.27705	-.48567	-.71157	-.92169	-.91597
1972	189.06561	-60.66561	-79.57496	207.97496	.53243	-.60167	-.68908	-.67448
1973	168.01836	155.78164	181.66845	142.13155	.01508	1.54500	1.66844	1.80823
1974	164.88541	108.01459	154.68040	118.21960	-.06193	1.07126	1.28195	1.31777
1975	190.42491	30.57509	50.97169	170.02831	.56584	.30324	.39153	.37840
1976	190.88381	-9.38381	-13.18919	194.68919	.57712	-.09307	-.11033	-.10606
1977	229.71406	-94.81406	-173.87921	308.77921	1.53159	-.94034	-1.27342	-1.30775
1978	175.86601	168.33399	222.02098	122.17902	.20798	1.66949	1.91732	2.17515
1979	137.40651	-15.30651	-36.48210	158.58210	-.73738	-.15181	-.23436	-.22565
1980	80.71953	9.88047	15.89730	74.70270	-2.13077	.09799	.12430	.11949
1981	58.88193	18.91807	44.58101	33.21899	-2.66755	.18762	.28802	.27761

PRE_1	Predicted value of harvest
RES_1	Ordinary residual; observed harvest minus predicted harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

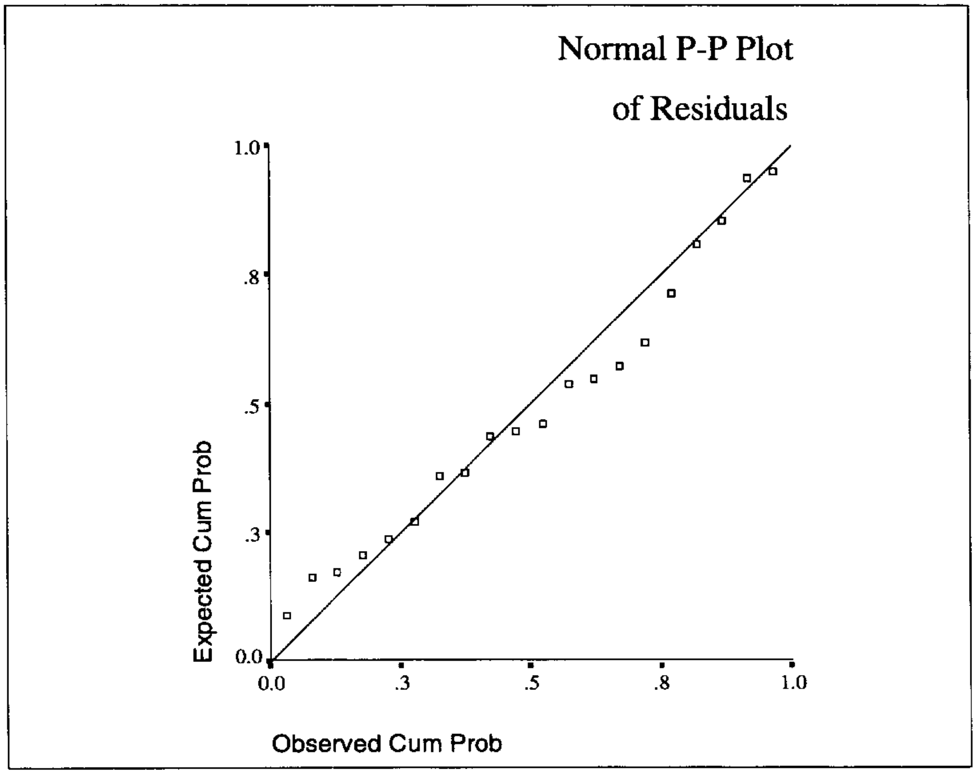
[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{12,0.01} = 2.681$.

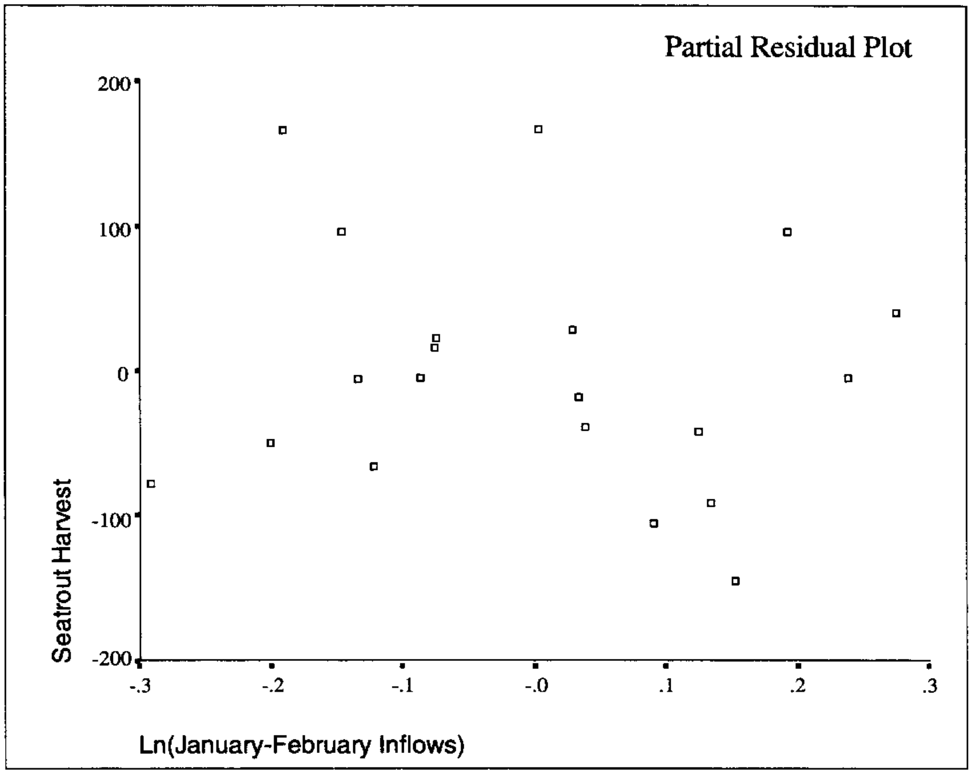
Graphics

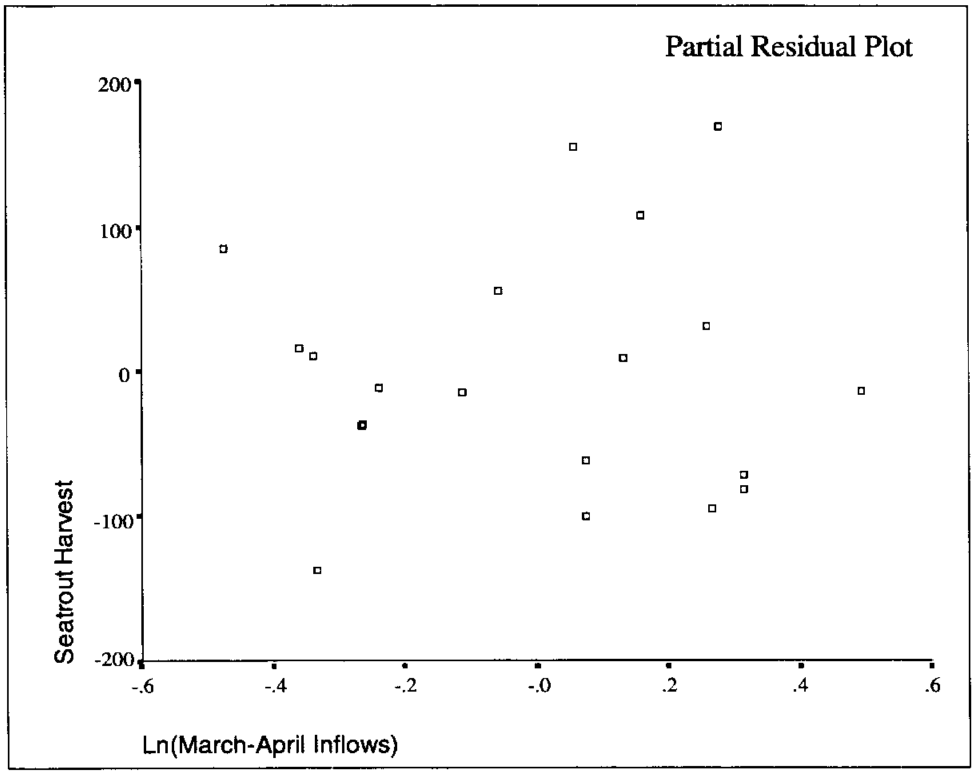


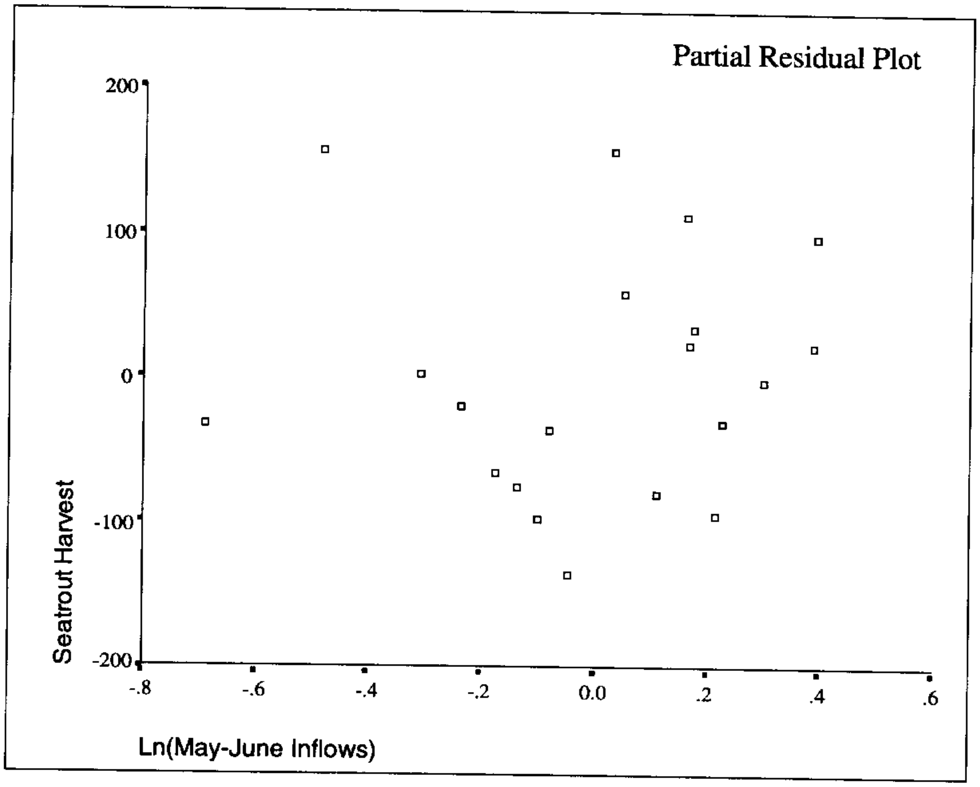
Seatrout Harvest
Regression Standardized Residual
Frequency
7
6
5
4
3
2
1
0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5

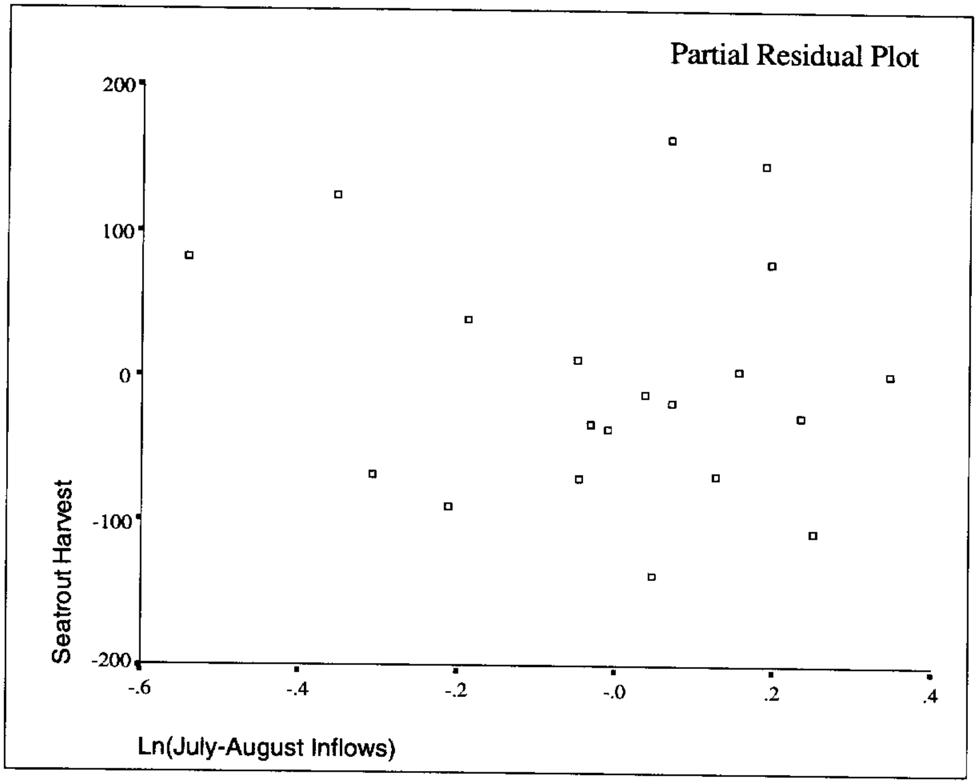


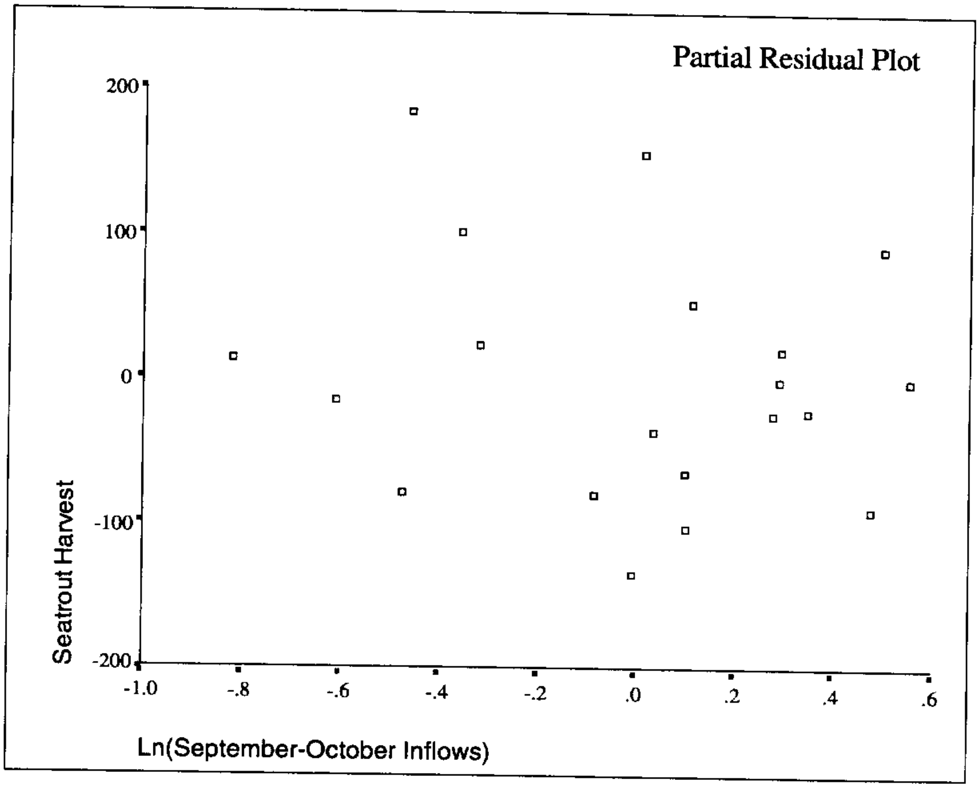
Normal P-P Plot
of Residuals
Expected Cum Prob
1.0
.8
.5
.3
0.0
0.0
.3
.5
.8
1.0
Observed Cum Prob

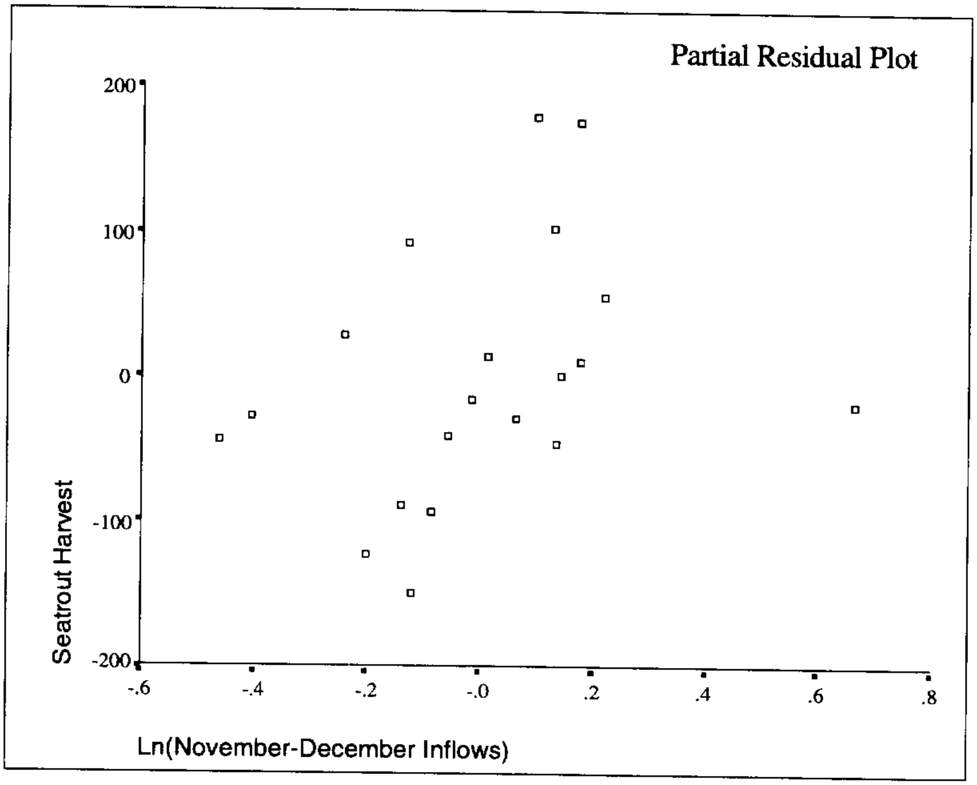

Partial Residual Plot
200
100
0
-100
-200
Seatrout Harvest
-.3
-.2
-.1
-.0
.1
.2
.3
Ln(January-February Inflows)

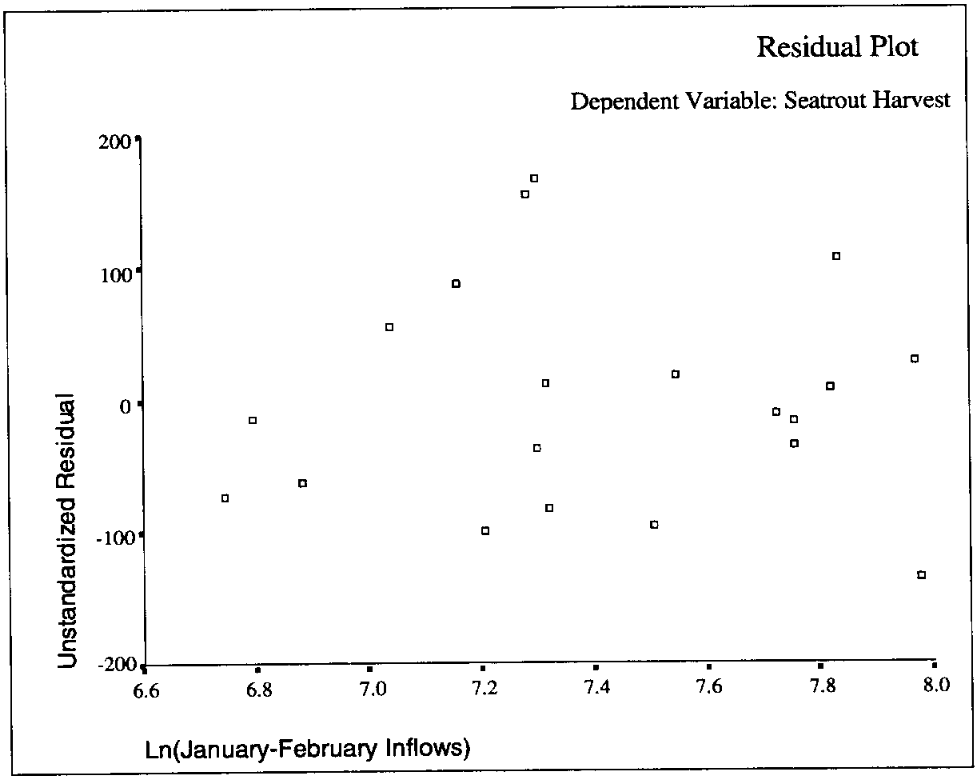

Partial Residual Plot
200
100
0
-100
-200
Seatrout Harvest
-.6
-.4
-.2
-.0
.2
.4
.6
Ln(March-April Inflows)

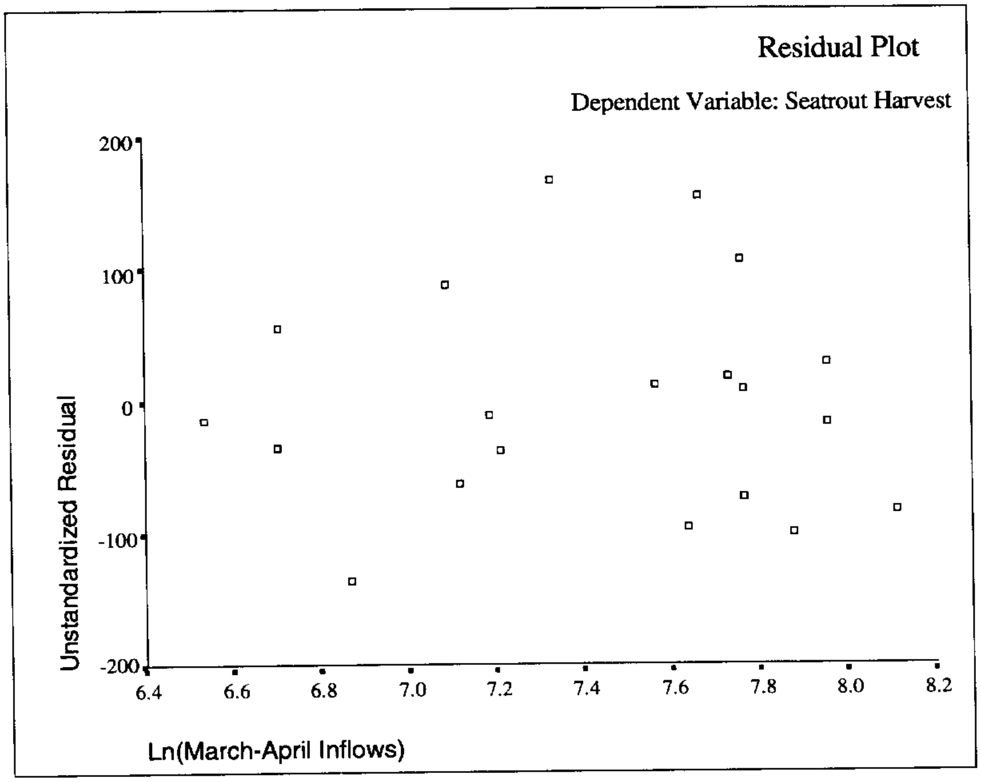

Partial Residual Plot
200
100
0
-100
-200
Seatrout Harvest
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Ln(May-June Inflows)

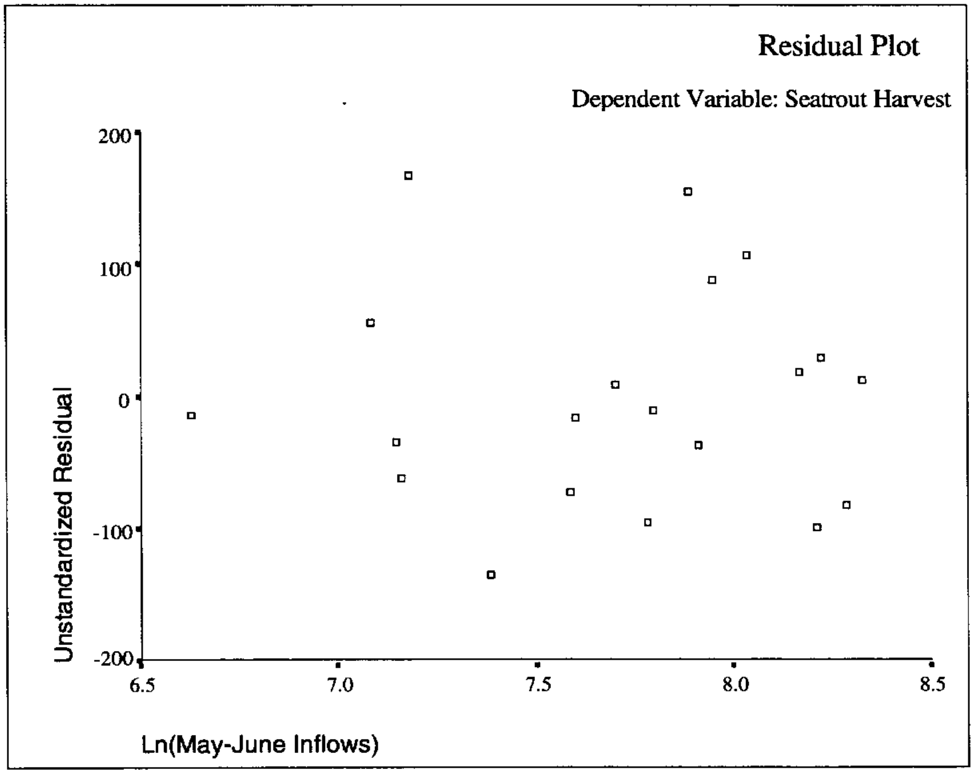

Partial Residual Plot
200
100
0
-100
-200
Seatrout Harvest
-.6
-.4
-.2
-.0
.2
.4
Ln(July-August Inflows)

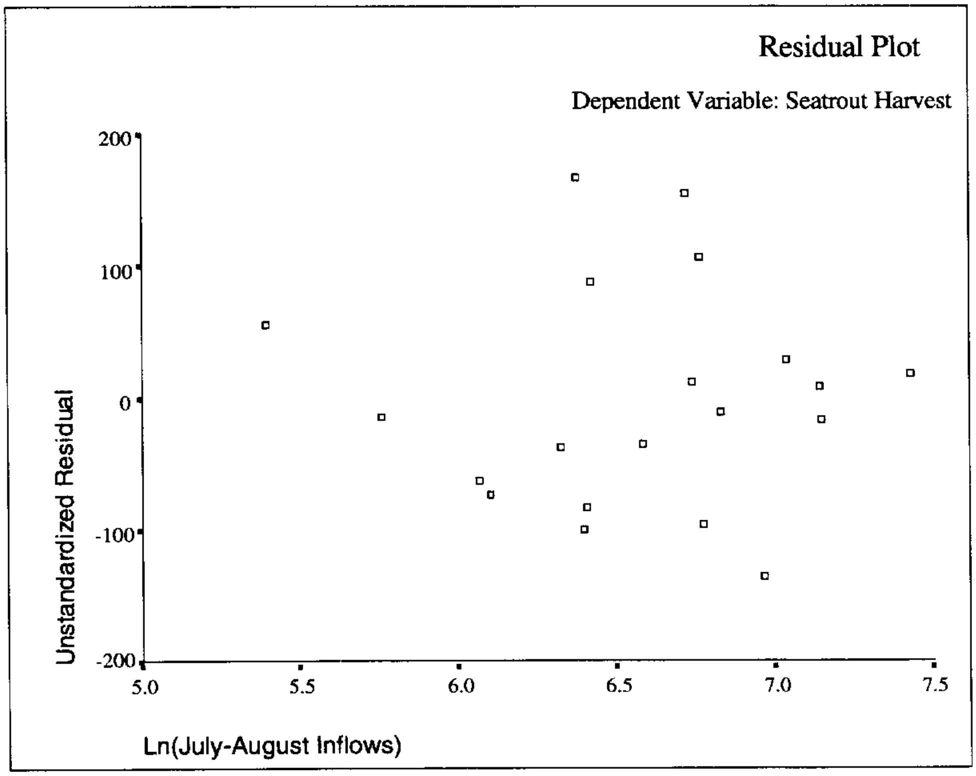

Partial Residual Plot
200
100
0
-100
-200
Seatrout Harvest
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Ln(September-October Inflows)

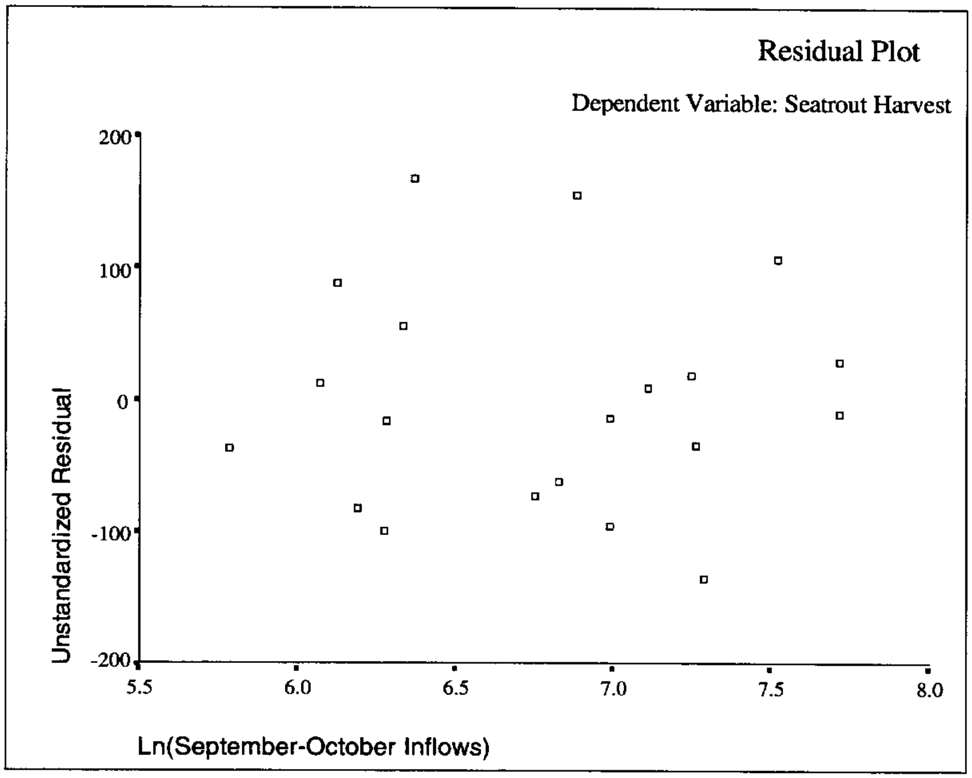

Partial Residual Plot
200
100
0
-100
-200
Seatrout Harvest
-.6
-.4
-.2
-.0
.2
.4
.6
.8
Ln(November-December Inflows)

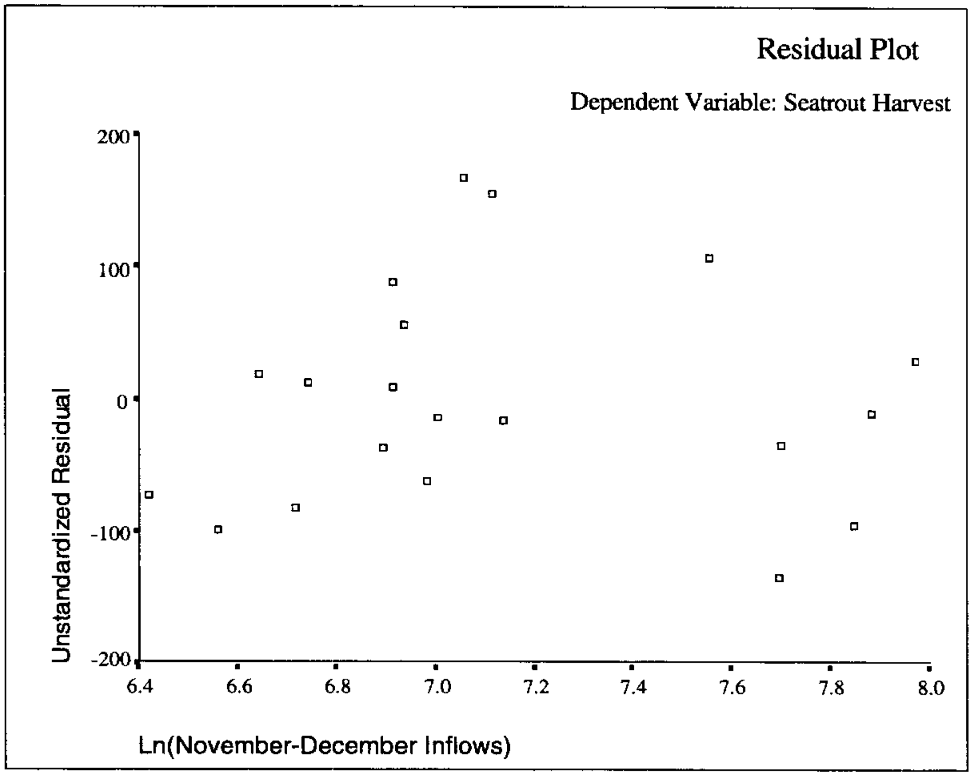

Residual Plot
Dependent Variable: Seatrout Harvest
Unstandardized Residual
200
100
0
-100
-200
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(January-February Inflows)


Residual Plot
Dependent Variable: Seatrout Harvest
Unstandardized Residual
200
100
0
-100
-200
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Ln(March-April Inflows)


Residual Plot
Dependent Variable: Seatrout Harvest
Unstandardized Residual
200
100
0
-100
-200
6.5
7.0
7.5
8.0
8.5
Ln(May-June Inflows)


Residual Plot
Dependent Variable: Seatrout Harvest
Unstandardized Residual
200
100
0
-100
-200
5.0
5.5
6.0
6.5
7.0
7.5
Ln(July-August Inflows)


Residual Plot
Dependent Variable: Seatrout Harvest
Unstandardized Residual
200
100
0
-100
-200
5.5
6.0
6.5
7.0
7.5
8.0
Ln(September-October Inflows)


Residual Plot
Dependent Variable: Seatrout Harvest
Unstandardized Residual
200
100
0
-100
-200
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(November-December Inflows)

Prediction Intervals for Seatrout Harvest

YEAR	SEATROUT	LICI_1	UICI_1
1962	17.00	-198.53602	500.85609
1963	142.90	-166.08047	519.57488
1964	176.90	-171.23280	551.59492
1965	277.00	-154.42483	594.38894
1966	161.70	-149.93043	544.73234
1967	280.40	-157.57831	541.34493
1968	174.20	-184.24033	506.91518
1969	55.70	-181.41512	490.35670
1970	89.20	-176.21900	519.06735
1971	75.90	-212.23734	507.53105
1972	128.40	-148.82590	526.95711
1973	323.80	-156.62690	492.66363
1974	272.90	-181.64077	511.41159
1975	221.00	-168.96848	549.81829
1976	181.50	-153.88497	535.65259
1977	134.90	-136.61437	596.04249
1978	344.20	-162.59575	514.32777
1979	122.10	-244.42402	519.23704
1980	90.60	-275.88135	437.32042
1981	77.80	-322.36948	440.13334

SEATROUT	Seatrout harvest
LICI_1	Lower limit for 99% prediction interval for seatrout harvest
UICI_1	Upper limit for 99% prediction interval for seatrout harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	5.23669	.18108	.27562	.6311	.0153
1963	4.25703	.00837	.22405	.7497	.0000
1964	6.95291	.00302	.36594	.4338	.0000
1965	8.92203	.10284	.46958	.2583	.0029
1966	4.89722	.01150	.25775	.6725	.0000
1967	5.20293	.07798	.27384	.6352	.0012
1968	4.64695	.00138	.24458	.7030	.0000
1969	3.28664	.05063	.17298	.8573	.0003
1970	4.94185	.06189	.26010	.6671	.0006
1971	6.72566	.08226	.35398	.4580	.0014
1972	3.56496	.02114	.18763	.8283	.0000
1973	1.75740	.06608	.09249	.9720	.0007
1974	4.78215	.10143	.25169	.6865	.0027
1975	6.65295	.01461	.35016	.4659	.0000
1976	4.53192	.00071	.23852	.7169	.0000
1977	7.68955	.19318	.40471	.3608	.0184
1978	3.64440	.16749	.19181	.8197	.0123
1979	10.07832	.01086	*.53044	.1842	.0000
1980	6.24115	.00134	.32848	.5119	.0000
1981	9.98730	.01608	*.52565	.1893	.0000

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2] MAHA_PV = 1 − F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	*-1.21083	.02213	-.47139	.57473
1963	-.23398	-.01746	-.08128	.09523
1964	-.13990	-.09748	.04227	.01968
1965	.83688	.11493	.46612	-.05204
1966	-.27453	-.05236	-.02790	.10633
1967	.74318	.27969	-.27631	-.50256
1968	.09438	.01417	-.01905	-.04792
1969	-.60123	.08727	-.16882	-.07815
1970	-.65724	.25933	-.23049	-.30299
1971	-.75410	-.20834	.20852	-.30498
1972	-.37656	-.21670	.22561	-.04672
1973	.73712	.05049	-.54016	.09347
1974	.86616	-.64774	.44290	.20603
1975	.30907	-.26138	.02079	.10312
1976	-.06754	.02235	.01580	.02447
1977	*-1.19421	.25721	.74896	-.38444
1978	*1.22839	.41077	.01475	.56977
1979	-.26540	.00182	-.01735	-.14042
1980	.09325	-.00803	.05265	.01655
1981	.32333	.06358	-.04573	-.12503

SDFFITS	Standardized dffits value
SDFBETA_0	Standardized dfbeta for the intercept term
SDFBETA_1	Standardized dfbeta for logged January-February inflows
SDFBETA_2	Standardized dfbeta for logged March-April inflows

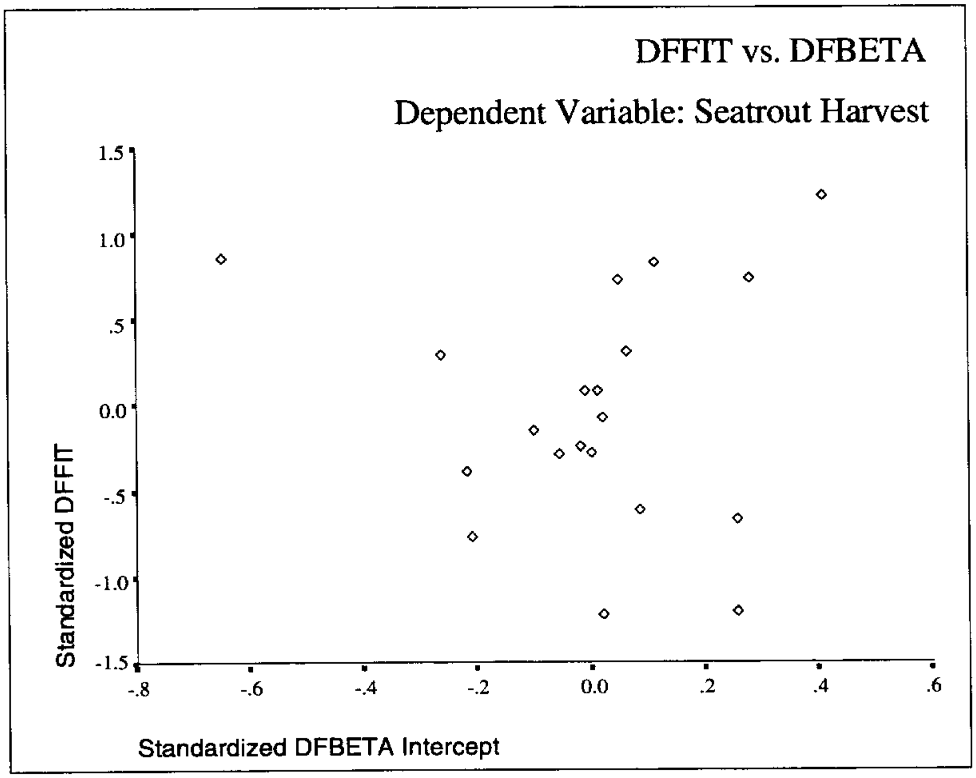
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

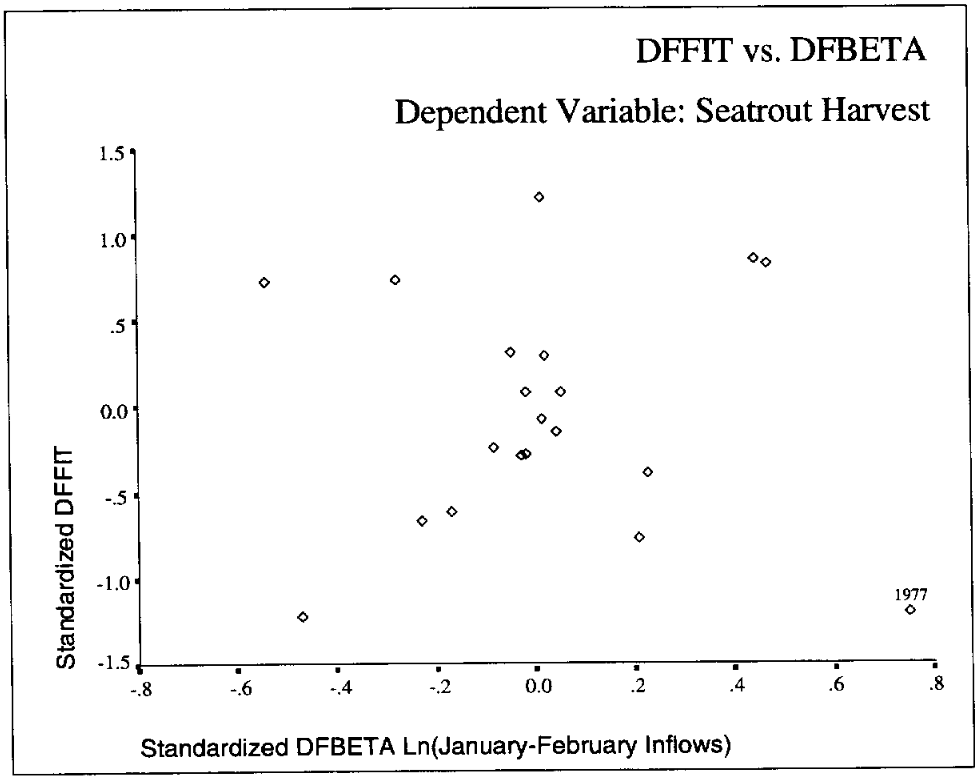
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.07333	-.10053	.00825	.23288
1963	.02816	.01466	-.00914	.02270
1964	.04133	-.01605	-.03541	.00268
1965	.05055	-.64015	.07640	-.25905
1966	-.09096	.00413	.17598	-.03006
1967	.41712	.26130	-.27148	.15994
1968	.05500	.02762	-.03223	.00234
1969	-.22279	.27274	-.07811	.23545
1970	-.10793	.36767	.05775	.09280
1971	.12774	.05534	-.33443	.15301
1972	.10867	-.10059	-.04494	-.09858
1973	.05326	.37679	.01424	.32183
1974	.20760	-.56568	.46534	-.18682
1975	.07058	-.09330	.08480	.10054
1976	-.03076	-.00488	-.02579	-.02086
1977	.14152	-.45403	.49070	*-1.09628
1978	-.97745	.17902	-.67398	.22970
1979	.19456	-.08359	.16743	-.04738
1980	-.03760	-.00747	.02591	-.06474
1981	.05827	.15071	.13905	-.15922

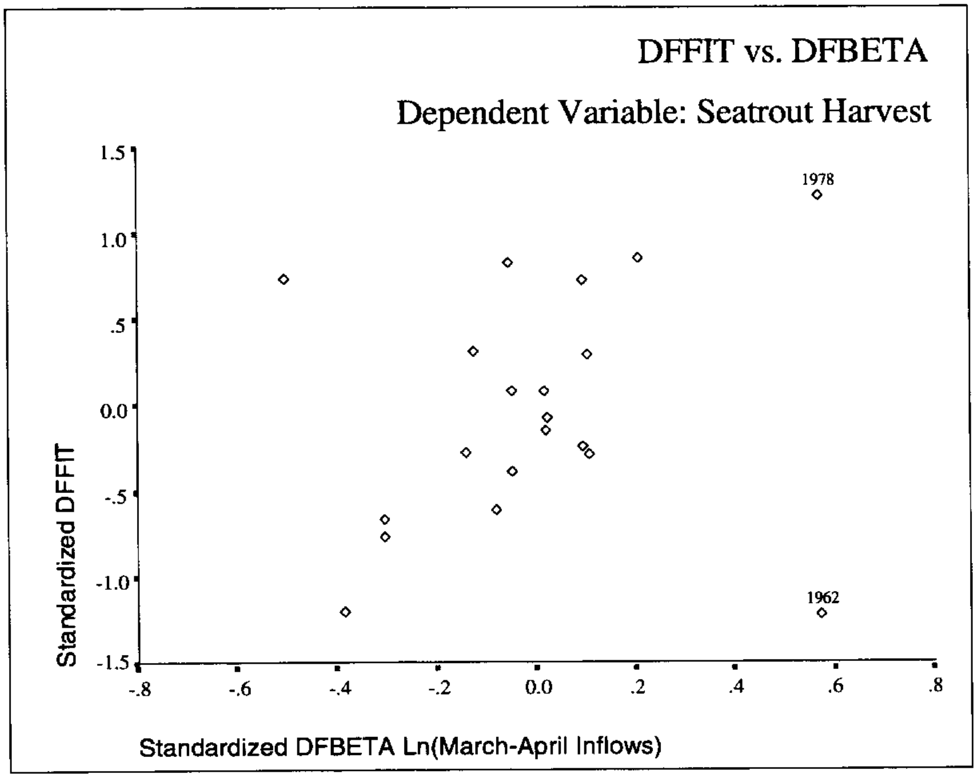
SDFBETA_3	Standardized dfbeta for logged May-June inflows
SDFBETA_4	Standardized dfbeta for logged July-August inflows
SDFBETA_5	Standardized dfbeta for logged September-October inflows
SDFBETA_6	Standardized dfbeta for logged November-December inflows

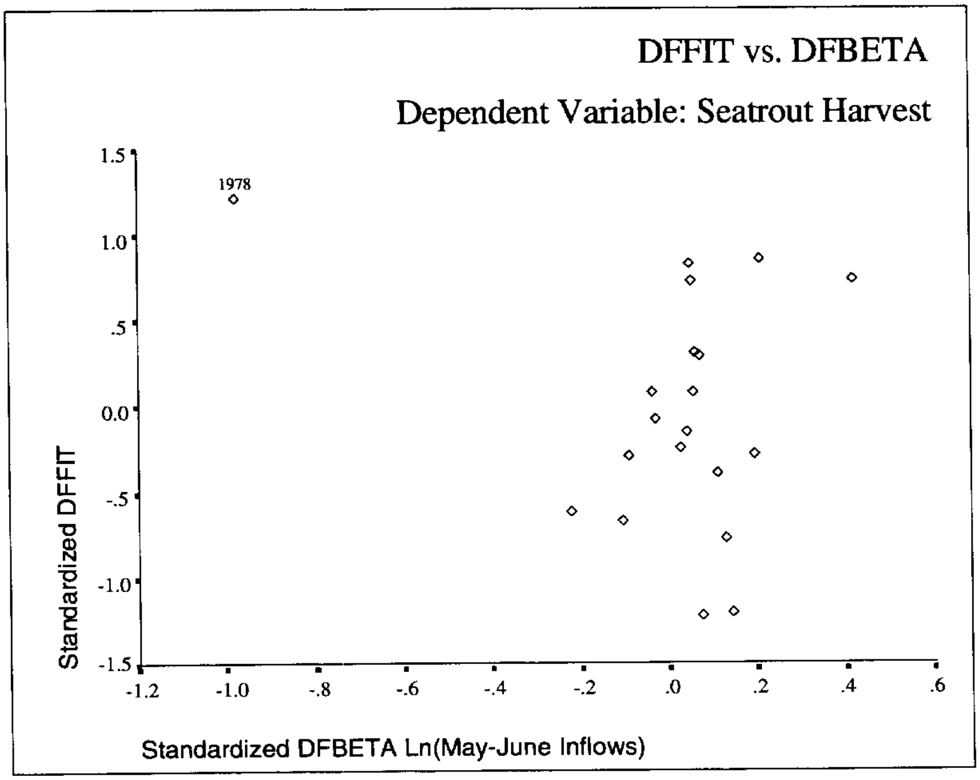
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

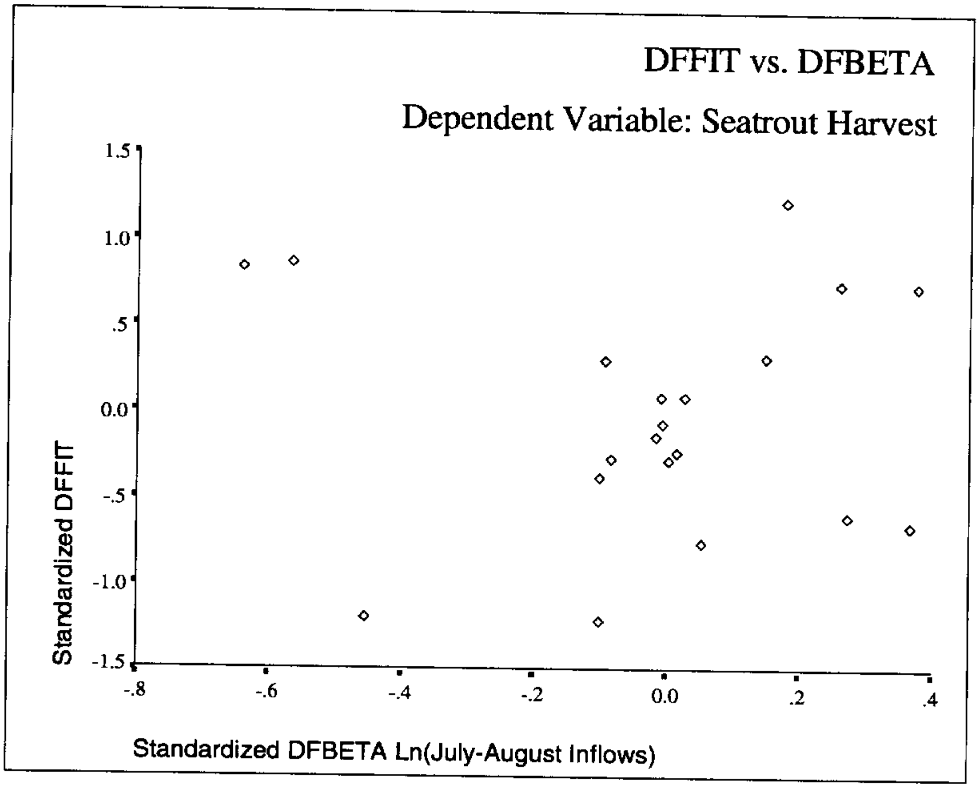
Graphics

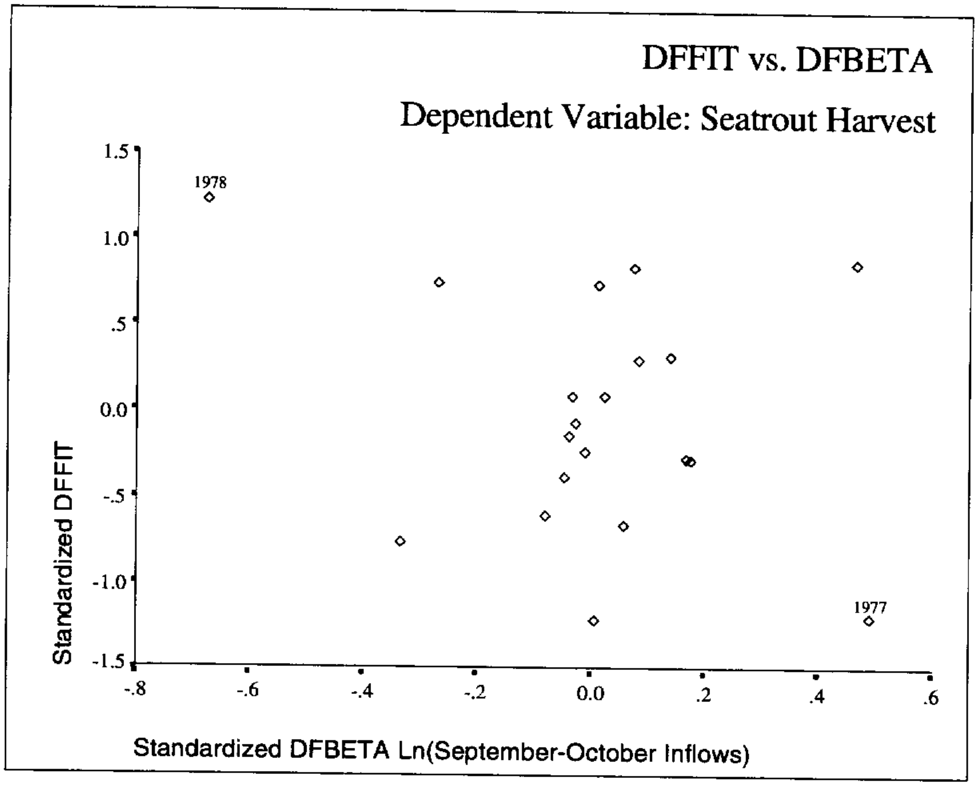

DFFIT vs. DFBETA
Dependent Variable: Seatrout Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA Intercept

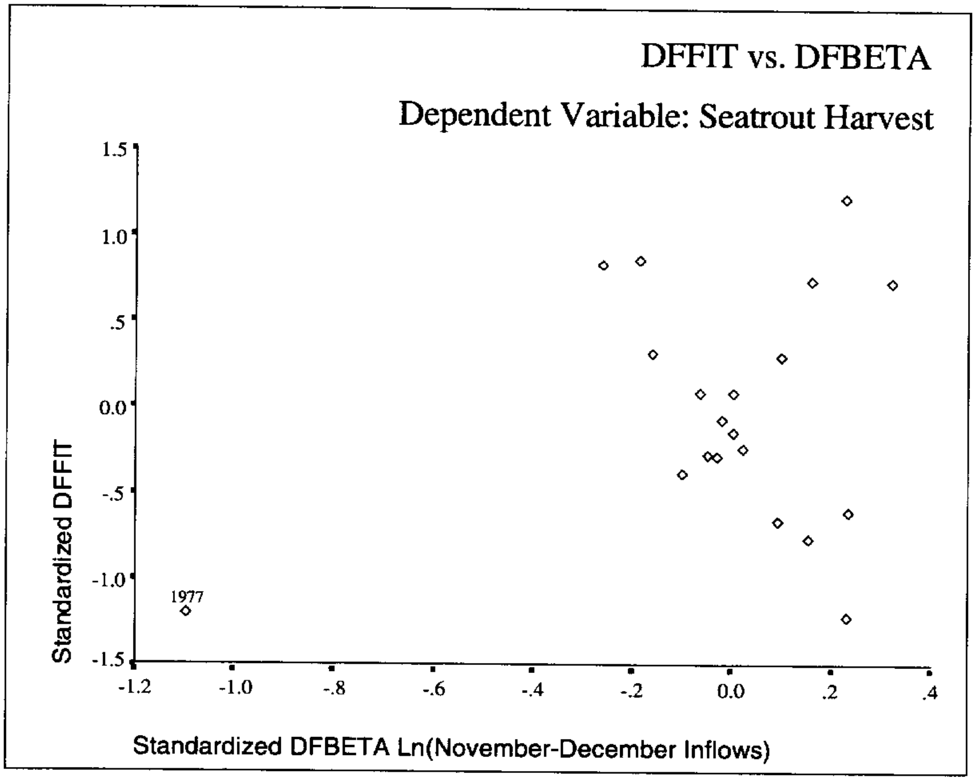

DFFIT vs. DFBETA
Dependent Variable: Seatrout Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
.8
1977
Standardized DFBETA Ln(January-February Inflows)


DFFIT vs. DFBETA
Dependent Variable: Seatrout Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
.8
1978
1962
Standardized DFBETA Ln(March-April Inflows)


DFFIT vs. DFBETA
Dependent Variable: Seatrout Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-1.2
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
1978
Standardized DFBETA Ln(May-June Inflows)


DFFIT vs. DFBETA
Dependent Variable: Seatrout Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.8
-.6
-.4
-.2
0.0
.2
.4
Standardized DFBETA Ln(July-August Inflows)


DFFIT vs. DFBETA
Dependent Variable: Seatrout Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1978
1977
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA Ln(September-October Inflows)


DFFIT vs. DFBETA
Dependent Variable: Seatrout Harvest
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
Standardized DFFIT
1977
-1.2
-1.0
-.8
-.6
-.4
-.2
0.0
.2
.4
Standardized DFBETA Ln(November-December Inflows)

Regression—Logged Harvest

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	*November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows*[c,d]	.	*.408*	*.166*	*-.219*	*.7903*	*1.234*

a. Dependent Variable: Ln(Seatrout Harvest)

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*1.617*	*6*	*.270*	*.432*	*.845*[b]
	Residual	*8.120*	*13*	*.625*		
	Total	*9.737*	*19*			

a. Dependent Variable: Ln(Seatrout Harvest)

b. Independent Variables: (Constant), November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	5.261	.665		7.912	.000	3.824	6.698
	January-February Inflows	-5.605E-04	.001	-.509	-.918	.375	-.002	.001
	March-April Inflows	-1.190E-05	.000	-.013	-.035	.973	-.001	.001
	May-June Inflows	8.435E-05	.000	.120	.335	.743	.000	.001
	July-August Inflows	-1.611E-04	.001	-.081	-.179	.860	-.002	.002
	September-October Inflows	1.020E-05	.001	.008	.019	.985	-.001	.001
	November-December Inflows	4.226E-04	.001	.423	.827	.423	-.001	.002

a. Dependent Variable: Ln(Seatrout Harvest)

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	January-February Inflows	.209	4.782
	March-April Inflows	.459	2.179
	May-June Inflows	.498	2.007
	July-August Inflows	.312	3.208
	September-October Inflows	.342	2.928
	November-December Inflows	.245	4.083

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	January-February Inflows	March-April Inflows
1	1	6.382	1.000	.00	.00	.00
	2	.345	4.299	.00	.00	.05
	3	.102	7.901	.13	.01	.00
	4	6.710E-02	9.752	.35	.04	.06
	5	4.552E-02	11.841	.42	.04	.02
	6	4.212E-02	12.310	.07	.01	.86
	7	1.550E-02	20.292	.02	.90	.01

a. Dependent Variable: Ln(Seatrout Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		May-June Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	.00	.00	.00	.00
	2	.04	.00	.06	.04
	3	.03	.30	.00	.06
	4	.15	.03	.39	.00
	5	.20	.00	.44	.28
	6	.55	.03	.02	.04
	7	.03	.64	.08	.58

a. Dependent Variable: Ln(Seatrout Harvest)

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.2573	5.3721	4.9286	.2918	20
Std. Predicted Value	-2.301	1.520	.000	1.000	20
Standard Error of Predicted Value	.2544	.6851	.4561	.1055	20
Adjusted Predicted Value	3.9024	6.2179	5.0007	.5261	20
Residual	-1.6949	.9138	-6.2172E-16	.6537	20
Std. Residual	-2.145	1.156	.000	.827	20
Stud. Residual	-2.760	1.318	-.034	1.025	20
Deleted Residual	-2.8069	1.2821	-7.2062E-02	1.0276	20
Stud. Deleted Residual	-4.120	1.360	-.105	1.244	20
Mahal. Distance	1.019	13.328	5.700	3.071	20
Cook's Distance	.000	.714	.088	.160	20
Centered Leverage Value	.054	.701	.300	.162	20

a. Dependent Variable: Ln(Seatrout Harvest)

Case Values for Residuals Diagnostics

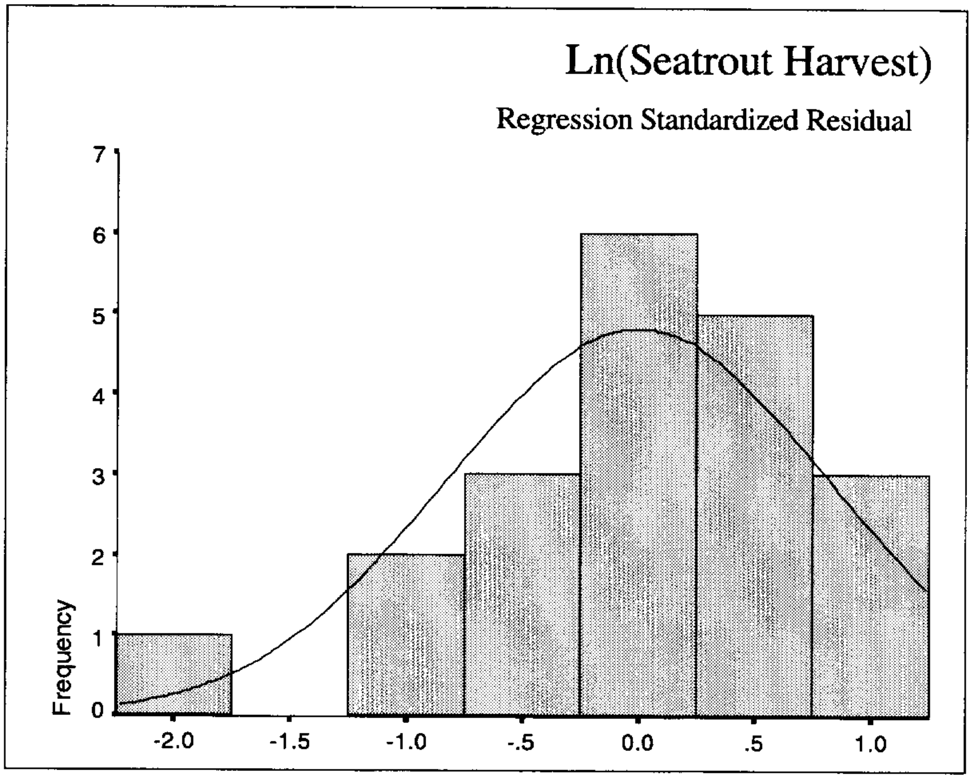
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	4.52809	-1.69488	-2.80688	5.64009	-1.37280	-2.14457	-2.75984	*-4.12050
1963	4.87982	.08232	.10839	4.85376	-.16725	.10417	.11952	.11490
1964	5.24285	-.06727	-.10040	5.27598	1.07702	-.08512	-.10398	-.09995
1965	5.11872	.50529	.65744	4.96658	.65157	.63936	.72929	.71547
1966	4.97510	.11064	.14489	4.94086	.15931	.14000	.16020	.15407
1967	5.09735	.53887	.71258	4.92363	.57831	.68185	.78408	.77179
1968	4.97070	.18951	.30573	4.85447	.14422	.23979	.30457	.29367
1969	4.99039	-.97041	-1.25250	5.27248	.21172	-1.22789	-1.39499	-1.45345
1970	4.96433	-.47345	-.77649	5.26737	.12240	-.59907	-.76720	-.75438
1971	5.11983	-.79041	-1.23928	5.56869	.65537	-1.00013	-1.25232	-1.28307
1972	5.20330	-.34815	-.43702	5.29217	.94147	-.44053	-.49356	-.47870
1973	5.04163	.73850	.82389	4.95623	.38734	.93444	.98699	.98593
1974	4.76297	.84614	1.28214	4.32696	-.56776	1.07064	1.31792	1.36036
1975	4.98529	.41288	.75411	4.64405	.19422	.52242	.70604	.69174
1976	5.18184	.01942	.03027	5.17098	.86790	.02457	.03068	.02947
1977	5.37209	-.46756	-1.31333	6.21787	1.51999	-.59162	-.99154	-.99084
1978	4.92740	.91383	1.09154	4.74968	-.00420	1.15629	1.26373	1.29639
1979	4.41832	.38652	.90247	3.90237	-1.74904	.48908	.74732	.73394
1980	4.25729	.24917	.39923	4.10722	-2.30097	.31528	.39908	.38580
1981	4.53509	-.18095	-.72802	5.08217	-1.34882	-.22896	-.45925	-.44486

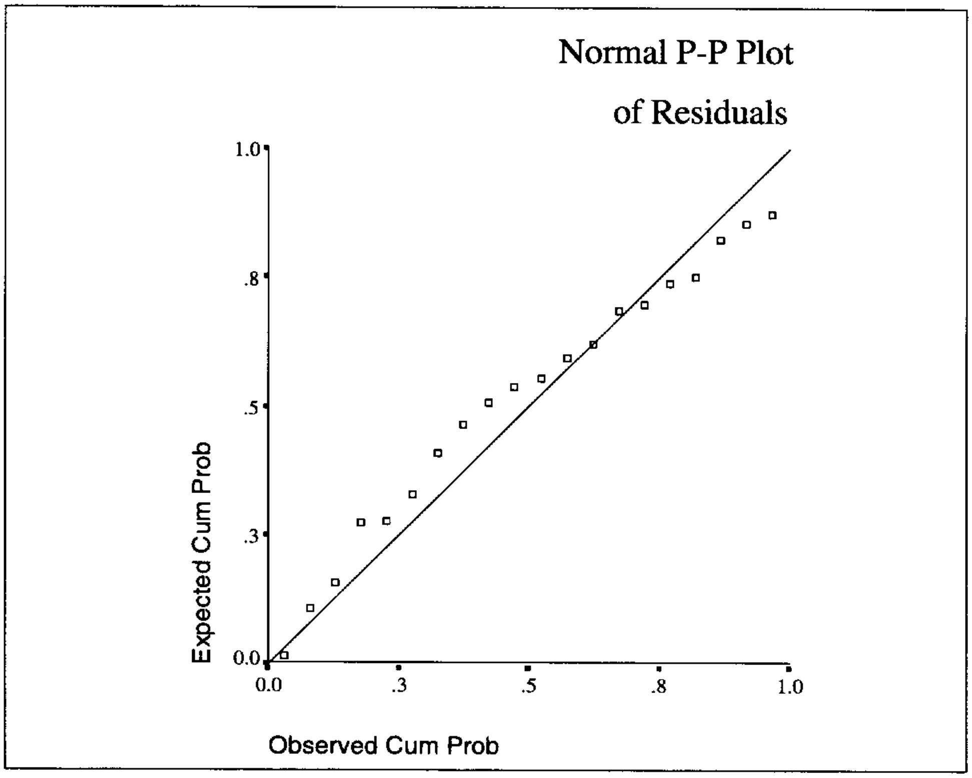
PRE_1	Predicted value of the natural log of harvest
RES_1	Ordinary residual; observed logged harvest minus predicted logged harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of logged harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of logged harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

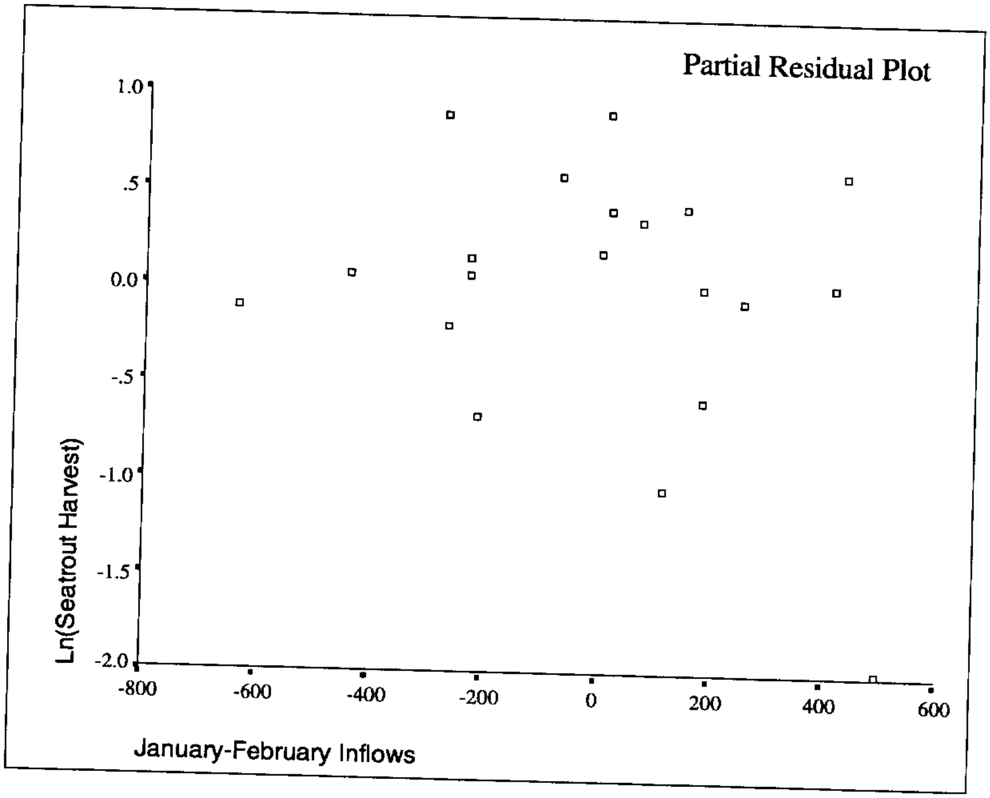
[1] Values greater than 3 are flagged.

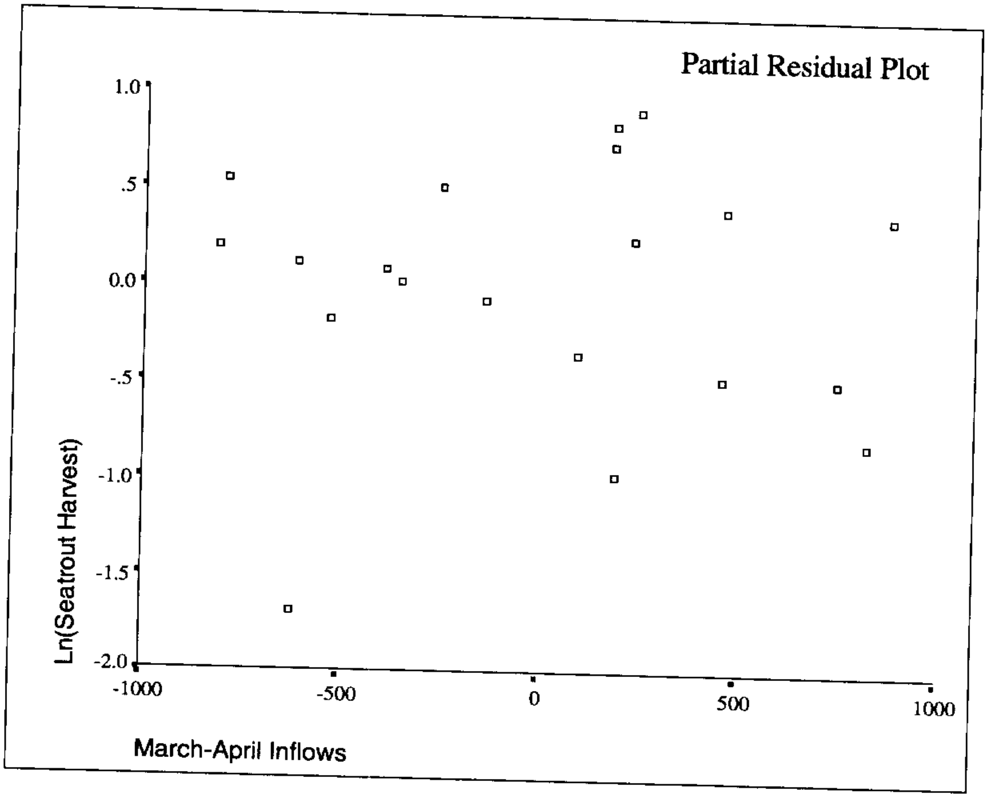
[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{12,0.01} = 2.681$.

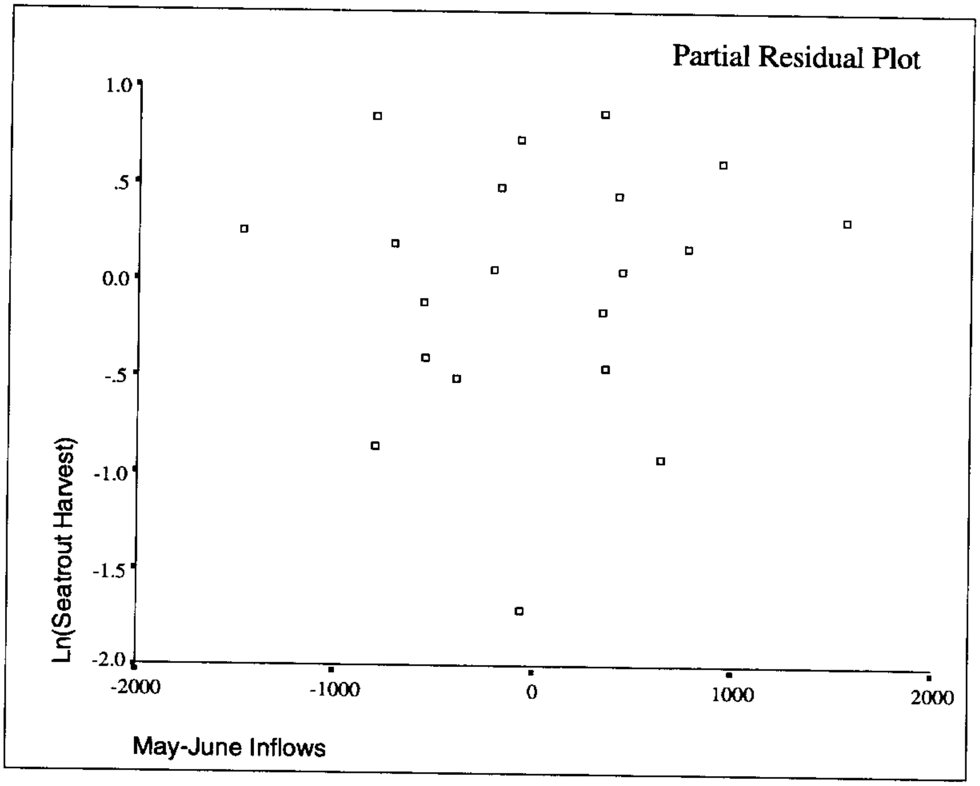
Graphics

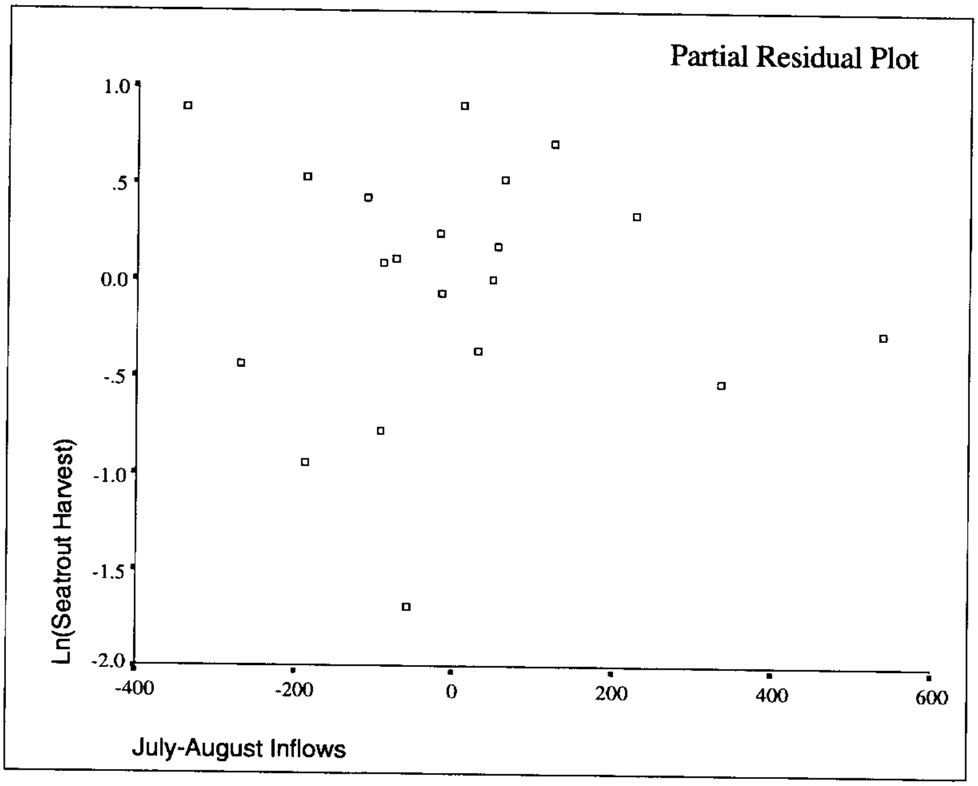

Ln(Seatrout Harvest)
Regression Standardized Residual
Frequency
0
1
2
3
4
5
6
7
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0

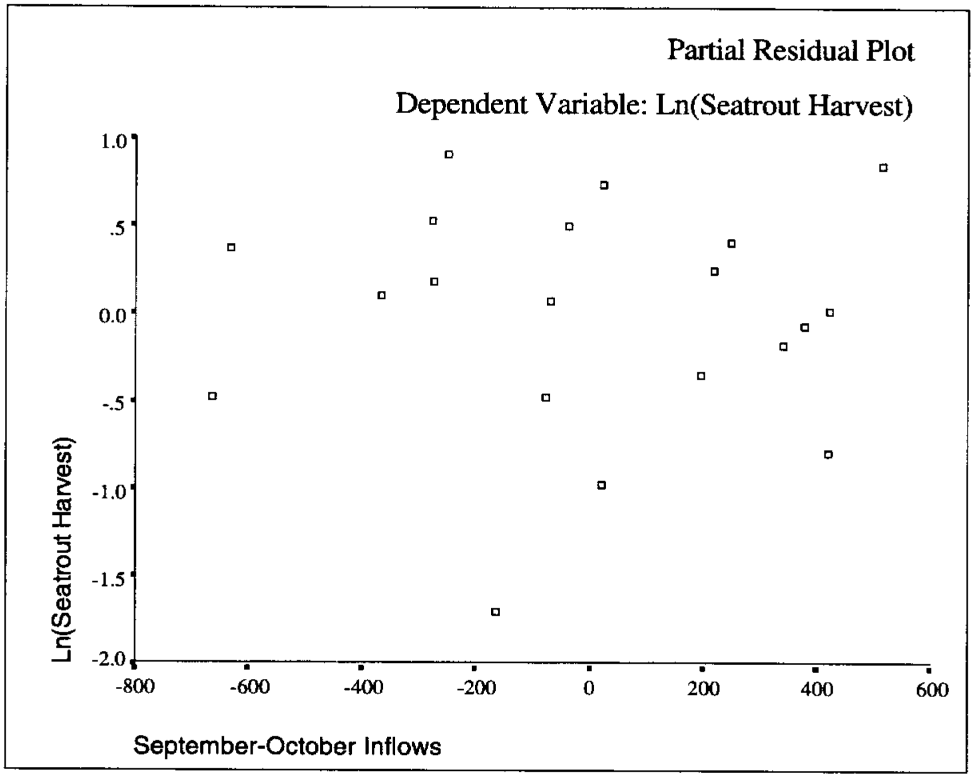

Normal P-P Plot
of Residuals
Expected Cum Prob
0.0
.3
.5
.8
1.0
Observed Cum Prob
0.0
.3
.5
.8
1.0


Partial Residual Plot
Ln(Seatrout Harvest)
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-800
-600
-400
-200
0
200
400
600
January-February Inflows

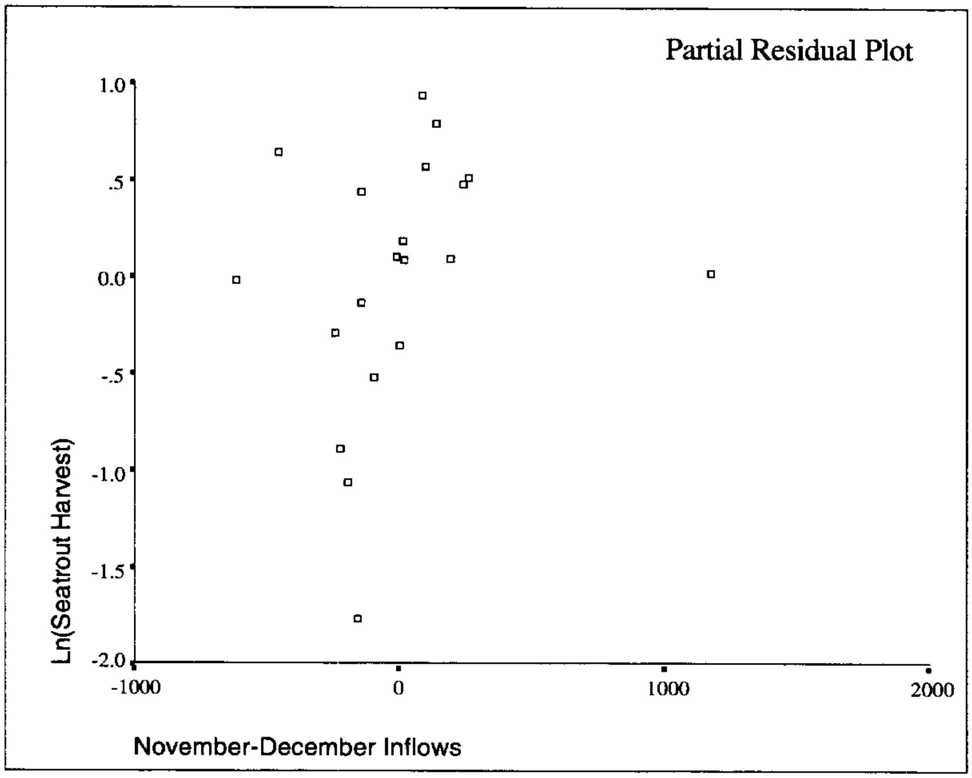

Partial Residual Plot
Ln(Seatrout Harvest)
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1000
-500
0
500
1000
March-April Inflows


Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Ln(Seatrout Harvest)
-2000
-1000
0
1000
2000
May-June Inflows


Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Ln(Seatrout Harvest)
-400
-200
0
200
400
600
July-August Inflows



Partial Residual Plot
Dependent Variable: Ln(Seatrout Harvest)
Ln(Seatrout Harvest)
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-800
-600
-400
-200
0
200
400
600
September-October Inflows



Partial Residual Plot
Ln(Seatrout Harvest)
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1000
0
1000
2000
November-December Inflows

Prediction Intervals for the Natural Log of Seatrout Harvest

YEAR	LGSTROUT	LICI_1	UICI_1
1962	2.83	1.71514	7.34104
1963	4.96	2.22836	7.53128
1964	5.18	2.49738	7.98832
1965	5.62	2.47696	7.76049
1966	5.09	2.32805	7.62215
1967	5.64	2.44235	7.75234
1968	5.16	2.17394	7.76746
1969	4.02	2.35528	7.62551
1970	4.49	2.15734	7.77133
1971	4.33	2.34132	7.89834
1972	4.86	2.59182	7.81479
1973	5.78	2.54066	7.54260
1974	5.61	2.00713	7.51881
1975	5.40	2.11616	7.85441
1976	5.20	2.40701	7.95666
1977	4.90	2.31969	8.42450
1978	5.84	2.36027	7.49452
1979	4.80	1.43378	7.40286
1980	4.51	1.46485	7.04972
1981	4.35	1.38450	7.68568

LGSTROUT	Natural log of seatrout harvest
LICI_1	Lower limit for 99% prediction interval for the natural log of seatrout harvest
UICI_1	Upper limit for 99% prediction interval for the natural log ofseatrout harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	6.57724	.71390	.34617	.4742	.3376
1963	3.61888	.00065	.19047	.8225	.0000
1964	5.31987	.00076	.27999	.6210	.0000
1965	3.44693	.02288	.18142	.8408	.0000
1966	3.54060	.00113	.18635	.8309	.0000
1967	3.68182	.02831	.19378	.8156	.0000
1968	6.27283	.00813	.33015	.5083	.0000
1969	3.32923	.08081	.17522	.8530	.0013
1970	6.46508	.05382	.34027	.4866	.0004
1971	5.93173	.12723	.31220	.5477	.0055
1972	2.91360	.00888	.15335	.8929	.0000
1973	1.01937	.01609	.05365	.9945	.0000
1974	5.51117	.12786	.29006	.5978	.0056
1975	7.64748	.05886	.40250	.3647	.0005
1976	5.86311	.00008	.30858	.5558	.0000
1977	11.28581	.25406	*.59399	.1266	.0384
1978	2.14343	.04437	.11281	.9515	.0002
1979	9.91239	.10650	*.52170	.1936	.0032
1980	6.19176	.01370	.32588	.5175	.0000
1981	13.32768	.09110	*.70146	.0645	.0020

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2] MAHA_PV = 1 − F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	*-3.33759	.13900	*-2.03905	*1.42401
1963	.06465	.01189	.02601	-.02230
1964	-.07014	-.05802	.02140	.00739
1965	.39259	.30269	.09512	-.08896
1966	.08571	.02647	.02497	-.04659
1967	.43820	.17627	-.04620	-.30423
1968	.22998	.00159	.00102	-.13091
1969	-.78364	.01795	-.15046	-.13746
1970	-.60353	.14903	-.13774	-.31334
1971	-.96689	-.41015	.26255	-.57212
1972	-.24185	-.19619	.10933	-.02191
1973	.33527	.08805	-.21922	.08072
1974	.97652	-.35559	.55831	.13108
1975	.62886	-.43226	.01445	.18775
1976	.02204	-.00247	-.00651	-.00557
1977	*-1.33264	.14335	.81567	-.32892
1978	.57170	.34150	.01636	.14916
1979	.84796	-.07138	.06222	.42700
1980	.29940	-.00715	.15638	.04857
1981	-.77352	-.04494	.30292	.20356

SDFFITS	Standardized dffits value
SDFBETA_0	Standardized dfbeta for the intercept term
SDFBETA_1	Standardized dfbeta for January-February inflows
SDFBETA_2	Standardized dfbeta for March-April inflows

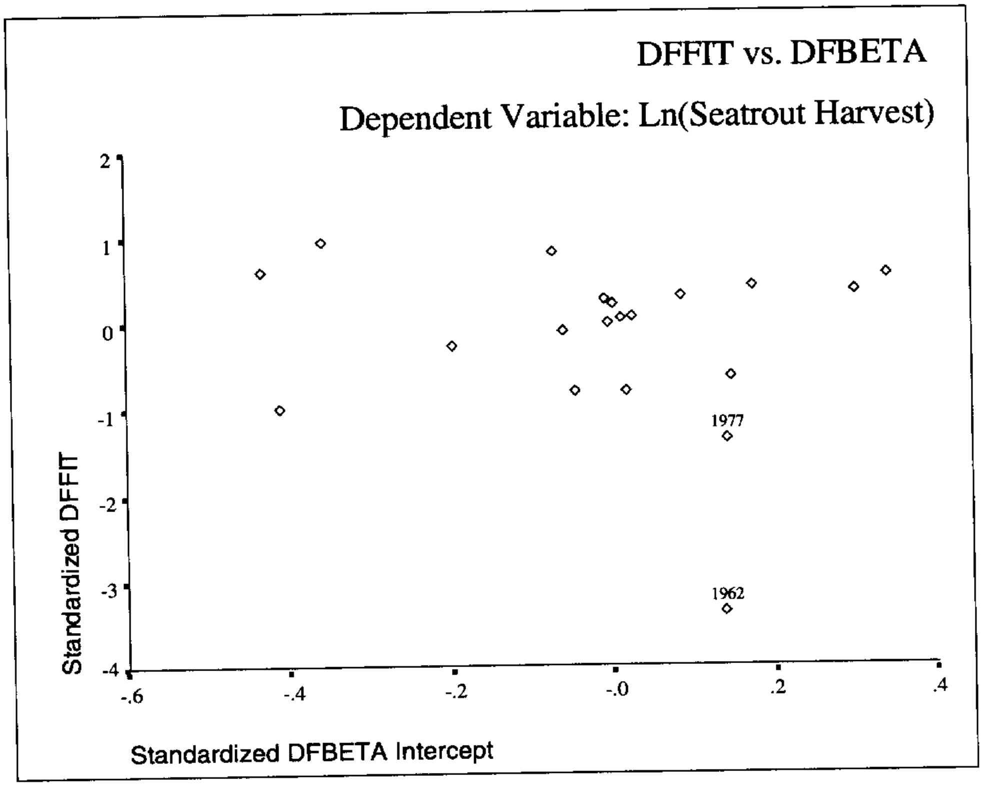
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

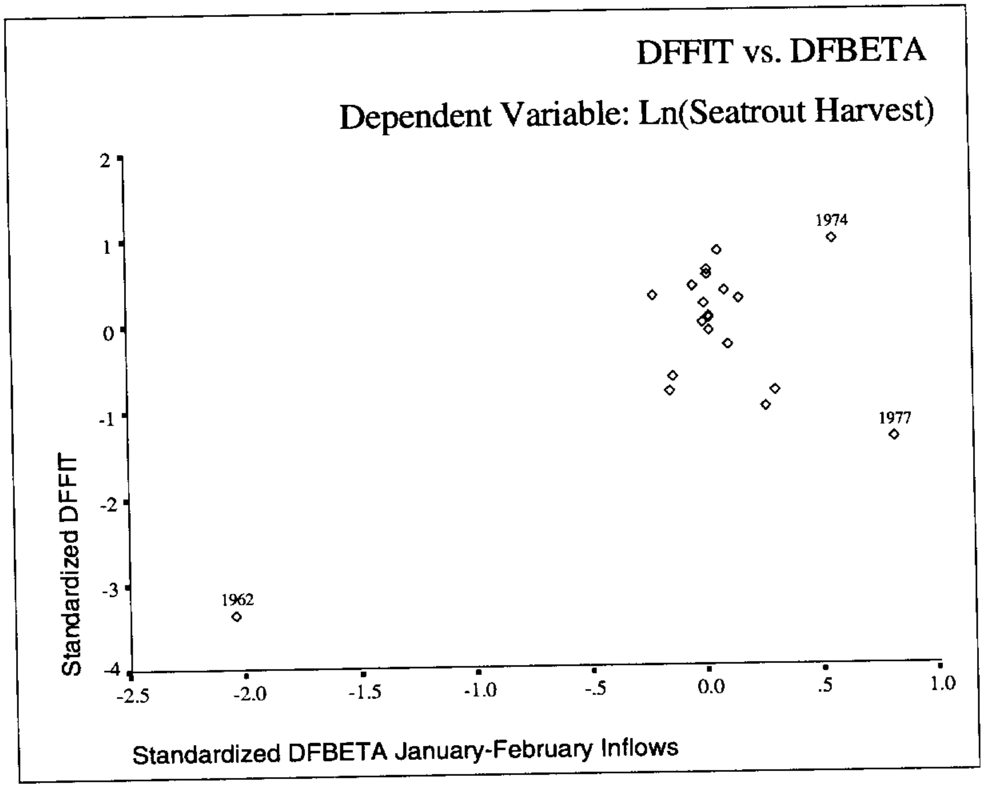
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.09720	.34217	.57747	.52942
1963	-.00850	-.01350	-.00582	.00189
1964	.02174	.00212	-.03083	.01101
1965	-.04517	-.17166	-.02042	-.07553
1966	.04292	-.01475	-.04290	-.00074
1967	.26585	.06285	-.16303	.05784
1968	.18545	.02291	-.06777	.00315
1969	-.33615	.34866	-.02500	.20134
1970	-.10942	.29354	.04825	.05859
1971	.40804	.16737	-.45117	.22942
1972	.09354	-.01818	-.06977	-.00201
1973	-.02493	.14767	.01763	.09590
1974	.18367	-.64440	.57723	-.49152
1975	.12228	-.11732	.15525	.15822
1976	.00517	.00201	.01041	.00470
1977	.20576	-.63525	.73382	*-1.26632
1978	-.36315	.01624	-.23396	.07800
1979	-.52738	.29108	-.46936	.17655
1980	-.11124	-.01015	.07115	-.19381
1981	-.09704	-.54637	-.20294	.13666

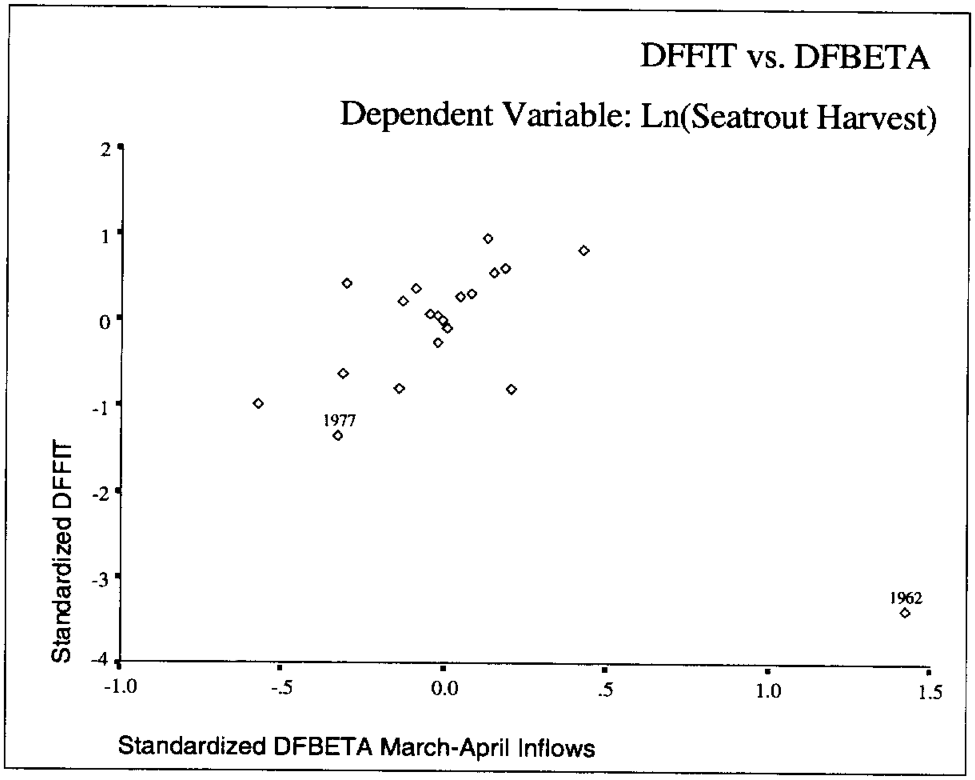
SDFBETA_3	Standardized dfbeta for May-June inflows
SDFBETA_4	Standardized dfbeta for July-August inflows
SDFBETA_5	Standardized dfbeta for September-October inflows
SDFBETA_6	Standardized dfbeta for November-December inflows

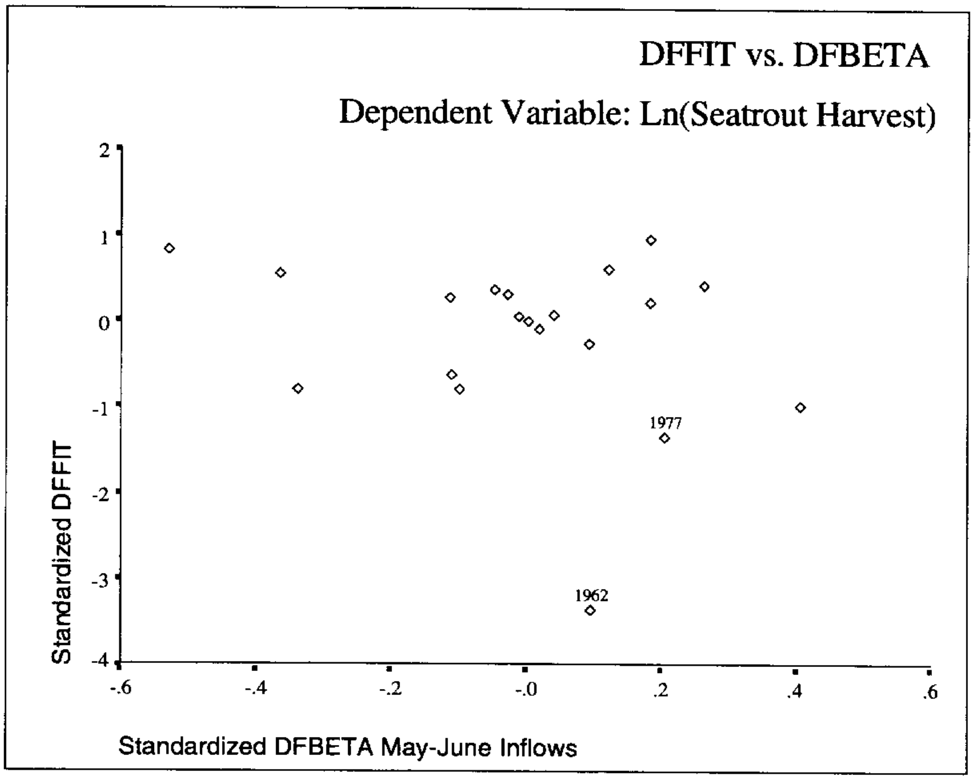
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

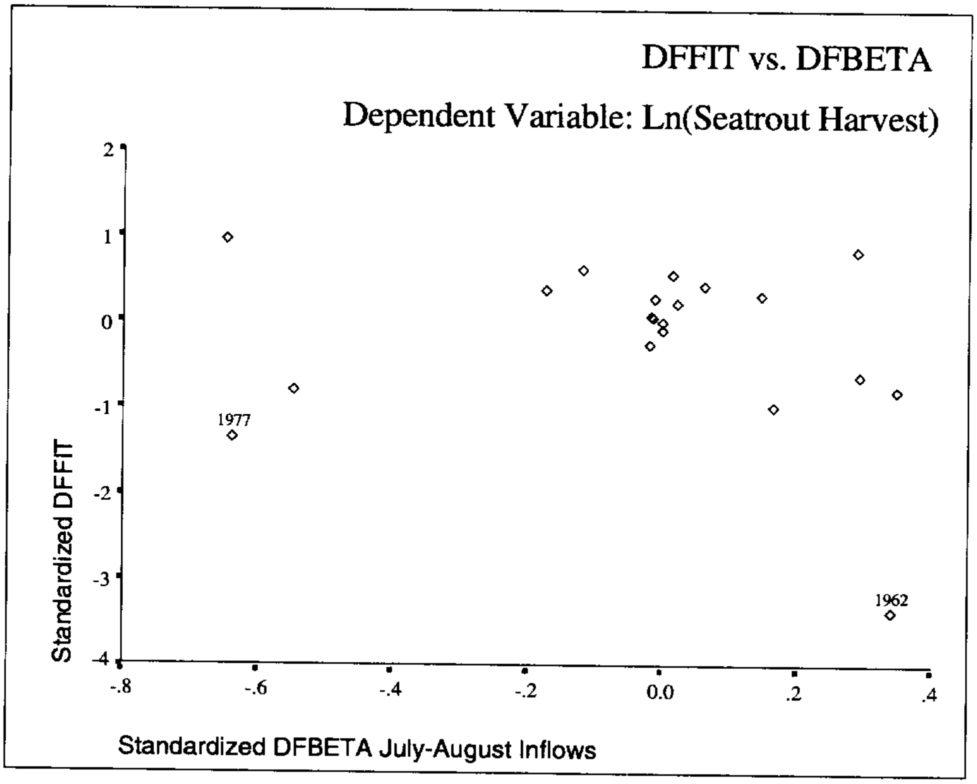
Graphics

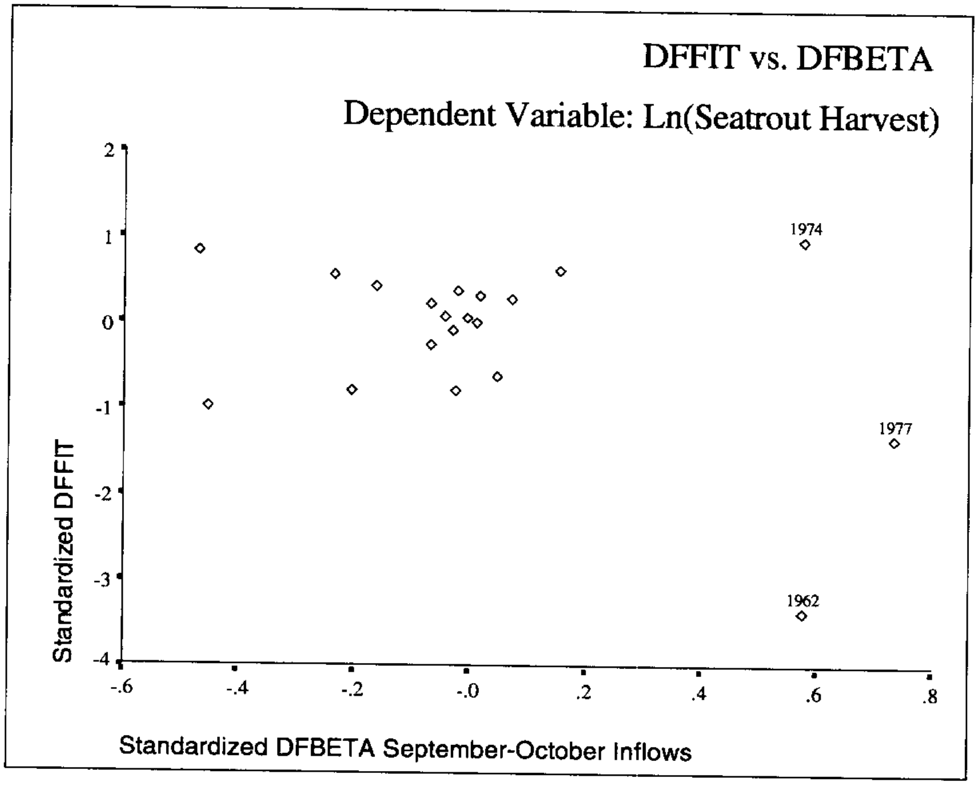

DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-4
1977
1962
-.6
-.4
-.2
-.0
.2
.4
Standardized DFBETA Intercept

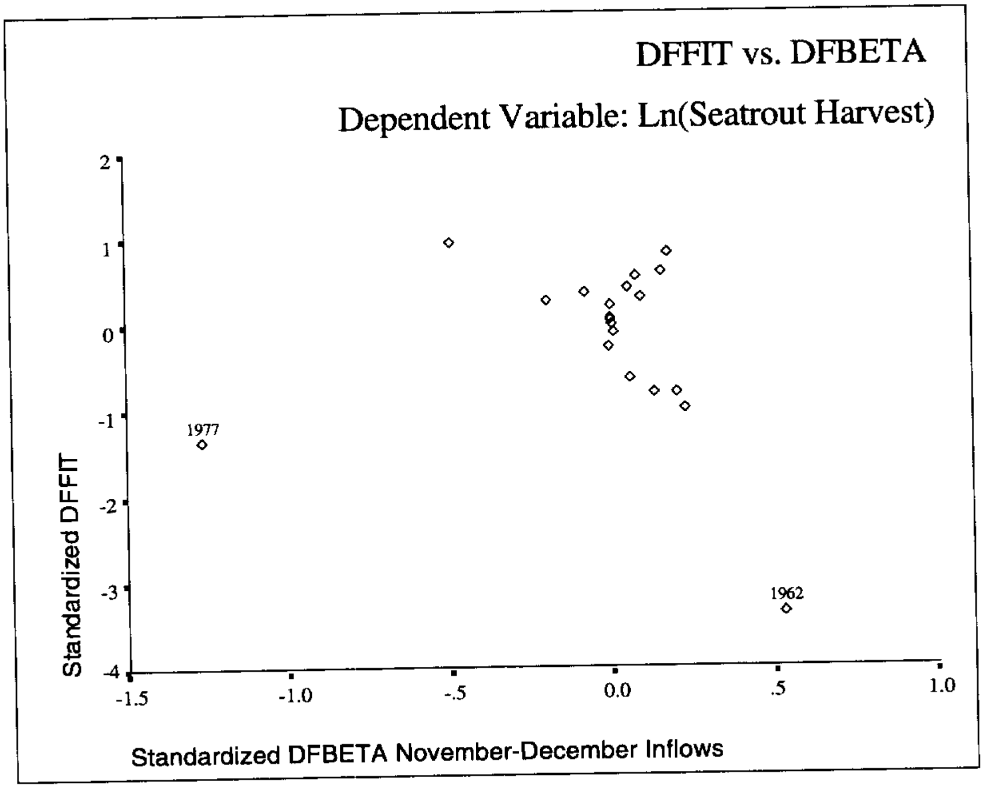

DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-4
1974
1977
1962
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA January-February Inflows


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-4
1977
1962
-1.0
-.5
0.0
.5
1.0
1.5
Standardized DFBETA March-April Inflows


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-4
1977
1962
-.6
-.4
-.2
-.0
.2
.4
.6
Standardized DFBETA May-June Inflows


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-4
1977
1962
-.8
-.6
-.4
-.2
0.0
.2
.4
Standardized DFBETA July-August Inflows


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-4
1974
1977
1962
-.6
-.4
-.2
-.0
.2
.4
.6
.8
Standardized DFBETA September-October Inflows


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-4
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA November-December Inflows
1977
1962

Regression—Logged Harvest and Inflows

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	*Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)*[c,d]	.	*.462*	*.213*	*-.150*	*.7676*	*1.377*

a. Dependent Variable: Ln(Seatrout Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*2.077*	*6*	*.346*	*.588*	*.735*[b]
	Residual	*7.660*	*13*	*.589*		
	Total	*9.737*	*19*			

a. Dependent Variable: Ln(Seatrout Harvest)

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	4.654	4.831		.963	.353	-5.783	15.091
	Ln(January-February Inflows)	-.885	1.118	-.470	-.792	.442	-3.300	1.529
	Ln(March-April Inflows)	.213	.626	.141	.341	.739	-1.139	1.566
	Ln(May-June Inflows)	.199	.622	.131	.319	.755	-1.146	1.543
	Ln(July-August Inflows)	-.256	.782	-.177	-.327	.749	-1.945	1.434
	Ln(September-October Inflows)	-.266	.451	-.215	-.591	.565	-1.240	.707
	Ln(November-December Inflows)	1.011	.713	.666	1.418	.180	-.529	2.550

a. Dependent Variable: Ln(Seatrout Harvest)

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln(January-February Inflows)	.172	5.821
	Ln(March-April Inflows)	.353	2.835
	Ln(May-June Inflows)	.357	2.801
	Ln(July-August Inflows)	.207	4.841
	Ln(September-October Inflows)	.456	2.193
	Ln(November-December Inflows)	.274	3.647

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Ln(January-February Inflows)	Ln(March-April Inflows)
1	1	6.984	1.000	.00	.00	.00
	2	9.020E-03	27.826	.00	.00	.03
	3	2.966E-03	48.524	.14	.00	.00
	4	2.173E-03	56.697	.00	.03	.09
	5	9.164E-04	87.299	.53	.01	.00
	6	7.542E-04	96.232	.16	.00	.87
	7	2.920E-04	154.662	.17	.96	.01

a. Dependent Variable: Ln(Seatrout Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions Ln(May-June Inflows)	Ln(July-August Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	.00	.00	.00	.00
	2	.03	.00	.12	.02
	3	.00	.19	.04	.03
	4	.00	.04	.63	.09
	5	.52	.08	.01	.19
	6	.45	.01	.10	.19
	7	.00	.67	.10	.47

a. Dependent Variable: Ln(Seatrout Harvest)

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*4.1263*	*5.5212*	*4.9286*	*.3307*	*20*
Std. Predicted Value	*-2.426*	*1.792*	*.000*	*1.000*	*20*
Standard Error of Predicted Value	*.2898*	*.5848*	*.4482*	*7.523E-02*	*20*
Adjusted Predicted Value	*3.8172*	*6.0355*	*4.9236*	*.4927*	*20*
Residual	*-1.7467*	*.8537*	*2.354E-15*	*.6349*	*20*
Std. Residual	*-2.276*	*1.112*	*.000*	*.827*	*20*
Stud. Residual	*-2.771*	*1.277*	*.001*	*1.003*	*20*
Deleted Residual	*-2.5901*	*1.1259*	*5.043E-03*	*.9407*	*20*
Stud. Deleted Residual	*-4.161*	*1.312*	*-.073*	*1.231*	*20*
Mahal. Distance	*1.757*	*10.078*	*5.700*	*2.212*	*20*
Cook's Distance	*.000*	*.530*	*.067*	*.116*	*20*
Centered Leverage Value	*.092*	*.530*	*.300*	*.116*	*20*

a. Dependent Variable: Ln(Seatrout Harvest)

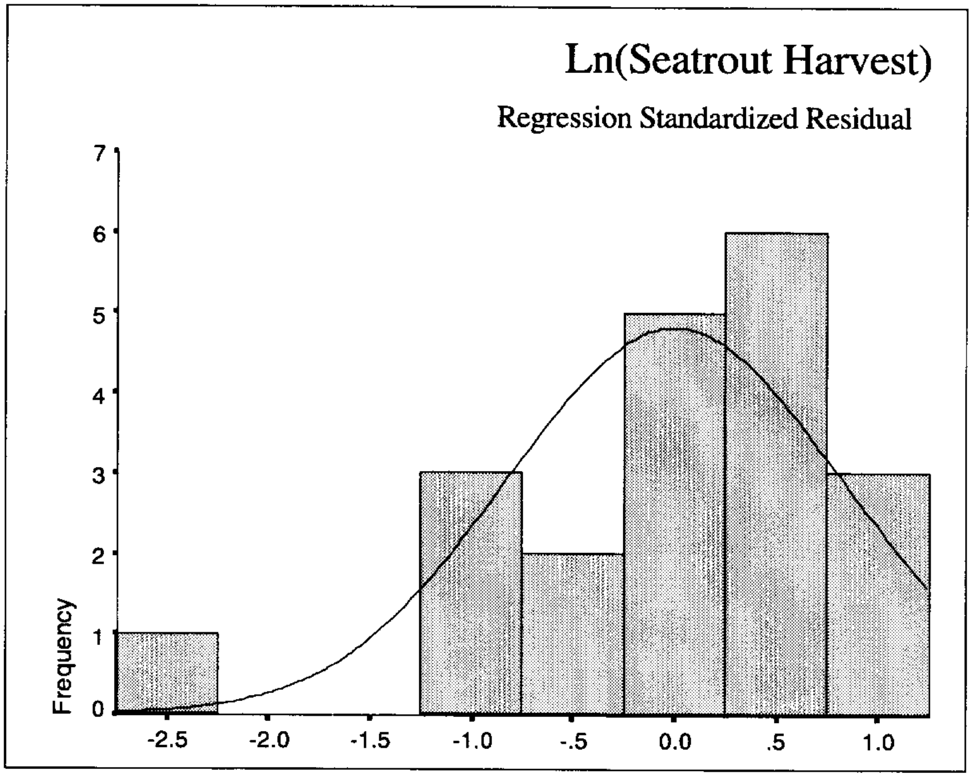
Case Values for Residuals Diagnostics

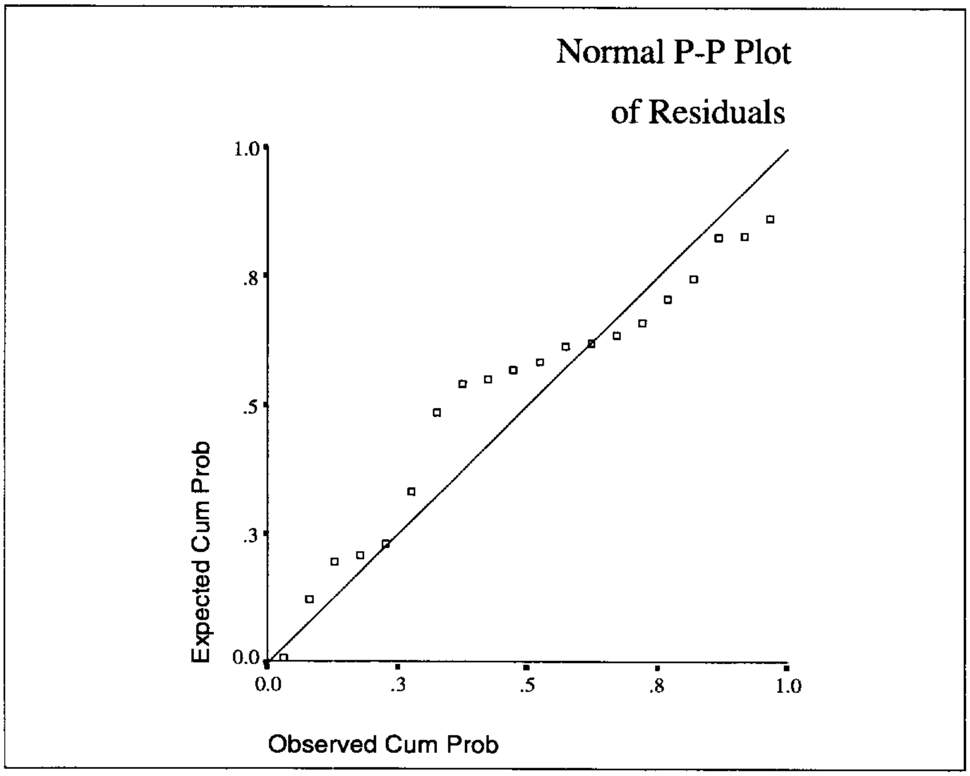
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	4.57996	-1.74675	-2.59013	5.42335	-1.05444	-2.27560	-2.77104	*-4.16125
1963	4.79802	.16412	.22608	4.73607	-.39495	.21381	.25094	.24169
1964	5.09525	.08034	.13755	5.03804	.50393	.10466	.13695	.13167
1965	5.20364	.42037	.87501	4.74901	.83175	.54765	.79012	.77803
1966	5.10966	-.02391	-.03455	5.12029	.54751	-.03116	-.03745	-.03598
1967	5.12124	.51498	.76162	4.87460	.58253	.67090	.81589	.80475
1968	4.91788	.24233	.34352	4.81668	-.03249	.31570	.37588	.36311
1969	4.90459	-.88461	-1.13847	5.15845	-.07267	-1.15244	-1.30738	-1.34782
1970	5.04918	-.55830	-.80924	5.30012	.36460	-.72733	-.87566	-.86728
1971	4.97546	-.64604	-1.08393	5.41335	.14166	-.84164	-1.09018	-1.09885
1972	5.18607	-.33092	-.43407	5.28922	.77860	-.43111	-.49375	-.47889
1973	5.04630	.73382	.85577	4.92436	.35590	.95600	1.03238	1.03522
1974	4.86949	.73961	1.05915	4.54996	-.17882	.96354	1.15305	1.16922
1975	5.12915	.26902	.44848	4.94968	.60644	.35047	.45251	.43822
1976	5.06430	.13695	.19249	5.00877	.41035	.17842	.21152	.20357
1977	5.52122	-.61668	-1.13093	6.03547	1.79217	-.80340	-1.08797	-1.09639
1978	4.98757	.85365	1.12591	4.71531	.17828	1.11211	1.27720	1.31218
1979	4.70517	.09967	.23756	4.56728	-.67577	.12985	.20047	.19290
1980	4.18195	.32450	.52211	3.98434	-2.25812	.42275	.53624	.52100
1981	4.12630	.22784	.53692	3.81722	-2.42643	.29683	.45566	.44132

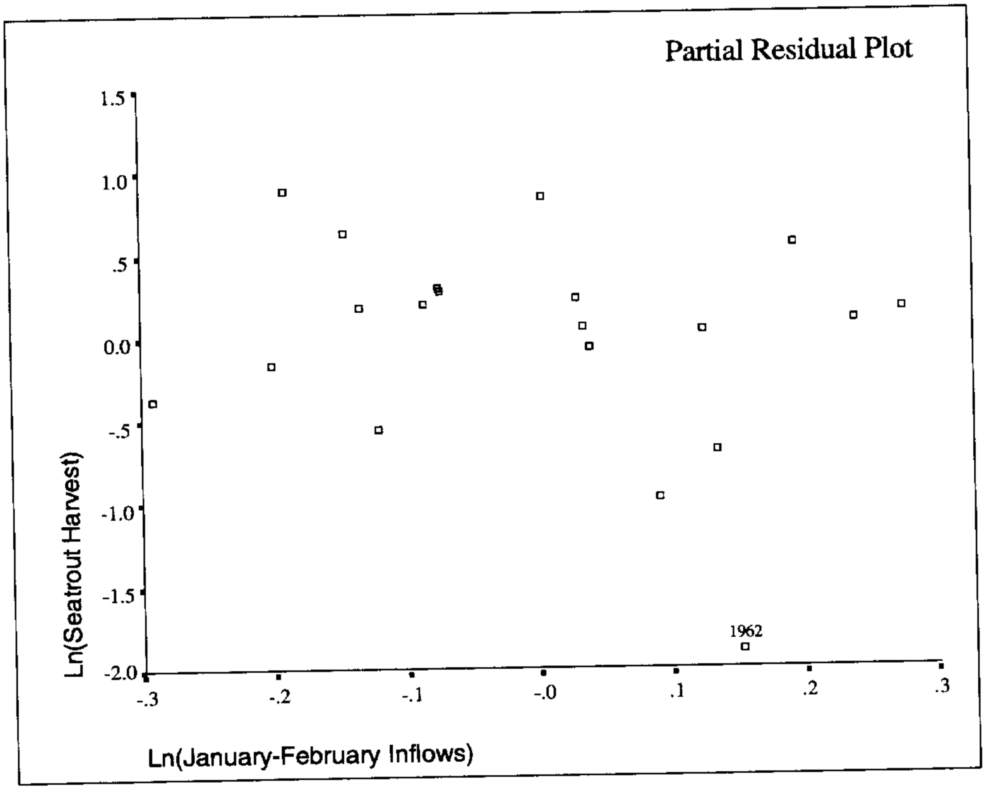
PRE_1	Predicted value of the natural log of harvest
RES_1	Ordinary residual; observed log harvest minus predicted log harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of the log of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of the log of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

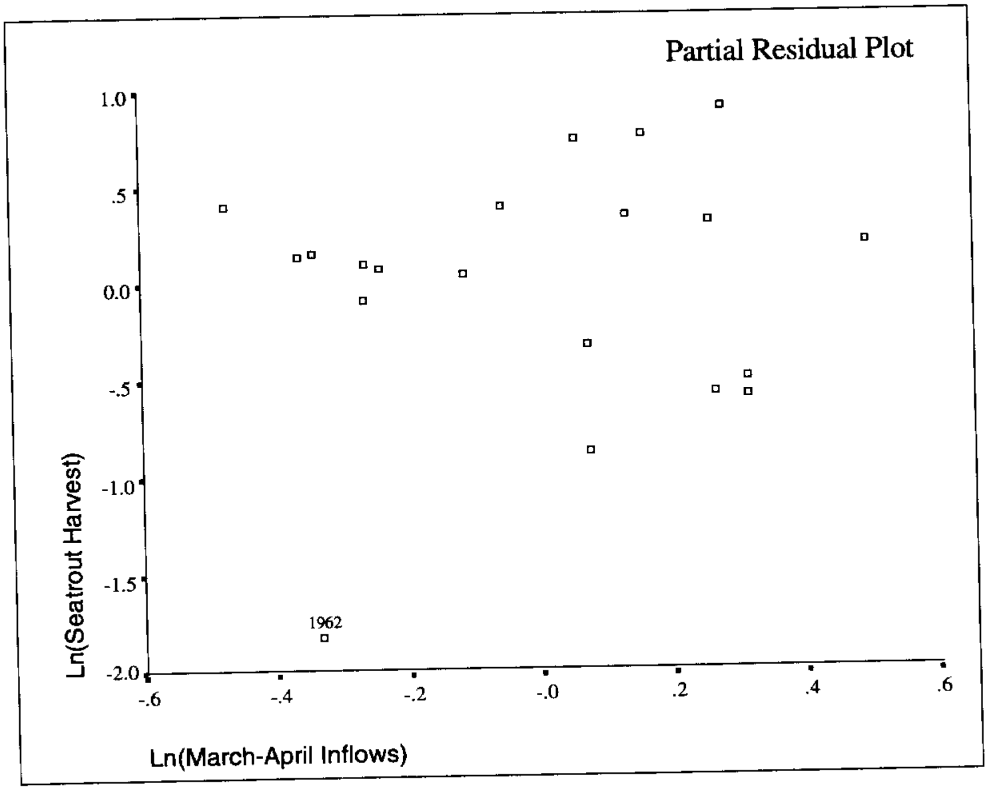
[1] Values greater than 3 are flagged.

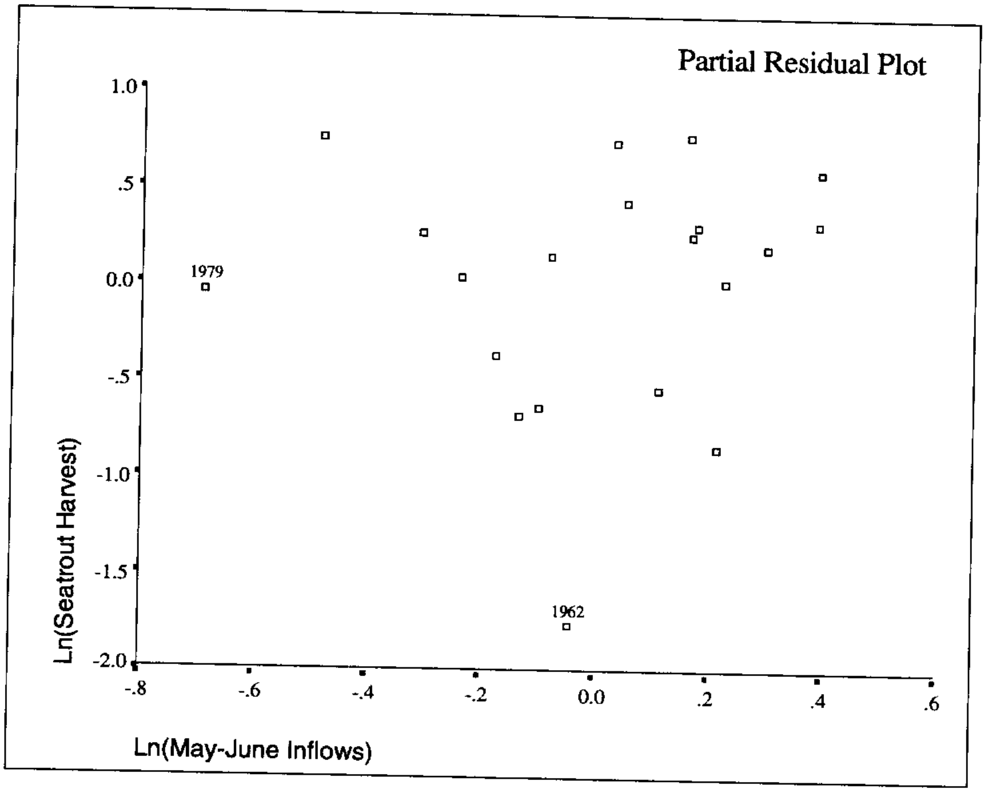
[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{12,0.01} = 2.681$.

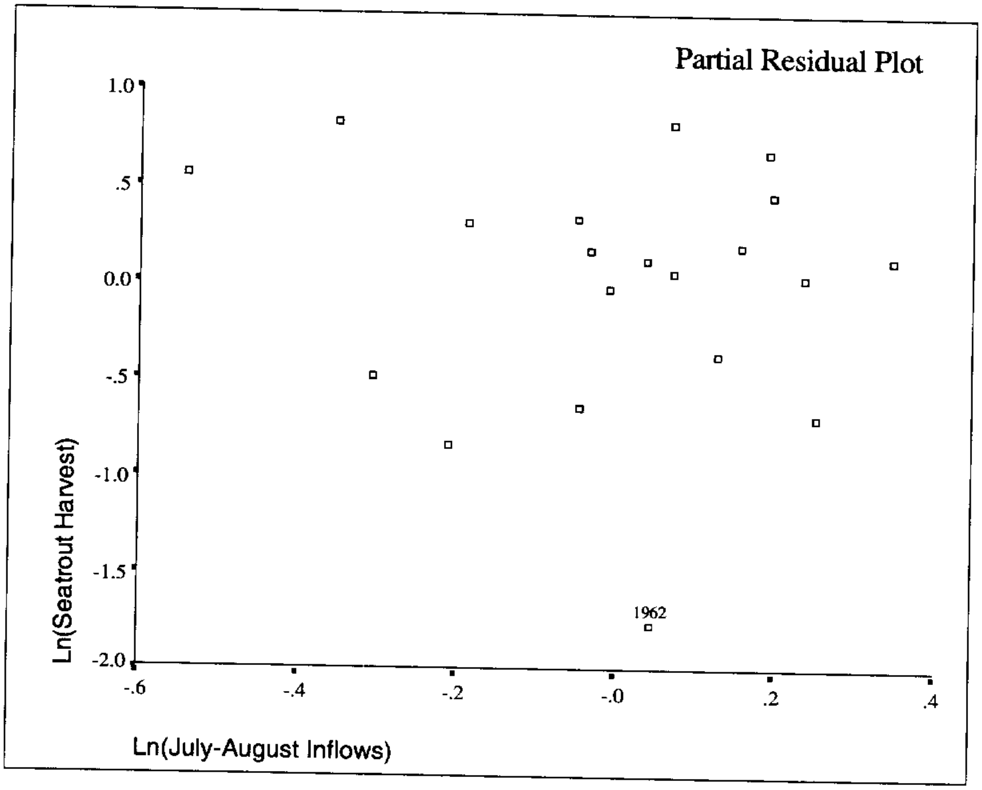

Ln(Seatrout Harvest)
Regression Standardized Residual
Frequency
7
6
5
4
3
2
1
0
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0

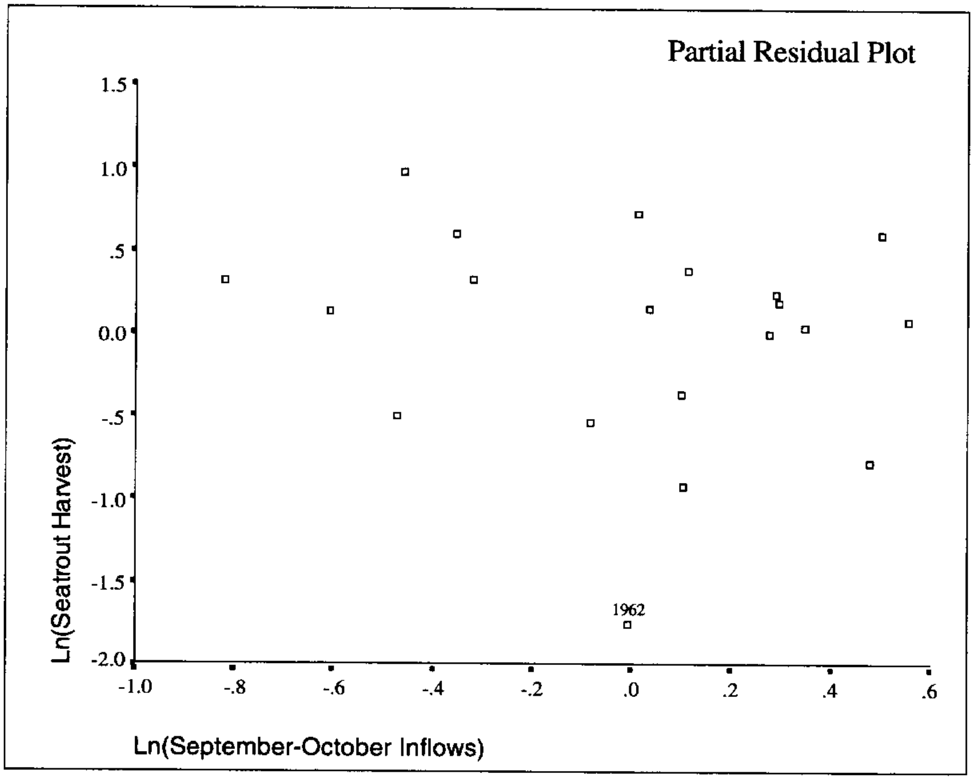

Normal P-P Plot
of Residuals
Expected Cum Prob
1.0
.8
.5
.3
0.0
0.0
.3
.5
.8
1.0
Observed Cum Prob


Partial Residual Plot
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Ln(Seatrout Harvest)
1962
-.3
-.2
-.1
-.0
.1
.2
.3
Ln(January-February Inflows)

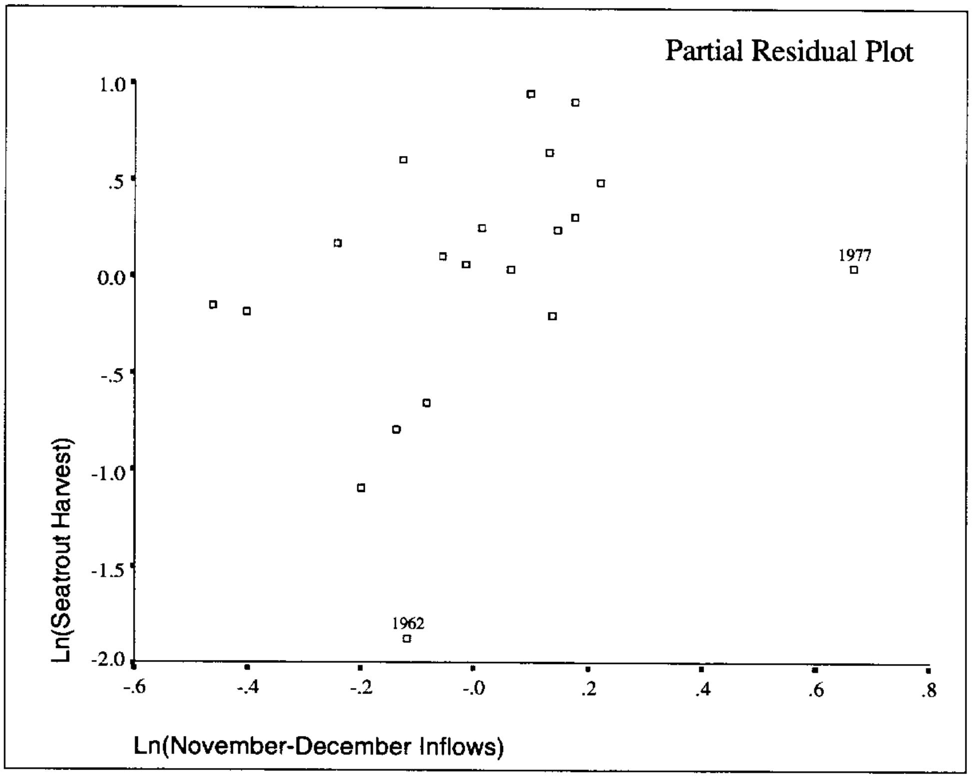

Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Ln(Seatrout Harvest)
1962
-.6
-.4
-.2
-.0
.2
.4
.6
Ln(March-April Inflows)


Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1979
1962
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Ln(Seatrout Harvest)
Ln(May-June Inflows)

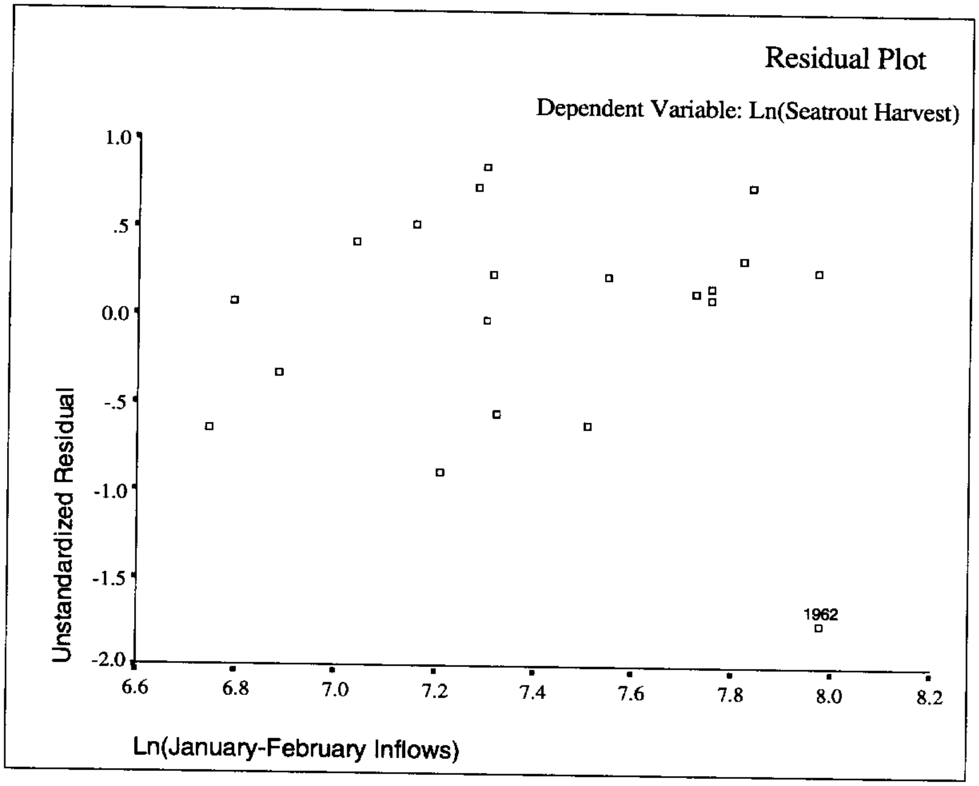

Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1962
-.6
-.4
-.2
-.0
.2
.4
Ln(Seatrout Harvest)
Ln(July-August Inflows)

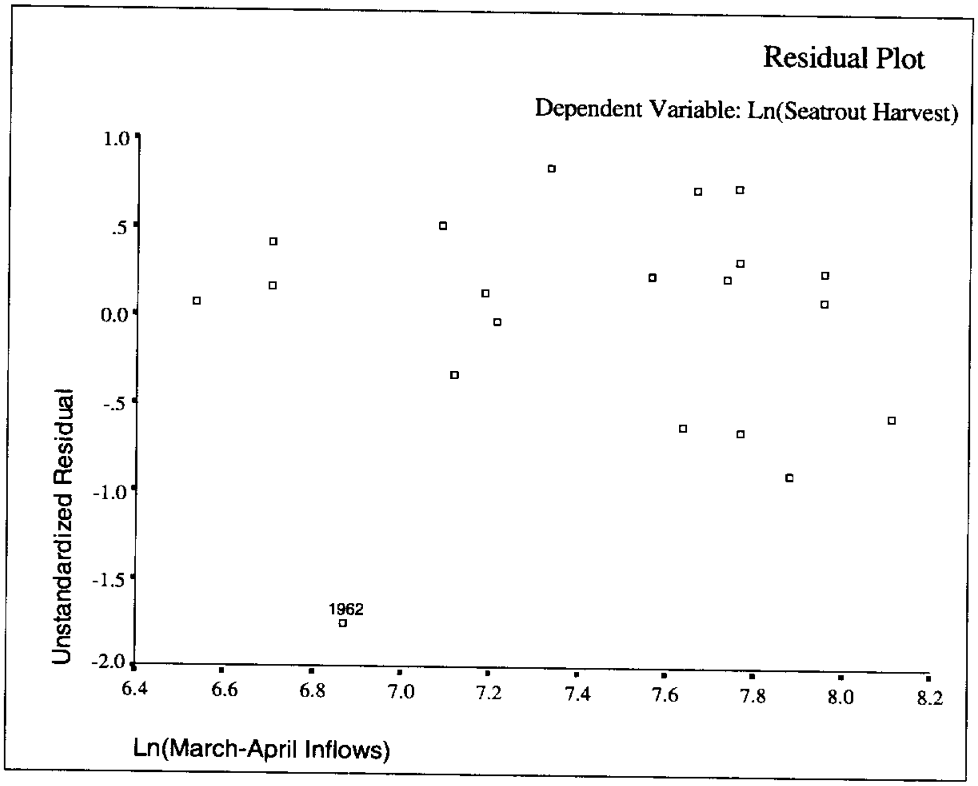


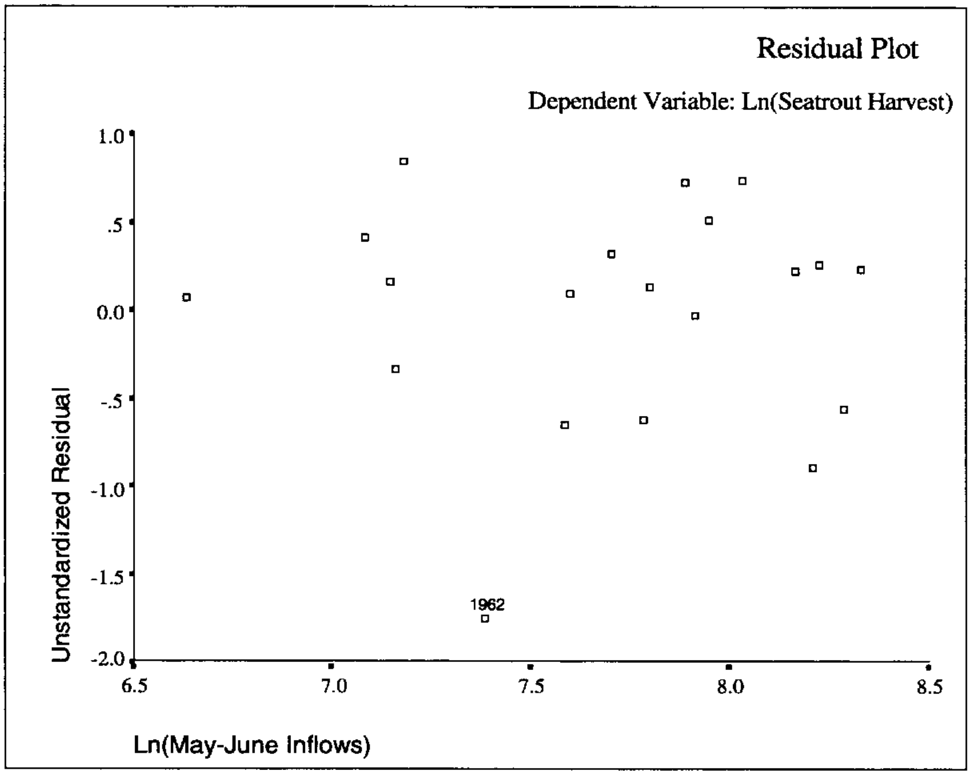
Partial Residual Plot
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Ln(Seatrout Harvest)
1962
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Ln(September-October Inflows)

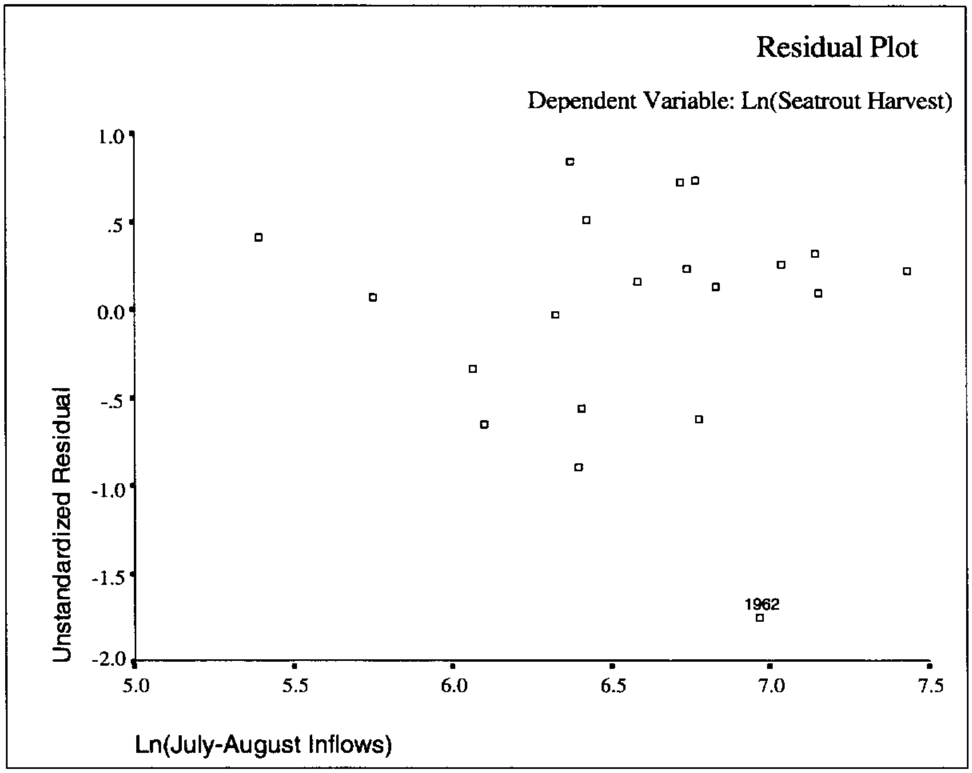


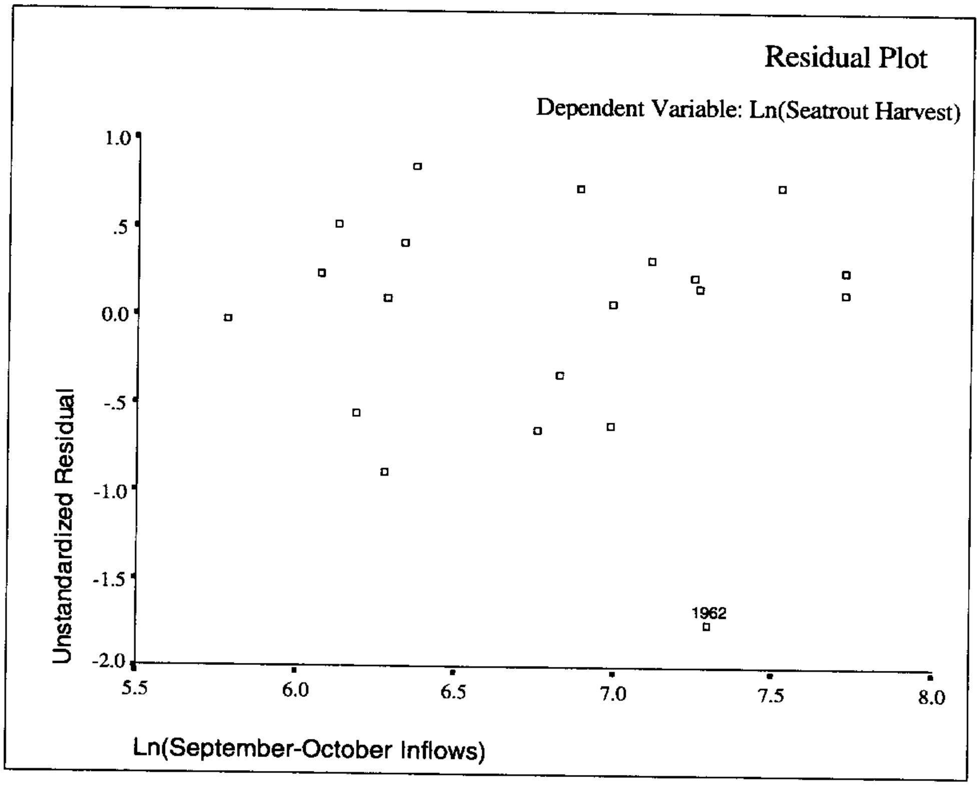
Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Ln(Seatrout Harvest)
1977
1962
-.6
-.4
-.2
-.0
.2
.4
.6
.8
Ln(November-December Inflows)

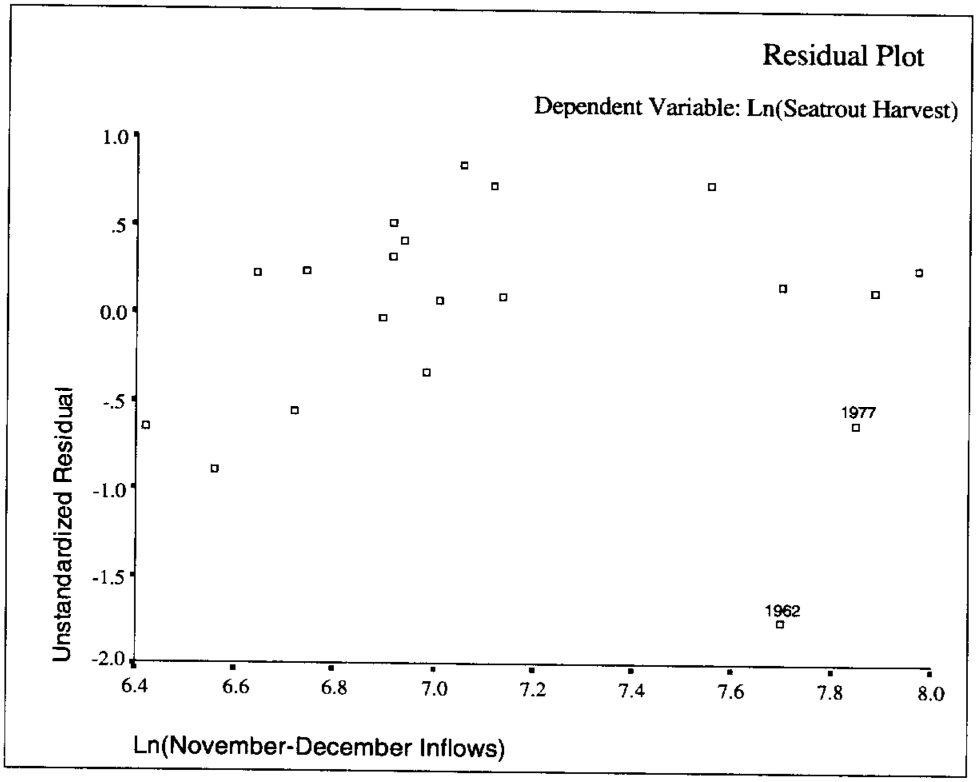

Residual Plot
Dependent Variable: Ln(Seatrout Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1962
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Ln(January-February Inflows)


Residual Plot
Dependent Variable: Ln(Seatrout Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1962
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Ln(March-April Inflows)


Residual Plot
Dependent Variable: Ln(Seatrout Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1962
6.5
7.0
7.5
8.0
8.5
Ln(May-June Inflows)


Residual Plot
Dependent Variable: Ln(Seatrout Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1962
5.0
5.5
6.0
6.5
7.0
7.5
Ln(July-August Inflows)


Residual Plot
Dependent Variable: Ln(Seatrout Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1962
5.5
6.0
6.5
7.0
7.5
8.0
Ln(September-October Inflows)


Residual Plot
Dependent Variable: Ln(Seatrout Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1977
1962
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(November-December Inflows)

Prediction Intervals for the Natural Log of Seatrout Harvest

YEAR	LGSTROUT	LICI_1	UICI_1
1962	2.83	1.91779	7.24213
1963	4.96	2.18814	7.40791
1964	5.18	2.34387	7.84663
1965	5.62	2.35335	8.05394
1966	5.09	2.46548	7.75383
1967	5.64	2.46085	7.78163
1968	5.16	2.28705	7.54870
1969	4.02	2.34755	7.46163
1970	4.49	2.40263	7.69572
1971	4.33	2.23573	7.71520
1972	4.86	2.61376	7.75838
1973	5.78	2.57483	7.51777
1974	5.61	2.23145	7.50753
1975	5.40	2.39315	7.86514
1976	5.20	2.43964	7.68897
1977	4.90	2.73242	8.31001
1978	5.84	2.41092	7.56422
1979	4.80	1.79836	7.61198
1980	4.51	1.46721	6.89669
1981	4.35	1.22390	7.02870

LGSTROUT	Natural log of seatrout harvest
LICI_1	Lower limit for 99% prediction interval for the natural log of seatrout harvest
UICI_1	Upper limit for 99% prediction interval for the natural log of seatrout harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	5.23669	.52965	.27562	.6311	.2026
1963	4.25703	.00340	.22405	.7497	.0000
1964	6.95291	.00191	.36594	.4338	.0000
1965	8.92203	.09645	.46958	.2583	.0023
1966	4.89722	.00009	.25775	.6725	.0000
1967	5.20293	.04555	.27384	.6352	.0002
1968	4.64695	.00843	.24458	.7030	.0000
1969	3.28664	.07007	.17298	.8573	.0008
1970	4.94185	.04924	.26010	.6671	.0003
1971	6.72566	.11508	.35398	.4580	.0040
1972	3.56496	.01086	.18763	.8283	.0000
1973	1.75740	.02530	.09249	.9720	.0000
1974	4.78215	.08206	.25169	.6865	.0014
1975	6.65295	.01951	.35016	.4659	.0000
1976	4.53192	.00259	.23852	.7169	.0000
1977	7.68955	.14101	.40471	.3608	.0074
1978	3.64440	.07432	.19181	.8197	.0010
1979	10.07832	.00794	*.53044	.1842	.0000
1980	6.24115	.02502	.32848	.5119	.0000
1981	9.98730	.04024	*.52565	.1893	.0001

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

---

[1] This is flagged if it exceeds (2p + 1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 − F(MAH_1), where F is the CDF of a Chi-squared random variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with p + 1 numerator degrees of freedom and n − p − 1 denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	*-2.89149	.05285	*-1.12569	*1.37247
1963	.14850	.01108	.05159	-.06044
1964	.11111	.07742	-.03357	-.01563
1965	.80912	.11112	.45066	-.05032
1966	-.02399	-.00458	-.00244	.00929
1967	.55693	.20959	-.20707	-.37661
1968	.23465	.03522	-.04735	-.11912
1969	-.72202	.10480	-.20274	-.09385
1970	-.58145	.22942	-.20391	-.26805
1971	-.90467	-.24994	.25015	-.36587
1972	-.26736	-.15386	.16019	-.03317
1973	.42200	.02890	-.30924	.05351
1974	.76852	-.57473	.39297	.18281
1975	.35792	-.30270	.02408	.11942
1976	.12964	-.04290	-.03033	-.04697
1977	*-1.00120	.21564	.62791	-.32231
1978	.74104	.24780	.00890	.34372
1979	.22689	-.00155	.01484	.12004
1980	.40657	-.03500	.22958	.07218
1981	.51401	.10107	-.07271	-.19876

SDFFITS	Standardized dffits value
SDFBETA_0	Standardized dfbeta for the intercept term
SDFBETA_1	Standardized dfbeta for logged January-February inflows
SDFBETA_2	Standardized dfbeta for logged March-April inflows

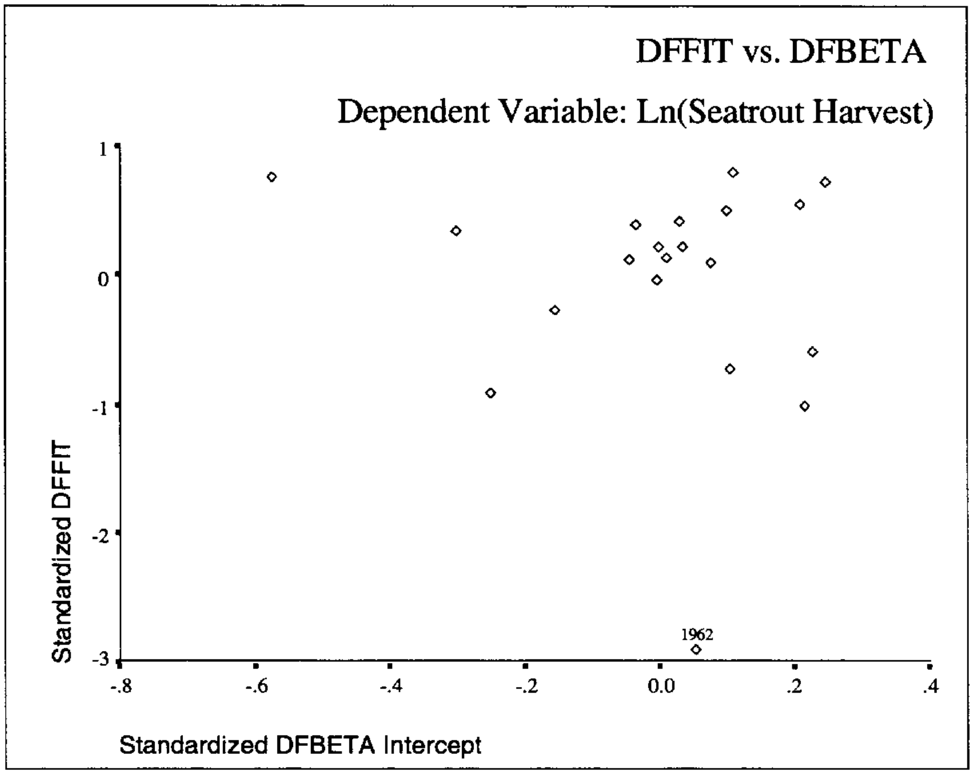
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

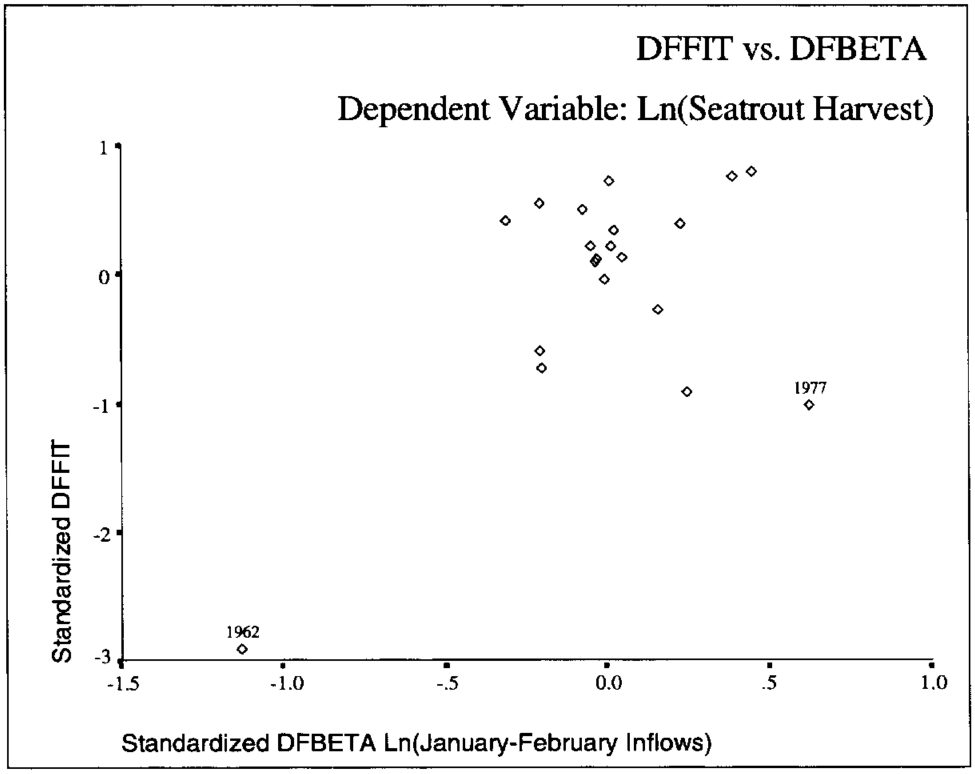
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.17511	-.24007	.01970	.55614
1963	-.01787	-.00930	.00580	-.01441
1964	-.03282	.01275	.02812	-.00213
1965	.04888	-.61891	.07386	-.25046
1966	-.00795	.00036	.01538	-.00263
1967	.31259	.19581	-.20344	.11986
1968	.13673	.06866	-.08013	.00581
1969	-.26755	.32754	-.09381	.28275
1970	-.09549	.32527	.05109	.08210
1971	.15325	.06639	-.40120	.18356
1972	.07716	-.07142	-.03191	-.06999
1973	.03049	.21571	.00815	.18425
1974	.18420	-.50191	.41289	-.16576
1975	.08174	-.10805	.09820	.11644
1976	.05905	.00936	.04950	.04004
1977	.11865	-.38065	.41139	-.91910
1978	-.58966	.10800	-.40659	.13857
1979	-.16632	.07145	-.14314	.04051
1980	-.16395	-.03258	.11297	-.28228
1981	.09263	.23959	.22104	-.25312

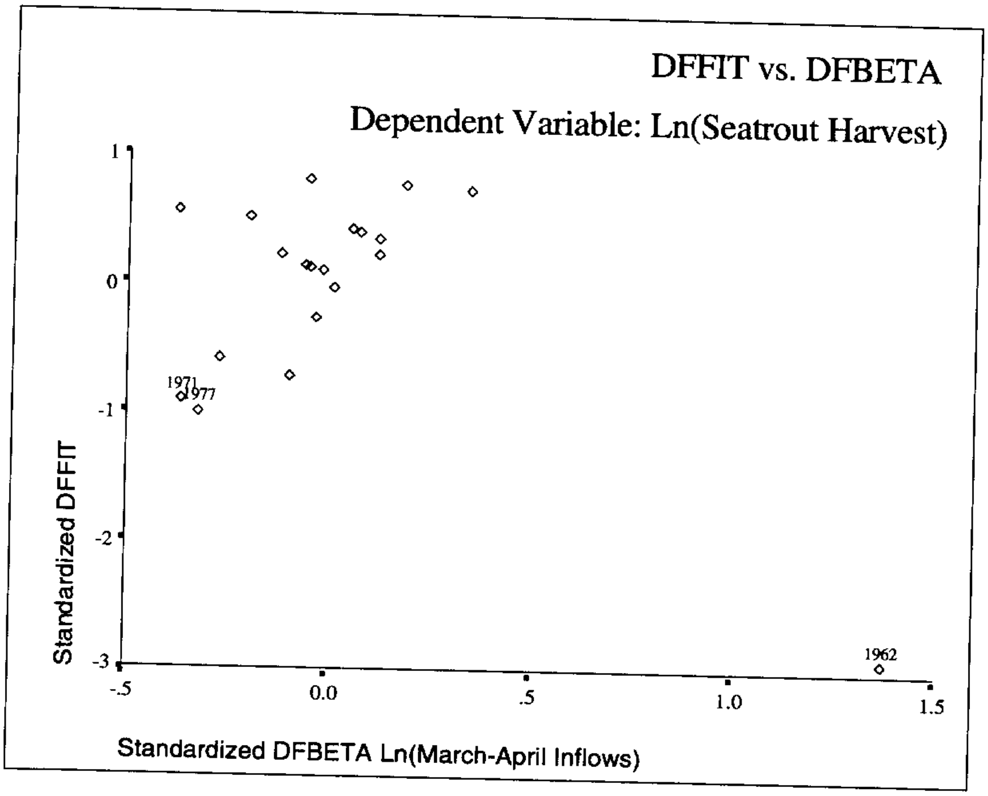
SDFBETA_3	Standardized dfbeta for logged May-June inflows
SDFBETA_4	Standardized dfbeta for logged July-August inflows
SDFBETA_5	Standardized dfbeta for logged September-October inflows
SDFBETA_6	Standardized dfbeta for logged November-December inflows

*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

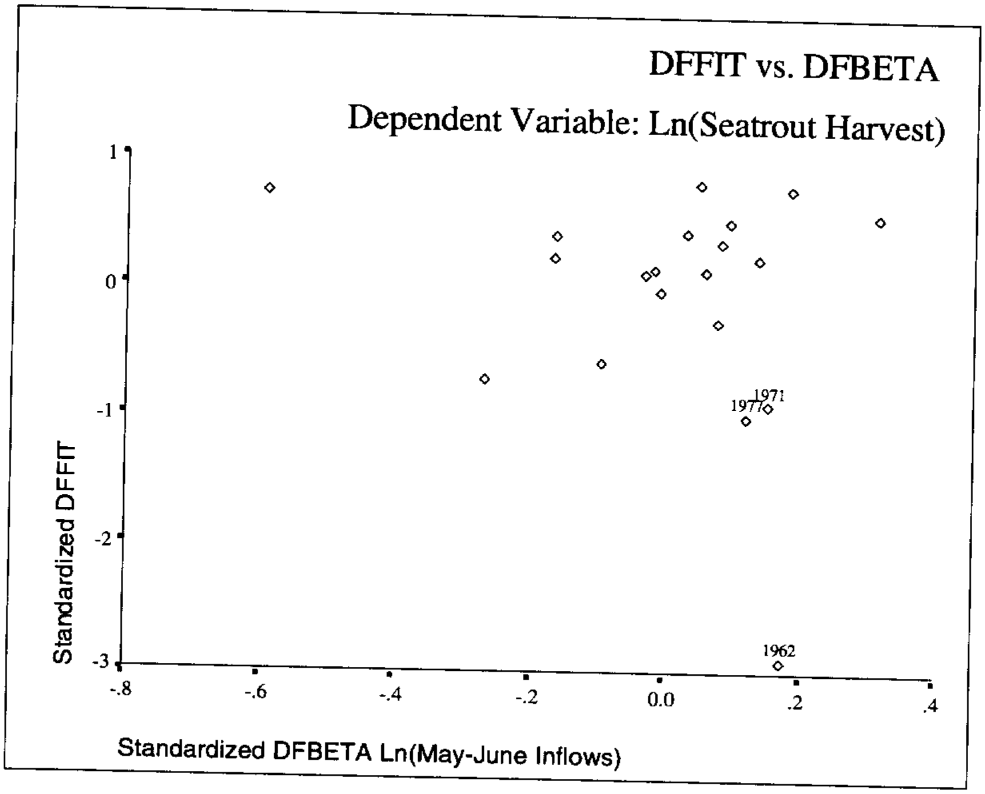
Graphics


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
1
0
-1
-2
-3
1962
-.8
-.6
-.4
-.2
0.0
.2
.4
Standardized DFBETA Intercept

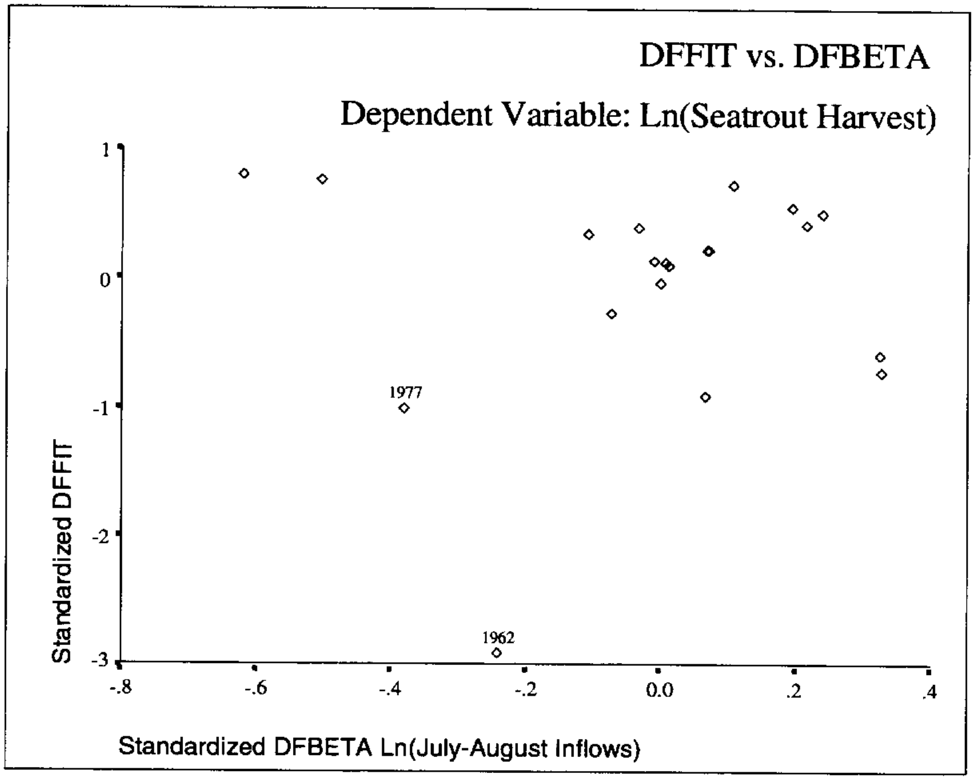

DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
1
0
-1
-2
-3
1977
1962
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA Ln(January-February Inflows)

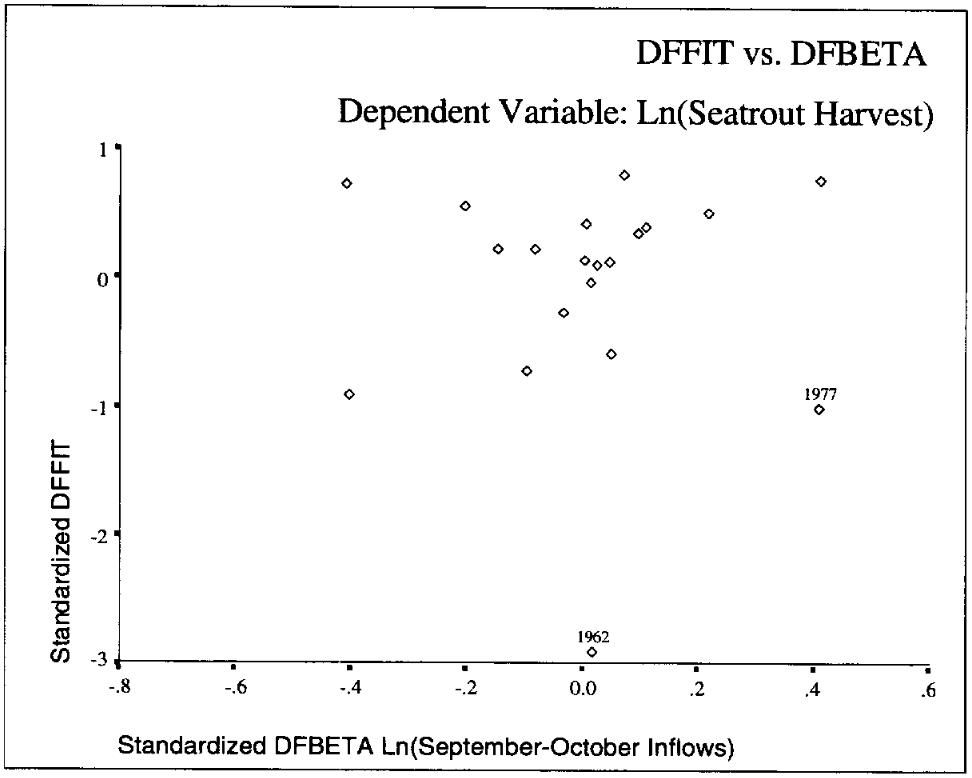


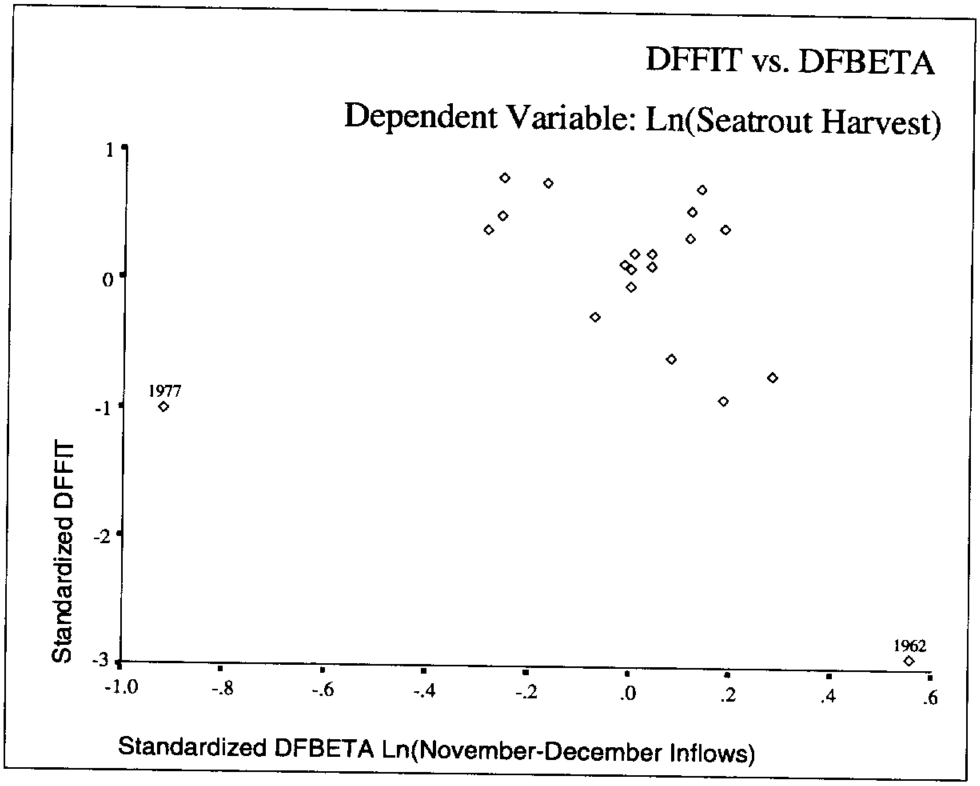
DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
1
0
-1
-2
-3
Standardized DFFIT
1971
1977
1962
-.5
0.0
.5
1.0
1.5
Standardized DFBETA Ln(March-April Inflows)



DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
1
0
-1
-2
-3
Standardized DFFIT
1971
1977
1962
-.8
-.6
-.4
-.2
0.0
.2
.4
Standardized DFBETA Ln(May-June Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
1
0
-1
-2
-3
-.8
-.6
-.4
-.2
0.0
.2
.4
1977
1962
Standardized DFBETA Ln(July-August Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
1
0
-1
-2
-3
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
1977
1962
Standardized DFBETA Ln(September-October Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
1
0
-1
-2
-3
1977
1962
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Standardized DFBETA Ln(November-December Inflows)

Examining Subsets of the Data

Logged Inflows: 1977 Omitted

```
N = 19     Regression Models for Dependent Variable: SEATROUT


        Rsq     Adj   C(p)     AIC      MSE     SBC Variables in Model
 In             Rsq

  1 0.0670 0.0121  0.748   174.7     8918   176.6 LGJAINFL
  1 0.0465 -.0096  1.094   175.1     9114   177.0 LGNDINFL
  1 0.0287 -.0285  1.395   175.5     9285   177.4 LGMAINFL
  1 0.0142 -.0438  1.639   175.8     9423   177.6 LGJFINFL
------------------------------------------------------------
  2 0.1875 0.0860  0.714   174.1     8252   176.9 LGJFINFL LGNDINFL
  2 0.1646 0.0601  1.101   174.6     8485   177.4 LGJAINFL LGNDINFL
  2 0.1318 0.0233  1.654   175.3     8817   178.2 LGSOINFL LGNDINFL
  2 0.0875 -.0265  2.402   176.3     9267   179.1 LGJFINFL LGJAINFL
----------------------------------------------------------------------
  3 0.2575 0.1090  1.533   174.4     8044   178.1 LGJFINFL LGSOINFL LGNDINFL
  3 0.2132 0.0558  2.281   175.5     8524   179.2 LGJFINFL LGMJINFL LGNDINFL
  3 0.2073 0.0487  2.381   175.6     8588   179.4 LGJAINFL LGSOINFL LGNDINFL
  3 0.2041 0.0450  2.433   175.7     8622   179.5 LGJFINFL LGMAINFL LGNDINFL
-------------------------------------------------------------------------------
  4 0.2875 0.0839  3.027   175.6     8271   180.3 LGJFINFL LGMAINFL LGSOINFL
                                                 LGNDINFL
  4 0.2781 0.0719  3.184   175.8     8379   180.6 LGJFINFL LGMJINFL LGSOINFL
                                                 LGNDINFL
  4 0.2612 0.0501  3.470   176.3     8576   181.0 LGJFINFL LGJAINFL LGSOINFL
                                                 LGNDINFL
  4 0.2263 0.0053  4.059   177.2     8980   181.9 LGMAINFL LGJAINFL LGSOINFL
                                                 LGNDINFL
-------------------------------------------------------------------------------
  5 0.2890 0.0156  5.000   177.5     8887   183.2 LGJFINFL LGMAINFL LGMJINFL
                                                 LGSOINFL LGNDINFL
  5 0.2875 0.0134  5.027   177.6     8906   183.3 LGJFINFL LGMAINFL LGJAINFL
                                                 LGSOINFL LGNDINFL
  5 0.2782 0.0006  5.183   177.8     9022   183.5 LGJFINFL LGMJINFL LGJAINFL
                                                 LGSOINFL LGNDINFL
  5 0.2281 -.0687  6.028   179.1     9648   184.8 LGMAINFL LGMJINFL LGJAINFL
                                                 LGSOINFL LGNDINFL
-------------------------------------------------------------------------------
  6 0.2891 -.0664  7.000   179.5     9627   186.2 LGJFINFL LGMAINFL LGMJINFL
                                                 LGJAINFL LGSOINFL LGNDINFL
-------------------------------------------------------------------------------


 OBS  _MODEL_   _TYPE_   _DEPVAR_    _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

   1  MODEL1    PARMS    SEATROUT   94.4362    488.117      .         .
   2  MODEL1    PARMS    SEATROUT   95.4683   -151.575      .         .
   3  MODEL1    PARMS    SEATROUT   96.3569    415.939      .      -33.2764
   4  MODEL1    PARMS    SEATROUT   97.0726    384.514   -29.077      .
   5  MODEL1    PARMS    SEATROUT   90.8385    252.424  -127.732      .
   6  MODEL1    PARMS    SEATROUT   92.1132    125.916      .         .
   7  MODEL1    PARMS    SEATROUT   93.9006   -126.659      .         .
   8  MODEL1    PARMS    SEATROUT   96.2674    292.627    57.647      .
   9  MODEL1    PARMS    SEATROUT   89.6873    253.513  -120.922      .
  10  MODEL1    PARMS    SEATROUT   92.3253     39.531  -166.294      .
  11  MODEL1    PARMS    SEATROUT   92.6711     97.197      .         .
  12  MODEL1    PARMS    SEATROUT   92.8531     53.451  -160.231   32.5266
  13  MODEL1    PARMS    SEATROUT   90.9426    -16.987  -164.406   44.2380
  14  MODEL1    PARMS    SEATROUT   91.5357     62.079  -155.826      .
  15  MODEL1    PARMS    SEATROUT   92.6043    266.575  -156.109      .
  16  MODEL1    PARMS    SEATROUT   94.7643   -149.667      .      37.0709
```

```
OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  SEATROUT  _IN_  _P_  _EDF_

  1     .      -48.6243     .          .         -1       1    2     17
  2     .          .        .       45.178       -1       1    2     17
  3     .          .        .          .         -1       1    2     17
  4     .          .        .          .         -1       1    2     17
  5     .          .        .      121.565       -1       2    3     16
  6     .      -67.9461     .       68.883       -1       2    3     16
  7     .          .     -64.6004  103.361       -1       2    3     16
  8     .      -83.9192     .          .         -1       2    3     16
  9     .          .     -58.6664  170.331       -1       3    4     15
 10  38.5935       .        .      149.941       -1       3    4     15
 11     .      -56.4299  -47.4811  107.630       -1       3    4     15
 12     .          .        .      149.523       -1       3    4     15
 13     .          .     -64.8409  213.488       -1       4    5     14
 14  34.6967       .     -56.6450  194.162       -1       4    5     14
 15     .       24.5938  -64.4008  187.958       -1       4    5     14
 16     .      -80.2196  -47.2263  125.414       -1       4    5     14

OBS   _MSE_      _RSQ_     _ADJRSQ_      _CP_       _AIC_       _SBC_

  1  8918.20    0.06702    0.01214    0.74778    174.708    176.597
  2  9114.19    0.04651   -0.00957    1.09387    175.121    177.010
  3  9284.65    0.02868   -0.02846    1.39486    175.473    177.362
  4  9423.09    0.01420   -0.04379    1.63932    175.754    177.643
  5  8251.63    0.18753    0.08597    0.71365    174.080    176.913
  6  8484.84    0.16457    0.06014    1.10123    174.610    177.443
  7  8817.33    0.13183    0.02331    1.65380    175.340    178.173
  8  9267.42    0.08751   -0.02655    2.40182    176.286    179.119
  9  8043.81    0.25749    0.10899    1.53275    174.369    178.147
 10  8523.95    0.21317    0.05581    2.28084    175.471    179.248
 11  8587.93    0.20727    0.04872    2.38052    175.613    179.391
 12  8621.70    0.20415    0.04498    2.43314    175.687    179.465
 13  8270.55    0.28746    0.08388    3.02696    175.586    180.309
 14  8378.78    0.27813    0.07189    3.18434    175.833    180.556
 15  8575.56    0.26118    0.05009    3.47049    176.275    180.997
 16  8980.27    0.22631    0.00526    4.05903    177.151    181.873


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

 17  MODEL1   PARMS   SEATROUT  94.2705    -33.176  -168.526   35.3830
 18  MODEL1   PARMS   SEATROUT  94.3738    -13.053  -167.132   43.7871
 19  MODEL1   PARMS   SEATROUT  94.9855     68.960  -160.660      .
 20  MODEL1   PARMS   SEATROUT  98.2255   -174.190      .       28.1731
 21  MODEL1   PARMS   SEATROUT  98.1191    -36.075  -166.797   35.5197

OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  SEATROUT  _IN_  _P_  _EDF_

 17   12.7479      .     -62.8623  213.605      -1       5    6     13
 18      .      2.2155   -65.2945  214.636      -1       5    6     13
 19   33.8333   3.9858   -57.6246  196.425      -1       5    6     13
 20   13.9935 -84.0098   -44.2808  123.679      -1       5    6     13
 21   12.9807  -1.4659   -62.5260  212.848      -1       6    7     12

OBS   _MSE_      _RSQ_     _ADJRSQ_      _CP_       _AIC_       _SBC_

 17  8886.92    0.28904    0.01560    5.00019    177.544    183.211
 18  8906.41    0.28749    0.01344    5.02650    177.586    183.252
 19  9022.25    0.27822    0.00061    5.18292    177.831    183.498
 20  9648.25    0.22814   -0.06873    6.02822    179.106    184.772
 21  9627.35    0.28906   -0.06642    7.00000    179.544    186.155
```

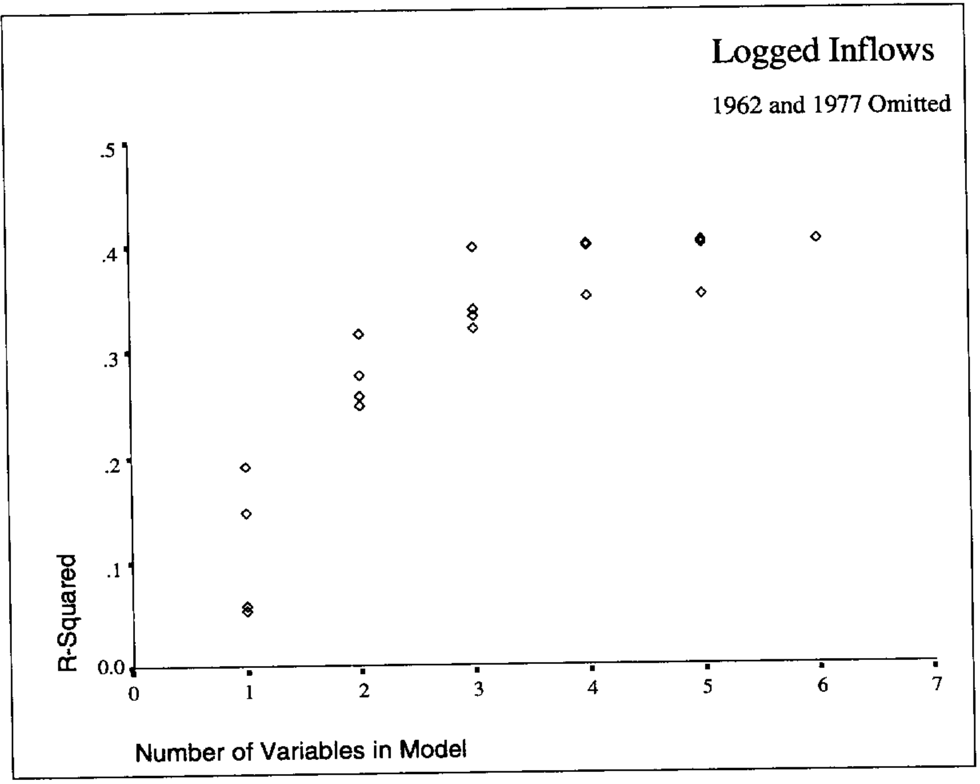
Logged Harvest : 1962 and 1977 Omitted

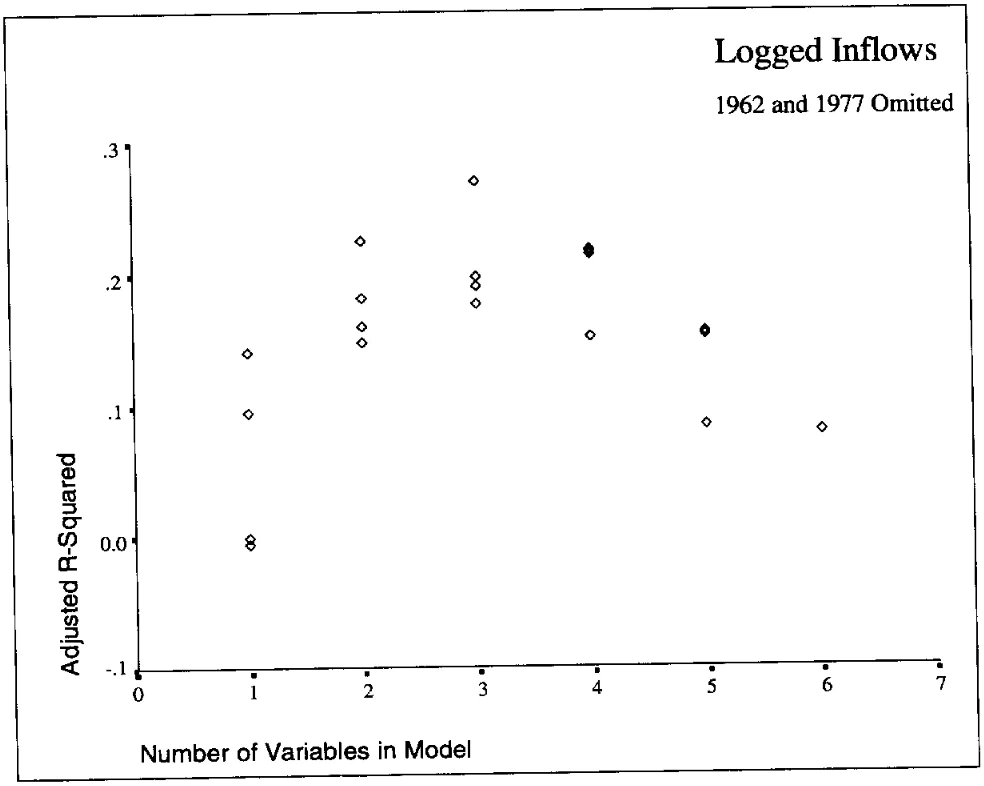
```
N = 18     Regression Models for Dependent Variable: LGSTROUT

          Rsq     Adj    C(p)     AIC     MSE     SBC Variables in Model
   In             Rsq

    1 0.1930 0.1426  0.930 -22.56 0.2572 -20.78 MA_INFL
    1 0.1493 0.0962  1.737 -21.61 0.2712 -19.83 ND_INFL
    1 0.0598 0.0010  3.395 -19.81 0.2997 -18.03 MJ_INFL
    1 0.0554 -.0036  3.474 -19.73 0.3011 -17.95 JA_INFL
-----------------------------------------------------------------
    2 0.3175 0.2266  0.625 -23.58 0.2320 -20.91 MA_INFL ND_INFL
    2 0.2793 0.1832  1.333 -22.60 0.2450 -19.92 SO_INFL ND_INFL
    2 0.2598 0.1611  1.693 -22.12 0.2517 -19.44 JA_INFL ND_INFL
    2 0.2495 0.1494  1.884 -21.87 0.2552 -19.19 JF_INFL MA_INFL
-------------------------------------------------------------------------
    3 0.4003 0.2718  1.094 -23.90 0.2185 -20.34 MA_INFL SO_INFL ND_INFL
    3 0.3402 0.1988  2.207 -22.18 0.2404 -18.62 JF_INFL SO_INFL ND_INFL
    3 0.3347 0.1922  2.307 -22.04 0.2424 -18.47 MA_INFL JA_INFL ND_INFL
    3 0.3232 0.1782  2.521 -21.73 0.2466 -18.16 JF_INFL MA_INFL ND_INFL
---------------------------------------------------------------------------
    4 0.4028 0.2191  3.048 -21.98 0.2343 -17.53 JF_INFL MA_INFL SO_INFL
                                                ND_INFL
    4 0.4025 0.2187  3.054 -21.97 0.2344 -17.52 MA_INFL MJ_INFL SO_INFL
                                                ND_INFL
    4 0.4007 0.2163  3.087 -21.92 0.2351 -17.46 MA_INFL JA_INFL SO_INFL
                                                ND_INFL
    4 0.3526 0.1533  3.978 -20.52 0.2540 -16.07 JF_INFL MJ_INFL SO_INFL
                                                ND_INFL
-----------------------------------------------------------------------------
    5 0.4051 0.1572  5.006 -20.05 0.2528 -14.71 JF_INFL MA_INFL MJ_INFL
                                                SO_INFL ND_INFL
    5 0.4036 0.1552  5.033 -20.00 0.2535 -14.66 JF_INFL MA_INFL JA_INFL
                                                SO_INFL ND_INFL
    5 0.4033 0.1546  5.039 -19.99 0.2536 -14.65 MA_INFL MJ_INFL JA_INFL
                                                SO_INFL ND_INFL
    5 0.3542 0.0851  5.948 -18.57 0.2745 -13.23 JF_INFL MJ_INFL JA_INFL
                                                SO_INFL ND_INFL
-----------------------------------------------------------------------------
    6 0.4054 0.0811  7.000 -18.06 0.2757 -11.82 JF_INFL MA_INFL MJ_INFL
                                                JA_INFL SO_INFL ND_INFL
-----------------------------------------------------------------------------
```

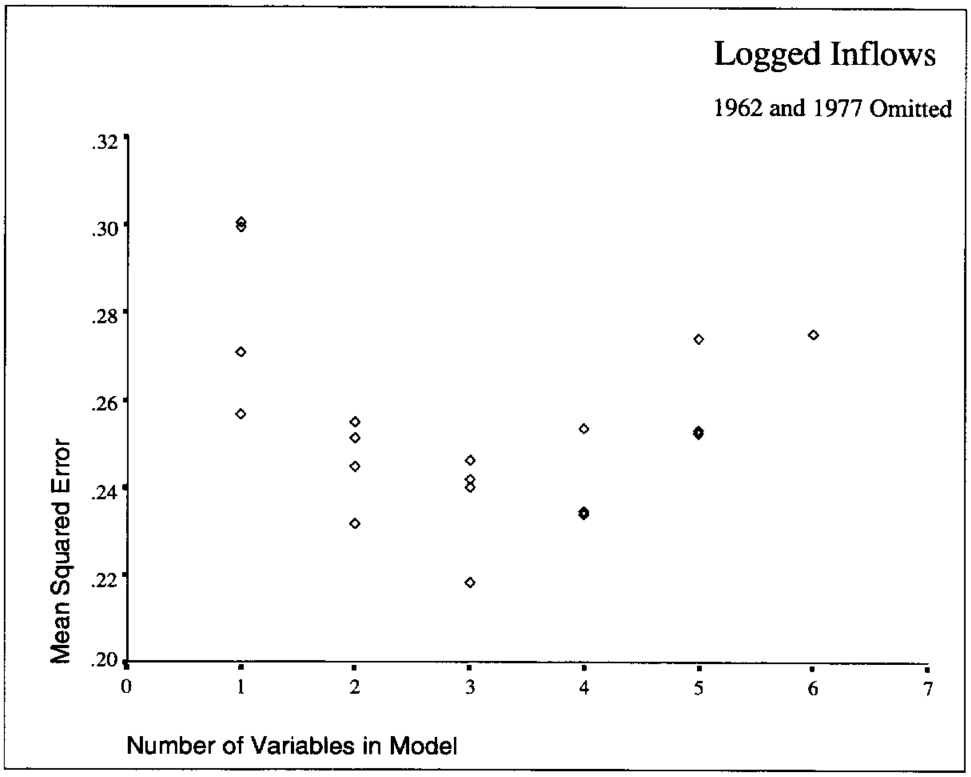
```
OBS  _MODEL_  _TYPE_  _DEPVAR_  _RMSE_   INTERCEP    JF_INFL     MA_INFL

  1  MODEL1   PARMS   LGSTROUT  0.50719  5.61859    .           -.00030213
  2  MODEL1   PARMS   LGSTROUT  0.52073  4.63616    .            .
  3  MODEL1   PARMS   LGSTROUT  0.54746  5.36160    .            .
  4  MODEL1   PARMS   LGSTROUT  0.54871  5.31245    .            .
  5  MODEL1   PARMS   LGSTROUT  0.48171  5.20620    .           -.00028295
  6  MODEL1   PARMS   LGSTROUT  0.49502  4.65154    .            .
  7  MODEL1   PARMS   LGSTROUT  0.50167  4.93877    .            .
  8  MODEL1   PARMS   LGSTROUT  0.50515  5.35894  0.00022443   -.00036696
  9  MODEL1   PARMS   LGSTROUT  0.46739  5.14119    .           -.00024447
 10  MODEL1   PARMS   LGSTROUT  0.49027  4.91373  -.00031433     .
 11  MODEL1   PARMS   LGSTROUT  0.49229  5.23076    .           -.00022465
 12  MODEL1   PARMS   LGSTROUT  0.49655  5.22581  -.00011844   -.00024328
 13  MODEL1   PARMS   LGSTROUT  0.48403  5.15528  -.00007909   -.00021857
 14  MODEL1   PARMS   LGSTROUT  0.48416  5.11943    .           -.00027519
 15  MODEL1   PARMS   LGSTROUT  0.48488  5.14705    .           -.00023615
 16  MODEL1   PARMS   LGSTROUT  0.50399  5.01898  -.00024909     .
```

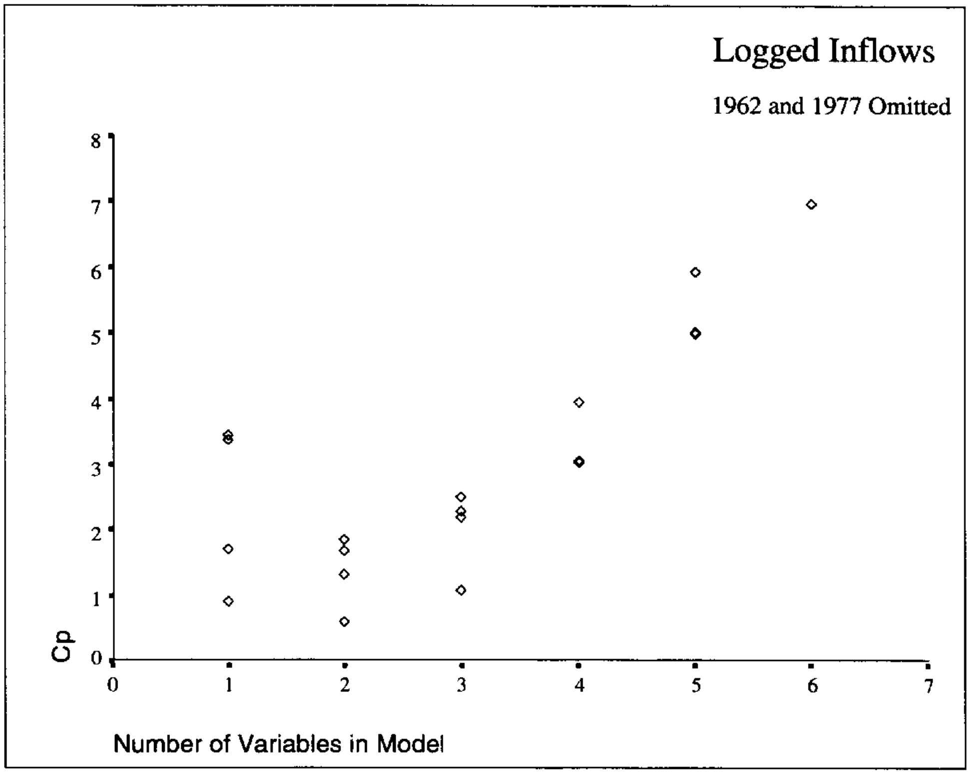
```
OBS    MJ_INFL      JA_INFL      SO_INFL      ND_INFL    LGSTROUT  _IN_  _P_

  1   .            .            .            .              -1       1    2
  2   .            .            .            .00031699      -1       1    2
  3   -.00012661   .            .            .              -1       1    2
  4   .            -.00034312   .            .              -1       1    2
  5   .            .            .            .00029041      -1       2    3
  6   .            .            -.00057048   .00075064      -1       2    3
  7   .            -.00049748   .            .00038088      -1       2    3
  8   .            .            .            .              -1       2    3
  9   .            .            -.00046378   .00064657      -1       3    4
 10   .            .            -.00049725   .00090452      -1       3    4
 11   .            -.00023348   .            .00032587      -1       3    4
 12   .            .            .            .00037309      -1       3    4
 13   .            .            -.00045666   .00069631      -1       4    5
 14   0.00003324   .            -.00046064   .00064196      -1       4    5
 15   .            -.00003779   -.00045032   .00064197      -1       4    5
 16   -.00006374   .            -.00049277   .00085635      -1       4    5

OBS   _EDF_    _MSE_     _RSQ_     _ADJRSQ_     _CP_       _AIC_       _SBC_

  1    16     0.25724   0.19299    0.14255    0.92982   -22.5592   -20.7784
  2    16     0.27116   0.14933    0.09617    1.73745   -21.6109   -19.8301
  3    16     0.29971   0.05976    0.00100    3.39452   -19.8089   -18.0281
  4    16     0.30109   0.05545   -0.00359    3.47435   -19.7264   -17.9457
  5    15     0.23204   0.31755    0.22655    0.62544   -23.5768   -20.9057
  6    15     0.24504   0.27931    0.18322    1.33288   -22.5955   -19.9243
  7    15     0.25167   0.25982    0.16113    1.69334   -22.1153   -19.4442
  8    15     0.25518   0.24950    0.14943    1.88435   -21.8659   -19.1948
  9    14     0.21846   0.40034    0.27184    1.09378   -23.9047   -20.3432
 10    14     0.24037   0.34019    0.19880    2.20656   -22.1841   -18.6227
 11    14     0.24235   0.33474    0.19219    2.30731   -22.0362   -18.4747
 12    14     0.24656   0.32319    0.17816    2.52108   -21.7262   -18.1647
 13    13     0.23428   0.40284    0.21909    3.04761   -21.9798   -17.5279
 14    13     0.23441   0.40251    0.21866    3.05370   -21.9699   -17.5180
 15    13     0.23511   0.40072    0.21633    3.08674   -21.9162   -17.4643
 16    13     0.25401   0.35256    0.15334    3.97779   -20.5247   -16.0728


OBS   _MODEL_   _TYPE_   _DEPVAR_   _RMSE_   INTERCEP    JF_INFL      MA_INFL

 17   MODEL1    PARMS    LGSTROUT   0.50283   5.13332   -.00008061   -.00024947
 18   MODEL1    PARMS    LGSTROUT   0.50345   5.15152   -.00013181   -.00021998
 19   MODEL1    PARMS    LGSTROUT   0.50360   5.12567   .            -.00026631
 20   MODEL1    PARMS    LGSTROUT   0.52391   5.02004   -.00032224   .
 21   MODEL1    PARMS    LGSTROUT   0.52506   5.13291   -.00011412   -.00024756

OBS    MJ_INFL      JA_INFL      SO_INFL      ND_INFL    LGSTROUT  _IN_  _P_

 17   0.00003398   .            -.00045331   .00069256      -1       5    6
 18   .            0.00008482   -.00048212   .00073978      -1       5    6
 19   0.00003667   -.00005469   -.00044083   .00063483      -1       5    6
 20   -.00006905   0.00012289   -.00052967   .00091727      -1       5    6
 21   0.00003089   0.00005413   -.00046986   .00072064      -1       6    7

OBS   _EDF_    _MSE_     _RSQ_     _ADJRSQ_     _CP_       _AIC_       _SBC_

 17    12     0.25284   0.40510    0.15722    5.00575   -20.0481   -14.7059
 18    12     0.25346   0.40365    0.15516    5.03264   -20.0042   -14.6620
 19    12     0.25362   0.40328    0.15465    5.03937   -19.9932   -14.6510
 20    12     0.27449   0.35417    0.08508    5.94785   -18.5697   -13.2275
 21    11     0.27568   0.40541    0.08109    7.00000   -18.0575   -11.8249
```

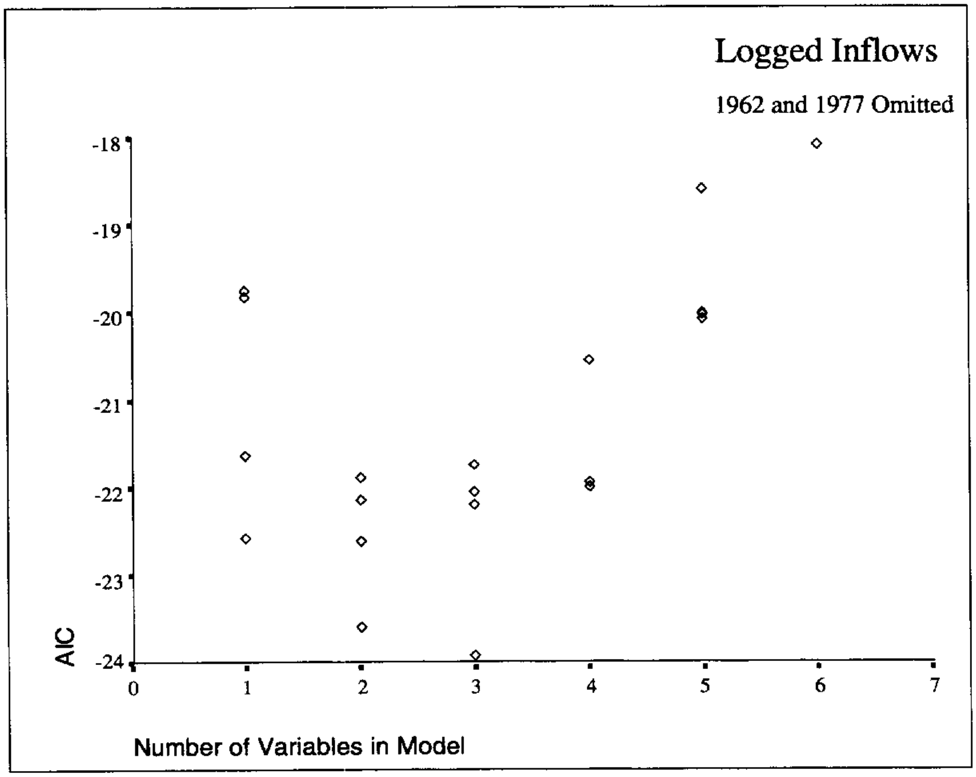
Scree Plots

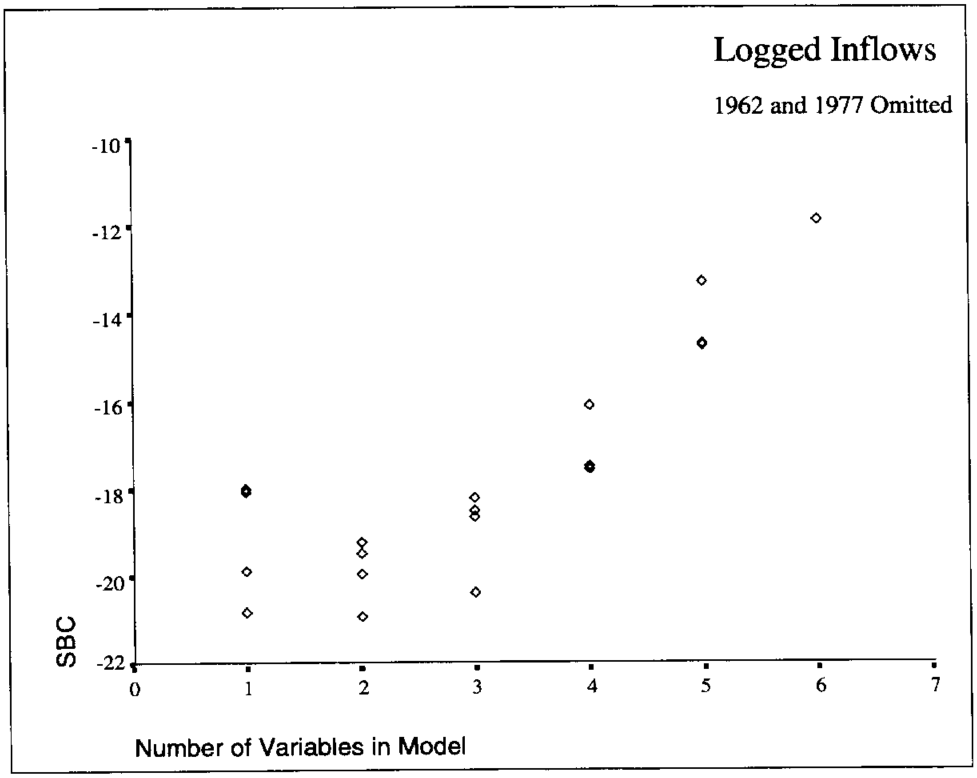

Logged Inflows
1962 and 1977 Omitted
R-Squared
.5
.4
.3
.2
.1
0.0
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Inflows
1962 and 1977 Omitted
Adjusted R-Squared
.3
.2
.1
0.0
-.1
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Inflows
1962 and 1977 Omitted
Mean Squared Error
.32
.30
.28
.26
.24
.22
.20
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Inflows
1962 and 1977 Omitted
Cp
8
7
6
5
4
3
2
1
0
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Inflows
1962 and 1977 Omitted
AIC
-18
-19
-20
-21
-22
-23
-24
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Inflows
1962 and 1977 Omitted
SBC
-10
-12
-14
-16
-18
-20
-22
0
1
2
3
4
5
6
7
Number of Variables in Model

All Variables Logged: 1962 Omitted

```
N = 19     Regression Models for Dependent Variable: LGSTROUT

        Rsq     Adj   C(p)     AIC     MSE     SBC Variables in Model
  In            Rsq

   1 0.1867 0.1389  0.911 -24.84 0.2450 -22.95 LGNDINFL
   1 0.1612 0.1118  1.410 -24.25 0.2527 -22.36 LGMAINFL
   1 0.0560 0.0005  3.468 -22.01 0.2843 -20.12 LGMJINFL
   1 0.0410 -.0155  3.762 -21.71 0.2889 -19.82 LGJAINFL
--------------------------------------------------------------
   2 0.3100 0.2238  0.499 -25.96 0.2208 -23.13 LGMAINFL LGNDINFL
   2 0.3032 0.2161  0.632 -25.78 0.2230 -22.94 LGJAINFL LGNDINFL
   2 0.2770 0.1866  1.145 -25.07 0.2314 -22.24 LGSOINFL LGNDINFL
   2 0.2634 0.1713  1.411 -24.72 0.2358 -21.89 LGJFINFL LGNDINFL
-----------------------------------------------------------------------
   3 0.3759 0.2511  1.209 -25.87 0.2130 -22.09 LGMAINFL LGSOINFL LGNDINFL
   3 0.3501 0.2201  1.714 -25.10 0.2218 -21.32 LGJAINFL LGSOINFL LGNDINFL
   3 0.3347 0.2017  2.015 -24.66 0.2271 -20.88 LGJFINFL LGSOINFL LGNDINFL
   3 0.3288 0.1945  2.131 -24.49 0.2291 -20.71 LGMAINFL LGJAINFL LGNDINFL
--------------------------------------------------------------------------------
   4 0.3816 0.2050  3.097 -24.05 0.2262 -19.32 LGMAINFL LGJAINFL LGSOINFL
                                               LGNDINFL
   4 0.3802 0.2032  3.125 -24.00 0.2267 -19.28 LGJFINFL LGMAINFL LGSOINFL
                                               LGNDINFL
   4 0.3776 0.1997  3.177 -23.92 0.2277 -19.20 LGMAINFL LGMJINFL LGSOINFL
                                               LGNDINFL
   4 0.3522 0.1671  3.674 -23.16 0.2369 -18.44 LGMJINFL LGJAINFL LGSOINFL
                                               LGNDINFL
--------------------------------------------------------------------------------
   5 0.3862 0.1501  5.008 -22.19 0.2418 -16.52 LGMAINFL LGMJINFL LGJAINFL
                                               LGSOINFL LGNDINFL
   5 0.3838 0.1468  5.055 -22.11 0.2427 -16.44 LGJFINFL LGMAINFL LGMJINFL
                                               LGSOINFL LGNDINFL
   5 0.3819 0.1442  5.092 -22.05 0.2435 -16.39 LGJFINFL LGMAINFL LGJAINFL
                                               LGSOINFL LGNDINFL
   5 0.3528 0.1039  5.662 -21.18 0.2549 -15.51 LGJFINFL LGMJINFL LGJAINFL
                                               LGSOINFL LGNDINFL
--------------------------------------------------------------------------------
   6 0.3866 0.0799  7.000 -20.20 0.2617 -13.59 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGSOINFL LGNDINFL
--------------------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

  1  MODEL1   PARMS   LGSTROUT  0.49495   1.52290      .          .
  2  MODEL1   PARMS   LGSTROUT  0.50266   8.45760      .      -0.45839
  3  MODEL1   PARMS   LGSTROUT  0.53324   7.06248      .          .
  4  MODEL1   PARMS   LGSTROUT  0.53747   6.45620      .          .
  5  MODEL1   PARMS   LGSTROUT  0.46992   4.88878      .      -0.40401
  6  MODEL1   PARMS   LGSTROUT  0.47224   3.18330      .          .
  7  MODEL1   PARMS   LGSTROUT  0.48104   1.87175      .          .
  8  MODEL1   PARMS   LGSTROUT  0.48555   3.53408  -0.52471      .
  9  MODEL1   PARMS   LGSTROUT  0.46156   4.86526      .      -0.36509
 10  MODEL1   PARMS   LGSTROUT  0.47101   3.15029      .          .
 11  MODEL1   PARMS   LGSTROUT  0.47655   3.59614  -0.45930      .
 12  MODEL1   PARMS   LGSTROUT  0.47868   4.55949      .      -0.25408
 13  MODEL1   PARMS   LGSTROUT  0.47557   4.67979      .      -0.28277
 14  MODEL1   PARMS   LGSTROUT  0.47611   4.98736  -0.15604  -0.30854
 15  MODEL1   PARMS   LGSTROUT  0.47714   4.75034      .      -0.42088
 16  MODEL1   PARMS   LGSTROUT  0.48677   3.51445      .          .
```

```
OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  LGSTROUT  _IN_  _P_  _EDF_

  1     .          .         .      0.49478     -1       1    2     17
  2     .          .         .       .          -1       1    2     17
  3  -0.26213      .         .       .          -1       1    2     17
  4     .      -0.21637      .       .          -1       1    2     17
  5     .          .         .      0.44513     -1       2    3     16
  6     .      -0.38102      .      0.61232     -1       2    3     16
  7     .          .     -0.36337   0.79151     -1       2    3     16
  8     .          .         .      0.75692     -1       2    3     16
  9     .          .     -0.31324   0.70571     -1       3    4     15
 10     .      -0.31351  -0.27206   0.81367     -1       3    4     15
 11     .          .     -0.32581   0.99030     -1       3    4     15
 12     .      -0.21108      .      0.52868     -1       3    4     15
 13     .      -0.12003  -0.28959   0.73354     -1       4    5     14
 14     .          .     -0.30825   0.78654     -1       4    5     14
 15   0.06955      .     -0.30379   0.69588     -1       4    5     14
 16  -0.06796  -0.26568  -0.28775   0.80708     -1       4    5     14

OBS   _MSE_     _RSQ_    _ADJRSQ_     _CP_      _AIC_      _SBC_

  1  0.24498   0.18669    0.13885   0.91113   -24.8385   -22.9496
  2  0.25266   0.16118    0.11183   1.41033   -24.2516   -22.3627
  3  0.28434   0.05600    0.00047   3.46793   -22.0072   -20.1183
  4  0.28887   0.04096   -0.01545   3.76211   -21.7069   -19.8181
  5  0.22082   0.31001    0.22377   0.49852   -25.9629   -23.1296
  6  0.22301   0.30318    0.21608   0.63226   -25.7756   -22.9422
  7  0.23140   0.27696    0.18658   1.14519   -25.0738   -22.2405
  8  0.23575   0.26335    0.17127   1.41141   -24.7195   -21.8862
  9  0.21303   0.37595    0.25114   1.20862   -25.8712   -22.0934
 10  0.22185   0.35012    0.22015   1.71383   -25.1008   -21.3230
 11  0.22710   0.33473    0.20168   2.01495   -24.6560   -20.8783
 12  0.22914   0.32878    0.19454   2.13141   -24.4868   -20.7090
 13  0.22617   0.38164    0.20497   3.09726   -24.0453   -19.3231
 14  0.22668   0.38024    0.20317   3.12464   -24.0023   -19.2801
 15  0.22766   0.37756    0.19972   3.17709   -23.9203   -19.1981
 16  0.23695   0.35217    0.16707   3.67388   -23.1606   -18.4384


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

 17  MODEL1   PARMS   LGSTROUT  0.49169   4.41977       .     -0.35716
 18  MODEL1   PARMS   LGSTROUT  0.49267   4.84096  -0.19491  -0.38028
 19  MODEL1   PARMS   LGSTROUT  0.49342   4.76452  -0.05557  -0.28094
 20  MODEL1   PARMS   LGSTROUT  0.50490   3.64355  -0.08584      .
 21  MODEL1   PARMS   LGSTROUT  0.51161   4.51974  -0.06828  -0.35609

OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  LGSTROUT  _IN_  _P_  _EDF_

 17   0.12361  -0.15613  -0.26567   0.72444     -1       5    6     13
 18   0.10701      .     -0.29246   0.79155     -1       5    6     13
 19     .      -0.09334  -0.29307   0.75614     -1       5    6     13
 20  -0.06476  -0.22476  -0.29256   0.84149     -1       5    6     13
 21   0.12557  -0.12390  -0.26957   0.75206     -1       6    7     12

OBS   _MSE_     _RSQ_    _ADJRSQ_     _CP_      _AIC_      _SBC_

 17  0.24176   0.38622    0.15015   5.00774   -22.1864   -16.5198
 18  0.24272   0.38379    0.14679   5.05521   -22.1115   -16.4448
 19  0.24346   0.38190    0.14417   5.09212   -22.0534   -16.3867
 20  0.25493   0.35279    0.10387   5.66163   -21.1789   -15.5123
 21  0.26174   0.38661    0.07992   7.00000   -20.1987   -13.5876
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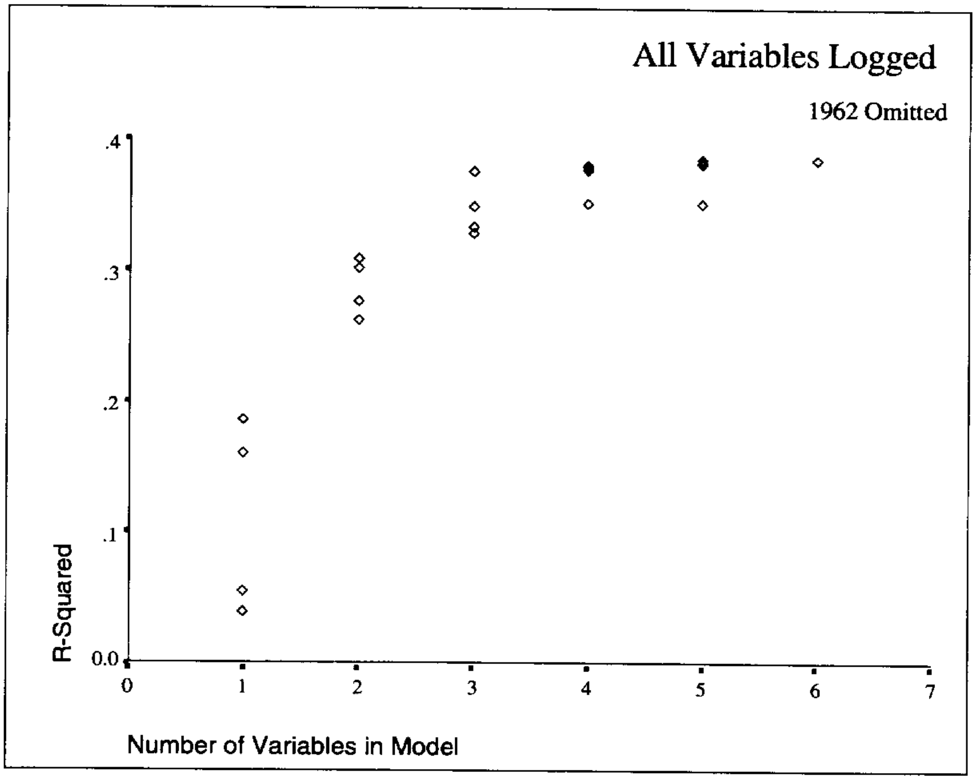
Scree Plots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0
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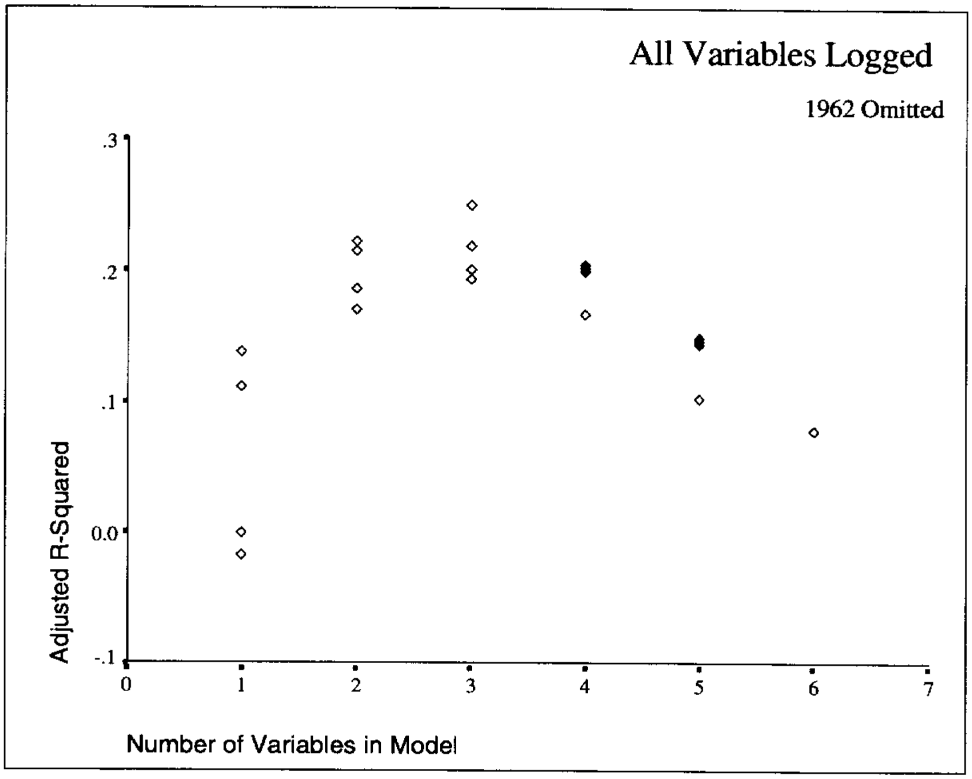
2
3
4
5
6
7
Number of Variables in Model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Adjusted R-Squared
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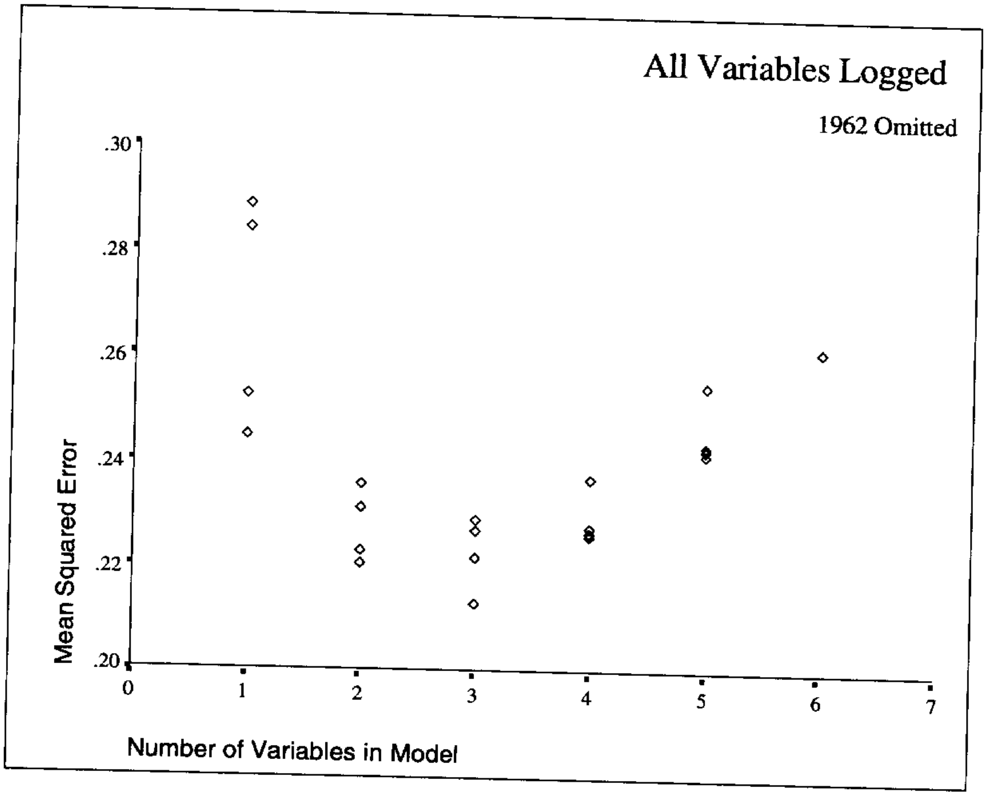
.1
0.0
-.1
0
1
2
3
4
5
6
7
Number of Variables in Model


All Variables Logged
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Mean Squared Error
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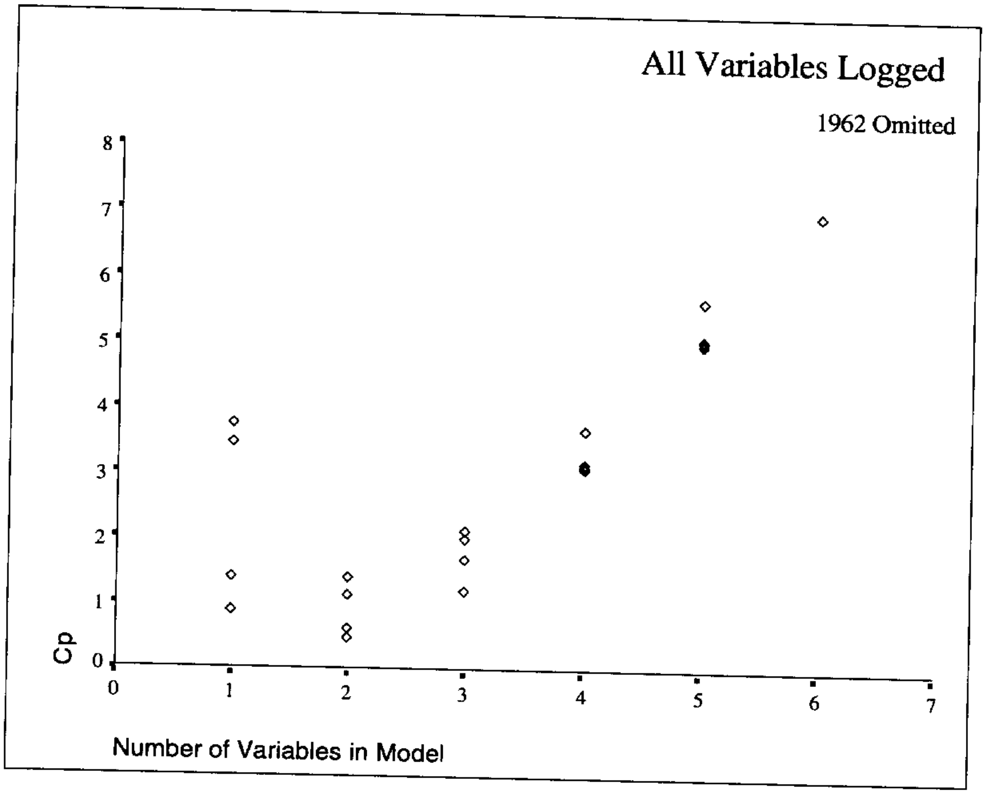
.26
.24
.22
.20
0
1
2
3
4
5
6
7
Number of Variables in Model


All Variables Logged
1962 Omitted
Cp
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7
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5
4
3
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1
0
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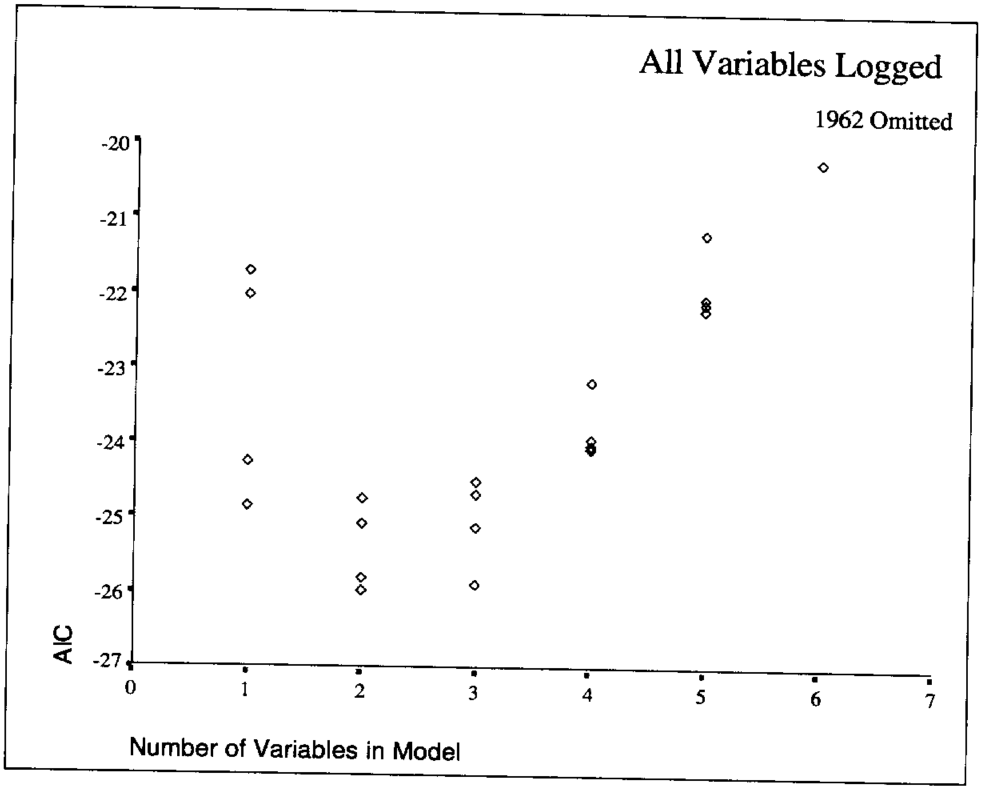
1
2
3
4
5
6
7
Number of Variables in Model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AIC
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-21
-22
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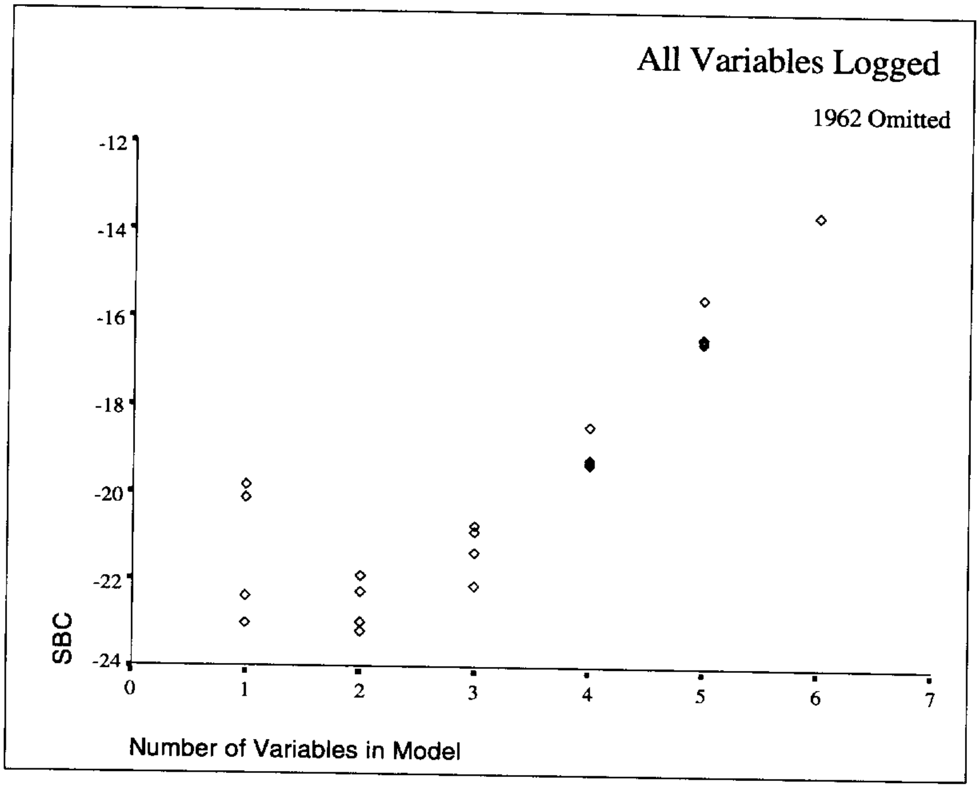
-24
-25
-26
-27
0
1
2
3
4
5
6
7
Number of Variables in Model


All Variables Logged
1962 Omitted
SBC
-12
-14
-16
-18
-20
-22
-24
0
1
2
3
4
5
6
7
Number of Variables in Model

All Variables Logged: 1962 and 1977 Omitted

```
N = 18     Regression Models for Dependent Variable: LGSTROUT

        Rsq      Adj   C(p)     AIC      MSE      SBC Variables in Model
 In              Rsq

  1 0.2460 0.1988  2.239 -23.78 0.2404 -22.00 LGNDINFL
  1 0.1585 0.1059  4.124 -21.81 0.2682 -20.02 LGMAINFL
  1 0.0554 -.0037  6.344 -19.72 0.3011 -17.94 LGMJINFL
  1 0.0389 -.0212  6.699 -19.41 0.3064 -17.63 LGJAINFL
-------------------------------------------------------------
  2 0.3808 0.2983  1.335 -25.33 0.2105 -22.66 LGSOINFL LGNDINFL
  2 0.3640 0.2792  1.697 -24.85 0.2162 -22.18 LGJFINFL LGNDINFL
  2 0.3638 0.2790  1.701 -24.84 0.2163 -22.17 LGJAINFL LGNDINFL
  2 0.3464 0.2593  2.076 -24.36 0.2222 -21.68 LGMAINFL LGNDINFL
----------------------------------------------------------------------
  3 0.4801 0.3687  1.198 -26.47 0.1894 -22.91 LGJFINFL LGSOINFL LGNDINFL
  3 0.4472 0.3287  1.906 -25.37 0.2014 -21.81 LGMAINFL LGSOINFL LGNDINFL
  3 0.4444 0.3253  1.966 -25.28 0.2024 -21.72 LGJAINFL LGSOINFL LGNDINFL
  3 0.4200 0.2957  2.491 -24.50 0.2113 -20.94 LGMJINFL LGSOINFL LGNDINFL
-----------------------------------------------------------------------------
  4 0.4843 0.3257  3.106 -24.62 0.2023 -20.17 LGJFINFL LGMAINFL LGSOINFL
                                              LGNDINFL
  4 0.4815 0.3220  3.166 -24.52 0.2034 -20.07 LGJFINFL LGJAINFL LGSOINFL
                                              LGNDINFL
  4 0.4801 0.3201  3.197 -24.47 0.2040 -20.02 LGJFINFL LGMJINFL LGSOINFL
                                              LGNDINFL
  4 0.4578 0.2910  3.676 -23.72 0.2127 -19.27 LGMAINFL LGJAINFL LGSOINFL
                                              LGNDINFL
-----------------------------------------------------------------------------
  5 0.4881 0.2747  5.026 -22.75 0.2176 -17.41 LGJFINFL LGMAINFL LGJAINFL
                                              LGSOINFL LGNDINFL
  5 0.4865 0.2726  5.059 -22.70 0.2182 -17.35 LGJFINFL LGMAINFL LGMJINFL
                                              LGSOINFL LGNDINFL
  5 0.4818 0.2659  5.160 -22.53 0.2202 -17.19 LGJFINFL LGMJINFL LGJAINFL
                                              LGSOINFL LGNDINFL
  5 0.4591 0.2337  5.650 -21.76 0.2299 -16.42 LGMAINFL LGMJINFL LGJAINFL
                                              LGSOINFL LGNDINFL
-----------------------------------------------------------------------------
  6 0.4892 0.2106  7.000 -20.79 0.2368 -14.56 LGJFINFL LGMAINFL LGMJINFL
                                              LGJAINFL LGSOINFL LGNDINFL
-----------------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

  1  MODEL1   PARMS   LGSTROUT  0.49026   0.70460      .          .
  2  MODEL1   PARMS   LGSTROUT  0.51793   8.44028      .      -0.45566
  3  MODEL1   PARMS   LGSTROUT  0.54874   7.05477      .          .
  4  MODEL1   PARMS   LGSTROUT  0.55351   6.42996      .          .
  5  MODEL1   PARMS   LGSTROUT  0.45883   0.86200      .          .
  6  MODEL1   PARMS   LGSTROUT  0.46502   2.99931  -0.66747      .
  7  MODEL1   PARMS   LGSTROUT  0.46509   2.36551      .          .
  8  MODEL1   PARMS   LGSTROUT  0.47140   3.93624      .      -0.36838
  9  MODEL1   PARMS   LGSTROUT  0.43521   2.96186  -0.61397      .
 10  MODEL1   PARMS   LGSTROUT  0.44877   3.50861      .      -0.30389
 11  MODEL1   PARMS   LGSTROUT  0.44991   2.09954      .          .
 12  MODEL1   PARMS   LGSTROUT  0.45967   2.70467      .          .
 13  MODEL1   PARMS   LGSTROUT  0.44979   3.47225  -0.50150  -0.10277
 14  MODEL1   PARMS   LGSTROUT  0.45101   3.02422  -0.73971      .
 15  MODEL1   PARMS   LGSTROUT  0.45164   2.98347  -0.60893      .
 16  MODEL1   PARMS   LGSTROUT  0.46120   3.20218      .      -0.18855
```

```
OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  LGSTROUT  _IN_  _P_  _EDF_

  1    .         .         .        0.61459     -1       1    2     16
  2    .         .         .         .          -1       1    2     16
  3 -0.26025     .         .         .          -1       1    2     16
  4    .      -0.21158     .         .          -1       1    2     16
  5    .         .      -0.45510  1.02715     -1       2    3     15
  6    .         .         .      0.98666     -1       2    3     15
  7    .      -0.38248     .      0.73343     -1       2    3     15
  8    .         .         .      0.54551     -1       2    3     15
  9    .         .      -0.42354  1.34079     -1       3    4     14
 10    .         .      -0.39930  0.91958     -1       3    4     14
 11    .      -0.29209  -0.36582  1.03698     -1       3    4     14
 12 -0.21969     .      -0.45760  1.00866     -1       3    4     14
 13    .         .      -0.41045  1.24696     -1       4    5     13
 14    .       0.08678  -0.44360  1.40210     -1       4    5     13
 15 -0.00463     .      -0.42385  1.33782     -1       4    5     13
 16    .      -0.16477  -0.37011  0.96596     -1       4    5     13

OBS   _MSE_     _RSQ_     _ADJRSQ_     _CP_       _AIC_      _SBC_

  1  0.24036   0.24597    0.19884    2.23932   -23.7815   -22.0007
  2  0.26825   0.15847    0.10587    4.12386   -21.8052   -20.0244
  3  0.30111   0.05537   -0.00367    6.34430   -19.7249   -17.9442
  4  0.30637   0.03888   -0.02119    6.69941   -19.4134   -17.6327
  5  0.21052   0.38083    0.29828    1.33478   -25.3285   -22.6574
  6  0.21624   0.36402    0.27923    1.69684   -24.8463   -22.1752
  7  0.21631   0.36381    0.27899    1.70137   -24.8404   -22.1693
  8  0.22222   0.34644    0.25930    2.07559   -24.3554   -21.6842
  9  0.18941   0.48007    0.36866    1.19752   -26.4728   -22.9114
 10  0.20139   0.44718    0.32872    1.90596   -25.3686   -21.8071
 11  0.20241   0.44437    0.32531    1.96637   -25.2775   -21.7160
 12  0.21129   0.42000    0.29572    2.49122   -24.5048   -20.9434
 13  0.20231   0.48433    0.32566    3.10582   -24.6209   -20.1690
 14  0.20341   0.48152    0.32199    3.16637   -24.5230   -20.0711
 15  0.20398   0.48008    0.32011    3.19729   -24.4732   -20.0214
 16  0.21270   0.45784    0.29102    3.67635   -23.7191   -19.2673


OBS  _MODEL_  _TYPE_  _DEPVAR_    _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

 17  MODEL1   PARMS   LGSTROUT  0.46646   3.73145  -0.67955  -0.13379
 18  MODEL1   PARMS   LGSTROUT  0.46716   3.36622  -0.52998  -0.16014
 19  MODEL1   PARMS   LGSTROUT  0.46929   3.15931  -0.73242     .
 20  MODEL1   PARMS   LGSTROUT  0.47948   3.08851     .       -0.22871
 21  MODEL1   PARMS   LGSTROUT  0.48664   3.61932  -0.67910  -0.17333

OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  LGSTROUT  _IN_  _P_  _EDF_

 17     .      0.14631  -0.44032  1.32201     -1       5    6     12
 18  0.08382     .      -0.39750  1.24825     -1       5    6     12
 19 -0.02665   0.10177  -0.44886  1.39562     -1       5    6     12
 20  0.06442  -0.18292  -0.35646  0.95777     -1       5    6     12
 21  0.06335   0.12826  -0.42685  1.31372     -1       6    7     11

OBS   _MSE_     _RSQ_     _ADJRSQ_     _CP_       _AIC_      _SBC_

 17  0.21759   0.48805    0.27474    5.02563   -22.7513   -17.4091
 18  0.21824   0.48651    0.27256    5.05882   -22.6972   -17.3550
 19  0.22023   0.48183    0.26593    5.15966   -22.5338   -17.1916
 20  0.22990   0.45907    0.23368    5.64985   -21.7600   -16.4178
 21  0.23681   0.48924    0.21065    7.00000   -20.7932   -14.5606
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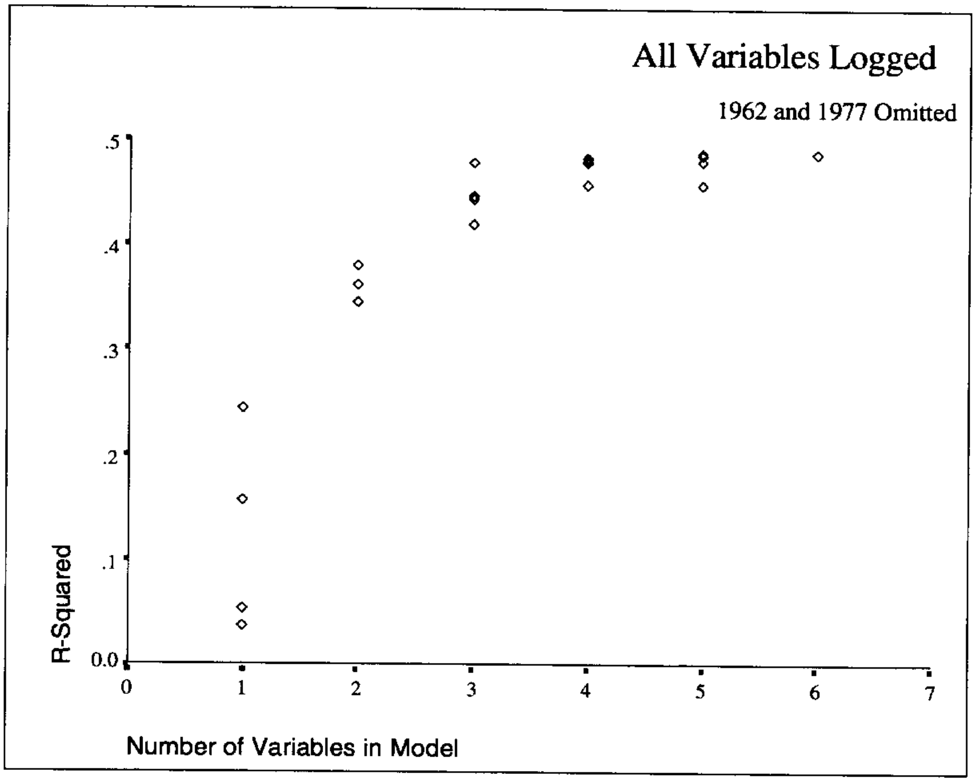
Scree Plots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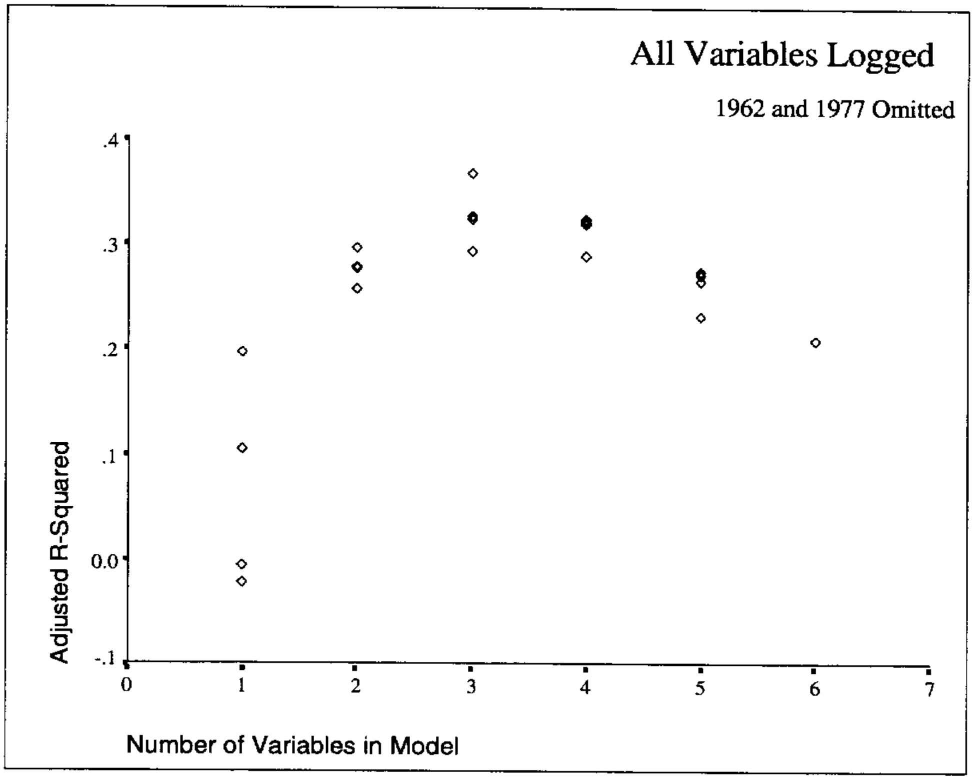
4
5
6
7
Number of Variables in Model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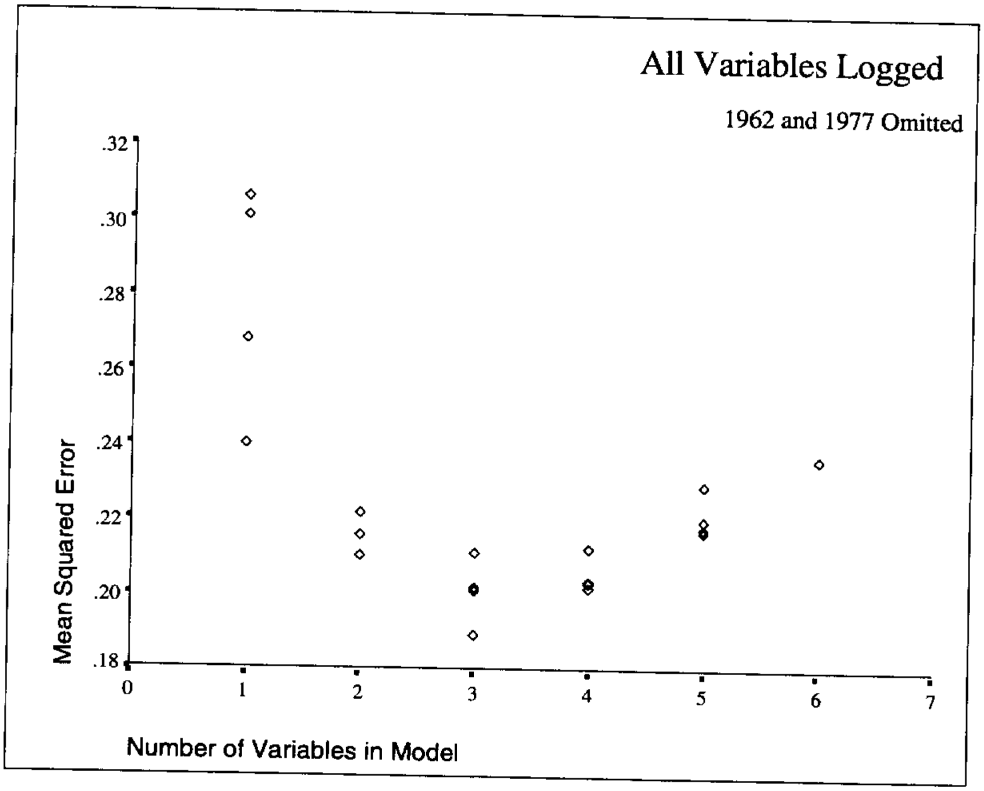
Number of Variables in Model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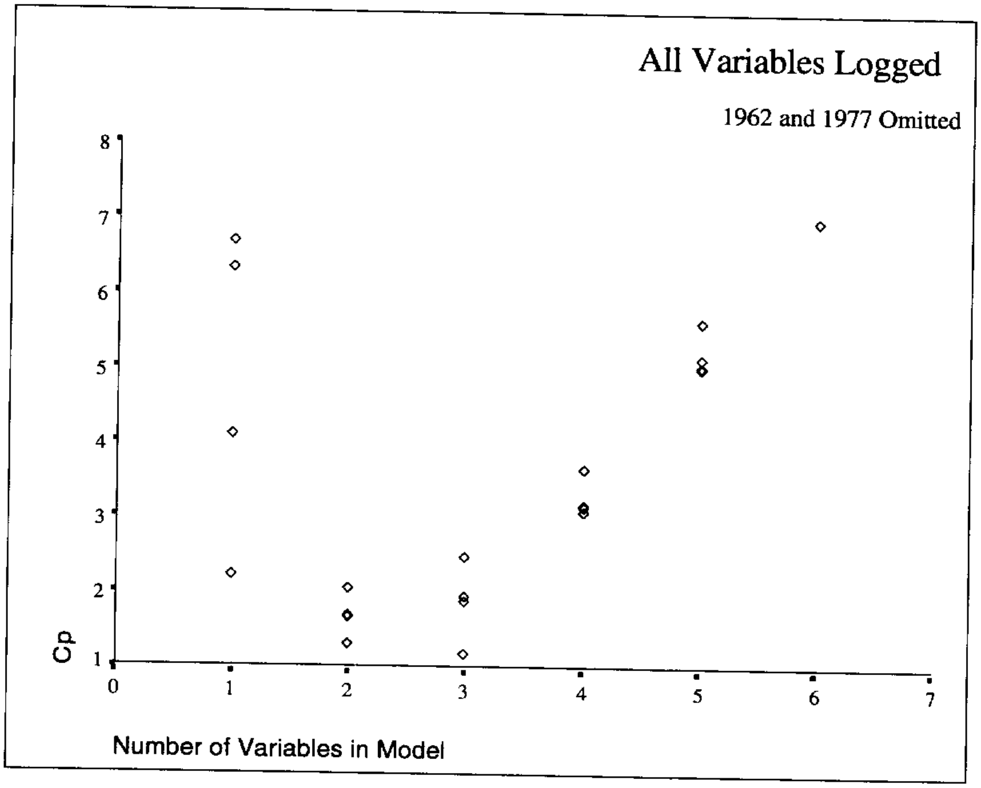
7
Number of Variables in Model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Cp
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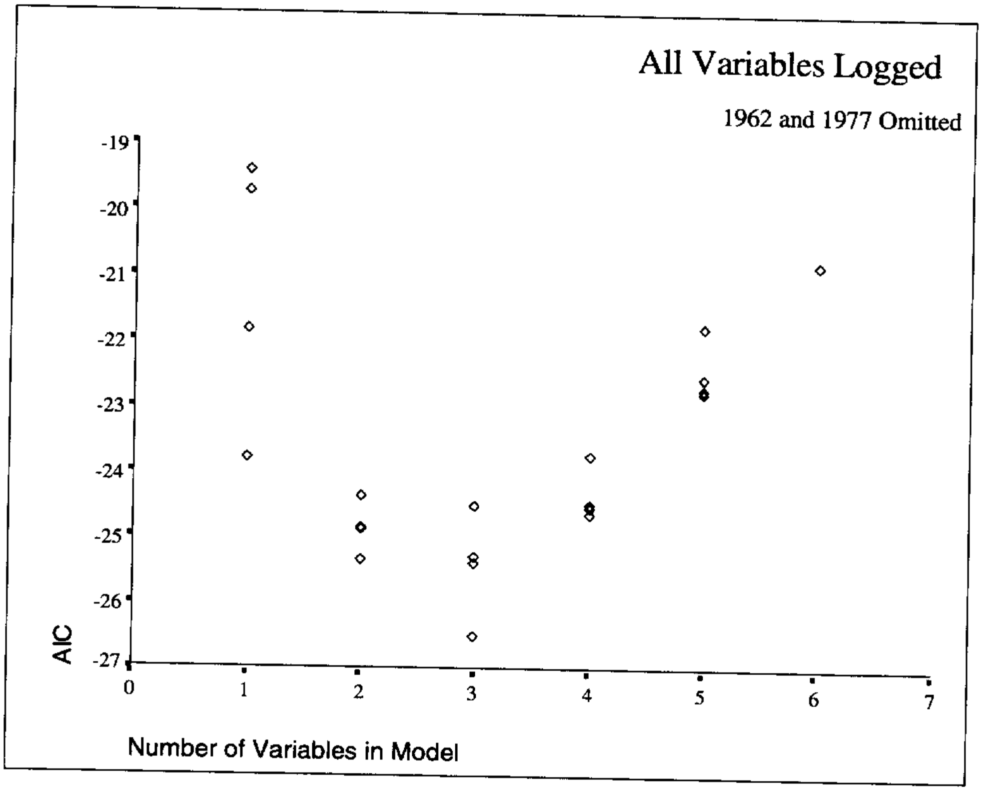
Number of Variables in Model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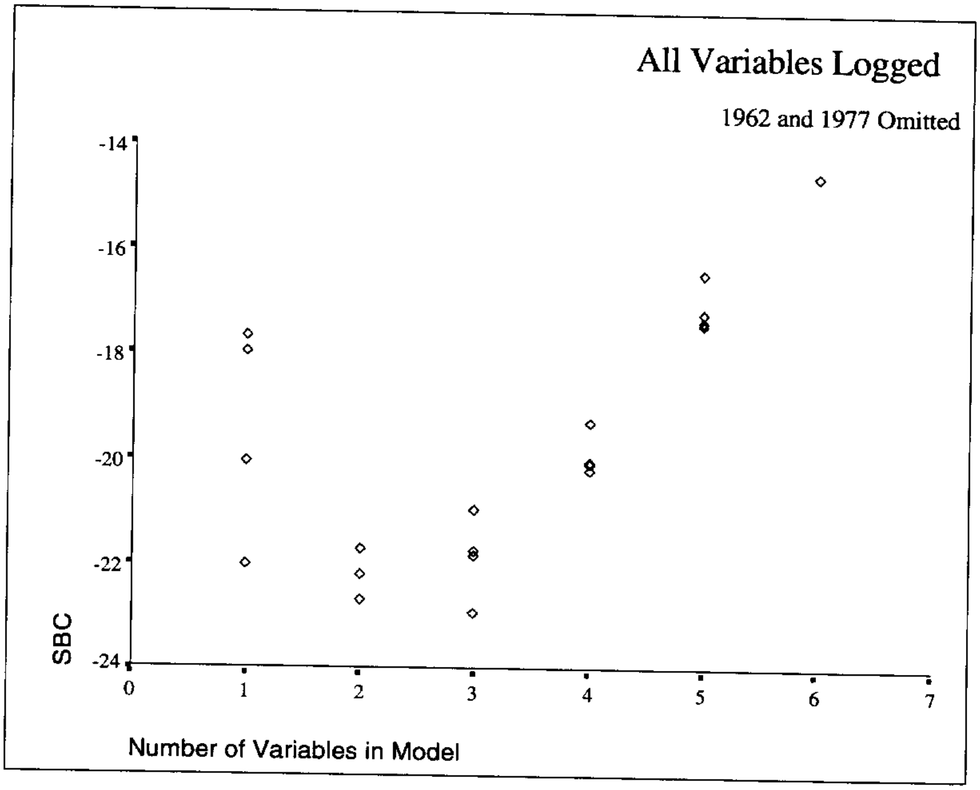
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SBC
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-18
-20
-22
-24
0
1
2
3
4
5
6
7
Number of Variables in Model

Black Drum Harvests in Galveston Bay: A Regression Analysis

Harvest vs. Freshwater Inflows

F. Michael Speed
Jacqueline Kiffe

Department of Statistics
Texas A&M University

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Table of Contents

Summary Report

Description of the Problem

Bimonthly freshwater inflows into Galveston Bay were recorded for the years 1962 to 1987. These variables, and various transformations of them, were used to construct a model for the annual harvest of black drum.

Constructing Models—General Discussion

Stability of coefficient estimates and accuracy of predicted values are primary goals in constructing models for prediction. To this end, the data must be examined from three points of view: individual observations (to detect outliers or influential points); variables, individually and in groups (to select an optimal set of predictors); and the interaction of these two, which produces the overall structure of the data set (to determine whether multicollinearity is present or not). The first two of these were examined by both graphic and quantitative means; the third by quantitative means only.

Detecting Influential Points and Outliers

The structures of individual variables were examined via box plots and histograms, as well as by all the usual numerical measures. For each pair of variables, 99% prediction ellipses were plotted in a further effort to look for unusual points. For example, suppose large values of Variable A are generally associated with large values of Variable B. If an observation consisted of a large value for Variable A but a small value for Variable B, that point would be considered unusual, even though it was well within the range of data for both variables and could not be considered an outlier.

In addition, a number of residual analysis techniques were employed. A large *residual* indicates a point not well-fit by the model. The *deleted residual*, however, is somewhat more useful in the search for influential points. The model is fitted without a given observation, and the predicted response and corresponding residual are calculated for that observation. The *Studentized deleted residual* is scaled to have a Student's t distribution. Histograms and normal P-P plots of the residuals were also examined.

Other quantities, such as the Mahalanobis distance, Cook's distance, the leverage value, standardized values for the Dffits (to measure the influence of a given observation on the predicted response) and the Dfbetas (to measure the influence of a given observation on the calculated coefficients) were also used to build a general picture of the influence of individual points. Plots were made of the standardized Dffits value for each model against the Dfbeta values for each predictor in the model. Points which were extreme indicated observations which had strong effects on both predicted values and coefficient estimates.

Variable Selection

For each regression, residuals were plotted against each of the independent variables to look for nonlinear relationships between the response variable and individual predictors. Partial residual plots were employed to examine the overall relationship between the response and individual predictors. A partial residual is a corollary to the deleted residual. That is, the model is fitted without a given variable and the predicted response and corresponding residual are calculated for each observation. This seeks to answer the question, "What is the relationship of this predictor to the response variable, taking all other variables into account?" Thus, it examines the marginal relationship of a given predictor to the response.

Numerous measures have been developed over the years to assess the adequacy of a given model. We examined a number of these, including R^2 and mean squared error (MSE), and several others which directly incorporate penalties for having too many predictors in the model, such as adjusted R^2, C_p, AIC, and SBC. It is well-established that too many predictors in a model can lead to bad prediction, just as too few can, and these measures are used as part of the attempt to find an optimal model.

Multicollinearity

Multicollinearity arises when one or more variables are nearly closely approximated by linear combinations of the remaining variables, resulting in unstable coefficient estimates. The variance inflation factor (VIF) was calculated for each coefficient estimate to measure this instability, which is not usually considered profound for VIF's less that 10. No problems were found with this data. Additionally, the condition index (a ratio of eigenvalues of the covariance matrix, with the largest eigenvalue always on top) was calculated. A ratio greater than 30 is considered cause for concern. Again, no evidence of multicollinearity was found.

Other Procedures

Several other miscellaneous diagnostics, including the Durbin-Watson test for serial autocorrelation, were performed, and no general problems were detected. The Box-Cox procedure, used to find a transformation to normality, was also performed.

How the Final Model Was Chosen

Selecting the Data Set Used. First, the variables were explored thoroughly, individually and in pairs, in a first effort to detect outliers. The SAS® programming language allows a number of diagnostics to be calculated for a group of models on a given data set without actually performing a formal regression, thus allowing one to examine a large number of models quite efficiently. In addition to the untransformed data, three transformed data sets were selected for this procedure, based on prior experience. Before we proceeded, the Box-Cox procedure was performed to find if a transformation to normality was suggested. The log transform was suggested; this was already one of our choices for transformed data sets, so it involved adding no additional analyses. At this point, there were four data sets for which the diagnostic series was calculated:

1. Untransformed data
2. Natural log of inflow variables; harvest untransformed
3. Natural log of harvest; inflows untransformed
4. Natural log of all variables

Selecting the Points to be Omitted. The maximum R^2 for models from these four data sets were 0.34, 0.46, 0.41, and 0.56, respectively. Thus, there was no real competitor to the data set with all variables logged. Therefore, the full regression with all diagnostics was performed only for the model containing all the variables from the fourth data set, that is, natural log of black drum harvest regressed against all the logged inflow variables.

The observations flagged as potentially influential are given in the summary table below. Only 1971 garnered multiple flags. Therefore, the regression diagnostics were run for the fourth data set with 1971 alone omitted, and 1971 in conjunction with each of the other five points. Deleting 1971 alone raised the maximum R^2 to 0.73 (from 0.56), but deleting both 1971 and 1967 raised it to 0.81. If 1983 is removed as well, the R^2 jumps to 0.86. No other combination of removals of the same number of points produced as much improvement in fit, and removing additional points resulted in fit that was either only marginally better or actually worse. Raw fit, however, is only one concern. The other is the danger which comes with hand-selecting data. Therefore, we removed only the three points 1967, 1971, and 1983 before continuing.

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	Total
Data Set 4									
1963							1		1
***1967**							1		1
***1971**							1	2	3
1981			1						1
***1983**							1		1
1984	1								1

Summary of points flagged by diagnostic measures

Key to Abbreviations:

BOX	Box plot
SRE	Studentized residual
SDR	Studentized deleted residual
LEV	Leverage value
MAH	Mahalanobis distance
COO	Cook's distance
SDF	Standardized Dffits value
SDB	Standardized Dfbeta value

Selecting the Final Model. This analysis was unique in two regards. First, it was immediately apparent that no other transformation of the data had as much to offer in the way of a model as that in which all variables were logged; no other set even came close in terms of performance. Second, in choosing among the possible models for that data set, no model came close to that containing all the variables. So we came straight to our final candidate model. However, there was a fly in the ointment—multicollinearity. The condition index for the model was 119.625, and this time it was *not* an artifact of the data.

Thus, it was decided to do an incomplete principal components analysis (IPC), and compare the abilities of the two models (ordinary least squares, or OLS, and IPC) when it came to prediction. The procedure used was as follows: First, the three suspect years 1967, 1971, and 1983 were deleted. Then the remaining 23 data points were divided into two subsets nonrandomly by simply allocating every other observation to each set. Therefore, subset 1 had 12 points and subset 2 had 11 points. For *each* subset, OLS and IPC coefficients were calculated separately, producing two separate models. Then the models for subset 1 were used to make predictions for the observed harvest for subset 2, and vice versa. Therefore, each model was tested on a data set that was not used to develop it. These predicted values were transformed back to the original units (from the log scale), and the squared residuals calculated.

The results showed that IPC analysis was better at prediction for both data subsets. Therefore, it is our final choice for a model. However, we present the results from both IPC regression and OLS regression, in order that the researcher may choose. Because the output format of the program used to run the former analysis is less user-friendly than that used to obtain the results for the latter, some of the IPC results are presented twice—first in a format similar to that for the OLS model for the convenience of the reader, then in native format with full output information. The OLS model results follow that, with a comparison of the results for the two models in tabular form afterward.

Descriptive Statistics for Subset 1 Using Models Developed from Subset 2

	N	Minimum	Maximum	Mean	Std. Deviation
Residuals for IPC	*12*	*3.9177*	*3448.5200*	*936.241064*	*1140.903194*
Residuals for OLS	*12*	*.0038*	*6649.5108*	*1384.226361*	*2090.403362*

Descriptive Statistics for Subset 2 Using Models Developed from Subset 1

	N	Minimum	Maximum	Mean	Std. Deviation
Residuals for IPC	*11*	*22.2857*	*10644.6022*	*1251.021551*	*3126.069940*
Residuals for OLS	*11*	*14.0331*	*11126.0740*	*1309.219817*	*3283.266992*

Model—Incomplete Principal Components

$$
\begin{aligned}
\text{Ln(Black Drum Harvest)} = 9.1197 &- 2.55030 * \text{Ln(January-February Inflows)} \\
&+ 1.64765 * \text{Ln(March-April Inflows)} \\
&- 1.35222 * \text{Ln(May-June Inflows)} \\
&+ 1.79922 * \text{Ln(July-August Inflows)} \\
&- 0.97541 * \text{Ln(September-October Inflows)} \\
&+ 0.93640 * \text{Ln(November-December Inflows)}
\end{aligned}
$$

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate
	Entered	Removed				
1	*Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows, Ln(September-October Inflows)*[c,d]	.	*.924*	*.854*	*.811*	*.347000*

a. Dependent Variable: Ln(Black Drum Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows, Ln(September-October Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*11.305*	*6*	*1.884*	*15.653*	*.000*[b]
	Residual	*1.926*	*16*	*.120*		
	Total	*13.231*	*22*			

a. Dependent Variable: Ln(Black Drum Harvest)

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows, Ln(September-October Inflows)

Coefficients[a]

Model		Coefficients B
1	(Constant)	9.120
	Ln(January-February Inflows)	-2.550
	Ln(March-April Inflows)	1.648
	Ln(May-June Inflows)	-1.352
	Ln(July-August Inflows)	1.799
	Ln(September-October Inflows)	-.975
	Ln(November-December Inflows)	.936

a. Dependent Variable: Ln(Black Drum Harvest)

Collinearity Diagnostics[a]

				Variance Proportions					
Model	Dimension	Eigenvalue	Condition Index	Ln(January-February Inflows)	Ln(March-April Inflows)	Ln(May-June Inflows)	Ln(July-August Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	1.449	1.000	-.17	.55	.51	.01	-.30	-.56
	2	.553	2.620	-.53	.08	.46	-.35	.06	.62
	3	.341	4.249	-.62	.23	-.36	.23	.58	-.22
	4	.272	5.327	.31	.58	-.35	-.65	.16	.06
	5	.126	11.500	-.14	.41	-.39	.41	-.57	.40

a. Dependent Variable: Ln(Black Drum Harvest)

```
BMDP4R - REGRESSION ON PRINCIPAL COMPONENTS AND RIDGE REGRESSION
VARIABLES TO BE USED
     1 year        2 lblkdrum    3 lgjfinfl    4 lgmainfl     5 lgmjinfl
     6 lgjainfl    7 lgsoinfl    8 lgndinfl

  DEPENDENT VARIABLE. . . . .   2
INDEPENDENT VARIABLE(S) . . .   3    4    5    6    7    8
    MODEL SPECIFICATION . . . WITH INTERCEPT

  COMPUTATION BASED ON CORRELATION MATRIX OF INDEPENDENT VARIABLES.
  PRINCIPAL COMPONENTS ARE ENTERED IN ORDER OF
  MAGNITUDE OF CORRELATIONS WITH DEPENDENT VARIABLE.

  MAXIMUM NUMBER OF COMPONENTS TO ENTER . . . .        6
  NUMBER OF COMPONENTS TO ENTER LIMITED BY
  MAGNITUDE OF CORRELATION GREATER THAN . . . .   0.0100

NUMBER OF CASES READ. . . . . . . . . . . . . .       23
```

```
CORRELATION MATRIX

                   lblkdrum    lgjfinfl    lgmainfl    lgmjinfl    lgjainfl    lgsoinfl
                          2           3           4           5           6           7

lblkdrum    2      1.0000
lgjfinfl    3     -0.2691      1.0000
lgmainfl    4      0.3257      0.3570      1.0000
lgmjinfl    5      0.0642      0.3105      0.7420      1.0000
lgjainfl    6      0.2869      0.6991      0.5037      0.4960      1.0000
lgsoinfl    7      0.0329      0.6332      0.3530      0.2751      0.7142      1.0000
lgndinfl    8      0.0091      0.4358     -0.0573      0.0870      0.3439      0.6495

                   lgndinfl
                          8

lgndinfl    8      1.0000

EIGENVALUES

      3.25872      1.44860      0.55348      0.34104      0.27195      0.12622

*** NOTE     *** THE LAST     1 OF THE ABOVE EIGENVALUES IS (ARE) SMALLER THAN
                 THE LOWER LIMIT,   0.20E+00.  RESULTS FOR THIS (THOSE)
                 COMPONENT(S) MAY NOT BE MEANINGFUL.


CUMULATIVE PROPORTION OF TOTAL VARIANCE OF INDEPENDENT VARIABLES

      0.54312      0.78455      0.87680      0.93364      0.97896      1.00000


EIGENVECTORS
                        1           2           3           4           5           6
  3 lgjfinfl       0.4453     -0.1696     -0.5279     -0.6164      0.3078     -0.1400
  4 lgmainfl       0.3613      0.5511      0.0822      0.2335      0.5775      0.4135
  5 lgmjinfl       0.3555      0.5088      0.4591     -0.3608     -0.3471     -0.3915
  6 lgjainfl       0.4890      0.0072     -0.3475      0.2328     -0.6486      0.4065
  7 lgsoinfl       0.4652     -0.2996      0.0605      0.5784      0.1630     -0.5737
  8 lgndinfl       0.2987     -0.5647      0.6159     -0.2160      0.0635      0.4023
DEPENDENT VARIABLE     2 lblkdrum

TOTAL SUM OF SQUARES          13.230783
  DEGREES OF FREEDOM        22
         MEAN SQUARE           0.601399


CORRELATION BETWEEN PRINCIPAL COMPONENTS AND DEPENDENT VARIABLE
                  0.09916      0.20344      0.14279      0.51818     -0.18635
                  0.69959

REGRESSION COEFFICIENTS OF PRINCIPAL COMPONENTS
  CONSTANT        COMPONENTS
 (MEAN OF Y)
    3.93444       0.04260      0.13108      0.14884      0.68812     -0.27711
                  1.52709


COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION

 INDEX OF   RESIDUAL         F-VALUES
COMPONENTS   SUM  OF REGRESSION COMPONENT
 ENTERING    SQUARES     MODEL    TO ENTER   R2        CONSTANT      VARIABLES
                                                                  3 lgjfinfl
    6        6.75536     20.13     20.13  0.4894        1.7716      -0.6617
    4        3.20274     31.31     22.18  0.7579        8.2407      -1.9744
    2        2.65517     25.23      3.92  0.7993        7.9394      -2.0431
    5        2.19573     22.62      3.77  0.8340        9.4384      -2.3071
    3*       1.92597     19.96      2.38  0.8544        9.1197      -2.5503
    1        0.00000      0.00      0.00  1.0000        7.4572      -2.4916
```

```
COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION
(CONTINUED)
           4 lgmainfl  5 lgmjinfl  6 lgjainfl  7 lgsoinfl  8 lgndinfl
    6        1.45188    -1.31480     1.22749    -1.54387     1.23514
    4        1.82140    -1.86072     1.54423    -0.84244     0.93629
    2        1.98750    -1.71405     1.54610    -0.91166     0.78749
    5        1.61950    -1.50250     1.90149    -0.99128     0.75210
    3*       1.64765    -1.35222     1.79922    -0.97541     0.93640
    1        1.68304    -1.31892     1.84041    -0.94049     0.96198

-----------------------------------------------------------------------
   * PREDICTED AND RESIDUAL VALUES ARE CALCULATED USING THE
     COEFFICIENTS BASED ON THESE   5 COMPONENTS, SINCE
     THOSE LISTED BELOW DO NOT PASS THE ENTRANCE LIMITS.
-----------------------------------------------------------------------
```

Model—Ordinary Least Squares

$$\begin{aligned} \text{Ln(Black Drum Harvest)} = 7.457 &- 2.492*\text{Ln(January-February Inflows)} \\ &+ 1.683*\text{Ln(March-April Inflows)} \\ &- 1.319*\text{Ln(May-June Inflows)} \\ &+ 1.840*\text{Ln(July-August Inflows)} \\ &- 0.940*\text{Ln(September-October Inflows)} \\ &+ 0.962*\text{Ln(November-December Inflows)} \end{aligned}$$

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows)*[c,d]	.	*.930*	*.864*	*.813*	*.335022*	*2.437*

a. Dependent Variable: Ln(Black Drum Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows, Ln(September-October Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*11.435*	*6*	*1.906*	*16.980*	*.000*[b]
	Residual	*1.796*	*16*	*.112*		
	Total	*13.231*	*22*			

a. Dependent Variable: Ln(Black Drum Harvest)

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows)

Coefficients[a]

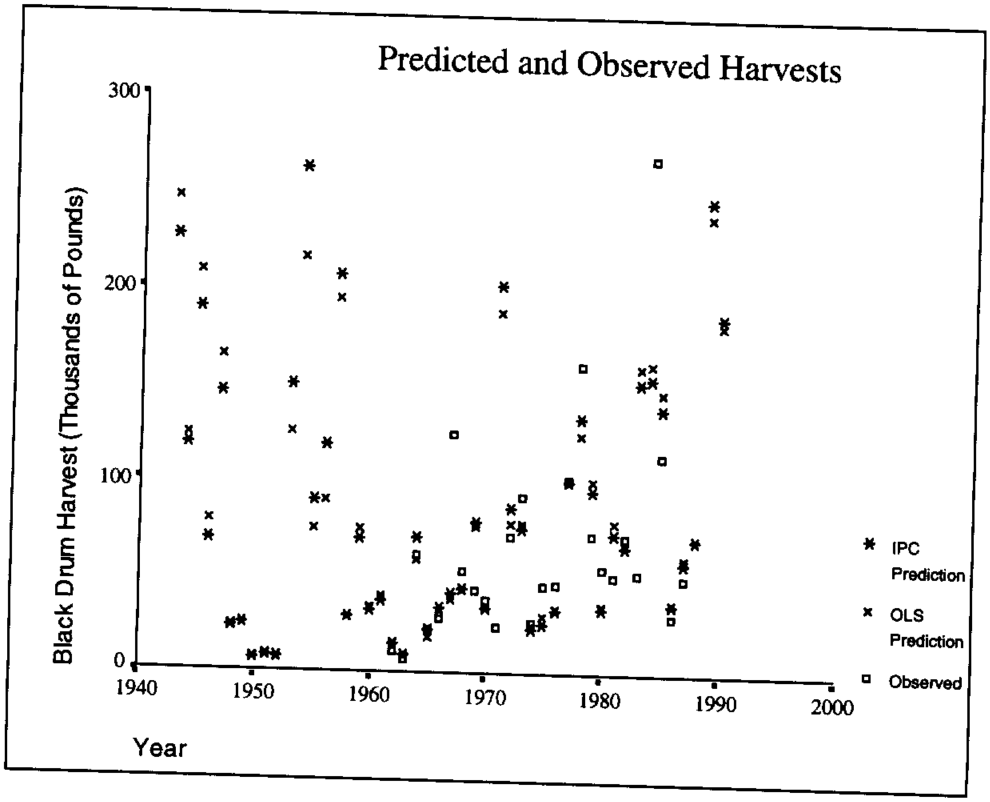
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	7.457	2.098		3.554	.003	3.009	11.905		
	Ln(January-February Inflows)	-2.492	.328	-1.038	-7.596	.000	-3.187	-1.796	.454	2.202
	Ln(March-April Inflows)	1.683	.285	.944	5.914	.000	1.080	2.286	.333	3.003
	Ln(May-June Inflows)	-1.319	.255	-.773	-5.170	.000	-1.860	-.778	.379	2.638
	Ln(July-August Inflows	1.840	.257	1.200	7.166	.000	1.296	2.385	.302	3.306
	Ln(September-October Inflows)	-.940	.246	-.688	-3.822	.002	-1.462	-.419	.262	3.821
	Ln(November-December Inflows)	.962	.221	.617	4.354	.000	.494	1.430	.422	2.367

a. Dependent Variable: Ln(Black Drum Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions						
				(Constant)	Ln(January-February Inflows)	Ln(March-April Inflows)	Ln(May-June Inflows)	Ln(July-August Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	6.986	1.000	.00	.00	.00	.00	.00	.00	.00
	2	5.952E-03	34.260	.01	.00	.04	.04	.00	.07	.09
	3	3.692E-03	43.499	.07	.00	.00	.00	.16	.06	.12
	4	1.663E-03	64.821	.09	.13	.05	.14	.16	.10	.09
	5	1.251E-03	74.729	.06	.01	.15	.21	.26	.30	.17
	6	5.554E-04	112.156	.75	.51	.24	.05	.06	.19	.16
	7	5.127E-04	116.737	.02	.35	.51	.55	.36	.29	.37

a. Dependent Variable: Ln(Black Drum Harvest)



	OLS	IPC	Difference
R	0.930	0.924	-0.006
R^2	0.864	0.854	-0.010
Adjusted R^2	0.813	0.811	-0.002
Coefficients:			
Intercept	7.457	9.120	1.663
Ln(January-February Inflows)	-2.492	-2.550	-0.058
Ln(March-April Inflows)	1.683	1.648	-0.035
Ln(May-June Inflows)	-1.319	-1.352	-0.033
Ln(July-August Inflows)	1.840	1.799	-0.041
Ln(September-October Inflows)	-0.940	-0.975	-0.035
Ln(November-December Inflows)	0.962	0.936	-0.026

Exploring the Data

Listing of Data

YEAR	BLK_DRUM	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL	ND_INFL
1962	11.90	2915.47	963.27	1615.30	1059.68	1432.16	2208.27
1963	7.90	2336.83	815.63	1270.07	724.21	1089.76	1105.07
1964	62.40	894.15	689.43	759.57	316.70	564.65	1030.93
1965	23.90	1140.22	818.07	1192.23	220.39	325.37	987.87
1966	29.10	1481.65	1358.37	2727.63	560.03	459.59	1007.86
1967	124.90	1283.51	1199.18	2828.73	616.20	435.08	848.36
1968	54.40	1504.38	1932.88	4136.47	844.60	533.83	706.48
1969	44.60	1349.94	2640.94	3676.87	600.78	489.11	828.41
1970	39.00	1514.87	3337.73	3968.77	607.07	859.88	615.13
1971	25.20	849.90	2360.83	1973.78	446.99	923.73	1077.87
1972	72.60	976.26	1232.03	1288.20	431.40	980.35	1232.31
1973	93.00	1455.68	2134.83	2664.22	829.55	1845.28	1908.59
1974	27.70	2524.91	2348.44	3077.98	868.72	2253.25	2897.57
1975	46.40	2890.51	2857.40	3726.31	1138.54	2254.37	2659.43
1976	47.60	2260.46	1321.18	2439.21	925.46	1085.72	2562.96
1977	102.20	1819.08	2075.70	2395.03	874.23	585.86	1162.82
1978	161.90	1479.44	1530.34	1315.67	587.24	535.72	1259.39
1979	73.10	2336.64	2853.94	1997.58	1274.52	1229.99	1006.62
1980	56.00	2491.90	2356.53	2213.29	1264.55	1407.21	767.72
1981	51.90	1895.84	2285.70	3516.54	1686.25	2043.34	1412.12
1982	72.50	1398.82	1233.03	3387.94	1176.05	1223.45	1853.22
1983	53.50	1459.79	1289.26	3551.73	2087.11	1559.15	2092.08
1984	269.00	1768.99	1585.85	2297.95	1709.83	1458.87	1825.24
1985	114.60	2131.44	1947.16	1701.05	1422.37	1797.78	2158.85
1986	31.30	1793.04	1575.27	2366.30	664.29	1657.75	3115.37
1987	50.90	2008.42	1799.30	3115.69	914.48	1131.20	2930.13

BLK_DRUM	Black drum harvest (thousands of pounds)
JF_INFL	Lagged January-February inflows (thousands of acre-feet)
MA_INFL	Lagged March-April inflows (thousands of acre-feet)
MJ_INFL	Lagged May-June inflows (thousands of acre-feet)
JA_INFL	Lagged July-August inflows (thousands of acre-feet)
SO_INFL	Lagged September-October inflows (thousands of acre-feet)
ND_INFL	Lagged November-December inflows (thousands of acre-feet)

Summary Information for Individual Variables

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Black Drum Harvest	.226	26	.001	.785	26	.010*
Ln(Black Drum Harvest)	.117	26	.200*	.977	26	.774
January-February Inflows	.168	26	.056	.955	26	.373
March-April Inflows	.115	26	.200*	.965	26	.503
May-June Inflows	.091	26	.200*	.965	26	.505
July-August Inflows	.147	26	.156	.946	26	.260
September-October Inflows	.145	26	.167	.941	26	.194
November-December Inflows	.203	26	.008	.895	26	.013
Ln(January-February Inflows)	.116	26	.200*	.963	26	.476
Ln(March-April Inflows)	.107	26	.200*	.964	26	.488
Ln(May-June Inflows)	.116	26	.200*	.936	26	.135
Ln(July-August Inflows)	.095	26	.200*	.979	26	.833
Ln(September-October Inflows)	.139	26	.200*	.937	26	.150
Ln(November-December Inflows)	.134	26	.200*	.941	26	.199

**. This is an upper bound of the true significance.

*. This is a lower bound of the true significance.

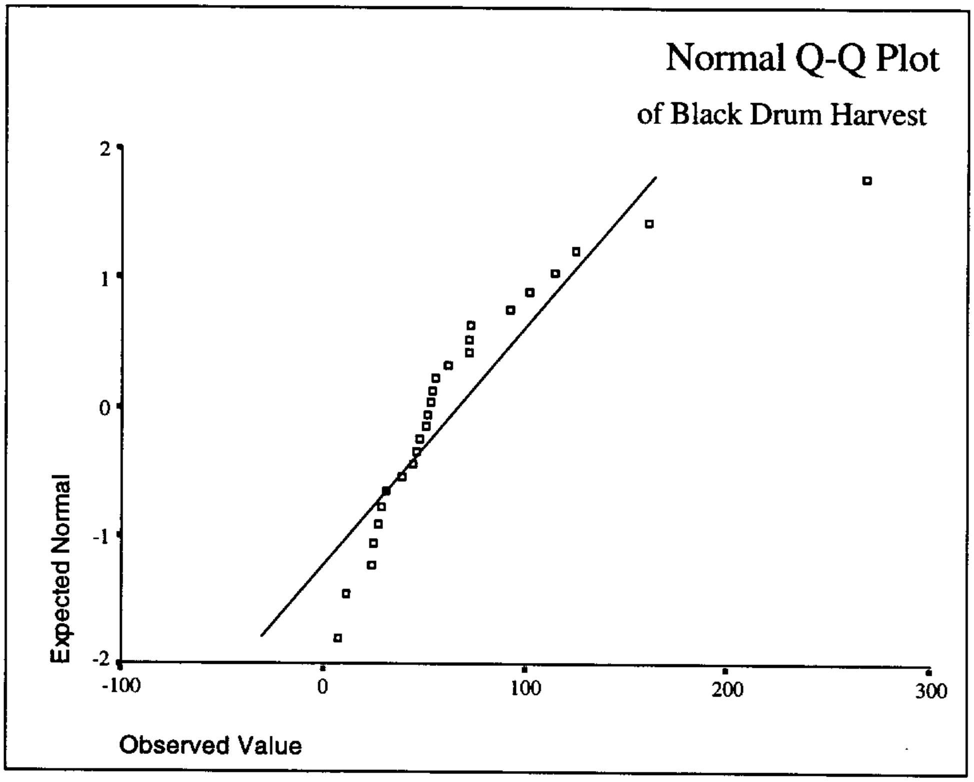
a. Lilliefors Significance Correction

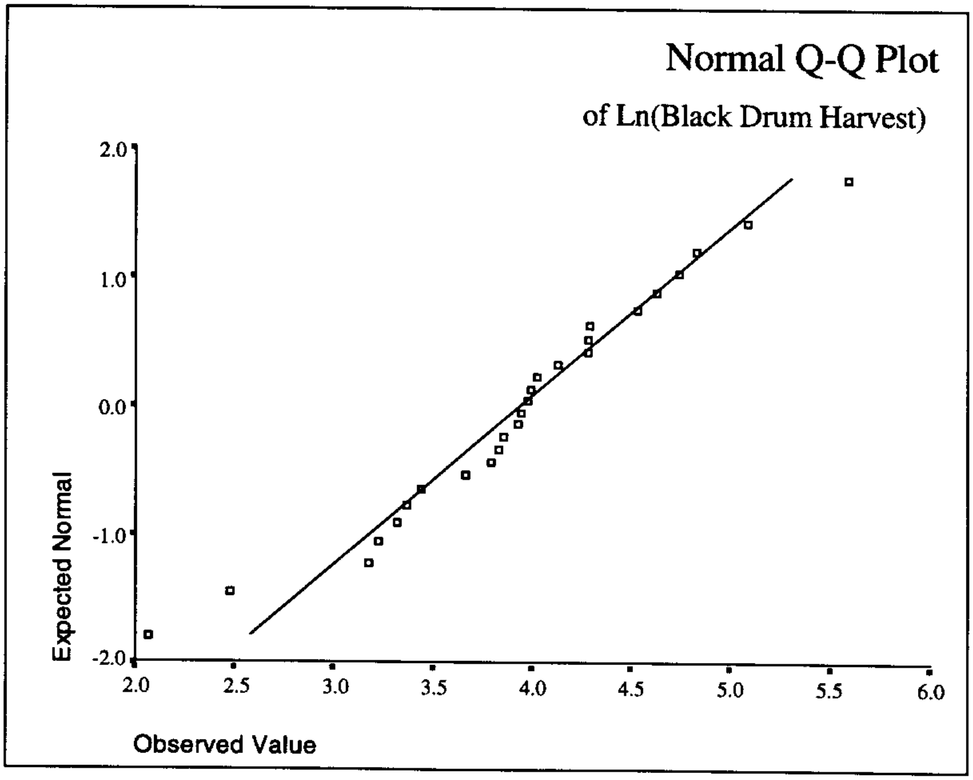
Descriptives

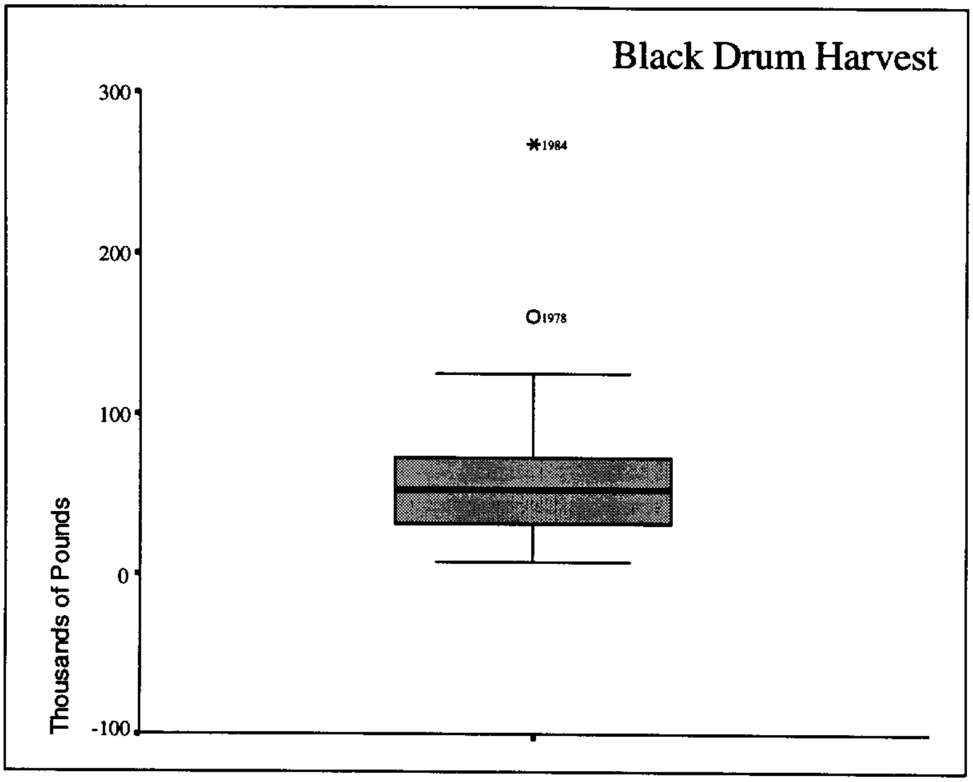
			Statistic	Std. Error
Black Drum Harvest	Mean		67.2115	10.7336
	95% Confidence Interval for Mean	Lower Bound	45.1052	
		Upper Bound	89.3178	
	5% Trimmed Mean		60.6179	
	Median		52.7000	
	Variance		2995.472	
	Std. Deviation		54.7309	
	Minimum		7.90	
	Maximum		269.00	
	Range		261.10	
	Interquartile Range		47.3250	
	Skewness		2.290	.456
	Kurtosis		6.765	.887

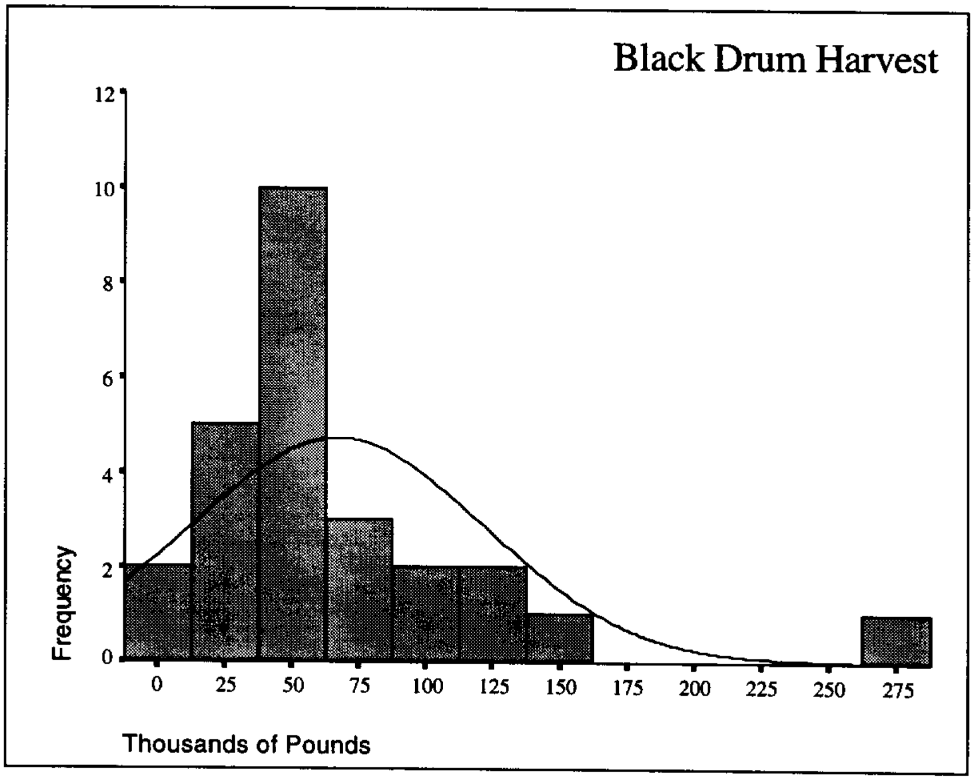
Extreme Values

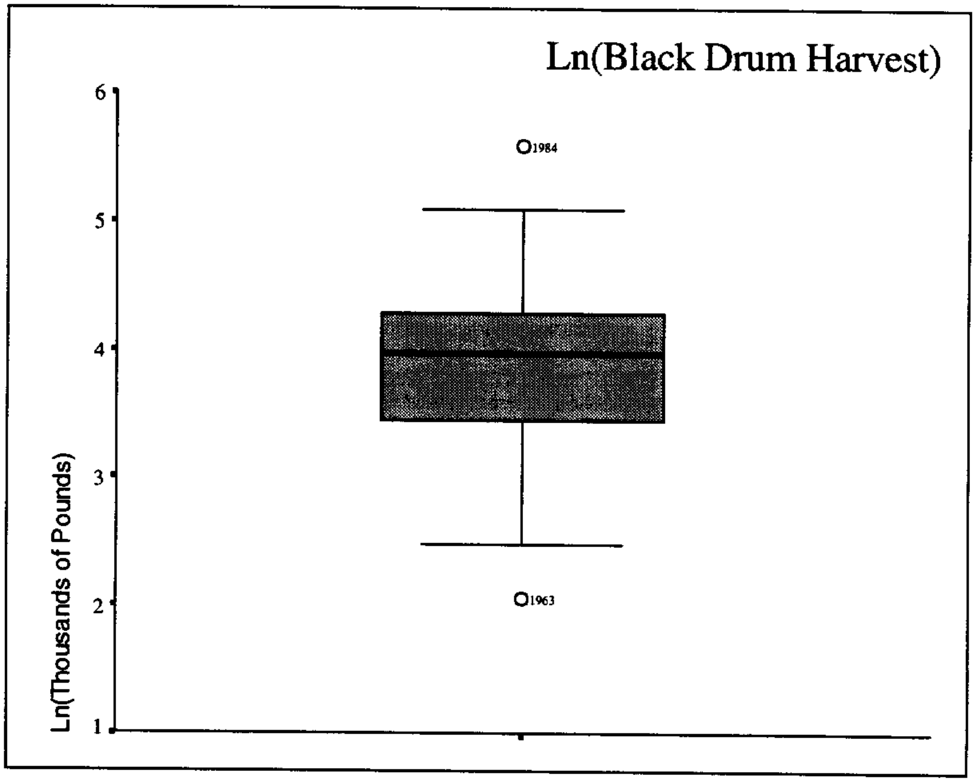
			Case Number	Year	Value
Black Drum Harvest	Highest	1	23	1984	269.00
		2	17	1978	161.90
		3	6	1967	124.90
		4	24	1985	114.60
		5	16	1977	102.20
	Lowest	1	2	1963	7.90
		2	1	1962	11.90
		3	4	1965	23.90
		4	10	1971	25.20
		5	13	1974	27.70


Normal Q-Q Plot
of Black Drum Harvest
Expected Normal
2
1
0
-1
-2
-100
0
100
200
300
Observed Value


Normal Q-Q Plot
of Ln(Black Drum Harvest)
Expected Normal
2.0
1.0
0.0
-1.0
-2.0
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
Observed Value


Black Drum Harvest
300
200
100
0
-100
Thousands of Pounds
1984
1978


Black Drum Harvest
12
10
8
6
4
2
0
Frequency
0
25
50
75
100
125
150
175
200
225
250
275
Thousands of Pounds

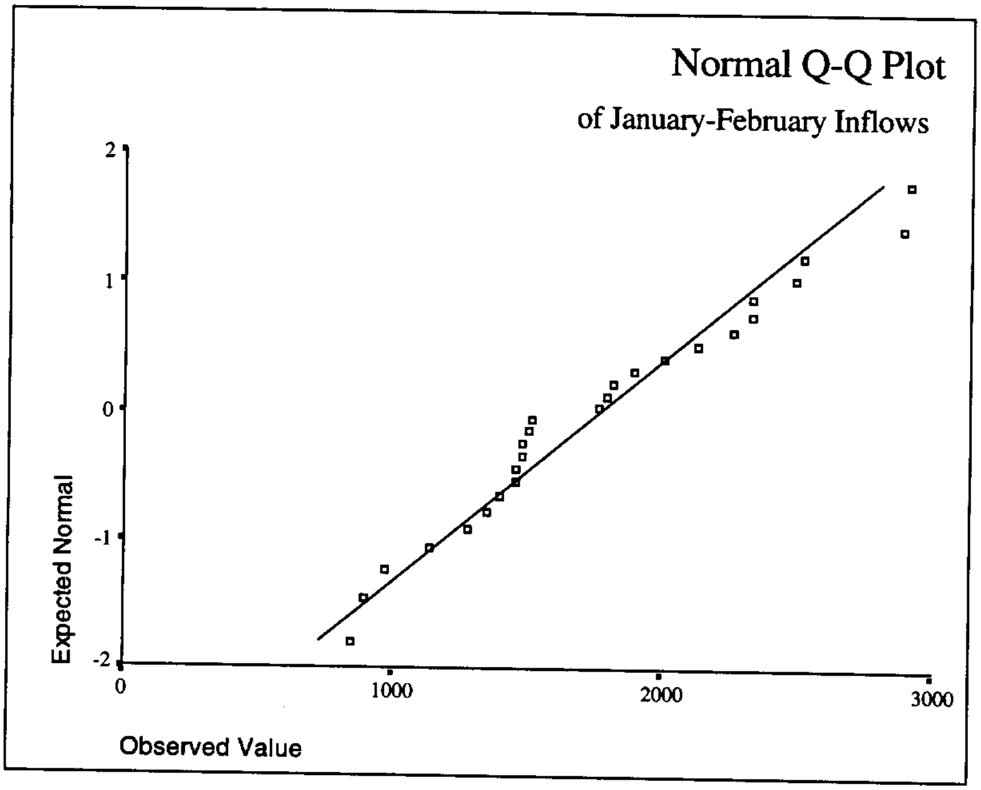

Ln(Black Drum Harvest)
Ln(Thousands of Pounds)
6
5
4
3
2
1
1984
1963

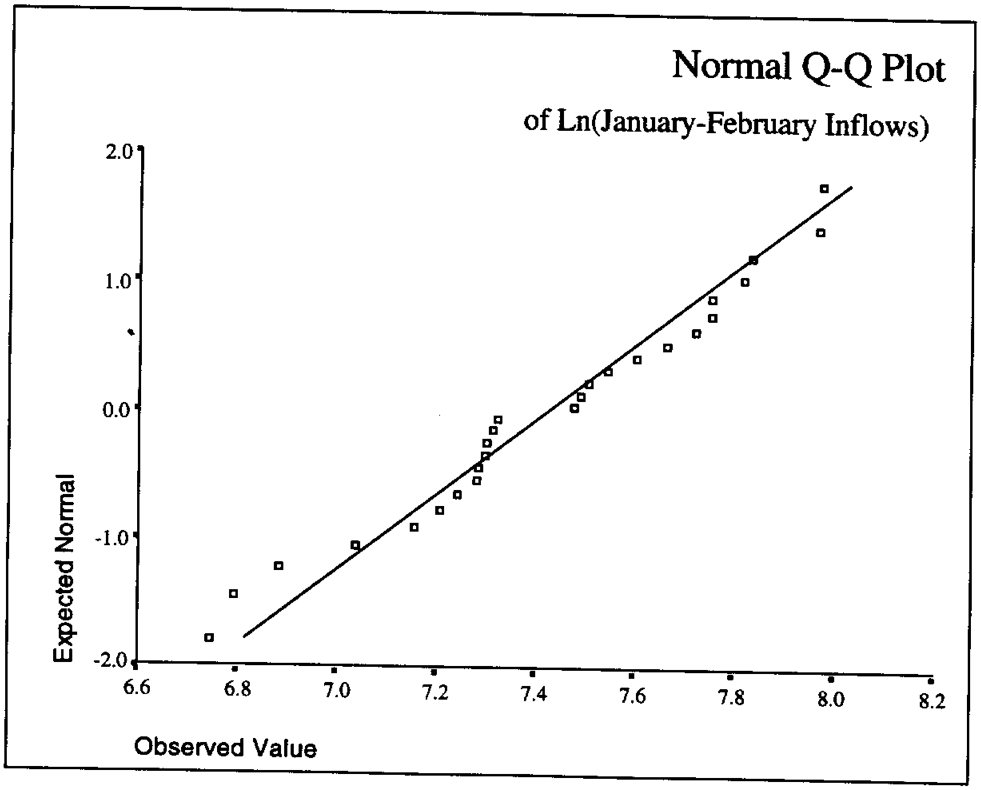
Descriptives

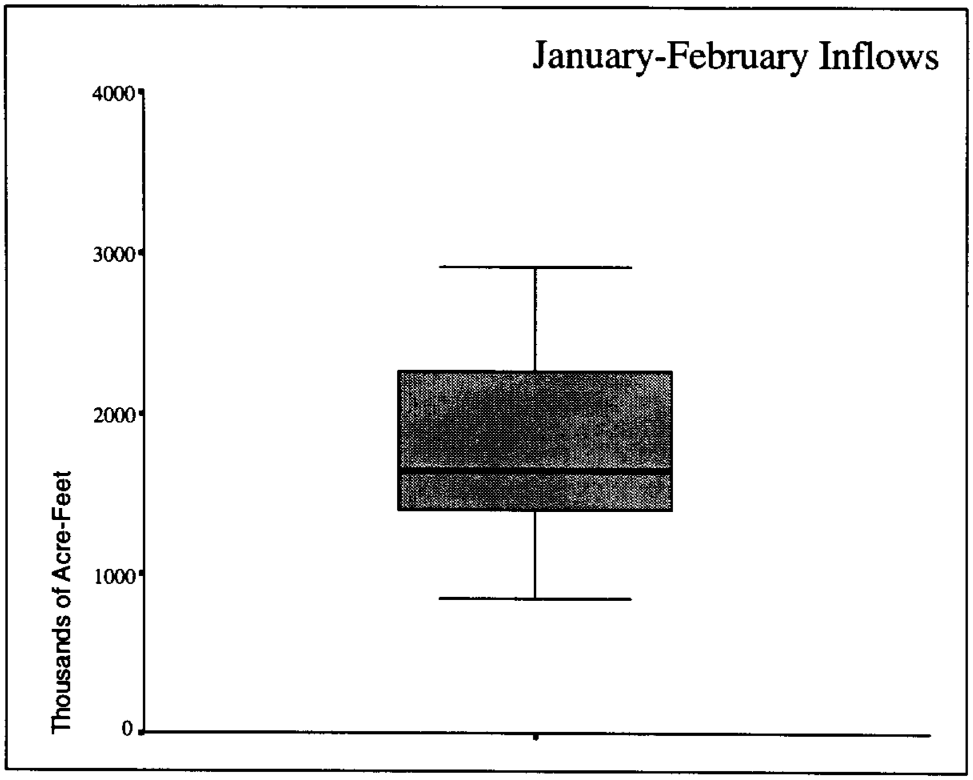
			Statistic	Std. Error
January-February Inflows	Mean		1767.7746	113.9313
	95% Confidence Interval for Mean	Lower Bound	1533.1288	
		Upper Bound	2002.4204	
	5% Trimmed Mean		1754.7595	
	Median		1641.9300	
	Variance		337488.636	
	Std. Deviation		580.9377	
	Minimum		849.90	
	Maximum		2915.47	
	Range		2065.57	
	Interquartile Range		892.9050	
	Skewness		.383	.456
	Kurtosis		-.627	.887

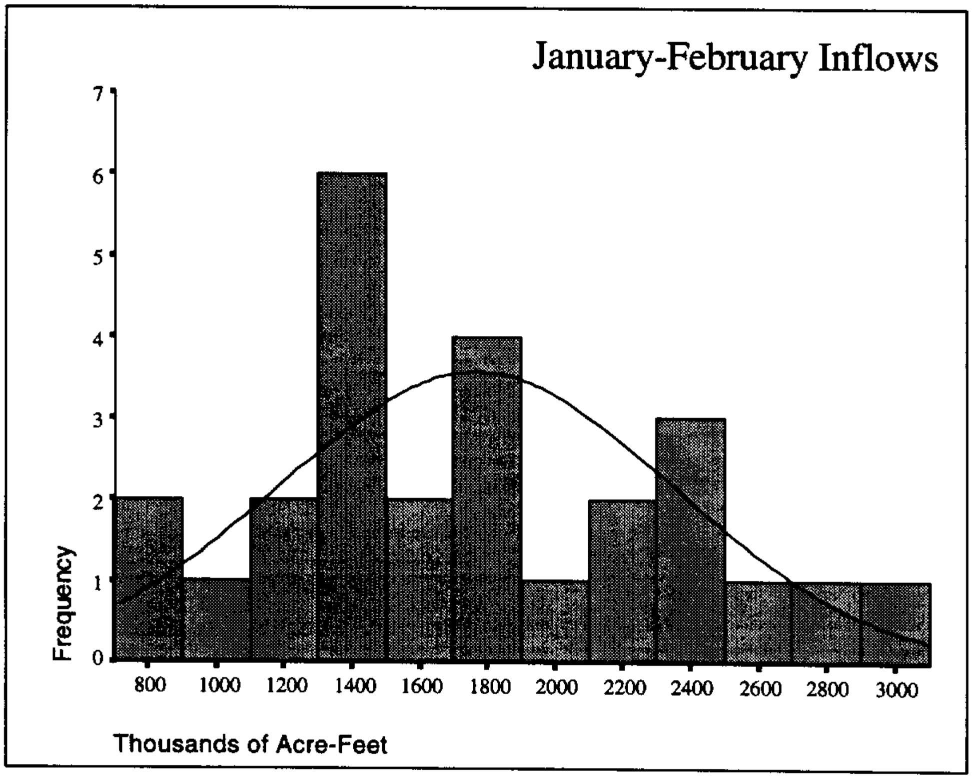
Extreme Values

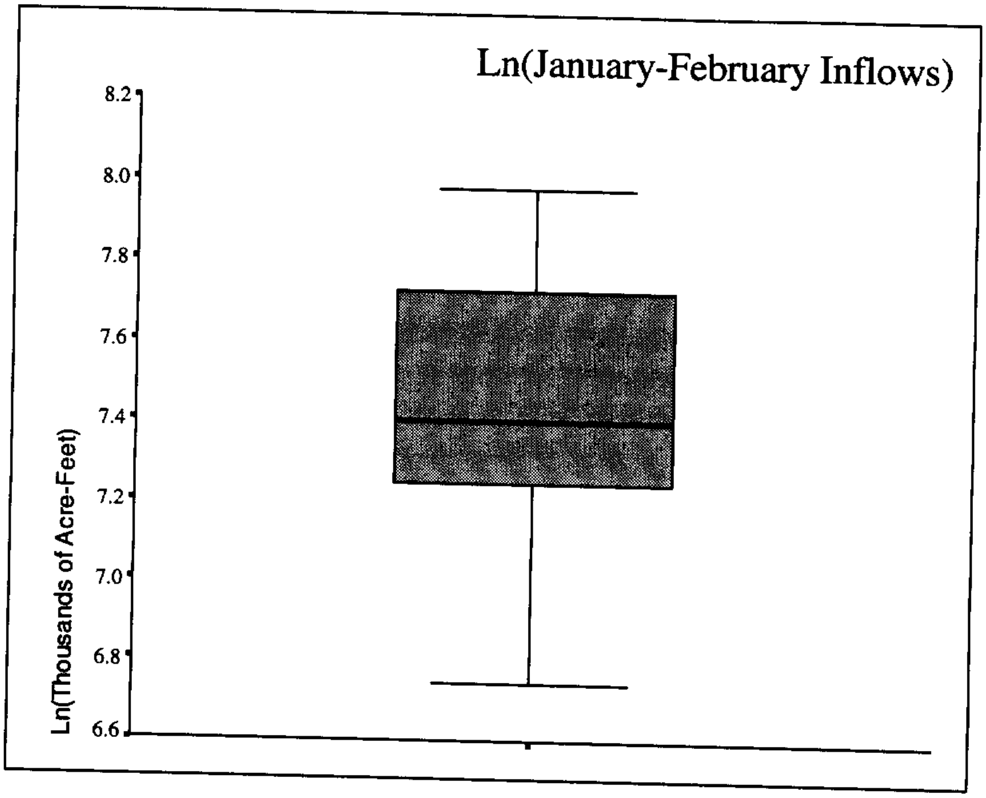
			Case Number	Year	Value
January-February Inflows	Highest	1	1	1962	2915.47
		2	14	1975	2890.51
		3	13	1974	2524.91
		4	19	1980	2491.90
		5	2	1963	2336.83
	Lowest	1	10	1971	849.90
		2	3	1964	894.15
		3	11	1972	976.26
		4	4	1965	1140.22
		5	6	1967	1283.51


Normal Q-Q Plot
of January-February Inflows
Expected Normal
2
1
0
-1
-2
0
1000
2000
3000
Observed Value


Normal Q-Q Plot
of Ln(January-February Inflows)
Expected Normal
2.0
1.0
0.0
-1.0
-2.0
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Observed Value


January-February Inflows
4000
3000
2000
1000
0
Thousands of Acre-Feet


January-February Inflows
7
6
5
4
3
2
1
0
Frequency
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
Thousands of Acre-Feet

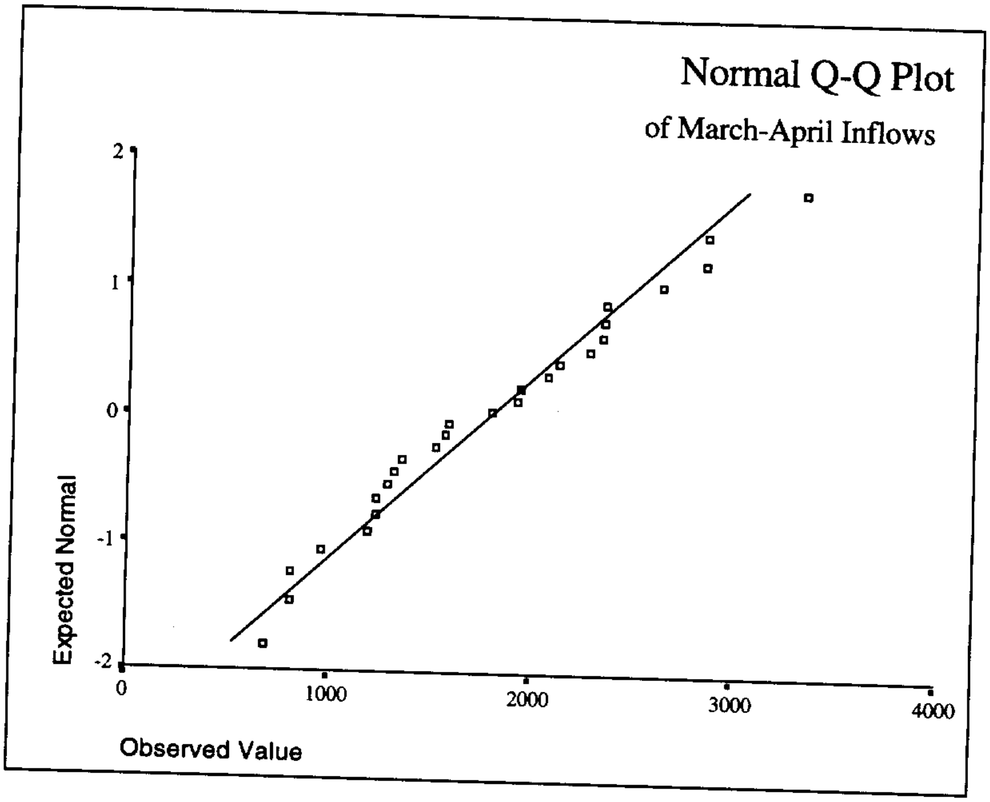

Ln(January-February Inflows)
Ln(Thousands of Acre-Feet)
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
6.6

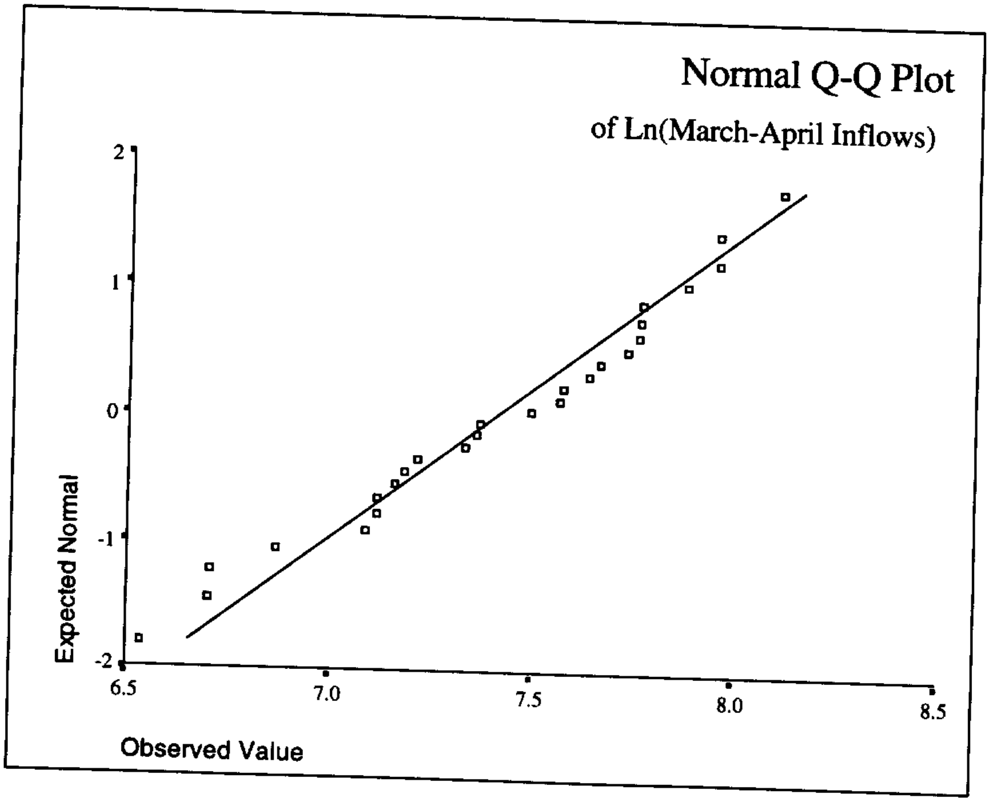
Descriptives

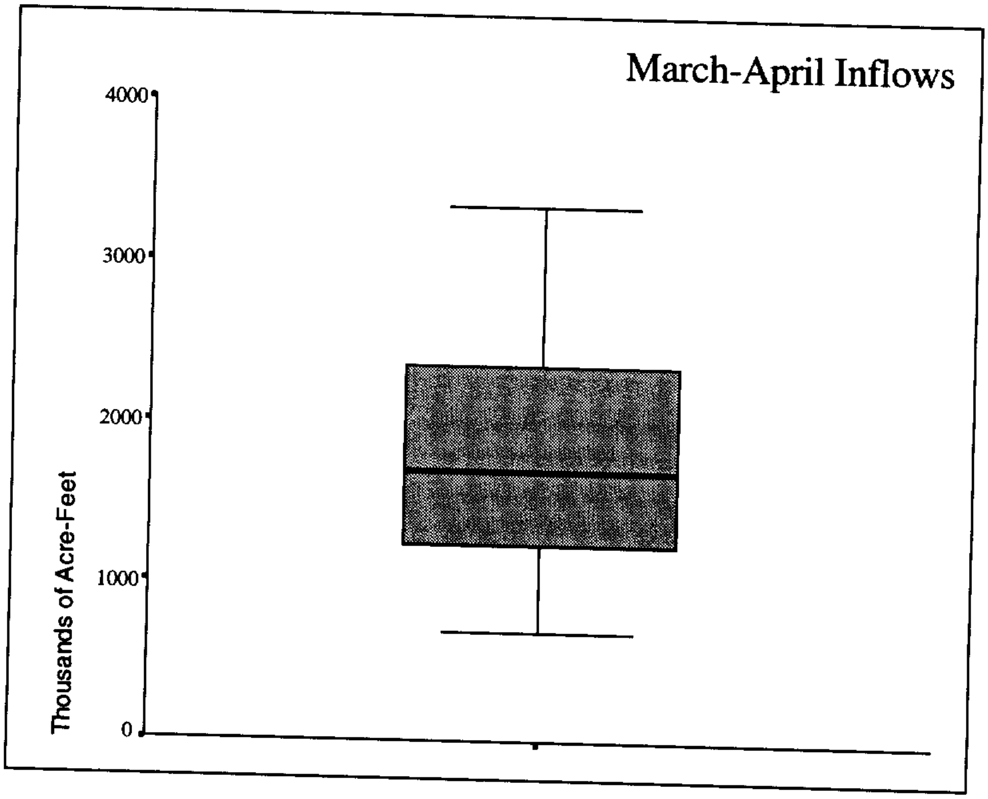
			Statistic	Std. Error
March-April Inflows	Mean		1790.0881	138.1884
	95% Confidence Interval for Mean	Lower Bound	1505.4836	
		Upper Bound	2074.6925	
	5% Trimmed Mean		1769.7958	
	Median		1692.5750	
	Variance		496497.206	
	Std. Deviation		704.6256	
	Minimum		689.43	
	Maximum		3337.73	
	Range		2648.30	
	Interquartile Range		1117.6825	
	Skewness		.351	.456
	Kurtosis		-.626	.887

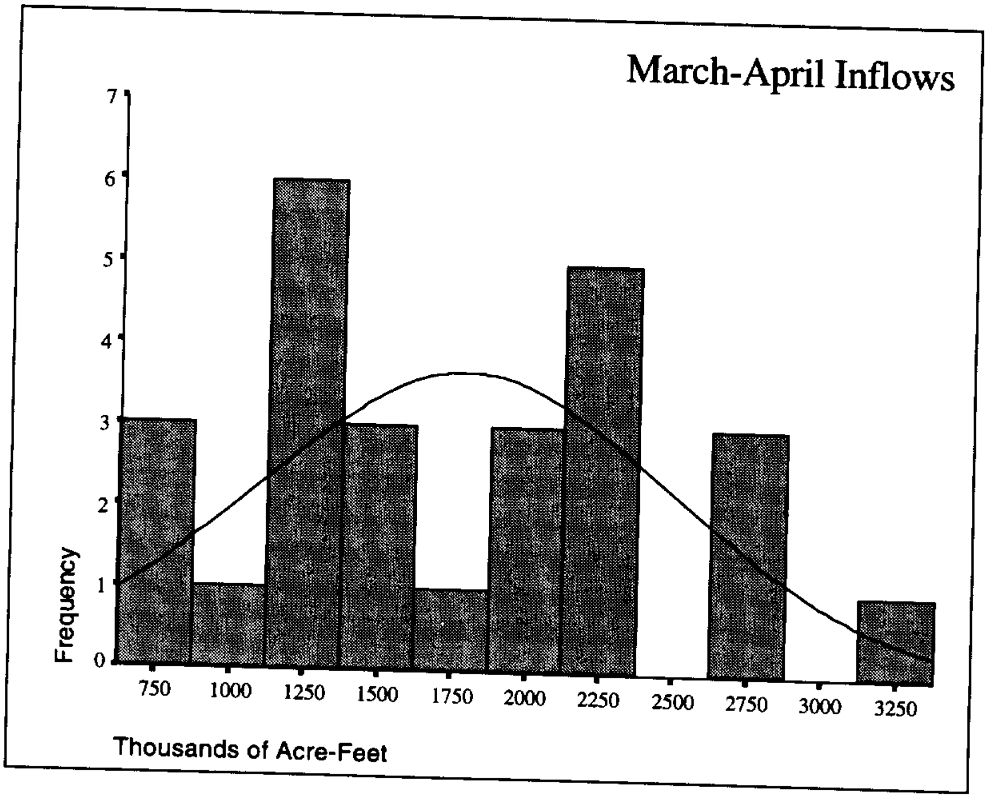
Extreme Values

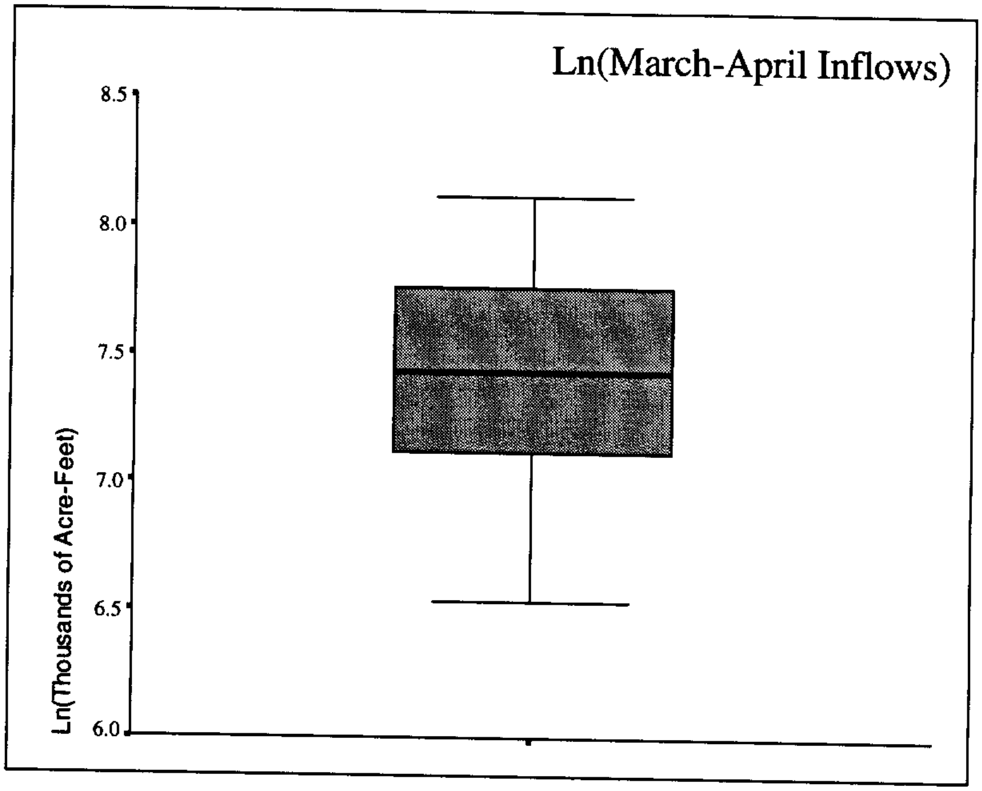
			Case Number	Year	Value
March-April Inflows	Highest	1	9	1970	3337.73
		2	14	1975	2857.40
		3	18	1979	2853.94
		4	8	1969	2640.94
		5	10	1971	2360.83
	Lowest	1	3	1964	689.43
		2	2	1963	815.63
		3	4	1965	818.07
		4	1	1962	963.27
		5	6	1967	1199.18


Normal Q-Q Plot
of March-April Inflows
Expected Normal
2
1
0
-1
-2
Observed Value
0
1000
2000
3000
4000


Normal Q-Q Plot
of Ln(March-April Inflows)
Expected Normal
2
1
0
-1
-2
Observed Value
6.5
7.0
7.5
8.0
8.5


March-April Inflows
4000
3000
2000
1000
0
Thousands of Acre-Feet


March-April Inflows
7
6
5
4
3
2
1
0
Frequency
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
3250
Thousands of Acre-Feet

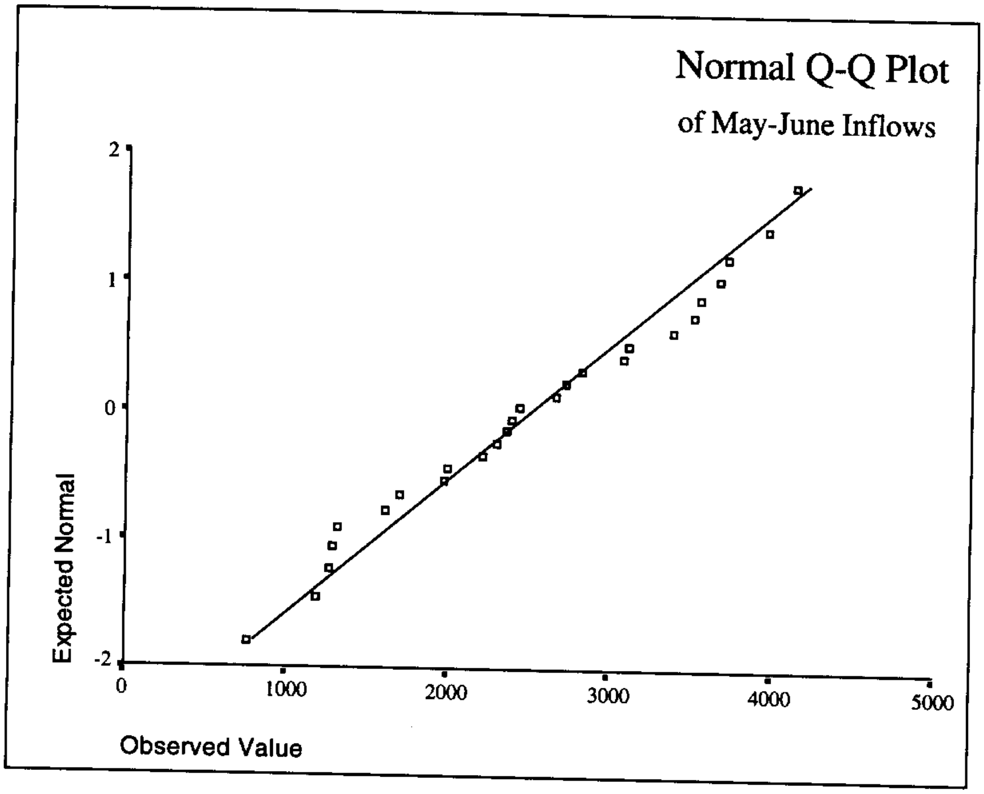

Ln(March-April Inflows)
Ln(Thousands of Acre-Feet)
8.5
8.0
7.5
7.0
6.5
6.0

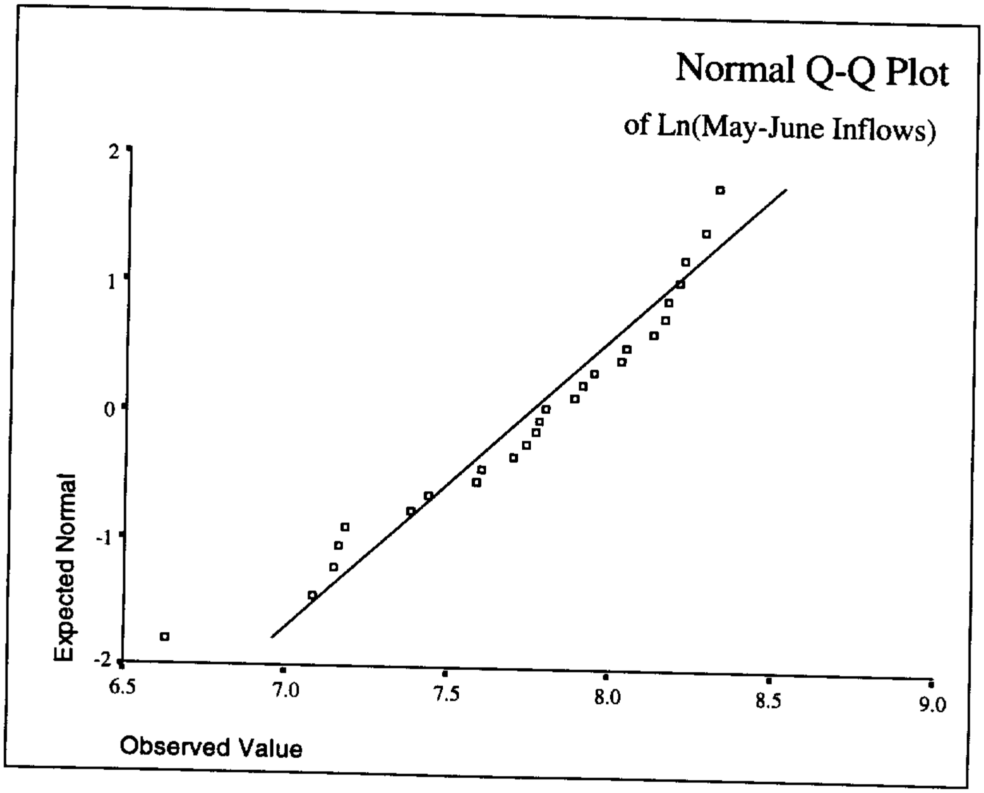
Descriptives

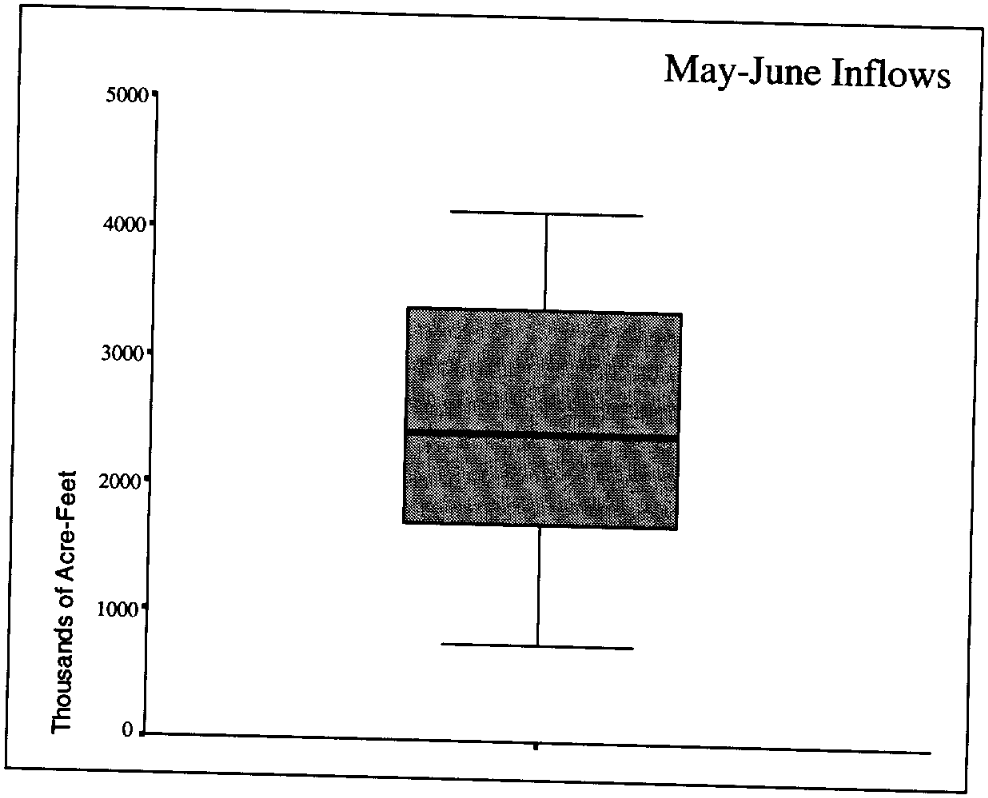
			Statistic	Std. Error
May-June Inflows	Mean		2507.8504	187.2047
	95% Confidence Interval for Mean	Lower Bound	2122.2951	
		Upper Bound	2893.4056	
	5% Trimmed Mean		2511.1013	
	Median		2417.1200	
	Variance		911185.363	
	Std. Deviation		954.5603	
	Minimum		759.57	
	Maximum		4136.47	
	Range		3376.90	
	Interquartile Range		1740.4775	
	Skewness		-.022	.456
	Kurtosis		-1.015	.887

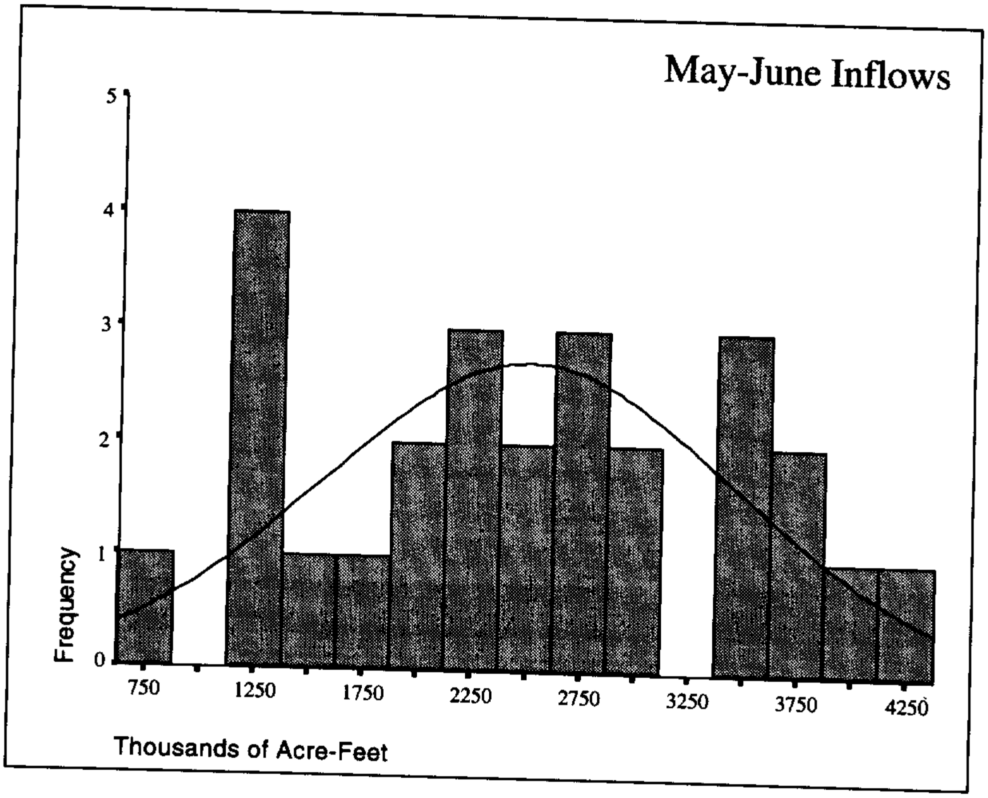
Extreme Values

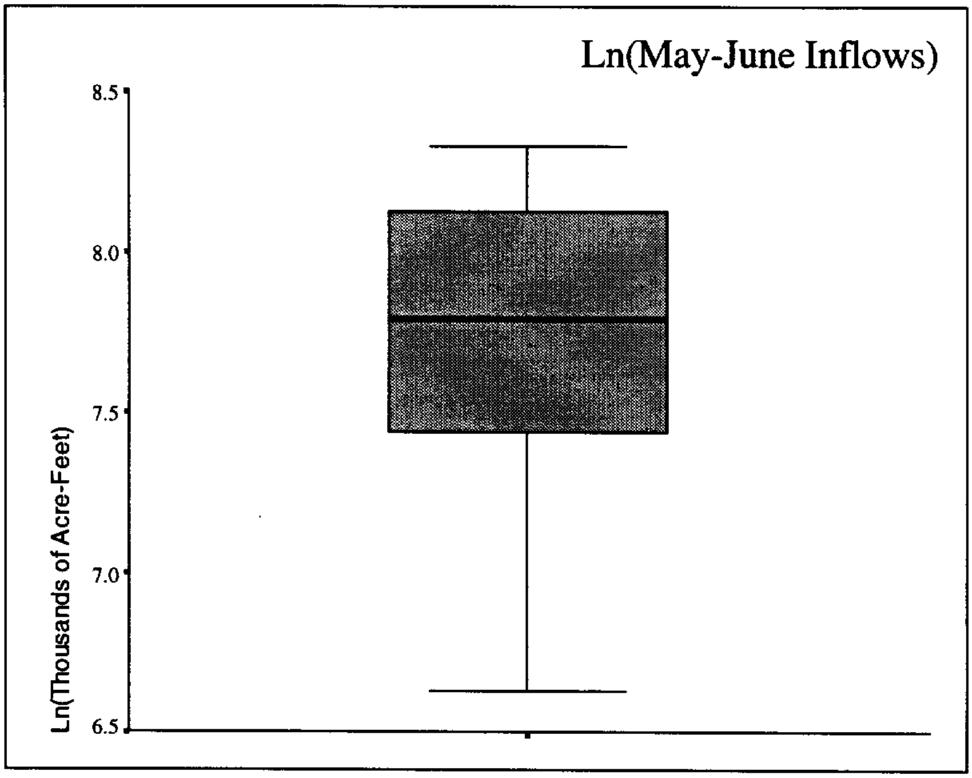
			Case Number	Year	Value
May-June Inflows	Highest	1	7	1968	4136.47
		2	9	1970	3968.77
		3	14	1975	3726.31
		4	8	1969	3676.87
		5	22	1983	3551.73
	Lowest	1	3	1964	759.57
		2	4	1965	1192.23
		3	2	1963	1270.07
		4	11	1972	1288.20
		5	17	1978	1315.67


Normal Q-Q Plot
of May-June Inflows
Expected Normal
2
1
0
-1
-2
0
1000
2000
3000
4000
5000
Observed Value


Normal Q-Q Plot
of Ln(May-June Inflows)
Expected Normal
2
1
0
-1
-2
6.5
7.0
7.5
8.0
8.5
9.0
Observed Value


May-June Inflows
5000
4000
3000
2000
1000
0
Thousands of Acre-Feet


May-June Inflows
5
4
3
2
1
0
Frequency
750
1250
1750
2250
2750
3250
3750
4250
Thousands of Acre-Feet

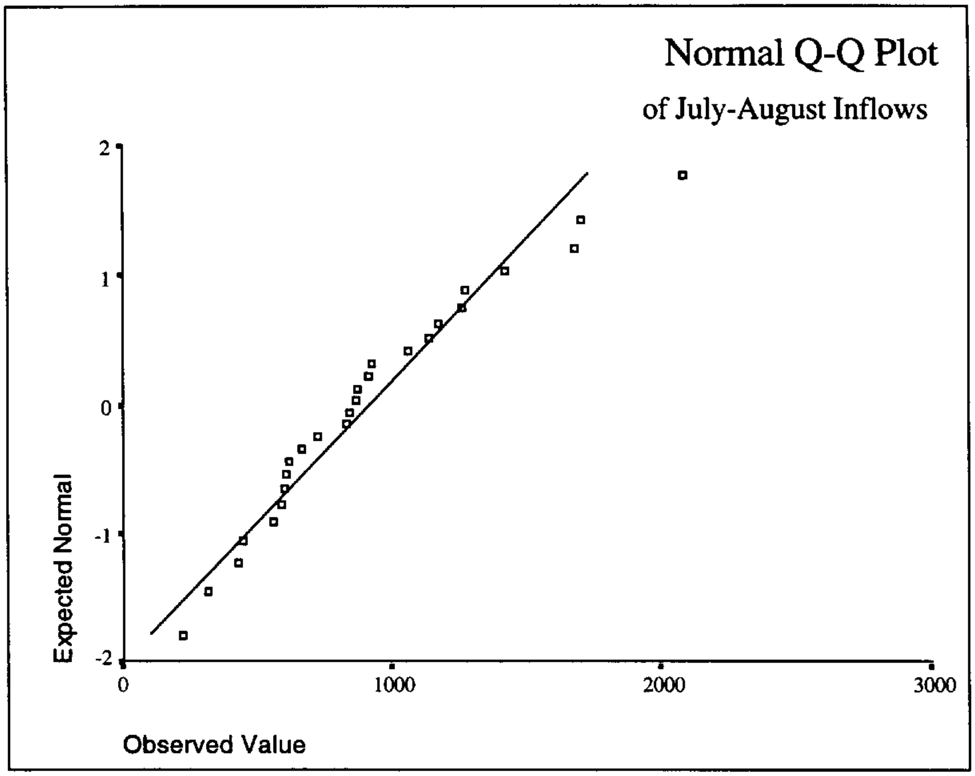

Ln(May-June Inflows)
Ln(Thousands of Acre-Feet)
8.5
8.0
7.5
7.0
6.5

Descriptives

			Statistic	Std. Error
July-August Inflows	Mean		917.3554	89.2122
	95% Confidence Interval for Mean	Lower Bound	733.6193	
		Upper Bound	1101.0914	
	5% Trimmed Mean		894.6915	
	Median		856.6600	
	Variance		206929.424	
	Std. Deviation		454.8950	
	Minimum		220.39	
	Maximum		2087.11	
	Range		1866.72	
	Interquartile Range		600.7800	
	Skewness		.843	.456
	Kurtosis		.466	.887

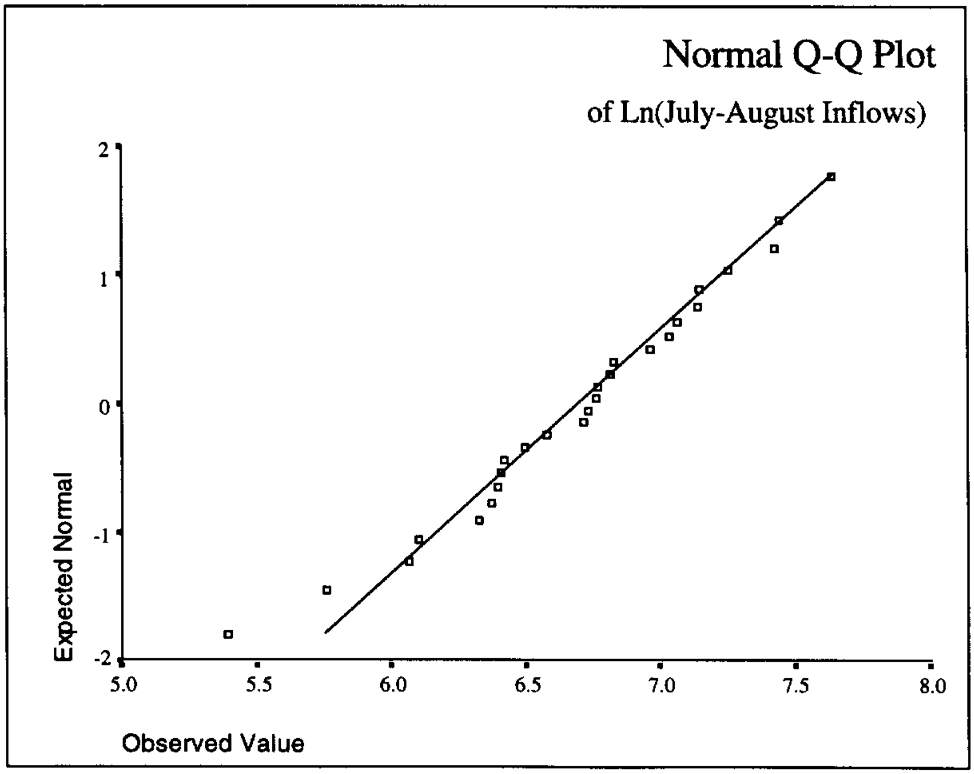
Extreme Values

			Case Number	Year	Value
July-August Inflows	Highest	1	22	1983	2087.11
		2	23	1984	1709.83
		3	20	1981	1686.25
		4	24	1985	1422.37
		5	18	1979	1274.52
	Lowest	1	4	1965	220.39
		2	3	1964	316.70
		3	11	1972	431.40
		4	10	1971	446.99
		5	5	1966	560.03



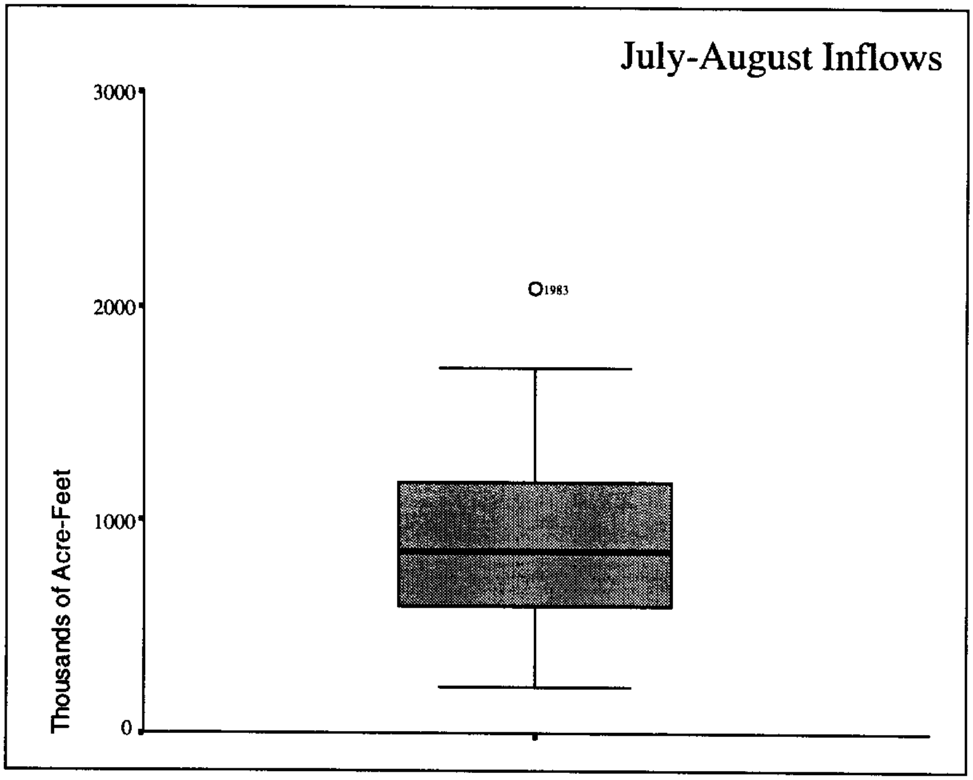
Normal Q-Q Plot

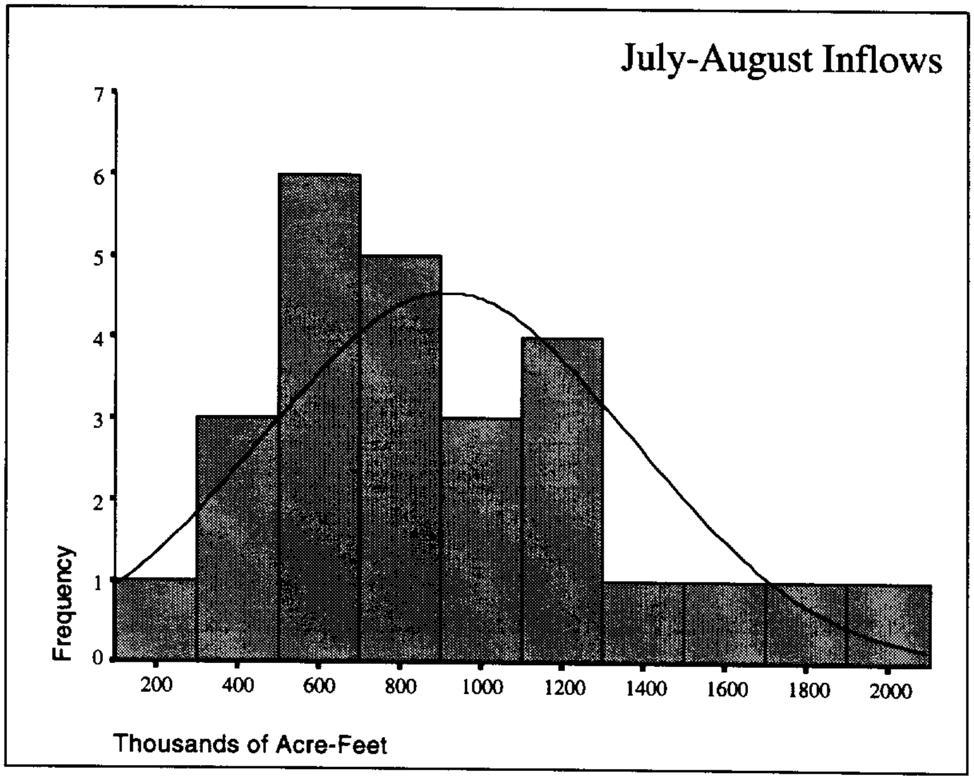
of July-August Inflows

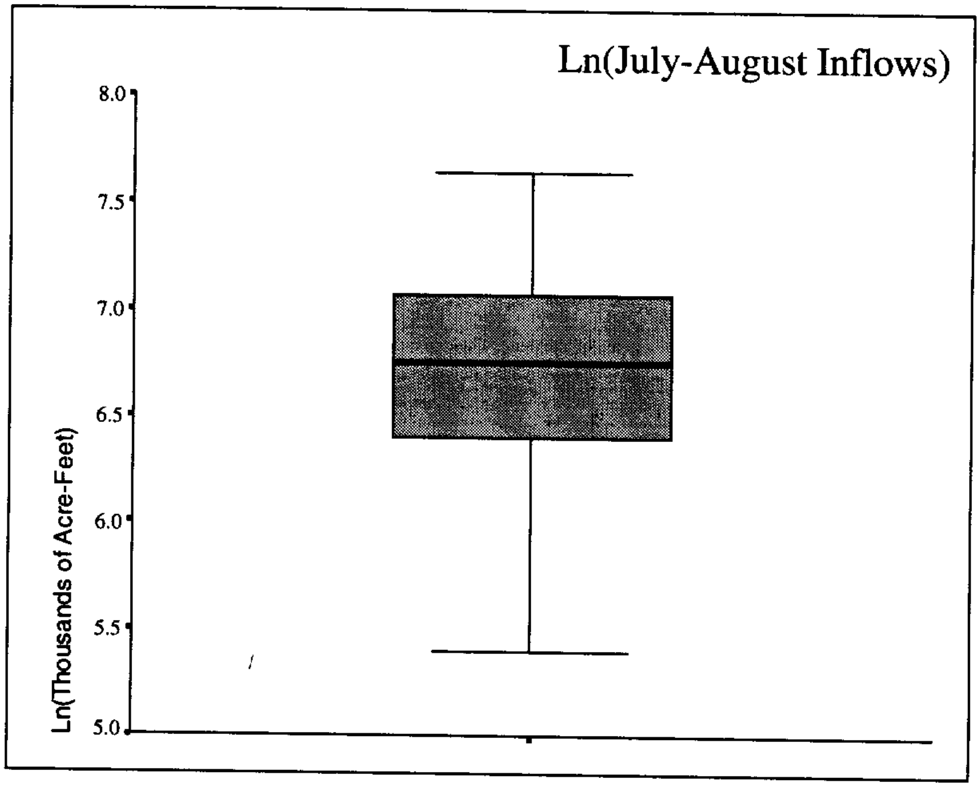


Normal Q-Q Plot

of Ln(July-August Inflows)


July-August Inflows
3000
2000
1000
0
Thousands of Acre-Feet
1983


July-August Inflows
7
6
5
4
3
2
1
0
Frequency
200
400
600
800
1000
1200
1400
1600
1800
2000
Thousands of Acre-Feet

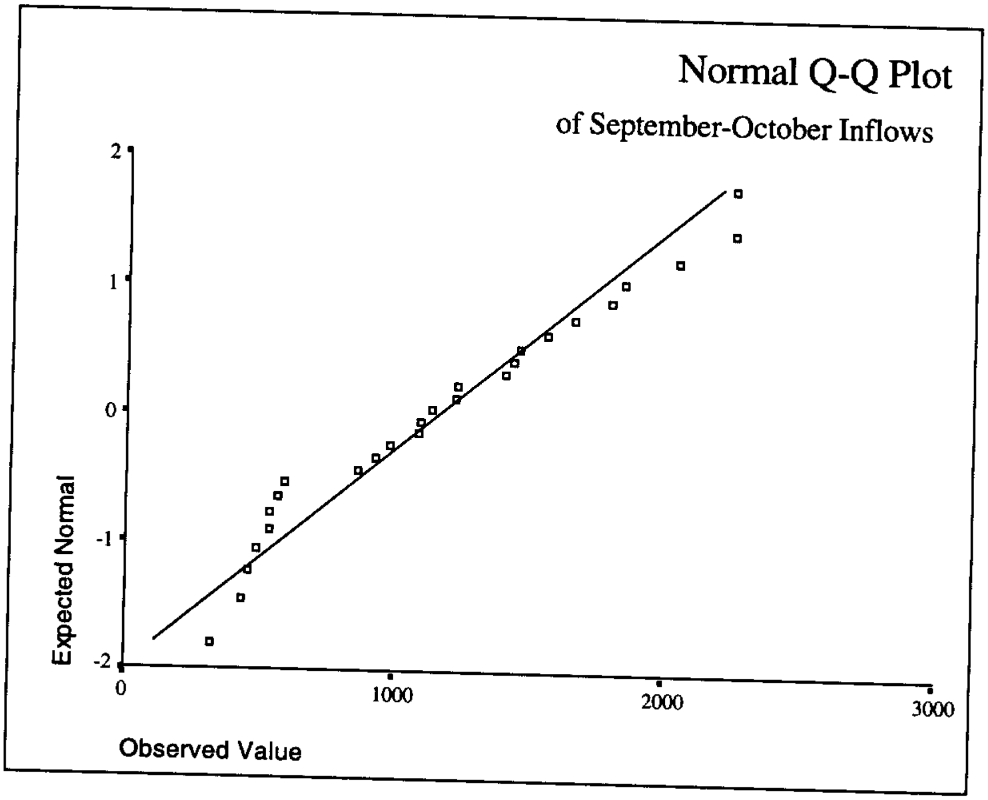

Ln(July-August Inflows)
Ln(Thousands of Acre-Feet)
8.0
7.5
7.0
6.5
6.0
5.5
5.0

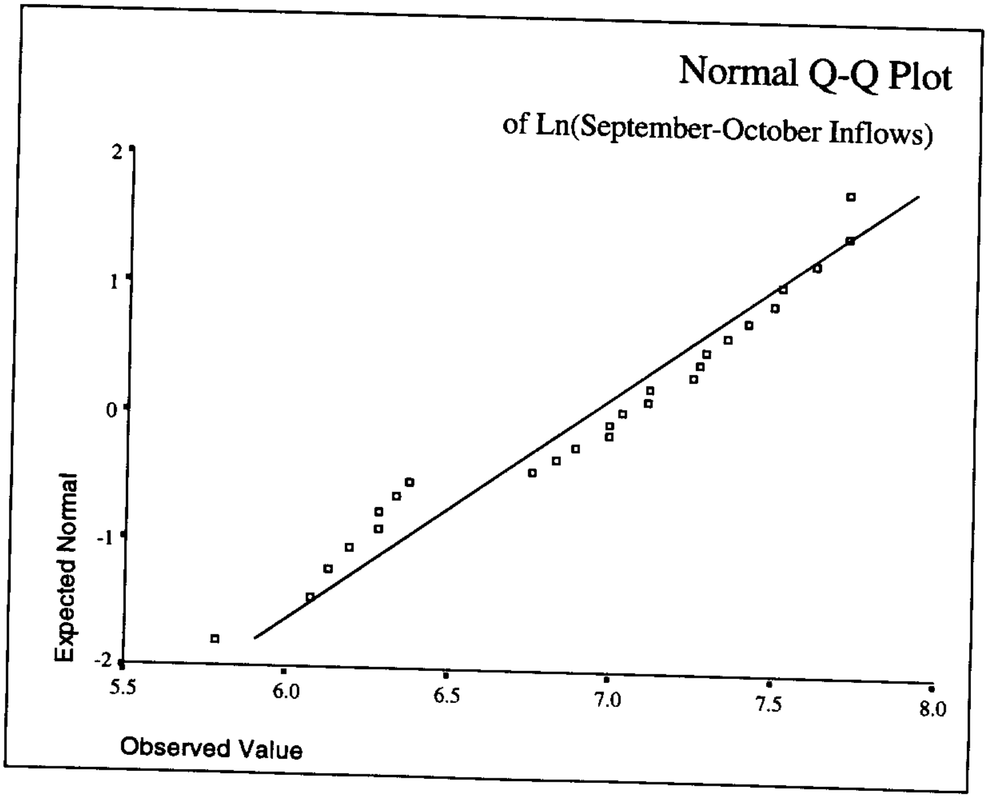
Descriptives

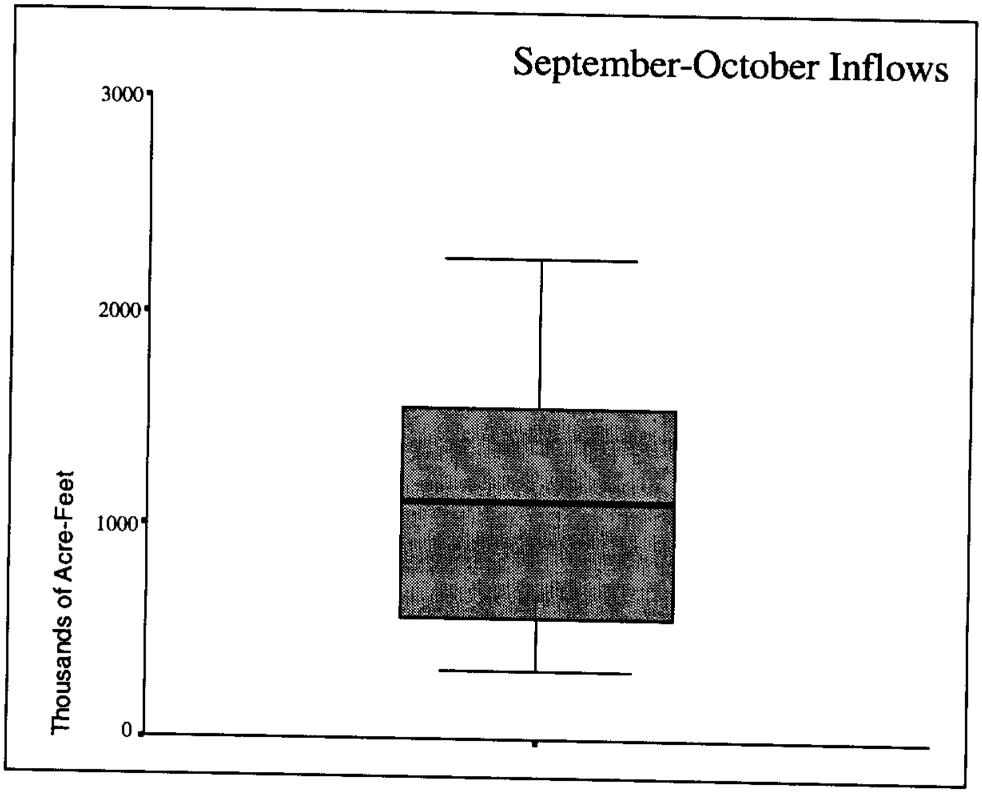
			Statistic	Std. Error
September-October Inflows	Mean		1160.0942	114.4091
	95% Confidence Interval for Mean	Lower Bound	924.4643	
		Upper Bound	1395.7242	
	5% Trimmed Mean		1144.2825	
	Median		1110.4800	
	Variance		340325.473	
	Std. Deviation		583.3742	
	Minimum		325.37	
	Maximum		2254.37	
	Range		1929.00	
	Interquartile Range		1026.3825	
	Skewness		.347	.456
	Kurtosis		-.885	.887

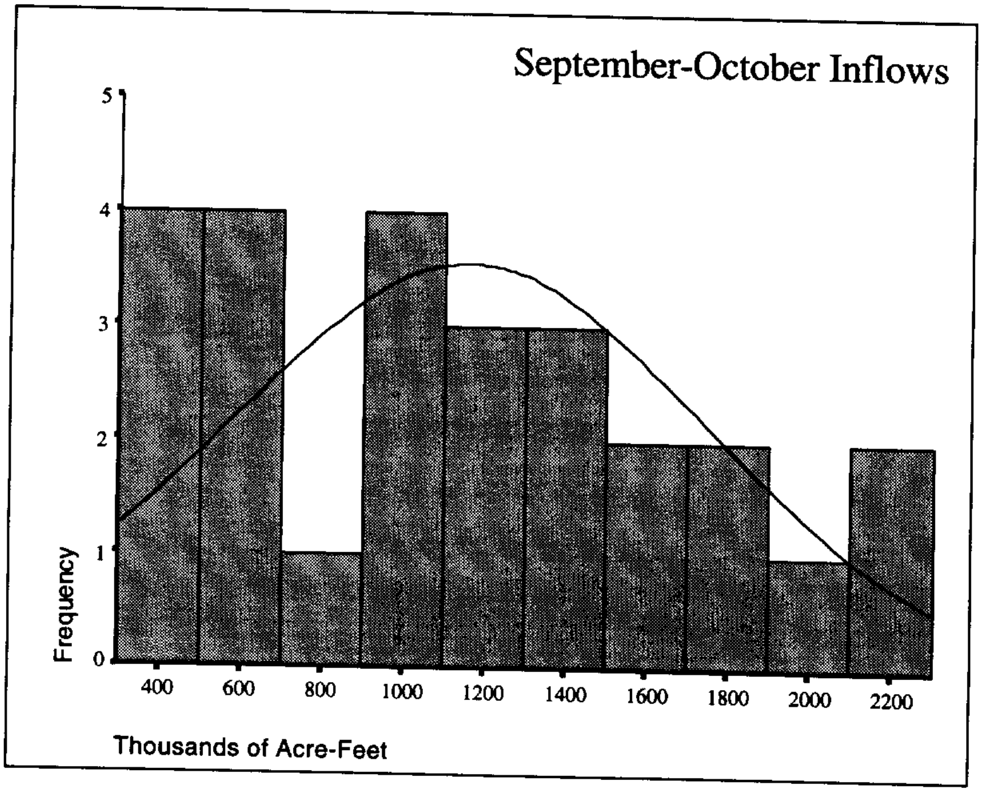
Extreme Values

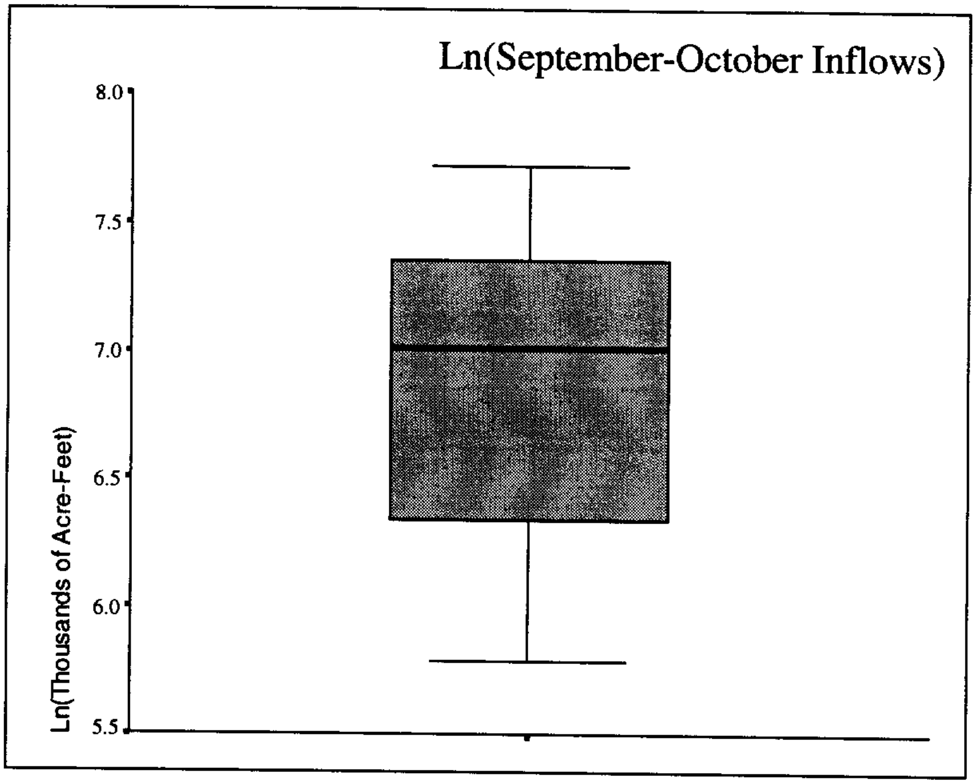
			Case Number	Year	Value
September-October Inflows	Highest	1	14	1975	2254.37
		2	13	1974	2253.25
		3	20	1981	2043.34
		4	12	1973	1845.28
		5	24	1985	1797.78
	Lowest	1	4	1965	325.37
		2	6	1967	435.08
		3	5	1966	459.59
		4	8	1969	489.11
		5	7	1968	533.83


Normal Q-Q Plot
of September-October Inflows
Expected Normal
2
1
0
-1
-2
0
1000
2000
3000
Observed Value


Normal Q-Q Plot
of Ln(September-October Inflows)
Expected Normal
2
1
0
-1
-2
5.5
6.0
6.5
7.0
7.5
8.0
Observed Value


September-October Inflows
3000
2000
1000
0
Thousands of Acre-Feet


September-October Inflows
5
4
3
2
1
0
Frequency
400
600
800
1000
1200
1400
1600
1800
2000
2200
Thousands of Acre-Feet

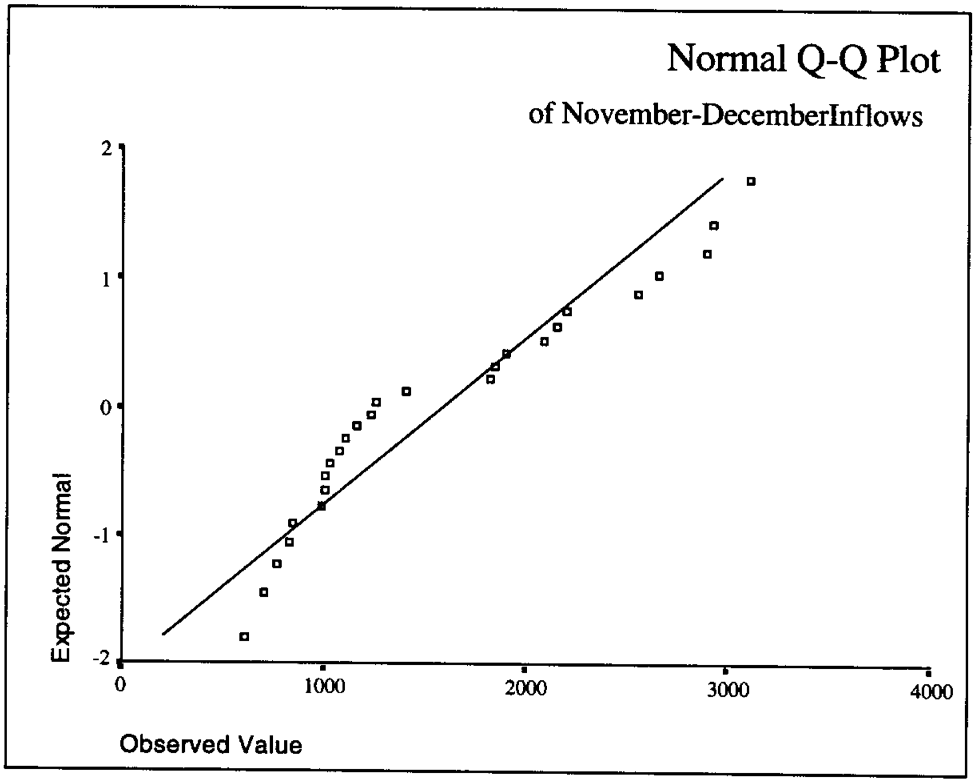

Ln(September-October Inflows)
Ln(Thousands of Acre-Feet)
8.0
7.5
7.0
6.5
6.0
5.5

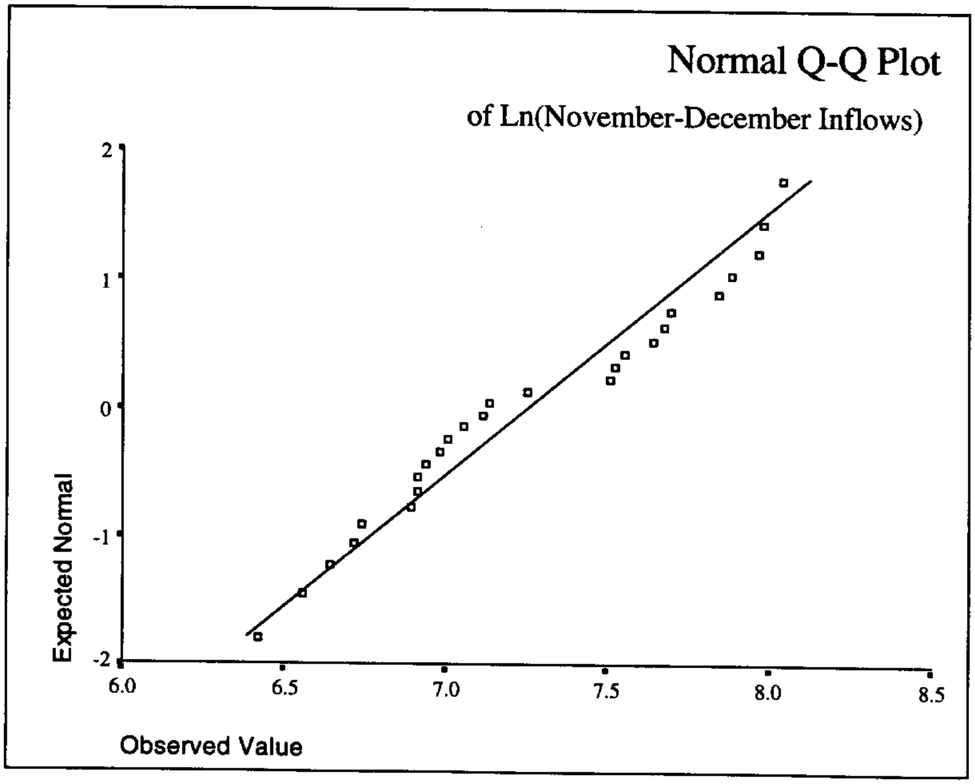
Descriptives

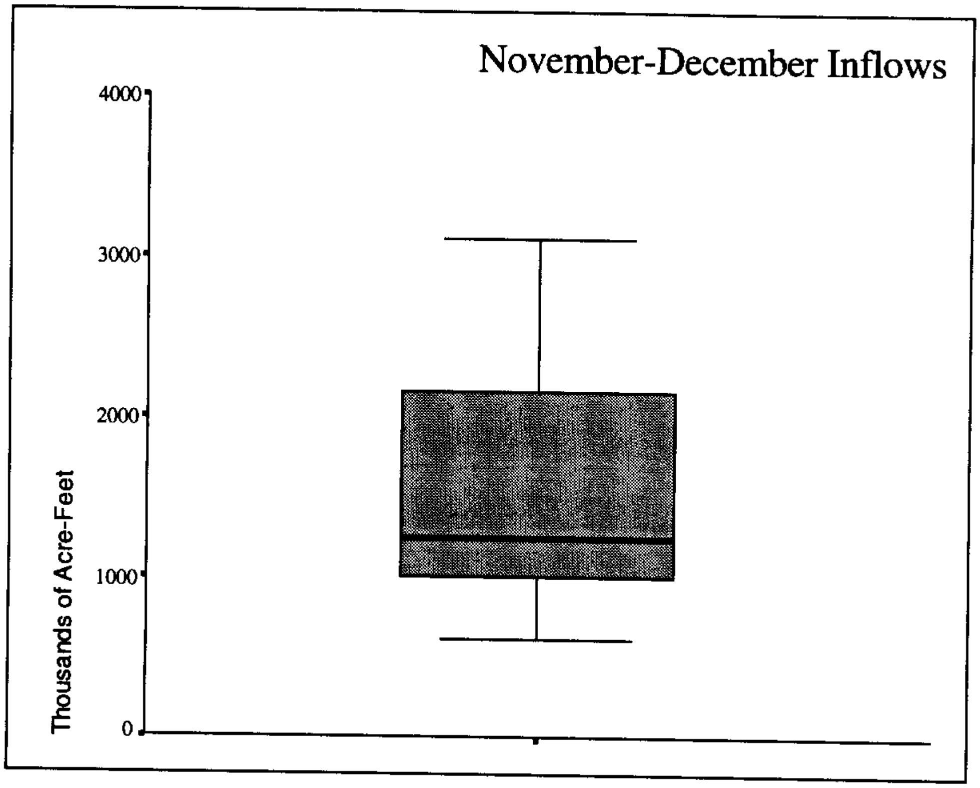
			Statistic	Std. Error
November-December Inflows	Mean		1586.9488	151.6418
	95% Confidence Interval for Mean	Lower Bound	1274.6367	
		Upper Bound	1899.2610	
	5% Trimmed Mean		1557.2302	
	Median		1245.8500	
	Variance		597876.031	
	Std. Deviation		773.2244	
	Minimum		615.13	
	Maximum		3115.37	
	Range		2500.24	
	Interquartile Range		1169.2725	
	Skewness		.643	.456
	Kurtosis		-.915	.887

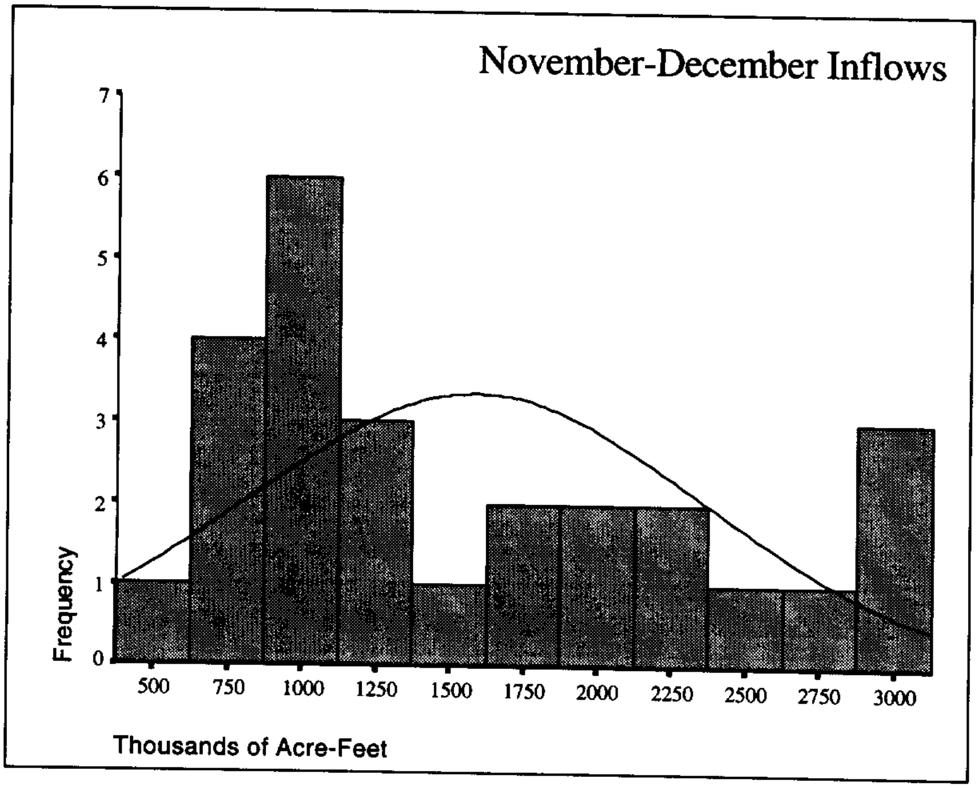
Extreme Values

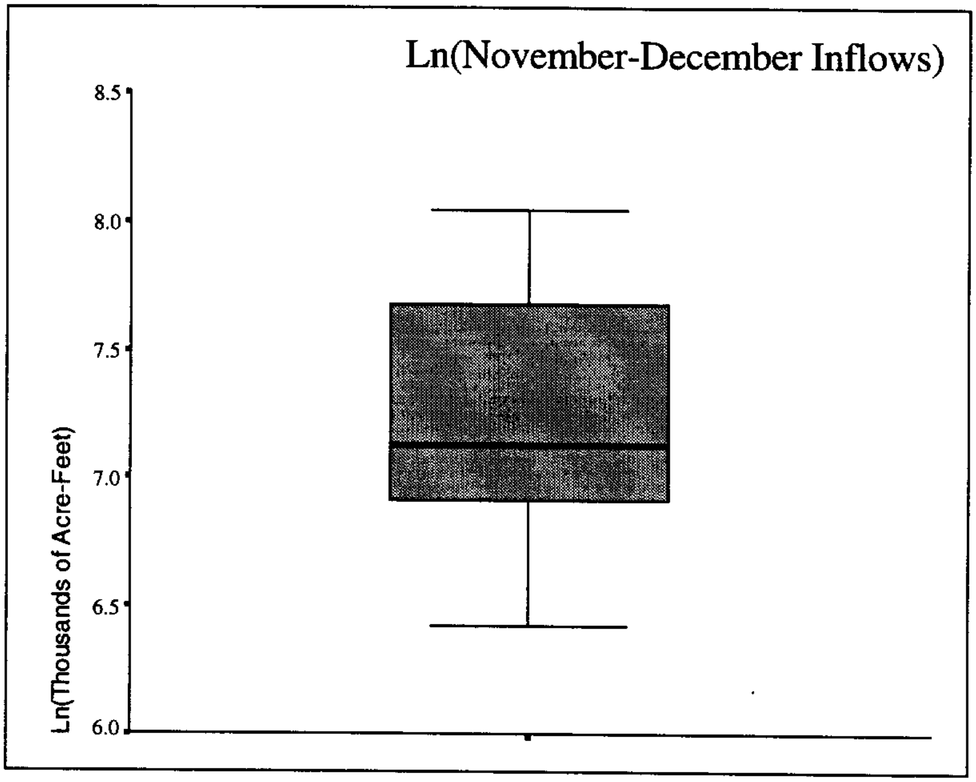
			Case Number	Year	Value
November-December Inflows	Highest	1	25	1986	3115.37
		2	26	1987	2930.13
		3	13	1974	2897.57
		4	14	1975	2659.43
		5	15	1976	2562.96
	Lowest	1	9	1970	615.13
		2	7	1968	706.48
		3	19	1980	767.72
		4	8	1969	828.41
		5	6	1967	848.36


Normal Q-Q Plot
of November-DecemberInflows
Expected Normal
2
1
0
-1
-2
0
1000
2000
3000
4000
Observed Value


Normal Q-Q Plot
of Ln(November-December Inflows)
Expected Normal
2
1
0
-1
-2
6.0
6.5
7.0
7.5
8.0
8.5
Observed Value


November-December Inflows
4000
3000
2000
1000
0
Thousands of Acre-Feet

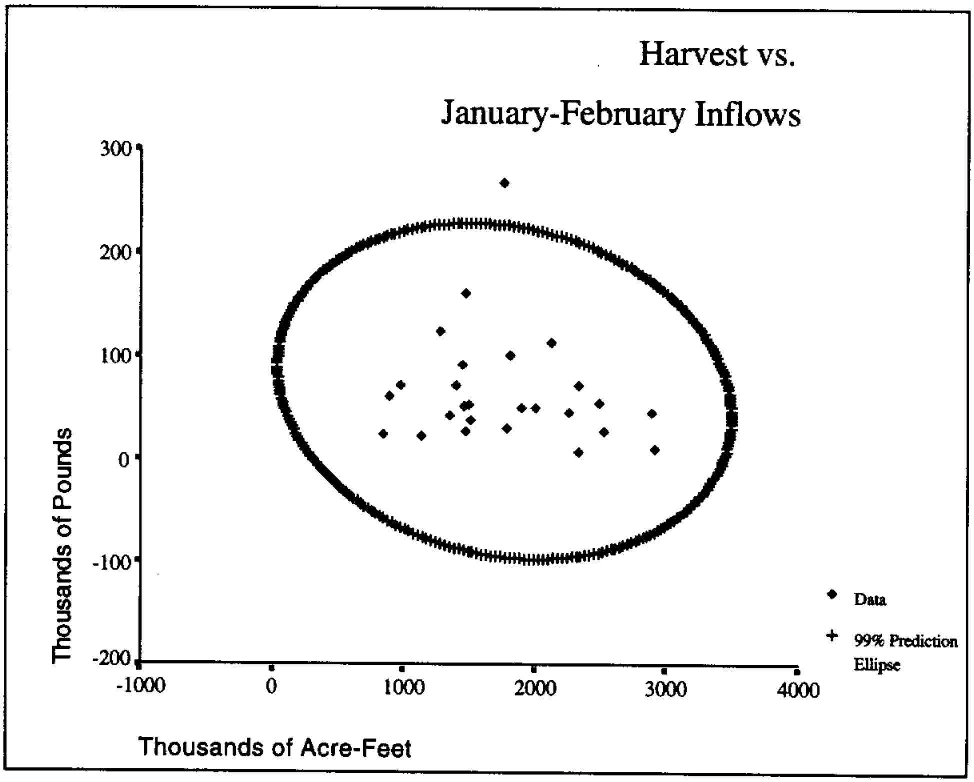

November-December Inflows
7
6
5
4
3
2
1
0
Frequency
500
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
Thousands of Acre-Feet


Ln(November-December Inflows)
Ln(Thousands of Acre-Feet)
8.5
8.0
7.5
7.0
6.5
6.0

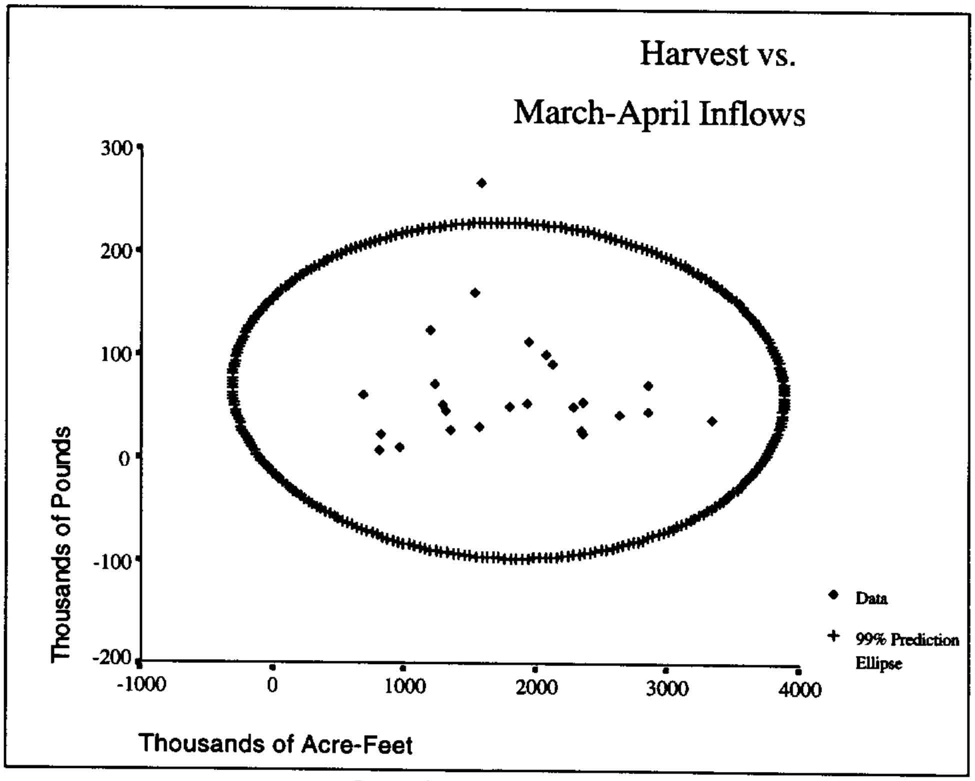
Percentiles

		Percentiles						
		5	10	25	50	75	90	95
Weighted Average (Definition 1)	Black Drum Harvest	9.3000	20.3000	30.7500	52.7000	78.0750	136.0000	231.5150
	Ln(Black Drum Harvest)	2.210249	2.964676	3.425398	3.964500	4.352021	4.905353	5.417005
	January-February Inflows	865.3875	951.6270	1386.6000	1641.9300	2279.5050	2634.5900	2906.7340
	March-April Inflows	733.6000	817.3380	1232.7800	1692.5750	2350.4625	2854.9780	3169.6145
	May-June Inflows	911.0010	1246.7180	1679.6125	2417.1200	3420.0900	3799.0480	4077.7750
	July-August Inflows	254.0985	396.9900	597.3950	856.6600	1198.1750	1693.3240	1955.0620
	September-October Inflows	363.7685	452.2370	557.4175	1110.4800	1583.8000	2106.3130	2253.9780
	November-December Inflows	647.1025	749.3480	1001.9325	1245.8500	2171.2050	2907.3380	3050.5360
	Ln(January-February Inflows)	6.762883	6.857372	7.234492	7.400624	7.731610	7.874529	7.974777
	Ln(March-April Inflows)	6.594699	6.706052	7.117027	7.432014	7.762366	7.956819	8.058664
	Ln(May-June Inflows)	6.790542	7.127853	7.426070	7.790290	8.137291	8.242085	8.313113
	Ln(July-August Inflows)	5.522293	5.974311	6.392530	6.752942	7.088055	7.434428	7.573750
	Ln(September-October Inflows)	5.886661	6.113893	6.323057	7.012374	7.367226	7.651677	7.720452
	Ln(November-December Inflows)	6.470295	6.618486	6.909653	7.127514	7.682989	7.974980	8.022648
Tukey's Hinges	Black Drum Harvest			31.3000	52.7000	73.1000		
	Ln(Black Drum Harvest)			3.443618	3.964500	4.291828		
	January-February Inflows			1398.8200	1641.9300	2260.4600		
	March-April Inflows			1233.0300	1692.5750	2348.4400		
	May-June Inflows			1701.0500	2417.1200	3387.9400		
	July-August Inflows			600.7800	856.6600	1176.0500		
	September-October Inflows			564.6500	1110.4800	1559.1500		
	November-December Inflows			1006.6200	1245.8500	2158.8500		
	Ln(January-February Inflows)			7.243384	7.400624	7.723324		
	Ln(March-April Inflows)			7.117230	7.432014	7.761507		
	Ln(May-June Inflows)			7.439001	7.790290	8.127977		
	Ln(July-August Inflows)			6.398229	6.752942	7.069917		
	Ln(September-October Inflows)			6.336206	7.012374	7.351896		
	Ln(November-December Inflows)			6.914353	7.127514	7.677331		

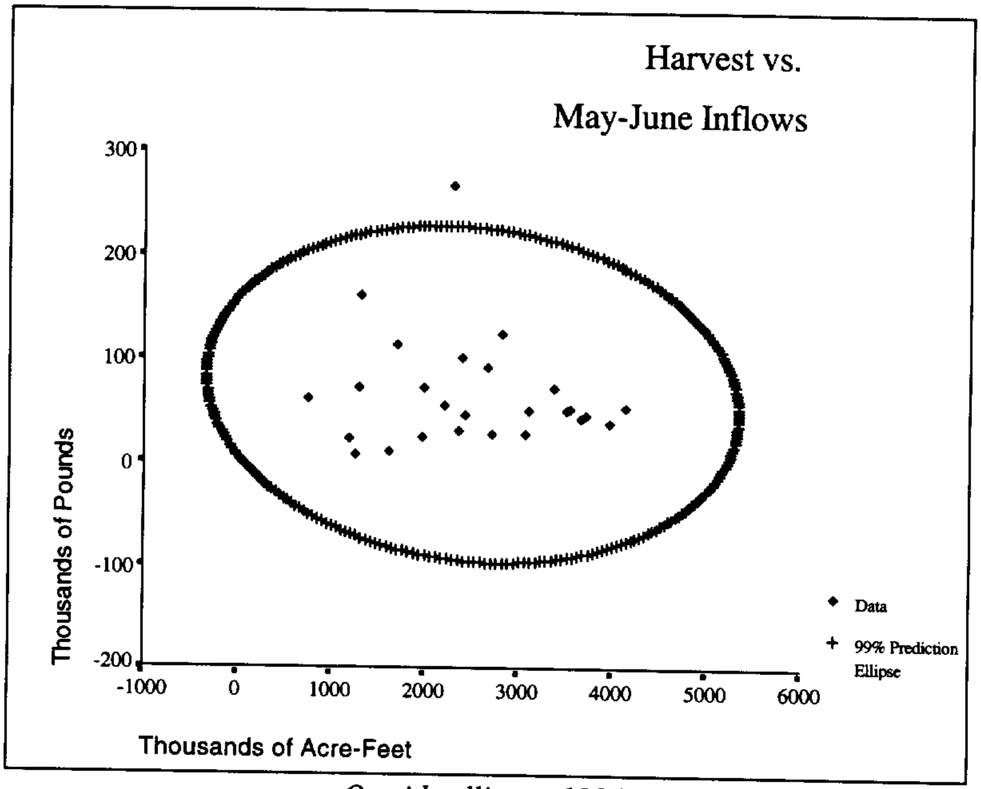
99% Prediction Ellipses



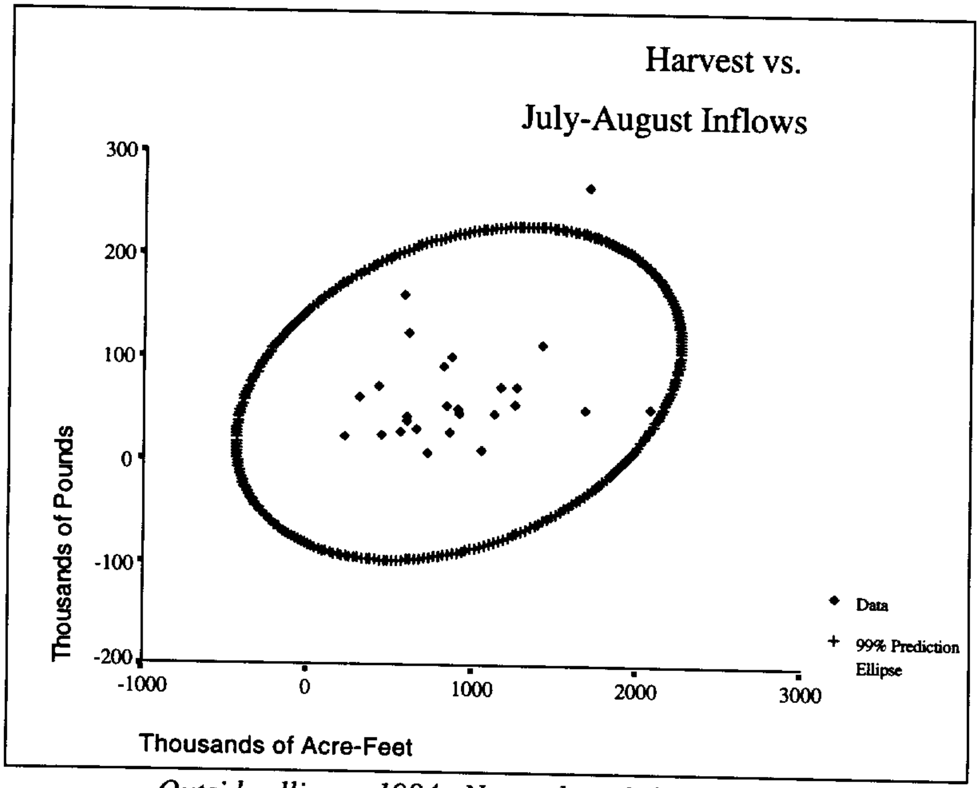
Outside ellipse: 1984.



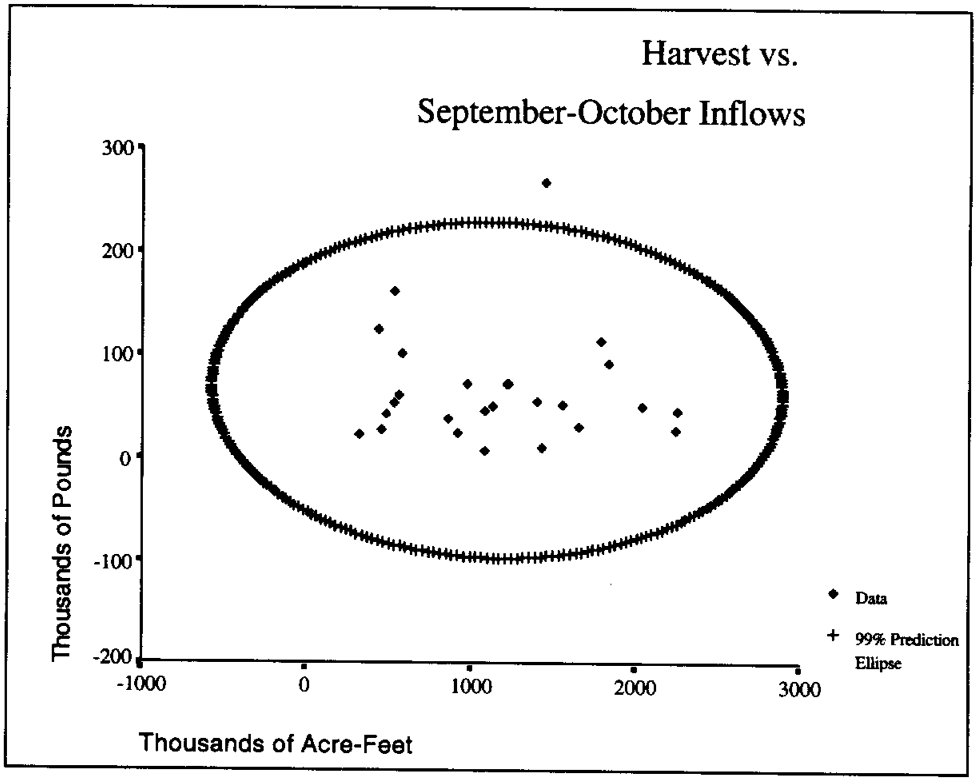
Outside ellipse: 1984.



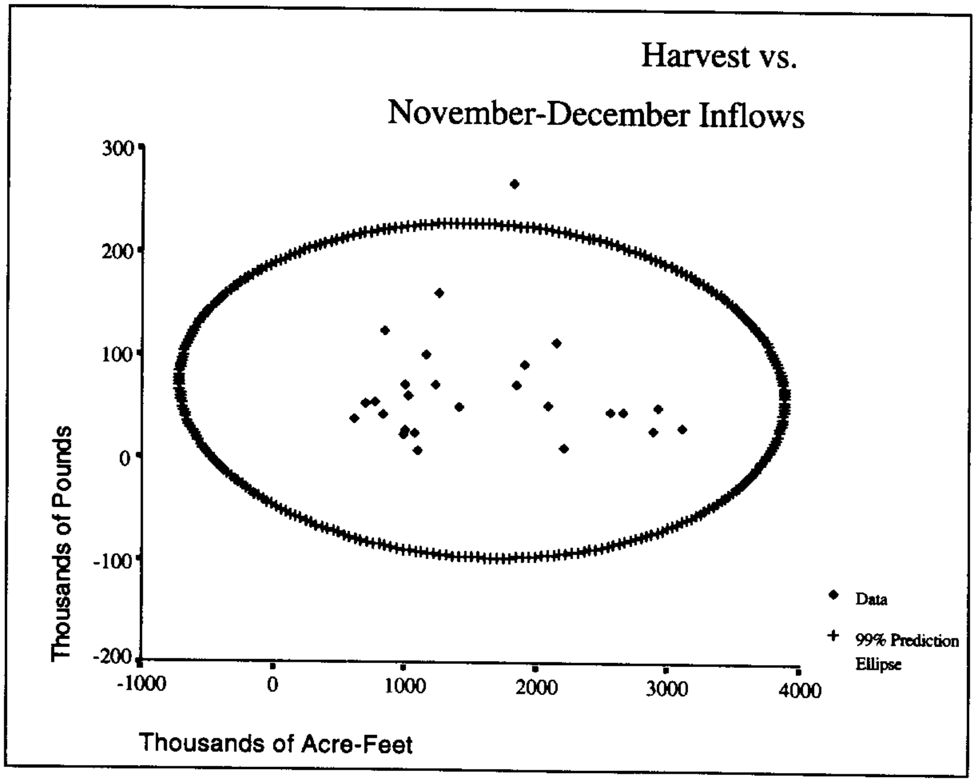
Outside ellipse: 1984.



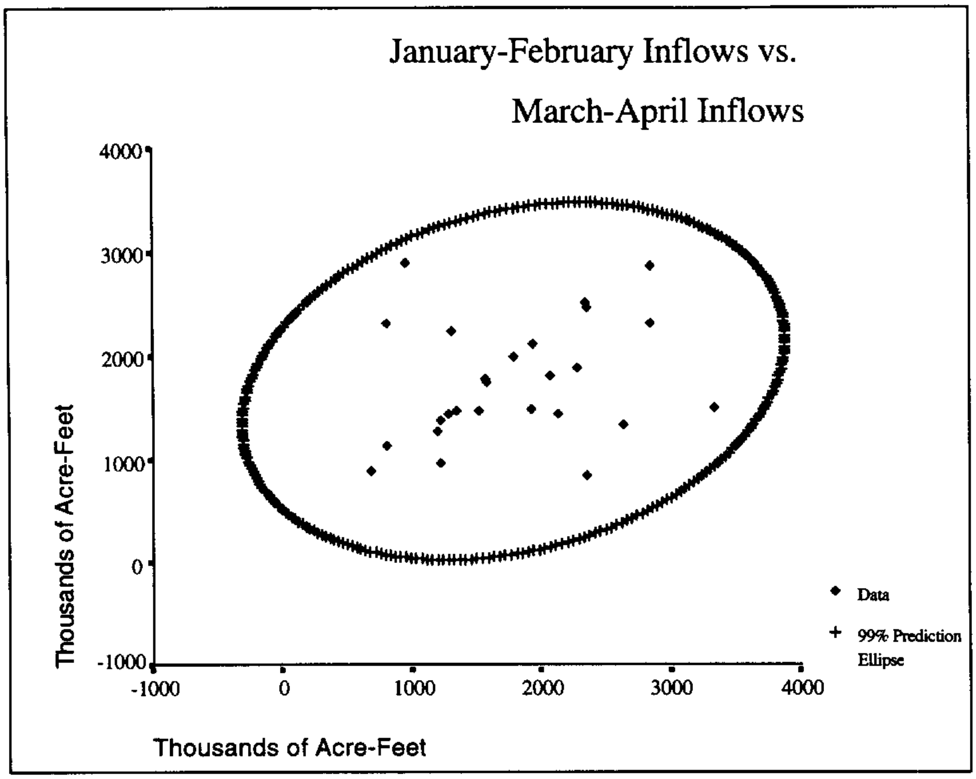
Outside ellipse: 1984. Near edge of ellipse: 1983.

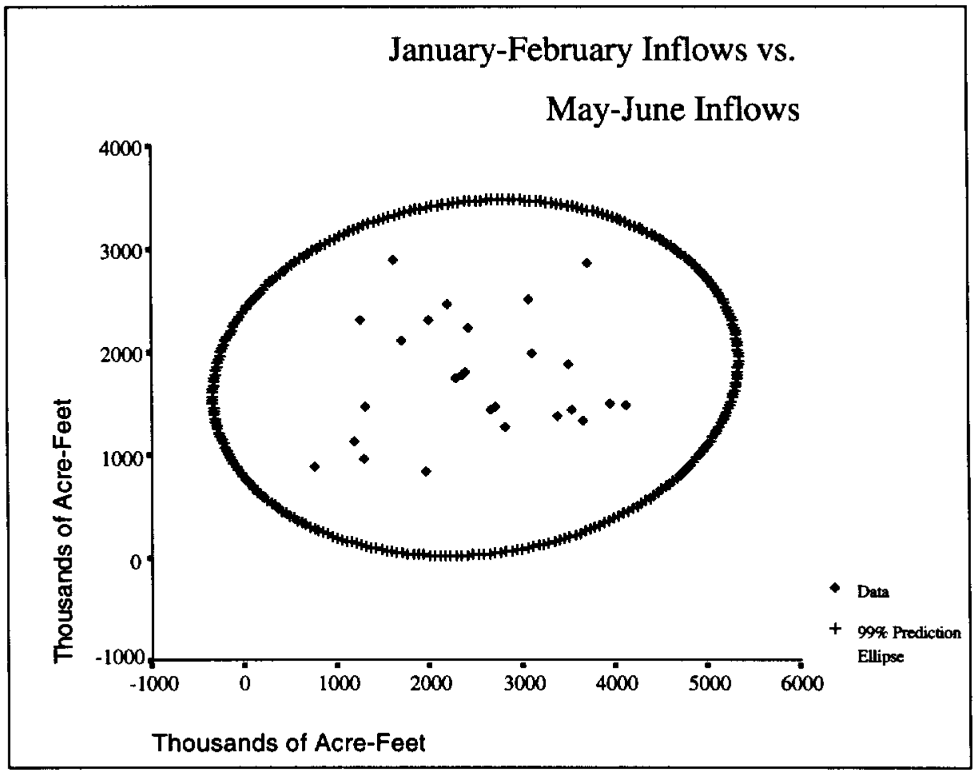


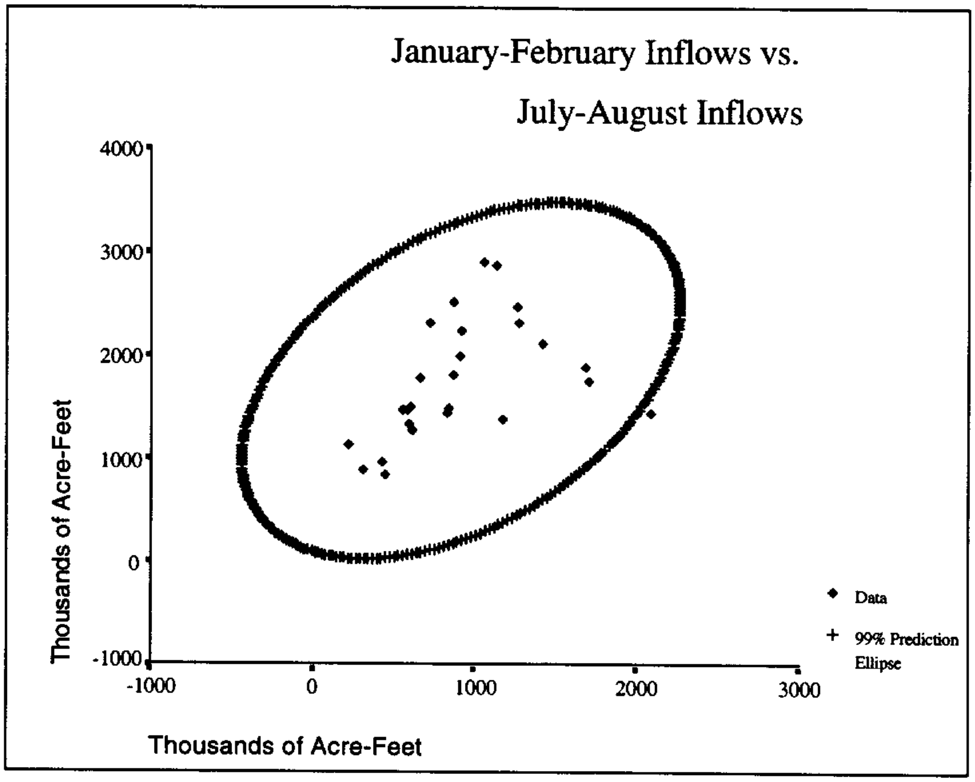
Outside ellipse: 1984.



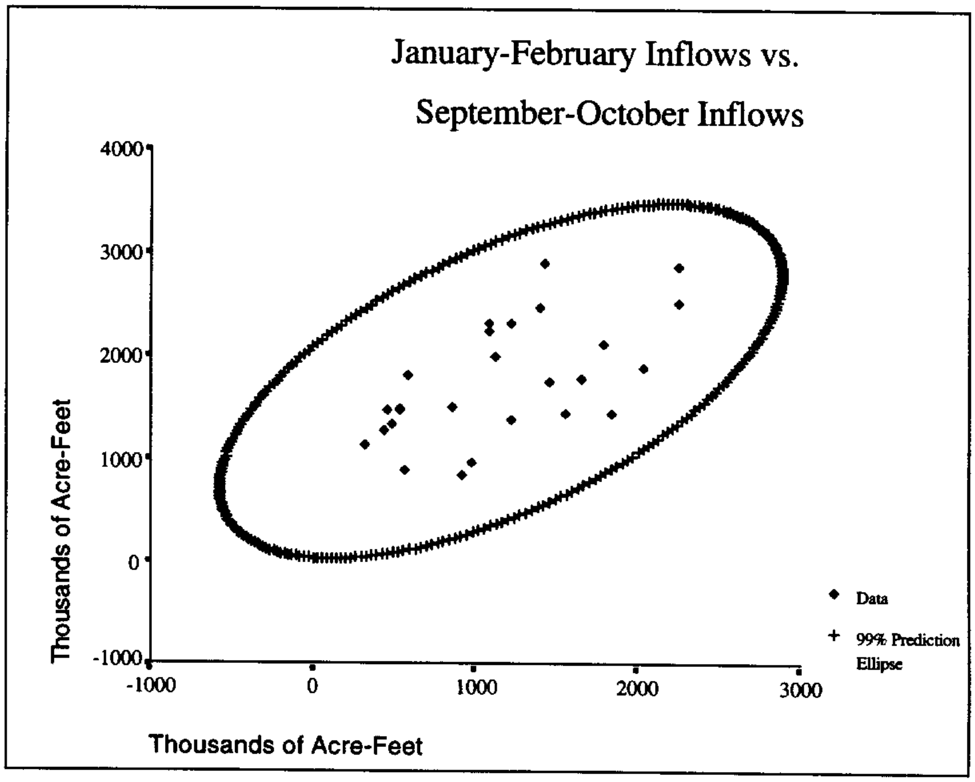
Outside ellipse: 1984.

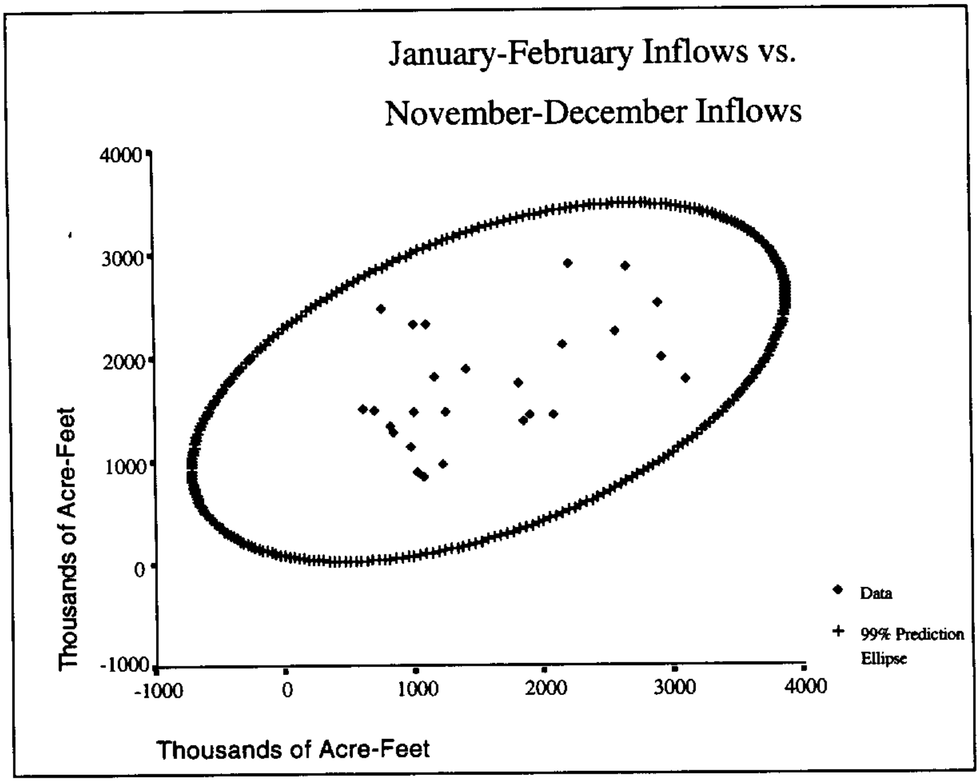

January-February Inflows vs.
March-April Inflows
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

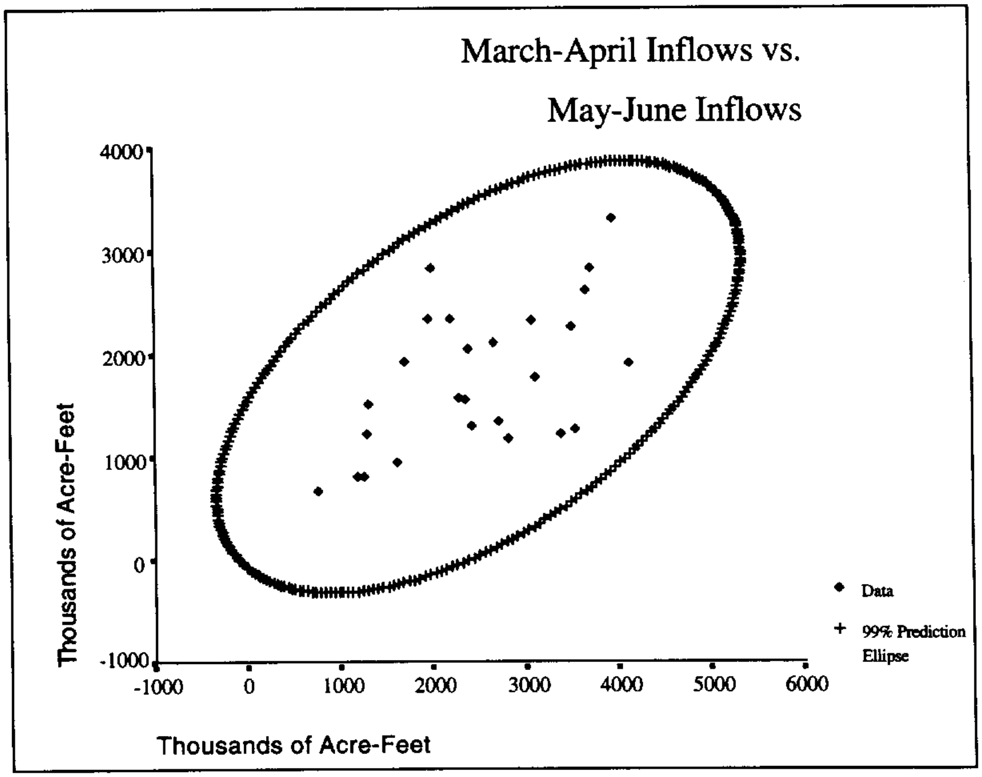

January-February Inflows vs.
May-June Inflows
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000
Thousands of Acre-Feet
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

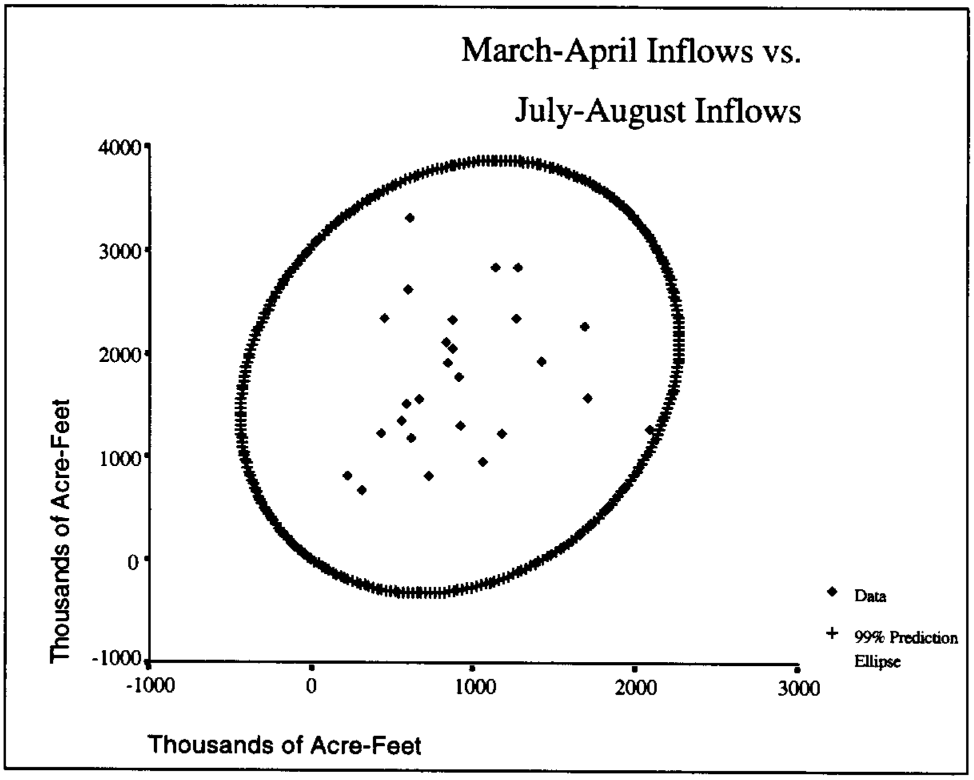


Outside ellipse: 1983.

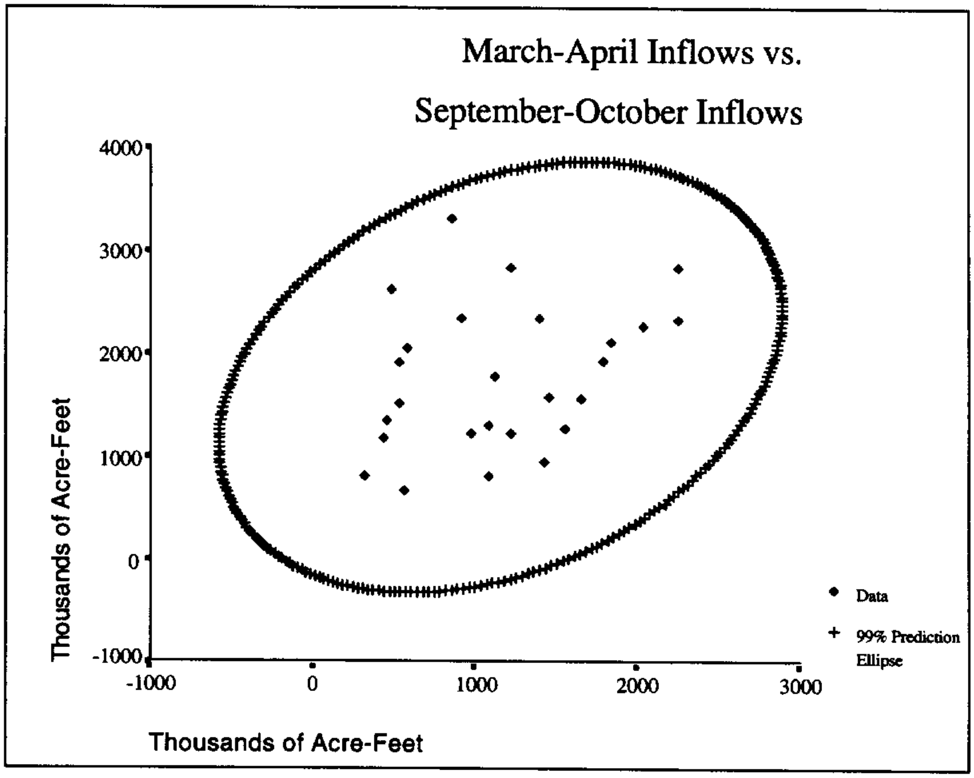


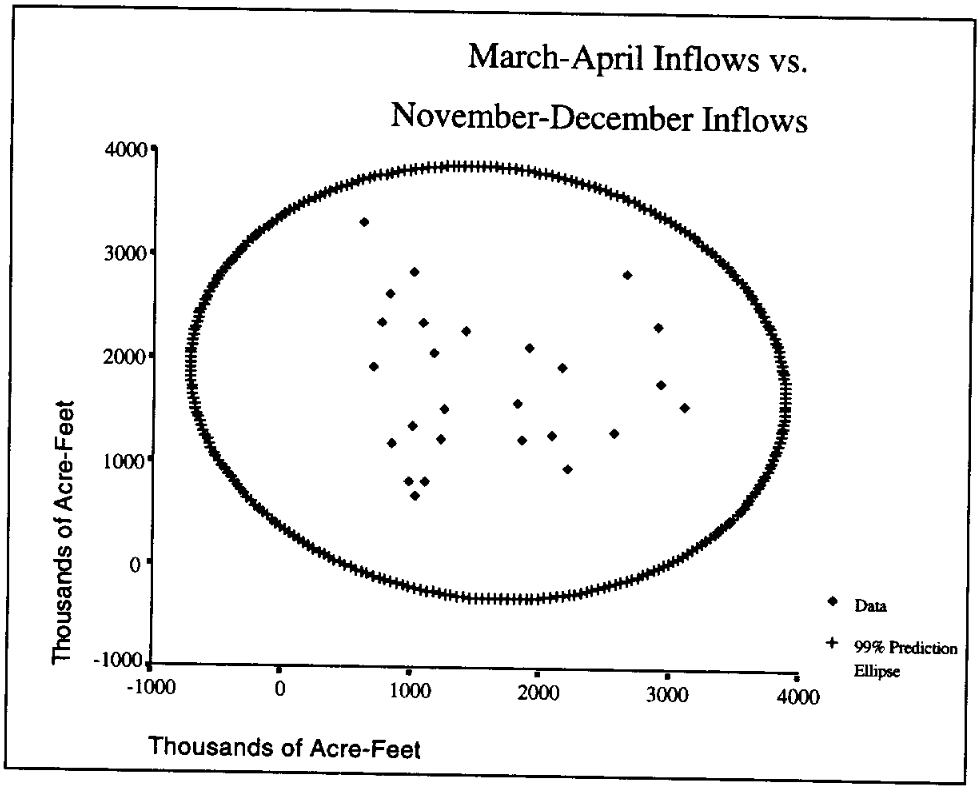

January-February Inflows vs. November-December Inflows

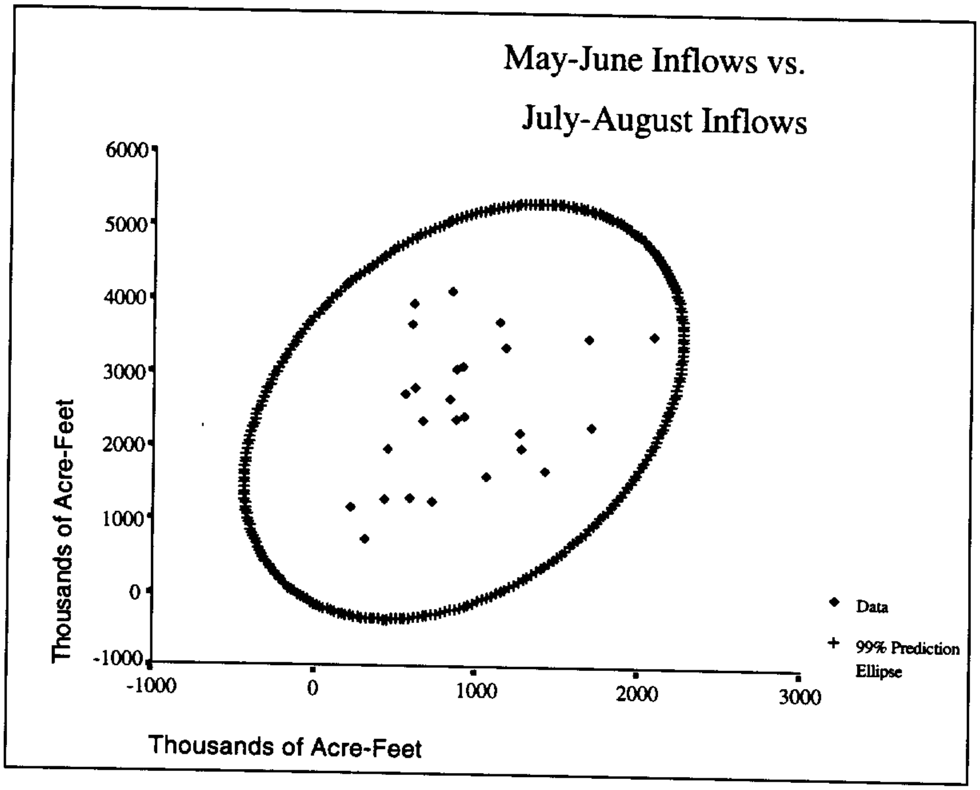

March-April Inflows vs. May-June Inflows

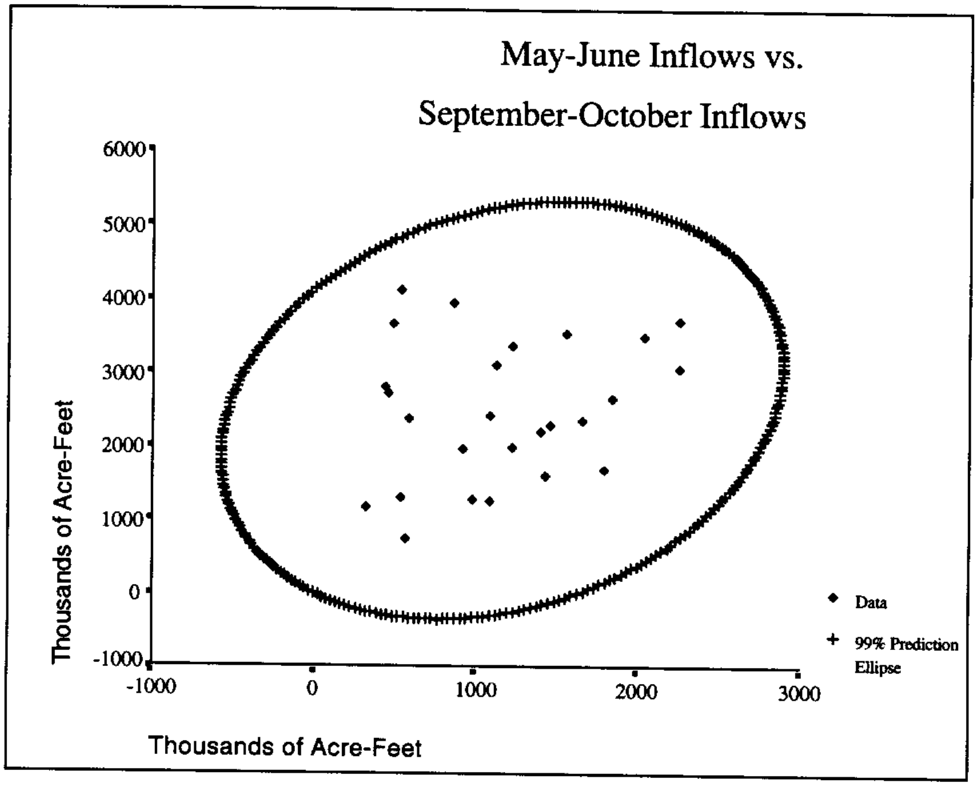


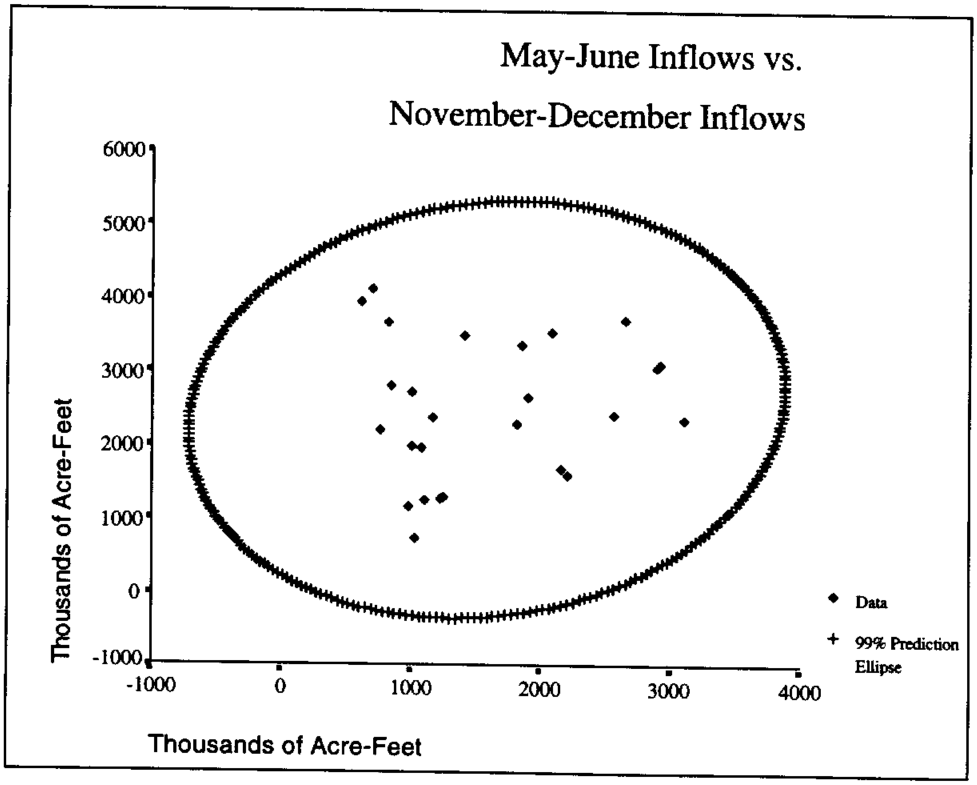
Near edge of ellipse: 1983.

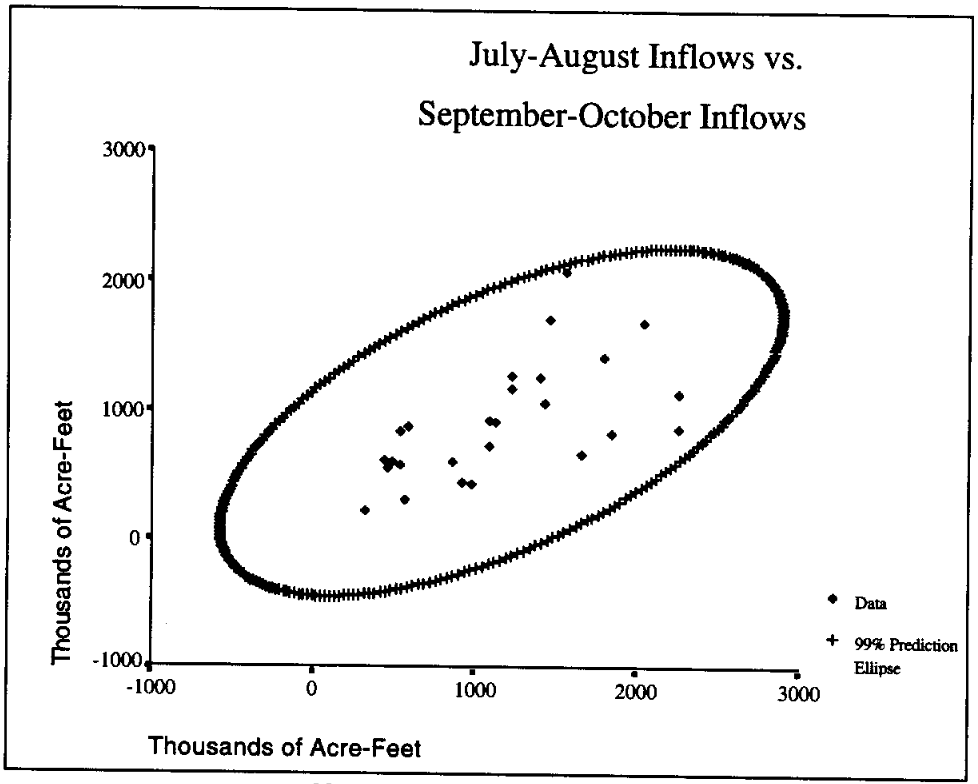



March-April Inflows vs.
November-December Inflows
Thousands of Acre-Feet
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

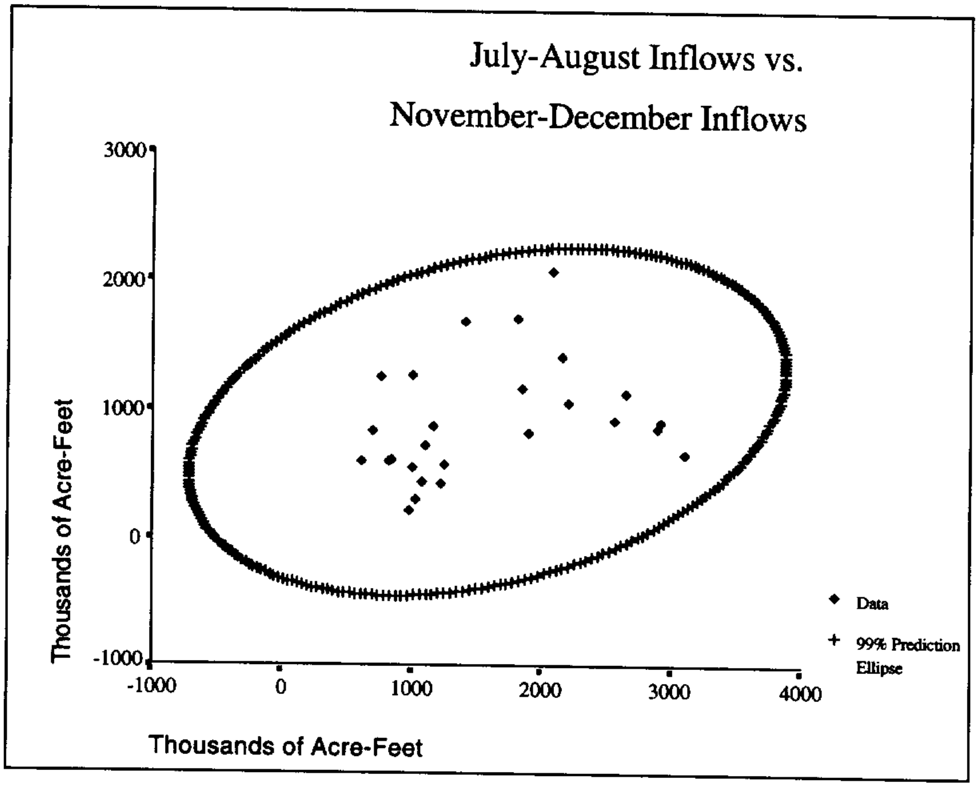

May-June Inflows vs.
July-August Inflows
Thousands of Acre-Feet
6000
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

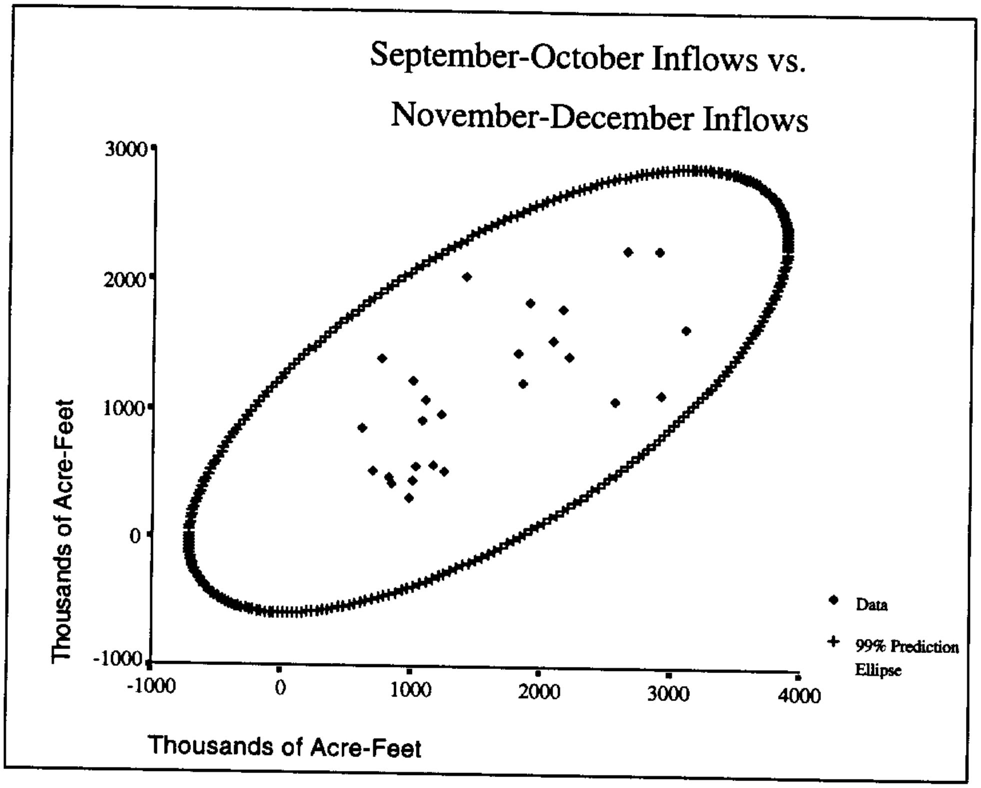

May-June Inflows vs.
September-October Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse


May-June Inflows vs.
November-December Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse



Near edge of ellipse: 1983.



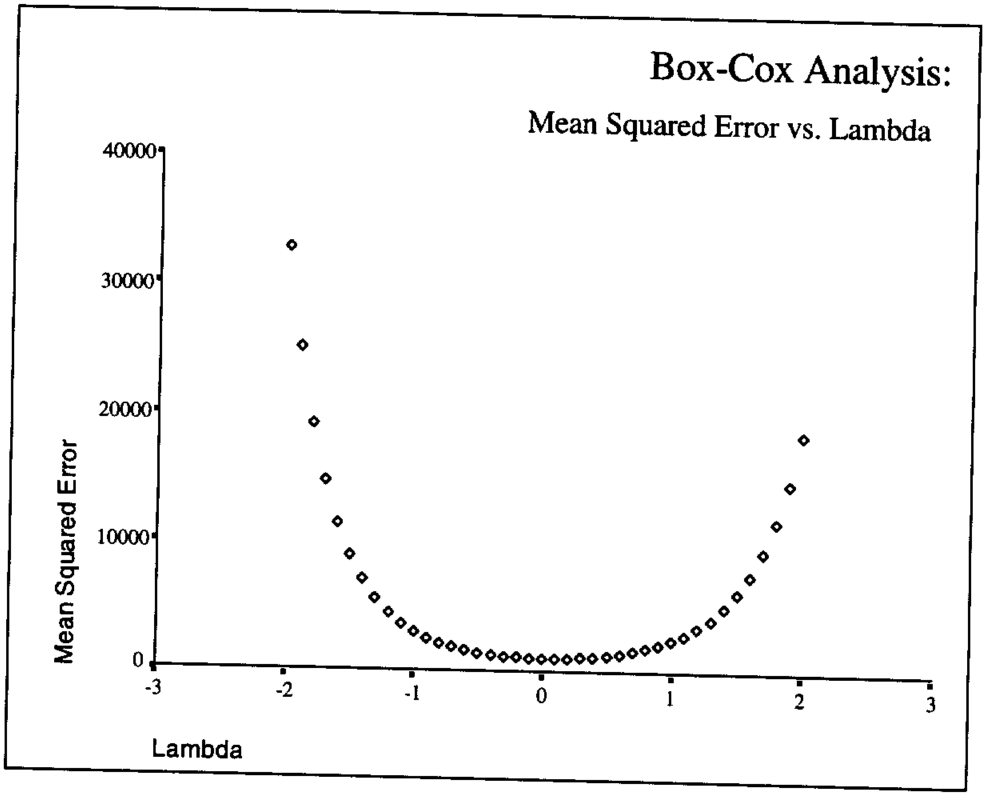

September-October Inflows vs.
November-December Inflows
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

Box–Cox Analysis

Numerical Results

LAMBDA	MSE
-2.0000	32978.4843
-1.9000	25115.8834
-1.8000	19250.2532
-1.7000	14858.6619
-1.6000	11558.2113
-1.5000	9067.9413
-1.4000	7181.2315
-1.3000	5745.7779
-1.2000	4649.0443
-1.1000	3807.6753
-1.0000	3159.7788
-.9000	2659.2934
-.8000	2271.8685
-.7000	1971.8497
-.6000	1740.0680
-.5000	1562.2194
-.4000	1427.6783
-.3000	1328.6300
-.2000	1259.4426
-.1000	1216.2170
.0000	1196.4760
.1000	1198.9603
.2000	1223.5142
.3000	1271.0485
.4000	1343.5751
.5000	1444.3139
.6000	1577.8789
.7000	1750.5542
.8000	1970.6800
.9000	2249.1744
1.0000	2600.2299
1.1000	3042.2328
1.2000	3598.9736
1.3000	4301.2389
1.4000	5188.9012
1.5000	6313.6657
1.6000	7742.6829
1.7000	9563.3036
1.8000	11889.3440
1.9000	14869.3519
2.0000	18697.5219

Plots


Box-Cox Analysis:
Mean Squared Error vs. Lambda
40000
30000
20000
10000
0
Mean Squared Error
-3
-2
-1
0
1
2
3
Lambda

Model Choice Diagnostics

Untransformed Data

```
N = 26      Regression Models for Dependent Variable: BLK_DRUM

        Rsq      Adj    C(p)     AIC      MSE     SBC Variables in Model
 In              Rsq

  1 0.0969 0.0593   4.009   208.5    2818   211.0 JA_INFL
  1 0.0216 -.0191   6.177   210.5    3053   213.1 JF_INFL
  1 0.0121 -.0290   6.450   210.8    3082   213.3 MJ_INFL
  1 0.0024 -.0392   6.731   211.0    3113   213.6 ND_INFL
-----------------------------------------------------------------
  2 0.1977 0.1279   3.107   207.4    2612   211.2 JF_INFL JA_INFL
  2 0.1723 0.1003   3.838   208.2    2695   212.0 JA_INFL SO_INFL
  2 0.1522 0.0785   4.416   208.8    2760   212.6 MJ_INFL JA_INFL
  2 0.1211 0.0446   5.313   209.8    2862   213.5 JA_INFL ND_INFL
-------------------------------------------------------------------------
  3 0.2627 0.1621   3.235   207.2    2510   212.2 JF_INFL MJ_INFL JA_INFL
  3 0.2258 0.1202   4.297   208.5    2635   213.5 MJ_INFL JA_INFL SO_INFL
  3 0.2177 0.1111   4.529   208.7    2663   213.8 JF_INFL JA_INFL SO_INFL
  3 0.1987 0.0894   5.079   209.3    2728   214.4 JF_INFL JA_INFL ND_INFL
---------------------------------------------------------------------------------
  4 0.2818 0.1450   4.684   208.5    2561   214.8 JF_INFL MA_INFL MJ_INFL
                                                  JA_INFL
  4 0.2794 0.1421   4.753   208.6    2570   214.9 JF_INFL MJ_INFL JA_INFL
                                                  SO_INFL
  4 0.2632 0.1229   5.219   209.2    2627   215.5 JF_INFL MJ_INFL JA_INFL
                                                  ND_INFL
  4 0.2451 0.1013   5.742   209.8    2692   216.1 MA_INFL MJ_INFL JA_INFL
                                                  SO_INFL
---------------------------------------------------------------------------------
  5 0.3087 0.1359   5.908   209.5    2588   217.1 JF_INFL MA_INFL MJ_INFL
                                                  JA_INFL SO_INFL
  5 0.2831 0.1039   6.646   210.5    2684   218.0 JF_INFL MJ_INFL JA_INFL
                                                  SO_INFL ND_INFL
  5 0.2821 0.1026   6.675   210.5    2688   218.0 JF_INFL MA_INFL MJ_INFL
                                                  JA_INFL ND_INFL
  5 0.2578 0.0722   7.376   211.4    2779   218.9 MA_INFL MJ_INFL JA_INFL
                                                  SO_INFL ND_INFL
---------------------------------------------------------------------------------
  6 0.3403 0.1319   7.000   210.3    2600   219.1 JF_INFL MA_INFL MJ_INFL
                                                  JA_INFL SO_INFL ND_INFL
---------------------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP   JF_INFL    MA_INFL

  1  MODEL1   PARMS   BLK_DRUM  53.0838    32.852     .           .
  2  MODEL1   PARMS   BLK_DRUM  55.2517    91.712   -0.013860     .
  3  MODEL1   PARMS   BLK_DRUM  55.5194    83.054     .           .
  4  MODEL1   PARMS   BLK_DRUM  55.7923    72.718     .           .
  5  MODEL1   PARMS   BLK_DRUM  51.1107    74.524   -0.033342     .
  6  MODEL1   PARMS   BLK_DRUM  51.9127    47.133     .           .
  7  MODEL1   PARMS   BLK_DRUM  52.5383    59.205     .           .
  8  MODEL1   PARMS   BLK_DRUM  53.4954    45.537     .           .
  9  MODEL1   PARMS   BLK_DRUM  50.0982   105.172   -0.034968     .
 10  MODEL1   PARMS   BLK_DRUM  51.3358    72.874     .           .
 11  MODEL1   PARMS   BLK_DRUM  51.6018    72.938   -0.025388     .
 12  MODEL1   PARMS   BLK_DRUM  52.2276    75.518   -0.031913     .
 13  MODEL1   PARMS   BLK_DRUM  50.6072    99.974   -0.038872   0.013448
 14  MODEL1   PARMS   BLK_DRUM  50.6921   102.960   -0.027656     .
 15  MODEL1   PARMS   BLK_DRUM  51.2572   105.853   -0.033866     .
 16  MODEL1   PARMS   BLK_DRUM  51.8853    64.629     .         0.013719
```

```
OBS  MJ_INFL     JA_INFL     SO_INFL     ND_INFL     BLK_DRUM  _IN_  _P_

  1      .       0.037455       .            .          -1       1     2
  2      .           .          .            .          -1       1     2
  3  -0.006317       .          .            .          -1       1     2
  4      .           .          .       -0.003470       -1       1     2
  5      .       0.056279       .            .          -1       2     3
  6      .       0.063170   -0.032644        .          -1       2     3
  7  -0.014414   0.048132       .            .          -1       2     3
  8      .       0.043687       .       -0.011596       -1       2     3
  9  -0.015651   0.068791       .            .          -1       3     4
 10  -0.014174   0.073356   -0.032247        .          -1       3     4
 11      .       0.066831   -0.019096        .          -1       3     4
 12      .       0.056838       .       -0.002541       -1       3     4
 13  -0.021439   0.071559       .            .          -1       3     4
 14  -0.015262   0.078127   -0.017458        .          -1       4     5
 15  -0.015609   0.069186       .       -0.001952       -1       4     5
 16  -0.019897   0.078058   -0.037654        .          -1       4     5

OBS  _EDF_   _MSE_     _RSQ_     _ADJRSQ_     _CP_      _AIC_     _SBC_

  1   24    2817.89   0.09691    0.05928    4.00896   208.456   210.972
  2   24    3052.75   0.02164   -0.01912    6.17677   210.538   213.054
  3   24    3082.41   0.01214   -0.02902    6.45047   210.789   213.305
  4   24    3112.78   0.00240   -0.03916    6.73085   211.044   213.560
  5   23    2612.30   0.19768    0.12792    3.10677   207.380   211.154
  6   23    2694.93   0.17231    0.10033    3.83763   208.190   211.964
  7   23    2760.27   0.15224    0.07852    4.41565   208.813   212.587
  8   23    2861.75   0.12107    0.04464    5.31328   209.751   213.526
  9   22    2509.83   0.26267    0.16212    3.23517   207.184   212.216
 10   22    2635.36   0.22579    0.12022    4.29725   208.453   213.485
 11   22    2662.74   0.21775    0.11108    4.52891   208.722   213.754
 12   22    2727.72   0.19866    0.08938    5.07870   209.348   214.381
 13   21    2561.08   0.28181    0.14501    4.68385   208.500   214.790
 14   21    2569.69   0.27940    0.14214    4.75334   208.587   214.878
 15   21    2627.30   0.26324    0.12291    5.21861   209.164   215.454
 16   21    2692.08   0.24508    0.10128    5.74184   209.797   216.087


OBS  _MODEL_   _TYPE_   _DEPVAR_    _RMSE_   INTERCEP   JF_INFL     MA_INFL

 17  MODEL1    PARMS    BLK_DRUM   50.8754    95.696   -0.030411   0.017075
 18  MODEL1    PARMS    BLK_DRUM   51.8091   100.111   -0.028669       .
 19  MODEL1    PARMS    BLK_DRUM   51.8461    99.261   -0.039854   0.013964
 20  MODEL1    PARMS    BLK_DRUM   52.7174    52.473       .       0.020102
 21  MODEL1    PARMS    BLK_DRUM   50.9924    81.316   -0.035634   0.028004

OBS  MJ_INFL     JA_INFL     SO_INFL     ND_INFL     BLK_DRUM  _IN_  _P_

 17  -0.022494   0.084453   -0.022715        .          -1       5     6
 18  -0.015264   0.079978   -0.023222    0.006070       -1       5     6
 19  -0.021692   0.071367       .        0.001474       -1       5     6
 20  -0.022480   0.083775   -0.053447    0.012781       -1       5     6
 21  -0.027129   0.094825   -0.045761    0.020729       -1       6     7

OBS  _EDF_   _MSE_     _RSQ_     _ADJRSQ_     _CP_      _AIC_     _SBC_

 17   20    2588.30   0.30874    0.13593    5.90826   209.506   217.055
 18   20    2684.19   0.28314    0.10392    6.64575   210.452   218.001
 19   20    2688.02   0.28211    0.10264    6.67522   210.489   218.038
 20   20    2779.12   0.25778    0.07223    7.37596   211.356   218.904
 21   19    2600.23   0.34028    0.13195    7.00000   210.292   219.099
```

Logged Inflows

```
N = 26     Regression Models for Dependent Variable: BLK_DRUM

         Rsq     Adj    C(p)     AIC      MSE     SBC Variables in Model
 In              Rsq

  1 0.0810 0.0427  10.31  208.9    2868   211.4 LGJAINFL
  1 0.0070 -.0343  12.91  210.9    3098   213.4 LGJFINFL
  1 0.0040 -.0375  13.01  211.0    3108   213.5 LGMJINFL
  1 0.0025 -.0391  13.07  211.0    3113   213.6 LGMAINFL
----------------------------------------------------------------
  2 0.1989 0.1293  8.160  207.3    2608   211.1 LGJFINFL LGJAINFL
  2 0.1656 0.0930  9.332  208.4    2717   212.2 LGJAINFL LGSOINFL
  2 0.1398 0.0650  10.24  209.2    2801   213.0 LGMJINFL LGJAINFL
  2 0.0911 0.0120  11.95  210.6    2959   214.4 LGJAINFL LGNDINFL
------------------------------------------------------------------------
  3 0.2759 0.1772  7.455  206.7    2465   211.7 LGJFINFL LGMJINFL LGJAINFL
  3 0.2524 0.1505  8.279  207.5    2545   212.6 LGMJINFL LGJAINFL LGSOINFL
  3 0.2439 0.1408  8.579  207.8    2574   212.9 LGJFINFL LGJAINFL LGSOINFL
  3 0.2008 0.0918  10.10  209.3    2721   214.3 LGJFINFL LGMAINFL LGJAINFL
----------------------------------------------------------------------------------
  4 0.3411 0.2156  7.164  206.3    2350   212.6 LGJFINFL LGMJINFL LGJAINFL
                                                LGSOINFL
  4 0.2971 0.1632  8.710  207.9    2507   214.2 LGJFINFL LGMAINFL LGMJINFL
                                                LGJAINFL
  4 0.2899 0.1546  8.964  208.2    2532   214.5 LGMAINFL LGMJINFL LGJAINFL
                                                LGSOINFL
  4 0.2777 0.1401  9.392  208.6    2576   214.9 LGJFINFL LGMJINFL LGJAINFL
                                                LGNDINFL
----------------------------------------------------------------------------------
  5 0.3877 0.2346  7.525  206.4    2293   213.9 LGJFINFL LGMAINFL LGMJINFL
                                                LGJAINFL LGSOINFL
  5 0.3570 0.1963  8.603  207.6    2408   215.2 LGJFINFL LGMJINFL LGJAINFL
                                                LGSOINFL LGNDINFL
  5 0.3294 0.1617  9.574  208.7    2511   216.3 LGMAINFL LGMJINFL LGJAINFL
                                                LGSOINFL LGNDINFL
  5 0.2971 0.1214  10.71  209.9    2632   217.5 LGJFINFL LGMAINFL LGMJINFL
                                                LGJAINFL LGNDINFL
----------------------------------------------------------------------------------
  6 0.4595 0.2888  7.000  205.1    2130   213.9 LGJFINFL LGMAINFL LGMJINFL
                                                LGJAINFL LGSOINFL LGNDINFL
----------------------------------------------------------------------------------


OBS  _MODEL_   _TYPE_   _DEPVAR_    _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

  1  MODEL1    PARMS    BLK_DRUM   53.5504   -130.603      .         .
  2  MODEL1    PARMS    BLK_DRUM   55.6625    167.338  -13.4876      .
  3  MODEL1    PARMS    BLK_DRUM   55.7483    128.152      .         .
  4  MODEL1    PARMS    BLK_DRUM   55.7905     19.480      .       6.4422
  5  MODEL1    PARMS    BLK_DRUM   51.0705    203.791  -71.5782      .
  6  MODEL1    PARMS    BLK_DRUM   52.1227    -55.808      .         .
  7  MODEL1    PARMS    BLK_DRUM   52.9209     41.851      .         .
  8  MODEL1    PARMS    BLK_DRUM   54.4006    -71.772      .         .
  9  MODEL1    PARMS    BLK_DRUM   49.6469    428.299  -77.2322      .
 10  MODEL1    PARMS    BLK_DRUM   50.4445    169.229      .         .
 11  MODEL1    PARMS    BLK_DRUM   50.7319    206.983  -60.2126      .
 12  MODEL1    PARMS    BLK_DRUM   52.1586    233.956  -71.1042   -5.9875
 13  MODEL1    PARMS    BLK_DRUM   48.4746    462.688  -64.1679      .
 14  MODEL1    PARMS    BLK_DRUM   50.0666    386.305  -81.3317   25.0307
 15  MODEL1    PARMS    BLK_DRUM   50.3231    104.395      .      34.2557
 16  MODEL1    PARMS    BLK_DRUM   50.7527    446.684  -74.9195      .
```

```
OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  BLK_DRUM  _IN_  _P_  _EDF_

  1     .       29.536      .          .        -1       1     2     24
  2     .         .         .          .        -1       1     2     24
  3   -7.8691     .         .          .        -1       1     2     24
  4     .         .         .          .        -1       1     2     24
  5     .       58.946      .          .        -1       2     3     23
  6     .       58.946  -39.2960       .        -1       2     3     23
  7  -35.2259   44.518      .          .        -1       2     3     23
  8     .       34.097      .      -12.3181     -1       2     3     23
  9  -40.4632   78.479      .          .        -1       3     4     22
 10  -43.3771   82.380  -45.9569       .        -1       3     4     22
 11     .       76.409  -29.5732       .        -1       3     4     22
 12     .       60.540      .          .        -1       3     4     22
 13  -45.9611  102.387  -35.9922       .        -1       4     5     21
 14  -55.6224   79.130      .          .        -1       4     5     21
 15  -65.0680   86.961  -53.4288       .        -1       4     5     21
 16  -41.1620   79.824      .       -5.3955     -1       4     5     21

OBS   _MSE_      _RSQ_     _ADJRSQ_      _CP_       _AIC_      _SBC_

  1  2867.65   0.08097    0.04267    10.3070    208.911    211.428
  2  3098.32   0.00704   -0.03433    12.9058    210.923    213.439
  3  3107.87   0.00398   -0.03752    13.0134    211.003    213.519
  4  3112.58   0.00247   -0.03910    13.0665    211.042    213.558
  5  2608.20   0.19894    0.12929     8.1597    207.339    211.113
  6  2716.78   0.16560    0.09304     9.3320    208.400    212.174
  7  2800.63   0.13984    0.06505    10.2373    209.190    212.964
  8  2959.43   0.09107    0.01203    11.9518    210.624    214.398
  9  2464.82   0.27589    0.17715     7.4547    206.713    211.746
 10  2544.64   0.25244    0.15050     8.2791    207.542    212.574
 11  2573.72   0.24390    0.14080     8.5793    207.837    212.870
 12  2720.52   0.20077    0.09179    10.0954    209.280    214.312
 13  2349.79   0.34106    0.21555     7.1637    206.261    212.552
 14  2506.66   0.29707    0.16318     8.7102    207.941    214.232
 15  2532.42   0.28985    0.15458     8.9640    208.207    214.498
 16  2575.84   0.27768    0.14009     9.3920    208.649    214.940


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

 17  MODEL1   PARMS   BLK_DRUM  47.8821   405.833  -67.6063   38.3483
 18  MODEL1   PARMS   BLK_DRUM  49.0670   407.513  -68.0992      .
 19  MODEL1   PARMS   BLK_DRUM  50.1100   -61.523      .       53.3792
 20  MODEL1   PARMS   BLK_DRUM  51.3017   389.427  -80.9516   24.7659
 21  MODEL1   PARMS   BLK_DRUM  46.1551   231.040  -79.6283   65.4007

OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  BLK_DRUM  _IN_  _P_  _EDF_

 17  -70.3819  108.586  -43.8228       .        -1       5     6     20
 18  -45.3072  105.717  -48.3857   19.6670      -1       5     6     20
 19  -75.7367   93.250  -80.6602   34.8757      -1       5     6     20
 20  -55.5638   79.319      .      -0.7857      -1       5     6     20
 21  -86.0130  121.090  -79.6003   48.0086      -1       6     7     19

OBS   _MSE_      _RSQ_     _ADJRSQ_      _CP_       _AIC_      _SBC_

 17  2292.69   0.38769    0.23461     7.5246    206.353    213.902
 18  2407.57   0.35701    0.19626     8.6031    207.624    215.173
 19  2511.01   0.32938    0.16173     9.5743    208.718    216.267
 20  2631.86   0.29711    0.12139    10.7089    209.940    217.489
 21  2130.30   0.45951    0.28883     7.0000    205.109    213.916
```

Logged Harvest

```
N = 26     Regression Models for Dependent Variable: LBLKDRUM

       Rsq     Adj    C(p)     AIC     MSE     SBC Variables in Model
 In            Rsq

  1 0.0823 0.0441  7.656 -13.36 0.5555 -10.85 JA_INFL
  1 0.0688 0.0300  8.094 -12.98 0.5637 -10.47 JF_INFL
  1 0.0209 -.0199  9.642 -11.68 0.5927 -9.164 MA_INFL
  1 0.0053 -.0361  10.14 -11.27 0.6021 -8.754 MJ_INFL
---------------------------------------------------
  2 0.2706 0.2071  3.573 -17.33 0.4608 -13.56 JF_INFL JA_INFL
  2 0.1531 0.0795  7.369 -13.45 0.5350 -9.677 JA_INFL SO_INFL
  2 0.1148 0.0378  8.608 -12.30 0.5592 -8.526 JF_INFL MA_INFL
  2 0.1096 0.0321  8.776 -12.15 0.5625 -8.374 JA_INFL ND_INFL
-----------------------------------------------------------
  3 0.3023 0.2071  4.549 -16.49 0.4608 -11.46 JF_INFL MA_INFL JA_INFL
  3 0.2754 0.1766  5.416 -15.51 0.4785 -10.48 JF_INFL JA_INFL SO_INFL
  3 0.2738 0.1747  5.470 -15.45 0.4796 -10.42 JF_INFL MJ_INFL JA_INFL
  3 0.2707 0.1712  5.570 -15.34 0.4817 -10.30 JF_INFL JA_INFL ND_INFL
-----------------------------------------------------------------
  4 0.3383 0.2122  5.386 -15.87 0.4578 -9.575 JF_INFL MA_INFL MJ_INFL
                                              JA_INFL
  4 0.3143 0.1837  6.161 -14.94 0.4744 -8.650 JF_INFL MA_INFL JA_INFL
                                              SO_INFL
  4 0.3048 0.1724  6.467 -14.58 0.4810 -8.293 JF_INFL MA_INFL JA_INFL
                                              ND_INFL
  4 0.2790 0.1417  7.300 -13.64 0.4988 -7.346 JF_INFL JA_INFL SO_INFL
                                              ND_INFL
--------------------------------------------------------------------
  5 0.3542 0.1928  6.869 -14.50 0.4691 -6.953 JF_INFL MA_INFL MJ_INFL
                                              JA_INFL SO_INFL
  5 0.3462 0.1827  7.130 -14.18 0.4750 -6.629 JF_INFL MA_INFL MJ_INFL
                                              JA_INFL ND_INFL
  5 0.3402 0.1752  7.324 -13.94 0.4793 -6.393 JF_INFL MA_INFL JA_INFL
                                              SO_INFL ND_INFL
  5 0.2818 0.1023  9.209 -11.74 0.5217 -4.190 JF_INFL MJ_INFL JA_INFL
                                              SO_INFL ND_INFL
--------------------------------------------------------------------
  6 0.4121 0.2264  7.000 -14.94 0.4496 -6.134 JF_INFL MA_INFL MJ_INFL
                                              JA_INFL SO_INFL ND_INFL
--------------------------------------------------------------------
```

```
OBS  _MODEL_   _TYPE_   _DEPVAR_    _RMSE_   INTERCEP     JF_INFL     MA_INFL

  1  MODEL1    PARMS    LBLKDRUM   0.74534    3.50217    .            .
  2  MODEL1    PARMS    LBLKDRUM   0.75082    4.55181   -.00034422    .
  3  MODEL1    PARMS    LBLKDRUM   0.76988    3.66323    .           .00015646
  4  MODEL1    PARMS    LBLKDRUM   0.77598    3.79692    .            .
  5  MODEL1    PARMS    LBLKDRUM   0.67881    4.29550   -.00063473    .
  6  MODEL1    PARMS    LBLKDRUM   0.73142    3.69489    .            .
  7  MODEL1    PARMS    LBLKDRUM   0.74779    4.24781   -.00041436   .00023909
  8  MODEL1    PARMS    LBLKDRUM   0.74999    3.68977    .            .
  9  MODEL1    PARMS    LBLKDRUM   0.67882    4.05069   -.00068364   .00019915
 10  MODEL1    PARMS    LBLKDRUM   0.69174    4.28462   -.00058021    .
 11  MODEL1    PARMS    LBLKDRUM   0.69254    4.39019   -.00063976    .
 12  MODEL1    PARMS    LBLKDRUM   0.69402    4.29149   -.00064050    .
 13  MODEL1    PARMS    LBLKDRUM   0.67664    4.25734   -.00073955   .00034378
 14  MODEL1    PARMS    LBLKDRUM   0.68878    4.00072   -.00060241   .00022556
 15  MODEL1    PARMS    LBLKDRUM   0.69352    4.01154   -.00071995   .00021227
 16  MODEL1    PARMS    LBLKDRUM   0.70627    4.24573   -.00059401    .
```

```
OBS    MJ_INFL      JA_INFL     SO_INFL       ND_INFL     LBLKDRUM   _IN_   _P_

  1   .            .0004809    .             .              -1        1     2
  2   .            .           .             .              -1        1     2
  3   .            .           .             .              -1        1     2
  4  0.00005837    .           .             .              -1        1     2
  5   .            .0008392    .             .              -1        2     3
  6   .            .0008279   -.00044054     .              -1        2     3
  7   .            .           .             .              -1        2     3
  8   .            .0005730    .            -.00017149      -1        2     3
  9   .            .0008117    .             .              -1        3     4
 10   .            .0009116   -.00013091     .              -1        3     4
 11  -.00004836    .0008779    .             .              -1        3     4
 12   .            .0008370    .            0.00001024      -1        3     4
 13  -.00019632    .0009487    .             .              -1        4     5
 14   .            .0009244   -.00021060     .              -1        4     5
 15   .            .0007970    .            0.00005884      -1        4     5
 16   .            .0009368   -.00020946    0.00008273      -1        4     5

OBS   _EDF_    _MSE_      _RSQ_     _ADJRSQ_      _CP_       _AIC_       _SBC_

  1    24     0.55553    0.08234    0.04410     7.6564    -13.3647    -10.8485
  2    24     0.56372    0.06881    0.03001     8.0937    -12.9841    -10.4679
  3    24     0.59272    0.02091   -0.01988     9.6415    -11.6801     -9.1639
  4    24     0.60214    0.00534   -0.03610    10.1447    -11.2698     -8.7536
  5    23     0.46078    0.27058    0.20715     3.5731    -17.3336    -13.5593
  6    23     0.53498    0.15311    0.07947     7.3693    -13.4513     -9.6770
  7    23     0.55919    0.11479    0.03781     8.6078    -12.3007     -8.5264
  8    23     0.56248    0.10957    0.03214     8.7764    -12.1479     -8.3736
  9    22     0.46080    0.30226    0.20711     4.5492    -16.4882    -11.4558
 10    22     0.47851    0.27544    0.17663     5.4160    -15.5074    -10.4750
 11    22     0.47961    0.27377    0.17474     5.4697    -15.4478    -10.4154
 12    22     0.48167    0.27066    0.17120     5.5704    -15.3365    -10.3041
 13    21     0.45784    0.33825    0.21220     5.3860    -15.8652     -9.5747
 14    21     0.47442    0.31428    0.18367     6.1607    -14.9400     -8.6495
 15    21     0.48097    0.30482    0.17240     6.4665    -14.5836     -8.2931
 16    21     0.49882    0.27901    0.14168     7.3005    -13.6360     -7.3455


OBS  _MODEL_   _TYPE_   _DEPVAR_    _RMSE_    INTERCEP     JF_INFL      MA_INFL

 17  MODEL1    PARMS    LBLKDRUM   0.68492    4.21140    -.00064873   .00038271
 18  MODEL1    PARMS    LBLKDRUM   0.68919    4.20625    -.00080981   .00038067
 19  MODEL1    PARMS    LBLKDRUM   0.69234    3.77336    -.00065231   .00031397
 20  MODEL1    PARMS    LBLKDRUM   0.72229    4.33538    -.00060079   .
 21  MODEL1    PARMS    LBLKDRUM   0.67050    3.94016    -.00074724   .00058885

OBS    MJ_INFL      JA_INFL     SO_INFL       ND_INFL     LBLKDRUM   _IN_   _P_

 17  -.00020765    .0010871   -.00024384     .              -1        5     6
 18  -.00021446    .0009349    .            0.00010548      -1        5     6
 19   .            .0010048   -.00047634    0.00024696      -1        5     6
 20  -.00004558    .0009705   -.00020461    0.00008277      -1        5     6
 21  -.00029508    .0012827   -.00067855    0.00039100      -1        6     7

OBS   _EDF_    _MSE_      _RSQ_     _ADJRSQ_      _CP_       _AIC_       _SBC_

 17    20     0.46911    0.35425    0.19281     6.8691    -14.5014     -6.9528
 18    20     0.47498    0.34616    0.18270     7.1304    -14.1778     -6.6292
 19    20     0.47933    0.34018    0.17523     7.3236    -13.9411     -6.3925
 20    20     0.52171    0.28185    0.10231     9.2089    -11.7384     -4.1899
 21    19     0.44957    0.41208    0.22642     7.0000    -14.9409     -6.1342
```

All Variables Logged

```
 N = 26     Regression Models for Dependent Variable: LBLKDRUM

         Rsq      Adj    C(p)     AIC      MSE     SBC Variables in Model
  In              Rsq

   1 0.0719 0.0332  18.49 -13.07 0.5619 -10.55 LGJAINFL
   1 0.0538 0.0144  19.28 -12.57 0.5728 -10.05 LGMAINFL
   1 0.0370 -.0032  20.01 -12.11 0.5830 -9.594 LGJFINFL
   1 0.0094 -.0319  21.22 -11.38 0.5997 -8.860 LGMJINFL
------------------------------------------------------------
   2 0.2931 0.2317  10.84 -18.15 0.4465 -14.38 LGJFINFL LGJAINFL
   2 0.1658 0.0933  16.39 -13.84 0.5270 -10.07 LGJAINFL LGSOINFL
   2 0.1248 0.0487  18.18 -12.60 0.5528 -8.823 LGJFINFL LGMAINFL
   2 0.0921 0.0132  19.61 -11.64 0.5735 -7.868 LGMAINFL LGJAINFL
---------------------------------------------------------------------
   3 0.3313 0.2401  11.17 -17.59 0.4416 -12.56 LGJFINFL LGJAINFL LGSOINFL
   3 0.3212 0.2286  11.61 -17.20 0.4483 -12.17 LGJFINFL LGMAINFL LGJAINFL
   3 0.3018 0.2066  12.46 -16.47 0.4611 -11.44 LGJFINFL LGMJINFL LGJAINFL
   3 0.2933 0.1970  12.83 -16.16 0.4667 -11.13 LGJFINFL LGJAINFL LGNDINFL
------------------------------------------------------------------------------
   4 0.3758 0.2569  11.23 -17.38 0.4319 -11.09 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL
   4 0.3679 0.2475  11.57 -17.06 0.4373 -10.77 LGJFINFL LGMAINFL LGJAINFL
                                               LGSOINFL
   4 0.3464 0.2219  12.51 -16.19 0.4522 -9.897 LGJFINFL LGMJINFL LGJAINFL
                                               LGSOINFL
   4 0.3460 0.2214  12.53 -16.17 0.4525 -9.881 LGJFINFL LGJAINFL LGSOINFL
                                               LGNDINFL
------------------------------------------------------------------------------
   5 0.4588 0.3235  9.610 -19.09 0.3932 -11.55 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGSOINFL
   5 0.4163 0.2703  11.47 -17.13 0.4241 -9.578 LGJFINFL LGMAINFL LGJAINFL
                                               LGSOINFL LGNDINFL
   5 0.3778 0.2222  13.14 -15.47 0.4520 -7.919 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGNDINFL
   5 0.3601 0.2001  13.92 -14.74 0.4649 -7.189 LGJFINFL LGMJINFL LGJAINFL
                                               LGSOINFL LGNDINFL
------------------------------------------------------------------------------
   6 0.5645 0.4269  7.000 -22.74 0.3330 -13.93 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGSOINFL LGNDINFL
------------------------------------------------------------------------------


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_  INTERCEP  LGJFINFL  LGMAINFL

  1  MODEL1   PARMS   LBLKDRUM  0.74957   1.34712    .          .
  2  MODEL1   PARMS   LBLKDRUM  0.75683   0.83868    .        0.41902
  3  MODEL1   PARMS   LBLKDRUM  0.76355   7.13891  -0.43047     .
  4  MODEL1   PARMS   LBLKDRUM  0.77440   2.63874    .          .
  5  MODEL1   PARMS   LBLKDRUM  0.66823   7.72556  -1.36533     .
  6  MODEL1   PARMS   LBLKDRUM  0.72592   2.44459    .          .
  7  MODEL1   PARMS   LBLKDRUM  0.74353   4.42457  -0.62074   0.55699
  8  MODEL1   PARMS   LBLKDRUM  0.75731  -0.14987    .        0.27682
  9  MODEL1   PARMS   LBLKDRUM  0.66453   7.76654  -1.21940     .
 10  MODEL1   PARMS   LBLKDRUM  0.66957   6.08138  -1.39116   0.32636
 11  MODEL1   PARMS   LBLKDRUM  0.67906   8.77315  -1.39171     .
 12  MODEL1   PARMS   LBLKDRUM  0.68315   7.79266  -1.35418     .
 13  MODEL1   PARMS   LBLKDRUM  0.65717   7.67967  -1.49846   0.65177
 14  MODEL1   PARMS   LBLKDRUM  0.66129   5.87967  -1.23249   0.37546
 15  MODEL1   PARMS   LBLKDRUM  0.67245   9.16958  -1.24111     .
 16  MODEL1   PARMS   LBLKDRUM  0.67266   7.07816  -1.27267     .
```

```
OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  LBLKDRUM  _IN_  _P_  _EDF_

  1     .       0.38764     .         .         -1      1     2     24
  2     .        .          .         .         -1      1     2     24
  3     .        .          .         .         -1      1     2     24
  4   0.16846    .          .         .         -1      1     2     24
  5     .       0.94862     .         .         -1      2     3     23
  6     .       0.81918  -0.57660     .         -1      2     3     23
  7     .        .          .         .         -1      2     3     23
  8     .       0.30491     .         .         -1      2     3     23
  9     .       1.17284  -0.37969     .         -1      3     4     22
 10     .       0.86170     .         .         -1      3     4     22
 11  -0.18881   1.03976     .         .         -1      3     4     22
 12     .       0.95328     .      -0.02495     -1      3     4     22
 13  -0.58353   1.05673     .         .         -1      3     4     22
 14     .       1.09840  -0.42297     .         -1      4     5     21
 15  -0.25219   1.31537  -0.41492     .         -1      4     5     21
 16     .       1.22226  -0.54646   0.26269     -1      4     5     21

OBS   _MSE_     _RSQ_    _ADJRSQ_     _CP_       _AIC_      _SBC_

  1  0.56186   0.07188   0.03321    18.4893   -13.0701   -10.5539
  2  0.57279   0.05382   0.01440    19.2771   -12.5691   -10.0529
  3  0.58300   0.03696  -0.00317    20.0129   -12.1097    -9.5935
  4  0.59969   0.00940  -0.03188    21.2153   -11.3760    -8.8598
  5  0.44653   0.29313   0.23166    10.8373   -18.1503   -14.3760
  6  0.52696   0.16580   0.09326    16.3922   -13.8439   -10.0696
  7  0.55284   0.12484   0.04874    18.1790   -12.5977    -8.8234
  8  0.57352   0.09210   0.01315    19.6073   -11.6427    -7.8685
  9  0.44160   0.33133   0.24015    11.1709   -17.5947   -12.5623
 10  0.44832   0.32115   0.22858    11.6148   -17.2019   -12.1695
 11  0.46112   0.30177   0.20655    12.4605   -16.4699   -11.4375
 12  0.46669   0.29333   0.19697    12.8286   -16.1576   -11.1252
 13  0.43187   0.37578   0.25688    11.2316   -17.3833   -11.0928
 14  0.43731   0.36792   0.24752    11.5746   -17.0578   -10.7673
 15  0.45219   0.34641   0.22191    12.5131   -16.1876    -9.8971
 16  0.45247   0.34601   0.22144    12.5304   -16.1719    -9.8814

OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

 17  MODEL1   PARMS   LBLKDRUM  0.62702   7.94003  -1.31546   0.82933
 18  MODEL1   PARMS   LBLKDRUM  0.65120   3.52392  -1.34544   0.57128
 19  MODEL1   PARMS   LBLKDRUM  0.67231   7.35215  -1.53834   0.67956
 20  MODEL1   PARMS   LBLKDRUM  0.68181   8.45794  -1.29181    .
 21  MODEL1   PARMS   LBLKDRUM  0.57710   4.98683  -1.51858   1.28639

OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  LBLKDRUM  _IN_  _P_  _EDF_

 17  -0.78031   1.44945  -0.58426     .         -1      5     6     20
 18     .       1.15805  -0.77782   0.52343     -1      5     6     20
 19  -0.58968   1.03691     .       0.08244     -1      5     6     20
 20  -0.24375   1.35833  -0.57477   0.25366     -1      5     6     20
 21  -1.04441   1.66070  -1.18874   0.81112     -1      6     7     19

OBS   _MSE_     _RSQ_    _ADJRSQ_     _CP_       _AIC_      _SBC_

 17  0.39315   0.45881   0.32351     9.6097   -19.0940   -11.5454
 18  0.42406   0.41626   0.27032    11.4658   -17.1263    -9.5777
 19  0.45201   0.37779   0.22224    13.1439   -15.4671    -7.9185
 20  0.46487   0.36008   0.20010    13.9166   -14.7373    -7.1887
 21  0.33304   0.56447   0.42694     7.0000   -22.7417   -13.9350
```

Regression—Logged Harvest and Inflows

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	*Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows, Ln(September-October Inflows)*[c,d]	.	*.751*	*.565*	*.427*	*.577071*	*2.428*

a. Dependent Variable: Ln(Black Drum Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows, Ln(September-October Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*8.202*	*6*	*1.367*	*4.105*	*.008*[b]
	Residual	*6.327*	*19*	*.333*		
	Total	*14.529*	*25*			

a. Dependent Variable: Ln(Black Drum Harvest)

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows, Ln(September-October Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	4.986	3.402		1.466	.159	-2.133	12.106
	Ln(January-February Inflows)	-1.519	.466	-.678	-3.262	.004	-2.493	-.544
	Ln(March-April Inflows)	1.286	.431	.712	2.986	.008	.385	2.188
	Ln(May-June Inflows)	-1.044	.411	-.601	-2.543	.020	-1.904	-.185
	Ln(July-August Inflows	1.661	.394	1.149	4.220	.000	.837	2.484
	Ln(September-October Inflows)	-1.189	.417	-.882	-2.854	.010	-2.061	-.317
	Ln(November-December Inflows)	.811	.378	.519	2.147	.045	.021	1.602

a. Dependent Variable: Ln(Black Drum Harvest)

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln(January-February Inflows)	.530	1.886
	Ln(March-April Inflows)	.403	2.482
	Ln(May-June Inflows)	.410	2.437
	Ln(July-August Inflows	.309	3.233
	Ln(September-October Inflows)	.240	4.167
	Ln(November-December Inflows)	.393	2.546

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Ln(January-February Inflows)	Ln(March-April Inflows)
1	1	6.986	1.000	.00	.00	.00
	2	5.902E-03	34.403	.01	.00	.05
	3	3.570E-03	44.236	.06	.01	.00
	4	1.917E-03	60.366	.02	.06	.20
	5	1.509E-03	68.051	.05	.22	.02
	6	6.527E-04	103.457	.82	.63	.03
	7	4.882E-04	119.625	.04	.08	.70

a. Dependent Variable: Ln(Black Drum Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		Ln(May-June Inflows)	Ln(July-August Inflows	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	.00	.00	.00	.00
	2	.04	.01	.07	.06
	3	.00	.22	.02	.13
	4	.00	.23	.25	.00
	5	.33	.00	.02	.21
	6	.06	.14	.04	.06
	7	.56	.39	.60	.54

a. Dependent Variable: Ln(Black Drum Harvest)

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.673727	4.819534	3.943309	.572777	26
Std. Predicted Value	-2.217	1.530	.000	1.000	26
Standard Error of Predicted Value	.233084	.375777	.296763	4.06474E-02	26
Adjusted Predicted Value	3.120511	5.302643	3.973134	.626447	26
Residual	-1.264507	.975474	6.31973E-16	.503079	26
Std. Residual	-2.191	1.690	.000	.872	26
Stud. Residual	-2.732	1.900	-.021	1.043	26
Deleted Residual	-1.965019	1.232533	-2.982482E-02	.725689	26
Stud. Deleted Residual	-3.412	2.055	-.047	1.143	26
Mahal. Distance	3.117	9.639	5.769	1.857	26
Cook's Distance	.000	.591	.068	.129	26
Centered Leverage Value	.125	.386	.231	.074	26

a. Dependent Variable: Ln(Black Drum Harvest)

Case Values for Residuals Diagnostics

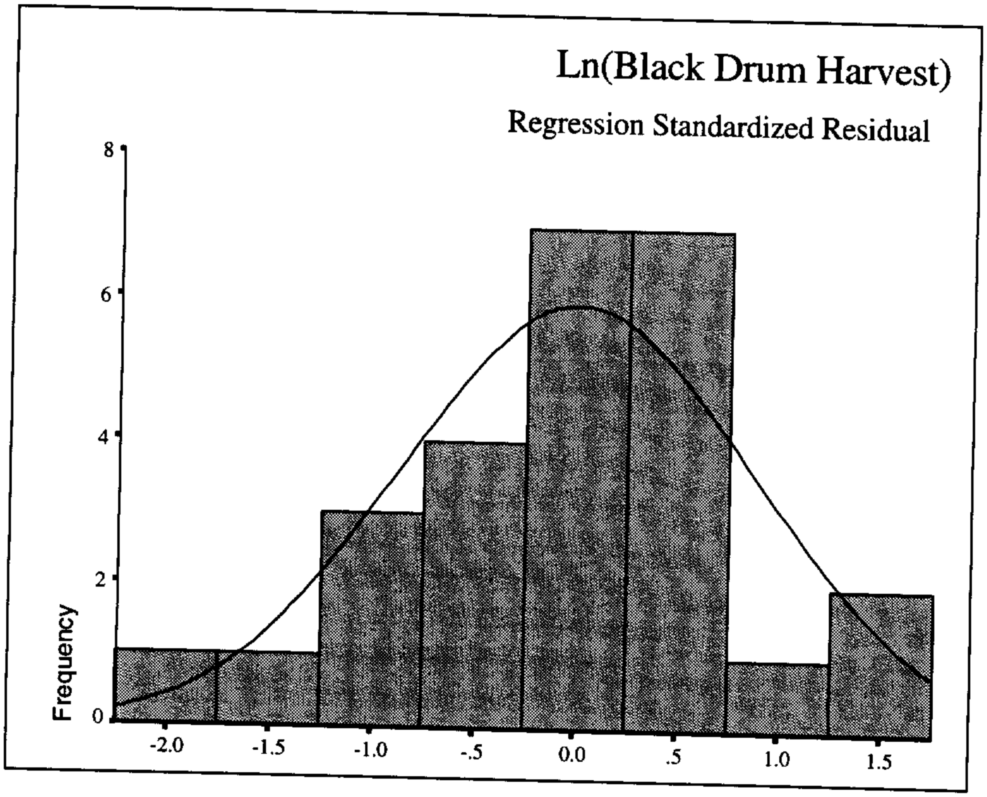
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	3.16959	-.69305	-.96095	3.43749	-1.35082	-1.20098	-1.41417	-1.45517
1963	2.67373	-.60686	-1.05365	3.12051	-2.21654	-1.05163	-1.38568	-1.42252
1964	3.80494	.32863	.52433	3.60924	-.24158	.56947	.71932	.70987
1965	3.20360	-.02972	-.04466	3.21854	-1.29144	-.05151	-.06314	-.06146
1966	3.74826	-.37752	-.45112	3.82186	-.34053	-.65421	-.71514	-.70562
1967	3.85204	.97547	1.23253	3.59498	-.15935	1.69039	1.90010	2.05494
1968	3.96012	.03625	.04807	3.94829	.02934	.06282	.07234	.07042
1969	4.31661	-.51887	-.67272	4.47046	.65173	-.89915	-1.02381	-1.02518
1970	3.46809	.19547	.30708	3.35648	-.82967	.33873	.42456	.41521
1971	4.49135	-1.26451	-1.96502	5.19186	.95681	-2.19125	-2.73158	*-3.41175
1972	3.86883	.41613	.55455	3.73042	-.13003	.72111	.83245	.82544
1973	3.89926	.63334	.76577	3.76683	-.07691	1.09751	1.20681	1.22241
1974	3.21268	.10875	.14952	3.17192	-1.27559	.18846	.22097	.21535
1975	3.43907	.39823	.53792	3.29938	-.88034	.69008	.80204	.79421
1976	3.75715	.10569	.12672	3.73611	-.32502	.18314	.20054	.19540
1977	4.68501	-.05808	-.07545	4.70238	1.29492	-.10064	-.11471	-.11169
1978	4.74265	.34433	.49298	4.59400	1.39555	.59669	.71396	.70443
1979	4.53123	-.23940	-.34335	4.63517	1.02644	-.41486	-.49682	-.48674
1980	3.68724	.33811	.50514	3.52021	-.44707	.58591	.71615	.70665
1981	4.10850	-.15918	-.19803	4.14735	.28840	-.27584	-.30767	-.30021
1982	4.04696	.23663	.31075	3.97283	.18096	.41005	.46990	.46005
1983	4.75295	-.77327	-1.32296	5.30264	1.41354	-1.34000	-1.75271	-1.86323
1984	4.81953	.77518	.97591	4.61880	1.52978	1.34330	1.50722	1.56346
1985	4.69681	.04464	.05880	4.68265	1.31552	.07736	.08878	.08643
1986	3.47148	-.02786	-.03571	3.47933	-.82376	-.04828	-.05466	-.05320
1987	4.11837	-.18851	-.24189	4.17175	.30564	-.32667	-.37004	-.36147

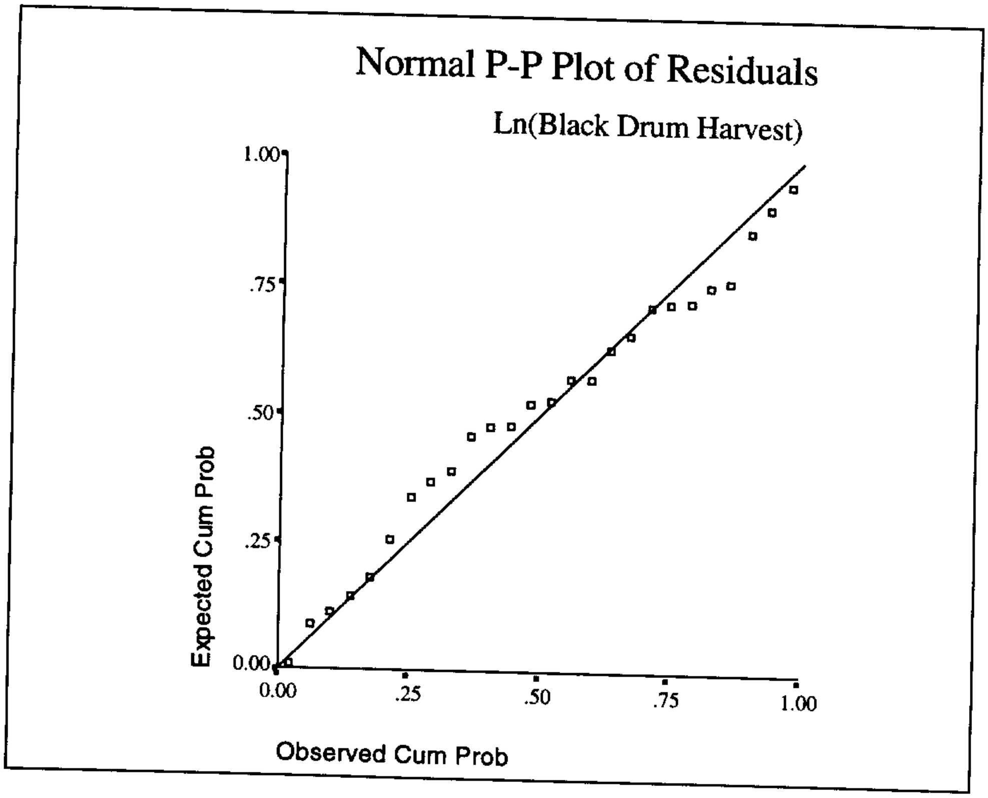
PRE_1	Predicted value of the natural log of harvest
RES_1	Ordinary residual; observed log harvest minus predicted log harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of the log of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of the log of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

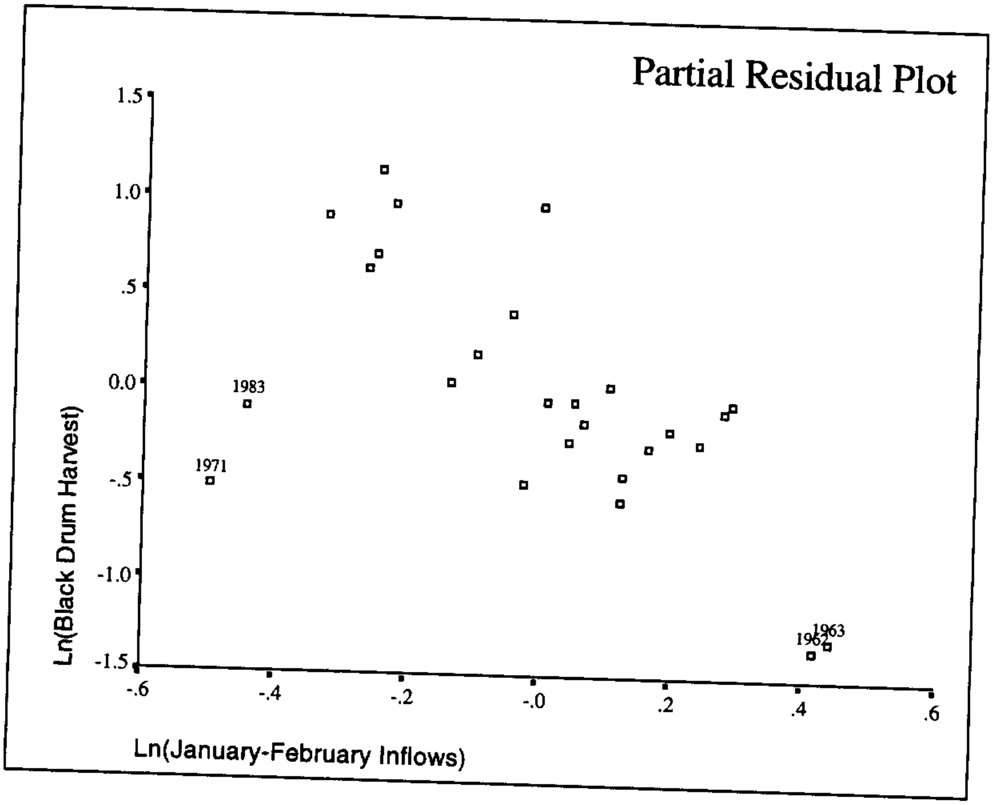
[1] Values greater than 3 are flagged.

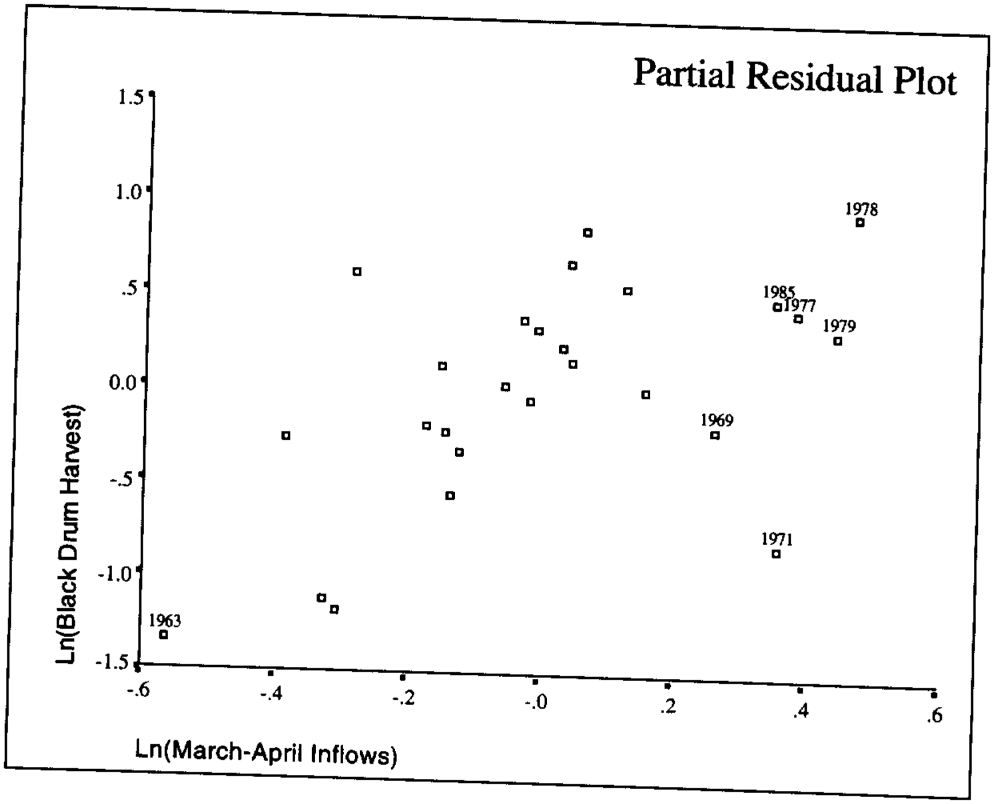
[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$.

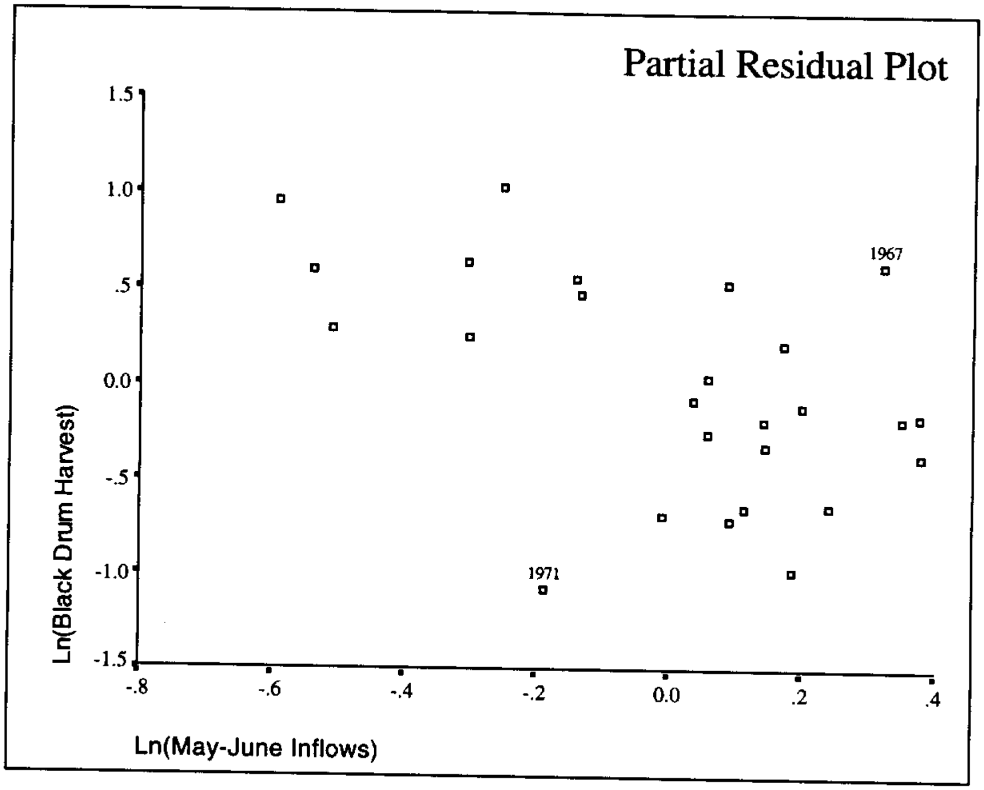
Graphics

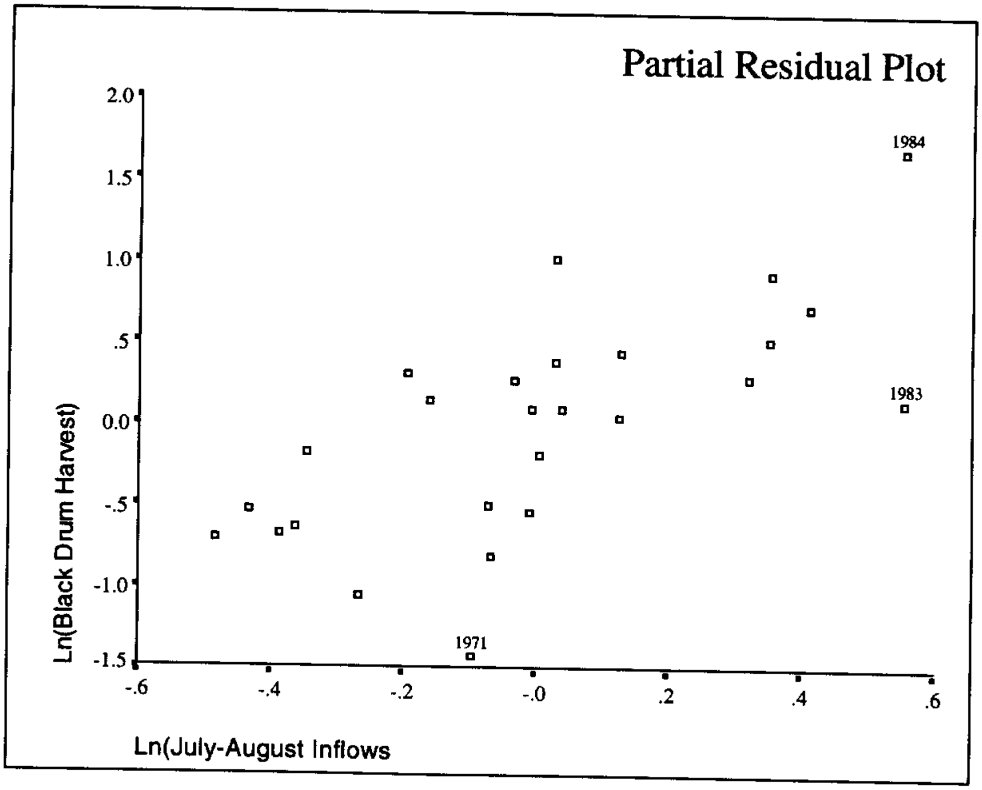

Ln(Black Drum Harvest)
Regression Standardized Residual
Frequency
0
2
4
6
8
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5

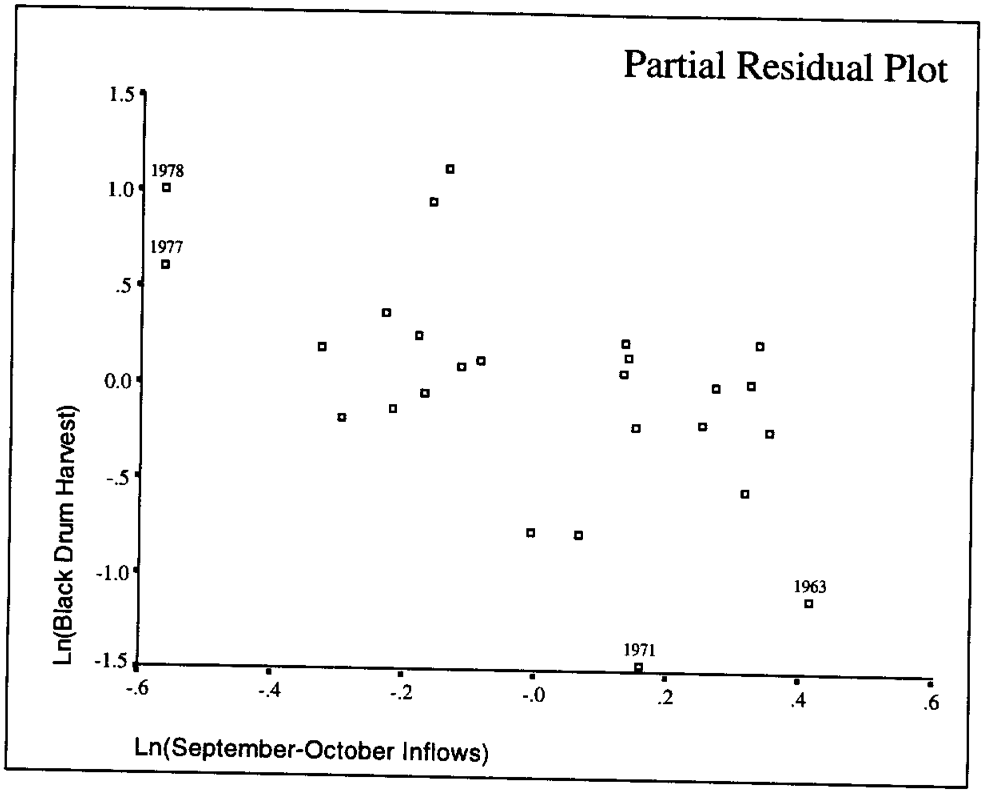

Normal P-P Plot of Residuals
Ln(Black Drum Harvest)
Expected Cum Prob
0.00
.25
.50
.75
1.00
Observed Cum Prob
0.00
.25
.50
.75
1.00

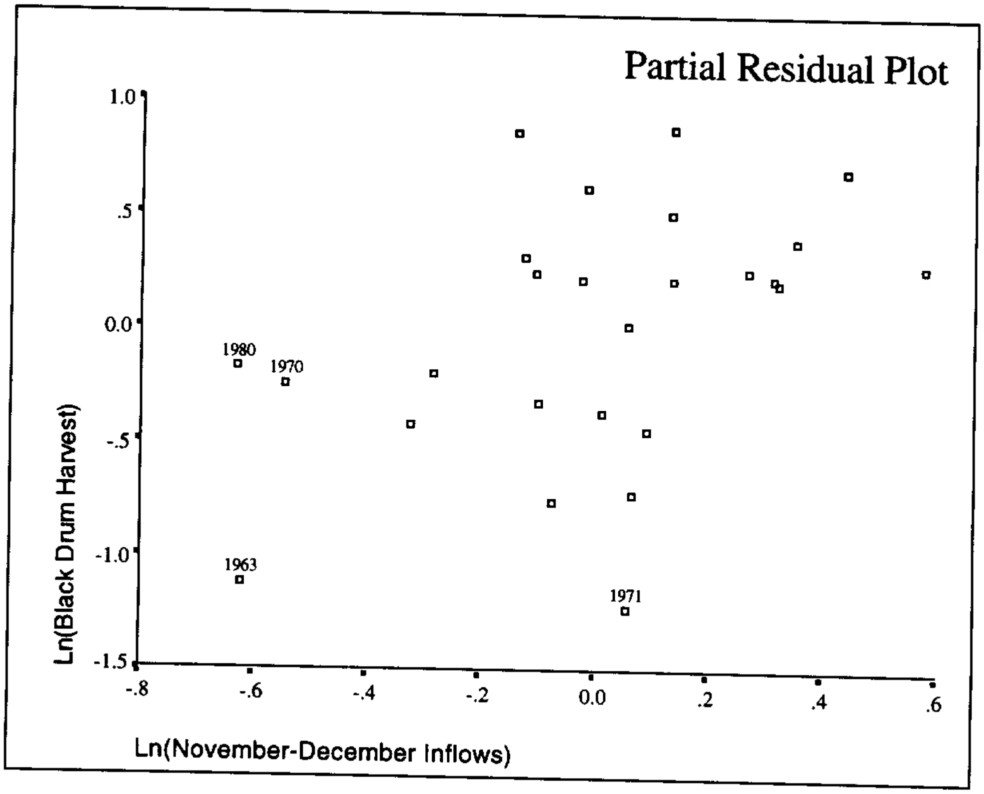

Partial Residual Plot
Ln(Black Drum Harvest)
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.6
-.4
-.2
-.0
.2
.4
.6
Ln(January-February Inflows)
1983
1971
1962
1963

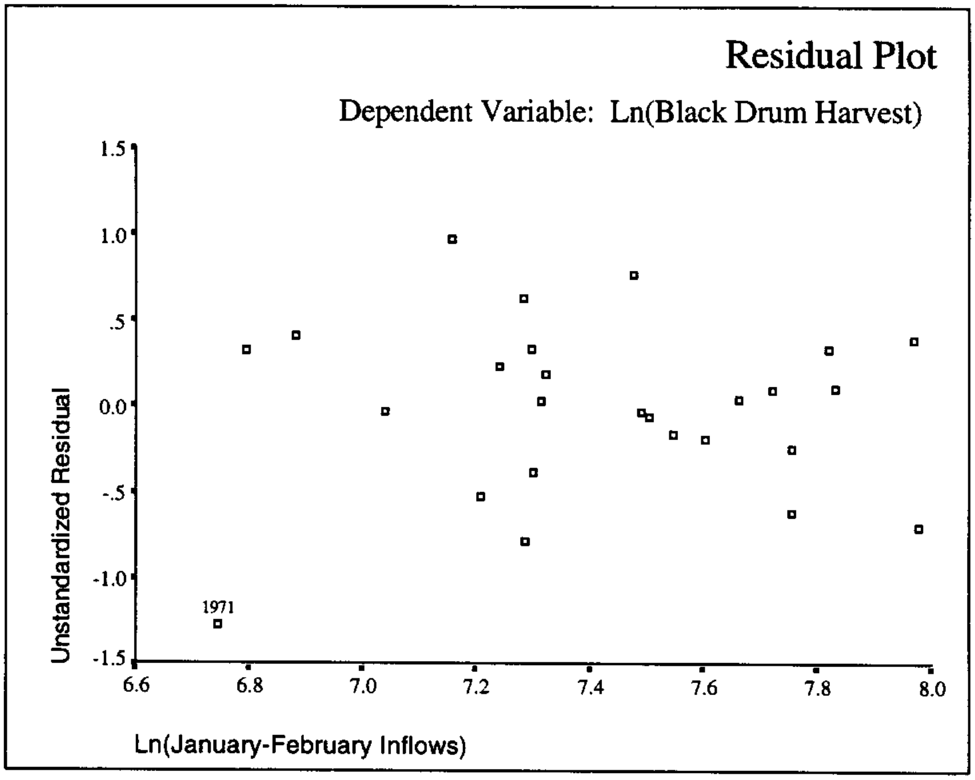

Partial Residual Plot
Ln(Black Drum Harvest)
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.6
-.4
-.2
-.0
.2
.4
.6
Ln(March-April Inflows)
1978
1985
1977
1979
1969
1971
1963

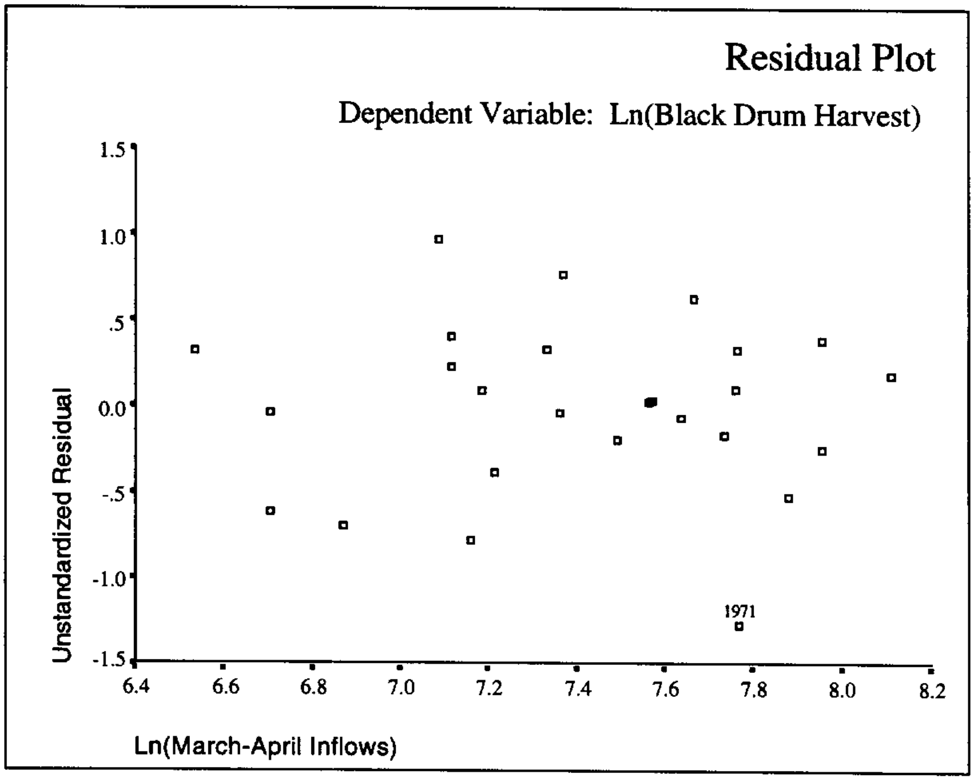

Partial Residual Plot
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
Ln(Black Drum Harvest)
1967
1971
-.8
-.6
-.4
-.2
0.0
.2
.4
Ln(May-June Inflows)

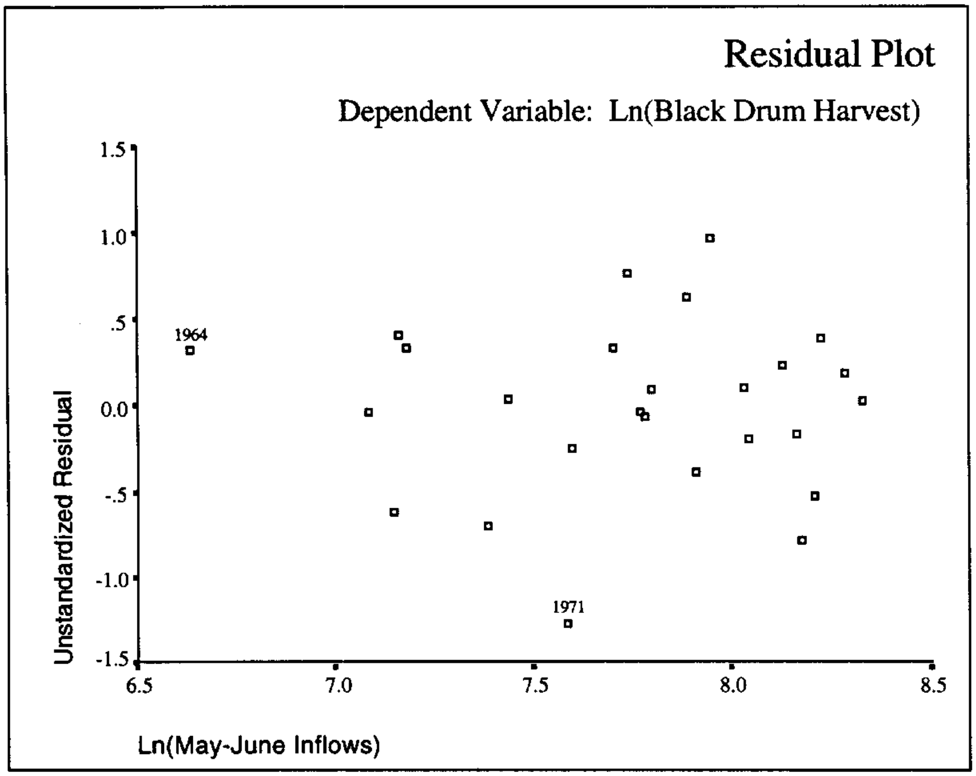

Partial Residual Plot
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
Ln(Black Drum Harvest)
1984
1983
1971
-.6
-.4
-.2
-.0
.2
.4
.6
Ln(July-August Inflows

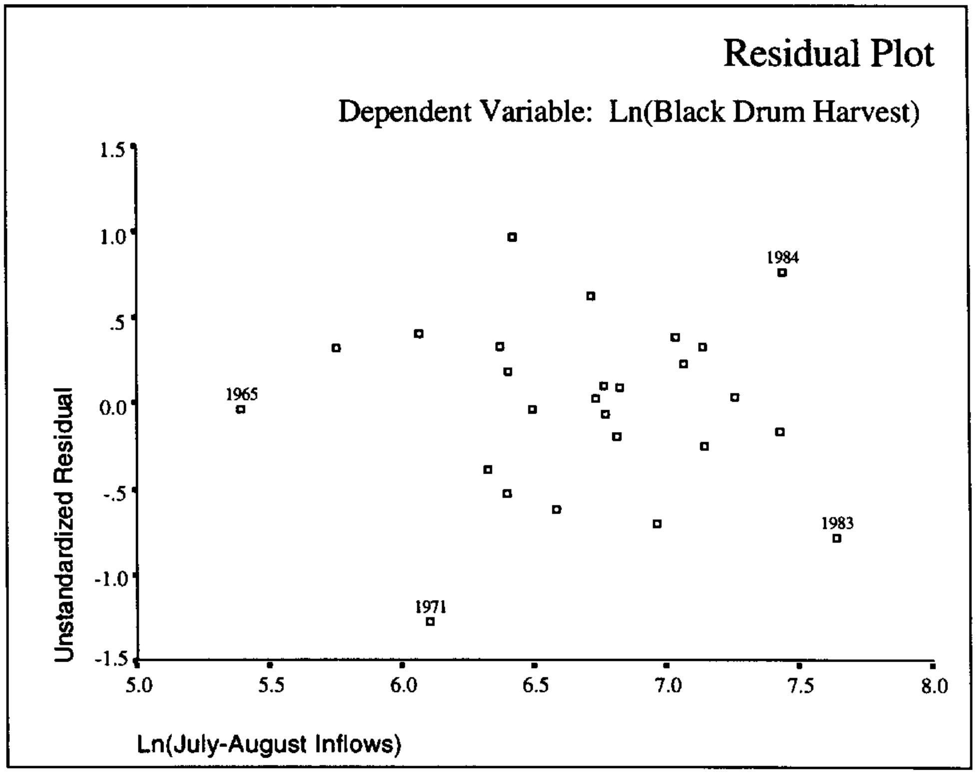

Partial Residual Plot
Ln(Black Drum Harvest)
Ln(September-October Inflows)
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.6
-.4
-.2
-.0
.2
.4
.6
1978
1977
1963
1971

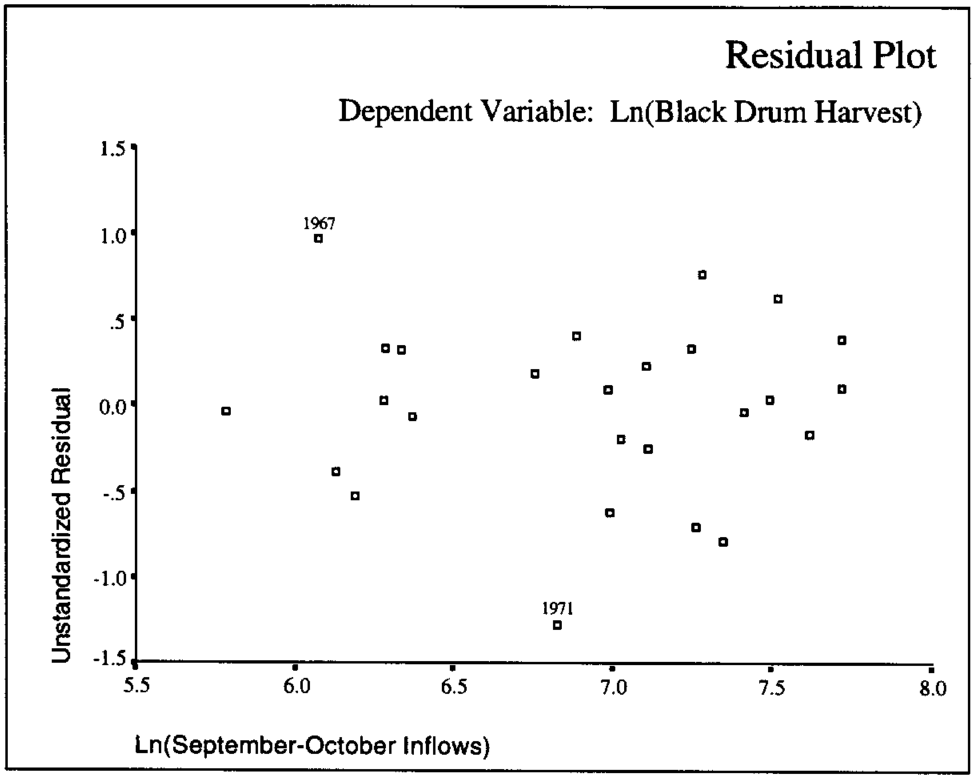

Partial Residual Plot
Ln(Black Drum Harvest)
Ln(November-December Inflows)
1.0
.5
0.0
-.5
-1.0
-1.5
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
1980
1970
1963
1971

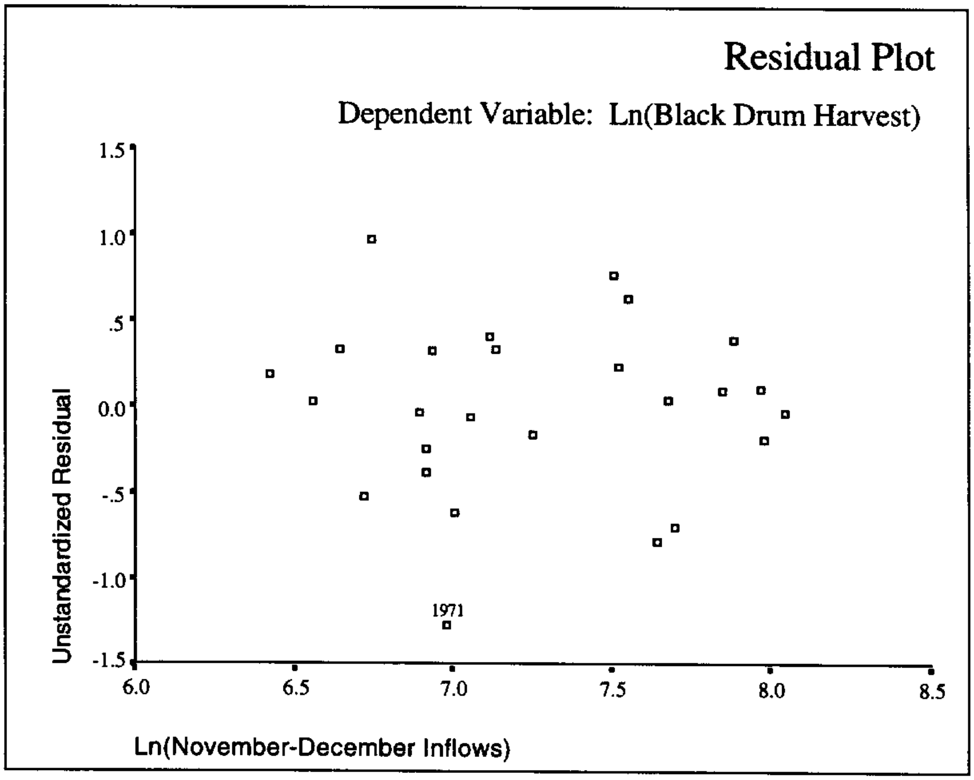

Residual Plot
Dependent Variable: Ln(Black Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1971
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(January-February Inflows)


Residual Plot
Dependent Variable: Ln(Black Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1971
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Ln(March-April Inflows)


Residual Plot
Dependent Variable: Ln(Black Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1964
1971
6.5
7.0
7.5
8.0
8.5
Ln(May-June Inflows)


Residual Plot
Dependent Variable: Ln(Black Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1984
1965
1983
1971
5.0
5.5
6.0
6.5
7.0
7.5
8.0
Ln(July-August Inflows)


Residual Plot
Dependent Variable: Ln(Black Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
5.5
6.0
6.5
7.0
7.5
8.0
1967
1971
Ln(September-October Inflows)


Residual Plot
Dependent Variable: Ln(Black Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
6.0
6.5
7.0
7.5
8.0
8.5
1971
Ln(November-December Inflows)

Prediction Intervals for the Natural Log of Black Drum Harvest

YEAR	LBLKDRUM	LICI_1	UICI_1
1962	2.4765	1.30263	5.03655
1963	2.0669	.70358	4.64387
1964	4.1336	1.87025	5.73963
1965	3.1739	1.29644	5.11077
1966	3.3707	1.96771	5.52881
1967	4.8275	2.03706	5.66702
1968	3.9964	2.11725	5.80298
1969	3.7977	2.48657	6.14665
1970	3.6636	1.54031	5.39587
1971	3.2268	2.56850	6.41420
1972	4.2850	2.02329	5.71437
1973	4.5326	2.11123	5.68728
1974	3.3214	1.35021	5.07515
1975	3.8373	1.58610	5.29205
1976	3.8628	1.97443	5.53987
1977	4.6269	2.85382	6.51620
1978	5.0870	2.85915	6.62614
1979	4.2918	2.64687	6.41560
1980	4.0254	1.78279	5.59169
1981	3.9493	2.30284	5.91416
1982	4.2836	2.20961	5.88431
1983	3.9797	2.78873	6.71718
1984	5.5947	3.00671	6.63235
1985	4.7414	2.85780	6.53581
1986	3.4436	1.64807	5.29489
1987	3.9299	2.29431	5.94243

LBLKDRUM	Natural log of black drum harvest
LICI_1	Lower limit for 99% prediction interval for the natural log of black drum harvest
UICI_1	Upper limit for 99% prediction interval for the natural log of black drum harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	6.00802	.11044	.24032	.5388	.0031
1963	9.63934	.20195	.38557	.2099	.0189
1964	8.36951	.04402	.33478	.3011	.0002
1965	7.39957	.00029	.29598	.3885	.0000
1966	3.11701	.01424	.12468	.8740	.0000
1967	4.25249	.13592	.17010	.7503	.0059
1968	5.18799	.00024	.20752	.6370	.0000
1969	4.75592	.04440	.19024	.6897	.0002
1970	8.12486	.01470	.32499	.3217	.0000
1971	7.95075	.59051	.31803	.3370	.2443
1972	5.27843	.03293	.21114	.6260	.0001
1973	3.36180	.04350	.13447	.8496	.0002
1974	5.85435	.00261	.23417	.5569	.0000
1975	5.53068	.03224	.22123	.5955	.0001
1976	3.18799	.00114	.12752	.8671	.0000
1977	4.79458	.00056	.19178	.6850	.0000
1978	6.57670	.03144	.26307	.4742	.0001
1979	6.60682	.01531	.26427	.4709	.0000
1980	7.30486	.03619	.29219	.3978	.0001
1981	3.94293	.00330	.15772	.7863	.0000
1982	5.00182	.00988	.20007	.6597	.0000
1983	9.42591	.31197	.37704	.2235	.0605
1984	4.18065	.08404	.16723	.7588	.0013
1985	5.05763	.00036	.20231	.6529	.0000
1986	4.53381	.00012	.18135	.7166	.0000
1987	4.55557	.00554	.18222	.7140	.0000

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

---

[1] This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2] MAHA_PV = 1 − F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	-.90472	.11588	-.57755	.41763
1963	*-1.22056	-.35949	-.66765	.78817
1964	.54780	.45613	-.18131	-.10228
1965	-.04357	-.01442	-.01008	.00820
1966	-.31155	-.00159	-.07723	.07883
1967	*1.05489	.30709	-.00039	-.49134
1968	.04022	.00130	.00345	-.01059
1969	-.55824	.11213	.02246	-.22683
1970	.31375	-.01701	.04359	.01196
1971	*-2.53936	-.88703	*1.70987	*-1.13673
1972	.47606	.32510	-.25145	-.02124
1973	.55897	.01385	-.24506	.03870
1974	.13185	-.08224	.04915	.00819
1975	.47038	-.37344	.21680	.08474
1976	.08717	-.04191	.03372	-.00916
1977	-.06108	.01600	-.00678	-.03636
1978	.46284	.02745	-.03044	.29627
1979	-.32072	.04745	-.05973	-.19232
1980	.49667	.02044	.19448	-.00528
1981	-.14831	-.00630	.03674	.03124
1982	.25749	.05638	-.11215	-.15249
1983	*-1.57093	-.33816	.87569	.56063
1984	.79560	.11490	-.35044	.08088
1985	.04867	-.00514	-.00777	.02600
1986	-.02824	.00919	-.00055	.00077
1987	-.19236	.11694	-.01441	-.04758

SDFFITS	Standardized dffits value
SDFBETA_0	Standardized dfbeta for the intercept term
SDFBETA_1	Standardized dfbeta for logged January-February inflows
SDFBETA_2	Standardized dfbeta for logged March-April inflows

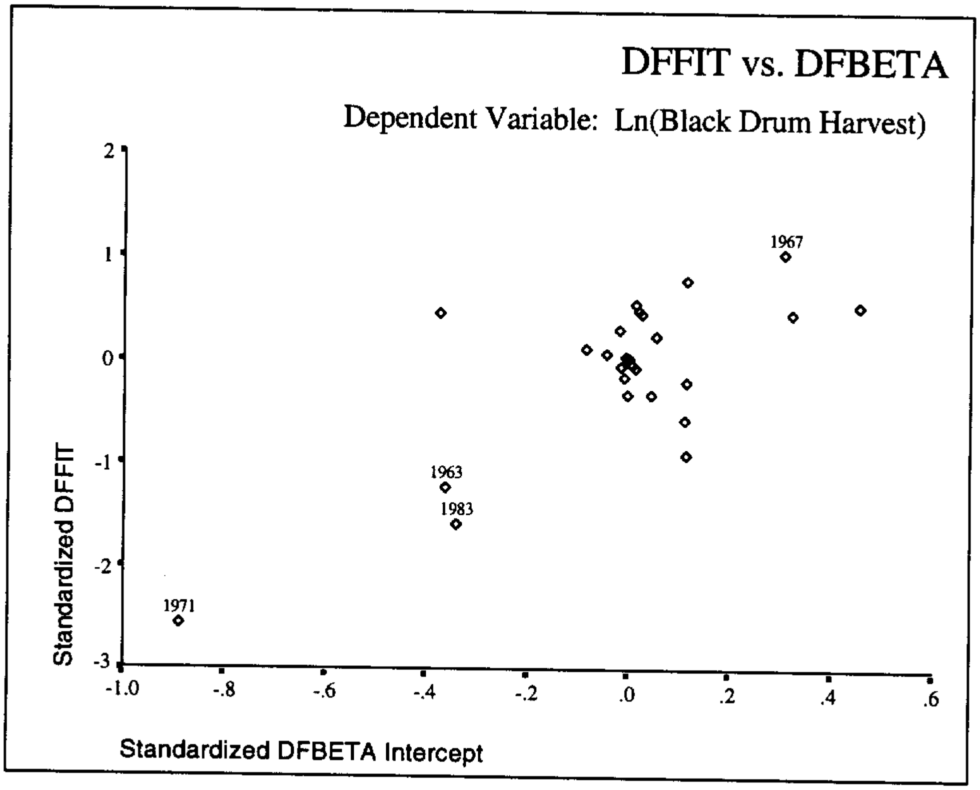
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

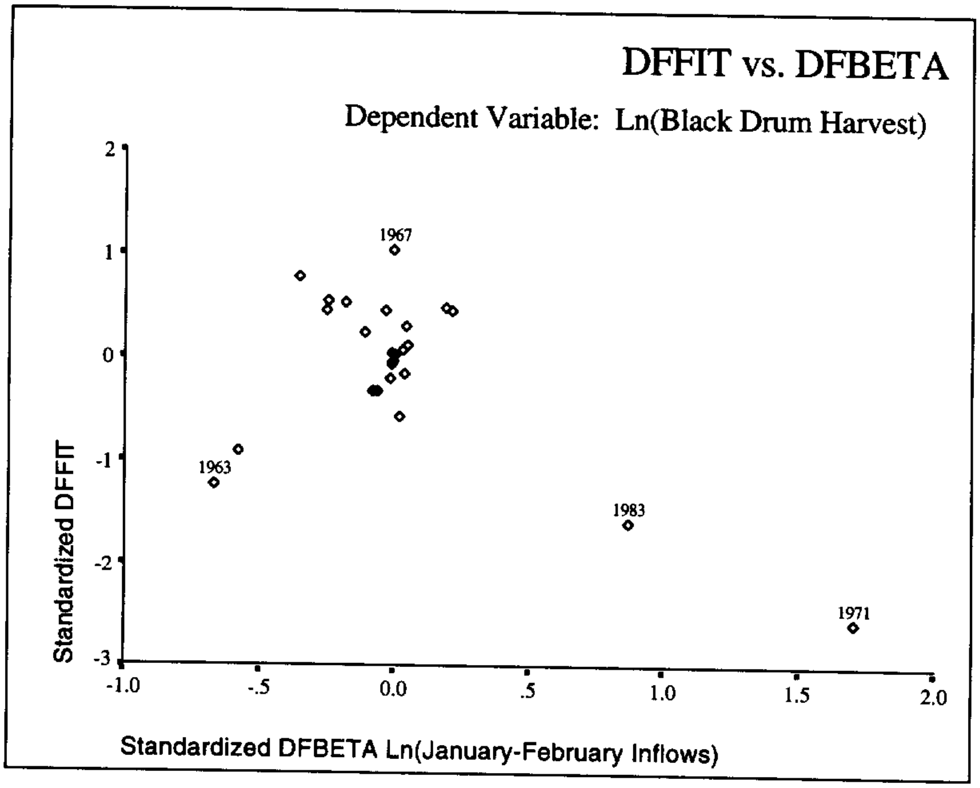
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.01147	.07855	-.08335	.08291
1963	-.12511	.34008	-.56139	.76299
1964	-.19520	-.01927	.09009	-.06075
1965	-.00201	.01990	.00623	-.00291
1966	-.13329	.03783	.12110	-.00770
1967	.52712	.04818	-.22828	-.20785
1968	.02189	.00218	-.00507	-.01515
1969	-.09593	.00724	.24899	-.07012
1970	.12949	-.15339	.13278	-.18584
1971	.56480	.27439	-.49455	-.16519
1972	-.09591	-.10411	.22256	-.07646
1973	.08486	-.17831	.32547	-.01145
1974	.03602	-.08331	.04601	.02257
1975	.11385	-.21731	.08947	.08174
1976	.00905	-.00098	-.03540	.04954
1977	.02734	-.03059	.05198	-.02694
1978	-.35516	.20423	-.34398	.24337
1979	.21143	-.12763	.07133	.03809
1980	-.08235	.01765	.16907	-.35651
1981	-.03456	-.02906	-.07657	.07093
1982	.14135	.04603	.05030	-.00788
1983	-.32333	-.92278	.01068	-.10554
1984	-.31407	.66358	-.20224	.15807
1985	-.03794	.02789	-.01289	.01745
1986	-.00611	.01485	-.00656	-.01239
1987	-.01695	-.00163	.09636	-.15490

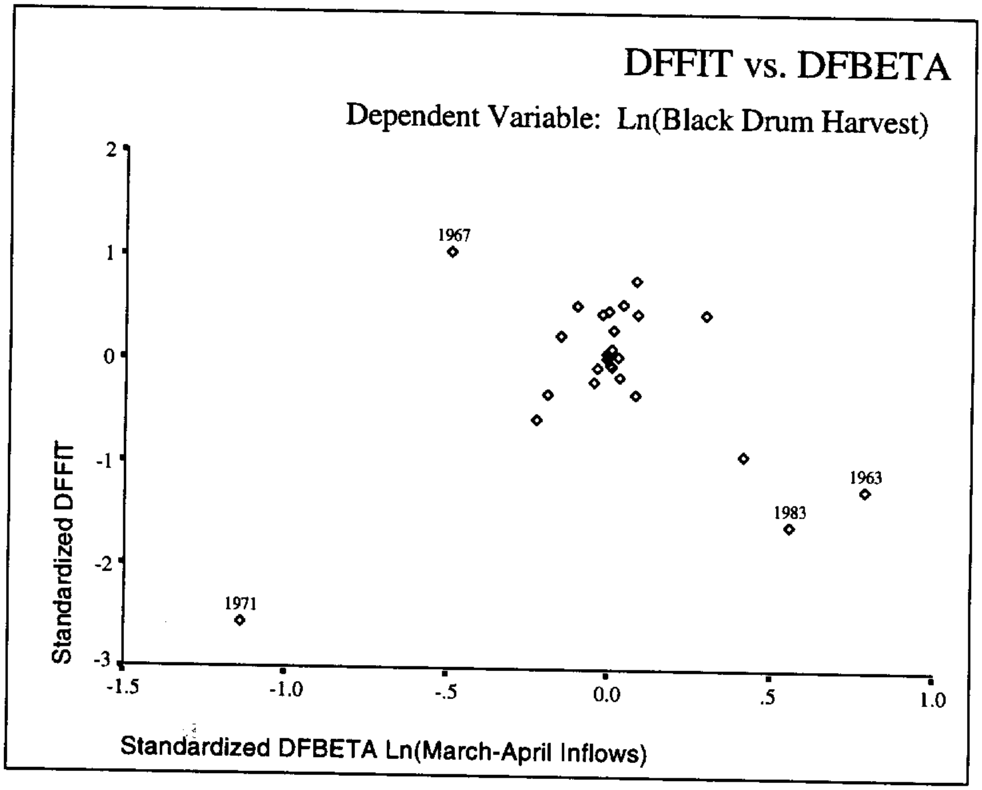
SDFBETA_3	Standardized dfbeta for logged May-June inflows
SDFBETA_4	Standardized dfbeta for logged July-August inflows
SDFBETA_5	Standardized dfbeta for logged September-October inflows
SDFBETA_6	Standardized dfbeta for logged November-December inflows

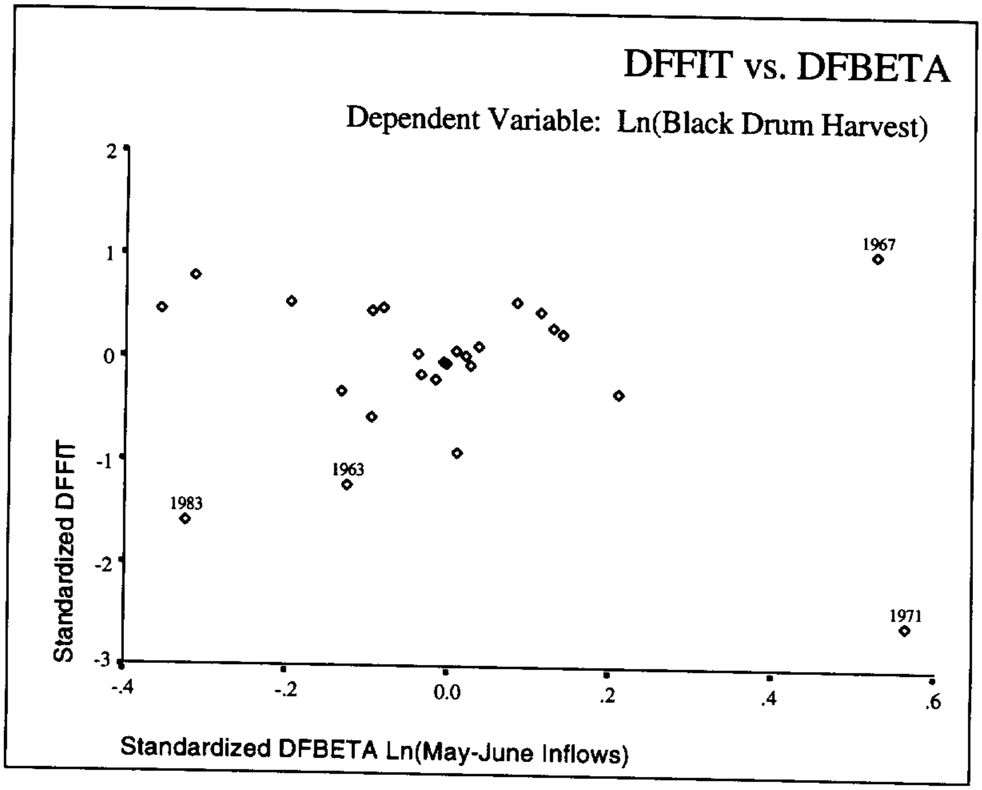
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

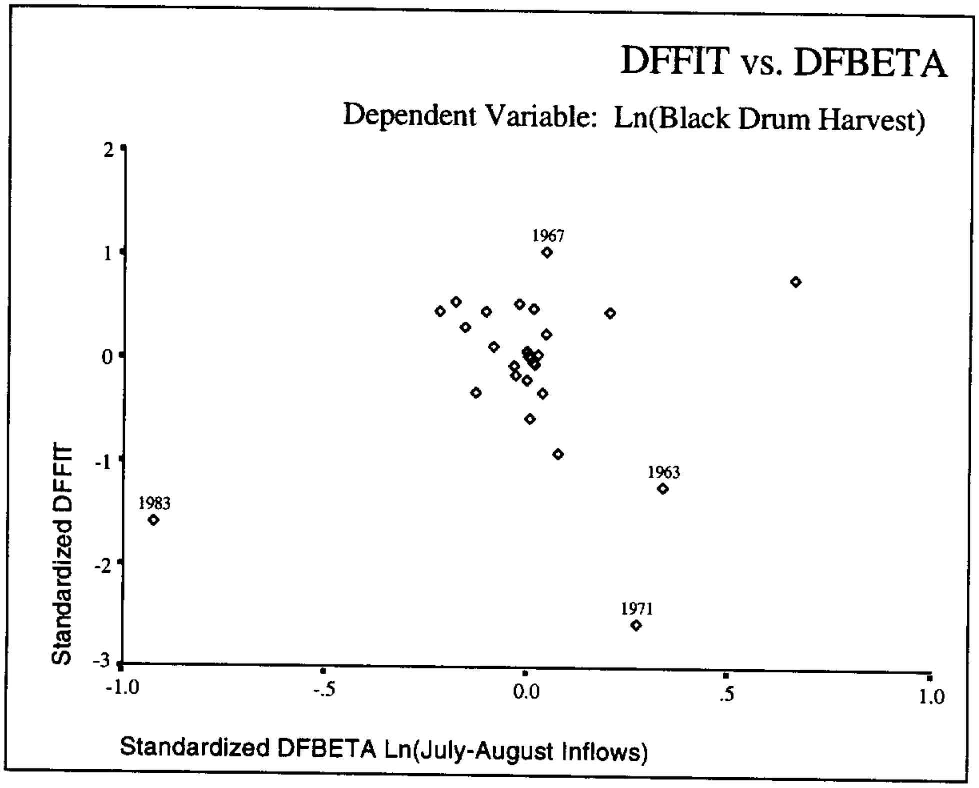
Graphics


DFFIT vs. DFBETA
Dependent Variable: Ln(Black Drum Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Standardized DFBETA Intercept
1967
1963
1983
1971


DFFIT vs. DFBETA
Dependent Variable: Ln(Black Drum Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-1.0
-.5
0.0
.5
1.0
1.5
2.0
Standardized DFBETA Ln(January-February Inflows)
1967
1963
1983
1971

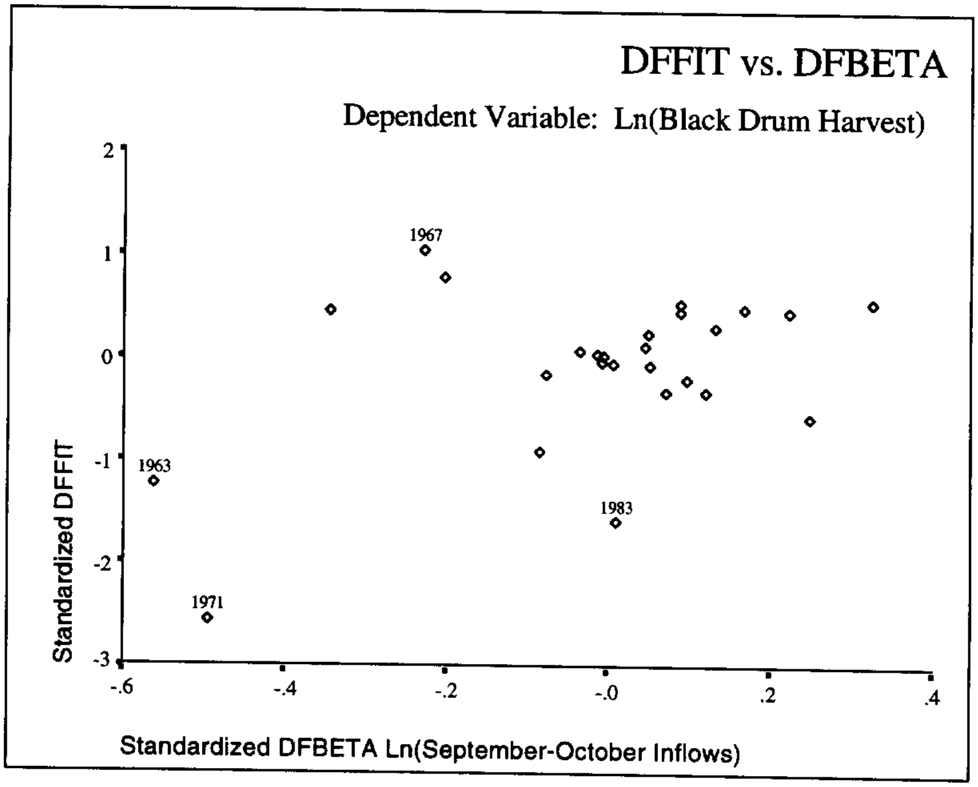

DFFIT vs. DFBETA
Dependent Variable: Ln(Black Drum Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
1967
1963
1983
1971
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA Ln(March-April Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Black Drum Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
1967
1963
1983
1971
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA Ln(May-June Inflows)



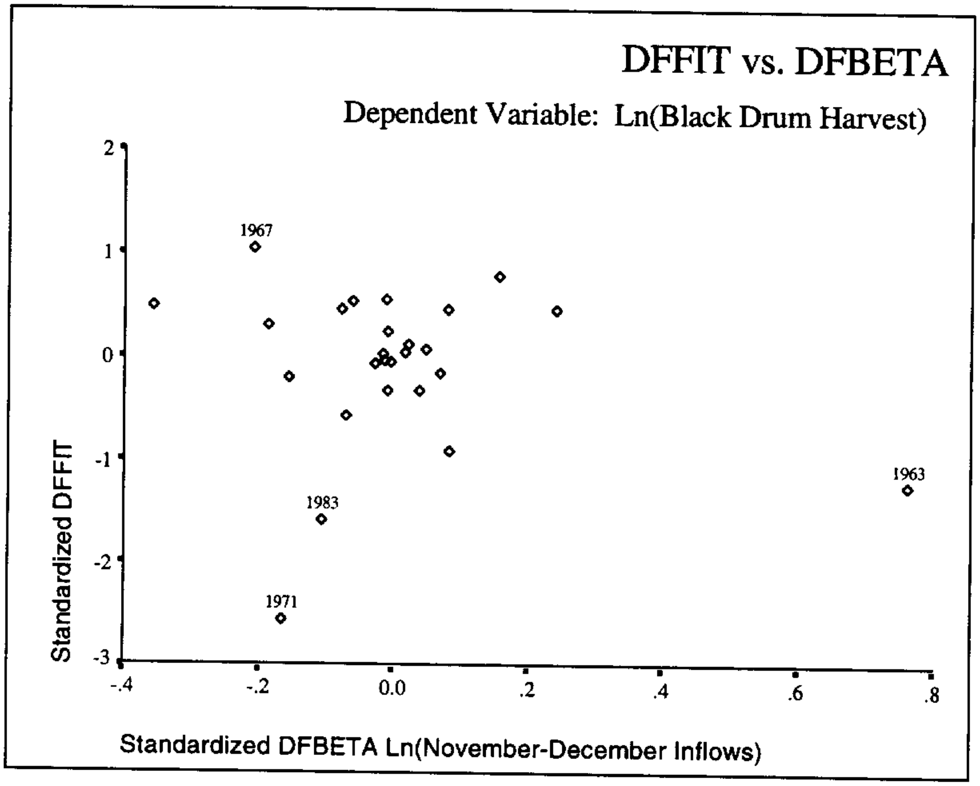
DFFIT vs. DFBETA

Dependent Variable: Ln(Black Drum Harvest)



DFFIT vs. DFBETA

Dependent Variable: Ln(Black Drum Harvest)


DFFIT vs. DFBETA
Dependent Variable: Ln(Black Drum Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-.4
-.2
0.0
.2
.4
.6
.8
Standardized DFBETA Ln(November-December Inflows)
1967
1983
1971
1963

Examining Subsets of the Data

All Variables Logged: 1971 Omitted

```
N = 25     Regression Models for Dependent Variable: LBLKDRUM

        Rsq     Adj    C(p)    AIC     MSE     SBC Variables in Model
  In            Rsq

   1 0.0908 0.0512  38.61 -12.88 0.5533 -10.45 LGJFINFL
   1 0.0752 0.0350  39.63 -12.46 0.5627 -10.02 LGMAINFL
   1 0.0550 0.0139  40.95 -11.92 0.5750 -9.481 LGJAINFL
   1 0.0072 -.0360  44.09 -10.68 0.6041 -8.247 LGMJINFL
------------------------------------------------------------
   2 0.3699 0.3126  22.31 -20.05 0.4009 -16.39 LGJFINFL LGJAINFL
   2 0.2692 0.2028  28.91 -16.35 0.4649 -12.69 LGJFINFL LGMAINFL
   2 0.1403 0.0622  37.36 -12.28 0.5469 -8.628 LGJAINFL LGSOINFL
   2 0.1267 0.0474  38.25 -11.89 0.5555 -8.236 LGJFINFL LGSOINFL
----------------------------------------------------------------------
   3 0.4547 0.3768  18.75 -21.66 0.3634 -16.79 LGJFINFL LGMAINFL LGJAINFL
   3 0.3815 0.2931  23.55 -18.52 0.4122 -13.64 LGJFINFL LGJAINFL LGSOINFL
   3 0.3776 0.2887  23.80 -18.36 0.4148 -13.48 LGJFINFL LGMJINFL LGJAINFL
   3 0.3699 0.2799  24.30 -18.05 0.4199 -13.18 LGJFINFL LGJAINFL LGNDINFL
------------------------------------------------------------------------------
   4 0.5657 0.4789  13.47 -25.36 0.3039 -19.26 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL
   4 0.4677 0.3612  19.90 -20.27 0.3725 -14.17 LGJFINFL LGMAINFL LGJAINFL
                                               LGSOINFL
   4 0.4656 0.3587  20.03 -20.17 0.3740 -14.07 LGJFINFL LGMAINFL LGJAINFL
                                               LGNDINFL
   4 0.3928 0.2714  24.80 -16.98 0.4249 -10.88 LGJFINFL LGMJINFL LGJAINFL
                                               LGSOINFL
------------------------------------------------------------------------------
   5 0.6021 0.4974  13.09 -25.54 0.2931 -18.23 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGSOINFL
   5 0.5846 0.4753  14.23 -24.47 0.3060 -17.16 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGNDINFL
   5 0.5176 0.3907  18.62 -20.73 0.3553 -13.42 LGJFINFL LGMAINFL LGJAINFL
                                               LGSOINFL LGNDINFL
   5 0.4003 0.2424  26.32 -15.29 0.4418 -7.973 LGJFINFL LGMJINFL LGJAINFL
                                               LGSOINFL LGNDINFL
------------------------------------------------------------------------------
   6 0.7254 0.6339  7.000 -32.82 0.2135 -24.29 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGSOINFL LGNDINFL
------------------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

  1  MODEL1   PARMS   LBLKDRUM  0.74381    9.3710  -0.72464        .
  2  MODEL1   PARMS   LBLKDRUM  0.75014    0.3220         .   0.49357
  3  MODEL1   PARMS   LBLKDRUM  0.75830    1.6735         .        .
  4  MODEL1   PARMS   LBLKDRUM  0.77725    2.8483         .        .
  5  MODEL1   PARMS   LBLKDRUM  0.63313   10.1311  -1.70403        .
  6  MODEL1   PARMS   LBLKDRUM  0.68182    6.4321  -1.14750   0.82346
  7  MODEL1   PARMS   LBLKDRUM  0.73951    2.5863         .        .
  8  MODEL1   PARMS   LBLKDRUM  0.74533    9.8570  -1.08787        .
  9  MODEL1   PARMS   LBLKDRUM  0.60284    7.9108  -1.85613   0.58938
 10  MODEL1   PARMS   LBLKDRUM  0.64202    9.9022  -1.58568        .
 11  MODEL1   PARMS   LBLKDRUM  0.64405   11.0890  -1.72653        .
 12  MODEL1   PARMS   LBLKDRUM  0.64799   10.0931  -1.71188        .
 13  MODEL1   PARMS   LBLKDRUM  0.55125   10.5436  -2.09668   1.10501
 14  MODEL1   PARMS   LBLKDRUM  0.61034    7.6514  -1.73242   0.59409
 15  MODEL1   PARMS   LBLKDRUM  0.61152    7.1976  -1.96777   0.65817
 16  MODEL1   PARMS   LBLKDRUM  0.65182   11.0415  -1.59441        .
```

```
OBS  LGMJINFL   LGJAINFL   LGSOINFL   LGNDINFL   LBLKDRUM  _IN_  _P_  _EDF_

  1      .          .          .          .         -1       1    2     23
  2      .          .          .          .         -1       1    2     23
  3      .       0.34197       .          .         -1       1    2     23
  4   0.14498       .          .          .         -1       1    2     23
  5      .       0.97259       .          .         -1       2    3     22
  6      .          .          .          .         -1       2    3     22
  7      .       0.77122   -0.54888       .         -1       2    3     22
  8      .          .       0.32088       .         -1       2    3     22
  9      .       0.82309       .          .         -1       3    4     21
 10      .       1.09736   -0.21554       .         -1       3    4     21
 11  -0.17517    1.05701       .          .         -1       3    4     21
 12      .       0.96966       .       0.01599      -1       3    4     21
 13  -0.83668    1.09552       .          .         -1       4    5     20
 14      .       0.95360   -0.22753       .         -1       4    5     20
 15      .       0.77053       .       0.19123      -1       4    5     20
 16  -0.21504    1.22091   -0.24995       .         -1       4    5     20

OBS   _MSE_      _RSQ_     _ADJRSQ_     _CP_       _AIC_      _SBC_

  1  0.55326    0.09077    0.05123    38.6066    -12.8829   -10.4452
  2  0.56272    0.07522    0.03501    39.6260    -12.4590   -10.0212
  3  0.57502    0.05500    0.01391    40.9512    -11.9184    -9.4806
  4  0.60411    0.00719   -0.03598    44.0857    -10.6845    -8.2467
  5  0.40086    0.36987    0.31258    22.3096    -20.0497   -16.3931
  6  0.46488    0.26922    0.20278    28.9079    -16.3451   -12.6885
  7  0.54688    0.14033    0.06217    37.3575    -12.2842    -8.6276
  8  0.55552    0.12674    0.04735    38.2482    -11.8922    -8.2356
  9  0.36342    0.45469    0.37679    18.7490    -21.6640   -16.7885
 10  0.41219    0.38150    0.29315    23.5467    -18.5157   -13.6402
 11  0.41480    0.37758    0.28866    23.8040    -18.3576   -13.4821
 12  0.41989    0.36995    0.27994    24.3041    -18.0530   -13.1775
 13  0.30388    0.56574    0.47888    13.4689    -25.3567   -19.2624
 14  0.37251    0.46765    0.36118    19.8991    -20.2655   -14.1712
 15  0.37395    0.46560    0.35872    20.0338    -20.1693   -14.0749
 16  0.42487    0.39283    0.27140    24.8041    -16.9778   -10.8835


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

 17  MODEL1   PARMS   LBLKDRUM  0.54139   10.4332  -1.91506   1.17861
 18  MODEL1   PARMS   LBLKDRUM  0.55313    9.7065  -2.25397   1.21671
 19  MODEL1   PARMS   LBLKDRUM  0.59607    5.2986  -1.84479   0.78939
 20  MODEL1   PARMS   LBLKDRUM  0.66465   10.4458  -1.61694    .
 21  MODEL1   PARMS   LBLKDRUM  0.46204    7.4027  -2.15590   1.67852

OBS  LGMJINFL   LGJAINFL   LGSOINFL   LGNDINFL   LBLKDRUM  _IN_  _P_  _EDF_

 17  -0.94298   1.35398   -0.39024       .         -1       5    6     19
 18  -0.87034   1.03699       .       0.25283      -1       5    6     19
 19      .      1.01325   -0.58187    0.52246      -1       5    6     19
 20  -0.21040   1.25611   -0.37331    0.18504      -1       5    6     19
 21  -1.23019   1.57423   -1.02382    0.86112      -1       6    7     18

OBS   _MSE_      _RSQ_     _ADJRSQ_     _CP_       _AIC_      _SBC_

 17  0.29310    0.60208    0.49736    13.0864    -25.5418   -18.2285
 18  0.30596    0.58463    0.47532    14.2305    -24.4686   -17.1554
 19  0.35529    0.51765    0.39071    18.6215    -20.7312   -13.4179
 20  0.44176    0.40026    0.24244    26.3168    -15.2858    -7.9725
 21  0.21348    0.72543    0.63391     7.0000    -32.8178   -24.2857
```

All Variables Logged: 1967 and 1971 Omitted

```
N = 24     Regression Models for Dependent Variable: LBLKDRUM

         Rsq     Adj    C(p)     AIC      MSE      SBC Variables in Model
 In              Rsq

  1 0.1035 0.0627  61.01 -12.91 0.5392 -10.55 LGMAINFL
  1 0.0737 0.0316  63.70 -12.13 0.5571 -9.770 LGJAINFL
  1 0.0722 0.0300  63.84 -12.09 0.5581 -9.730 LGJFINFL
  1 0.0043 -.0410  69.98 -10.39 0.5989 -8.035 LGMJINFL
-----------------------------------------------------------------
  2 0.3676 0.3074  39.15 -19.29 0.3985 -15.75 LGJFINFL LGJAINFL
  2 0.2760 0.2070  47.42 -16.04 0.4562 -12.51 LGJFINFL LGMAINFL
  2 0.1523 0.0716  58.60 -12.25 0.5342 -8.720 LGMAINFL LGMJINFL
  2 0.1330 0.0504  60.35 -11.71 0.5463 -8.179 LGJFINFL LGSOINFL
--------------------------------------------------------------------------
  3 0.4679 0.3881  32.08 -21.43 0.3520 -16.72 LGJFINFL LGMAINFL LGJAINFL
  3 0.3827 0.2901  39.78 -17.87 0.4084 -13.16 LGJFINFL LGMJINFL LGJAINFL
  3 0.3713 0.2770  40.81 -17.43 0.4160 -12.72 LGJFINFL LGJAINFL LGSOINFL
  3 0.3691 0.2745  41.01 -17.34 0.4174 -12.63 LGJFINFL LGJAINFL LGNDINFL
-----------------------------------------------------------------------------------
  4 0.6428 0.5676  18.28 -29.00 0.2488 -23.11 LGJFINFL LGMAINFL LGMJINFL
                                              LGJAINFL
  4 0.4908 0.3836  32.01 -20.49 0.3546 -14.60 LGJFINFL LGMAINFL LGJAINFL
                                              LGNDINFL
  4 0.4715 0.3602  33.76 -19.59 0.3681 -13.70 LGJFINFL LGMAINFL LGJAINFL
                                              LGSOINFL
  4 0.4229 0.3014  38.15 -17.48 0.4019 -11.59 LGJFINFL LGMAINFL LGMJINFL
                                              LGNDINFL
-----------------------------------------------------------------------------------
  5 0.6918 0.6062  15.85 -30.54 0.2265 -23.47 LGJFINFL LGMAINFL LGMJINFL
                                              LGJAINFL LGNDINFL
  5 0.6581 0.5632  18.89 -28.05 0.2513 -20.98 LGJFINFL LGMAINFL LGMJINFL
                                              LGJAINFL LGSOINFL
  5 0.5265 0.3950  30.79 -20.23 0.3481 -13.16 LGJFINFL LGMAINFL LGJAINFL
                                              LGSOINFL LGNDINFL
  5 0.4229 0.2626  40.15 -15.48 0.4243 -8.414 LGJFINFL LGMAINFL LGMJINFL
                                              LGSOINFL LGNDINFL
-----------------------------------------------------------------------------------
  6 0.8119 0.7455  7.000 -40.38 0.1464 -32.14 LGJFINFL LGMAINFL LGMJINFL
                                              LGJAINFL LGSOINFL LGNDINFL
-----------------------------------------------------------------------------------


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

  1  MODEL1   PARMS   LBLKDRUM  0.73433   -0.2817    .          0.56941
  2  MODEL1   PARMS   LBLKDRUM  0.74642    1.3257    .          .
  3  MODEL1   PARMS   LBLKDRUM  0.74704    8.7149  -0.64031     .
  4  MODEL1   PARMS   LBLKDRUM  0.77390    3.0909    .          .
  5  MODEL1   PARMS   LBLKDRUM  0.63127    9.4730  -1.61979     .
  6  MODEL1   PARMS   LBLKDRUM  0.67544    5.5142  -1.06385   0.85878
  7  MODEL1   PARMS   LBLKDRUM  0.73086    0.8882    .        0.94877
  8  MODEL1   PARMS   LBLKDRUM  0.73915    9.1296  -1.08533     .
  9  MODEL1   PARMS   LBLKDRUM  0.59334    7.0176  -1.76864   0.62563
 10  MODEL1   PARMS   LBLKDRUM  0.63907   10.7221  -1.64132     .
 11  MODEL1   PARMS   LBLKDRUM  0.64494    9.4059  -1.56004     .
 12  MODEL1   PARMS   LBLKDRUM  0.64608    9.2924  -1.64974     .
 13  MODEL1   PARMS   LBLKDRUM  0.49876    9.8500  -2.02405   1.30171
 14  MODEL1   PARMS   LBLKDRUM  0.59550    5.8662  -1.91661   0.72960
 15  MODEL1   PARMS   LBLKDRUM  0.60670    6.9541  -1.71012   0.62511
 16  MODEL1   PARMS   LBLKDRUM  0.63398    4.7668  -1.49356   1.52304
```

```
OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  LBLKDRUM  _IN_  _P_  _EDF_

  1   .          .         .         .          -1       1    2     22
  2   .        0.38770     .         .          -1       1    2     22
  3   .          .         .         .          -1       1    2     22
  4  0.10919     .         .         .          -1       1    2     22
  5   .        0.97298     .         .          -1       2    3     21
  6   .          .         .         .          -1       2    3     21
  7 -0.51408     .         .         .          -1       2    3     21
  8   .          .       0.41792     .          -1       2    3     21
  9   .        0.81434     .         .          -1       3    4     20
 10 -0.24209   1.08970     .         .          -1       3    4     20
 11   .        1.04464  -0.12386     .          -1       3    4     20
 12   .        0.96074     .       0.06675      -1       3    4     20
 13 -1.06324   1.15551     .         .          -1       4    5     19
 14   .        0.73759     .       0.27471      -1       4    5     19
 15   .        0.88451  -0.12105     .          -1       4    5     19
 16 -0.67364     .         .       0.58298      -1       4    5     19

OBS   _MSE_     _RSQ_     _ADJRSQ_     _CP_       _AIC_      _SBC_

  1  0.53924   0.10349    0.06274    61.0129   -12.9105   -10.5544
  2  0.55715   0.07372    0.03162    63.7029   -12.1266    -9.7704
  3  0.55807   0.07218    0.03000    63.8424   -12.0866    -9.7305
  4  0.59892   0.00428   -0.04099    69.9782   -10.3915    -8.0354
  5  0.39850   0.36759    0.30736    39.1472   -19.2860   -15.7518
  6  0.45621   0.27600    0.20705    47.4241   -16.0398   -12.5056
  7  0.53415   0.15231    0.07158    58.6012   -12.2544    -8.7203
  8  0.54634   0.13298    0.05040    60.3483   -11.7132    -8.1790
  9  0.35205   0.46791    0.38810    32.0819   -21.4314   -16.7192
 10  0.40841   0.38273    0.29014    39.7790   -17.8676   -13.1554
 11  0.41595   0.37133    0.27703    40.8095   -17.4283   -12.7161
 12  0.41742   0.36911    0.27448    41.0102   -17.3436   -12.6314
 13  0.24876   0.64282    0.56763    18.2761   -28.9973   -23.1070
 14  0.35462   0.49083    0.38363    32.0114   -20.4878   -14.5975
 15  0.36809   0.47148    0.36022    33.7593   -19.5930   -13.7027
 16  0.40194   0.42289    0.30139    38.1507   -17.4818   -11.5916


OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

 17  MODEL1   PARMS   LBLKDRUM  0.47596    8.3877  -2.26532   1.51402
 18  MODEL1   PARMS   LBLKDRUM  0.50132    9.8438  -1.91290   1.33092
 19  MODEL1   PARMS   LBLKDRUM  0.58998    4.5313  -1.82411   0.82539
 20  MODEL1   PARMS   LBLKDRUM  0.65135    4.7860  -1.49591   1.52095
 21  MODEL1   PARMS   LBLKDRUM  0.38267    6.4519  -2.17542   1.89840

OBS  LGMJINFL  LGJAINFL  LGSOINFL  LGNDINFL  LBLKDRUM  _IN_  _P_  _EDF_

 17 -1.15481   1.07117     .       0.40709      -1       5    6     18
 18 -1.11087   1.31778  -0.25358     .          -1       5    6     18
 19   .        0.94323  -0.47936   0.53321      -1       5    6     18
 20 -0.67323     .       0.00498   0.57969      -1       5    6     18
 21 -1.44847   1.55294  -0.92535   0.93976      -1       6    7     17

OBS   _MSE_     _RSQ_     _ADJRSQ_     _CP_       _AIC_      _SBC_

 17  0.22654   0.69184    0.60624    15.8465   -30.5402   -23.4719
 18  0.25132   0.65814    0.56318    18.8921   -28.0491   -20.9808
 19  0.34808   0.52652    0.39500    30.7854   -20.2324   -13.1641
 20  0.42426   0.42289    0.26258    40.1502   -15.4820    -8.4137
 21  0.14644   0.81187    0.74548     7.0000   -40.3840   -32.1376
```

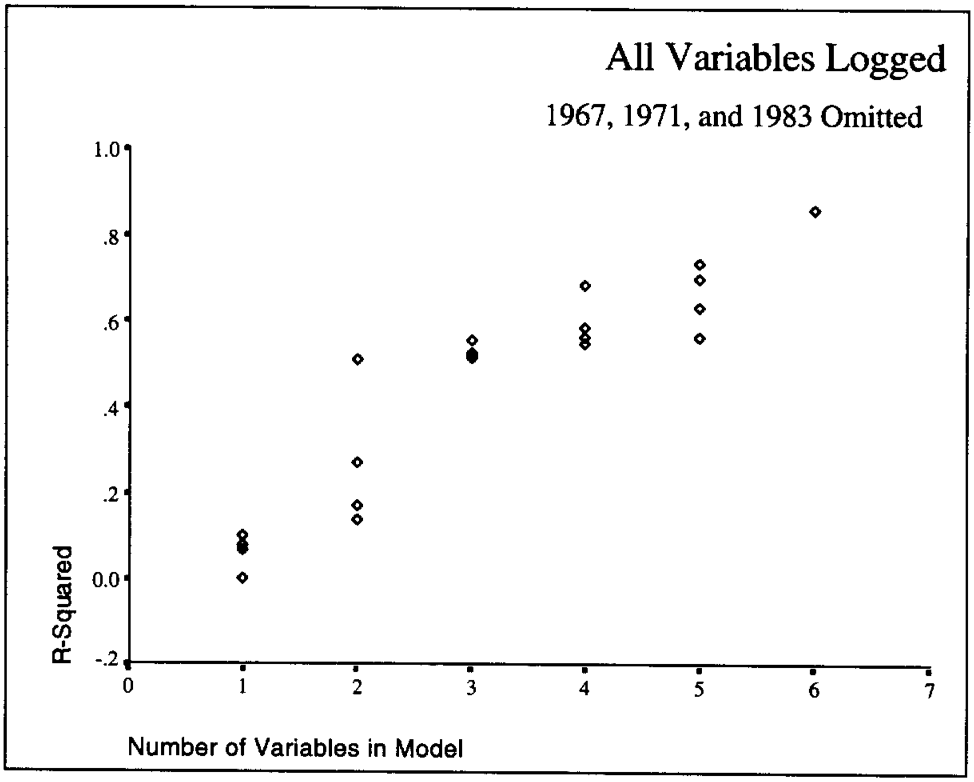
All Variables Logged: 1967, 1971, and 1983 Omitted

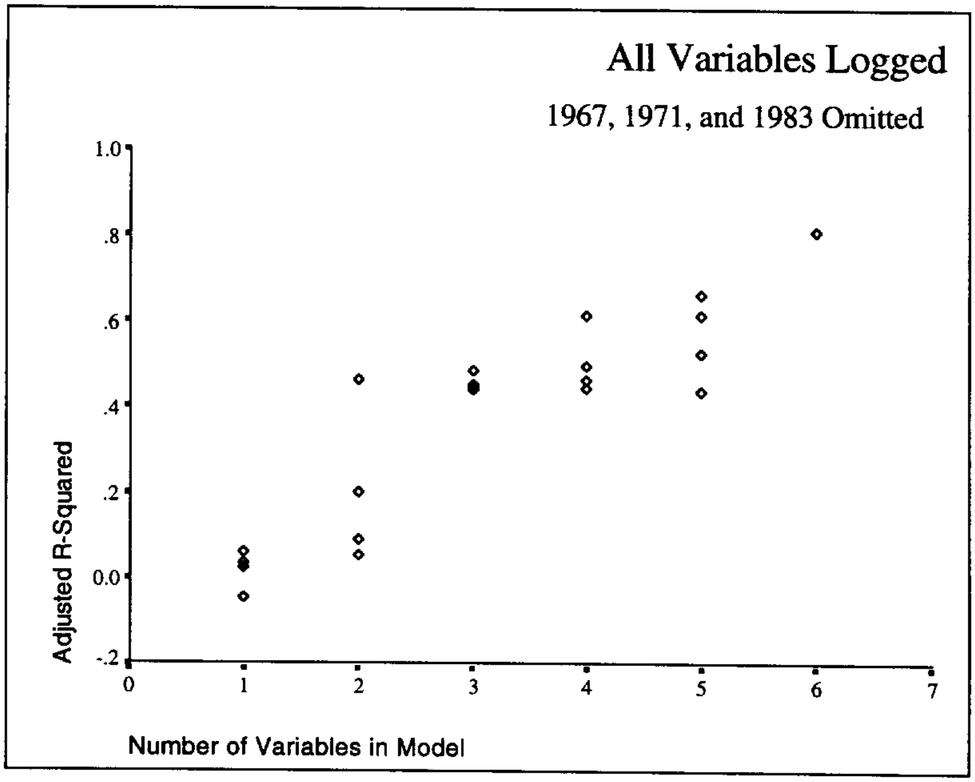
```
 N = 23     Regression Models for Dependent Variable: LBLKDRUM

        Rsq     Adj   C(p)    AIC     MSE     SBC Variables in Model
  In            Rsq

   1 0.1060 0.0635  86.36 -11.30 0.5632 -9.025 LGMAINFL
   1 0.0823 0.0386  89.16 -10.69 0.5782 -8.422 LGJAINFL
   1 0.0724 0.0283  90.32 -10.45 0.5844 -8.176 LGJFINFL
   1 0.0041 -.0433  98.37 -8.813 0.6274 -6.542 LGMJINFL
-----------------------------------------------------------
   2 0.5137 0.4651  40.31 -23.30 0.3217 -19.89 LGJFINFL LGJAINFL
   2 0.2762 0.2039  68.30 -14.15 0.4788 -10.75 LGJFINFL LGMAINFL
   2 0.1760 0.0936  80.11 -11.17 0.5451 -7.765 LGMAINFL LGMJINFL
   2 0.1427 0.0569  84.05 -10.26 0.5672 -6.851 LGJAINFL LGSOINFL
--------------------------------------------------------------------
   3 0.5599 0.4904  36.87 -23.59 0.3065 -19.05 LGJFINFL LGMAINFL LGJAINFL
   3 0.5302 0.4561  40.37 -22.10 0.3271 -17.55 LGJFINFL LGMJINFL LGJAINFL
   3 0.5237 0.4485  41.13 -21.78 0.3317 -17.24 LGJFINFL LGJAINFL LGNDINFL
   3 0.5190 0.4430  41.69 -21.55 0.3350 -17.01 LGJFINFL LGJAINFL LGSOINFL
------------------------------------------------------------------------------
   4 0.6882 0.6189  23.75 -29.52 0.2292 -23.84 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL
   4 0.5896 0.4984  35.37 -23.20 0.3017 -17.52 LGJFINFL LGMAINFL LGJAINFL
                                               LGNDINFL
   4 0.5647 0.4680  38.30 -21.85 0.3199 -16.17 LGJFINFL LGMAINFL LGJAINFL
                                               LGSOINFL
   4 0.5497 0.4496  40.08 -21.07 0.3310 -15.39 LGJFINFL LGJAINFL LGSOINFL
                                               LGNDINFL
-------------------------------------------------------------------------------
   5 0.7403 0.6640  19.60 -31.73 0.2021 -24.92 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGNDINFL
   5 0.7034 0.6162  23.96 -28.67 0.2308 -21.86 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGSOINFL
   5 0.6375 0.5308  31.73 -24.05 0.2822 -17.24 LGJFINFL LGMAINFL LGJAINFL
                                               LGSOINFL LGNDINFL
   5 0.5676 0.4404  39.97 -20.00 0.3365 -13.19 LGJFINFL LGMJINFL LGJAINFL
                                               LGSOINFL LGNDINFL
-------------------------------------------------------------------------------
   6 0.8642 0.8133  7.000 -44.65 0.1123 -36.70 LGJFINFL LGMAINFL LGMJINFL
                                               LGJAINFL LGSOINFL LGNDINFL
-------------------------------------------------------------------------------
```

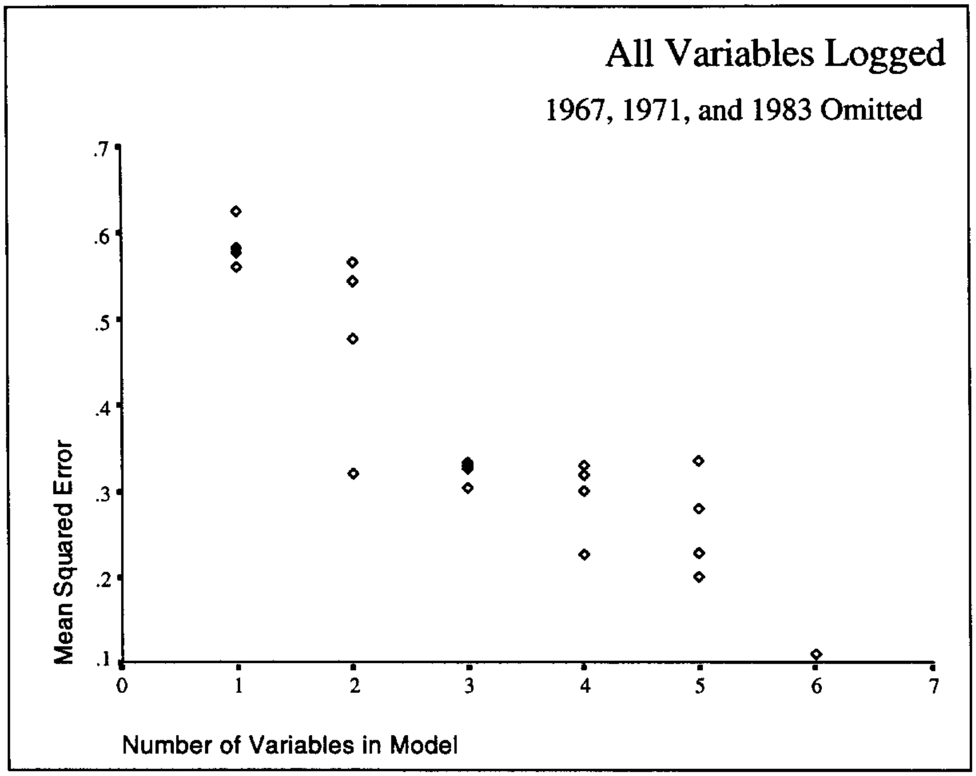
```
 OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP  LGJFINFL  LGMAINFL

   1  MODEL1   PARMS   LBLKDRUM  0.75048   -0.3735      .       0.58072
   2  MODEL1   PARMS   LBLKDRUM  0.76039    0.9897      .        .
   3  MODEL1   PARMS   LBLKDRUM  0.76446    8.7599  -0.64593     .
   4  MODEL1   PARMS   LBLKDRUM  0.79211    3.0881      .         .
   5  MODEL1   PARMS   LBLKDRUM  0.56718   10.8680  -2.20469     .
   6  MODEL1   PARMS   LBLKDRUM  0.69195    5.4597  -1.05999   0.86185
   7  MODEL1   PARMS   LBLKDRUM  0.73830    0.9509      .       1.10283
   8  MODEL1   PARMS   LBLKDRUM  0.75310    1.7442      .         .
   9  MODEL1   PARMS   LBLKDRUM  0.55361    8.8892  -2.21033   0.44350
  10  MODEL1   PARMS   LBLKDRUM  0.57194   12.1795  -2.22999     .
  11  MODEL1   PARMS   LBLKDRUM  0.57589   10.4559  -2.30689     .
  12  MODEL1   PARMS   LBLKDRUM  0.57875   10.7962  -2.13700     .
  13  MODEL1   PARMS   LBLKDRUM  0.47874   10.8605  -2.31214   1.08908
  14  MODEL1   PARMS   LBLKDRUM  0.54926    7.6477  -2.39615   0.55511
  15  MODEL1   PARMS   LBLKDRUM  0.56563    8.8291  -2.14534   0.44153
  16  MODEL1   PARMS   LBLKDRUM  0.57534    9.7856  -2.24009     .
```

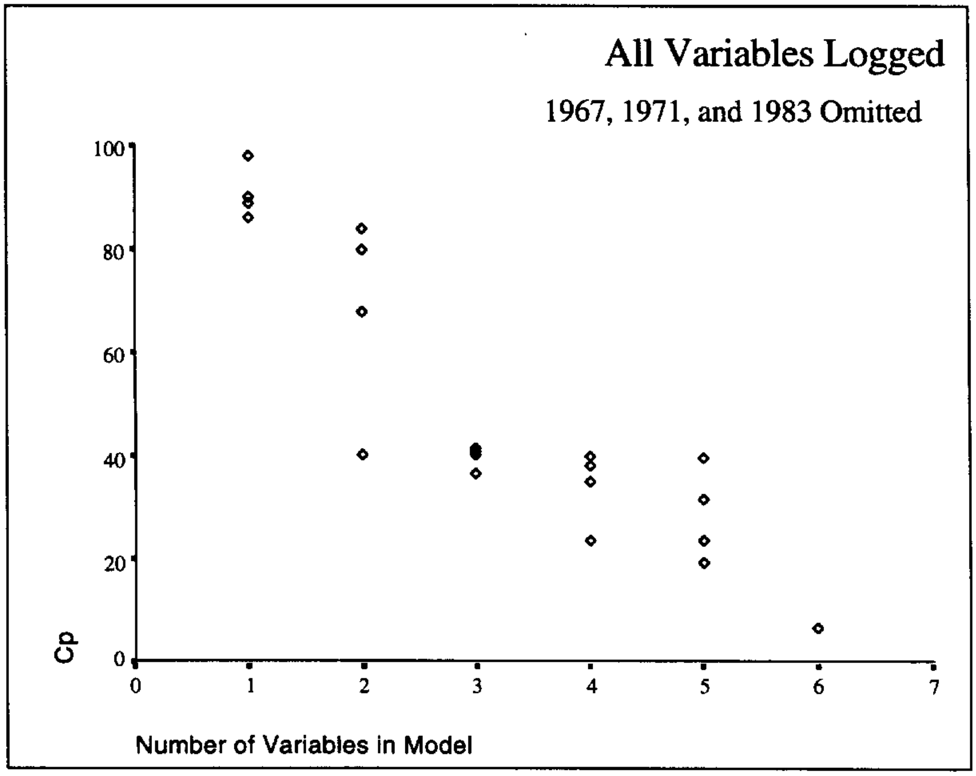
```
 OBS  LGMJINFL   LGJAINFL   LGSOINFL   LGNDINFL   LBLKDRUM   _IN_   _P_   _EDF_

  1    .          .          .          .          -1         1      2      21
  2    .         0.43991     .          .          -1         1      2      21
  3    .          .          .          .          -1         1      2      21
  4   0.10958     .          .          .          -1         1      2      21
  5    .         1.42467     .          .          -1         2      3      20
  6    .          .          .          .          -1         2      3      20
  7  -0.67297     .          .          .          -1         2      3      20
  8    .         0.82441   -0.47979     .          -1         2      3      20
  9    .         1.23507     .          .          -1         3      4      19
 10  -0.25290    1.54877     .          .          -1         3      4      19
 11    .         1.41156     .         0.17369     -1         3      4      19
 12    .         1.51242   -0.14723     .          -1         3      4      19
 13  -0.93554    1.41818     .          .          -1         4      5      18
 14    .         1.16372     .         0.31340     -1         4      5      18
 15    .         1.32013   -0.14129     .          -1         4      5      18
 16    .         1.63567   -0.40132    0.37375     -1         4      5      18

 OBS   _MSE_      _RSQ_      _ADJRSQ_      _CP_        _AIC_        _SBC_

  1   0.56322    0.10605    0.06348     86.3620    -11.2962     -9.0252
  2   0.57819    0.08229    0.03859     89.1621    -10.6930     -8.4220
  3   0.58440    0.07243    0.02826     90.3243    -10.4471     -8.1762
  4   0.62743    0.00413   -0.04329     98.3743     -8.8130     -6.5420
  5   0.32170    0.51372    0.46509     40.3138    -23.3000    -19.8935
  6   0.47879    0.27625    0.20387     68.3024    -14.1538    -10.7473
  7   0.54508    0.17604    0.09364     80.1127    -11.1714     -7.7649
  8   0.56717    0.14265    0.05692     84.0474    -10.2579     -6.8514
  9   0.30648    0.55987    0.49038     36.8737    -23.5938    -19.0518
 10   0.32712    0.53024    0.45607     40.3663    -22.0951    -17.5531
 11   0.33165    0.52373    0.44853     41.1332    -21.7787    -17.2368
 12   0.33495    0.51899    0.44305     41.6918    -21.5510    -17.0090
 13   0.22920    0.68819    0.61889     23.7507    -29.5209    -23.8434
 14   0.30169    0.58956    0.49835     35.3746    -23.2001    -17.5226
 15   0.31994    0.56473    0.46801     38.3009    -21.8492    -16.1717
 16   0.33102    0.54966    0.44958     40.0779    -21.0660    -15.3885


 OBS  _MODEL_   _TYPE_   _DEPVAR_   _RMSE_   INTERCEP   LGJFINFL   LGMAINFL

 17   MODEL1    PARMS    LBLKDRUM  0.44954    9.3862   -2.57102    1.30085
 18   MODEL1    PARMS    LBLKDRUM  0.48044   10.8534   -2.20103    1.11841
 19   MODEL1    PARMS    LBLKDRUM  0.53119    6.2097   -2.31944    0.65528
 20   MODEL1    PARMS    LBLKDRUM  0.58013   11.1650   -2.24969     .
 21   MODEL1    PARMS    LBLKDRUM  0.33505    7.4582   -2.49168    1.68311

 OBS  LGMJINFL   LGJAINFL   LGSOINFL   LGNDINFL   LBLKDRUM   _IN_   _P_   _EDF_

 17  -1.02565   1.34017      .         0.42009     -1         5      6      17
 18  -0.98317   1.57970   -0.25283      .          -1         5      6      17
 19    .        1.43037   -0.55758    0.61657      -1         5      6      17
 20  -0.26531   1.78291   -0.42902    0.36661      -1         5      6      17
 21  -1.31900   1.84035   -0.94039    0.96192      -1         6      7      16

 OBS   _MSE_      _RSQ_      _ADJRSQ_      _CP_        _AIC_        _SBC_

 17   0.20209    0.74034    0.66397     19.6037    -31.7307     -24.9178
 18   0.23083    0.70341    0.61618     23.9560    -28.6724     -21.8595
 19   0.28216    0.63746    0.53083     31.7293    -24.0541     -17.2411
 20   0.33655    0.56757    0.44039     39.9664    -19.9997     -13.1867
 21   0.11226    0.86425    0.81334      7.0000    -44.6469     -36.6985
```

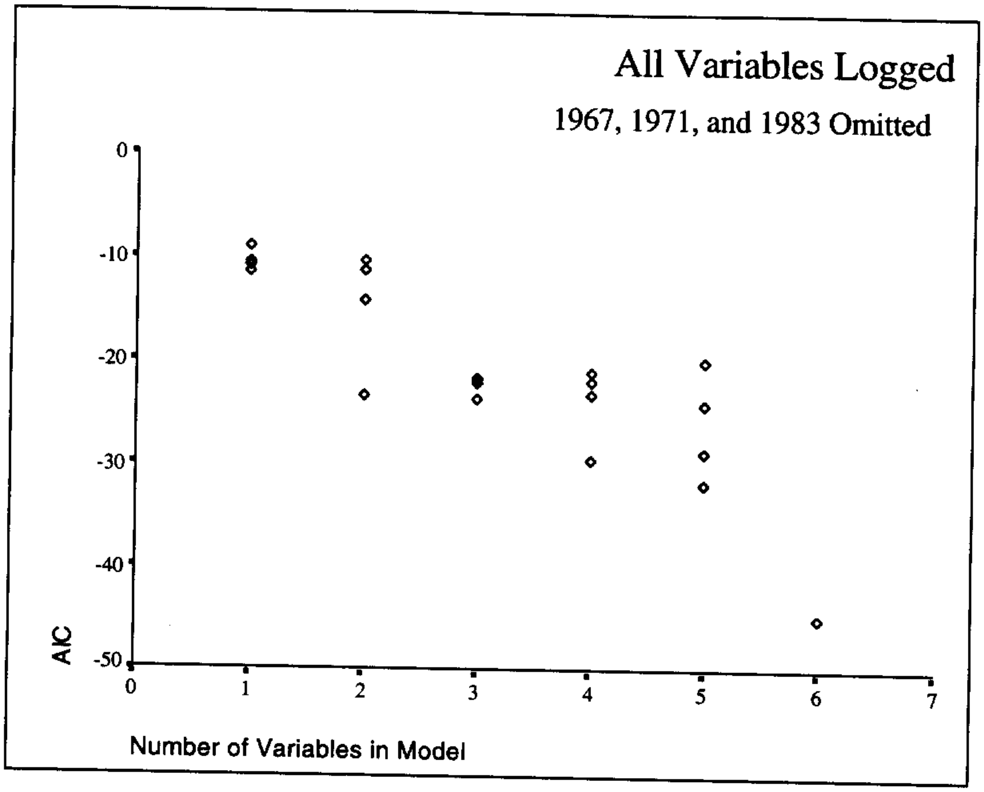
Scree Plots

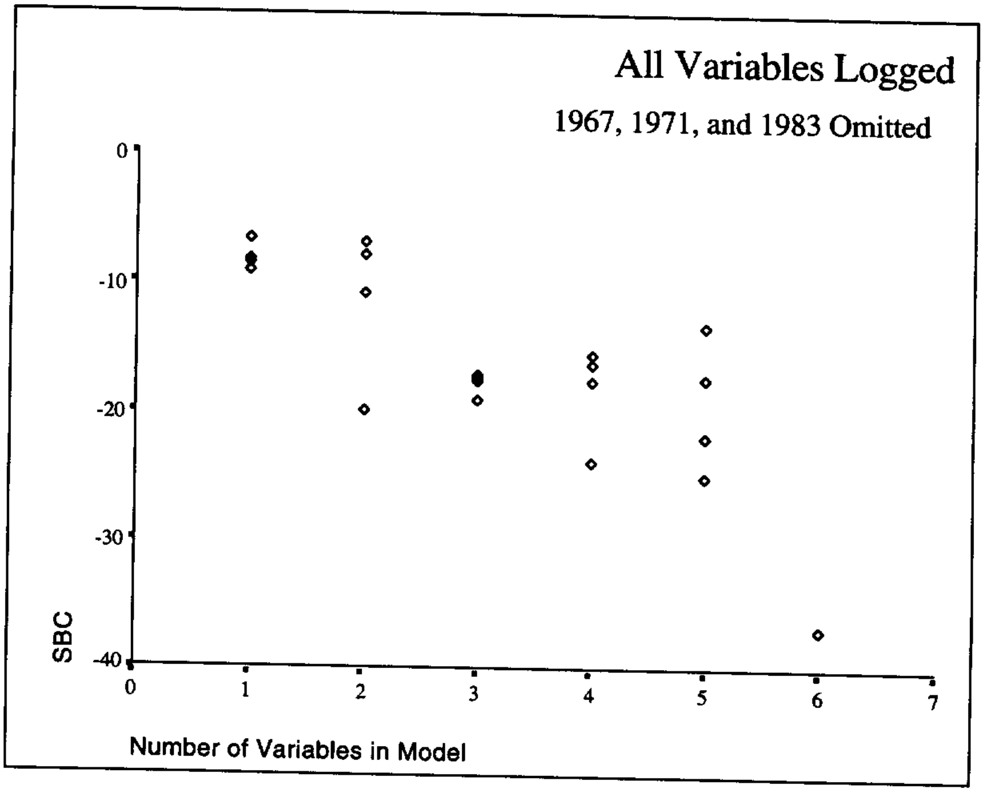

All Variables Logged
1967, 1971, and 1983 Omitted
R-Squared
1.0
.8
.6
.4
.2
0.0
-.2
0
1
2
3
4
5
6
7
Number of Variables in Model


All Variables Logged
1967, 1971, and 1983 Omitted
Adjusted R-Squared
1.0
.8
.6
.4
.2
0.0
-.2
0
1
2
3
4
5
6
7
Number of Variables in Model


All Variables Logged
1967, 1971, and 1983 Omitted
Mean Squared Error
.7
.6
.5
.4
.3
.2
.1
0
1
2
3
4
5
6
7
Number of Variables in Model


All Variables Logged
1967, 1971, and 1983 Omitted
Cp
100
80
60
40
20
0
0
1
2
3
4
5
6
7
Number of Variables in Model


All Variables Logged
1967, 1971, and 1983 Omitted
AIC
0
-10
-20
-30
-40
-50
0
1
2
3
4
5
6
7
Number of Variables in Model


All Variables Logged
1967, 1971, and 1983 Omitted
SBC
0
-10
-20
-30
-40
0
1
2
3
4
5
6
7
Number of Variables in Model

Red Drum Harvests in Galveston Bay: A Regression Analysis

Harvest vs. Freshwater Inflows

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Jacqueline Kiffe

Department of Statistics
Texas A&M University

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Table of Contents

Summary Report

Description of the Problem

Bimonthly freshwater inflows into Galveston Bay were recorded for the years 1962 to 1981. These variables, and various transformations of them, were used to construct a model for the annual harvest of red drum.

Constructing Models—General Discussion

Stability of coefficient estimates and accuracy of predicted values are primary goals in constructing models for prediction. To this end, the data must be examined from three points of view: individual observations (to detect outliers or influential points); variables, individually and in groups (to select an optimal set of predictors); and the interaction of these two, which produces the overall structure of the data set (to determine whether multicollinearity is present or not). The first two of these were examined by both graphic and quantitative means; the third by quantitative means only.

Detecting Influential Points and Outliers

The structures of individual variables were examined via box plots and histograms, as well as by all the usual numerical measures. For each pair of variables, 99% prediction ellipses were plotted in a further effort to look for unusual points. For example, suppose large values of Variable A are generally associated with large values of Variable B. If an observation consisted of a large value for Variable A but a small value for Variable B, that point would be considered unusual, even though it was well within the range of data for both variables and could not be considered an outlier.

In addition, a number of residual analysis techniques were employed. A large *residual* indicates a point not well-fit by the model. The *deleted residual*, however, is somewhat more useful in the search for influential points. The model is fitted without a given observation, and the predicted response and corresponding residual are calculated for that observation. The *Studentized deleted residual* is scaled to have a Student's t distribution. Histograms and normal P-P plots of the residuals were also examined.

Other quantities, such as the Mahalanobis distance, Cook's distance, the leverage value, standardized values for the Dffits (to measure the influence of a given observation on the predicted response) and the Dfbetas (to measure the influence of a given observation on the calculated coefficients) were also used to build a general picture of the influence of individual points. Plots were made of the standardized Dffits value for each model against the Dfbeta values for each predictor in the model. Points which were extreme indicated observations which had strong effects on both predicted values and coefficient estimates.

Variable Selection

For each regression, residuals were plotted against each of the independent variables to look for nonlinear relationships between the response variable and individual predictors. Partial residual plots were employed to examine the overall relationship between the response and individual predictors. A partial residual is a corollary to the deleted residual. That is, the model is fitted without a given variable and the predicted response and corresponding residual are calculated for each observation. This seeks to answer the question, "What is the relationship of this predictor to the response variable, taking all other variables into account?" Thus, it examines the marginal relationship of a given predictor to the response.

Numerous measures have been developed over the years to assess the adequacy of a given model. We examined a number of these, including R^2 and mean squared error (MSE), and several others which directly incorporate penalties for having too many predictors in the model, such as adjusted R^2, C_P, AIC, and SBC. It is well-established that too many predictors in a model can lead to bad prediction, just as too few can, and these measures are used as part of the attempt to find an optimal model.

Multicollinearity

Multicollinearity arises when one or more variables are closely approximated by linear combinations of the remaining variables, resulting in unstable coefficient estimates. The variance inflation factor (VIF) was calculated for each coefficient estimate to measure this instability, which is not usually considered profound for VIF's less that 10. Additionally, the condition index (a ratio of eigenvalues of the covariance matrix, with the largest eigenvalue always on top) was calculated. A ratio greater than 30 is considered cause for concern.

Other Procedures

Several other miscellaneous diagnostics, including the Durbin-Watson test for serial autocorrelation, were performed, and no general problems were detected. The Box-Cox procedure, used to find a transformation to normality, was also performed.

How the Final Models Were Chosen

Selecting the Data Set Used. First, the variables were explored thoroughly, individually and in pairs, in a first effort to detect outliers. The SAS® programming language allows a number of diagnostics to be calculated for a group of models on a given data set without actually performing a formal regression, thus allowing one to examine a large number of models quite efficiently. In addition to the untransformed data, three transformed data sets were selected for this procedure, based on prior experience. Before we proceeded, the Box-Cox procedure was performed to find if a transformation to normality was suggested. The recommended transformation was the square root of harvest. At this point, there were five data sets for which the diagnostic series was calculated:

1. Untransformed data
2. Square root of harvest; remaining variables untransformed

3. Natural log of inflow variables; harvest untransformed
4. Natural log of harvest; inflows untransformed
5. Natural log of all variables

Selecting the Points to be Omitted. The maximum R^2 values for these data sets were 0.55, 0.52, 0.55, 0.48, and 0.56, in order of data set. Thus, this initial examination of the five models did not produce an immediate candidate for a superior model; however, the fourth data set seemed less promising than the remaining four. Therefore, full regressions were performed for four models, each of which contained all variables in its corresponding data set. A number of diagnostics were employed to determine potentially influential points; the results are summarized in the table below. (An asterisk indicates that the observation year was deleted for subsequent analysis.) The abbreviation key and a similar summary table for points designated by box plots as potentially influential appear on the next page. A point was not considered to be a problem unless it garnered multiple flags.

	BOX	SDR	LEV	MAH	COO	SDF	SDB	Total
Data set 1								
1976	1					1		2
***1977**			1		1	1	4	7
***1979**			1			1	3	5
***1981**	1		1		1	1	2	6
Data Set 2								
1963						1		1
1971						1		1
1976	1					1		2
***1977**			1			1	4	6
***1979**			1			1	3	5
***1981**	1		1		1	1	2	6
Data Set 3								
1965	1							1
***1976**	1	1				1		3
***1977**		1				1	3	5
***1979**			1			1	2	4
1981			1					1
Data Set 5								
***1963**	1	1				1		3
1965	1							1
1971						1		1
1976						1		1
***1977**						1	1	2
***1979**			1			1	1	3
1981			1					1

Summary of points flagged by diagnostic measures

Key to Abbreviations:

BOX	Box plot
SDR	Studentized deleted residual
LEV	Leverage value
MAH	Mahalanobis distance
COO	Cook's distance
SDF	Standardized Dffits value
SDB	Standardized Dfbeta value

Year	Variable
1962	Natural log of Red Drum Harvest
1963	Natural log of Red Drum Harvest
1965	Natural log of July-August Inflows
1975	Red Drum Harvest
1976	Red Drum Harvest, Square Root of Red Drum Harvest
1981	July-August Inflows

Summary of points flagged by box plots

Selecting the Final Candidate Models. Twenty-one different models were examined for each of the four data subsets (Data Sets 1, 2, 3, and 5, each without the points indicated by an asterisk), and three models were chosen from each of two data subsets (1 and 3) for further examination.

1977, 1979, and 1981 Omitted:

1a. Harvest regressed on January-February, May-June, and November-December inflows (adjusted $R^2 = 0.589$)

1b. Harvest regressed on January-February, May-June, September-October, and November-December inflows (adjusted $R^2 = 0.634$)

1c. Harvest regressed on January-February, May-June, July-August, and September-October, and November-December inflows (adjusted $R^2 = 0.627$)

1976, 1977, and 1979 Omitted:

3a. Harvest regressed on natural log of January-February, May-June, and November-December inflows (adjusted $R^2 = 0.607$)

3b. Harvest regressed on natural log of January-February, March-April, May-June, and November-December inflows (adjusted $R^2 = 0.632$)

3c. Harvest regressed on natural log of January-February, March-April, May-June, July-August, and November-December inflows (adjusted $R^2 = 0.635$)

Selecting the Final Models. To put these models on a common ground for testing, the observations corresponding to the years 1976, 1977, 1979, and 1981 were deleted. Regression was performed using each of these six models, and the deleted residuals were calculated. Various descriptive statistics were calculated for the square of these deleted residuals. (See tabular results.) Two models, 3a and 3b, were clearly better than the others. Incidentally, the poorer results from models with a larger number of variables shows the danger of overfitting the model.

Descriptive Statistics for Squared Deleted Residuals

	N	Minimum	Maximum	Mean	Std. Deviation
1a	16	.0605	2322.9546	465.617784	782.259005
1b	16	.2584	2171.0065	445.043241	676.275526
1c	16	2.7460	2690.4705	514.005926	782.252689
3a	16	.0140	1886.1565	348.985208	575.176139
3b	16	8.8319	1587.6798	342.194402	480.842916
3c	16	.1097	2526.1724	426.897013	650.251199

To be more confident in our final choice, we repeated the previous deleted residual analysis using all data points. Model 3a, which was second-ranked in the previous analysis, is first-ranked when all data points are used. Model 3b, which was first-ranked in the previous analysis, is third-ranked when all observations are used. No other model shows any clear advantage over either of these two, when both set of results are taken into account.

Descriptive Statistics for Squared Deleted Residuals (All Data)

	N	Minimum	Maximum	Mean	Std. Deviation
1a	20	.8780	3204.3323	533.948180	917.760300
1b	20	1.9131	2762.5477	568.136366	816.686987
1c	20	3.3703	3231.0915	740.122015	1046.356996
3a	20	.0821	3024.1501	478.749371	876.635946
3b	20	.0240	3728.1851	544.136083	1017.543199
3c	20	1.9308	3582.0904	549.319335	1041.582161

If we look at the actual diagnostic numbers, we find that the difference between these two models is relatively small. (See table at right.) Therefore, we recommend both these two models as our final choice, with somewhat of a preference for model 3b. The results of these two regressions appear on the following pages.

	3a	**3b**
R^2	0.681	0.724
Adjusted R^2	0.607	0.632
MSE	148.397	139.166
C_p	3.726	4.016
AIC	88.438	87.9851
SBC	91.771	92.151

Model 1

Red Drum Harvest = −198.741 − 62.120*Ln(January-February Inflows)
+ 38.007*Ln(May-June Inflows)
+ 55.626*Ln(November-December Inflows)

Notes on the results. There is no evidence of serial autocorrelation from examining the Durbin-Watson results. The relatively small variance inflation factors (VIF's) indicate no serious multicollinearity, while the condition index *does*. This apparent contradiction is caused by the presence of the intercept term. When the standardized data are analyzed via principal components, the apparent multicollinearity disappears. (See BMDP® output section.) We can get a more accurate version of the condition index (the ratio of largest to smallest eigenvalues) from this output: 1.72761/0.14847 = 11.636, which is considerably smaller than the 94.028 indicated in the standard regression. (See the shaded area of the BMDP® output for the source of the values.) For both this model and the next, the fitted coefficients resulting from principle components regression are the same as the fitted coefficients from ordinary least squares regression.

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	Ln(November-December Inflows), Ln(May-June Inflows), Ln(January-February Inflows)[c,d]	.	.825	.681	.607	12.1819	2.093

a. Dependent Variable: Red Drum Harvest

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4117.590	3	1372.530	9.249	.002[b]
	Residual	1929.167	13	148.397		
	Total	6046.758	16			

a. Dependent Variable: Red Drum Harvest

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(January-February Inflows)

Coefficients[a]

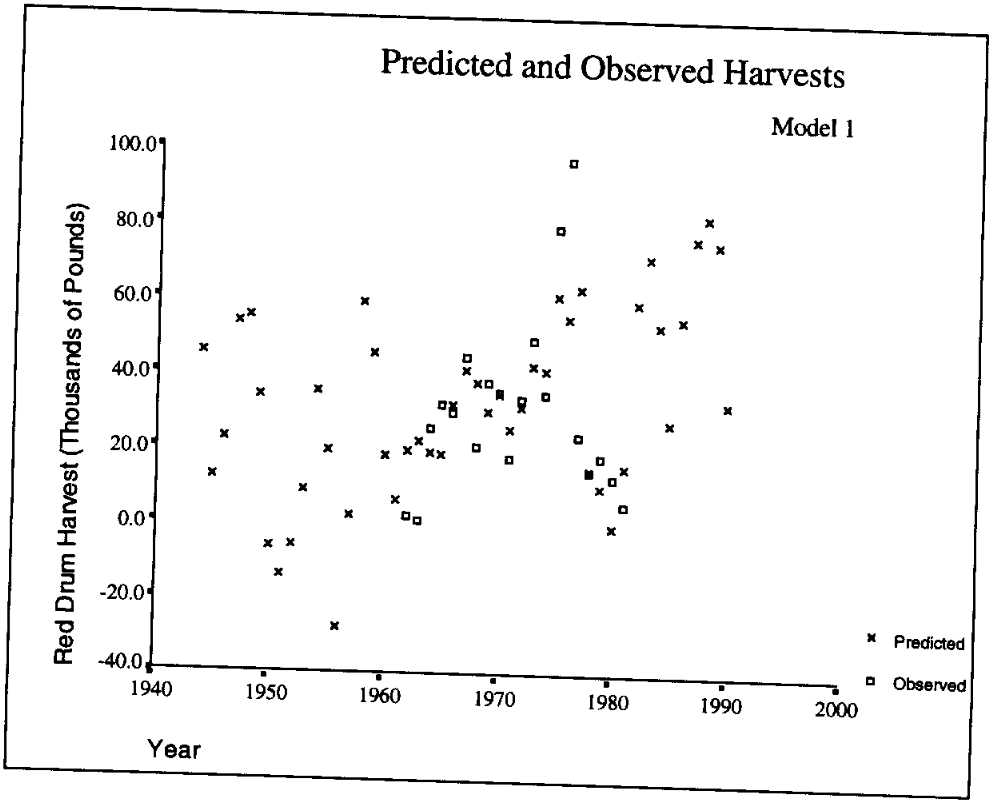
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-198.741	73.487		-2.704	.018	-357.501	-39.982		
	Ln(January-February Inflows)	-62.120	14.198	-1.260	-4.375	.001	-92.793	-31.447	.296	3.379
	Ln(May-June Inflows)	38.007	7.851	1.006	4.841	.000	21.047	54.967	.569	1.758
	Ln(November-December Inflows)	55.626	12.248	1.246	4.542	.001	29.166	82.086	.326	3.066

a. Dependent Variable: Red Drum Harvest

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	Ln(January-February Inflows)	Ln(May-June Inflows)	Ln(November-December Inflows)
1	1	3.994	1.000	.00	.00	.00	.00
	2	4.657E-03	29.283	.00	.00	.30	.10
	3	1.381E-03	53.775	.82	.13	.10	.01
	4	4.517E-04	94.028	.18	.86	.61	.89

a. Dependent Variable: Red Drum Harvest



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BMDP4R - REGRESSION ON PRINCIPAL COMPONENTS AND RIDGE REGRESSION
Copyright 1977, 1979, 1981, 1982, 1983, 1985, 1987, 1988, 1990, 1993
                 by BMDP Statistical Software, Inc.

  COMPUTATION BASED ON CORRELATION MATRIX OF INDEPENDENT VARIABLES.
  PRINCIPAL COMPONENTS ARE ENTERED IN ORDER OF
  MAGNITUDE OF CORRELATIONS WITH DEPENDENT VARIABLE.

  MAXIMUM NUMBER OF COMPONENTS TO ENTER . . . .        3
  NUMBER OF COMPONENTS TO ENTER LIMITED BY
  MAGNITUDE OF CORRELATION GREATER THAN . . . .   0.0100

NUMBER OF CASES READ. . . . . . . . . . . . . .       17

CORRELATION MATRIX

               red_drum   lgjfinfl   lgmjinfl   lgndinfl
                   2          5          7         10

red_drum   2     1.0000
lgjfinfl   5    -0.0426     1.0000
lgmjinfl   7     0.3765     0.3406     1.0000
lgndinfl  10     0.1996     0.7023    -0.1605     1.0000

EIGENVALUES

     1.72761     1.12392     0.14847


CUMULATIVE PROPORTION OF TOTAL VARIANCE OF INDEPENDENT VARIABLES

     0.57587     0.95051     1.00000

EIGENVECTORS
                  1          2          3
  5 lgjfinfl    0.7269     0.1329    -0.6738
  7 lgmjinfl    0.1950     0.9008     0.3880
 10 lgndinfl    0.6585    -0.4134     0.6288

DEPENDENT VARIABLE      2 red_drum

TOTAL SUM OF SQUARES          6046.757810
  DEGREES OF FREEDOM          16
         MEAN SQUARE           377.922363


CORRELATION BETWEEN PRINCIPAL COMPONENTS AND DEPENDENT VARIABLE
                0.13233     0.23671     0.77937

REGRESSION COEFFICIENTS OF PRINCIPAL COMPONENTS
  CONSTANT      COMPONENTS
 (MEAN OF Y)
   28.28823     1.95724     4.34059     39.32120

COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION

 INDEX OF   RESIDUAL         F-VALUES
COMPONENTS   SUM  OF REGRESSION COMPONENT
 ENTERING    SQUARES     MODEL    TO ENTER   R2        CONSTANT      VARIABLES
                                                                    5 lgjfinfl
     3     2373.87109     23.21     23.21  0.6074    -105.3260     -67.1911
     2     2035.06226     13.80      2.33  0.6634    -145.5779     -65.7277
     1     1929.17285      9.25      0.71  0.6810    -198.7393     -62.1199


COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION
(CONTINUED)
        7 lgmjinfl 10 lgndinfl
     3     29.66326    56.78691
     2     37.26490    52.66591
     1     38.00673    55.62605
```

Model 2

$$\begin{aligned}\text{Red Drum Harvest} = {} & -234.131 - 64.132*\text{Ln(January-February Inflows)} \\ & + 14.634*\text{Ln(March-April Inflows)} - 27.510*\text{Ln(May-June Inflows)} \\ & + 58.853*\text{Ln(November-December Inflows)}\end{aligned}$$

Notes on the results. There is no evidence of serial autocorrelation from examining the Durbin-Watson results for this second model, either. The apparent contradiction between multicollinearity indicators exists here, as well, and for the same reasons. We can again calculate the effective condition index as 1.98478/0.14558 = 13.6336, much smaller than the apparent condition index of 105.190.

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	Ln(March-April Inflows), Ln(January-February Inflows), Ln(November-December Inflows), Ln(May-June Inflows)[c,d]	.	.851	.724	.632	11.7968	2.193

a. Dependent Variable: Red Drum Harvest

b. Method: Enter

c. Independent Variables: (Constant), Ln(March-April Inflows), Ln(January-February Inflows), Ln(November-December Inflows), Ln(May-June Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4376.771	4	1094.193	7.863	.002[b]
	Residual	1669.987	12	139.166		
	Total	6046.758	16			

a. Dependent Variable: Red Drum Harvest

b. Independent Variables: (Constant), Ln(March-April Inflows), Ln(January-February Inflows), Ln(November-December Inflows), Ln(May-June Inflows)

Coefficients[a]

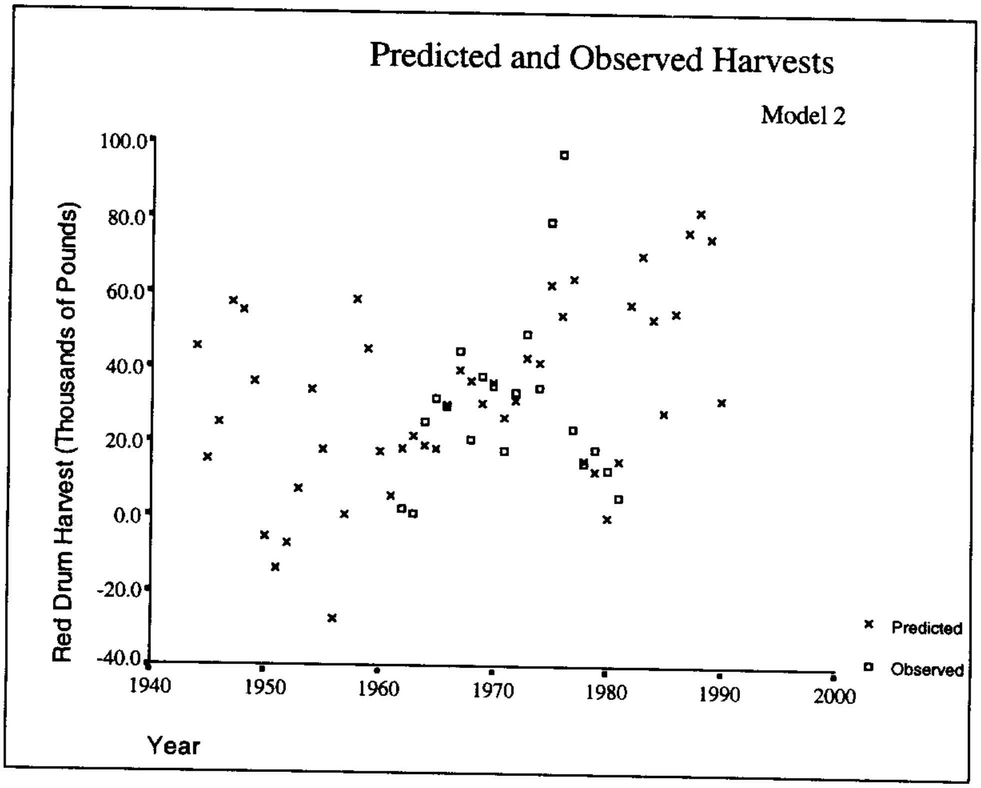
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-234.131	75.742		-3.091	.009	-399.160	-69.103		
	Ln(January-February Inflows)	-64.132	13.828	-1.301	-4.638	.001	-94.261	-34.003	.293	3.418
	Ln(May-June Inflows)	27.510	10.815	.728	2.544	.026	3.946	51.074	.281	3.558
	Ln(November-December Inflows)	58.853	12.094	1.318	4.866	.000	32.502	85.204	.314	3.188
	Ln(March-April Inflows)	14.634	10.723	.370	1.365	.197	-8.730	37.999	.313	3.194

a. Dependent Variable: Red Drum Harvest

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	Ln(January-February Inflows)	Ln(May-June Inflows)	Ln(November-December Inflows)	Ln(March-April Inflows)
1	1	4.991	1.000	.00	.00	.00	.00	.00
	2	6.739E-03	27.214	.00	.01	.04	.07	.05
	3	1.385E-03	60.034	.69	.13	.07	.01	.00
	4	7.152E-04	83.532	.13	.00	.64	.04	.94
	5	4.510E-04	105.190	.18	.86	.25	.88	.00

a. Dependent Variable: Red Drum Harvest



BMDP4R - REGRESSION ON PRINCIPAL COMPONENTS AND RIDGE REGRESSION

```
   COMPUTATION BASED ON CORRELATION MATRIX OF INDEPENDENT VARIABLES.
   PRINCIPAL COMPONENTS ARE ENTERED IN ORDER OF
   MAGNITUDE OF CORRELATIONS WITH DEPENDENT VARIABLE.

   MAXIMUM NUMBER OF COMPONENTS TO ENTER . . . .       4
   NUMBER OF COMPONENTS TO ENTER LIMITED BY
   MAGNITUDE OF CORRELATION GREATER THAN . . . .  0.0100

 NUMBER OF CASES READ. . . . . . . . . . . . . .      17

 CORRELATION MATRIX

                 red_drum   lgjfinfl   lgmainfl   lgmjinfl   lgndinfl
                     2          5          6          7         10

 red_drum    2    1.0000
 lgjfinfl    5   -0.0426     1.0000
 lgmainfl    6    0.3547     0.2287     1.0000
 lgmjinfl    7    0.3765     0.3406     0.8195     1.0000
 lgndinfl   10    0.1996     0.7023    -0.2384    -0.1605     1.0000

EIGENVALUES

      1.98478     1.68418     0.18546     0.14558

  CUMULATIVE PROPORTION OF TOTAL VARIANCE OF INDEPENDENT VARIABLES

      0.49619     0.91724     0.96360     1.00000

  EIGENVECTORS
                    1          2          3          4
   5 lgjfinfl    0.3878    -0.6106     0.3225    -0.6105
   6 lgmainfl    0.6393     0.2322    -0.7056    -0.1989
   7 lgmjinfl    0.6639     0.1483     0.4990     0.5369
  10 lgndinfl    0.0136    -0.7425    -0.3862     0.5472

 DEPENDENT VARIABLE    2 red_drum

 TOTAL SUM OF SQUARES        6046.757810
   DEGREES OF FREEDOM        16
          MEAN SQUARE         377.922363


 CORRELATION BETWEEN PRINCIPAL COMPONENTS AND DEPENDENT VARIABLE
                  0.32860     0.01230    -0.35595     0.69928

 REGRESSION COEFFICIENTS OF PRINCIPAL COMPONENTS
   CONSTANT       COMPONENTS
  (MEAN OF Y)
    28.28823      4.53435     0.18431   -16.06832    35.62813


 COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION

  INDEX OF   RESIDUAL        F-VALUES
 COMPONENTS   SUM  OF REGRESSION COMPONENT
  ENTERING    SQUARES     MODEL    TO ENTER  R2        CONSTANT    VARIABLES
                                                                  5 lgjfinfl
     4     3089.95923      14.35     14.35  0.4890     -60.5444    -55.1632
     3     2323.82373      11.21      4.62  0.6157    -114.8519    -68.3055
     1     1670.90088      11.35      5.08  0.7237    -237.3963    -63.8461
     2     1669.98547       7.86      0.01  0.7238    -234.1312    -64.1315


 COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION
 (CONTINUED)
          6 lgmainfl   7 lgmjinfl 10 lgndinfl
     4     -14.41642    37.19105    44.77312
     3       8.64986    21.60399    59.02561
     1      14.54716    27.45659    59.16724
     2      14.63422    27.50974    58.85297
```

Exploring the Data

Listing of Data

YEAR	RED_DRUM	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL	ND_INFL
1962	2.60	2915.47	963.27	1615.30	1059.68	1469.86	2205.60
1963	1.30	2336.83	815.63	1270.07	724.21	1432.16	2208.27
1964	25.70	894.15	689.43	759.57	316.70	1089.76	1105.07
1965	32.20	1140.22	818.07	1192.23	220.39	564.65	1030.93
1966	29.80	1481.65	1358.37	2727.63	560.03	325.37	987.87
1967	45.00	1283.51	1199.18	2828.73	616.20	459.59	1007.86
1968	21.20	1504.38	1932.88	4136.47	844.60	435.08	848.36
1969	38.10	1349.94	2640.94	3676.87	600.78	533.83	706.48
1970	35.30	1514.87	3337.73	3968.77	607.07	489.11	828.41
1971	18.10	849.90	2360.83	1973.78	446.99	859.88	615.13
1972	33.60	976.26	1232.03	1288.20	431.40	923.73	1077.87
1973	49.60	1455.68	2134.83	2664.22	829.55	980.35	1232.31
1974	34.90	2524.91	2348.44	3077.98	868.72	1845.28	1908.59
1975	79.50	2890.51	2857.40	3726.31	1138.54	2253.25	2897.57
1976	97.50	2260.46	1321.18	2439.21	925.46	2254.37	2659.43
1977	24.20	1819.08	2075.70	2395.03	874.23	1085.72	2562.96
1978	14.90	1479.44	1530.34	1315.67	587.24	585.86	1162.82
1979	18.70	2336.64	2853.94	1997.58	1274.52	535.72	1259.39
1980	13.10	2491.90	2356.53	2213.29	1264.55	1229.99	1006.62
1981	6.00	1895.84	2285.70	3516.54	1686.25	1407.21	767.72

RED_DRUM	Red drum harvest (thousands of pounds)
JF_INFL	Lagged January-February inflows (thousands of acre-feet)
MA_INFL	Lagged March-April inflows (thousands of acre-feet)
MJ_INFL	Lagged May-June inflows (thousands of acre-feet)
JA_INFL	Lagged July-August inflows (thousands of acre-feet)
SO_INFL	Lagged September-October inflows (thousands of acre-feet)
ND_INFL	Lagged November-December inflows (thousands of acre-feet)

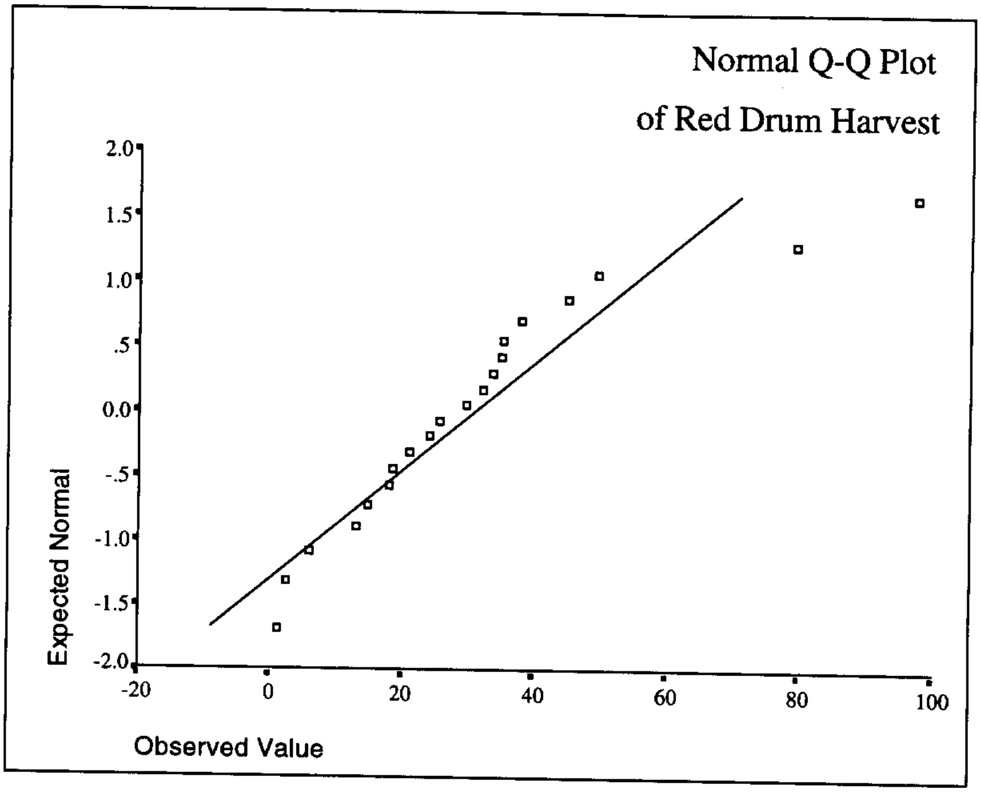
Examination of Individual Variables

Descriptives

			Statistic	Std. Error
Red Drum Harvest	Mean		31.0650	5.3290
	95% Confidence Interval for Mean	Lower Bound	19.9112	
		Upper Bound	42.2188	
	5% Trimmed Mean		29.0278	
	Median		27.7500	
	Variance		567.972	
	Std. Deviation		23.8322	
	Minimum		1.30	
	Maximum		97.50	
	Range		96.20	
	Interquartile Range		21.7000	
	Skewness		1.450	.512
	Kurtosis		2.555	.992

Extreme Values

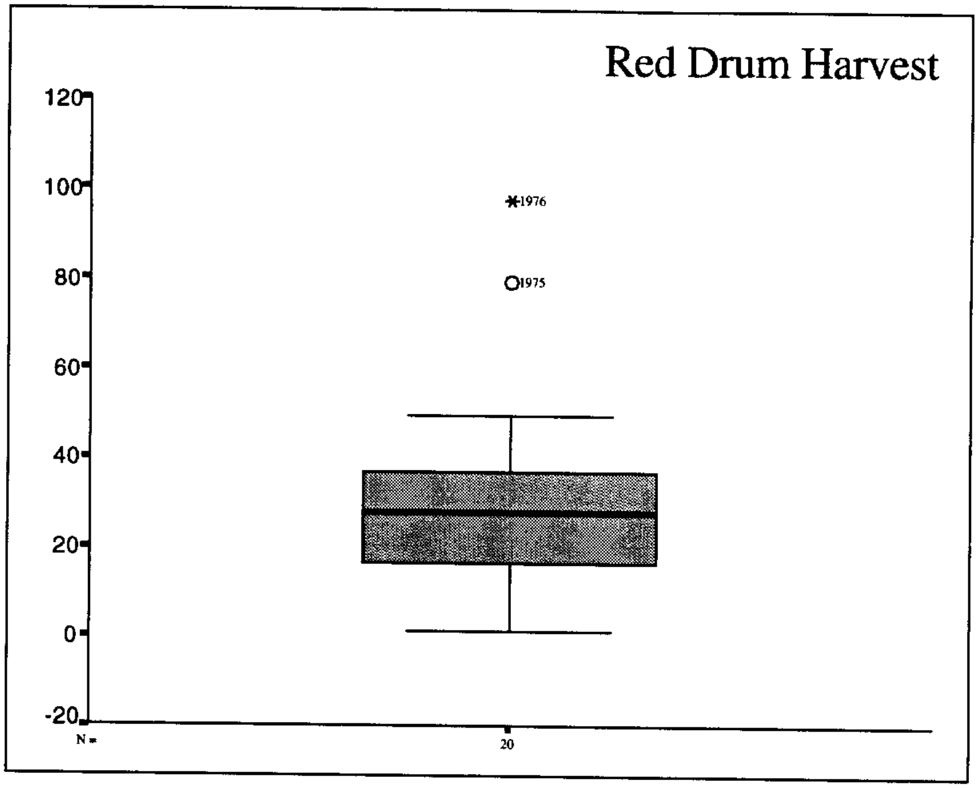
			Case Number	Year	Value
Red Drum Harvest	Highest	1	15	1976	97.50
		2	14	1975	79.50
		3	12	1973	49.60
		4	6	1967	45.00
		5	8	1969	38.10
	Lowest	1	2	1963	1.30
		2	1	1962	2.60
		3	20	1981	6.00
		4	19	1980	13.10
		5	17	1978	14.90

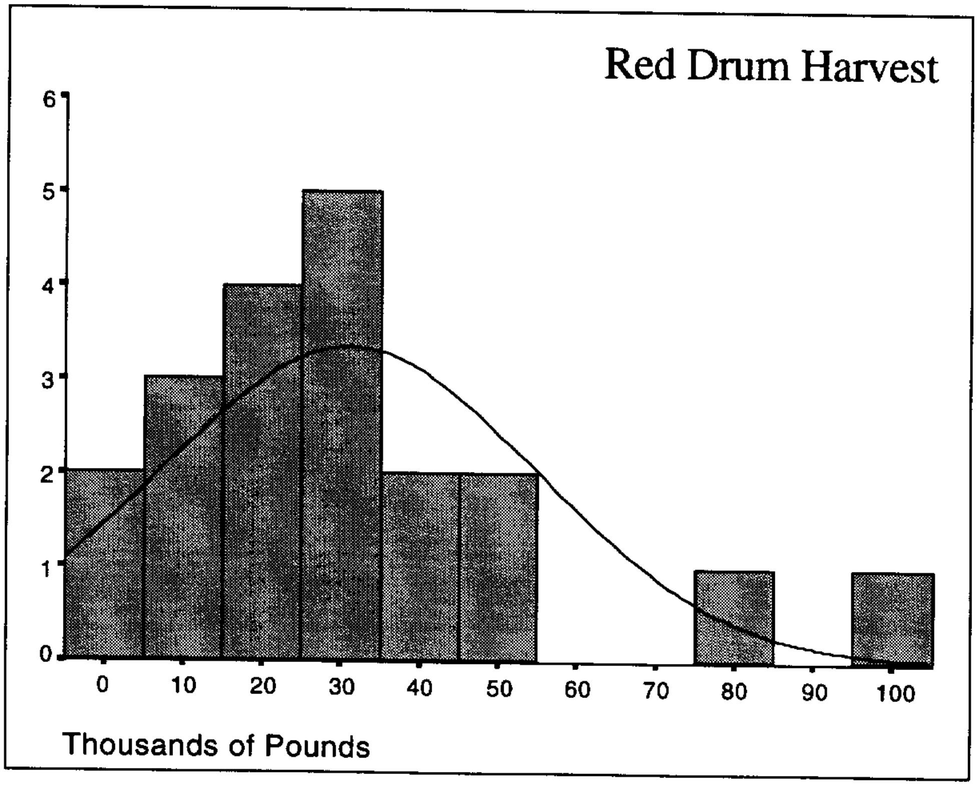


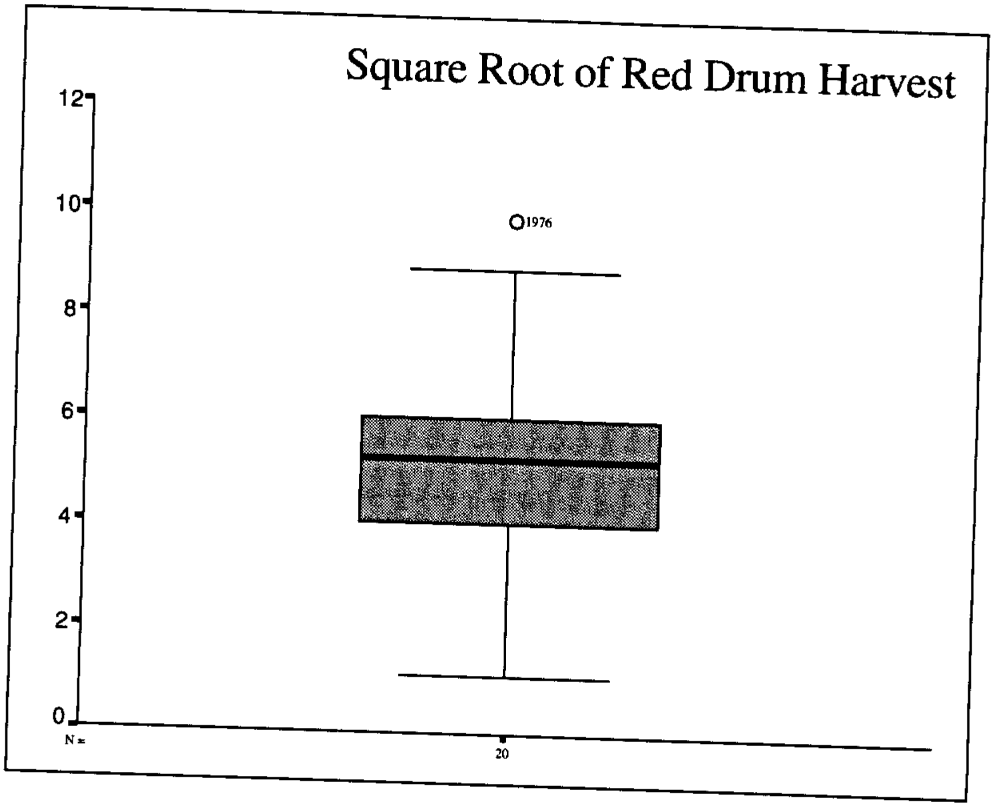
Tests of Normality

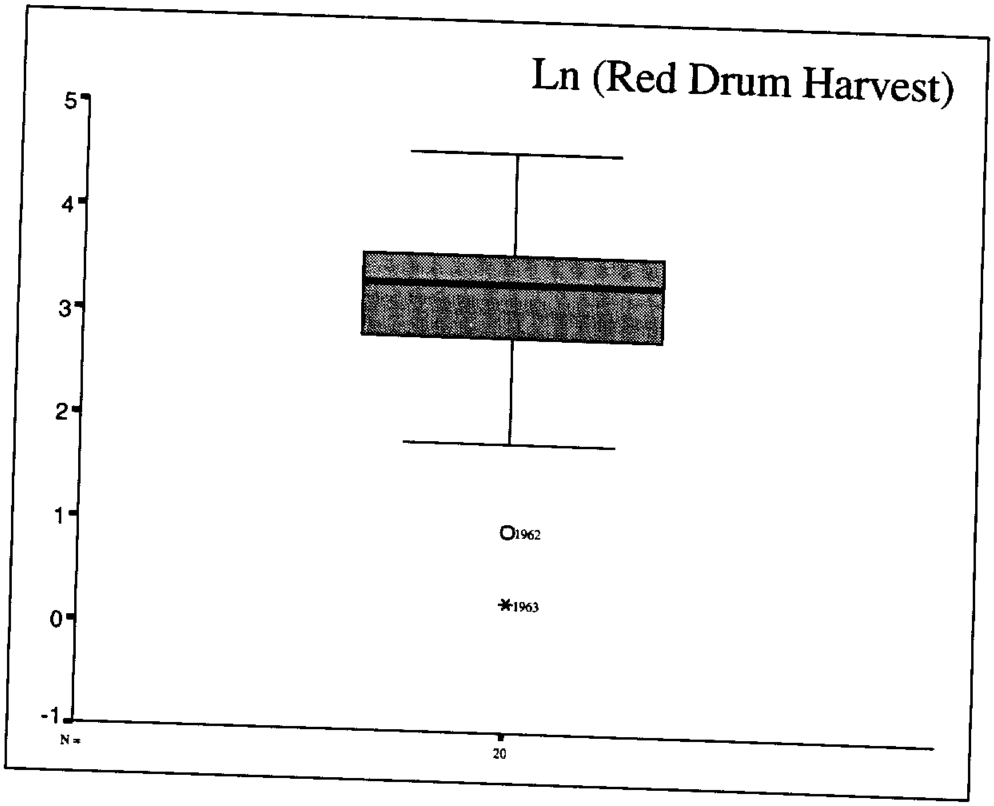
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Red Drum Harvest	*.184*	*20*	*.075*	*.875*	*20*	*.014*

a. Lilliefors Significance Correction


Red Drum Harvest
120
100
80
60
40
20
0
-20
1976
1975
N =
20


Red Drum Harvest
6
5
4
3
2
1
0
0
10
20
30
40
50
60
70
80
90
100
Thousands of Pounds


Square Root of Red Drum Harvest

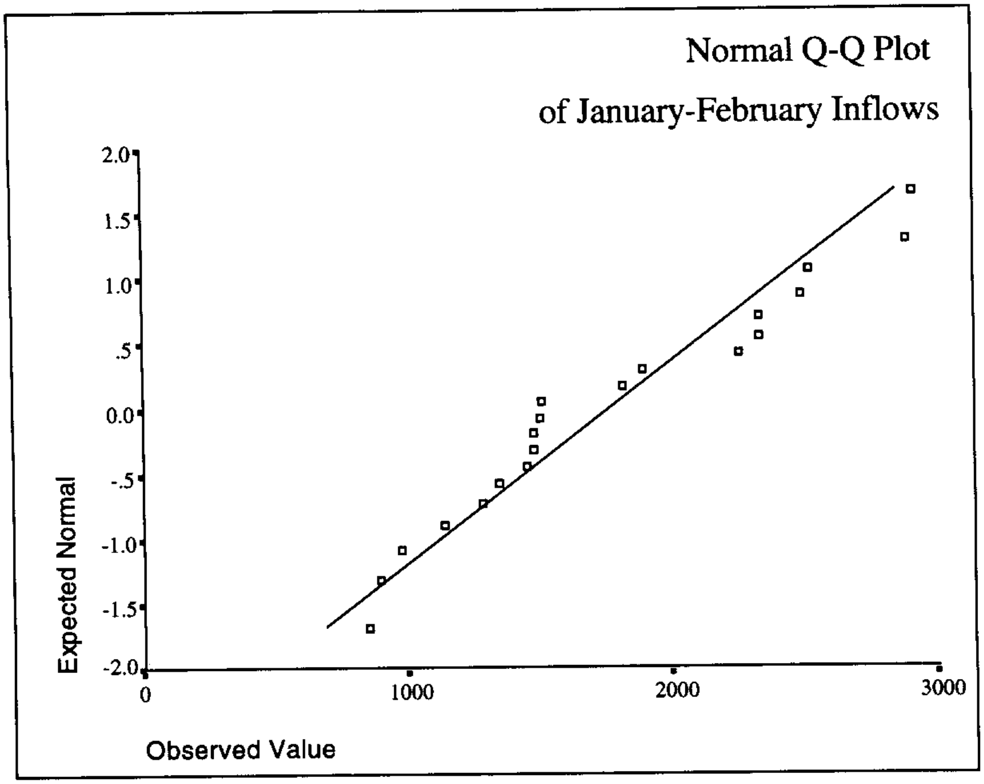

Ln (Red Drum Harvest)

Descriptives

			Statistic	Std. Error
January-February Inflows	Mean		1770.0820	145.2342
	95% Confidence Interval for Mean	Lower Bound	1466.1034	
		Upper Bound	2074.0606	
	5% Trimmed Mean		1757.5706	
	Median		1509.6250	
	Variance		421859.203	
	Std. Deviation		649.5069	
	Minimum		849.90	
	Maximum		2915.47	
	Range		2065.57	
	Interquartile Range		1036.6650	
	Skewness		.361	.512
	Kurtosis		-1.048	.992

Extreme Values

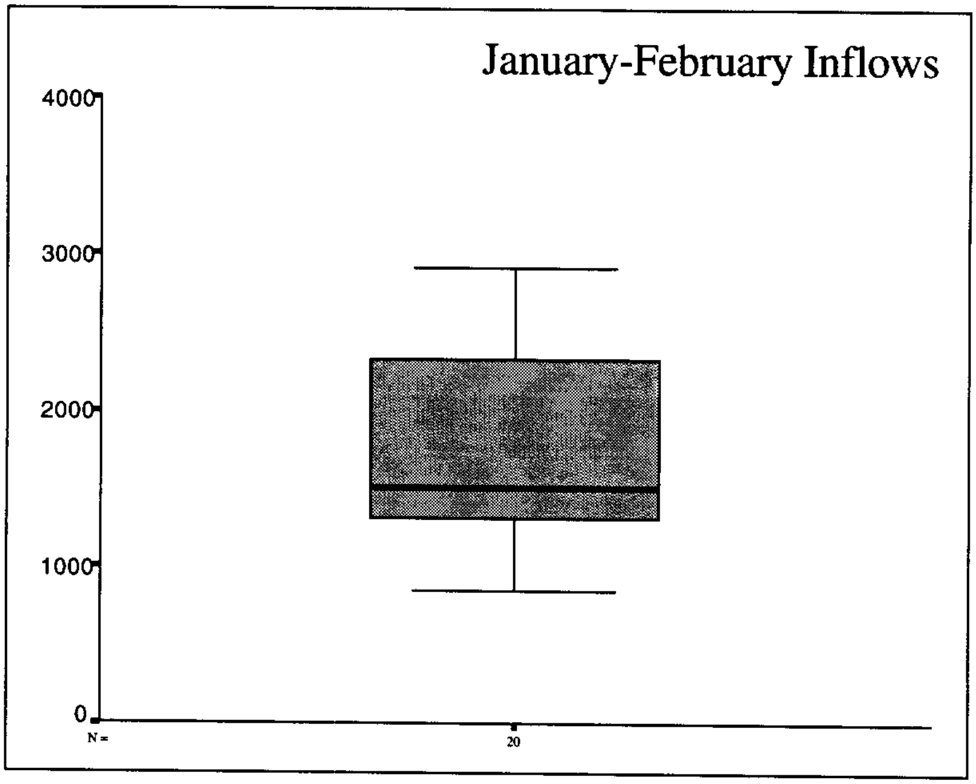
			Case Number	Year	Value
January-February Inflows	Highest	1	1	1962	2915.47
		2	14	1975	2890.51
		3	13	1974	2524.91
		4	19	1980	2491.90
		5	2	1963	2336.83
	Lowest	1	10	1971	849.90
		2	3	1964	894.15
		3	11	1972	976.26
		4	4	1965	1140.22
		5	6	1967	1283.51

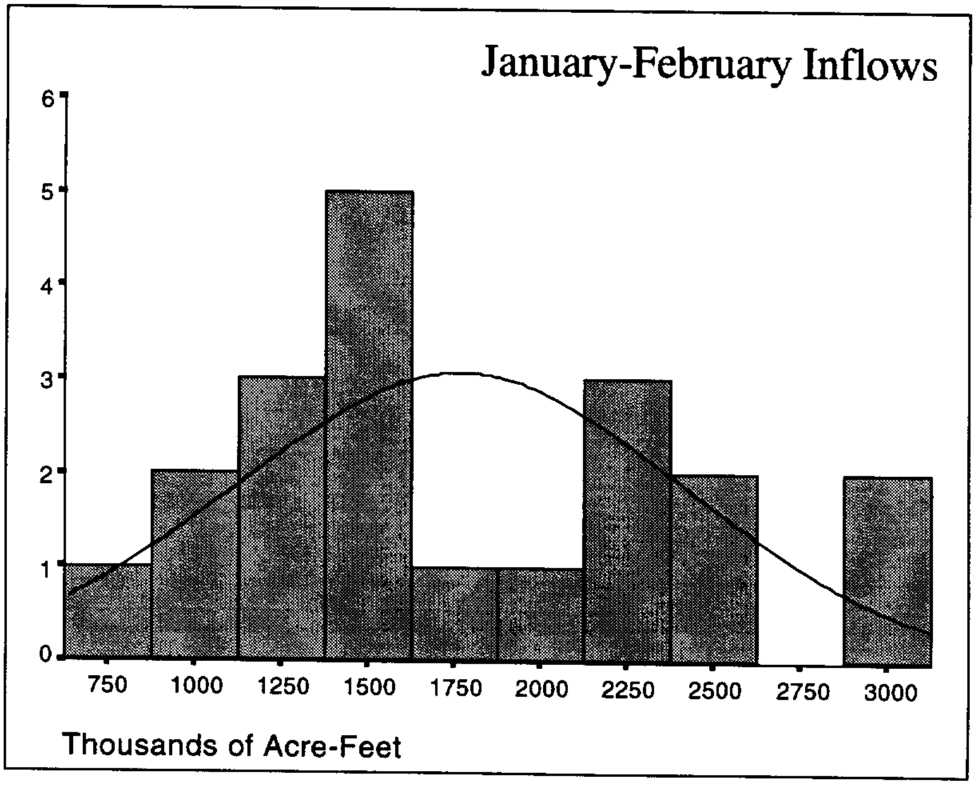


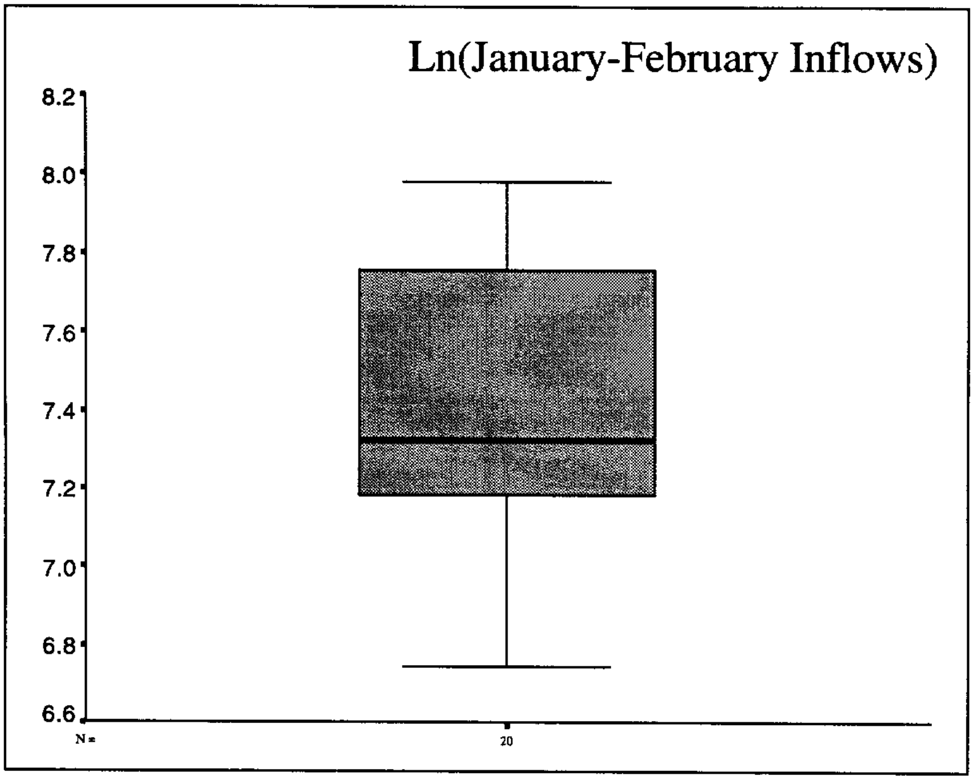
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
January-February Inflows	*.203*	*20*	*.030*	*.930*	*20*	*.205*

a. Lilliefors Significance Correction


January-February Inflows
4000
3000
2000
1000
0
N =
20


January-February Inflows
6
5
4
3
2
1
0
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
Thousands of Acre-Feet

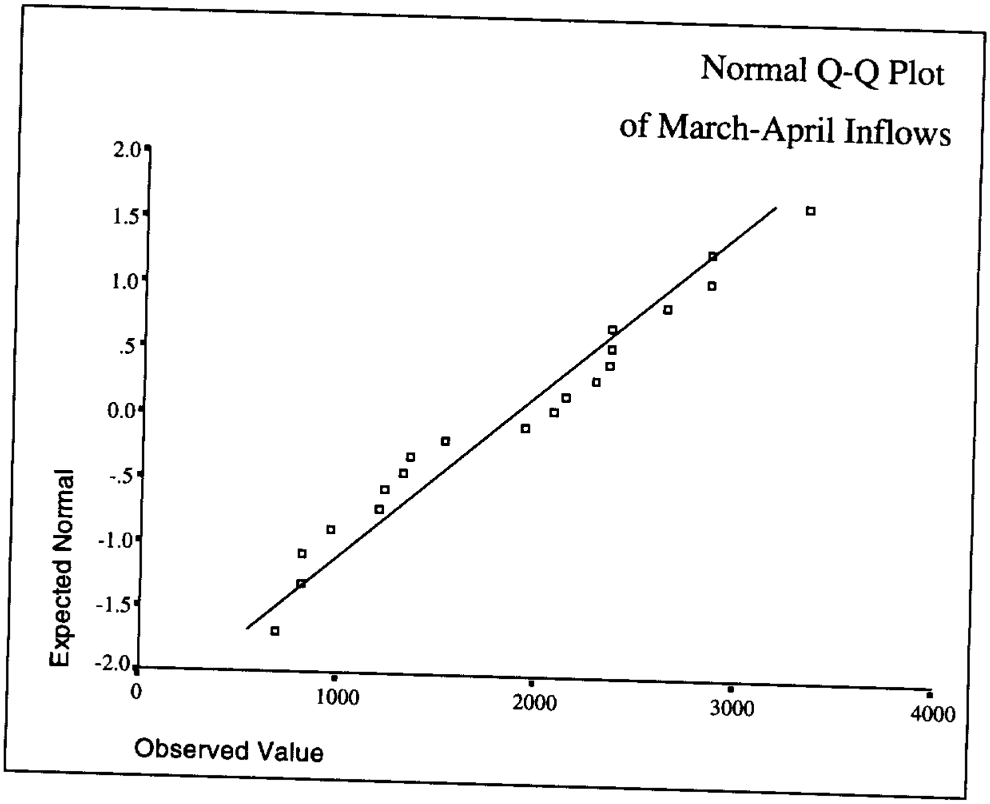

Ln(January-February Inflows)
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
6.6
N =
20

Descriptives

			Statistic	Std. Error
March-April Inflows	Mean		*1855.6210*	*175.1148*
	95% Confidence Interval for Mean	Lower Bound	*1489.1014*	
		Upper Bound	*2222.1406*	
	5% Trimmed Mean		*1838.0700*	
	Median		*2004.2900*	
	Variance		*613304.209*	
	Std. Deviation		*783.1374*	
	Minimum		*689.43*	
	Maximum		*3337.73*	
	Range		*2648.30*	
	Interquartile Range		*1152.3625*	
	Skewness		*.104*	*.512*
	Kurtosis		*-1.093*	*.992*

Extreme Values

			Case Number	Year	Value
March-April Inflows	Highest	1	*9*	*1970*	*3337.73*
		2	*14*	*1975*	*2857.40*
		3	*18*	*1979*	*2853.94*
		4	*8*	*1969*	*2640.94*
		5	*10*	*1971*	*2360.83*
	Lowest	1	*3*	*1964*	*689.43*
		2	*2*	*1963*	*815.63*
		3	*4*	*1965*	*818.07*
		4	*1*	*1962*	*963.27*
		5	*6*	*1967*	*1199.18*

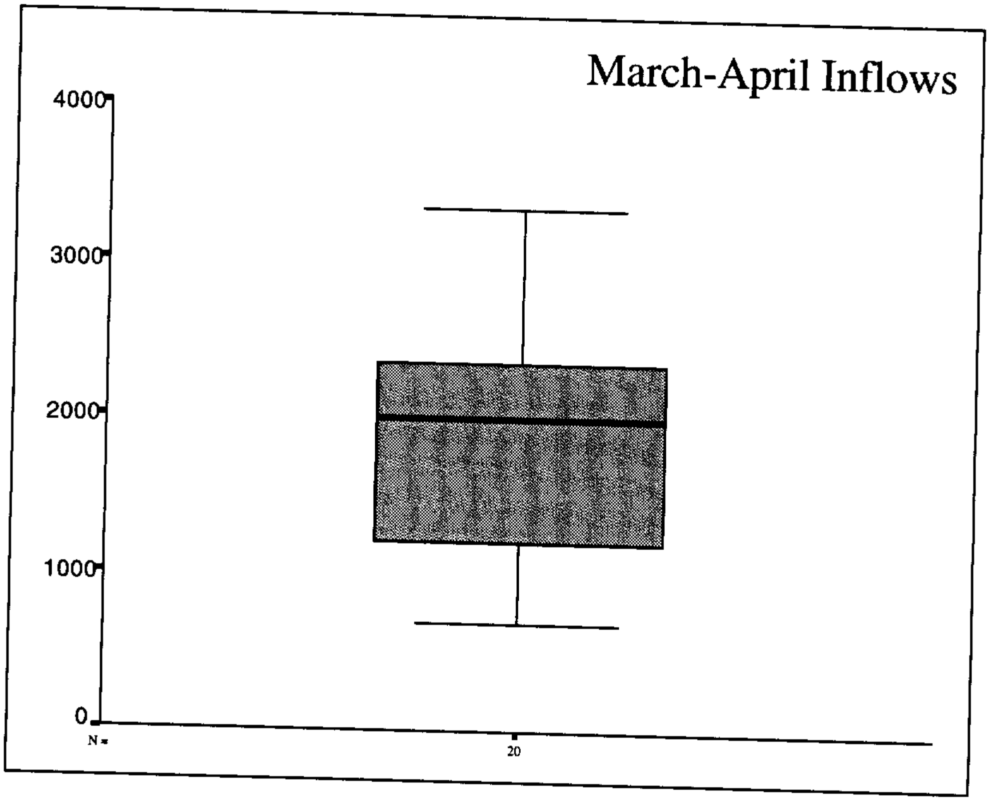


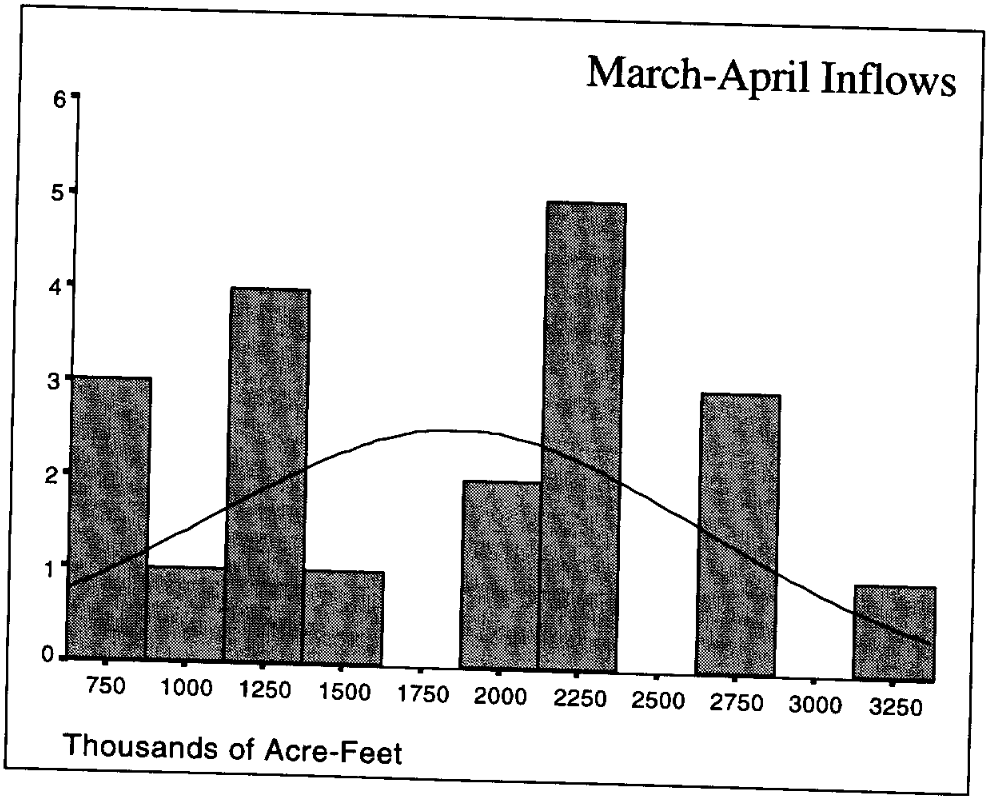
Tests of Normality

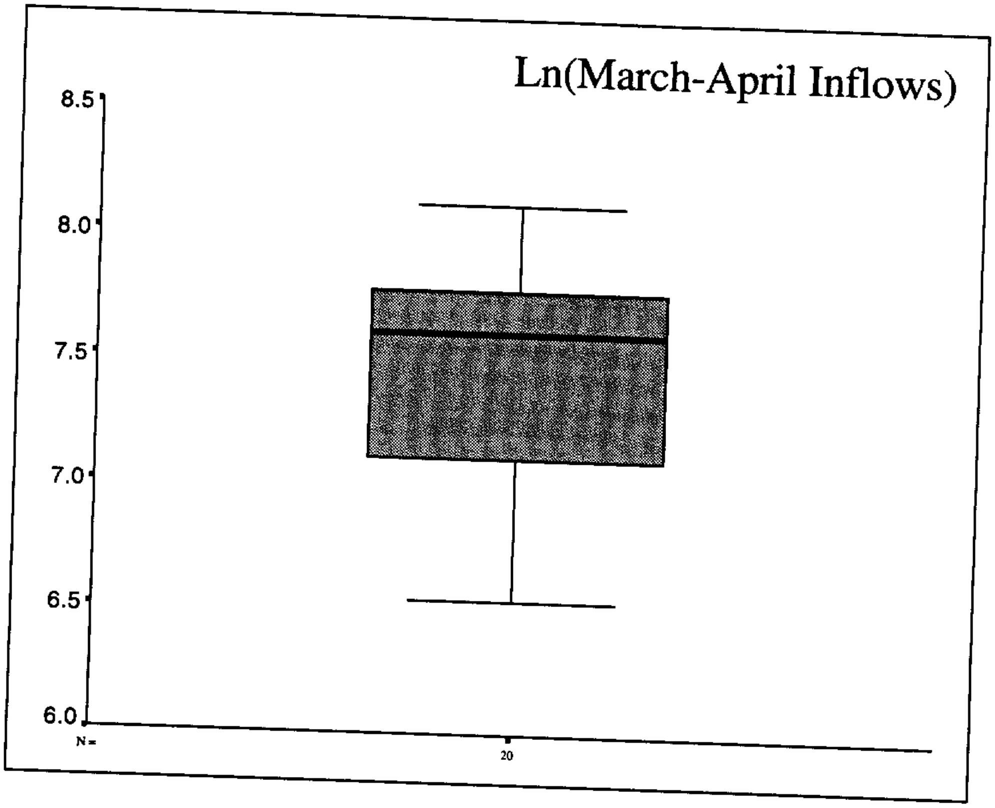
	Kolmogorov-Smirnov^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
March-April Inflows	*.137*	*20*	*.200**	*.948*	*20*	*.387*

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction


March-April Inflows
4000
3000
2000
1000
0
N =
20


March-April Inflows
6
5
4
3
2
1
0
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
3250
Thousands of Acre-Feet

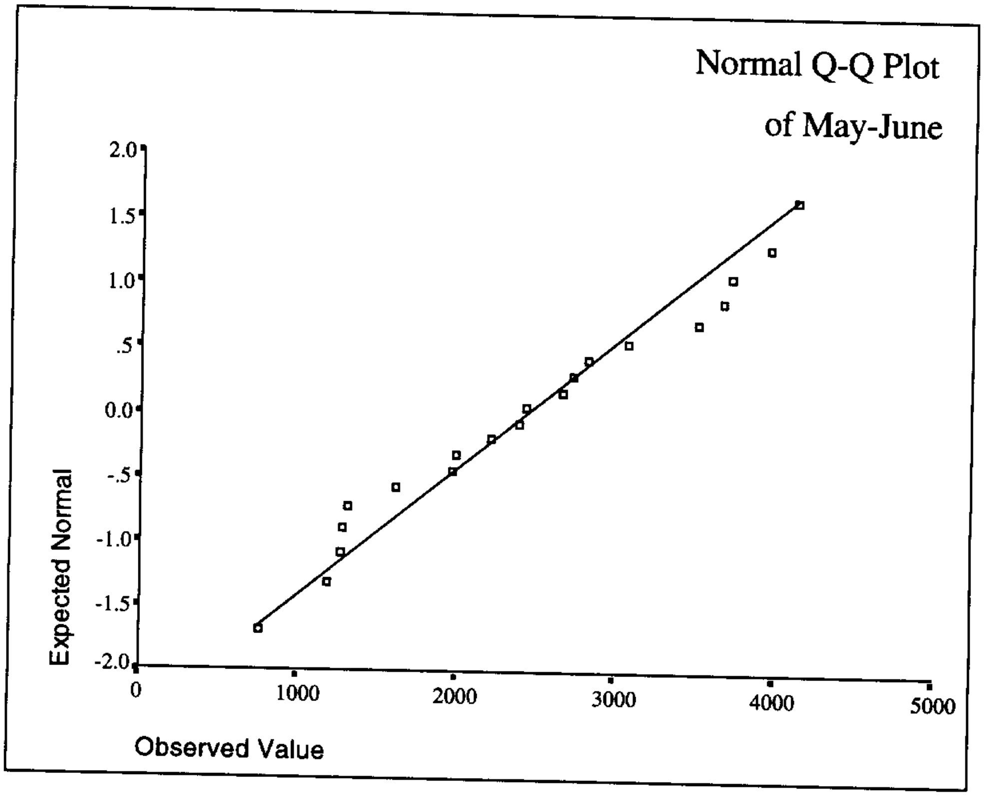

Ln(March-April Inflows)
8.5
8.0
7.5
7.0
6.5
6.0
N =
20

Descriptives

			Statistic	Std. Error
May-June Inflows	Mean		*2439.1725*	*227.8998*
	95% Confidence Interval for Mean	Lower Bound	*1962.1727*	
		Upper Bound	*2916.1723*	
	5% Trimmed Mean		*2438.1894*	
	Median		*2417.1200*	
	Variance		*1038766.743*	
	Std. Deviation		*1019.1991*	
	Minimum		*759.57*	
	Maximum		*4136.47*	
	Range		*3376.90*	
	Interquartile Range		*2016.3225*	
	Skewness		*.117*	*.512*
	Kurtosis		*-1.092*	*.992*

Extreme Values

			Case Number	Year	Value
May-June Inflows	Highest	1	*7*	*1968*	*4136.47*
		2	*9*	*1970*	*3968.77*
		3	*14*	*1975*	*3726.31*
		4	*8*	*1969*	*3676.87*
		5	*20*	*1981*	*3516.54*
	Lowest	1	*3*	*1964*	*759.57*
		2	*4*	*1965*	*1192.23*
		3	*2*	*1963*	*1270.07*
		4	*11*	*1972*	*1288.20*
		5	*17*	*1978*	*1315.67*

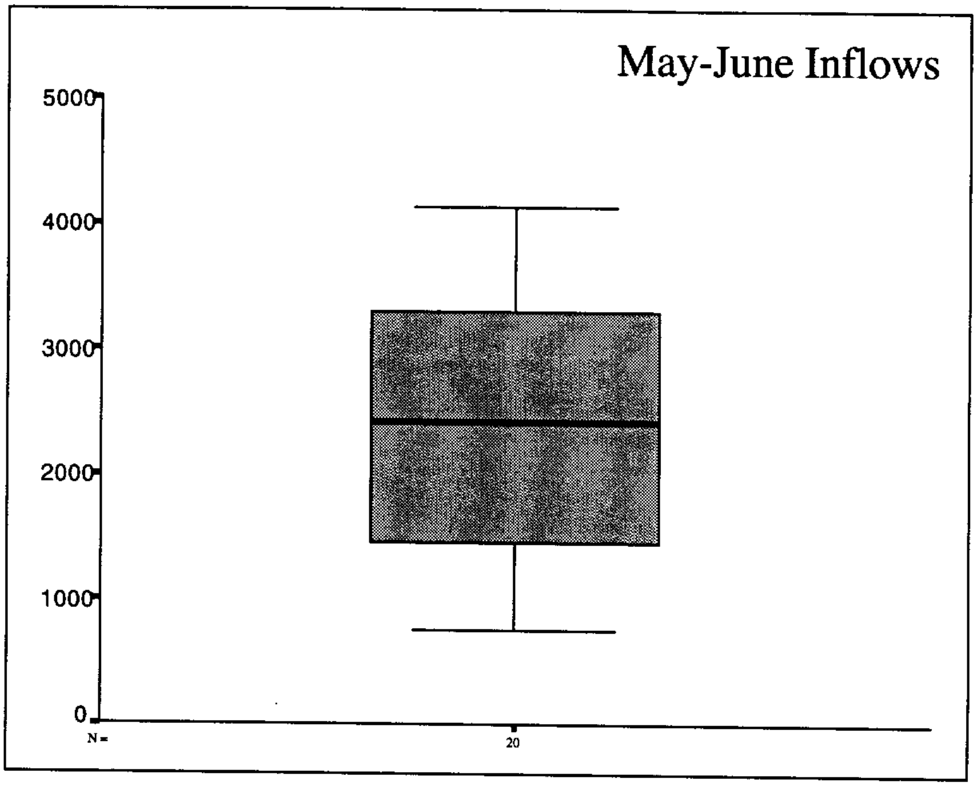


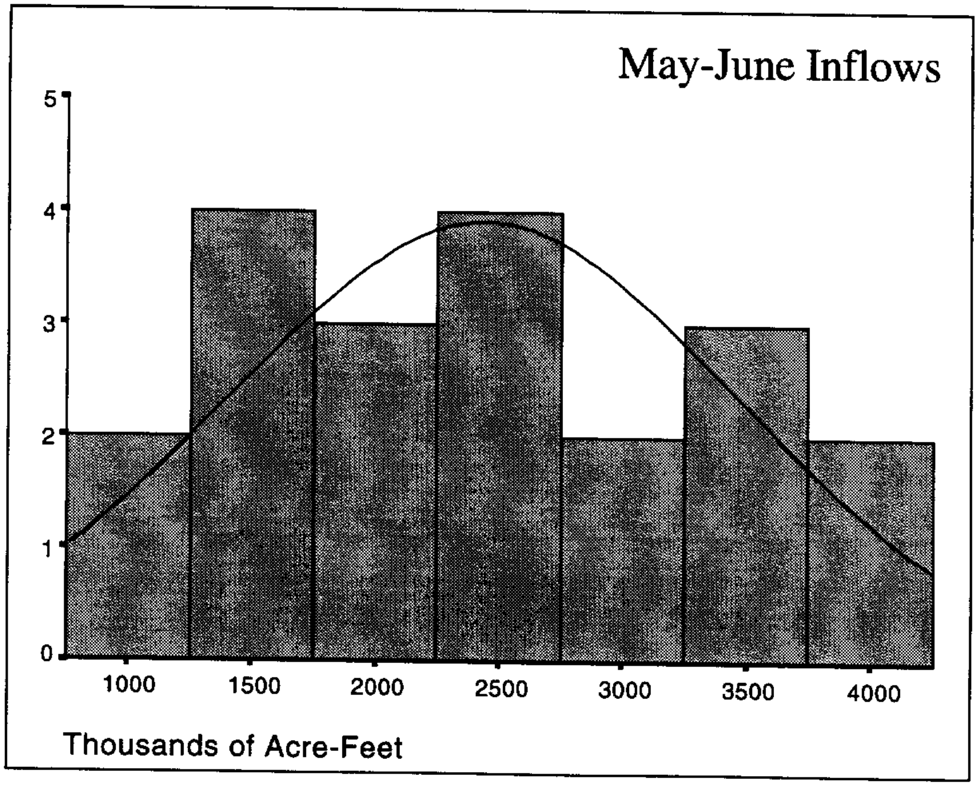
Tests of Normality

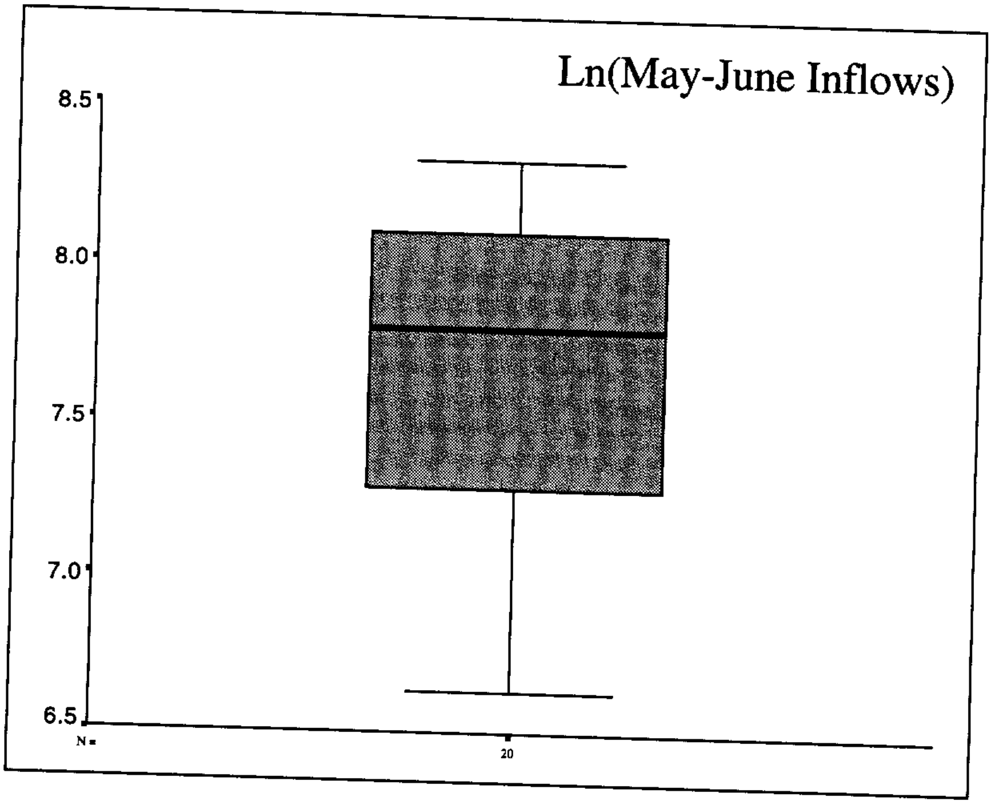
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
May-June Inflows	*.115*	*20*	*.200**	*.955*	*20*	*.455*

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction


May-June Inflows
5000
4000
3000
2000
1000
0
N =
20


May-June Inflows
5
4
3
2
1
0
1000
1500
2000
2500
3000
3500
4000
Thousands of Acre-Feet

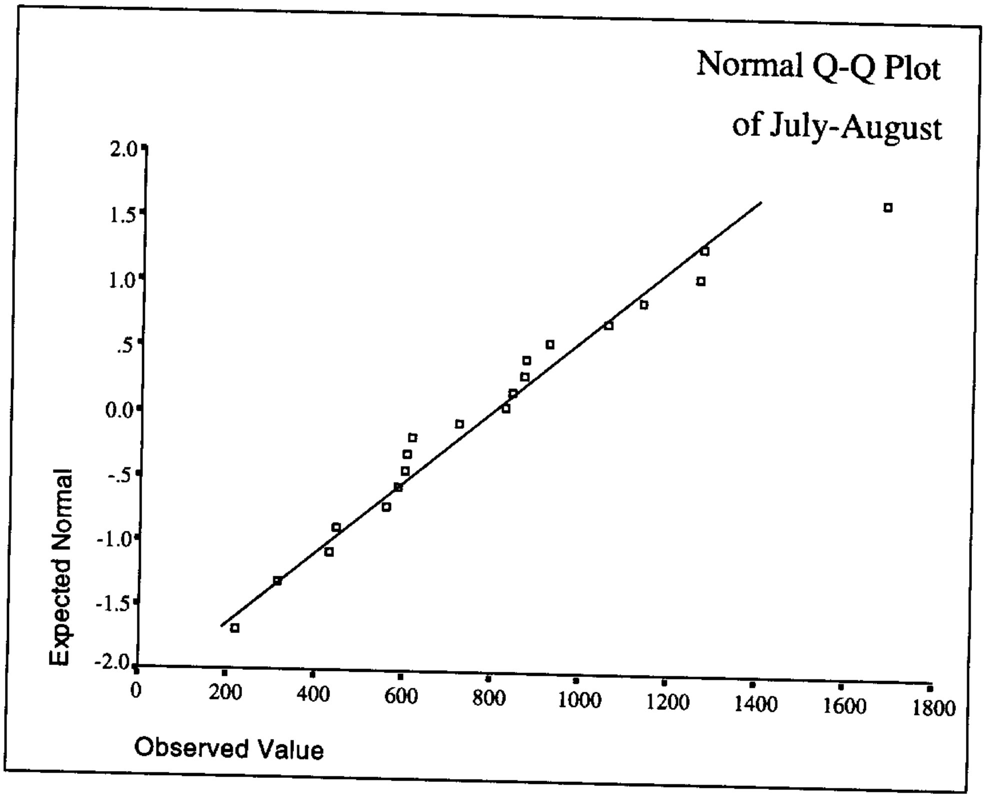

Ln(May-June Inflows)
8.5
8.0
7.5
7.0
6.5
N =
20

Descriptives

			Statistic	Std. Error
July-August Inflows	Mean		793.8555	80.8806
	95% Confidence Interval for Mean	Lower Bound	624.5704	
		Upper Bound	963.1406	
	5% Trimmed Mean		776.1372	
	Median		776.8800	
	Variance		130833.488	
	Std. Deviation		361.7091	
	Minimum		220.39	
	Maximum		1686.25	
	Range		1465.86	
	Interquartile Range		459.2925	
	Skewness		.694	.512
	Kurtosis		.497	.992

Extreme Values

			Case Number	Year	Value
July-August Inflows	Highest	1	20	1981	1686.25
		2	18	1979	1274.52
		3	19	1980	1264.55
		4	14	1975	1138.54
		5	1	1962	1059.68
	Lowest	1	4	1965	220.39
		2	3	1964	316.70
		3	11	1972	431.40
		4	10	1971	446.99
		5	5	1966	560.03

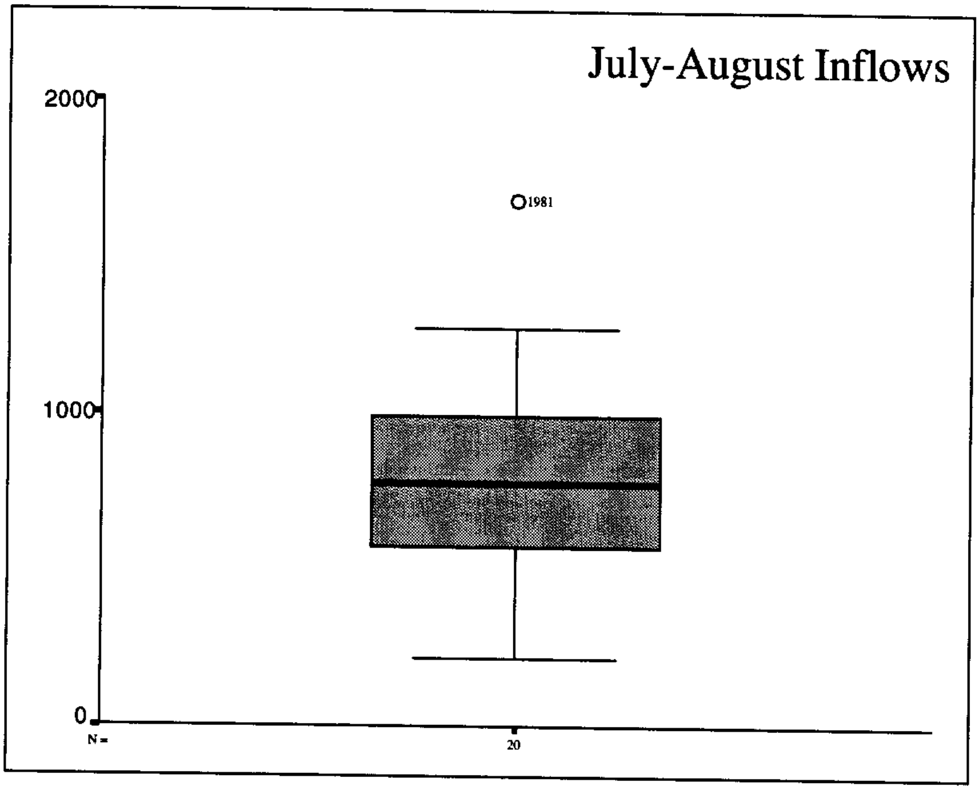


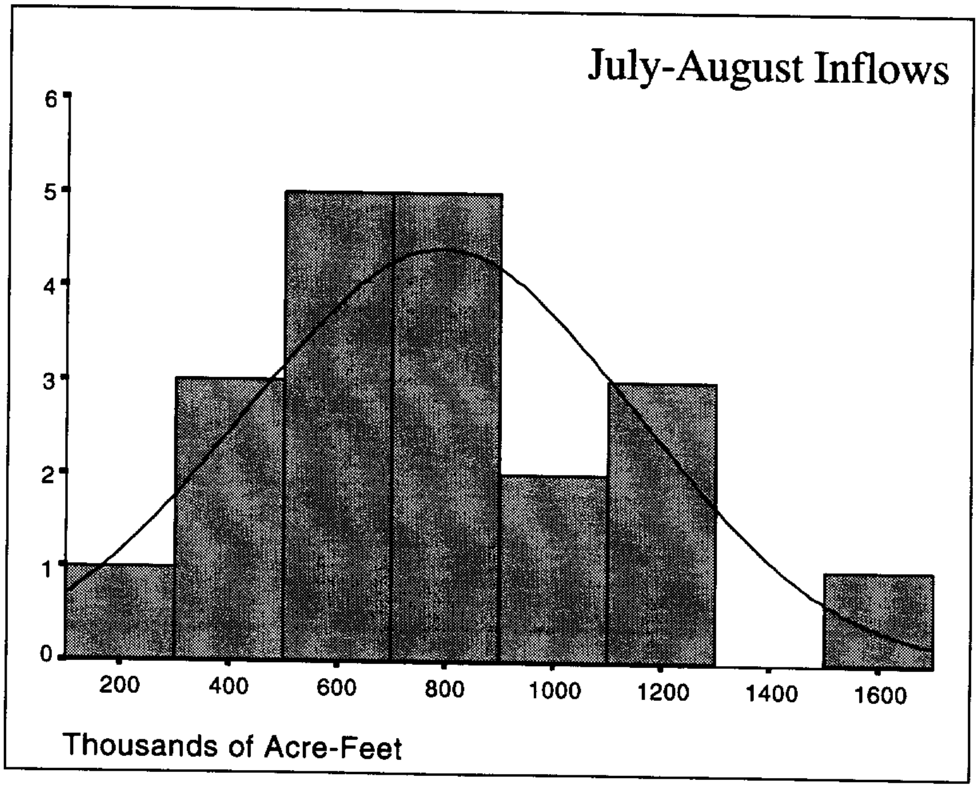
Tests of Normality

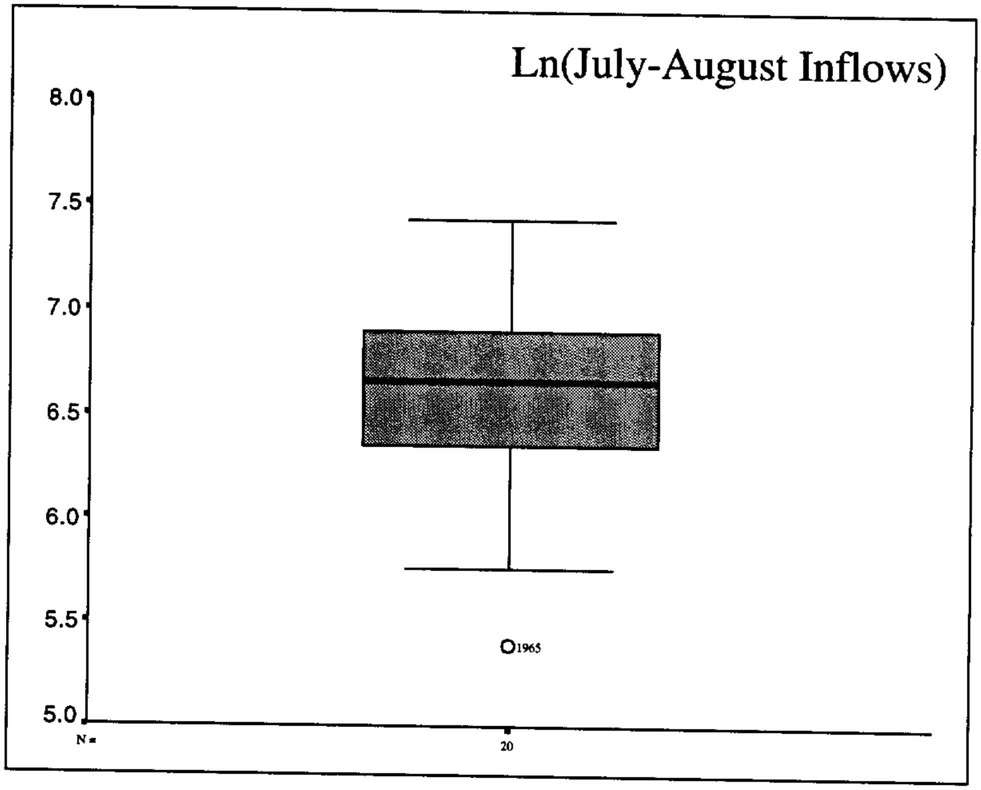
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
July-August Inflows	.138	20	.200*	.962	20	.555

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction


July-August Inflows


July-August Inflows

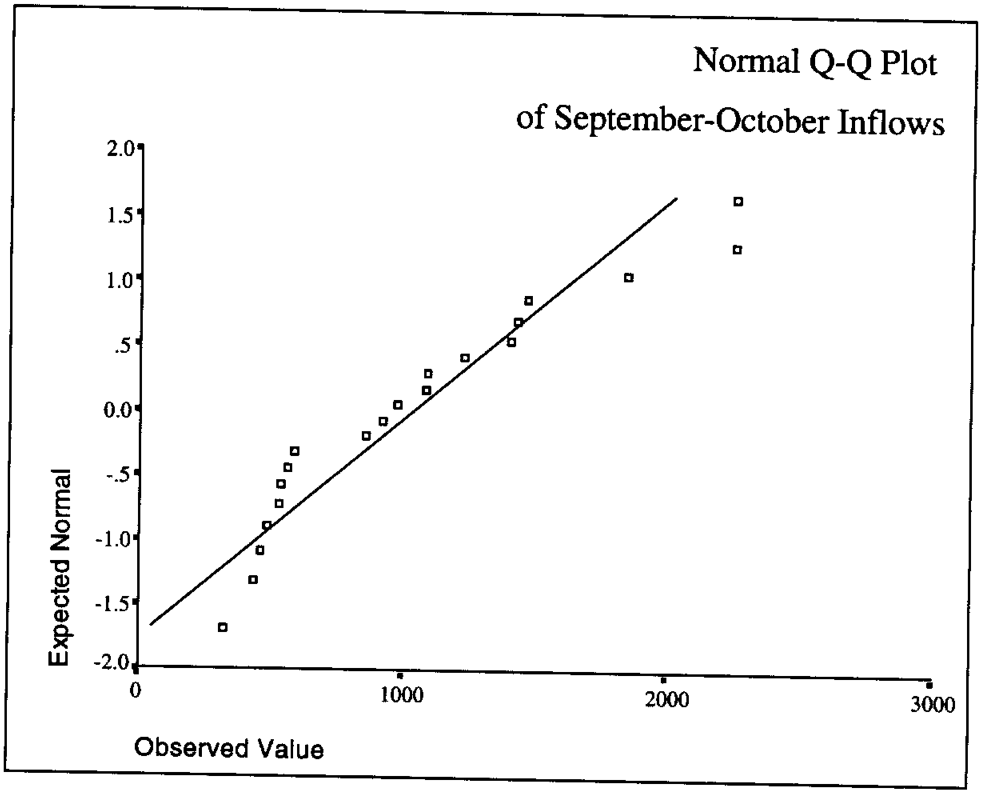

Ln(July-August Inflows)
8.0
7.5
7.0
6.5
6.0
5.5
5.0
1965
N =
20

Descriptives

			Statistic	Std. Error
September-October Inflows	Mean		*1038.0385*	*131.9724*
	95% Confidence Interval for Mean	Lower Bound	*761.8171*	
		Upper Bound	*1314.2599*	
	5% Trimmed Mean		*1010.0572*	
	Median		*952.0400*	
	Variance		*348334.255*	
	Std. Deviation		*590.1985*	
	Minimum		*325.37*	
	Maximum		*2254.37*	
	Range		*1929.00*	
	Interquartile Range		*891.6200*	
	Skewness		*.830*	*.512*
	Kurtosis		*-.153*	*.992*

Extreme Values

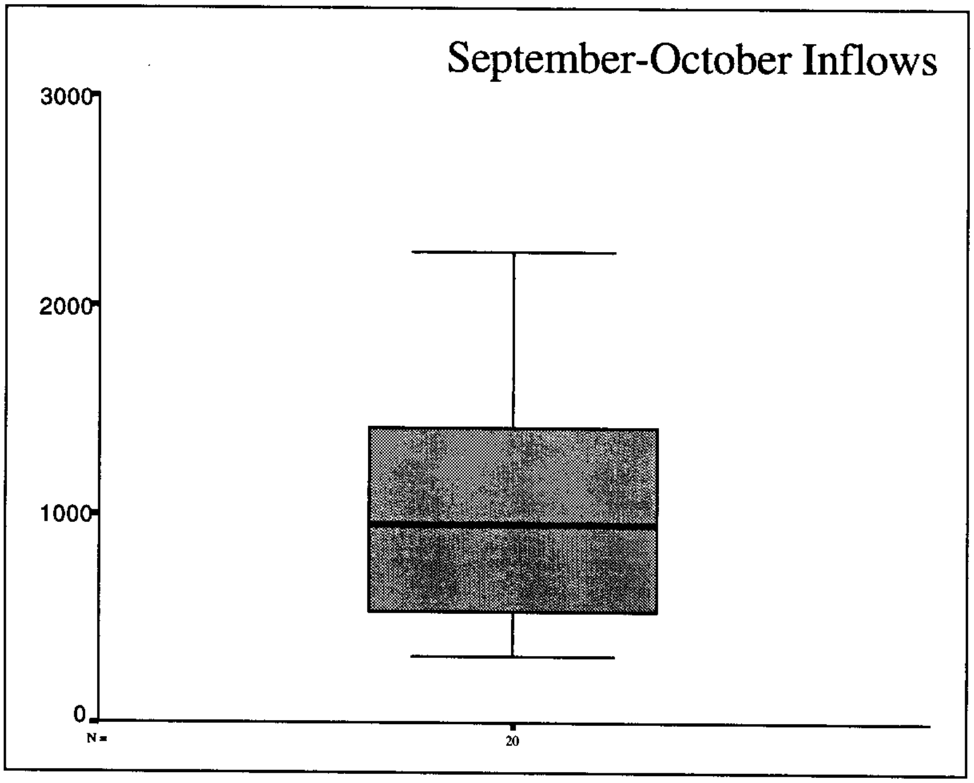
			Case Number	Year	Value
September-October Inflows	Highest	1	*15*	*1976*	*2254.37*
		2	*14*	*1975*	*2253.25*
		3	*13*	*1974*	*1845.28*
		4	*1*	*1962*	*1469.86*
		5	*2*	*1963*	*1432.16*
	Lowest	1	*5*	*1966*	*325.37*
		2	*7*	*1968*	*435.08*
		3	*6*	*1967*	*459.59*
		4	*9*	*1970*	*489.11*
		5	*8*	*1969*	*533.83*

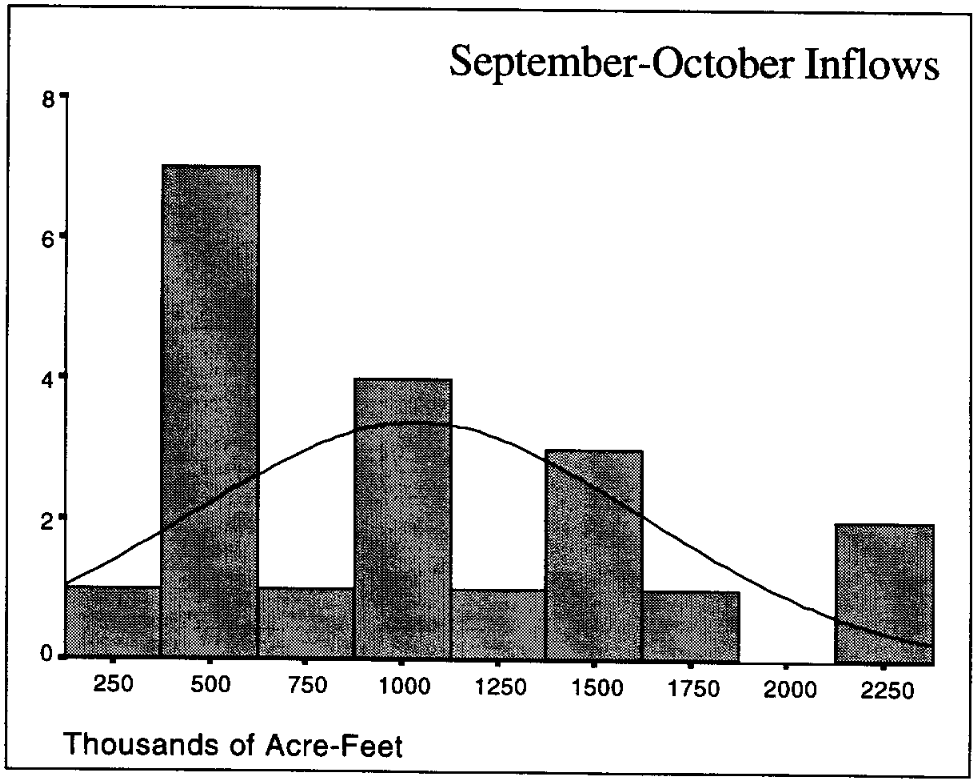


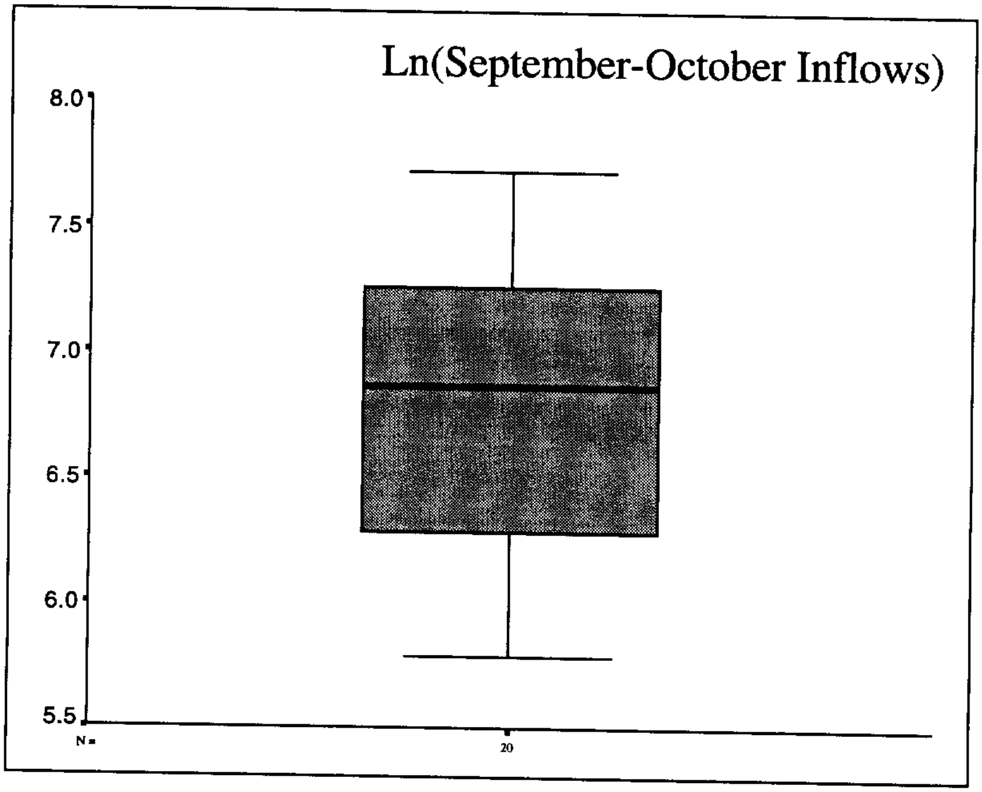
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
September-October Inflows	*.178*	*20*	*.096*	*.897*	*20*	*.039*

a. Lilliefors Significance Correction


September-October Inflows
3000
2000
1000
0
N =
20


September-October Inflows
8
6
4
2
0
250
500
750
1000
1250
1500
1750
2000
2250
Thousands of Acre-Feet

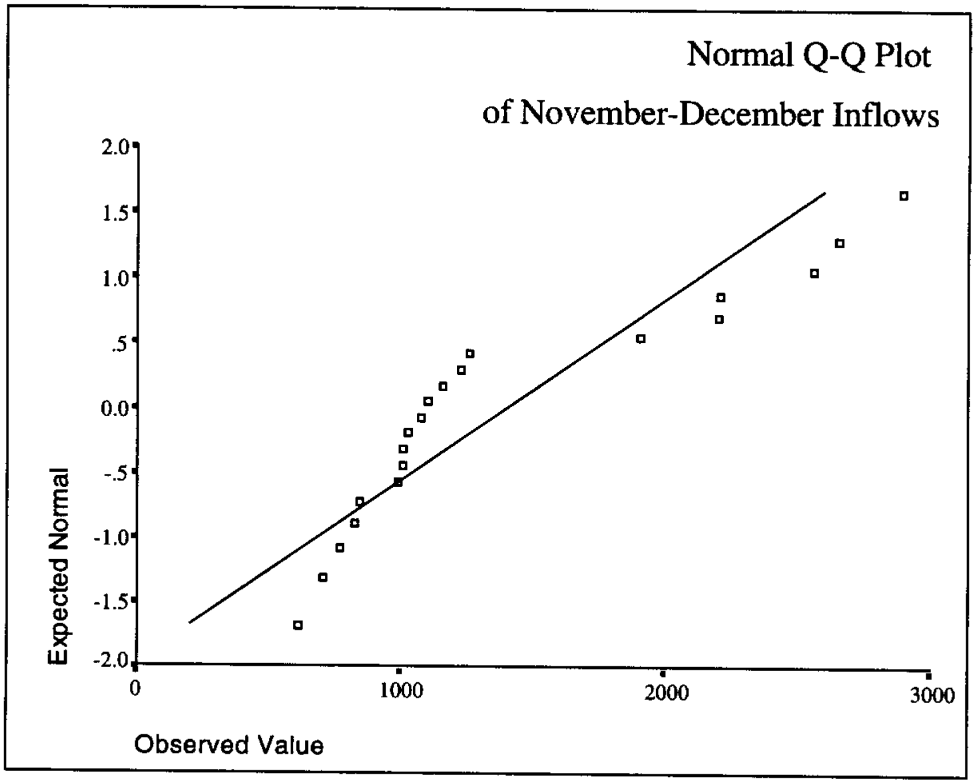

Ln(September-October Inflows)
8.0
7.5
7.0
6.5
6.0
5.5
N=
20

Descriptives

			Statistic	Std. Error
November-December Inflows	Mean		1403.9630	160.4211
	95% Confidence Interval for Mean	Lower Bound	1068.1978	
		Upper Bound	1739.7282	
	5% Trimmed Mean		1364.8089	
	Median		1091.4700	
	Variance		514698.435	
	Std. Deviation		717.4249	
	Minimum		615.13	
	Maximum		2897.57	
	Range		2282.44	
	Interquartile Range		1248.1100	
	Skewness		.990	.512
	Kurtosis		-.464	.992

Extreme Values

			Case Number	Year	Value
November-December Inflows	Highest	1	14	1975	2897.57
		2	15	1976	2659.43
		3	16	1977	2562.96
		4	2	1963	2208.27
		5	1	1962	2205.60
	Lowest	1	10	1971	615.13
		2	8	1969	706.48
		3	20	1981	767.72
		4	9	1970	828.41
		5	7	1968	848.36

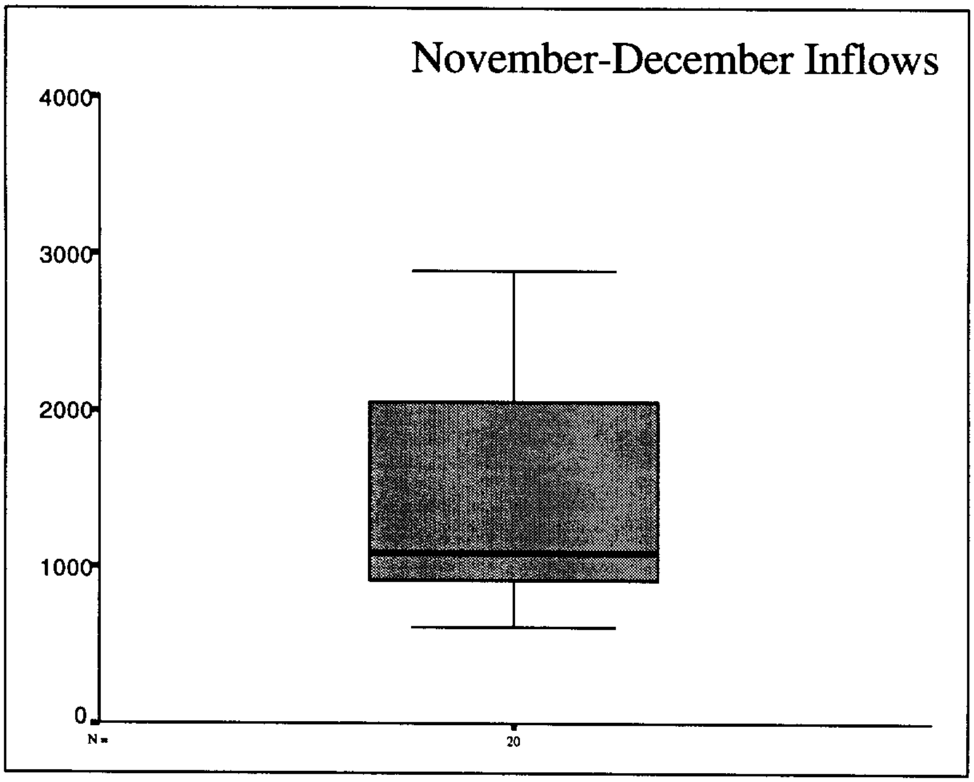


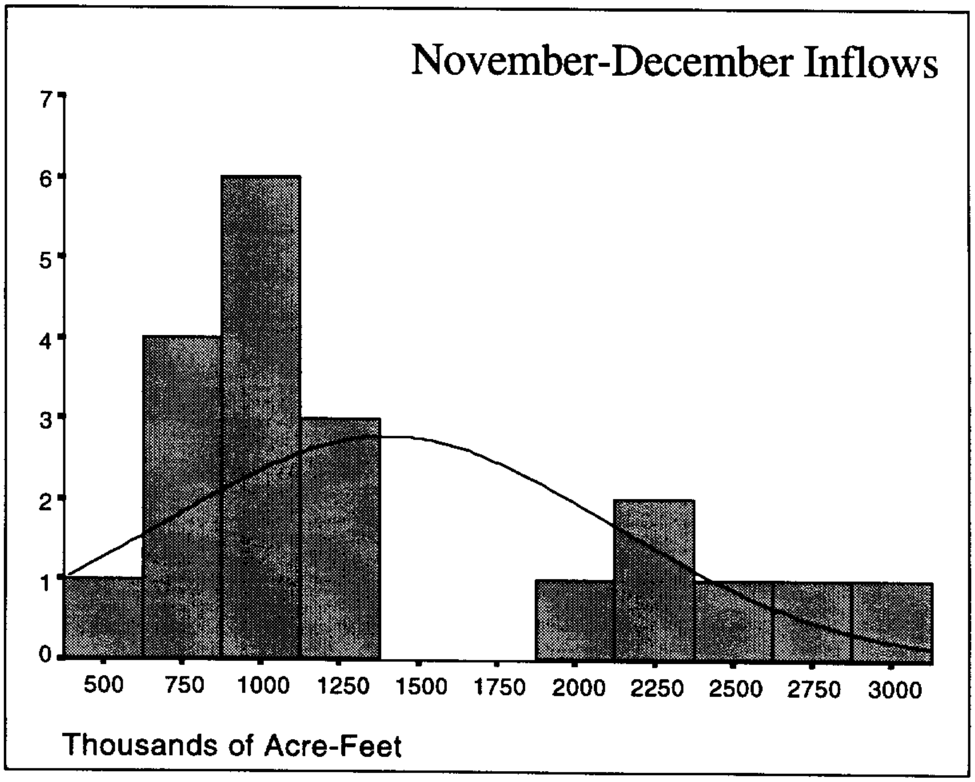
Tests of Normality

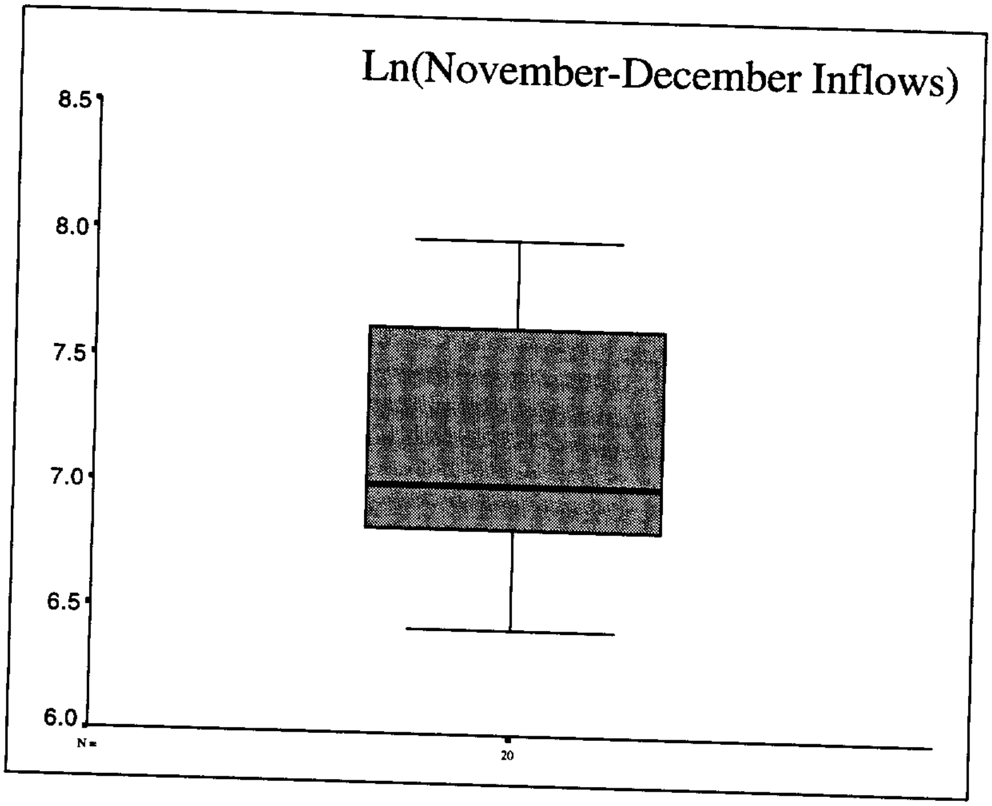
	Kolmogoro		Shapiro-Wilk	
	df	Sig.	df	Sig.
November-December Inflows	*20*	*.000*	*20*	*.010***

**. This is an upper bound of the true significance.

a. Lilliefors Significance Correction


November-December Inflows
4000
3000
2000
1000
0
N =
20

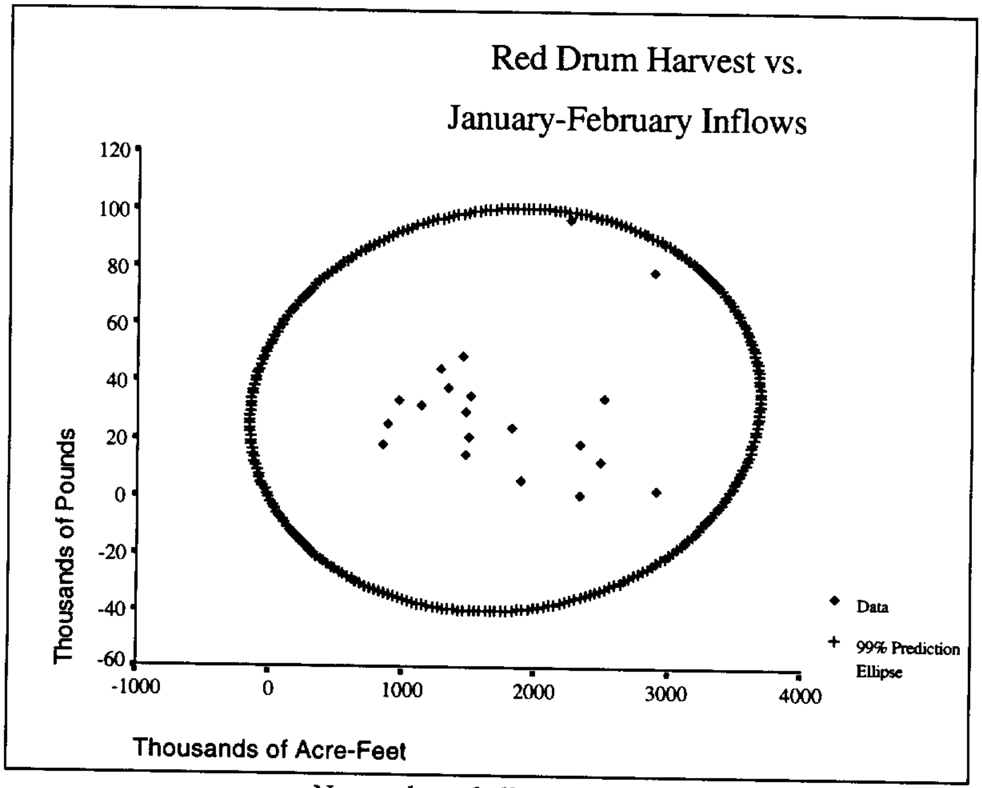

November-December Inflows
7
6
5
4
3
2
1
0
500
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
Thousands of Acre-Feet


Ln(November-December Inflows)
8.5
8.0
7.5
7.0
6.5
6.0
N =
20

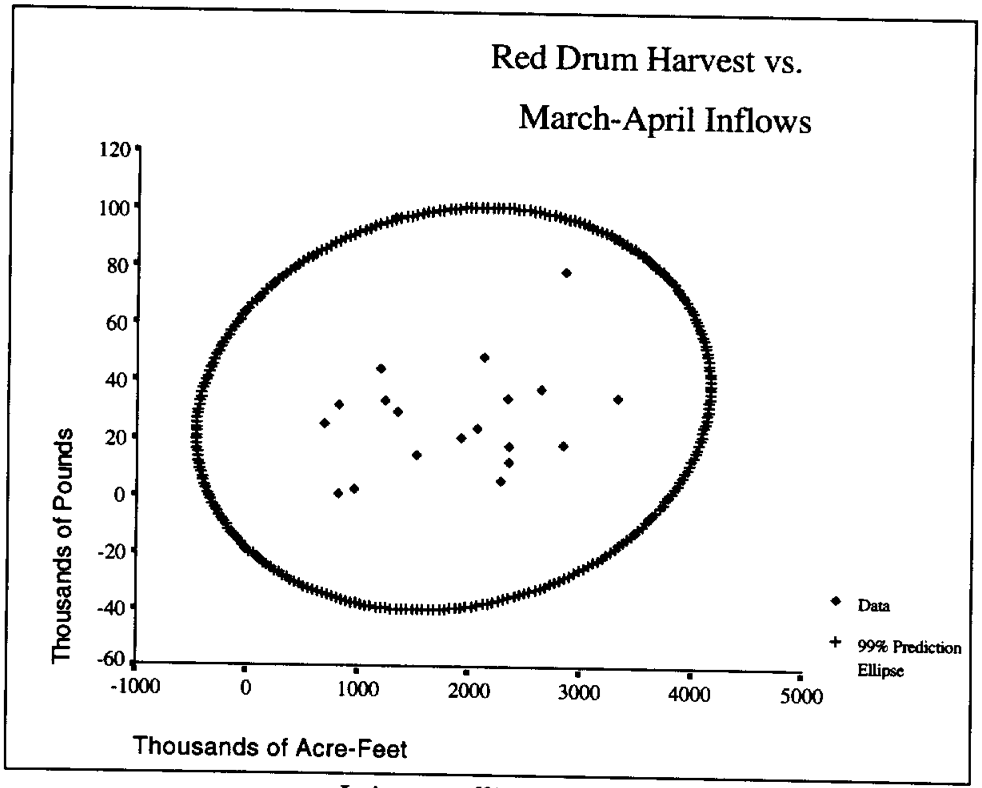
Percentiles

		Percentiles						
		5	10	25	50	75	90	95
Weighted Average (Definition 1)	Red Drum Harvest	1.3650	2.9400	15.7000	27.7500	37.4000	76.5100	96.6000
	January-February Inflows	852.1125	902.3610	1300.1175	1509.6250	2336.7825	2853.9500	2914.2220
	March-April Inflows	695.7400	815.8740	1207.3925	2004.2900	2359.7550	2857.0540	3313.7135
	May-June Inflows	781.2030	1200.0140	1390.5775	2417.1200	3406.9000	3944.5240	4128.0850
	July-August Inflows	225.2055	328.1700	566.8325	776.8800	1026.1250	1273.5230	1665.6635
	September-October Inflows	330.8555	437.5310	534.3025	952.0400	1425.9225	2212.4530	2254.3140
	November-December Inflows	619.6975	712.6040	883.2375	1091.4700	2131.3475	2649.7830	2885.6630
Tukey's Hinges	Red Drum Harvest			16.5000	27.7500	36.7000		
	January-February Inflows			1316.7250	1509.6250	2336.7350		
	March-April Inflows			1215.6050	2004.2900	2358.6800		
	May-June Inflows			1465.4850	2417.1200	3297.2600		
	July-August Inflows			573.6350	776.8800	992.5700		
	September-October Inflows			534.7750	952.0400	1419.6850		
	November-December Inflows			918.1150	1091.4700	2057.0950		

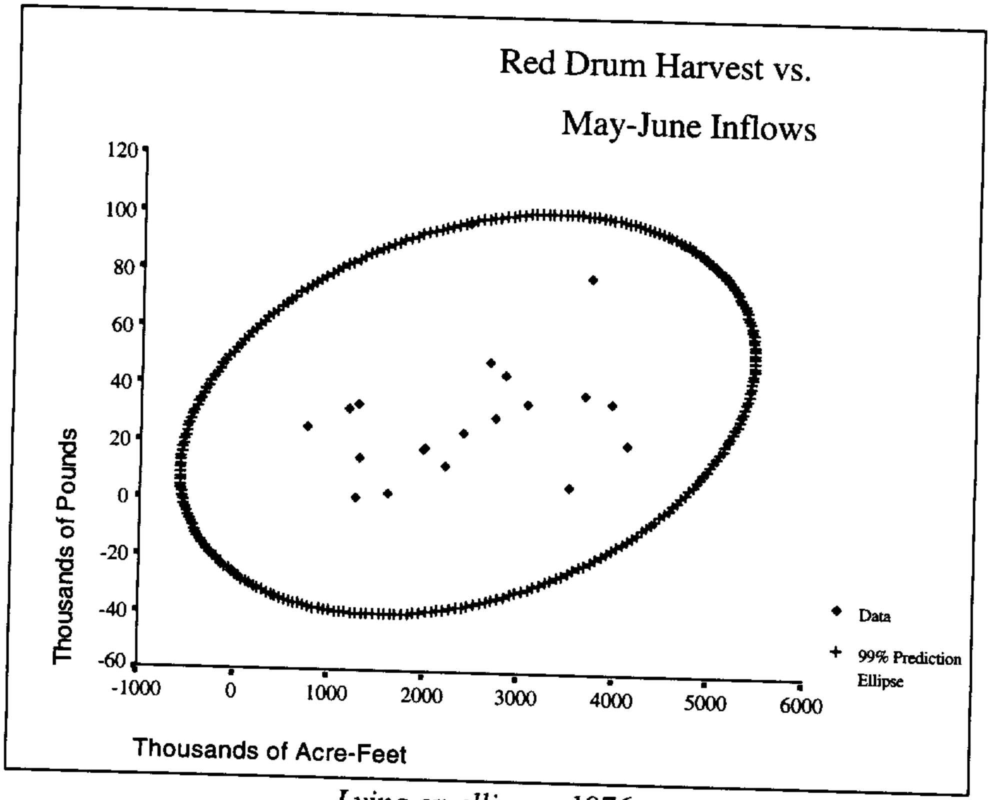
99% Prediction Ellipses



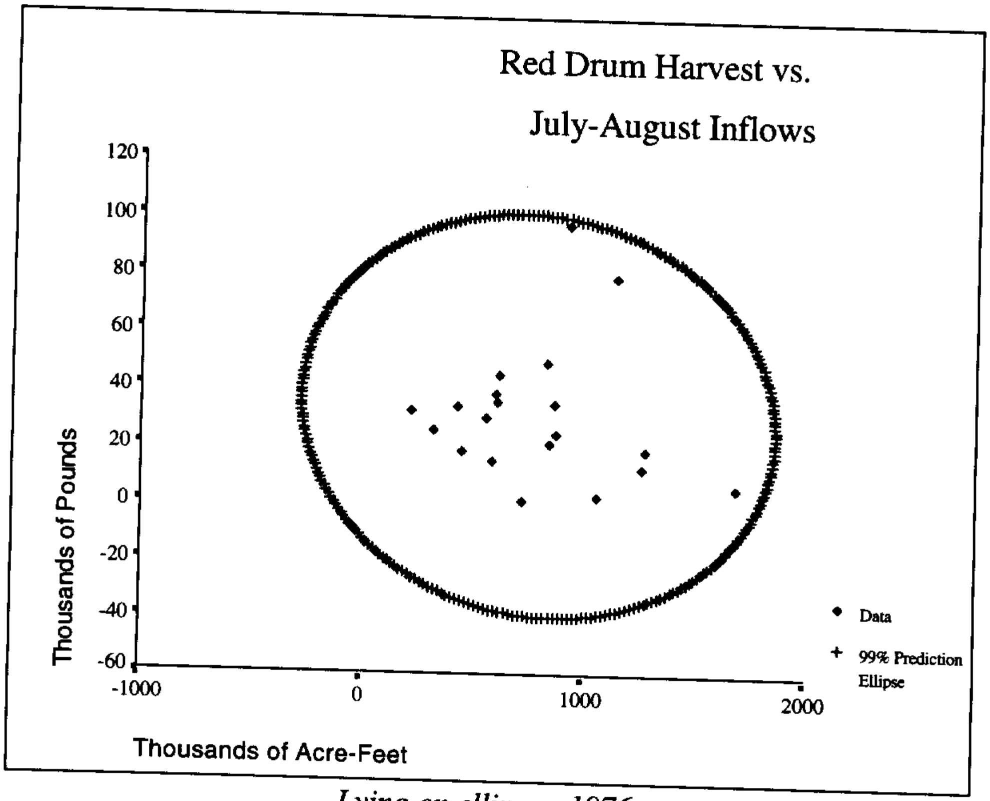
Near edge of ellipse: 1976.



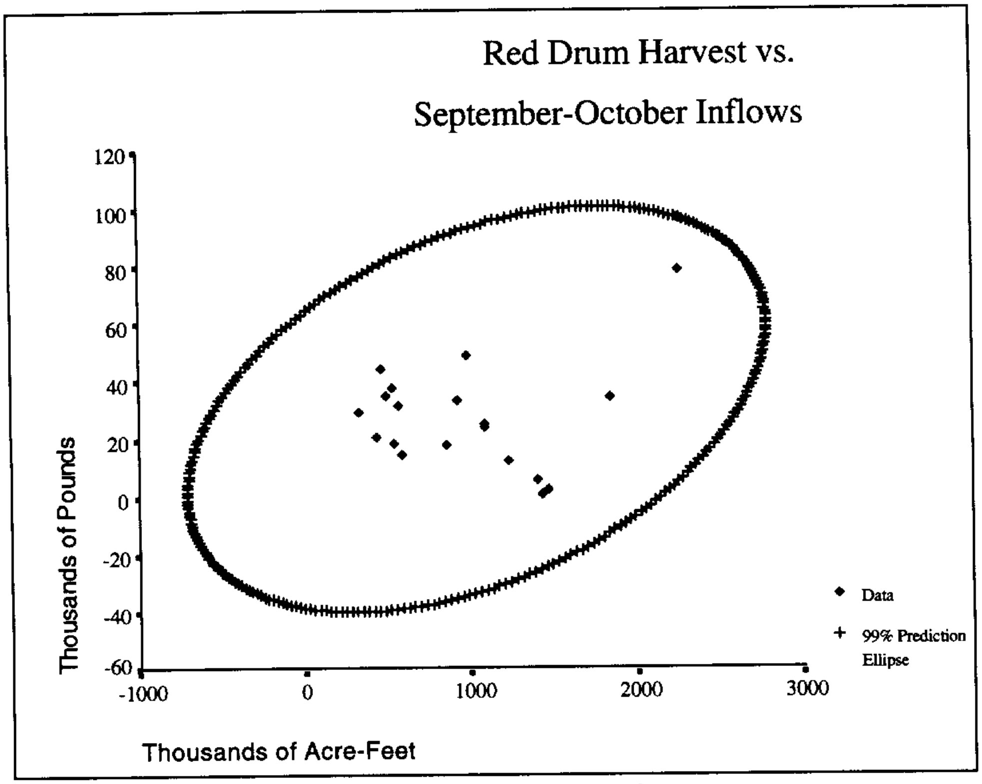
Lying on ellipse: 1976.



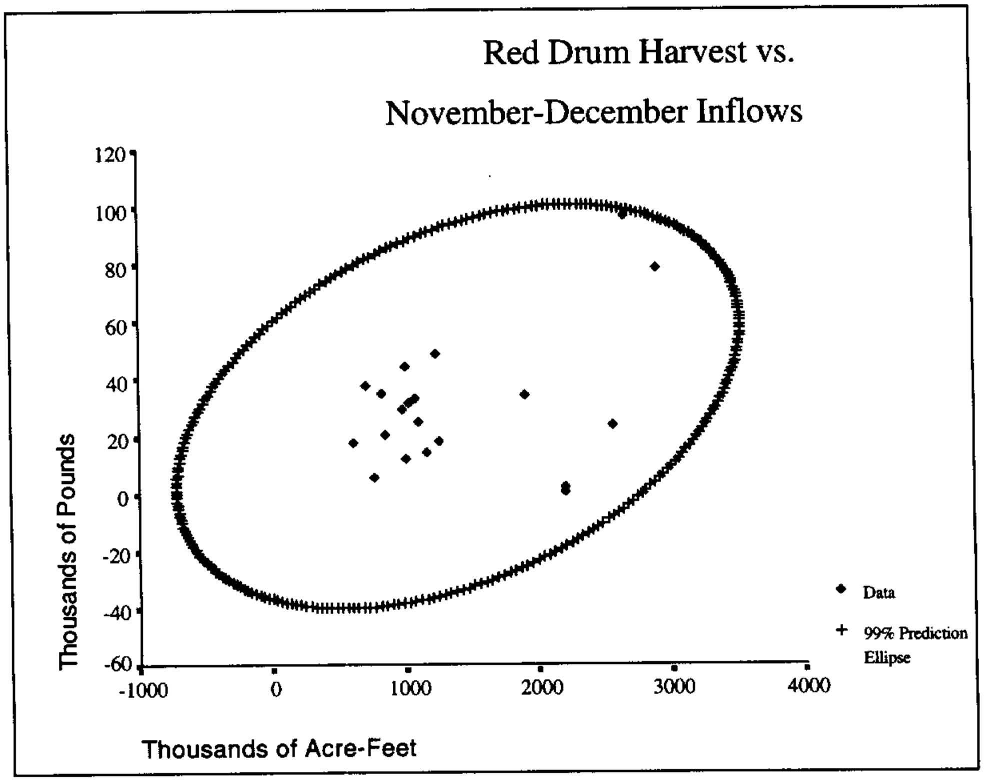
Lying on ellipse: 1976.



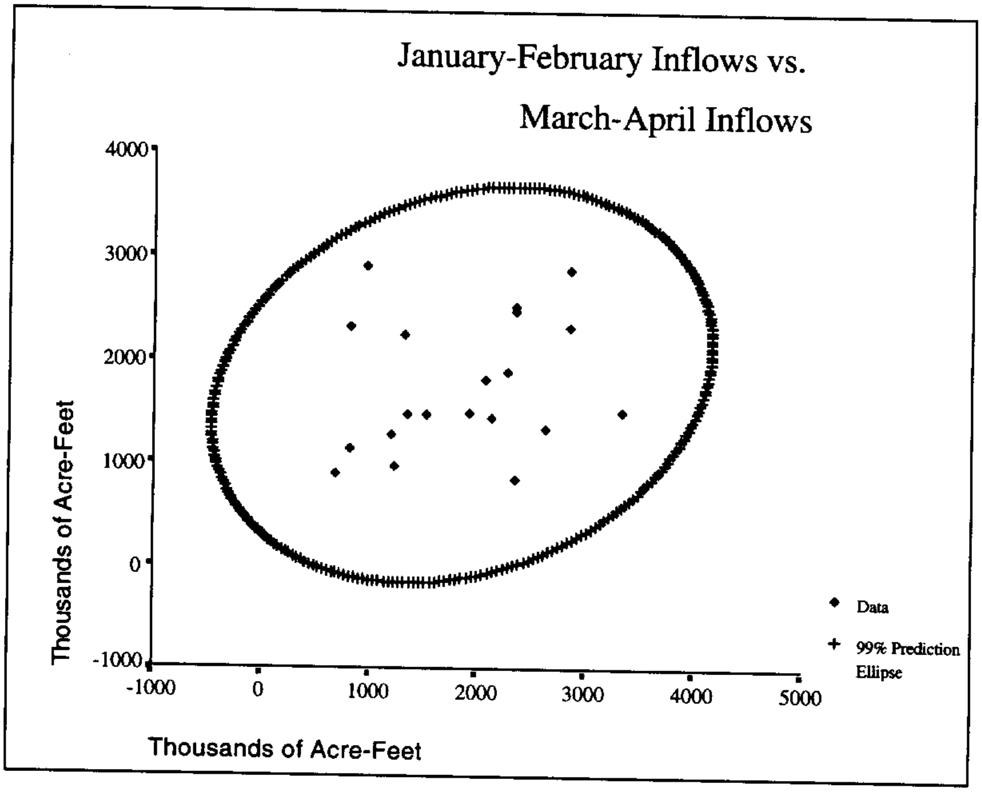
Lying on ellipse: 1976.

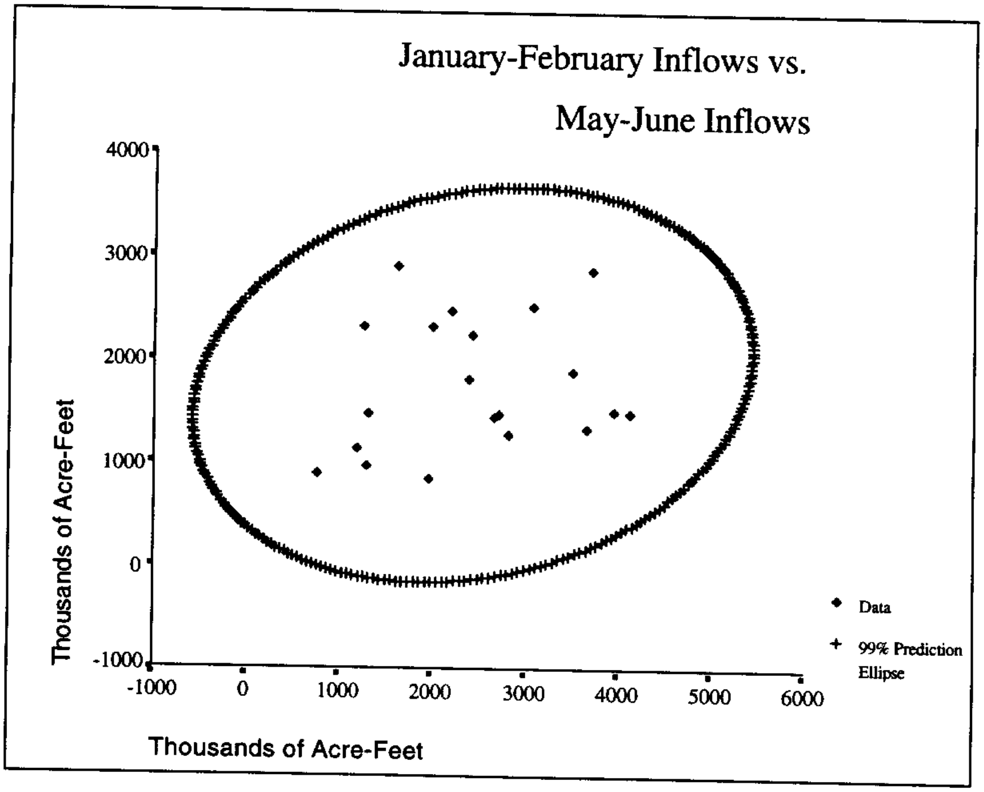


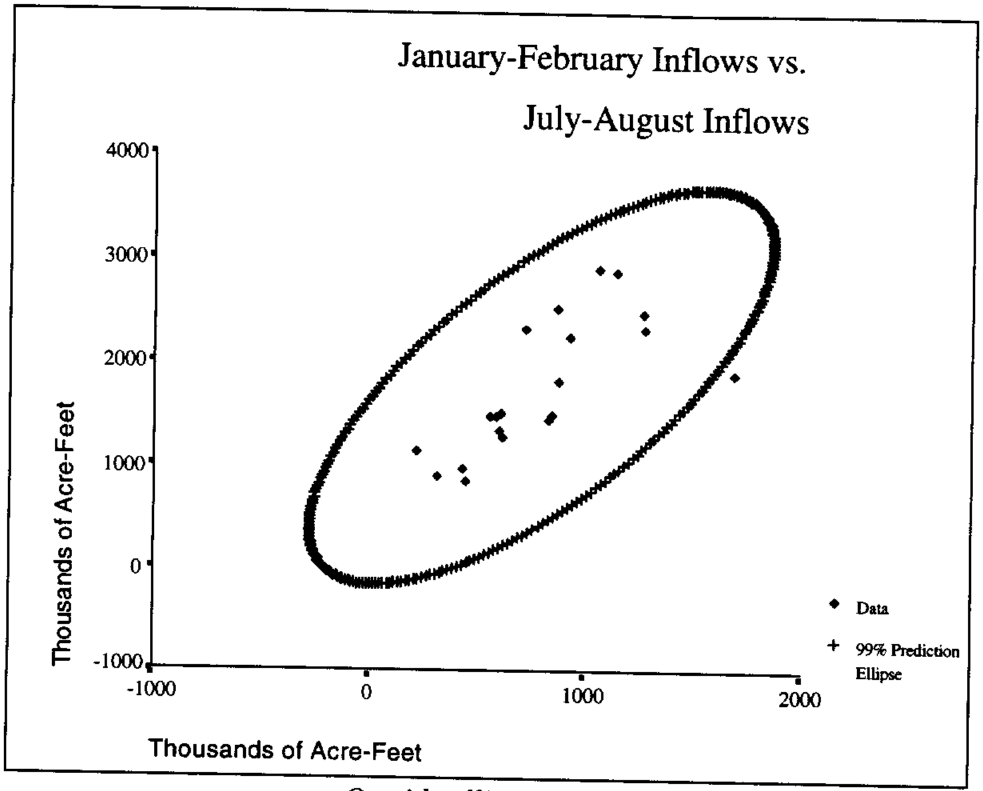
Lying on ellipse: 1976.



Lying on ellipse: 1976.

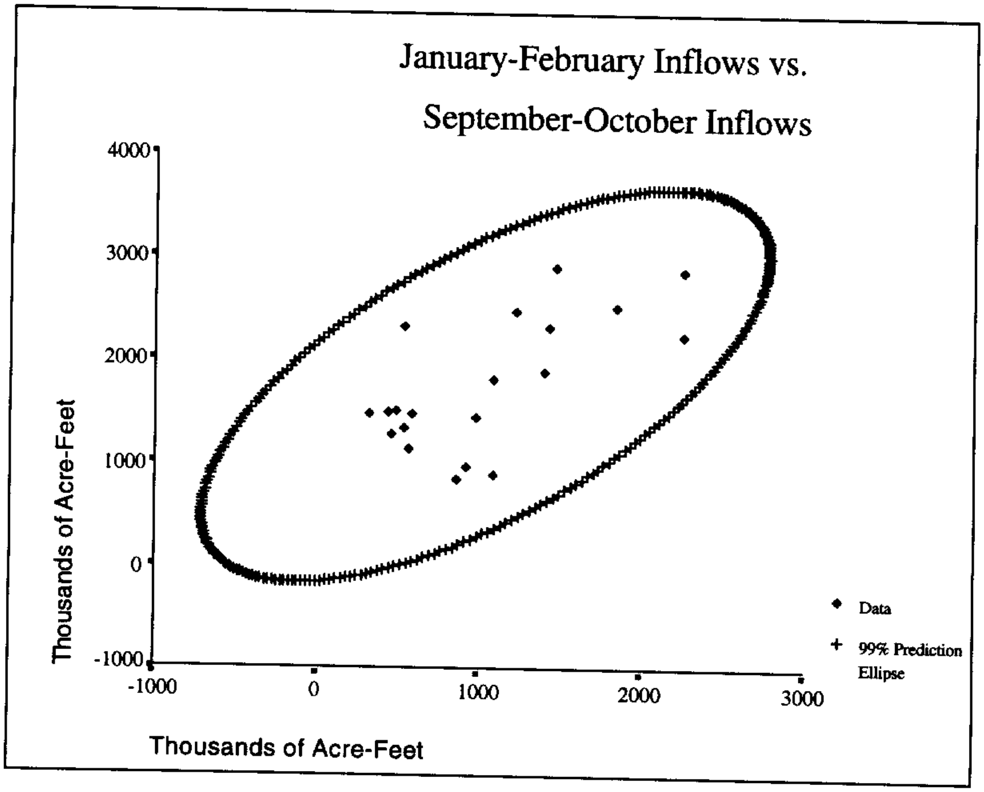

January-February Inflows vs.
March-April Inflows
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
5000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse


January-February Inflows vs.
May-June Inflows
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
5000
6000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

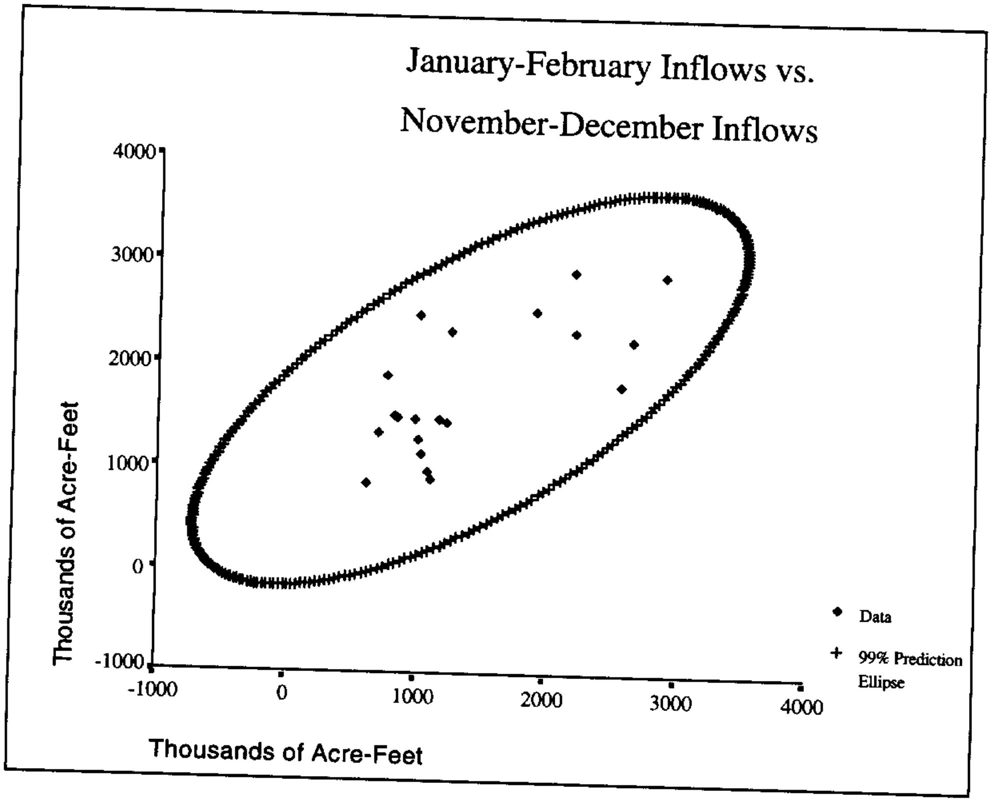


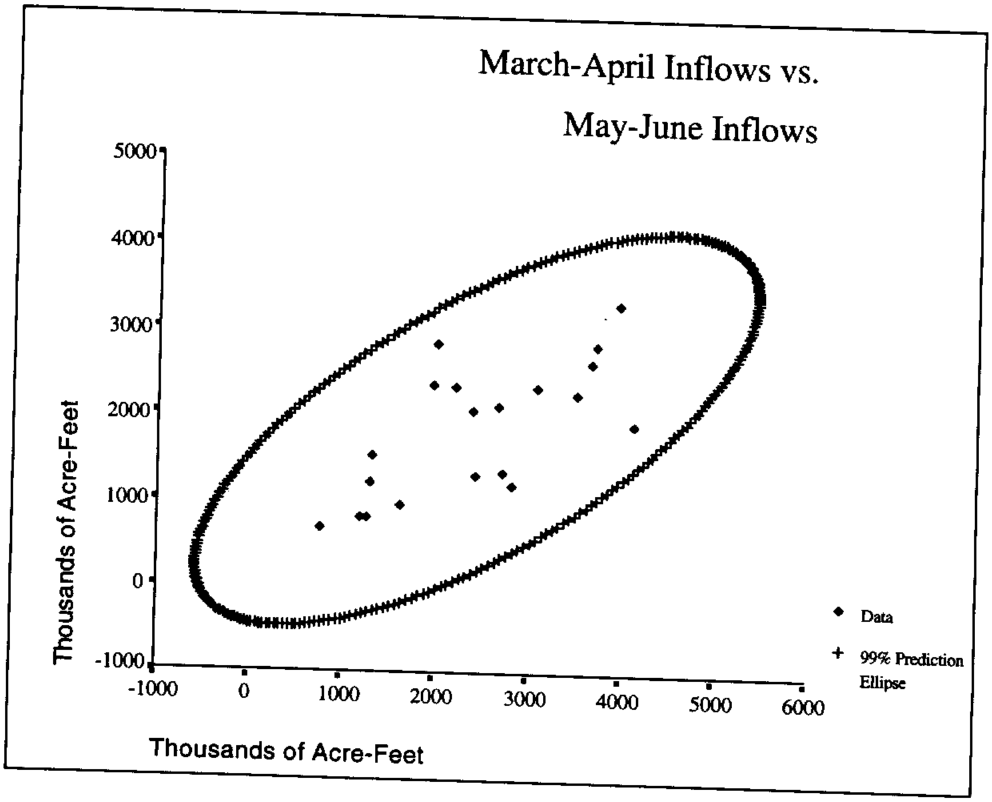
January-February Inflows vs.
July-August Inflows

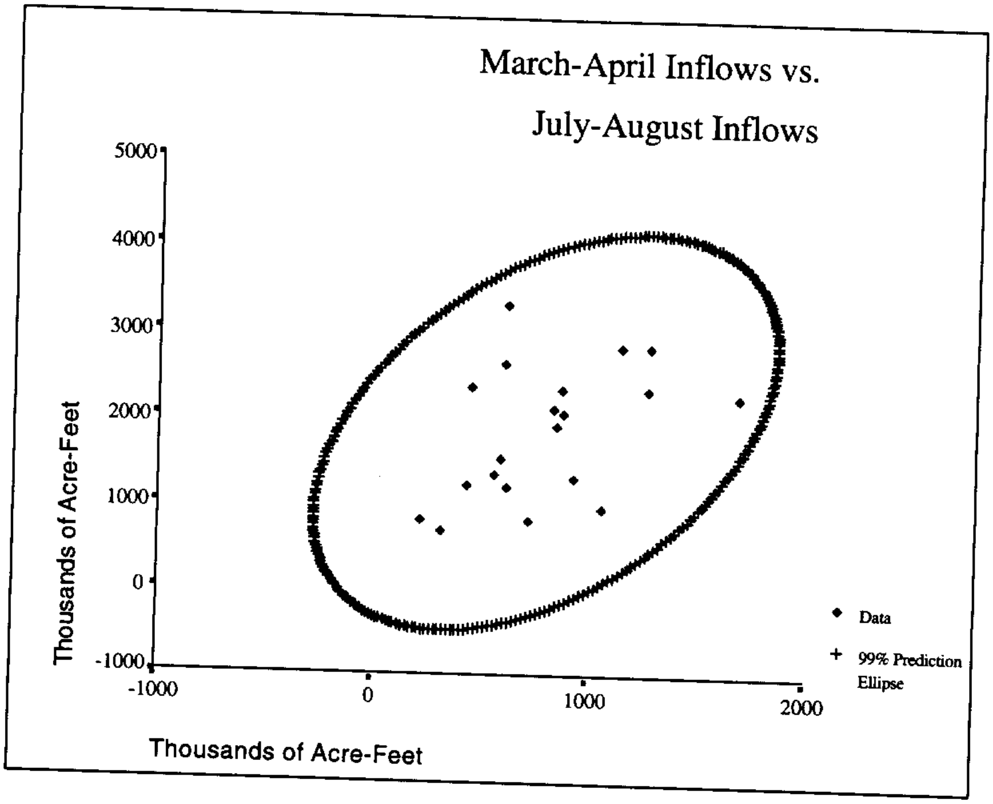
Outside ellipse: 1981.

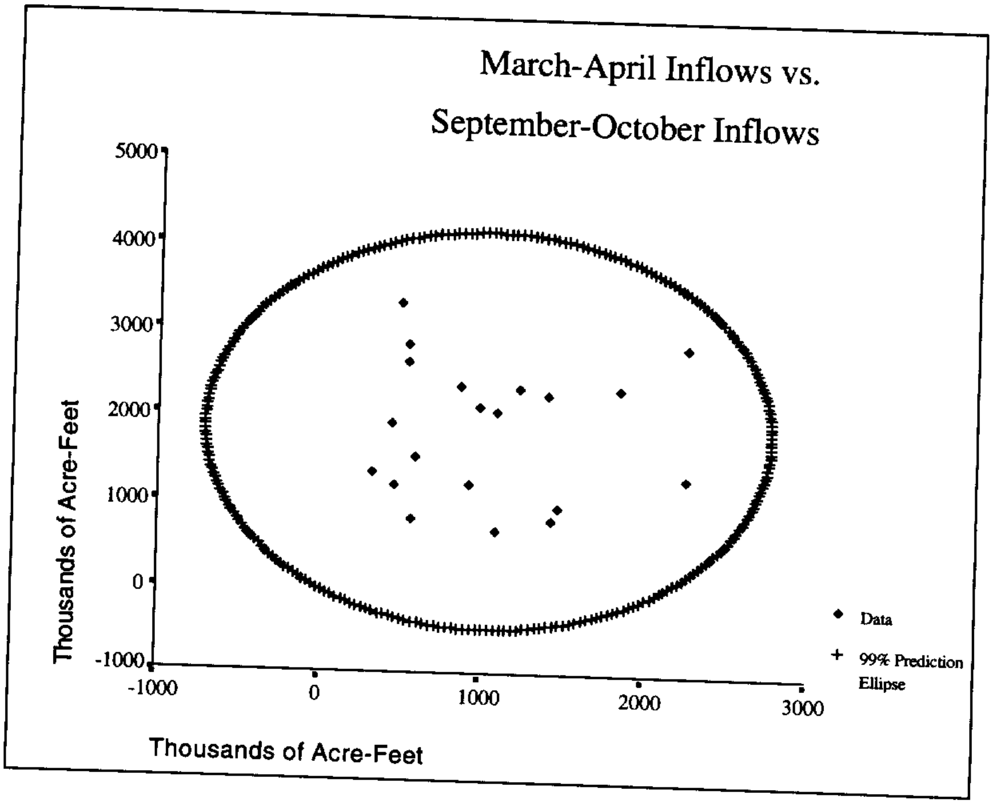


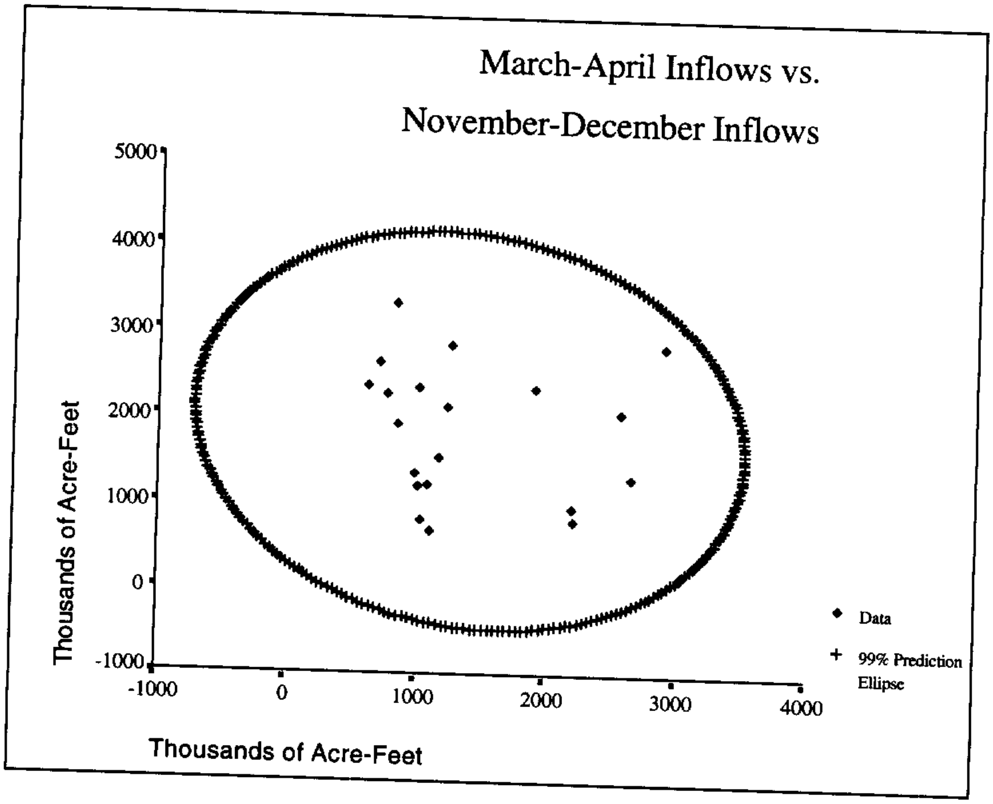
January-February Inflows vs.
September-October Inflows

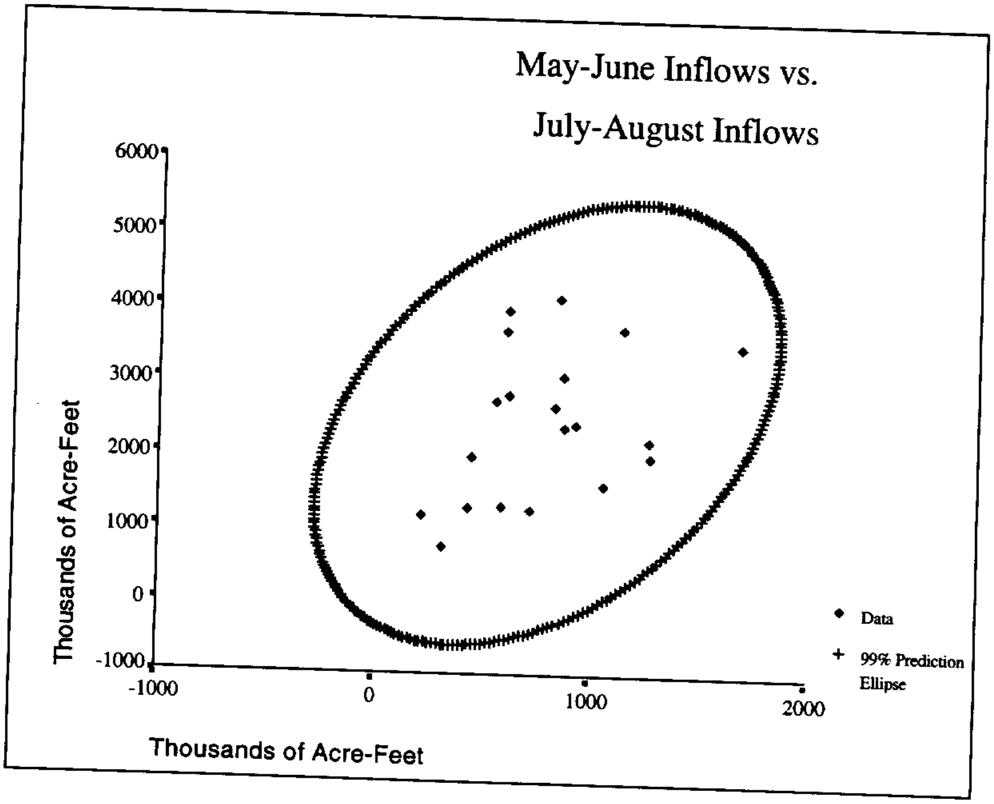

January-February Inflows vs.
November-December Inflows
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

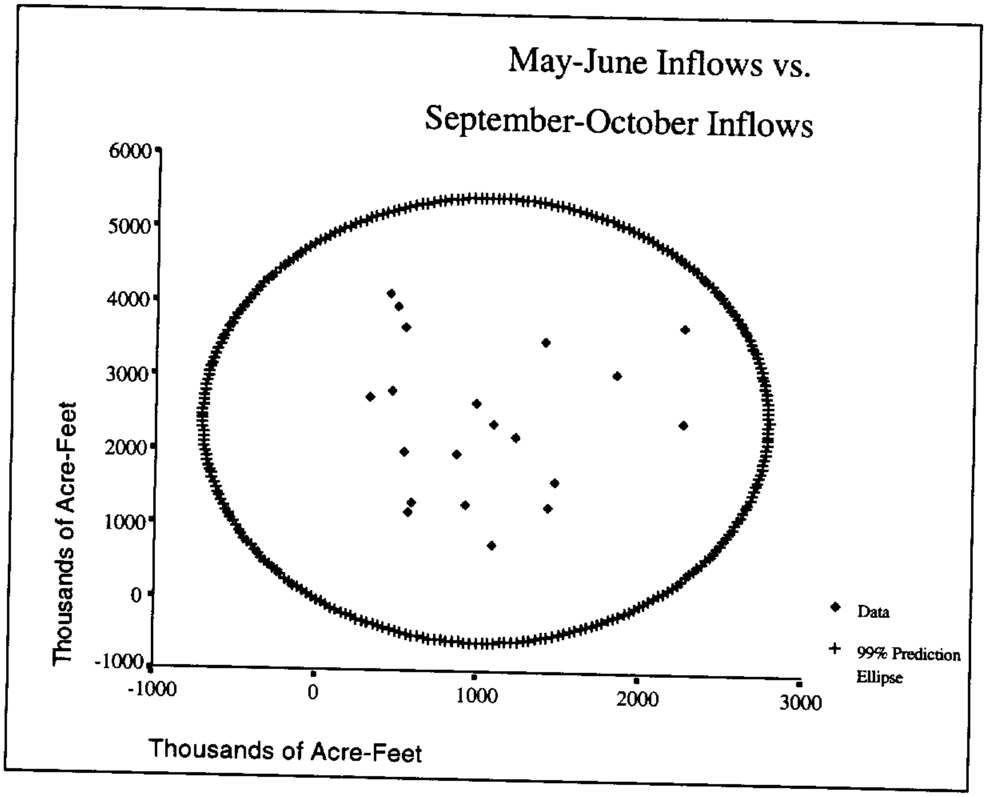

March-April Inflows vs.
May-June Inflows
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
5000
6000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

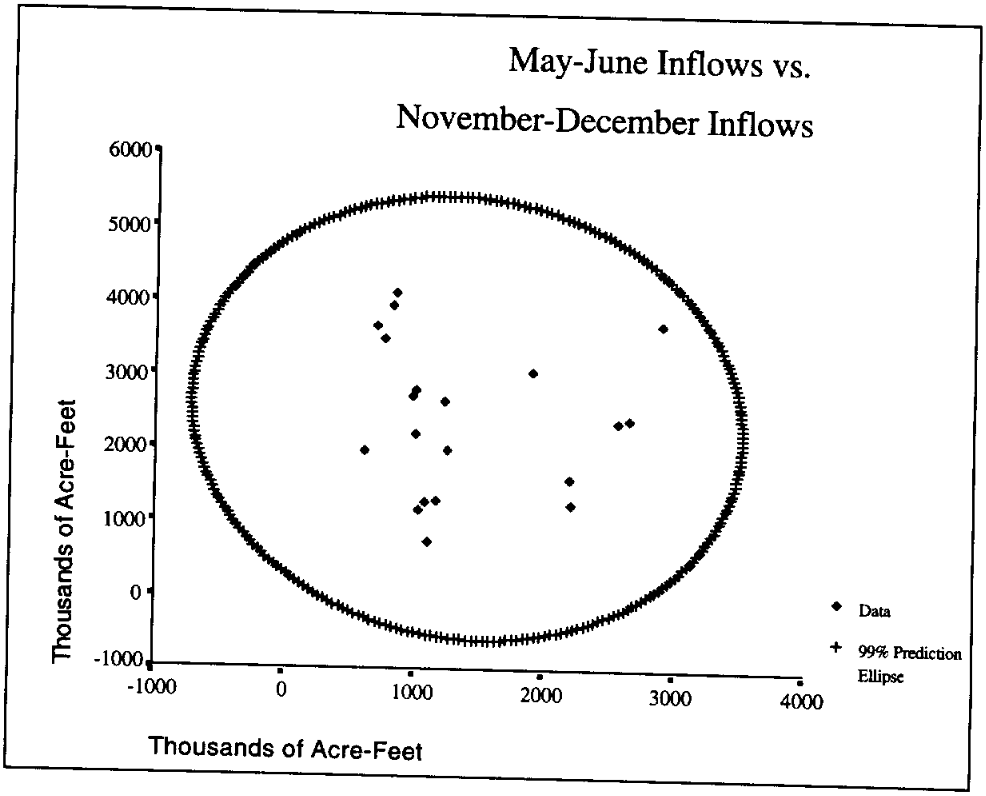

March-April Inflows vs.
July-August Inflows
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

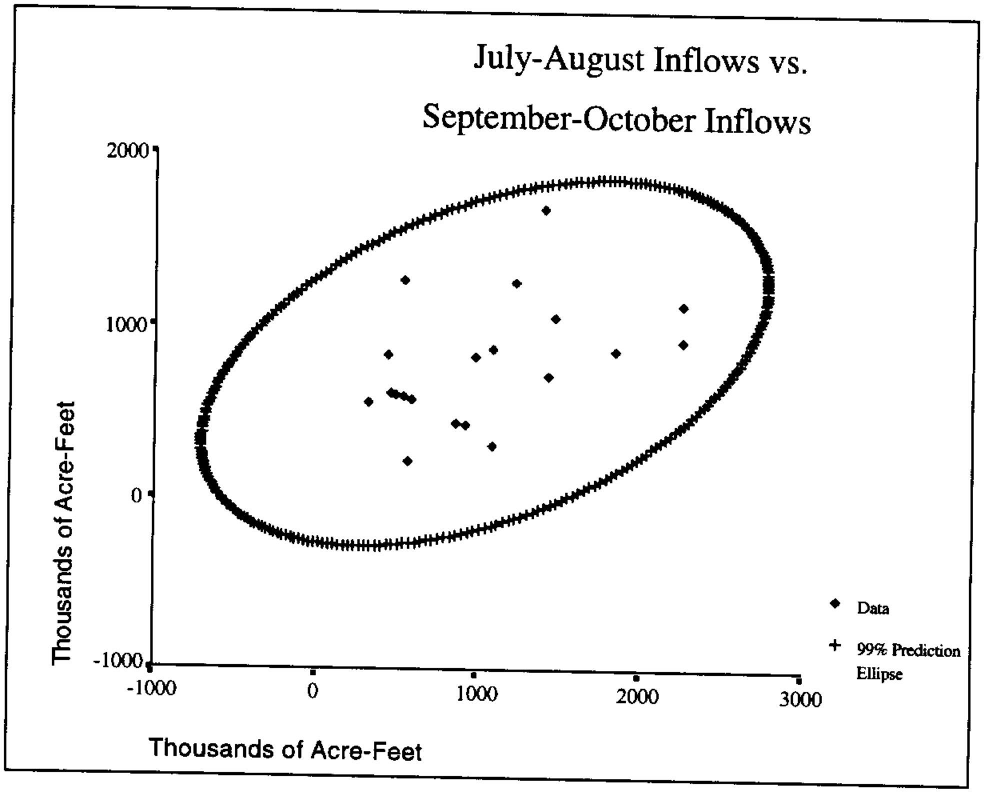

March-April Inflows vs.
September-October Inflows
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

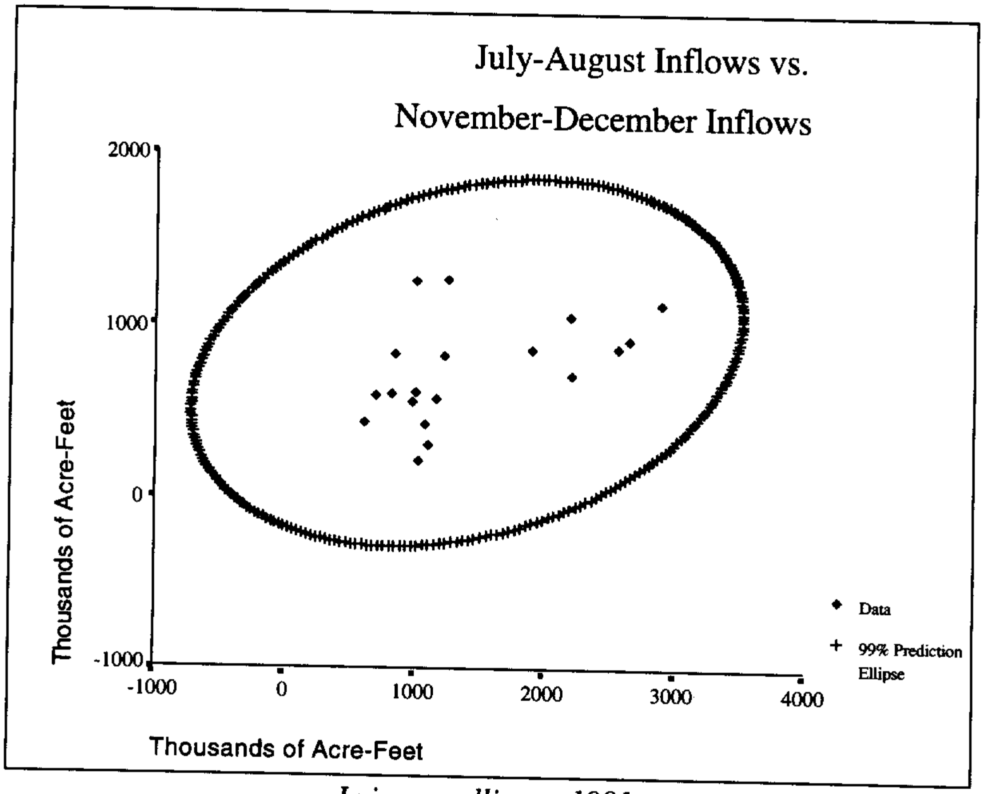

March-April Inflows vs.
November-December Inflows
Thousands of Acre-Feet
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse


May-June Inflows vs.
July-August Inflows
Thousands of Acre-Feet
6000
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

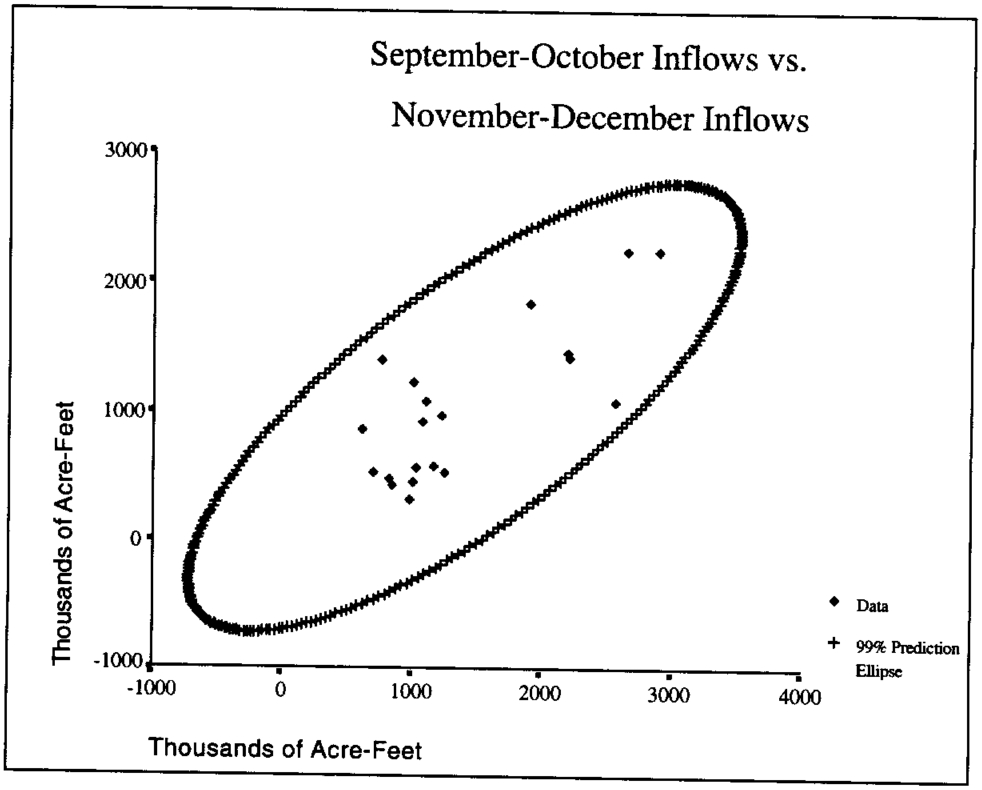

May-June Inflows vs.
September-October Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse


May-June Inflows vs.
November-December Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse





Lying on ellipse: 1981.

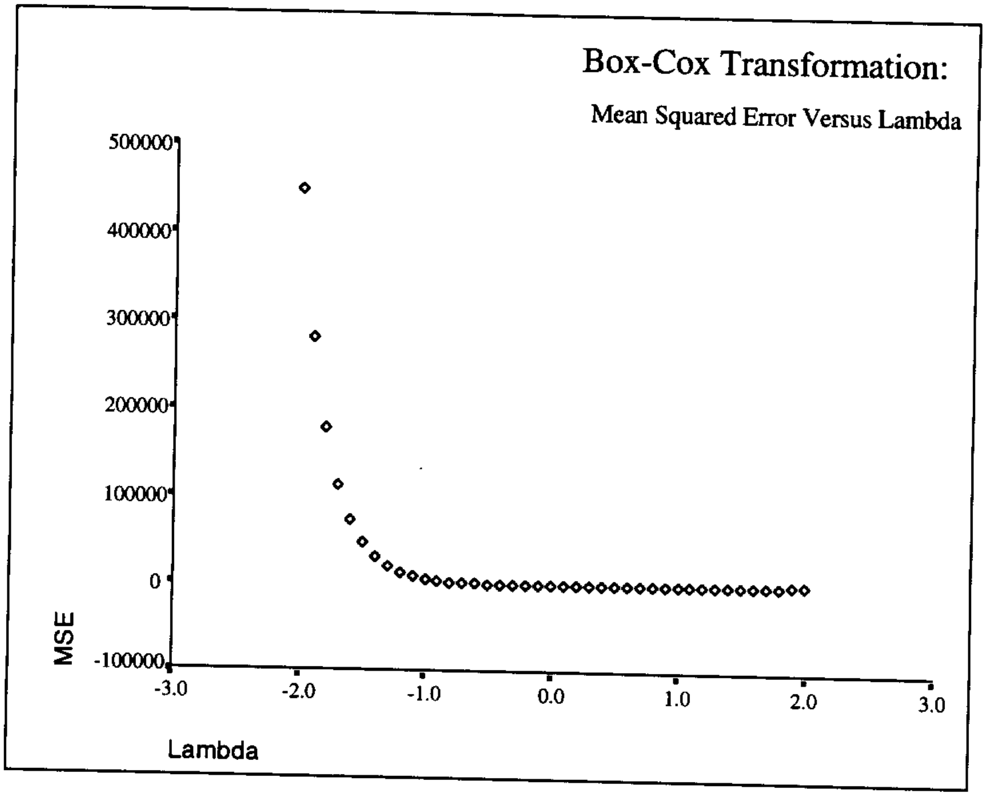

September-October Inflows vs.
November-December Inflows
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
◆ Data
+ 99% Prediction Ellipse

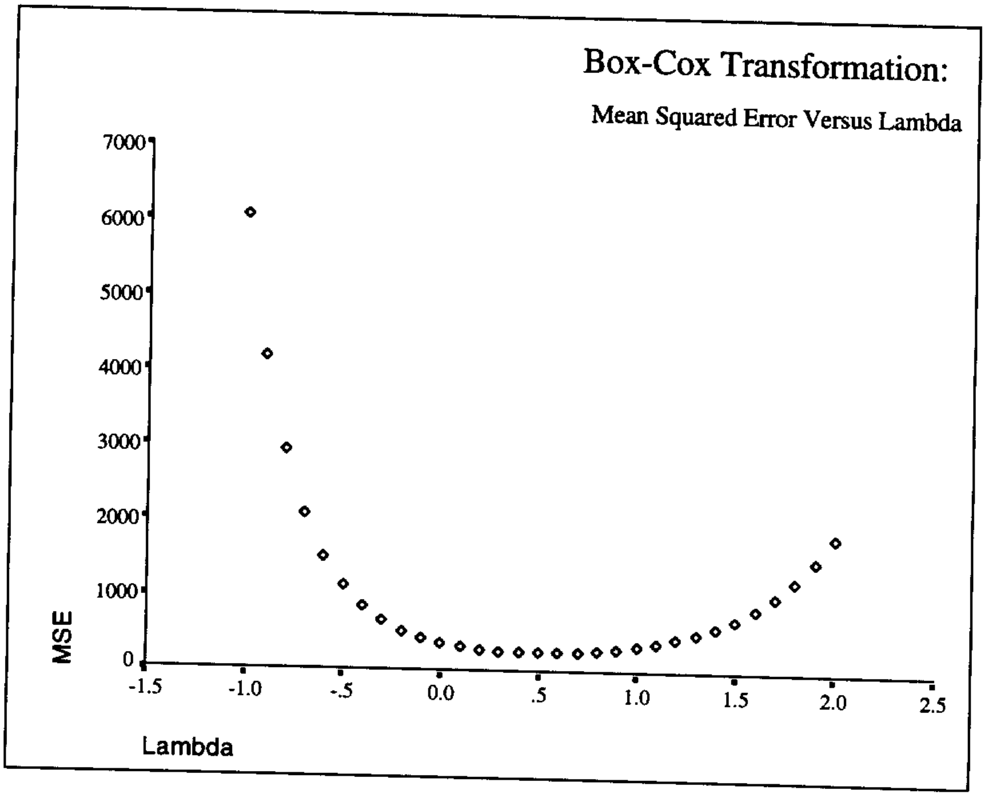
Box–Cox Analysis

Numerical Results

Lambda	Error MS
-2.0	449380.9912
-1.9	282454.5014
-1.8	178522.9342
-1.7	113531.9354
-1.6	72697.7464
-1.5	46907.2705
-1.4	30524.8639
-1.3	20053.2130
-1.2	13313.7686
-1.1	8943.8865
-1.0	6087.4561
-0.9	4204.0016
-0.8	2950.5242
-0.7	2108.1156
-0.6	1536.2127
-0.5	1143.9709
-0.4	872.2725
-0.3	682.3703
-0.2	548.6823
-0.1	454.1985
0.0	387.5374
0.1	341.0485
0.2	309.5851
0.3	289.7053
0.4	279.1533
0.5	276.5220
0.6	281.0381
0.7	292.4293
0.8	310.8499
0.9	336.8495
1.0	371.3774
1.1	415.8166
1.2	472.0488
1.3	542.5513
1.4	630.5314
1.5	740.1059
1.6	876.5360
1.7	1046.5336
1.8	1258.6573
1.9	1523.8237
2.0	1855.9695

Plots


Box-Cox Transformation:
Mean Squared Error Versus Lambda
500000
400000
300000
200000
100000
0
-100000
MSE
-3.0
-2.0
-1.0
0.0
1.0
2.0
3.0
Lambda


Box-Cox Transformation:
Mean Squared Error Versus Lambda
7000
6000
5000
4000
3000
2000
1000
0
MSE
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
2.0
2.5
Lambda

Model Choice Diagnostics

Untransformed Data

```
N = 20     Regression Models for Dependent Variable: RED_DRUM

     R-square      Adj      C(p)       AIC       MSE       SBC Variables in Model
 In               Rsq

   1 0.176523 0.130775   7.9285     125.9  493.696     127.9 SO_INFL
   1 0.165816 0.119472   8.2397     126.2  500.115     128.2 ND_INFL
   1 0.095222 0.044956  10.2910     127.8  542.438     129.8 MJ_INFL
   1 0.017965 -.036592  12.5359     129.5  588.755     131.4 MA_INFL
-----------------------------------------------------------------------
   2 0.279697 0.194955   6.9305     125.3  457.243     128.2 MJ_INFL ND_INFL
   2 0.268778 0.182752   7.2478     125.6  464.174     128.5 MJ_INFL SO_INFL
   2 0.261220 0.174305   7.4674     125.8  468.972     128.7 JA_INFL SO_INFL
   2 0.252252 0.164282   7.7280     126.0  474.665     129.0 JF_INFL SO_INFL
-------------------------------------------------------------------------------
   3 0.488148 0.392176   2.8734     120.4  345.227     124.4 MJ_INFL JA_INFL SO_INFL
   3 0.456201 0.354239   3.8017     121.6  366.774     125.6 JF_INFL MJ_INFL ND_INFL
   3 0.418010 0.308887   4.9114     123.0  392.533     127.0 MJ_INFL JA_INFL ND_INFL
   3 0.394531 0.281005   5.5937     123.8  408.369     127.8 JF_INFL MJ_INFL SO_INFL
---------------------------------------------------------------------------------------
   4 0.519420 0.391266   3.9647     121.2  345.744     126.1 JF_INFL MJ_INFL SO_INFL ND_INFL
   4 0.504873 0.372839   4.3874     121.8  356.210     126.7 MJ_INFL JA_INFL SO_INFL ND_INFL
   4 0.495840 0.361398   4.6499     122.1  362.708     127.1 JF_INFL MJ_INFL JA_INFL SO_INFL
   4 0.489131 0.352899   4.8448     122.4  367.535     127.4 MA_INFL MJ_INFL JA_INFL SO_INFL
-----------------------------------------------------------------------------------------------
   5 0.548192 0.386832   5.1286     121.9  348.262     127.9 JF_INFL MJ_INFL JA_INFL SO_INFL
                                                           ND_INFL
   5 0.521263 0.350286   5.9111     123.1  369.019     129.1 JF_INFL MA_INFL MJ_INFL SO_INFL
                                                           ND_INFL
   5 0.506973 0.330892   6.3264     123.7  380.035     129.6 MA_INFL MJ_INFL JA_INFL SO_INFL
                                                           ND_INFL
   5 0.496887 0.317203   6.6194     124.1  387.809     130.1 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                           SO_INFL
--------------------------------------------------------------------------------------------------------
   6 0.552618 0.346134   7.0000     123.7  371.377     130.7 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                           SO_INFL ND_INFL
--------------------------------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_   _RMSE_ INTERCEP  JF_INFL   MA_INFL  MJ_INFL   JA_INFL    SO_INFL

  1 MODEL1   PARMS  RED_DRUM 22.2193  13.4542         .        .         .         .  0.016965
  2 MODEL1   PARMS  RED_DRUM 22.3633  12.0737         .        .         .         .         .
  3 MODEL1   PARMS  RED_DRUM 23.2903  13.4649         .        .  0.007216         .         .
  4 MODEL1   PARMS  RED_DRUM 24.2643  23.4962         . .0040789         .         .         .
  5 MODEL1   PARMS  RED_DRUM 21.3832  -8.3076         .        .  0.007910         .         .
  6 MODEL1   PARMS  RED_DRUM 21.5447  -3.7233         .        .  0.007103         .  0.016823
  7 MODEL1   PARMS  RED_DRUM 21.6558  24.4204         .        .         . -0.021366  0.022741
  8 MODEL1   PARMS  RED_DRUM 21.7868  27.1153 -0.013522        .         .         .  0.026863
  9 MODEL1   PARMS  RED_DRUM 18.5803   3.1494         .        .  0.012354 -0.038133  0.027026
 10 MODEL1   PARMS  RED_DRUM 19.1513   3.2456 -0.022626        .  0.011206         .         .
 11 MODEL1   PARMS  RED_DRUM 19.8124  -1.9315         .        .  0.012039 -0.028137         .
 12 MODEL1   PARMS  RED_DRUM 20.2081   9.6232 -0.017905        .  0.009064         .  0.029890
 13 MODEL1   PARMS  RED_DRUM 18.5942   4.3183 -0.026308        .  0.011114         .  0.016660
 14 MODEL1   PARMS  RED_DRUM 18.8735  -0.8562         .        .  0.012606 -0.037235  0.020352
 15 MODEL1   PARMS  RED_DRUM 19.0449   6.3223 -0.005581        .  0.012211 -0.032657  0.029633
 16 MODEL1   PARMS  RED_DRUM 19.1712   2.5022         . .0013933  0.011713 -0.038908  0.027258
 17 MODEL1   PARMS  RED_DRUM 18.6618   3.7049 -0.016620        .  0.012487 -0.019831  0.019973
 18 MODEL1   PARMS  RED_DRUM 19.2099   3.3973 -0.026975 .0019108  0.010195         .  0.016613
 19 MODEL1   PARMS  RED_DRUM 19.4945  -1.9646         . .0020485  0.011673 -0.038339  0.020432
 20 MODEL1   PARMS  RED_DRUM 19.6929   5.6677 -0.005604 .0014375  0.011549 -0.033434  0.029883
 21 MODEL1   PARMS  RED_DRUM 19.2712   2.2314 -0.017143 .0029887  0.011123 -0.020895  0.020078
```

```
OBS  ND_INFL   RED_DRUM  _IN_  _P_  _EDF_   _MSE_     _RSQ_    _ADJRSQ_     _CP_     _AIC_     _SBC_

  1    .          -1       1    2     18   493.696  0.17652   0.13077    7.9285   125.931   127.923
  2 0.013527      -1       1    2     18   500.115  0.16582   0.11947    8.2397   126.190   128.181
  3    .          -1       1    2     18   542.438  0.09522   0.04496   10.2910   127.814   129.806
  4    .          -1       1    2     18   588.755  0.01797  -0.03659   12.5359   129.453   131.444
  5 0.014302      -1       2    3     17   457.243  0.27970   0.19496    6.9305   125.254   128.241
  6    .          -1       2    3     17   464.174  0.26878   0.18275    7.2478   125.555   128.542
  7    .          -1       2    3     17   468.972  0.26122   0.17430    7.4674   125.760   128.748
  8    .          -1       2    3     17   474.665  0.25225   0.16428    7.7280   126.002   128.989
  9    .          -1       3    4     16   345.227  0.48815   0.39218    2.8734   120.421   124.404
 10 0.028872      -1       3    4     16   366.774  0.45620   0.35424    3.8017   121.632   125.615
 11 0.018497      -1       3    4     16   392.533  0.41801   0.30889    4.9114   122.990   126.972
 12    .          -1       3    4     16   408.369  0.39453   0.28101    5.5937   123.781   127.763
 13 0.020593      -1       4    5     15   345.744  0.51942   0.39127    3.9647   121.160   126.139
 14 0.006843      -1       4    5     15   356.210  0.50487   0.37284    4.3874   121.757   126.735
 15    .          -1       4    5     15   362.708  0.49584   0.36140    4.6499   122.118   127.097
 16    .          -1       4    5     15   367.535  0.48913   0.35290    4.8448   122.383   127.361
 17 0.015193      -1       5    6     14   348.262  0.54819   0.38683    5.1286   121.926   127.900
 18 0.021196      -1       5    6     14   369.019  0.52126   0.35029    5.9111   123.083   129.058
 19 0.007110      -1       5    6     14   380.035  0.50697   0.33089    6.3264   123.672   129.646
 20    .          -1       5    6     14   387.809  0.49689   0.31720    6.6194   124.077   130.051
 21 0.015846      -1       6    7     13   371.377  0.55262   0.34613    7.0000   123.729   130.699
```

Square Root of Harvest (Box-Cox Transformation)

```
N = 20     Regression Models for Dependent Variable: SQRTRDRM

      R-square      Adj       C(p)        AIC        MSE        SBC Variables in Model
 In                 Rsq

  1 0.114119 0.064903    8.0901    31.0433    4.29532    33.0348 MJ_INFL
  1 0.053465 0.000880    9.7395    32.3678    4.58940    34.3593 ND_INFL
  1 0.052455 -.000186    9.7669    32.3891    4.59430    34.3806 SO_INFL
  1 0.042116 -.011099   10.0481    32.6062    4.64443    34.5976 MA_INFL
-------------------------------------------------------------------------------
  2 0.237645 0.147956    6.7310    30.0399    3.91381    33.0271 MJ_INFL JA_INFL
  2 0.185165 0.089302    8.1581    31.3713    4.18324    34.3585 JF_INFL ND_INFL
  2 0.179208 0.082644    8.3201    31.5170    4.21382    34.5042 MJ_INFL ND_INFL
  2 0.166561 0.068509    8.6640    31.8228    4.27875    34.8100 JF_INFL SO_INFL
-------------------------------------------------------------------------------
  3 0.436011 0.330263    3.3368    26.0123    3.07640    29.9953 MJ_INFL JA_INFL SO_INFL
  3 0.430605 0.323843    3.4838    26.2031    3.10589    30.1861 JF_INFL MJ_INFL ND_INFL
  3 0.388519 0.273866    4.6282    27.6293    3.33546    31.6122 MJ_INFL JA_INFL ND_INFL
  3 0.362282 0.242710    5.3417    28.4695    3.47857    32.4525 JF_INFL MA_INFL ND_INFL
-------------------------------------------------------------------------------
  4 0.463440 0.320357    4.5909    27.0152    3.12190    31.9939 JF_INFL MJ_INFL SO_INFL ND_INFL
  4 0.455045 0.309723    4.8192    27.3257    3.17075    32.3044 JF_INFL MJ_INFL JA_INFL SO_INFL
  4 0.449868 0.303166    4.9599    27.5148    3.20087    32.4935 MA_INFL MJ_INFL JA_INFL SO_INFL
  4 0.447389 0.300026    5.0274    27.6047    3.21529    32.5834 JF_INFL MJ_INFL JA_INFL ND_INFL
-------------------------------------------------------------------------------
  5 0.498969 0.320030    5.6247    27.6450    3.12341    33.6194 JF_INFL MJ_INFL JA_INFL SO_INFL
                                                                ND_INFL
  5 0.478971 0.292890    6.1685    28.4277    3.24807    34.4021 JF_INFL MA_INFL MJ_INFL SO_INFL
                                                                ND_INFL
  5 0.469273 0.279727    6.4323    28.7966    3.30853    34.7710 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                                SO_INFL
  5 0.468812 0.279102    6.4448    28.8140    3.31141    34.7884 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                                ND_INFL
-------------------------------------------------------------------------------
  6 0.521942 0.301300    7.0000    28.7063    3.20944    35.6764 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                                SO_INFL ND_INFL
-------------------------------------------------------------------------------

OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_  INTERCEP  JF_INFL    MA_INFL  MJ_INFL   JA_INFL    SO_INFL

  1 MODEL1  PARMS  SQRTRDRM 2.07251  3.43459   .          .        .0007104  .          .
  2 MODEL1  PARMS  SQRTRDRM 2.14229  4.19752   .          .        .         .          .
  3 MODEL1  PARMS  SQRTRDRM 2.14343  4.30399   .          .        .         .          .0008317
  4 MODEL1  PARMS  SQRTRDRM 2.15509  4.12513   .          .0005616 .         .          .
  5 MODEL1  PARMS  SQRTRDRM 1.97834  4.46189   .          .        .0010263  -.0022648  .
  6 MODEL1  PARMS  SQRTRDRM 2.04530  5.67425   -.0016667  .        .         .          .
  7 MODEL1  PARMS  SQRTRDRM 2.05276  2.27154   .          .        .0007475  .          .
  8 MODEL1  PARMS  SQRTRDRM 2.06851  5.81203   -.0014927  .        .         .          .0019243
  9 MODEL1  PARMS  SQRTRDRM 1.75397  3.28649   .          .        .0012300  -.0038130  .0018378
 10 MODEL1  PARMS  SQRTRDRM 1.76235  3.51150   -.0024283  .        .0011012  .          .
 11 MODEL1  PARMS  SQRTRDRM 1.82632  2.97692   .          .        .0012042  -.0031127  .
 12 MODEL1  PARMS  SQRTRDRM 1.86509  3.85958   -.0025414  .0012729 .         .          .
 13 MODEL1  PARMS  SQRTRDRM 1.76689  3.58103   -.0026670  .        .0010953  .          .0010797
 14 MODEL1  PARMS  SQRTRDRM 1.78066  3.73533   -.0007895  .        .0012098  -.0030383  .0022066
 15 MODEL1  PARMS  SQRTRDRM 1.78910  3.06795   .          .0004704 .0010136  -.0040747  .0019160
 16 MODEL1  PARMS  SQRTRDRM 1.79312  3.45703   -.0017418  .        .0011929  -.0013065  .
 17 MODEL1  PARMS  SQRTRDRM 1.76732  3.51973   -.0016988  .        .0012325  -.0019818  .0014109
 18 MODEL1  PARMS  SQRTRDRM 1.80224  3.34058   -.0028410  .0004988 .0008553  .          .0010675
 19 MODEL1  PARMS  SQRTRDRM 1.81894  3.51826   -.0007972  .0004767 .0009903  -.0032960  .0022896
 20 MODEL1  PARMS  SQRTRDRM 1.81973  3.16466   -.0018459  .0005911 .0009225  -.0015071  .
 21 MODEL1  PARMS  SQRTRDRM 1.79149  3.21784   -.0018060  .0006123 .0009530  -.0021998  .0014323
```

```
OBS  ND_INFL   SQRTRDRM  _IN_  _P_  _EDF_   _MSE_     _RSQ_    _ADJRSQ_    _CP_     _AIC_     _SBC_

  1 .            -1        1    2     18   4.29532  0.11412   0.06490    8.0901   31.0433   33.0348
  2 .0006908     -1        1    2     18   4.58940  0.05346   0.00088    9.7395   32.3678   34.3593
  3 .            -1        1    2     18   4.59430  0.05246  -0.00019    9.7669   32.3891   34.3806
  4 .            -1        1    2     18   4.64443  0.04212  -0.01110   10.0481   32.6062   34.5976
  5 .            -1        2    3     17   3.91381  0.23765   0.14796    6.7310   30.0399   33.0271
  6 .0017403     -1        2    3     17   4.18324  0.18516   0.08930    8.1581   31.3713   34.3585
  7 .0007640     -1        2    3     17   4.21382  0.17921   0.08264    8.3201   31.5170   34.5042
  8 .            -1        2    3     17   4.27875  0.16656   0.06851    8.6640   31.8228   34.8100
  9 .            -1        3    4     16   3.07640  0.43601   0.33026    3.3368   26.0123   29.9953
 10 .0023278     -1        3    4     16   3.10589  0.43060   0.32384    3.4838   26.2031   30.1861
 11 .0012281     -1        3    4     16   3.33546  0.38852   0.27387    4.6282   27.6293   31.6122
 12 .0024532     -1        3    4     16   3.47857  0.36228   0.24271    5.3417   28.4695   32.4525
 13 .0017912     -1        4    5     15   3.12190  0.46344   0.32036    4.5909   27.0152   31.9939
 14 .            -1        4    5     15   3.17075  0.45504   0.30972    4.8192   27.3257   32.3044
 15 .            -1        4    5     15   3.20087  0.44987   0.30317    4.9599   27.5148   32.4935
 16 .0020805     -1        4    5     15   3.21529  0.44739   0.30003    5.0274   27.6047   32.5834
 17 .0012515     -1        5    6     14   3.12341  0.49897   0.32003    5.6247   27.6450   33.6194
 18 .0019486     -1        5    6     14   3.24807  0.47897   0.29289    6.1685   28.4277   34.4021
 19 .            -1        5    6     14   3.30853  0.46927   0.27973    6.4323   28.7966   34.7710
 20 .0022218     -1        5    6     14   3.31141  0.46881   0.27910    6.4448   28.8140   34.7884
 21 .0013854     -1        6    7     13   3.20944  0.52194   0.30130    7.0000   28.7063   35.6764
```

Logged Inflows

```
N = 20     Regression Models for Dependent Variable: RED_DRUM

      R-square       Adj      C(p)       AIC       MSE        SBC Variables in Model
 In                  Rsq

    1 0.126545 0.078020   9.1628    127.1   523.659    129.1 LGNDINFL
    1 0.099400 0.049366   9.9448    127.7   539.933    129.7 LGMJINFL
    1 0.069707 0.018024  10.8002    128.4   557.735    130.4 LGSOINFL
    1 0.021681 -.032670  12.1838    129.4   586.528    131.4 LGMAINFL
-------------------------------------------------------------------------------
    2 0.251948 0.163942   7.5502    126.0   474.857    129.0 LGMJINFL LGNDINFL
    2 0.185745 0.089951   9.4574    127.7   516.882    130.7 LGMJINFL LGSOINFL
    2 0.177080 0.080266   9.7070    127.9   522.383    130.9 LGJFINFL LGNDINFL
    2 0.174294 0.077152   9.7873    128.0   524.152    131.0 LGMAINFL LGNDINFL
-------------------------------------------------------------------------------
    3 0.493738 0.398814   2.5846    120.2   341.456    124.2 LGJFINFL LGMJINFL LGNDINFL
    3 0.456863 0.355025   3.6469    121.6   366.328    125.6 LGMJINFL LGJAINFL LGNDINFL
    3 0.396429 0.283259   5.3879    123.7   407.089    127.7 LGMJINFL LGJAINFL LGSOINFL
    3 0.331718 0.206415   7.2521    125.8   450.734    129.7 LGJFINFL LGMAINFL LGNDINFL
-------------------------------------------------------------------------------
    4 0.511336 0.381026   4.0776    121.5   351.560    126.5 LGJFINFL LGMJINFL LGJAINFL LGNDINFL
    4 0.510206 0.379594   4.1102    121.5   352.373    126.5 LGJFINFL LGMJINFL LGSOINFL LGNDINFL
    4 0.506780 0.375254   4.2089    121.7   354.838    126.7 LGMJINFL LGJAINFL LGSOINFL LGNDINFL
    4 0.494209 0.359331   4.5710    122.2   363.882    127.2 LGJFINFL LGMAINFL LGMJINFL LGNDINFL
-------------------------------------------------------------------------------
    5 0.546977 0.385182   5.0509    122.0   349.199    128.0 LGJFINFL LGMJINFL LGJAINFL LGSOINFL
                                                             LGNDINFL
    5 0.515093 0.341912   5.9694    123.3   373.775    129.3 LGJFINFL LGMAINFL LGMJINFL LGJAINFL
                                                             LGNDINFL
    5 0.510216 0.335293   6.1099    123.5   377.535    129.5 LGJFINFL LGMAINFL LGMJINFL LGSOINFL
                                                             LGNDINFL
    5 0.509517 0.334344   6.1300    123.6   378.074    129.5 LGMAINFL LGMJINFL LGJAINFL LGSOINFL
                                                             LGNDINFL
-------------------------------------------------------------------------------
    6 0.548742 0.340470   7.0000    123.9   374.595    130.9 LGJFINFL LGMAINFL LGMJINFL LGJAINFL
                                                             LGSOINFL LGNDINFL
-------------------------------------------------------------------------------

OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_ INTERCEP LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL

  1 MODEL1  PARMS  RED_DRUM 22.8836  -97.131      .        .         .        .        .
  2 MODEL1  PARMS  RED_DRUM 23.2365  -91.171      .        .      15.8692     .        .
  3 MODEL1  PARMS  RED_DRUM 23.6164  -42.756      .        .         .        .     10.8721
  4 MODEL1  PARMS  RED_DRUM 24.2183  -23.972      .      7.4093      .        .        .
  5 MODEL1  PARMS  RED_DRUM 21.7912 -248.495      .        .      17.9213     .        .
  6 MODEL1  PARMS  RED_DRUM 22.7350 -184.053      .        .      17.2170     .     12.1504
  7 MODEL1  PARMS  RED_DRUM 22.8557  -29.606 -19.0670     .         .        .        .
  8 MODEL1  PARMS  RED_DRUM 22.8944 -195.487      .     11.1980      .        .        .
  9 MODEL1  PARMS  RED_DRUM 18.4785 -207.147 -49.4313     .      33.7526     .        .
 10 MODEL1  PARMS  RED_DRUM 19.1397 -279.762      .        .      35.9695 -29.3173     .
 11 MODEL1  PARMS  RED_DRUM 20.1764 -211.311      .        .      36.7131 -31.5784  24.6032
 12 MODEL1  PARMS  RED_DRUM 21.2305 -164.875 -39.4277  23.6100      .        .        .
 13 MODEL1  PARMS  RED_DRUM 18.7499 -232.970 -34.8132     .      36.9186 -12.7478     .
 14 MODEL1  PARMS  RED_DRUM 18.7716 -213.335 -51.6564     .      34.6516     .      7.2616
 15 MODEL1  PARMS  RED_DRUM 18.8371 -300.641      .        .      39.8033 -34.9870  13.3811
 16 MODEL1  PARMS  RED_DRUM 19.0757 -211.019 -49.8873   1.7539  32.5782     .        .
 17 MODEL1  PARMS  RED_DRUM 18.6869 -256.920 -30.2889     .      40.0763 -19.7533  11.4518
 18 MODEL1  PARMS  RED_DRUM 19.3333 -247.854 -34.1853   5.1655  33.8868 -14.4666     .
 19 MODEL1  PARMS  RED_DRUM 19.4303 -212.783 -51.5988  -0.2637  34.8326     .      7.2973
 20 MODEL1  PARMS  RED_DRUM 19.4441 -312.119      .      4.4266  37.1182 -36.0534  13.0260
 21 MODEL1  PARMS  RED_DRUM 19.3544 -266.625 -29.9607   3.5603  37.9137 -20.7761  11.1871
```

```
OBS LGNDINFL  RED_DRUM  _IN_  _P_  _EDF_   _MSE_     _RSQ_    _ADJRSQ_    _CP_     _AIC_     _SBC_

  1  17.9653     -1       1    2    18    523.659  0.12655   0.07802   9.1628  127.110  129.101
  2    .         -1       1    2    18    539.933  0.09940   0.04937   9.9448  127.722  129.713
  3    .         -1       1    2    18    557.735  0.06971   0.01802  10.8002  128.370  130.362
  4    .         -1       1    2    18    586.528  0.02168  -0.03267  12.1838  129.377  131.369
  5  19.8321     -1       2    3    17    474.857  0.25195   0.16394   7.5502  126.010  128.997
  6    .         -1       2    3    17    516.882  0.18575   0.08995   9.4574  127.706  130.693
  7  28.3079     -1       2    3    17    522.383  0.17708   0.08027   9.7070  127.918  130.905
  8  20.0922     -1       2    3    17    524.152  0.17429   0.07715   9.7873  127.985  130.972
  9  48.2945     -1       3    4    16    341.456  0.49374   0.39881   2.5846  120.202  124.184
 10  31.7243     -1       3    4    16    366.328  0.45686   0.35502   3.6469  121.608  125.591
 11    .         -1       3    4    16    407.089  0.39643   0.28326   5.3879  123.718  127.701
 12  43.8367     -1       3    4    16    450.734  0.33172   0.20642   7.2521  125.755  129.738
 13  45.0484     -1       4    5    15    351.560  0.51134   0.38103   4.0776  121.494  126.473
 14  43.5928     -1       4    5    15    352.373  0.51021   0.37959   4.1102  121.540  126.519
 15  22.9993     -1       4    5    15    354.838  0.50678   0.37525   4.2089  121.680  126.658
 16  48.7527     -1       4    5    15    363.882  0.49421   0.35933   4.5710  122.183  127.162
 17  35.8498     -1       5    6    14    349.199  0.54698   0.38518   5.0509  121.979  127.954
 18  45.9602     -1       5    6    14    373.775  0.51509   0.34191   5.9694  123.340  129.314
 19  43.5008     -1       5    6    14    377.535  0.51022   0.33529   6.1099  123.540  129.514
 20  24.2180     -1       5    6    14    378.074  0.50952   0.33434   6.1300  123.568  129.543
 21  36.6908     -1       6    7    13    374.595  0.54874   0.34047   7.0000  123.901  130.871
```

Logged Harvest

```
N = 20     Regression Models for Dependent Variable: LGRDDRUM

        R-square      Adj      C(p)       AIC       MSE       SBC Variables in Model
  In                  Rsq

     1 0.118278 0.069294   6.1207    2.4158   1.02650    4.4073 MJ_INFL
     1 0.084019 0.033132   6.9802    3.1782   1.06638    5.1697 MA_INFL
     1 0.077532 0.026283   7.1429    3.3194   1.07394    5.3108 JF_INFL
     1 0.064608 0.012641   7.4672    3.5976   1.08898    5.5891 JA_INFL
-------------------------------------------------------------------------------
     2 0.297590 0.214954   3.6221   -0.1313   0.86585    2.8559 MJ_INFL JA_INFL
     2 0.263303 0.176632   4.4823    0.8219   0.90811    3.8091 MA_INFL JA_INFL
     2 0.237869 0.148206   5.1204    1.5007   0.93946    4.4879 JF_INFL MJ_INFL
     2 0.205255 0.111756   5.9386    2.3387   0.97967    5.3259 JF_INFL MA_INFL
---------------------------------------------------------------------------------------
     3 0.390275 0.275952   3.2968   -0.9615   0.79857    3.0214 JF_INFL MA_INFL ND_INFL
     3 0.388576 0.273934   3.3394   -0.9059   0.80079    3.0770 JF_INFL MJ_INFL ND_INFL
     3 0.348307 0.226115   4.3497    0.3698   0.85354    4.3527 MJ_INFL JA_INFL SO_INFL
     3 0.335037 0.210357   4.6826    0.7729   0.87092    4.7559 JF_INFL MJ_INFL SO_INFL
-----------------------------------------------------------------------------------------------
     4 0.439998 0.290665   4.0493   -0.6629   0.78234    4.3158 JF_INFL MA_INFL MJ_INFL ND_INFL
     4 0.402010 0.242546   5.0024    0.6498   0.83541    5.6285 JF_INFL MA_INFL SO_INFL ND_INFL
     4 0.401109 0.241404   5.0250    0.6799   0.83667    5.6586 JF_INFL MJ_INFL SO_INFL ND_INFL
     4 0.400330 0.240418   5.0445    0.7059   0.83776    5.6846 JF_INFL MA_INFL JA_INFL ND_INFL
-------------------------------------------------------------------------------------------------------
     5 0.458433 0.265016   5.5868    0.6676   0.81063    6.6420 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                                ND_INFL
     5 0.451712 0.255895   5.7555    0.9143   0.82069    6.8887 JF_INFL MA_INFL MJ_INFL SO_INFL
                                                                ND_INFL
     5 0.444921 0.246679   5.9258    1.1605   0.83086    7.1349 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                                SO_INFL
     5 0.421115 0.214370   6.5231    2.0004   0.86649    7.9748 JF_INFL MJ_INFL JA_INFL SO_INFL
                                                                ND_INFL
---------------------------------------------------------------------------------------------------------------
     6 0.481825 0.242667   7.0000    1.7846   0.83528    8.7547 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                                SO_INFL ND_INFL
---------------------------------------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_ INTERCEP JF_INFL   MA_INFL   MJ_INFL   JA_INFL   SO_INFL

  1 MODEL1   PARMS  LGRDDRUM 1.01316  2.20555 .         .         .00035438 .         .
  2 MODEL1   PARMS  LGRDDRUM 1.03266  2.34864 .         .00038871 .         .         .
  3 MODEL1   PARMS  LGRDDRUM 1.03631  3.86687 -.0004502 .         .         .         .
  4 MODEL1   PARMS  LGRDDRUM 1.04354  3.65580 .         .         .         -.0007380 .
  5 MODEL1   PARMS  LGRDDRUM 0.93051  2.81204 .         .         .00054091 -.0013371 .
  6 MODEL1   PARMS  LGRDDRUM 0.95295  2.92176 .         .00066458 .         -.0013668 .
  7 MODEL1   PARMS  LGRDDRUM 0.96926  3.05302 -.0005684 .         .00041942 .         .
  8 MODEL1   PARMS  LGRDDRUM 0.98978  3.17968 -.0005762 .00049052 .         .         .
  9 MODEL1   PARMS  LGRDDRUM 0.89363  2.80103 -.0013650 .00073105 .         .         .
 10 MODEL1   PARMS  LGRDDRUM 0.89487  2.79176 -.0012330 .         .00053539 .         .
 11 MODEL1   PARMS  LGRDDRUM 0.92387  2.52081 .         .         .00059136 -.0017207 .00045534
 12 MODEL1   PARMS  LGRDDRUM 0.93323  2.98284 -.0010359 .         .00046788 .         .00075093
 13 MODEL1   PARMS  LGRDDRUM 0.88450  2.57811 -.0013905 .00044469 .00032137 .         .
 14 MODEL1   PARMS  LGRDDRUM 0.91401  2.82303 -.0014337 .00072749 .         .         .00031633
 15 MODEL1   PARMS  LGRDDRUM 0.91470  2.81280 -.0013052 .         .00053358 .         .00032686
 16 MODEL1   PARMS  LGRDDRUM 0.91529  2.78299 -.0011129 .00077704 .         -.0004943 .
 17 MODEL1   PARMS  LGRDDRUM 0.90035  2.53250 -.0010476 .00048086 .00035149 -.0006771 .
 18 MODEL1   PARMS  LGRDDRUM 0.90592  2.60014 -.0014591 .00044120 .00032130 .         .00031605
 19 MODEL1   PARMS  LGRDDRUM 0.91151  2.67301 -.0006208 .00043212 .00037669 -.0013520 .00081730
 20 MODEL1   PARMS  LGRDDRUM 0.93085  2.79026 -.0009492 .         .00058405 -.0007287 .00044862
 21 MODEL1   PARMS  LGRDDRUM 0.91394  2.54979 -.0010346 .00048775 .00036141 -.0009023 .00046568
```

```
OBS  ND_INFL   LGRDDRUM _IN_ _P_ _EDF_  _MSE_    _RSQ_   _ADJRSQ_   _CP_     _AIC_    _SBC_

  1 .              -1      1    2    18  1.02650 0.11828  0.06929 6.12067  2.41585 4.40731
  2 .              -1      1    2    18  1.06638 0.08402  0.03313 6.98015  3.17822 5.16968
  3 .              -1      1    2    18  1.07394 0.07753  0.02628 7.14292  3.31938 5.31084
  4 .              -1      1    2    18  1.08898 0.06461  0.01264 7.46716  3.59764 5.58910
  5 .              -1      2    3    17  0.86585 0.29759  0.21495 3.62208 -0.13134 2.85585
  6 .              -1      2    3    17  0.90811 0.26330  0.17663 4.48229  0.82186 3.80906
  7 .              -1      2    3    17  0.93946 0.23787  0.14821 5.12038  1.50070 4.48789
  8 .              -1      2    3    17  0.97967 0.20526  0.11176 5.93859  2.33874 5.32593
  9 .00094631      -1      3    4    16  0.79857 0.39027  0.27595 3.29680 -0.96152 3.02141
 10 .00082248      -1      3    4    16  0.80079 0.38858  0.27393 3.33942 -0.90588 3.07705
 11 .              -1      3    4    16  0.85354 0.34831  0.22611 4.34969  0.36978 4.35271
 12 .              -1      3    4    16  0.87092 0.33504  0.21036 4.68261  0.77293 4.75586
 13 .00095737      -1      4    5    15  0.78234 0.44000  0.29066 4.04934 -0.66289 4.31577
 14 .00078806      -1      4    5    15  0.83541 0.40201  0.24255 5.00240  0.64980 5.62846
 15 .00066005      -1      4    5    15  0.83667 0.40111  0.24140 5.02500  0.67992 5.65858
 16 .00086001      -1      4    5    15  0.83776 0.40033  0.24042 5.04455  0.70591 5.68457
 17 .00084018      -1      5    6    14  0.81063 0.45843  0.26502 5.58685  0.66765 6.64204
 18 .00079926      -1      5    6    14  0.82069 0.45171  0.25590 5.75546  0.91432 6.88871
 19 .              -1      5    6    14  0.83086 0.44492  0.24668 5.92583  1.16051 7.13491
 20 .00046162      -1      5    6    14  0.86649 0.42112  0.21437 6.52309  2.00039 7.97479
 21 .00056823      -1      6    7    13  0.83528 0.48182  0.24267 7.00000  1.78459 8.75471
```

Logged Harvest and Inflows

```
N = 20     Regression Models for Dependent Variable: LGRDDRUM

       R-square      Adj       C(p)       AIC       MSE       SBC Variables in Model
  In                 Rsq

   1 0.111024 0.061636  10.3067    2.5797   1.03494    4.5712 LGMJINFL
   1 0.097646 0.047515  10.7026    2.8785   1.05052    4.8699 LGMAINFL
   1 0.069711 0.018028  11.5293    3.4882   1.08304    5.4797 LGJFINFL
   1 0.047315 -.005612  12.1920    3.9640   1.10911    5.9555 LGJAINFL
-------------------------------------------------------------------------------
   2 0.340012 0.262366   5.5305   -1.3772   0.81355    1.6100 LGMJINFL LGJAINFL
   2 0.305072 0.223315   6.5644   -0.3455   0.85662    2.6417 LGMAINFL LGJAINFL
   2 0.265912 0.179549   7.7232    0.7509   0.90489    3.7381 LGJFINFL LGMJINFL
   2 0.222740 0.131297   9.0008    1.8938   0.95811    4.8810 LGJFINFL LGMAINFL
---------------------------------------------------------------------------------------
   3 0.466939 0.366991   3.7744   -3.6490   0.69816    0.3339 LGJFINFL LGMJINFL LGNDINFL
   3 0.424885 0.317051   5.0189   -2.1303   0.75324    1.8526 LGJFINFL LGMAINFL LGNDINFL
   3 0.401206 0.288932   5.7196   -1.3233   0.78425    2.6596 LGMJINFL LGJAINFL LGNDINFL
   3 0.396290 0.283095   5.8651   -1.1598   0.79069    2.8231 LGMAINFL LGJAINFL LGNDINFL
-----------------------------------------------------------------------------------------------
   4 0.514389 0.384893   4.3703   -3.5135   0.67842    1.4651 LGJFINFL LGMAINFL LGMJINFL LGNDINFL
   4 0.488059 0.351541   5.1494   -2.4575   0.71520    2.5212 LGJFINFL LGMJINFL LGJAINFL LGNDINFL
   4 0.484657 0.347233   5.2501   -2.3250   0.71995    2.6536 LGMAINFL LGMJINFL LGJAINFL LGNDINFL
   4 0.467231 0.325160   5.7658   -1.6599   0.74430    3.3187 LGJFINFL LGMJINFL LGSOINFL LGNDINFL
--------------------------------------------------------------------------------------------------------
   5 0.560593 0.403662   5.0030   -3.5132   0.65771    2.4612 LGJFINFL LGMAINFL LGMJINFL LGJAINFL
                                                              LGNDINFL
   5 0.518032 0.345900   6.2625   -1.6641   0.72142    4.3103 LGJFINFL LGMAINFL LGMJINFL LGSOINFL
                                                              LGNDINFL
   5 0.489488 0.307162   7.1071   -0.5134   0.76415    5.4610 LGJFINFL LGMJINFL LGJAINFL LGSOINFL
                                                              LGNDINFL
   5 0.487348 0.304259   7.1705   -0.4298   0.76735    5.5446 LGMAINFL LGMJINFL LGJAINFL LGSOINFL
                                                              LGNDINFL

---------------------------------------------------------------------------------------------------------
   6 0.560694 0.357938   7.0000   -1.5178   0.70815    5.4524 LGJFINFL LGMAINFL LGMJINFL LGJAINFL
                                                              LGSOINFL LGNDINFL

---------------------------------------------------------------------------------------------------------


OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_ INTERCEP LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL

  1 MODEL1   PARMS  LGRDDRUM 1.01732 -2.62283    .        .      0.73906    .        .
  2 MODEL1   PARMS  LGRDDRUM 1.02495 -2.07702    .      0.69291    .        .        .
  3 MODEL1   PARMS  LGRDDRUM 1.04069  8.47713 -0.72950    .        .        .        .
  4 MODEL1   PARMS  LGRDDRUM 1.05314  6.09943    .        .        .     -0.46112    .
  5 MODEL1   PARMS  LGRDDRUM 0.90197 -0.01334    .        .      1.43486 -1.21296    .
  6 MODEL1   PARMS  LGRDDRUM 0.92554  0.67963    .      1.33265    .     -1.14289    .
  7 MODEL1   PARMS  LGRDDRUM 0.95126  3.59033 -1.14970    .      1.03877    .        .
  8 MODEL1   PARMS  LGRDDRUM 0.97883  3.89636 -1.00948  0.89606    .        .        .
  9 MODEL1   PARMS  LGRDDRUM 0.83556 -0.40894 -2.64281    .      1.58542    .        .
 10 MODEL1   PARMS  LGRDDRUM 0.86789 -0.61395 -2.50265  1.49136    .        .        .
 11 MODEL1   PARMS  LGRDDRUM 0.88558 -4.25921    .        .      1.68545 -1.53738    .
 12 MODEL1   PARMS  LGRDDRUM 0.88921 -5.03751    .      1.73755    .     -1.59736    .
 13 MODEL1   PARMS  LGRDDRUM 0.82366 -2.12307 -2.84473  0.77655  1.06548    .        .
 14 MODEL1   PARMS  LGRDDRUM 0.84570 -1.65557 -1.93711    .      1.73826 -0.61540    .
 15 MODEL1   PARMS  LGRDDRUM 0.84850 -7.16825    .      1.07026  1.06084 -1.83160    .
 16 MODEL1   PARMS  LGRDDRUM 0.86273 -0.37264 -2.62975    .      1.58015    .     -0.04260
 17 MODEL1   PARMS  LGRDDRUM 0.81100 -4.53744 -1.81555  1.00016  1.15125 -0.94821    .
 18 MODEL1   PARMS  LGRDDRUM 0.84937 -2.08598 -2.80875  0.81896  1.01809    .     -0.15339
 19 MODEL1   PARMS  LGRDDRUM 0.87415 -1.86690 -1.89719    .      1.76613 -0.67722  0.10105
 20 MODEL1   PARMS  LGRDDRUM 0.87598 -7.32405    .      1.04848  1.11303 -1.88399  0.13779
 21 MODEL1   PARMS  LGRDDRUM 0.84151 -4.58272 -1.80536  0.99628  1.16096 -0.96343  0.02699
```

```
OBS LGNDINFL  LGRDDRUM  _IN_  _P_  _EDF_    _MSE_     _RSQ_    _ADJRSQ_    _CP_      _AIC_     _SBC_

  1     .        -1       1    2     18    1.03494   0.11102    0.06164  10.3067    2.57972   4.57119
  2     .        -1       1    2     18    1.05052   0.09765    0.04752  10.7026    2.87846   4.86992
  3     .        -1       1    2     18    1.08304   0.06971    0.01803  11.5293    3.48823   5.47969
  4     .        -1       1    2     18    1.10911   0.04731   -0.00561  12.1920    3.96400   5.95547
  5     .        -1       2    3     17    0.81355   0.34001    0.26237   5.5305   -1.37724   1.60996
  6     .        -1       2    3     17    0.85662   0.30507    0.22332   6.5644   -0.34551   2.64169
  7     .        -1       2    3     17    0.90489   0.26591    0.17955   7.7232    0.75089   3.73809
  8     .        -1       2    3     17    0.95811   0.22274    0.13130   9.0008    1.89383   4.88102
  9  1.52131     -1       3    4     16    0.69816   0.46694    0.36699   3.7744   -3.64898   0.33395
 10  1.56339     -1       3    4     16    0.75324   0.42489    0.31705   5.0189   -2.13029   1.85263
 11  0.62321     -1       3    4     16    0.78425   0.40121    0.28893   5.7196   -1.32332   2.65961
 12  0.79814     -1       3    4     16    0.79069   0.39629    0.28309   5.8651   -1.15982   2.82311
 13  1.72417     -1       4    5     15    0.67842   0.51439    0.38489   4.3703   -3.51354   1.46512
 14  1.36461     -1       4    5     15    0.71520   0.48806    0.35154   5.1494   -2.45749   2.52117
 15  0.86190     -1       4    5     15    0.71995   0.48466    0.34723   5.2501   -2.32504   2.65362
 16  1.54890     -1       4    5     15    0.74430   0.46723    0.32516   5.7658   -1.65994   3.31872
 17  1.54114     -1       5    6     14    0.65771   0.56059    0.40366   5.0030   -3.51318   2.46121
 18  1.83457     -1       5    6     14    0.72142   0.51803    0.34590   6.2625   -1.66412   4.31027
 19  1.28344     -1       5    6     14    0.76415   0.48949    0.30716   7.1071   -0.51340   5.46099
 20  0.76720     -1       5    6     14    0.76735   0.48735    0.30426   7.1705   -0.42976   5.54464
 21  1.51878     -1       6    7     13    0.70815   0.56069    0.35794   7.0000   -1.51777   5.45236
```

Regression—Untransformed Data

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows*[c,d]	.	*.743*	*.553*	*.346*	*19.2712*	*2.045*

a. Dependent Variable: Red Drum Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*5963.560*	*6*	*993.927*	*2.676*	*.065*[b]
	Residual	*4827.906*	*13*	*371.377*		
	Total	*10791.466*	*19*			

a. Dependent Variable: Red Drum Harvest

b. Independent Variables: (Constant), November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	2.231	16.215		.138	.893	-32.800	37.262
	January-February Inflows	-1.714E-02	.015	-.467	-1.152	.270	-.049	.015
	March-April Inflows	2.989E-03	.008	.098	.359	.726	-.015	.021
	May-June Inflows	1.112E-02	.006	.476	1.810	.093	-.002	.024
	July-August Inflows	-2.089E-02	.022	-.317	-.955	.357	-.068	.026
	September-October Inflows	2.008E-02	.013	.497	1.566	.141	-.008	.048
	November-December Inflows	1.585E-02	.012	.477	1.273	.225	-.011	.043

a. Dependent Variable: Red Drum Harvest

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	January-February Inflows	.209	4.782
	March-April Inflows	.459	2.179
	May-June Inflows	.498	2.007
	July-August Inflows	.312	3.208
	September-October Inflows	.342	2.928
	November-December Inflows	.245	4.083

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	January-February Inflows	March-April Inflows
1	1	6.382	1.000	.00	.00	.00
	2	.345	4.299	.00	.00	.05
	3	.102	7.901	.13	.01	.00
	4	6.710E-02	9.752	.35	.04	.06
	5	4.552E-02	11.841	.42	.04	.02
	6	4.212E-02	12.310	.07	.01	.86
	7	1.550E-02	20.292	.02	.90	.01

a. Dependent Variable: Red Drum Harvest

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		May-June Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	.00	.00	.00	.00
	2	.04	.00	.06	.04
	3	.03	.30	.00	.06
	4	.15	.03	.39	.00
	5	.20	.00	.44	.28
	6	.55	.03	.02	.04
	7	.03	.64	.08	.58

a. Dependent Variable: Red Drum Harvest

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-2.9956	70.0328	31.0650	17.7164	20
Std. Predicted Value	-1.923	2.200	.000	1.000	20
Standard Error of Predicted Value	6.2043	16.7055	11.1218	2.5725	20
Adjusted Predicted Value	-31.9558	91.1519	34.0072	25.6672	20
Residual	-26.0503	34.8729	5.063E-15	15.9405	20
Std. Residual	-1.352	1.810	.000	.827	20
Stud. Residual	-2.073	2.259	-.050	1.116	20
Deleted Residual	-66.9519	54.3686	-2.9422	30.9495	20
Stud. Deleted Residual	-2.434	2.786	-.046	1.236	20
Mahal. Distance	1.019	13.328	5.700	3.071	20
Cook's Distance	.000	1.110	.184	.336	20
Centered Leverage Value	.054	.701	.300	.162	20

a. Dependent Variable: Red Drum Harvest

Case Values for Residuals Diagnostics

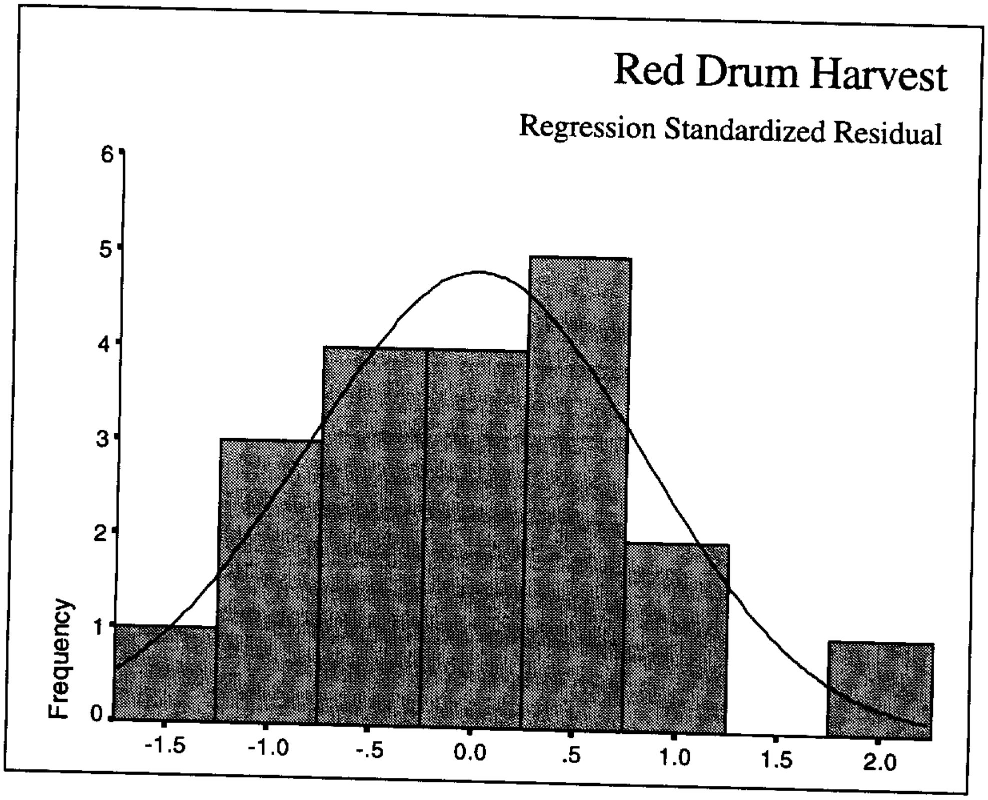
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	15.41678	-12.81678	-21.22583	23.82583	-.88326	-.66508	-.85588	-.84650
1963	27.35030	-26.05030	-34.29780	35.59780	-.20968	-1.35178	-1.55107	-1.65078
1964	30.18570	-4.48570	-6.69500	32.39500	-.04963	-.23277	-.28437	-.27407
1965	21.45886	10.74114	13.97526	18.22474	-.54222	.55737	.63577	.62055
1966	21.71563	8.08437	10.58645	19.21355	-.52772	.41951	.48005	.46536
1967	27.59909	17.40091	23.01038	21.98962	-.19563	.90295	1.03834	1.04174
1968	32.75965	-11.55965	-18.64909	39.84909	.09565	-.59984	-.76189	-.74891
1969	37.24027	.85973	1.10965	36.99035	.34856	.04461	.05068	.04870
1970	40.64504	-5.34504	-8.76620	44.06620	.54074	-.27736	-.35520	-.34293
1971	34.34389	-16.24389	-25.46847	43.56847	.18508	-.84291	-1.05545	-1.06050
1972	30.11862	3.48138	4.37001	29.22999	-.05342	.18065	.20240	.19477
1973	35.16845	14.43155	16.10037	33.49963	.23162	.74887	.79098	.77893
1974	49.34289	-14.44289	-21.88520	56.78520	1.03169	-.74946	-.92256	-.91689
1975	70.03282	9.46718	17.29161	62.20839	2.19953	.49126	.66393	.64898
1976	62.62714	34.87286	54.36861	43.13139	1.78152	1.80959	2.25949	*2.78569
1977	48.03556	-23.83556	-66.95193	91.15193	.95790	-1.23685	-2.07294	-2.43413
1978	13.99584	.90416	1.08000	13.82000	-.96347	.04692	.05128	.04927
1979	-2.99564	21.69564	50.65581	-31.95581	-1.92255	1.12581	1.72026	1.88062
1980	5.39755	7.70245	12.34134	.75866	-1.44879	.39969	.50593	.49094
1981	20.86157	-14.86157	-59.79470	65.79470	-.57593	-.77118	-1.54688	-1.64531

PRE_1	Predicted value of harvest
RES_1	Ordinary residual; observed harvest minus predicted harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{12,0.01} = 2.681$.

Graphics


Red Drum Harvest
Regression Standardized Residual
Frequency
0
1
2
3
4
5
6
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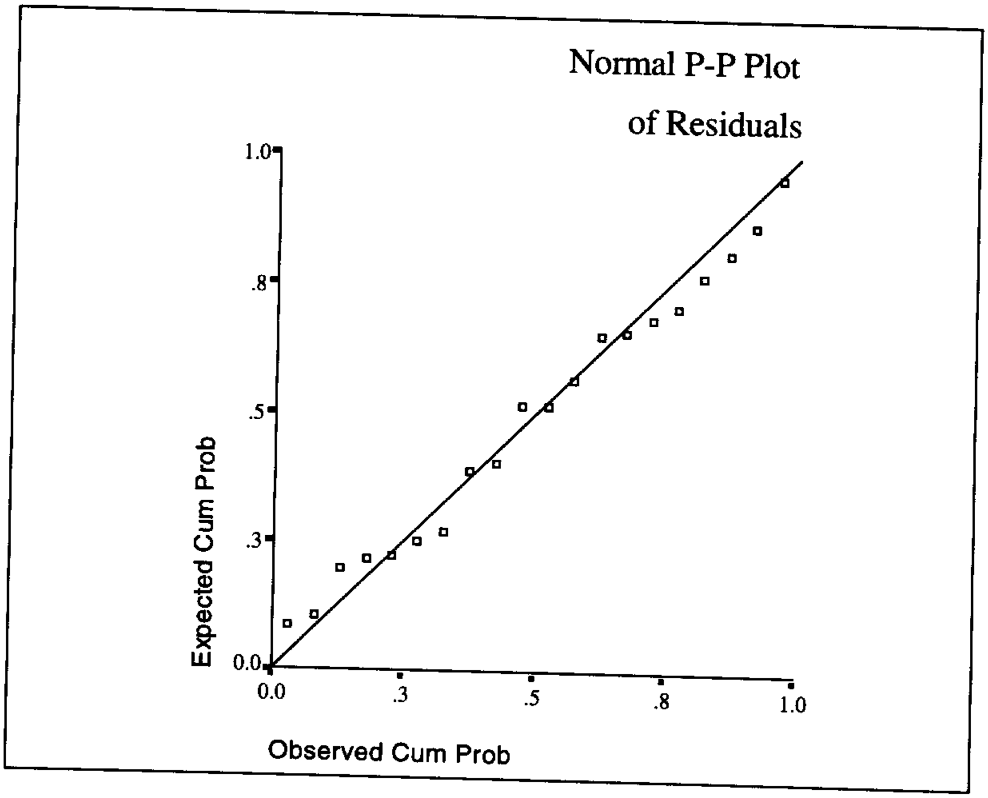
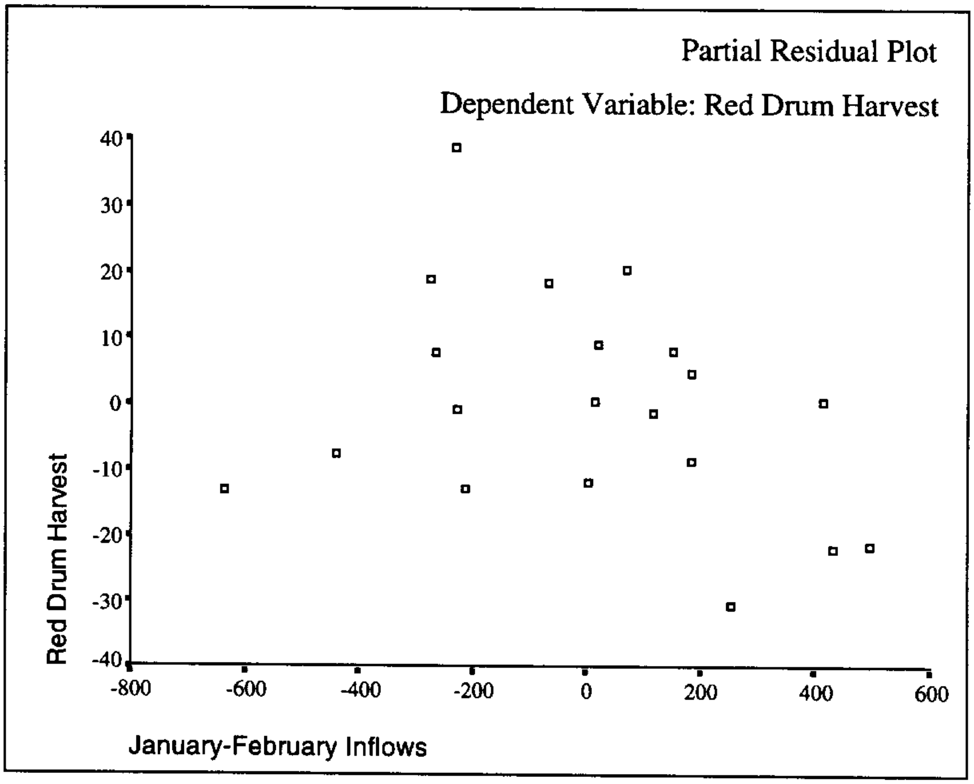
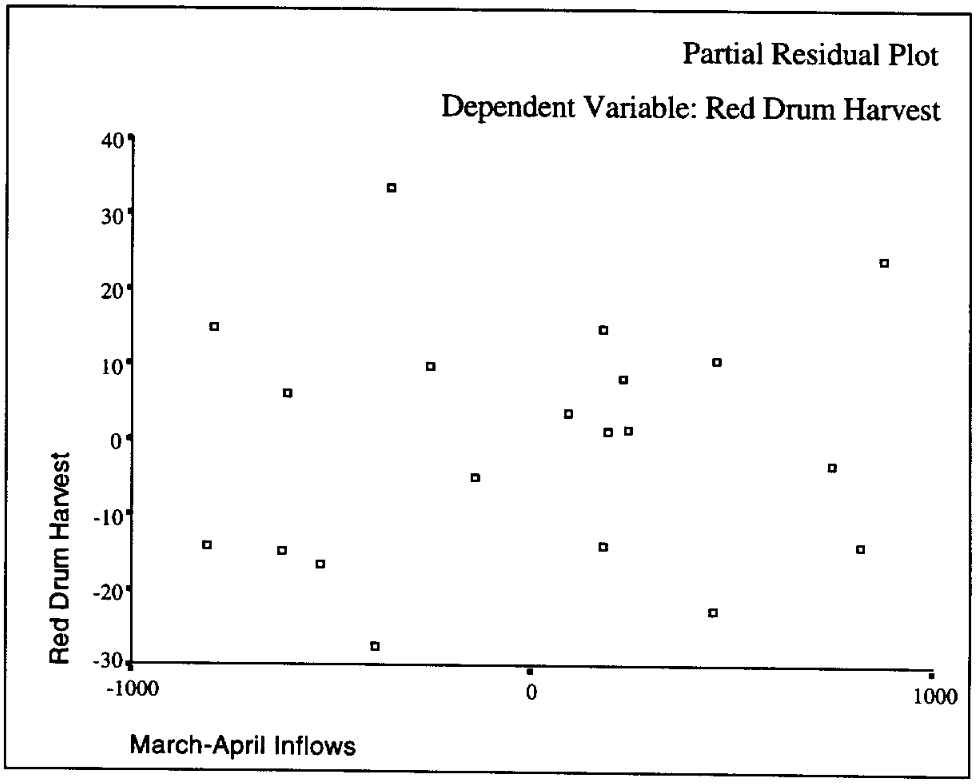
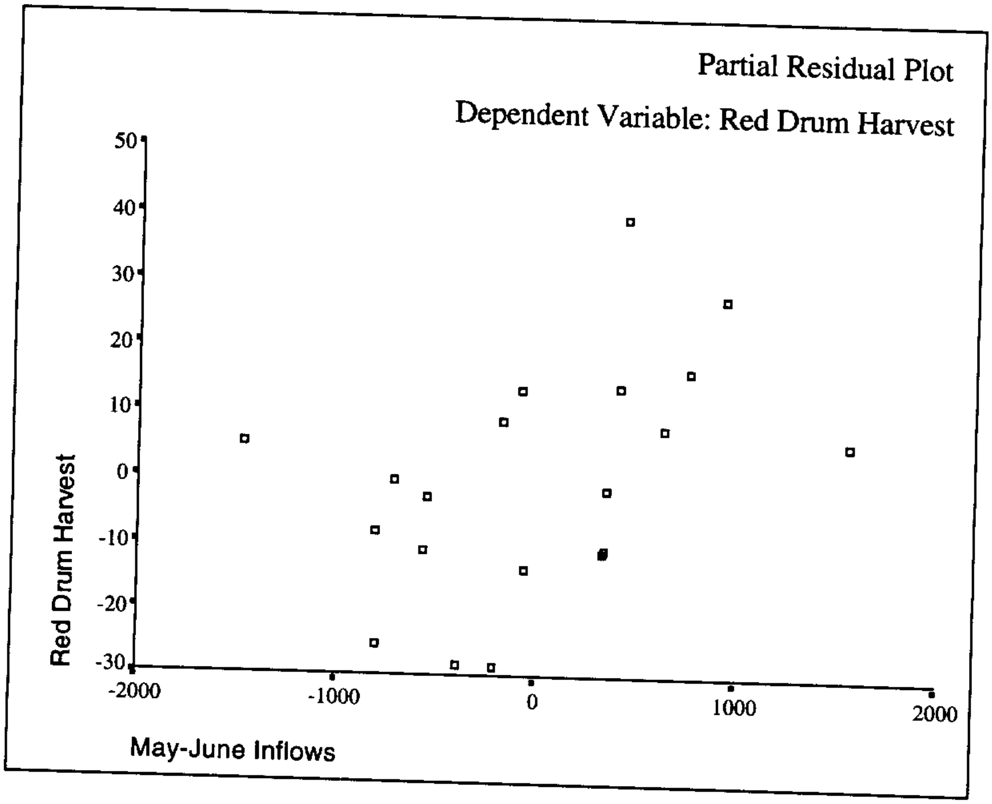
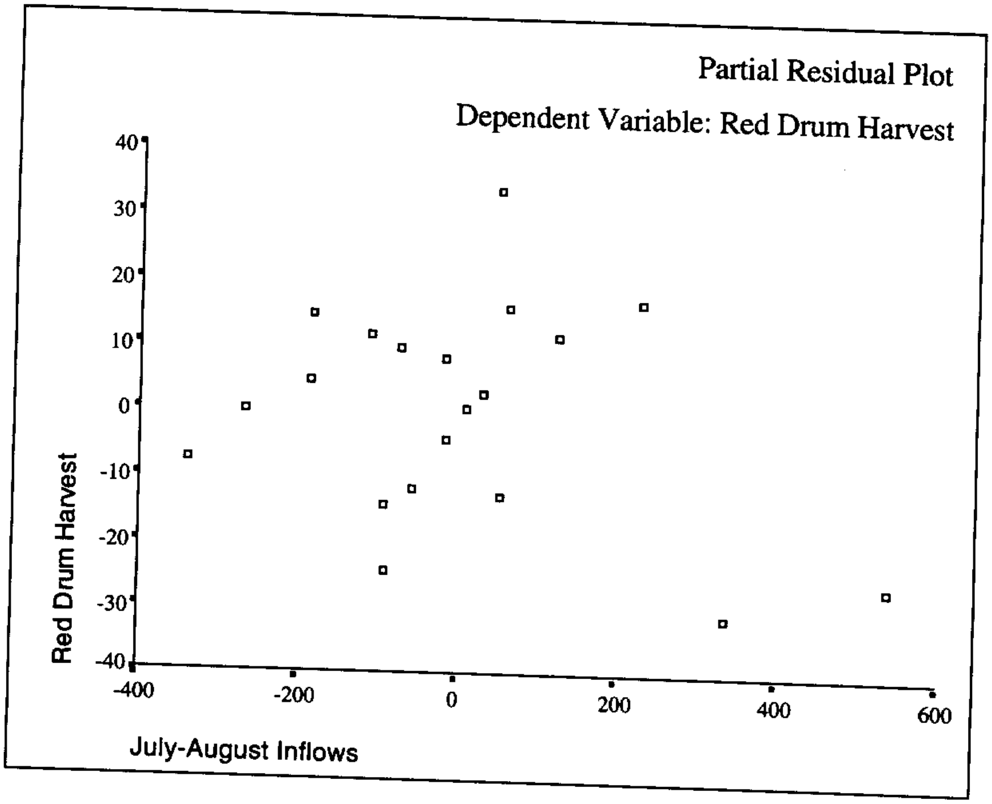
-1.0
-.5
0.0
.5
1.0
1.5
2.0

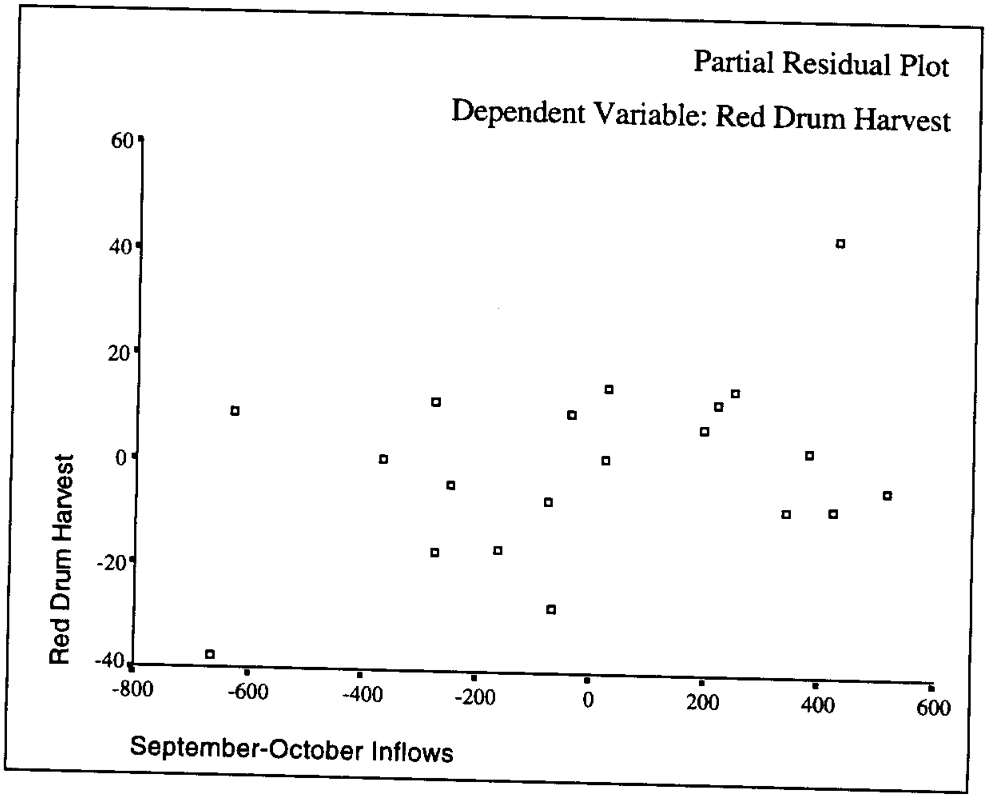

Normal P-P Plot
of Residuals
Expected Cum Prob
0.0
.3
.5
.8
1.0
Observed Cum Prob
0.0
.3
.5
.8
1.0

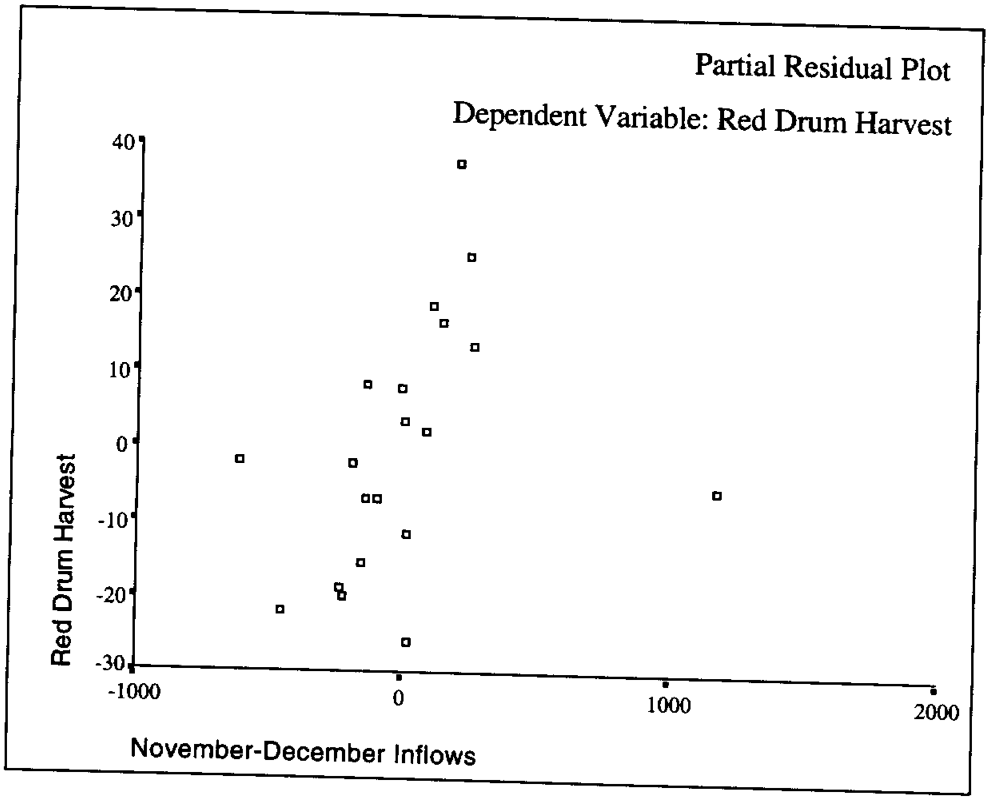

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
40
30
20
10
0
-10
-20
-30
-40
-800
-600
-400
-200
0
200
400
600
January-February Inflows

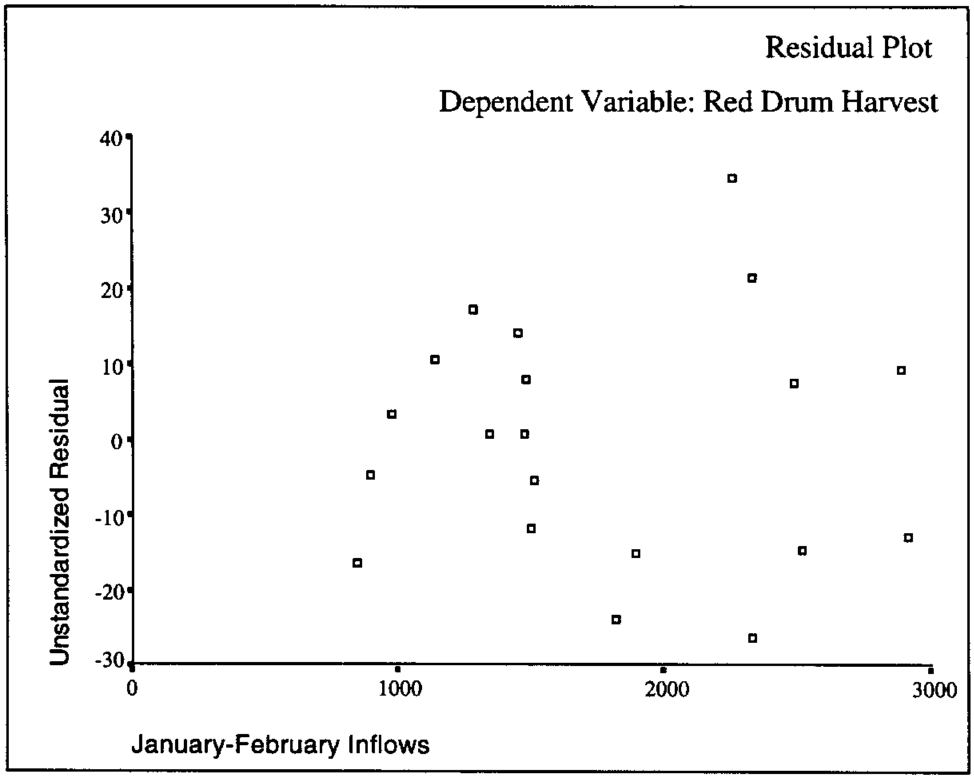

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
40
30
20
10
0
-10
-20
-30
-1000
0
1000
March-April Inflows

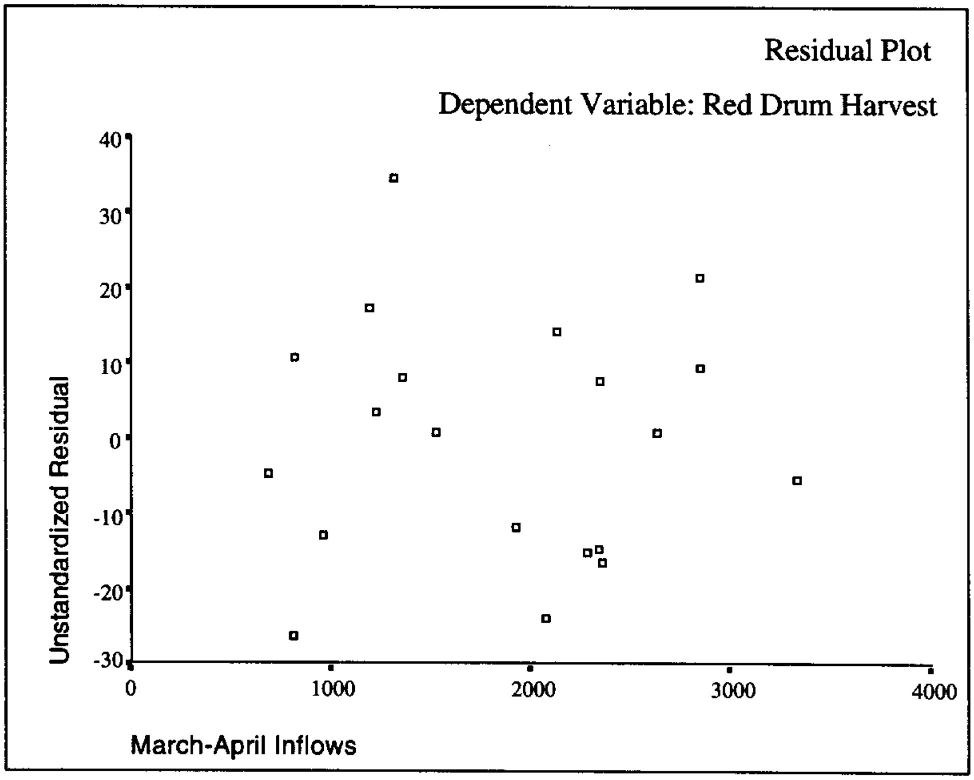

Partial Residual Plot
Dependent Variable: Red Drum Harvest
50
40
30
20
10
0
-10
-20
-30
Red Drum Harvest
-2000
-1000
0
1000
2000
May-June Inflows

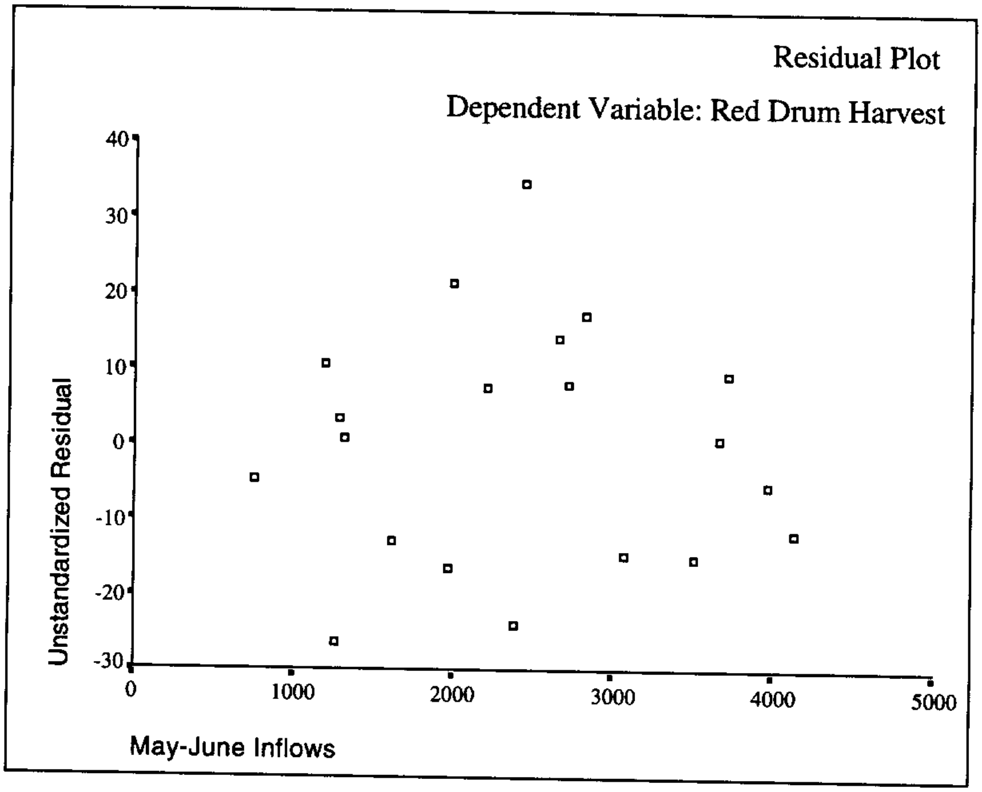

Partial Residual Plot
Dependent Variable: Red Drum Harvest
40
30
20
10
0
-10
-20
-30
-40
Red Drum Harvest
-400
-200
0
200
400
600
July-August Inflows

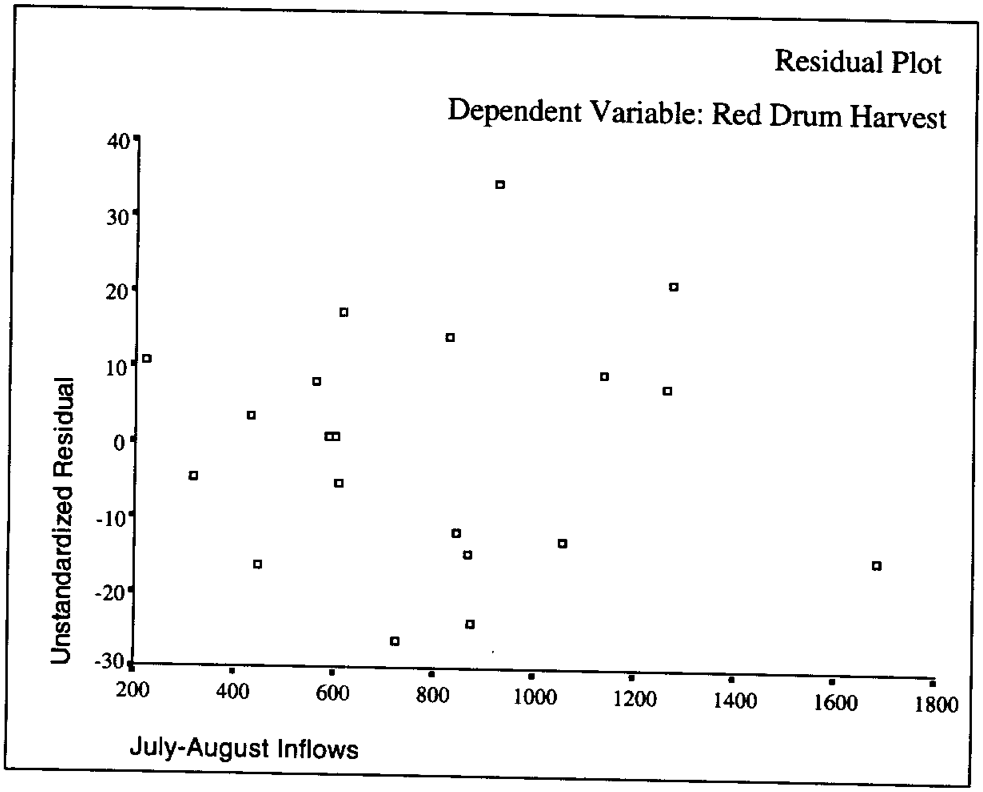

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
60
40
20
0
-20
-40
-800
-600
-400
-200
0
200
400
600
September-October Inflows

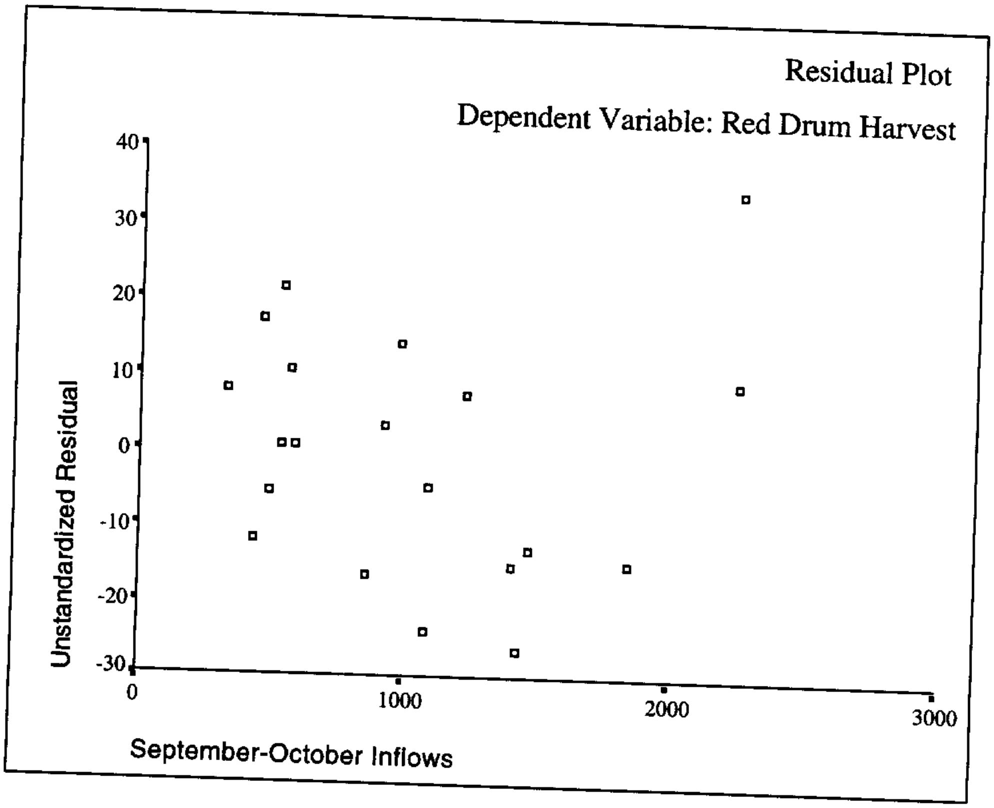

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
40
30
20
10
0
-10
-20
-30
-1000
0
1000
2000
November-December Inflows

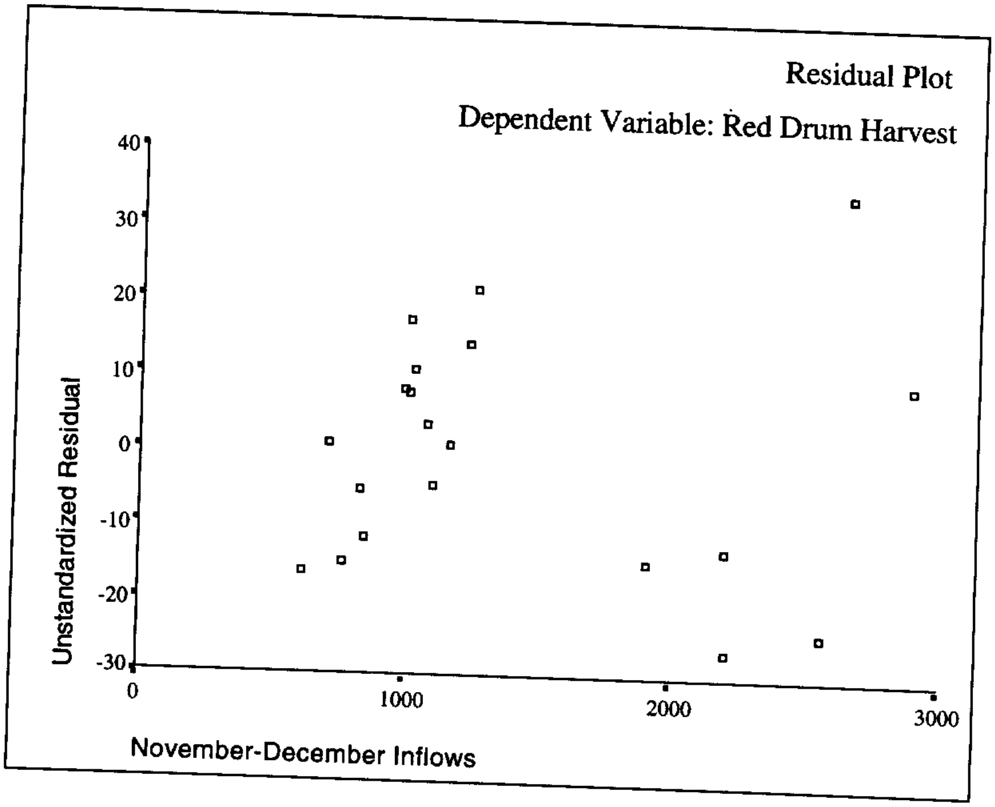

Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
40
30
20
10
0
-10
-20
-30
0
1000
2000
3000
January-February Inflows


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
40
30
20
10
0
-10
-20
-30
0
1000
2000
3000
4000
March-April Inflows


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
40
30
20
10
0
-10
-20
-30
0
1000
2000
3000
4000
5000
May-June Inflows


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
40
30
20
10
0
-10
-20
-30
200
400
600
800
1000
1200
1400
1600
1800
July-August Inflows


Residual Plot
Dependent Variable: Red Drum Harvest
40
30
20
10
0
-10
-20
-30
Unstandardized Residual
0
1000
2000
3000
September-October Inflows


Residual Plot
Dependent Variable: Red Drum Harvest
40
30
20
10
0
-10
-20
-30
Unstandardized Residual
0
1000
2000
3000
November-December Inflows

Prediction Intervals for Red Drum Harvest

YEAR	RED_DRUM	LICI_1	UICI_1
1962	2.60	-53.17494	84.00850
1963	1.30	-37.30365	92.00426
1964	25.70	-36.76069	97.13208
1965	32.20	-42.95882	85.87654
1966	29.80	-42.83088	86.26213
1967	45.00	-37.14114	92.33932
1968	21.20	-35.43737	100.95668
1969	38.10	-27.01519	101.49572
1970	35.30	-27.80151	109.09159
1971	18.10	-33.40814	102.09591
1972	33.60	-33.56064	93.79788
1973	49.60	-25.81589	96.15279
1974	34.90	-17.85643	116.54220
1975	79.50	.07112	139.99451
1976	97.50	-5.03502	130.28929
1977	24.20	-26.39513	122.46625
1978	14.90	-48.60170	76.59337
1979	18.70	-75.77160	69.78033
1980	13.10	-62.69397	73.48907
1981	6.00	-55.96335	97.68650

RED_DRUM	Red drum harvest
LICI_1	Lower limit for 99% prediction interval for red drum harvest
UICI_1	Upper limit for 99% prediction interval for red drum harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	6.57724	.06866	.34617	.4742	.0008
1963	3.61888	.10881	.19047	.8225	.0034
1964	5.31987	.00569	.27999	.6210	.0000
1965	3.44693	.01739	.18142	.8408	.0000
1966	3.54060	.01019	.18635	.8309	.0000
1967	3.68182	.04965	.19378	.8156	.0003
1968	6.27283	.05086	.33015	.5083	.0003
1969	3.32923	.00011	.17522	.8530	.0000
1970	6.46508	.01154	.34027	.4866	.0000
1971	5.93173	.09037	.31220	.5477	.0019
1972	2.91360	.00149	.15335	.8929	.0000
1973	1.01937	.01034	.05365	.9945	.0000
1974	5.51117	.06265	.29006	.5978	.0006
1975	7.64748	.05204	.40250	.3647	.0003
1976	5.86311	.40773	.30858	.5558	.1191
1977	11.28581	1.11043	*.59399	.1266	*.5878
1978	2.14343	.00007	.11281	.9515	.0000
1979	9.91239	.56431	*.52170	.1936	.2278
1980	6.19176	.02202	.32588	.5175	.0000
1981	13.32768	1.03351	*.70146	.0645	*.5461

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

---

[1] This is flagged if it exceeds (2p + 1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with p + 1 numerator degrees of freedom and n – p – 1 denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	-.68566	.02856	-.41889	.29254
1963	-.92885	-.17082	-.37372	.32037
1964	-.19234	-.15911	.05869	.02025
1965	.34051	.26253	.08250	-.07716
1966	.25889	.07996	.07541	-.14072
1967	.59147	.23792	-.06236	-.41063
1968	-.58650	-.00407	-.00260	.33385
1969	.02626	-.00060	.00504	.00461
1970	-.27436	.06775	-.06262	-.14244
1971	-.79917	-.33900	.21700	-.47288
1972	.09840	.07982	-.04448	.00891
1973	.26488	.06956	-.17320	.06377
1974	-.65818	.23967	-.37630	-.08835
1975	.58999	-.40554	.01356	.17615
1976	*2.08285	-.23380	-.61489	-.52669
1977	*-3.27381	.35216	*2.00381	-.80804
1978	.02173	.01298	.00062	.00567
1979	*2.17278	-.18289	.15944	*1.09412
1980	.38099	-.00910	.19900	.06181
1981	*-2.86087	-.16622	*1.12035	.75288

SDFFITS	Standardized dffits value
SDFBETA_0	Standardized dfbeta for the intercept term
SDFBETA_1	Standardized dfbeta for January-February inflows
SDFBETA_2	Standardized dfbeta for March-April inflows

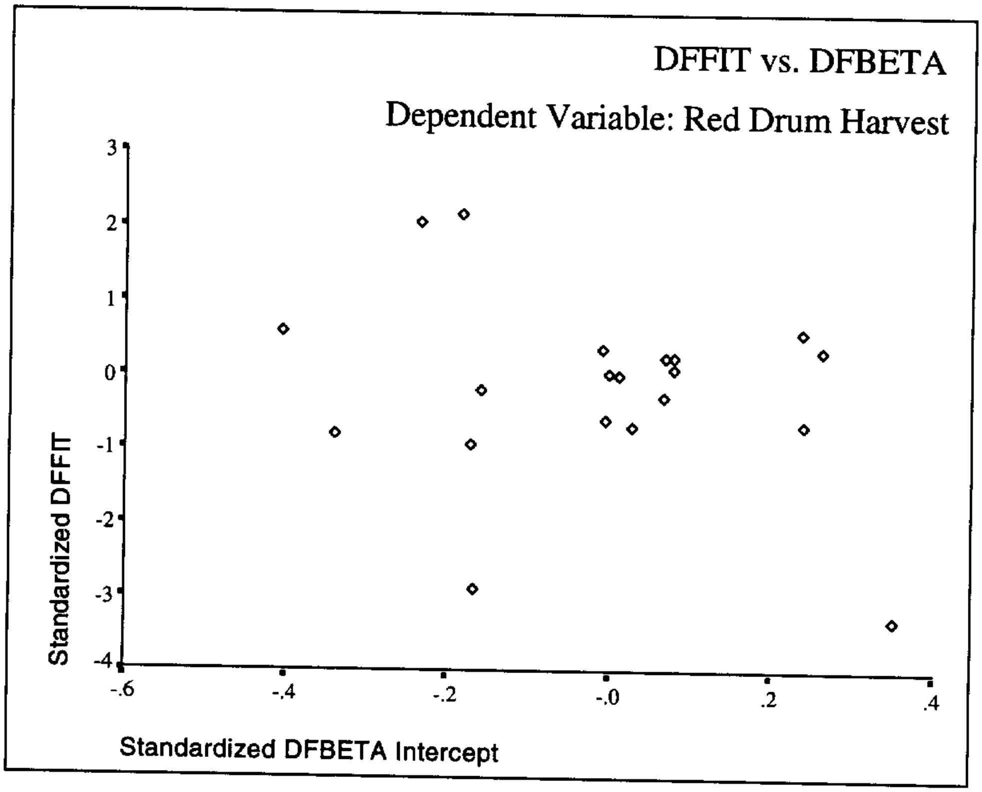
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.0.

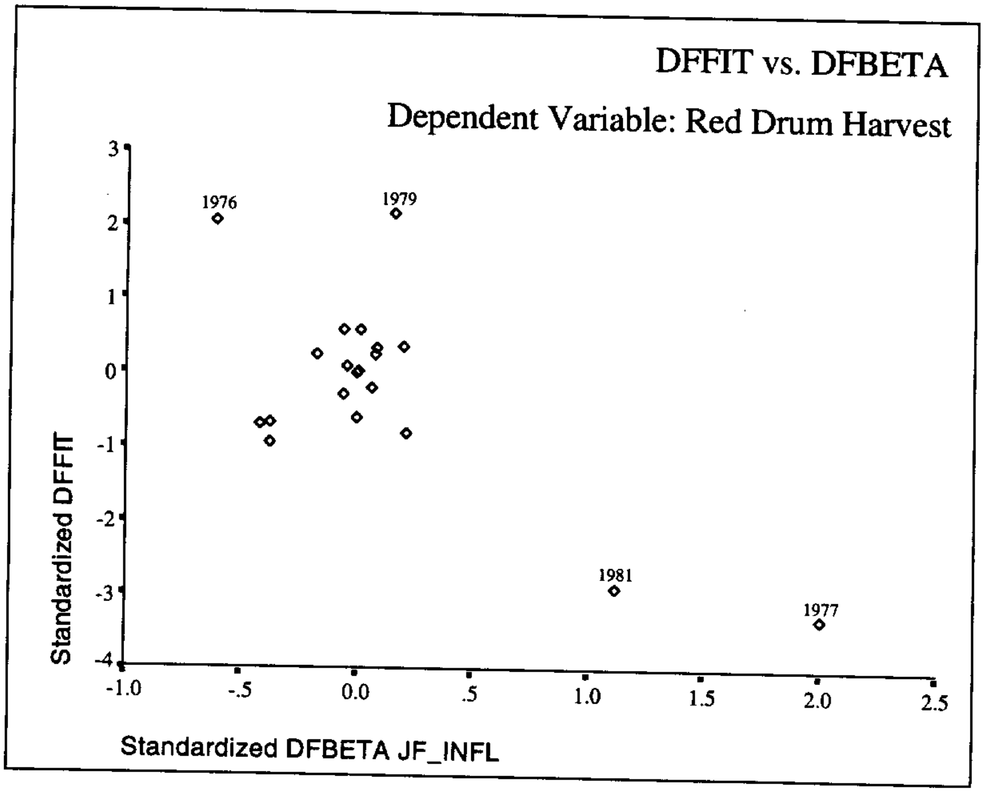
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.01997	.07029	.11863	.10876
1963	.12215	.19391	.08365	-.02722
1964	.05962	.00582	-.08455	.03020
1965	-.03918	-.14889	-.01771	-.06551
1966	.12963	-.04454	-.12958	-.00224
1967	.35884	.08483	-.22005	.07807
1968	-.47293	-.05843	.17282	-.00803
1969	.01126	-.01168	.00084	-.00675
1970	-.04974	.13344	.02193	.02664
1971	.33726	.13834	-.37290	.18963
1972	-.03806	.00740	.02839	.00082
1973	-.01970	.11667	.01393	.07576
1974	-.12379	.43433	-.38906	.33129
1975	.11472	-.11007	.14566	.14844
1976	.48900	.19039	.98383	.44391
1977	.50549	*-1.56058	*1.80273	*-3.11090
1978	-.01380	.00062	-.00889	.00296
1979	*-1.35134	.74586	*-1.20267	.45238
1980	-.14155	-.01292	.09054	-.24663
1981	-.35890	*-2.02076	-.75059	.50544

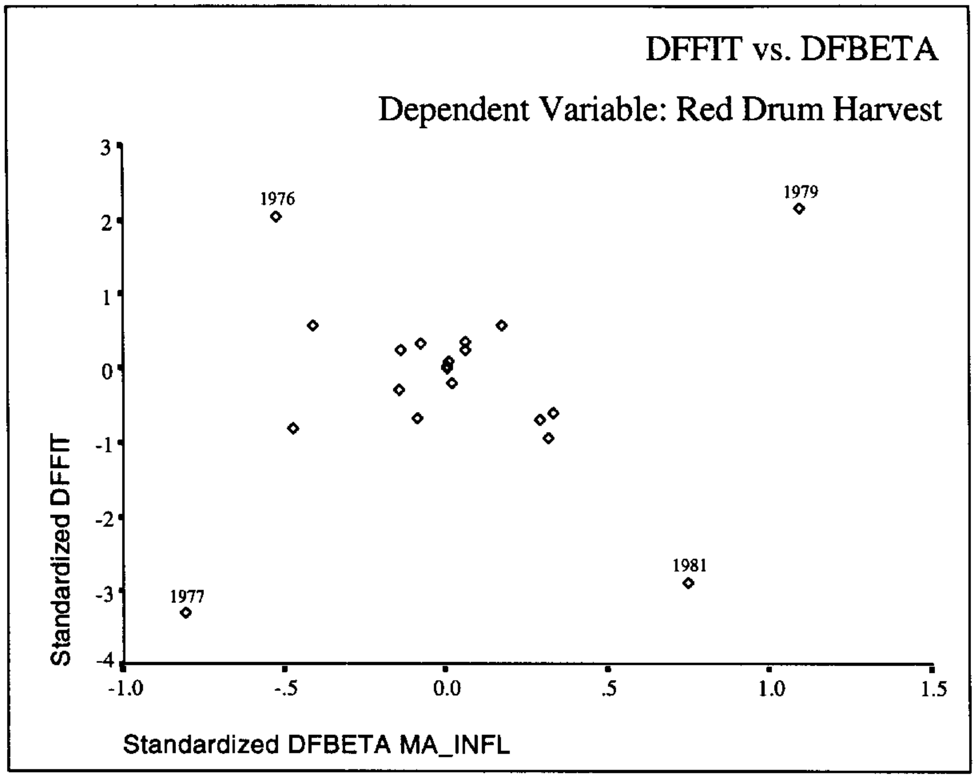
SDFBETA_3	Standardized dfbeta for May-June inflows
SDFBETA_4	Standardized dfbeta for July-August inflows
SDFBETA_5	Standardized dfbeta for September-October inflows
SDFBETA_6	Standardized dfbeta for November-December inflows

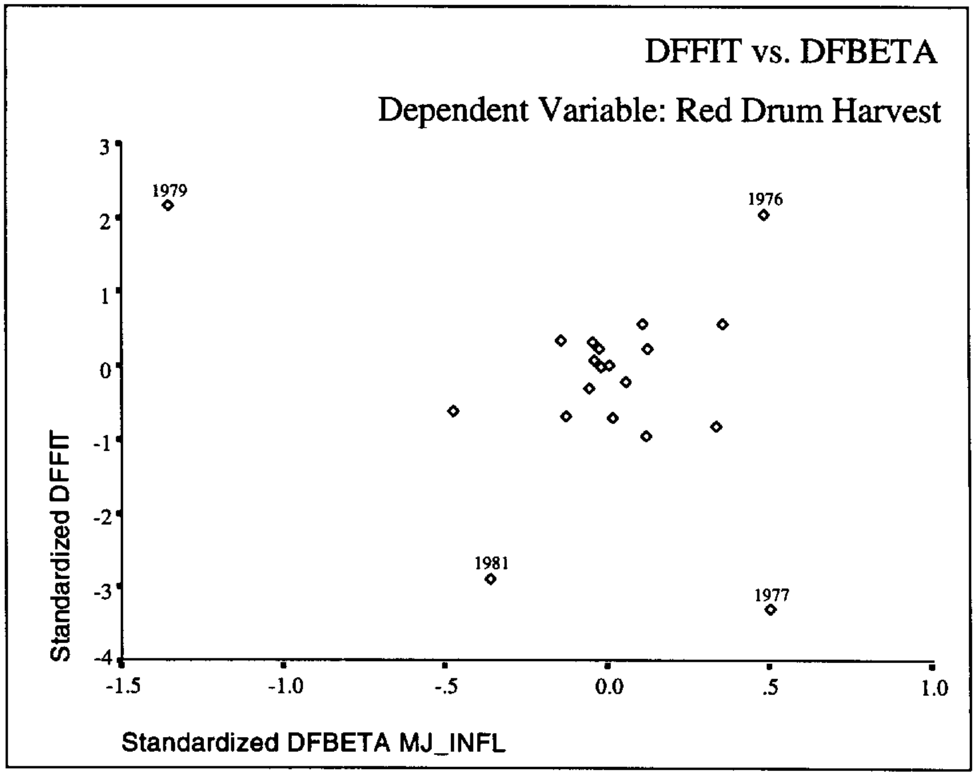
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

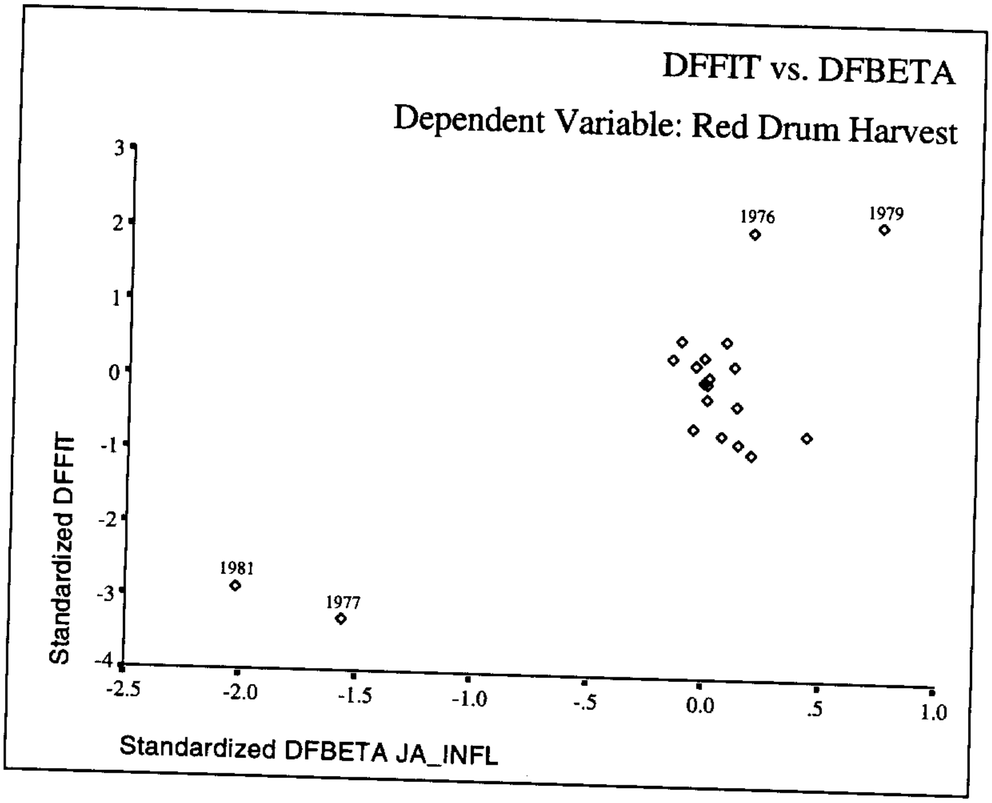
Graphics

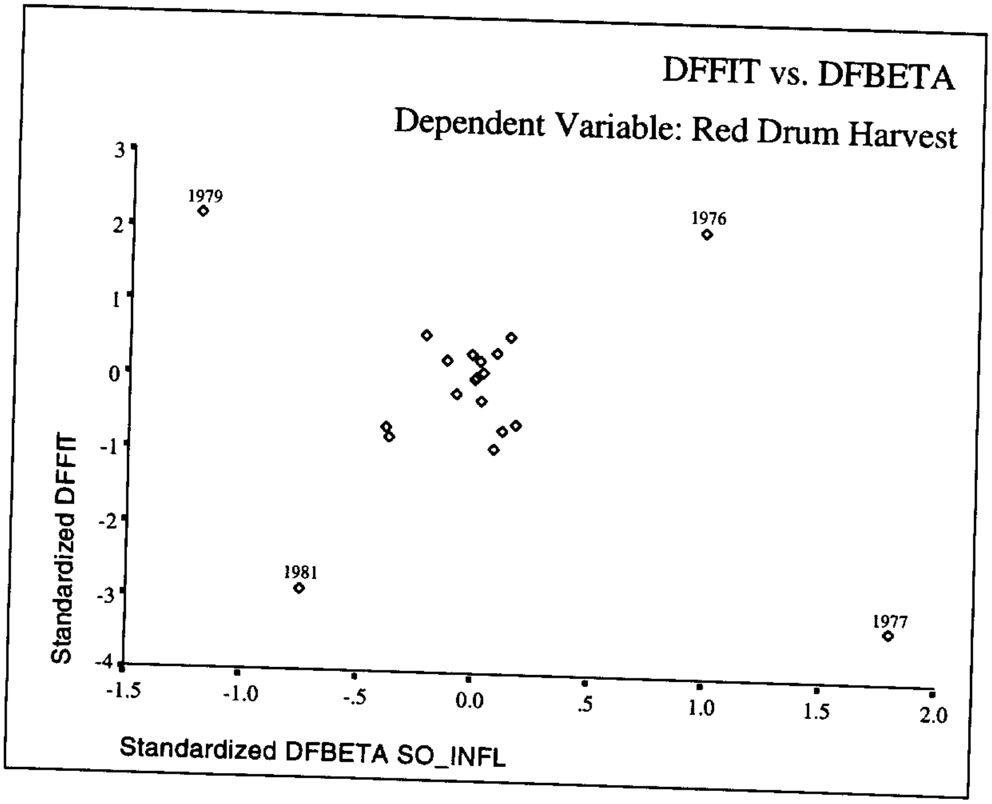

DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
-.6
-.4
-.2
-.0
.2
.4
Standardized DFBETA Intercept

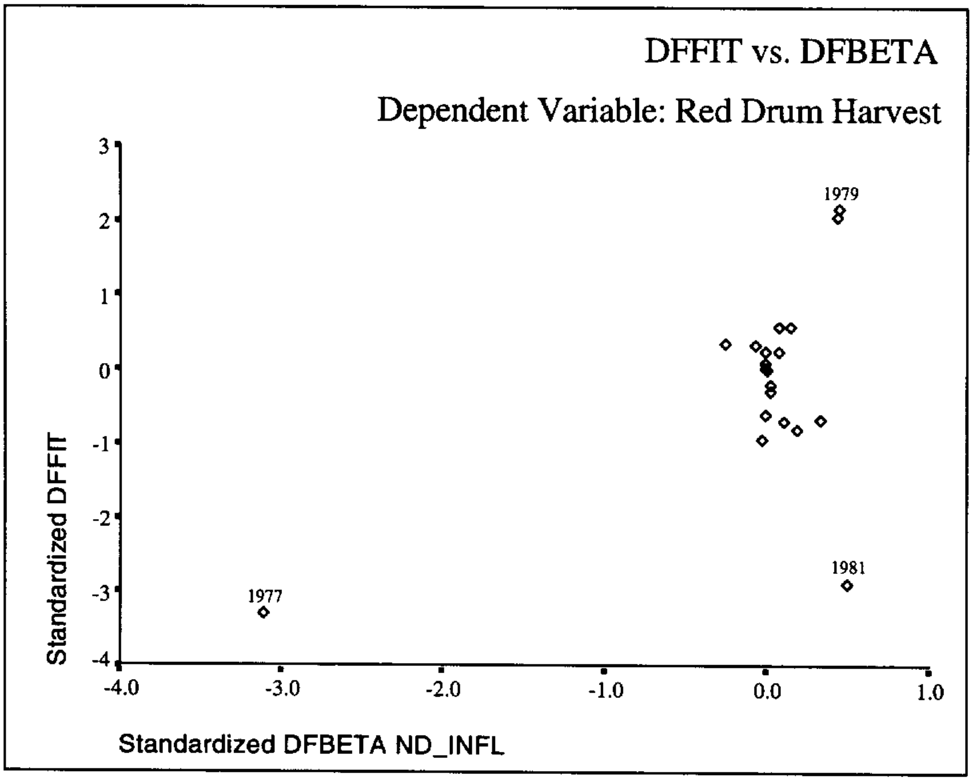

DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
1976
1979
1981
1977
-1.0
-.5
0.0
.5
1.0
1.5
2.0
2.5
Standardized DFBETA JF_INFL


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
Standardized DFBETA MA_INFL
3
2
1
0
-1
-2
-3
-4
-1.0
-.5
0.0
.5
1.0
1.5
1976
1979
1981
1977


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
Standardized DFBETA MJ_INFL
3
2
1
0
-1
-2
-3
-4
-1.5
-1.0
-.5
0.0
.5
1.0
1979
1976
1981
1977


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
1976
1979
1981
1977
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA JA_INFL


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
1979
1976
1981
1977
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
2.0
Standardized DFBETA SO_INFL


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
Standardized DFBETA ND_INFL
-4.0
-3.0
-2.0
-1.0
0.0
1.0
1979
1981
1977

Regression—Square Root of Harvest (Box–Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	*November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows*[c,d]	.	*.722*	*.522*	*.301*	*1.7915*	*1.732*

a. Dependent Variable: Square Root of Red Drum Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*45.553*	*6*	*7.592*	*2.366*	*.091*[b]
	Residual	*41.723*	*13*	*3.209*		
	Total	*87.275*	*19*			

a. Dependent Variable: Square Root of Red Drum Harvest

b. Independent Variables: (Constant), November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3.218	1.507		2.135	.052	-.039	6.474
	January-February Inflows	-1.806E-03	.001	-.547	-1.305	.214	-.005	.001
	March-April Inflows	6.123E-04	.001	.224	.790	.443	-.001	.002
	May-June Inflows	9.530E-04	.001	.453	1.668	.119	.000	.002
	July-August Inflows	-2.200E-03	.002	-.371	-1.081	.299	-.007	.002
	September-October Inflows	1.432E-03	.001	.394	1.202	.251	-.001	.004
	November-December Inflows	1.385E-03	.001	.464	1.197	.253	-.001	.004

a. Dependent Variable: Square Root of Red Drum Harvest

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	January-February Inflows	.209	4.782
	March-April Inflows	.459	2.179
	May-June Inflows	.498	2.007
	July-August Inflows	.312	3.208
	September-October Inflows	.342	2.928
	November-December Inflows	.245	4.083

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	January-February Inflows	March-April Inflows
1	1	6.382	1.000	.00	.00	.00
	2	.345	4.299	.00	.00	.05
	3	.102	7.901	.13	.01	.00
	4	6.710E-02	9.752	.35	.04	.06
	5	4.552E-02	11.841	.42	.04	.02
	6	4.212E-02	12.310	.07	.01	.86
	7	1.550E-02	20.292	.02	.90	.01

a. Dependent Variable: Square Root of Red Drum Harvest

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions May-June Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	.00	.00	.00	.00
	2	.04	.00	.06	.04
	3	.03	.30	.00	.06
	4	.15	.03	.39	.00
	5	.20	.00	.44	.28
	6	.55	.03	.02	.04
	7	.03	.64	.08	.58

a. Dependent Variable: Square Root of Red Drum Harvest

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*2.3574*	*8.0354*	*5.1673*	*1.5484*	*20*
Std. Predicted Value	*-1.815*	*1.852*	*.000*	*1.000*	*20*
Standard Error of Predicted Value	*.5768*	*1.5530*	*1.0339*	*.2391*	*20*
Adjusted Predicted Value	*-.2681*	*9.8330*	*5.4211*	*2.2241*	*20*
Residual	*-3.0846*	*2.7278*	*1.066E-15*	*1.4819*	*20*
Std. Residual	*-1.722*	*1.523*	*.000*	*.827*	*20*
Stud. Residual	*-1.976*	*1.901*	*-.046*	*1.096*	*20*
Deleted Residual	*-5.8946*	*4.5924*	*-.2538*	*2.7860*	*20*
Stud. Deleted Residual	*-2.269*	*2.150*	*-.057*	*1.178*	*20*
Mahal. Distance	*1.019*	*13.328*	*5.700*	*3.071*	*20*
Cook's Distance	*.000*	*1.162*	*.168*	*.300*	*20*
Centered Leverage Value	*.054*	*.701*	*.300*	*.162*	*20*

a. Dependent Variable: Square Root of Red Drum Harvest

Case Values for Residuals Diagnostics

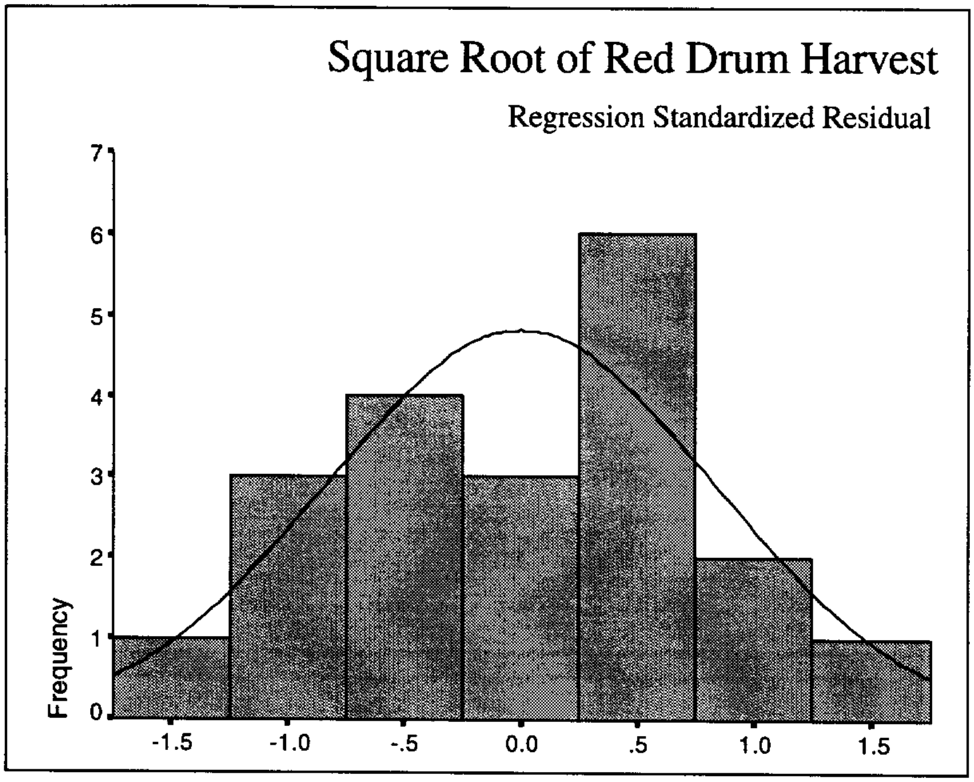
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	2.91148	-1.29902	-2.15131	3.76376	-1.45690	-.72511	-.93314	-.92815
1963	4.22475	-3.08458	-4.06115	5.20133	-.60874	-1.72179	-1.97564	-2.26910
1964	5.14413	-.07461	-.11136	5.18088	-.01498	-.04165	-.05088	-.04889
1965	4.54788	1.12663	1.46585	4.20866	-.40006	.62888	.71733	.70325
1966	4.57585	.88309	1.15640	4.30254	-.38199	.49293	.56408	.54871
1967	5.02894	1.67926	2.22060	4.48760	-.08937	.93736	1.07790	1.08525
1968	5.56711	-.96276	-1.55321	6.15756	.25819	-.53741	-.68259	-.66789
1969	6.32280	-.15029	-.19397	6.36649	.74625	-.08389	-.09530	-.09160
1970	6.82081	-.87943	-1.44232	7.38370	1.06788	-.49089	-.62866	-.61340
1971	6.11003	-1.85562	-2.90938	7.16379	.60883	-1.03579	-1.29697	-1.33548
1972	5.30408	.49247	.61818	5.17837	.08832	.27490	.30799	.29699
1973	5.72162	1.32110	1.47387	5.56885	.35798	.73743	.77890	.76644
1974	6.40527	-.49764	-.75408	6.66170	.79950	-.27778	-.34194	-.33001
1975	8.03539	.88089	1.60893	7.30735	1.85229	.49171	.66453	.64959
1976	7.14640	2.72781	4.25280	5.62141	1.27815	1.52265	1.90121	2.14978
1977	6.66864	-1.74929	-4.91360	9.83295	.96960	-.97644	-1.63650	-1.76453
1978	3.89512	-.03507	-.04189	3.90194	-.82163	-.01957	-.02139	-.02055
1979	2.35744	1.96691	4.59241	-.26806	-1.81471	1.09792	1.67764	1.82095
1980	2.64419	.97520	1.56253	2.05687	-1.62952	.54435	.68904	.67444
1981	3.91454	-1.46505	-5.89456	8.34405	-.80908	-.81779	-1.64036	-1.76977

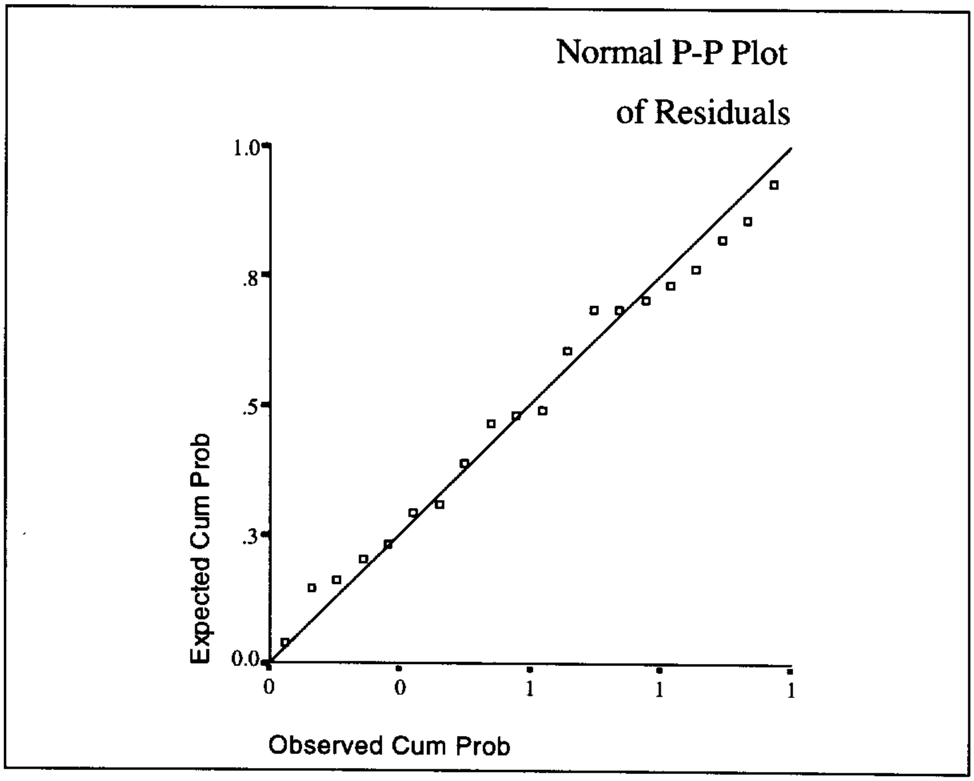
PRE_1	Predicted value of the square root of harvest
RES_1	Ordinary residual; observed square root of harvest minus predicted square root of harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of square root of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of the square root of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

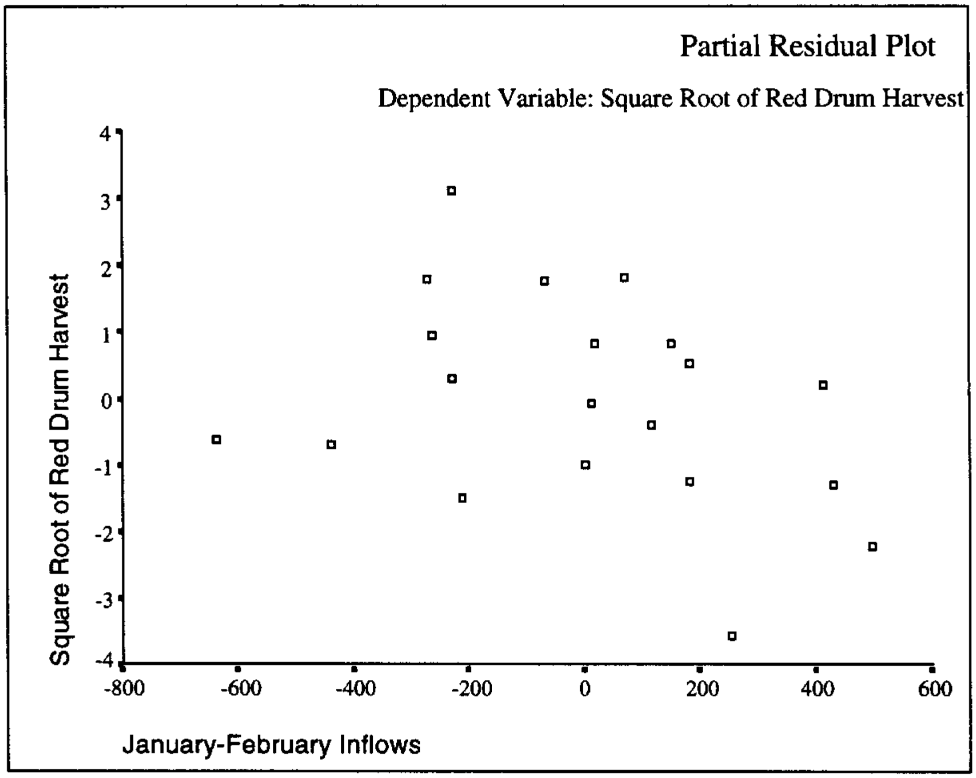
[1] Values greater than 3 are flagged.

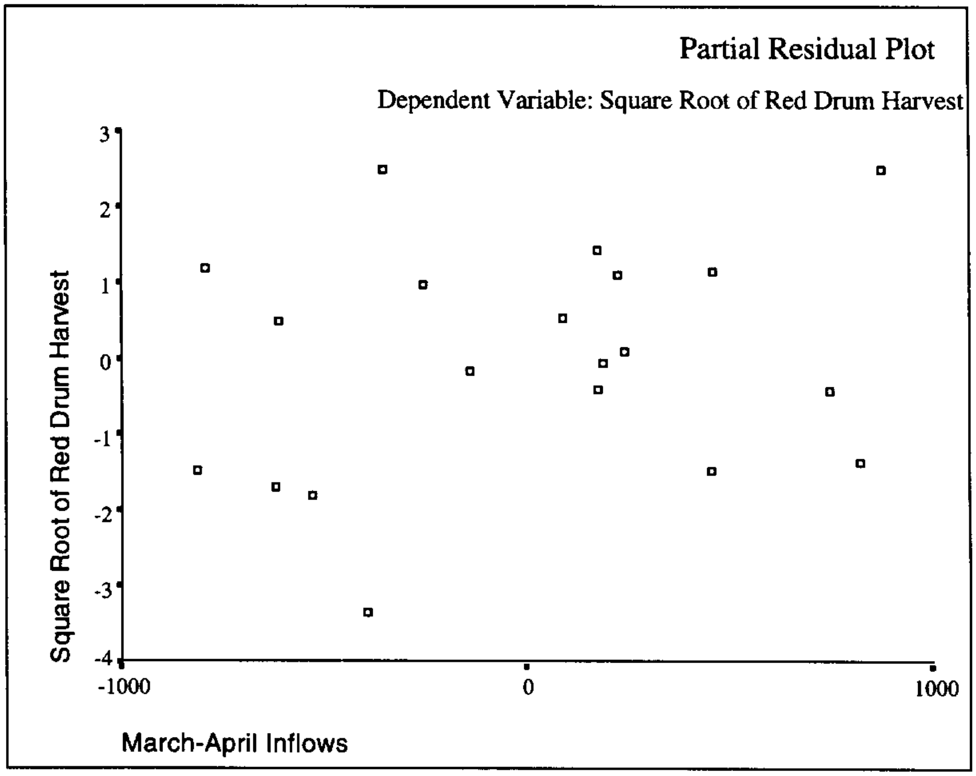
[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{12,0.01} = 2.681$.

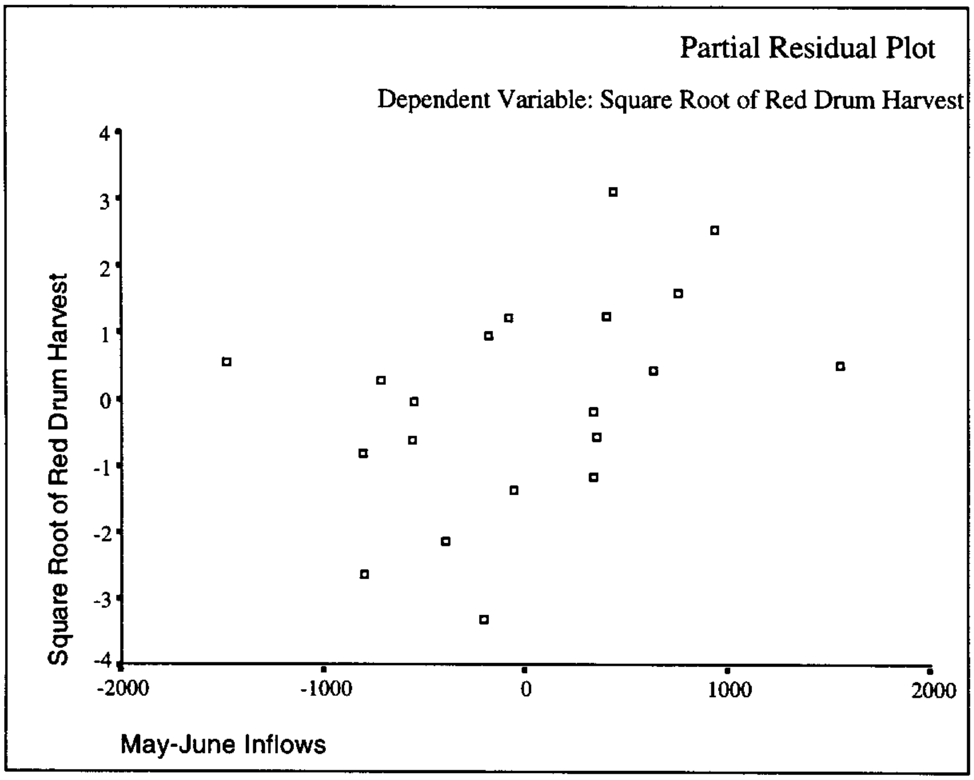
Graphics

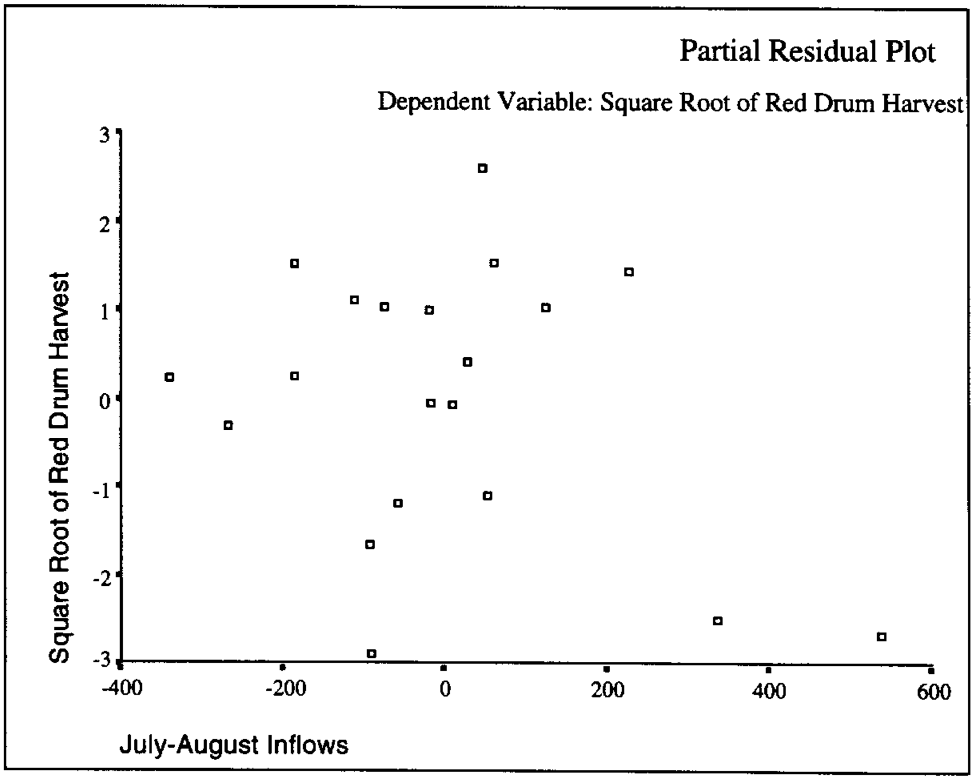

Square Root of Red Drum Harvest
Regression Standardized Residual
Frequency
0
1
2
3
4
5
6
7
-1.5
-1.0
-.5
0.0
.5
1.0
1.5

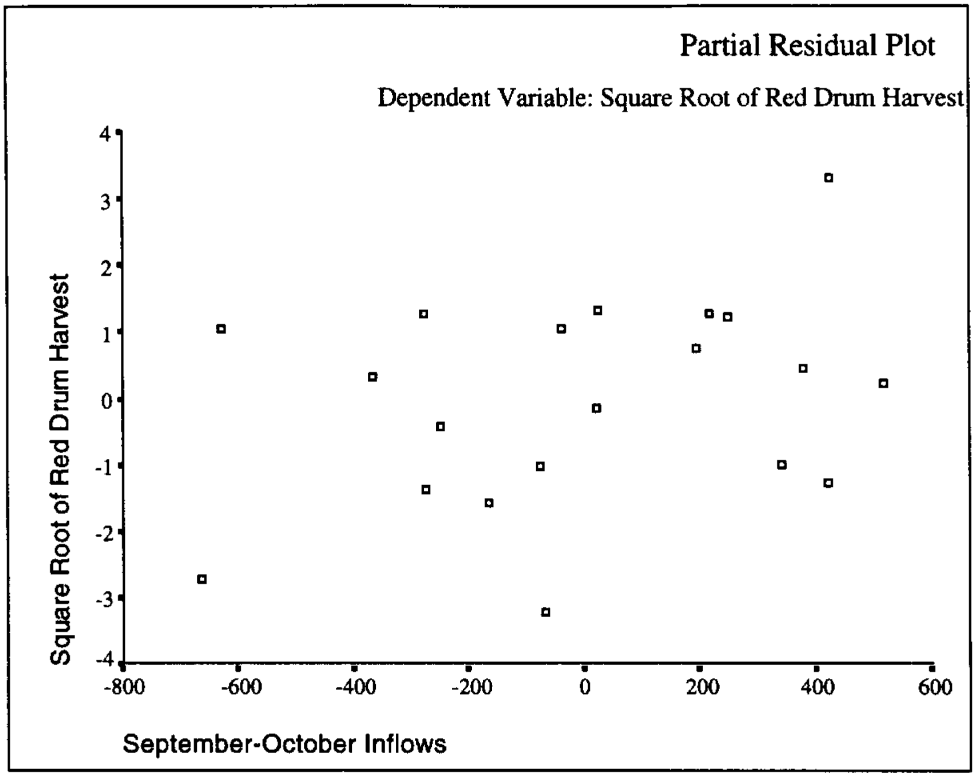

Normal P-P Plot
of Residuals
Expected Cum Prob
0.0
.3
.5
.8
1.0
0
0
1
1
1
Observed Cum Prob

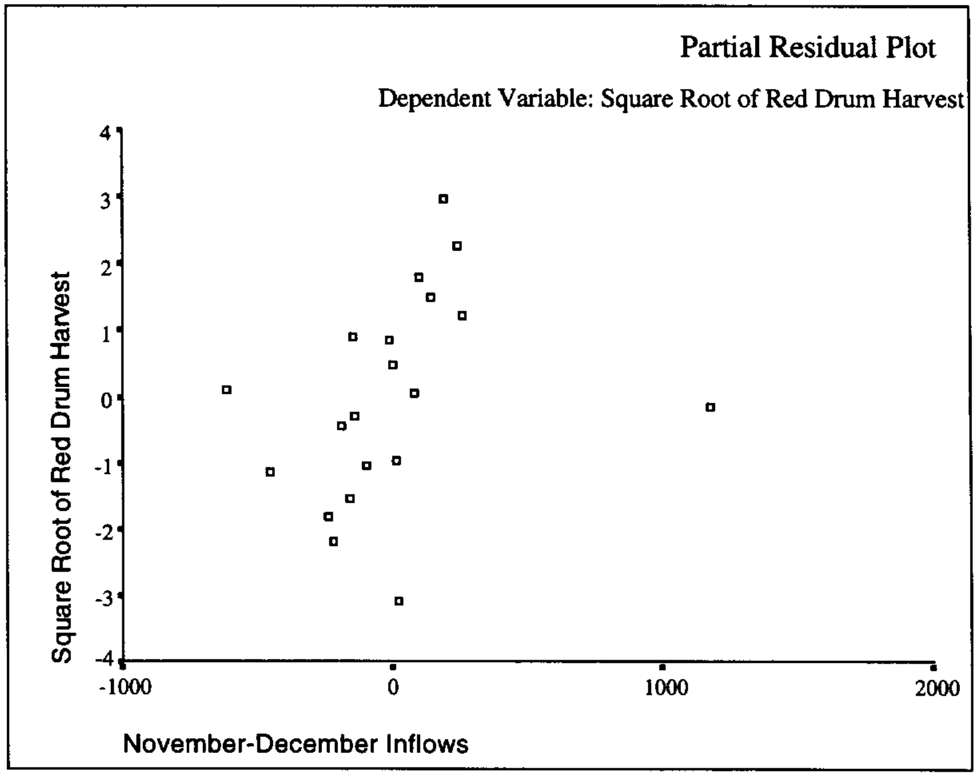

Partial Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Square Root of Red Drum Harvest
4
3
2
1
0
-1
-2
-3
-4
-800
-600
-400
-200
0
200
400
600
January-February Inflows

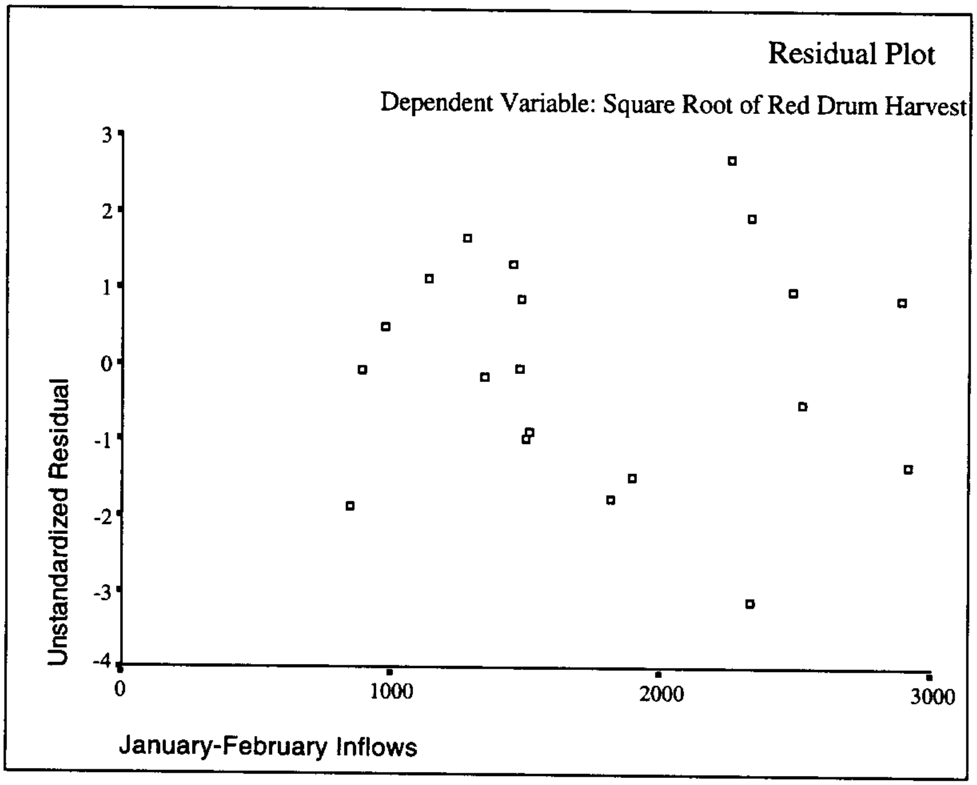

Partial Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Square Root of Red Drum Harvest
3
2
1
0
-1
-2
-3
-4
-1000
0
1000
March-April Inflows

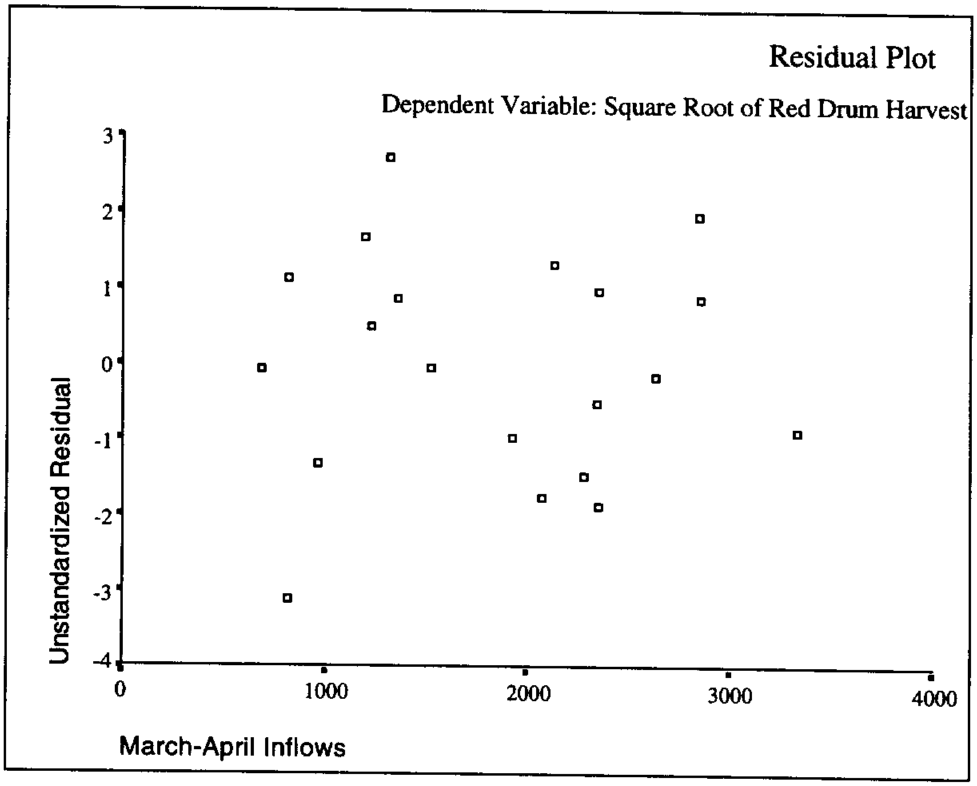

Partial Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Square Root of Red Drum Harvest
4
3
2
1
0
-1
-2
-3
-4
-2000
-1000
0
1000
2000
May-June Inflows

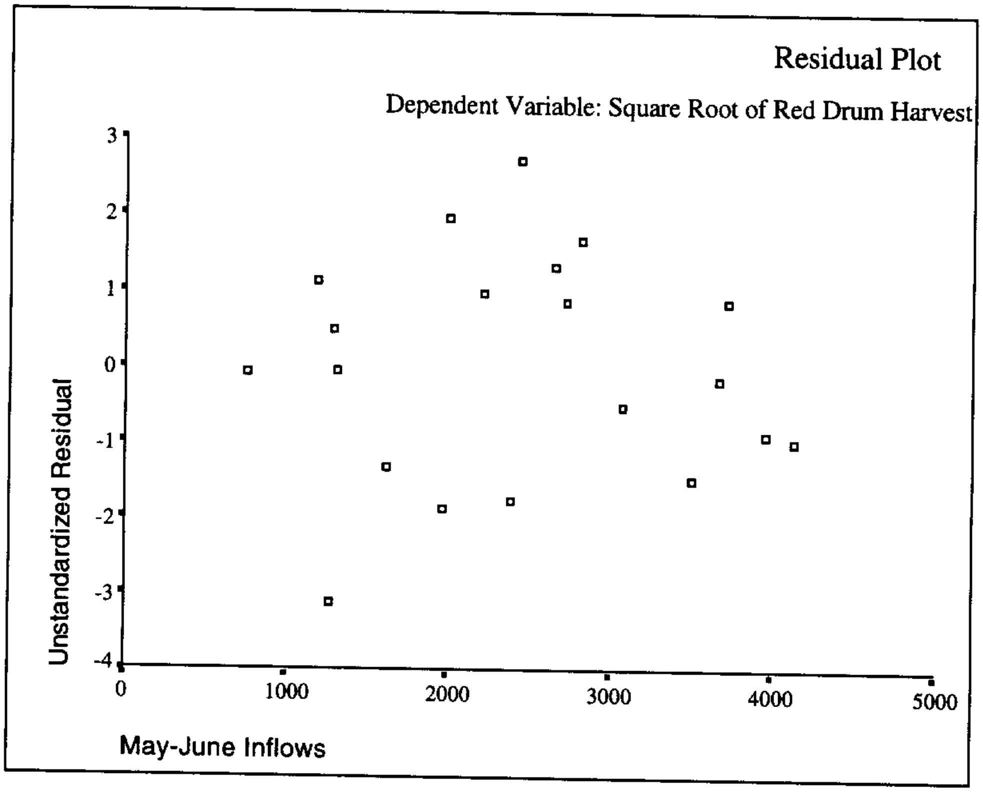

Partial Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Square Root of Red Drum Harvest
3
2
1
0
-1
-2
-3
-400
-200
0
200
400
600
July-August Inflows

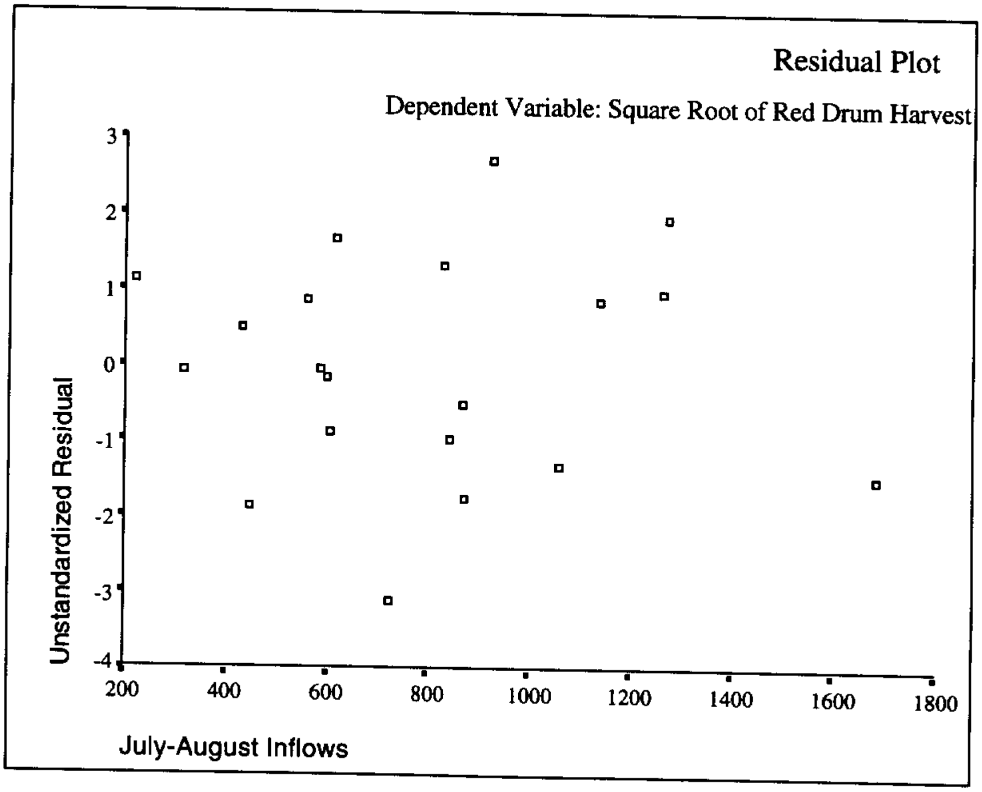

Partial Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Square Root of Red Drum Harvest
4
3
2
1
0
-1
-2
-3
-4
-800
-600
-400
-200
0
200
400
600
September-October Inflows

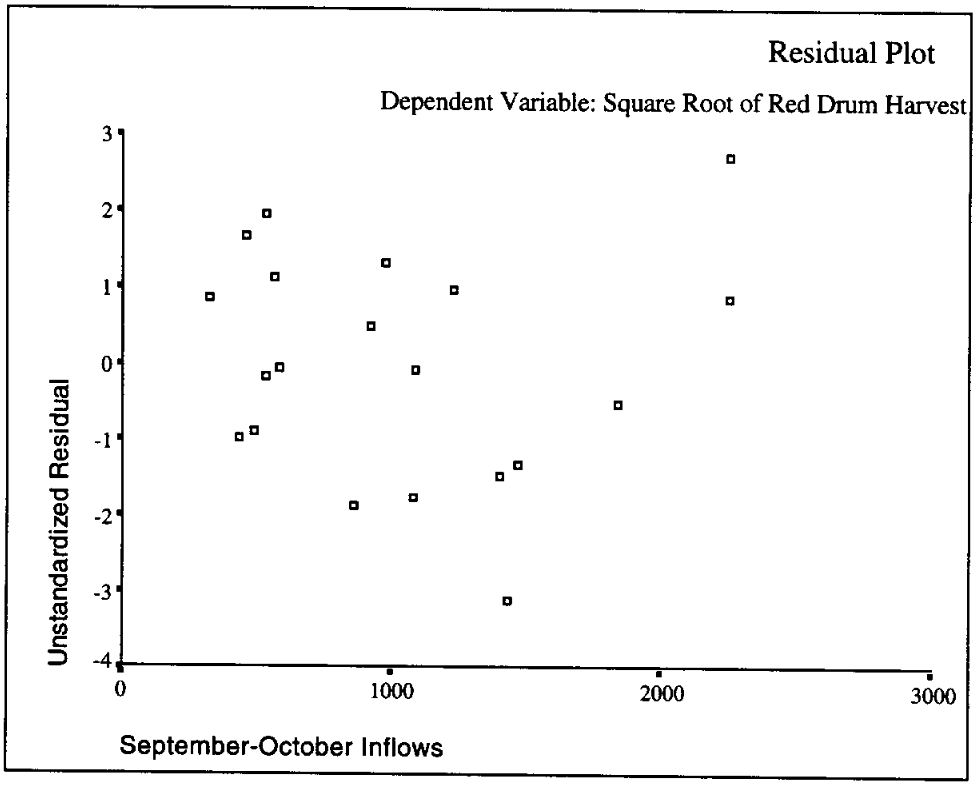

Partial Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Square Root of Red Drum Harvest
4
3
2
1
0
-1
-2
-3
-4
-1000
0
1000
2000
November-December Inflows

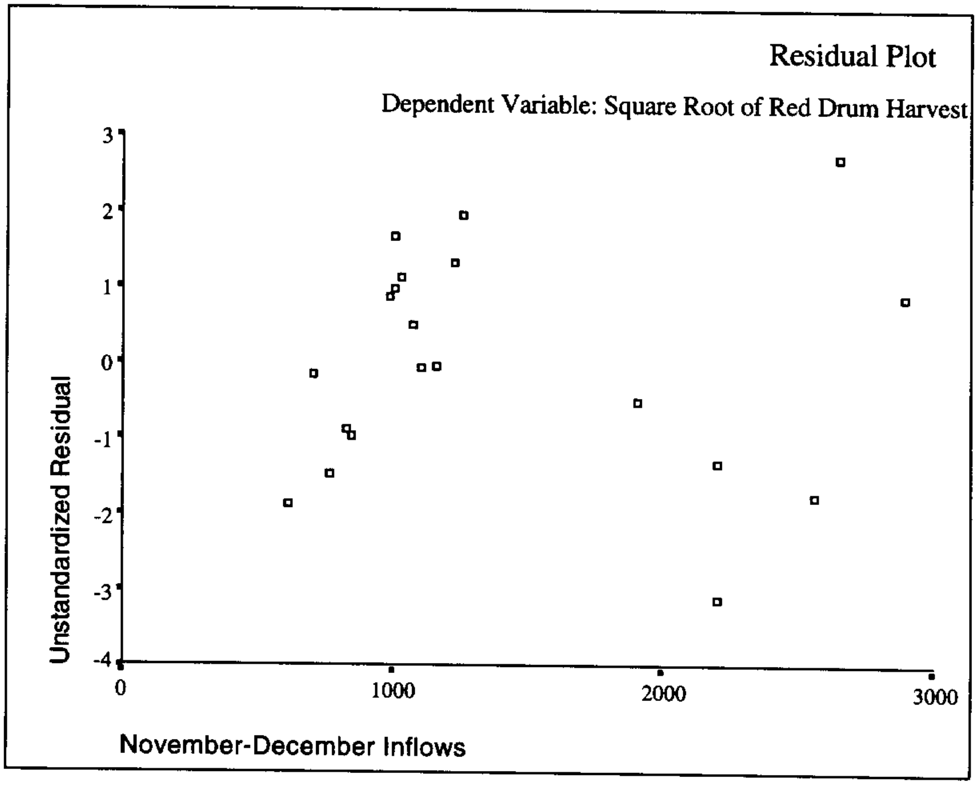

Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Unstandardized Residual
3
2
1
0
-1
-2
-3
-4
0
1000
2000
3000
January-February Inflows


Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Unstandardized Residual
3
2
1
0
-1
-2
-3
-4
0
1000
2000
3000
4000
March-April Inflows


Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Unstandardized Residual
3
2
1
0
-1
-2
-3
-4
0
1000
2000
3000
4000
5000
May-June Inflows


Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Unstandardized Residual
3
2
1
0
-1
-2
-3
-4
200
400
600
800
1000
1200
1400
1600
1800
July-August Inflows


Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Unstandardized Residual
3
2
1
0
-1
-2
-3
-4
0
1000
2000
3000
September-October Inflows


Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Unstandardized Residual
3
2
1
0
-1
-2
-3
-4
0
1000
2000
3000
November-December Inflows

Prediction Intervals for Square Root of Red Drum Harvest

YEAR	SQRTRDRM	LICI_1	UICI_1
1962	1.61	-3.46497	9.28792
1963	1.14	-1.78563	10.23513
1964	5.07	-1.07936	11.36762
1965	5.67	-1.44054	10.53629
1966	5.46	-1.42454	10.57624
1967	6.71	-.98946	11.04734
1968	4.60	-.77265	11.90686
1969	6.17	.34947	12.29614
1970	5.94	.45786	13.18376
1971	4.25	-.18836	12.40841
1972	5.80	-.61569	11.22385
1973	7.04	.05238	11.39087
1974	5.91	.15826	12.65227
1975	8.92	1.53159	14.53919
1976	9.87	.85637	13.43643
1977	4.92	-.25061	13.58789
1978	3.86	-1.92409	9.71433
1979	4.32	-4.40798	9.12286
1980	3.62	-3.68575	8.97414
1981	2.45	-3.22728	11.05637

SQRTRDRM	Square root of red drum harvest
LICI_1	Lower limit for 99% prediction interval for square root of red drum harvest
UICI_1	Upper limit for 99% prediction interval for square root of red drum harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	6.57724	.08161	.34617	.4742	.0014
1963	3.61888	.17653	.19047	.8225	.0143
1964	5.31987	.00018	.27999	.6210	.0000
1965	3.44693	.02213	.18142	.8408	.0000
1966	3.54060	.01407	.18635	.8309	.0000
1967	3.68182	.05351	.19378	.8156	.0004
1968	6.27283	.04082	.33015	.5083	.0001
1969	3.32923	.00038	.17522	.8530	.0000
1970	6.46508	.03614	.34027	.4866	.0001
1971	5.93173	.13646	.31220	.5477	.0067
1972	2.91360	.00346	.15335	.8929	.0000
1973	1.01937	.01002	.05365	.9945	.0000
1974	5.51117	.00861	.29006	.5978	.0000
1975	7.64748	.05214	.40250	.3647	.0003
1976	5.86311	.28868	.30858	.5558	.0532
1977	11.28581	.69207	*.59399	.1266	.3217
1978	2.14343	.00001	.11281	.9515	.0000
1979	9.91239	.53669	*.52170	.1936	.2077
1980	6.19176	.04085	.32588	.5175	.0001
1981	13.32768	1.16220	*.70146	.0645	*.6140

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

---

[1] This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2] MAHA_PV = 1 − F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	-.75180	.03131	-.45930	.32076
1963	*-1.27676	-.23481	-.51370	.44037
1964	-.03431	-.02838	.01047	.00361
1965	.38589	.29752	.09350	-.08744
1966	.30526	.09428	.08892	-.16593
1967	.61618	.24786	-.06497	-.42778
1968	-.52304	-.00363	-.00232	.29773
1969	-.04939	.00113	-.00948	-.00866
1970	-.49074	.12118	-.11200	-.25478
1971	*-1.00639	-.42690	.27327	-.59549
1972	.15005	.12172	-.06783	.01359
1973	.26063	.06845	-.17042	.06275
1974	-.23690	.08626	-.13544	-.03180
1975	.59055	-.40592	.01357	.17631
1976	*1.60739	-.18043	-.47453	-.40646
1977	*-2.37321	.25529	*1.45258	-.58576
1978	-.00906	-.00541	-.00026	-.00236
1979	*2.10383	-.17709	.15438	*1.05940
1980	.52340	-.01250	.27339	.08491
1981	*-3.07728	-.17879	*1.20510	.80983

SDFFITS	Standardized dffits value
SDFBETA_0	Standardized dfbeta for the intercept term
SDFBETA_1	Standardized dfbeta for January-February inflows
SDFBETA_2	Standardized dfbeta for March-April inflows

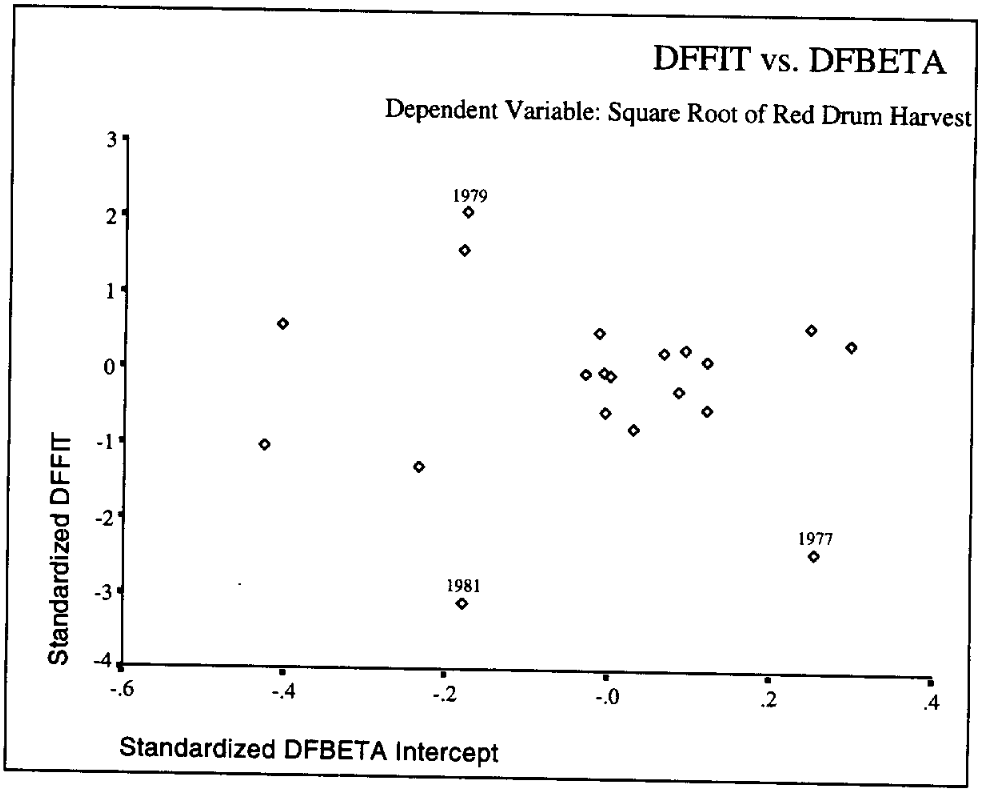
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

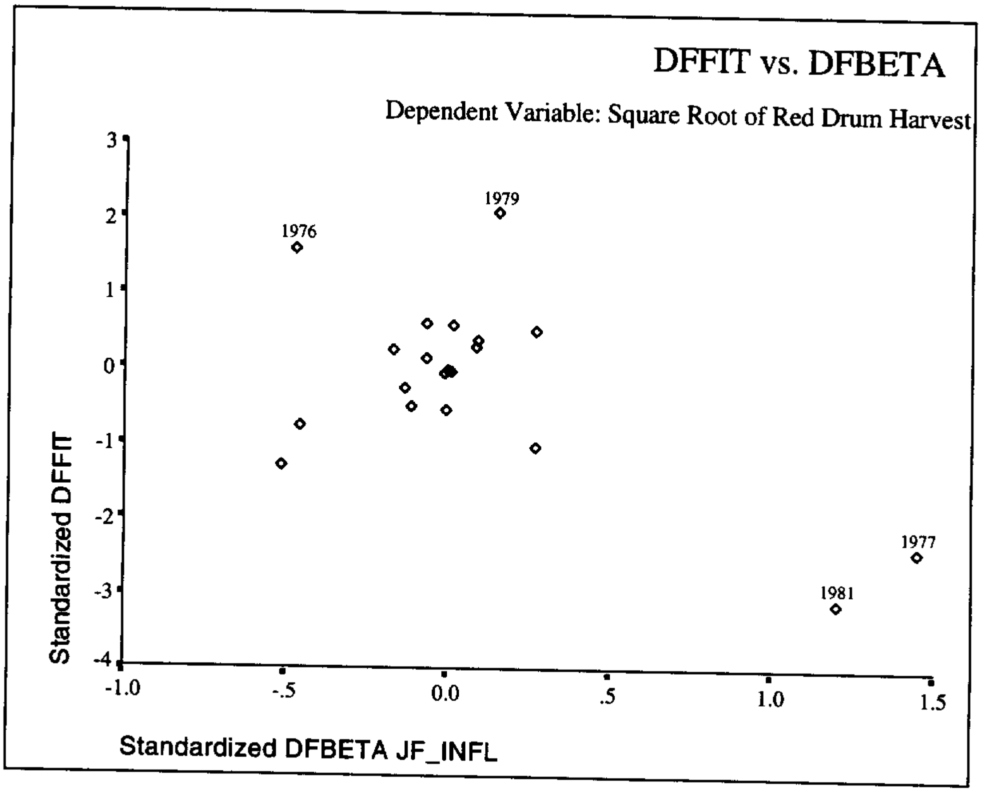
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.02189	.07707	.13008	.11925
1963	.16791	.26654	.11498	-.03741
1964	.01064	.00104	-.01508	.00539
1965	-.04440	-.16873	-.02008	-.07424
1966	.15285	-.05252	-.15278	-.00264
1967	.37382	.08838	-.22924	.08133
1968	-.42177	-.05211	.15412	-.00716
1969	-.02118	.02197	-.00158	.01269
1970	-.08897	.23868	.03923	.04764
1971	.42471	.17421	-.46960	.23879
1972	-.05803	.01128	.04329	.00125
1973	-.01938	.11480	.01371	.07455
1974	-.04456	.15633	-.14003	.11924
1975	.11483	-.11017	.14579	.14858
1976	.37737	.14693	.75924	.34258
1977	.36643	*-1.13128	*1.30682	*-2.25512
1978	.00576	-.00026	.00371	-.00124
1979	*-1.30845	.72219	*-1.16450	.43802
1980	-.19446	-.01774	.12438	-.33881
1981	-.38605	*-2.17362	-.80737	.54367

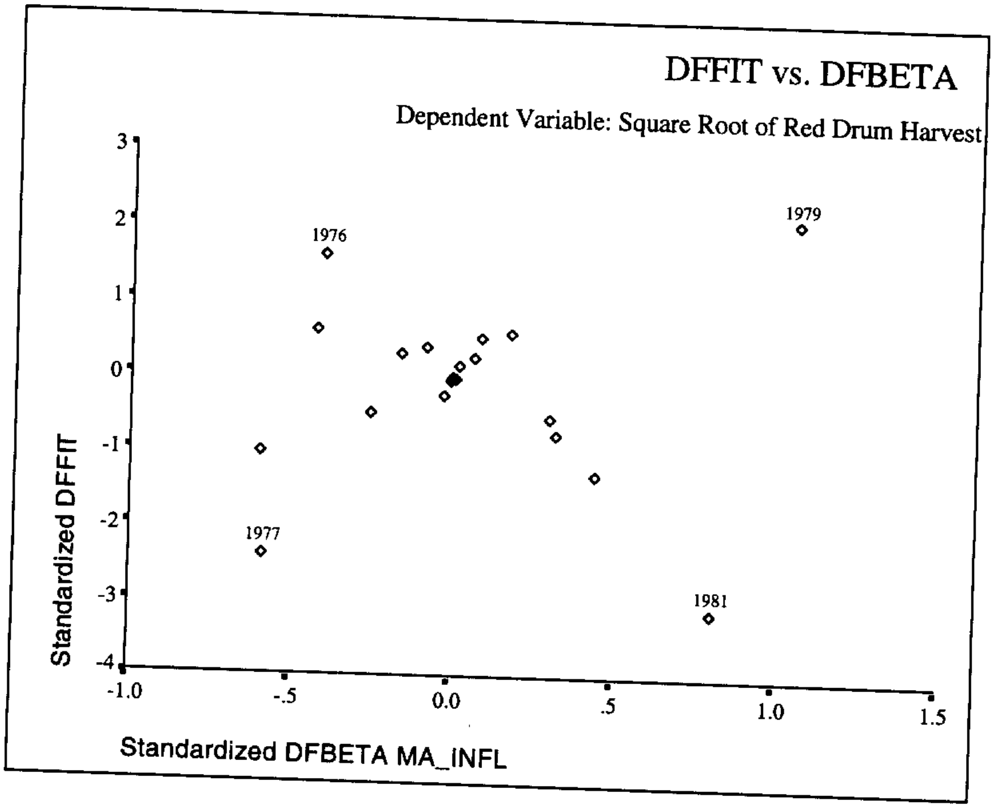
SDFBETA_3	Standardized dfbeta for May-June inflows
SDFBETA_4	Standardized dfbeta for July-August inflows
SDFBETA_5	Standardized dfbeta for September-October inflows
SDFBETA_6	Standardized dfbeta for November-December inflows

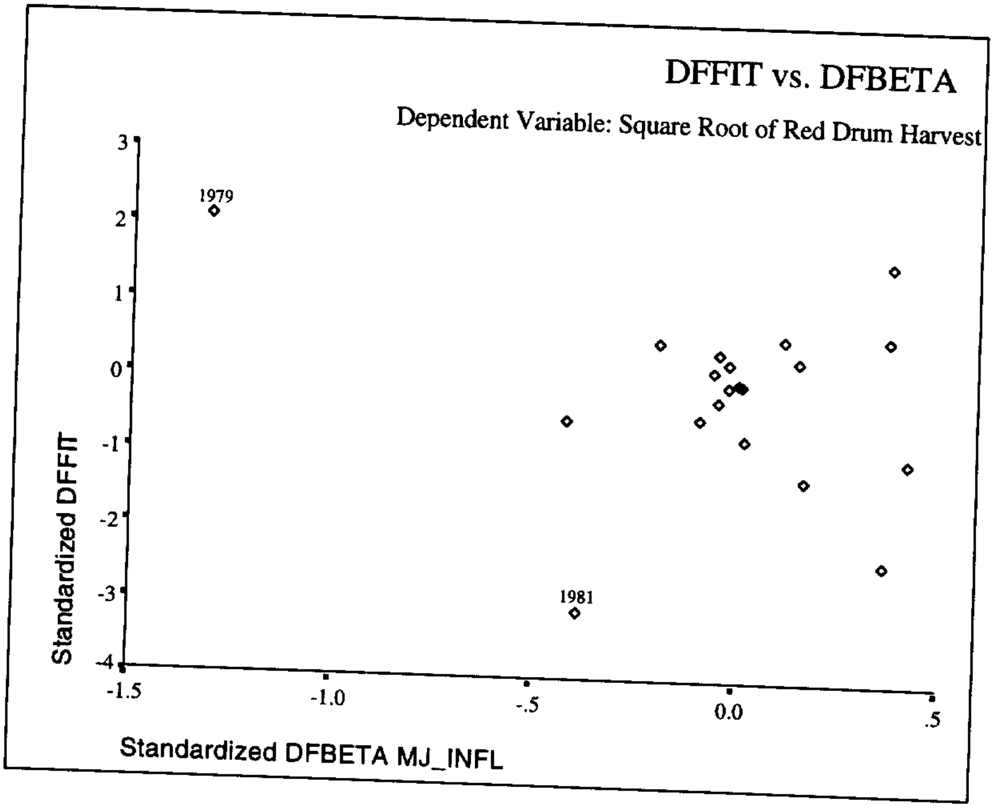
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

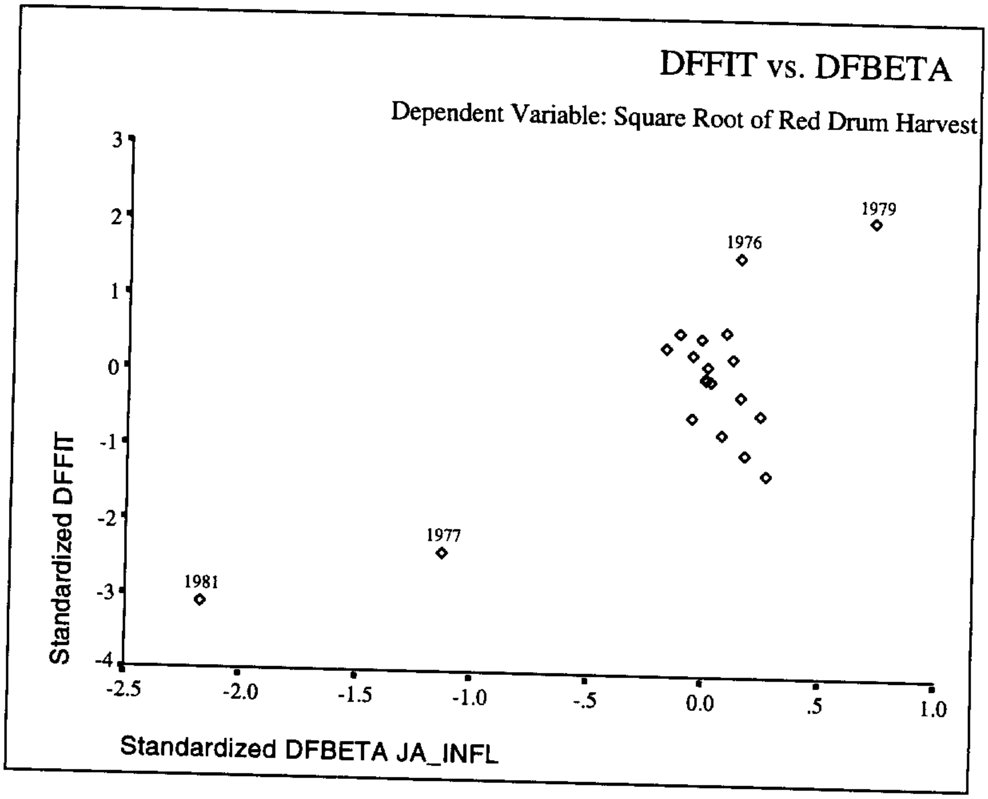
Graphics

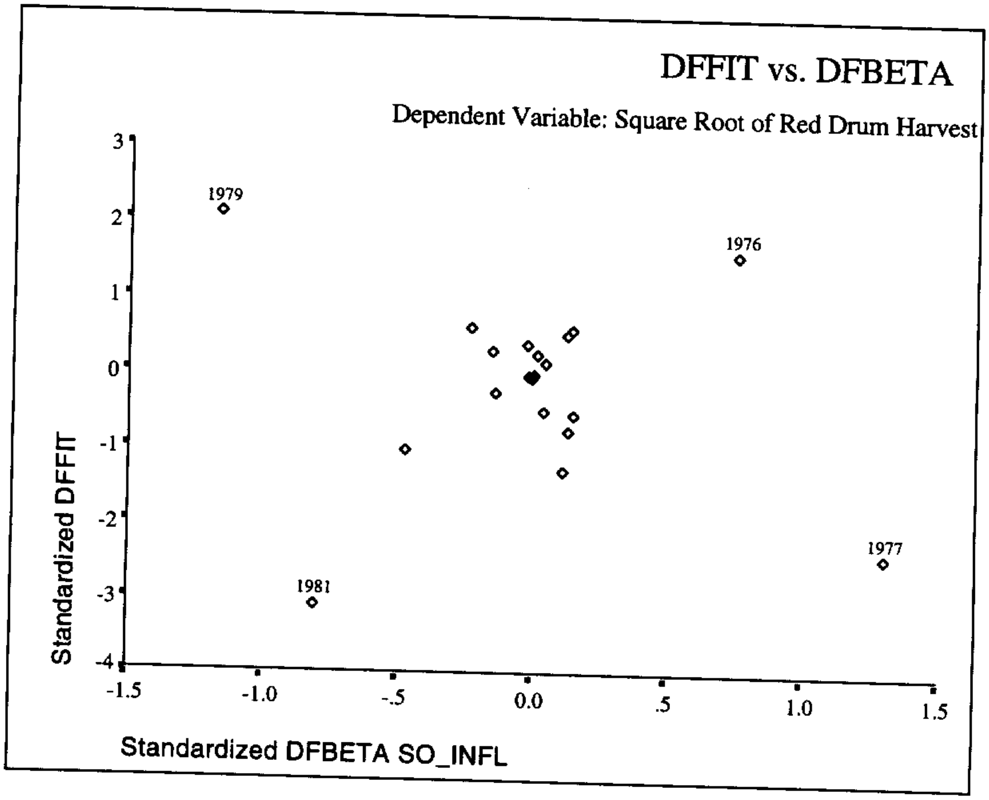

DFFIT vs. DFBETA
Dependent Variable: Square Root of Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
1979
1981
1977
-.6
-.4
-.2
-.0
.2
.4
Standardized DFBETA Intercept

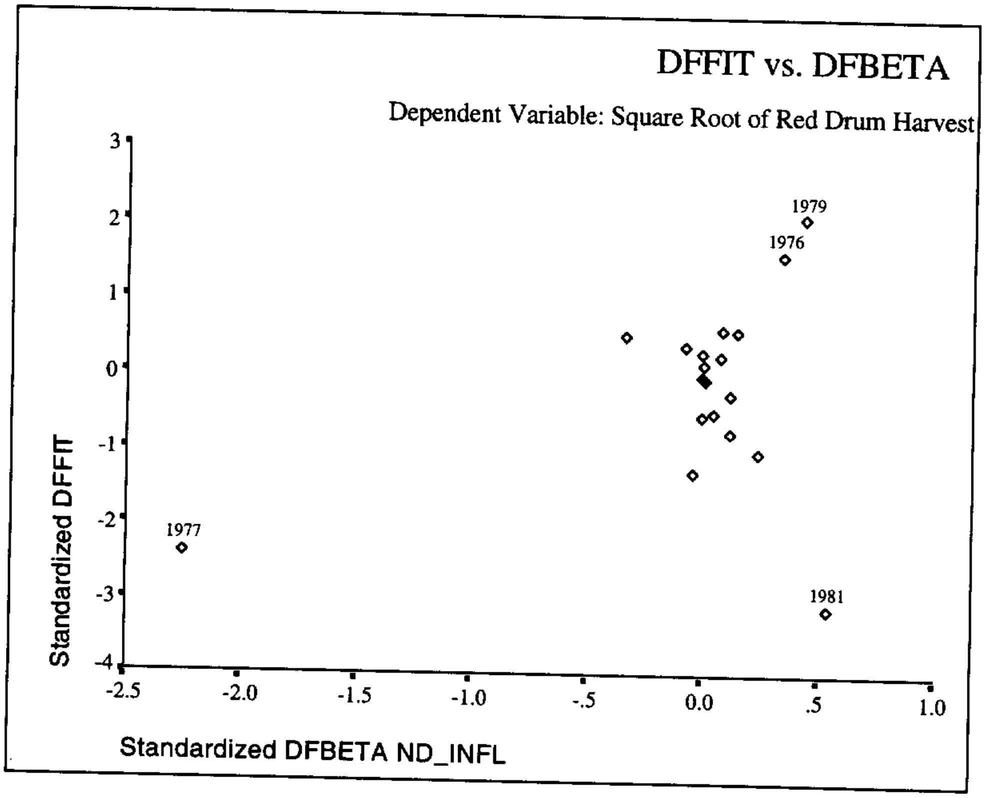

DFFIT vs. DFBETA
Dependent Variable: Square Root of Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
1976
1979
1977
1981
-1.0
-.5
0.0
.5
1.0
1.5
Standardized DFBETA JF_INFL


DFFIT vs. DFBETA
Dependent Variable: Square Root of Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
1976
1977
1979
1981
-1.0
-.5
0.0
.5
1.0
1.5
Standardized DFBETA MA_INFL


DFFIT vs. DFBETA
Dependent Variable: Square Root of Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
1979
1981
-1.5
-1.0
-.5
0.0
.5
Standardized DFBETA MJ_INFL


DFFIT vs. DFBETA
Dependent Variable: Square Root of Red Drum Harvest
Standardized DFFIT
Standardized DFBETA JA_INFL
3
2
1
0
-1
-2
-3
-4
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1979
1976
1977
1981


DFFIT vs. DFBETA
Dependent Variable: Square Root of Red Drum Harvest
Standardized DFFIT
Standardized DFBETA SO_INFL
3
2
1
0
-1
-2
-3
-4
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
1979
1976
1977
1981


DFFIT vs. DFBETA
Dependent Variable: Square Root of Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
1979
1976
1977
1981
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA ND_INFL

Regression—Logged Inflows

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	*Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)*[c,d]	.	*.741*	*.549*	*.340*	*19.3544*	*2.332*

a. Dependent Variable: Red Drum Harvest

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*5921.734*	*6*	*986.956*	*2.635*	*.068*[b]
	Residual	*4869.731*	*13*	*374.595*		
	Total	*10791.466*	*19*			

a. Dependent Variable: Red Drum Harvest

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-266.625	121.818		-2.189	.047	-529.797	-3.453
	Ln(January-February Inflows)	-29.961	28.184	-.478	-1.063	.307	-90.849	30.928
	Ln(March-April Inflows)	3.560	15.785	.071	.226	.825	-30.542	37.663
	Ln(May-June Inflows)	37.914	15.694	.753	2.416	.031	4.009	71.819
	Ln(July-August Inflows)	-20.776	19.721	-.432	-1.054	.311	-63.381	21.828
	Ln(September-October Inflows)	11.187	11.362	.272	.985	.343	-13.360	35.734
	Ln(November-December Inflows)	36.691	17.969	.727	2.042	.062	-2.130	75.511

a. Dependent Variable: Red Drum Harvest

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln(January-February Inflows)	.172	5.821
	Ln(March-April Inflows)	.353	2.835
	Ln(May-June Inflows)	.357	2.801
	Ln(July-August Inflows)	.207	4.841
	Ln(September-October Inflows)	.456	2.193
	Ln(November-December Inflows)	.274	3.647

Case Values for Residuals Diagnostics

YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	18.23396	-15.63396	-23.18255	25.78255	-.72680	-.80777	-.98364	-.98231
1963	22.81565	-21.51565	-29.63809	30.93809	-.46727	-1.11166	-1.30473	-1.34468
1964	20.23608	5.46392	9.35511	16.34489	-.61339	.28231	.36940	.35678
1965	28.28304	3.91696	8.15321	24.04679	-.15758	.20238	.29198	.28145
1966	26.51046	3.28954	4.75194	25.04806	-.25799	.16996	.20428	.19658
1967	34.36060	10.63940	15.73500	29.26500	.18668	.54971	.66852	.65362
1968	32.22602	-11.02602	-15.63035	36.83035	.06576	-.56969	-.67829	-.66352
1969	34.76771	3.33229	4.28856	33.81144	.20974	.17217	.19532	.18793
1970	39.69072	-4.39072	-6.36425	41.66425	.48859	-.22686	-.27312	-.26317
1971	31.04086	-12.94086	-21.71221	39.81221	-.00137	-.66862	-.86607	-.85719
1972	30.51363	3.08637	4.04838	29.55162	-.03123	.15947	.18263	.17570
1973	40.04624	9.55376	11.14134	38.45866	.50873	.49362	.53306	.51784
1974	51.52706	-16.62706	-23.81049	58.71049	1.15905	-.85908	-1.02804	-1.03049
1975	67.35464	12.14536	20.24751	59.25249	2.05558	.62752	.81023	.79888
1976	57.07281	40.42719	56.82145	40.67855	1.47318	2.08878	2.47635	*3.27339
1977	56.15067	-31.95067	-58.59424	82.79424	1.42095	-1.65082	-2.23556	*-2.73761
1978	10.91336	3.98664	5.25811	9.64189	-1.14147	.20598	.23656	.22777
1979	1.09804	17.60196	41.95314	-23.25314	-1.69744	.90945	1.40405	1.46457
1980	3.61815	9.48185	15.25595	-2.15595	-1.55469	.48991	.62142	.60611
1981	14.84030	-8.84030	-20.83243	26.83243	-.91903	-.45676	-.70117	-.68677

PRE_1	Predicted value of harvest
RES_1	Ordinary residual; observed harvest minus predicted harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

---

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{12,0.01} = 2.681$.

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Ln(January-February Inflows)	Ln(March-April Inflows)
1	1	6.984	1.000	.00	.00	.00
	2	9.020E-03	27.826	.00	.00	.03
	3	2.966E-03	48.524	.14	.00	.00
	4	2.173E-03	56.697	.00	.03	.09
	5	9.164E-04	87.299	.53	.01	.00
	6	7.542E-04	96.232	.16	.00	.87
	7	2.920E-04	154.662	.17	.96	.01

a. Dependent Variable: Red Drum Harvest

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions Ln(May-June Inflows)	Ln(July-August Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	.00	.00	.00	.00
	2	.03	.00	.12	.02
	3	.00	.19	.04	.03
	4	.00	.04	.63	.09
	5	.52	.08	.01	.19
	6	.45	.01	.10	.19
	7	.00	.67	.10	.47

a. Dependent Variable: Red Drum Harvest

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*1.0980*	*67.3546*	*31.0650*	*17.6542*	*20*
Std. Predicted Value	*-1.697*	*2.056*	*.000*	*1.000*	*20*
Standard Error of Predicted Value	*7.3060*	*14.7455*	*11.3000*	*1.8968*	*20*
Adjusted Predicted Value	*-23.2531*	*82.7942*	*31.2027*	*22.3343*	*20*
Residual	*-31.9507*	*40.4272*	*-5.1781E-14*	*16.0094*	*20*
Std. Residual	*-1.651*	*2.089*	*.000*	*.827*	*20*
Stud. Residual	*-2.236*	*2.476*	*-.004*	*1.046*	*20*
Deleted Residual	*-58.5942*	*56.8214*	*-.1377*	*26.0041*	*20*
Stud. Deleted Residual	*-2.738*	*3.273*	*.009*	*1.213*	*20*
Mahal. Distance	*1.757*	*10.078*	*5.700*	*2.212*	*20*
Cook's Distance	*.001*	*.595*	*.097*	*.160*	*20*
Centered Leverage Value	*.092*	*.530*	*.300*	*.116*	*20*

a. Dependent Variable: Red Drum Harvest

Case Values for Residuals Diagnostics

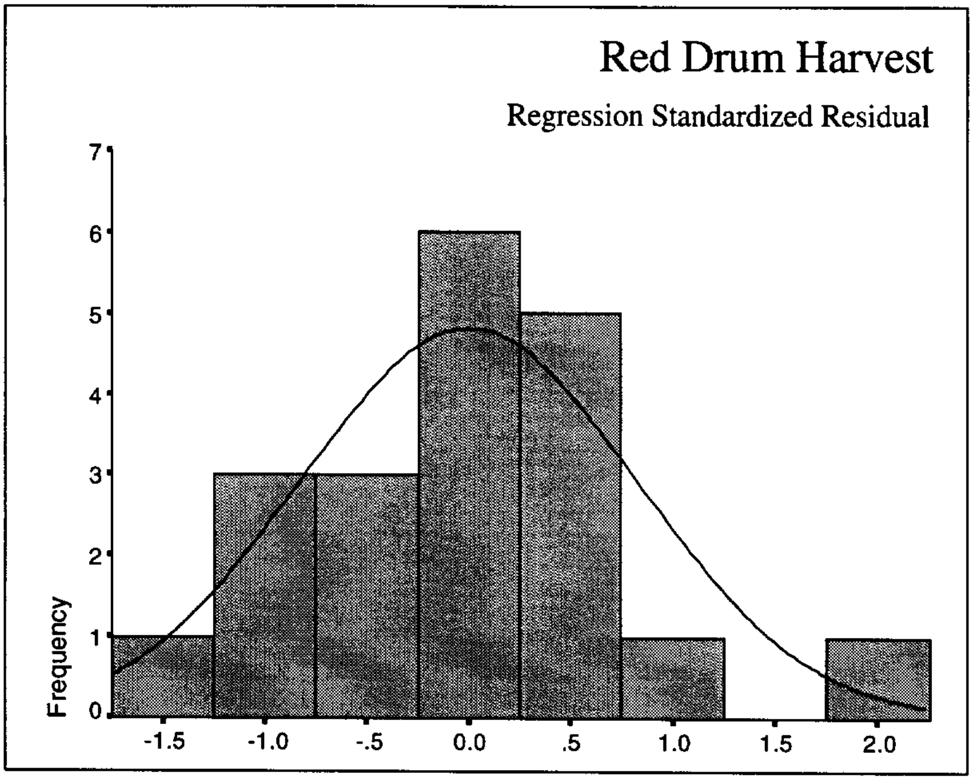
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	18.23396	-15.63396	-23.18255	25.78255	-.72680	-.80777	-.98364	-.98231
1963	22.81565	-21.51565	-29.63809	30.93809	-.46727	-1.11166	-1.30473	-1.34468
1964	20.23608	5.46392	9.35511	16.34489	-.61339	.28231	.36940	.35678
1965	28.28304	3.91696	8.15321	24.04679	-.15758	.20238	.29198	.28145
1966	26.51046	3.28954	4.75194	25.04806	-.25799	.16996	.20428	.19658
1967	34.36060	10.63940	15.73500	29.26500	.18668	.54971	.66852	.65362
1968	32.22602	-11.02602	-15.63035	36.83035	.06576	-.56969	-.67829	-.66352
1969	34.76771	3.33229	4.28856	33.81144	.20974	.17217	.19532	.18793
1970	39.69072	-4.39072	-6.36425	41.66425	.48859	-.22686	-.27312	-.26317
1971	31.04086	-12.94086	-21.71221	39.81221	-.00137	-.66862	-.86607	-.85719
1972	30.51363	3.08637	4.04838	29.55162	-.03123	.15947	.18263	.17570
1973	40.04624	9.55376	11.14134	38.45866	.50873	.49362	.53306	.51784
1974	51.52706	-16.62706	-23.81049	58.71049	1.15905	-.85908	-1.02804	-1.03049
1975	67.35464	12.14536	20.24751	59.25249	2.05558	.62752	.81023	.79888
1976	57.07281	40.42719	56.82145	40.67855	1.47318	2.08878	2.47635	*3.27339
1977	56.15067	-31.95067	-58.59424	82.79424	1.42095	-1.65082	-2.23556	*-2.73761
1978	10.91336	3.98664	5.25811	9.64189	-1.14147	.20598	.23656	.22777
1979	1.09804	17.60196	41.95314	-23.25314	-1.69744	.90945	1.40405	1.46457
1980	3.61815	9.48185	15.25595	-2.15595	-1.55469	.48991	.62142	.60611
1981	14.84030	-8.84030	-20.83243	26.83243	-.91903	-.45676	-.70117	-.68677

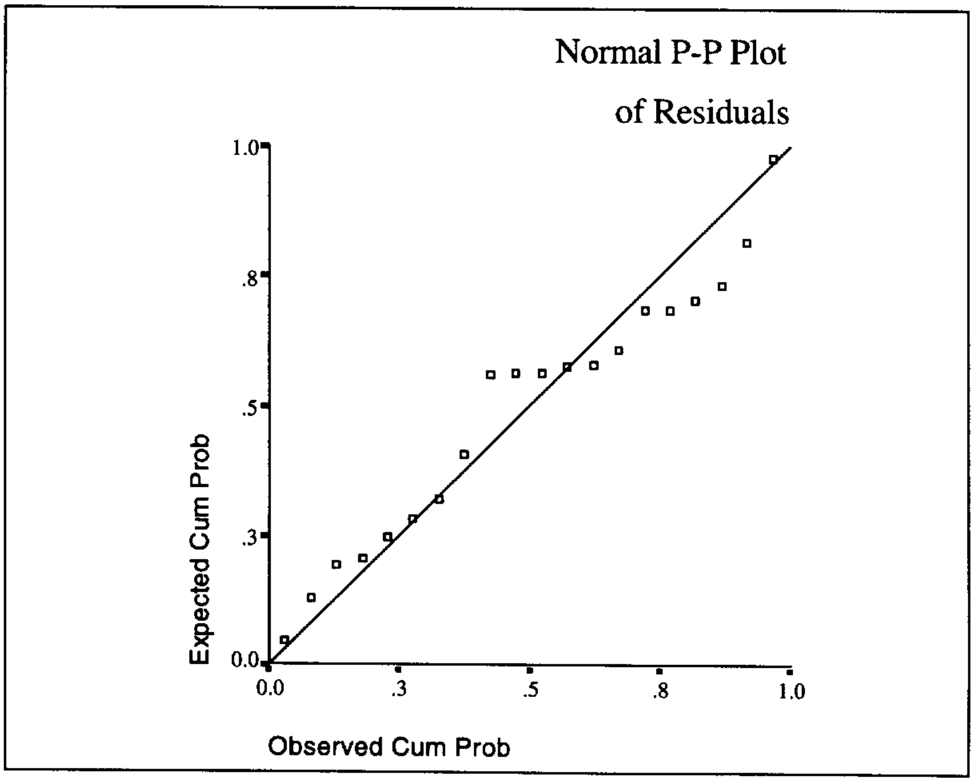
PRE_1	Predicted value of harvest
RES_1	Ordinary residual; observed harvest minus predicted harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

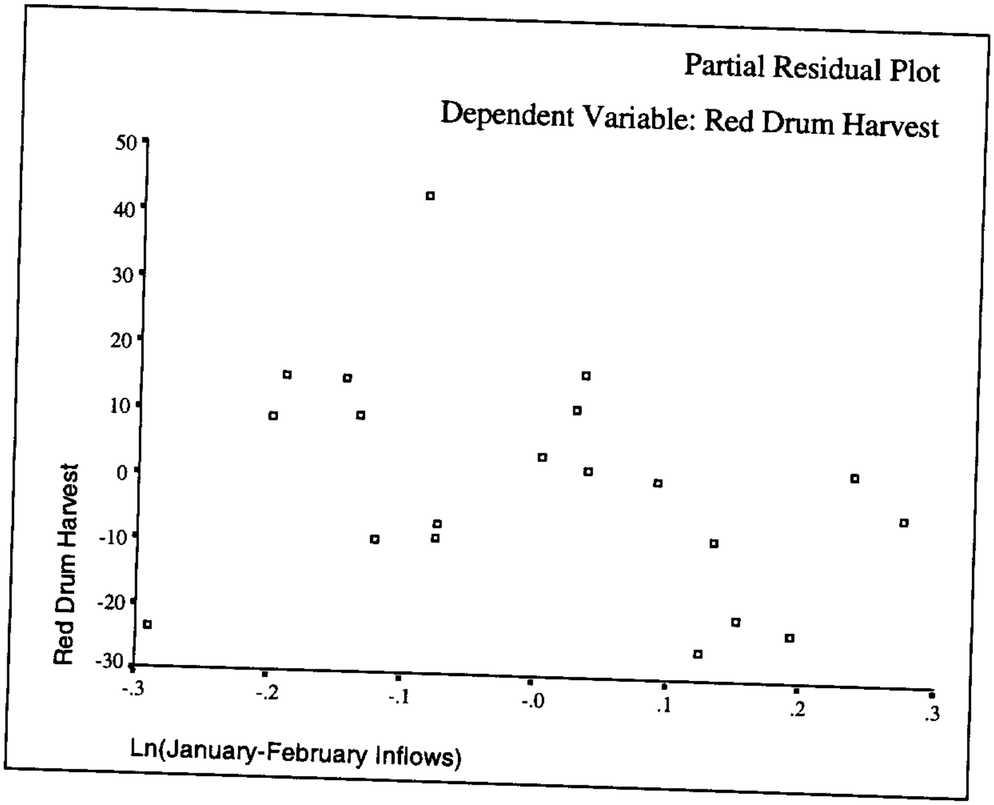
[1] Values greater than 3 are flagged.

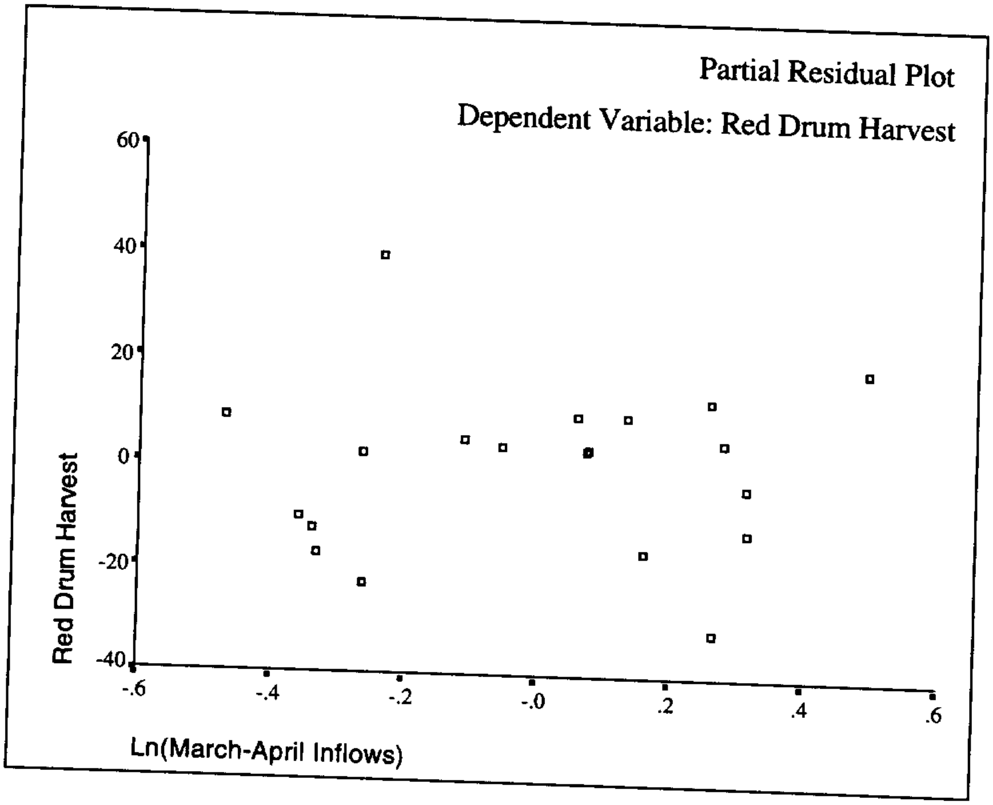
[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{12,0.01} = 2.681$.

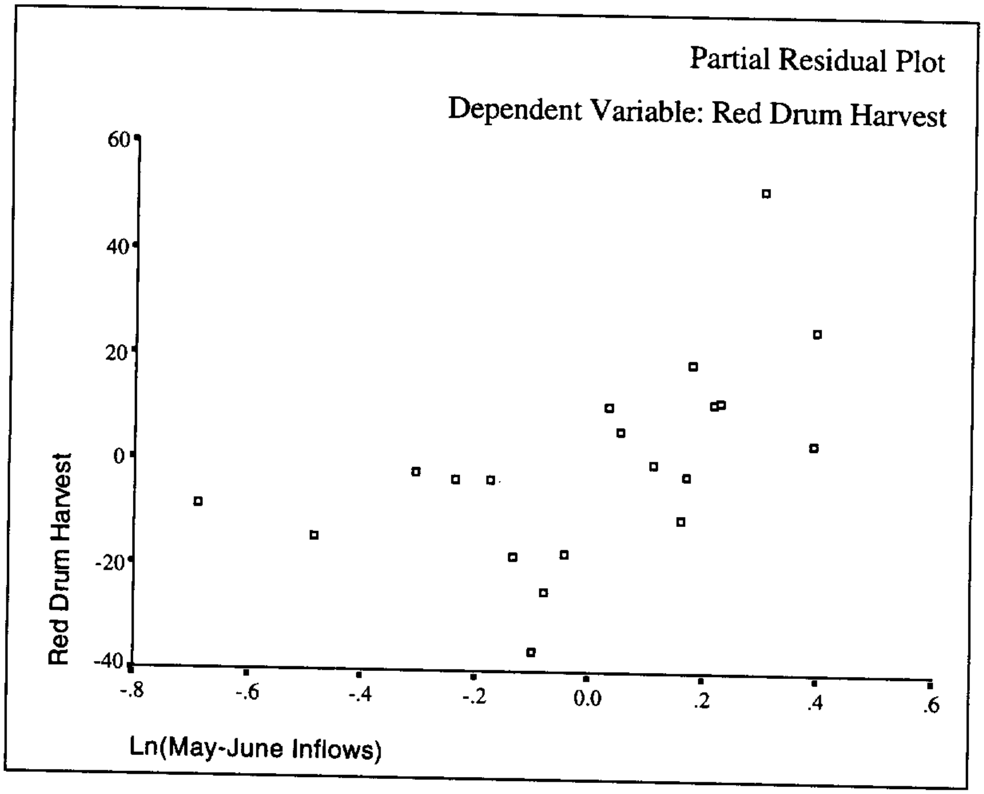
Graphics

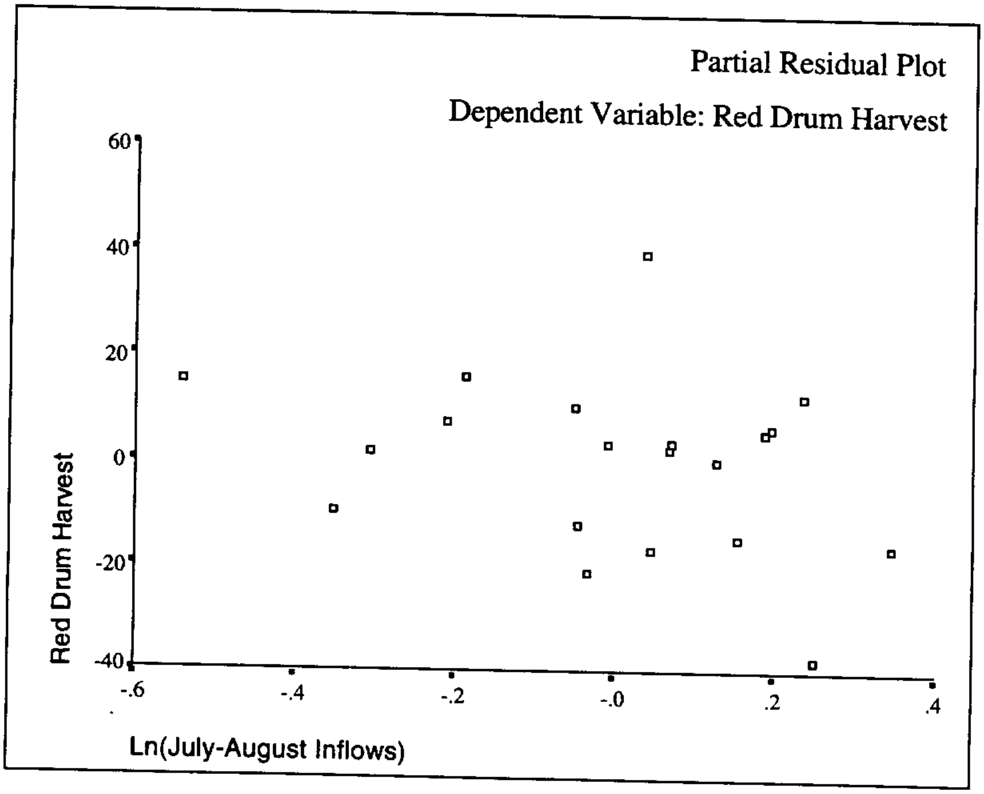

Red Drum Harvest
Regression Standardized Residual
Frequency
0
1
2
3
4
5
6
7
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
2.0

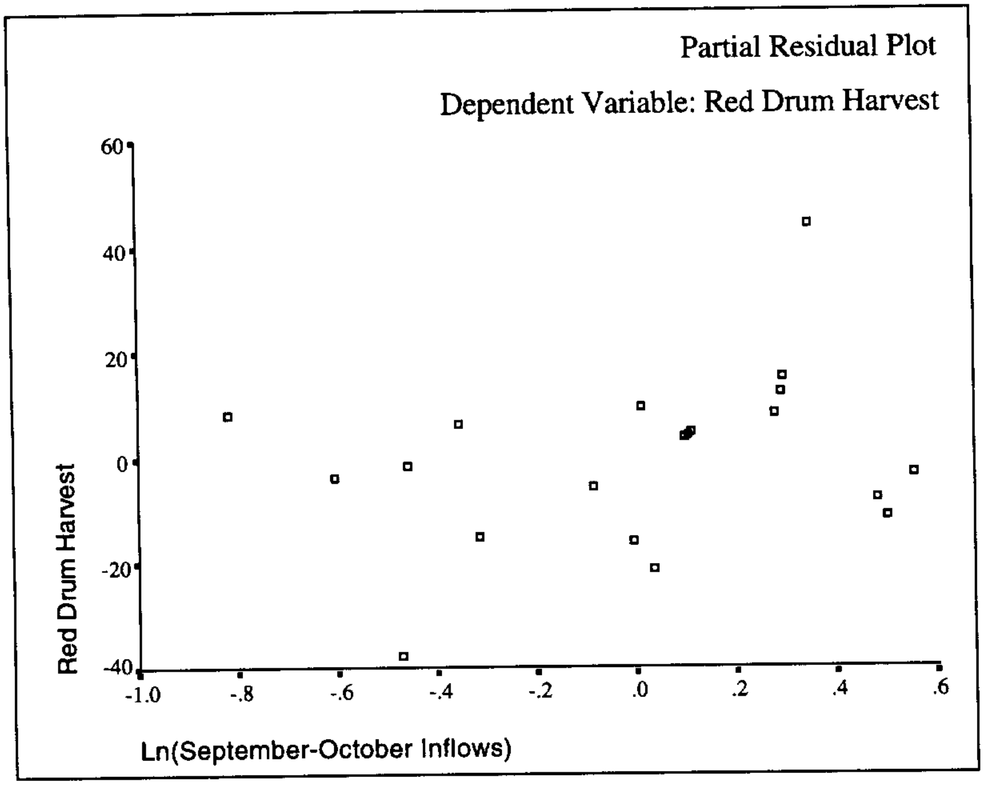

Normal P-P Plot
of Residuals
Expected Cum Prob
0.0
.3
.5
.8
1.0
Observed Cum Prob
0.0
.3
.5
.8
1.0

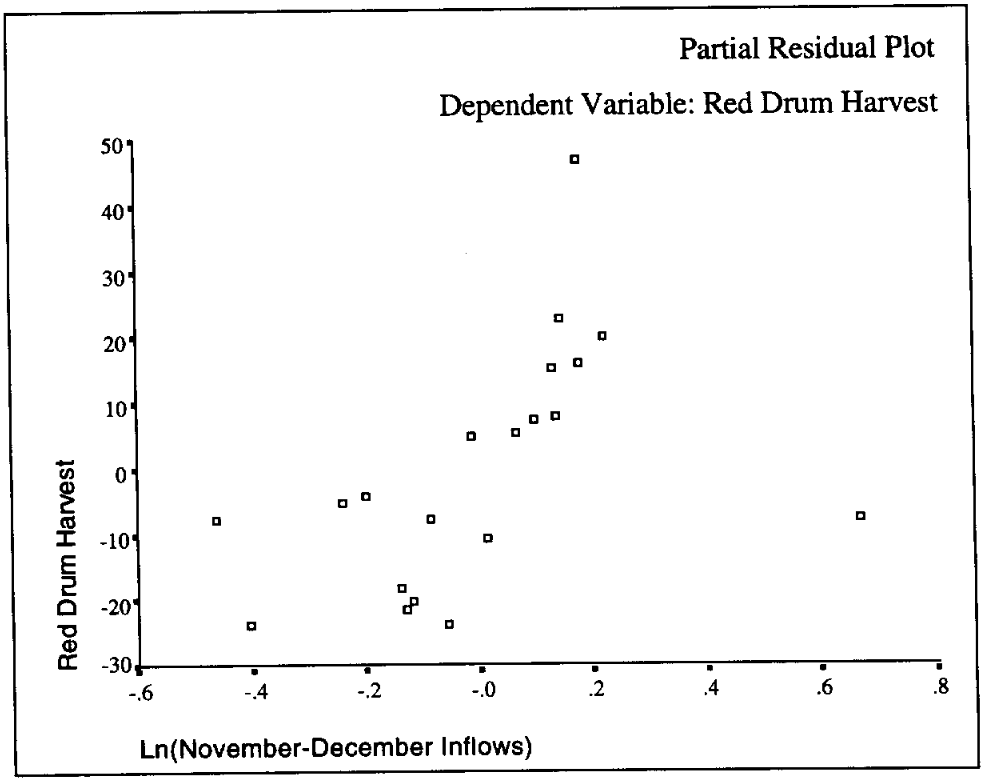

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
50
40
30
20
10
0
-10
-20
-30
-.3
-.2
-.1
-.0
.1
.2
.3
Ln(January-February Inflows)

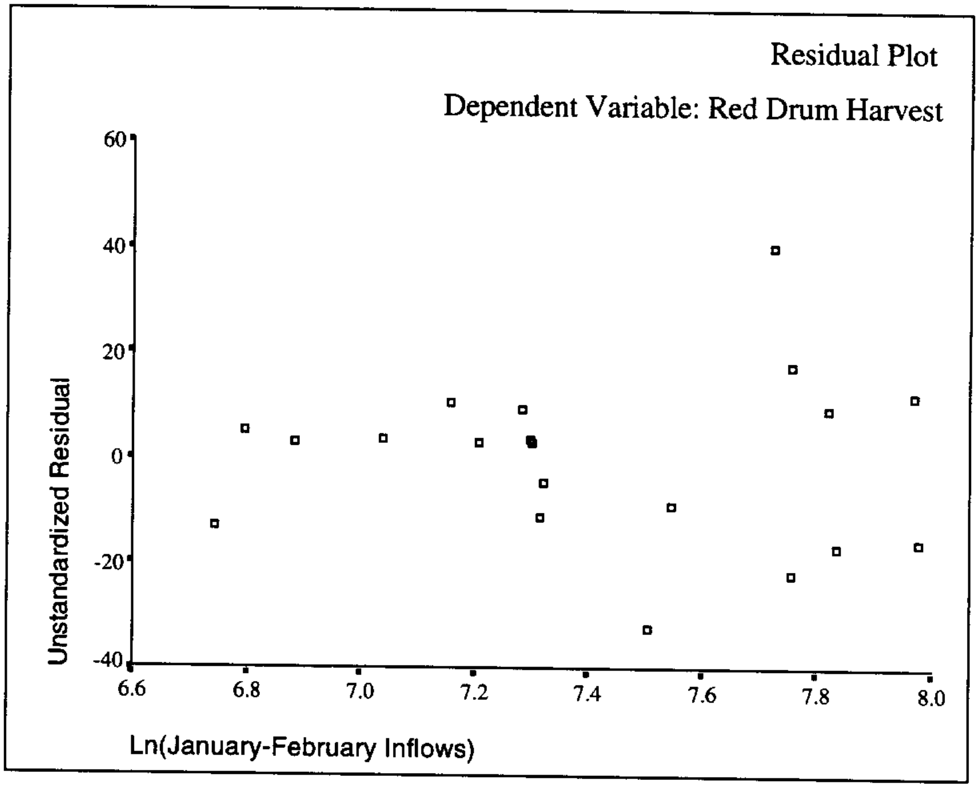

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
60
40
20
0
-20
-40
-.6
-.4
-.2
-.0
.2
.4
.6
Ln(March-April Inflows)

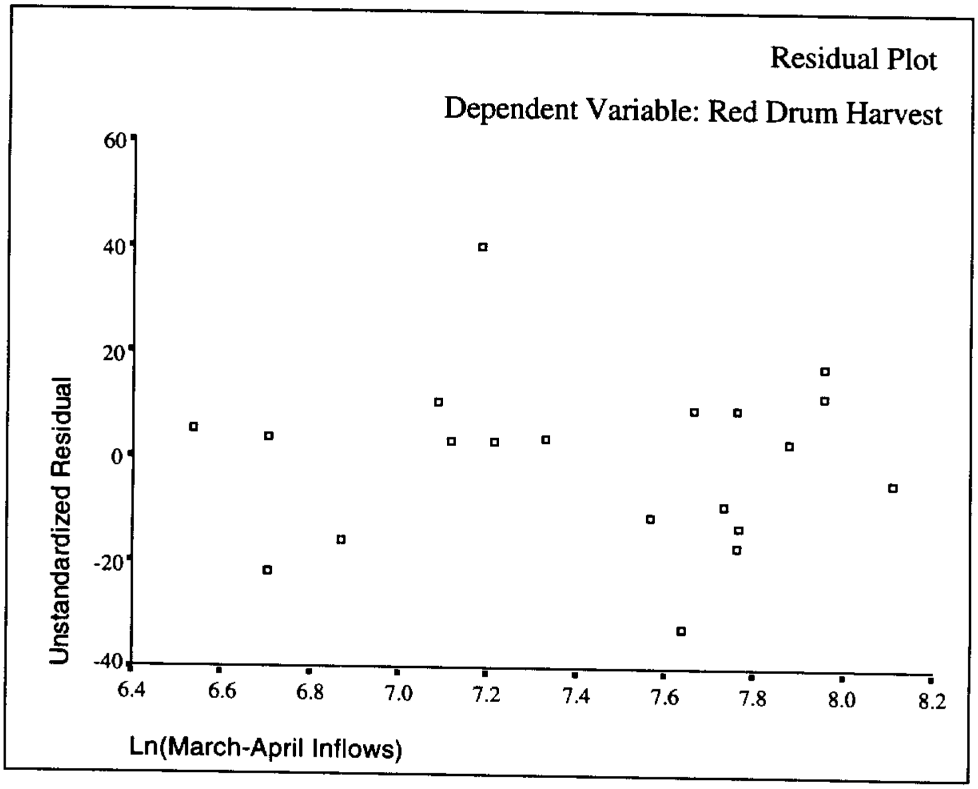

Partial Residual Plot
Dependent Variable: Red Drum Harvest
60
40
20
0
-20
-40
Red Drum Harvest
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Ln(May-June Inflows)

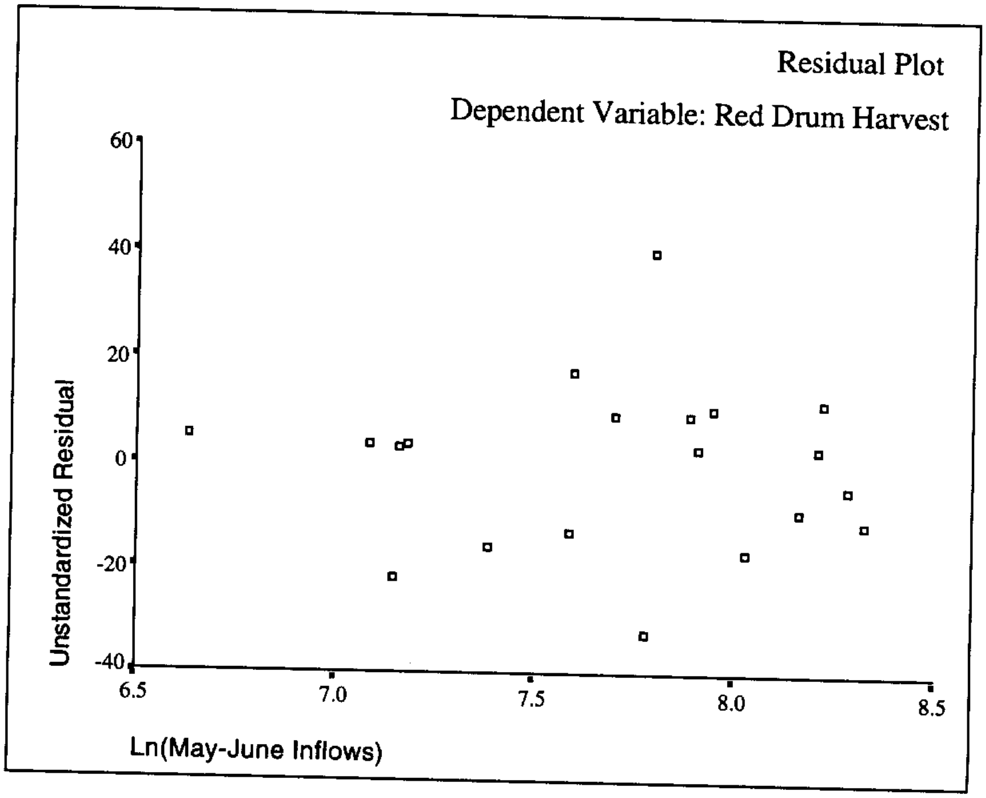

Partial Residual Plot
Dependent Variable: Red Drum Harvest
60
40
20
0
-20
-40
Red Drum Harvest
-.6
-.4
-.2
-.0
.2
.4
Ln(July-August Inflows)

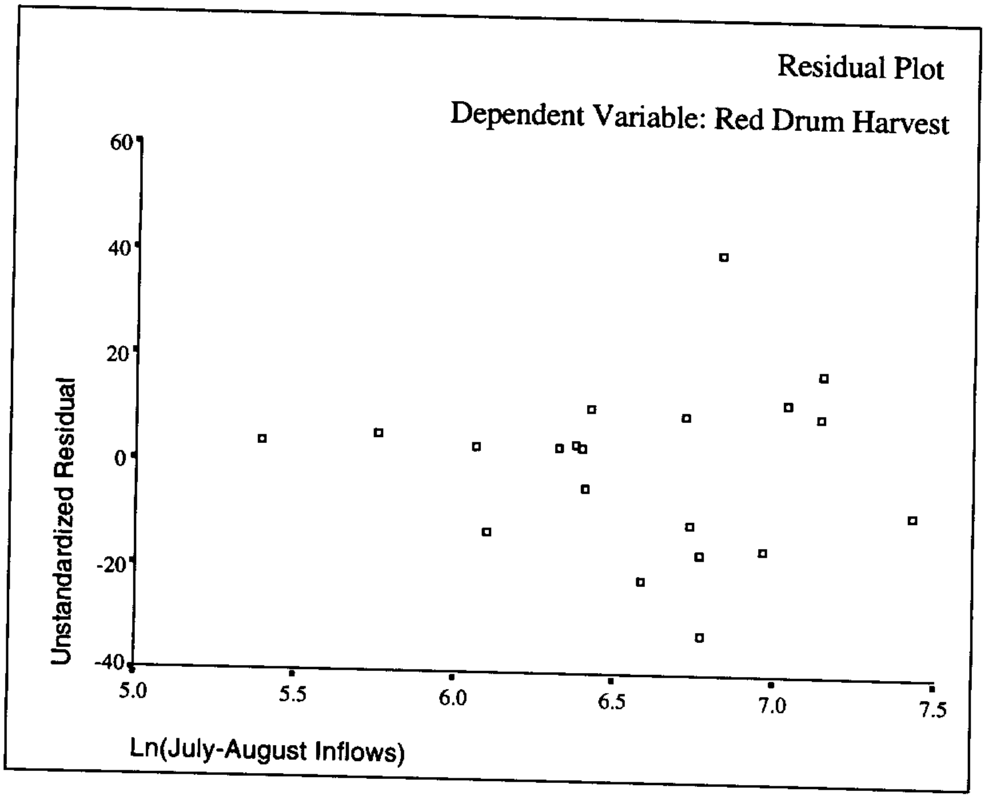

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
60
40
20
0
-20
-40
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Ln(September-October Inflows)

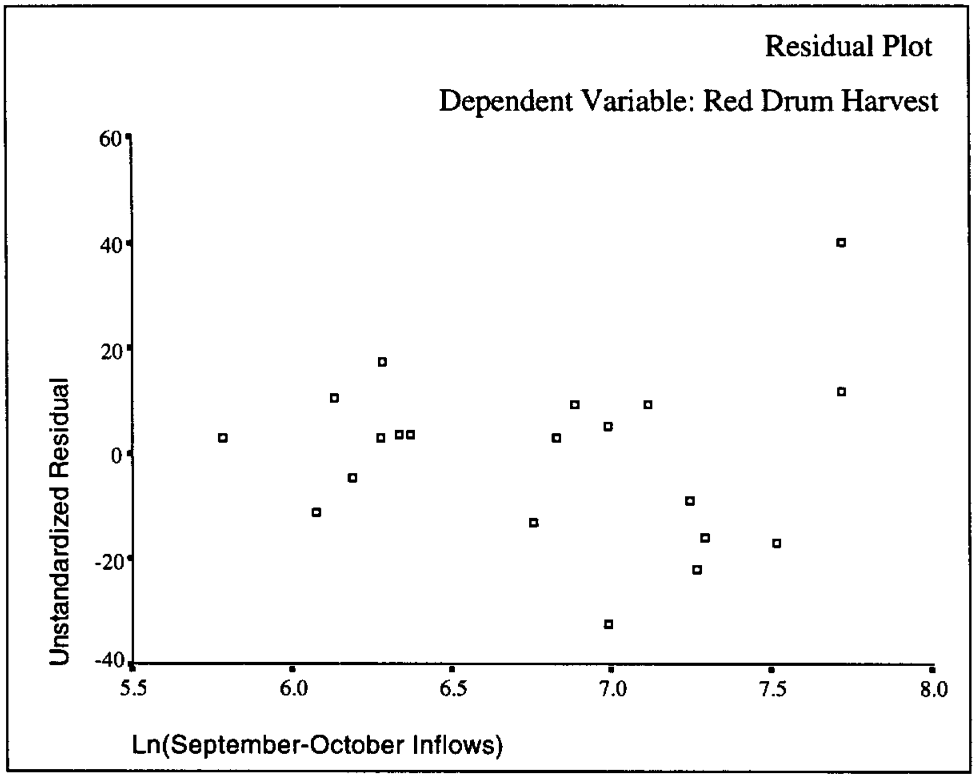

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
50
40
30
20
10
0
-10
-20
-30
-.6
-.4
-.2
-.0
.2
.4
.6
.8
Ln(November-December Inflows)

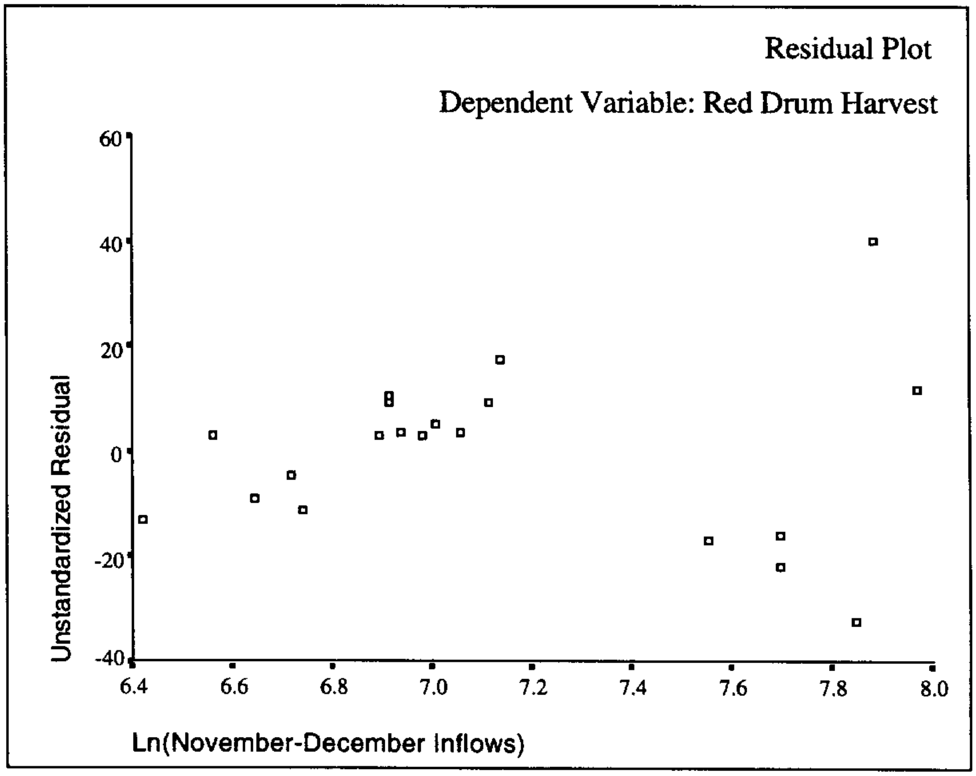

Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
60
40
20
0
-20
-40
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(January-February Inflows)


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
60
40
20
0
-20
-40
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Ln(March-April Inflows)


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
60
40
20
0
-20
-40
6.5
7.0
7.5
8.0
8.5
Ln(May-June Inflows)


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
60
40
20
0
-20
-40
5.0
5.5
6.0
6.5
7.0
7.5
Ln(July-August Inflows)


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
60
40
20
0
-20
-40
5.5
6.0
6.5
7.0
7.5
8.0
Ln(September-October Inflows)


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
60
40
20
0
-20
-40
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(November-December Inflows)

Prediction Intervals for Red Drum Harvest

YEAR	RED_DRUM	LICI_1	UICI_1
1962	2.60	-48.89105	85.35896
1963	1.30	-42.99095	88.62225
1964	25.70	-49.13819	89.61034
1965	32.20	-43.58527	100.15135
1966	29.80	-40.16064	93.18156
1967	45.00	-32.71941	101.44060
1968	21.20	-34.10847	98.56051
1969	38.10	-29.70641	99.24182
1970	35.30	-27.04023	106.42167
1971	18.10	-38.03978	100.12151
1972	33.60	-34.34546	95.37273
1973	49.60	-22.27020	102.36269
1974	34.90	-14.98948	118.04360
1975	79.50	-1.63179	136.34107
1976	97.50	-9.10640	123.25201
1977	24.20	-14.16696	126.46830
1978	14.90	-54.05520	75.88191
1979	18.70	-72.19525	74.39134
1980	13.10	-64.83226	72.06855
1981	6.00	-58.34184	88.02243

RED_DRUM	Red drum harvest harvest
LICI_1	Lower limit for 99% prediction interval for red drum harvest
UICI_1	Upper limit for 99% prediction interval for red drum harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	5.23669	.06674	.27562	.6311	.0007
1963	4.25703	.09181	.22405	.7497	.0020
1964	6.95291	.01388	.36594	.4338	.0000
1965	8.92203	.01317	.46958	.2583	.0000
1966	4.89722	.00265	.25775	.6725	.0000
1967	5.20293	.03058	.27384	.6352	.0001
1968	4.64695	.02745	.24458	.7030	.0000
1969	3.28664	.00156	.17298	.8573	.0000
1970	4.94185	.00479	.26010	.6671	.0000
1971	6.72566	.07263	.35398	.4580	.0010
1972	3.56496	.00149	.18763	.8283	.0000
1973	1.75740	.00675	.09249	.9720	.0000
1974	4.78215	.06523	.25169	.6865	.0007
1975	6.65295	.06256	.35016	.4659	.0006
1976	4.53192	.35526	.23852	.7169	.0875
1977	7.68955	.59537	.40471	.3608	.2506
1978	3.64440	.00255	.19181	.8197	.0000
1979	10.07832	.38961	*.53044	.1842	.1078
1980	6.24115	.03359	.32848	.5119	.0001
1981	9.98730	.09527	*.52565	.1893	.0023

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

---

[1] This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2] MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	-.68257	.01248	-.26573	.32399
1963	-.82620	-.06165	-.28702	.33626
1964	.30109	.20980	-.09096	-.04235
1965	.29270	.04020	.16303	-.01820
1966	.13107	.02500	.01332	-.05076
1967	.45234	.17023	-.16818	-.30588
1968	-.42878	-.06436	.08652	.21768
1969	.10068	-.01461	.02827	.01309
1970	-.17643	.06962	-.06187	-.08134
1971	-.70571	-.19497	.19514	-.28541
1972	.09809	.05645	-.05877	.01217
1973	.21109	.01446	-.15469	.02677
1974	-.67733	.50653	-.34634	-.16112
1975	.65249	-.55182	.04389	.21771
1976	*2.08452	-.68984	-.48772	-.75533
1977	*-2.49993	.53844	*1.56785	-.80477
1978	.12863	.04301	.00154	.05966
1979	*1.72263	-.01180	.11263	.91143
1980	.47299	-.04072	.26709	.08397
1981	-.79989	-.15728	.11314	.30930

SDFFITS	Standardized dffits value
SDFBETA_0	Standardized dfbeta for the intercept term
SDFBETA_1	Standardized dfbeta for logged January-February inflows
SDFBETA_2	Standardized dfbeta for logged March-April inflows

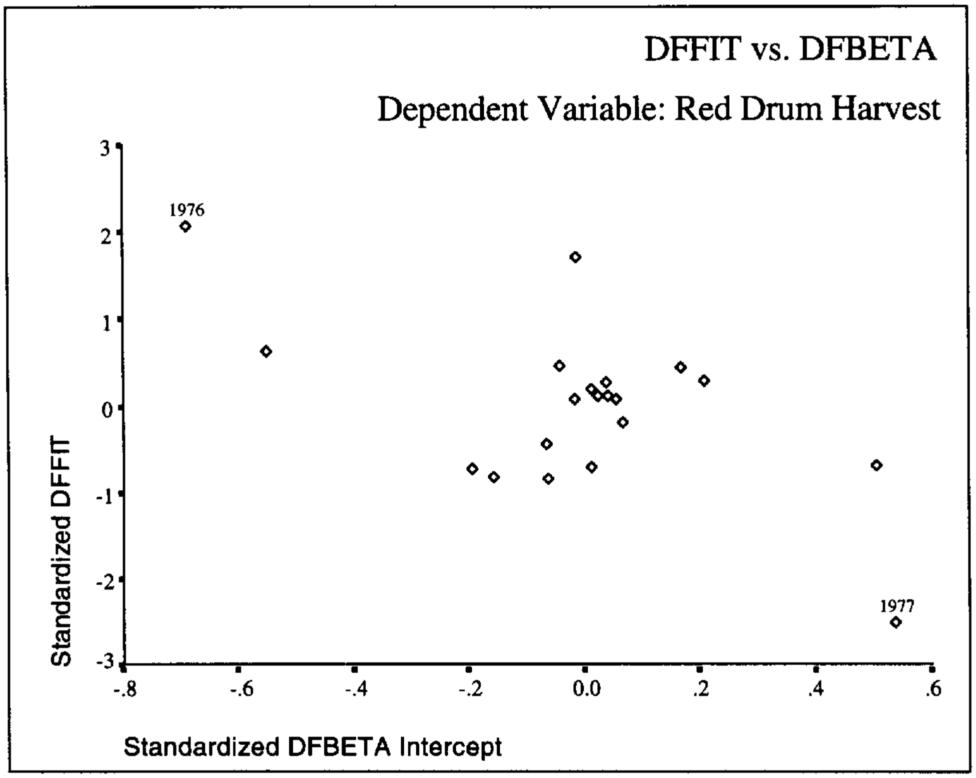
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

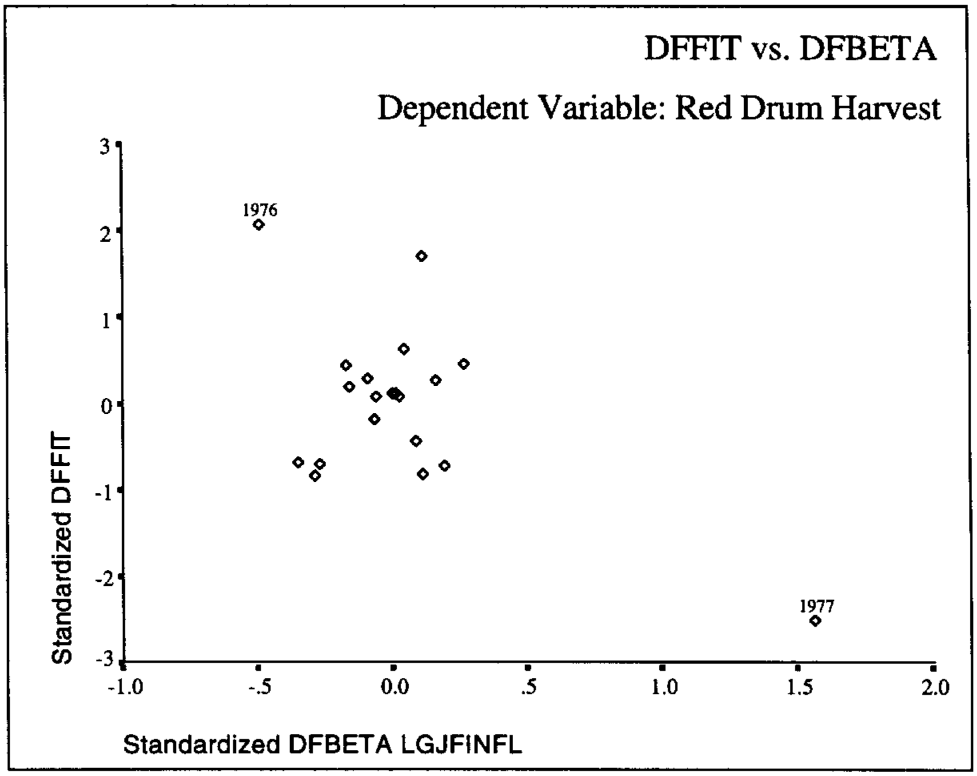
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.04134	-.05667	.00465	.13128
1963	.09944	.05176	-.03229	.08015
1964	-.08894	.03455	.07620	-.00577
1965	.01768	-.22389	.02672	-.09060
1966	.04343	-.00197	-.08402	.01435
1967	.25388	.15904	-.16524	.09735
1968	-.24986	-.12546	.14643	-.01061
1969	.03731	-.04567	.01308	-.03943
1970	-.02897	.09870	.01550	.02491
1971	.11955	.05179	-.31297	.14320
1972	-.02831	.02620	.01171	.02568
1973	.01525	.10790	.00408	.09217
1974	-.16234	.44236	-.36390	.14609
1975	.14901	-.19697	.17902	.21227
1976	.94943	.15051	.79594	.64388
1977	.29625	-.95045	*1.02722	*-2.29493
1978	-.10235	.01875	-.07058	.02405
1979	*-1.26280	.54251	*-1.08674	.30754
1980	-.19074	-.03790	.13143	-.32840
1981	-.14415	-.37285	-.34398	.39390

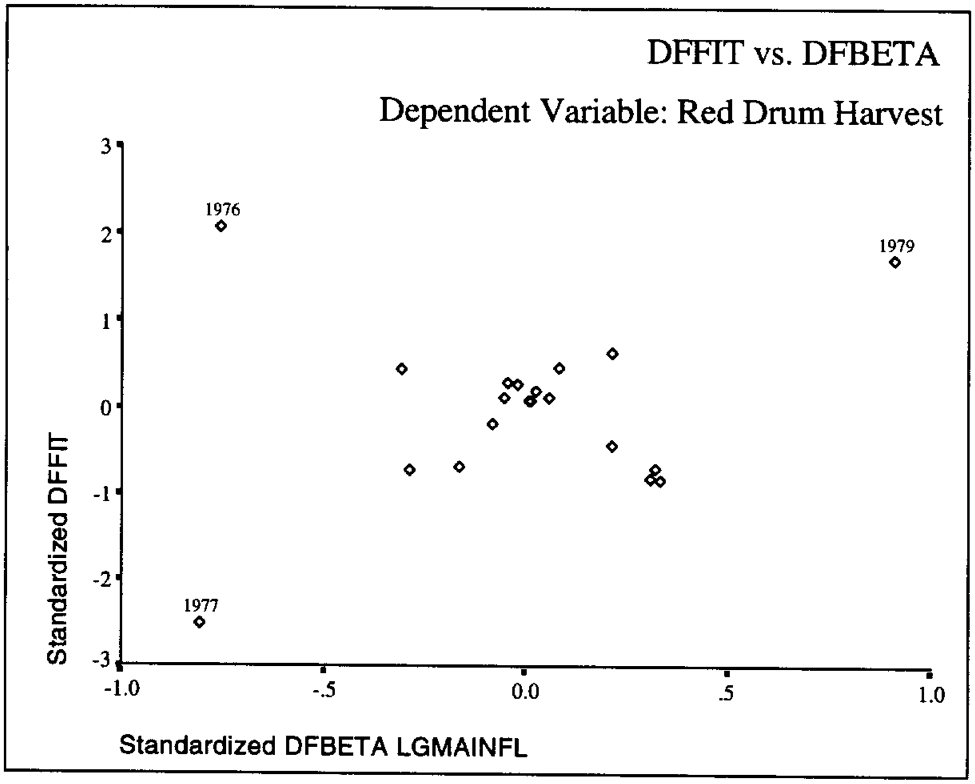
SDFBETA_3	Standardized dfbeta for logged May-June inflows
SDFBETA_4	Standardized dfbeta for logged July-August inflows
SDFBETA_5	Standardized dfbeta for logged September-October inflows
SDFBETA_6	Standardized dfbeta for logged November-December inflows

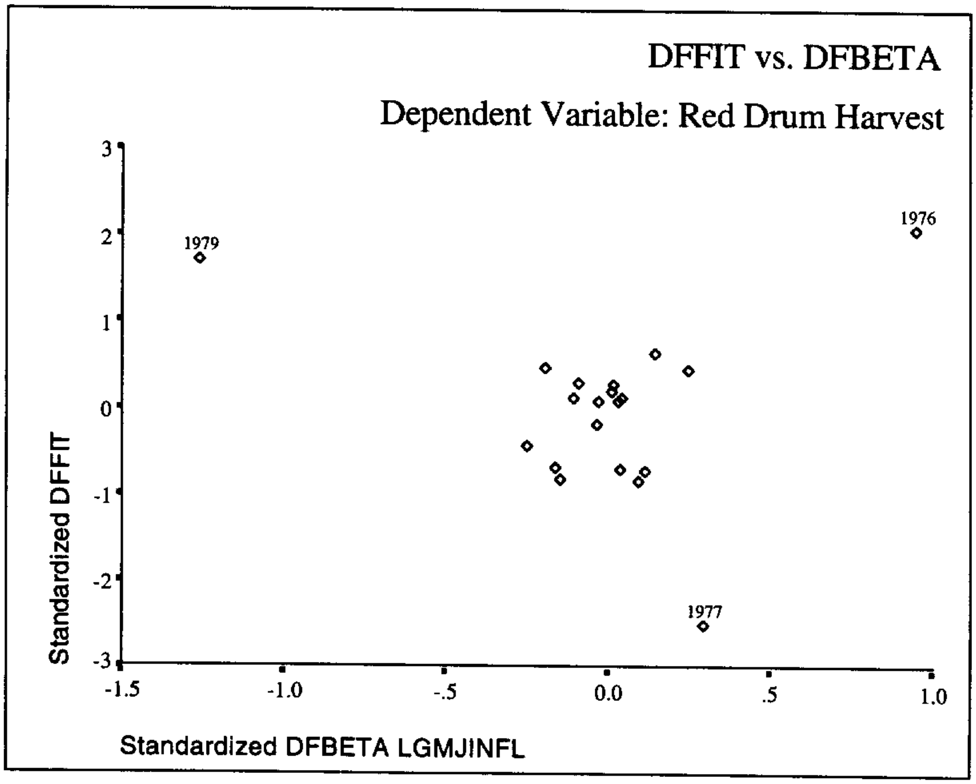
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

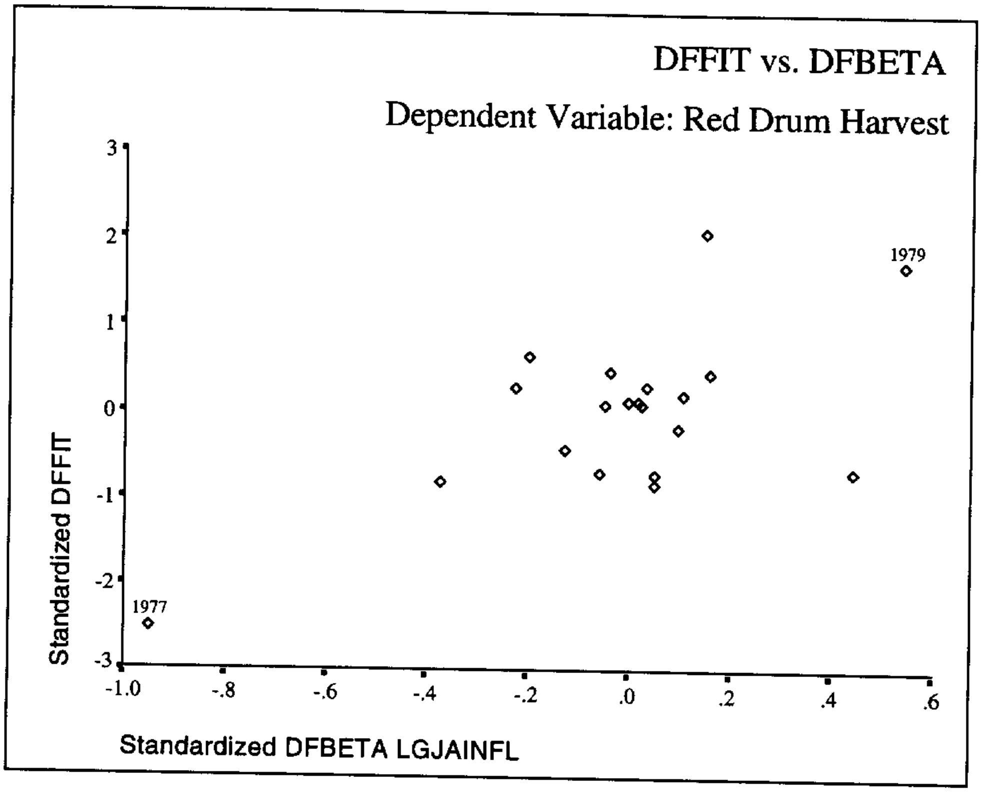
Graphics

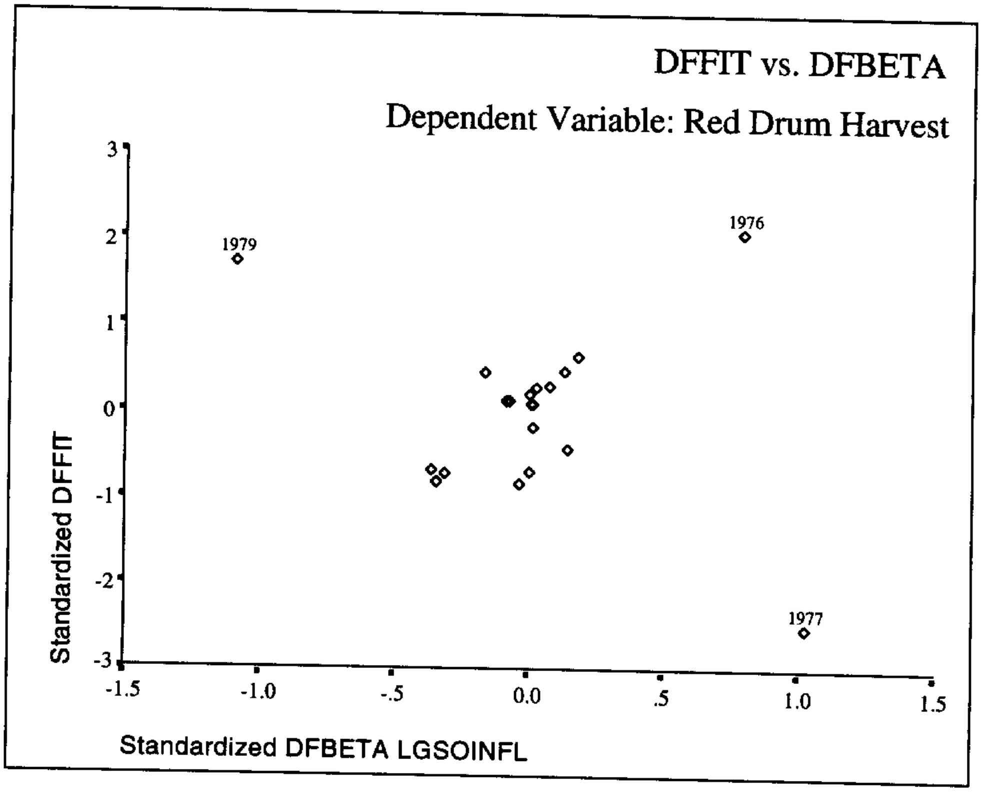

DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
1976
1977
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA Intercept

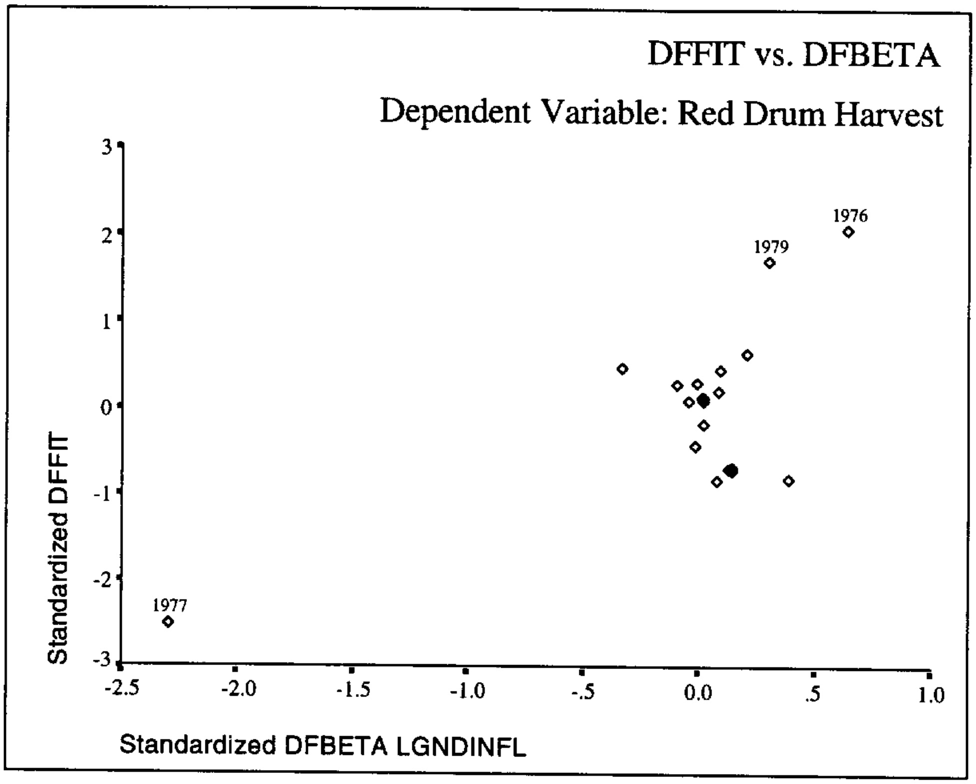

DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
1976
1977
-1.0
-.5
0.0
.5
1.0
1.5
2.0
Standardized DFBETA LGJFINFL


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
1976
1979
1977
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA LGMAINFL


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
1979
1976
1977
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA LGMJINFL


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
Standardized DFBETA LGJAINFL
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
1979
1977


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
Standardized DFBETA LGSOINFL
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
1979
1976
1977


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
1976
1979
1977
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA LGNDINFL

Regression—Logged Harvest and Inflows

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	*Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)*[c,d]	.	*.749*	*.561*	*.358*	*.8415*	*1.852*

a. Dependent Variable: Ln(Red Drum Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*11.750*	*6*	*1.958*	*2.765*	*.059*[b]
	Residual	*9.206*	*13*	*.708*		
	Total	*20.956*	*19*			

a. Dependent Variable: Ln(Red Drum Harvest)

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	*-4.583*	*5.297*		*-.865*	*.403*	*-16.025*	*6.860*
	Ln(January-February Inflows)	*-1.805*	*1.225*	*-.653*	*-1.473*	*.164*	*-4.453*	*.842*
	Ln(March-April Inflows)	*.996*	*.686*	*.449*	*1.452*	*.170*	*-.486*	*2.479*
	Ln(May-June Inflows)	*1.161*	*.682*	*.523*	*1.701*	*.113*	*-.313*	*2.635*
	Ln(July-August Inflows)	*-.963*	*.857*	*-.454*	*-1.124*	*.282*	*-2.816*	*.889*
	Ln(September-October Inflows)	*2.699E-02*	*.494*	*.015*	*.055*	*.957*	*-1.040*	*1.094*
	Ln(November-December Inflows)	*1.519*	*.781*	*.682*	*1.944*	*.074*	*-.169*	*3.207*

a. Dependent Variable: Ln(Red Drum Harvest)

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln(January-February Inflows)	*.172*	*5.821*
	Ln(March-April Inflows)	*.353*	*2.835*
	Ln(May-June Inflows)	*.357*	*2.801*
	Ln(July-August Inflows)	*.207*	*4.841*
	Ln(September-October Inflows)	*.456*	*2.193*
	Ln(November-December Inflows)	*.274*	*3.647*

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Ln(January-February Inflows)	Ln(March-April Inflows)
1	1	6.984	1.000	.00	.00	.00
	2	9.020E-03	27.826	.00	.00	.03
	3	2.966E-03	48.524	.14	.00	.00
	4	2.173E-03	56.697	.00	.03	.09
	5	9.164E-04	87.299	.53	.01	.00
	6	7.542E-04	96.232	.16	.00	.87
	7	2.920E-04	154.662	.17	.96	.01

a. Dependent Variable: Ln(Red Drum Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		Ln(May-June Inflows)	Ln(July-August Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	.00	.00	.00	.00
	2	.03	.00	.12	.02
	3	.00	.19	.04	.03
	4	.00	.04	.63	.09
	5	.52	.08	.01	.19
	6	.45	.01	.10	.19
	7	.00	.67	.10	.47

a. Dependent Variable: Ln(Red Drum Harvest)

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*1.6142*	*4.0977*	*3.0699*	*.7864*	20
Std. Predicted Value	*-1.851*	*1.307*	*.000*	*1.000*	20
Standard Error of Predicted Value	*.3177*	*.6411*	*.4913*	*8.247E-02*	20
Adjusted Predicted Value	*1.3105*	*4.8494*	*3.0557*	*.9531*	20
Residual	*-1.6742*	*1.2868*	*5.407E-15*	*.6961*	20
Std. Residual	*-1.990*	*1.529*	*.000*	*.827*	20
Stud. Residual	*-2.335*	*1.813*	*.006*	*1.032*	20
Deleted Residual	*-2.3063*	*1.8086*	*1.428E-02*	*1.0993*	20
Stud. Deleted Residual	*-2.944*	*2.015*	*-.022*	*1.138*	20
Mahal. Distance	*1.757*	*10.078*	*5.700*	*2.212*	20
Cook's Distance	*.000*	*.294*	*.087*	*.100*	20
Centered Leverage Value	*.092*	*.530*	*.300*	*.116*	20

a. Dependent Variable: Ln(Red Drum Harvest)

Case Values for Residuals Diagnostics

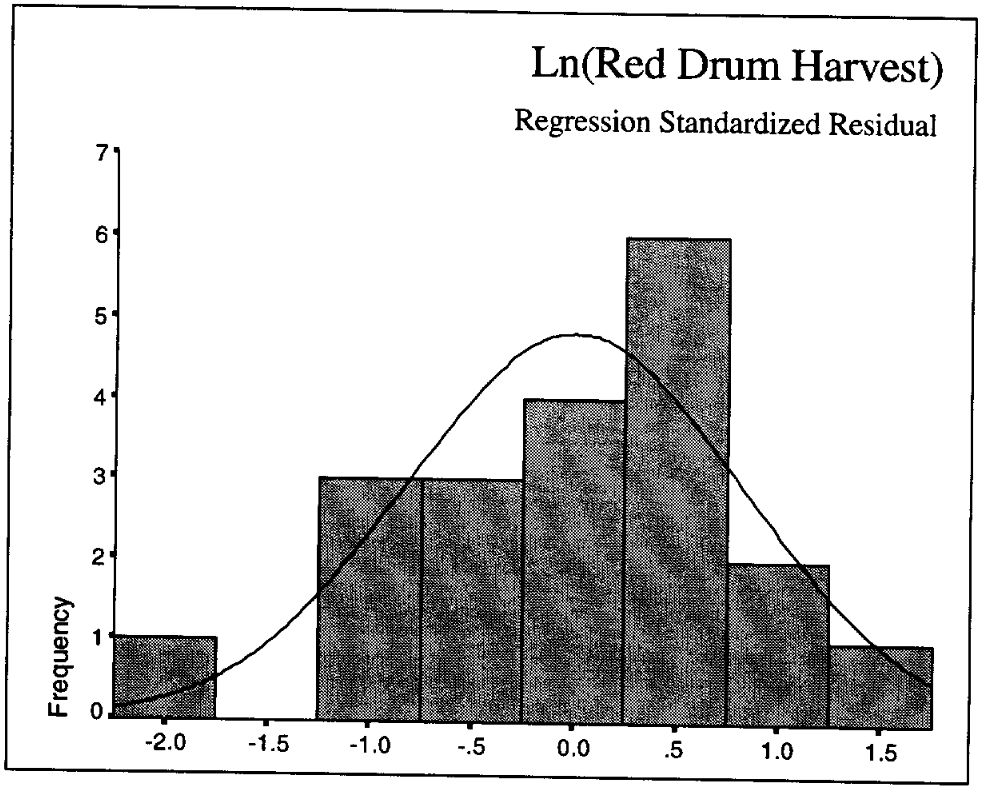
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	1.61423	-.65872	-.97677	1.93228	-1.85114	-.78278	-.95320	-.94959
1963	1.93659	-1.67422	-2.30626	2.56863	-1.44121	-1.98954	-2.33507	*-2.94435
1964	2.64471	.60178	1.03035	2.21614	-.54074	.71512	.93573	.93092
1965	3.12574	.34623	.72067	2.75129	.07096	.41143	.59359	.57819
1966	3.14073	.25378	.36660	3.02790	.09002	.30158	.36247	.35002
1967	3.26563	.54103	.80015	3.00651	.24885	.64293	.78187	.76951
1968	3.32886	-.27486	-.38964	3.44364	.32926	-.32662	-.38889	-.37582
1969	3.75439	-.11417	-.14694	3.78715	.87037	-.13567	-.15392	-.14801
1970	4.09767	-.53379	-.77372	4.33760	1.30691	-.63432	-.76369	-.75076
1971	3.84322	-.94730	-1.58939	4.48530	.98333	-1.12571	-1.45814	-1.53179
1972	3.33768	.17684	.23196	3.28256	.34048	.21015	.24068	.23176
1973	3.58280	.32119	.37457	3.52943	.65218	.38168	.41218	.39862
1974	3.48818	.06430	.09208	3.46040	.53186	.07641	.09144	.08788
1975	4.04030	.33546	.55924	3.81651	1.23395	.39864	.51471	.49963
1976	3.29309	1.28676	1.80857	2.77128	.28378	1.52910	1.81282	2.01490
1977	4.09319	-.90684	-1.66304	4.84940	1.30121	-1.07762	-1.45933	-1.53329
1978	2.63354	.06782	.08945	2.61191	-.55494	.08059	.09256	.08895
1979	2.28631	.64222	1.53068	1.39784	-.99650	.76317	1.17821	1.19774
1980	1.78816	.78445	1.26215	1.31046	-1.62996	.93219	1.18243	1.20255
1981	2.10372	-.31196	-.73515	2.52691	-1.22868	-.37072	-.56909	-.55370

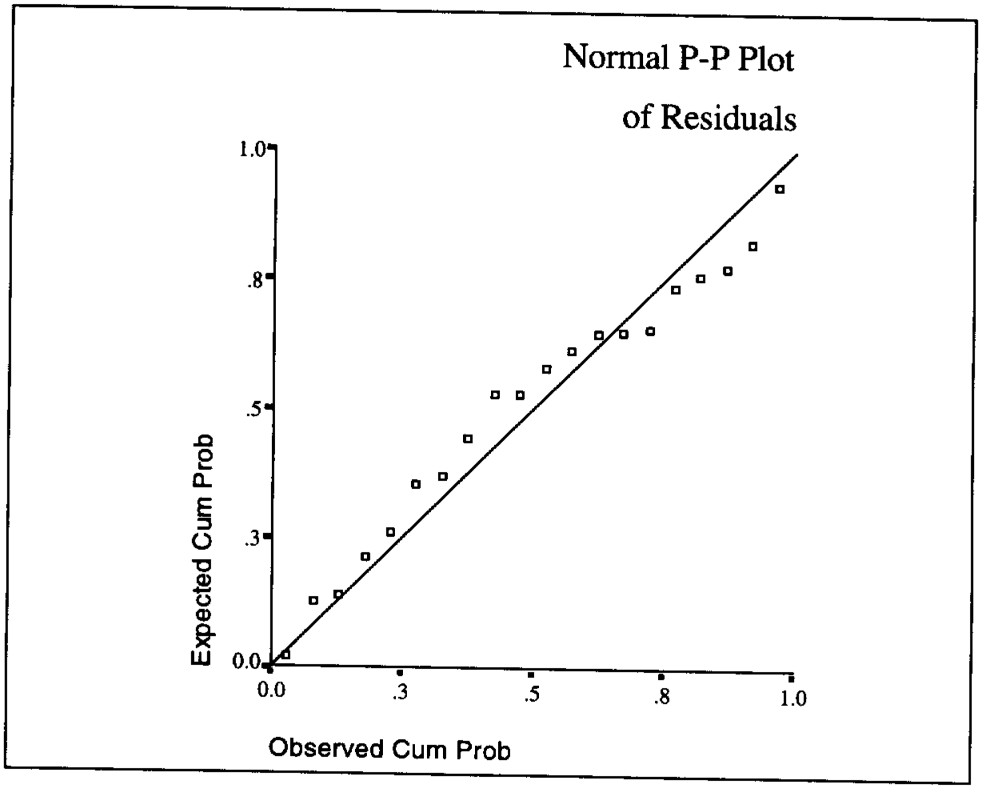
PRE_1	Predicted value of the natural log of harvest
RES_1	Ordinary residual; observed log harvest minus predicted log harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of the log of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of the log of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

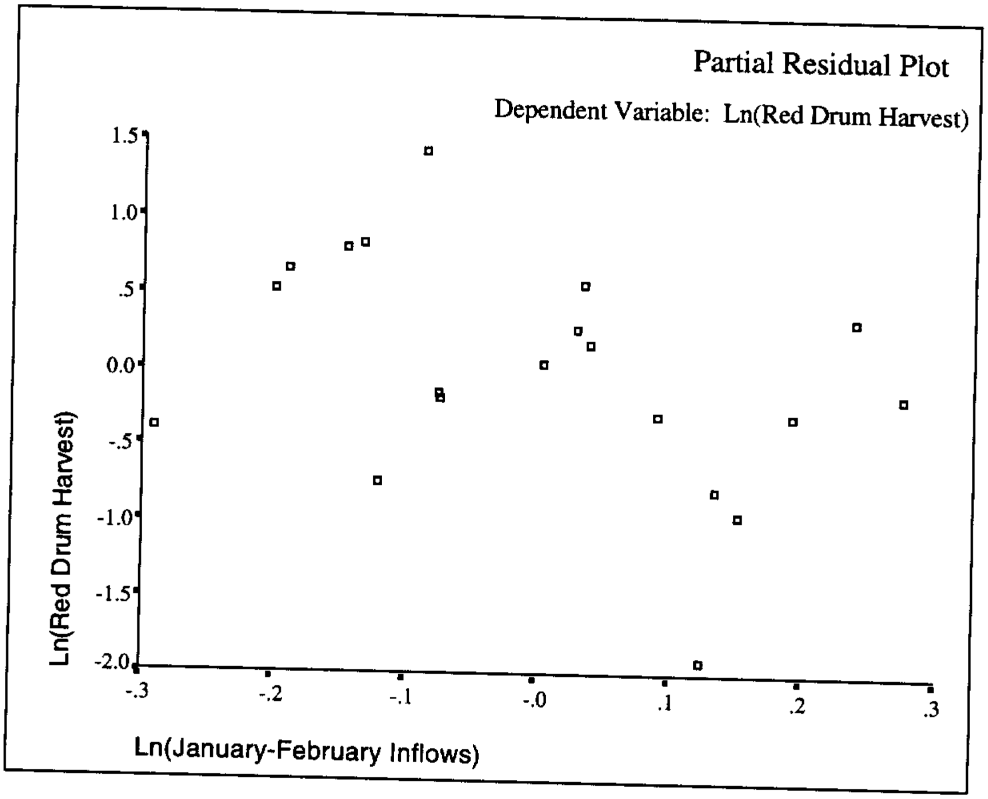
[1] Values greater than 3 are flagged.

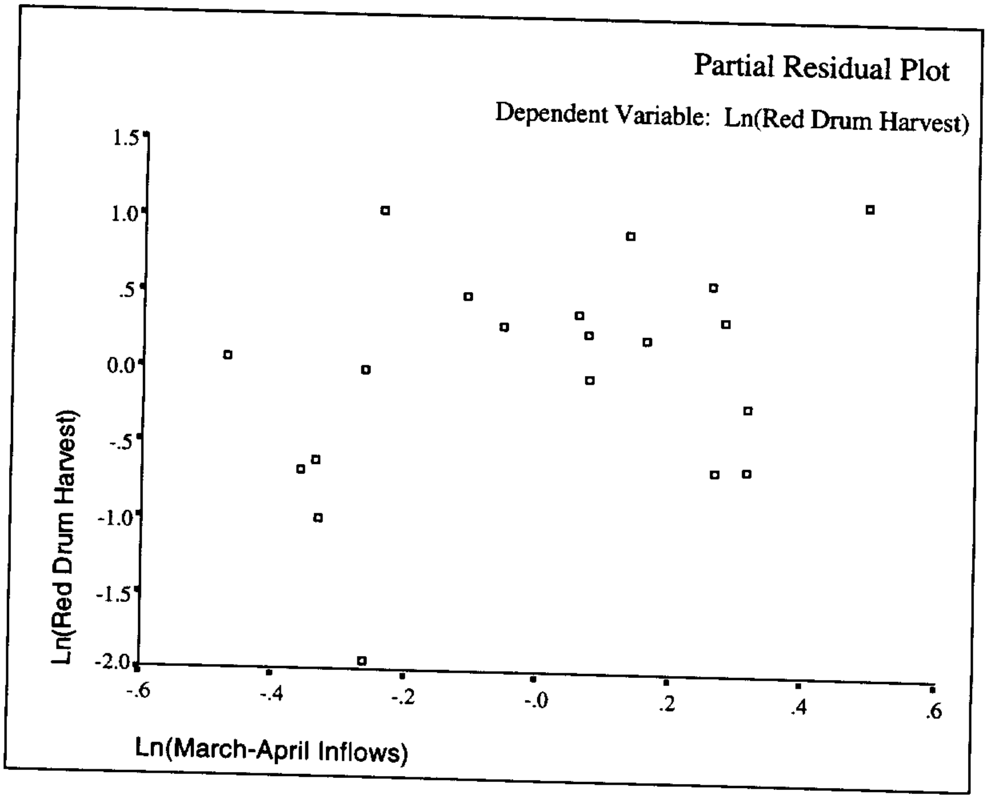
[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{12,0.01} = 2.681$.

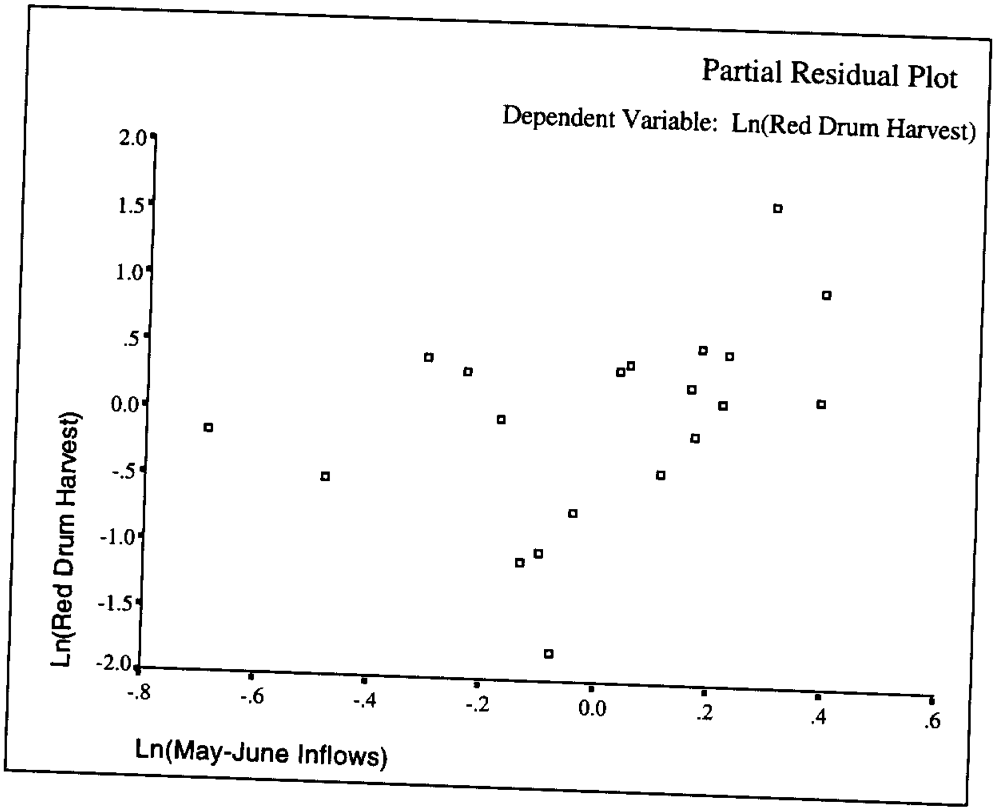
Graphics

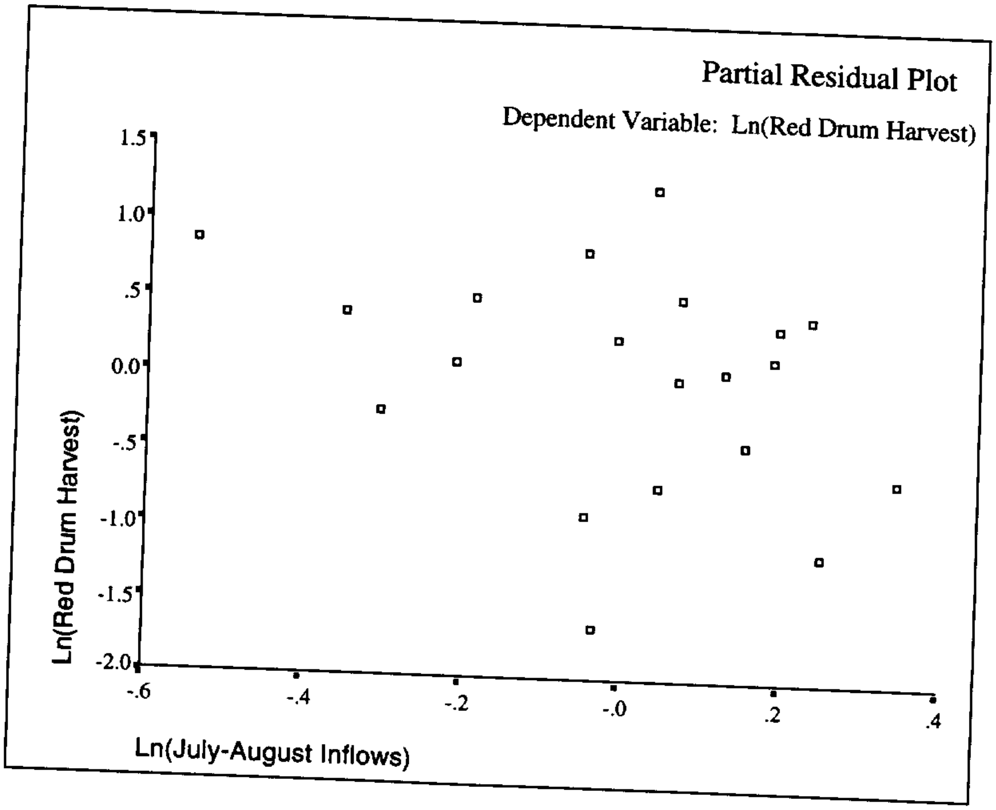

Ln(Red Drum Harvest)
Regression Standardized Residual
Frequency
0
1
2
3
4
5
6
7
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5

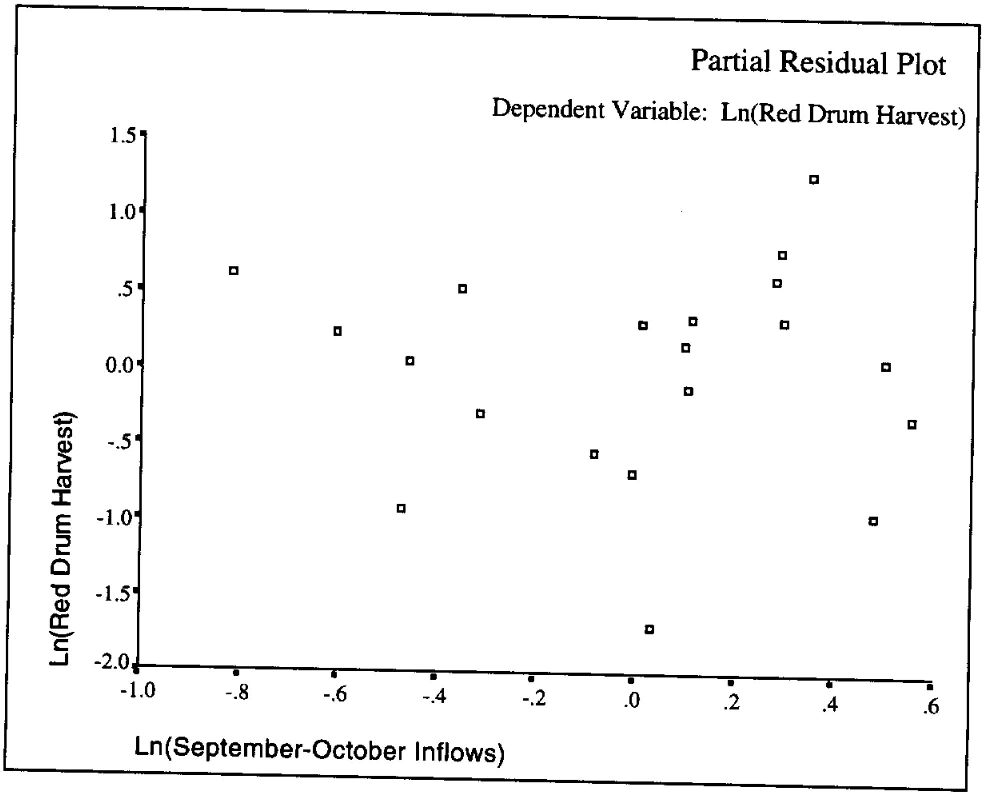

Normal P-P Plot
of Residuals
Expected Cum Prob
0.0
.3
.5
.8
1.0
Observed Cum Prob
0.0
.3
.5
.8
1.0

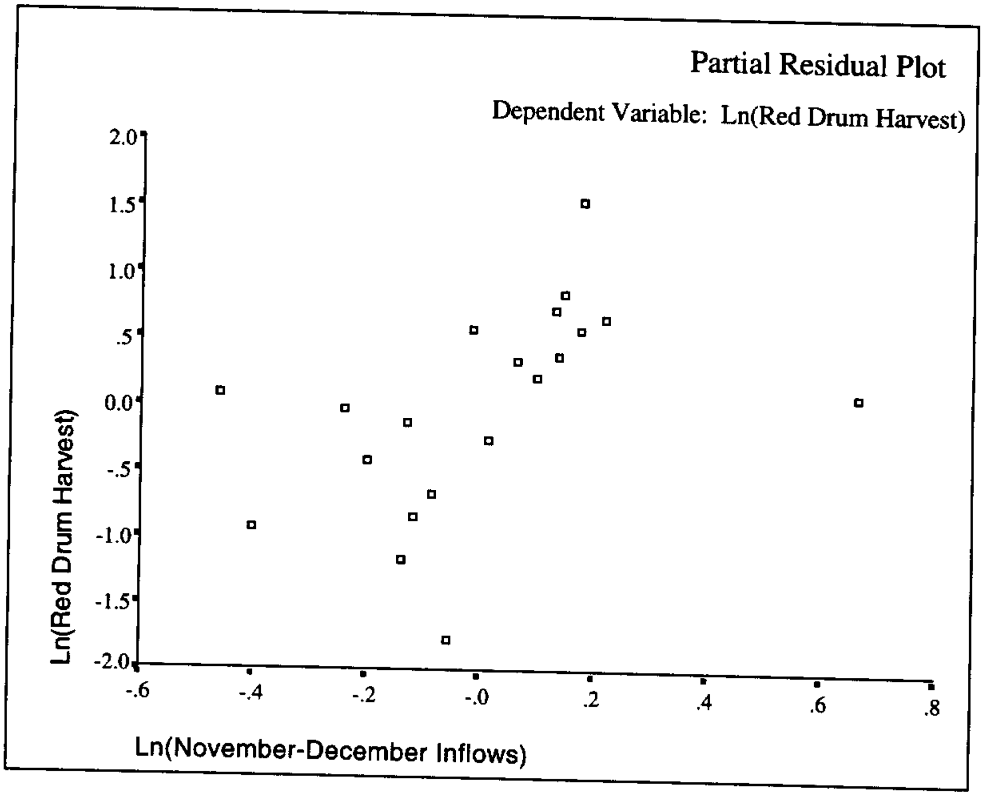

Partial Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Ln(Red Drum Harvest)
-.3
-.2
-.1
-.0
.1
.2
.3
Ln(January-February Inflows)

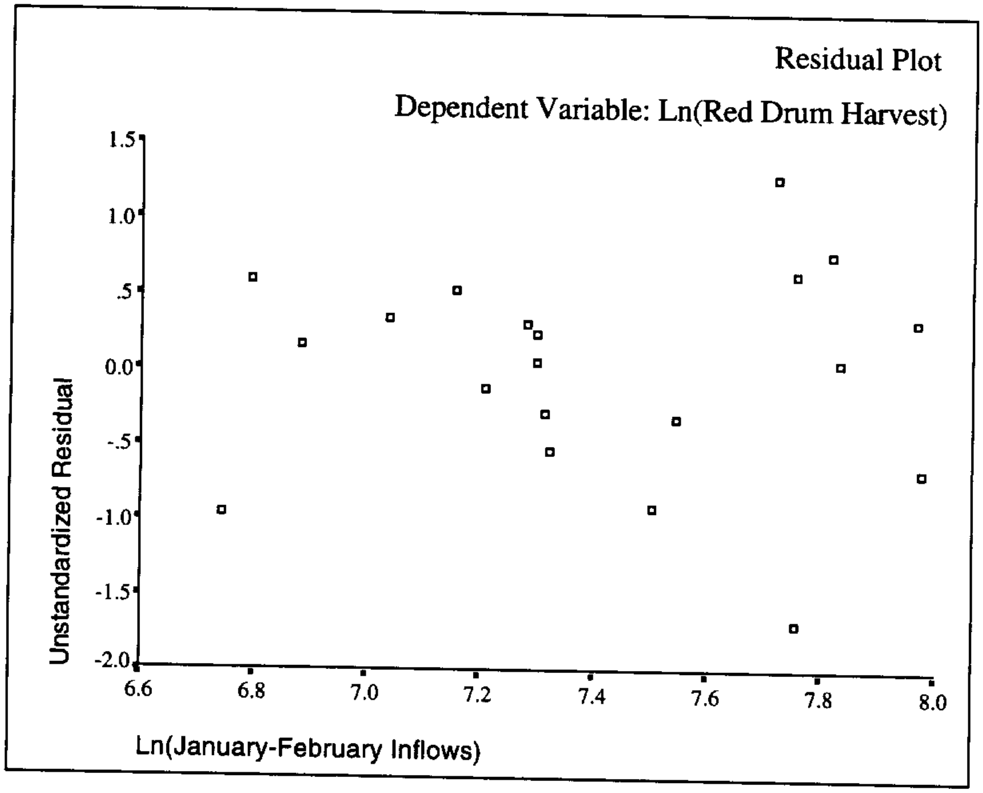

Partial Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Ln(Red Drum Harvest)
-.6
-.4
-.2
-.0
.2
.4
.6
Ln(March-April Inflows)

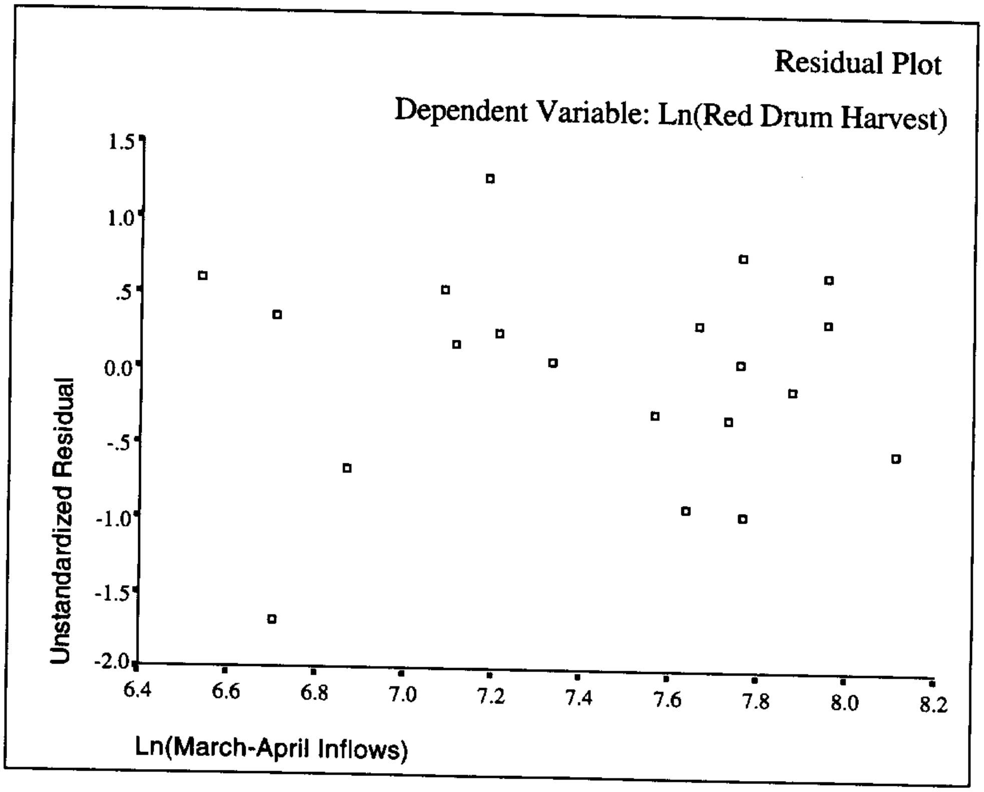

Partial Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Ln(Red Drum Harvest)
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Ln(May-June Inflows)

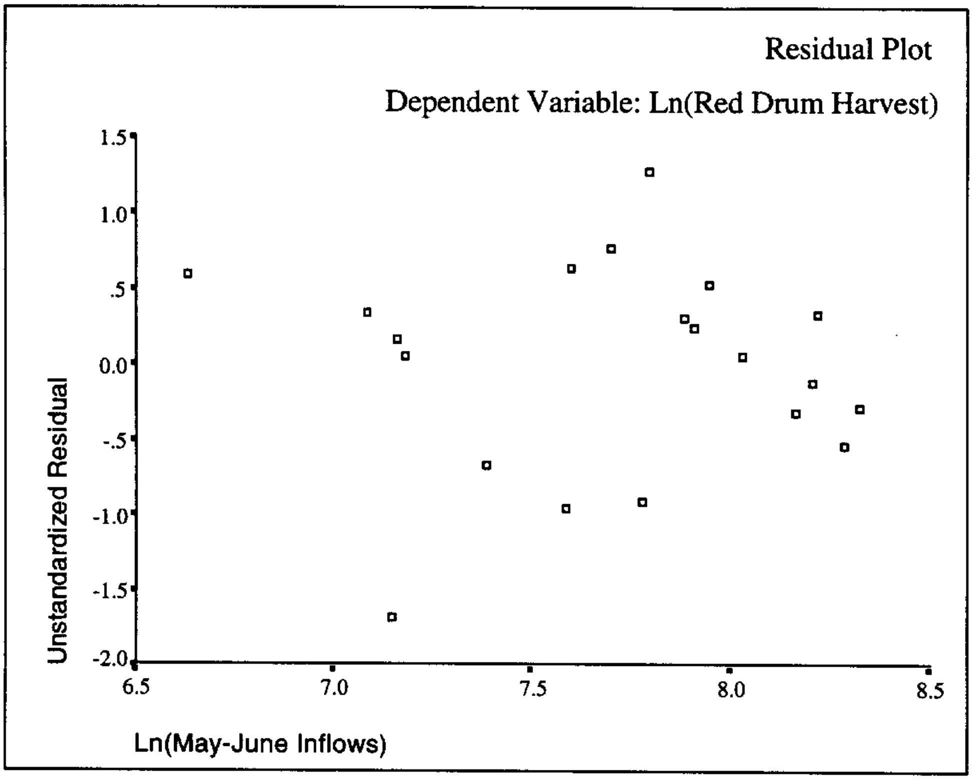

Partial Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Ln(Red Drum Harvest)
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.6
-.4
-.2
-.0
.2
.4
Ln(July-August Inflows)

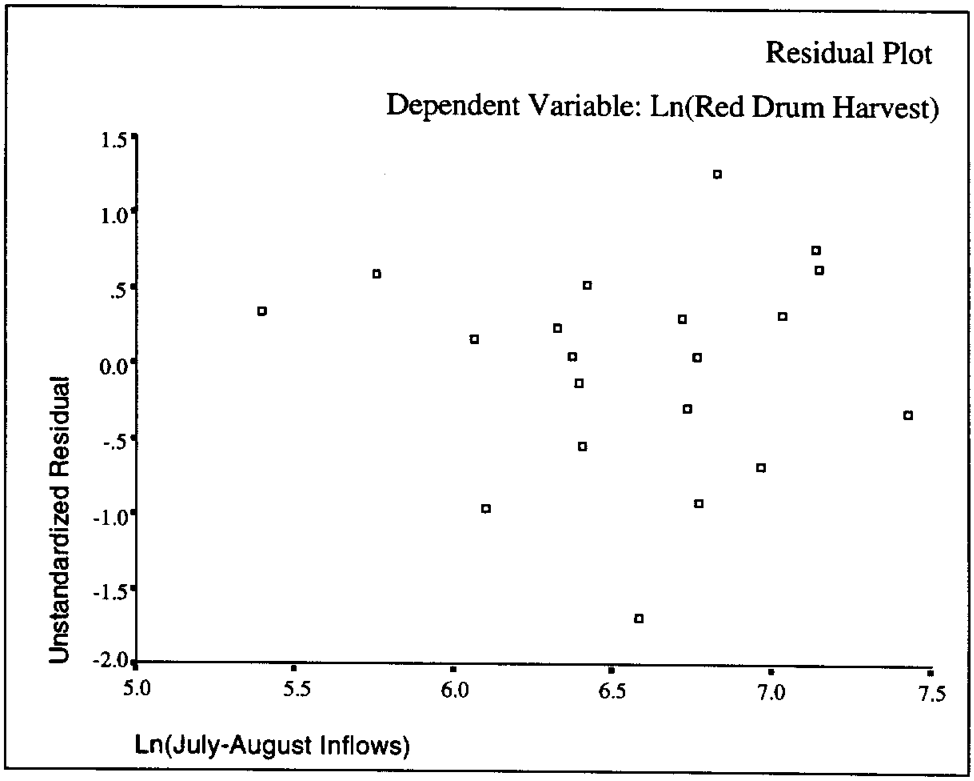

Partial Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Ln(Red Drum Harvest)
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Ln(September-October Inflows)

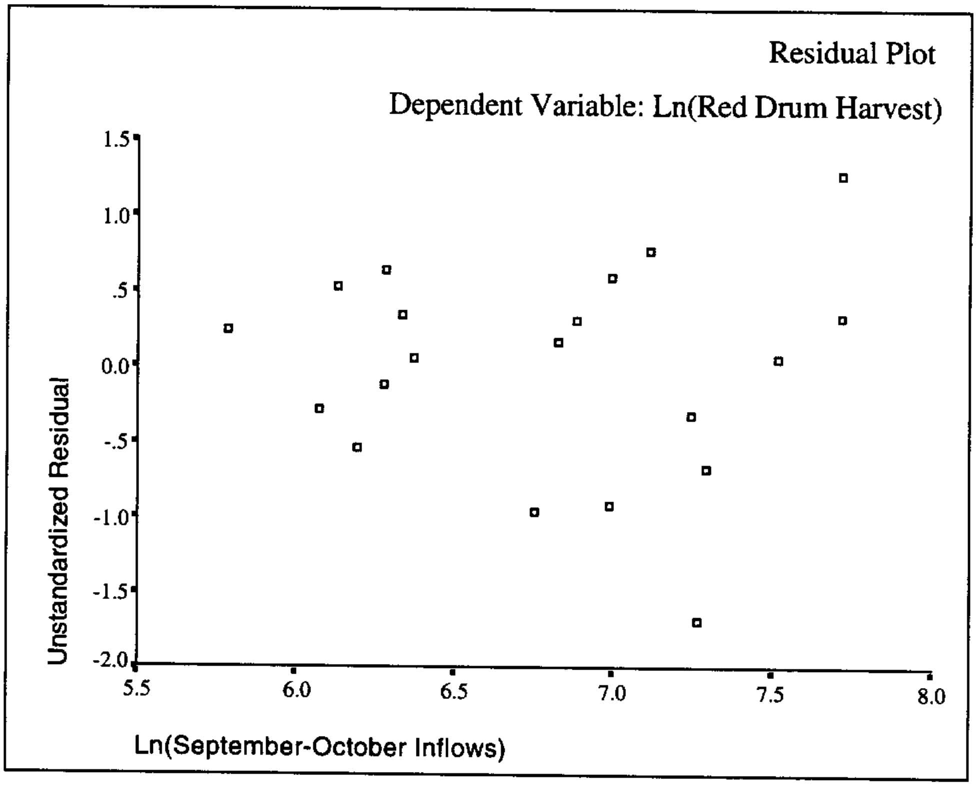

Partial Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Ln(Red Drum Harvest)
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.6
-.4
-.2
-.0
.2
.4
.6
.8
Ln(November-December Inflows)

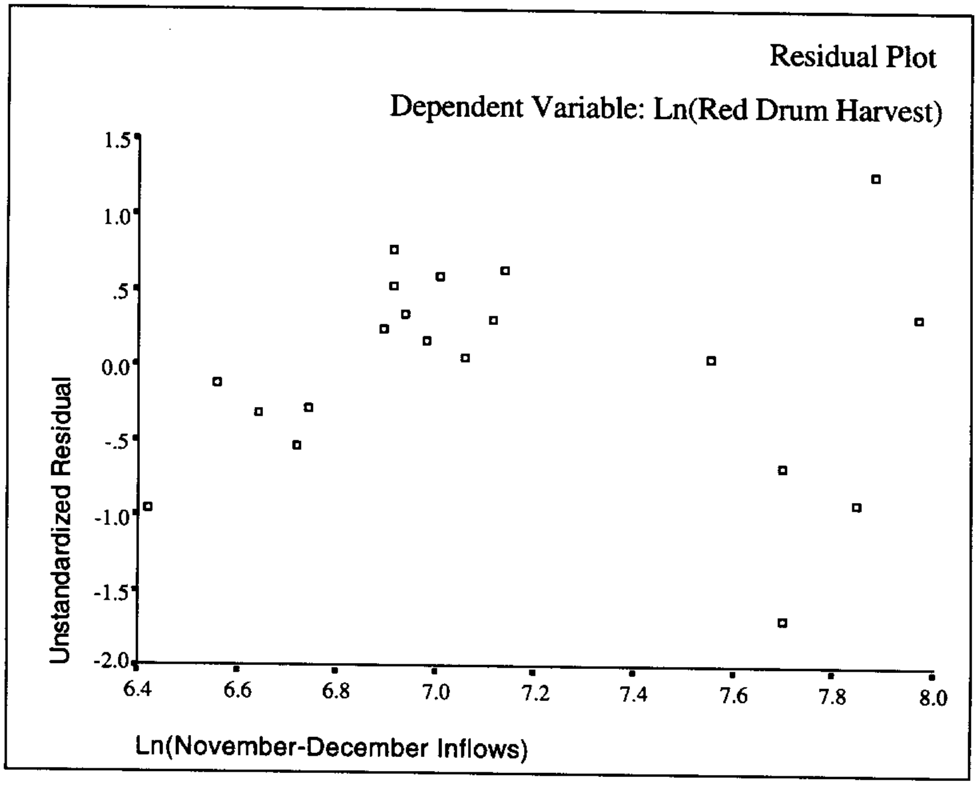

Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(January-February Inflows)


Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Ln(March-April Inflows)


Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.5
7.0
7.5
8.0
8.5
Ln(May-June Inflows)


Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
5.0
5.5
6.0
6.5
7.0
7.5
Ln(July-August Inflows)


Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
5.5
6.0
6.5
7.0
7.5
8.0
Ln(September-October Inflows)


Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(November-December Inflows)

Prediction Intervals for the Natural Log of Red Drum Harvest

YEAR	LGRDDRUM	LICI_1	UICI_1
1962	.96	-1.30431	4.53276
1963	.26	-.92463	4.79780
1964	3.25	-.37162	5.66104
1965	3.47	.00097	6.25051
1966	3.39	.24193	6.03953
1967	3.81	.34905	6.18221
1968	3.05	.44470	6.21302
1969	3.64	.95111	6.55766
1970	3.56	1.19627	6.99908
1971	2.90	.83965	6.84678
1972	3.51	.51767	6.15770
1973	3.90	.87334	6.29226
1974	3.55	.59611	6.38026
1975	4.38	1.04083	7.03976
1976	4.58	.41568	6.17051
1977	3.19	1.03584	7.15054
1978	2.70	-.19123	5.45832
1979	2.93	-.90042	5.47303
1980	2.57	-1.18800	4.76432
1981	1.79	-1.07817	5.28562

LGRDDRUM	Natural log of red drum harvest
LICI_1	Lower limit for 99% prediction interval for the natural log of red drum harvest
UICI_1	Upper limit for 99% prediction interval for the natural log of red drum harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	5.23669	.06267	.27562	0.6311	0.0006
1963	4.25703	.29406	.22405	0.7497	0.0557
1964	6.95291	.08908	.36594	0.4338	0.0018
1965	8.92203	.05444	.46958	0.2583	0.0004
1966	4.89722	.00834	.25775	0.6725	0.0000
1967	5.20293	.04183	.27384	0.6352	0.0002
1968	4.64695	.00902	.24458	0.7030	0.0000
1969	3.28664	.00097	.17298	0.8573	0.0000
1970	4.94185	.03745	.26010	0.6671	0.0001
1971	6.72566	.20587	.35398	0.4580	0.0219
1972	3.56496	.00258	.18763	0.8283	0.0000
1973	1.75740	.00403	.09249	0.9720	0.0000
1974	4.78215	.00052	.25169	0.6865	0.0000
1975	6.65295	.02525	.35016	0.4659	0.0000
1976	4.53192	.19038	.23852	0.7169	0.0176
1977	7.68955	.25370	.40471	0.3608	0.0383
1978	3.64440	.00039	.19181	0.8197	0.0000
1979	10.07832	.27435	*.53044	0.1842	0.0468
1980	6.24115	.12163	.32848	0.5119	0.0048
1981	9.98730	.06276	*.52565	0.1893	0.0006

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2] MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	-.65983	.01206	-.25688	.31319
1963	*-1.80907	-.13498	-.62846	.73629
1964	.78560	.54740	-.23734	-.11051
1965	.60130	.08258	.33491	-.03739
1966	.23338	.04451	.02372	-.09039
1967	.53254	.20042	-.19800	-.36012
1968	-.24286	-.03646	.04901	.12329
1969	-.07929	.01151	-.02226	-.01031
1970	-.50334	.19860	-.17651	-.23204
1971	*-1.26110	-.34841	.34871	-.51002
1972	.12939	.07446	-.07752	.01605
1973	.16250	.01113	-.11908	.02060
1974	.05776	-.04320	.02954	.01374
1975	.40808	-.34511	.02745	.13616
1976	*1.28311	-.42462	-.30021	-.46494
1977	*-1.40017	.30157	.87813	-.45074
1978	.05024	.01680	.00060	.02330
1979	*1.40878	-.00965	.09211	.74537
1980	.93842	-.08079	.52991	.16660
1981	-.64490	-.12680	.09122	.24937

SDFFITS	Standardized dffits value
SDFBETA_0	Standardized dfbeta for the intercept term
SDFBETA_1	Standardized dfbeta for logged January-February inflows
SDFBETA_2	Standardized dfbeta for logged March-April inflows

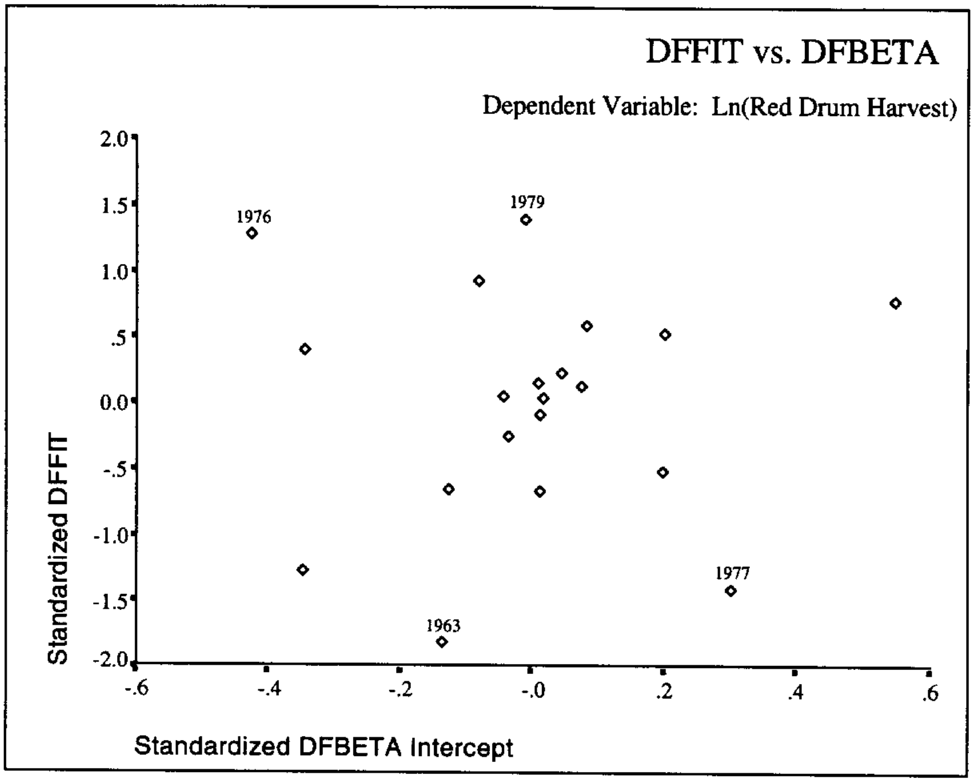
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

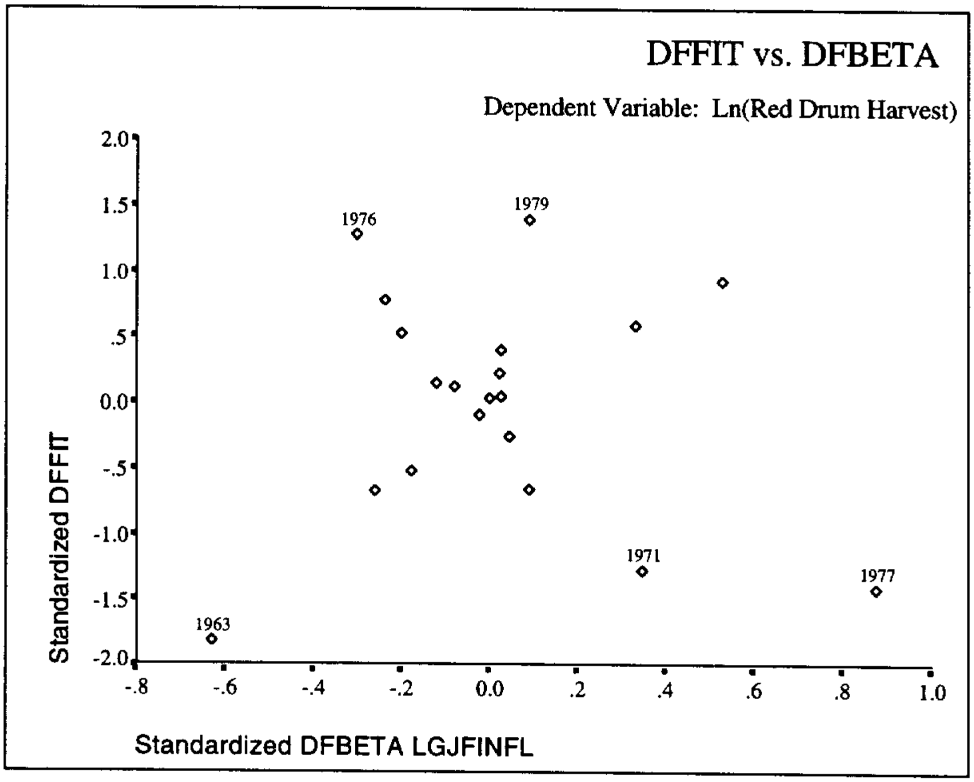
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.03996	-.05478	.00450	.12691
1963	.21773	.11334	-.07070	.17551
1964	-.23206	.09014	.19883	-.01505
1965	.03632	-.45995	.05489	-.18613
1966	.07732	-.00351	-.14960	.02555
1967	.29890	.18724	-.19453	.11461
1968	-.14152	-.07106	.08294	-.00601
1969	-.02938	.03597	-.01030	.03105
1970	-.08266	.28157	.04423	.07107
1971	.21363	.09254	-.55928	.25589
1972	-.03734	.03456	.01544	.03387
1973	.01174	.08306	.00314	.07095
1974	.01385	-.03773	.03103	-.01246
1975	.09319	-.12319	.11196	.13275
1976	.58441	.09265	.48994	.39634
1977	.16592	-.53233	.57533	*-1.28535
1978	-.03997	.00732	-.02756	.00939
1979	*-1.03273	.44367	-.88874	.25151
1980	-.37843	-.07520	.26077	-.65156
1981	-.11622	-.30060	-.27733	.31757

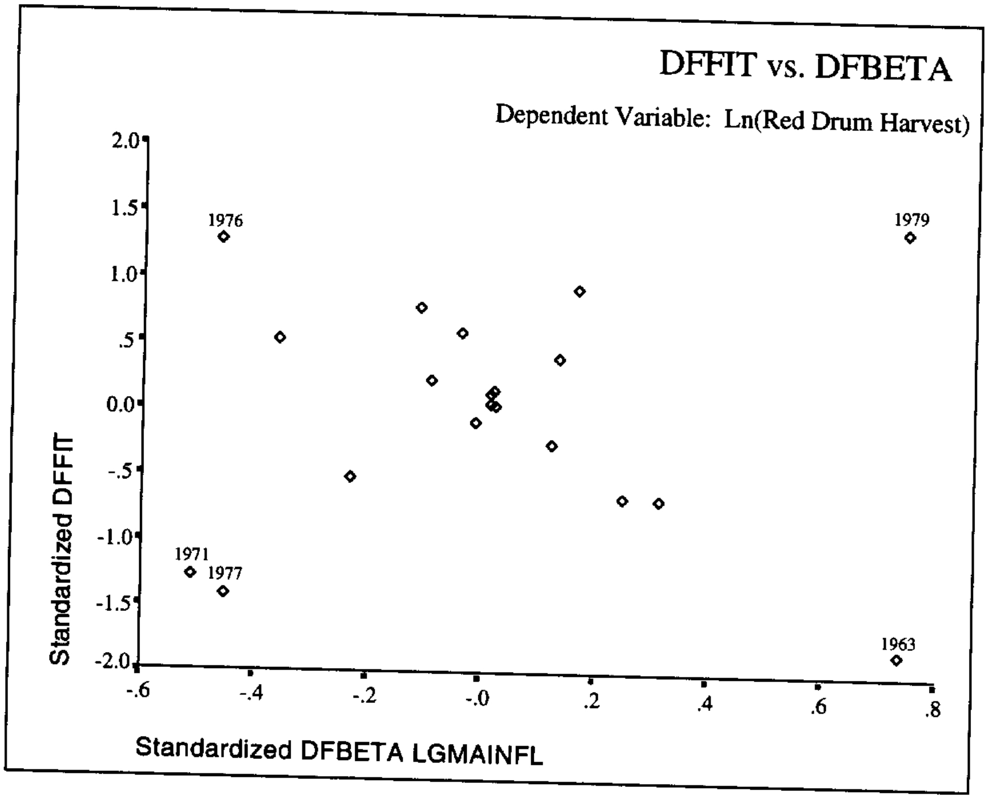
SDFBETA_3	Standardized dfbeta for logged May-June inflows
SDFBETA_4	Standardized dfbeta for logged July-August inflows
SDFBETA_5	Standardized dfbeta for logged September-October inflows
SDFBETA_6	Standardized dfbeta for logged November-December inflows

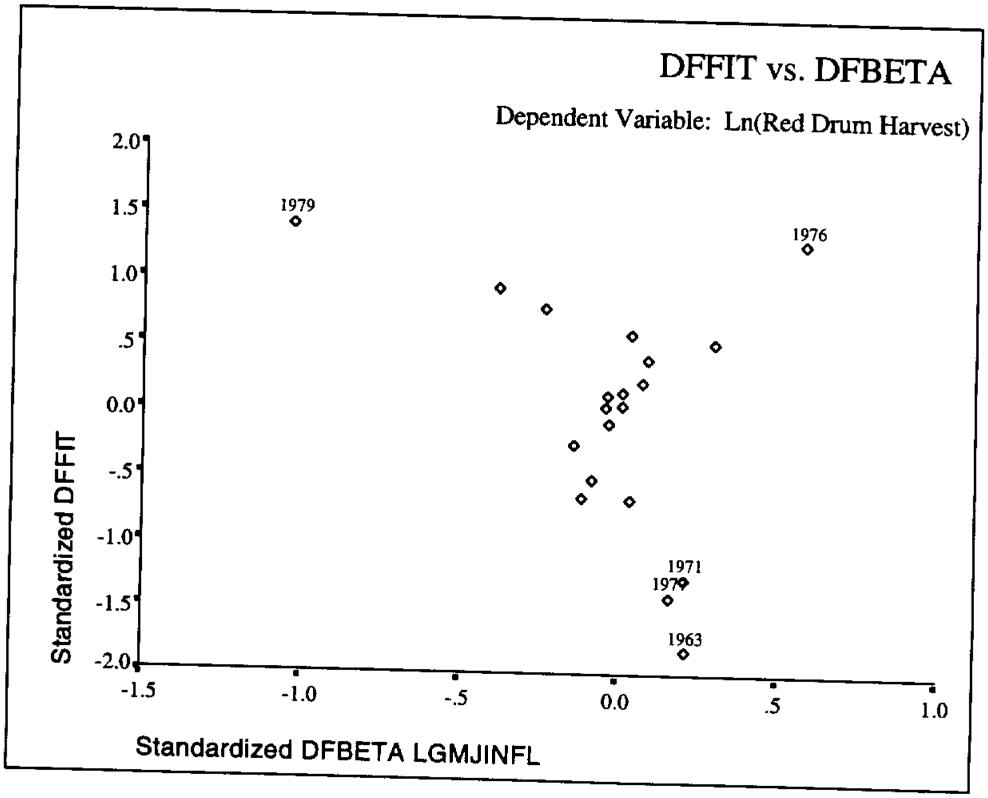
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

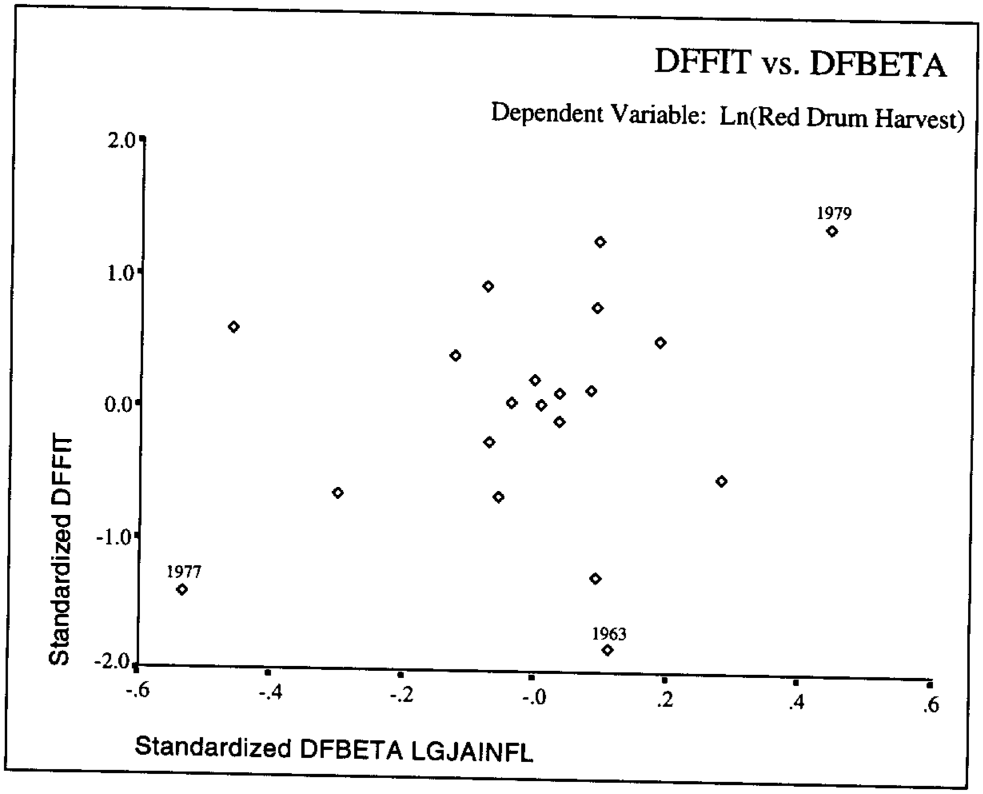
Graphics

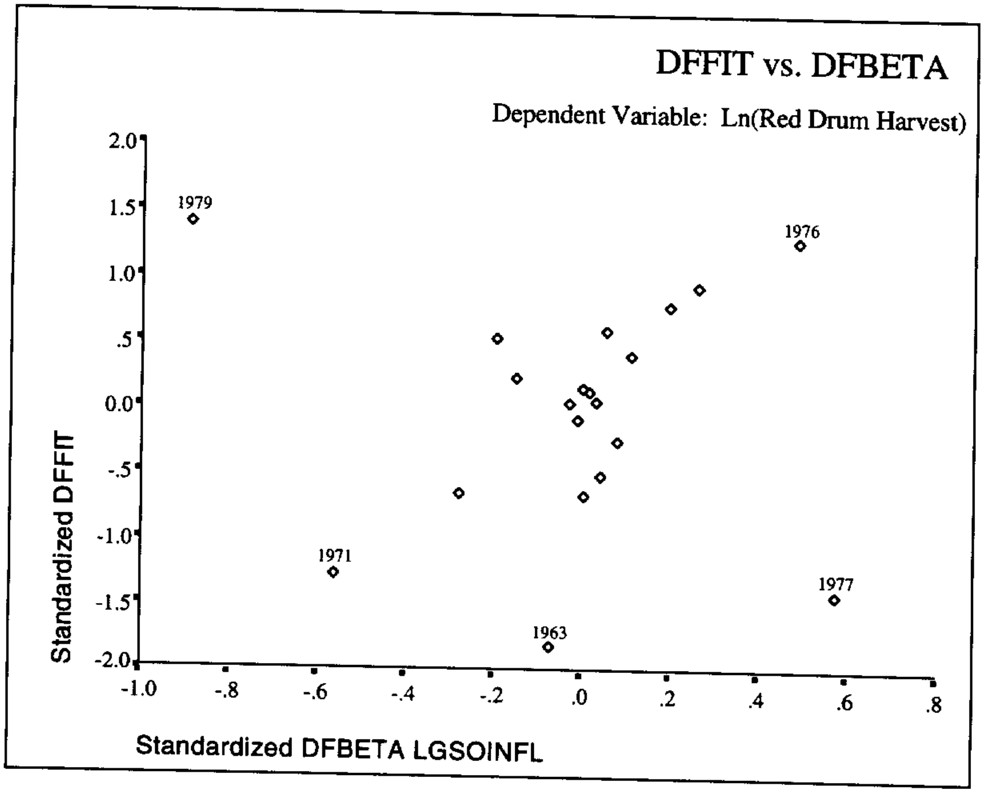

DFFIT vs. DFBETA
Dependent Variable: Ln(Red Drum Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.6
-.4
-.2
-.0
.2
.4
.6
Standardized DFBETA Intercept
1976
1979
1977
1963

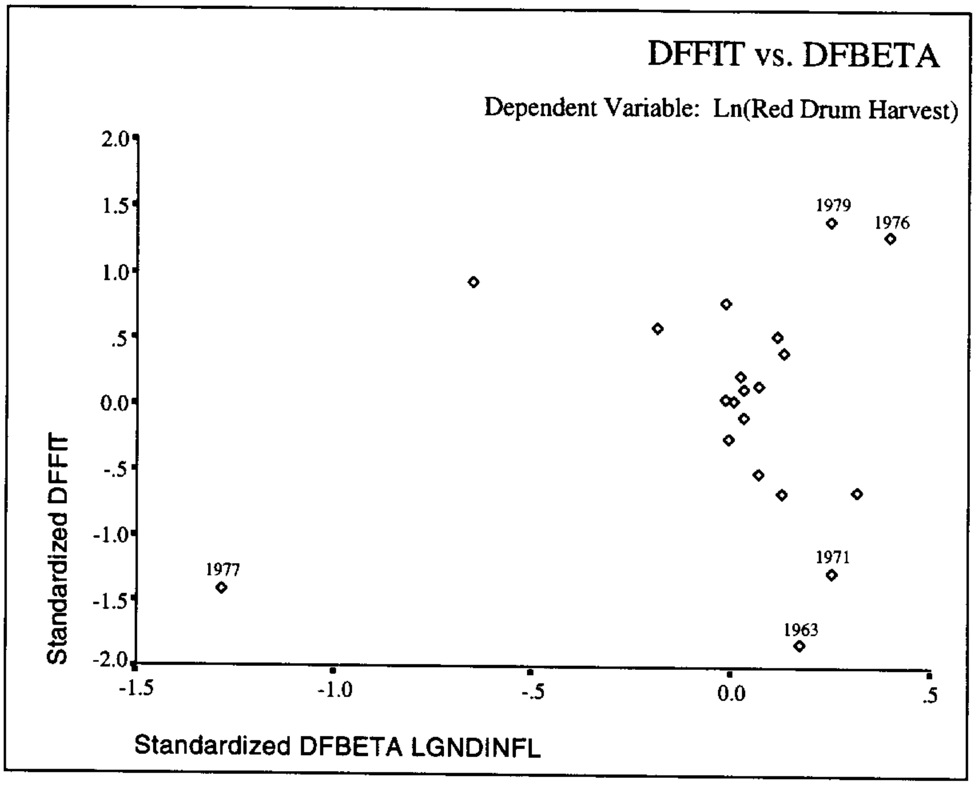

DFFIT vs. DFBETA
Dependent Variable: Ln(Red Drum Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
.8
1.0
Standardized DFBETA LGJFINFL
1976
1979
1971
1977
1963


DFFIT vs. DFBETA
Dependent Variable: Ln(Red Drum Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.6
-.4
-.2
-.0
.2
.4
.6
.8
Standardized DFBETA LGMAINFL
1976
1979
1971
1977
1963


DFFIT vs. DFBETA
Dependent Variable: Ln(Red Drum Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA LGMJINFL
1979
1976
1971
1977
1963


DFFIT vs. DFBETA
Dependent Variable: Ln(Red Drum Harvest)
Standardized DFFIT
Standardized DFBETA LGJAINFL
2.0
1.0
0.0
-1.0
-2.0
-.6
-.4
-.2
-.0
.2
.4
.6
1979
1977
1963


DFFIT vs. DFBETA
Dependent Variable: Ln(Red Drum Harvest)
Standardized DFFIT
Standardized DFBETA LGSOINFL
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
.8
1979
1976
1971
1977
1963


DFFIT vs. DFBETA
Dependent Variable: Ln(Red Drum Harvest)
Standardized DFFIT
Standardized DFBETA LGNDINFL
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1979
1976
1977
1971
1963

Examining Subsets of the Data

Untransformed Data: 1977, 1979, and 1981 Omitted

```
N = 17     Regression Models for Dependent Variable: RED_DRUM

     R-square        Adj      C(p)       AIC       MSE       SBC Variables in Model
  In                 Rsq

   1 0.217280 0.165099   17.5314     108.0   513.870     109.7 SO_INFL
   1 0.193525 0.139760   18.4580     108.5   529.465     110.2 ND_INFL
   1 0.150944 0.094340   20.1190     109.4   557.421     111.0 MJ_INFL
   1 0.057845 -.004965   23.7505     111.1   618.542     112.8 MA_INFL
-----------------------------------------------------------------------
   2 0.385340 0.297532   12.9759     105.9   432.359     108.4 MJ_INFL SO_INFL
   2 0.353098 0.260683   14.2336     106.7   455.039     109.2 MJ_INFL ND_INFL
   2 0.335613 0.240700   14.9157     107.2   467.338     109.7 JF_INFL ND_INFL
   2 0.322155 0.225320   15.4406     107.5   476.805     110.0 JF_INFL SO_INFL
-------------------------------------------------------------------------------
   3 0.666441 0.589465    4.0111   97.4855   252.678     100.8 JF_INFL MJ_INFL ND_INFL
   3 0.629754 0.544312    5.4421   99.2594   280.469     102.6 JF_INFL MJ_INFL SO_INFL
   3 0.588641 0.493713    7.0458     101.0   311.613     104.4 JF_INFL MA_INFL ND_INFL
   3 0.544310 0.439151    8.7750     102.8   345.195     106.1 MJ_INFL JA_INFL SO_INFL
---------------------------------------------------------------------------------------
   4 0.725777 0.634370    3.6966   96.1555   225.040     100.3 JF_INFL MJ_INFL SO_INFL ND_INFL
   4 0.713777 0.618369    4.1647   96.8837   234.889     101.0 JF_INFL MJ_INFL JA_INFL ND_INFL
   4 0.681298 0.575064    5.4316   98.7109   261.542     102.9 JF_INFL MA_INFL MJ_INFL ND_INFL
   4 0.673616 0.564822    5.7312   99.1158   267.846     103.3 JF_INFL MA_INFL MJ_INFL SO_INFL
-----------------------------------------------------------------------------------------------
   5 0.743623 0.627088    5.0005   97.0116   229.522     102.0 JF_INFL MJ_INFL JA_INFL SO_INFL
                                                               ND_INFL
   5 0.726383 0.602012    5.6729   98.1179   244.956     103.1 JF_INFL MA_INFL MJ_INFL SO_INFL
                                                               ND_INFL
   5 0.723628 0.598004    5.7804   98.2883   247.423     103.3 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                               ND_INFL
   5 0.673626 0.525275    7.7308     101.1   292.187     106.1 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                               SO_INFL
-------------------------------------------------------------------------------------------------------
   6 0.743635 0.589816    7.0000   99.0108   252.463     104.8 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                               SO_INFL ND_INFL
-------------------------------------------------------------------------------------------------------
```

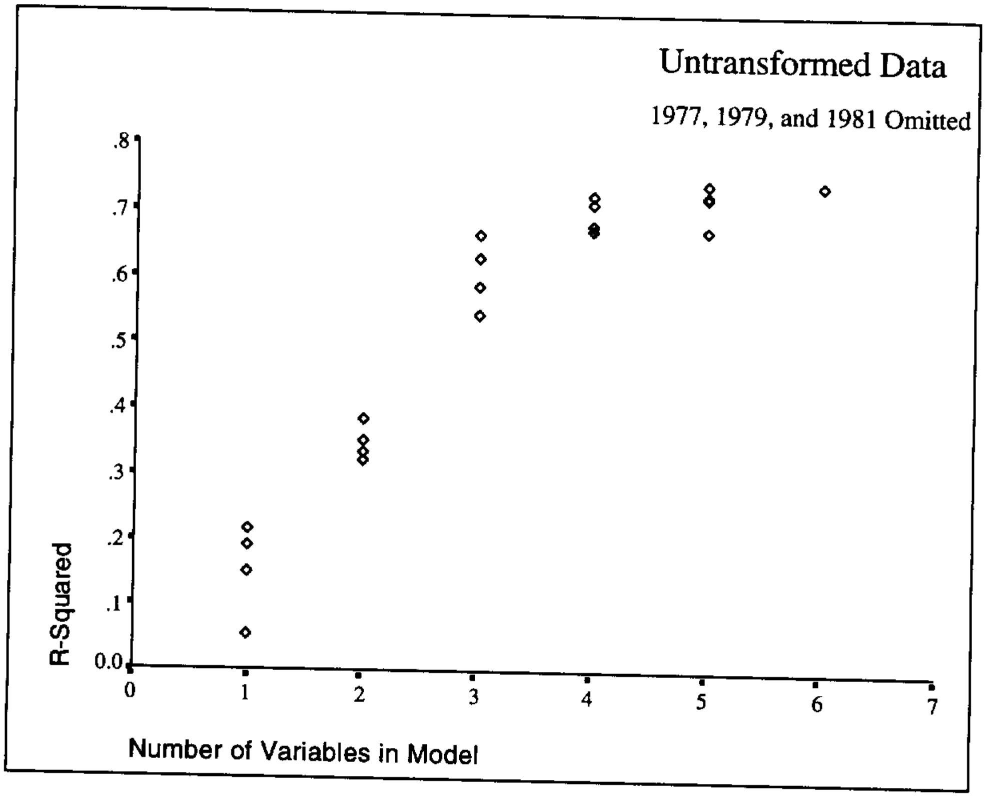
```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_  INTERCEP   JF_INFL    MA_INFL   MJ_INFL   JA_INFL    SO_INFL

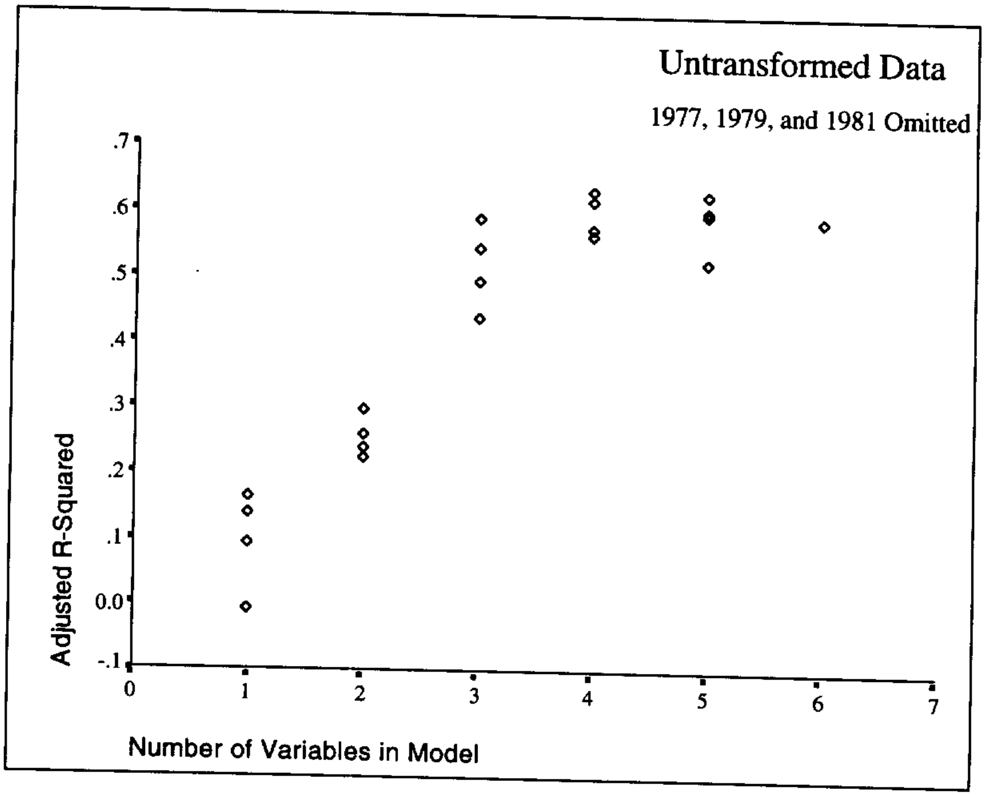
  1 MODEL1   PARMS  RED_DRUM 22.6687  14.3353         .          .         .         .   0.018537
  2 MODEL1   PARMS  RED_DRUM 23.0101  12.3470         .          .         .         .          .
  3 MODEL1   PARMS  RED_DRUM 23.6098  12.0353         .          .  0.008998         .          .
  4 MODEL1   PARMS  RED_DRUM 24.8705  20.5683         .   0.007450         .         .          .
  5 MODEL1   PARMS  RED_DRUM 20.7933  -9.2845         .          .  0.009504         .   0.019273
  6 MODEL1   PARMS  RED_DRUM 21.3316 -10.3817         .          .  0.009255         .          .
  7 MODEL1   PARMS  RED_DRUM 21.6180  26.9144 -0.022486          .         .         .          .
  8 MODEL1   PARMS  RED_DRUM 21.8359  29.3788 -0.017194          .         .         .   0.032575
  9 MODEL1   PARMS  RED_DRUM 15.8959   0.4445 -0.035828          .  0.014298         .          .
 10 MODEL1   PARMS  RED_DRUM 16.7472   4.7658 -0.027943          .  0.013688         .   0.042410
 11 MODEL1   PARMS  RED_DRUM 17.6526   2.1535 -0.036443   0.017318         .         .          .
 12 MODEL1   PARMS  RED_DRUM 18.5794  -2.2920         .          .  0.015220 -0.050130   0.033437
 13 MODEL1   PARMS  RED_DRUM 15.0013   1.2974 -0.037485          .  0.014826         .   0.021963
 14 MODEL1   PARMS  RED_DRUM 15.3261   0.8569 -0.055035          .  0.012099  0.044411          .
 15 MODEL1   PARMS  RED_DRUM 16.1723  -2.3444 -0.037757   0.006136  0.011065         .          .
 16 MODEL1   PARMS  RED_DRUM 16.3660   8.4010 -0.029483  -0.010248  0.019815         .   0.044627
 17 MODEL1   PARMS  RED_DRUM 15.1500   1.3753 -0.049896          .  0.013239  0.029582   0.016898
 18 MODEL1   PARMS  RED_DRUM 15.6511   2.0519 -0.037126  -0.001524  0.015667         .   0.023553
 19 MODEL1   PARMS  RED_DRUM 15.7297  -1.4473 -0.055674   0.005025  0.009559  0.042238          .
 20 MODEL1   PARMS  RED_DRUM 17.0935   8.4315 -0.029699  -0.010278  0.019794  0.000621   0.044634
 21 MODEL1   PARMS  RED_DRUM 15.8891   1.4809 -0.049795  -0.000214  0.013364  0.029460   0.017142
```

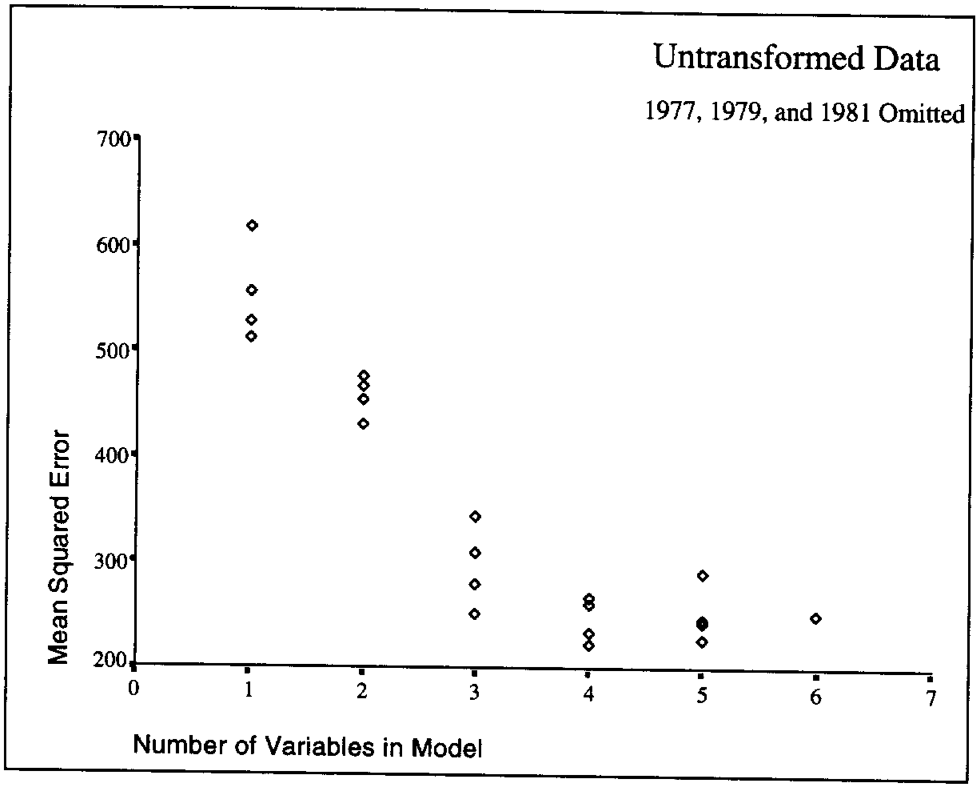
```
OBS  ND_INFL   RED_DRUM  _IN_  _P_  _EDF_   _MSE_     _RSQ_    _ADJRSQ_    _CP_     _AIC_    _SBC_

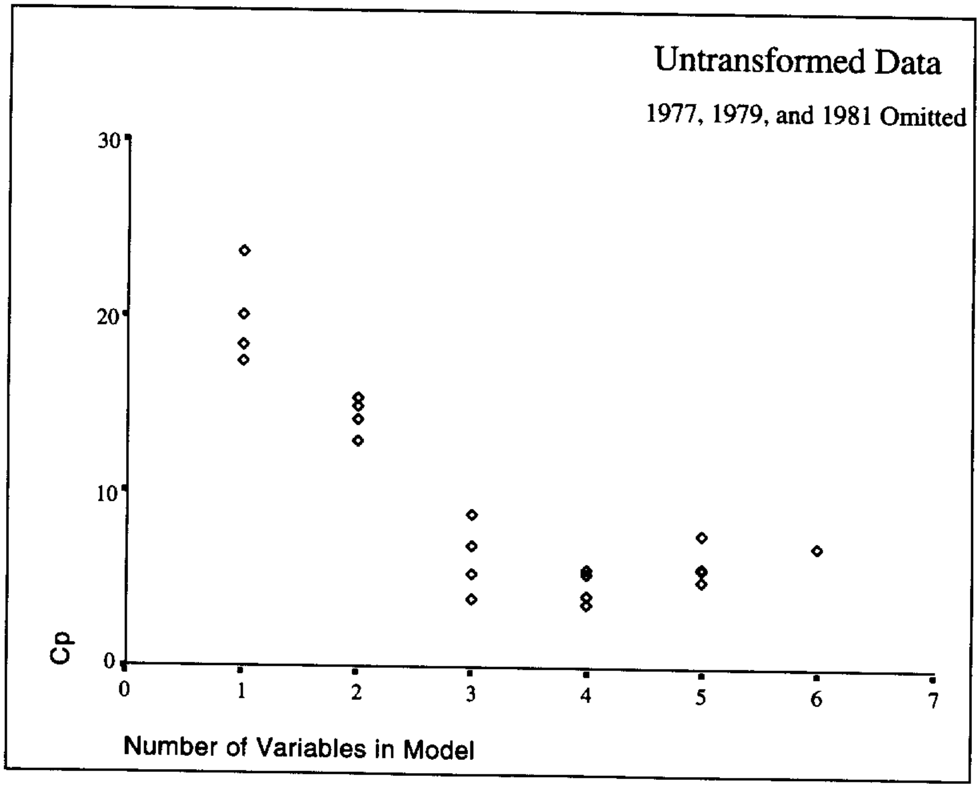
  1   .           -1      1     2     15    513.870   0.21728   0.16510   17.5314  107.986  109.652
  2  0.015433     -1      1     2     15    529.465   0.19353   0.13976   18.4580  108.494  110.160
  3   .           -1      1     2     15    557.421   0.15094   0.09434   20.1190  109.369  111.035
  4   .           -1      1     2     15    618.542   0.05784  -0.00497   23.7505  111.137  112.804
  5   .           -1      2     3     14    432.359   0.38534   0.29753   12.9759  105.877  108.376
  6  0.015778     -1      2     3     14    455.039   0.35310   0.26068   14.2336  106.746  109.245
  7  0.032986     -1      2     3     14    467.338   0.33561   0.24070   14.9157  107.199  109.699
  8   .           -1      2     3     14    476.805   0.32215   0.22532   15.4406  107.540  110.040
  9  0.043934     -1      3     4     13    252.678   0.66644   0.58947    4.0111   97.486  100.818
 10   .           -1      3     4     13    280.469   0.62975   0.54431    5.4421   99.259  102.592
 11  0.046304     -1      3     4     13    311.613   0.58864   0.49371    7.0458  101.049  104.382
 12   .           -1      3     4     13    345.195   0.54431   0.43915    8.7750  102.789  106.122
 13  0.027889     -1      4     5     12    225.040   0.72578   0.63437    3.6966   96.156  100.322
 14  0.048694     -1      4     5     12    234.889   0.71378   0.61837    4.1647   96.884  101.050
 15  0.046178     -1      4     5     12    261.542   0.68130   0.57506    5.4316   98.711  102.877
 16   .           -1      4     5     12    267.846   0.67362   0.56482    5.7312   99.116  103.282
 17  0.034760     -1      5     6     11    229.522   0.74362   0.62709    5.0005   97.012  102.011
 18  0.026170     -1      5     6     11    244.956   0.72638   0.60201    5.6729   98.118  103.117
 19  0.050298     -1      5     6     11    247.423   0.72363   0.59800    5.7804   98.288  103.288
 20   .           -1      5     6     11    292.187   0.67363   0.52527    7.7308  101.115  106.115
 21  0.034490     -1      6     7     10    252.463   0.74363   0.58982    7.0000   99.011  104.843
```

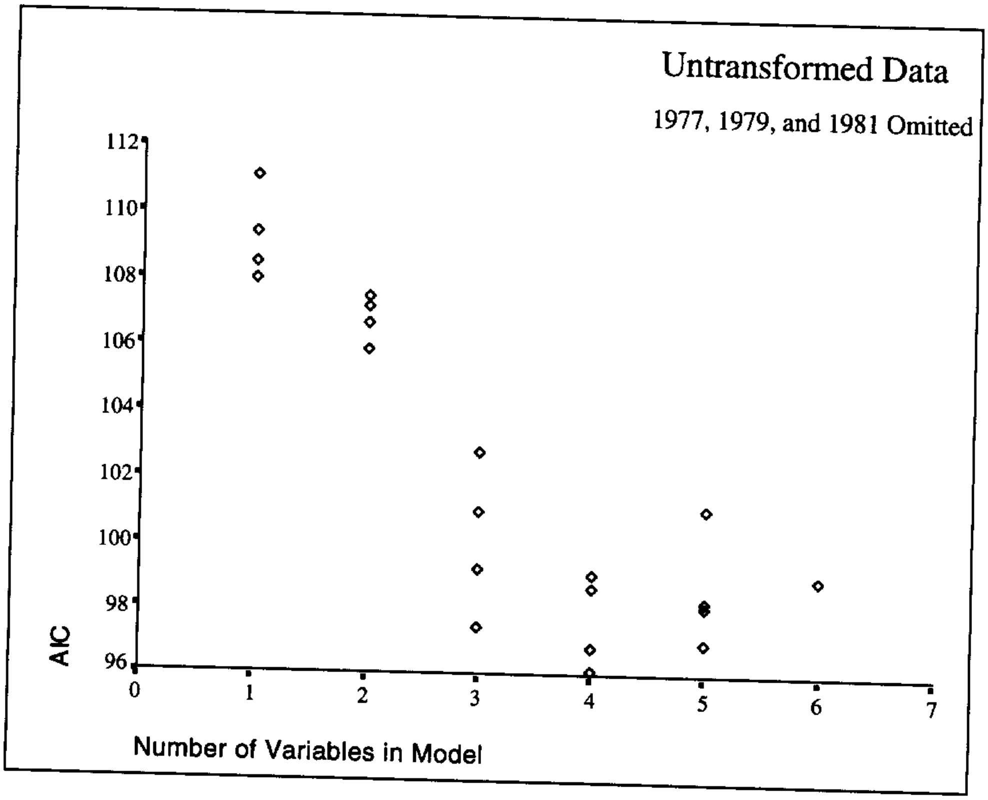
Scree Plots

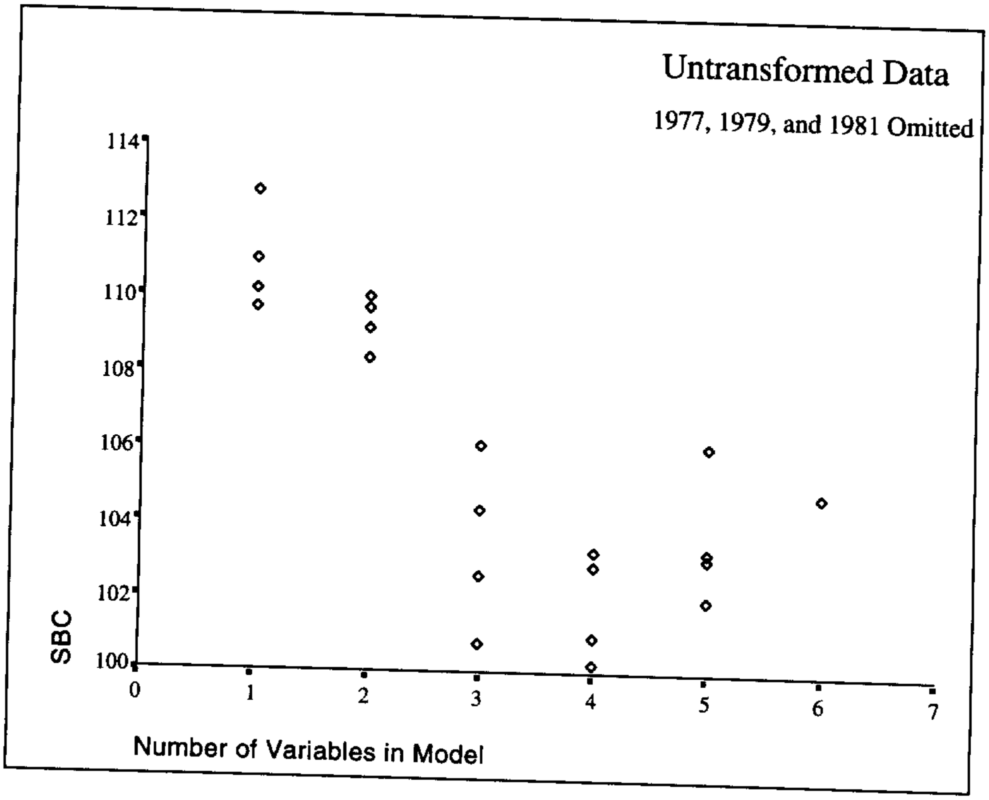

Untransformed Data
1977, 1979, and 1981 Omitted
R-Squared
.8
.7
.6
.5
.4
.3
.2
.1
0.0
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1977, 1979, and 1981 Omitted
Adjusted R-Squared
.7
.6
.5
.4
.3
.2
.1
0.0
-.1
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1977, 1979, and 1981 Omitted
Mean Squared Error
700
600
500
400
300
200
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1977, 1979, and 1981 Omitted
Cp
30
20
10
0
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1977, 1979, and 1981 Omitted
AIC
112
110
108
106
104
102
100
98
96
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1977, 1979, and 1981 Omitted
SBC
114
112
110
108
106
104
102
100
0
1
2
3
4
5
6
7
Number of Variables in Model

Square Root of Harvest (Box-Cox Transformation): 1977, 1979, and 1981 Omitted

```
N = 17     Regression Models for Dependent Variable: SQRTRDRM

    R-square        Adj      C(p)       AIC       MSE       SBC Variables in Model
 In                 Rsq

  1 0.194057 0.140328  12.4310   26.2891   4.20505   27.9555 MJ_INFL
  1 0.100376 0.040401  15.3871   28.1585   4.69384   29.8249 MA_INFL
  1 0.075778 0.014164  16.1632   28.6171   4.82218   30.2835 SO_INFL
  1 0.044452 -.019251  17.1517   29.1837   4.98563   30.8502 ND_INFL
-------------------------------------------------------------------------------
  2 0.281344 0.178679  11.6767   26.3404   4.01746   28.8400 MJ_INFL SO_INFL
  2 0.243229 0.135119  12.8794   27.2189   4.23053   29.7186 MJ_INFL ND_INFL
  2 0.235418 0.126192  13.1259   27.3935   4.27420   29.8931 JF_INFL SO_INFL
  2 0.218946 0.107367  13.6456   27.7558   4.36628   30.2555 JF_INFL MJ_INFL
---------------------------------------------------------------------------------------
  3 0.630426 0.545139   2.6617   17.0349   2.22493   20.3677 JF_INFL MJ_INFL SO_INFL
  3 0.595565 0.502234   3.7617   18.5672   2.43480   21.9001 JF_INFL MJ_INFL ND_INFL
  3 0.515057 0.403148   6.3020   21.6534   2.91948   24.9863 JF_INFL MA_INFL ND_INFL
  3 0.497868 0.381992   6.8444   22.2455   3.02296   25.5784 MJ_INFL JA_INFL SO_INFL
----------------------------------------------------------------------------------------
  4 0.675220 0.566960   3.2482   16.8384   2.11820   21.0045 JF_INFL MJ_INFL SO_INFL ND_INFL
  4 0.650889 0.534519   4.0160   18.0665   2.27688   22.2326 JF_INFL MA_INFL MJ_INFL SO_INFL
  4 0.632093 0.509458   4.6091   18.9580   2.39947   23.1241 JF_INFL MJ_INFL JA_INFL ND_INFL
  4 0.631212 0.508282   4.6369   18.9987   2.40522   23.1647 JF_INFL MJ_INFL JA_INFL SO_INFL
------------------------------------------------------------------------------------------------
  5 0.683079 0.539024   5.0002   18.4220   2.25485   23.4213 JF_INFL MJ_INFL JA_INFL SO_INFL
                                                            ND_INFL
  5 0.675503 0.528004   5.2393   18.8236   2.30875   23.8229 JF_INFL MA_INFL MJ_INFL SO_INFL
                                                            ND_INFL
  5 0.650889 0.492203   6.0160   20.0665   2.48387   25.0658 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                            SO_INFL
  5 0.649279 0.489861   6.0668   20.1447   2.49533   25.1440 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                            ND_INFL
-----------------------------------------------------------------------------------------------------
  6 0.683086 0.492938   7.0000   20.4216   2.48027   26.2541 JF_INFL MA_INFL MJ_INFL JA_INFL
                                                            SO_INFL ND_INFL
-----------------------------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_  INTERCEP  JF_INFL   MA_INFL   MJ_INFL   JA_INFL   SO_INFL

  1 MODEL1  PARMS  SQRTRDRM 2.05062  3.20447   .         .         .0009096  .         .
  2 MODEL1  PARMS  SQRTRDRM 2.16653  3.85272   .         0.0008749 .         .         .
  3 MODEL1  PARMS  SQRTRDRM 2.19595  4.37343   .         .         .         .         .0009759
  4 MODEL1  PARMS  SQRTRDRM 2.23285  4.48031   .         .         .         .         .
  5 MODEL1  PARMS  SQRTRDRM 2.00436  2.04464   .         .         .0009371  .         .0010485
  6 MODEL1  PARMS  SQRTRDRM 2.05683  2.21886   .         .         .0009208  .         .
  7 MODEL1  PARMS  SQRTRDRM 2.06741  6.02803  -.0018912  .         .         .         .0025199
  8 MODEL1  PARMS  SQRTRDRM 2.08956  3.93518  -.0005150  .         .0009755  .         .
  9 MODEL1  PARMS  SQRTRDRM 1.49162  3.54155  -.0029771  .         .0013828  .         .0035135
 10 MODEL1  PARMS  SQRTRDRM 1.56039  3.24228  -.0033869  .         .0013975  .         .
 11 MODEL1  PARMS  SQRTRDRM 1.70865  3.35806  -.0034759 0.0017286 .         .         .
 12 MODEL1  PARMS  SQRTRDRM 1.73867  2.77215   .         .         .0015318 -.0052156  .0025221
 13 MODEL1  PARMS  SQRTRDRM 1.45540  3.33036  -.0035580  .         .0014521  .         .0022685
 14 MODEL1  PARMS  SQRTRDRM 1.50893  3.76290  -.0030708 -.0006240  .0017559  .         .0036485
 15 MODEL1  PARMS  SQRTRDRM 1.54902  3.27457  -.0048910  .         .0012253 0.0034779  .
 16 MODEL1  PARMS  SQRTRDRM 1.55088  3.52641  -.0028136  .         .0014132 -.0004805  .0035140
 17 MODEL1  PARMS  SQRTRDRM 1.50161  3.33498  -.0042923  .         .0013582 0.0017500  .0019689
 18 MODEL1  PARMS  SQRTRDRM 1.51946  3.37634  -.0035362 -.0000929  .0015033  .         .0023654
 19 MODEL1  PARMS  SQRTRDRM 1.57603  3.76279  -.0030700 -.0006239  .0017560 -.0000022  .0036485
 20 MODEL1  PARMS  SQRTRDRM 1.57966  3.00326  -.0049663 0.0005917  .0009263 0.0032220  .
 21 MODEL1  PARMS  SQRTRDRM 1.57489  3.34259  -.0042850 -.0000154  .0013672 0.0017413  .0019864
```

```
OBS  ND_INFL   SQRTRDRM  _IN_  _P_  _EDF_   _MSE_     _RSQ_    _ADJRSQ_    _CP_     _AIC_     _SBC_

  1 .             -1       1    2     15   4.20505  0.19406   0.14033  12.4310  26.2891  27.9555
  2 .             -1       1    2     15   4.69384  0.10038   0.04040  15.3871  28.1585  29.8249
  3 .             -1       1    2     15   4.82218  0.07578   0.01416  16.1632  28.6171  30.2835
  4 .0006594      -1       1    2     15   4.98563  0.04445  -0.01925  17.1517  29.1837  30.8502
  5 .             -1       2    3     14   4.01746  0.28134   0.17868  11.6767  26.3404  28.8400
  6 .0006937      -1       2    3     14   4.23053  0.24323   0.13512  12.8794  27.2189  29.7186
  7 .             -1       2    3     14   4.27420  0.23542   0.12619  13.1259  27.3935  29.8931
  8 .             -1       2    3     14   4.36628  0.21895   0.10737  13.6456  27.7558  30.2555
  9 .             -1       3    4     13   2.22493  0.63043   0.54514   2.6617  17.0349  20.3677
 10 .0033554      -1       3    4     13   2.43480  0.59557   0.50223   3.7617  18.5672  21.9001
 11 .0036146      -1       3    4     13   2.91948  0.51506   0.40315   6.3020  21.6534  24.9863
 12 .             -1       3    4     13   3.02296  0.49787   0.38199   6.8444  22.2455  25.5784
 13 .0016981      -1       4    5     12   2.11820  0.67522   0.56696   3.2482  16.8384  21.0045
 14 .             -1       4    5     12   2.27688  0.65089   0.53452   4.0160  18.0665  22.2326
 15 .0037281      -1       4    5     12   2.39947  0.63209   0.50946   4.6091  18.9580  23.1241
 16 .             -1       4    5     12   2.40522  0.63121   0.50828   4.6369  18.9987  23.1647
 17 .0021046      -1       5    6     11   2.25485  0.68308   0.53902   5.0002  18.4220  23.4213
 18 .0015934      -1       5    6     11   2.30875  0.67550   0.52800   5.2393  18.8236  23.8229
 19 .             -1       5    6     11   2.48387  0.65089   0.49220   6.0160  20.0665  25.0658
 20 .0039171      -1       5    6     11   2.49533  0.64928   0.48986   6.0668  20.1447  25.1440
 21 .0020852      -1       6    7     10   2.48027  0.68309   0.49294   7.0000  20.4216  26.2541
```

Logged Inflows: 1976, 1977, and 1979 Omitted

```
N = 17      Regression Models for Dependent Variable: RED_DRUM

        R-square      Adj      C(p)       AIC       MSE       SBC Variables in Model
  In                  Rsq

     1 0.141742 0.084525  21.2332     101.3   345.978     102.9 LGMJINFL
     1 0.125846 0.067569  21.8672     101.6   352.386     103.2 LGMAINFL
     1 0.039857 -.024153  25.2971     103.2   387.050     104.8 LGNDINFL
     1 0.008494 -.057606  26.5480     103.7   399.693     105.4 LGJAINFL
--------------------------------------------------------------------------------------
     2 0.290838 0.189529  17.2862     100.0   306.295     102.5 LGMJINFL LGJAINFL
     2 0.229198 0.119083  19.7449     101.4   332.918     103.9 LGMAINFL LGJAINFL
     2 0.211482 0.098836  20.4515     101.8   340.570     104.3 LGMAINFL LGNDINFL
     2 0.211168 0.098478  20.4640     101.8   340.705     104.3 LGMJINFL LGNDINFL
-----------------------------------------------------------------------------------------------
     3 0.680958 0.607333   3.7256   88.4377   148.397   91.7706 LGJFINFL LGMJINFL LGNDINFL
     3 0.574907 0.476809   7.9556   93.3165   197.726   96.6493 LGJFINFL LGMAINFL LGNDINFL
     3 0.548415 0.444203   9.0123   94.3442   210.048   97.6771 LGMJINFL LGJAINFL LGNDINFL
     3 0.496698 0.380552  11.0751   96.1875   234.103   99.5203 LGMAINFL LGJAINFL LGNDINFL
--------------------------------------------------------------------------------------------------------
     4 0.723821 0.631761   4.0159   87.9851   139.166   92.1511 LGJFINFL LGMAINFL LGMJINFL LGNDINFL
     4 0.695819 0.594426   5.1328   89.6268   153.276   93.7929 LGJFINFL LGMJINFL LGJAINFL LGNDINFL
     4 0.683113 0.577484   5.6396   90.3225   159.678   94.4886 LGJFINFL LGMJINFL LGSOINFL LGNDINFL
     4 0.650372 0.533830   6.9455   91.9940   176.176   96.1601 LGJFINFL LGMAINFL LGSOINFL LGNDINFL
------------------------------------------------------------------------------------------------------------
     5 0.749182 0.635174   5.0043   88.3476   137.876   93.3469 LGJFINFL LGMAINFL LGMJINFL LGJAINFL
                                                                LGNDINFL
     5 0.729894 0.607118   5.7737   89.6071   148.479   94.6064 LGJFINFL LGMAINFL LGMJINFL LGSOINFL
                                                                LGNDINFL
     5 0.713788 0.583691   6.4161   90.5917   157.333   95.5910 LGJFINFL LGMJINFL LGJAINFL LGSOINFL
                                                                LGNDINFL
     5 0.650467 0.491588   8.9418   93.9894   192.140   98.9887 LGJFINFL LGMAINFL LGJAINFL LGSOINFL
                                                                LGNDINFL
------------------------------------------------------------------------------------------------------------
     6 0.749291 0.598865   7.0000   90.3403   151.598   96.1727 LGJFINFL LGMAINFL LGMJINFL LGJAINFL
                                                                LGSOINFL LGNDINFL
------------------------------------------------------------------------------------------------------------

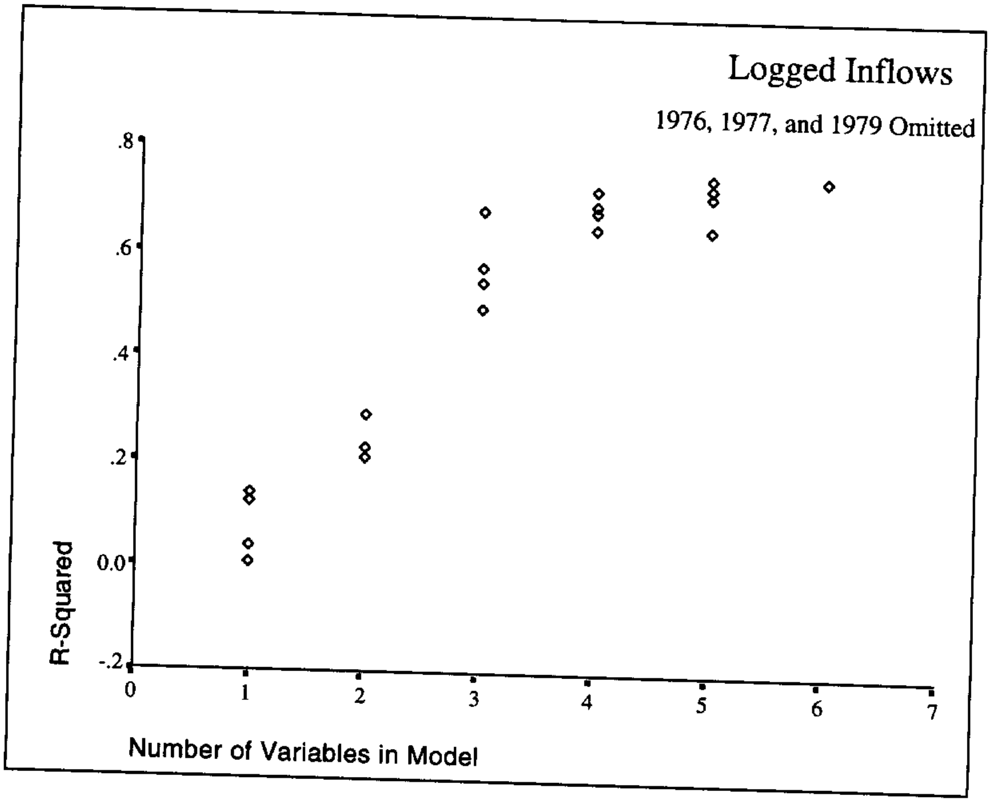

OBS _MODEL_  _TYPE_  _DEPVAR_   _RMSE_  INTERCEP LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL

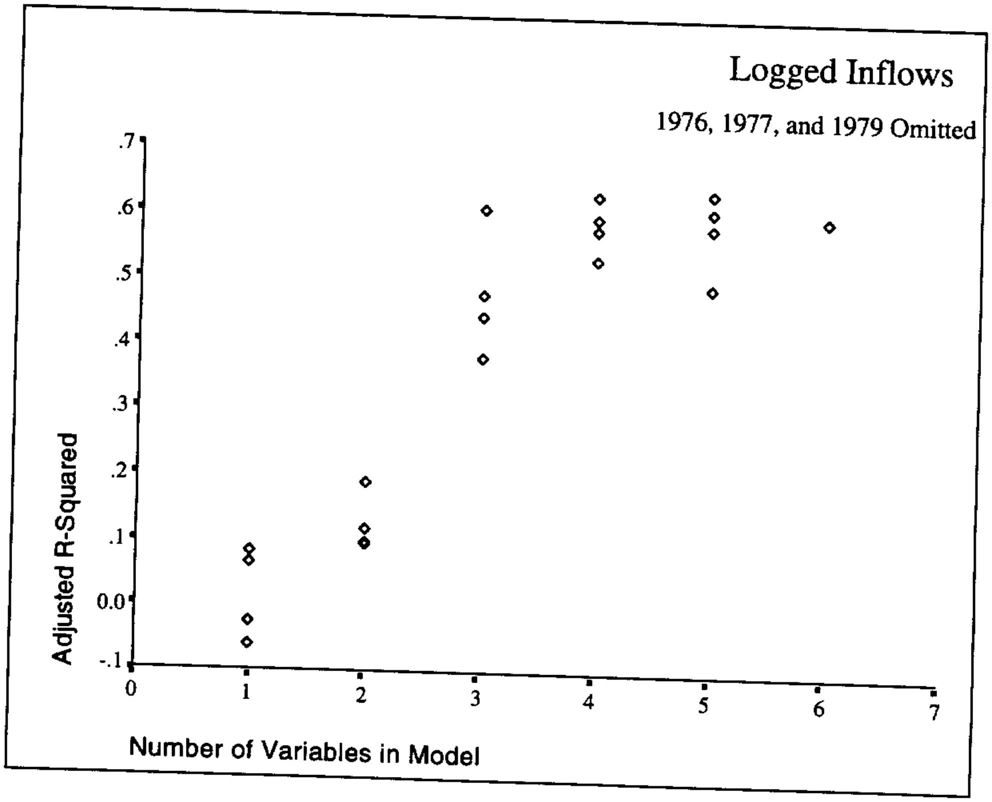
  1 MODEL1   PARMS   RED_DRUM 18.6005  -81.256      .        .     14.2293      .        .
  2 MODEL1   PARMS   RED_DRUM 18.7720  -75.521      .     14.0305      .        .        .
  3 MODEL1   PARMS   RED_DRUM 19.6736  -34.547      .        .        .        .        .
  4 MODEL1   PARMS   RED_DRUM 19.9923   51.177      .        .        .     -3.5167      .
  5 MODEL1   PARMS   RED_DRUM 17.5013  -44.178      .        .     24.7874 -18.1853      .
  6 MODEL1   PARMS   RED_DRUM 18.2460  -39.009      .     21.6959      .    -14.3239      .
  7 MODEL1   PARMS   RED_DRUM 18.4545 -191.376      .     16.8711      .        .        .
  8 MODEL1   PARMS   RED_DRUM 18.4582 -177.742      .        .     15.8488      .        .
  9 MODEL1   PARMS   RED_DRUM 12.1819 -198.741 -62.1200      .     38.0069      .        .
 10 MODEL1   PARMS   RED_DRUM 14.0615 -203.974 -50.9383  34.0343      .        .        .
 11 MODEL1   PARMS   RED_DRUM 14.4930 -229.041      .        .     35.8131 -31.0721      .
 12 MODEL1   PARMS   RED_DRUM 15.3004 -240.956      .     34.4127      .    -27.3168      .
 13 MODEL1   PARMS   RED_DRUM 11.7968 -234.131 -64.1316  14.6342  27.5098      .        .
 14 MODEL1   PARMS   RED_DRUM 12.3805 -210.441 -50.4995      .     39.9440  -9.4661      .
 15 MODEL1   PARMS   RED_DRUM 12.6364 -201.380 -63.3789      .     38.5301      .      2.1978
 16 MODEL1   PARMS   RED_DRUM 13.2731 -225.386 -50.0298  37.0364      .        .    -12.9940
 17 MODEL1   PARMS   RED_DRUM 11.7421 -254.315 -48.9947  16.5677  28.6906 -12.5471      .
 18 MODEL1   PARMS   RED_DRUM 12.1852 -237.430 -62.1057  18.1757  23.9251      .     -4.3869
 19 MODEL1   PARMS   RED_DRUM 12.5432 -227.827 -46.5706      .     43.1198 -16.1929   7.5574
 20 MODEL1   PARMS   RED_DRUM 13.8615 -226.308 -49.0032  37.1735      .     -0.8314 -12.7939
 21 MODEL1   PARMS   RED_DRUM 12.3125 -254.647 -48.6747  16.0847  29.3128 -13.0804   0.7000
```

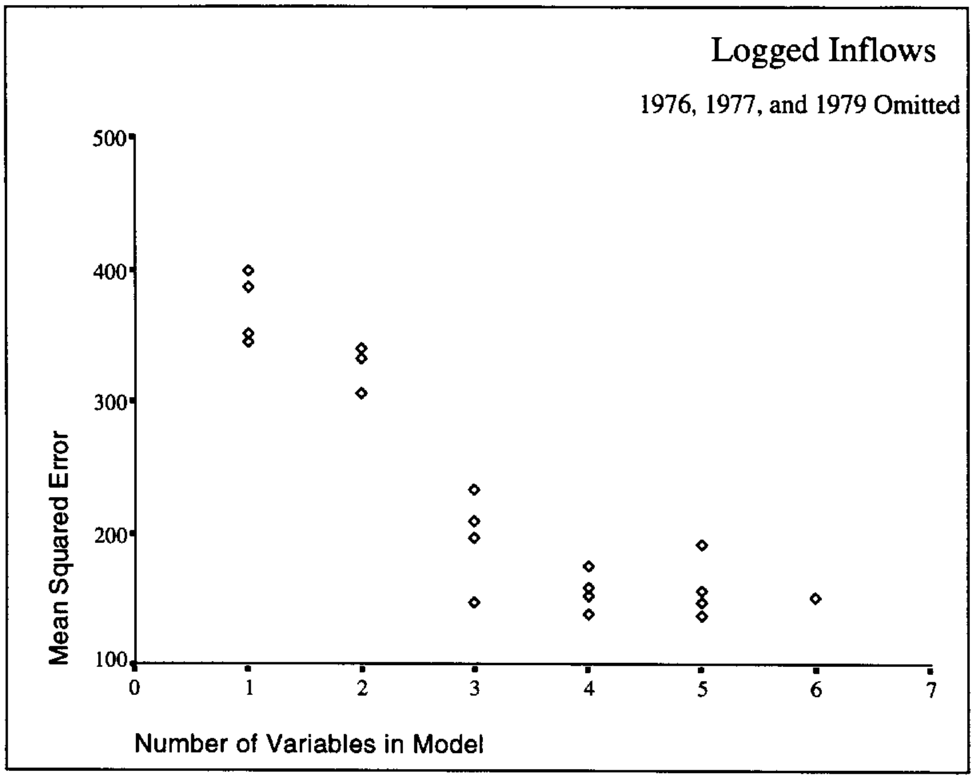
```
OBS LGNDINFL  RED_DRUM  _IN_  _P_  _EDF_   _MSE_     _RSQ_    _ADJRSQ_    _CP_     _AIC_     _SBC_

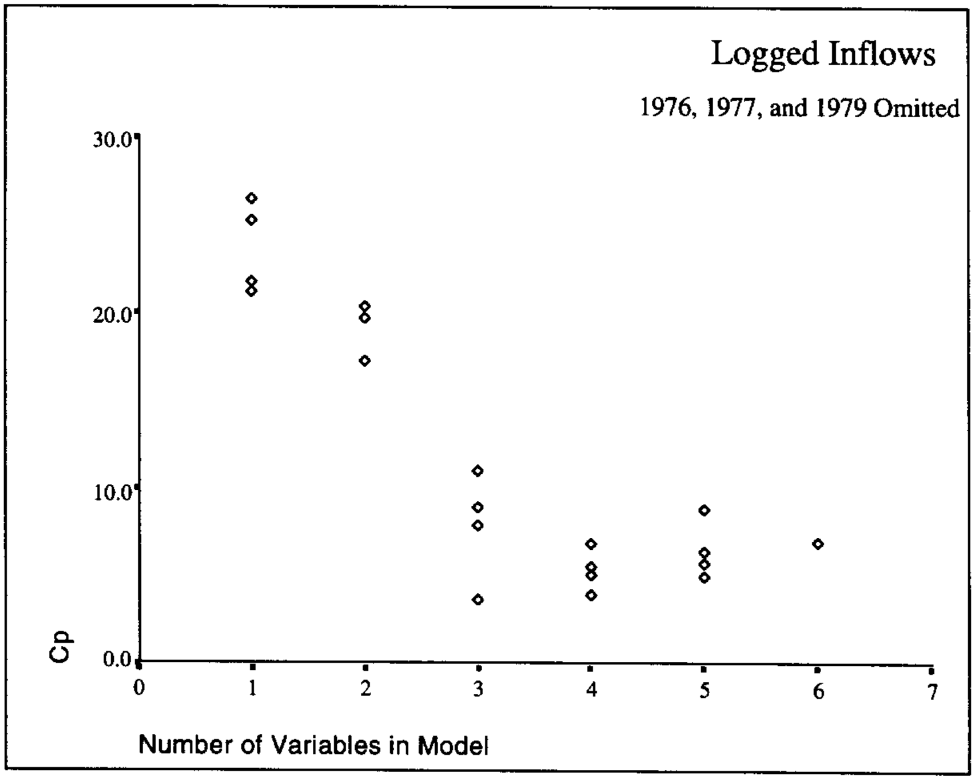
  1     .        -1       1    2     15   345.978  0.14174   0.08452  21.2332  101.261  102.927
  2     .        -1       1    2     15   352.386  0.12585   0.06757  21.8672  101.573  103.239
  3   8.9133     -1       1    2     15   387.050  0.03986  -0.02415  25.2971  103.168  104.834
  4     .        -1       1    2     15   399.693  0.00849  -0.05761  26.5480  103.714  105.381
  5     .        -1       2    3     14   306.295  0.29084   0.18953  17.2862  100.017  102.516
  6     .        -1       2    3     14   332.918  0.22920   0.11908  19.7449  101.434  103.933
  7  13.4529     -1       2    3     14   340.570  0.21148   0.09884  20.4515  101.820  104.320
  8  11.9184     -1       2    3     14   340.705  0.21117   0.09848  20.4640  101.827  104.326
  9  55.6263     -1       3    4     13   148.397  0.68096   0.60733   3.7256   88.438   91.771
 10  50.4664     -1       3    4     13   197.726  0.57491   0.47681   7.9556   93.316   96.649
 11  26.0806     -1       3    4     13   210.048  0.54841   0.44420   9.0123   94.344   97.677
 12  27.2957     -1       3    4     13   234.103  0.49670   0.38055  11.0751   96.187   99.520
 13  58.8530     -1       4    5     12   139.166  0.72382   0.63176   4.0159   87.985   92.151
 14  51.7646     -1       4    5     12   153.276  0.69582   0.59443   5.1328   89.627   93.793
 15  54.6394     -1       4    5     12   159.678  0.68311   0.57748   5.6396   90.323   94.489
 16  61.8510     -1       4    5     12   176.176  0.65037   0.53383   6.9455   91.994   96.160
 17  54.1608     -1       5    6     11   137.876  0.74918   0.63517   5.0043   88.348   93.347
 18  61.6037     -1       5    6     11   148.479  0.72989   0.60712   5.7737   89.607   94.606
 19  45.6270     -1       5    6     11   157.333  0.71379   0.58369   6.4161   90.592   95.591
 20  61.3409     -1       5    6     11   192.140  0.65047   0.49159   8.9418   93.989   98.989
 21  53.5224     -1       6    7     10   151.598  0.74929   0.59887   7.0000   90.340   96.173
```

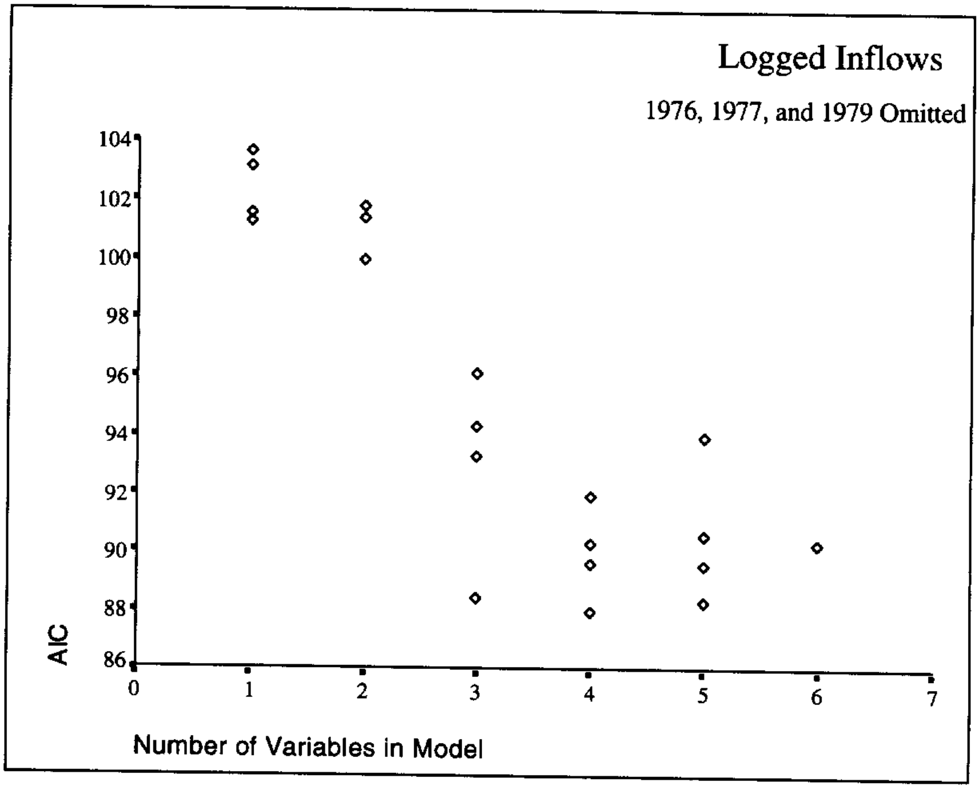
Scree Plots

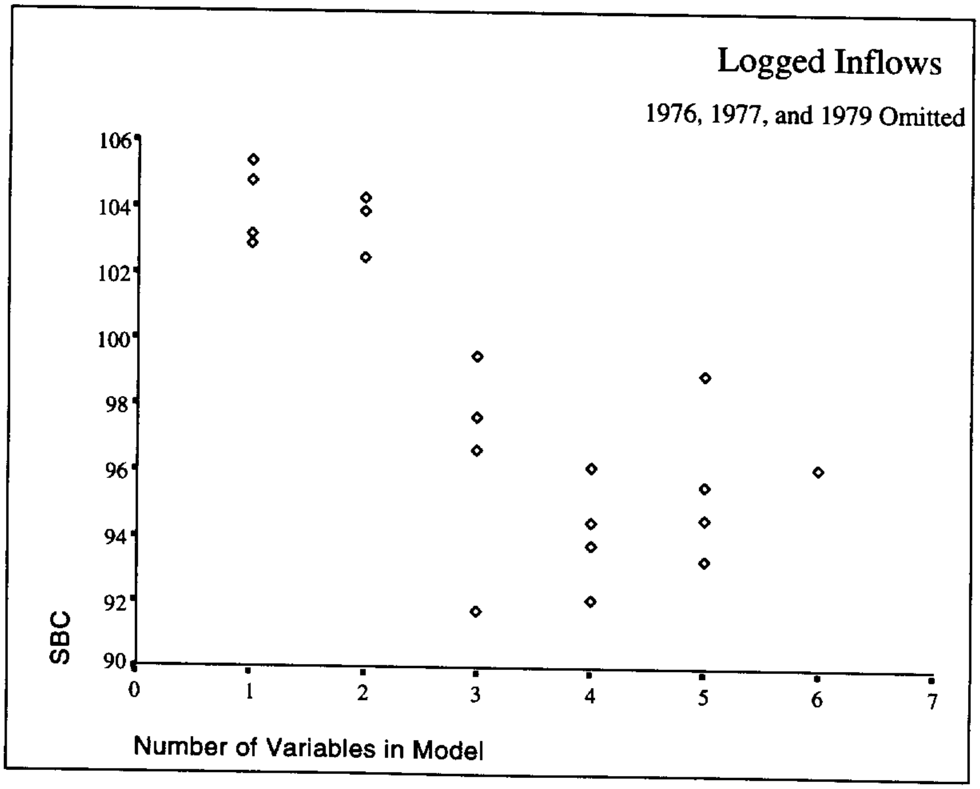

Logged Inflows
1976, 1977, and 1979 Omitted
R-Squared
.8
.6
.4
.2
0.0
-.2
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Inflows
1976, 1977, and 1979 Omitted
Adjusted R-Squared
.7
.6
.5
.4
.3
.2
.1
0.0
-.1
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Inflows
1976, 1977, and 1979 Omitted
Mean Squared Error
500
400
300
200
100
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Inflows
1976, 1977, and 1979 Omitted
Cp
30.0
20.0
10.0
0.0
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Inflows
1976, 1977, and 1979 Omitted
AIC
104
102
100
98
96
94
92
90
88
86
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Inflows
1976, 1977, and 1979 Omitted
SBC
106
104
102
100
98
96
94
92
90
0
1
2
3
4
5
6
7
Number of Variables in Model

All Variables Logged: 1963, 1977, and 1979 Omitted

```
N = 17     Regression Models for Dependent Variable: LGRDDRUM

      R-square      Adj      C(p)       AIC       MSE       SBC Variables in Model
 In                 Rsq

   1 0.068790 0.006710  19.2060  -2.3472 0.780203  -0.6808 LGJAINFL
   1 0.046288 -.017293  19.9842  -1.9413 0.799056  -0.2749 LGNDINFL
   1 0.043746 -.020004  20.0721  -1.8960 0.801185  -0.2296 LGMJINFL
   1 0.024309 -.040737  20.7443  -1.5540 0.817471   0.1125 LGJFINFL
------------------------------------------------------------------
   2 0.292395 0.191309  13.4726  -5.0154 0.635205  -2.5157 LGMJINFL LGJAINFL
   2 0.224248 0.113427  15.8294  -3.4523 0.696379  -0.9526 LGJFINFL LGNDINFL
   2 0.186611 0.070412  17.1311  -2.6469 0.730166  -0.1472 LGMAINFL LGJAINFL
   2 0.170450 0.051943  17.6900  -2.3124 0.744673   0.1872 LGJAINFL LGNDINFL
---------------------------------------------------------------------------
   3 0.630836 0.545645   3.7676 -14.0764 0.356884 -10.7435 LGJFINFL LGMJINFL LGNDINFL
   3 0.542505 0.436929   6.8225 -10.4294 0.442277  -7.0966 LGMJINFL LGJAINFL LGNDINFL
   3 0.520858 0.410287   7.5711  -9.6435 0.463203  -6.3106 LGJFINFL LGMAINFL LGNDINFL
   3 0.500697 0.385474   8.2684  -8.9428 0.482694  -5.6100 LGMJINFL LGJAINFL LGSOINFL
------------------------------------------------------------------------------------
   4 0.675116 0.566821   4.2361 -14.2485 0.340250 -10.0824 LGJFINFL LGMJINFL LGJAINFL LGNDINFL
   4 0.655554 0.540738   4.9127 -13.2545 0.360737  -9.0884 LGJFINFL LGMAINFL LGMJINFL LGNDINFL
   4 0.631512 0.508682   5.7442 -12.1075 0.385917  -7.9414 LGJFINFL LGMJINFL LGSOINFL LGNDINFL
   4 0.599992 0.466656   6.8343 -10.7122 0.418927  -6.5461 LGJFINFL LGMAINFL LGSOINFL LGNDINFL
------------------------------------------------------------------------------------------------
   5 0.710547 0.578978   5.0107 -14.2116 0.330702  -9.2123 LGJFINFL LGMAINFL LGMJINFL LGJAINFL
                                                           LGNDINFL
   5 0.687194 0.545010   5.8184 -12.8925 0.357383  -7.8933 LGJFINFL LGMJINFL LGJAINFL LGSOINFL
                                                           LGNDINFL
   5 0.669576 0.519383   6.4278 -11.9610 0.377512  -6.9617 LGJFINFL LGMAINFL LGMJINFL LGSOINFL
                                                           LGNDINFL
   5 0.604191 0.424278   8.6891  -8.8916 0.452214  -3.8923 LGJFINFL LGMAINFL LGJAINFL LGSOINFL
                                                           LGNDINFL
------------------------------------------------------------------------------------------------
   6 0.710858 0.537373   7.0000 -12.2298 0.363381  -6.3973 LGJFINFL LGMAINFL LGMJINFL LGJAINFL
                                                           LGSOINFL LGNDINFL
------------------------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_   _RMSE_  INTERCEP LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL

  1 MODEL1   PARMS  LGRDDRUM 0.88329  6.17952   .         .        .       -0.45117    .
  2 MODEL1   PARMS  LGRDDRUM 0.89390  0.27569   .         .        .        .          .
  3 MODEL1   PARMS  LGRDDRUM 0.89509  0.33683   .         .       0.37479   .          .
  4 MODEL1   PARMS  LGRDDRUM 0.90414  5.83082 -0.35219    .        .        .          .
  5 MODEL1   PARMS  LGRDDRUM 0.79700  2.01365   .         .       1.07868 -1.09195    .
  6 MODEL1   PARMS  LGRDDRUM 0.83449  4.43497 -1.31928    .        .        .          .
  7 MODEL1   PARMS  LGRDDRUM 0.85450  2.83405   .       0.78091    .       -0.82746    .
  8 MODEL1   PARMS  LGRDDRUM 0.86294  2.77700   .         .        .       -0.64166    .
  9 MODEL1   PARMS  LGRDDRUM 0.59740 -2.28189 -2.99100    .       1.49212   .          .
 10 MODEL1   PARMS  LGRDDRUM 0.66504 -5.14863   .         .       1.47165 -1.64139    .
 11 MODEL1   PARMS  LGRDDRUM 0.68059 -2.91573 -2.58292  1.31867    .        .          .
 12 MODEL1   PARMS  LGRDDRUM 0.69476 -3.22162   .         .       1.72776 -2.00203  0.90707
 13 MODEL1   PARMS  LGRDDRUM 0.58331 -3.47531 -2.11853    .       1.65490 -0.73494    .
 14 MODEL1   PARMS  LGRDDRUM 0.60061 -3.64481 -3.10981  0.51365  1.15883   .          .
 15 MODEL1   PARMS  LGRDDRUM 0.62122 -2.25940 -2.96240    .       1.47960   .       -0.05531
 16 MODEL1   PARMS  LGRDDRUM 0.64725 -4.14408 -2.57237  1.47298    .        .       -0.60124
 17 MODEL1   PARMS  LGRDDRUM 0.57507 -5.27258 -2.15283  0.62098  1.27237 -0.82704    .
 18 MODEL1   PARMS  LGRDDRUM 0.59781 -4.00807 -1.95841    .       1.77570 -0.99251  0.28167
 19 MODEL1   PARMS  LGRDDRUM 0.61442 -4.10559 -3.01066  0.73162  0.95193   .       -0.28925
 20 MODEL1   PARMS  LGRDDRUM 0.67247 -4.48198 -2.27041  1.51263    .       -0.24852 -0.53772
 21 MODEL1   PARMS  LGRDDRUM 0.60281 -5.27351 -2.12125  0.58714  1.31563 -0.86982  0.05227
```

```
OBS LGNDINFL LGRDDRUM _IN_ _P_ _EDF_  _MSE_    _RSQ_   _ADJRSQ_   _CP_     _AIC_     _SBC_

  1     .       -1      1   2   15  0.78020 0.06879  0.00671 19.2060   -2.3472   -0.6808
  2  0.41936    -1      1   2   15  0.79906 0.04629 -0.01729 19.9842   -1.9413   -0.2749
  3     .       -1      1   2   15  0.80119 0.04375 -0.02000 20.0721   -1.8960   -0.2296
  4     .       -1      1   2   15  0.81747 0.02431 -0.04074 20.7443   -1.5540    0.1125
  5     .       -1      2   3   14  0.63520 0.29240  0.19131 13.4726   -5.0154   -2.5157
  6  1.20666    -1      2   3   14  0.69638 0.22425  0.11343 15.8294   -3.4523   -0.9526
  7     .       -1      2   3   14  0.73017 0.18661  0.07041 17.1311   -2.6469   -0.1472
  8  0.65789    -1      2   3   14  0.74467 0.17045  0.05194 17.6900   -2.3124    0.1872
  9  2.26702    -1      3   4   13  0.35688 0.63084  0.54564  3.7676  -14.0764  -10.7435
 10  1.09142    -1      3   4   13  0.44228 0.54250  0.43693  6.8225  -10.4294   -7.0966
 11  2.17894    -1      3   4   13  0.46320 0.52086  0.41029  7.5711   -9.6435   -6.3106
 12     .       -1      3   4   13  0.48269 0.50070  0.38547  8.2684   -8.9428   -5.6100
 13  2.02642    -1      4   5   12  0.34025 0.67512  0.56682  4.2361  -14.2485  -10.0824
 14  2.40889    -1      4   5   12  0.36074 0.65555  0.54074  4.9127  -13.2545   -9.0884
 15  2.30083    -1      4   5   12  0.38592 0.63151  0.50868  5.7442  -12.1075   -7.9414
 16  2.75692    -1      4   5   12  0.41893 0.59999  0.46666  6.8343  -10.7122   -6.5461
 17  2.16779    -1      5   6   11  0.33070 0.71055  0.57898  5.0107  -14.2116   -9.2123
 18  1.76993    -1      5   6   11  0.35738 0.68719  0.54501  5.8184  -12.8925   -7.8933
 19  2.64590    -1      5   6   11  0.37751 0.66958  0.51938  6.4278  -11.9610   -6.9617
 20  2.61664    -1      5   6   11  0.45221 0.60419  0.42428  8.6891   -8.8916   -3.8923
 21  2.11249    -1      6   7   10  0.36338 0.71086  0.53737  7.0000  -12.2298   -6.3973
```

Crab Harvests in Galveston Bay: A Regression Analysis

Harvest vs. Freshwater Inflows

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Rita Miranda-López

Department of Statistics
Texas A&M University

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Table of Contents

Summary Report

Description of the Problem[1]

Bimonthly freshwater inflows into Galveston Bay were recorded for the years 1962 to 1987. These variables, and various transformations of them, were used to construct a model for the annual harvest of crab.

Constructing Models - General Discussion

Stability of coefficient estimates and accuracy of predicted values are primary goals in constructing models for prediction. To this end, the data must be examined from three points of view: individual observations (to detect outliers or influential points); variables, individually and in groups (to select an optimal set of predictors); and the interaction of these two, which produces the overall structure of the data set (to determine whether multicollinearity is present or not). The first two of these were examined by both graphic and quantitative means; the third by quantitative means only.

Detecting Influential Points and Outliers

The structures of individual variables were examined via box plots and histograms, as well as by all the usual numerical measures. For each pair of variables, 50, 90 and 95 % prediction ellipses and 95% confidence ellipses were plotted in a further effort to look for unusual points. For example, suppose large values of Variable A are generally associated with large values for Variable B. If an observation consisted of a large value for Variable A but a small value for Variable B, that point would be considered unusual, even though it was well within the range of data for both variables and could not be considered an outlier.

In addition, a number of residual analysis techniques were employed. A large *residual* indicates a point not well-fit by the model. The *deleted residual*, however, is somewhat more useful in the search for influential points. The model is fitted without a given observation, and the predicted response and corresponding residual are calculated for that observation. The *Studentized deleted residual* is scaled to have a Student's t distribution. Histograms and normal P-P plots of the residuals were also examined.

Other quantities, such as the Mahalanobis distance, Cook's distance, the leverage value, standarized values for the Dffits (to measure the influence of a given observation on the predicted response) and the Dfbetas (to measure the influence of a given observation on the calculated coefficients) were also used to build a general picture of the influence of individual points. Plots were made of the standardized Dffits value for each model against the Dfbeta values for each predictor in the model. Points which were extreme indicated observations which had strong effects on both predicted values and coefficient estimates.

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[1] The following discussion, prepared by Jacqueline Kiffe, was taken from *Seatrout Harvests in Galveston Bay: A Regression Analysis,* by F. Michael Speed, Sr. And Jacqueline Kiffe.

Variable Selection

For each regression, residuals were plotted against each of the independent variables to look for nonlinear relationships between the response variable and individual predictors. Partial residual plots were employed to examine the overall relationship between the response and individual predictors. A partial residual is a corollary to the deleted residual. That is, the model is fitted without a given variable and the predicted response and corresponding residual are calculated for each observation. This seeks to answer the question, "What is the relationship of this predictor to the response variable, taking all other variables into account?" Thus, it examines the marginal relationship of a given predictor to the response.

Numerous measures have been developed over the years to assess the adequacy of a given model. We examined a number of these, including R^2 and mean squared error (MSE), and several others which directly incorporate penalties for having too many predictors in the model, such as adjusted R^2, C_p, AIC, and SBC. It is well-established that too many predictors in a model can lead to bad prediction, just as too few can, and these measures are used as part of the attempt to find an optimal model.

Multicollinearity

Multicollinearity arises when one or more variables are nearly closely approximated by linear combinations of the remaining variables, resulting in unstable coefficient estimates. The variance inflation factor (VIF) was calculated for each coefficient estimate to measure this instability, which is not usually considered profound for VIF's less than 10. No problems were found with this data. Additionally, the condition index (a ratio of eigenvalues of the covariance matrix, with the largest eigenvalue always on top) was calculated. A ratio greater than 30 is considered cause for concern. Again, no evidence of multicollinearity was found.

Other Procedures

Several other miscellaneous diagnostics, including the Durbin-Watson test for serial autocorrelation were performed, and no general problems were detected. The Box-Cox procedure, used to find a transformation to normality, was also performed.

How the Final Model Was Chosen

Selecting the Data Set Used. First, the variables were explored thoroughly, individually and in pairs, in a first effort to detect outliers. The SAS programming language allows a number of diagnostics to be calculated for a group of models on a given data set without actually performing a formal regression, thus allowing one to examine a large number of models quite efficiently. The Box-Cox procedure was performed to find if a transformation to normallity was suggested. The log transform was suggested for some variables, and the squared root for others. At this point, there were several data sets for which the diagnostic series was calculated:

1. Untransformed data
2. Harvest untransformed, and natural log of inflow variables
3. Harvest untransformed, and squared root of inflow variables
4. Harvest untransformed, and squared root of Jan-Feb, Mar-Apr, May-Jun Inflows, natural log of Jul-Aug, Sept-Oct and Nov-Dec inflows
5. All Variables Logged.
6. Harvest, Jan-Feb, May-Jun Inflows untransformed, logged others inflows
7. Harvest, Jan-Feb, May-Jun Inflows untransformed, squared root others inflows
8. Harvest, Jan-Feb, May-Jun Inflows untransformed, squared root Mar-April, logged the others inflows

Data Set	R^2	Adjusted R^2
1	**0.639**	**0.524**
2	0.521	0.369
3	**0.592**	**0.463**
4	0.539	0.393
5	0.507	0.351
6	0.538	0.393
7	**0.601**	**0.483**
8	0.552	0.410

Selecting the Points to be Omitted. Data sets 1, 3, and 7 presented the highest R^2 values. Therefore, the full regression with all diagnostics was performed only for the three models, each one contained all variables in its corresponding data set. All diagnostics were generated, and influential points were determined for each model.

The observations flagged as potentially influential are given in the summary table below, for each model.

Year	Variable
1962	Harvest
1969	March-April Inflows
1971	Ln (January-February Inflows)
1974	November-December Inflows
1983	July-August Inflows
1986	Harvest November-December Inflows

Summary of points flagged by Boxplots

Year	Variable
1969	Mar-Apr vs. Sept-Oct Inflows
1974	Harvest vs. Sept-Oct Inflows Jan-Feb vs. Sept-Oct Inflows Mar-Apr vs. Sept-Oct Inflows May-Jun vs. Sept-Oct Inflows Jul-Aug vs. Sept-Oct Inflows Mar-Apr vs. Nov-Dec Inflows Sept-Oct vs. Nov-Dec Inflows
1983	Jan-Feb vs. Jul-Aug Inflows Mar-Apr vs. Jul-Aug Inflows May-Jun vs. Jul-Aug Inflows Jul-Aug vs. Sept-Oct Inflows
1986	Harvest vs. Nov-Dec Inflows

Summary of points flagged by 95% Prediction Ellipses

Data Set 1

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	TOTAL
***1962**	1						1		2
***1969**	1						1		2
***1974**	1						1		2
1982							1		1
1983	1								1
***1986**	2								2
***1987**			1				1		2

Data Set 3

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	TOTAL
***1962**	1						1		2
1969							1		1
1970							1		1
1974							1		1
1982							1		1
1986	1								1
***1987**			1				1		2

Data set 7

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	TOTAL
***1962**	1						1		2
1969							1		1
1970							1		1
1974							1		1
1977							1		1
1986	1								1
***1987**			1				1		2

Summary of Points flagged by diagnostic measures

<u>Key to Abbreviations:</u>

BOX	Box plot
SRE	Studentized residual
SDR	Studentized deleted residual
LEV	Leverage value
MAH	Mahalanobis distance
COO	Cook's distance
SDF	Standardized Dffits value
SDB	Standardized Dfbeta value

Selecting the Final Candidate Models. For Data Set 1 (untransformed data), the observations to be omitted are 1969 and 1974. For Data Sets 3 (squared root of inflows) and 7 (some untransformed and others squared root inflows), the observations 1962 and 1987 will be omitted

	Observations omitted	**R^2**	**Adjusted R^2**
Data Set 1	1962	0.597	0.462
	1987	0.715	0.620
	1962 & 1987	0.698	0.591
	1969 & 1974	0.759	0.674
	1986 & 1987	0.730	0.635
	1962, 1969 & 1974	0.734	0.635
	1969, 1974 & 1987	0.819	0.751
	1962, 1969, 1974, 1986 & 1987	0.814	0.734
Data Set 3	1962 and 1987	0.648	0.524
Data Set 7	1962 and 1987	0.668	0.551

Selecting the Final Models. Regression was performed using each of these three models, and the deleted residuals were calculated. It needs to be mentioned that Model 1 does not completely meet the assumption of normality as Model 7 does. However, It seems that Model 1, untransformed data, performs better from the point of view of prediction, and could be considered as the final choice.

Data Set	**Best Candidate Model (Inflows)**	**R^2**	**Adjusted R^2**	**C_p**	**Deleted Residuals**	**Prob>F**
1	Jan-Feb, Mar-Apr, May-Jun, Sept-Oct, Nov-Dec	0.815	0.760	5.42	(- 713.87 , 741.42)	0.000
3	SQRT (Mar-Apr), SQRT (May-Jun), SQRT (Jul-Aug), SQRT (Nov-Dec)	0.623	0.544	4.20	(- 904.43 , 1161.68)	0.001
7	SQRT (Mar-Apr), May-Jun, SQRT (Jul-Aug), SQRT (Nov-Dec)	0.638	0.562	4.52	(- 890.82 , 1149.063)	0.000

Model 1:
Crab Harvest = 751.228 - 0.276*(January-February Inflows) + 0.846*(March-April Inflows)
- 0.184*(May-June Inflows) - 0.475*(September-October Inflows)
+ 0.600*(November-December Inflows)

Model 3:
Crab Harvest = 480.128 + 38.994*SQRT(March-April Inflows) - 12.893*SQRT(May-June Inflows)
- 21.752*SQRT(July-August Inflows) + 22.828*SQRT(November-December Inflows)

Model 7:
Crab Harvest = 219.226 + 39.532*SQRT(Mach-April Inflows) - 0.147*(May-June Inflows)
- 22.195*SQRT(July-August Inflows) + 22.699*SQRT(November-December Inflows)

Untransformed Data

Summary Information

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	Nov-Dec Inflows, Mar-Apr Inflows, May-Jun Inflows, Jan-Feb Inflows, Sept-Oct Inflows[c,d]	.	.903	.815	.760	298.1370	1.813

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), Nov-Dec Inflows, Mar-Apr Inflows, May-Jun Inflows, Jan-Feb Inflows, Sept-Oct Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6637882	5	1327576	14.936	.000[b]
	Residual	1511056	17	88885.7		
	Total	8148939	22			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), Nov-Dec Inflows, Mar-Apr Inflows, May-Jun Inflows, Jan-Feb Inflows, Sept-Oct Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	751.228	220.649		3.405	.003	285.701	1216.756
	Jan-Feb Inflows	-.276	.105	-.326	-2.613	.018	-.498	-.053
	Mar-Apr Inflows	.846	.106	1.114	8.001	.000	.623	1.070
	May-Jun Inflows	-.184	.064	-.331	-2.872	.011	-.319	-.049
	Sept-Oct Inflows	-.475	.143	-.473	-3.310	.004	-.777	-.172
	Nov-Dec Inflows	.600	.095	.802	6.294	.000	.399	.801

a. Dependent Variable: CRAB

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	710.1958	2605.443	1639.72	549.2922	23
Std. Predicted Value	-1.692	1.758	.000	1.000	23
Standard Error of Predicted Value	82.2191	198.3782	149.1354	31.4517	23
Adjusted Predicted Value	810.2377	2648.966	1639.29	532.7179	23
Residual	-586.7430	479.0525	-3.E-14	262.0770	23
Std. Residual	-1.968	1.607	.000	.879	23
Stud. Residual	-2.198	1.856	.000	1.040	23
Deleted Residual	-731.8687	741.4173	.4295	371.3925	23
Stud. Deleted Residual	-2.520	2.017	-.010	1.107	23
Mahal. Distance	.717	8.784	4.783	2.258	23
Cook's Distance	.000	.456	.075	.118	23
Centered Leverage Value	.033	.399	.217	.103	23

a. Dependent Variable: CRAB

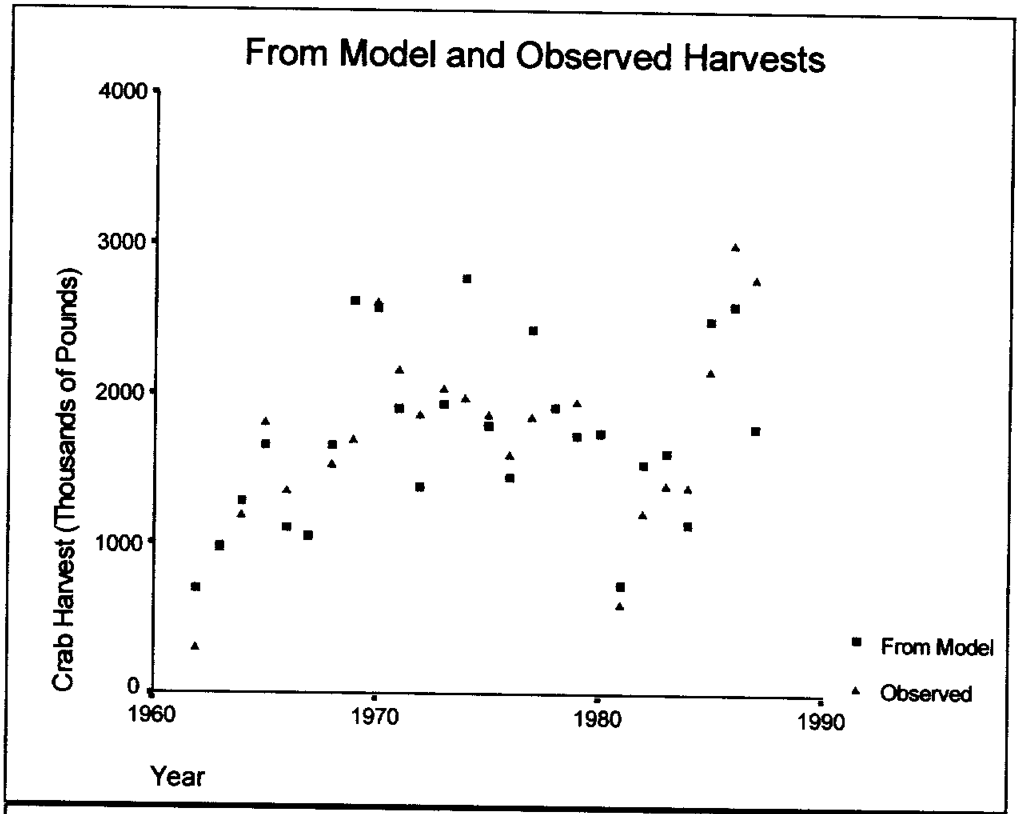
Tests of Normality

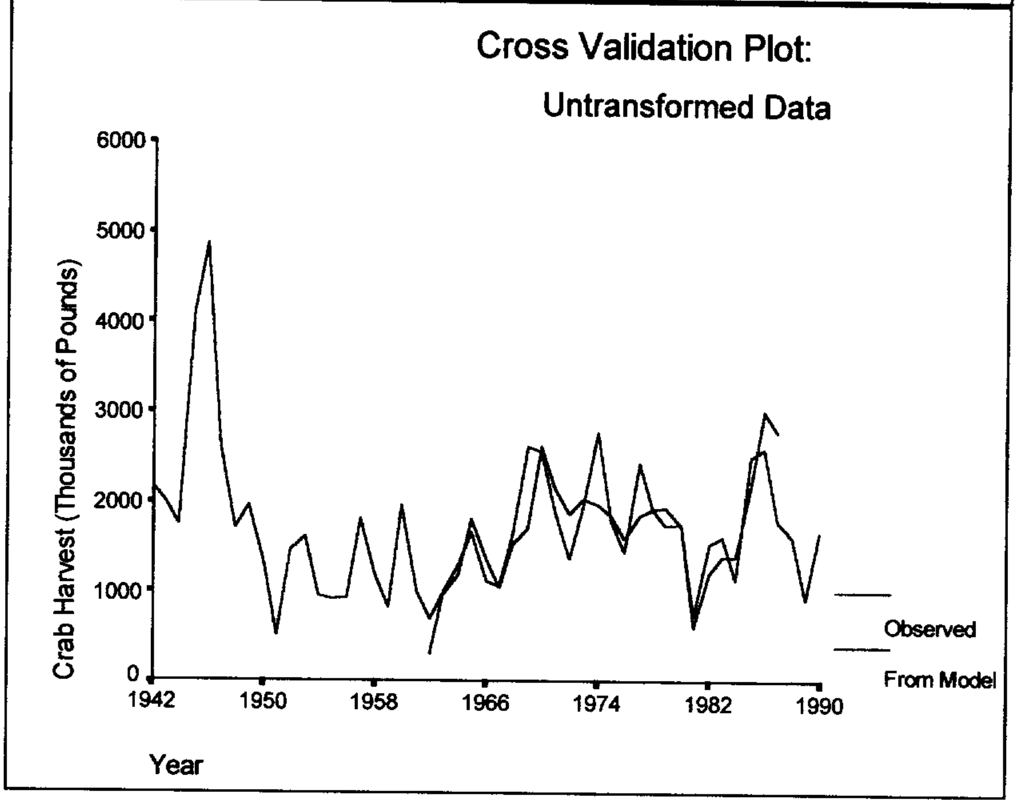
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CRAB	.106	23	.200*	.980	23	.883
Jan-Feb Inflows	.178	23	.058	.955	23	.417
Mar-Apr Inflows	.170	23	.083	.927	23	.097
May-Jun Inflows	.162	23	.119	.921	23	.076
Sept-Oct Inflows	.205	23	.013	.917	23	.062
Nov-Dec Inflows	.179	23	.054	.874	23	.010**

*. This is a lower bound of the true significance.

**. This is an upper bound of the true significance.

a. Lilliefors Significance Correction


From Model and Observed Harvests
Crab Harvest (Thousands of Pounds)
4000
3000
2000
1000
0
1960
1970
1980
1990
Year
■ From Model
▲ Observed


Cross Validation Plot:
Untransformed Data
Crab Harvest (Thousands of Pounds)
6000
5000
4000
3000
2000
1000
0
1942
1950
1958
1966
1974
1982
1990
Year
Observed
From Model

Squared Root Inflows Data

Summary Information

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), SQRT (May-Jun Inflows)[c,d]	.	.789	.623	.544	355.7150	1.775

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), SQRT (May-Jun Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3976430	4	994107	7.856	.001[b]
	Residual	2404130	19	126533		
	Total	6380560	23			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), SQRT (May-Jun Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	480.128	411.242		1.168	.257	-380.611	1340.867		
	SQRT (Mar-Apr Inflows)	38.994	8.209	.800	4.750	.000	21.812	56.175	.700	1.429
	SQRT (May-Jun Inflows)	-12.893	7.587	-.316	-1.699	.106	-28.773	2.987	.574	1.743
	SQRT (Jul-Aug Inflows)	-21.752	9.960	-.370	-2.184	.042	-42.597	-.906	.692	1.446
	SQRT (Nov-Dec Inflows)	22.828	6.968	.478	3.276	.004	8.243	37.413	.931	1.074

a. Dependent Variable: CRAB

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1116.783	2581.655	1712.12	415.7983	24
Std. Predicted Value	-1.432	2.091	.000	1.000	24
Standard Error of Predicted Value	98.6433	206.7975	159.6020	30.4448	24
Adjusted Predicted Value	1131.264	2887.331	1713.49	439.8818	24
Residual	-598.7549	837.1177	-4.E-13	323.3070	24
Std. Residual	-1.683	2.353	.000	.909	24
Stud. Residual	-2.069	2.772	-.001	1.052	24
Deleted Residual	-904.4313	1161.679	-1.3647	435.1929	24
Stud. Deleted Residual	-2.288	3.497	.020	1.175	24
Mahal. Distance	.810	6.815	3.833	1.730	24
Cook's Distance	.000	.596	.075	.148	24
Centered Leverage Value	.035	.296	.167	.075	24

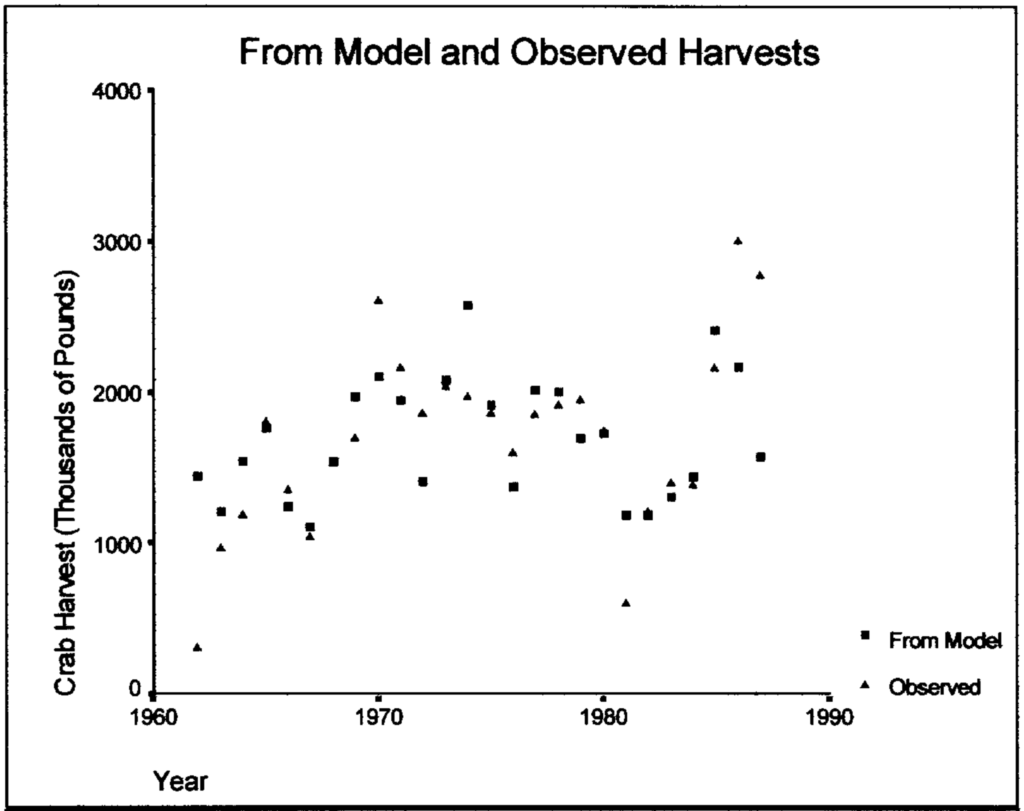
a. Dependent Variable: CRAB

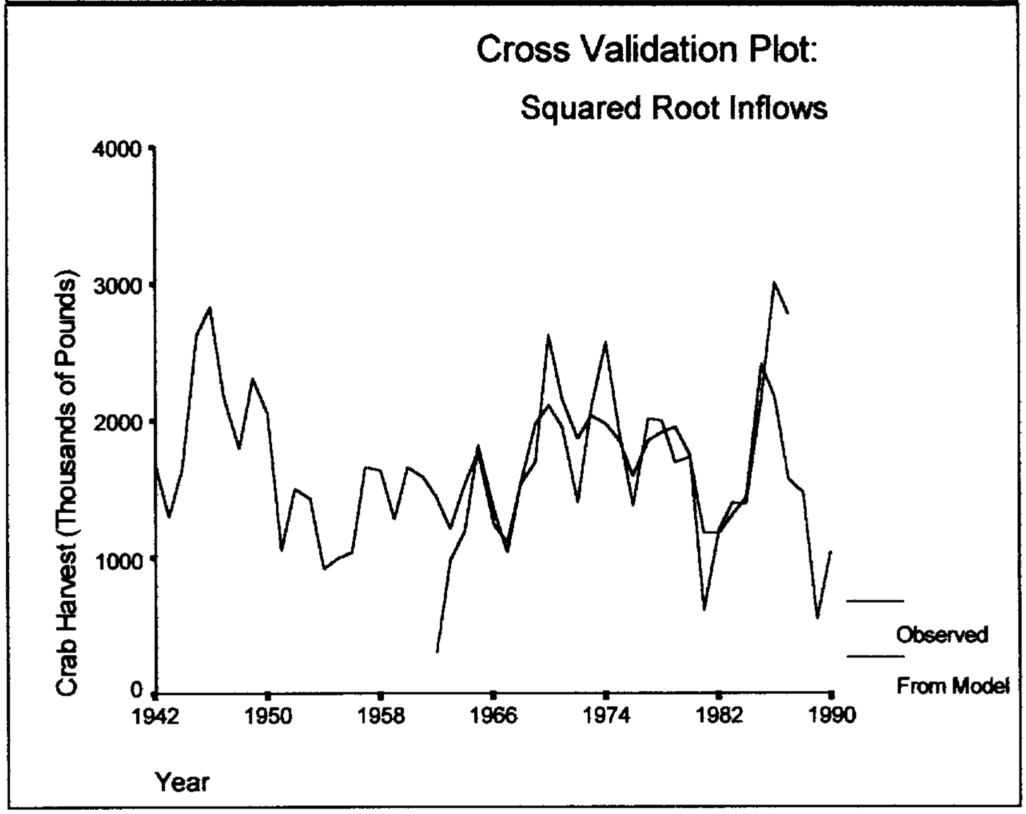
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CRAB	.110	24	.200*	.976	24	.780
SQRT (Mar-Apr Inflows)	.139	24	.200*	.955	24	.404
SQRT (May-Jun Inflows)	.184	24	.035	.936	24	.176
SQRT (Jul-Aug Inflows)	.114	24	.200*	.960	24	.461
SQRT (Nov-Dec Inflows)	.141	24	.200*	.911	24	.042

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction


From Model and Observed Harvests
Crab Harvest (Thousands of Pounds)
4000
3000
2000
1000
0
1960
1970
1980
1990
Year
■ From Model
▲ Observed


Cross Validation Plot:
Squared Root Inflows
Crab Harvest (Thousands of Pounds)
4000
3000
2000
1000
0
1942
1950
1958
1966
1974
1982
1990
Year
Observed
From Model

Untransformed and Squared Root Inflows Data

Summary Information

Model Summary^{a,b}

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), May-Jun Inflows^{c,d}	.	.799	.638	.562	348.5928	1.766

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), May-Jun Inflows

d. All requested variables entered.

ANOVA^{a}

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4071738	4	1017934	8.377	.000^{b}
	Residual	2308822	19	121517		
	Total	6380560	23			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), SQRt (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), May-Jun Inflows

Coefficients^{a}

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	219.226	401.35		.546	.591	-620.808	1059.260		
	SQRT (Mar-Apr Inflows)	39.532	7.989	.811	4.948	.000	22.811	56.254	.709	1.410
	May-Jun Inflows	-.147	.075	-.340	-1.947	.066	-.305	.011	.623	1.605
	SQRT (Jul-Aug Inflows)	-22.195	9.502	-.377	-2.336	.031	-42.083	-2.308	.730	1.370
	SQRT (Nov-Dec Inflows)	22.699	6.821	.475	3.328	.004	8.422	36.975	.933	1.072

a. Dependent Variable: CRAB

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1122.854	2572.278	1712.12	420.7518	24
Std. Predicted Value	-1.401	2.044	.000	1.000	24
Standard Error of Predicted Value	94.3874	217.0104	156.0606	31.6686	24
Adjusted Predicted Value	1118.849	2873.718	1713.14	444.4088	24
Residual	-589.3783	834.0538	-2.E-13	316.8337	24
Std. Residual	-1.691	2.393	.000	.909	24
Stud. Residual	-2.079	2.808	-.001	1.050	24
Deleted Residual	-890.8176	1149.063	-1.0171	424.3412	24
Stud. Deleted Residual	-2.302	3.574	.022	1.178	24
Mahal. Distance	.728	7.955	3.833	1.878	24
Cook's Distance	.000	.596	.073	.148	24
Centered Leverage Value	.032	.346	.167	.082	24

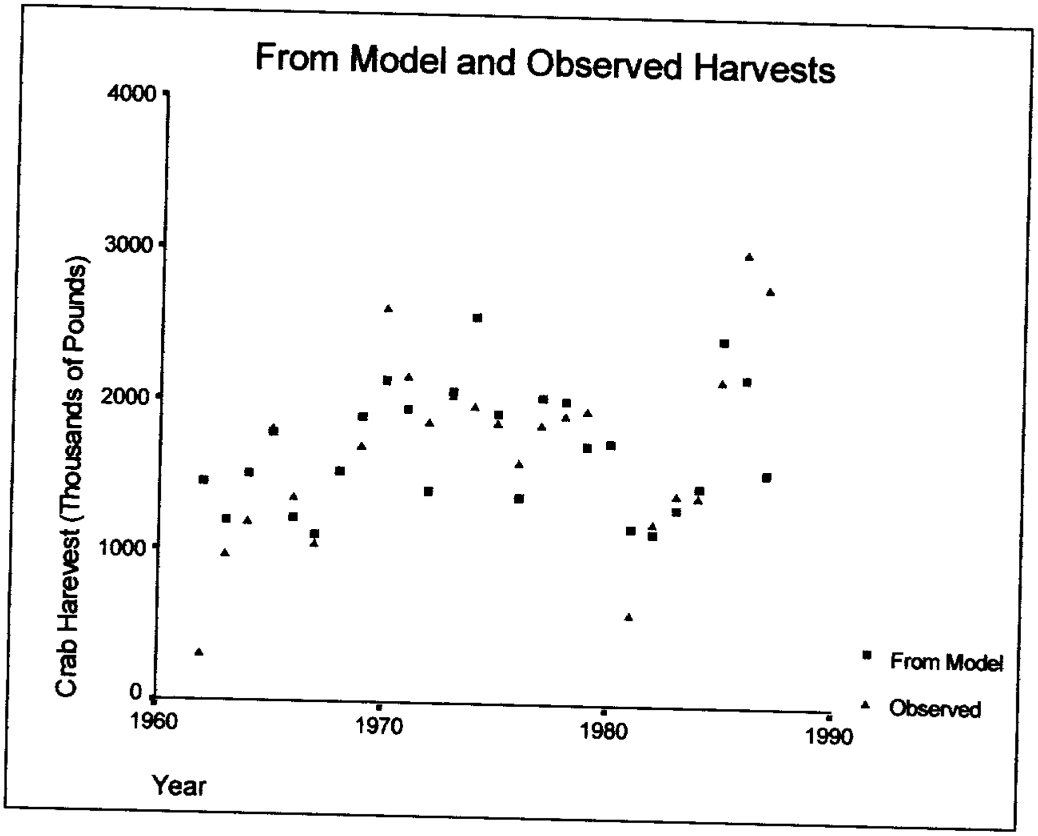
a. Dependent Variable: CRAB

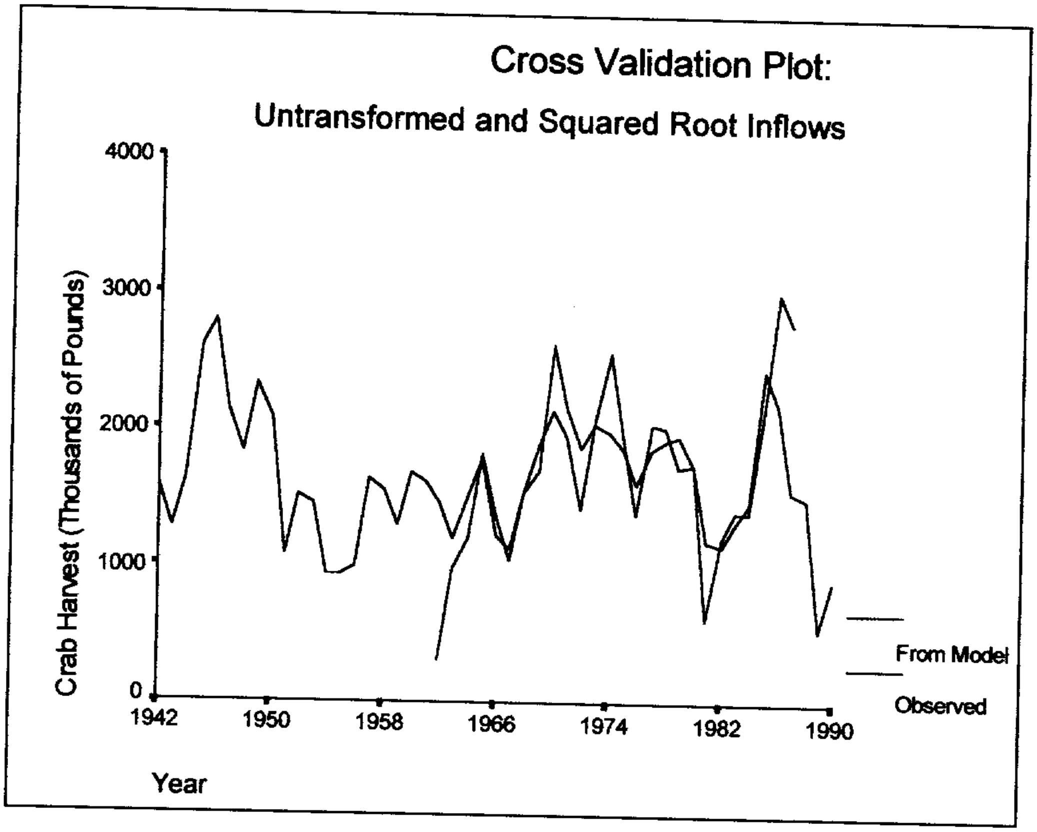
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CRAB	.110	24	.200*	.976	24	.780
SQRT (Mar-Apr Inflows)	.139	24	.200*	.955	24	.404
May-June Inflows	.139	24	.200*	.945	24	.282
SQRT (Jul-Aug Inflows)	.114	24	.200*	.960	24	.461
SQRT (Nov-Dec Inflows)	.141	24	.200*	.911	24	.042

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction


From Model and Observed Harvests
4000
3000
2000
1000
0
Crab Harevest (Thousands of Pounds)
1960
1970
1980
1990
Year
■ From Model
▲ Observed


Cross Validation Plot:
Untransformed and Squared Root Inflows
4000
3000
2000
1000
0
Crab Harvest (Thousands of Pounds)
1942
1950
1958
1966
1974
1982
1990
Year
From Model
Observed

Exploring the Data

Listing of Data

Obs.	YEAR	CRAB	JF_LAG	MA_LAG	MJ_LAG	JA_LAG	SO_LAG	ND_LAG
1	**1962**	311.30	2954.20	1045.00	1507.05	985.43	1571.22	1519.35
2	**1963**	977.50	915.25	503.40	916.45	367.34	552.67	847.05
3	**1964**	1195.60	977.03	709.20	620.95	208.60	357.73	837.60
4	**1965**	1817.90	1159.28	1048.65	1390.30	229.70	424.64	1343.55
5	**1966**	1357.80	1796.50	1506.80	3868.55	732.35	395.08	812.45
6	**1967**	1047.90	1191.97	1280.87	3075.70	802.31	522.30	628.35
7	**1968**	1542.60	1193.37	1910.42	3503.55	656.56	536.00	891.47
8	**1969**	1705.70	1896.15	3669.45	5140.75	709.21	476.12	782.52
9	**1970**	2622.00	1207.70	3388.15	2824.15	446.00	1011.38	491.33
10	**1971**	2160.80	443.30	1490.24	948.92	425.88	1187.93	1265.65
11	**1972**	1870.10	1088.25	510.89	1119.91	445.71	656.82	1708.29
12	**1973**	2047.00	2116.37	3049.16	3859.81	1019.84	2393.69	1737.41
13	**1974**	1982.90	2766.28	3164.87	3633.59	1081.86	3097.29	3763.55
14	**1975**	1863.50	3240.49	1594.75	2713.05	909.19	1270.46	2834.55
15	**1976**	1599.50	1719.70	1508.26	2901.65	1104.96	642.39	1235.49
16	**1977**	1859.40	1159.13	1992.32	1636.66	685.40	594.52	1518.63
17	**1978**	1920.90	2068.95	1908.49	1027.73	401.86	445.47	879.19
18	**1979**	1953.70	2496.04	2675.62	2305.49	1705.39	1608.58	1001.19
19	**1980**	1749.10	2677.83	3231.60	2983.10	1701.37	1901.76	781.13
20	**1981**	610.20	1407.75	1056.13	3306.17	1019.45	1665.50	1487.45
21	**1982**	1216.10	856.42	990.37	4067.47	1572.64	1332.93	2629.44
22	**1983**	1407.60	2023.75	1736.94	3035.88	2302.66	1175.47	1801.08
23	**1984**	1396.60	1963.01	1585.36	1671.18	1820.12	2018.63	1445.47
24	**1985**	2167.90	1863.89	1977.23	1291.46	575.53	1690.87	2729.59
25	**1986**	3018.60	2059.82	1721.08	3138.40	734.34	1473.80	3736.27
26	**1987**	2786.90	1778.48	1363.56	3793.13	1058.29	1018.77	2602.39

CRAB	Crab harvest (thousands of pounds)
JF_LAG	Lagged January-February inflows (thousands of acre-feet)
MA_LAG	Lagged March-April inflows (thousands of acre-feet)
MJ_LAG	Lagged May-June inflows (thousands of acre-feet)
JA_LAG	Lagged July-August inflows (thousands of acre-feet)
SO_LAG	Lagged September-October inflows (thousands of acre-feet)
ND_LAG	Lagged November-December inflows (thousands of acre-feet)

Summary Information for Individual Variables

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Crab Harvest	.108	26	.200*	.978	26	.814
January-February Inflows	.155	26	.112	.963	26	.475
March-April Inflows	.181	26	.028	.919	26	.048
May-June Inflows	.150	26	.139	.942	26	.218
July-August Inflows	.166	26	.063	.915	26	.040
September-October Inflows	.183	26	.025	.902	26	.019
November-December Inflows	.184	26	.024	.865	26	.010**
Ln (January-February Inflows)	.150	26	.137	.948	26	.289
Ln (March-April Inflows)	.112	26	.200*	.950	26	.307
Ln (May-June Inflows)	.214	26	.004	.912	26	.035
Ln (July-August Inflows)	.092	26	.200*	.970	26	.620
Ln (September-October Inflows)	.151	26	.132	.938	26	.168
Ln (November-December Inflows)	.128	26	.200*	.959	26	.425
SQRT (January-February Inflows)	.137	26	.200*	.973	26	.686
SQRT (March-April Inflows)	.137	26	.200*	.954	26	.366
SQRT (May-June Inflows)	.175	26	.039	.936	26	.133
SQRT (July-August Inflows)	.119	26	.200*	.967	26	.542
SQRT (September-October Inflows)	.175	26	.040	.935	26	.130
SQRT (November-December Inflows)	.133	26	.200*	.924	26	.065

*. This is a lower bound of the true significance.

**. This is a lower bound of the true significance.

a. This is a lower bound of the true significance.

Descriptives

			Statistic	Std. Error
Crab Harvest	Mean		1699.58	120.8554
	95% Confidence Interval for Mean	Lower Bound	1450.67	
		Upper Bound	1948.49	
	5% Trimmed Mean		1702.57	
	Median		1783.50	
	Variance		379757	
	Std. Deviation		616.2441	
	Minimum		311.30	
	Maximum		3018.60	
	Range		2707.30	
	Interquartile Range		676.5500	
	Skewness		-.053	.456
	Kurtosis		.482	.887

Extreme Values

			Case Number	YEAR	Value
Crab Harvest	Highest	1	25	1986	3018.60
		2	26	1987	2786.90
		3	9	1970	2622.00
		4	24	1985	2167.90
		5	10	1971	2160.80
	Lowest	1	1	1962	311.30
		2	20	1981	610.20
		3	2	1963	977.50
		4	6	1967	1047.90
		5	3	1964	1195.60

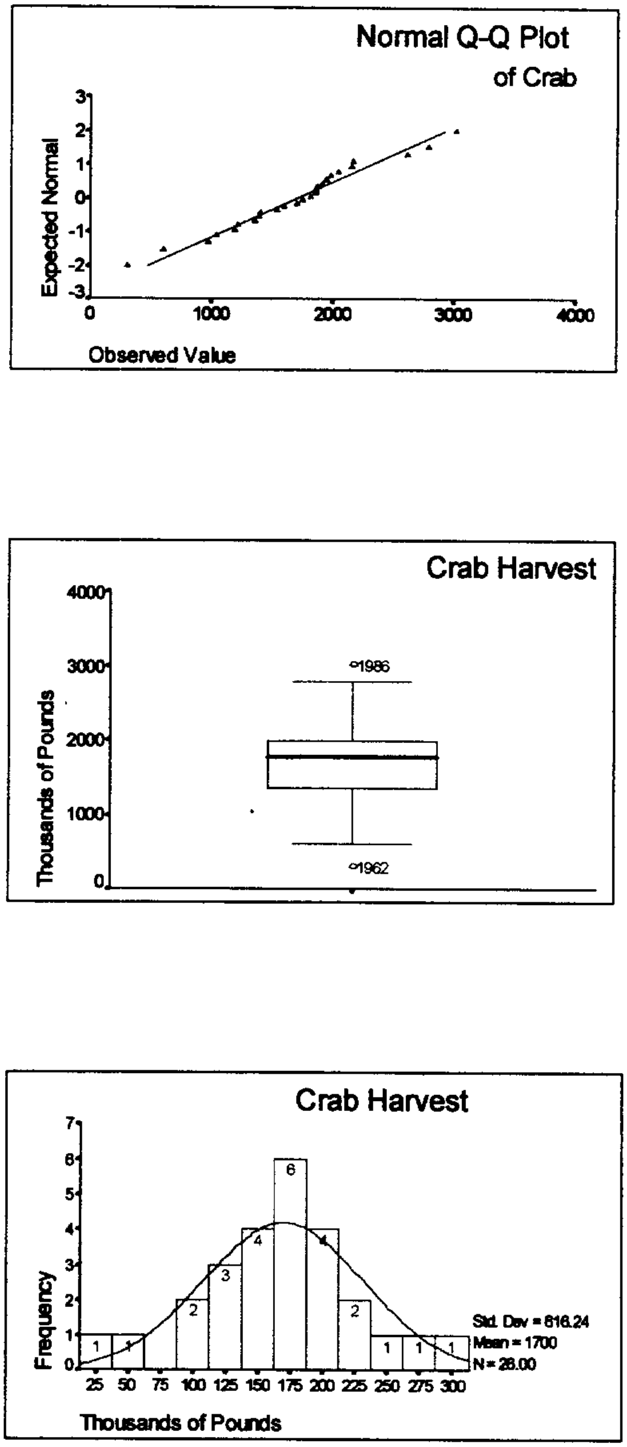


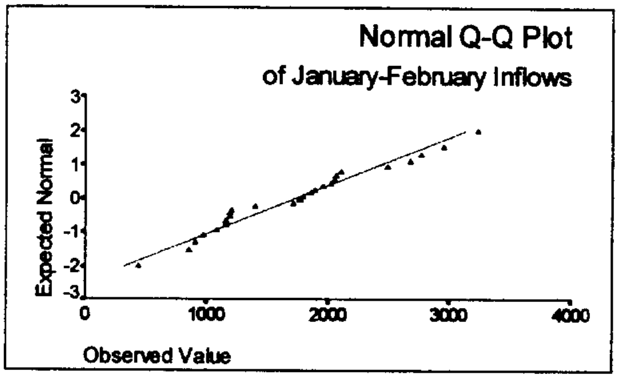
Fig. 1.1a. Exploratory Plots of Crab Harvest.

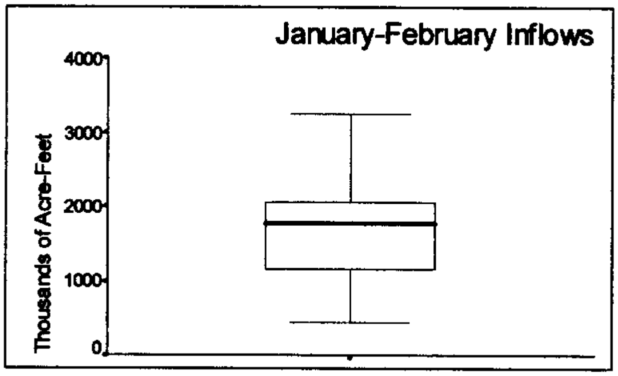
Descriptives

			Statistic	Std. Error
January-February Inflows	Mean		1731.57	139.0755
	95% Confidence Interval for Mean	Lower Bound	1445.14	
		Upper Bound	2018.00	
	5% Trimmed Mean		1717.69	
	Median		1787.49	
	Variance		502892	
	Std. Deviation		709.1485	
	Minimum		443.30	
	Maximum		3240.49	
	Range		2797.19	
	Interquartile Range		921.5675	
	Skewness		.356	.456
	Kurtosis		-.477	.887

Extreme Values

			Case Number	YEAR	Value
January-February Inflows	Highest	1	14	1975	3240.49
		2	1	1962	2954.20
		3	13	1974	2766.28
		4	19	1980	2677.83
		5	18	1979	2496.04
	Lowest	1	10	1971	443.30
		2	21	1982	856.42
		3	2	1963	915.25
		4	3	1964	977.03
		5	11	1972	1088.25





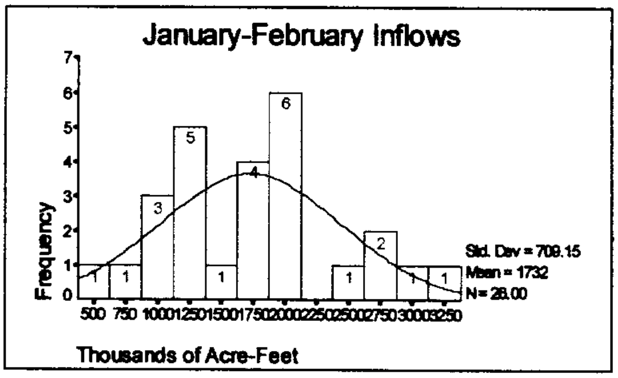
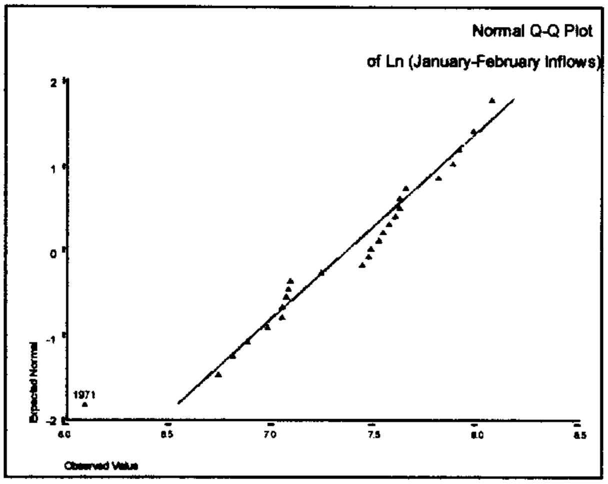
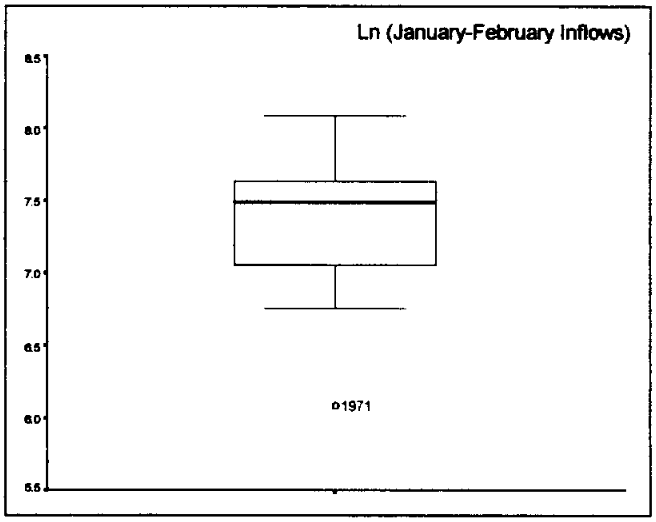


Fig. 1.2a. Exploratory Plots of January-February Inflows.





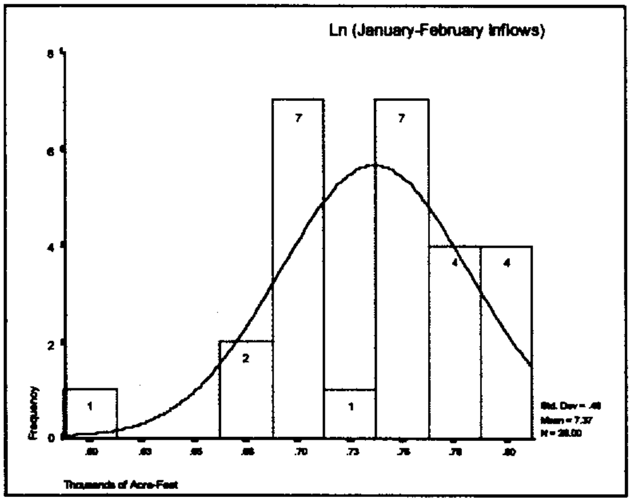
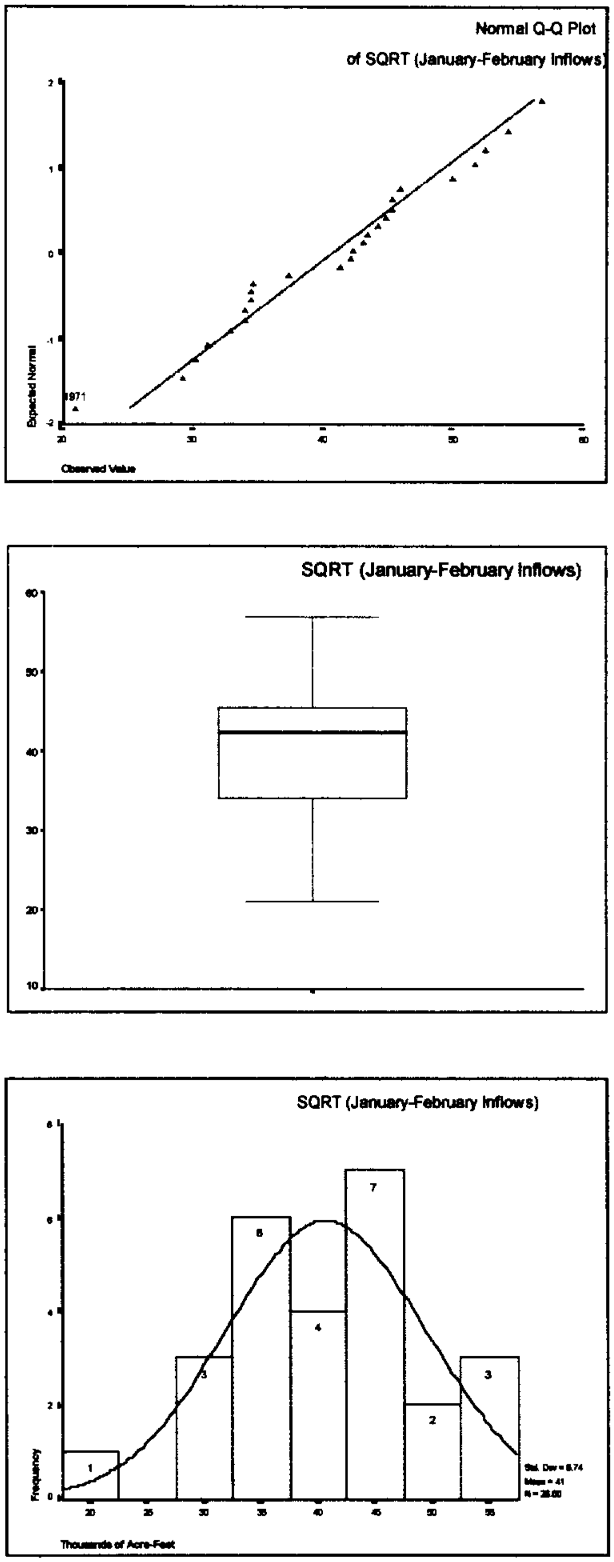


Fig. 1.2b. Exploratory Plots of Transformed January-February Inflows



Normal Q-Q Plot of SQRT (January-February Inflows)

SQRT (January-February Inflows)

SQRT (January-February Inflows)

Fig. 1.2c. Exploratory Plots of Transformed January-February Inflows.

Descriptives

			Statistic	Std. Error
March-April Inflows	Mean		1793.03	175.6272
	95% Confidence Interval for Mean	Lower Bound	1431.32	
		Upper Bound	2154.74	
	5% Trimmed Mean		1763.94	
	Median		1590.05	
	Variance		801968	
	Std. Deviation		895.5268	
	Minimum		503.40	
	Maximum		3669.45	
	Range		3166.05	
	Interquartile Range		1108.88	
	Skewness		.684	.456
	Kurtosis		-.383	.887

Extreme Values

			Case Number	YEAR	Value
March-April Inflows	Highest	1	8	1969	3669.45
		2	9	1970	3388.15
		3	19	1980	3231.60
		4	13	1974	3164.87
		5	12	1973	3049.16
	Lowest	1	2	1963	503.40
		2	11	1972	510.89
		3	3	1964	709.20
		4	21	1982	990.37
		5	1	1962	1045.00

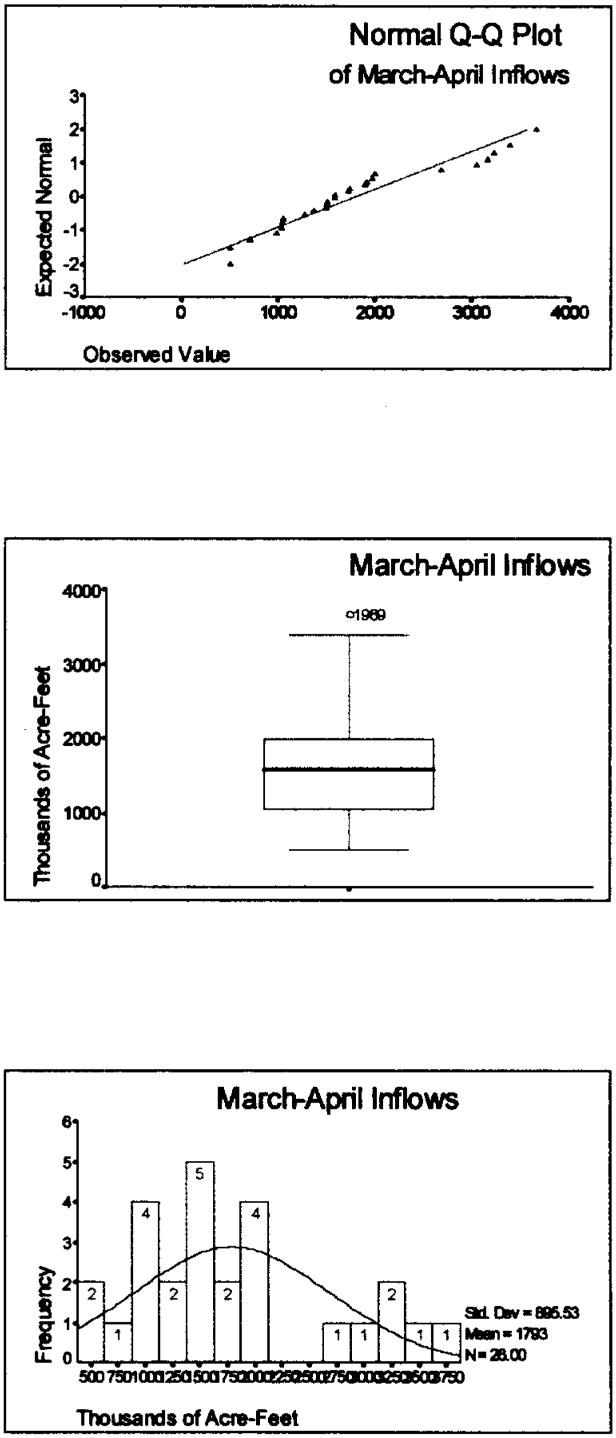


Fig. 1.3a. Exploratory Plots of March-April Inflows.

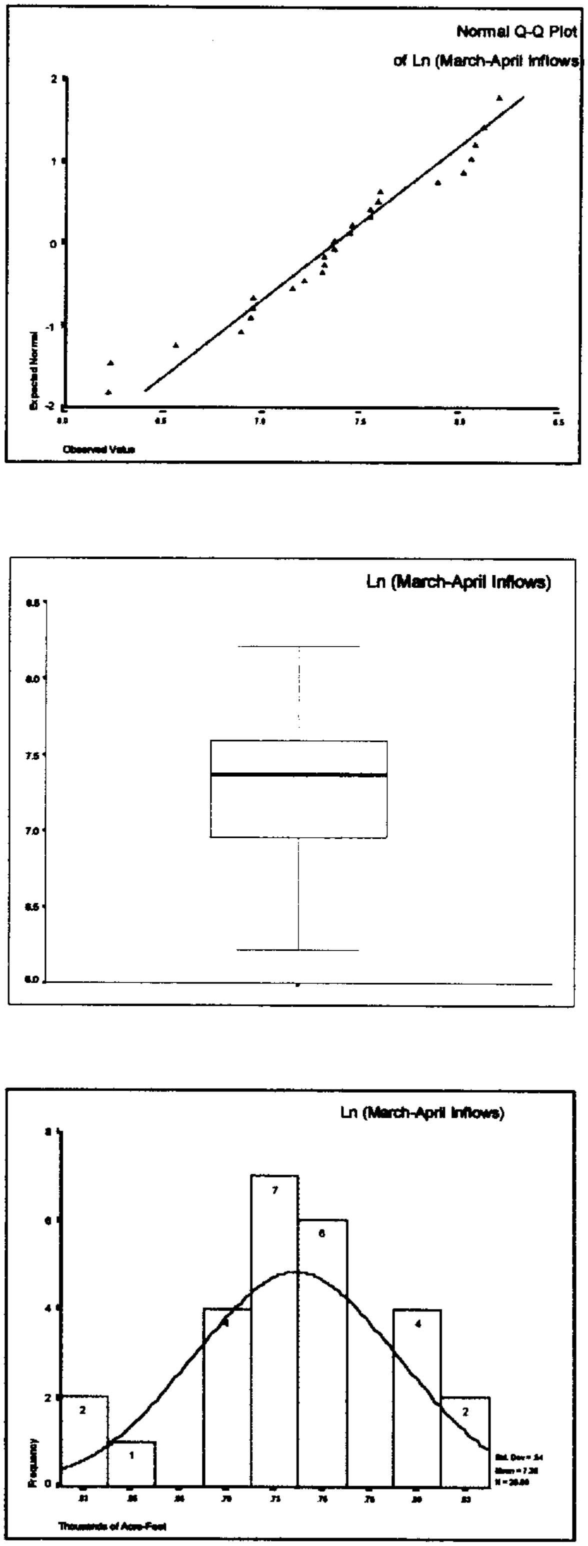


Fig. 1.3b. Exploratory Plots of Transformed March-April Inflows.

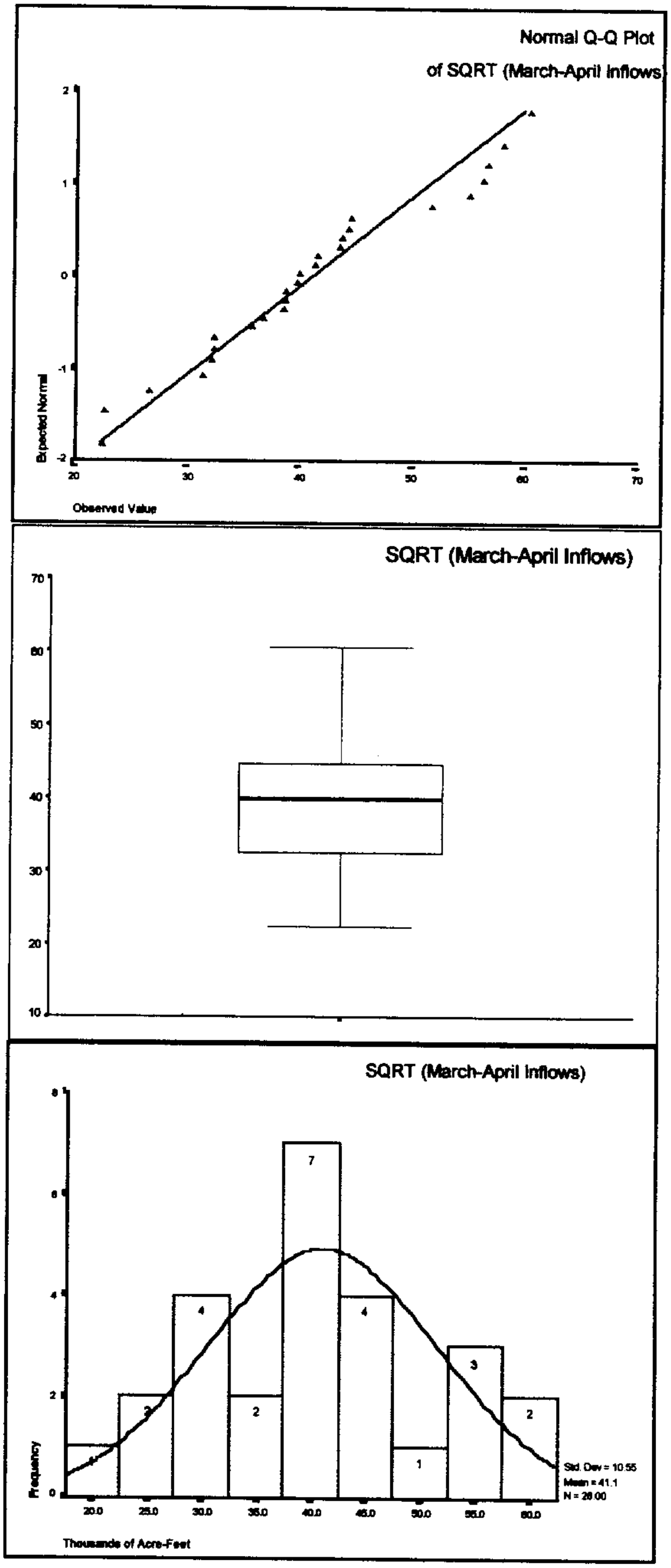


Fig. 1.3c. Exploratory Plots of Transformed March-April Inflows.

Descriptives

			Statistic	Std. Error
May-June Inflows	Mean		2549.27	238.3907
	95% Confidence Interval for Mean	Lower Bound	2058.29	
		Upper Bound	3040.24	
	5% Trimmed Mean		2522.40	
	Median		2862.90	
	Variance		1477583	
	Std. Deviation		1215.56	
	Minimum		620.95	
	Maximum		5140.75	
	Range		4519.80	
	Interquartile Range		2170.47	
	Skewness		.057	.456
	Kurtosis		-.940	.887

Extreme Values

			Case Number	YEAR	Value
May-June Inflows	Highest	1	8	1969	5140.75
		2	21	1982	4067.47
		3	5	1966	3868.55
		4	12	1973	3859.81
		5	26	1987	3793.13
	Lowest	1	3	1964	620.95
		2	2	1963	916.45
		3	10	1971	948.92
		4	17	1978	1027.73
		5	11	1972	1119.91

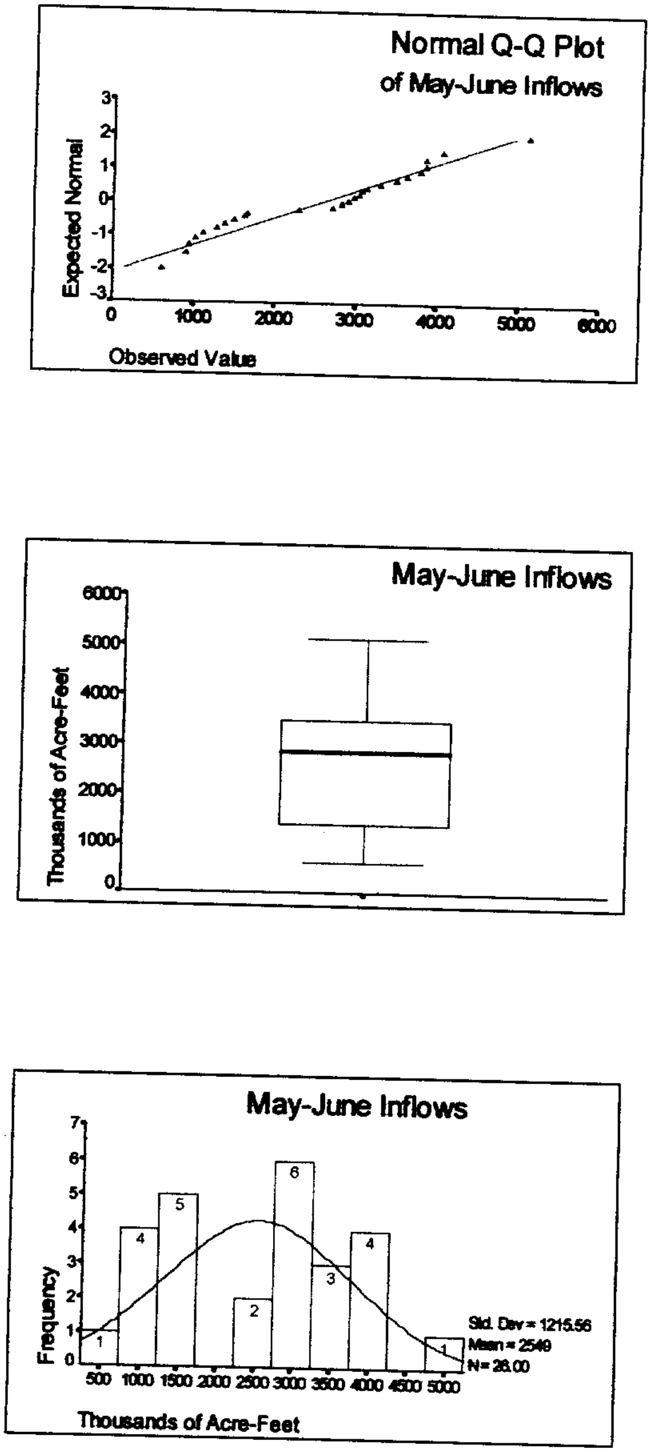


Fig. 1.4a. Exploratory Plots of May-June Inflows.

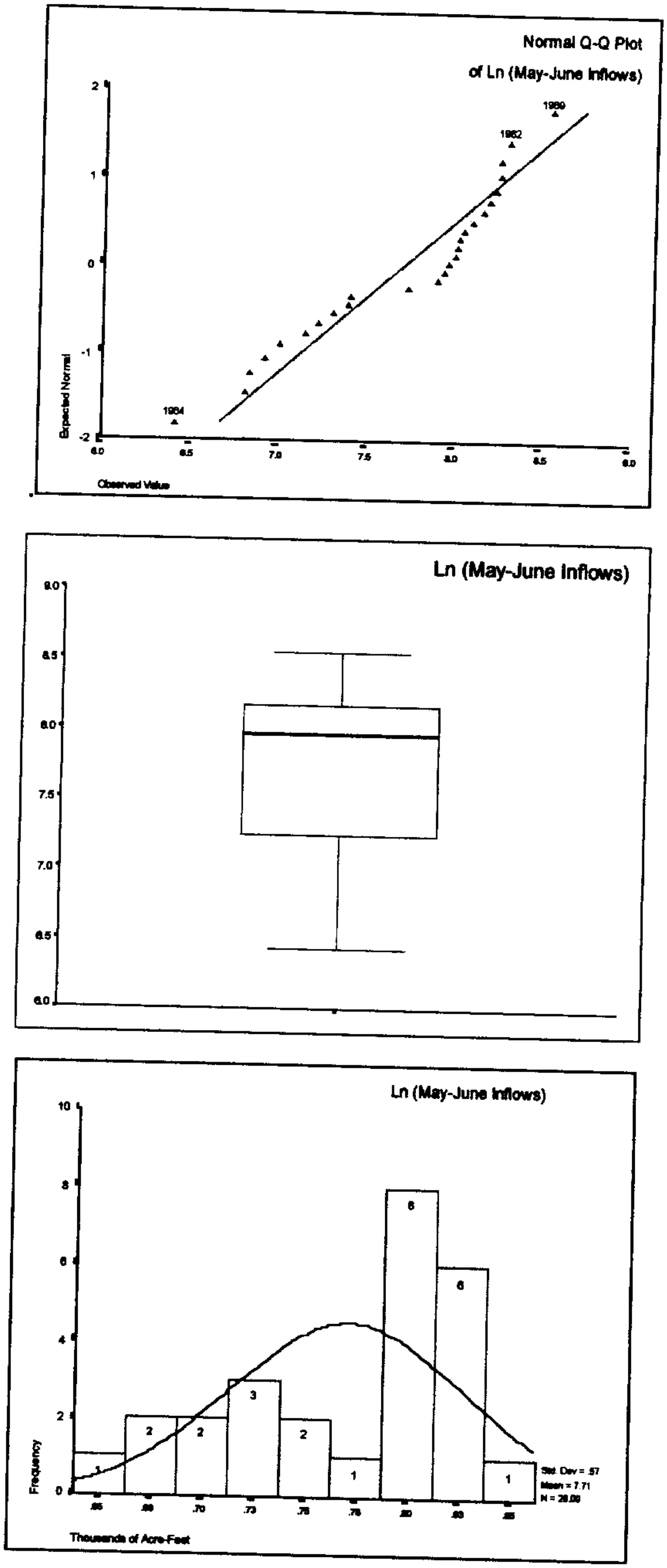


Fig. 1.4b. Exploratory Plots of Transformed May-June Inflows.

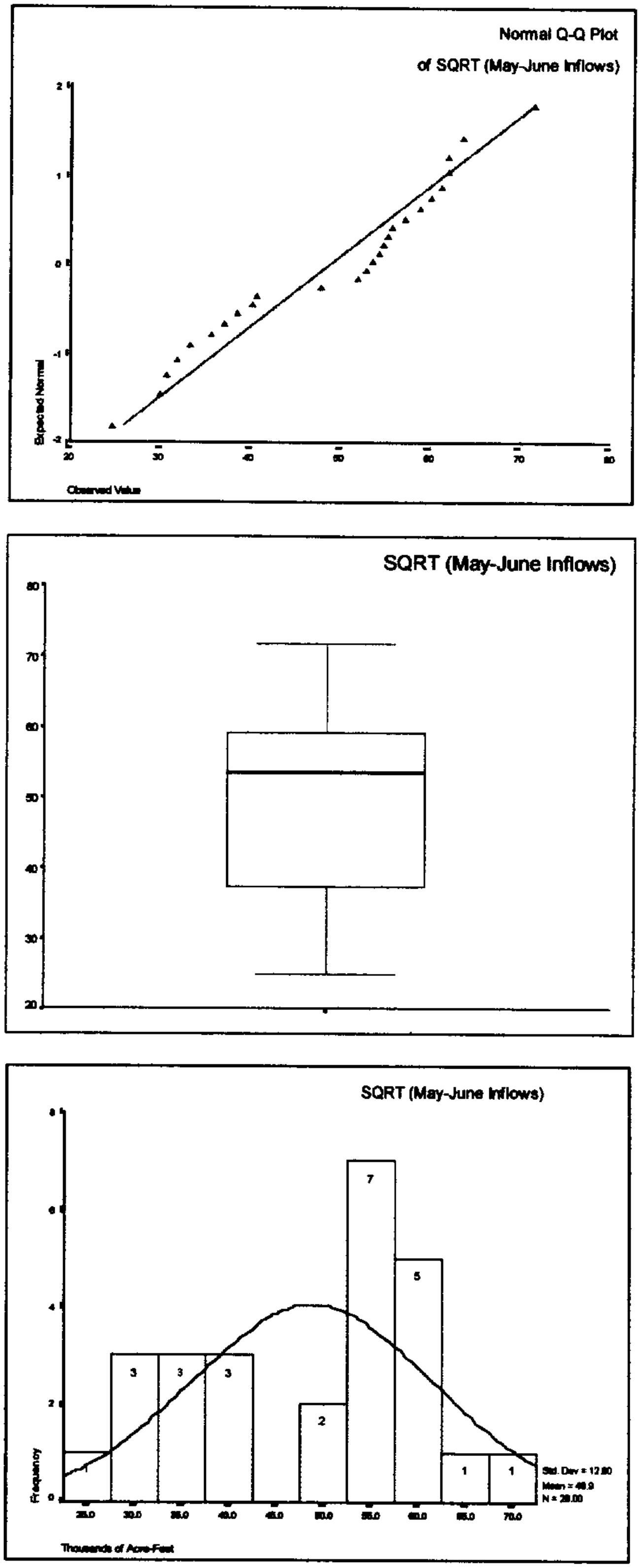


Fig. 1.4c. Exploratory Plots of Transformed May-June Inflows.

Descriptives

			Statistic	Std. Error
July-August Inflows	Mean		911.6129	104.5030
	95% Confidence Interval for Mean	Lower Bound	696.3850	
		Upper Bound	1126.84	
	5% Trimmed Mean		879.3051	
	Median		768.3225	
	Variance		283943	
	Std. Deviation		532.8626	
	Minimum		208.60	
	Maximum		2302.66	
	Range		2094.06	
	Interquartile Range		641.7063	
	Skewness		.968	.456
	Kurtosis		.512	.887

Extreme Values

			Case Number	YEAR	Value
July-August Inflows	Highest	1	22	1983	2302.66
		2	23	1984	1820.12
		3	18	1979	1705.39
		4	19	1980	1701.37
		5	21	1982	1572.64
	Lowest	1	3	1964	208.60
		2	4	1965	229.70
		3	2	1963	367.34
		4	17	1978	401.86
		5	10	1971	425.88

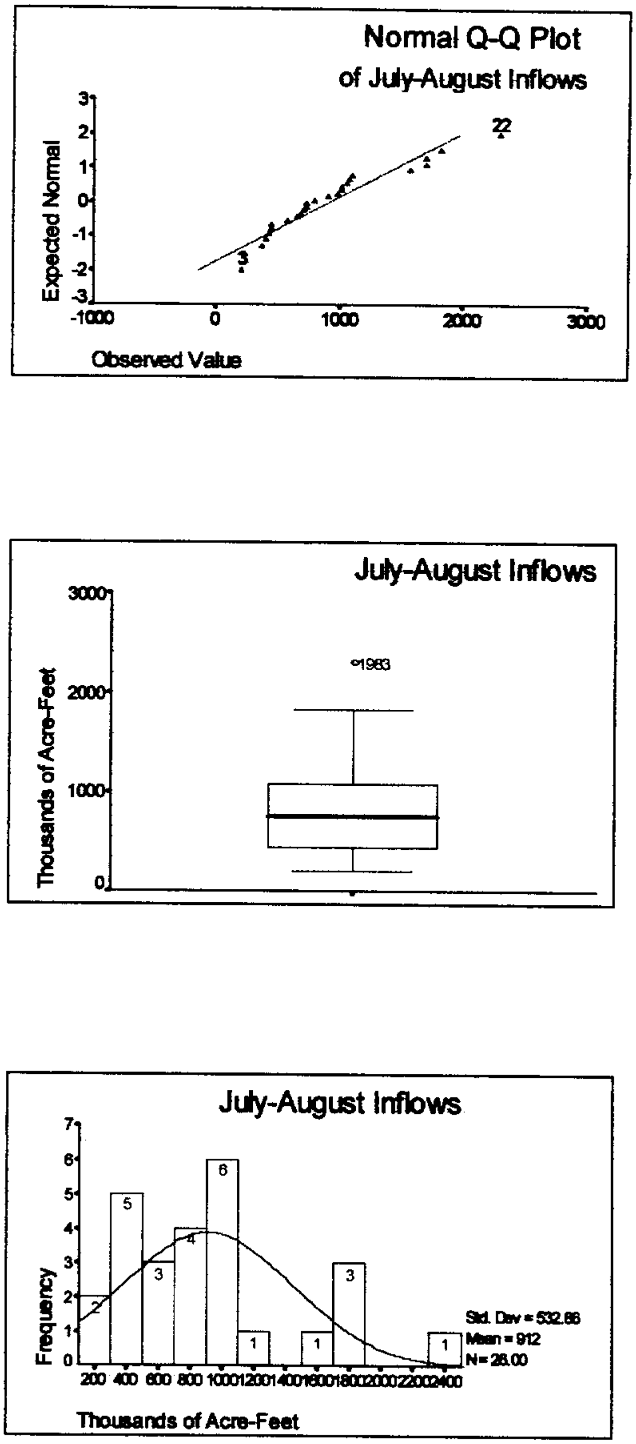


Fig. 1.5a. Exploratory Plots of July-August Inflows.

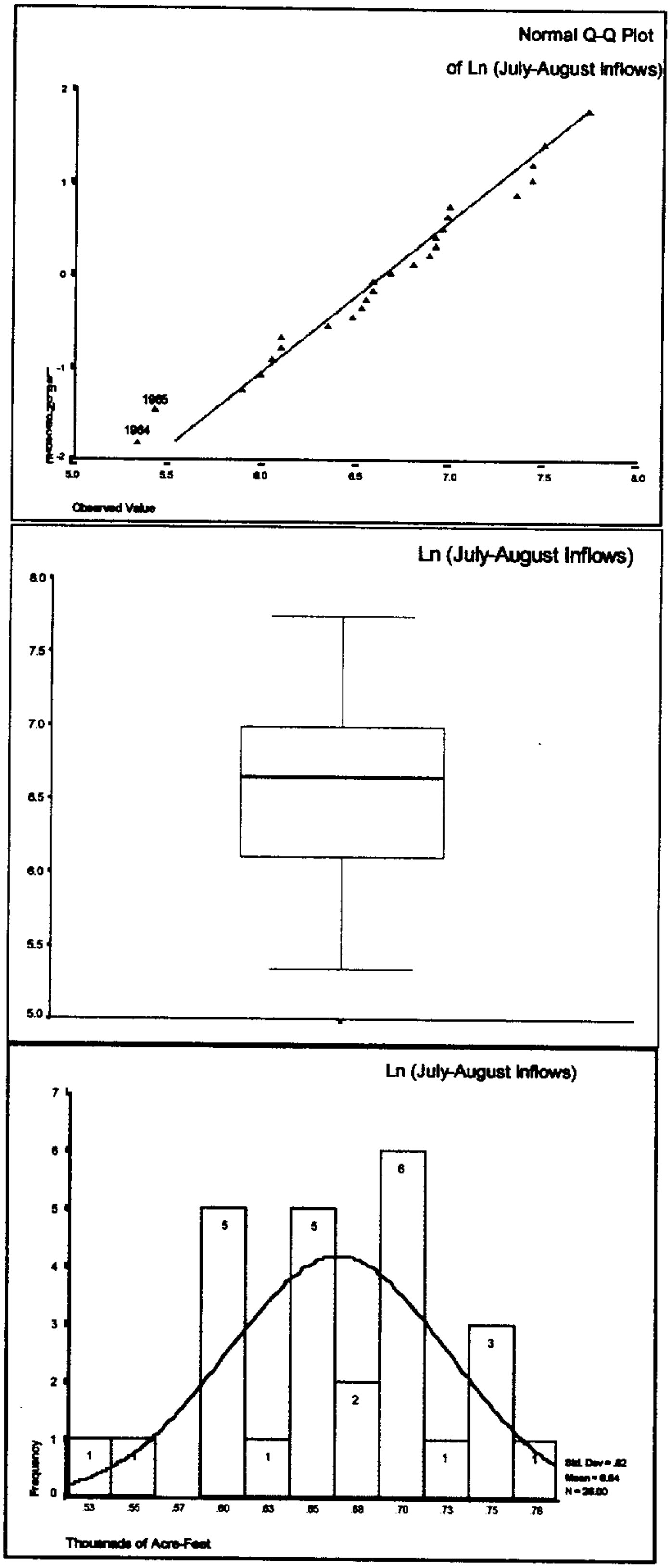


Fig. 1.5b. Exploratory Plots of Transformed July-August Inflows.

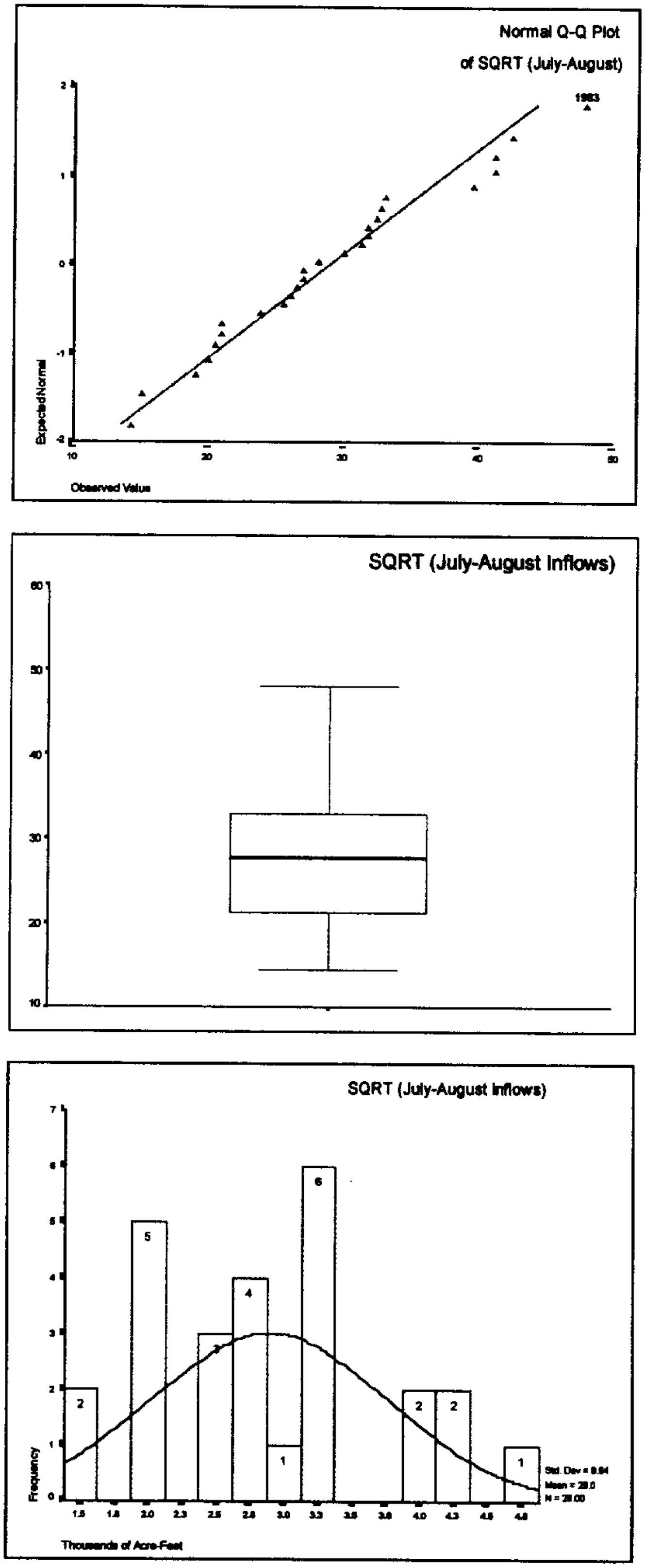


Fig. 1.5c. Exploratory Plots of Transformed July-August Inflows.

Descriptives

			Statistic	Std. Error
September-October Inflows	Mean		1154.69	138.1562
	95% Confidence Interval for Mean	Lower Bound	870.1527	
		Upper Bound	1439.23	
	5% Trimmed Mean		1099.59	
	Median		1097.12	
	Variance		496265	
	Std. Deviation		704.4609	
	Minimum		357.73	
	Maximum		3097.29	
	Range		2739.56	
	Interquartile Range		1090.23	
	Skewness		.947	.456
	Kurtosis		.704	.887

Extreme Values

			Case Number	YEAR	Value
September-October Inflows	Highest	1	13	1974	3097.29
		2	12	1973	2393.69
		3	23	1984	2018.63
		4	19	1980	1901.76
		5	24	1985	1690.87
	Lowest	1	3	1964	357.73
		2	5	1966	395.08
		3	4	1965	424.64
		4	17	1978	445.47
		5	8	1969	476.12

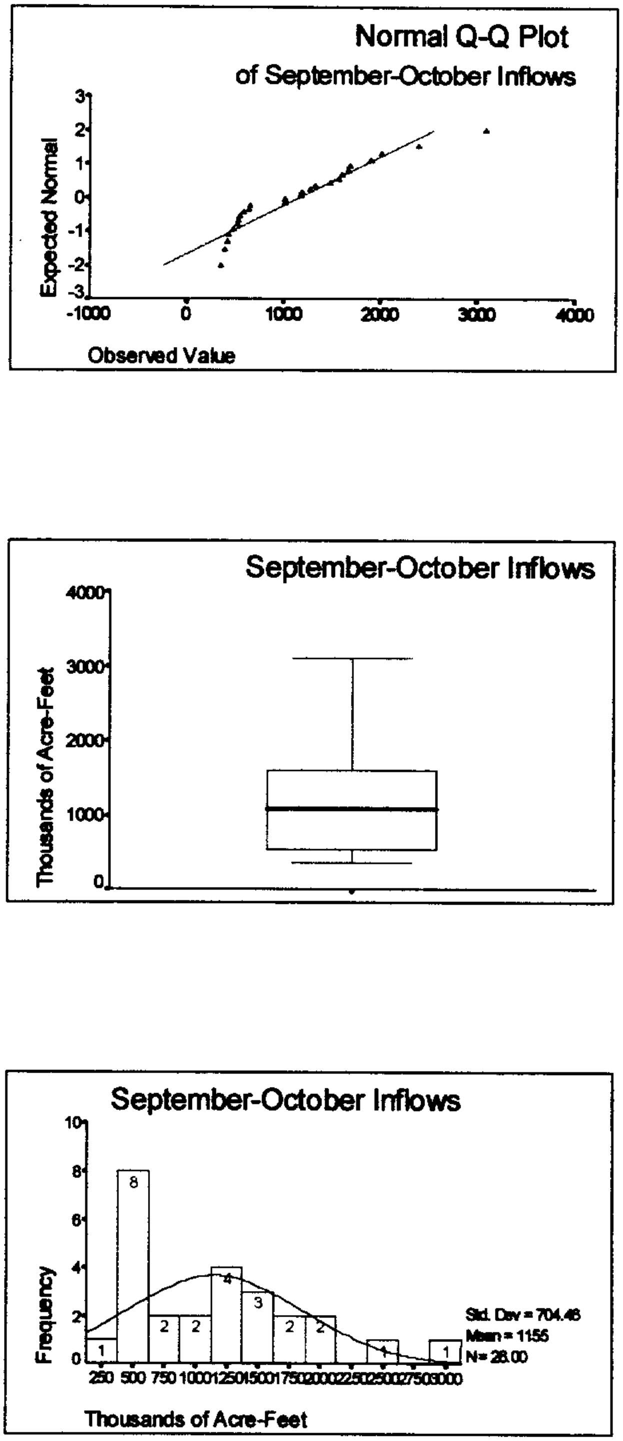


Fig. 1.6a. Exploratory Plots of September-October Inflows.

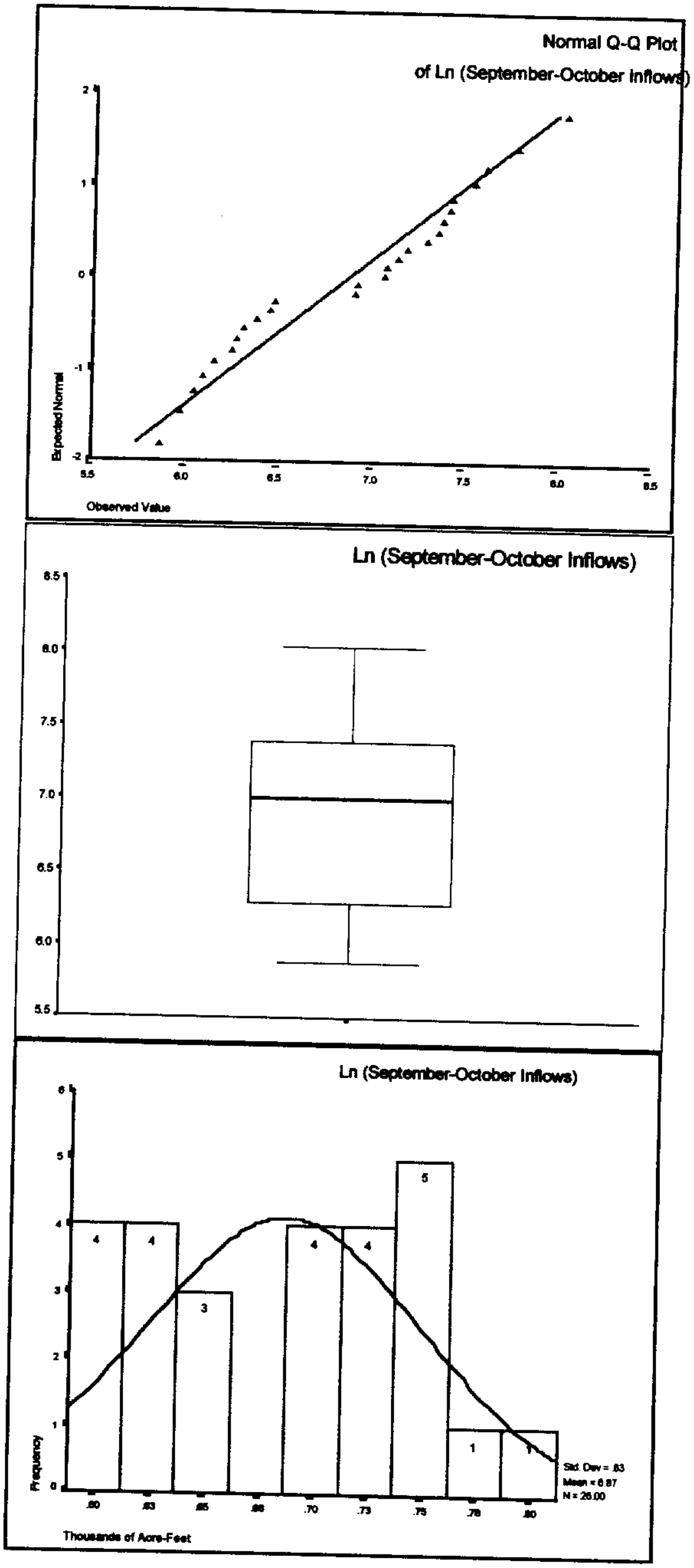


Fig. 1.6b. Exploratory Plots of Transformed September-October Inflows.

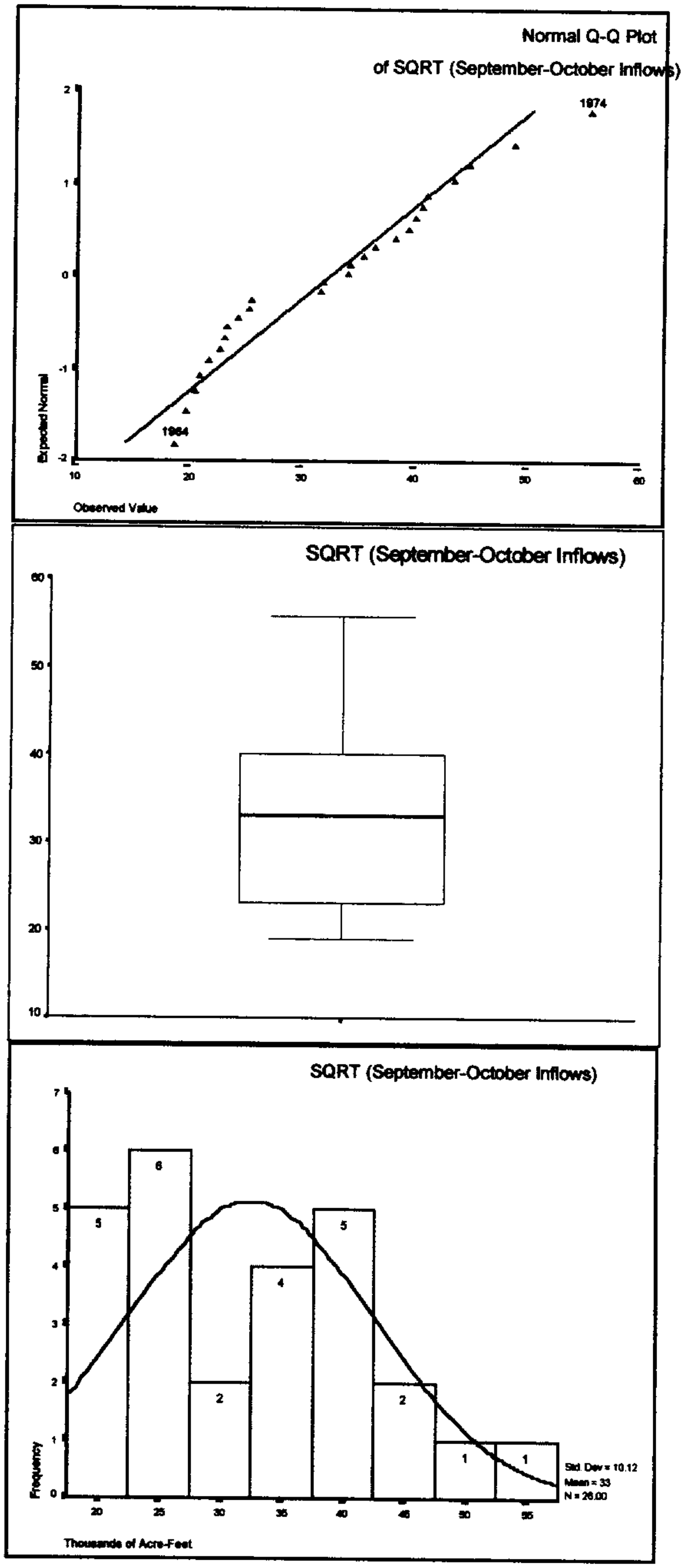


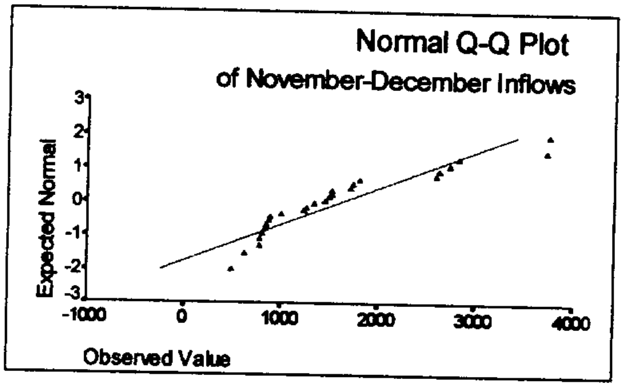
Fig. 1.6c. Exploratory Plots of Transformed September-October Inflows.

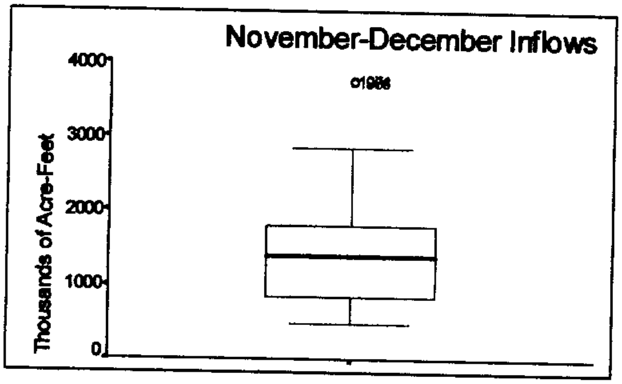
Descriptives

			Statistic	Std. Error
November-December Inflows	Mean		1588.86	180.5879
	95% Confidence Interval for Mean	Lower Bound	1216.93	
		Upper Bound	1960.79	
	5% Trimmed Mean		1527.61	
	Median		1394.51	
	Variance		847912	
	Std. Deviation		920.8213	
	Minimum		491.33	
	Maximum		3763.55	
	Range		3272.23	
	Interquartile Range		1156.72	
	Skewness		1.123	.456
	Kurtosis		.476	.887

Extreme Values

			Case Number	YEAR	Value
November-December Inflows	Highest	1	13	1974	3763.55
		2	25	1986	3736.27
		3	14	1975	2834.55
		4	24	1985	2729.59
		5	21	1982	2629.44
	Lowest	1	9	1970	491.33
		2	6	1967	628.35
		3	19	1980	781.13
		4	8	1969	782.52
		5	5	1966	812.45





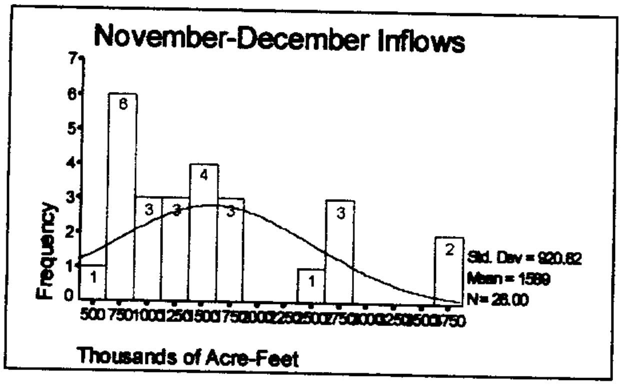


Fig. 1.7a. Exploratory Plots of November-December Inflows.

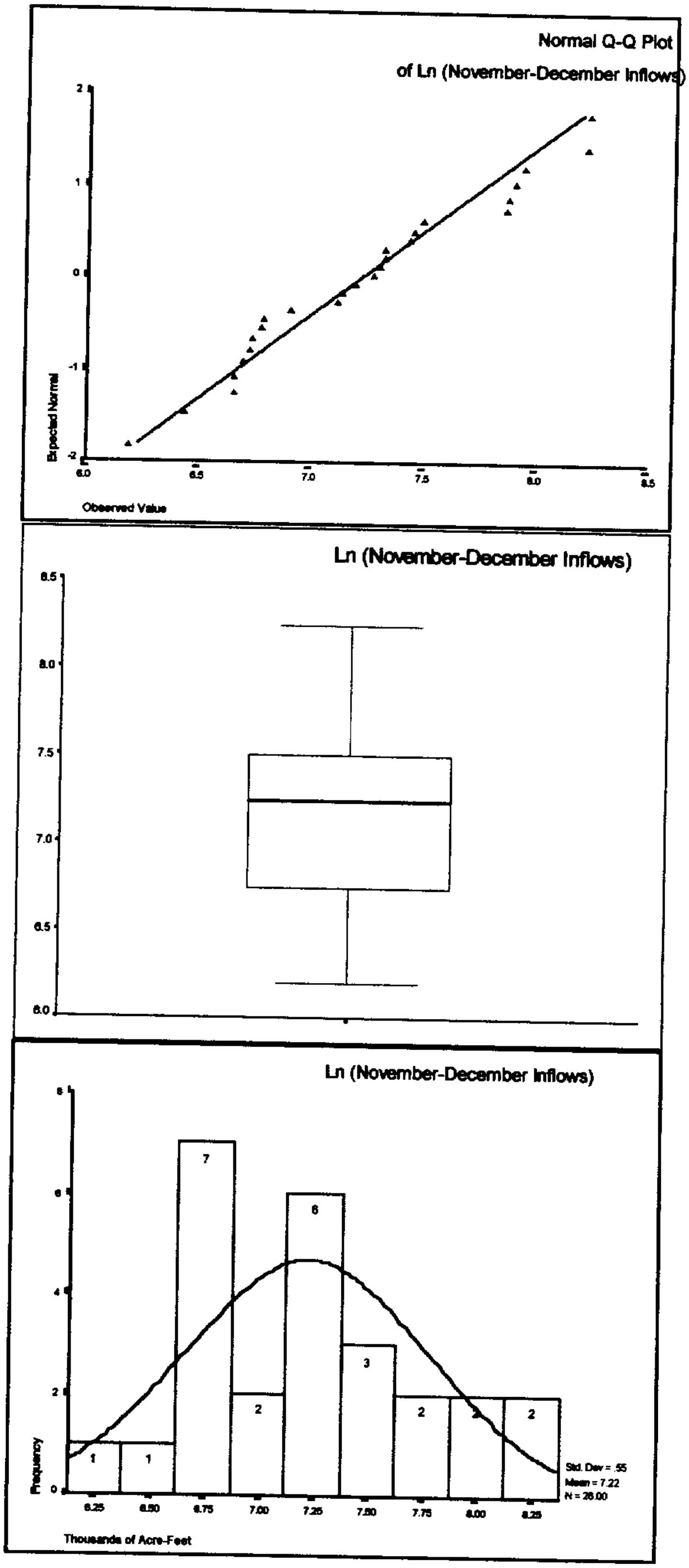


Fig. 1.7b. Exploratory Plots of Transformed November-December Inflows.

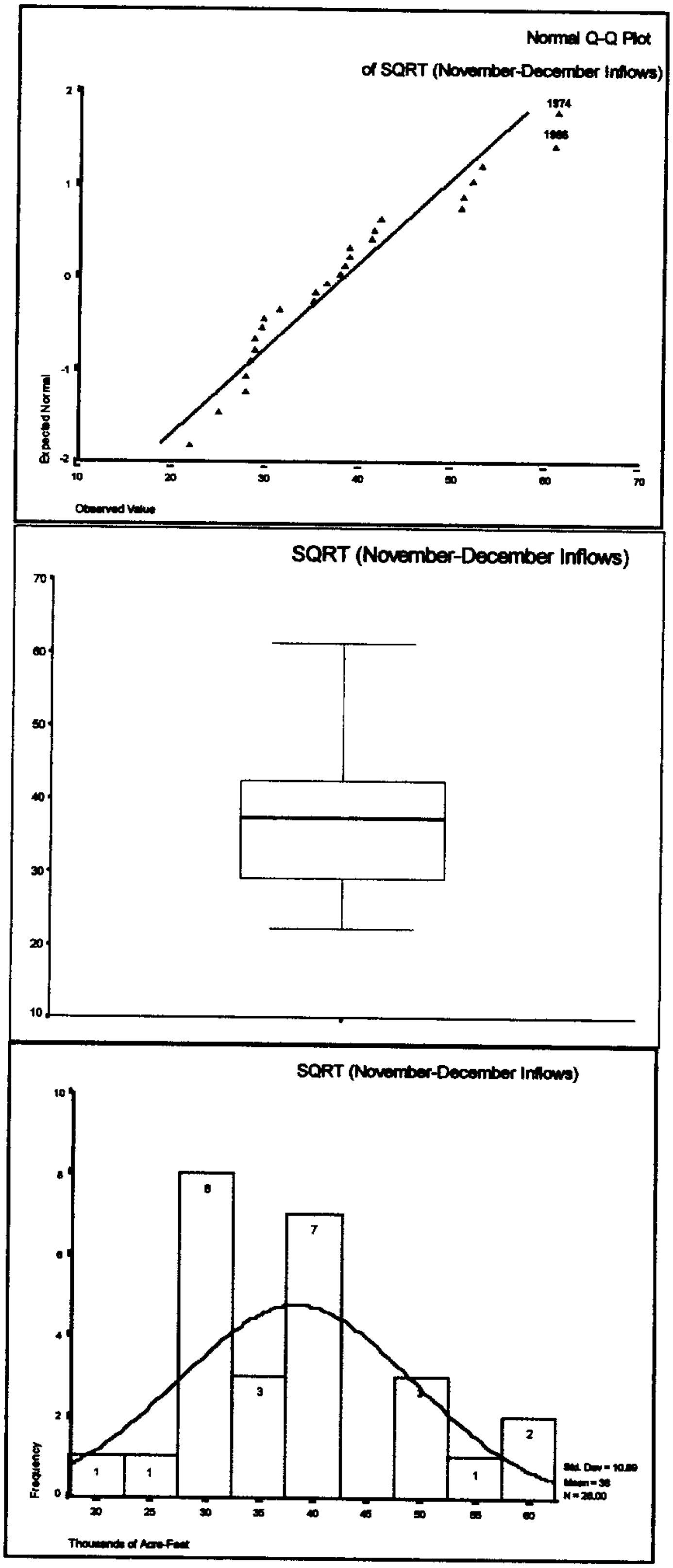


Fig. 1.7c. Exploratory Plots of Transformed November-December Inflows.

Percentiles

		Percentiles						
		5	10	25	50	75	90	95
Weighted Average (Definition 1)	CRAB	415.9150	867.3100	1322.38	1783.50	1998.93	2671.47	2937.50
	QJF_LAG	587.8903	897.5995	1159.24	1787.49	2080.80	2822.65	3140.29
	QMA_LAG	506.0215	649.7070	1054.26	1590.05	2163.14	3278.56	3570.99
	QMJ_LAG	724.3750	939.1790	1365.59	2862.90	3536.06	3928.22	4765.10
	QJA_LAG	215.9818	326.0480	445.9275	768.3225	1087.63	1739.81	2133.77
	QSO_LAG	370.7975	415.7670	532.5713	1097.12	1622.81	2131.15	2851.03
	QND_LAG	539.2820	735.2945	844.6875	1394.51	2001.40	3105.07	3754.00
	LN_QJF	6.3247	6.7993	7.0555	7.4886	7.6405	7.9450	8.0511
	LN_QMA	6.2266	6.4657	6.9606	7.3715	7.6708	8.0949	8.1799
	LN_QMJ	6.5675	6.8449	7.2188	7.9595	8.1706	8.2757	8.4630
	LN_QJA	5.3741	5.7654	6.1002	6.6432	6.9917	7.4611	7.6595
	LN_QSO	5.9145	6.0296	6.2777	6.9979	7.3918	7.6613	7.9481
	LN_QND	6.2832	6.5954	6.7390	7.2396	7.5882	8.0325	8.2306
	SQR_QJF	23.9281	29.9565	34.0476	42.2786	45.6153	53.1225	56.0248
	SQR_QMA	22.4948	25.4224	32.4693	39.8754	46.4081	57.2553	59.7471
	SQR_QMJ	26.7928	30.6451	36.9493	53.5048	59.4629	62.6714	68.9262
	SQR_QJA	14.6924	17.9630	21.1170	27.7118	32.9789	41.7063	46.1229
	SQR_QSO	19.2506	20.3876	23.0771	33.1016	40.2829	46.1280	53.2985
	SQR_QND	23.1812	27.0841	29.0634	37.3369	44.5827	55.6059	61.2698
Tukey's Hinges	CRAB			1357.80	1783.50	1982.90		
	QJF_LAG			1159.28	1787.49	2068.95		
	QMA_LAG			1056.13	1590.05	1992.32		
	QMJ_LAG			1390.30	2862.90	3503.55		
	QJA_LAG			446.0000	768.3225	1081.86		
	QSO_LAG			535.9950	1097.12	1608.58		
	QND_LAG			847.0500	1394.51	1801.08		
	LN_QJF			7.0556	7.4886	7.6348		
	LN_QMA			6.9624	7.3715	7.5971		
	LN_QMJ			7.2373	7.9595	8.1615		
	LN_QJA			6.1003	6.6432	6.9864		
	LN_QSO			6.2841	6.9979	7.3831		
	LN_QND			6.7418	7.2396	7.4961		
	SQR_QJF			34.0481	42.2786	45.4857		
	SQR_QMA			32.4982	39.8754	44.6354		
	SQR_QMJ			37.2867	53.5048	59.1908		
	SQR_QJA			21.1187	27.7118	32.8916		
	SQR_QSO			23.1516	33.1016	40.1070		
	SQR_QND			29.1041	37.3369	42.4391		

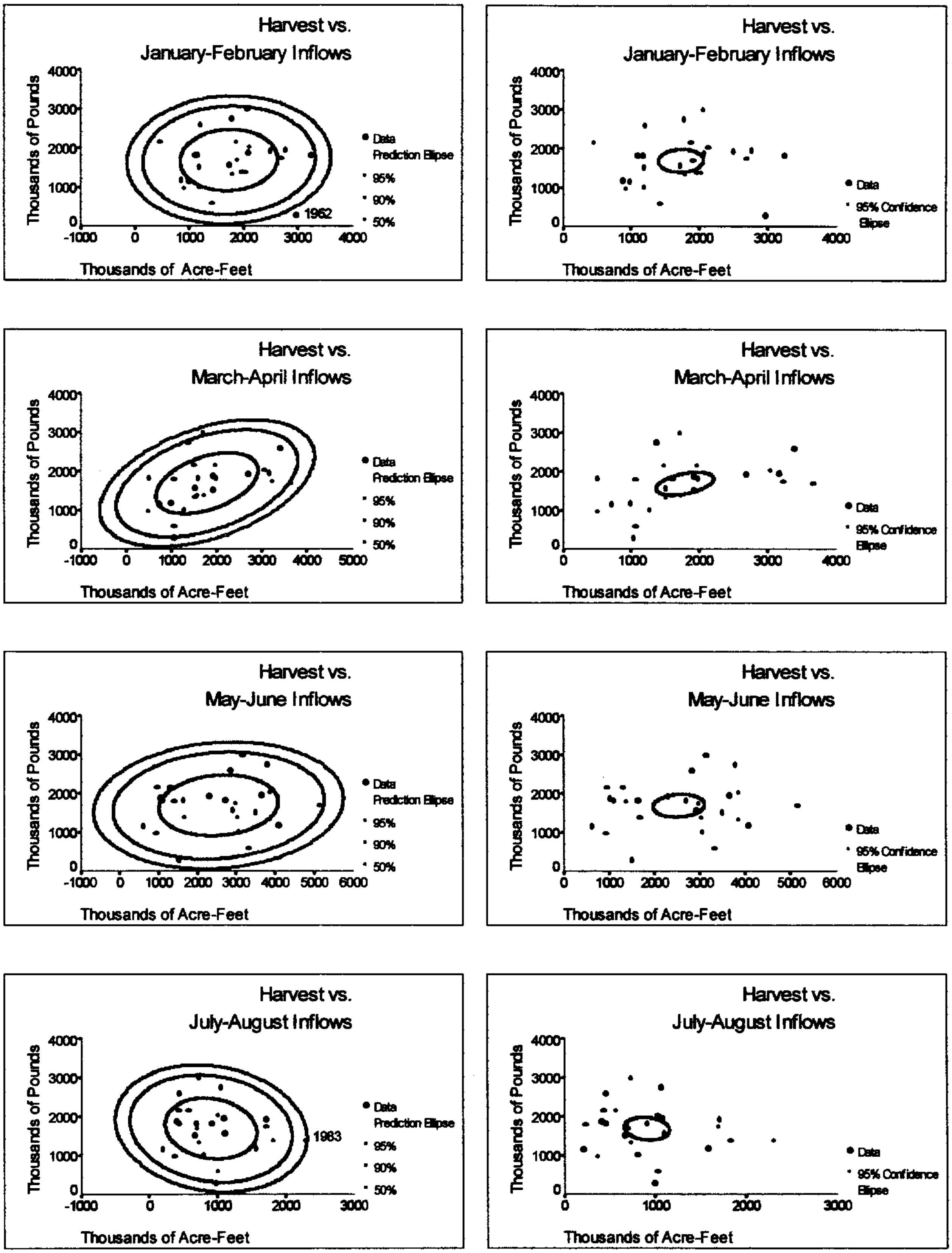


Fig. 2.1. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

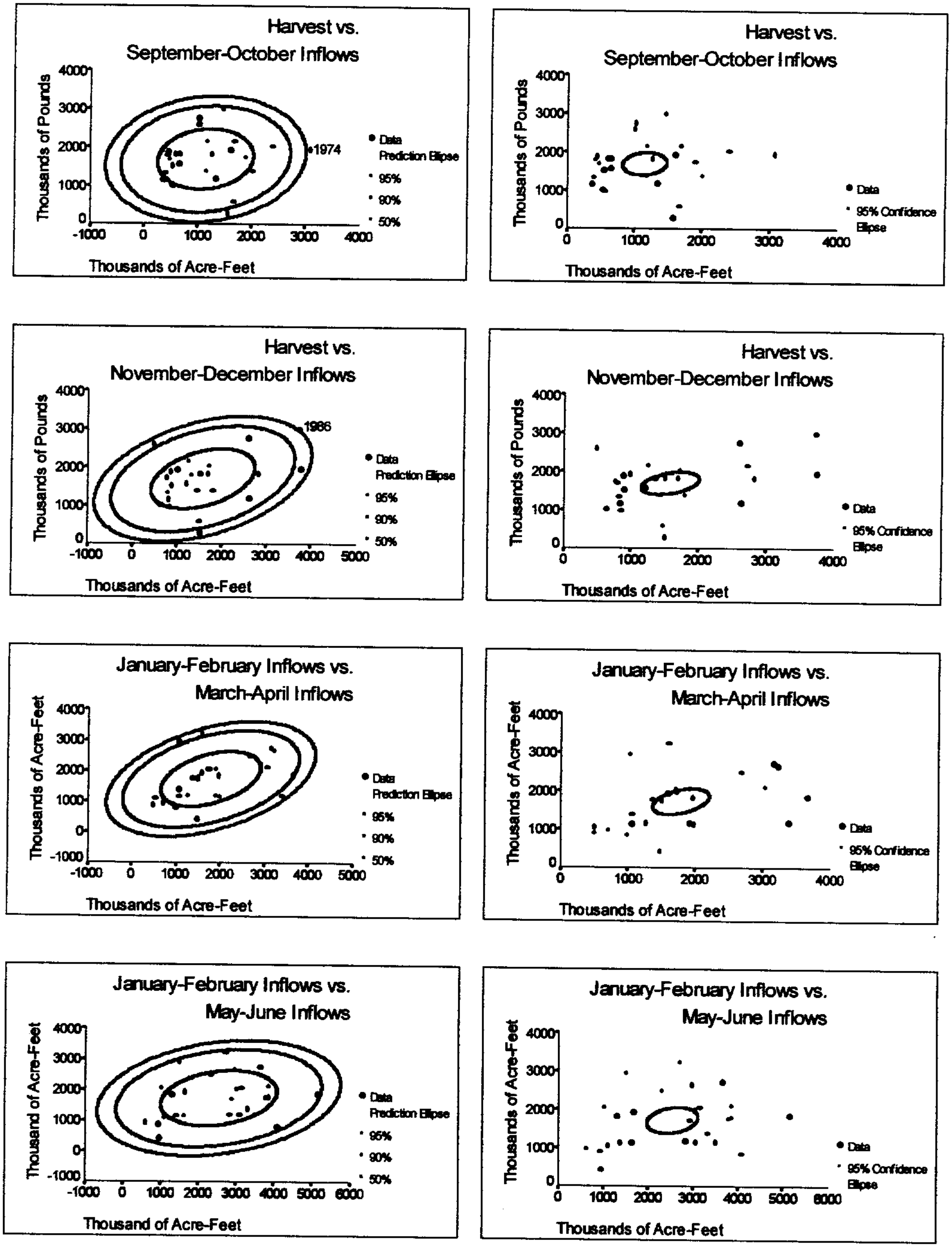


Fig. 2.2. Prediction and Confidence Ellipses.

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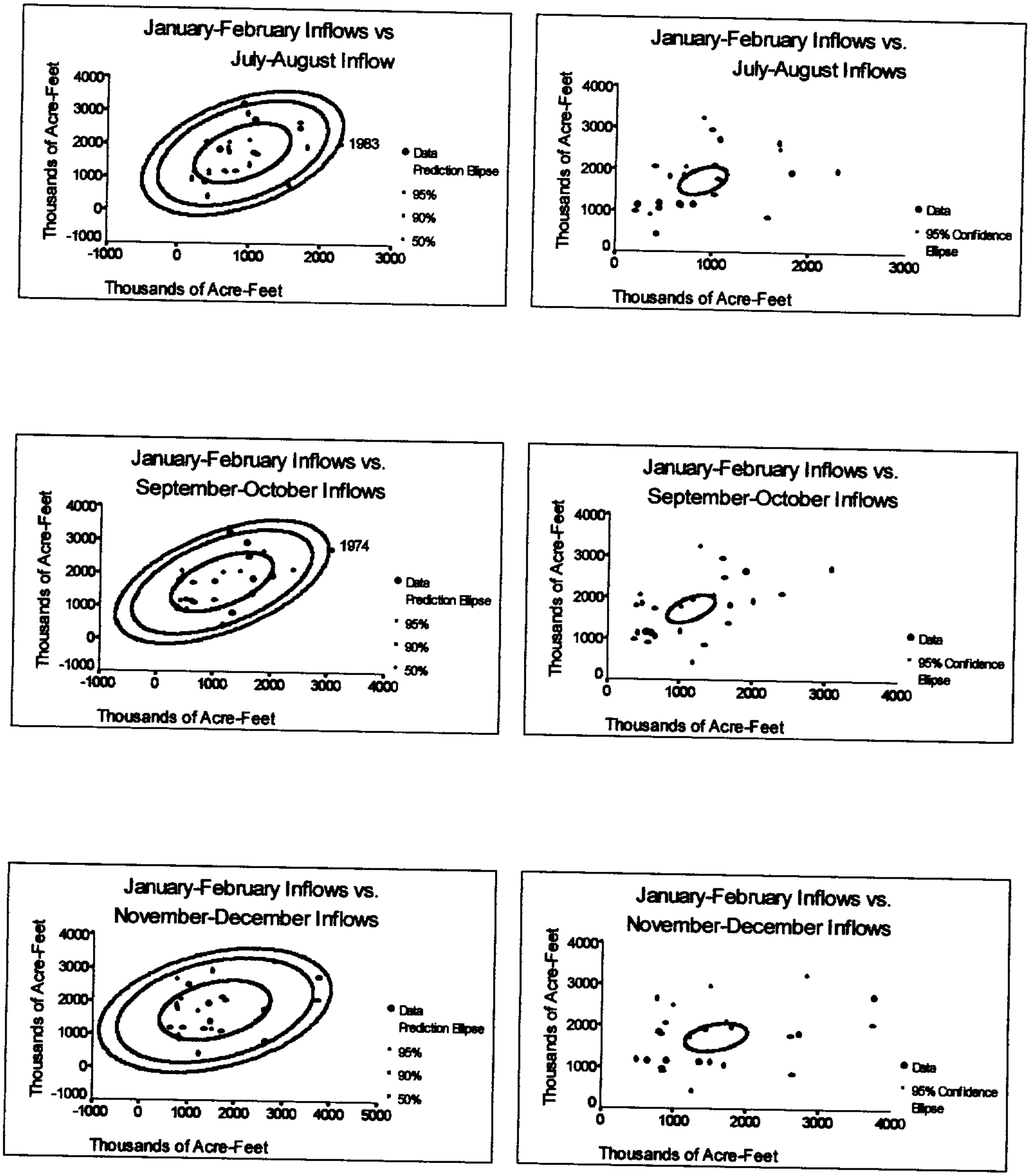

Fig. 2.3. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

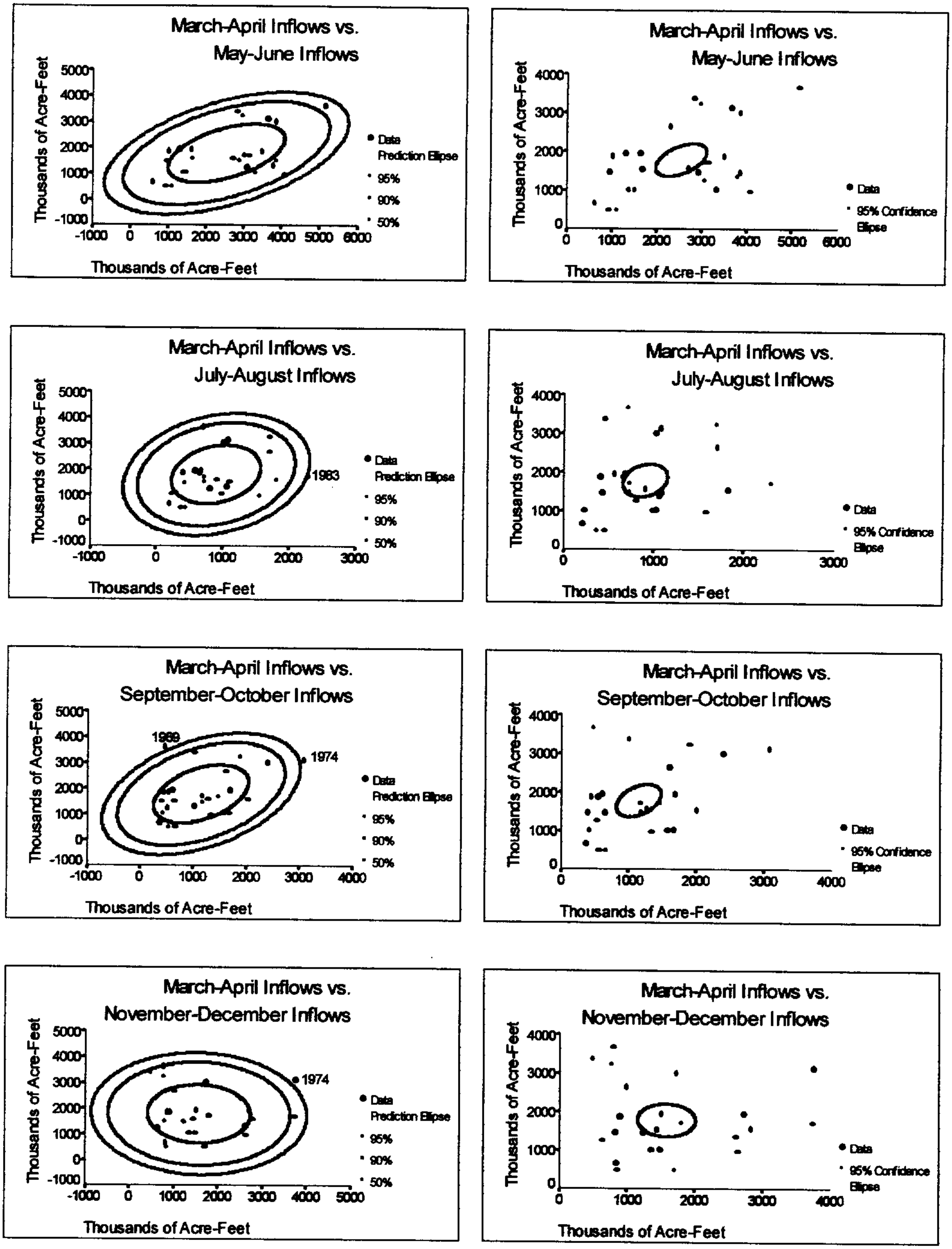

Fig. 2.4. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

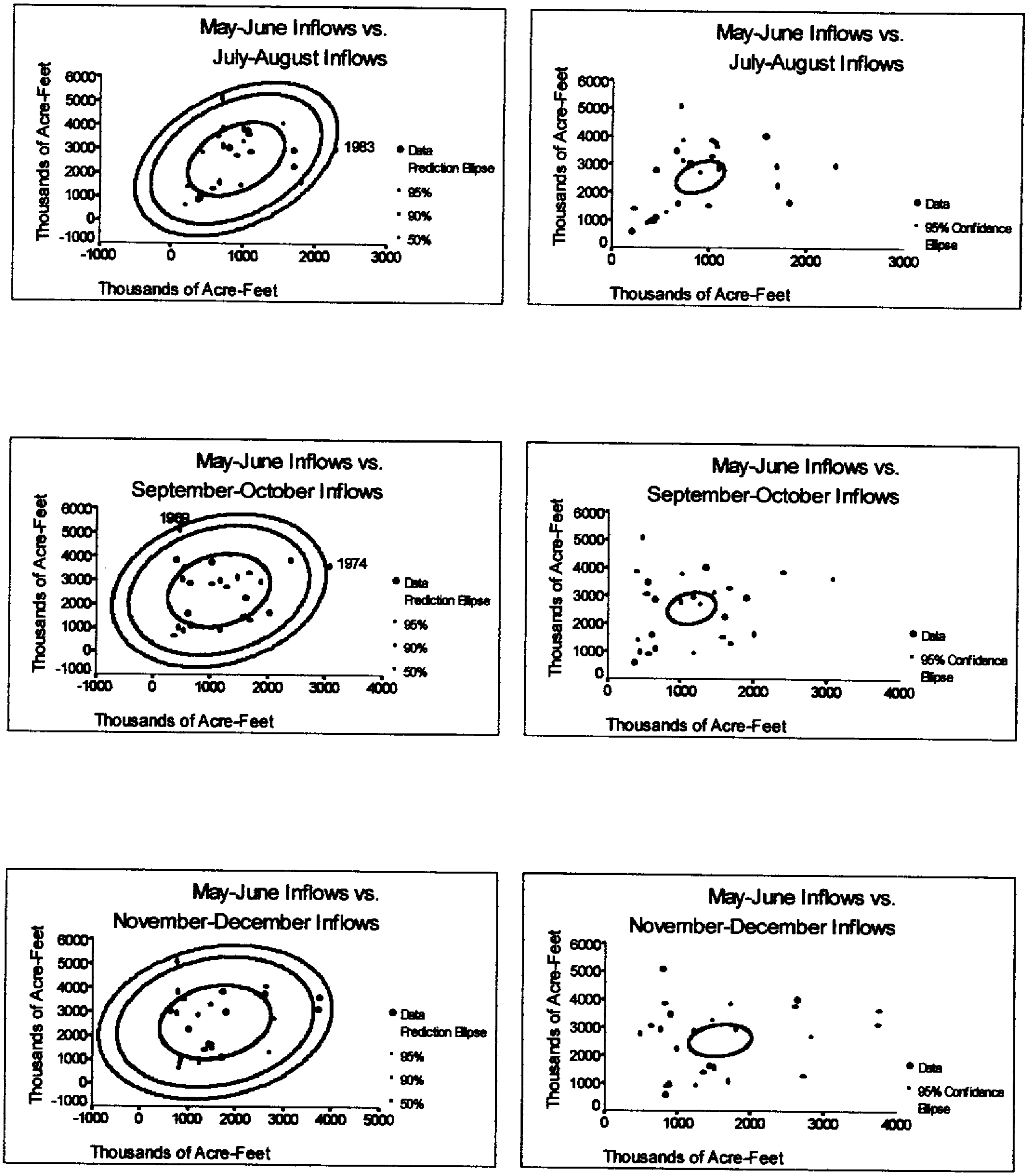

Fig. 2.5. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

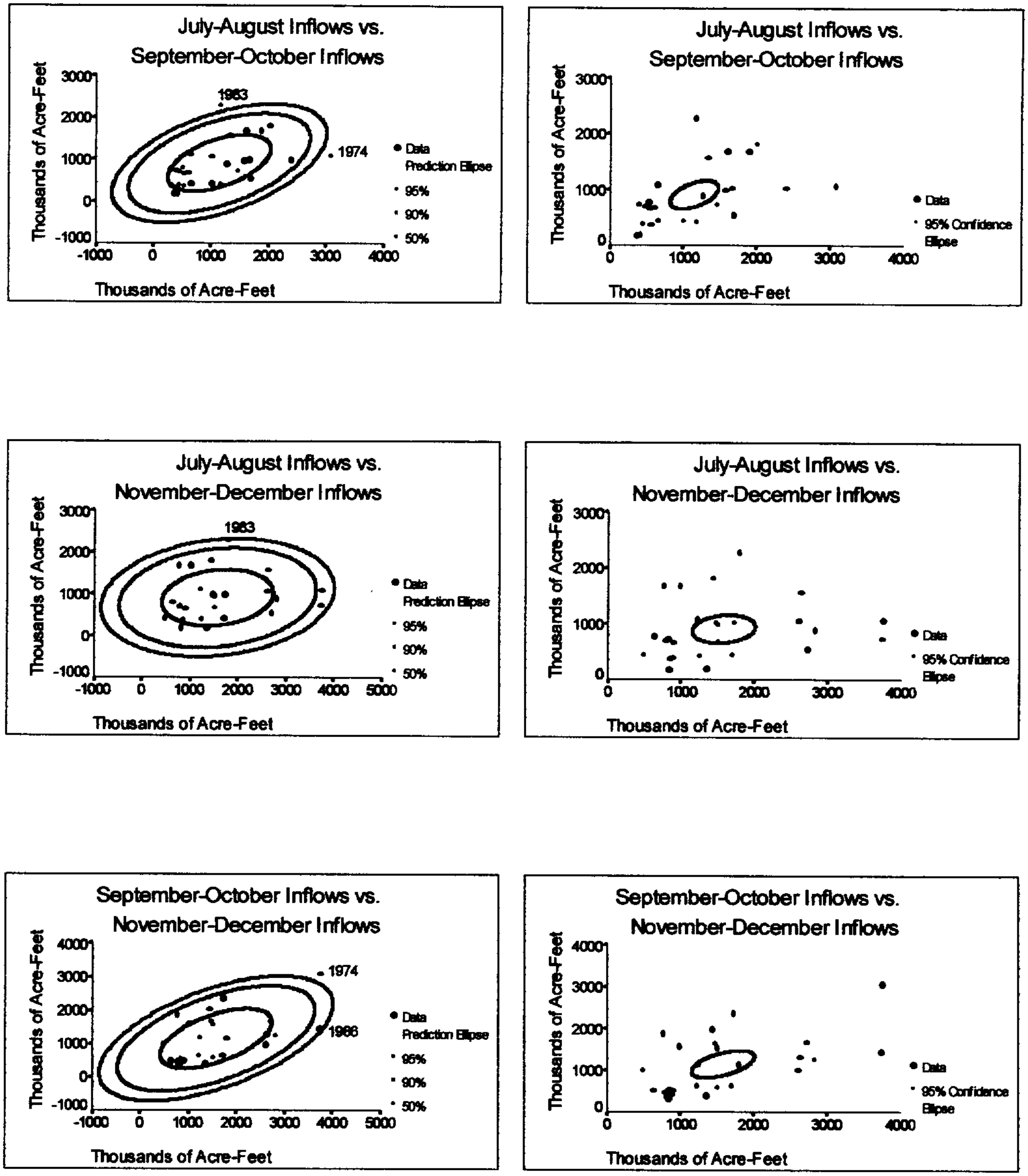

Fig. 2.6. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

Box-Cox Analysis

Numerical Results

Crab	QJF_Lag	QMA_Lag	QMJ_Lag	QJA_Lag	QSO_Lag	QND_Lag	LAMBDA
1.426623057	.367313724	.396937052	.954703085	.156784601	.097485750	.139773131	-.000200000
1.139668141	.314432682	.346935332	.830470433	.134041271	.089299500	.127389959	-.000190000
.914418790	.270436073	.304355779	.725860019	.115107263	.082073957	.116601492	-.000180000
.737132744	.233765319	.268052825	.637559595	.099316763	.075693538	.107200286	-.000170000
.597207602	.203145249	.237066226	.562845899	.086125228	.070058195	.099009140	-.000160000
.486449614	.177531418	.210590405	.499476592	.075086817	.065081327	.091876706	-.000150000
.398515351	.156067401	.187948987	.445602523	.065836107	.060687999	.085673779	-.000140000
.328484882	.138050151	.168573644	.399696435	.058073280	.056813413	.080290160	-.000130000
.272535081	.122901874	.151986502	.360494969	.051552110	.053401611	.075632013	-.000120000
.227689246	.110147175	.137785500	.326951443	.046070216	.050404363	.071619624	-.000110000
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.138970867	.082659794	.106373987	.252291754	.034337873	.043514785	.062834399	-.000080000
.119840924	.076191070	.098827191	.234039188	.031618297	.041817968	.060830745	-.000070000
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.041289075	.060018715	.109865409	.174070788	.045204646	.080594460	.136408262	.000160000
.042519901	.062514483	.117309490	.181454669	.049738324	.089196238	.149798285	.000170000
.043949461	.065301435	.125656829	.189878887	.054972241	.099255017	.165111641	.000180000
.045584923	.068401202	.135002157	.199440387	.061015560	.111029237	.182636566	.000190000
.047435649	.071838454	.145453214	.210251216	.067996885	.124827907	.202709048	.000200000

Model Choice Diagnostics

Untransformed Data

```
N = 26     Regression Models for Dependent Variable: CRAB

   In      Rsq      Adj    C(p)      AIC      MSE     SBC Variables in Model
                    Rsq

    1 0.1850 0.1510   20.84   331.7 322399   334.2 QMA_LAG
    1 0.1473 0.1117   22.82   332.9 337330   335.4 QND_LAG
    1 0.0210 -.0198   29.46   336.5 387271   339.0 QJA_LAG
    1 0.0145 -.0266   29.80   336.6 389857   339.1 QSO_LAG
 --------------------------------------------------------------
    2 0.3414 0.2841   14.62   328.2 271852   331.9 QMA_LAG QND_LAG
    2 0.2463 0.1808   19.62   331.7 311100   335.4 QMA_LAG QJA_LAG
    2 0.2074 0.1384   21.66   333.0 327188   336.7 QJF_LAG QMA_LAG
    2 0.1982 0.1285   22.14   333.3 330961   337.0 QMA_LAG QMJ_LAG
 -----------------------------------------------------------------------
    3 0.4995 0.4313   8.308   323.0 215984   328.0 QMA_LAG QSO_LAG QND_LAG
    3 0.4528 0.3782   10.76   325.3 236123   330.4 QJF_LAG QMA_LAG QND_LAG
    3 0.4472 0.3718   11.06   325.6 238549   330.6 QMA_LAG QJA_LAG QND_LAG
    3 0.3859 0.3022   14.28   328.3 265011   333.4 QMA_LAG QMJ_LAG QND_LAG
 --------------------------------------------------------------------------------
    4 0.5823 0.5028   5.954   320.3 188826   326.6 QMA_LAG QMJ_LAG QSO_LAG
                                                   QND_LAG
    4 0.5545 0.4697   7.416   322.0 201398   328.3 QJF_LAG QMA_LAG QSO_LAG
                                                   QND_LAG
    4 0.5257 0.4353   8.931   323.6 214431   329.9 QMA_LAG QJA_LAG QSO_LAG
                                                   QND_LAG
    4 0.5050 0.4107   10.02   324.7 223807   331.0 QJF_LAG QMA_LAG QMJ_LAG
                                                   QND_LAG
 ---------------------------------------------------------------------------------
    5 0.6376 0.5470   5.049   318.6 172028   326.2 QJF_LAG QMA_LAG QMJ_LAG
                                                   QSO_LAG QND_LAG
    5 0.5842 0.4802   7.858   322.2 197398   329.7 QMA_LAG QMJ_LAG QJA_LAG
                                                   QSO_LAG QND_LAG
    5 0.5648 0.4559   8.878   323.4 206609   330.9 QJF_LAG QMA_LAG QJA_LAG
                                                   QSO_LAG QND_LAG
    5 0.5283 0.4103   10.80   325.5 223937   333.0 QJF_LAG QMA_LAG QMJ_LAG
                                                   QJA_LAG QND_LAG
 ---------------------------------------------------------------------------------
    6 0.6385 0.5244   7.000   320.6 180619   329.4 QJF_LAG QMA_LAG QMJ_LAG
                                                   QJA_LAG QSO_LAG QND_LAG
 ---------------------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_  INTERCEP   QJF_LAG  QMA_LAG
  1  MODEL1   PARMS     CRAB    567.802   1168.89     .       0.29598
  2  MODEL1   PARMS     CRAB    580.801   1291.55     .        .
  3  MODEL1   PARMS     CRAB    622.311   1852.38     .        .
  4  MODEL1   PARMS     CRAB    624.386   1578.09     .        .
  5  MODEL1   PARMS     CRAB    521.395    735.02     .       0.30333
  6  MODEL1   PARMS     CRAB    557.763   1366.51     .       0.33518
  7  MODEL1   PARMS     CRAB    572.003   1331.25  -0.14327   0.34378
  8  MODEL1   PARMS     CRAB    575.292   1258.79     .       0.34137
  9  MODEL1   PARMS     CRAB    464.741    665.43     .       0.46853
 10  MODEL1   PARMS     CRAB    485.925    971.66  -0.34845   0.42227
 11  MODEL1   PARMS     CRAB    488.415    932.80     .       0.35681
 12  MODEL1   PARMS     CRAB    514.792    850.15     .       0.38979
 13  MODEL1   PARMS     CRAB    434.541    815.87     .       0.61055
 14  MODEL1   PARMS     CRAB    448.774    849.81  -0.25442   0.52785
 15  MODEL1   PARMS     CRAB    463.067    790.48     .       0.46400

OBS   QMJ_LAG    QJA_LAG    QSO_LAG   QND_LAG   CRAB  _IN_  _P_  _EDF_
  1      .          .          .         .       -1     1    2     24
  2      .          .          .      0.25681    -1     1    2     24
  3      .      -0.16761       .         .       -1     1    2     24
  4      .          .       0.10521      .       -1     1    2     24
  5      .          .          .      0.26477    -1     2    3     23
  6      .      -0.29388       .         .       -1     2    3     23
  7      .          .          .         .       -1     2    3     23
  8  -0.06719       .          .         .       -1     2    3     23
  9      .          .      -0.48930   0.47773    -1     3    4     22
 10      .          .          .      0.36135    -1     3    4     22
 11      .      -0.39259       .      0.30519    -1     3    4     22
 12  -0.12663       .          .      0.29792    -1     3    4     22
 13  -0.17569       .      -0.55460   0.55214    -1     4    5     21
 14      .          .      -0.40777   0.51276    -1     4    5     21
 15      .      -0.21943   -0.38731   0.45593    -1     4    5     21

OBS     _MSE_       _RSQ_     _ADJRSQ_      _CP_      _AIC_      _SBC_
  1  322398.73    0.18500     0.15104     20.8393    331.691    334.207
  2  337329.91    0.14725     0.11172     22.8233    332.868    335.384
  3  387270.85    0.02101    -0.01979     29.4593    336.458    338.974
  4  389857.46    0.01447    -0.02660     29.8030    336.631    339.147
  5  271852.37    0.34141     0.28414     14.6177    328.151    331.925
  6  311099.60    0.24633     0.18079     19.6155    331.657    335.431
  7  327188.00    0.20735     0.13843     21.6642    332.968    336.742
  8  330960.66    0.19821     0.12849     22.1446    333.266    337.040
  9  215984.29    0.49951     0.43126      8.3077    323.014    328.046
 10  236123.36    0.45284     0.37822     10.7607    325.331    330.364
 11  238549.24    0.44722     0.37184     11.0562    325.597    330.630
 12  265010.81    0.38590     0.30216     14.2793    328.332    333.365
 13  188825.86    0.58233     0.50277      5.9542    320.310    326.601
 14  201397.95    0.55452     0.46967      7.4160    321.986    328.277
 15  214431.09    0.52569     0.43535      8.9313    323.616    329.907

OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_  INTERCEP   QJF_LAG  QMA_LAG
 16  MODEL1   PARMS     CRAB    473.083   1104.71  -0.36065  0.52014
 17  MODEL1   PARMS     CRAB    414.763   1000.92  -0.25502  0.67023
 18  MODEL1   PARMS     CRAB    444.295    841.87     .      0.59922
 19  MODEL1   PARMS     CRAB    454.542    908.36  -0.22300  0.51758
 20  MODEL1   PARMS     CRAB    473.220   1134.54  -0.29264  0.50333
 21  MODEL1   PARMS     CRAB    424.993    989.17  -0.26562  0.68118

OBS   QMJ_LAG    QJA_LAG    QSO_LAG   QND_LAG   CRAB  _IN_  _P_  _EDF_
 16  -0.13724       .          .      0.40066    -1     4    5     21
 17  -0.17597       .      -0.47297   0.58737    -1     5    6     20
 18  -0.16333   -0.06420   -0.52016   0.54052    -1     5    6     20
 19      .      -0.14271   -0.35151   0.49426    -1     5    6     20
 20  -0.10484   -0.20939       .      0.39488    -1     5    6     20
 21  -0.18523    0.04800   -0.49533   0.59752    -1     6    7     19

OBS     _MSE_       _RSQ_     _ADJRSQ_      _CP_      _AIC_      _SBC_
 16  223807.07    0.50495     0.41066     10.0214    324.729    331.020
 17  172028.33    0.63760     0.54700      5.0488    318.619    326.168
 18  197397.83    0.58416     0.48020      7.8580    322.196    329.744
 19  206608.83    0.56476     0.45594      8.8779    323.382    330.930
 20  223937.04    0.52825     0.41031     10.7967    325.476    333.024
 21  180618.64    0.63853     0.52438      7.0000    320.553    329.359
```

Logged Inflows

```
N = 26     Regression Models for Dependent Variable: CRAB

   In      Rsq     Adj    C(p)     AIC     MSE     SBC Variables in Model
                   Rsq

    1 0.2045 0.1714   9.527   331.1 314668   333.6 LN_QMA
    1 0.0802 0.0419   14.46   334.8 363863   337.4 LN_QND
    1 0.0237 -.0170   16.70   336.4 386212   338.9 LN_QSO
    1 0.0186 -.0222   16.89   336.5 388203   339.0 LN_QMJ
-------------------------------------------------------------
    2 0.2996 0.2387   7.758   329.7 289090   333.5 LN_QMA LN_QND
    2 0.2945 0.2331   7.962   329.9 291218   333.7 LN_QMA LN_QJA
    2 0.2374 0.1711   10.23   332.0 314790   335.7 LN_QJF LN_QMA
    2 0.2223 0.1547   10.82   332.5 320999   336.2 LN_QMA LN_QMJ
--------------------------------------------------------------------
    3 0.4861 0.4160   2.367   323.7 221765   328.7 LN_QMA LN_QJA LN_QND
    3 0.3919 0.3089   6.103   328.1 262440   333.1 LN_QJF LN_QMA LN_QND
    3 0.3753 0.2902   6.757   328.8 269564   333.8 LN_QMA LN_QSO LN_QND
    3 0.3414 0.2516   8.104   330.2 284221   335.2 LN_QMA LN_QMJ LN_QND
---------------------------------------------------------------------------
    4 0.5133 0.4206   3.289   324.3 220028   330.6 LN_QJF LN_QMA LN_QJA
                                                   LN_QND
    4 0.4914 0.3945   4.158   325.4 229934   331.7 LN_QMA LN_QJA LN_QSO
                                                   LN_QND
    4 0.4865 0.3887   4.351   325.7 232132   332.0 LN_QMA LN_QMJ LN_QJA
                                                   LN_QND
    4 0.4491 0.3442   5.833   327.5 249043   333.8 LN_QJF LN_QMA LN_QSO
                                                   LN_QND
--------------------------------------------------------------------------------
    5 0.5200 0.4000   5.023   325.9 227843   333.5 LN_QJF LN_QMA LN_QJA
                                                   LN_QSO LN_QND
    5 0.5134 0.3918   5.285   326.3 230982   333.8 LN_QJF LN_QMA LN_QMJ
                                                   LN_QJA LN_QND
    5 0.4915 0.3643   6.155   327.4 241398   335.0 LN_QMA LN_QMJ LN_QJA
                                                   LN_QSO LN_QND
    5 0.4819 0.3524   6.534   327.9 245932   335.5 LN_QJF LN_QMA LN_QMJ
                                                   LN_QSO LN_QND
--------------------------------------------------------------------------------
    6 0.5206 0.3692   7.000   327.9 239541   336.7 LN_QJF LN_QMA LN_QMJ
                                                   LN_QJA LN_QSO LN_QND
--------------------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP   LN_QJF    LN_QMA
  1  MODEL1   PARMS    CRAB     560.953   -2122.84      .      519.12
  2  MODEL1   PARMS    CRAB     603.211    -584.38      .         .
  3  MODEL1   PARMS    CRAB     621.459     663.55      .         .
  4  MODEL1   PARMS    CRAB     623.060     566.70      .         .
  5  MODEL1   PARMS    CRAB     537.671   -4757.12      .      538.54
  6  MODEL1   PARMS    CRAB     539.646   -1028.02      .      663.35
  7  MODEL1   PARMS    CRAB     561.062    -904.70  -276.837   630.61
  8  MODEL1   PARMS    CRAB     566.568   -1538.82      .      619.62
  9  MODEL1   PARMS    CRAB     470.919   -4425.22      .      769.51
 10  MODEL1   PARMS    CRAB     512.289   -3521.77  -492.966   743.95
 11  MODEL1   PARMS    CRAB     519.196   -5313.80      .      720.10
 12  MODEL1   PARMS    CRAB     533.124   -4224.66      .      698.89
 13  MODEL1   PARMS    CRAB     469.071   -3757.00  -285.225   855.97
 14  MODEL1   PARMS    CRAB     479.514   -4625.52      .      802.69
 15  MODEL1   PARMS    CRAB     481.801   -4478.44      .      757.24

OBS   LN_QMJ    LN_QJA    LN_QSO    LN_QND   CRAB  _IN_  _P_  _EDF_
  1      .         .         .         .      -1     1    2     24
  2      .         .         .      316.248   -1     1    2     24
  3      .         .      150.840      .      -1     1    2     24
  4   147.015      .         .         .      -1     1    2     24
  5      .         .         .      344.954   -1     1    2     24
  6      .     -324.597      .         .      -1     2    3     23
  7      .         .         .         .      -1     2    3     23
  8  -171.825      .         .         .      -1     2    3     23
  9      .     -497.480      .      521.213   -1     2    3     23
 10      .         .         .      467.233   -1     3    4     22
 11      .         .     -375.089   593.639   -1     3    4     22
 12  -269.316      .         .      395.097   -1     3    4     22
 13      .     -427.715      .      567.245   -1     3    4     22
 14      .     -450.335  -113.767   579.938   -1     4    5     21
 15    31.727  -511.734      .      520.357   -1     4    5     21

OBS    _MSE_      _RSQ_    _ADJRSQ_     _CP_      _AIC_     _SBC_
  1  314667.94   0.20454    0.17140    9.5271    331.060   333.576
  2  363863.02   0.08018    0.04185   14.4561    334.837   337.353
  3  386211.75   0.02368   -0.01700   16.6952    336.387   338.903
  4  388203.45   0.01865   -0.02224   16.8948    336.520   339.036
  5  289090.47   0.29965    0.23875    7.7576    329.749   333.523
  6  291217.68   0.29450    0.23315    7.9619    329.940   333.714
  7  314790.45   0.23739    0.17107   10.2253    331.964   335.738
  8  320999.35   0.22235    0.15472   10.8214    332.471   336.246
  9  221764.53   0.48611    0.41604    2.3674    323.700   328.733
 10  262440.45   0.39185    0.30892    6.1032    328.079   333.111
 11  269563.98   0.37535    0.29017    6.7574    328.775   333.808
 12  284221.28   0.34138    0.25157    8.1036    330.152   335.184
 13  220027.80   0.51331    0.42061    3.2893    324.286   330.577
 14  229933.50   0.49140    0.39452    4.1578    325.431   331.722
 15  232132.11   0.48654    0.38873    4.3505    325.679   331.969

OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP   LN_QJF    LN_QMA
 16  MODEL1   PARMS    CRAB     499.042   -4131.44  -444.410   882.89
 17  MODEL1   PARMS    CRAB     477.329   -3964.68  -293.032   895.77
 18  MODEL1   PARMS    CRAB     480.606   -3785.36  -284.104   849.70
 19  MODEL1   PARMS    CRAB     491.322   -4611.96      .      809.64
 20  MODEL1   PARMS    CRAB     495.915   -3773.32  -405.316  1016.68
 21  MODEL1   PARMS    CRAB     489.429   -3915.89  -296.991   917.45

OBS   LN_QMJ    LN_QJA    LN_QSO    LN_QND   CRAB  _IN_  _P_  _EDF_
 16      .         .     -328.810   673.191   -1     4    5     21
 17      .     -372.617  -128.351   634.757   -1     5    6     20
 18    15.343  -434.882      .      566.650   -1     5    6     20
 19   -13.825  -441.857  -119.238   583.135   -1     5    6     20
 20  -240.958      .     -342.487   717.424   -1     5    6     20
 21   -40.655  -346.635  -144.636   644.900   -1     6    7     19

OBS    _MSE_      _RSQ_    _ADJRSQ_     _CP_      _AIC_     _SBC_
 16  249043.34   0.44913    0.34420    5.8331    327.507   333.797
 17  227843.10   0.52002    0.40003    5.0233    325.925   333.474
 18  230982.09   0.51341    0.39176    5.2854    326.281   333.830
 19  241397.58   0.49147    0.36434    6.1550    327.428   334.976
 20  245931.79   0.48192    0.35240    6.5336    327.912   335.460
 21  239540.70   0.52061    0.36923    7.0000    327.893   336.700
```

Squared Root Inflows

```
N = 26     Regression Models for Dependent Variable: CRAB

   In     Rsq     Adj   C(p)     AIC     MSE     SBC Variables in Model
                  Rsq

    1 0.2015 0.1683  15.17  331.2 315858  333.7 SQR_QMA
    1 0.1156 0.0788  19.16  333.8 349844  336.3 SQR_QND
    1 0.0184 -.0224  23.69  336.5 388282  339.0 SQR_QSO
    1 0.0168 -.0242  23.77  336.6 388945  339.1 SQR_QJA
 ----------------------------------------------------
    2 0.3315 0.2734  11.11  328.5 275931  332.3 SQR_QMA SQR_QND
    2 0.2794 0.2167  13.54  330.5 297451  334.3 SQR_QMA SQR_QJA
    2 0.2309 0.1640  15.80  332.2 317474  336.0 SQR_QJF SQR_QMA
    2 0.2170 0.1490  16.44  332.6 323186  336.4 SQR_QMA SQR_QMJ
 -----------------------------------------------------------
    3 0.4846 0.4143  5.989  323.8 222413  328.8 SQR_QMA SQR_QJA SQR_QND
    3 0.4588 0.3850  7.189  325.0 233534  330.1 SQR_QMA SQR_QSO SQR_QND
    3 0.4434 0.3675  7.908  325.8 240197  330.8 SQR_QJF SQR_QMA SQR_QND
    3 0.3764 0.2914  11.02  328.7 269099  333.8 SQR_QMA SQR_QMJ SQR_QND
 -----------------------------------------------------------------
    4 0.5293 0.4397  5.907  323.4 212780  329.7 SQR_QJF SQR_QMA SQR_QSO
                                                SQR_QND
    4 0.5272 0.4372  6.005  323.5 213731  329.8 SQR_QJF SQR_QMA SQR_QJA
                                                SQR_QND
    4 0.5258 0.4354  6.074  323.6 214399  329.9 SQR_QMA SQR_QMJ SQR_QSO
                                                SQR_QND
    4 0.5213 0.4301  6.284  323.9 216438  330.1 SQR_QMA SQR_QJA SQR_QSO
                                                SQR_QND

 ------------------------------------------------------------------
    5 0.5889 0.4862  5.133  321.9 195128  329.4 SQR_QJF SQR_QMA SQR_QMJ
                                                SQR_QSO SQR_QND
    5 0.5607 0.4509  6.447  323.6 208529  331.2 SQR_QJF SQR_QMA SQR_QJA
                                                SQR_QSO SQR_QND
    5 0.5433 0.4292  7.256  324.6 216777  332.2 SQR_QMA SQR_QMJ SQR_QJA
                                                SQR_QSO SQR_QND
    5 0.5352 0.4190  7.634  325.1 220636  332.6 SQR_QJF SQR_QMA SQR_QMJ
                                                SQR_QJA SQR_QND
 ------------------------------------------------------------------
    6 0.5918 0.4629  7.000  323.7 203968  332.5 SQR_QJF SQR_QMA SQR_QMJ
                                                SQR_QJA SQR_QSO SQR_QND
 ------------------------------------------------------------------
```

```
OBS  _MODEL_   _TYPE_  _DEPVAR_   _RMSE_  INTERCEP   SQR_QJF  SQR_QMA
  1  MODEL1    PARMS     CRAB    562.012    623.25      .     26.2136
  2  MODEL1    PARMS     CRAB    591.476    960.84      .         .
  3  MODEL1    PARMS     CRAB    623.123   1430.72      .         .
  4  MODEL1    PARMS     CRAB    623.655   1967.41      .         .
  5  MODEL1    PARMS     CRAB    525.292   -199.73      .     27.1599
  6  MODEL1    PARMS     CRAB    545.391   1015.67      .     31.4077
  7  MODEL1    PARMS     CRAB    563.448    964.42  -13.6228  31.4149
  8  MODEL1    PARMS     CRAB    568.494    785.47      .     30.6142
  9  MODEL1    PARMS     CRAB    471.606    120.71      .     35.0142
 10  MODEL1    PARMS     CRAB    483.254   -353.01      .     39.6528
 11  MODEL1    PARMS     CRAB    490.099    205.33  -28.7775  38.5103
 12  MODEL1    PARMS     CRAB    518.748    -29.05      .     34.9753
 13  MODEL1    PARMS     CRAB    461.281      0.35  -23.3658  46.8741
 14  MODEL1    PARMS     CRAB    462.310    323.16  -19.0666  40.9189
 15  MODEL1    PARMS     CRAB    463.033   -157.02      .     50.4162

OBS   SQR_QMJ   SQR_QJA    SQR_QSO   SQR_QND   CRAB   _IN_   _P_   _EDF_
  1      .         .          .          .      -1     1      2     24
  2      .         .          .      19.2366    -1     1      2     24
  3      .         .       8.2728        .      -1     1      2     24
  4      .      -9.2416       .          .      -1     1      2     24
  5      .         .          .      20.4182    -1     2      3     23
  6      .     -20.8995       .          .      -1     2      3     23
  7      .         .          .          .      -1     2      3     23
  8   -7.0117      .          .          .      -1     2      3     23
  9      .     -30.4414       .      26.6494    -1     3      4     22
 10      .         .      -30.6530   36.9937    -1     3      4     22
 11      .         .          .      28.2496    -1     3      4     22
 12  -12.2462      .          .      23.2134    -1     3      4     22
 13      .         .      -25.7588   40.7058    -1     4      5     21
 14      .     -24.1797       .      30.5564    -1     4      5     21
 15  -15.0706      .      -33.4635   41.9533    -1     4      5     21

OBS     _MSE_        _RSQ_      _ADJRSQ_        _CP_       _AIC_       _SBC_
  1  315857.65    0.20153      0.16826      15.1655     331.158     333.674
  2  349843.94    0.11562      0.07877      19.1645     333.815     336.331
  3  388281.77    0.01845     -0.02245      23.6873     336.526     339.042
  4  388945.49    0.01677     -0.02420      23.7654     336.570     339.086
  5  275931.29    0.33153      0.27340      11.1147     328.538     332.312
  6  297451.21    0.27939      0.21673      13.5414     330.490     334.265
  7  317473.60    0.23089      0.16401      15.7991     332.184     335.959
  8  323185.63    0.21705      0.14897      16.4432     332.648     336.422
  9  222412.62    0.48461      0.41433       5.9894     323.776     328.809
 10  233534.33    0.45884      0.38504       7.1890     325.045     330.077
 11  240197.32    0.44340      0.36750       7.9076     325.776     330.809
 12  269099.01    0.37642      0.29139      11.0250     328.730     333.763
 13  212780.22    0.52934      0.43969       5.9072     323.415     329.706
 14  213730.60    0.52724      0.43719       6.0051     323.531     329.822
 15  214399.24    0.52576      0.43543       6.0739     323.613     329.903

OBS  _MODEL_   _TYPE_  _DEPVAR_   _RMSE_  INTERCEP   SQR_QJF  SQR_QMA
 16  MODEL1    PARMS     CRAB    465.229    -59.90      .     40.5483
 17  MODEL1    PARMS     CRAB    441.733    167.26  -22.1538  56.6729
 18  MODEL1    PARMS     CRAB    456.649    142.89  -18.3597  45.9937
 19  MODEL1    PARMS     CRAB    465.593    -36.44      .     47.5143
 20  MODEL1    PARMS     CRAB    469.719    382.23  -20.2104  44.1093
 21  MODEL1    PARMS     CRAB    451.629    194.92  -20.5268  54.9748

OBS   SQR_QMJ   SQR_QJA   SQR_QSO   SQR_QND   CRAB   _IN_   _P_   _EDF_
 16      .     -22.2094  -18.7899   35.1250    -1     4      5     21
 17  -14.2445      .     -28.6691   45.2010    -1     5      6     20
 18      .     -16.5373  -17.9741   38.5190    -1     5      6     20
 19  -10.2218  -13.9150  -25.1266   39.1868    -1     5      6     20
 20   -5.6850  -20.7351      .      31.4601    -1     5      6     20
 21  -12.2356   -5.9393  -25.4628   43.7817    -1     6      7     19

OBS     _MSE_        _RSQ_      _ADJRSQ_        _CP_       _AIC_       _SBC_
 16  216437.83    0.52125      0.43006       6.2838     323.859     330.149
 17  195127.98    0.58894      0.48618       5.1332     321.895     329.444
 18  208528.53    0.56071      0.45089       6.4471     323.622     331.171
 19  216777.28    0.54333      0.42917       7.2560     324.631     332.179
 20  220635.69    0.53521      0.41901       7.6343     325.090     332.638
 21  203968.41    0.59180      0.46290       7.0000     323.714     332.520
```

Logged and Squared Root Inflows

```
N = 26     Regression Models for Dependent Variable: CRAB

   In     Rsq     Adj   C(p)     AIC    MSE     SBC Variables in Model
                  Rsq

    1 0.2015 0.1683  10.89  331.2 315858  333.7 SQR_QMA
    1 0.0802 0.0419  15.89  334.8 363863  337.4 LN_QND
    1 0.0237 -.0170  18.22  336.4 386212  338.9 LN_QSO
    1 0.0158 -.0252  18.54  336.6 389319  339.1 SQR_QMJ
 -----------------------------------------------------
    2 0.3102 0.2502  8.413  329.4 284735  333.1 SQR_QMA LN_QND
    2 0.2761 0.2132  9.817  330.6 298799  334.4 SQR_QMA LN_QJA
    2 0.2309 0.1640  11.68  332.2 317474  336.0 SQR_QJF SQR_QMA
    2 0.2170 0.1490  12.25  332.6 323186  336.4 SQR_QMA SQR_QMJ
 -------------------------------------------------------------
    3 0.4831 0.4126  3.291  323.9 223059  328.9 SQR_QMA LN_QJA LN_QND
    3 0.4172 0.3377  6.006  327.0 251508  332.0 SQR_QJF SQR_QMA LN_QND
    3 0.3987 0.3167  6.770  327.8 259505  332.8 SQR_QMA LN_QSO LN_QND
    3 0.3496 0.2609  8.792  329.8 280693  334.9 SQR_QMA SQR_QMJ LN_QND
 --------------------------------------------------------------------
    4 0.5196 0.4280  3.790  324.0 217206  330.2 SQR_QJF SQR_QMA LN_QJA
                                                LN_QND
    4 0.4939 0.3975  4.845  325.3 228786  331.6 SQR_QMA LN_QJA LN_QSO
                                                LN_QND
    4 0.4831 0.3847  5.291  325.9 233679  332.1 SQR_QMA SQR_QMJ LN_QJA
                                                LN_QND
    4 0.4771 0.3775  5.540  326.2 236412  332.4 SQR_QJF SQR_QMA LN_QSO
                                                LN_QND
 ----------------------------------------------------------------------
    5 0.5307 0.4133  5.332  325.3 222786  332.9 SQR_QJF SQR_QMA LN_QJA
                                                LN_QSO LN_QND
    5 0.5229 0.4036  5.652  325.8 226471  333.3 SQR_QJF SQR_QMA SQR_QMJ
                                                LN_QSO LN_QND
    5 0.5207 0.4009  5.743  325.9 227520  333.4 SQR_QJF SQR_QMA SQR_QMJ
                                                LN_QJA LN_QND
    5 0.4967 0.3708  6.733  327.2 238936  334.7 SQR_QMA SQR_QMJ LN_QJA
                                                LN_QSO LN_QND
 ----------------------------------------------------------------------
    6 0.5387 0.3931  7.000  326.9 230486  335.7 SQR_QJF SQR_QMA SQR_QMJ
                                                LN_QJA LN_QSO LN_QND
 ----------------------------------------------------------------------
```

```
OBS  _MODEL_   _TYPE_   _DEPVAR_    _RMSE_   INTERCEP   SQR_QJF   SQR_QMA
  1  MODEL1    PARMS     CRAB      562.012     623.25      .      26.2136
  2  MODEL1    PARMS     CRAB      603.211    -584.38      .         .
  3  MODEL1    PARMS     CRAB      621.459     663.55      .         .
  4  MODEL1    PARMS     CRAB      623.955    1403.27      .         .
  5  MODEL1    PARMS     CRAB      533.605   -2128.42      .      28.1460
  6  MODEL1    PARMS     CRAB      546.625    2312.61      .      32.0618
  7  MODEL1    PARMS     CRAB      563.448     964.42  -13.6228   31.4149
  8  MODEL1    PARMS     CRAB      568.494     785.47      .      30.6142
  9  MODEL1    PARMS     CRAB      472.291    -686.21      .      38.5761
 10  MODEL1    PARMS     CRAB      501.505   -2586.24  -28.2799   39.7623
 11  MODEL1    PARMS     CRAB      509.417   -1777.30      .      38.7406
 12  MODEL1    PARMS     CRAB      529.804   -2220.64      .      35.5654
 13  MODEL1    PARMS     CRAB      466.054   -1226.16  -17.6755   44.0010
 14  MODEL1    PARMS     CRAB      478.316    -751.93      .      41.3512
 15  MODEL1    PARMS     CRAB      483.404    -690.39      .      38.6267

OBS   SQR_QMJ    LN_QJA     LN_QSO     LN_QND   CRAB   _IN_   _P_   _EDF_
  1      .          .          .          .      -1      1     2      24
  2      .          .          .       316.248   -1      1     2      24
  3      .          .       150.840       .      -1      1     2      24
  4    6.0587       .          .          .      -1      1     2      24
  5      .          .          .       370.023   -1      2     3      23
  6      .      -290.383       .          .      -1      2     3      23
  7      .          .          .          .      -1      2     3      23
  8   -7.0117       .          .          .      -1      2     3      23
  9      .      -472.355       .       545.618   -1      3     4      22
 10      .          .          .       526.825   -1      3     4      22
 11      .          .      -411.353    652.378   -1      3     4      22
 12  -11.4228       .          .       417.962   -1      3     4      22
 13      .      -389.228       .       612.721   -1      4     5      21
 14      .      -404.427   -165.983    634.298   -1      4     5      21
 15   -0.1142   -471.288       .       545.701   -1      4     5      21

OBS     _MSE_       _RSQ_     _ADJRSQ_      _CP_       _AIC_      _SBC_
  1   315857.65    0.20153    0.16826     10.8895    331.158    333.674
  2   363863.02    0.08018    0.04185     15.8882    334.837    337.353
  3   386211.75    0.02368   -0.01700     18.2153    336.387    338.903
  4   389319.39    0.01583   -0.02518     18.5389    336.595    339.111
  5   284734.60    0.31020    0.25022      8.4134    329.354    333.129
  6   298798.88    0.27613    0.21318      9.8168    330.608    334.382
  7   317473.60    0.23089    0.16401     11.6804    332.184    335.959
  8   323185.63    0.21705    0.14897     12.2504    332.648    336.422
  9   223058.51    0.48311    0.41263      3.2910    323.852    328.884
 10   251507.56    0.41719    0.33771      6.0065    326.973    332.005
 11   259505.31    0.39866    0.31665      6.7699    327.786    332.819
 12   280692.73    0.34956    0.26086      8.7922    329.827    334.859
 13   217206.24    0.51955    0.42804      3.7900    323.951    330.241
 14   228786.00    0.49394    0.39755      4.8451    325.301    331.592
 15   233678.96    0.48312    0.38466      5.2909    325.851    332.142

OBS  _MODEL_   _TYPE_   _DEPVAR_    _RMSE_   INTERCEP   SQR_QJF   SQR_QMA
 16  MODEL1    PARMS     CRAB      486.222   -2233.03  -24.5786   47.0915
 17  MODEL1    PARMS     CRAB      472.002   -1295.01  -17.7484   46.8366
 18  MODEL1    PARMS     CRAB      475.889   -2291.23  -23.6319   55.5595
 19  MODEL1    PARMS     CRAB      476.991   -1324.62  -18.2048   45.1605
 20  MODEL1    PARMS     CRAB      488.811    -906.15      .      43.6976
 21  MODEL1    PARMS     CRAB      480.090   -1614.14  -19.3393   51.4429

OBS   SQR_QMJ    LN_QJA     LN_QSO     LN_QND   CRAB   _IN_   _P_   _EDF_
 16      .          .      -343.598    742.150   -1      4     5      21
 17      .      -320.023   -168.265    702.897   -1      5     6      20
 18  -12.4008       .      -374.746    810.326   -1      5     6      20
 19   -2.2490   -365.735       .       616.360   -1      5     6      20
 20   -3.7813   -352.709   -206.063    658.453   -1      5     6      20
 21   -6.6310   -221.765   -238.754    751.404   -1      6     7      19

OBS     _MSE_       _RSQ_     _ADJRSQ_      _CP_       _AIC_      _SBC_
 16   236411.82    0.47707    0.37747      5.5399    326.154    332.444
 17   222785.52    0.53068    0.41335      5.3318    325.342    332.890
 18   226470.72    0.52291    0.40364      5.6515    325.768    333.317
 19   227520.12    0.52070    0.40088      5.7426    325.888    333.437
 20   238936.42    0.49665    0.37082      6.7332    327.161    334.710
 21   230486.45    0.53873    0.39307      7.0000    326.892    335.698
```

Logged Harvest and Inflows

```
N = 26     Regression Models for Dependent Variable: LN_CRAB

          Rsq      Adj    C(p)     AIC     MSE     SBC Variables in Model
   In              Rsq

    1 0.1983 0.1649  8.863 -41.42 0.1888 -38.91 LN_QMA
    1 0.0345 -.0058  15.17 -36.59 0.2274 -34.07 LN_QND
    1 0.0162 -.0247  15.87 -36.10 0.2317 -33.59 LN_QMJ
    1 0.0108 -.0305  16.08 -35.96 0.2330 -33.44 LN_QJA
 ----------------------------------------------------
    2 0.2877 0.2258  7.421 -42.50 0.1751 -38.72 LN_QMA LN_QJA
    2 0.2726 0.2093  8.004 -41.95 0.1788 -38.18 LN_QJF LN_QMA
    2 0.2425 0.1767  9.160 -40.90 0.1862 -37.12 LN_QMA LN_QND
    2 0.2197 0.1518  10.04 -40.12 0.1918 -36.35 LN_QMA LN_QSO
 -----------------------------------------------------------
    3 0.3986 0.3166  5.152 -44.90 0.1545 -39.86 LN_QMA LN_QJA LN_QND
    3 0.3760 0.2909  6.022 -43.94 0.1603 -38.91 LN_QJF LN_QMA LN_QND
    3 0.3706 0.2848  6.231 -43.71 0.1617 -38.68 LN_QMA LN_QSO LN_QND
    3 0.3139 0.2203  8.415 -41.47 0.1763 -36.44 LN_QJF LN_QMA LN_QJA
 ------------------------------------------------------------------
    4 0.4752 0.3752  4.203 -46.44 0.1413 -40.15 LN_QJF LN_QMA LN_QSO
                                                LN_QND
    4 0.4582 0.3550  4.858 -45.61 0.1458 -39.32 LN_QJF LN_QMA LN_QJA
                                                LN_QND
    4 0.4341 0.3263  5.787 -44.48 0.1523 -38.19 LN_QMA LN_QJA LN_QSO
                                                LN_QND
    4 0.4119 0.2998  6.642 -43.48 0.1583 -37.19 LN_QMA LN_QMJ LN_QSO
                                                LN_QND
 ----------------------------------------------------------------------
    5 0.5015 0.3769  5.190 -45.78 0.1409 -38.23 LN_QJF LN_QMA LN_QMJ
                                                LN_QSO LN_QND
    5 0.4990 0.3738  5.286 -45.65 0.1416 -38.10 LN_QJF LN_QMA LN_QJA
                                                LN_QSO LN_QND
    5 0.4582 0.3228  6.858 -43.61 0.1531 -36.06 LN_QJF LN_QMA LN_QMJ
                                                LN_QJA LN_QND
    5 0.4379 0.2974  7.639 -42.65 0.1589 -35.11 LN_QMA LN_QMJ LN_QJA
                                                LN_QSO LN_QND
 ----------------------------------------------------------------------
    6 0.5065 0.3506  7.000 -44.04 0.1468 -35.23 LN_QJF LN_QMA LN_QMJ
                                                LN_QJA LN_QSO LN_QND
 ----------------------------------------------------------------------
```

```
OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP   LN_QJF     LN_QMA
  1  MODEL1   PARMS   LN_CRAB   0.43453   4.44753     .        0.39441
  2  MODEL1   PARMS   LN_CRAB   0.47688   6.19650     .         .
  3  MODEL1   PARMS   LN_CRAB   0.48135   6.53582     .         .
  4  MODEL1   PARMS   LN_CRAB   0.48269   7.88247     .         .
  5  MODEL1   PARMS   LN_CRAB   0.41839   5.28973     .        0.50537
  6  MODEL1   PARMS   LN_CRAB   0.42282   5.86073  -0.32117    0.52376
  7  MODEL1   PARMS   LN_CRAB   0.43146   3.06130     .        0.40463
  8  MODEL1   PARMS   LN_CRAB   0.43793   4.87542     .        0.44782
  9  MODEL1   PARMS   LN_CRAB   0.39309   3.29560     .        0.56768
 10  MODEL1   PARMS   LN_CRAB   0.40040   4.20814  -0.45764    0.59533
 11  MODEL1   PARMS   LN_CRAB   0.40214   2.50266     .        0.58684
 12  MODEL1   PARMS   LN_CRAB   0.41987   6.00285  -0.21007    0.56214
 13  MODEL1   PARMS   LN_CRAB   0.37584   3.58905  -0.40834    0.73641
 14  MODEL1   PARMS   LN_CRAB   0.38188   4.05882  -0.32578    0.66644
 15  MODEL1   PARMS   LN_CRAB   0.39030   2.89546     .        0.63397

OBS   LN_QMJ     LN_QJA     LN_QSO     LN_QND   LN_CRAB  _IN_  _P_  _EDF_
  1     .          .          .          .        -1      1     2     24
  2     .          .          .       0.15996     -1      1     2     24
  3  0.10588       .          .          .        -1      1     2     24
  4     .      -0.07988       .          .        -1      1     2     24
  5     .      -0.24970       .          .        -1      1     2     24
  6     .          .          .          .        -1      2     3     23
  7     .          .          .       0.18152     -1      2     3     23
  8     .          .      -0.11956       .        -1      2     3     23
  9     .      -0.35118       .       0.30595     -1      3     4     22
 10     .          .          .       0.29504     -1      3     4     22
 11     .          .      -0.37641    0.43108     -1      3     4     22
 12     .      -0.18707       .          .        -1      3     4     22
 13     .          .      -0.33389    0.50418     -1      4     5     21
 14     .      -0.27150       .       0.35853     -1      4     5     21
 15     .      -0.25700   -0.22728    0.42327     -1      4     5     21

OBS   _MSE_      _RSQ_     _ADJRSQ_     _CP_       _AIC_      _SBC_
  1  0.18882    0.19831    0.16491     8.8630    -41.4225   -38.9063
  2  0.22741    0.03445   -0.00578    15.1712    -36.5871   -34.0709
  3  0.23170    0.01625   -0.02474    15.8721    -36.1014   -33.5852
  4  0.23299    0.01075   -0.03046    16.0835    -35.9567   -33.4405
  5  0.17505    0.28772    0.22578     7.4210    -42.4969   -38.7226
  6  0.17878    0.27256    0.20931     8.0045    -41.9495   -38.1752
  7  0.18616    0.24255    0.17668     9.1601    -40.8982   -37.1239
  8  0.19178    0.21966    0.15181    10.0410    -40.1243   -36.3500
  9  0.15452    0.39861    0.31660     5.1520    -44.8969   -39.8645
 10  0.16032    0.37602    0.29093     6.0219    -43.9379   -38.9055
 11  0.16172    0.37058    0.28475     6.2310    -43.7126   -38.6802
 12  0.17629    0.31386    0.22030     8.4146    -41.4691   -36.4368
 13  0.14126    0.47521    0.37525     4.2032    -46.4391   -40.1487
 14  0.14583    0.45821    0.35501     4.8576    -45.6103   -39.3199
 15  0.15233    0.43407    0.32627     5.7871    -44.4767   -38.1863

OBS  _MODEL_  _TYPE_  _DEPVAR_   _RMSE_   INTERCEP   LN_QJF     LN_QMA
 16  MODEL1   PARMS   LN_CRAB   0.39788   2.89938     .        0.71399
 17  MODEL1   PARMS   LN_CRAB   0.37534   3.83669  -0.38131    0.82892
 18  MODEL1   PARMS   LN_CRAB   0.37628   3.66364  -0.34063    0.74217
 19  MODEL1   PARMS   LN_CRAB   0.39131   4.05815  -0.32575    0.66629
 20  MODEL1   PARMS   LN_CRAB   0.39858   2.97364     .        0.67401
 21  MODEL1   PARMS   LN_CRAB   0.38318   3.79745  -0.35149    0.80161

OBS   LN_QMJ     LN_QJA     LN_QSO     LN_QND   LN_CRAB  _IN_  _P_  _EDF_
 16  -0.20685       .      -0.38465    0.47506     -1      4     5     21
 17  -0.16662       .      -0.34334    0.53477     -1      5     6     20
 18     .      -0.16666   -0.24423    0.48699     -1      5     6     20
 19   0.00036  -0.27167       .       0.35851     -1      5     6     20
 20  -0.07973  -0.20810   -0.25883    0.44171     -1      5     6     20
 21  -0.11149  -0.09541   -0.28889    0.51480     -1      6     7     19

OBS   _MSE_      _RSQ_     _ADJRSQ_     _CP_       _AIC_      _SBC_
 16  0.15831    0.41187    0.29984     6.6416    -43.4765   -37.1860
 17  0.14088    0.50154    0.37692     5.1895    -45.7775   -38.2289
 18  0.14159    0.49903    0.37378     5.2862    -45.6468   -38.0982
 19  0.15313    0.45821    0.32276     6.8576    -43.6103   -36.0618
 20  0.15887    0.43790    0.29738     7.6394    -42.6536   -35.1050
 21  0.14683    0.50646    0.35061     7.0000    -44.0356   -35.2289
```

Untransformed Harvest, Jan-Feb and May-Jun Inflows, and Logged the others Inflows

```
N = 26     Regression Models for Dependent Variable: CRAB

 R-square       Adj      C(p)       AIC       MSE       SBC Variables in Model
In              Rsq
1 0.204540 0.171396  10.7453     331.1    314668     333.6 LN_QMA
1 0.080178 0.041853  15.8647     334.8    363863     337.4 LN_QND
1 0.023682 -.016998  18.1903     336.4    386212     338.9 LN_QSO
1 0.013075 -.028047  18.6270     336.7    390408     339.2 QMJ_LAG
--------------------------------------------------------------------
2 0.299649 0.238748   8.8301     329.7    289090     333.5 LN_QMA LN_QND
2 0.294495 0.233147   9.0423     329.9    291218     333.7 LN_QMA LN_QJA
2 0.239274 0.173123  11.3155     331.9    314012     335.7 QJF_LAG LN_QMA
2 0.222859 0.155282  11.9912     332.5    320788     336.2 LN_QMA QMJ_LAG
---------------------------------------------------------------------------
3 0.486111 0.416035   3.1544     323.7    221765     328.7 LN_QMA LN_QJA LN_QND
3 0.410694 0.330334   6.2589     327.3    254310     332.3 QJF_LAG LN_QMA LN_QND
3 0.375347 0.290167   7.7140     328.8    269564     333.8 LN_QMA LN_QSO LN_QND
3 0.334170 0.243375   9.4090     330.4    287333     335.5 LN_QMA QMJ_LAG LN_QND
----------------------------------------------------------------------------
4 0.527093 0.437016   3.4673     323.5    213797     329.8 QJF_LAG LN_QMA LN_QJA LN_QND
4 0.491400 0.394524   4.9366     325.4    229934     331.7 LN_QMA LN_QJA LN_QSO LN_QND
4 0.486347 0.388509   5.1446     325.7    232218     332.0 LN_QMA QMJ_LAG LN_QJA LN_QND
4 0.452657 0.348401   6.5315     327.3    247449     333.6 QJF_LAG LN_QMA QMJ_LAG
                                                               LN_QND
---------------------------------------------------------------------------------
5 0.530752 0.413440   5.3167     325.3    222750     332.9 QJF_LAG LN_QMA QMJ_LAG
                                                               LN_QJA LN_QND
5 0.530279 0.412848   5.3362     325.4    222975     332.9 QJF_LAG LN_QMA LN_QJA
                                                               LN_QSO LN_QND
5 0.505764 0.382205   6.3453     326.7    234612     334.2 QJF_LAG LN_QMA QMJ_LAG
                                                               LN_QSO LN_QND
5 0.493798 0.367247   6.8379     327.3    240292     334.9 LN_QMA QMJ_LAG LN_QJA
                                                               LN_QSO LN_QND
---------------------------------------------------------------------------------
6 0.538446 0.392692   7.0000     326.9    230630     335.7 QJF_LAG LN_QMA QMJ_LAG
                                                               LN_QJA LN_QSO LN_QND
---------------------------------------------------------------------------------

Dependent Variable: CRAB

                               Analysis of Variance
                              Sum of           Mean
          Source        DF   Squares          Square         F Value       Prob>F
          Model          6 5111959.1091 851993.18485           3.694       0.0133
          Error         19 4381961.3113  230629.5427
          C Total       25 9493920.4204

                Root MSE      480.23905     R-square         0.5384
                Dep Mean     1699.58077     Adj R-sq         0.3927
                C.V.           28.25632
```

```
                                      Parameter Estimates

                 Parameter      Standard    T for H0:                     Variance
Variable  DF      Estimate         Error   Parameter=0    Prob > |T|     Inflation
INTERCEP   1  -6833.967452  2628.1430767        -2.600        0.0176    0.00000000
QJF_LAG    1     -0.244419    0.18028923        -1.356        0.1911    1.77189933
LN_QMA     1    982.877125  264.40381067         3.717        0.0015    2.18429793
QMJ_LAG    1     -0.065603    0.11314383        -0.580        0.5689    2.05040016
LN_QJA     1   -298.093077  257.00103263        -1.160        0.2605    2.72877848
LN_QSO     1   -150.030964  266.59024040        -0.563        0.5802    3.04516031
LN_QND     1    678.199232  239.08254108         2.837        0.0105    1.88637277

                          Collinearity Diagnostics(intercept adjusted)

                Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
#  Eigenvalue       Index  QJF_LAG   LN_QMA    QMJ_LAG   LN_QJA    LN_QSO    LN_QND

1     2.93974     1.00000    0.0368    0.0223    0.0205    0.0296    0.0245    0.0151
2     1.26660     1.52348    0.0014    0.0897    0.0837    0.0003    0.0289    0.1754
3     0.72028     2.02024    0.2351    0.0775    0.2778    0.0275    0.0068    0.0726
4     0.47740     2.48149    0.0086    0.1462    0.0582    0.3594    0.0246    0.3101
5     0.44956     2.55717    0.5801    0.1837    0.0382    0.0074    0.2275    0.0022
6     0.14642     4.48084    0.1380    0.4806    0.5216    0.5758    0.6876    0.4246

  OBS _MODEL_ _TYPE_  _DEPVAR_ _RMSE_ INTERCEP  QJF_LAG  LN_QMA  QMJ_LAG  LN_QJA   LN_QSO

    1 MODEL1  PARMS    CRAB   560.953 -2122.84   .       519.12   .          .        .
    2 MODEL1  PARMS    CRAB   603.211  -584.38   .          .     .          .        .
    3 MODEL1  PARMS    CRAB   621.459   663.55   .          .     .          .     150.840
    4 MODEL1  PARMS    CRAB   624.826  1551.80   .          .    0.05797     .        .
    5 MODEL1  PARMS    CRAB   537.671 -4757.12   .       538.54   .          .        .
    6 MODEL1  PARMS    CRAB   539.646 -1028.02   .       663.35   .      -324.597     .
    7 MODEL1  PARMS    CRAB   560.368 -2634.65 -0.18300  631.66   .          .        .
    8 MODEL1  PARMS    CRAB   566.381 -2598.07   .       611.28 -0.07978     .        .
    9 MODEL1  PARMS    CRAB   470.919 -4425.22   .       769.51   .      -497.480     .
   10 MODEL1  PARMS    CRAB   504.292 -6958.39 -0.35542  766.02   .          .        .
   11 MODEL1  PARMS    CRAB   519.196 -5313.80   .       720.10   .          .    -375.089
   12 MODEL1  PARMS    CRAB   536.035 -5668.60   .       668.48 -0.11088     .        .
   13 MODEL1  PARMS    CRAB   462.382 -5895.53 -0.22865  878.13   .      -416.227     .
   14 MODEL1  PARMS    CRAB   479.514 -4625.52   .       802.69   .      -450.335 -113.767
   15 MODEL1  PARMS    CRAB   481.890 -4512.50   .       777.66 -0.01000 -489.807     .
   16 MODEL1  PARMS    CRAB   497.442 -8041.08 -0.36772  917.38 -0.12244     .        .
   17 MODEL1  PARMS    CRAB   471.964 -6344.47 -0.24375  918.16 -0.04029 -379.934     .
   18 MODEL1  PARMS    CRAB   472.202 -6018.03 -0.22344  901.49   .      -381.367  -88.586
   19 MODEL1  PARMS    CRAB   484.368 -8309.77 -0.31133 1057.94 -0.13894     .    -324.999
   20 MODEL1  PARMS    CRAB   490.196 -4989.22   .       840.97 -0.03482 -409.571 -147.637
   21 MODEL1  PARMS    CRAB   480.239 -6833.97 -0.24442  982.88 -0.06560 -298.093 -150.031

  OBS  LN_QND  CRAB  _IN_  _P_  _EDF_    _MSE_     _RSQ_   _ADJRSQ_    _CP_    _AIC_    _SBC_

    1    .      -1     1    2     24   314667.94  0.20454   0.17140  10.7453  331.060  333.576
    2 316.248   -1     1    2     24   363863.02  0.08018   0.04185  15.8647  334.837  337.353
    3    .      -1     1    2     24   386211.75  0.02368  -0.01700  18.1903  336.387  338.903
    4    .      -1     1    2     24   390407.94  0.01307  -0.02805  18.6270  336.668  339.184
    5 344.954   -1     2    3     23   289090.47  0.29965   0.23875   8.8301  329.749  333.523
    6    .      -1     2    3     23   291217.68  0.29450   0.23315   9.0423  329.940  333.714
    7    .      -1     2    3     23   314012.02  0.23927   0.17312  11.3155  331.899  335.673
    8    .      -1     2    3     23   320787.60  0.22286   0.15528  11.9912  332.454  336.229
    9 521.213   -1     3    4     22   221764.53  0.48611   0.41604   3.1544  323.700  328.733
   10 503.039   -1     3    4     22   254310.32  0.41069   0.33033   6.2589  327.261  332.293
   11 593.639   -1     3    4     22   269563.98  0.37535   0.29017   7.7140  328.775  333.808
   12 377.820   -1     3    4     22   287333.43  0.33417   0.24338   9.4090  330.435  335.467
   13 594.123   -1     4    5     21   213797.17  0.52709   0.43702   3.4673  323.539  329.830
   14 579.938   -1     4    5     21   229933.50  0.49140   0.39452   4.9366  325.431  331.722
   15 521.458   -1     4    5     21   232217.98  0.48635   0.38851   5.1446  325.688  331.979
   16 544.802   -1     4    5     21   247449.00  0.45266   0.34840   6.5315  327.340  333.631
   17 599.923   -1     5    6     20   222750.30  0.53075   0.41344   5.3167  325.338  332.886
   18 638.190   -1     5    6     20   222974.79  0.53028   0.41285   5.3362  325.364  332.912
   19 740.085   -1     5    6     20   234611.89  0.50576   0.38220   6.3453  326.686  334.235
   20 598.272   -1     5    6     20   240292.12  0.49380   0.36725   6.8379  327.308  334.857
   21 678.199   -1     6    7     19   230629.54  0.53845   0.39269   7.0000  326.908  335.714
```

Untransformed Harvest, Jan-Feb and May-Jun Inflows, and Squared Root others Inflows

```
N = 26     Regression Models for Dependent Variable: CRAB

  R-square       Adj      C(p)        AIC       MSE       SBC Variables in Model
In               Rsq
1 0.201533 0.168263  16.6470      331.2    315858      333.7 SQR_QMA
1 0.115618 0.078768  20.8054      333.8    349844      336.3 SQR_QND
1 0.018449 -.022448  25.5085      336.5    388282      339.0 SQR_QSO
1 0.016772 -.024196  25.5897      336.6    388945      339.1 SQR_QJA
------------------------------------------------------------------------------
2 0.331528 0.273400  12.3551      328.5    275931      332.3 SQR_QMA SQR_QND
2 0.279394 0.216732  14.8784      330.5    297451      334.3 SQR_QMA SQR_QJA
2 0.231761 0.164957  17.1840      332.2    317113      335.9 QJF_LAG SQR_QMA
2 0.218511 0.150555  17.8253      332.6    322583      336.4 SQR_QMA QMJ_LAG
---------------------------------------------------------------------------------------
3 0.484609 0.414329   6.9457      323.8    222413      328.8 SQR_QMA SQR_QJA SQR_QND
3 0.458837 0.385042   8.1931      325.0    233534      330.1 SQR_QMA SQR_QSO SQR_QND
3 0.451456 0.376654   8.5504      325.4    236720      330.4 QJF_LAG SQR_QMA SQR_QND
3 0.374148 0.288804  12.2922      328.8    270081      333.9 SQR_QMA QMJ_LAG SQR_QND
-------------------------------------------------------------------------------------------------
4 0.534509 0.445844   6.5305      323.1    210444      329.4 QJF_LAG SQR_QMA SQR_QJA
                                                            SQR_QND
4 0.531705 0.442506   6.6662      323.3    211712      329.6 SQR_QMA QMJ_LAG SQR_QSO
                                                            SQR_QND
4 0.529027 0.439317   6.7958      323.4    212923      329.7 QJF_LAG SQR_QMA SQR_QSO
                                                            SQR_QND
4 0.521252 0.430062   7.1721      323.9    216438      330.1 SQR_QMA SQR_QJA SQR_QSO
                                                            SQR_QND
-------------------------------------------------------------------------------------------------
5 0.604848 0.506060   5.1259      320.9    187577      328.4 QJF_LAG SQR_QMA QMJ_LAG
                                                            SQR_QSO SQR_QND
5 0.563339 0.454173   7.1351      323.5    207281      331.0 QJF_LAG SQR_QMA SQR_QJA
                                                            SQR_QSO SQR_QND
5 0.550445 0.438056   7.7591      324.2    213402      331.8 QJF_LAG SQR_QMA QMJ_LAG
                                                            SQR_QJA SQR_QND
5 0.549941 0.437426   7.7835      324.3    213641      331.8 SQR_QMA QMJ_LAG SQR_QJA
                                                            SQR_QSO SQR_QND
-------------------------------------------------------------------------------------------------
6 0.607450 0.483487   7.0000      322.7    196149      331.5 QJF_LAG SQR_QMA QMJ_LAG
                                                            SQR_QJA SQR_QSO SQR_QND
-------------------------------------------------------------------------------------------------

                              Analysis of Variance
                                 Sum of         Mean
         Source          DF     Squares        Square      F Value       Prob>F
         Model            6 5767085.0405 961180.84008        4.900       0.0035
         Error           19 3726835.3799 196149.23052
         C Total         25 9493920.4204

             Root MSE      442.88738     R-square       0.6075
             Dep Mean     1699.58077     Adj R-sq       0.4835
             C.V.           26.05862
```

```
                                Parameter Estimates

                       Parameter      Standard    T for H0:                 Variance
Variable    DF          Estimate         Error   Parameter=0   Prob > |T|  Inflation

INTERCEP     1       -483.921868  559.30987441        -0.865       0.3977  0.00000000
QJF_LAG      1         -0.277329    0.16622519        -1.668       0.1116  1.77101179
SQR_QMA      1         56.461946   12.79028711         4.414       0.0003  2.32226711
QMJ_LAG      1         -0.148894    0.10189949        -1.461       0.1603  1.95546146
SQR_QJA      1         -5.489123   15.46741800        -0.355       0.7266  2.27392551
SQR_QSO      1        -25.624601   15.42660911        -1.661       0.1131  3.10514756
SQR_QND      1         44.706014   11.65770793         3.835       0.0011  2.05519575


                     Collinearity Diagnostics(intercept adjusted)

                         Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
Number   Eigenvalue          Index  QJF_LAG   SQR_QMA   QMJ_LAG   SQR_QJA   SQR_QSO   SQR_QND

     1      2.86420        1.00000    0.0398    0.0210    0.0219    0.0322    0.0262    0.0159
     2      1.22708        1.52779    0.0019    0.0974    0.0907    0.0003    0.0255    0.1597
     3      0.72526        1.98726    0.1929    0.0735    0.3099    0.0287    0.0122    0.0764
     4      0.59137        2.20075    0.0017    0.1255    0.0346    0.4249    0.0000    0.1765
     5      0.44975        2.52356    0.6462    0.0858    0.0479    0.0064    0.2398    0.0130
     6      0.14233        4.48586    0.1174    0.5968    0.4949    0.5075    0.6963    0.5585

OBS _MODEL_ _TYPE_ _DEPVAR_   _RMSE_ INTERCEP  QJF_LAG SQR_QMA  QMJ_LAG  SQR_QJA  SQR_QSO

  1 MODEL1   PARMS    CRAB   562.012   623.25   .      26.2136   .         .        .
  2 MODEL1   PARMS    CRAB   591.476   960.84   .        .       .         .        .
  3 MODEL1   PARMS    CRAB   623.123  1430.72   .        .       .         .       8.2728
  4 MODEL1   PARMS    CRAB   623.655  1967.41   .        .       .       -9.2416    .
  5 MODEL1   PARMS    CRAB   525.292  -199.73   .      27.1599   .         .        .
  6 MODEL1   PARMS    CRAB   545.391  1015.67   .      31.4077   .      -20.8995    .
  7 MODEL1   PARMS    CRAB   563.128   707.02 -0.16898 31.2996   .         .        .
  8 MODEL1   PARMS    CRAB   567.964   635.50   .      30.6674 -0.07654    .        .
  9 MODEL1   PARMS    CRAB   471.606   120.71   .      35.0142   .      -30.4414    .
 10 MODEL1   PARMS    CRAB   483.254  -353.01   .      39.6528   .         .     -30.6530
 11 MODEL1   PARMS    CRAB   486.539  -361.39 -0.36702 38.6014   .         .        .
 12 MODEL1   PARMS    CRAB   519.694  -275.94   .      34.4720 -0.12377    .        .
 13 MODEL1   PARMS    CRAB   458.742   -59.07 -0.25276 41.2165   .      -23.9399    .
 14 MODEL1   PARMS    CRAB   460.122  -473.76   .      50.9543 -0.16415    .     -34.5880
 15 MODEL1   PARMS    CRAB   461.436  -451.16 -0.29014 46.2819   .         .     -24.7254
 16 MODEL1   PARMS    CRAB   465.229   -59.90   .      40.5483   .      -22.2094 -18.7899
 17 MODEL1   PARMS    CRAB   433.102  -576.43 -0.29625 57.9520 -0.16747    .     -28.6155
 18 MODEL1   PARMS    CRAB   455.282  -206.26 -0.23332 45.6731   .      -17.1009 -16.7519
 19 MODEL1   PARMS    CRAB   461.954  -169.41 -0.28277 45.8734 -0.08227 -19.5255    .
 20 MODEL1   PARMS    CRAB   462.213  -258.23   .      48.3383 -0.11809 -13.7642 -26.1318
 21 MODEL1   PARMS    CRAB   442.887  -483.92 -0.27733 56.4619 -0.14889  -5.4891 -25.6246

OBS SQR_QND   CRAB  _IN_  _P_  _EDF_      _MSE_    _RSQ_  _ADJRSQ_     _CP_    _AIC_    _SBC_

  1    .        -1     1    2     24  315857.65  0.20153   0.16826  16.6470  331.158  333.674
  2 19.2366     -1     1    2     24  349843.94  0.11562   0.07877  20.8054  333.815  336.331
  3    .        -1     1    2     24  388281.77  0.01845  -0.02245  25.5085  336.526  339.042
  4    .        -1     1    2     24  388945.49  0.01677  -0.02420  25.5897  336.570  339.086
  5 20.4182     -1     2    3     23  275931.29  0.33153   0.27340  12.3551  328.538  332.312
  6    .        -1     2    3     23  297451.21  0.27939   0.21673  14.8784  330.490  334.265
  7    .        -1     2    3     23  317113.24  0.23176   0.16496  17.1840  332.155  335.929
  8    .        -1     2    3     23  322582.55  0.21851   0.15055  17.8253  332.599  336.374
  9 26.6494     -1     3    4     22  222412.62  0.48461   0.41433   6.9457  323.776  328.809
 10 36.9937     -1     3    4     22  233534.33  0.45884   0.38504   8.1931  325.045  330.077
 11 28.9433     -1     3    4     22  236719.90  0.45146   0.37665   8.5504  325.397  330.429
 12 22.8005     -1     3    4     22  270081.49  0.37415   0.28880  12.2922  328.825  333.857
 13 31.1898     -1     4    5     21  210444.49  0.53451   0.44584   6.5305  323.128  329.419
 14 42.2811     -1     4    5     21  211712.16  0.53171   0.44251   6.6662  323.285  329.575
 15 40.5278     -1     4    5     21  212923.05  0.52903   0.43932   6.7958  323.433  329.723
 16 35.1250     -1     4    5     21  216437.83  0.52125   0.43006   7.1721  323.859  330.149
 17 45.9968     -1     5    6     20  187576.94  0.60485   0.50606   5.1259  320.869  328.418
 18 38.3968     -1     5    6     20  207281.36  0.56334   0.45417   7.1351  323.466  331.015
 19 32.5668     -1     5    6     20  213401.90  0.55045   0.43806   7.7591  324.223  331.771
 20 39.6394     -1     5    6     20  213641.12  0.54994   0.43743   7.7835  324.252  331.800
 21 44.7060     -1     6    7     19  196149.23  0.60745   0.48349   7.0000  322.697  331.504
```

Untransformed Harvest, Jan-Feb and May-Jun Inflows, Squared Root March-April Inflows, and Logged others Inflows

```
 N = 26      Regression Models for Dependent Variable: CRAB

  R-square       Adj       C(p)        AIC       MSE       SBC Variables in Model
In               Rsq

1 0.201533 0.168263  11.8486     331.2    315858     333.7 SQR_QMA
1 0.080178 0.041853  16.9930     334.8    363863     337.4 LN_QND
1 0.023682 -.016998  19.3880     336.4    386212     338.9 LN_QSO
1 0.013075 -.028047  19.8377     336.7    390408     339.2 QMJ_LAG
----------------------------------------------------------------------
2 0.310201 0.250219   9.2419     329.4    284735     333.1 SQR_QMA LN_QND
2 0.276129 0.213184  10.6863     330.6    298799     334.4 SQR_QMA LN_QJA
2 0.231761 0.164957  12.5672     332.2    317113     335.9 QJF_LAG SQR_QMA
2 0.218511 0.150555  13.1289     332.6    322583     336.4 SQR_QMA QMJ_LAG
------------------------------------------------------------------------------
3 0.483113 0.412628   3.9119     323.9    223059     328.9 SQR_QMA LN_QJA LN_QND
3 0.424799 0.346363   6.3839     326.6    248223     331.7 QJF_LAG SQR_QMA LN_QND
3 0.398656 0.316654   7.4922     327.8    259505     332.8 SQR_QMA LN_QSO LN_QND
3 0.347716 0.258768   9.6516     329.9    281488     334.9 SQR_QMA QMJ_LAG LN_QND
---------------------------------------------------------------------------------------
4 0.526536 0.436352   4.0711     323.6    214049     329.9 QJF_LAG SQR_QMA LN_QJA
                                                           LN_QND
4 0.493939 0.397546   5.4529     325.3    228786     331.6 SQR_QMA LN_QJA LN_QSO LN_QND
4 0.483741 0.385406   5.8852     325.8    233396     332.1 SQR_QMA QMJ_LAG LN_QJA
                                                           LN_QND
4 0.477307 0.377747   6.1580     326.1    236305     332.4 QJF_LAG SQR_QMA LN_QSO
                                                           LN_QND
----------------------------------------------------------------------------------------
5 0.538299 0.422874   5.5724     324.9    219167     332.5 QJF_LAG SQR_QMA QMJ_LAG
                                                           LN_QSO LN_QND
5 0.535042 0.418802   5.7105     325.1    220714     332.6 QJF_LAG SQR_QMA LN_QJA
                                                           LN_QSO LN_QND
5 0.532174 0.415218   5.8321     325.3    222075     332.8 QJF_LAG SQR_QMA QMJ_LAG
                                                           LN_QJA LN_QND
5 0.500275 0.375344   7.1843     327.0    237218     334.5 SQR_QMA QMJ_LAG LN_QJA
                                                           LN_QSO LN_QND
----------------------------------------------------------------------------------------
6 0.551802 0.410266   7.0000     326.1    223956     335.0 QJF_LAG SQR_QMA QMJ_LAG
                                                           LN_QJA LN_QSO LN_QND
----------------------------------------------------------------------------------------

                              Analysis of Variance

                                  Sum of          Mean
          Source          DF     Squares        Square      F Value        Prob>F
          Model            6 5238763.0261 873127.17101        3.899        0.0105
          Error           19 4255157.3943 223955.65233
          C Total         25 9493920.4204

              Root MSE      473.23953      R-square        0.5518
              Dep Mean     1699.58077      Adj R-sq        0.4103
              C.V.           27.84449
```

```
                           Parameter Estimates

                    Parameter      Standard    T for H0:                   Variance
    Variable  DF     Estimate         Error  Parameter=0   Prob > |T|     Inflation

    INTERCEP   1 -2350.421967  1787.1149339       -1.315       0.2041    0.00000000
    QJF_LAG    1    -0.264959    0.17927483       -1.478       0.1558    1.80422628
    SQR_QMA    1    53.399210   13.88207582        3.847       0.0011    2.39598993
    QMJ_LAG    1    -0.097286    0.11541695       -0.843       0.4098    2.19719721
    LN_QJA     1  -197.104072  260.52305743       -0.757       0.4586    2.88764491
    LN_QSO     1  -249.807570  273.86124363       -0.912       0.3731    3.30929688
    LN_QND     1   773.974627  246.97086210        3.134       0.0055    2.07288943


                 Collinearity Diagnostics(intercept adjusted)

                      Condition  Var Prop   Var Prop   Var Prop   Var Prop   Var Prop   Var Prop
Number  Eigenvalue        Index  QJF_LAG    SQR_QMA    QMJ_LAG    LN_QJA     LN_QSO     LN_QND

     1     2.90443      1.00000    0.0371     0.0190     0.0197     0.0285     0.0234     0.0139
     2     1.29726      1.49629    0.0010     0.0899     0.0703     0.0001     0.0231     0.1557
     3     0.73174      1.99229    0.2097     0.0742     0.2647     0.0314     0.0101     0.0506
     4     0.48209      2.45451    0.0174     0.1840     0.0399     0.3344     0.0000     0.2646
     5     0.45837      2.51723    0.5738     0.0686     0.0527     0.0088     0.2345     0.0312
     6     0.12611      4.79904    0.1610     0.5643     0.5527     0.5969     0.7089     0.4839


OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_ INTERCEP  QJF_LAG SQR_QMA  QMJ_LAG  LN_QJA   LN_QSO

  1 MODEL1   PARMS    CRAB   562.012   623.25   .       26.2136   .         .        .
  2 MODEL1   PARMS    CRAB   603.211  -584.38   .        .        .         .        .
  3 MODEL1   PARMS    CRAB   621.459   663.55   .        .        .         .     150.840
  4 MODEL1   PARMS    CRAB   624.826  1551.80   .        .       0.05797    .        .
  5 MODEL1   PARMS    CRAB   533.605 -2128.42   .       28.1460   .         .        .
  6 MODEL1   PARMS    CRAB   546.625  2312.61   .       32.0618   .      -290.383    .
  7 MODEL1   PARMS    CRAB   563.128   707.02 -0.16898 31.2996   .         .        .
  8 MODEL1   PARMS    CRAB   567.964   635.50   .       30.6674 -0.07654    .        .
  9 MODEL1   PARMS    CRAB   472.291  -686.21   .       38.5761   .      -472.355    .
 10 MODEL1   PARMS    CRAB   498.220 -3217.90 -0.36065 39.8913   .         .        .
 11 MODEL1   PARMS    CRAB   509.417 -1777.30   .       38.7406   .         .     -411.353
 12 MODEL1   PARMS    CRAB   530.554 -2409.89   .       35.0903 -0.11572    .        .
 13 MODEL1   PARMS    CRAB   462.654 -1664.59 -0.23638 44.3629   .      -385.790    .
 14 MODEL1   PARMS    CRAB   478.316  -751.93   .       41.3512   .      -404.427 -165.983
 15 MODEL1   PARMS    CRAB   483.111  -765.37   .       39.2788 -0.01643 -459.520    .
 16 MODEL1   PARMS    CRAB   486.112 -2776.03 -0.30613 46.4798   .         .     -324.738
 17 MODEL1   PARMS    CRAB   468.153 -3117.78 -0.31289 56.9082 -0.14921    .     -373.447
 18 MODEL1   PARMS    CRAB   469.802 -1698.02 -0.23036 46.6793   .      -327.686 -147.367
 19 MODEL1   PARMS    CRAB   471.248 -1991.62 -0.25654 47.0188 -0.05057 -338.911    .
 20 MODEL1   PARMS    CRAB   487.050 -1057.35   .       44.8942 -0.05823 -333.170 -228.969
 21 MODEL1   PARMS    CRAB   473.240 -2350.42 -0.26496 53.3992 -0.09729 -197.104 -249.808

OBS  LN_QND  CRAB  _IN_  _P_  _EDF_     _MSE_      _RSQ_   _ADJRSQ_     _CP_    _AIC_    _SBC_

  1    .      -1     1    2     24   315857.65  0.20153   0.16826  11.8486  331.158  333.674
  2 316.248   -1     1    2     24   363863.02  0.08018   0.04185  16.9930  334.837  337.353
  3    .      -1     1    2     24   386211.75  0.02368  -0.01700  19.3880  336.387  338.903
  4    .      -1     1    2     24   390407.94  0.01307  -0.02805  19.8377  336.668  339.184
  5 370.023   -1     2    3     23   284734.60  0.31020   0.25022   9.2419  329.354  333.129
  6    .      -1     2    3     23   298798.88  0.27613   0.21318  10.6863  330.608  334.382
  7    .      -1     2    3     23   317113.24  0.23176   0.16496  12.5672  332.155  335.929
  8    .      -1     2    3     23   322582.55  0.21851   0.15055  13.1289  332.599  336.374
  9 545.618   -1     3    4     22   223058.51  0.48311   0.41263   3.9119  323.852  328.884
 10 540.569   -1     3    4     22   248223.09  0.42480   0.34636   6.3839  326.631  331.663
 11 652.378   -1     3    4     22   259505.31  0.39866   0.31665   7.4922  327.786  332.819
 12 410.363   -1     3    4     22   281487.75  0.34772   0.25877   9.6516  329.901  334.933
 13 625.219   -1     4    5     21   214049.03  0.52654   0.43635   4.0711  323.570  329.861
 14 634.298   -1     4    5     21   228786.00  0.49394   0.39755   5.4529  325.301  331.592
 15 546.575   -1     4    5     21   233396.10  0.48374   0.38541   5.8852  325.820  332.110
 16 737.693   -1     4    5     21   236304.94  0.47731   0.37775   6.1580  326.142  332.432
 17 826.336   -1     5    6     20   219167.47  0.53830   0.42287   5.5724  324.916  332.464
 18 701.926   -1     5    6     20   220713.90  0.53504   0.41880   5.7105  325.099  332.647
 19 634.953   -1     5    6     20   222075.00  0.53217   0.41522   5.8321  325.259  332.807
 20 671.341   -1     5    6     20   237217.55  0.50027   0.37534   7.1843  326.974  334.522
 21 773.975   -1     6    7     19   223955.65  0.55180   0.41027   7.0000  326.144  334.951
```

Regression –Untransformed Data

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	November-December Inflows, March-April Inflows, July-August Inflows, May-June Inflows, January-February Inflows, September-October Inflows[c,d]	.	.799	.639	.524	424.9925	1.413

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, March-April Inflows, July-August Inflows, May-June Inflows, January-February Inflows, September-October Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6062166.35	6	1010361	5.594	.002[b]
	Residual	3431754.07	19	180619		
	Total	9493920.42	25			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), November-December Inflows, March-April Inflows, July-August Inflows, May-June Inflows, January-February Inflows, September-October Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	989.172	281.43		3.515	.002	400.1	1578		
	Jan-Feb Inflows	-.266	.157	-.306	-1.691	.107	-.594	.063	.582	1.72
	March-April Inflows	.681	.144	.990	4.744	.000	.381	.982	.437	2.29
	May-June Inflows	-.185	.094	-.365	-1.969	.064	-.382	.012	.553	1.81
	July-Aug Inflows	4.8E-02	.217	.042	.221	.828	-.407	.503	.539	1.86
	Sept-Oct Inflows	-.495	.206	-.566	-2.408	.026	-.926	-.065	.344	2.91
	Nov-Dec Inflows	.598	.133	.893	4.479	.000	.318	.877	.479	2.09

a. Dependent Variable: CRAB

Collinearity Diagnostics

```
                              Parameter   Standard    T for H0:                 Variance
      Variable           DF   Estimate     Error    Parameter=0  Prob > |T|   Inflation
INTERCEP                  1    989.172   281.4255      3.515       0.0023       0.0000
Jan-Feb Inflows           1    -0.2656     0.1571     -1.691       0.1073       1.7184
March-April Inflows       1     0.6812     0.1436      4.744       0.0001       2.2883
May-June Inflows          1    -0.1852     0.0941     -1.969       0.0637       1.8095
July-August Inflows       1     0.0480     0.2173      0.221       0.8275       1.8561
Sept-Oct Inflows          1    -0.4953     0.2057     -2.408       0.0264       2.9074
Nov-Dec Inflows           1     0.5975     0.1334      4.479       0.0003       2.0884
```

```
#  Eigenvalue   Condition   Jan-Feb   March-April   May-June   July-Aug   Sept-Oct   Nov-Dec
                Index       Inflows   Inflows       Inflows    Inflows    Inflows    Inflows
1  2.75491      1.00000     0.0449    0.0224        0.0252     0.0338     0.0305     0.0179
2  1.18438      1.52514     0.0037    0.1088        0.1020     0.0006     0.0249     0.1584
3  0.72926      1.94362     0.0959    0.0012        0.2657     0.1593     0.0048     0.1979
4  0.72003      1.95605     0.0693    0.1641        0.1101     0.3511     0.0149     0.0000
5  0.45798      2.45263     0.7005    0.0636        0.0429     0.0196     0.2438     0.0055
6  0.15344      4.23727     0.0857    0.6399        0.4542     0.4355     0.6811     0.6204
```

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	814.0202	2570.804	1699.58	492.4293	26
Std. Predicted Value	-1.798	1.769	.000	1.000	26
Standard Error of Predicted Value	129.9764	291.3629	216.0501	45.0383	26
Adjusted Predicted Value	940.6474	2943.434	1736.24	538.0580	26
Residual	-592.9131	942.7524	-6.E-13	370.4999	26
Std. Residual	-1.395	2.218	.000	.872	26
Stud. Residual	-1.880	2.442	-.035	1.050	26
Deleted Residual	-1076.12	1142.900	-36.6583	544.2051	26
Stud. Deleted Residual	-2.028	2.870	-.032	1.114	26
Mahal. Distance	1.377	10.789	5.769	2.701	26
Cook's Distance	.001	.411	.075	.107	26
Centered Leverage Value	.055	.432	.231	.108	26

a. Dependent Variable: CRAB

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE	SDR
1962	814.02017	-502.72017	-817.07773	1128.37773	-1.79835	-1.18289	-1.50804	-1.56443
1963	1169.22280	-191.72280	-234.48003	1211.98003	-1.07702	-.45112	-.49889	-.48880
1964	1431.02827	-235.42827	-287.89365	1483.49365	-.54536	-.55396	-.61258	-.60222
1965	1741.52353	76.37647	87.40872	1730.49128	.08518	.17971	.19225	.18731
1966	1146.72013	211.07987	279.57389	1078.22611	-1.12272	.49667	.57160	.56120
1967	1130.59352	-82.69352	-97.25097	1145.15097	-1.15547	-.19458	-.21101	-.20562
1968	1623.24869	-80.64869	-92.77538	1635.37538	-.15501	-.18976	-.20353	-.19832
1969	2298.61310	-592.91310	-1076.12281	2781.82281	1.21648	-1.39511	-1.87951	-2.02755
1970	2267.21055	354.78945	514.34724	2107.65276	1.15271	.83481	1.00515	1.00544
1971	1899.05182	261.74818	369.76962	1791.03038	.40508	.61589	.73203	.72277
1972	1557.46686	312.63314	365.80593	1504.29407	-.28860	.73562	.79572	.78774
1973	1690.50266	356.49734	511.38744	1535.61256	-.01844	.83883	1.00467	1.00493
1974	2503.72380	-520.82380	-960.53420	2943.43420	1.63301	-1.22549	-1.66426	-1.75265
1975	1820.23756	43.26244	68.67847	1794.82153	.24502	.10180	.12826	.12489
1976	1495.37697	104.12303	114.86692	1484.63308	-.41469	.24500	.25733	.25090
1977	2381.07316	-521.67316	-666.59047	2525.99047	1.38394	-1.22749	-1.38755	-1.42465
1978	1873.23308	47.66692	62.95570	1857.94430	.35264	.11216	.12890	.12551
1979	1605.00782	348.69218	456.71663	1496.98337	-.19205	.82047	.93899	.93592
1980	1533.02410	216.07590	301.49720	1447.60280	-.33823	.50842	.60057	.59018
1981	834.99953	-224.79953	-330.44738	940.64738	-1.75575	-.52895	-.64131	-.63107
1982	1669.28923	-453.18923	-771.43436	1987.53436	-.06151	-1.06635	-1.39126	-1.42889
1983	1676.91120	-269.31120	-508.14281	1915.74281	-.04604	-.63368	-.87044	-.86464
1984	1189.29004	207.30996	288.93763	1107.66237	-1.03627	.48780	.57588	.56548
1985	2422.77937	-254.87937	-328.33077	2496.23077	1.46863	-.59973	-.68068	-.67075
1986	2570.80449	447.79551	653.11806	2365.48194	1.76924	1.05366	1.27249	1.29496
1987	1844.14756	942.75244	1142.90000	1644.00000	.29358	2.21828	2.44243	**2.87019**

PRE	Predicted value of harvest
RES	Ordinary residual; observed harvest minus predicted harvest
DRE	Deleted residual; residual obtained when the model is fitted without that observation
ADJ	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR	Z-score of the predicted value of harvest
ZRE	Z-score of the residual
SRE	Studentized residual
SDR	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$

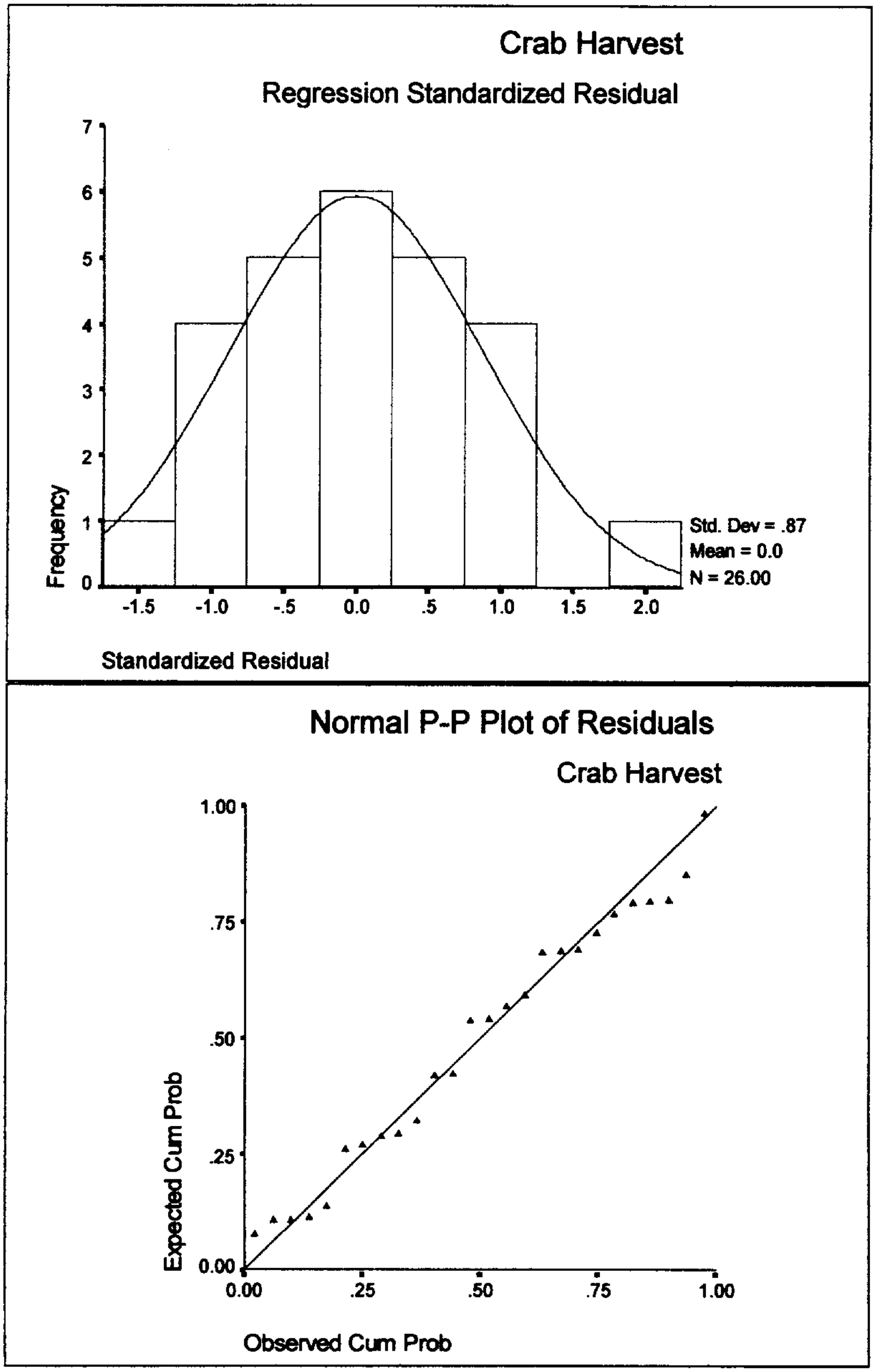


Fig. 3.1. Exploratory Plots of Crab Harvest Standardized Residual.

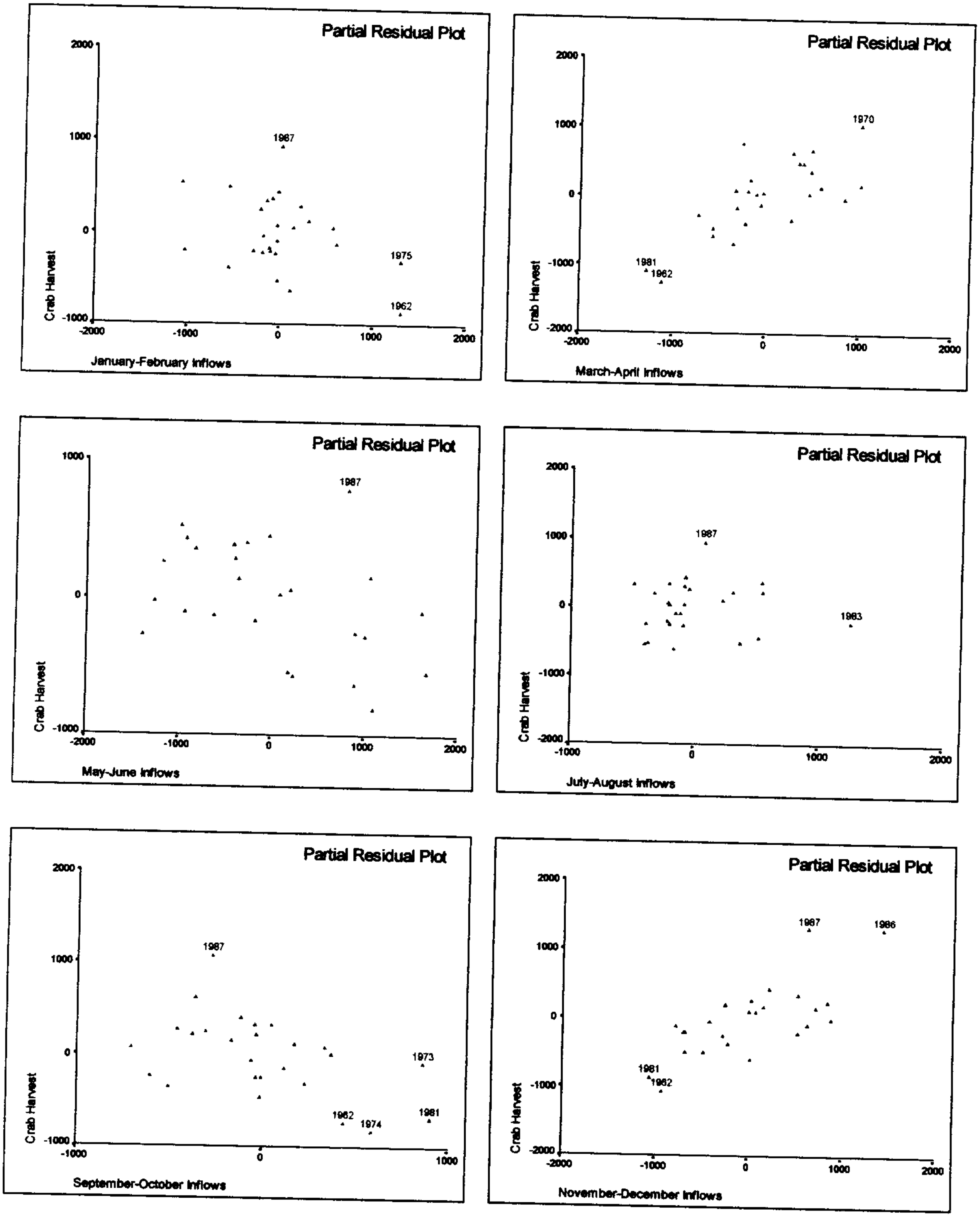


Fig. 3.2. Partial Residual Plots of Crab Harvest vs. Inflows.

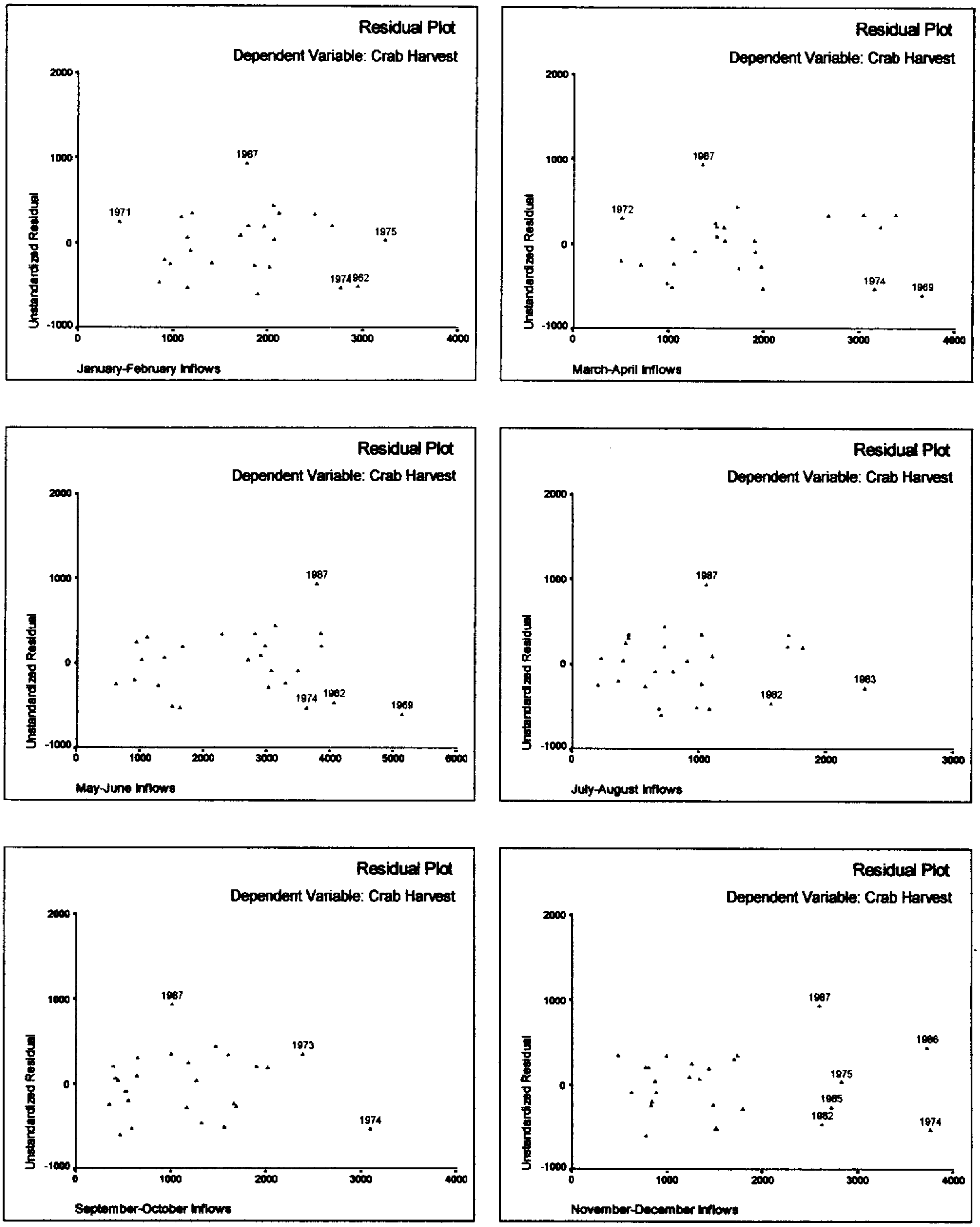


Fig. 3.3. Residual Plots of Crab Harvest vs. Inflows.

Prediction Intervals for Crab Harvest

YEAR	CRAB	LICI	UICI
1962	311.30	-232.71947	1860.75981
1963	977.50	201.99589	2136.44970
1964	1195.60	463.84651	2398.21002
1965	1817.90	797.53639	2685.51068
1966	1357.80	154.20032	2139.23994
1967	1047.90	176.81885	2084.36818
1968	1542.60	677.37933	2569.11804
1969	1705.70	1227.84864	3369.37756
1970	2622.00	1249.02568	3285.39541
1971	2160.80	887.91740	2910.18624
1972	1870.10	605.49062	2509.44309
1973	2047.00	675.17071	2705.83462
1974	1982.90	1429.73183	3577.71577
1975	1863.50	779.05397	2861.42115
1976	1599.50	565.18732	2425.56662
1977	1859.40	1399.61387	3362.53246
1978	1920.90	881.56846	2864.89770
1979	1953.70	615.87007	2594.14557
1980	1749.10	525.34186	2540.70634
1981	610.20	-186.86896	1856.86802
1982	1216.10	612.09351	2726.48495
1983	1407.60	598.42282	2755.39958
1984	1396.60	181.92745	2196.65263
1985	2167.90	1438.77951	3406.77922
1986	3018.60	1551.00503	3590.60395
1987	2786.90	879.88107	2808.41406

CRAB	Crab harvest
LICI	Lower limit for 99% prediction interval for crab harvest
UICI	Upper limit for 99% prediction interval for crab harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	8.65681	.20315	.34627	.278	.019
1963	3.59719	.00793	.14389	.825	.000
1964	3.59443	.01195	.14378	.825	.000
1965	2.19383	.00076	.08775	.948	.000
1966	5.16332	.01515	.20653	.640	.000
1967	2.78070	.00112	.11123	.905	.000
1968	2.30622	.00089	.09225	.941	.000
1969	10.26417	.41128	.41057	.174	.117
1970	6.79382	.06491	.27175	.451	.001
1971	6.34175	.03159	.25367	.500	.000
1972	2.67241	.01538	.10690	.914	.000
1973	6.61051	.06265	.26442	.471	.001
1974	10.48288	.33406	.41932	.163	.072
1975	8.29028	.00138	.33161	.308	.000
1976	1.37679	.00098	.05507	.986	.000
1977	4.47348	.07640	.17894	.724	.001
1978	5.10971	.00076	.20439	.647	.000
1979	4.95156	.03902	.19806	.666	.000
1980	6.12155	.02037	.24486	.526	.000
1981	7.03125	.02761	.28125	.426	.000
1982	9.35188	.19418	.37408	.228	.017
1983	10.78868	.09599	.43155	.148	.002
1984	6.10120	.01865	.24405	.528	.000
1985	4.63125	.01907	.18525	.705	.000
1986	6.89778	.10606	.27591	.440	.003
1987	3.41653	.18092	.13666	.844	.014

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds $(2p+1)/n$ or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degree of freedom and $n - p - 1$ denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	**-1.23710**	-.13920	-.96763	.74562	-.08208	.38186	-.42420	.57883
1963	-.23083	-.21897	.02152	.10333	.02095	.06073	-.05935	.08199
1964	-.28429	-.25526	.01144	.04828	.09151	.06789	.00225	.04474
1965	.07119	.05055	-.00217	-.00200	-.01602	-.02189	-.01600	.01006
1966	.31968	.03988	.13739	-.15641	.23080	-.10692	-.01109	-.13827
1967	-.08627	-.04593	.00221	.04252	-.04993	.01335	-.01253	.04736
1968	-.07690	-.02461	.01419	.00413	-.04226	.01662	.00605	.01852
1969	**-1.83039**	.52176	-.12249	-.77568	-.66687	.23062	.66857	-.01450
1970	.67427	.12595	-.24516	.41710	-.07356	-.12658	.02819	-.09586
1971	.46431	.32108	-.33519	.10052	-.17554	-.01997	.14018	.00824
1972	.32487	.24271	-.04658	-.09260	-.07891	-.03636	-.01699	.05802
1973	.66240	-.06153	-.03922	-.06845	.28168	-.30073	.50265	-.29295
1974	**-1.61039**	.68866	.01702	-.22484	-.12193	.48607	-.68148	-.39927
1975	.09573	-.03579	.07601	-.01629	.00293	-.01633	-.02873	.02602
1976	.08060	.01158	.01433	-.00934	.01174	.03058	-.03931	.00009
1977	-.75088	-.16886	.32519	-.55373	.49302	-.30279	.46958	-.44591
1978	.07108	.01617	.03254	.02355	-.03755	-.00621	-.03218	.00362
1979	.52093	-.07799	.08728	.17749	-.23342	.29448	-.06031	-.08504
1980	.37108	-.08025	.07939	.09386	-.06199	.10927	.05718	-.15169
1981	-.43263	-.15128	.02987	.32908	-.28371	.15417	-.33385	.25487
1982	**-1.19740**	-.05033	.70405	.21485	-.37279	-.49132	.00779	-.36941
1983	-.81424	.16806	.12535	-.18654	.24472	-.76223	.40573	-.26823
1984	.35483	.06576	-.05200	-.04316	-.12205	.18664	.11955	-.08702
1985	-.36008	-.01963	.05099	-.15148	.21292	.03472	.01229	-.20122
1986	.87687	-.28370	-.00967	.15149	-.01337	-.05947	-.27538	.70509
1987	**1.32247**	-.27361	.01782	-.27203	.56823	.12289	-.41803	.62536

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the January-February inflows
SDFB_2	Standardized dfbeta for the March-April inflows
SDFB_3	Standardized dfbeta for the May-June inflows
SDFB_4	Standardized dfbeta for the July-August inflows
SDFB_5	Standardized dfbeta for the September-October inflows
SDFB_6	Standardized dfbeta for the November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

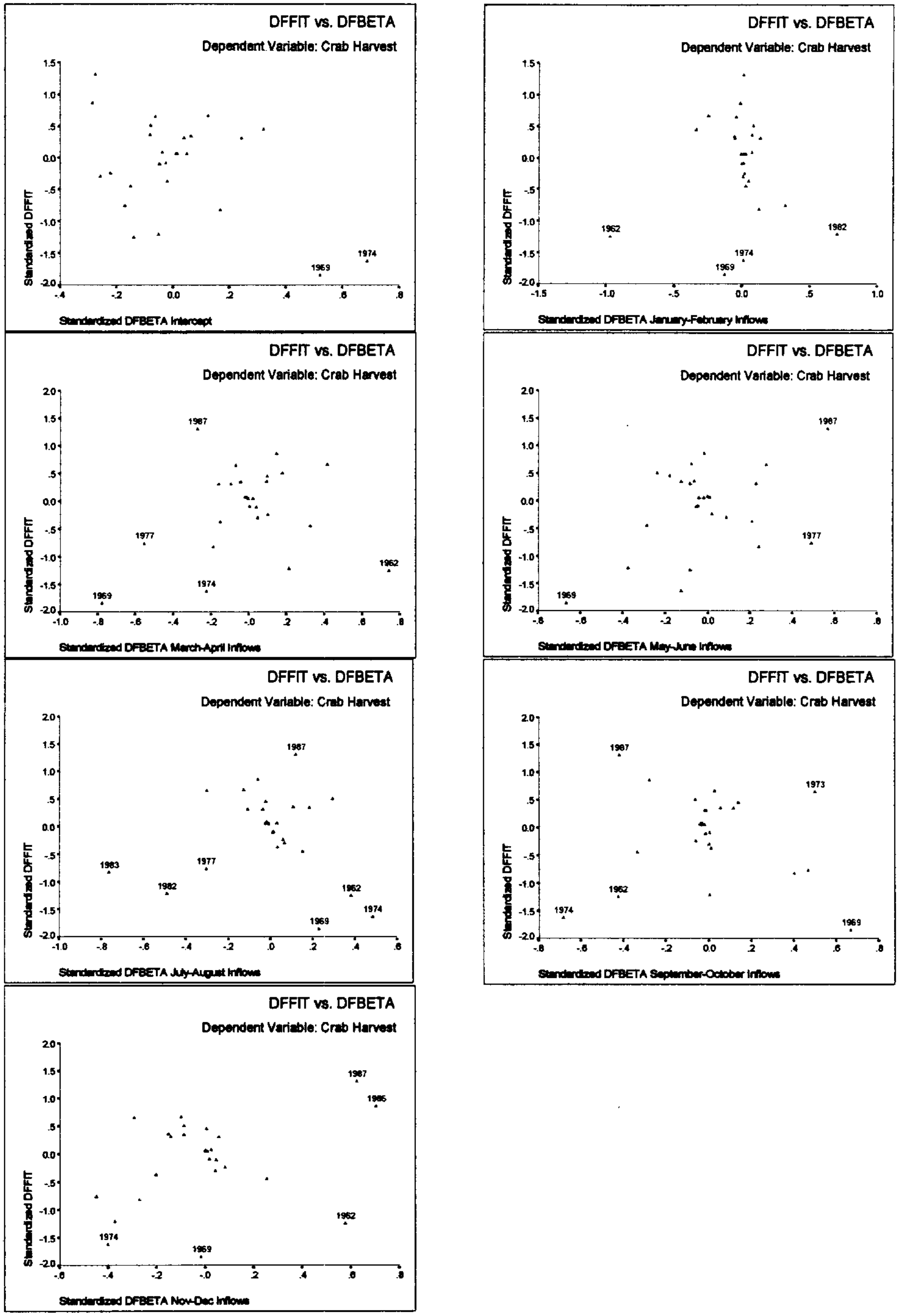


Fig. 3.4. Standardized DFFIT vs. Standardized DFBETA.

Regression – Harvest and Logged Inflows
(Box-Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	Ln (November-December Inflows), Ln (March-April Inflows), Ln(July-August Inflows), Ln(January -February Inflows), Ln(May -June Inflows), Ln(September-October Inflows)[c,d]	.	.722	.521	.369	489.4289	1.454

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), Ln (November-December Inflows) , Ln (March-April Inflows), Ln (July-August Inflows), Ln (January -February Inflows), Ln (May -June Inflows), Ln (September-October Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4942647	6	823775	3.439	.018[b]
	Residual	4551273	19	239541		
	Total	9493920	25			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), Ln (November-December Inflows), Ln (March-April Inflows), Ln (July-August Inflows), Ln (January-February Inflows), L (May-June Inflows), Ln (September-October Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-3916	2085		-1.878	.076		
	Ln (January-February Inflows)	-297	276.3	-.221	-1.075	.296	.599	1.670
	Ln (March-April Inflows)	917.4	271.3	.799	3.382	.003	.452	2.214
	Ln (May-June Inflows)	-40.7	266.2	-.038	-.153	.880	.413	2.422
	Ln (July-August Inflows)	-347	279.9	-.347	-1.238	.231	.321	3.116
	Ln (September-October Inflows)	-145	270.7	-.148	-.534	.599	.331	3.024
	Ln (November-December Inflows)	644.9	243.5	.577	2.649	.016	.531	1.884

a. Dependent Variable: CRAB

Collinearity Diagnostics

```
Variable                 DF  Parameter   Standard    T for H0:     Prob >     Variance
                              Estimate     Error    Parameter=0     |T|      Inflation
INTERCEP                  1  -3915.89    2084.65      -1.878      0.0758      0.0000
Ln(Jan-Feb Inflows)       1   -296.99     276.34      -1.075      0.296       1.6698
Ln(Mar-Apr Inflows)       1    917.45     271.27       3.382      0.003       2.2137
Ln(May-Jun Inflows)       1    -40.66     266.16      -0.153      0.880       2.4224
Ln(Jul-Aug Inflows)       1   -346.64     279.91      -1.238      0.231       3.1165
Ln(Sept-Oct Inflows)      1   -144.64     270.73      -0.534      0.599       3.0236
Ln(Nov-Dec Inflows)       1    644.90     243.48       2.649      0.016       1.8835

#  Eigen    Cond    Ln(Jan-Feb  Ln(Mar-Apr  Ln(May-Jun  Ln(Jul-Aug  Ln(Sept_Oct  Ln(Nov-De
   value    Index    Inflows)    Inflows)    Inflows)    Inflows)    Inflows)     Inflows)
1  3.041   1.0000    0.0351      0.0212      0.0236      0.0249      0.0214       0.0126
2  1.233   1.5704    0.0021      0.0888      0.0391      0.0000      0.0360       0.2162
3  0.622   2.2106    0.3653      0.0822      0.2349      0.0694      0.0080       0.0028
4  0.519   2.4196    0.4658      0.2052      0.0316      0.0061      0.1912       0.0102
5  0.449   2.6017    0.0080      0.1240      0.1268      0.2466      0.0535       0.3718
6  0.135   4.7543    0.1237      0.4786      0.5440      0.6530      0.6897       0.3865
```

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	876.4794	2516.776	1699.58	444.6413	26
Std. Predicted Value	-1.851	1.838	.000	1.000	26
Standard Error of Predicted Value	174.7694	370.7955	250.6312	41.7464	26
Adjusted Predicted Value	835.3041	2750.170	1709.41	472.1406	26
Residual	-750.6632	982.6425	1.0E-12	426.6743	26
Std. Residual	-1.534	2.008	.000	.872	26
Stud. Residual	-1.826	2.186	-.009	1.018	26
Deleted Residual	-1063.54	1164.410	-9.8329	586.2800	26
Stud. Deleted Residual	-1.957	2.459	.005	1.072	26
Mahal. Distance	2.226	13.388	5.769	2.344	26
Cook's Distance	.000	.329	.055	.078	26
Centered Leverage Value	.089	.536	.231	.094	26

a. Dependent Variable: CRAB

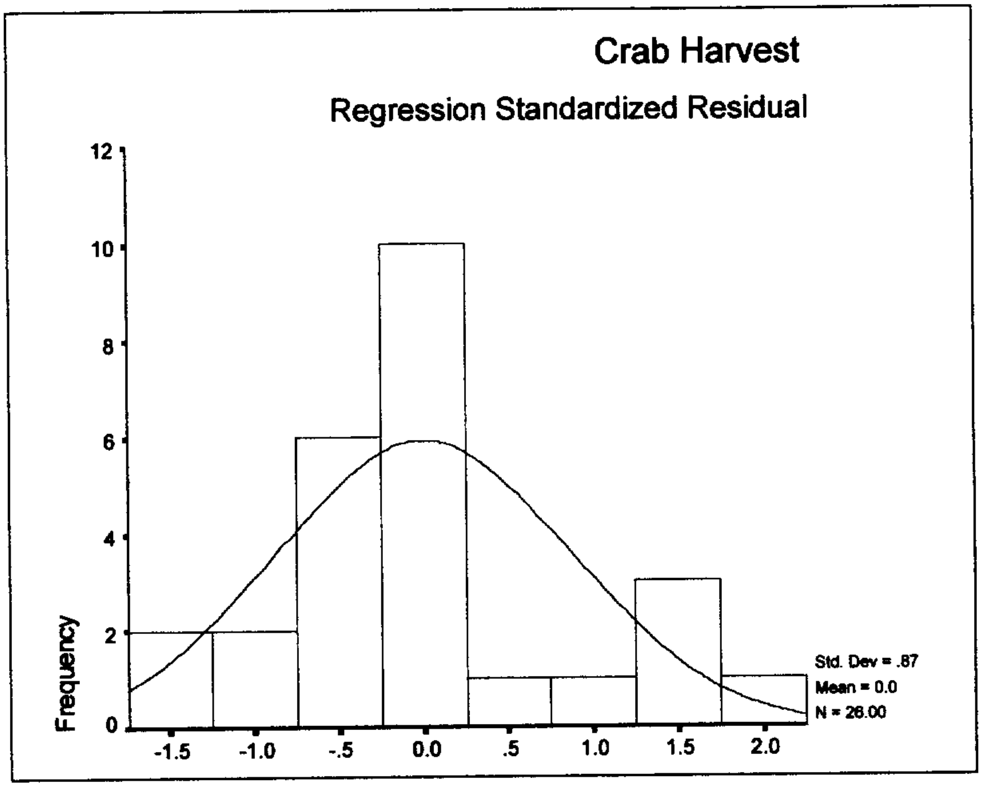
Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE[1]	SDR[2]
1962	1061.9632	-750.6632	-1063.54144	1374.84144	-1.43400	-1.53375	-1.82562	-1.95682
1963	876.4794	101.0206	142.19590	835.30410	-1.85116	.20640	.24488	.23873
1964	1439.2082	-243.6028	-341.86437	1537.46437	-.58559	-.49773	-.58963	-.57923
1965	1960.9971	-143.0971	-184.80432	2002.70432	.58793	-.29238	-.33226	-.32434
1966	1405.9791	-48.1791	-62.36044	1420.16044	-.66031	-.09844	-.11199	-.10904
1967	1150.3819	-102.4819	-127.22263	1175.12263	-1.23515	-.20939	-.23330	-.22740
1968	1802.8458	-260.2458	-304.82364	1847.42364	.23224	-.53173	-.57548	-.56507
1969	2154.9025	-449.2025	-654.18625	2359.88625	1.02402	-.91781	-1.10760	-1.11464
1970	1991.7228	630.2772	1122.41931	1499.58069	.65703	1.28778	1.71852	1.82011
1971	2183.1281	-22.3281	-52.40976	2213.20976	1.08750	-.04562	-.06989	-.06804
1972	1190.8458	679.2542	873.05288	997.04712	-1.14415	1.38785	1.57343	1.64218
1973	2118.9317	-71.9317	-90.70496	2137.70496	.94312	-.14697	-.16504	-.16075
1974	2516.7758	-533.8758	-767.27036	2750.17036	1.83787	-1.09081	-1.30769	-1.33427
1975	1859.1956	4.3044	5.47647	1858.02353	.35897	.00879	.00992	.00966
1976	1488.9774	110.5226	126.67518	1472.82482	-.47365	.22582	.24176	.23567
1977	2194.5869	-335.1869	-475.33774	2334.73774	1.11327	-.68485	-.81556	-.80808
1978	1876.3332	44.5668	65.26146	1855.63854	.39752	.09106	.11019	.10729
1979	1494.7782	458.9218	588.64884	1365.05116	-.46060	.93767	1.06196	1.06575
1980	1453.1715	295.9285	408.98449	1340.11551	-.55418	.60464	.71082	.70124
1981	1226.0034	-615.8034	-841.96317	1452.16317	-1.06508	-1.25821	-1.47122	-1.52125
1982	1555.5598	-339.4598	-571.99744	1788.09744	-.32390	-.69358	-.90033	-.89563
1983	1469.4600	-61.8600	-85.47853	1493.07853	-.51754	-.12639	-.14857	-.14470
1984	1280.4631	116.1369	155.74791	1240.85209	-.94260	.23729	.27479	.26800
1985	2343.6851	-175.7851	-230.11617	2398.01617	1.44859	-.35916	-.41094	-.40177
1986	2288.4722	730.1278	945.55305	2073.04695	1.32442	1.49180	1.69767	1.79405
1987	1804.2575	982.6425	1164.41023	1622.48977	.23542	2.00773	2.18555	2.45865

PRE	Predicted value of harvest
RES	Ordinary residual of harvest; observed minus predicted
DRE	Deleted residual; residual obtained when the model is fitted without that observation
ADJ	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR	Z-score of the predicted value of harvest
ZRE	Z-score of the residual
SRE	Studentized residual
SDR	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$



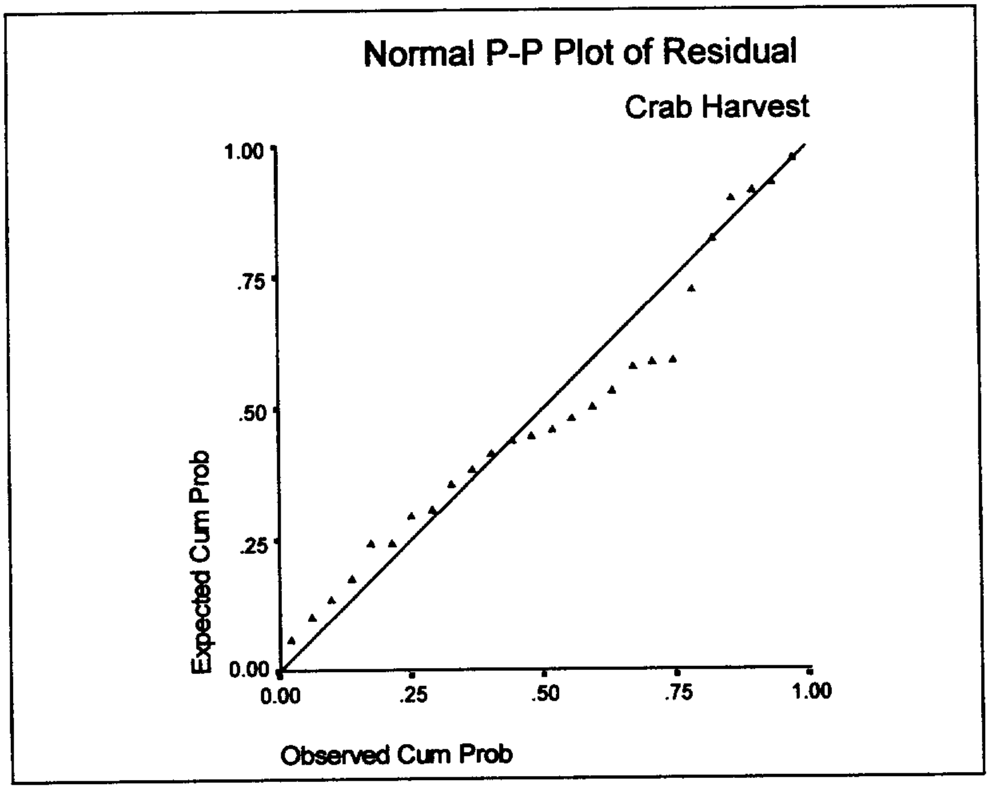


Fig. 4.1. Exploratory Plots of Crab Harvest Standardized Residual.

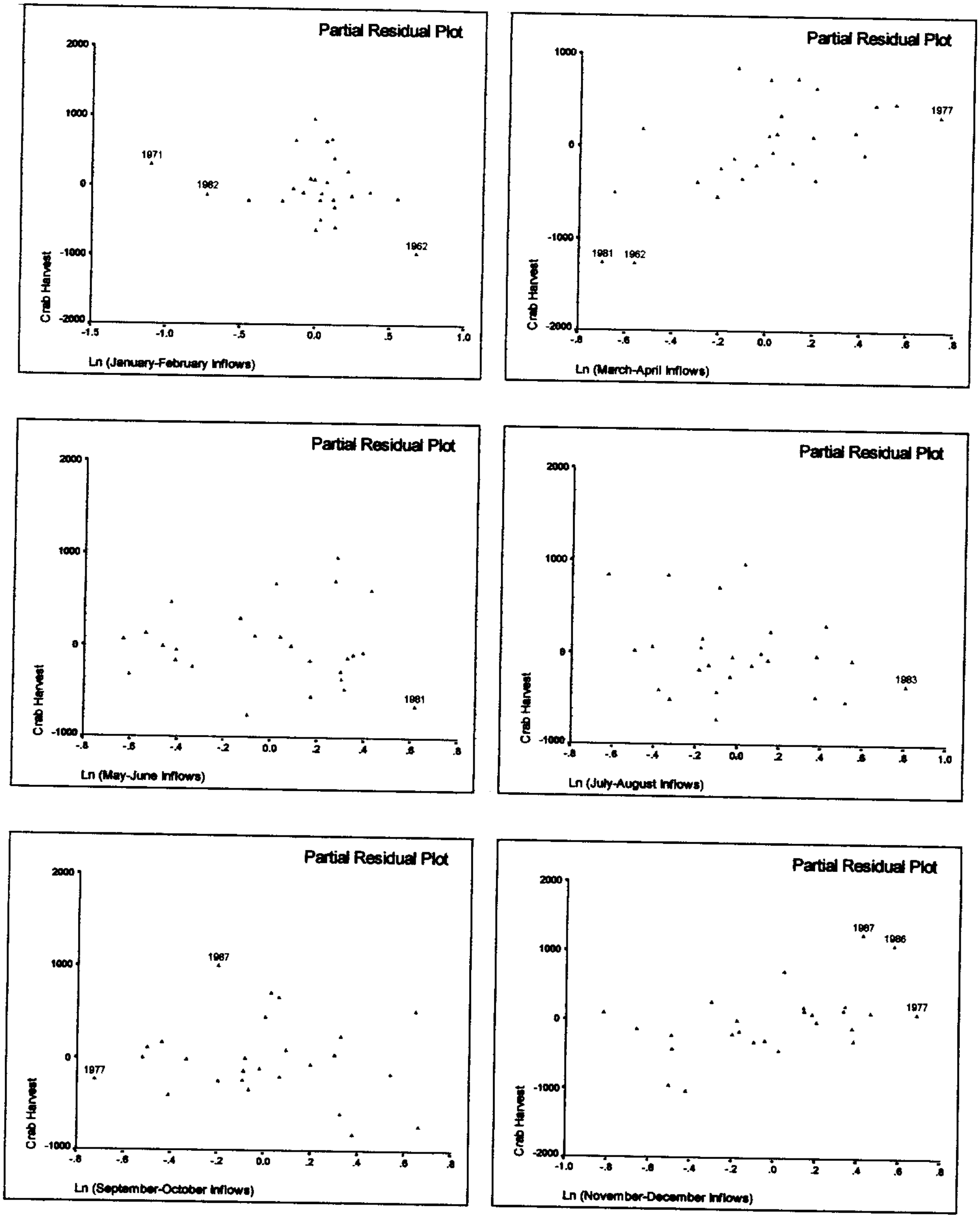


Fig 4.2. Partial Residual Plots of Crab Harvest vs. Logged Inflows

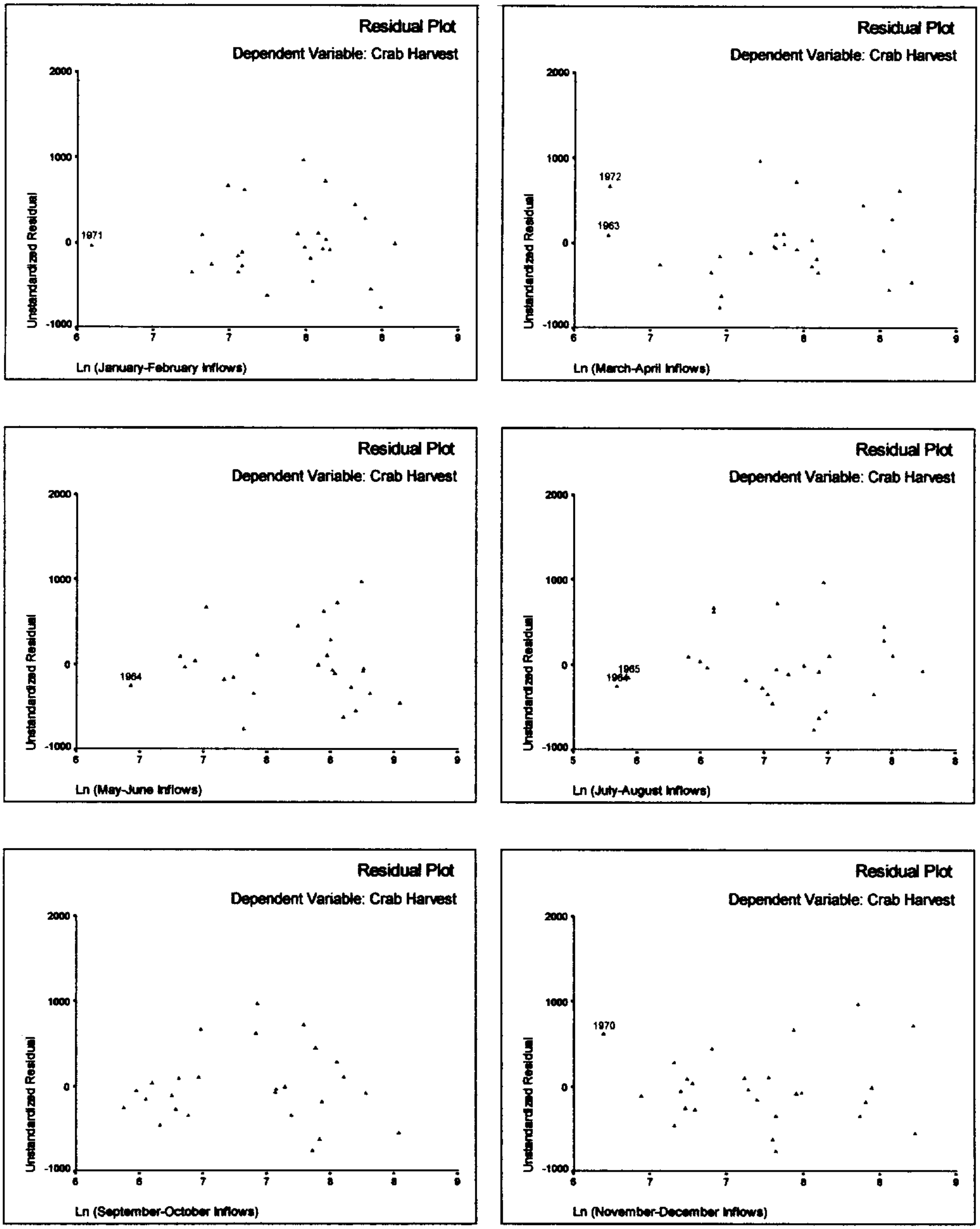


Fig 4.3. Residual Plots of Crab Harvest vs. Logged Inflows

Prediction Intervals for Crab Harvest

YEAR	CRAB	LICI	UICI
1962	311.30	-530.96353	2654.88999
1963	977.50	-713.60304	2466.56191
1964	1195.60	-149.56027	3027.96590
1965	1817.90	410.80067	3511.19346
1966	1357.80	-145.30813	2957.26637
1967	1047.90	-379.94718	2680.71099
1968	1542.60	303.72842	3301.96316
1969	1705.70	550.22990	3759.57507
1970	2622.00	312.34927	3671.09635
1971	2160.80	426.43498	3939.82121
1972	1870.10	-357.00574	2738.69744
1973	2047.00	580.61452	3657.24891
1974	1982.90	917.70488	4115.84666
1975	1863.50	316.39838	3401.99273
1976	1599.50	2.15813	2975.79676
1977	1859.40	601.25426	3787.91948
1978	1920.90	269.36364	3483.30281
1979	1953.70	-52.06150	3041.61793
1980	1749.10	-128.79126	3035.13432
1981	610.20	-351.10541	2803.11221
1982	1216.10	-105.07083	3216.19039
1983	1407.60	-112.42719	3051.34725
1984	1396.60	-287.74276	2848.66891
1985	2167.90	786.91355	3900.45663
1986	3018.60	736.91895	3840.02546
1987	2786.90	298.70530	3309.80969

CRAB	Crab harvest
LICI	Lower limit for 99% prediction interval for crab harvest
UICI	Upper limit for 99% prediction interval for crab harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	6.39309	.19845	.25572	.495	.018
1963	6.27765	.00349	.25111	.508	.000
1964	6.22417	.02003	.24897	.514	.000
1965	4.68054	.00460	.18722	.699	.000
1966	4.72368	.00053	.18895	.694	.000
1967	3.90016	.00188	.15601	.791	.000
1968	2.69450	.00810	.10778	.912	.000
1969	6.87200	.07997	.27488	.442	.001
1970	10.00010	.32943	.40000	.189	.069
1971	13.38773	.00094	**.53551**	**.063**	.000
1972	4.58792	.10091	.18352	.710	.002
1973	4.21272	.00102	.16851	.755	.000
1974	6.64317	.10680	.26573	.467	.003
1975	4.38873	.00000	.17555	.734	.000
1976	2.22626	.00122	.08905	.946	.000
1977	6.40958	.03973	.25638	.493	.000
1978	6.96607	.00081	.27864	.432	.000
1979	4.54799	.04554	.18192	.715	.000
1980	5.94924	.02758	.23797	.546	.000
1981	5.75371	.11356	.23015	.569	.003
1982	9.20187	.07932	.36807	.238	.001
1983	5.94619	.00120	.23785	.546	.000
1984	5.39665	.00368	.21587	.612	.000
1985	4.94103	.00746	.19764	.667	.000
1986	4.73421	.12148	.18937	.692	.004
1987	2.94103	.12623	.11764	.890	.005

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	**-1.26333**	-.04643	-.89488	.72084	.12104	.13224	-.49178	.48612
1963	.15241	.12241	.01238	-.10165	.00619	-.02712	.04703	-.06923
1964	-.36787	-.23960	-.05026	.03945	.12509	.07249	.03375	.03180
1965	-.17510	-.03235	-.02437	.00930	-.03370	.10426	.01791	-.03785
1966	-.05916	-.00124	-.01700	.01339	-.02675	.00168	.02263	.01010
1967	-.11173	-.05326	.01162	.04127	-.04567	-.00996	.00232	.06144
1968	-.23387	-.02628	.07586	-.03743	-.09973	.01208	.06574	.01334
1969	-.75296	.21592	-.02529	-.31064	-.23126	.07421	.30163	-.01597
1970	**1.60834**	.30242	-.18244	.17297	.56807	-.86601	.87072	-.98521
1971	-.07897	-.03400	.06497	-.03164	.02621	-.00863	-.01144	-.00941
1972	.87716	.44211	.07377	-.54865	.02050	-.09746	.06327	.04590
1973	-.08212	.03459	-.00410	-.00251	-.03482	.04231	-.05412	.01774
1974	-.88220	.64057	-.11871	-.18669	-.15066	.34240	-.29063	-.30616
1975	.00504	-.00306	.00339	-.00084	.00051	-.00109	-.00049	.00185
1976	.09010	-.00278	-.00069	.00596	-.00941	.05455	-.06101	.01783
1977	-.52252	.01069	.24368	-.39446	.31679	-.28711	.38436	-.32923
1978	.07311	.00319	.02673	.03328	-.04443	.00844	-.03574	.00956
1979	.56663	-.04410	.08311	.14075	-.27906	.29314	.00360	-.17926
1980	.43343	-.02923	.09946	.02684	-.05863	.07449	.14872	-.26981
1981	-.92191	-.16432	-.00489	.68760	-.59897	.32792	-.65324	.44295
1982	-.74128	-.04772	.47695	.13445	-.19214	-.24910	.04212	-.21763
1983	-.08941	.01584	.01453	-.01861	.03737	-.07876	.04882	-.02821
1984	.15651	.01757	-.00617	.00151	-.09005	.09730	.01600	-.02689
1985	-.22336	.06748	-.00813	-.09599	.10196	.03698	-.01697	-.10658
1986	.97450	-.58736	.12299	.01482	.30498	-.39342	.03216	.58539
1987	**1.05744**	-.44245	-.01821	-.18978	.41161	.05101	-.29420	.56693

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the January-February inflows
SDFB_2	Standardized dfbeta for the March-April inflows
SDFB_3	Standardized dfbeta for the May-June inflows
SDFB_4	Standardized dfbeta for the July-August inflows
SDFB_5	Standardized dfbeta for the September-October inflows
SDFB_6	Standardized dfbeta for the November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

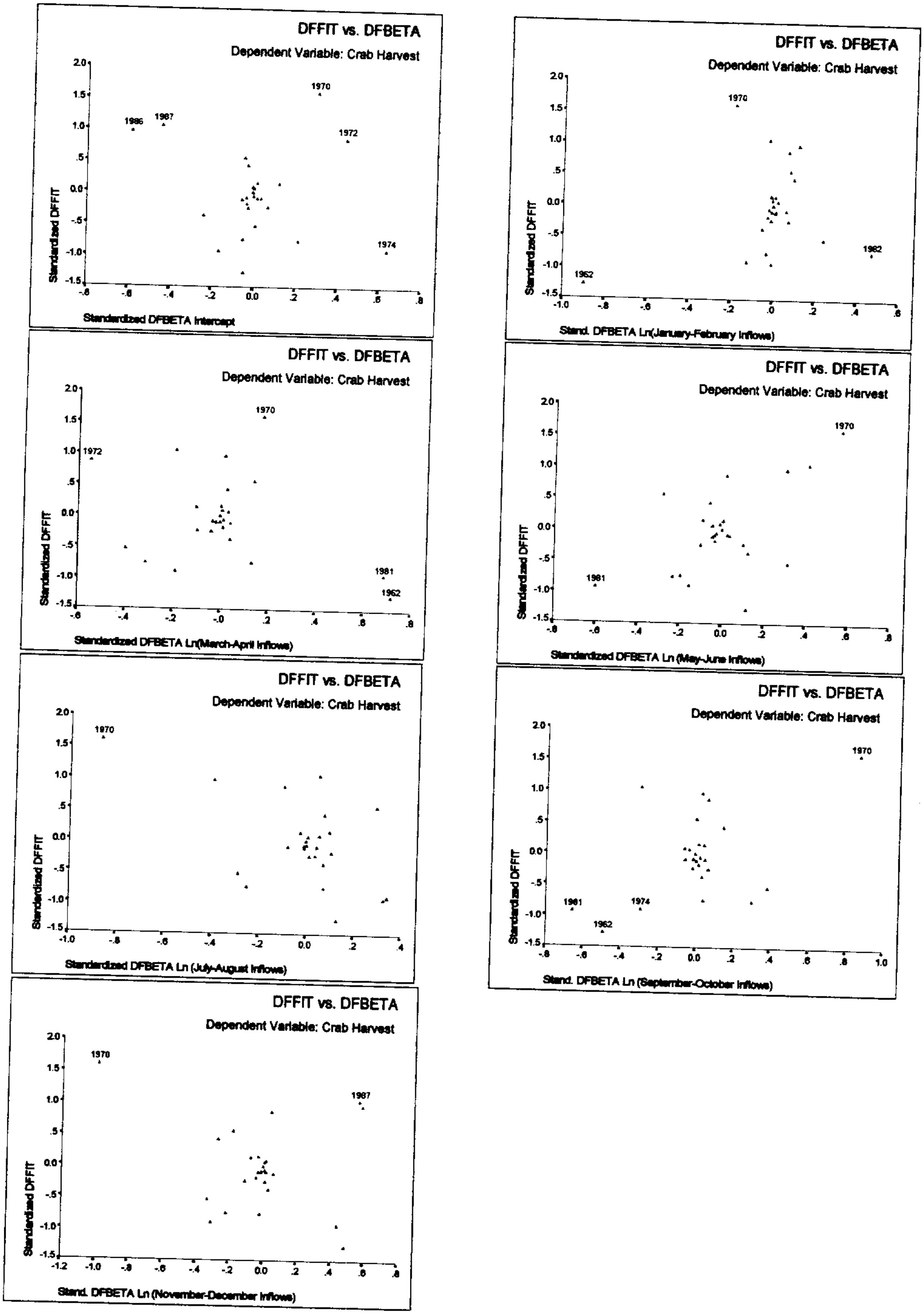


Fig. 4.4. Standardized DFFIT vs. Standardized DFBETA.

Regression – Harvest and Squared Root Inflows
(Box-Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	SQRT (Sept-Oct Inflows), SQRT (May-June Inflows), SQRT (Jan-Feb Inflows), SQRT (Nov-Dec Inflows), SQRT (March-April Inflows), SQRT (Jul-Aug Inflows)[c,d]	.	.769	.592	.463	451.629	1.442

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows), SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5618521	6	936420	4.591	.005[b]
	Residual	3875400	19	203968		
	Total	9493920	25			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows), SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	194.9	548.70		.355	.726	-953.5	1343.4		
	SQRT (Jul-Aug Inflows)	-5.939	16.276	-.083	-.365	.719	-40.006	28.127	.413	2.421
	SQRT (Jan-Feb Inflows)	-20.53	13.666	-.291	-1.5	.150	-49.131	8.077	.572	1.747
	SQRT (March-April Inflows)	54.975	13.111	.941	4.19	.000	27.533	82.416	.426	2.347
	SQRT (May-June Inflows)	-12.24	10.171	-.254	-1.2	.244	-33.524	9.053	.482	2.076
	SQRT (Nov-Dec Inflows)	43.782	11.911	.774	3.68	.002	18.851	68.712	.485	2.063
	SQRT (Sept-Oct Inflows)	-25.46	15.688	-.418	-1.6	.121	-58.299	7.373	.324	3.088

a. Dependent Variable: CRAB

Collinearity Diagnostics

```
     Variable        D    Estimate        Error     Parameter=    Prob >   Variance
                     F                                  0          |T|    Inflation
INTERCEP             1   194.9154       548.7037      0.355      0.7263   0.0000000
SQRT (Jan - Feb      1   -20.5269        13.6665     -1.502      0.1495   1.7467889
Inflows)
SQRT (March-April    1    54.9748        13.1110      4.193      0.0005   2.3466283
Inflows)
SQRT (May-June       1   -12.2356        10.1712     -1.203      0.2438   2.0760729
Inflows)
SQRT (July-August    1    -5.9393        16.2763     -0.365      0.7192   2.4214418
Inflows)
SQRT (Sept-October   1   -25.4628        15.6882     -1.623      0.1211   3.0882503
Inflows)
SQRT (Nov - Dec      1    43.7817        11.9113      3.676      0.0016   2.0633136
Inflows)
```

```
#   Eigen   Cond     SQRT       SQRT       SQRT       SQRT       SQRT        SQRT
    value   Index    (Jan-Feb   (Mar-Apr   (May-Jun   (Jul-Aug   (Sept-Oct   (Nov-Dec
                     Inflows)   Inflows)   Inflows)   Inflows)   Inflows)    Inflows)
1   2.922   1.0000   0.0388     0.0203     0.0243     0.0296     0.0243      0.0144
2   1.205   1.5571   0.0000     0.0973     0.0635     0.0001     0.0291      0.1840
3   0.685   2.0651   0.1883     0.1006     0.2880     0.0753     0.0214      0.0233
4   0.577   2.2499   0.0371     0.1097     0.0883     0.3329     0.0006      0.2031
5   0.473   2.4844   0.6179     0.0741     0.0363     0.0156     0.2246      0.0254
6   0.138   4.6073   0.1179     0.5980     0.4997     0.5464     0.7000      0.5497
```

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	892.1780	2543.935	1699.58	474.0684	26
Std. Predicted Value	-1.703	1.781	.000	1.000	26
Standard Error of Predicted Value	151.5117	294.4166	231.2297	38.7982	26
Adjusted Predicted Value	1005.069	2880.392	1726.76	504.8395	26
Residual	-580.8781	953.6703	-6.E-13	393.7207	26
Std. Residual	-1.286	2.112	.000	.872	26
Stud. Residual	-1.601	2.318	-.025	1.031	26
Deleted Residual	-902.2435	1148.765	-27.1781	554.6936	26
Stud. Deleted Residual	-1.676	2.663	-.016	1.086	26
Mahal. Distance	1.852	9.663	5.769	2.172	26
Cook's Distance	.000	.217	.062	.076	26
Centered Leverage Value	.074	.387	.231	.087	26

a. Dependent Variable: CRAB

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	892.1781	-580.8780	-900.2616	1211.5616	-1.70314	-1.28619	-1.60120	-1.67564
1963	998.7458	-21.2458	-27.5692	1005.0692	-1.47834	-.04704	-.05359	-.05216
1964	1412.1501	-216.5501	-279.5305	1475.1305	-.60631	-.47949	-.54477	-.53443
1965	1810.1047	7.7952	9.2273	1808.6726	.23314	.01726	.01878	.01828
1966	1278.9278	78.8721	103.2593	1254.5406	-.88733	.17464	.19982	.19470
1967	1122.4685	-74.5685	-90.0148	1137.9148	-1.21736	-.16511	-.18141	-.17672
1968	1729.9540	-187.3540	-217.5858	1760.1858	.06407	-.41484	-.44706	-.43744
1969	2264.9049	-559.2049	-902.2435	2607.9435	1.19250	-1.23820	-1.57277	-1.64140
1970	2066.5496	555.4504	838.4407	1783.5592	.77408	1.22988	1.51104	1.56797
1971	2065.4411	95.3588	163.0614	1997.7385	.77175	.21114	.27611	.26928
1972	1382.4851	487.6148	589.8788	1280.2211	-.66888	1.07968	1.18751	1.20128
1973	1915.5622	131.4377	177.2699	1869.7300	.45559	.29103	.33798	.32996
1974	2543.9350	-561.0350	-897.4922	2880.3922	1.78108	-1.24225	-1.57119	-1.63950
1975	1828.7678	34.7321	48.8142	1814.6857	.27251	.07690	.09117	.08876
1976	1515.7185	83.7814	94.4065	1505.0934	-.38784	.18551	.19692	.19187
1977	2384.6877	-525.2877	-724.5286	2583.9286	1.44516	-1.16310	-1.36598	-1.40007
1978	1912.3206	8.5793	12.0127	1908.8873	.44875	.01900	.02248	.02188
1979	1544.3445	409.3554	535.3197	1418.3802	-.32746	.90640	1.03651	1.03866
1980	1457.8233	291.2766	405.5922	1343.5077	-.50996	.64495	.76106	.75231
1981	967.5510	-357.3510	-524.4970	1134.6970	-1.54414	-.79125	-.95860	-.95645
1982	1623.8032	-407.7032	-709.0162	1925.1162	-.15985	-.90274	-1.19047	-1.20451
1983	1588.5390	-180.9390	-295.9102	1703.5102	-.23423	-.40064	-.51235	-.50216
1984	1241.3087	155.2912	213.2867	1183.3132	-.96668	.34385	.40297	.39391
1985	2411.3875	-243.4875	-318.6192	2486.5192	1.50149	-.53913	-.61673	-.60638
1986	2396.2105	622.3894	841.3031	2177.2968	1.46947	1.37810	1.60223	1.67689
1987	1833.2296	953.6703	1148.7650	1638.1350	.28192	2.11163	2.31757	**2.66342**

PRE	Predicted value of harvest
RES	Ordinary residual of harvest; observed minus predicted
DRE	Deleted residual; residual obtained when the model is fitted without that observation
ADJ	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR	Z-score of the predicted value of harvest
ZRE	Z-score of the residual
SRE	Studentized residual
SDR	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$

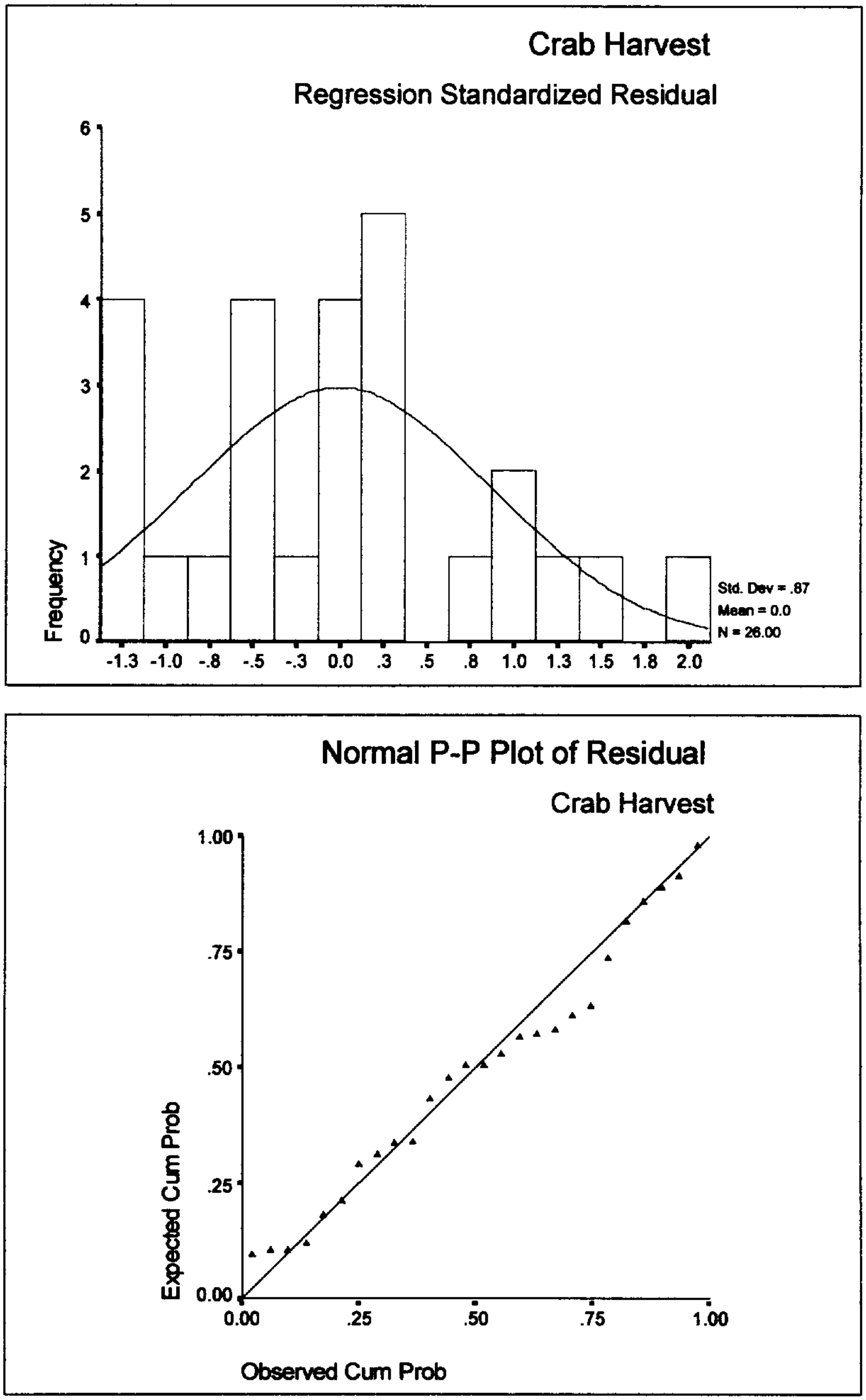


Fig. 5.1. Exploratory Plots of Crab Harvest Standardized Residual.

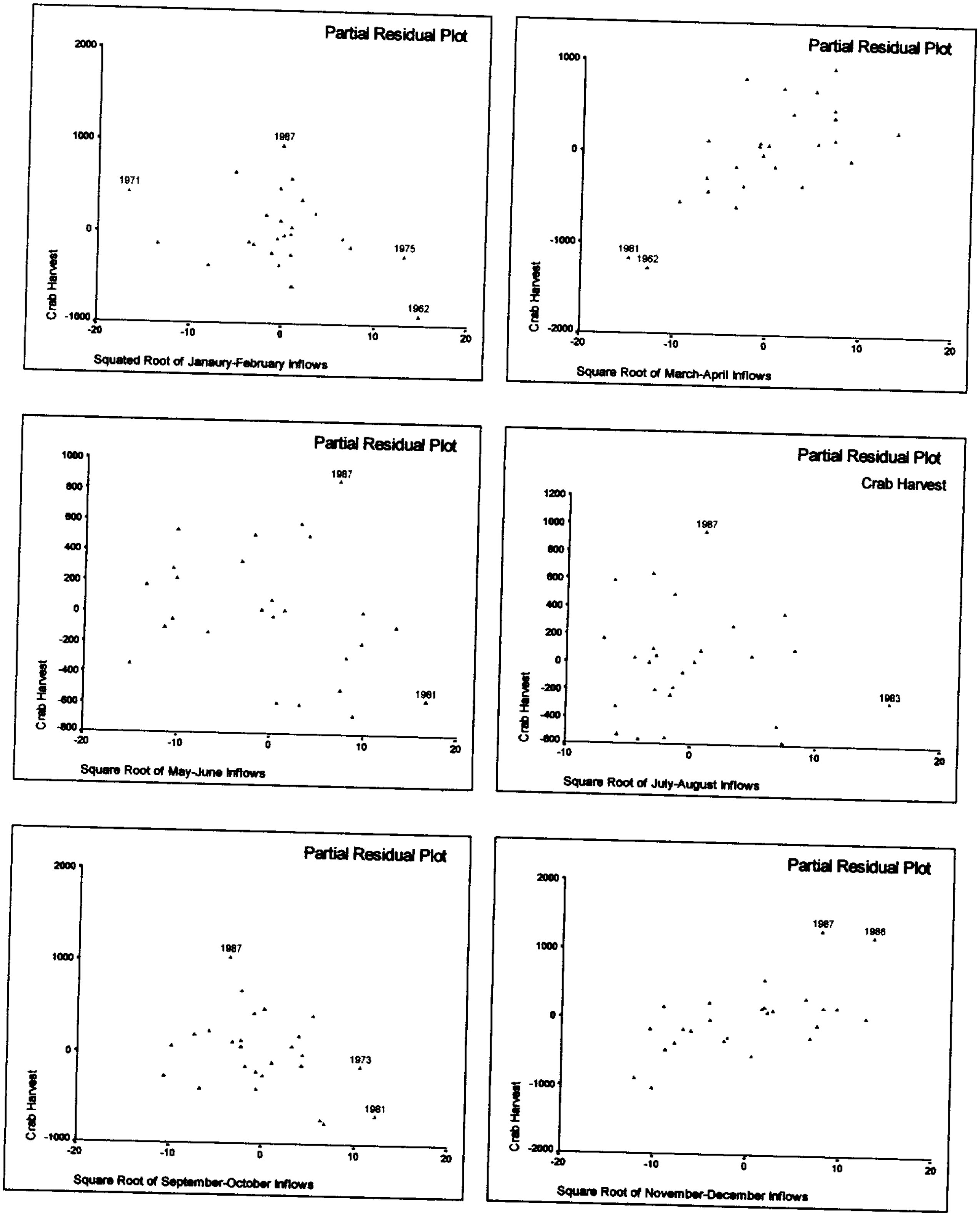


Fig 5.2. Partial Residual Plots of Crab Harvest vs. Squared Root Inflows

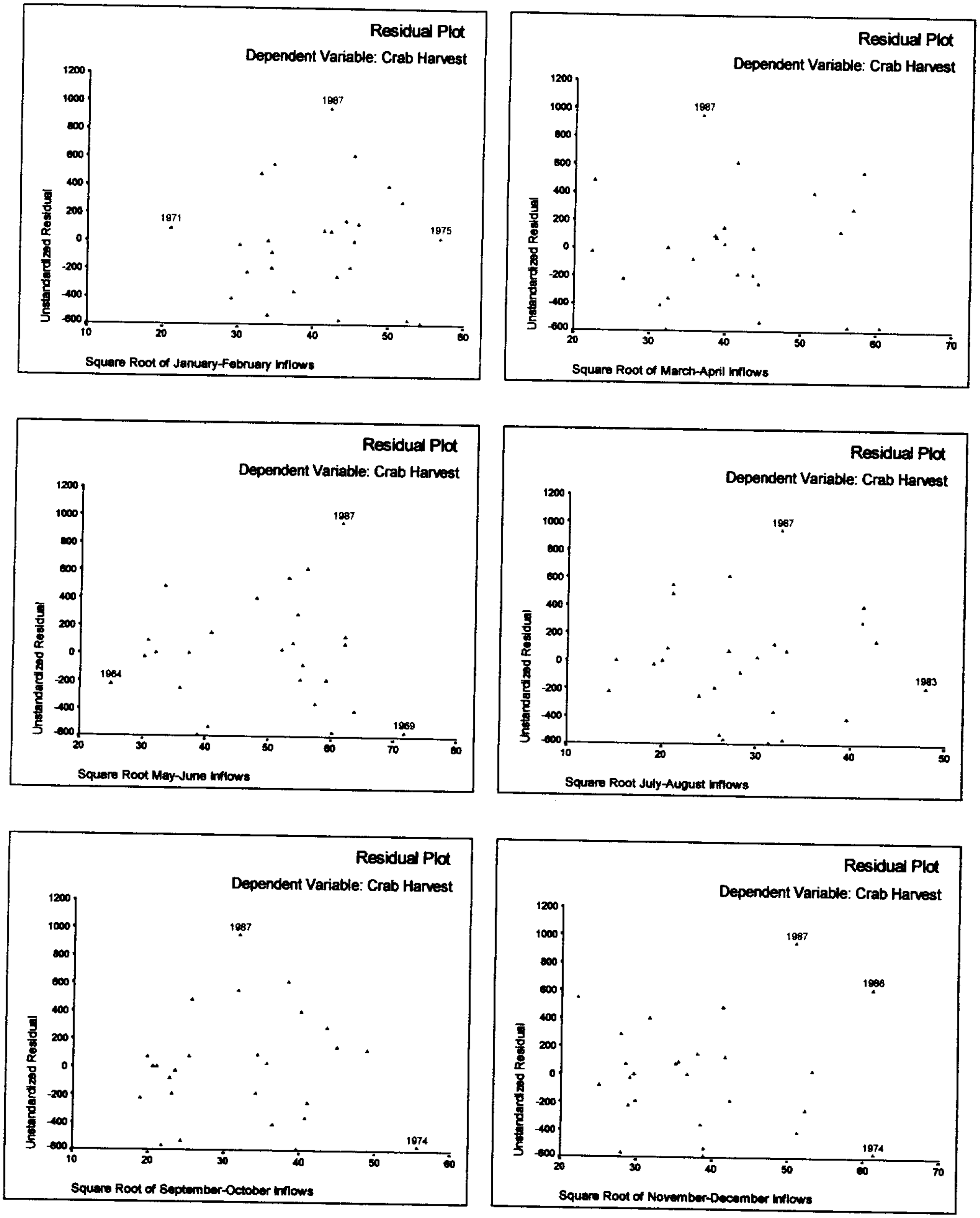


Fig 5.3. Residual Plots of Crab Harvest vs. Squared Root Inflows

Prediction Intervals for Crab Harvest

YEAR	CRAB	LICI	UICI
1962	311.30	-611.73170	2396.08782
1963	977.50	-433.87112	2431.36275
1964	1195.60	-18.09996	2842.40028
1965	1817.90	421.37719	3198.83227
1966	1357.80	-157.65016	2715.50578
1967	1047.90	-276.08310	2521.02027
1968	1542.60	351.03037	3108.87764
1969	1705.70	746.94131	3782.86859
1970	2622.00	572.24374	3560.85547
1971	2160.80	528.35624	3602.52614
1972	1870.10	-17.12100	2782.09128
1973	2047.00	466.04384	3365.08070
1974	1982.90	1028.89994	4058.97025
1975	1863.50	362.11022	3295.42546
1976	1599.50	152.86764	2878.56947
1977	1859.40	925.72770	3843.64787
1978	1920.90	447.18365	3377.45773
1979	1953.70	108.27066	2980.41843
1980	1749.10	-5.05339	2920.70006
1981	610.20	-516.19264	2451.29469
1982	1216.10	81.41841	3166.18813
1983	1407.60	66.00274	3111.07532
1984	1396.60	-215.88771	2698.50517
1985	2167.90	975.02463	3847.75048
1986	3018.60	945.73479	3846.68630
1987	2786.90	435.73311	3230.72626

CRAB	Crab harvest
LICI	Lower limit for 99% prediction interval for crab harvest
UICI	Upper limit for 99% prediction interval for crab harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV[1]	MAHA_PV[2]	COOK_PV[3]
1962	7.90765	.20138	.31631	.341	.019
1963	4.77262	.00012	.19090	.688	.000
1964	4.67116	.01233	.18685	.700	.000
1965	2.91834	.00001	.11673	.892	.000
1966	4.94281	.00176	.19771	.667	.000
1967	3.32839	.00097	.13314	.853	.000
1968	2.51201	.00461	.10048	.926	.000
1969	8.54362	.21677	.34174	.287	.023
1970	7.47646	.16618	.29906	.381	.011
1971	9.41839	.00773	.37674	.224	.000
1972	3.37257	.04225	.13490	.849	.000
1973	5.50208	.00569	.22008	.599	.000
1974	8.41061	.21149	.33642	.298	.022
1975	6.25054	.00048	.25002	.511	.000
1976	1.85211	.00070	.07408	.968	.000
1977	5.91330	.10111	.23653	.550	.002
1978	6.18378	.00003	.24735	.518	.000
1979	4.92113	.04723	.19685	.670	.000
1980	6.08467	.03247	.24339	.530	.000
1981	7.00543	.06140	.28022	.428	.000
1982	9.66279	.14963	.38651	.209	.008
1983	8.75181	.02383	.35007	.271	.000
1984	5.83629	.00866	.23345	.559	.000
1985	4.93356	.01677	.19734	.668	.000
1986	5.54366	.12899	.22175	.594	.005
1987	3.28421	.15697	.13137	.858	.009

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	**SDFFIT**	**SDFB_0**	**SDFB_1**	**SDFB_2**	**SDFB_3**	**SDFB_4**	**SDFB_5**	**SDFB_6**
1962	**-1.2425**	-.11165	.31016	-.93852	.76860	-.03631	.55771	-.48991
1963	-.0284	-.02536	.00715	-.00040	.01627	-.00024	.01213	-.00874
1964	-.2882	-.22962	.06312	-.01785	.04618	.09197	.03839	.01459
1965	.0078	.00391	-.00326	.00055	-.00032	-.00044	.00145	-.00165
1966	.1082	.01035	-.02459	.04407	-.04222	.06736	-.03576	-.01796
1967	-.0804	-.04073	.00463	.00326	.03575	-.04252	.04477	-.00706
1968	-.1757	-.04042	.02349	.04372	-.01074	-.08609	.02615	.02986
1969	**-1.2855**	.35979	.14878	-.06559	-.54175	-.42037	-.03027	.48499
1970	**1.1191**	.24106	-.43467	-.29775	.39214	.17177	-.45857	.36312
1971	.2269	.12088	.00922	-.17733	.07266	-.08038	.01747	.05296
1972	.5501	.34667	-.06647	-.00997	-.24869	-.05691	.06490	.00419
1973	.1948	-.04159	-.09668	-.00207	-.01079	.08499	-.06955	.14039
1974	**-1.2696**	.72934	.43792	-.07469	-.22741	-.15112	-.37123	-.45857
1975	.0565	-.02661	-.01068	.04203	-.01040	.00333	.01752	-.01176
1976	.0683	.00043	.03542	.00616	.00011	.00026	.00870	-.04118
1977	-.8622	-.02671	-.44004	.39682	-.66515	.55707	-.55386	.60240
1978	.0138	.00146	.00025	.00580	.00535	-.00781	.00150	-.00662
1979	.5761	-.09381	.31731	.07650	.17351	-.27249	-.12716	-.03891
1980	.4713	-.07848	.10661	.09685	.06816	-.06503	-.24381	.12057
1981	-.6541	-.19959	.24959	.01025	.49770	-.43771	.36956	-.49679
1982	**-1.0355**	-.04178	-.39811	.64776	.15526	-.27008	-.31667	.03581
1983	-.4002	.09588	-.36843	.07015	-.10003	.15344	-.13834	.21924
1984	.2407	.02531	.13738	-.02483	-.01150	-.10976	-.04815	.05091
1985	-.3368	.04858	.04118	.02260	-.14431	.17794	-.17657	-.00150
1986	.9945	-.45216	-.22446	.05599	.09199	.13572	.69792	-.15609
1987	**1.20466**	-.37520	.10630	-.00127	-.21208	.46860	.61209	-.37598

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the squared root January-February inflows
SDFB_2	Standardized dfbeta for the squared root March-April inflows
SDFB_3	Standardized dfbeta for the squared root May-June inflows
SDFB_4	Standardized dfbeta for the squared root July-August inflows
SDFB_5	Standardized dfbeta for the squared root September-October inflows
SDFB_6	Standardized dfbeta for the squared root November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

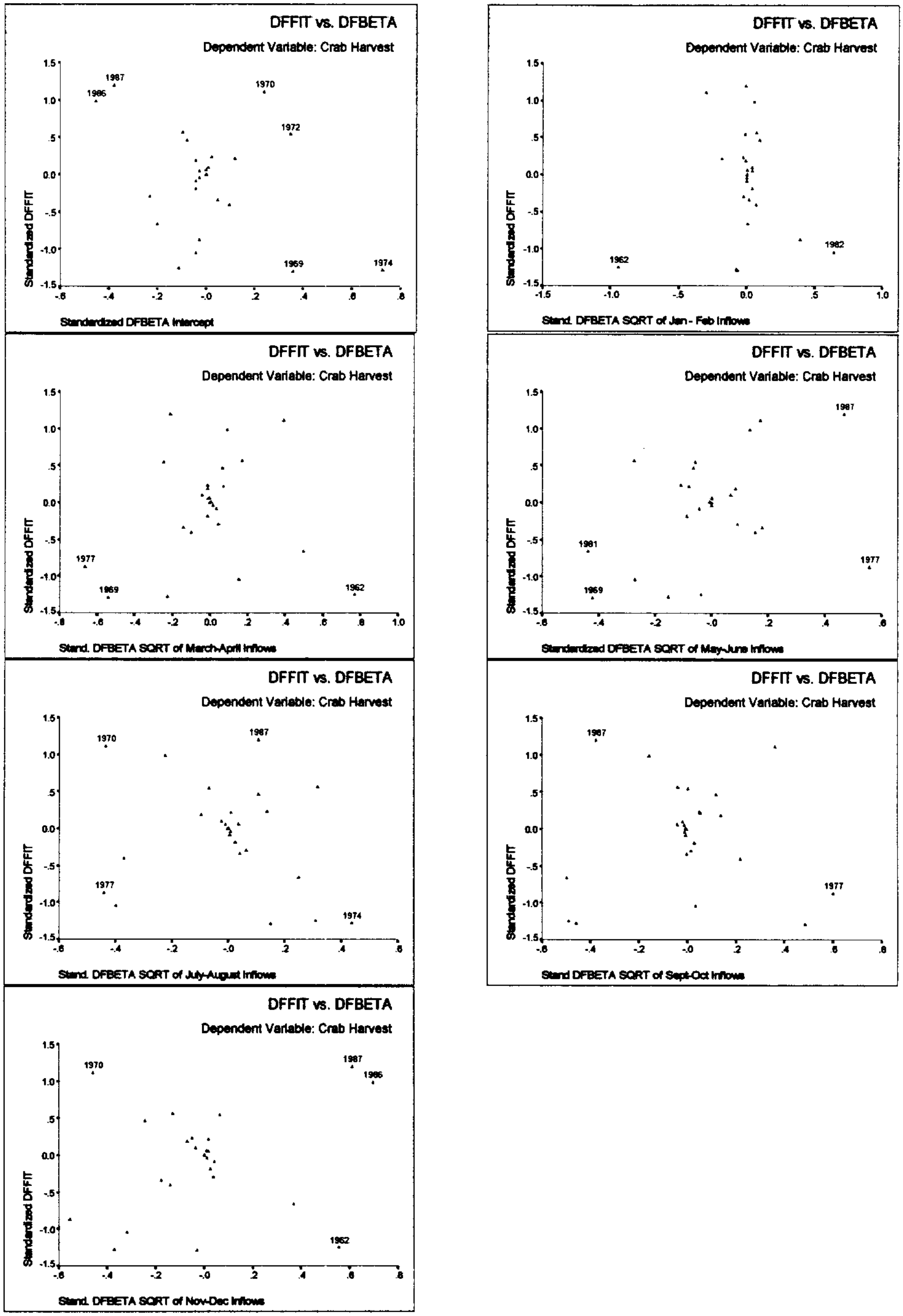


Fig. 5.4. Standardized DFFIT vs. Standardized DFBETA.

Regression – Harvest and Logged and Squared Root Inflows
(Box-Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	Ln (Nov - Dec Inflows), SQRT (March-April Inflows), Ln(Jul - Aug Inflows), SQRT(Jan - Feb Inflows), SQRT (March-Jun Inflows), Ln (Sept - Oct Inflows)[c,d]	.	.734	.539	.393	480.090	1.399

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), Ln (November - December Inflows), SQRT (March-April Inflows), Ln(July - August Inflows), SQRT(January - February Inflows), SQRT (March-June Inflows), Ln (September - October Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5114678	6	852446	3.698	.013[b]
	Residual	4379242	19	230486		
	Total	9493920	25			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), Ln (November-December Inflows), SQRT (March-April Inflows), Ln (July-August Inflows), SQRT (January-February Inflows), SQRT (May-June Inflows, Ln (September-October

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-1614.14	1625.9		-.993	.333	-5017.20	1788.923		
	SQRT (Jan-Feb Inflows)	-19.339	14.690	-.274	-1.317	.204	-50.085	11.407	.560	1.786
	SQRT (March-April Inflows)	51.443	14.142	.881	3.638	.002	21.844	81.042	.414	2.416
	SQRT (May-June Inflows)	-6.631	11.512	-.138	-.576	.571	-30.726	17.464	.425	2.354
	Ln (Jul-Aug Inflows)	-221.765	274.740	-.222	-.807	.430	-796.803	353.272	.320	3.120
	Ln (Sept-Oct Inflows)	-238.754	277.059	-.244	-.862	.400	-818.644	341.137	.304	3.291
	Ln (Nov-Dec Inflows)	751.404	250.508	.673	3.000	.007	227.084	1275.724	.483	2.072

a. Dependent Variable: CRAB

Collinearity Diagnostics

```
                           Parameter   Standard   T for H0:            Variance
Variable              D    Estimate     Error     Parameter   Prob >   Inflation
                      F                              =0        |T|
INTERCEP              1  -1614.1376   1625.9062    -0.993    0.3333   0.0000000
SQRT (Jan-Feb         1  -19.339280     14.6897    -1.317    0.2037   1.7859554
Inflows)
SQRT (March-April     1   51.442922    14.14187     3.638    0.0018   2.4160531
Inflows)
SQRT (May-June        1   -6.630983    11.51226    -0.576    0.5714   2.3536440
Inflows)
LN (Jul-Aug           1  -221.76529   274.73994    -0.807    0.4296   3.1204102
Inflows)
Ln (Sept-Oct          1  -238.75372   277.05870    -0.862    0.3996   3.2910524
Inflows)
Ln (Nov-Dec           1  751.403882   250.50846     3.000    0.0074   2.0722691
Inflows)
```

```
#  Eigen    Cond      SQRT        SQRT        SQRT         Ln          Ln          Ln
   value    Index   (Jan-Feb    (Mar-Apr    (May-Jun    (Jul-Aug   (Sept-Oct   (Nov -Dec
                    Inflows)    Inflows)    Inflows)    Inflows)    Inflows     Inflows)
1  2.965   1.0000    0.0359      0.0184      0.0216      0.0257      0.0217      0.0125
2  1.275   1.5248    0.0000      0.0905      0.0490      0.0000      0.0260      0.1760
3  0.687   2.0772    0.2252      0.0835      0.2617      0.0465      0.0158      0.0184
4  0.488   2.4651    0.5338      0.1925      0.0020      0.0343      0.1520      0.0094
5  0.464   2.5289    0.0393      0.0529      0.1079      0.2547      0.0766      0.3176
6  0.121   4.9476    0.1657      0.5622      0.5578      0.6387      0.7079      0.4661
```

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	959.3063	2580.904	1699.58	452.3131	26
Std. Predicted Value	-1.637	1.948	.000	1.000	26
Standard Error of Predicted Value	172.4314	315.0494	246.1914	38.7503	26
Adjusted Predicted Value	1010.363	2866.474	1721.37	485.9429	26
Residual	-648.0062	1014.378	1.3E-12	418.5328	26
Std. Residual	-1.350	2.113	.000	.872	26
Stud. Residual	-1.672	2.308	-.020	1.029	26
Deleted Residual	-994.1964	1210.875	-21.7927	588.5165	26
Stud. Deleted Residual	-1.762	2.649	-.006	1.090	26
Mahal. Distance	2.263	9.804	5.769	2.081	26
Cook's Distance	.000	.301	.061	.083	26
Centered Leverage Value	.091	.392	.231	.083	26

a. Dependent Variable: CRAB

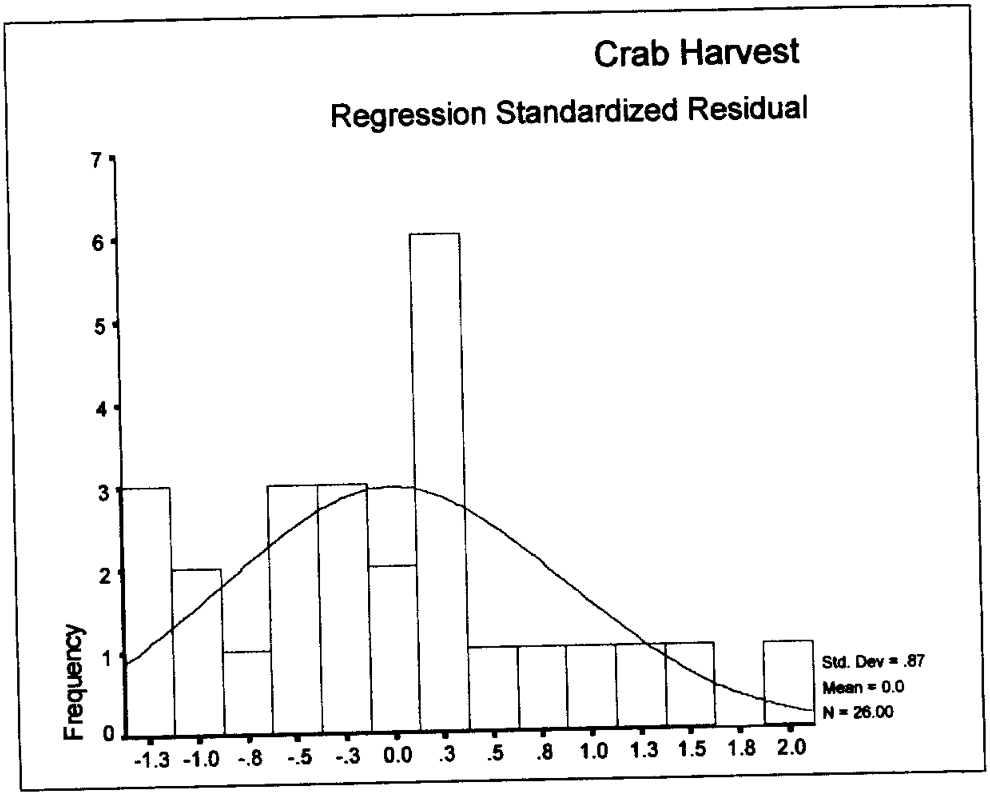
Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	959.3063	-648.0063	-994.19642	1305.49642	-1.63664	-1.34976	-1.67187	-1.76204
1963	1002.5573	-25.0573	-32.86336	1010.36336	-1.54102	-.05219	-.05977	-.05818
1964	1455.3214	-259.7214	-351.22103	1546.82103	-.54002	-.54098	-.62910	-.61880
1965	1907.9915	-90.0915	-115.11355	1933.01355	.46077	-.18766	-.21212	-.20671
1966	1294.7154	63.0846	83.53756	1274.26244	-.89510	.13140	.15121	.14727
1967	1055.6596	-7.7596	-9.69899	1057.59899	-1.42362	-.01616	-.01807	-.01759
1968	1739.0131	-196.4131	-227.39974	1769.99974	.08718	-.40912	-.44021	-.43067
1969	2262.9732	-557.2732	-899.80989	2605.50989	1.24558	-1.16077	-1.47498	-1.52564
1970	2007.5122	614.4878	1068.36147	1553.63853	.68079	1.27994	1.68769	1.78164
1971	2094.8634	65.9366	115.80787	2044.99213	.87391	.13734	.18202	.17732
1972	1380.0368	490.0632	592.06252	1278.03748	-.70647	1.02077	1.12199	1.13014
1973	2136.5306	-89.5306	-114.42784	2161.42784	.96603	-.18649	-.21083	-.20545
1974	2580.9042	-598.0042	-883.57436	2866.47436	1.94848	-1.24561	-1.51409	-1.57156
1975	1750.1119	113.3881	155.96656	1707.53344	.11172	.23618	.27700	.27016
1976	1476.3292	123.1708	141.41296	1458.08704	-.49358	.25656	.27490	.26810
1977	2286.5802	-427.1802	-654.18942	2513.58942	1.29777	-.88979	-1.10112	-1.10768
1978	1848.8232	72.0768	102.07025	1818.82975	.32995	.15013	.17866	.17404
1979	1540.6168	413.0832	535.51768	1418.18232	-.35145	.86043	.97968	.97858
1980	1499.7479	249.3521	347.58927	1401.51073	-.44180	.51939	.61322	.60286
1981	1132.4256	-522.2256	-743.92298	1354.12298	-1.25390	-1.08777	-1.29829	-1.32374
1982	1582.7008	-366.6008	-614.77465	1830.87465	-.25840	-.76361	-.98885	-.98825
1983	1522.3783	-114.7783	-158.99588	1566.59588	-.39177	-.23908	-.28138	-.27445
1984	1291.9069	104.6931	141.12780	1255.47220	-.90131	.21807	.25319	.24685
1985	2361.0944	-193.1944	-251.30748	2419.20748	1.46251	-.40241	-.45896	-.44922
1986	2246.4784	772.1216	990.55548	2028.04452	1.20911	1.60829	1.82163	1.95164
1987	1772.5217	1014.3783	1210.87517	1576.02483	.16126	2.11289	2.30848	**2.64889**

PRE	Predicted value of harvest
RES	Ordinary residual of harvest; observed minus predicted
DRE	Deleted residual; residual obtained when the model is fitted without that observation
ADJ	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR	Z-score of the predicted value of harvest
ZRE	Z-score of the residual
SRE	Studentized residual
SDR	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$



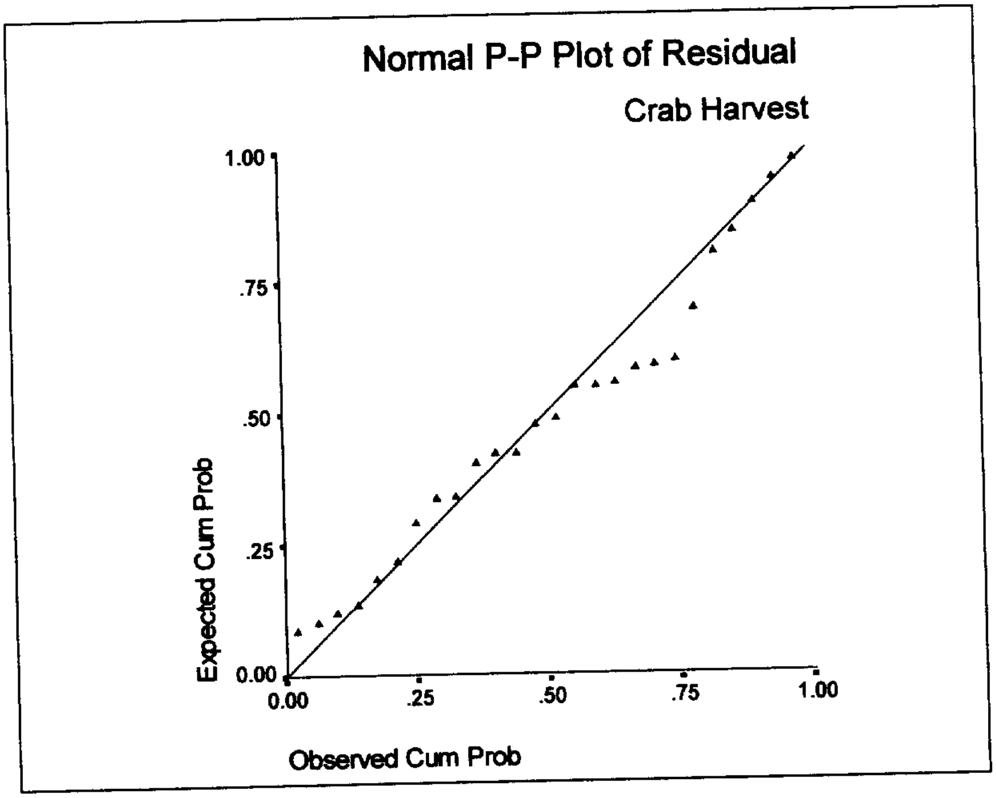


Fig. 6.1. Exploratory Plots of Crab Harvest Standardized Residual.

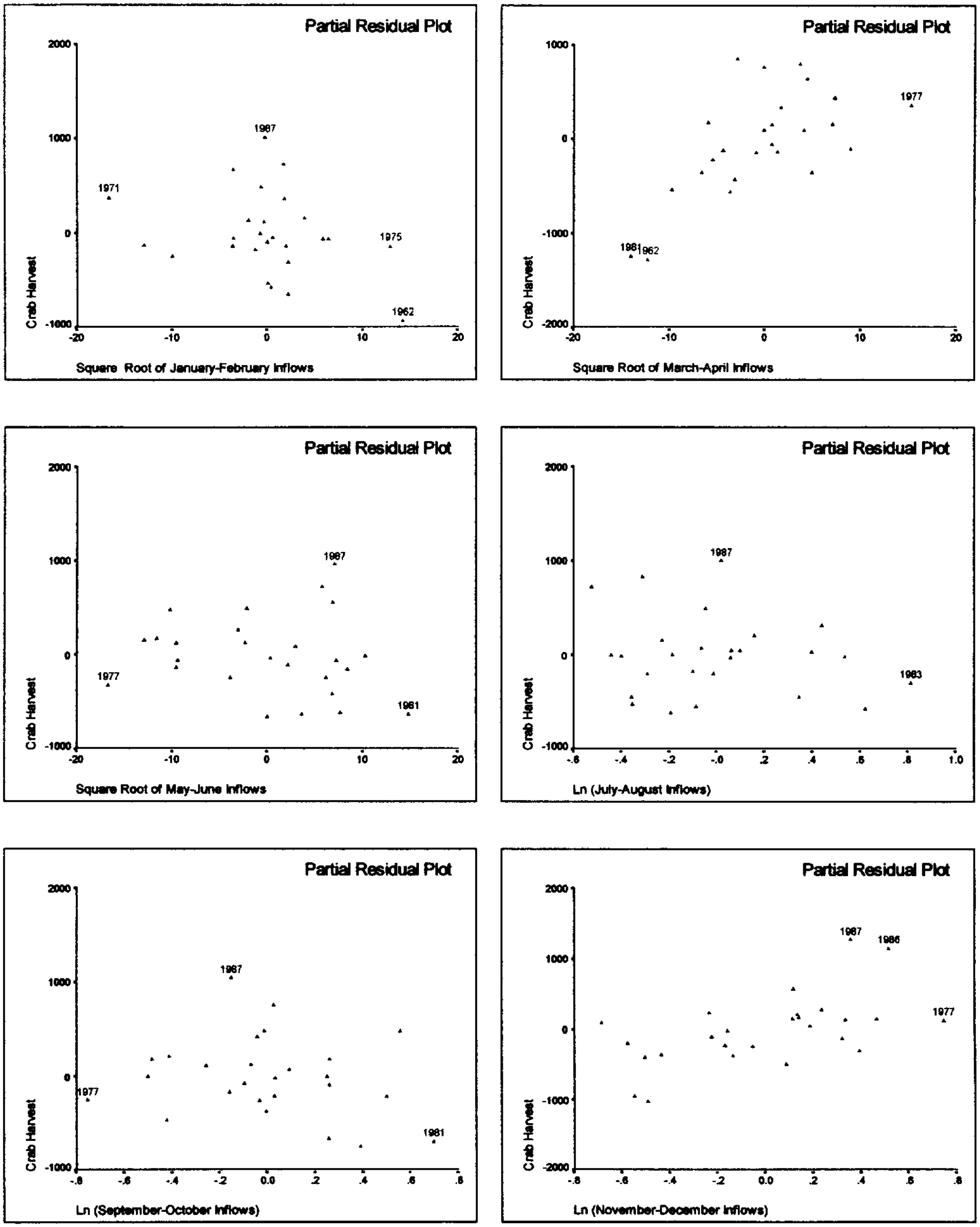


Fig 6.2. Partial Residual Plots of Crab Harvest vs. Squared Root and Logged Inflows

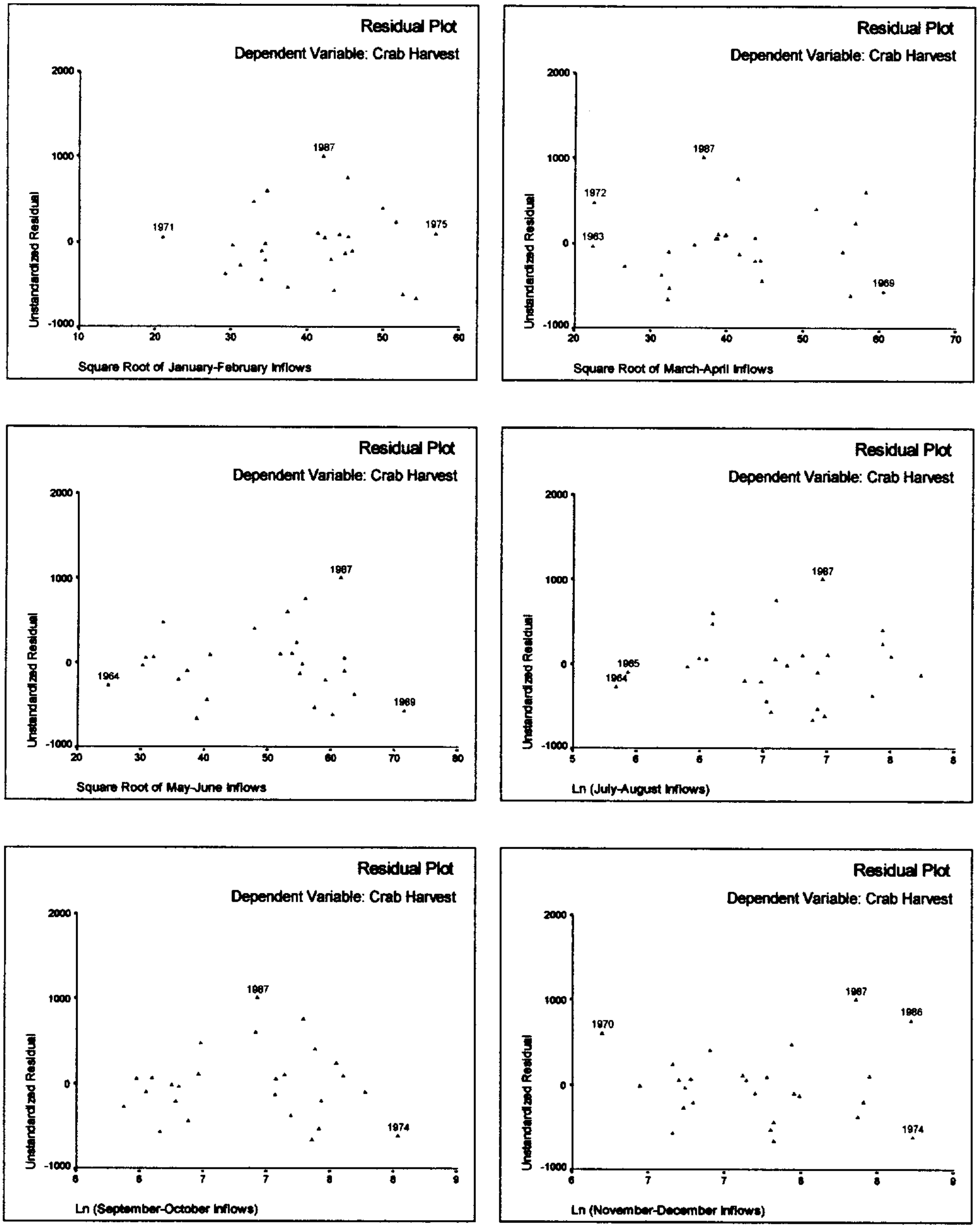


Fig 6.3. Residual Plots of Crab Harvest vs. Squared Root and Logged Inflows

Prediction Intervals for Crab Harvest

YEAR	CRAB	LICI	UICI
1962	311.30	-635.50601	2554.11851
1963	977.50	-525.39116	2530.50573
1964	1195.60	-86.75285	2997.39560
1965	1817.90	392.54107	3423.44183
1966	1357.80	-237.73545	2827.16618
1967	1047.90	-448.91310	2560.23234
1968	1542.60	274.91409	3203.11212
1969	1705.70	649.07324	3876.87324
1970	2622.00	368.00854	3647.01584
1971	2160.80	452.02267	3737.70405
1972	1870.10	-107.08289	2867.15644
1973	2047.00	620.94864	3652.11256
1974	1982.90	1000.95477	4160.85357
1975	1863.50	200.42359	3299.80016
1976	1599.50	16.91872	2935.73972
1977	1859.40	692.47934	3880.68099
1978	1920.90	286.49330	3411.15307
1979	1953.70	18.17437	3063.05921
1980	1749.10	-55.78913	3055.28491
1981	610.20	-432.41401	2697.26527
1982	1216.10	-44.58963	3209.99131
1983	1407.60	-30.41619	3075.17271
1984	1396.60	-248.72877	2832.54253
1985	2167.90	837.03290	3885.15592
1986	3018.60	729.07006	3763.88669
1987	2786.90	291.75922	3253.28416

CRAB	Crab harvest
LICI	Lower limit for 99% prediction interval for crab harvest
UICI	Upper limit for 99% prediction interval for crab harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	7.74374	.21333	.30975	.356	.022
1963	4.97674	.00016	.19907	.663	.000
1964	5.55143	.01992	.22206	.593	.000
1965	4.47268	.00179	.17891	.724	.000
1966	5.15934	.00106	.20637	.641	.000
1967	4.03735	.00001	.16149	.775	.000
1968	2.44509	.00437	.09780	.931	.000
1969	8.55538	.19104	.34222	.286	.016
1970	9.65925	.30055	.38637	.209	.055
1971	9.80440	.00358	.39218	.200	.000
1972	3.34541	.03743	.13382	.851	.000
1973	4.47797	.00177	.17912	.723	.000
1974	7.11843	.15639	.28474	.417	.009
1975	5.86339	.00412	.23454	.556	.000
1976	2.26344	.00160	.09054	.944	.000
1977	7.71367	.09205	.30855	.359	.002
1978	6.38473	.00190	.25539	.496	.000
1979	4.75417	.04064	.19017	.690	.000
1980	6.10407	.02116	.24416	.528	.000
1981	6.48874	.10222	.25955	.484	.002
1982	9.13053	.09456	.36522	.243	.002
1983	5.99110	.00436	.23964	.541	.000
1984	5.49266	.00319	.21971	.600	.000
1985	4.81953	.00905	.19278	.682	.000
1986	4.55137	.13411	.18205	.715	.006
1987	3.09538	.14747	.12382	.876	.008

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	**-1.28791**	-.26016	-.95442	.78557	-.00166	.23576	-.49385	.55703
1963	-.03248	-.01976	-.00126	.01893	-.00058	.00705	-.01006	.01507
1964	-.36729	-.23913	-.05071	.06566	.06594	.11908	.01232	.04961
1965	-.10894	-.05093	-.01415	.00574	-.01209	.05902	.01277	-.02301
1966	.08385	.04346	.03036	-.02682	.04198	-.00595	-.02484	-.01968
1967	-.00879	-.00502	.00042	.00377	-.00344	-.00069	-.00039	.00514
1968	-.17106	-.06032	.05074	-.01803	-.06920	.00325	.04191	.01266
1969	**-1.19611**	-.25606	-.02448	-.51658	-.35930	.09279	.46930	-.09121
1970	**1.53120**	.73093	-.25265	.26024	.39404	-.70460	.75490	-.83857
1971	.15421	-.01855	-.11947	.05092	-.05375	.00873	.03406	.01433
1972	.51559	.07903	-.02405	-.21540	-.06158	-.03113	-.00856	.07831
1973	-.10834	.01266	-.00031	-.00553	-.04688	.05274	-.06732	.02031
1974	**-1.08601**	.52629	-.13255	-.27959	-.16676	.38331	-.28353	-.39556
1975	.16555	-.01873	.12566	-.04062	.02282	-.04116	-.01262	.03927
1976	.10318	-.00946	-.00241	.00687	-.01534	.06543	-.06809	.02040
1977	-.80748	.31234	.41463	-.62100	.54903	-.48873	.59404	-.53501
1978	.11227	.03049	.04088	.04490	-.06384	.01189	-.05776	.01541
1979	.53276	-.10290	.06190	.14796	-.27066	.28081	-.02689	-.13494
1980	.37840	.01943	.08748	.03696	-.05164	.06440	.10776	-.21324
1981	-.86249	-.16411	-.00548	.64799	-.56163	.31930	-.63843	.44931
1982	-.81310	.34852	.50337	.13573	-.21102	-.25317	.00232	-.21757
1983	-.17035	.09664	.03435	-.03968	.07233	-.15056	.09281	-.05698
1984	.14562	-.05399	-.01704	-.00033	-.07963	.08822	.01552	-.02338
1985	-.24638	.10334	.01921	-.10730	.11676	.02906	-.00973	-.12544
1986	**1.03805**	-.39610	.11830	-.00061	.30816	-.39019	.03641	.59914
1987	**1.16585**	-.39337	-.01577	-.24491	.49151	.03320	-.24990	.54327

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the squared root January-February inflows
SDFB_2	Standardized dfbeta for the squared root March-April inflows
SDFB_3	Standardized dfbeta for the squared root May-June inflows
SDFB_4	Standardized dfbeta for the squared root July-August inflows
SDFB_5	Standardized dfbeta for the squared root September-October inflows
SDFB_6	Standardized dfbeta for the squared root November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

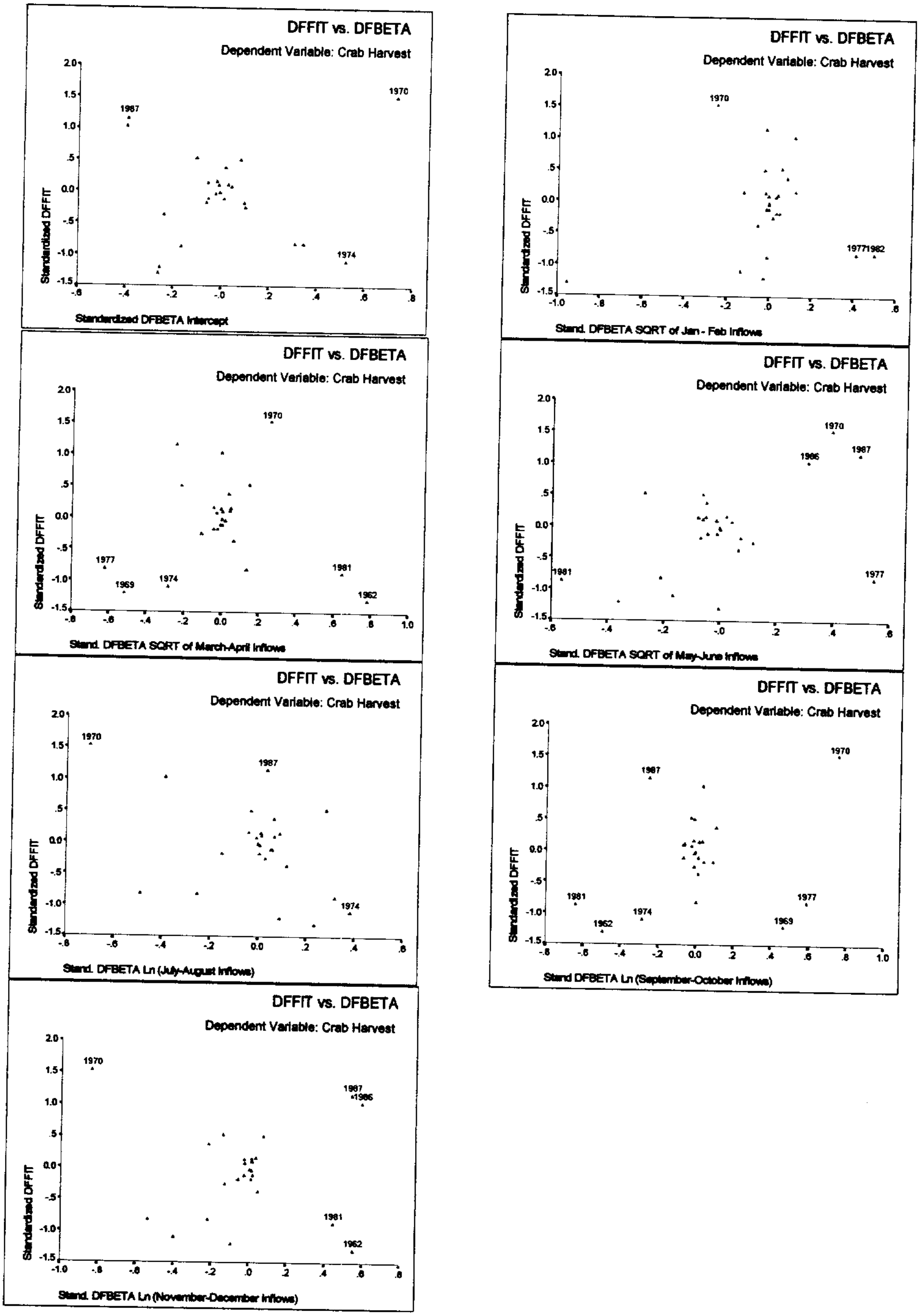


Fig. 6.4. Standardized DFFIT vs. Standardized DFBETA.

Regression – Logged Harvest and and Inflows
(Box-Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	Ln (Nov-Dec Inflows), Ln(Mar-Apr Inflows), Ln(Jul-Aug Inflows), Ln(Jan-Feb Inflows), Ln(May-Jun Inflows), Ln(Sept-Oct Inflows)[c,d]	.	.712	.506	.351	.3832	1.687

a. Dependent Variable: Ln (Crab Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln (Nov-Dec Inflows), Ln(Mar-Apr Inflows), Ln(Jul-Aug Inflows), Ln(Jan-Feb Inflows), Ln(May-Jun Inflows), Ln(Sept-Oct Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.863	6	.477	3.250	.023[b]
	Residual	2.790	19	.147		
	Total	5.653	25			

a. Dependent Variable: Ln (Crab Harvest)

b. Independent Variables: (Constant), Ln (Nov-Dec Inflows), Ln(Mar-Apr Inflows), Ln(Jul-Aug Inflows), Ln(Jan-Feb Inflows), Ln(May-Jun Inflows), Ln(Sept-Oct Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	3.797	1.632		2.327	.031	.381	7.214		
	Ln (Jan-Feb Inflows)	-.351	.216	-.338	-1.625	.121	-.804	.101	.599	1.670
	Ln (Mar-Apr Inflows)	.802	.212	.905	3.774	.001	.357	1.246	.452	2.214
	Ln (May-Jun Inflows)	-.111	.208	-.134	-.535	.599	-.548	.325	.413	2.422
	Ln (Jul-Aug Inflows)	-9.5E-02	.219	-.124	-.435	.668	-.554	.363	.321	3.116
	Ln (Sept-Oct Inflows)	-.289	.212	-.382	-1.363	.189	-.733	.155	.331	3.024
	Ln (Nov-Dec Inflows)	.515	.191	.597	2.701	.014	.116	.914	.531	1.884

a. Dependent Variable: Ln (Crab Harvest)

Collinearity Diagnostics

```
Variable      D  Parameter    Standard       T for H0:     Prob > |T|    Variance
              F  Estimate     Error        Parameter=0                  Inflation

INTERCEP      1    3.797449   1.63211449      2.327         0.0312      0.00000000

Ln (Jan-Feb   1   -0.351491   0.21635321     -1.625         0.1207      1.66979200
Inflows)
Ln (Mar-Apr   1    0.801611   0.21238374      3.774         0.0013      2.21370179
Inflows)
Ln (May-Jun   1   -0.111487   0.20838358     -0.535         0.5989      2.42244187
Inflows)
Ln (Jul-Aug   1   -0.095407   0.21914565     -0.435         0.6682      3.11648023
Inflows)
Ln Sept-Oct   1   -0.288886   0.21196036     -1.363         0.1888      3.02364711
Inflows)
Ln (Nov-Dec   1    0.514804   0.19062145      2.701         0.0142      1.88354265
Inflows)
```

```
#   Eigen     Condition    Ln         Ln         Ln         Ln         Ln          Ln
    value     Index      (Jan-Feb   (Mar-Apr   (May-Jun   (Jul-Aug   (Sept-Oct   (Nov-Dec
                          Inflows    Inflows    Inflows)   Inflows    Inflows     Inflows)
1   3.04119   1.00000    0.0351     0.0212     0.0236     0.0249     0.0214      0.0126
2   1.23316   1.57041    0.0021     0.0888     0.0391     0.0000     0.0360      0.2162
3   0.62231   2.21064    0.3653     0.0822     0.2349     0.0694     0.0080      0.0028
4   0.51948   2.41956    0.4658     0.2052     0.0316     0.0061     0.1912      0.0102
5   0.44931   2.60166    0.0080     0.1240     0.1268     0.2466     0.0535      0.3718
6   0.13455   4.75427    0.1237     0.4786     0.5440     0.6530     0.6897      0.3865
```

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	6.7102	7.8853	7.3517	.3384	26
Std. Predicted Value	-1.896	1.577	.000	1.000	26
Standard Error of Predicted Value	.1368	.2903	.1962	3.27E-02	26
Adjusted Predicted Value	6.6390	8.0346	7.3653	.3658	26
Residual	-.9924	.6021	-1.E-16	.3341	26
Std. Residual	-2.590	1.571	.000	.872	26
Stud. Residual	-3.083	1.781	-.015	1.024	26
Deleted Residual	-1.4061	.7739	-1.E-02	.4632	26
Stud. Deleted Residual	-4.244	1.900	-.054	1.189	26
Mahal. Distance	2.226	13.388	5.769	2.344	26
Cook's Distance	.000	.566	.057	.112	26
Centered Leverage Value	.089	.536	.231	.094	26

a. Dependent Variable: Ln (Crab Harvest)

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	6.73319	-.99244	-1.40609	7.14684	-1.82782	-2.58997	**-3.08283**	**-4.24436**
1963	6.71024	.17476	.24600	6.63900	-1.89566	.45608	.54110	.53078
1964	7.17931	-.09290	-.13038	7.21678	-.50951	-.24245	-.28721	-.28016
1965	7.52738	-.02195	-.02834	7.53378	.51910	-.05728	-.06509	-.06336
1966	7.20116	.01246	.01613	7.19749	-.44493	.03252	.03700	.03601
1967	7.01906	-.06452	-.08010	7.03464	-.98304	-.16838	-.18761	-.18277
1968	7.51632	-.17510	-.20509	7.54632	.48641	-.45696	-.49455	-.48449
1969	7.79380	-.35207	-.51273	7.95446	1.30639	-.91880	-1.10880	-1.11593
1970	7.54222	.32948	.58674	7.28495	.56293	.85984	1.14744	1.15766
1971	7.80273	-.12450	-.29223	7.97046	1.33278	-.32490	-.49777	-.48769
1972	6.93167	.60208	.77385	6.75989	-1.24129	1.57124	1.78134	1.89971
1973	7.54813	.07600	.09584	7.52829	.58040	.19834	.22273	.21707
1974	7.80844	-.21613	-.31061	7.90293	1.34966	-.56403	-.67617	-.66620
1975	7.36407	.16614	.21138	7.31883	.03649	.43358	.48906	.47904
1976	7.28547	.09197	.10541	7.27203	-.19577	.24002	.25696	.25054
1977	7.88525	-.35724	-.50662	8.03463	1.57664	-.93230	-1.11023	-1.11748
1978	7.55197	.00858	.01256	7.54799	.59175	.02239	.02709	.02637
1979	7.22484	.35264	.45233	7.12515	-.37496	.92030	1.04228	1.04479
1980	7.14682	.32003	.44230	7.02456	-.60549	.83519	.98185	.98087
1981	6.88364	-.46985	-.64241	7.05620	-1.38323	-1.22618	-1.43377	-1.47776
1982	7.29997	-.19657	-.33122	7.43462	-.15293	-.51298	-.66589	-.65583
1983	7.28580	-.03616	-.04996	7.29961	-.19481	-.09436	-.11093	-.10800
1984	7.04286	.19894	.26679	6.97501	-.91272	.51917	.60122	.59083
1985	7.75517	-.07366	-.09642	7.77794	1.19224	-.19223	-.21994	-.21434
1986	7.68789	.32466	.42045	7.59210	.99341	.84727	.96420	.96232
1987	7.41735	.51533	.61066	7.32202	.19394	1.34487	1.46399	1.51282

PRE	Predicted value of harvest
RES	Ordinary residual of harvest; observed minus predicted
DRE	Deleted residual; residual obtained when the model is fitted without that observation
ADJ	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR	Z-score of the predicted value of harvest
ZRE	Z-score of the residual
SRE	Studentized residual
SDR	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$

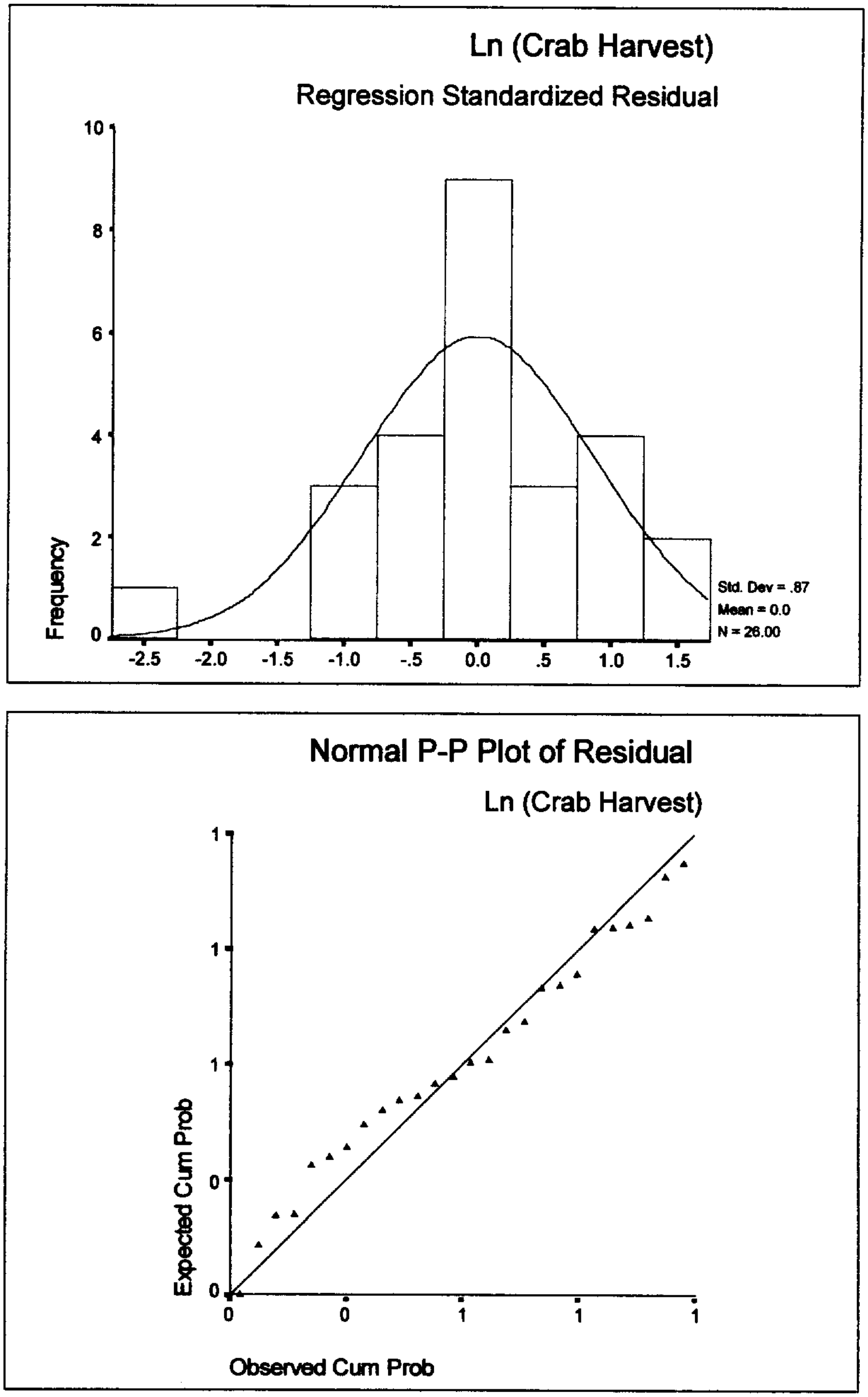


Fig. 7.1. Exploratory Plots of Ln (Crab Harvest) Standardized Residual.

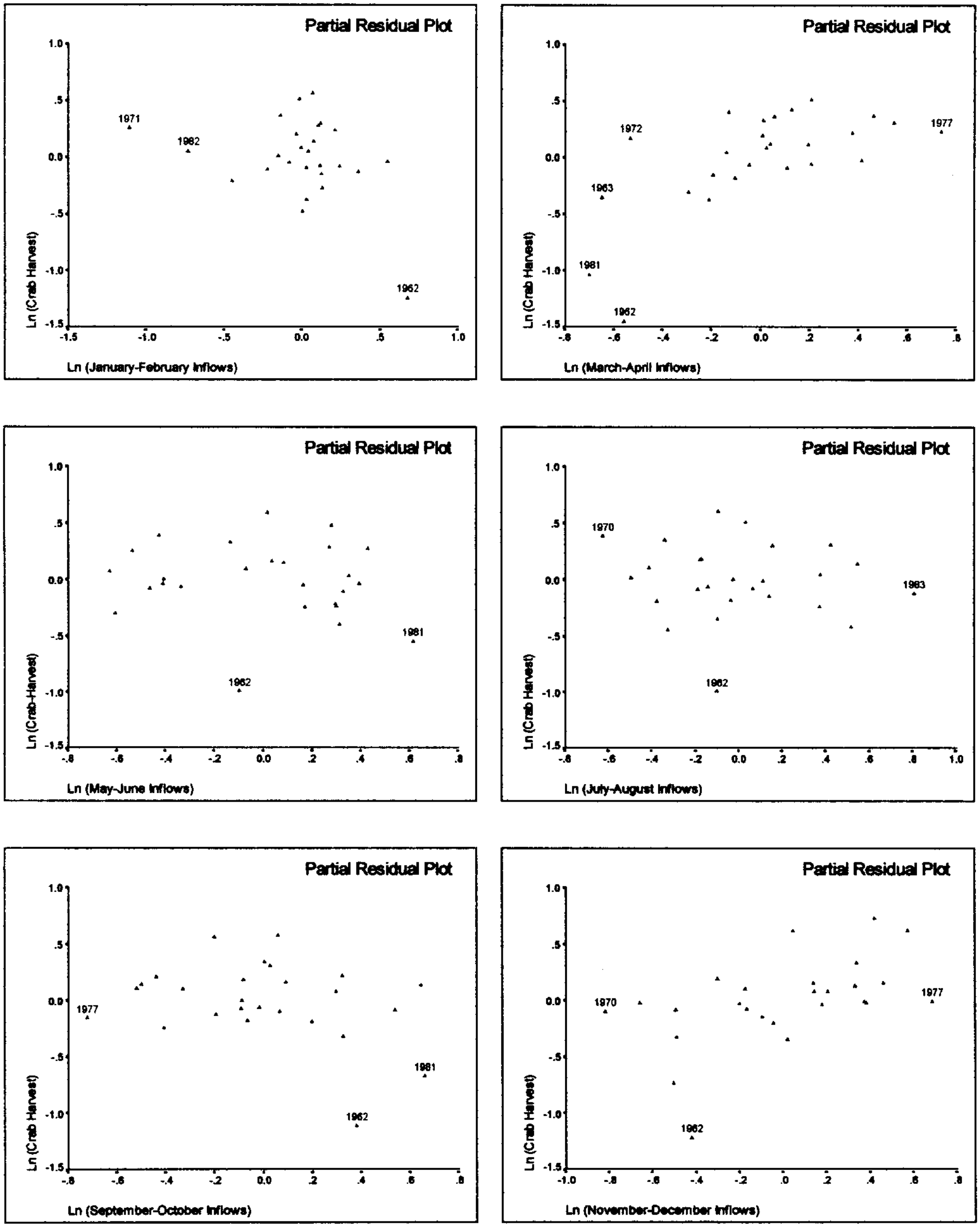


Fig 7.2. Partial Residual Plots of Ln (Crab Harvest) vs. Ln (Inflows).

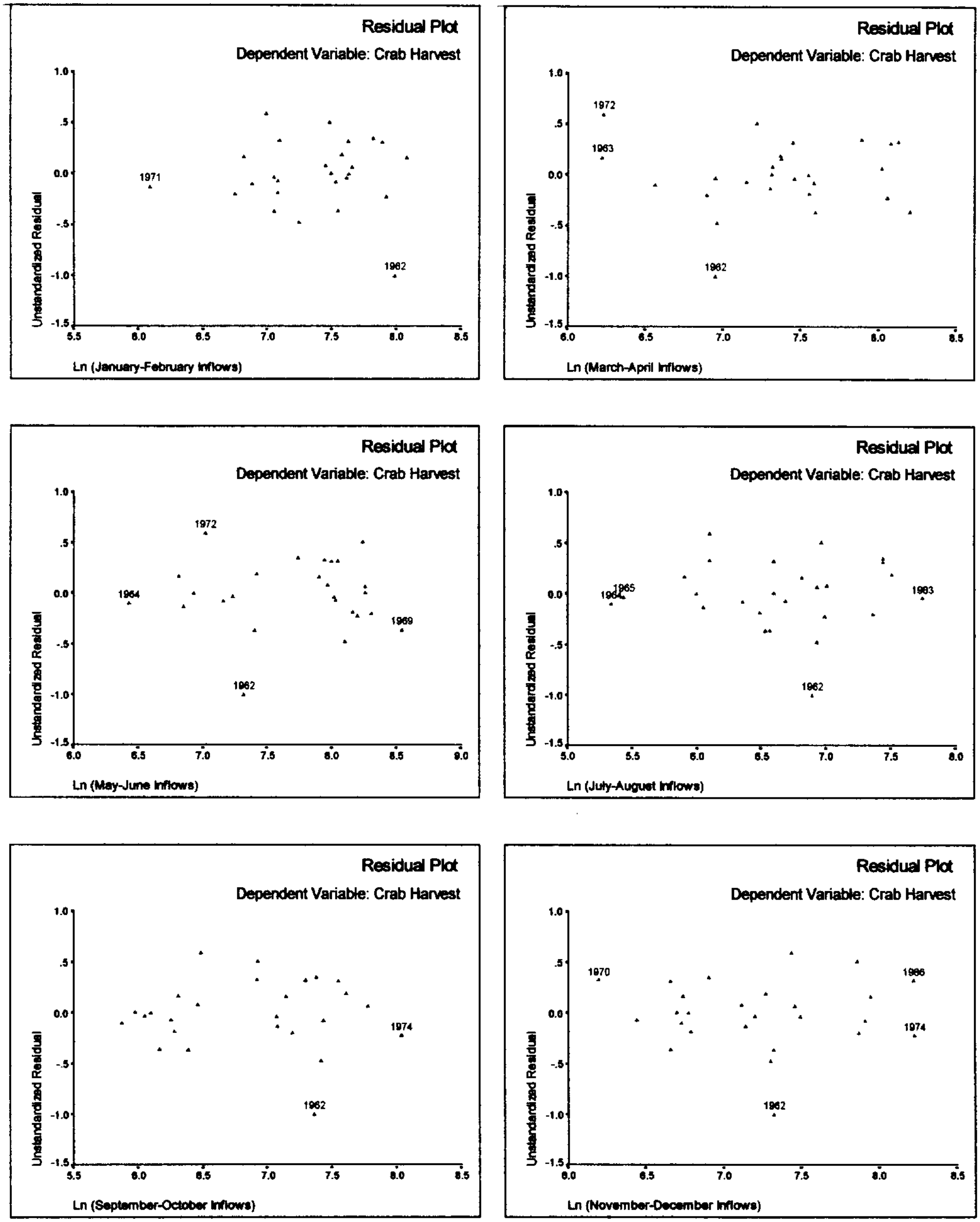


Fig 7.3. Residual Plots of Ln (Crab Harvest) vs. Ln (Inflows).
]

Prediction Intervals for Crab Harvest

YEAR	CRAB	LICI	UICI
1962	5.74	5.48606	7.98033
1963	6.88	5.46533	7.95514
1964	7.09	5.93543	8.42318
1965	7.51	6.31370	8.74107
1966	7.21	5.98663	8.41569
1967	6.95	5.82094	8.21719
1968	7.34	6.34263	8.69001
1969	7.44	6.53747	9.05013
1970	7.87	6.22740	8.85703
1971	7.68	6.42738	9.17808
1972	7.53	5.71983	8.14352
1973	7.62	6.34375	8.75251
1974	7.59	6.55650	9.06039
1975	7.53	6.15618	8.57196
1976	7.38	6.12141	8.44954
1977	7.53	6.63780	9.13271
1978	7.56	6.29384	8.81010
1979	7.58	6.01379	8.43589
1980	7.47	5.90827	8.38538
1981	6.41	5.64889	8.11839
1982	7.10	5.99983	8.60011
1983	7.25	6.04731	8.52429
1984	7.24	5.81508	8.27064
1985	7.68	6.53634	8.97400
1986	8.01	6.47314	8.90263
1987	7.93	6.23862	8.59608

CRAB	Crab harvest
LICI	Lower limit for 99% prediction interval for crab harvest
UICI	Upper limit for 99% prediction interval for crab harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	6.39309	.56589	.25572	.505	.2257
1963	6.27765	.01705	.25111	.492	.0000
1964	6.22417	.00475	.24897	.486	.0000
1965	4.68054	.00018	.18722	.301	.0000
1966	4.72368	.00006	.18895	.306	.0000
1967	3.90016	.00121	.15601	.209	.0000
1968	2.69450	.00598	.10778	.088	.0000
1969	6.87200	.08015	.27488	.558	.0011
1970	10.00010	.14687	.40000	.811	.0075
1971	13.38773	.04769	**.53551**	.937	.0002
1972	4.58792	.12933	.18352	.290	.0051
1973	4.21272	.00185	.16851	.245	.0000
1974	6.64317	.02855	.26573	.533	.0000
1975	4.38873	.00930	.17555	.266	.0000
1976	2.22626	.00138	.08905	**.054**	.0000
1977	6.40958	.07363	.25638	.507	.0009
1978	6.96607	.00005	.27864	.568	.0000
1979	4.54799	.04387	.18192	.285	.0002
1980	5.94924	.05261	.23797	.454	.0003
1981	5.75371	.10785	.23015	.431	.0029
1982	9.20187	.04339	.36807	.762	.0002
1983	5.94619	.00067	.23785	.454	.0000
1984	5.39665	.01761	.21587	.388	.0000
1985	4.94103	.00214	.19764	.333	.0000
1986	4.73421	.03919	.18937	.308	.0001
1987	2.94103	.05664	.11764	.110	.0004

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	**-2.74017**	-.10071	**-1.94101**	**1.56351**	.26253	.28684	**-1.06667**	**1.05441**
1963	.33886	.27216	.02753	-.22599	.01377	-.06029	.10456	-.15393
1964	-.17793	-.11589	-.02431	.01908	.06050	.03506	.01633	.01538
1965	-.03421	-.00632	-.00476	.00182	-.00658	.02037	.00350	-.00739
1966	.01954	.00041	.00561	-.00442	.00883	-.00055	-.00747	-.00334
1967	-.08980	-.04281	.00934	.03317	-.03670	-.00800	.00187	.04938
1968	-.20052	-.02253	.06504	-.03209	-.08550	.01036	.05636	.01144
1969	-.75384	.21617	-.02532	-.31100	-.23152	.07430	.30198	-.01598
1970	**1.02297**	.19235	-.11604	.11001	.36132	-.55082	.55381	-.62664
1971	-.56607	-.24373	.46568	-.22676	.18788	-.06189	-.08200	-.06747
1972	**1.01472**	.51144	.08534	-.63469	.02372	-.11275	.07320	.05310
1973	.11089	-.04671	.00554	.00338	.04702	-.05713	.07307	-.02396
1974	-.44048	.31983	-.05927	-.09321	-.07522	.17096	-.14511	-.15286
1975	.24997	-.15159	.16797	-.04169	.02550	-.05429	-.02426	.09175
1976	.09578	-.00296	-.00073	.00634	-.01001	.05799	-.06486	.01895
1977	-.72259	.01478	.33699	-.54550	.43808	-.39703	.53152	-.45529
1978	.01797	.00078	.00657	.00818	-.01092	.00207	-.00878	.00235
1979	.55549	-.04323	.08148	.13798	-.27357	.28738	.00353	-.17573
1980	.60627	-.04088	.13912	.03754	-.08201	.10419	.20802	-.37740
1981	-.89555	-.15963	-.00475	.66794	-.58185	.31854	-.63457	.43028
1982	-.54280	-.03495	.34925	.09845	-.14070	-.18240	.03084	-.15936
1983	-.06673	.01183	.01085	-.01389	.02790	-.05879	.03644	-.02105
1984	.34506	.03873	-.01359	.00334	-.19852	.21451	.03528	-.05929
1985	-.11916	.03600	-.00434	-.05121	.05440	.01973	-.00905	-.05686
1986	.52272	-.31506	.06597	.00795	.16359	-.21103	.01725	.31400
1987	.65065	-.27224	-.01121	-.11677	.25326	.03139	-.18102	.34883

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the squared root January-February inflows
SDFB_2	Standardized dfbeta for the squared root March-April inflows
SDFB_3	Standardized dfbeta for the squared root May-June inflows
SDFB_4	Standardized dfbeta for the squared root July-August inflows
SDFB_5	Standardized dfbeta for the squared root September-October inflows
SDFB_6	Standardized dfbeta for the squared root November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

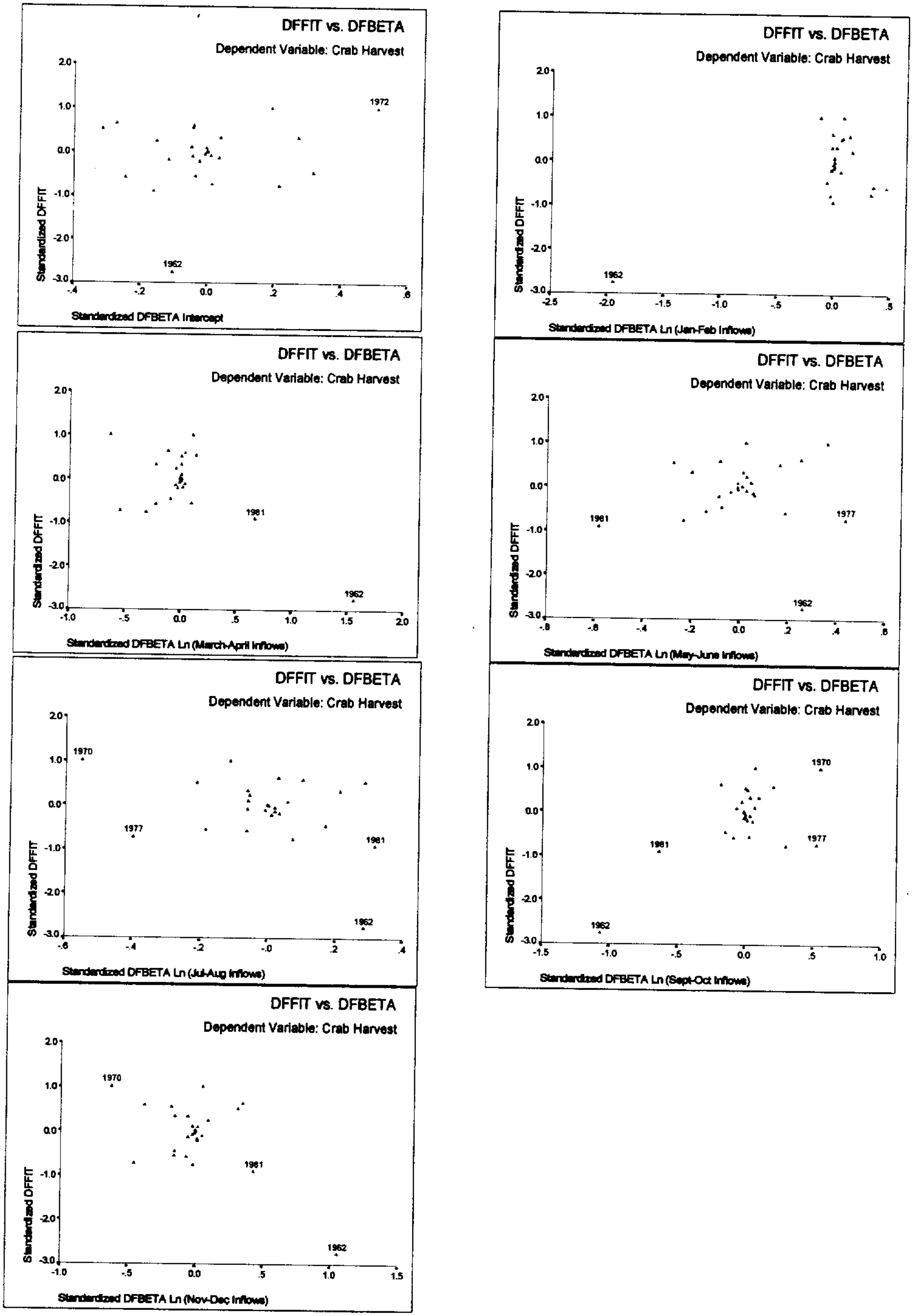


Fig. 7.4. Standardized DFFIT vs. Standardized DFBETA.

Regression - Untransformed Harvest, January-February and May-June Inflows, and Squared Root others Inflows

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), May-Jun Inflows, Jan-Feb Inflows, SQRT (Sept-Oct Inflows)[c,d]	.	.779	.607	.483	442.8874	1.426

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), May-Jun Inflows, Jan-Feb Inflows, SQRT (Sept-Oct Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5767085	6	961181	4.900	.003[b]
	Residual	3726835	19	196149		
	Total	9493920	25			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), May-Jun Inflows, Jan-Feb Inflows, SQRT (Sept-Oct Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-483.92	559.310		-.865	.398	-1654.57	686.727		
	Jan-Feb Inflows	-.277	.166	-.319	-1.668	.112	-.625	.071	.565	1.771
	SQRT (Mar-Apr Inflows)	56.462	12.790	.967	4.414	.000	29.692	83.232	.431	2.322
	May-Jun Inflows	-.149	.102	-.294	-1.461	.160	-.362	.064	.511	1.955
	SQRT (Jul-Aug Inflows)	-5.489	15.467	-.077	-.355	.727	-37.863	26.885	.440	2.274
	SQRT (Sept-Oct Inflows)	-25.625	15.427	-.421	-1.661	.113	-57.913	6.664	.322	3.105
	SQRT (Nov-Dec Inflows)	44.706	11.658	.790	3.835	.001	20.306	69.106	.487	2.055

a. Dependent Variable: CRAB

Collinearity Diagnostics

```
                     Parameter      Standard     T for H0:                  Variance
Variable    DF        Estimate         Error   Parameter=0   Prob > |T|    Inflation

INTERCEP     1     -483.921868  559.30987441        -0.865       0.3977   0.00000000
QJF_LAG      1       -0.277329    0.16622519        -1.668       0.1116   1.77101179
SQR_QMA      1       56.461946   12.79028711         4.414       0.0003   2.32226711
QMJ_LAG      1       -0.148894    0.10189949        -1.461       0.1603   1.95546146
SQR_QJA      1       -5.489123   15.46741800        -0.355       0.7266   2.27392551
SQR_QSO      1      -25.624601   15.42660911        -1.661       0.1131   3.10514756
SQR_QND      1       44.706014   11.65770793         3.835       0.0011   2.05519575
```

```
                  Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
#   Eigenval          Index  QJF_LAG   SQR_QMA   QMJ_LAG   SQR_QJA   SQR_QSO   SQR_QND

1    2.86420        1.00000    0.0398    0.0210    0.0219    0.0322    0.0262    0.0159
2    1.22708        1.52779    0.0019    0.0974    0.0907    0.0003    0.0255    0.1597
3    0.72526        1.98726    0.1929    0.0735    0.3099    0.0287    0.0122    0.0764
4    0.59137        2.20075    0.0017    0.1255    0.0346    0.4249    0.0000    0.1765
5    0.44975        2.52356    0.6462    0.0858    0.0479    0.0064    0.2398    0.0130
6    0.14233        4.48586    0.1174    0.5968    0.4949    0.5075    0.6963    0.5585
```

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	852.1708	2520.254	1699.58	480.2951	26
Std. Predicted Value	-1.764	1.709	.000	1.000	26
Standard Error of Predicted Value	148.6406	286.2543	226.6421	38.7362	26
Adjusted Predicted Value	988.7080	2846.969	1728.25	511.3326	26
Residual	-585.4000	959.7250	-1.E-12	386.1003	26
Std. Residual	-1.322	2.167	.000	.872	26
Stud. Residual	-1.579	2.382	-.027	1.033	26
Deleted Residual	-871.2051	1159.295	-28.6647	545.6781	26
Stud. Deleted Residual	-1.649	2.768	-.017	1.090	26
Mahal. Distance	1.854	9.482	5.769	2.194	26
Cook's Distance	.000	.211	.063	.075	26
Centered Leverage Value	.074	.379	.231	.088	26

a. Dependent Variable: CRAB

Cases Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	852.1708	-540.8707	-871.20516	1182.50516	-1.76435	-1.22124	-1.54994	-1.61408
1963	986.1316	-8.6316	-11.20800	988.70800	-1.48544	-.01949	-.02221	-.02162
1964	1386.2113	-190.6112	-241.25900	1436.85900	-.65245	-.43038	-.48420	-.47422
1965	1843.4149	-25.5149	-30.28688	1848.18688	.29947	-.05761	-.06277	-.06110
1966	1249.9665	107.8335	140.71339	1217.08661	-.93612	.24348	.27813	.27127
1967	1127.8208	-79.9207	-94.82509	1142.72509	-1.19043	-.18045	-.19656	-.19151
1968	1732.2312	-189.6312	-217.85455	1760.45455	.06798	-.42817	-.45893	-.44918
1969	2190.3037	-484.6037	-832.29633	2537.99633	1.02171	-1.09419	-1.43397	-1.47799
1970	2107.2803	514.7196	774.88042	1847.11958	.84885	1.16219	1.42597	1.46875
1971	2025.4824	135.3175	200.04979	1960.75021	.67854	.30553	.37149	.36291
1972	1398.8908	471.2091	570.44506	1299.65494	-.62605	1.06395	1.17063	1.18287
1973	1906.6849	140.3150	191.25132	1855.74868	.43120	.31682	.36988	.36132
1974	2520.2541	-537.3541	-864.06886	2846.96886	1.70869	-1.21330	-1.53855	-1.60053
1975	1769.5137	93.9862	144.68434	1718.81566	.14560	.21221	.26330	.25675
1976	1539.3588	60.1411	67.77523	1531.72477	-.33359	.13579	.14415	.14039
1977	2444.7999	-585.3999	-835.47805	2694.87805	1.55159	-1.32178	-1.57907	-1.64895
1978	1930.5975	-9.6975	-13.27415	1934.17415	.48099	-.02190	-.02562	-.02493
1979	1561.3132	392.3867	515.66905	1438.03095	-.28788	.88597	1.01566	1.01655
1980	1444.5696	304.5303	426.55244	1322.54756	-.53095	.68760	.81378	.80625
1981	971.4919	-361.2919	-522.35739	1132.55739	-1.51592	-.81576	-.98089	-.97986
1982	1589.0371	-372.9371	-634.14214	1850.24214	-.23016	-.84206	-1.09804	-1.10437
1983	1611.2874	-203.6874	-331.84336	1739.44336	-.18383	-.45991	-.58702	-.57662
1984	1285.1896	111.4103	153.42001	1243.17999	-.86278	.25155	.29520	.28798
1985	2467.8280	-299.9280	-395.33925	2563.23925	1.59953	-.67721	-.77750	-.76910
1986	2420.0940	598.5059	805.42126	2213.17874	1.50015	1.35137	1.56766	1.63527
1987	1827.1749	959.7250	1159.29497	1627.60503	.26566	2.16697	2.38165	**2.76780**

PRE	Predicted value of harvest
RES	Ordinary residual of harvest; observed minus predicted
DRE	Deleted residual; residual obtained when the model is fitted without that observation
ADJ	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR	Z-score of the predicted value of harvest
ZRE	Z-score of the residual
SRE	Studentized residual
SDR	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$

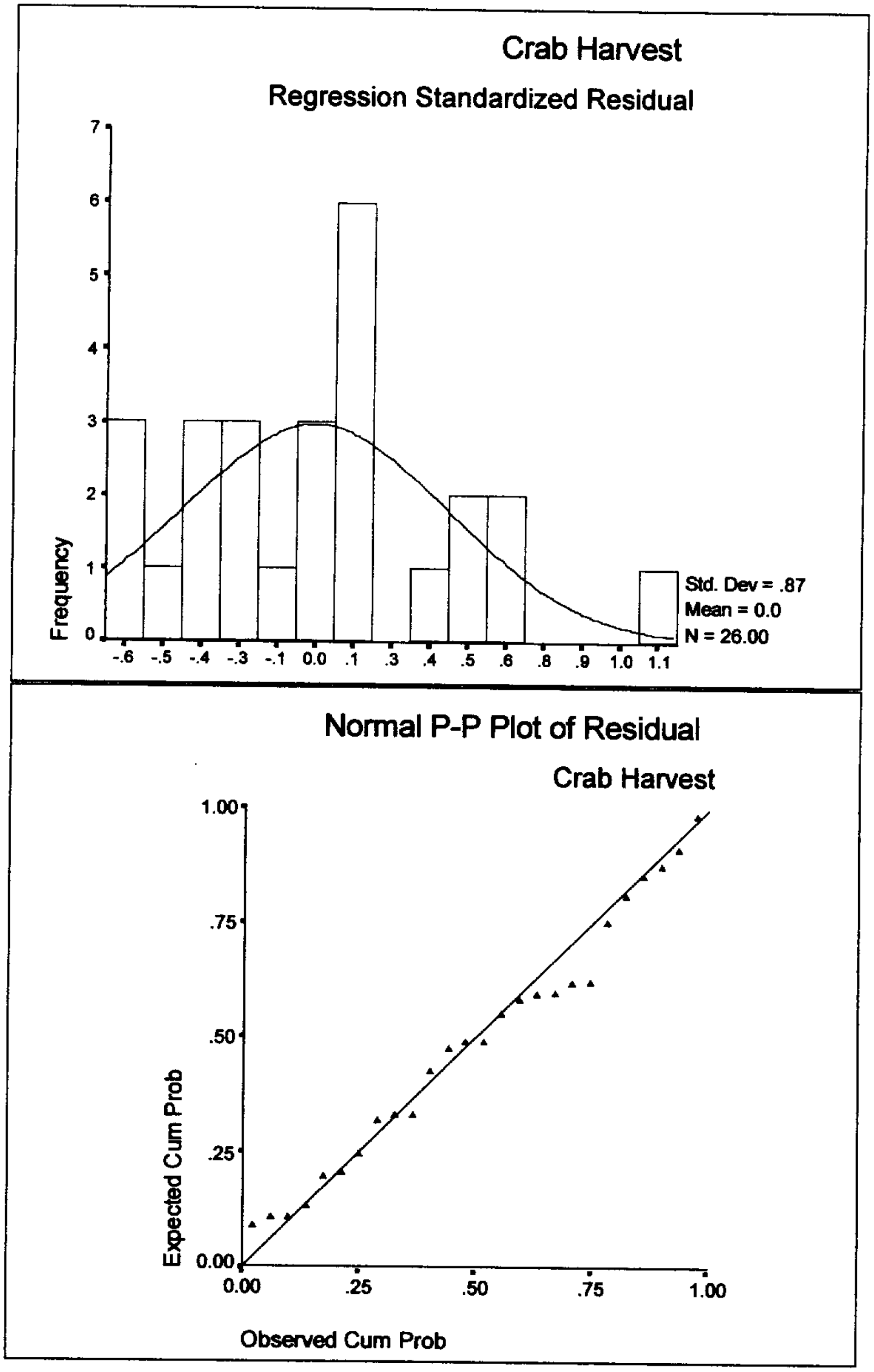


Fig. 8.1. Exploratory Plots of Crab Harvest Standarized Residual.

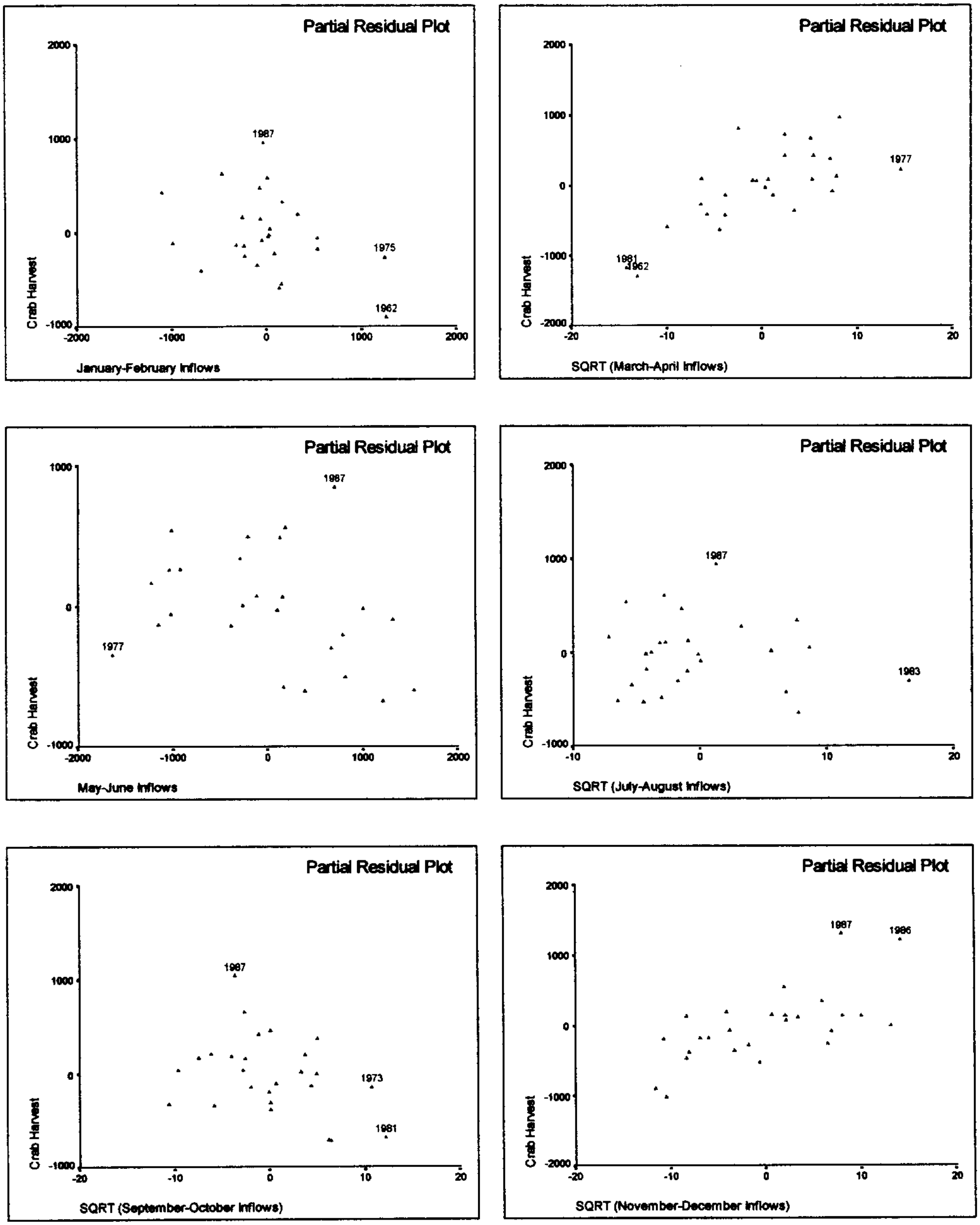


Fig 8.2. Partial Residual Plots of Crab Harvest vs. Untransformed and Squared Root Inflows

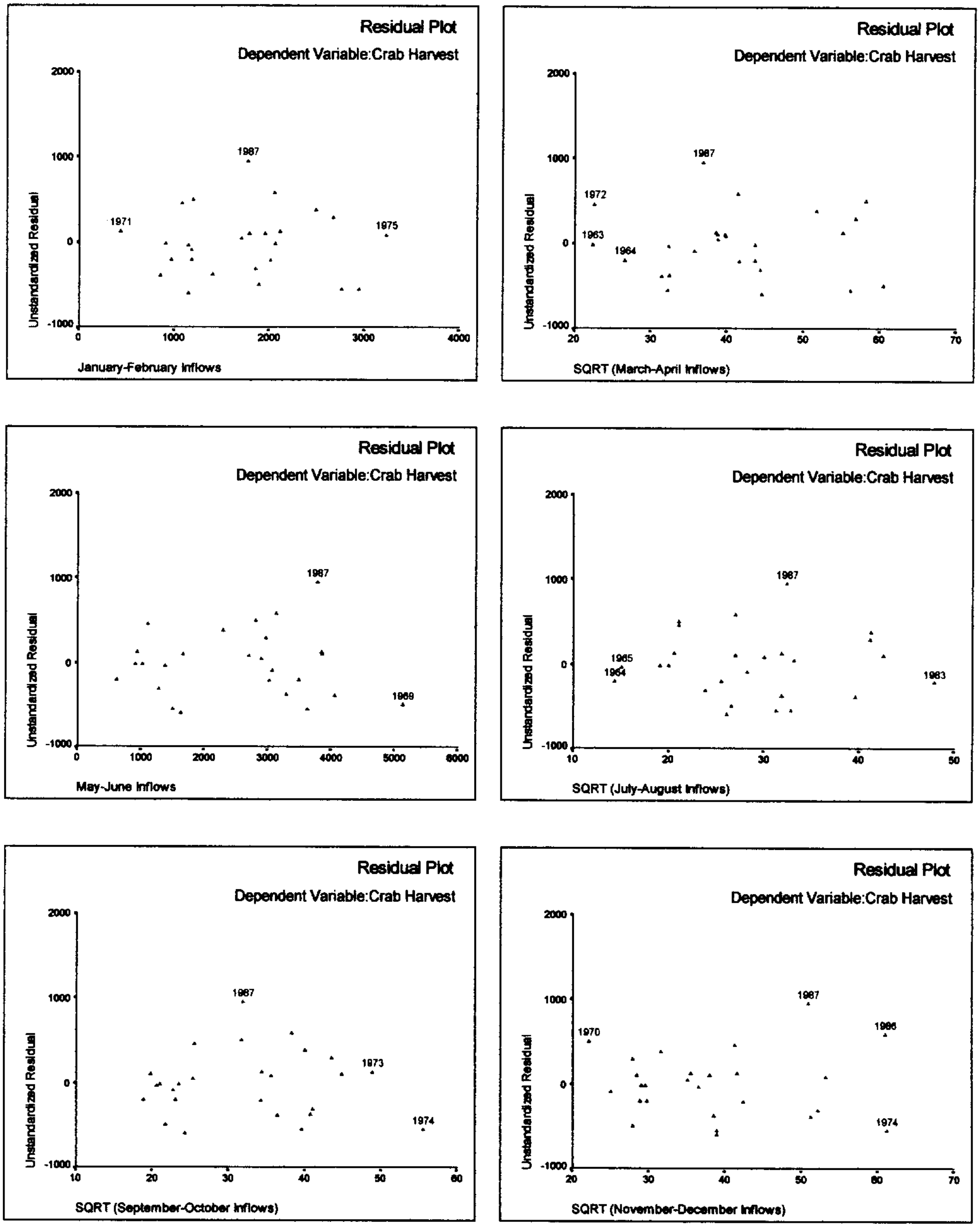


Fig 8.3. Residual Plots of Crab Harvest vs. Untransformed and Squared Root Inflows

Prediction Intervals for Crab Harvest

YEAR	CRAB	LICI	UICI
1962	311.30	-635.85360	2340.19517
1963	977.50	-419.04369	2391.30697
1964	1195.60	-7.52800	2779.95052
1965	1817.90	480.17426	3206.65565
1966	1357.80	-157.37650	2657.30946
1967	1047.90	-235.19575	2490.83729
1968	1542.60	385.58278	3078.87961
1969	1705.70	681.60957	3698.99790
1970	2622.00	642.87027	3571.69040
1971	2160.80	567.75467	3483.21018
1972	1870.10	26.02437	2771.75735
1973	2047.00	480.83129	3332.53860
1974	1982.90	1032.80039	4007.70792
1975	1863.50	297.08857	3241.93896
1976	1599.50	202.83003	2875.88775
1977	1859.40	1000.49188	3889.10810
1978	1920.90	502.99417	3358.20092
1979	1953.70	150.88954	2971.73702
1980	1749.10	7.64882	2881.49055
1981	610.20	-477.82081	2420.80468
1982	1216.10	83.45783	3094.61651
1983	1407.60	119.47830	3103.09653
1984	1396.60	-144.87446	2715.25382
1985	2167.90	1056.11449	3879.54170
1986	3018.60	999.55834	3840.62974
1987	2786.90	455.36991	3198.98004

CRAB	Crab harvest
LICI	Lower limit for 99% prediction interval for crab harvest
UICI	Upper limit for 99% prediction interval for crab harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV[1]	MAHA_PV[2]	COOK_PV[3]
1962	8.51770	.20960	.34071	.289	.0210
1963	4.78517	.00002	.19141	.686	.0000
1964	4.28674	.00890	.17147	.746	.0000
1965	2.97740	.00011	.11910	.887	.0000
1966	4.88010	.00337	.19520	.675	.0000
1967	2.96788	.00103	.11872	.888	.0000
1968	2.27725	.00448	.09109	.943	.0000
1969	9.48224	.21076	.37929	.220	.0214
1970	7.43204	.14682	.29728	.385	.0075
1971	7.12798	.00943	.28512	.416	.0000
1972	3.38752	.04123	.13550	.847	.0001
1973	5.69675	.00709	.22787	.576	.0000
1974	8.49126	.20560	.33965	.291	.0199
1975	7.79858	.00534	.31194	.351	.0000
1976	1.85443	.00038	.07418	.967	.0000
1977	6.52154	.15217	.26086	.480	.0083
1978	5.77450	.00003	.23098	.566	.0000
1979	5.01528	.04630	.20061	.658	.0002
1980	6.19011	.03791	.24760	.518	.0001
1981	6.74705	.06128	.26988	.456	.0005
1982	9.33603	.12064	.37344	.229	.0041
1983	8.69331	.03097	.34773	.275	.0000
1984	5.88400	.00469	.23536	.553	.0000
1985	5.07196	.02747	.20288	.651	.0000
1986	5.46104	.12138	.21844	.604	.0042
1987	3.34215	.16850	.13369	.852	.0113

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds $(2p+1)/n$ or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degree of freedom and $n - p - 1$ denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	**-1.26141**	-.55629	-.97428	.77234	-.07777	.31482	-.44131	.56156
1963	-.01181	-.01038	-.00025	.00704	-.00056	.00328	-.00379	.00521
1964	-.24445	-.18383	-.01711	.05918	.04673	.07732	.00059	.04574
1965	-.02642	-.01190	-.00048	-.00064	.00392	.00980	.00649	-.00597
1966	.14979	.07433	.06261	-.05744	.09396	-.02886	-.02741	-.04888
1967	-.08270	-.05398	.00359	.03433	-.03793	-.00081	-.00503	.04537
1968	-.17329	-.04625	.04271	-.01705	-.07424	.01563	.03287	.02262
1969	**-1.25192**	.10199	-.11701	-.41448	-.54138	.20458	.39220	.03040
1970	**1.04420**	.10881	-.31324	.42712	.05686	-.36317	.31644	-.39075
1971	.25100	.02048	-.18168	.06965	-.09294	-.01373	.07691	.00786
1972	.54283	.29897	-.03300	-.23788	-.06049	-.06326	.00447	.06972
1973	.21770	-.01274	-.00989	-.01151	.09781	-.10523	.15764	-.07610
1974	**-1.24801**	.58671	-.10037	-.20034	-.18280	.45508	-.45677	-.34873
1975	.18857	-.01203	.14925	-.03546	.01162	-.03462	-.04390	.04988
1976	.05002	.00074	.00212	.00297	-.00380	.02934	-.03171	.00824
1977	**-1.07776**	.44360	.51051	-.83266	.73885	-.53576	.72597	-.68588
1978	-.01514	-.00154	-.00590	-.00605	.00821	.00009	.00759	-.00165
1979	.56980	-.14897	.07308	.17402	-.27116	.31202	-.04625	-.12395
1980	.51036	-.05293	.12057	.06697	-.06192	.11035	.12450	-.26763
1981	-.65424	-.33059	.04206	.48281	-.41745	.21858	-.50037	.35850
1982	-.92424	.12574	.53331	.18359	-.27011	-.34161	-.00793	-.26247
1983	-.45738	.20323	.08727	-.11235	.17247	-.42398	.24582	-.15707
1984	.17684	-.02077	-.03217	-.00555	-.08006	.10216	.03882	-.03331
1985	-.43378	.16184	.07520	-.19951	.23346	.05263	-.00278	-.23514
1986	.96150	-.37650	.00818	.13110	.08304	-.18275	-.16896	.70751
1987	**1.26214**	-.20988	-.03323	-.21528	.49787	.14222	-.37812	.64402

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the squared root January-February inflows
SDFB_2	Standardized dfbeta for the squared root March-April inflows
SDFB_3	Standardized dfbeta for the squared root May-June inflows
SDFB_4	Standardized dfbeta for the squared root July-August inflows
SDFB_5	Standardized dfbeta for the squared root September-October inflows
SDFB_6	Standardized dfbeta for the squared root November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

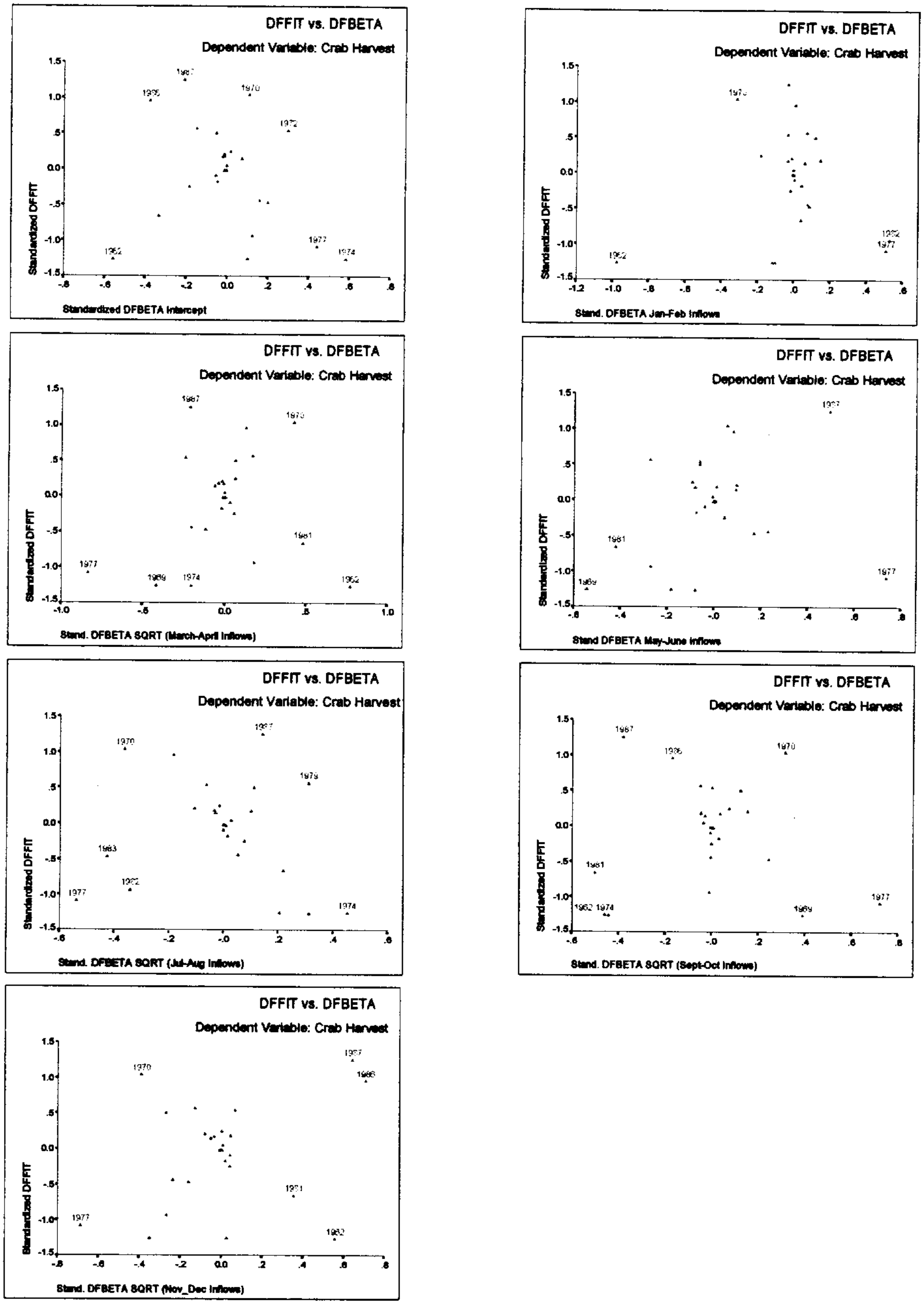


Fig. 8.4. Standardized DFFIT vs. Standardized DFBETA.

Examining Subsets of the Data

Untransformed Data: 1962 Omitted

```
 N = 25     Regression Models for Dependent Variable: CRAB

R-square       Adj     C(p)       AIC       MSE      SBC Variables in Model
  In           Rsq
1 0.179885 0.144228  15.5974    314.3    267055     316.7 QND_LAG
1 0.161605 0.125153  16.4132    314.8    273007     317.3 QMA_LAG
1 0.062107 0.021329  20.8533    317.7    305407     320.1 QJF_LAG
1 0.039705 -.002047  21.8530    318.2    312702     320.7 QSO_LAG
--------------------------------------------------------------------
2 0.352059 0.293155   9.9142    310.4    220580     314.1 QMA_LAG QND_LAG
2 0.230525 0.160573  15.3376    314.7    261954     318.4 QJA_LAG QND_LAG
2 0.223553 0.152967  15.6487    314.9    264327     318.6 QMA_LAG QJA_LAG
2 0.192911 0.119539  17.0162    315.9    274759     319.6 QMA_LAG QMJ_LAG
---------------------------------------------------------------------------
3 0.465673 0.389340   6.8442    307.6    190564     312.5 QMA_LAG QSO_LAG QND_LAG
3 0.464346 0.387824   6.9034    307.6    191037     312.5 QMA_LAG QJA_LAG QND_LAG
3 0.432577 0.351517   8.3211    309.1    202367     314.0 QMA_LAG QMJ_LAG QND_LAG
3 0.382641 0.294447  10.5495    311.2    220177     316.1 QJF_LAG QMA_LAG QND_LAG
---------------------------------------------------------------------------------
4 0.582430 0.498916   3.6340    303.4    156370     309.5 QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4 0.507315 0.408778   6.9860    307.6    184498     313.7 QMA_LAG QJA_LAG QSO_LAG QND_LAG
4 0.501019 0.401223   7.2669    307.9    186856     314.0 QMA_LAG QMJ_LAG QJA_LAG QND_LAG
4 0.481699 0.378039   8.1291    308.8    194091     314.9 QJF_LAG QMA_LAG QSO_LAG QND_LAG
-------------------------------------------------------------------------------------
5 0.596143 0.489865   5.0220    304.6    159194     311.9 QJF_LAG QMA_LAG QMJ_LAG QSO_LAG
                                                          QND_LAG
5 0.586619 0.477835   5.4470    305.2    162948     312.5 QMA_LAG QMJ_LAG QJA_LAG QSO_LAG
                                                          QND_LAG
5 0.510717 0.381958   8.8341    309.4    192868     316.7 QJF_LAG QMA_LAG QJA_LAG QSO_LAG
                                                          QND_LAG
5 0.506893 0.377128   9.0048    309.6    194375     316.9 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                          QND_LAG
-------------------------------------------------------------------------------------
6 0.596636 0.462182   7.0000    306.6    167833     315.1 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                          QSO_LAG QND_LAG
-------------------------------------------------------------------------------------

Dependent Variable: CRAB
                                      Analysis of Variance
                                         Sum of           Mean
                Source          DF      Squares         Square       F Value       Prob>F
                Model            6 4468511.3785 744751.89642           4.437       0.0063
                Error           18 3020992.6079 167832.92266
                C Total         24 7489503.9864

                    Root MSE       409.67417      R-square          0.5966
                    Dep Mean      1755.11200      Adj R-sq          0.4622
                    C.V.            23.34177
```

```
                                     Parameter Estimates

                   Parameter      Standard      T for H0:                    Variance
Variable   DF       Estimate         Error     Parameter=0    Prob > |T|    Inflation
INTERCEP    1    1026.934735  272.35363657           3.771        0.0014   0.00000000
QJF_LAG     1      -0.119068    0.17808962          -0.669        0.5122   2.08204460
QMA_LAG     1       0.577980    0.15331968           3.770        0.0014   2.72661496
QMJ_LAG     1      -0.177787    0.09079607          -1.958        0.0659   1.75897657
QJA_LAG     1      -0.031992    0.21563836          -0.148        0.8837   1.96516308
QSO_LAG     1      -0.411204    0.20547929          -2.001        0.0607   3.07574403
QND_LAG     1       0.523090    0.13710803           3.815        0.0013   2.37375747

                           Collinearity Diagnostics(intercept adjusted)

                     Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
#   Eigenvalue           Index   QJF_LAG   QMA_LAG   QMJ_LAG   QJA_LAG   QSO_LAG   QND_LAG
1      2.85839         1.00000    0.0382    0.0194    0.0263    0.0291    0.0262    0.0141
2      1.15906         1.57039    0.0000    0.0866    0.0788    0.0004    0.0257    0.1719
3      0.73170         1.97649    0.0327    0.1294    0.0646    0.3987    0.0097    0.0078
4      0.67724         2.05442    0.0425    0.0032    0.4507    0.1069    0.0241    0.1273
5      0.44323         2.53948    0.6485    0.0477    0.0000    0.0015    0.2484    0.0038
6      0.13037         4.68238    0.2381    0.7137    0.3796    0.4633    0.6658    0.6751

OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_ INTERCEP  QJF_LAG QMA_LAG  QMJ_LAG  QJA_LAG  QSO_LAG

  1 MODEL1  PARMS   CRAB    516.773  1353.81  .        .        .        .        .
  2 MODEL1  PARMS   CRAB    522.501  1300.57  .        0.24935  .        .        .
  3 MODEL1  PARMS   CRAB    552.636  1409.37  0.20547  .        .        .        .
  4 MODEL1  PARMS   CRAB    559.197  1577.63  .        .        .        .        0.15596
  5 MODEL1  PARMS   CRAB    469.659   872.61  .        0.25749  .        .        .
  6 MODEL1  PARMS   CRAB    511.814  1529.88  .        .        .       -0.23475  .
  7 MODEL1  PARMS   CRAB    514.128  1472.24  .        0.28625  .       -0.26296  .
  8 MODEL1  PARMS   CRAB    524.175  1429.75  .        0.30976 -0.09237  .        .
  9 MODEL1  PARMS   CRAB    436.536   785.48  .        0.39822  .        .       -0.38485
 10 MODEL1  PARMS   CRAB    437.078  1046.14  .        0.30920  .       -0.36021  .
 11 MODEL1  PARMS   CRAB    449.853  1020.32  .        0.35823 -0.15213  .        .
 12 MODEL1  PARMS   CRAB    469.230   967.65 -0.19051  0.33396  .        .        .
 13 MODEL1  PARMS   CRAB    395.436   951.40  .        0.54407 -0.18555  .       -0.44768
 14 MODEL1  PARMS   CRAB    429.533   931.11  .        0.39005  .       -0.24634 -0.26579
 15 MODEL1  PARMS   CRAB    432.268  1119.29  .        0.37116 -0.10770 -0.29499  .
 16 MODEL1  PARMS   CRAB    440.558   859.91 -0.13943  0.44632  .        .       -0.36332
 17 MODEL1  PARMS   CRAB    398.991  1018.70 -0.12903  0.58719 -0.18378  .       -0.42716
 18 MODEL1  PARMS   CRAB    403.668   987.66  .        0.52821 -0.16901 -0.08636 -0.40034
 19 MODEL1  PARMS   CRAB    439.167   952.06 -0.06866  0.41462  .       -0.21978 -0.26802
 20 MODEL1  PARMS   CRAB    440.880  1151.99 -0.09089  0.40590 -0.11313 -0.25782  .
 21 MODEL1  PARMS   CRAB    409.674  1026.93 -0.11907  0.57798 -0.17779 -0.03199 -0.41120

OBS QND_LAG  CRAB  _IN_  _P_  _EDF_     _MSE_     _RSQ_   _ADJRSQ_     _CP_    _AIC_    _SBC_

  1 0.25213   -1     1    2     23  267054.54  0.17989   0.14423  15.5974  314.296  316.733
  2  .        -1     1    2     23  273007.01  0.16161   0.12515  16.4132  314.847  317.285
  3  .        -1     1    2     23  305406.70  0.06211   0.02133  20.8533  317.650  320.088
  4  .        -1     1    2     23  312701.60  0.03970  -0.00205  21.8530  318.241  320.678
  5 0.25955   -1     2    3     22  220579.78  0.35206   0.29316   9.9142  310.405  314.061
  6 0.27552   -1     2    3     22  261953.91  0.23052   0.16057  15.3376  314.702  318.359
  7  .        -1     2    3     22  264327.30  0.22355   0.15297  15.6487  314.928  318.584
  8  .        -1     2    3     22  274759.06  0.19291   0.11954  17.0162  315.895  319.552
  9 0.42828   -1     3    4     21  190564.09  0.46567   0.38934   6.8442  307.585  312.460
 10 0.29693   -1     3    4     21  191037.19  0.46435   0.38782   6.9034  307.647  312.522
 11 0.29902   -1     3    4     21  202367.34  0.43258   0.35152   8.3211  309.087  313.963
 12 0.31366   -1     3    4     21  220176.90  0.38264   0.29445  10.5495  311.196  316.071
 13 0.50396   -1     4    5     20  156369.59  0.58243   0.49892   3.6340  303.421  309.515
 14 0.40164   -1     4    5     20  184498.32  0.50731   0.40878   6.9860  307.556  313.651
 15 0.31810   -1     4    5     20  186856.02  0.50102   0.40122   7.2669  307.874  313.968
 16 0.45844   -1     4    5     20  194090.93  0.48170   0.37804   8.1291  308.823  314.918
 17 0.53115   -1     5    6     19  159194.03  0.59614   0.48987   5.0220  304.586  311.899
 18 0.48788   -1     5    6     19  162948.16  0.58662   0.47784   5.4470  305.169  312.482
 19 0.41937   -1     5    6     19  192867.73  0.51072   0.38196   8.8341  309.383  316.696
 20 0.34147   -1     5    6     19  194375.03  0.50689   0.37713   9.0048  309.578  316.891
 21 0.52309   -1     6    7     18  167832.92  0.59664   0.46218   7.0000  306.556  315.088
```

Untransformed Data: 1987 Omitted

```
 N = 25     Regression Models for Dependent Variable: CRAB

    R-square   Adj      C(p)       AIC       MSE       SBC Variables in Model
In             Rsq
1 0.251133 0.218573  26.3182    314.5    269083    316.9 QMA_LAG
1 0.111025 0.072374  35.1711    318.8    319427    321.2 QND_LAG
1 0.031426 -.010686  40.2007    320.9    348028    323.4 QJA_LAG
1 0.020795 -.021779  40.8724    321.2    351848    323.6 QSO_LAG
---------------------------------------------------------------------

2 0.363902 0.306075  21.1927    312.4    238952    316.1 QMA_LAG QND_LAG
2 0.341889 0.282061  22.5837    313.3    247221    316.9 QMA_LAG QJA_LAG
2 0.320997 0.259270  23.9037    314.0    255069    317.7 QMA_LAG QMJ_LAG
2 0.286041 0.221136  26.1125    315.3    268201    318.9 QJF_LAG QMA_LAG
-----------------------------------------------------------------------------

3 0.500310 0.428926  14.5736    308.4    196649    313.2 QMA_LAG QSO_LAG QND_LAG
3 0.495936 0.423927  14.8500    308.6    198370    313.5 QMA_LAG QJA_LAG QND_LAG
3 0.484410 0.410754  15.5783    309.2    202906    314.0 QJF_LAG QMA_LAG QND_LAG
3 0.471358 0.395837  16.4030    309.8    208043    314.7 QMA_LAG QMJ_LAG QND_LAG
-------------------------------------------------------------------------------------

4 0.647616 0.577139   7.2659    301.6    145612    307.7 QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4 0.602483 0.522979  10.1177    304.7    164261    310.7 QJF_LAG QMA_LAG QMJ_LAG QND_LAG
4 0.566210 0.479453  12.4096    306.8    179250    312.9 QJF_LAG QMA_LAG QSO_LAG QND_LAG
4 0.549761 0.459713  13.4490    307.8    186047    313.9 QMA_LAG QMJ_LAG QJA_LAG QND_LAG
-----------------------------------------------------------------------------------------

5 0.714833 0.639790   5.0186    298.3    124038    305.7 QJF_LAG QMA_LAG QMJ_LAG QSO_LAG
                                                          QND_LAG
5 0.651544 0.559845   9.0177    303.4    151567    310.7 QMA_LAG QMJ_LAG QJA_LAG QSO_LAG
                                                          QND_LAG
5 0.625023 0.526345  10.6934    305.2    163102    312.5 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                          QND_LAG
5 0.588604 0.480342  12.9946    307.5    178943    314.8 QJF_LAG QMA_LAG QJA_LAG QSO_LAG
                                                          QND_LAG
-----------------------------------------------------------------------------------------

6 0.715129 0.620171   7.0000    300.3    130793    308.9 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                          QSO_LAG QND_LAG
-----------------------------------------------------------------------------------------

Dependent Variable: CRAB

                                 Analysis of Variance
                                    Sum of           Mean
                Source          DF   Squares          Square      F Value       Prob>F
                Model            6 5910084.4782 985014.07969        7.531       0.0004
                Error           18 2354282.3082 130793.46157
                C Total         24 8264366.7864

                    Root MSE     361.65379     R-square          0.7151
                    Dep Mean    1656.08800     Adj R-sq          0.6202
                    C.V.          21.83784
```

```
                              Parameter Estimates

                     Parameter      Standard    T for H0:                 Variance
Variable  DF          Estimate         Error   Parameter=0  Prob > |T|   Inflation
INTERCEP   1       1054.696948  240.56896563         4.384      0.0004  0.00000000
QJF_LAG    1         -0.268006    0.13370847        -2.004      0.0603  1.71817419
QMA_LAG    1          0.714414    0.12272809         5.821      0.0001  2.28677760
QMJ_LAG    1         -0.230713    0.08159675        -2.827      0.0112  1.79849548
QJA_LAG    1          0.025276    0.18510213         0.137      0.8929  1.85368665
QSO_LAG    1         -0.422145    0.17691914        -2.386      0.0282  2.96445121
QND_LAG    1          0.526532    0.11617910         4.532      0.0003  2.07731555
```

```
                      Collinearity Diagnostics(intercept adjusted)

                     Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
#    Eigenvalue          Index   QJF_LAG   QMA_LAG   QMJ_LAG   QJA_LAG   QSO_LAG   QND_LAG
1       2.77706        1.00000    0.0441    0.0232    0.0252    0.0329    0.0298    0.0177
2       1.21822        1.50984    0.0046    0.0950    0.1139    0.0009    0.0256    0.1508
3       0.73291        1.94655    0.0047    0.0891    0.0264    0.4730    0.0008    0.1086
4       0.67104        2.03431    0.2370    0.0818    0.3351    0.0358    0.0065    0.1000
5       0.44489        2.49842    0.6257    0.0908    0.0867    0.0173    0.2504    0.0167
6       0.15587        4.22095    0.0838    0.6201    0.4126    0.4401    0.6869    0.6062
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_   _RMSE_ INTERCEP  QJF_LAG  QMA_LAG  QMJ_LAG  QJA_LAG  QSO_LAG

  1 MODEL1  PARMS    CRAB     518.732  1070.86   .       0.32329   .        .        .
  2 MODEL1  PARMS    CRAB     565.178  1325.52   .        .        .        .        .
  3 MODEL1  PARMS    CRAB     589.939  1829.61   .        .        .      -0.19158   .
  4 MODEL1  PARMS    CRAB     593.168  1519.44   .        .        .        .       0.11779
  5 MODEL1  PARMS    CRAB     488.827   735.67   .       0.32442   .        .        .
  6 MODEL1  PARMS    CRAB     497.214  1290.37   .       0.36946   .      -0.33463   .
  7 MODEL1  PARMS    CRAB     505.044  1254.22   .       0.43052 -0.15101   .        .
  8 MODEL1  PARMS    CRAB     517.881  1257.94 -0.16734  0.37984   .        .        .
  9 MODEL1  PARMS    CRAB     443.451   674.21   .       0.46587   .        .      -0.43121
 10 MODEL1  PARMS    CRAB     445.387   942.00   .       0.38113   .      -0.40953   .
 11 MODEL1  PARMS    CRAB     450.451   965.36 -0.33826  0.43923   .        .        .
 12 MODEL1  PARMS    CRAB     456.117   908.73   .       0.45965 -0.19019   .        .
 13 MODEL1  PARMS    CRAB     381.591   869.78   .       0.64678 -0.22493   .      -0.49512
 14 MODEL1  PARMS    CRAB     405.292  1157.09 -0.35319  0.58620 -0.19956   .        .
 15 MODEL1  PARMS    CRAB     423.379   862.68 -0.25985  0.52641   .        .      -0.34688
 16 MODEL1  PARMS    CRAB     431.332  1029.91   .       0.47015 -0.14071 -0.32989   .
 17 MODEL1  PARMS    CRAB     352.190  1061.00 -0.26244  0.70873 -0.22594   .      -0.41025
 18 MODEL1  PARMS    CRAB     389.316   905.79   .       0.63158 -0.20842 -0.08783 -0.44752
 19 MODEL1  PARMS    CRAB     403.859  1183.87 -0.29083  0.56997 -0.16907 -0.19225   .
 20 MODEL1  PARMS    CRAB     423.017   945.30 -0.21647  0.51197   .      -0.19895 -0.26377
 21 MODEL1  PARMS    CRAB     361.654  1054.70 -0.26801  0.71441 -0.23071  0.02528 -0.42215

OBS  QND_LAG  CRAB _IN_ _P_ _EDF_       _MSE_     _RSQ_  _ADJRSQ_      _CP_     _AIC_     _SBC_

  1   .         -1    1   2    23   269083.23   0.25113   0.21857   26.3182   314.485   316.923
  2  0.21350    -1    1   2    23   319426.64   0.11103   0.07237   35.1711   318.773   321.210
  3   .         -1    1   2    23   348028.43   0.03143  -0.01069   40.2007   320.916   323.354
  4   .         -1    1   2    23   351848.29   0.02079  -0.02178   40.8724   321.189   323.627
  5  0.21517    -1    2   3    22   238952.09   0.36390   0.30608   21.1927   312.405   316.061
  6   .         -1    2   3    22   247221.38   0.34189   0.28206   22.5837   313.255   316.912
  7   .         -1    2   3    22   255069.45   0.32100   0.25927   23.9037   314.036   317.693
  8   .         -1    2   3    22   268200.87   0.28604   0.22114   26.1125   315.291   318.948
  9  0.41258    -1    3   4    21   196648.56   0.50031   0.42893   14.5736   308.371   313.246
 10  0.25517    -1    3   4    21   198369.91   0.49594   0.42393   14.8500   308.588   313.464
 11  0.31048    -1    3   4    21   202906.02   0.48441   0.41075   15.5783   309.154   314.029
 12  0.25232    -1    3   4    21   208042.61   0.47136   0.39584   16.4030   309.779   314.654
 13  0.48577    -1    4   5    20   145611.69   0.64762   0.57714    7.2659   301.639   307.733
 14  0.35366    -1    4   5    20   164261.40   0.60248   0.52298   10.1177   304.652   310.746
 15  0.44719    -1    4   5    20   179249.80   0.56621   0.47945   12.4096   306.835   312.929
 16  0.27488    -1    4   5    20   186047.20   0.54976   0.45971   13.4490   307.765   313.860
 17  0.52105    -1    5   6    19   124037.96   0.71483   0.63979    5.0186   298.348   305.661
 18  0.46933    -1    5   6    19   151566.60   0.65154   0.55985    9.0177   303.359   310.672
 19  0.34891    -1    5   6    19   163102.38   0.62502   0.52635   10.6934   305.192   312.506
 20  0.41635    -1    5   6    19   178943.42   0.58860   0.48034   12.9946   307.510   314.823
 21  0.52653    -1    6   7    18   130793.46   0.71513   0.62017    7.0000   300.322   308.854
```

Untransformed Data: 1962 and 1987 Omitted

```
 N = 24     Regression Models for Dependent Variable: CRAB

  R-square       Adj      C(p)       AIC       MSE       SBC Variables in Model
In              Rsq
1 0.232874 0.198005  23.1599     297.4    222486     299.8 QMA_LAG
1 0.141108 0.102067  28.3229     300.1    249101     302.5 QND_LAG
1 0.066478 0.024045  32.5217     302.1    270745     304.5 QJF_LAG
1 0.053146 0.010108  33.2717     302.5    274612     304.8 QSO_LAG
-------------------------------------------------------------------
2 0.376336 0.316939  17.0885     294.4    189492     298.0 QMA_LAG QND_LAG
2 0.351189 0.289397  18.5033     295.4    197132     298.9 QMA_LAG QMJ_LAG
2 0.329156 0.265266  19.7429     296.2    203827     299.7 QMA_LAG QJA_LAG
2 0.233221 0.160194  25.1404     299.4    232975     302.9 QMA_LAG QSO_LAG
---------------------------------------------------------------------------
3 0.549646 0.482093   9.3377     288.6    143675     293.3 QMA_LAG QMJ_LAG QND_LAG
3 0.521024 0.449178  10.9481     290.1    152807     294.8 QMA_LAG QJA_LAG QND_LAG
3 0.469797 0.390266  13.8302     292.5    169150     297.3 QMA_LAG QSO_LAG QND_LAG
3 0.411831 0.323606  17.0915     295.0    187642     299.8 QJF_LAG QMA_LAG QND_LAG
-----------------------------------------------------------------------------------
4 0.678108 0.610341   4.1103     282.6    108098     288.5 QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4 0.621260 0.541525   7.3086     286.5    127188     292.4 QMA_LAG QMJ_LAG QJA_LAG QND_LAG
4 0.584406 0.496912   9.3821     288.7    139564     294.6 QJF_LAG QMA_LAG QMJ_LAG QND_LAG
4 0.541649 0.445154  11.7877     291.1    153923     296.9 QMA_LAG QJA_LAG QSO_LAG QND_LAG
--------------------------------------------------------------------------------------
5 0.696046 0.611614   5.1010     283.2    107744     290.3 QJF_LAG QMA_LAG QMJ_LAG QSO_LAG
                                                           QND_LAG
5 0.686155 0.598976   5.6575     284.0    111250     291.0 QMA_LAG QMJ_LAG QJA_LAG QSO_LAG
                                                           QND_LAG
5 0.628970 0.525906   8.8748     288.0    131521     295.1 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                           QND_LAG
5 0.544475 0.417940  13.6287     292.9    161473     300.0 QJF_LAG QMA_LAG QJA_LAG QSO_LAG
                                                           QND_LAG
--------------------------------------------------------------------------------------
6 0.697841 0.591197   7.0000     285.1    113408     293.3 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                           QSO_LAG QND_LAG
--------------------------------------------------------------------------------------

Dependent Variable: CRAB

                                          Analysis of Variance

                                        Sum of          Mean
               Source          DF      Squares        Square        F Value         Prob>F
               Model            6 4452618.9629 742103.16048           6.544         0.0010
               Error           17 1927940.7767 113408.28098
               C Total         23 6380559.7396

                   Root MSE      336.76146      R-square          0.6978
                   Dep Mean     1712.12083      Adj R-sq          0.5912
                   C.V.           19.66926
```

```
                                 Parameter Estimates

                         Parameter       Standard     T for H0:                      Variance
Variable     DF           Estimate          Error    Parameter=0     Prob > |T|      Inflation
INTERCEP      1        1093.647873   224.90979192         4.863          0.0001     0.00000000
QJF_LAG       1          -0.118704     0.14639376        -0.811          0.4287     2.08023899
QMA_LAG       1           0.609512     0.12644086         4.821          0.0002     2.71333340
QMJ_LAG       1          -0.223460     0.07607253        -2.937          0.0092     1.75049777
QJA_LAG       1          -0.056393     0.17743379        -0.318          0.7545     1.96255285
QSO_LAG       1          -0.335901     0.17064135        -1.968          0.0655     3.13536716
QND_LAG       1           0.450181     0.11512663         3.910          0.0011     2.35245032

                       Collinearity Diagnostics(intercept adjusted)

                      Condition   Var Prop   Var Prop   Var Prop   Var Prop   Var Prop   Var Prop
#    Eigenvalue           Index    QJF_LAG    QMA_LAG    QMJ_LAG    QJA_LAG    QSO_LAG    QND_LAG
1       2.88133         1.00000     0.0375     0.0201     0.0263     0.0283     0.0256     0.0140
2       1.18808         1.55730     0.0002     0.0739     0.0953     0.0008     0.0275     0.1641
3       0.72973         1.98708     0.0138     0.1132     0.0018     0.4868     0.0011     0.0308
4       0.63344         2.13276     0.1082     0.0309     0.5238     0.0145     0.0148     0.1182
5       0.43511         2.57335     0.6031     0.0654     0.0086     0.0018     0.2616     0.0117
6       0.13230         4.66670     0.2371     0.6965     0.3443     0.4678     0.6694     0.6613


OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_  INTERCEP  QJF_LAG QMA_LAG  QMJ_LAG  QJA_LAG  QSO_LAG

  1 MODEL1   PARMS    CRAB   471.684  1200.30        .  0.27785        .        .        .
  2 MODEL1   PARMS    CRAB   499.100  1384.41        .        .        .        .        .
  3 MODEL1   PARMS    CRAB   520.332  1382.60  0.19630        .        .        .        .
  4 MODEL1   PARMS    CRAB   524.034  1521.65        .        .        .        .  0.16664
  5 MODEL1   PARMS    CRAB   435.307   867.27        .  0.27925        .        .        .
  6 MODEL1   PARMS    CRAB   443.996  1420.05        .  0.39775 -0.17342        .        .
  7 MODEL1   PARMS    CRAB   451.472  1392.88        .  0.32208        . -0.30368        .
  8 MODEL1   PARMS    CRAB   482.675  1192.91        .  0.27255        .        .  0.01500
  9 MODEL1   PARMS    CRAB   379.045  1072.61        .  0.42690 -0.21314        .        .
 10 MODEL1   PARMS    CRAB   390.905  1049.02        .  0.33452        . -0.37780        .
 11 MODEL1   PARMS    CRAB   411.278   793.98        .  0.39571        .        . -0.32712
 12 MODEL1   PARMS    CRAB   433.177   961.78 -0.18944  0.35526        .        .        .
 13 MODEL1   PARMS    CRAB   328.782  1007.49        .  0.57985 -0.23539        . -0.38632
 14 MODEL1   PARMS    CRAB   356.634  1165.07        .  0.43775 -0.16996 -0.27868        .
 15 MODEL1   PARMS    CRAB   373.583  1165.71 -0.18747  0.50181 -0.21269        .        .
 16 MODEL1   PARMS    CRAB   392.330   973.41        .  0.38540        . -0.30173 -0.17416
 17 MODEL1   PARMS    CRAB   328.244  1078.85 -0.13623  0.62557 -0.23379        . -0.36431
 18 MODEL1   PARMS    CRAB   333.542  1054.51        .  0.55990 -0.21472 -0.11060 -0.32506
 19 MODEL1   PARMS    CRAB   362.658  1199.75 -0.09612  0.47463 -0.17582 -0.23933        .
 20 MODEL1   PARMS    CRAB   401.837   990.85 -0.05778  0.40609        . -0.27913 -0.17645
 21 MODEL1   PARMS    CRAB   336.761  1093.65 -0.11870  0.60951 -0.22346 -0.05639 -0.33590

OBS QND_LAG  CRAB  _IN_  _P_  _EDF_      _MSE_     _RSQ_   _ADJRSQ_     _CP_     _AIC_     _SBC_

  1       .    -1     1    2     22  222485.92   0.23287    0.19801   23.1599   297.415   299.771
  2 0.21149    -1     1    2     22  249100.62   0.14111    0.10207   28.3229   300.126   302.483
  3       .    -1     1    2     22  270745.26   0.06648    0.02404   32.5217   302.126   304.482
  4       .    -1     1    2     22  274611.64   0.05315    0.01011   33.2717   302.466   304.823
  5 0.21325    -1     2    3     21  189491.81   0.37634    0.31694   17.0885   294.446   297.980
  6       .    -1     2    3     21  197132.39   0.35119    0.28940   18.5033   295.394   298.929
  7       .    -1     2    3     21  203826.67   0.32916    0.26527   19.7429   296.196   299.730
  8       .    -1     2    3     21  232975.35   0.23322    0.16019   25.1404   299.404   302.938
  9 0.25472    -1     3    4     20  143675.47   0.54965    0.48209    9.3377   288.632   293.344
 10 0.25028    -1     3    4     20  152806.62   0.52102    0.44918   10.9481   290.111   294.823
 11 0.36340    -1     3    4     20  169149.74   0.46980    0.39027   13.8302   292.549   297.261
 12 0.26713    -1     3    4     20  187642.40   0.41183    0.32361   17.0915   295.039   299.752
 13 0.43636    -1     4    5     19  108097.53   0.67811    0.61034    4.1103   282.572   288.462
 14 0.27363    -1     4    5     19  127188.12   0.62126    0.54153    7.3086   286.475   292.366
 15 0.30794    -1     4    5     19  139564.47   0.58441    0.49691    9.3821   288.704   294.594
 16 0.32276    -1     4    5     19  153923.01   0.54165    0.44515   11.7877   291.054   296.945
 17 0.46469    -1     5    6     18  107744.24   0.69605    0.61161    5.1010   283.196   290.264
 18 0.41506    -1     5    6     18  111250.29   0.68616    0.59898    5.6575   283.965   291.033
 19 0.29825    -1     5    6     18  131521.05   0.62897    0.52591    8.8748   287.982   295.050
 20 0.33803    -1     5    6     18  161472.58   0.54447    0.41794   13.6287   292.906   299.974
 21 0.45018    -1     6    7     17  113408.28   0.69784    0.59120    7.0000   285.054   293.300
```

Untransformed Data: 1969 and 1974 Omitted

```
N = 24     Regression Models for Dependent Variable: CRAB

  R-square       Adj     C(p)        AIC       MSE      SBC Variables in Model
In               Rsq
1 0.225845 0.190656  34.5987    307.0    331131    309.3 QMA_LAG
1 0.156594 0.118258  39.4828    309.0    360752    311.4 QND_LAG
1 0.023113 -.021291  48.8968    312.5    417847    314.9 QJA_LAG
1 0.011740 -.033181  49.6989    312.8    422711    315.2 QMJ_LAG
----------------------------------------------------------------------
2 0.447875 0.395292  20.9397    300.8    247408    304.4 QMA_LAG QND_LAG
2 0.314980 0.249740  30.3123    306.0    306958    309.6 QMA_LAG QJA_LAG
2 0.255971 0.185111  34.4740    308.0    333400    311.5 QJF_LAG QMA_LAG
2 0.248923 0.177391  34.9711    308.2    336559    311.8 QMA_LAG QSO_LAG
------------------------------------------------------------------------------
3 0.649260 0.596649   8.7366    292.0    165025    296.7 QMA_LAG QSO_LAG QND_LAG
3 0.609454 0.550872  11.5440    294.5    183754    299.2 QMA_LAG QJA_LAG QND_LAG
3 0.576525 0.513003  13.8664    296.5    199248    301.2 QJF_LAG QMA_LAG QND_LAG
3 0.487154 0.410227  20.1694    301.1    241297    305.8 QMA_LAG QMJ_LAG QND_LAG
----------------------------------------------------------------------------------
4 0.710035 0.648989   6.4503    289.4    143611    295.3 QJF_LAG QMA_LAG QSO_LAG QND_LAG
4 0.693912 0.629473   7.5874    290.7    151596    296.6 QMA_LAG QJA_LAG QSO_LAG QND_LAG
4 0.692702 0.628008   7.6727    290.8    152195    296.7 QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4 0.663691 0.592889   9.7188    292.9    166564    298.8 QJF_LAG QMA_LAG QJA_LAG QND_LAG
----------------------------------------------------------------------------------
5 0.755067 0.687030   5.2743    287.3    128047    294.4 QJF_LAG QMA_LAG QMJ_LAG QSO_LAG
                                                          QND_LAG
5 0.733308 0.659227   6.8089    289.4    139422    296.5 QJF_LAG QMA_LAG QJA_LAG QSO_LAG
                                                          QND_LAG
5 0.710532 0.630124   8.4153    291.3    151330    298.4 QMA_LAG QMJ_LAG QJA_LAG QSO_LAG
                                                          QND_LAG
5 0.672558 0.581602  11.0935    294.3    171182    301.4 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                          QND_LAG
----------------------------------------------------------------------------------
6 0.758957 0.673883   7.0000    289.0    133426    297.2 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                          QSO_LAG QND_LAG
----------------------------------------------------------------------------------

Dependent Variable: CRAB

                               Analysis of Variance
                                  Sum of          Mean
          Source          DF     Squares        Square        F Value        Prob>F
          Model            6 7141879.4052 1190313.2342          8.921        0.0002
          Error           17 2268243.1744 133426.06908
          C Total         23 9410122.5796

                  Root MSE      365.27533     R-square        0.7590
                  Dep Mean     1687.52083     Adj R-sq        0.6739
                  C.V.           21.64568
```

```
                                  Parameter Estimates
                          Parameter      Standard    T for H0:                     Variance
Variable    DF             Estimate         Error   Parameter=0     Prob > |T|    Inflation
INTERCEP     1           661.710440  267.72742894         2.472         0.0243   0.00000000
QJF_LAG      1            -0.250034    0.13529577        -1.848         0.0821   1.56599670
QMA_LAG      1             0.817883    0.13319831         6.140         0.0001   1.88907560
QMJ_LAG      1            -0.114768    0.08533122        -1.345         0.1963   1.55450657
QJA_LAG      1            -0.102199    0.19512236        -0.524         0.6072   2.00558178
QSO_LAG      1            -0.488880    0.19804796        -2.468         0.0245   2.38288269
QND_LAG      1             0.651195    0.11759829         5.537         0.0001   1.63145473

                           Collinearity Diagnostics(intercept adjusted)

                   Condition   Var Prop   Var Prop   Var Prop   Var Prop   Var Prop   Var Prop
#   Eigenvalue         Index    QJF_LAG    QMA_LAG    QMJ_LAG    QJA_LAG    QSO_LAG    QND_LAG
1      2.67474       1.00000     0.0465     0.0271     0.0322     0.0419     0.0397     0.0130
2      1.14522       1.52825     0.0007     0.1641     0.0009     0.0003     0.0026     0.3396
3      0.86100       1.76254     0.1586     0.0080     0.4903     0.0209     0.0394     0.0001
4      0.60819       2.09711     0.0156     0.2474     0.0391     0.4207     0.0033     0.1470
5      0.51176       2.28617     0.6793     0.0047     0.0739     0.0305     0.2958     0.0002
6      0.19910       3.66530     0.0993     0.5487     0.3636     0.4857     0.6193     0.5000
```

```
OBS _MODEL_  _TYPE_  _DEPVAR_   _RMSE_  INTERCEP  QJF_LAG QMA_LAG  QMJ_LAG  QJA_LAG  QSO_LAG
  1 MODEL1   PARMS     CRAB    575.440  1046.37      .    0.38677     .        .        .
  2 MODEL1   PARMS     CRAB    600.627  1218.82      .       .        .        .        .
  3 MODEL1   PARMS     CRAB    646.411  1848.12      .       .        .    -0.17591    .
  4 MODEL1   PARMS     CRAB    650.163  1538.30      .       .     0.06228     .        .
  5 MODEL1   PARMS     CRAB    497.401   386.98      .    0.44413     .        .        .
  6 MODEL1   PARMS     CRAB    554.038  1256.46      .    0.45839     .    -0.36014    .
  7 MODEL1   PARMS     CRAB    577.408  1237.20 -0.17014 0.44425     .        .        .
  8 MODEL1   PARMS     CRAB    580.137  1142.88      .    0.45129     .        .    -0.18462
  9 MODEL1   PARMS     CRAB    406.233   352.47      .    0.69609     .        .    -0.63041
 10 MODEL1   PARMS     CRAB    428.666   559.83      .    0.55266     .    -0.49509    .
 11 MODEL1   PARMS     CRAB    446.372   622.25 -0.37471 0.58681     .        .        .
 12 MODEL1   PARMS     CRAB    491.220   506.69      .    0.51095 -0.12624     .        .
 13 MODEL1   PARMS     CRAB    378.960   525.75 -0.26751 0.75908     .        .    -0.53315
 14 MODEL1   PARMS     CRAB    389.353   465.25      .    0.69573     .    -0.29734 -0.46641
 15 MODEL1   PARMS     CRAB    390.122   478.03      .    0.76904 -0.13279     .    -0.63705
 16 MODEL1   PARMS     CRAB    408.122   685.51 -0.25967 0.62808     .    -0.38810    .
 17 MODEL1   PARMS     CRAB    357.837   655.87 -0.27102 0.83418 -0.13522     .    -0.53864
 18 MODEL1   PARMS     CRAB    373.393   581.25 -0.22302 0.74833     .    -0.22228 -0.42673
 19 MODEL1   PARMS     CRAB    389.011   518.12      .    0.74602 -0.09136 -0.20899 -0.51971
 20 MODEL1   PARMS     CRAB    413.741   740.20 -0.27817 0.65784 -0.06562 -0.33325    .
 21 MODEL1   PARMS     CRAB    365.275   661.71 -0.25003 0.81788 -0.11477 -0.10220 -0.48888

OBS QND_LAG  CRAB  _IN_  _P_  _EDF_    _MSE_     _RSQ_    _ADJRSQ_     _CP_     _AIC_    _SBC_
  1  .        -1     1    2     22   331131.45  0.22585   0.19066   34.5987  306.958  309.314
  2 0.30597   -1     1    2     22   360752.34  0.15659   0.11826   39.4828  309.014  311.371
  3  .        -1     1    2     22   417846.73  0.02311  -0.02129   48.8968  312.541  314.897
  4  .        -1     1    2     22   422711.32  0.01174  -0.03318   49.6989  312.818  315.175
  5 0.36838   -1     2    3     21   247407.85  0.44787   0.39529   20.9397  300.846  304.380
  6  .        -1     2    3     21   306958.12  0.31498   0.24974   30.3123  306.022  309.557
  7  .        -1     2    3     21   333400.05  0.25597   0.18511   34.4740  308.006  311.540
  8  .        -1     2    3     21   336558.58  0.24892   0.17739   34.9711  308.232  311.766
  9 0.57177   -1     3    4     20   165025.43  0.64926   0.59665    8.7366  291.957  296.669
 10 0.43317   -1     3    4     20   183754.49  0.60945   0.55087   11.5440  294.537  299.249
 11 0.47175   -1     3    4     20   199247.73  0.57652   0.51300   13.8664  296.480  301.192
 12 0.41539   -1     3    4     20   241297.06  0.48715   0.41023   20.1694  301.075  305.787
 13 0.61419   -1     4    5     19   143610.98  0.71003   0.64899    6.4503  289.390  295.280
 14 0.55777   -1     4    5     19   151595.92  0.69391   0.62947    7.5874  290.689  296.579
 15 0.62337   -1     4    5     19   152195.19  0.69270   0.62801    7.6727  290.783  296.674
 16 0.49080   -1     4    5     19   166563.75  0.66369   0.59289    9.7188  292.948  298.839
 17 0.66728   -1     5    6     18   128047.02  0.75507   0.68703    5.2743  287.339  294.408
 18 0.59667   -1     5    6     18   139422.44  0.73331   0.65923    6.8089  289.382  296.450
 19 0.59743   -1     5    6     18   151329.65  0.71053   0.63012    8.4153  291.349  298.417
 20 0.51316   -1     5    6     18   171181.63  0.67256   0.58160   11.0935  294.307  301.375
 21 0.65119   -1     6    7     17   133426.07  0.75896   0.67388    7.0000  288.955  297.201
```

Untransformed Data: 1986 and 1987 Omitted

```
 N = 24     Regression Models for Dependent Variable: CRAB

  R-square      Adj     C(p)       AIC       MSE       SBC Variables in Model
In              Rsq
1 0.341036 0.311083  21.4822     293.6     189619     295.9 QMA_LAG
1 0.027742 -.016451  41.2042     302.9     279771     305.3 QJA_LAG
1 0.014830 -.029950  42.0170     303.2     283486     305.6 QND_LAG
1 0.013218 -.031636  42.1185     303.3     283950     305.6 QSO_LAG
-------------------------------------------------------------------
2 0.490308 0.441766  14.0854     289.4     153650     292.9 QMA_LAG QMJ_LAG
2 0.436759 0.383117  17.4563     291.8     169792     295.3 QMA_LAG QJA_LAG
2 0.419434 0.364142  18.5470     292.5     175015     296.1 QJF_LAG QMA_LAG
2 0.360833 0.299960  22.2359     294.8     192681     298.4 QMA_LAG QSO_LAG
---------------------------------------------------------------------------
3 0.566117 0.501035  11.3132     287.5     137336     292.3 QJF_LAG QMA_LAG QMJ_LAG
3 0.528073 0.457284  13.7081     289.6     149379     294.3 QMA_LAG QMJ_LAG QJA_LAG
3 0.517898 0.445582  14.3486     290.1     152599     294.8 QMA_LAG QMJ_LAG QND_LAG
3 0.511317 0.438014  14.7629     290.4     154682     295.1 QMA_LAG QMJ_LAG QSO_LAG
-----------------------------------------------------------------------------------
4 0.654924 0.582277   7.7227     284.1     114975     289.9 QJF_LAG QMA_LAG QMJ_LAG QND_LAG
4 0.644660 0.569851   8.3689     284.8     118395     290.6 QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4 0.573462 0.483664  12.8508     289.1     142118     295.0 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
4 0.572359 0.482329  12.9202     289.2     142485     295.1 QMA_LAG QMJ_LAG QJA_LAG QND_LAG
-------------------------------------------------------------------------------------
5 0.728960 0.653672   5.0621     280.3      95324     287.3 QJF_LAG QMA_LAG QMJ_LAG QSO_LAG
                                                           QND_LAG
5 0.664866 0.571774   9.0969     285.4     117866     292.4 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                           QND_LAG
5 0.648078 0.550322  10.1537     286.5     123770     293.6 QMA_LAG QMJ_LAG QJA_LAG QSO_LAG
                                                           QND_LAG
5 0.573510 0.455041  14.8478     291.1     149996     298.2 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                           QSO_LAG
-------------------------------------------------------------------------------------
6 0.729947 0.634634   7.0000     282.2     100564     290.4 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                           QSO_LAG QND_LAG
-------------------------------------------------------------------------------------

Dependent Variable: CRAB

                            Analysis of Variance
                               Sum of          Mean
         Source         DF    Squares        Square       F Value       Prob>F
         Model           6 4620984.1645 770164.02742        7.658       0.0004
         Error          17 1709592.0488 100564.23817
         C Total        23 6330576.2133

             Root MSE     317.11865     R-square        0.7299
             Dep Mean    1599.31667     Adj R-sq        0.6346
             C.V.          19.82838
```

```
                              Parameter Estimates

                     Parameter       Standard    T for H0:                  Variance
Variable    DF        Estimate          Error  Parameter=0   Prob > |T|     Inflation
INTERCEP     1     1186.494602   217.27225224        5.461       0.0001    0.00000000
QJF_LAG      1       -0.266167     0.11724546       -2.270       0.0365    1.70272267
QMA_LAG      1        0.687913     0.10812275        6.362       0.0001    2.30744632
QMJ_LAG      1       -0.237199     0.07159452       -3.313       0.0041    1.77912962
QJA_LAG      1        0.040475     0.16241905        0.249       0.8062    1.84819394
QSO_LAG      1       -0.323710     0.15993008       -2.024       0.0590    3.12456355
QND_LAG      1        0.372410     0.11867307        3.138       0.0060    2.12065322

                  Collinearity Diagnostics(intercept adjusted)

                    Condition   Var Prop   Var Prop   Var Prop   Var Prop   Var Prop   Var Prop
#   Eigenvalue          Index    QJF_LAG    QMA_LAG    QMJ_LAG    QJA_LAG    QSO_LAG    QND_LAG
1      2.80823        1.00000     0.0430     0.0221     0.0234     0.0340     0.0281     0.0187
2      1.25364        1.49668     0.0027     0.0910     0.1283     0.0001     0.0229     0.1336
3      0.70603        1.99437     0.0229     0.1611     0.0266     0.4813     0.0089     0.0194
4      0.64801        2.08174     0.3080     0.0050     0.3007     0.0334     0.0001     0.1933
5      0.42873        2.55931     0.5505     0.1037     0.1500     0.0513     0.2194     0.0513
6      0.15535        4.25163     0.0729     0.6171     0.3711     0.4000     0.7206     0.5838


OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_ INTERCEP  QJF_LAG QMA_LAG  QMJ_LAG  QJA_LAG  QSO_LAG

  1 MODEL1   PARMS    CRAB   435.453  1001.08     .     0.32980     .        .        .
  2 MODEL1   PARMS    CRAB   528.933  1743.45     .        .        .    -0.15788    .
  3 MODEL1   PARMS    CRAB   532.434  1484.58     .        .        .        .        .
  4 MODEL1   PARMS    CRAB   532.870  1504.65     .        .        .        .     0.08253
  5 MODEL1   PARMS    CRAB   391.982  1231.20     .     0.46903 -0.19518     .        .
  6 MODEL1   PARMS    CRAB   412.059  1201.19     .     0.37116     .    -0.30138    .
  7 MODEL1   PARMS    CRAB   418.348  1244.09 -0.22094 0.40484     .        .        .
  8 MODEL1   PARMS    CRAB   438.954  1062.56     .     0.36615     .        .    -0.11107
  9 MODEL1   PARMS    CRAB   370.589  1468.19 -0.21728 0.54162 -0.19349     .        .
 10 MODEL1   PARMS    CRAB   386.495  1324.31     .     0.47242 -0.16143 -0.20017    .
 11 MODEL1   PARMS    CRAB   390.640  1086.53     .     0.47574 -0.20534     .        .
 12 MODEL1   PARMS    CRAB   393.297  1295.47     .     0.50704 -0.19598     .    -0.11442
 13 MODEL1   PARMS    CRAB   339.080  1295.41 -0.31758 0.58821 -0.21254     .        .
 14 MODEL1   PARMS    CRAB   344.086  1010.97     .     0.61771 -0.22861     .    -0.38646
 15 MODEL1   PARMS    CRAB   376.985  1479.01 -0.18563 0.53270 -0.17731 -0.09747    .
 16 MODEL1   PARMS    CRAB   377.472  1158.17     .     0.48187 -0.16692 -0.24561    .
 17 MODEL1   PARMS    CRAB   308.746  1196.10 -0.25727 0.67892 -0.22954     .    -0.30504
 18 MODEL1   PARMS    CRAB   343.316  1305.30 -0.28228 0.57855 -0.19398 -0.11352    .
 19 MODEL1   PARMS    CRAB   351.810  1039.35     .     0.60551 -0.21509 -0.07177 -0.34836
 20 MODEL1   PARMS    CRAB   387.293  1478.82 -0.18742 0.53115 -0.17667 -0.10087  0.00663
 21 MODEL1   PARMS    CRAB   317.119  1186.49 -0.26617 0.68791 -0.23720  0.04047 -0.32371

OBS QND_LAG  CRAB  _IN_  _P_  _EDF_     _MSE_     _RSQ_   _ADJRSQ_    _CP_    _AIC_    _SBC_

  1  .        -1     1    2     22   189619.20  0.34104   0.31108  21.4822  293.578  295.934
  2  .        -1     1    2     22   279770.56  0.02774  -0.01645  41.2042  302.913  305.269
  3 0.07874   -1     1    2     22   283486.00  0.01483  -0.02995  42.0170  303.230  305.586
  4  .        -1     1    2     22   283950.05  0.01322  -0.03164  42.1185  303.269  305.625
  5  .        -1     2    3     21   153649.70  0.49031   0.44177  14.0854  289.414  292.948
  6  .        -1     2    3     21   169792.34  0.43676   0.38312  17.4563  291.811  295.345
  7  .        -1     2    3     21   175015.24  0.41943   0.36414  18.5470  292.538  296.072
  8  .        -1     2    3     21   192680.65  0.36083   0.29996  22.2359  294.846  298.380
  9  .        -1     3    4     20   137336.47  0.56612   0.50103  11.3132  287.549  292.261
 10  .        -1     3    4     20   149378.61  0.52807   0.45728  13.7081  289.566  294.278
 11 0.10818   -1     3    4     20   152599.31  0.51790   0.44558  14.3486  290.078  294.790
 12  .        -1     3    4     20   154682.28  0.51132   0.43801  14.7629  290.403  295.116
 13 0.21101   -1     4    5     19   114975.17  0.65492   0.58228   7.7227  284.053  289.943
 14 0.32701   -1     4    5     19   118395.19  0.64466   0.56985   8.3689  284.756  290.646
 15  .        -1     4    5     19   142117.50  0.57346   0.48366  12.8508  289.139  295.029
 16 0.14004   -1     4    5     19   142484.93  0.57236   0.48233  12.9202  289.201  295.091
 17 0.36421   -1     5    6     18    95324.28  0.72896   0.65367   5.0621  280.257  287.325
 18 0.21431   -1     5    6     18   117866.11  0.66487   0.57177   9.0969  285.351  292.419
 19 0.31475   -1     5    6     18   123770.34  0.64808   0.55032  10.1537  286.524  293.592
 20  .        -1     5    6     18   149995.96  0.57351   0.45504  14.8478  291.136  298.205
 21 0.37241   -1     6    7     17   100564.24  0.72995   0.63463   7.0000  282.169  290.415
```

Untransformed Data: 1962, 1969 and 1974 Omitted

```
 N = 23     Regression Models for Dependent Variable: CRAB

  R-square      Adj      C(p)       AIC       MSE       SBC Variables in Model
In              Rsq
1 0.207380 0.169636  28.7314     290.4    280580      292.7 QMA_LAG
1 0.196753 0.158504  29.3713     290.7    284341      293.0 QND_LAG
1 0.056302 0.011364  37.8292     294.4    334060      296.7 QJF_LAG
1 0.034326 -.011658  39.1526     295.0    341839      297.2 QSO_LAG
--------------------------------------------------------------------------
2 0.475736 0.423309  14.5711     282.9    194864      286.3 QMA_LAG QND_LAG
2 0.298945 0.228839  25.2174     289.6    260575      293.0 QMA_LAG QJA_LAG
2 0.247711 0.172482  28.3027     291.2    279618      294.6 QJA_LAG QND_LAG
2 0.220334 0.142368  29.9513     292.1    289794      295.5 QMA_LAG QMJ_LAG
-----------------------------------------------------------------------------------
3 0.650116 0.594871   6.0699     275.6    136893      280.2 QMA_LAG QJA_LAG QND_LAG
3 0.624393 0.565087   7.6190     277.3    146957      281.8 QMA_LAG QSO_LAG QND_LAG
3 0.551558 0.480752  12.0051     281.3    175454      285.9 QMA_LAG QMJ_LAG QND_LAG
3 0.521443 0.445881  13.8186     282.8    187237      287.4 QJF_LAG QMA_LAG QND_LAG
-------------------------------------------------------------------------------------------
4 0.696120 0.628591   5.2996     274.4    125499      280.1 QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4 0.693956 0.625946   5.4299     274.5    126393      280.2 QMA_LAG QJA_LAG QSO_LAG QND_LAG
4 0.665342 0.590973   7.1530     276.6    138210      282.3 QMA_LAG QMJ_LAG QJA_LAG QND_LAG
4 0.654760 0.578040   7.7903     277.3    142580      283.0 QJF_LAG QMA_LAG QJA_LAG QND_LAG
-----------------------------------------------------------------------------------------------
5 0.723099 0.641658   5.6749     274.2    121084      281.1 QMA_LAG QMJ_LAG QJA_LAG QSO_LAG
                                                            QND_LAG
5 0.721299 0.639328   5.7833     274.4    121871      281.2 QJF_LAG QMA_LAG QMJ_LAG QSO_LAG
                                                            QND_LAG
5 0.701094 0.613180   7.0001     276.0    130706      282.8 QJF_LAG QMA_LAG QJA_LAG QSO_LAG
                                                            QND_LAG
5 0.671922 0.575429   8.7568     278.1    143462      285.0 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                            QND_LAG
-----------------------------------------------------------------------------------------------
6 0.734306 0.634671   7.0000     275.3    123444      283.2 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                            QSO_LAG QND_LAG
-----------------------------------------------------------------------------------------------

Dependent Variable: CRAB
                                   Analysis of Variance
                                     Sum of          Mean
                Source          DF      Squares        Square        F Value        Prob>F
                Model            6 5458681.2827 909780.21378           7.370        0.0007
                Error           16 1975110.3939 123444.39962
                C Total         22 7433791.6765

                    Root MSE      351.34655     R-square         0.7343
                    Dep Mean     1747.35652     Adj R-sq         0.6347
                    C.V.           20.10732
```

```
                              Parameter Estimates

                  Parameter      Standard    T for H0:                  Variance
Variable   DF      Estimate         Error   Parameter=0   Prob > |T|   Inflation
INTERCEP    1    703.277369  258.92726553         2.716       0.0153  0.00000000
QJF_LAG     1     -0.125772    0.15309502        -0.822       0.4234  1.84641253
QMA_LAG     1      0.715345    0.14436853         4.955       0.0001  2.33251154
QMJ_LAG     1     -0.116083    0.08208178        -1.414       0.1765  1.50965844
QJA_LAG     1     -0.170701    0.19287465        -0.885       0.3892  2.11644568
QSO_LAG     1     -0.389722    0.20107046        -1.938       0.0704  2.57954027
QND_LAG     1      0.589417    0.12000825         4.911       0.0002  1.83636922

                   Collinearity Diagnostics(intercept adjusted)

                   Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
#   Eigenvalue         Index   QJF_LAG   QMA_LAG   QMJ_LAG   QJA_LAG   QSO_LAG   QND_LAG
1      2.78197       1.00000    0.0405    0.0228    0.0334    0.0361    0.0333    0.0103
2      1.14541       1.55846    0.0005    0.1280    0.0019    0.0000    0.0016    0.3086
3      0.80085       1.86381    0.0811    0.0240    0.5032    0.0558    0.0451    0.0266
4      0.58398       2.18261    0.0258    0.1095    0.2082    0.4021    0.0429    0.0727
5      0.52439       2.30329    0.5789    0.0518    0.0039    0.0275    0.2460    0.0101
6      0.16339       4.12636    0.2730    0.6639    0.2495    0.4785    0.6312    0.5718
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_  INTERCEP  QJF_LAG QMA_LAG  QMJ_LAG  QJA_LAG  QSO_LAG
  1 MODEL1  PARMS    CRAB   529.698  1184.71   .       0.33405   .        .        .
  2 MODEL1  PARMS    CRAB   533.237  1280.23   .        .        .        .        .
  3 MODEL1  PARMS    CRAB   577.979  1409.97  0.20746   .        .        .        .
  4 MODEL1  PARMS    CRAB   584.670  1552.67   .        .        .        .       0.18000
  5 MODEL1  PARMS    CRAB   441.434   535.41   .       0.39192   .        .        .
  6 MODEL1  PARMS    CRAB   510.465  1366.87   .       0.40169   .      -0.32545   .
  7 MODEL1  PARMS    CRAB   528.789  1457.91   .        .        .      -0.23490   .
  8 MODEL1  PARMS    CRAB   538.325  1289.57   .       0.36161 -0.06214   .        .
  9 MODEL1  PARMS    CRAB   369.991   682.70   .       0.49705   .      -0.45886   .
 10 MODEL1  PARMS    CRAB   383.350   457.74   .       0.61404   .        .      -0.51205
 11 MODEL1  PARMS    CRAB   418.872   696.19   .       0.47086 -0.15703   .        .
 12 MODEL1  PARMS    CRAB   432.708   634.89 -0.23457 0.49804   .        .        .
 13 MODEL1  PARMS    CRAB   354.258   615.21   .       0.68780 -0.15276   .      -0.50505
 14 MODEL1  PARMS    CRAB   355.517   593.54   .       0.60575   .      -0.33135 -0.31792
 15 MODEL1  PARMS    CRAB   371.766   742.57   .       0.52238 -0.07631 -0.40197   .
 16 MODEL1  PARMS    CRAB   377.598   707.42 -0.08013 0.52669   .      -0.43000   .
 17 MODEL1  PARMS    CRAB   347.971   662.76   .       0.66043 -0.10794 -0.22875 -0.37308
 18 MODEL1  PARMS    CRAB   349.100   688.55 -0.17541 0.75470 -0.14825   .      -0.48155
 19 MODEL1  PARMS    CRAB   361.533   621.51 -0.09964 0.64598   .      -0.29149 -0.32781
 20 MODEL1  PARMS    CRAB   378.764   776.17 -0.09589 0.55955 -0.08144 -0.36360   .
 21 MODEL1  PARMS    CRAB   351.347   703.28 -0.12577 0.71534 -0.11608 -0.17070 -0.38972

OBS QND_LAG  CRAB  _IN_  _P_  _EDF_     _MSE_     _RSQ_   _ADJRSQ_    _CP_    _AIC_    _SBC_
  1  .        -1     1    2     21   280579.53  0.20738   0.16964  28.7314  290.434  292.705
  2 0.30483   -1     1    2     21   284341.31  0.19675   0.15850  29.3713  290.740  293.011
  3  .        -1     1    2     21   334059.57  0.05630   0.01136  37.8292  294.446  296.717
  4  .        -1     1    2     21   341838.86  0.03433  -0.01166  39.1526  294.976  297.247
  5 0.36011   -1     2    3     20   194863.62  0.47574   0.42331  14.5711  282.927  286.333
  6  .        -1     2    3     20   260575.00  0.29894   0.22884  25.2174  289.610  293.017
  7 0.32835   -1     2    3     20   279618.17  0.24771   0.17248  28.3027  291.233  294.639
  8  .        -1     2    3     20   289793.61  0.22033   0.14237  29.9513  292.055  295.461
  9 0.42087   -1     3    4     19   136892.98  0.65012   0.59487   6.0699  275.626  280.168
 10 0.52808   -1     3    4     19   146957.03  0.62439   0.56509   7.6190  277.257  281.799
 11 0.41792   -1     3    4     19   175453.86  0.55156   0.48075  12.0051  281.334  285.876
 12 0.42748   -1     3    4     19   187236.53  0.52144   0.44588  13.8186  282.829  287.371
 13 0.58203   -1     4    5     18   125498.90  0.69612   0.62859   5.2996  274.383  280.061
 14 0.50828   -1     4    5     18   126392.68  0.69396   0.62595   5.4299  274.547  280.224
 15 0.44143   -1     4    5     18   138209.97  0.66534   0.59097   7.1530  276.602  282.280
 16 0.44006   -1     4    5     18   142580.09  0.65476   0.57804   7.7903  277.318  282.996
 17 0.55253   -1     5    6     17   121083.78  0.72310   0.64166   5.6749  274.245  281.058
 18 0.62304   -1     5    6     17   121870.78  0.72130   0.63933   5.7833  274.394  281.207
 19 0.53486   -1     5    6     17   130706.27  0.70109   0.61318   7.0001  276.004  282.817
 20 0.46578   -1     5    6     17   143462.37  0.67192   0.57543   8.7568  278.146  284.959
 21 0.58942   -1     6    7     16   123444.40  0.73431   0.63467   7.0000  275.295  283.243
```

Untransformed Data: 1969, 1974 and 1987 Omitted

```
 N = 23     Regression Models for Dependent Variable: CRAB

  R-square      Adj     C(p)       AIC      MSE      SBC Variables in Model
In              Rsq
1 0.295690 0.262151  43.3503     289.8    273304    292.1 QMA_LAG
1 0.108617 0.066170  59.9112     295.2    345896    297.5 QND_LAG
1 0.034481 -.011496  66.4742     297.1    374664    299.4 QJA_LAG
1 0.010676 -.036434  68.5816     297.6    383902    299.9 QSO_LAG
---------------------------------------------------------------------
2 0.459356 0.405292  30.8614     285.7    220284    289.2 QMA_LAG QND_LAG
2 0.423714 0.366086  34.0167     287.2    234806    290.6 QMA_LAG QJA_LAG
2 0.341892 0.276081  41.2602     290.3    268144    293.7 QJF_LAG QMA_LAG
2 0.336963 0.270659  41.6965     290.4    270152    293.8 QMA_LAG QMJ_LAG
-----------------------------------------------------------------------------
3 0.654209 0.599611  15.6117     277.5    148307    282.0 QMA_LAG QJA_LAG QND_LAG
3 0.653084 0.598308  15.7113     277.5    148789    282.1 QMA_LAG QSO_LAG QND_LAG
3 0.600636 0.537578  20.3544     280.8    171284    285.3 QJF_LAG QMA_LAG QND_LAG
3 0.550746 0.479811  24.7710     283.5    192681    288.0 QMA_LAG QMJ_LAG QND_LAG
-------------------------------------------------------------------------------------
4 0.740119 0.682368  10.0064     272.9    117653    278.6 QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4 0.724574 0.663369  11.3825     274.2    124690    279.9 QJF_LAG QMA_LAG QSO_LAG QND_LAG
4 0.719452 0.657108  11.8360     274.7    127010    280.3 QMA_LAG QJA_LAG QSO_LAG QND_LAG
4 0.709929 0.645468  12.6791     275.4    131321    281.1 QJF_LAG QMA_LAG QJA_LAG QND_LAG
----------------------------------------------------------------------------------------
5 0.814570 0.760032   5.4155     267.1     88886    273.9 QJF_LAG QMA_LAG QMJ_LAG QSO_LAG
                                                          QND_LAG
5 0.762505 0.692653  10.0247     272.8    113843    279.6 QJF_LAG QMA_LAG QJA_LAG QSO_LAG
                                                          QND_LAG
5 0.761499 0.691352  10.1137     272.9    114325    279.7 QMA_LAG QMJ_LAG QJA_LAG QSO_LAG
                                                          QND_LAG
5 0.745618 0.670800  11.5196     274.4    121938    281.2 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                          QND_LAG
----------------------------------------------------------------------------------------
6 0.819264 0.751487   7.0000     268.5     92051    276.5 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                          QSO_LAG QND_LAG
----------------------------------------------------------------------------------------

Dependent Variable: CRAB

                                  Analysis of Variance
                                     Sum of          Mean
                Source          DF      Squares        Square       F Value       Prob>F
                Model            6 6676129.1225 1112688.1871         12.088       0.0001
                Error           16 1472809.5766 92050.598537
                C Total         22 8148938.6991

                    Root MSE      303.39842     R-square        0.8193
                    Dep Mean     1639.72174     Adj R-sq        0.7515
                    C.V.           18.50304
```

```
                             Parameter Estimates

                   Parameter      Standard    T for H0:                   Variance
Variable  DF        Estimate         Error   Parameter=0   Prob > |T|    Inflation
INTERCEP   1      757.293276  224.73956599         3.370       0.0039   0.00000000
QJF_LAG    1       -0.254144    0.11238563        -2.261       0.0380   1.56489541
QMA_LAG    1        0.829779    0.11070876         7.495       0.0001   1.87958343
QMJ_LAG    1       -0.163093    0.07275777        -2.242       0.0395   1.52101736
QJA_LAG    1       -0.104469    0.16207086        -0.645       0.5283   1.99933819
QSO_LAG    1       -0.423809    0.16598174        -2.553       0.0213   2.42386764
QND_LAG    1        0.583573    0.10034964         5.815       0.0001   1.59111739


                 Collinearity Diagnostics(intercept adjusted)

                  Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
#  Eigenvalue         Index   QJF_LAG   QMA_LAG   QMJ_LAG   QJA_LAG   QSO_LAG   QND_LAG
1     2.69282       1.00000    0.0456    0.0283    0.0330    0.0412    0.0390    0.0124
2     1.15340       1.52797    0.0060    0.1359    0.0260    0.0011    0.0092    0.3383
3     0.83413       1.79675    0.1737    0.0428    0.4667    0.0265    0.0234    0.0171
4     0.61384       2.09449    0.0346    0.2441    0.0455    0.3976    0.0051    0.1505
5     0.50274       2.31436    0.6440    0.0066    0.1147    0.0446    0.2898    0.0019
6     0.20307       3.64151    0.0962    0.5422    0.3141    0.4890    0.6336    0.4799


OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_  INTERCEP  QJF_LAG QMA_LAG   QMJ_LAG  QJA_LAG  QSO_LAG

  1 MODEL1   PARMS    CRAB   522.785   949.57     .     0.41315     .         .         .
  2 MODEL1   PARMS    CRAB   588.130  1273.31     .        .        .         .         .
  3 MODEL1   PARMS    CRAB   612.098  1821.28     .        .        .     -0.20026     .
  4 MODEL1   PARMS    CRAB   619.598  1525.13     .        .        .         .      0.10365
  5 MODEL1   PARMS    CRAB   469.344   427.77     .     0.45391     .         .         .
  6 MODEL1   PARMS    CRAB   484.568  1178.10     .     0.49507     .     -0.40301     .
  7 MODEL1   PARMS    CRAB   517.826  1166.86 -0.19648 0.48036     .         .         .
  8 MODEL1   PARMS    CRAB   519.762  1130.60     .     0.47438 -0.12132      .         .
  9 MODEL1   PARMS    CRAB   385.106   606.20     .     0.56528     .     -0.50616     .
 10 MODEL1   PARMS    CRAB   385.732   387.07     .     0.68444     .         .     -0.58210
 11 MODEL1   PARMS    CRAB   413.865   655.77 -0.36560 0.59274     .         .         .
 12 MODEL1   PARMS    CRAB   438.955   613.93     .     0.55449 -0.18531      .         .
 13 MODEL1   PARMS    CRAB   343.006   569.21     .     0.78004 -0.18086      .     -0.57560
 14 MODEL1   PARMS    CRAB   353.115   562.36 -0.27001 0.74789     .         .     -0.48339
 15 MODEL1   PARMS    CRAB   356.384   520.37     .     0.68253     .     -0.33975 -0.38852
 16 MODEL1   PARMS    CRAB   362.382   723.37 -0.24517 0.63608     .     -0.40479     .
 17 MODEL1   PARMS    CRAB   298.137   751.23 -0.27559 0.84643 -0.18395      .     -0.47474
 18 MODEL1   PARMS    CRAB   337.407   632.32 -0.21701 0.73394     .     -0.26601 -0.35120
 19 MODEL1   PARMS    CRAB   338.120   610.45     .     0.75663 -0.13884 -0.21297 -0.45577
 20 MODEL1   PARMS    CRAB   349.196   835.20 -0.27858 0.69488 -0.12684 -0.30147     .
 21 MODEL1   PARMS    CRAB   303.398   757.29 -0.25414 0.82978 -0.16309 -0.10447 -0.42381

OBS QND_LAG  CRAB  _IN_  _P_  _EDF_     _MSE_     _RSQ_   _ADJRSQ_    _CP_    _AIC_    _SBC_

  1  .        -1     1    2     21   273303.75  0.29569   0.26215  43.3503  289.829  292.100
  2 0.24669   -1     1    2     21   345896.34  0.10862   0.06617  59.9112  295.247  297.518
  3  .        -1     1    2     21   374664.39  0.03448  -0.01150  66.4742  297.085  299.356
  4  .        -1     1    2     21   383901.83  0.01068  -0.03643  68.5816  297.645  299.916
  5 0.30547   -1     2    3     20   220283.61  0.45936   0.40529  30.8614  285.747  289.153
  6  .        -1     2    3     20   234805.76  0.42371   0.36609  34.0167  287.215  290.622
  7  .        -1     2    3     20   268144.19  0.34189   0.27608  41.2602  290.269  293.675
  8  .        -1     2    3     20   270152.42  0.33696   0.27066  41.6965  290.441  293.847
  9 0.36904   -1     3    4     19   148306.68  0.65421   0.59961  15.6117  277.468  282.010
 10 0.50691   -1     3    4     19   148789.20  0.65308   0.59831  15.7113  277.542  282.084
 11 0.40870   -1     3    4     19   171283.96  0.60064   0.53758  20.3544  280.781  285.323
 12 0.35837   -1     3    4     19   192681.43  0.55075   0.47981  24.7710  283.488  288.030
 13 0.55629   -1     4    5     18   117653.05  0.74012   0.68237  10.0064  272.899  278.576
 14 0.54899   -1     4    5     18   124690.32  0.72457   0.66337  11.3825  274.235  279.912
 15 0.48259   -1     4    5     18   127009.52  0.71945   0.65711  11.8360  274.659  280.336
 16 0.42554   -1     4    5     18   131320.75  0.70993   0.64547  12.6791  275.426  281.104
 17 0.60009   -1     5    6     17    88885.66  0.81457   0.76003   5.4155  267.135  273.948
 18 0.52169   -1     5    6     17   113843.31  0.76250   0.69265  10.0247  272.827  279.640
 19 0.52958   -1     5    6     17   114325.34  0.76150   0.69135  10.1137  272.924  279.737
 20 0.45820   -1     5    6     17   121937.64  0.74562   0.67080  11.5196  274.407  281.220
 21 0.58357   -1     6    7     16    92050.60  0.81926   0.75149   7.0000  268.545  276.494
```

Untransformed Data: 1962, 1969, 1974, 1986 and 1987 Omitted

```
 N = 21      Regression Models for Dependent Variable: CRAB

  R-square       Adj      C(p)       AIC       MSE       SBC Variables in Model
In               Rsq
1 0.396018 0.364229  28.3562    251.1    142502     253.2 QMA_LAG
1 0.036825 -.013869  55.3299    260.9    227249     263.0 QMJ_LAG
1 0.036329 -.014391  55.3671    260.9    227366     263.0 QJF_LAG
1 0.036004 -.014733  55.3915    260.9    227443     263.0 QJA_LAG
---------------------------------------------------------------------------
2 0.592486 0.547207  15.6024    244.8    101489     248.0 QMA_LAG QMJ_LAG
2 0.553006 0.503340  18.5671    246.8    111322     249.9 QMA_LAG QJA_LAG
2 0.432619 0.369577  27.6076    251.8    141303     254.9 QMA_LAG QND_LAG
2 0.430183 0.366870  27.7906    251.9    141910     255.0 QMA_LAG QSO_LAG
----------------------------------------------------------------------------------
3 0.663524 0.604145  12.2678    242.8     88727     247.0 QMA_LAG QMJ_LAG QND_LAG
3 0.656669 0.596081  12.7825    243.2     90535     247.4 QMA_LAG QJA_LAG QND_LAG
3 0.643512 0.580603  13.7705    244.0     94004     248.2 QMA_LAG QMJ_LAG QJA_LAG
3 0.607043 0.537697  16.5092    246.1    103621     250.3 QMA_LAG QMJ_LAG QSO_LAG
----------------------------------------------------------------------------------------
4 0.769689 0.712111   6.2953    236.9     64528     242.1 QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4 0.755127 0.693908   7.3888    238.1     68607     243.4 QMA_LAG QMJ_LAG QJA_LAG QND_LAG
4 0.705009 0.631261  11.1524    242.1     82649     247.3 QJF_LAG QMA_LAG QMJ_LAG QND_LAG
4 0.681348 0.601685  12.9293    243.7     89279     248.9 QMA_LAG QJA_LAG QSO_LAG QND_LAG
--------------------------------------------------------------------------------------------
5 0.801138 0.734850   5.9336    235.8     59431     242.0 QJF_LAG QMA_LAG QMJ_LAG QSO_LAG
                                                          QND_LAG
5 0.797763 0.730350   6.1870    236.1     60439     242.4 QMA_LAG QMJ_LAG QJA_LAG QSO_LAG
                                                          QND_LAG
5 0.765855 0.687806   8.5832    239.2     69975     245.5 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                          QND_LAG
5 0.688861 0.585148  14.3651    245.2     92985     251.4 QJF_LAG QMA_LAG QJA_LAG QSO_LAG
                                                          QND_LAG
--------------------------------------------------------------------------------------------
6 0.813570 0.733672   7.0000    236.4     59695     243.7 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
                                                          QSO_LAG QND_LAG
--------------------------------------------------------------------------------------------

Dependent Variable: CRAB

                               Analysis of Variance
                                  Sum of          Mean
        Source          DF       Squares        Square      F Value       Prob>F

        Model            6  3647078.5323  607846.42205       10.183       0.0002
        Error           14  835729.36008   59694.95429
        C Total         20  4482807.8924

            Root MSE     244.32551     R-square         0.8136
            Dep Mean    1637.31905     Adj R-sq         0.7337
            C.V.          14.92229
```

```
                              Parameter Estimates

                     Parameter      Standard    T for H0:                 Variance
Variable   DF         Estimate         Error   Parameter=0   Prob > |T|   Inflation
INTERCEP    1       982.445948  198.16974417         4.958       0.0002  0.00000000
QJF_LAG     1        -0.116051    0.10651615        -1.090       0.2943  1.80506263
QMA_LAG     1         0.677866    0.10226540         6.628       0.0001  2.40136907
QMJ_LAG     1        -0.180452    0.05896644        -3.060       0.0085  1.46301825
QJA_LAG     1        -0.131009    0.13558717        -0.966       0.3503  2.14657507
QSO_LAG     1        -0.270115    0.14269597        -1.893       0.0792  2.63102930
QND_LAG     1         0.376595    0.10539190         3.573       0.0031  1.71701851

                    Collinearity Diagnostics(intercept adjusted)

                 Condition   Var Prop   Var Prop   Var Prop   Var Prop   Var Prop   Var Prop
#   Eigenvalue       Index    QJF_LAG    QMA_LAG    QMJ_LAG    QJA_LAG    QSO_LAG    QND_LAG
1      2.80079     1.00000     0.0399     0.0230     0.0328     0.0376     0.0325     0.0092
2      1.19140     1.53324     0.0001     0.1013     0.0192     0.0026     0.0082     0.3148
3      0.81244     1.85671     0.0984     0.0586     0.4958     0.0544     0.0258     0.0014
4      0.53296     2.29240     0.5774     0.0550     0.0001     0.0177     0.2500     0.0035
5      0.49066     2.38919     0.0179     0.0739     0.2769     0.4747     0.0238     0.1990
6      0.17175     4.03825     0.2663     0.6883     0.1752     0.4129     0.6597     0.4722
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_  INTERCEP  QJF_LAG QMA_LAG  QMJ_LAG  QJA_LAG  QSO_LAG

  1 MODEL1   PARMS    CRAB   377.494  1026.29   .      0.35988   .        .        .
  2 MODEL1   PARMS    CRAB   476.706  1826.74   .       .      -0.08107   .        .
  3 MODEL1   PARMS    CRAB   476.829  1428.01  0.13095  .        .        .        .
  4 MODEL1   PARMS    CRAB   476.909  1775.96   .       .        .      -0.15217   .
  5 MODEL1   PARMS    CRAB   318.574  1331.27   .      0.45578 -0.20021   .        .
  6 MODEL1   PARMS    CRAB   333.649  1209.04   .      0.43095   .      -0.33301   .
  7 MODEL1   PARMS    CRAB   375.903   807.95   .      0.37877   .        .        .
  8 MODEL1   PARMS    CRAB   376.710  1094.65   .      0.42240   .        .      -0.16371
  9 MODEL1   PARMS    CRAB   297.871  1053.10   .      0.49190 -0.21994   .        .
 10 MODEL1   PARMS    CRAB   300.890   870.28   .      0.48196   .      -0.41621   .
 11 MODEL1   PARMS    CRAB   306.600  1371.89   .      0.47716 -0.15091 -0.21085   .
 12 MODEL1   PARMS    CRAB   321.902  1363.98   .      0.49314 -0.19206   .      -0.10805
 13 MODEL1   PARMS    CRAB   254.023   929.83   .      0.64355 -0.20970   .      -0.35222
 14 MODEL1   PARMS    CRAB   261.930  1027.24   .      0.53216 -0.15753 -0.29189   .
 15 MODEL1   PARMS    CRAB   287.488  1106.60 -0.17497 0.56970 -0.21448   .        .
 16 MODEL1   PARMS    CRAB   298.795   798.84   .      0.54922   .      -0.34427 -0.19102
 17 MODEL1   PARMS    CRAB   243.784   982.14 -0.15286 0.70466 -0.20539   .      -0.33631
 18 MODEL1   PARMS    CRAB   245.844   947.94   .      0.62659 -0.17325 -0.18385 -0.25395
 19 MODEL1   PARMS    CRAB   264.528  1059.65 -0.09509 0.56925 -0.16261 -0.25424   .
 20 MODEL1   PARMS    CRAB   304.935   818.24 -0.07950 0.58214   .      -0.31264 -0.20030
 21 MODEL1   PARMS    CRAB   244.326   982.45 -0.11605 0.67787 -0.18045 -0.13101 -0.27011

OBS QND_LAG  CRAB  _IN_  _P_  _EDF_     _MSE_     _RSQ_   _ADJRSQ_     _CP_    _AIC_    _SBC_

  1  .        -1     1    2     19   142501.90  0.39602   0.36423   28.3562  251.108  253.197
  2  .        -1     1    2     19   227248.90  0.03682  -0.01387   55.3299  260.908  262.997
  3  .        -1     1    2     19   227365.95  0.03633  -0.01439   55.3671  260.919  263.008
  4  .        -1     1    2     19   227442.58  0.03600  -0.01473   55.3915  260.926  263.015
  5  .        -1     2    3     18   101489.27  0.59249   0.54721   15.6024  244.845  247.978
  6  .        -1     2    3     18   111321.60  0.55301   0.50334   18.5671  246.787  249.920
  7 0.13532   -1     2    3     18   141303.34  0.43262   0.36958   27.6076  251.795  254.928
  8  .        -1     2    3     18   141910.10  0.43018   0.36687   27.7906  251.885  255.018
  9 0.19103   -1     3    4     17    88727.02  0.66352   0.60415   12.2678  242.822  247.000
 10 0.23825   -1     3    4     17    90534.58  0.65667   0.59608   12.7825  243.246  247.424
 11  .        -1     3    4     17    94003.82  0.64351   0.58060   13.7705  244.035  248.214
 12  .        -1     3    4     17   103620.74  0.60704   0.53770   16.5092  246.081  250.259
 13 0.34892   -1     4    5     16    64527.61  0.76969   0.71211    6.2953  236.861  242.084
 14 0.24741   -1     4    5     16    68607.49  0.75513   0.69391    7.3888  238.149  243.371
 15 0.25010   -1     4    5     16    82649.33  0.70501   0.63126   11.1524  242.059  247.282
 16 0.30749   -1     4    5     16    89278.58  0.68135   0.60168   12.9293  243.679  248.902
 17 0.39339   -1     5    6     15    59430.73  0.80114   0.73485    5.9336  235.778  242.045
 18 0.34038   -1     5    6     15    60439.35  0.79776   0.73035    6.1870  236.131  242.399
 19 0.27224   -1     5    6     15    69975.29  0.76585   0.68781    8.5832  239.208  245.475
 20 0.33137   -1     5    6     15    92985.14  0.68886   0.58515   14.3651  245.178  251.445
 21 0.37659   -1     6    7     14    59694.95  0.81357   0.73367    7.0000  236.422  243.734
```

Untransformed Harvest and Squared Root Inflows Data: 1962 and 1987 Omitted

```
N = 24     Regression Models for Dependent Variable: CRAB

 R-square      Adj      C(p)       AIC       MSE       SBC Variables in Model
In c           Rsq

1 0.248204 0.214031  16.3094     296.9    218040     299.3 SQR_QMA
1 0.109932 0.069474  22.9875     301.0    258142     303.3 SQR_QND
1 0.063230 0.020649  25.2431     302.2    271687     304.6 SQR_QSO
1 0.057030 0.014168  25.5425     302.4    273485     304.7 SQR_QJF
--------------------------------------------------------------------
2 0.367723 0.307506  12.5370     294.8    192109     298.3 SQR_QMA SQR_QJA
2 0.366152 0.305786  12.6129     294.8    192586     298.4 SQR_QMA SQR_QND
2 0.361985 0.301222  12.8141     295.0    193852     298.5 SQR_QMA SQR_QMJ
2 0.250454 0.179068  18.2007     298.9    227739     302.4 SQR_QJF SQR_QMA
----------------------------------------------------------------------------
3 0.565947 0.500839   4.9634     287.7    138475     292.5 SQR_QMA SQR_QJA SQR_QND
3 0.528619 0.457912   6.7662     289.7    150384     294.4 SQR_QMA SQR_QMJ SQR_QND
3 0.433800 0.348871  11.3457     294.1    180633     298.8 SQR_QMA SQR_QJA SQR_QSO
3 0.429596 0.344036  11.5487     294.3    181975     299.0 SQR_QMA SQR_QSO SQR_QND
------------------------------------------------------------------------------------
4 0.623210 0.543886   4.1978     286.4    126533     292.2 SQR_QMA SQR_QMJ SQR_QJA SQR_QND
4 0.607039 0.524310   4.9788     287.4    131964     293.3 SQR_QMA SQR_QMJ SQR_QSO SQR_QND
4 0.568907 0.478151   6.8204     289.6    144769     295.5 SQR_QJF SQR_QMA SQR_QJA SQR_QND
4 0.567372 0.476293   6.8946     289.7    145285     295.6 SQR_QMA SQR_QJA SQR_QSO SQR_QND
----------------------------------------------------------------------------------------
5 0.639407 0.539242   5.4155     287.3    127822     294.4 SQR_QMA SQR_QMJ SQR_QJA SQR_QSO
                                                           SQR_QND
5 0.630311 0.527619   5.8548     287.9    131046     295.0 SQR_QJF SQR_QMA SQR_QMJ SQR_QSO
                                                           SQR_QND
5 0.628520 0.525331   5.9413     288.0    131681     295.1 SQR_QJF SQR_QMA SQR_QMJ SQR_QJA
                                                           SQR_QND
5 0.570858 0.451653   8.7262     291.5    152120     298.5 SQR_QJF SQR_QMA SQR_QJA SQR_QSO
                                                           SQR_QND
----------------------------------------------------------------------------------------
6 0.648010 0.523779   7.0000     288.7    132111     297.0 SQR_QJF SQR_QMA SQR_QMJ SQR_QJA
                                                                SQR_QSO SQR_QND
----------------------------------------------------------------------------------------

                                   Analysis of Variance

                                        Sum of          Mean
                 Source          DF    Squares        Square        F Value        Prob>F
                 Model            6  4134668.579  689111.42984        5.216        0.0033
                 Error           17 2245891.1605  132111.24474
                 C Total         23 6380559.7396

                     Root MSE      363.47111     R-square        0.6480
                     Dep Mean     1712.12083     Adj R-sq        0.5238
                     C.V.           21.22929
```

```
                          Parameter Estimates

                      Parameter      Standard     T for H0:                 Variance
Variable     DF        Estimate         Error   Parameter=0   Prob > |T|   Inflation

INTERCEP      1      434.113541  446.95680627         0.971       0.3450  0.00000000
SQR_QJF       1       -8.126437   12.60657971        -0.645       0.5278  2.05733767
SQR_QMA       1       47.675926   11.63667493         4.097       0.0008  2.75124604
SQR_QMJ       1      -16.047186    8.31316302        -1.930       0.0704  2.00370995
SQR_QJA       1      -12.326996   13.33261271        -0.925       0.3681  2.48175504
SQR_QSO       1      -12.882837   13.27827400        -0.970       0.3455  3.34478330
SQR_QND       1       30.991014   10.34555581         2.996       0.0081  2.26817311


               Collinearity Diagnostics(intercept adjusted)

                      Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
Number   Eigenvalue       Index  SQR_QJF   SQR_QMA   SQR_QMJ   SQR_QJA   SQR_QSO   SQR_QND

     1      3.02499     1.00000    0.0331    0.0188    0.0253    0.0263    0.0207    0.0113
     2      1.20954     1.58144    0.0009    0.0649    0.0599    0.0001    0.0316    0.1853
     3      0.66179     2.13798    0.1191    0.1414    0.1643    0.2123    0.0055    0.0011
     4      0.52629     2.39746    0.0202    0.0051    0.3696    0.2170    0.0332    0.2003
     5      0.45452     2.57981    0.5846    0.1122    0.0001    0.0053    0.1968    0.0075
     6      0.12287     4.96170    0.2421    0.6575    0.3807    0.5391    0.7122    0.5945


OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_ INTERCEP  SQR_QJF SQR_QMA  SQR_QMJ  SQR_QJA  SQR_QSO

  1 MODEL1   PARMS    CRAB   466.948   701.75      .    24.2900      .        .        .
  2 MODEL1   PARMS    CRAB   508.077  1112.96      .        .        .        .        .
  3 MODEL1   PARMS    CRAB   521.236  1303.24      .        .        .        .    12.6875
  4 MODEL1   PARMS    CRAB   522.958  1127.30  14.5867      .        .        .        .
  5 MODEL1   PARMS    CRAB   438.302  1076.46      .    30.1524      .    -21.5283      .
  6 MODEL1   PARMS    CRAB   438.846    64.48      .    24.6861      .        .        .
  7 MODEL1   PARMS    CRAB   440.286  1064.10      .    34.6859 -16.2870      .        .
  8 MODEL1   PARMS    CRAB   477.220   777.02  -3.4922 25.8464      .        .        .
  9 MODEL1   PARMS    CRAB   372.122   348.63      .    32.6544      .    -28.7678      .
 10 MODEL1   PARMS    CRAB   387.793   372.27      .    37.3821 -19.7623      .        .
 11 MODEL1   PARMS    CRAB   425.010   998.20      .    25.7207      .    -31.3381  16.8949
 12 MODEL1   PARMS    CRAB   426.585   -70.71      .    32.8596      .        .    -18.8310
 13 MODEL1   PARMS    CRAB   355.715   480.13      .    38.9938 -12.8927 -21.7515      .
 14 MODEL1   PARMS    CRAB   363.268   236.24      .    47.0937 -20.7013      .    -20.9847
 15 MODEL1   PARMS    CRAB   380.485   387.94  -4.7003 34.4152      .    -27.4520      .
 16 MODEL1   PARMS    CRAB   381.162   311.90      .    33.6815      .    -27.4024  -3.2376
 17 MODEL1   PARMS    CRAB   357.521   373.82      .    43.9051 -15.3881 -15.4956 -11.6141
 18 MODEL1   PARMS    CRAB   362.003   371.43 -12.4237 51.8616 -20.0479      .    -19.9949
 19 MODEL1   PARMS    CRAB   362.878   535.99  -6.3135 41.5065 -13.1929 -19.8208      .
 20 MODEL1   PARMS    CRAB   390.026   348.31  -5.1335 35.7869      .    -25.7230  -3.8124
 21 MODEL1   PARMS    CRAB   363.471   434.11  -8.1264 47.6759 -16.0472 -12.3270 -12.8828

OBS SQR_QND  CRAB  _IN_  _P_  _EDF_     _MSE_      _RSQ_   _ADJRSQ_     _CP_     _AIC_    _SBC_

  1     .     -1     1    2     22   218040.00  0.24820    0.21403  16.3094  296.930  299.286
  2 15.8284   -1     1    2     22   258142.40  0.10993    0.06947  22.9875  300.982  303.338
  3     .     -1     1    2     22   271687.25  0.06323    0.02065  25.2431  302.209  304.566
  4     .     -1     1    2     22   273485.17  0.05703    0.01417  25.5425  302.368  304.724
  5     .     -1     2    3     21   192108.63  0.36772    0.30751  12.5370  294.775  298.309
  6 16.4000   -1     2    3     21   192585.85  0.36615    0.30579  12.6129  294.834  298.369
  7     .     -1     2    3     21   193852.08  0.36198    0.30122  12.8141  294.992  298.526
  8     .     -1     2    3     21   227739.27  0.25045    0.17907  18.2007  298.858  302.392
  9 21.9734   -1     3    4     20   138475.00  0.56595    0.50084   4.9634  287.747  292.459
 10 19.7937   -1     3    4     20   150383.63  0.52862    0.45791   6.7662  289.727  294.439
 11     .     -1     3    4     20   180633.50  0.43380    0.34887  11.3457  294.126  298.838
 12 27.0217   -1     3    4     20   181974.73  0.42960    0.34404  11.5487  294.303  299.015
 13 22.8281   -1     4    5     19   126533.15  0.62321    0.54389   4.1978  286.351  292.242
 14 31.7915   -1     4    5     19   131963.91  0.60704    0.52431   4.9788  287.360  293.250
 15 22.9797   -1     4    5     19   144769.08  0.56891    0.47815   6.8204  289.583  295.473
 16 23.5351   -1     4    5     19   145284.53  0.56737    0.47629   6.8946  289.668  295.558
 17 28.5956   -1     5    6     18   127821.54  0.63941    0.53924   5.4155  287.297  294.365
 18 34.4545   -1     5    6     18   131045.83  0.63031    0.52762   5.8548  287.895  294.963
 19 24.1996   -1     5    6     18   131680.60  0.62852    0.52533   5.9413  288.011  295.079
 20 24.9113   -1     5    6     18   152120.17  0.57086    0.45165   8.7262  291.474  298.542
 21 30.9910   -1     6    7     17   132111.24  0.64801    0.52378   7.0000  288.717  296.964
```

Untransformed Harvest, Jan-Feb and May-Jun Inflows, and Squared Root other Inflows Data: 1962 and 1987 Omitted

```
 N = 24     Regression Models for Dependent Variable: CRAB

  R-square       Adj      C(p)       AIC       MSE       SBC Variables in Model
In               Rsq

1 0.248204 0.214031  18.4847    296.9    218040     299.3 SQR_QMA
1 0.109932 0.069474  25.5629    301.0    258142     303.3 SQR_QND
1 0.066478 0.024045  27.7874    302.1    270745     304.5 QJF_LAG
1 0.063230 0.020649  27.9536    302.2    271687     304.6 SQR_QSO
-----------------------------------------------------------------------
2 0.375087 0.315572  13.9895    294.5    189871     298.0 SQR_QMA QMJ_LAG
2 0.367723 0.307506  14.3665    294.8    192109     298.3 SQR_QMA SQR_QJA
2 0.366152 0.305786  14.4469    294.8    192586     298.4 SQR_QMA SQR_QND
2 0.249688 0.178230  20.4087    298.9    227972     302.4 SQR_QMA SQR_QSO
-------------------------------------------------------------------------------
3 0.565947 0.500839   6.2193    287.7    138475     292.5 SQR_QMA SQR_QJA SQR_QND
3 0.534225 0.464359   7.8432    289.4    148595     294.2 SQR_QMA QMJ_LAG SQR_QND
3 0.433800 0.348871  12.9840    294.1    180633     298.8 SQR_QMA SQR_QJA SQR_QSO
3 0.429596 0.344036  13.1992    294.3    181975     299.0 SQR_QMA SQR_QSO SQR_QND
---------------------------------------------------------------------------------------
4 0.638147 0.561968   4.5234    285.4    121517     291.3 SQR_QMA QMJ_LAG SQR_QJA SQR_QND
4 0.622781 0.543367   5.3100    286.4    126677     292.3 SQR_QMA QMJ_LAG SQR_QSO SQR_QND
4 0.572998 0.483103   7.8584    289.4    143395     295.2 QJF_LAG SQR_QMA QMJ_LAG SQR_QND
4 0.568051 0.477114   8.1116    289.6    145057     295.5 QJF_LAG SQR_QMA SQR_QJA SQR_QND
-------------------------------------------------------------------------------------------
5 0.657485 0.562342   5.5335    286.1    121413     293.1 SQR_QMA QMJ_LAG SQR_QJA SQR_QSO
                                                          SQR_QND
5 0.649543 0.552194   5.9400    286.6    124228     293.7 QJF_LAG SQR_QMA QMJ_LAG SQR_QSO
                                                          SQR_QND
5 0.645278 0.546744   6.1583    286.9    125740     294.0 QJF_LAG SQR_QMA QMJ_LAG SQR_QJA
                                                          SQR_QND
5 0.569715 0.450191  10.0265    291.5    152526     298.6 QJF_LAG SQR_QMA SQR_QJA SQR_QSO
                                                          SQR_QND
-------------------------------------------------------------------------------------------
6 0.667906 0.550697   7.0000    287.3    124644     295.6 QJF_LAG SQR_QMA QMJ_LAG SQR_QJA
                                                          SQR_QSO SQR_QND
-------------------------------------------------------------------------------------------


                                 Analysis of Variance
                                     Sum of           Mean
          Source            DF      Squares         Square        F Value        Prob>F

          Model              6 4261616.1935 710269.36558          5.698          0.0021
          Error             17 2118943.5461   124643.738
          C Total           23 6380559.7396

              Root MSE      353.04920      R-square          0.6679
              Dep Mean     1712.12083      Adj R-sq          0.5507
              C.V.           20.62058
```

```
                              Parameter Estimates

                     Parameter      Standard    T for H0:                 Variance
Variable  DF          Estimate         Error   Parameter=0  Prob > |T|   Inflation

INTERCEP   1        -75.460341  472.98957985        -0.160      0.8751  0.00000000
QJF_LAG    1         -0.113065    0.15480244        -0.730      0.4751  2.11640124
SQR_QMA    1         49.130647   11.32543478         4.338      0.0004  2.76217196
QMJ_LAG    1         -0.185221    0.08261502        -2.242      0.0386  1.87844397
SQR_QJA    1        -12.197112   12.58025709        -0.970      0.3459  2.34194525
SQR_QSO    1        -13.847492   12.86626336        -1.076      0.2968  3.32857945
SQR_QND    1         31.729564   10.08566277         3.146      0.0059  2.28479241


                     Collinearity Diagnostics(intercept adjusted)

                          Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
Number   Eigenvalue           Index  QJF_LAG   SQR_QMA   QMJ_LAG   SQR_QJA   SQR_QSO   SQR_QND

     1      2.97946         1.00000    0.0336    0.0192    0.0233    0.0281    0.0222    0.0123
     2      1.22664         1.55851    0.0000    0.0651    0.0846    0.0002    0.0281    0.1674
     3      0.67484         2.10120    0.1374    0.1282    0.2299    0.1631    0.0041    0.0042
     4      0.56288         2.30071    0.0087    0.0150    0.2725    0.2963    0.0149    0.2019
     5      0.43091         2.62950    0.5623    0.1088    0.0060    0.0065    0.2362    0.0076
     6      0.12528         4.87680    0.2579    0.6637    0.3838    0.5058    0.6946    0.6066


OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_ INTERCEP  QJF_LAG  SQR_QMA  QMJ_LAG  SQR_QJA  SQR_QSO

  1 MODEL1   PARMS    CRAB   466.948   701.75    .      24.2900    .        .        .
  2 MODEL1   PARMS    CRAB   508.077  1112.96    .        .        .        .        .
  3 MODEL1   PARMS    CRAB   520.332  1382.60  0.19630    .        .        .        .
  4 MODEL1   PARMS    CRAB   521.236  1303.24    .        .        .        .      12.6875
  5 MODEL1   PARMS    CRAB   435.742   717.90    .      34.8974 -0.18001    .        .
  6 MODEL1   PARMS    CRAB   438.302  1076.46    .      30.1524    .     -21.5283    .
  7 MODEL1   PARMS    CRAB   438.846    64.48    .      24.6861    .        .        .
  8 MODEL1   PARMS    CRAB   477.464   669.92    .      23.3823    .        .       2.1592
  9 MODEL1   PARMS    CRAB   372.122   348.63    .      32.6544    .     -28.7678    .
 10 MODEL1   PARMS    CRAB   385.480   -27.49    .      37.0919 -0.20936    .        .
 11 MODEL1   PARMS    CRAB   425.010   998.20    .      25.7207    .     -31.3381  16.8949
 12 MODEL1   PARMS    CRAB   426.585   -70.71    .      32.8596    .        .     -18.8310
 13 MODEL1   PARMS    CRAB   348.593   219.23    .      39.5324 -0.14680 -22.1954    .
 14 MODEL1   PARMS    CRAB   355.917  -195.34    .      47.7763 -0.22576    .     -22.3770
 15 MODEL1   PARMS    CRAB   378.676  -169.39 -0.20136  44.3683 -0.20953    .        .
 16 MODEL1   PARMS    CRAB   380.863   302.83 -0.04992  34.1579    .     -27.6912    .
 17 MODEL1   PARMS    CRAB   348.444    50.44    .      44.8727 -0.17474 -15.5857 -12.7065
 18 MODEL1   PARMS    CRAB   352.460  -303.28 -0.16842  53.1785 -0.22485    .     -20.9447
 19 MODEL1   PARMS    CRAB   354.599   128.29 -0.09284  42.6348 -0.15334 -19.9004    .
 20 MODEL1   PARMS    CRAB   390.545   260.44 -0.05279  35.3561    .     -26.1513  -3.5051
 21 MODEL1   PARMS    CRAB   353.049   -75.46 -0.11307  49.1306 -0.18522 -12.1971 -13.8475

OBS SQR_QND  CRAB  _IN_  _P_  _EDF_       _MSE_    _RSQ_   _ADJRSQ_     _CP_     _AIC_     _SBC_

  1    .       -1     1    2     22   218040.00  0.24820   0.21403  18.4847   296.930   299.286
  2 15.8284    -1     1    2     22   258142.40  0.10993   0.06947  25.5629   300.982   303.338
  3    .       -1     1    2     22   270745.26  0.06648   0.02404  27.7874   302.126   304.482
  4    .       -1     1    2     22   271687.25  0.06323   0.02065  27.9536   302.209   304.566
  5    .       -1     2    3     21   189871.12  0.37509   0.31557  13.9895   294.494   298.028
  6    .       -1     2    3     21   192108.63  0.36772   0.30751  14.3665   294.775   298.309
  7 16.4000    -1     2    3     21   192585.85  0.36615   0.30579  14.4469   294.834   298.369
  8    .       -1     2    3     21   227971.80  0.24969   0.17823  20.4087   298.883   302.417
  9 21.9734    -1     3    4     20   138475.00  0.56595   0.50084   6.2193   287.747   292.459
 10 19.2504    -1     3    4     20   148595.10  0.53423   0.46436   7.8432   289.440   294.152
 11    .       -1     3    4     20   180633.50  0.43380   0.34887  12.9840   294.126   298.838
 12 27.0217    -1     3    4     20   181974.73  0.42960   0.34404  13.1992   294.303   299.015
 13 22.6987    -1     4    5     19   121516.95  0.63815   0.56197   4.5234   285.381   291.271
 14 32.0955    -1     4    5     19   126677.18  0.62278   0.54337   5.3100   286.379   292.269
 15 23.9436    -1     4    5     19   143395.23  0.57300   0.48310   7.8584   289.354   295.244
 16 22.9279    -1     4    5     19   145056.69  0.56805   0.47711   8.1116   289.630   295.521
 17 28.9657    -1     5    6     18   121413.11  0.65749   0.56234   5.5335   286.063   293.131
 18 35.1988    -1     5    6     18   124228.37  0.64954   0.55219   5.9400   286.613   293.681
 19 24.5060    -1     5    6     18   125740.21  0.64528   0.54674   6.1583   286.903   293.971
 20 24.6734    -1     5    6     18   152525.66  0.56971   0.45019  10.0265   291.538   298.606
 21 31.7296    -1     6    7     17   124643.74  0.66791   0.55070   7.0000   287.321   295.567
```

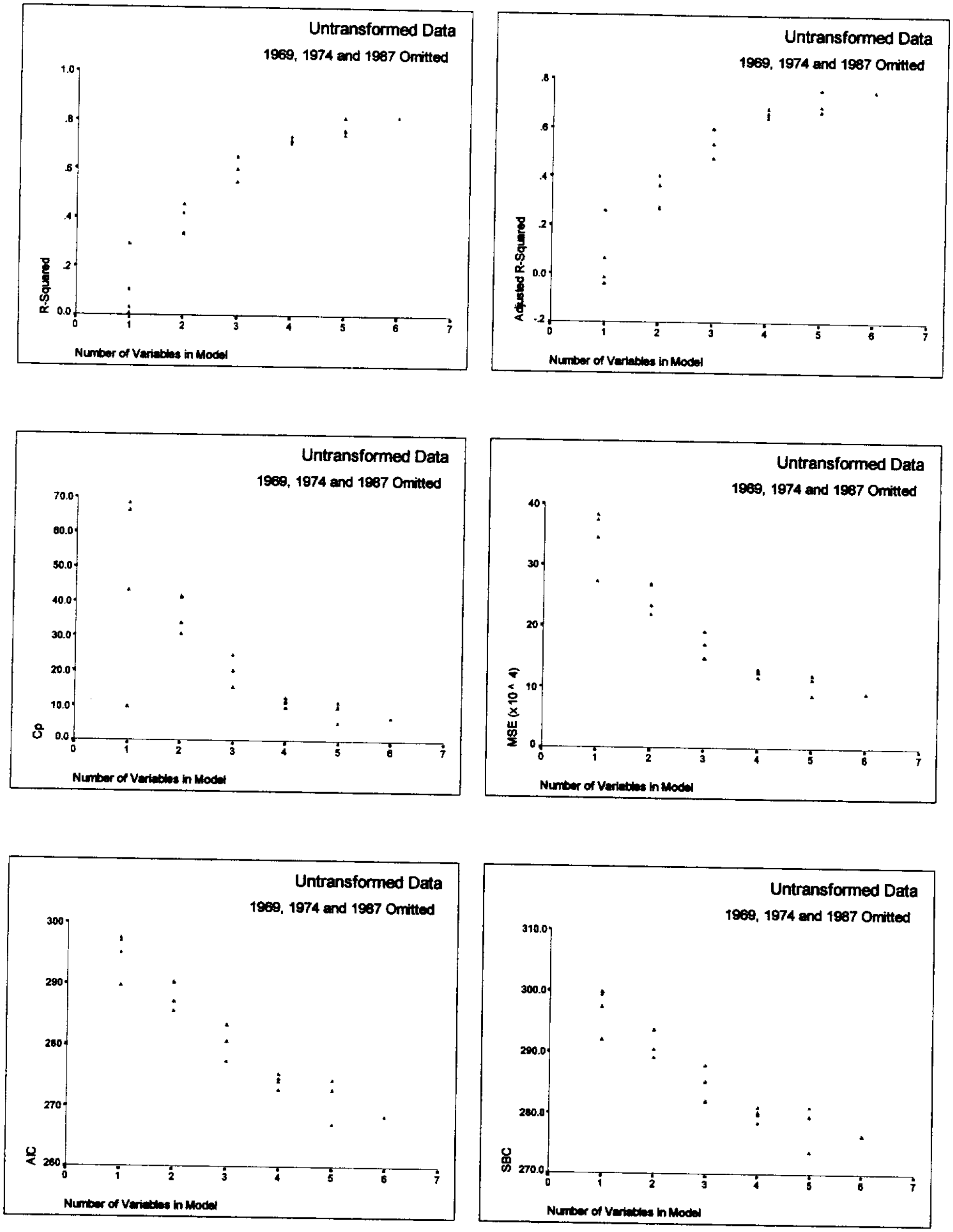


Fig. 9.1. Examining Subsets of Untransformed Data:
1969, 1974 and 1987 Omitted.

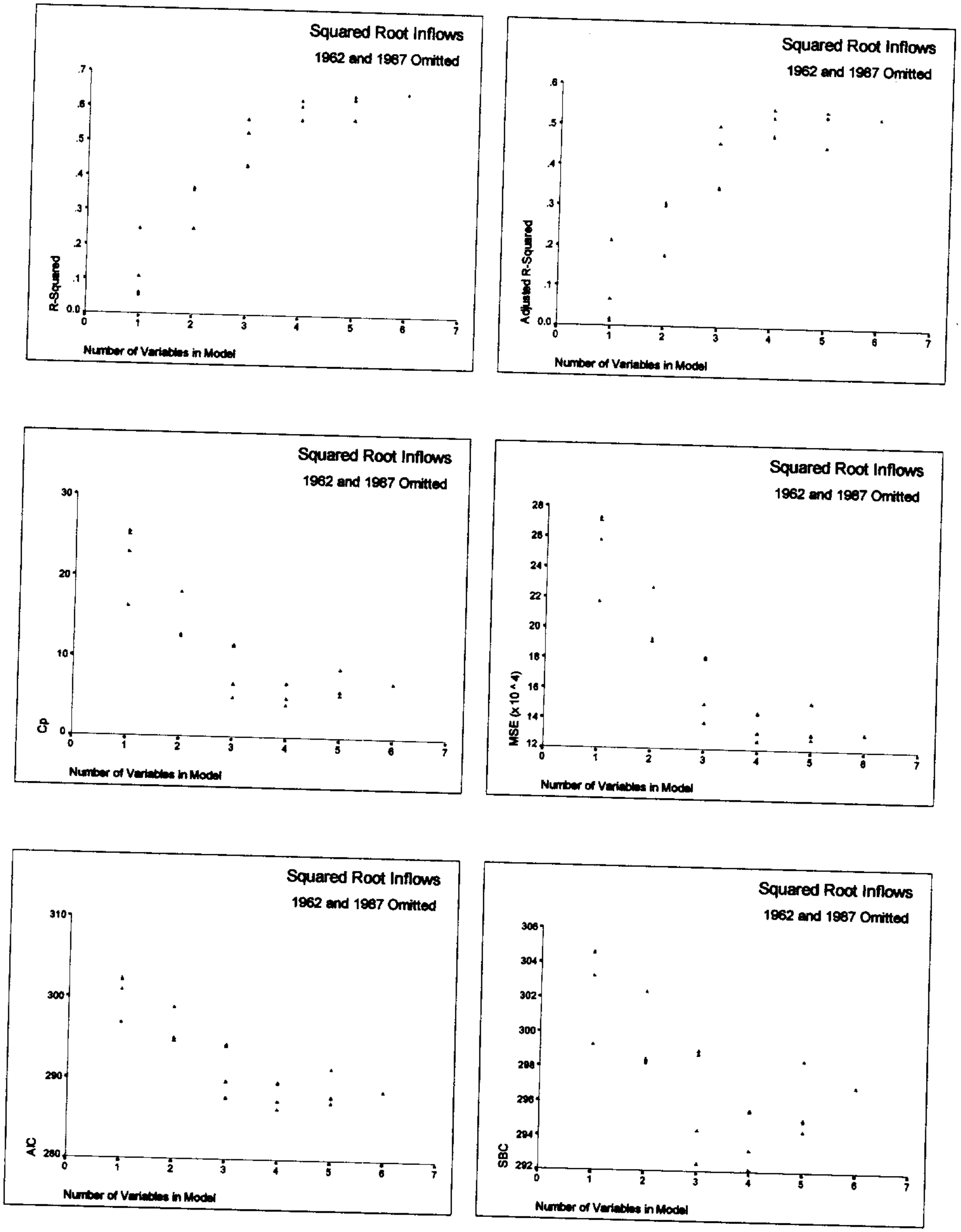


Fig. 9.2. Examining Subsets of Squared Root Inflows Data:
1962 and 1987 Omitted.

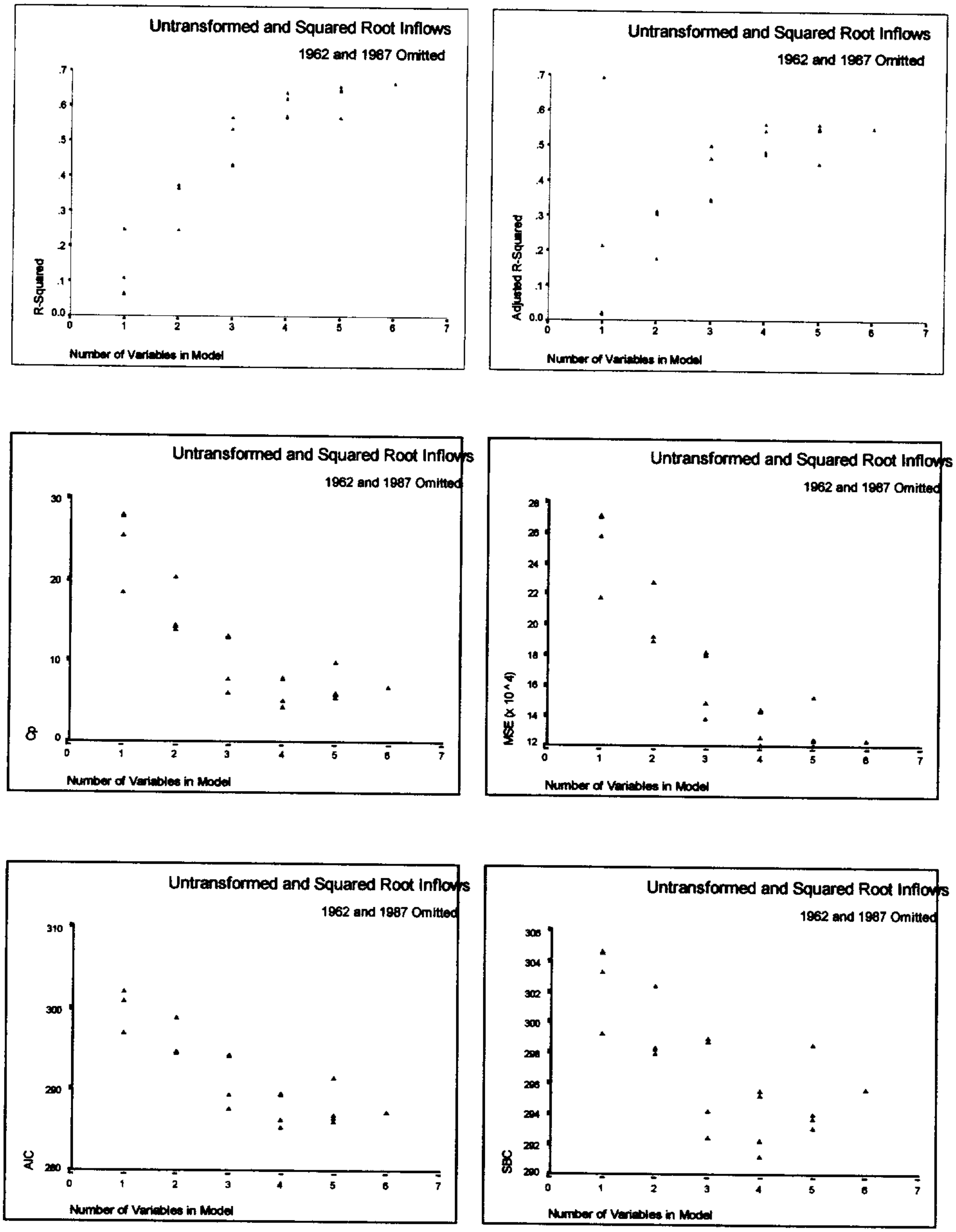


Fig. 9.3. Examining Subsets of Untransformed and Squared Root Inflows Data: 1969, 1974 and 1987 Omitted.

Oyster Harvests in Galveston Bay: A Regression Analysis

Harvest vs. Freshwater Inflows

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Table of Contents

Summary Report

Description of the Problem[1]

Bimonthly freshwater inflows into Galveston Bay were recorded for the years 1962 to 1987. These variables, and various transformations of them, were used to construct a model for the annual harvest of oyster.

Constructing Models - General Discussion

Stability of coefficient estimates and accuracy of predicted values are primary goals in constructing models for prediction. To this end, the data must be examined from three points of view: individual observations (to detect outliers or influential points); variables, individually and in groups (to select an optimal set of predictors); and the interaction of these two, which produces the overall structure of the data set (to determine whether multicollinearity is present or not). The first two of these were examined by both graphic and quantitative means; the third by quantitative means only.

Detecting Influential Points and Outliers

The structures of individual variables were examined via box plots and histograms, as well as by all the usual numerical measures. For each pair of variables, 50, 90 and 95 % prediction ellipses and 95% confidence ellipses were plotted in a further effort to look for unusual points. For example, suppose large values of Variable A are generally associated with large values for Variable B. If an observation consisted of a large value for Variable A but a small value for Variable B, that point would be considered unusual, even though it was well within the range of data for both variables and could not be considered an outlier.

In addition, a number of residual analysis techniques were employed. A large *residual* indicates a point not well-fit by the model. The *deleted residual*, however, is somewhat more useful in the search for influential points. The model is fitted without a given observation, and the predicted response and corresponding residual are calculated for that observation. The *Studentized deleted residual* is scaled to have a Student's t distribution. Histograms and normal P-P plots of the residuals were also examined.

Other quantities, such as the Mahalanobis distance, Cook's distance, the leverage value, standarized values for the Dffits (to measure the influence of a given observation on the predicted response) and the Dfbetas (to measure the influence of a given observation on the calculated coefficients) were also used to build a general picture of the influence of individual points. Plots were made of the standardized Dffits value for each model against the Dfbeta values for each predictor in the model. Points which were extreme indicated observations which had strong effects on both predicted values and coefficient estimates.

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[1] The following discussion, prepared by Jacqueline Kiffe, was taken from Seatrout Harvests in Galveston Bay: A Regression Analysis, by F. Michael Speed, Sr. And Jacqueline Kiffe.

Variable Selection

For each regression, residuals were plotted against each of the independent variables to look for nonlinear relationships between the response variable and individual predictors. Partial residual plots were employed to examine the overall relationship between the response and individual predictors. A partial residual is a corollary to the deleted residual. That is, the model is fitted without a given variable and the predicted response and corresponding residual are calculated for each observation. This seeks to answer the question, "What is the relationship of this predictor to the response variable, taking all other variables into account?" Thus, it examines the marginal relationship of a given predictor to the response.

Numerous measures have been developed over the years to assess the adequacy of a given model. We examined a number of these, including R^2 and mean squared error (MSE), and several others which directly incorporate penalties for having too many predictors in the model, such as adjusted R^2, C_p, AIC, and SBC. It is well-established that too many predictors in a model can lead to bad prediction, just as too few can, and these measures are used as part of the attempt to find an optimal model.

Multicollinearity

Multicollinearity arises when one or more variables are nearly closely approximated by linear combinations of the remaining variables, resulting in unstable coefficient estimates. The variance inflation factor (VIF) was calculated for each coefficient estimate to measure this instability, which is not usually considered profound for VIF's less than 10. No problems were found with this data. Additionally, the condition index (a ratio of eigenvalues of the covariance matrix, with the largest eigenvalue always on top) was calculated. A ratio greater than 30 is considered cause for concern. Again, no evidence of multicollinearity was found.

Other Procedures

Several other miscellaneous diagnostics, including the Durbin-Watson test for serial autocorrelation were performed, and no general problems were detected. The Box-Cox procedure, used to find a transformation to normality, was also performed.

How the Final Model Was Chosen

Selecting the Data Set Used. First, the variables were explored thoroughly, individually and in pairs, in a first effort to detect outliers. The SAS programming language allows a number of diagnostics to be calculated for a group of models on a given data set without actually performing a formal regression, thus allowing one to examine a large number of models quite efficiently. The Box-Cox procedure was performed to find if a transformation to normallity was suggested. The log transform was suggested for some variables, and the squared root for others. At this point, there were several data sets for which the diagnostic series was calculated:

1. Untransformed data
2. Harvest untransformed, and natural log of inflow variables
3. All variables logged
4. Harvest untransformed, and squared root of inflows variables
5. All variables squared root.
6. Harvest, Jan-Feb, May-Jun Inflows untransformed, logged others inflows

Selecting the Points to be Omitted. The full regression with all diagnostics was performed for these models, each one contained all variables in its corresponding data set. All diagnostics were generated, and influential points were determined for each model.

Data Set	**R^2**	**Adjusted R^2**
1	0.372	0.174
2	0.343	0.136
3	**0.479**	**0.315**
4	0.356	0.153
5	**0.442**	**0.265**
6	0.362	0.160

Data sets 3, and 5 presented the highest R^2 values. These two models were considered final candidates. The observations flagged as potentially influential are given in the summary table below, for each model.

Year	**Variable**
1969	Mar-Apr Inflows
1971	Ln(Jan-Feb Inflows)
1975	Nov-Dec Inflows
1979	Ln(Harvest)
1983	Harvest, Jul-Aug Inflows
1987	Nov-Dec Inflows

Summary of points flagged by Boxplots

Year	**Variable**
1975	Jan-Feb vs. Sept-Oct Inflows
	Mar-Apr vs. Sept-Oct Inflows
	May-Jun vs. Sept-Oct Inflows
	Jul-Aug vs. Sept-Oct Inflows
	Sept-Oct vs. Nov-Dec Inflows
1983	Harvest vs. Jan-Feb Inflows
	Harvest vs. Mar-Apr Inflows
	Harvest vs. May-Jun Inflows
	Harvest vs. Jul-Aug Inflows
	Harvest vs. Sept-Oct Inflows
	Harvest vs. Nov-Dec Inflows
	Jan-Feb vs. Jul-Aug Inflows
	Mar-Apr vs. Jul-Aug Inflows
	May-Jun vs. Jul-Aug Inflows
	Jul-Aug vs. Sept-Oct Inflows
	Jul-Aug vs. Nov-Dec Inflows
1987	Jan-Feb vs. Nov-Dec Inflows

Summary of points flagged by 95% Prediction Ellipses

Data Set 3

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	TOTAL
1971	1			1					2
1979	1	1	1			1	1	5	10
1983							1	1	2

Data Set 5

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	TOTAL
1979			1				1	1	3
1983			1				1	2	4
1987							1		1

Summary of Points flagged by diagnostic measures

Key to Abbreviations:

BOX	Box plot
SRE	Studentized residual
SDR	Studentized deleted residual
LEV	Leverage value
MAH	Mahalanobis distance
COO	Cook's distance
SDF	Standardized Dffits value
SDB	Standardized Dfbeta value

Selecting the Final Candidate Models. After the subset analysis led us to two models: Data Set 3 (all variables logged), 1979 omitted; and Data Set 5 (all variables squared root), 1983 and/or 1979 omitted.

	Observations omitted	R^2	Adjusted R^2
Data Set 3	1979	0.480	0.306
Data Set 5	**1983**	0.611	0.481
	1979	0.428	0.237
	1979 & 1983	0.556	0.400

Selecting the Final Models. It is clearly that Data set 5 with 1983 omitted is the best model. Regression was performed using this model, and the deleted residuals were calculated.

Best Candidate Model	**R^2**	**Adjusted R^2**	**Prob>F**
SQRT (Oyster Harvest) = 80.878 - 1.116*SQRT(Jan-Feb Inflows) + 0.45*SQRT(May-Jun Inflows) - 0.869*SQRT(Jul-Aug Inflows) + 0.381*SQRT(Nov-Dec Inflows)	0.60	0.52	0.001

All Variables Squared Root

Summary Information

Descriptive Statistics

	Mean	Std. Deviation	N
SQRT (Oyster Harvest)	47.4574	14.8242	25
SQRT (January-February Inflows)	40.5504	8.8711	25
SQRT (May-June Inflows)	48.6587	12.9957	25
SQRT (July-August Inflows)	28.2210	7.8759	25
SQRT (November-December Inflows)	37.8882	10.7900	25

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	SQRT (November-December Inflows), SQRT (May-June Inflows), SQRT (July-August Inflows), SQRT (January-February Inflows)[c,d]	.	.775	.601	.521	10.2574	1.529

a. Dependent Variable: SQRT (Oyster Harvest)

b. Method: Enter

c. Independent Variables: (Constant), SQRT (November-December Inflows), SQRT (May-June Inflows), SQRT (July-August Inflows), SQRT (January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3169.886	4	792.472	7.532	.001[b]
	Residual	2104.288	20	105.214		
	Total	5274.175	24			

a. Dependent Variable: SQRT (Oyster Harvest)

b. Independent Variables: (Constant), SQRT (November-December Inflows), SQRT (May-June Inflows), SQRT (July-August Inflows), SQRT (January-February Inflows)

Coefficients[a]

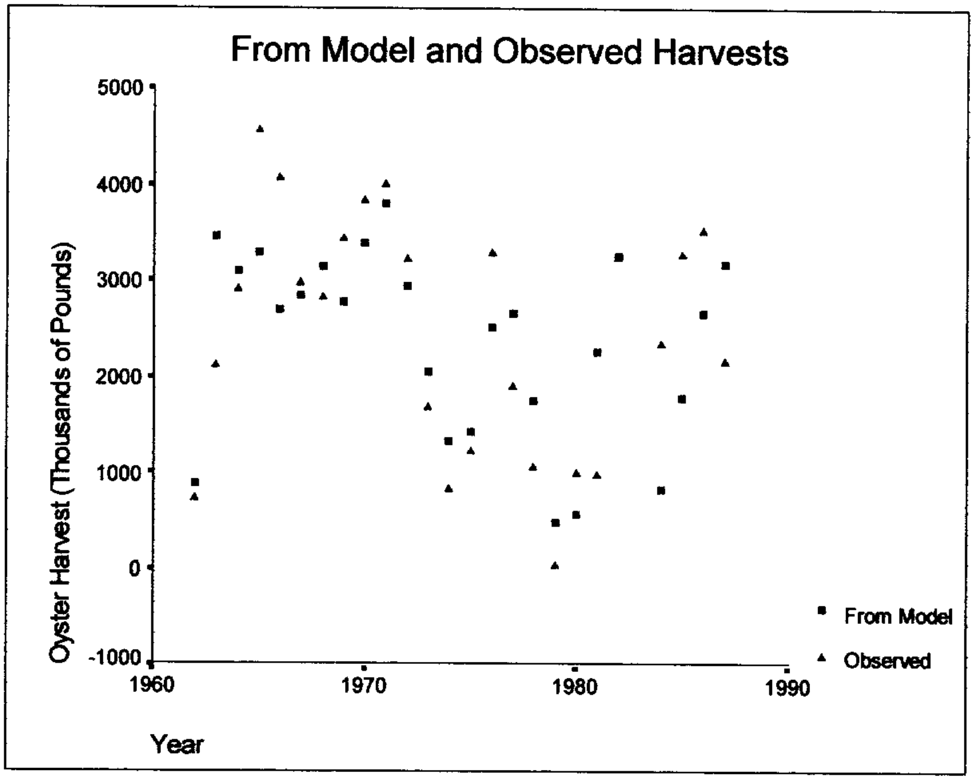
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	80.878	11.330		7.138	.000	57.243	104.513
	SQRT (January-February Inflows)	-1.116	.318	-.668	-3.515	.002	-1.778	-.454
	SQRT (May-June Inflows)	.450	.190	.395	2.367	.028	.054	.847
	SQRT (July-August Inflows)	-.869	.347	-.462	-2.507	.021	-1.592	-.146
	SQRT (November-December Inflows)	.381	.234	.277	1.628	.119	-.107	.870

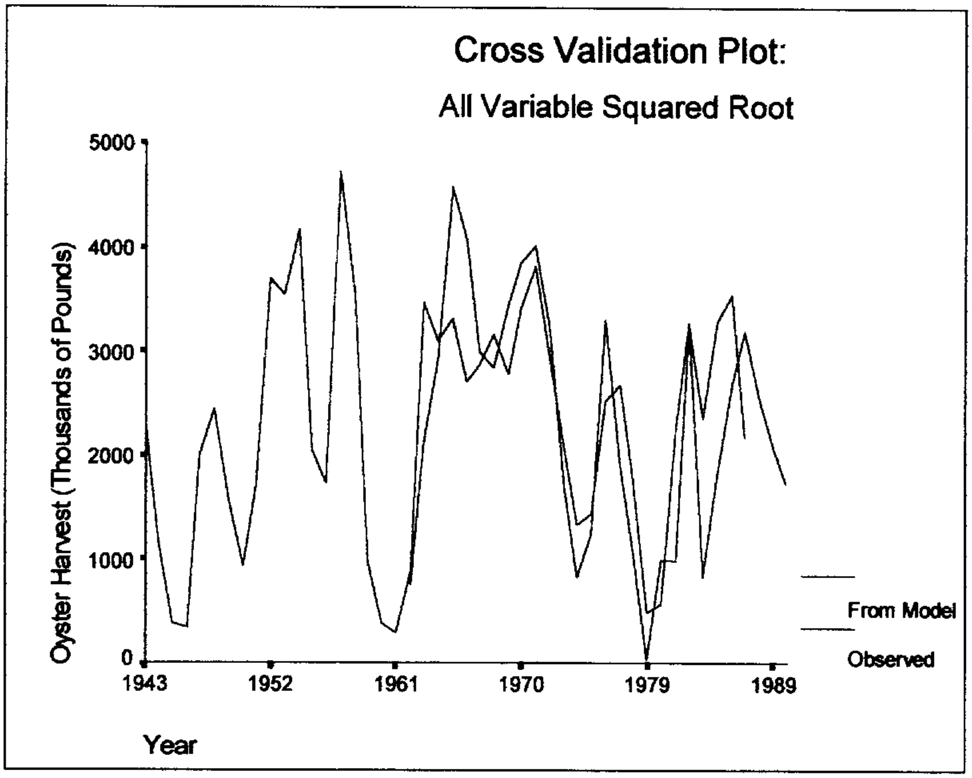
a. Dependent Variable: SQRT (Oyster Harvest)

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	22.1680	61.7712	47.4574	11.4925	25
Std. Predicted Value	-2.201	1.245	.000	1.000	25
Standard Error of Predicted Value	2.8369	6.5596	4.4675	1.0628	25
Adjusted Predicted Value	19.1685	61.7778	47.4599	12.0495	25
Residual	-16.4183	19.6293	-2.E-14	9.3637	25
Std. Residual	-1.601	1.914	.000	.913	25
Stud. Residual	-1.854	2.343	.000	1.036	25
Deleted Residual	-23.1691	29.4134	-2.E-03	12.1501	25
Stud. Deleted Residual	-1.985	2.680	.006	1.090	25
Mahal. Distance	.876	8.855	3.840	2.255	25
Cook's Distance	.000	.547	.063	.122	25
Centered Leverage Value	.036	.369	.160	.094	25

a. Dependent Variable: SQRT (Oyster Harvest)


From Model and Observed Harvests
Oyster Harvest (Thousands of Pounds)
5000
4000
3000
2000
1000
0
-1000
1960
1970
1980
1990
Year
From Model
Observed


Cross Validation Plot:
All Variable Squared Root
Oyster Harvest (Thousands of Pounds)
5000
4000
3000
2000
1000
0
1943
1952
1961
1970
1979
1989
Year
From Model
Observed

Exploring the Data

Listing of Data

Obs.	YEAR	OYSTER	JF_LAG	MA_LAG	MJ_LAG	JA_LAG	SO_LAG	ND_LAG
1	**1962**	749.90	2954.20	1045.00	1507.05	985.43	1658.99	2603.60
2	**1963**	2131.30	915.25	503.40	916.45	367.34	1571.22	1519.35
3	**1964**	2920.80	977.03	709.20	620.95	208.60	552.67	847.05
4	**1965**	4583.30	1159.28	1048.65	1390.30	229.70	357.73	837.60
5	**1966**	4083.30	1796.50	1506.80	3868.55	732.35	424.64	1343.55
6	**1967**	2992.60	1191.97	1280.87	3075.70	802.31	395.08	812.45
7	**1968**	2838.70	1193.37	1910.42	3503.55	656.56	522.30	628.35
8	**1969**	3447.20	1896.15	3669.45	5140.75	709.21	536.00	891.47
9	**1970**	3850.20	1207.70	3388.15	2824.15	446.00	476.12	782.52
10	**1971**	4021.70	443.30	1490.24	948.92	425.88	1011.38	491.33
11	**1972**	3242.60	1088.25	510.89	1119.91	445.71	1187.93	1265.65
12	**1973**	1703.30	2116.37	3049.16	3859.81	1019.84	656.82	1708.29
13	**1974**	836.70	2766.28	3164.87	3633.59	1081.86	2393.69	1737.41
14	**1975**	1236.80	3240.49	1594.75	2713.05	909.19	3097.29	3763.55
15	**1976**	3298.90	1719.70	1508.26	2901.65	1104.96	1270.46	2834.55
16	**1977**	1917.50	1159.13	1992.32	1636.66	685.40	642.39	1235.49
17	**1978**	1076.80	2068.95	1908.49	1027.73	401.86	594.52	1518.63
18	**1979**	43.10	2496.04	2675.62	2305.49	1705.39	445.47	879.19
19	**1980**	1004.20	2677.83	3231.60	2983.10	1701.37	1608.58	1001.19
20	**1981**	985.40	1407.75	1056.13	3306.17	1019.45	1901.76	781.13
21	**1982**	3253.80	856.42	990.37	4067.47	1572.64	1665.50	1487.45
22	**1983**	6967.10	2023.75	1736.94	3035.88	2302.66	1332.93	2629.44
23	**1984**	2360.20	1963.01	1585.36	1671.18	1820.12	1175.47	1801.08
24	**1985**	3285.10	1863.89	1977.23	1291.46	575.53	2018.63	1445.47
25	**1986**	3541.10	2059.82	1721.08	3138.40	734.34	1690.87	2729.59
26	**1987**	2174.90	1778.48	1363.56	3793.13	1058.29	1473.80	3736.27

OYSTER	Oyster harvest (thousands of pounds)
JF_LAG	Lagged January-February inflows (thousands of acre-feet)
MA_LAG	Lagged March-April inflows (thousands of acre-feet)
MJ_LAG	Lagged May-June inflows (thousands of acre-feet)
JA_LAG	Lagged July-August inflows (thousands of acre-feet)
SO_LAG	Lagged September-October inflows (thousands of acre-feet)
ND_LAG	Lagged November-December inflows (thousands of acre-feet)

Summary Information for Individual Variables

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Oyster Harvest	.093	26	.200*	.950	26	.308
January-February Inflows	.155	26	.112	.963	26	.475
March-April Inflows	.181	26	.028	.919	26	.048
May-June Inflows	.150	26	.139	.942	26	.218
July-August Inflows	.166	26	.063	.915	26	.040
September-October Inflows	.192	26	.015	.904	26	.020
November-December Inflows	.184	26	.024	.865	26	.010**
Ln (Oyster Harvest)	.175	26	.039	.755	26	.010**
Ln (January-February Inflows)	.150	26	.137	.948	26	.289
Ln (March-April Inflows)	.112	26	.200*	.950	26	.307
Ln (May-June Inflows)	.214	26	.004	.912	26	.035
Ln (July-August Inflows)	.092	26	.200*	.970	26	.620
Ln (September-October Inflows)	.158	26	.095	.925	26	.070
Ln (November-December Inflows)	.128	26	.200*	.959	26	.425
SQRT (Oyster Harvest)	.147	26	.156	.960	26	.434
SQRT (January-February Inflows)	.137	26	.200*	.973	26	.686
SQRT (March-April Inflows)	.137	26	.200*	.954	26	.366
SQRT (May-June Inflows)	.175	26	.039	.936	26	.133
SQRT (July-August Inflows)	.119	26	.200*	.967	26	.542
SQRT (September-October Inflows)	.182	26	.026	.928	26	.082
SQRT (November-December Inflows)	.133	26	.200*	.924	26	.064

*. This is a lower bound of the true significance.

**. This is an upper bound of the true significance.

a. Lilliefors Significance Correction

Descriptives

			Statistic	Std. Error
Oyster Harvest	Mean		2636.40	295.0886
	95% Confidence Interval for Mean	Lower Bound	2028.66	
		Upper Bound	3244.15	
	5% Trimmed Mean		2561.38	
	Median		2879.75	
	Variance		2264009	
	Std. Deviation		1504.66	
	Minimum		43.10	
	Maximum		6967.10	
	Range		6924.00	
	Interquartile Range		2273.88	
	Skewness		.657	.456
	Kurtosis		1.287	.887

Extreme Values

			Case Number	Year	Value
Oyster Harvest	Highest	1	22	1983	6967.10
		2	4	1965	4583.30
		3	5	1966	4083.30
		4	10	1971	4021.70
		5	9	1970	3850.20
	Lowest	1	18	1979	43.10
		2	1	1962	749.90
		3	13	1974	836.70
		4	20	1981	985.40
		5	19	1980	1004.20

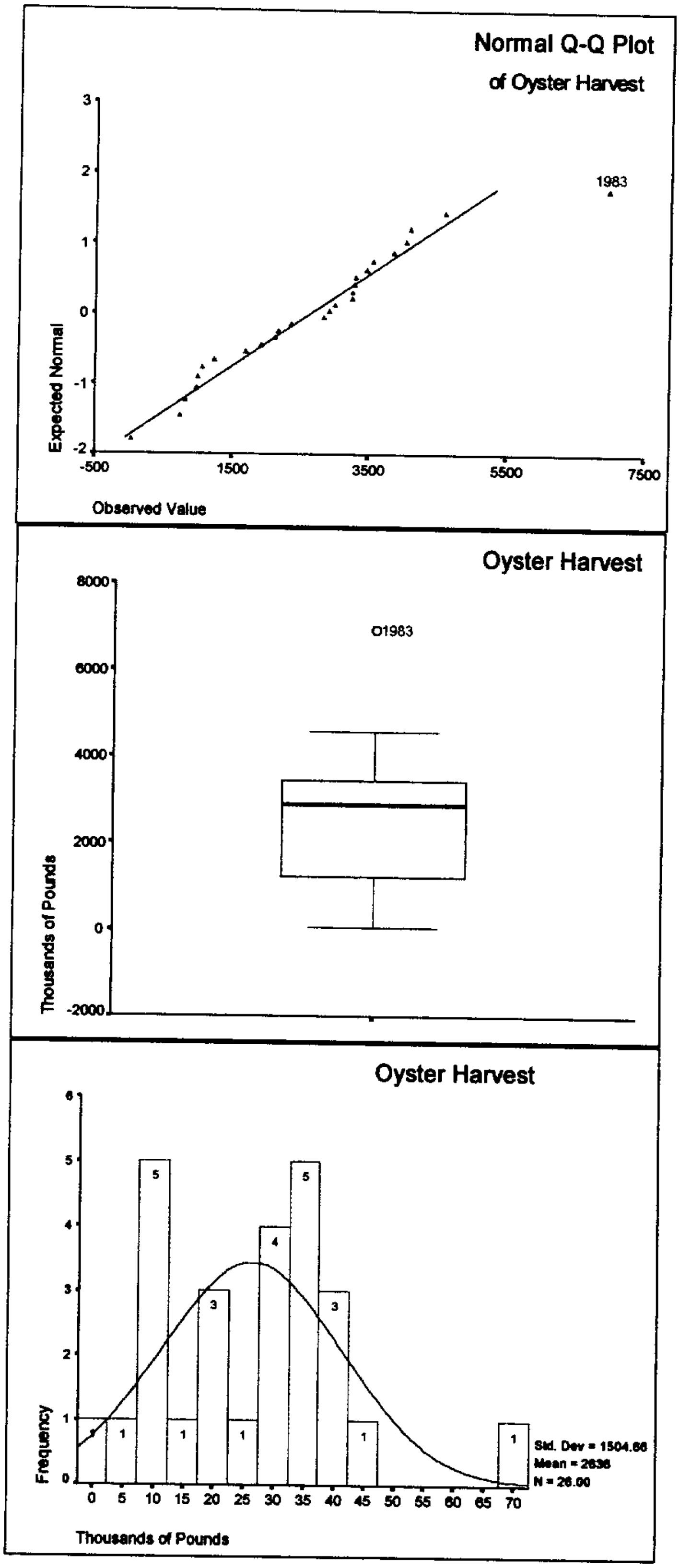


Fig. 1.1a. Exploratory Plots of Oyster Harvest.

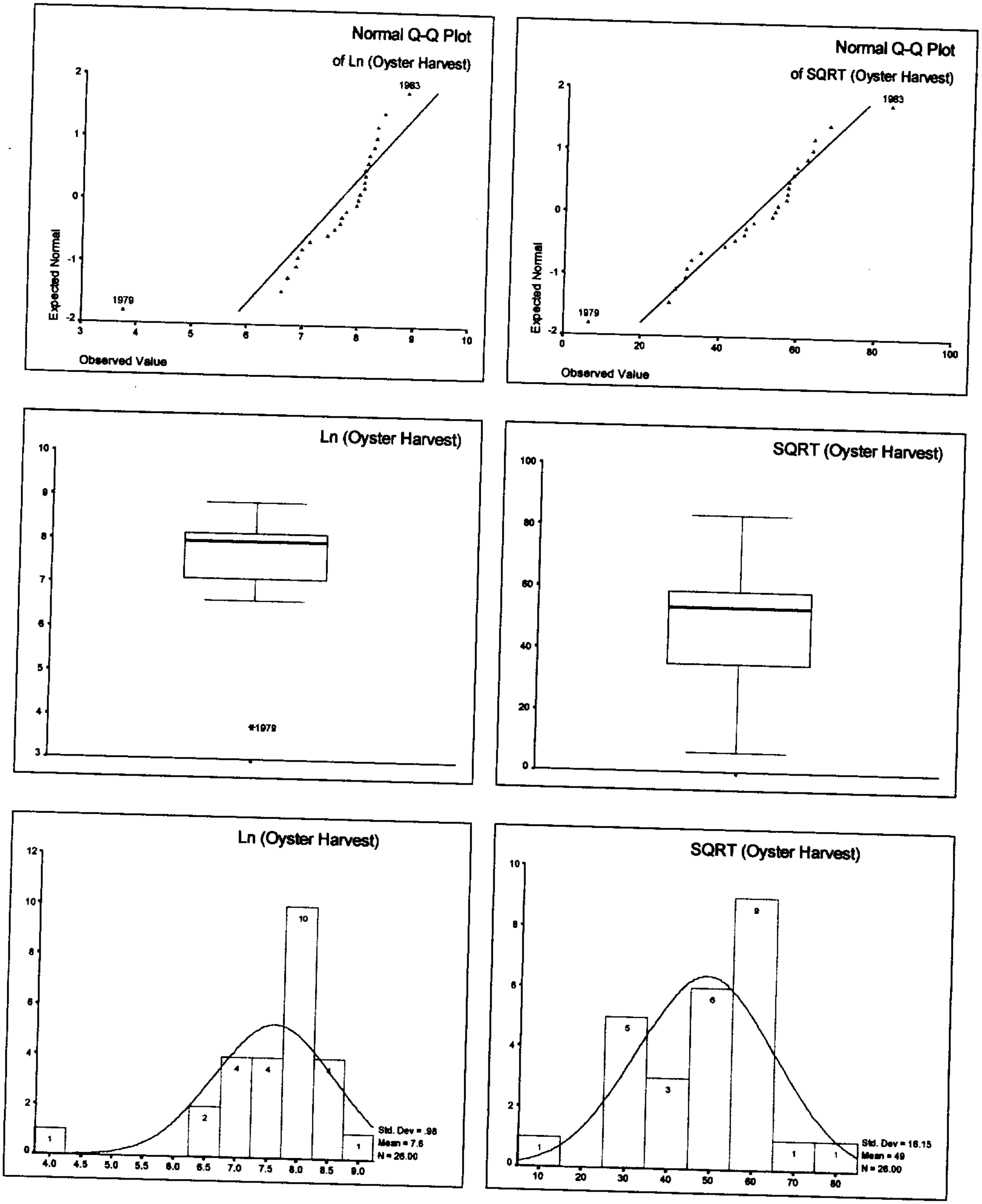


Fig. 1.1b. Exploratory Plots of Transformed Oyster Harvest.

Descriptives

			Statistic	Std. Error
January-February Inflows	Mean		1731.57	139.0755
	95% Confidence Interval for Mean	Lower Bound	1445.14	
		Upper Bound	2018.00	
	5% Trimmed Mean		1717.69	
	Median		1787.49	
	Variance		502892	
	Std. Deviation		709.1485	
	Minimum		443.30	
	Maximum		3240.49	
	Range		2797.19	
	Interquartile Range		921.5675	
	Skewness		.356	.456
	Kurtosis		-.477	.887

Extreme Values

			Case Number	Year	Value
January-February Inflows	Highest	1	14	1975	3240.49
		2	1	1962	2954.20
		3	13	1974	2766.28
		4	19	1980	2677.83
		5	18	1979	2496.04
	Lowest	1	10	1971	443.30
		2	21	1982	856.42
		3	2	1963	915.25
		4	3	1964	977.03
		5	11	1972	1088.25

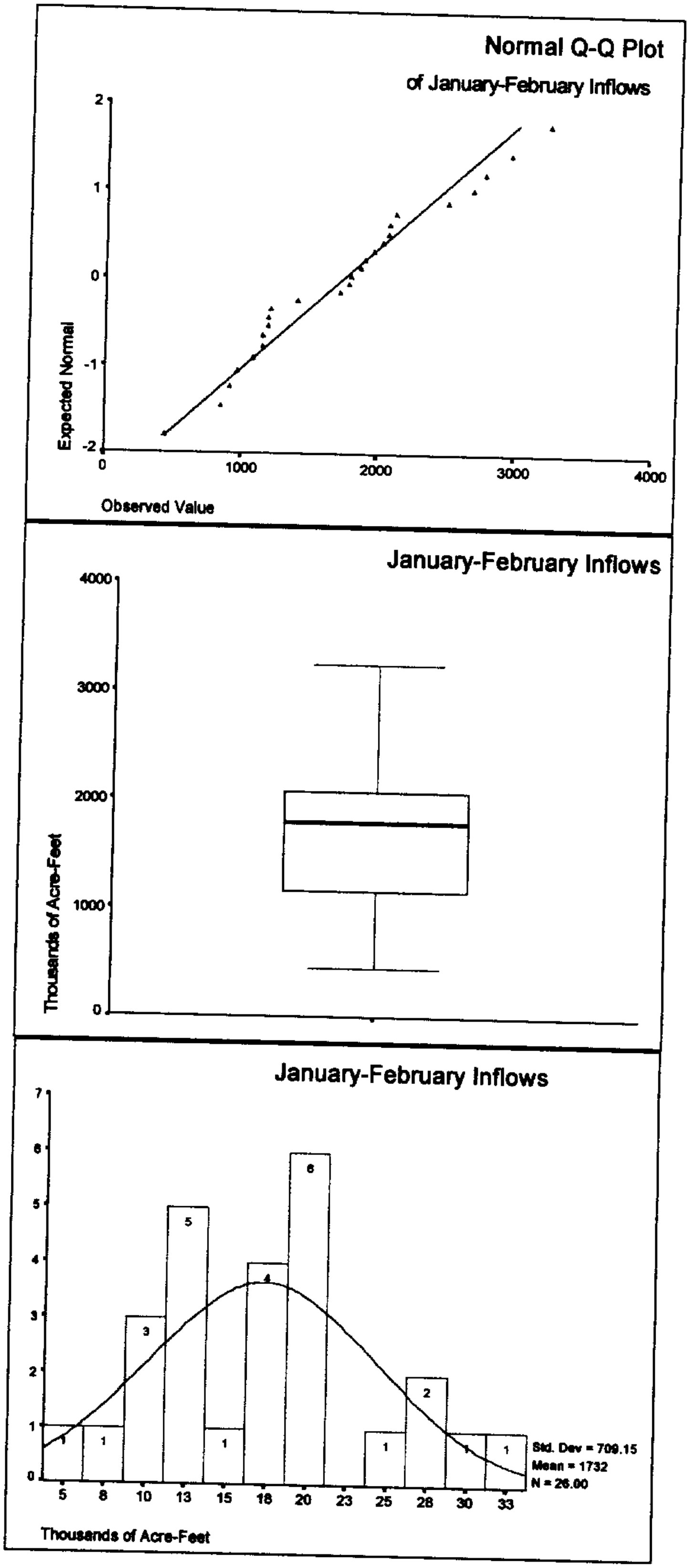


Fig. 1.2a. Exploratory Plots of January-February Inflows.

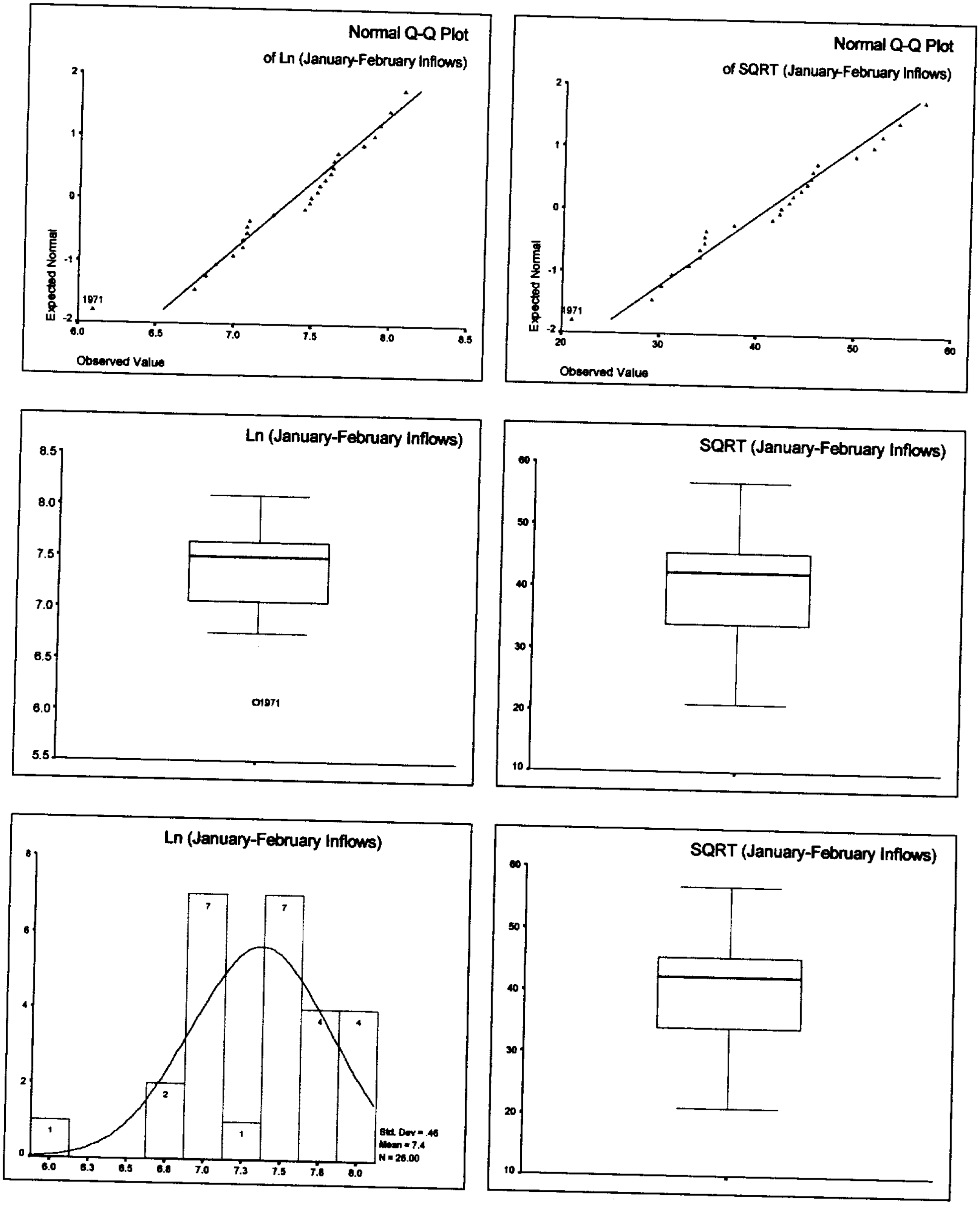


Fig. 1.2b. Exploratory Plots of Transformed January-February Inflows.

Descriptives

			Statistic	Std. Error
March-April Inflows	Mean		1793.03	175.6272
	95% Confidence Interval for Mean	Lower Bound	1431.32	
		Upper Bound	2154.74	
	5% Trimmed Mean		1763.94	
	Median		1590.05	
	Variance		801968	
	Std. Deviation		895.5268	
	Minimum		503.40	
	Maximum		3669.45	
	Range		3166.05	
	Interquartile Range		1108.88	
	Skewness		.684	.456
	Kurtosis		-.383	.887

Extreme Values

			Case Number	Year	Value
March-April Inflows	Highest	1	8	1969	3669.45
		2	9	1970	3388.15
		3	19	1980	3231.60
		4	13	1974	3164.87
		5	12	1973	3049.16
	Lowest	1	2	1963	503.40
		2	11	1972	510.89
		3	3	1964	709.20
		4	21	1982	990.37
		5	1	1962	1045.00

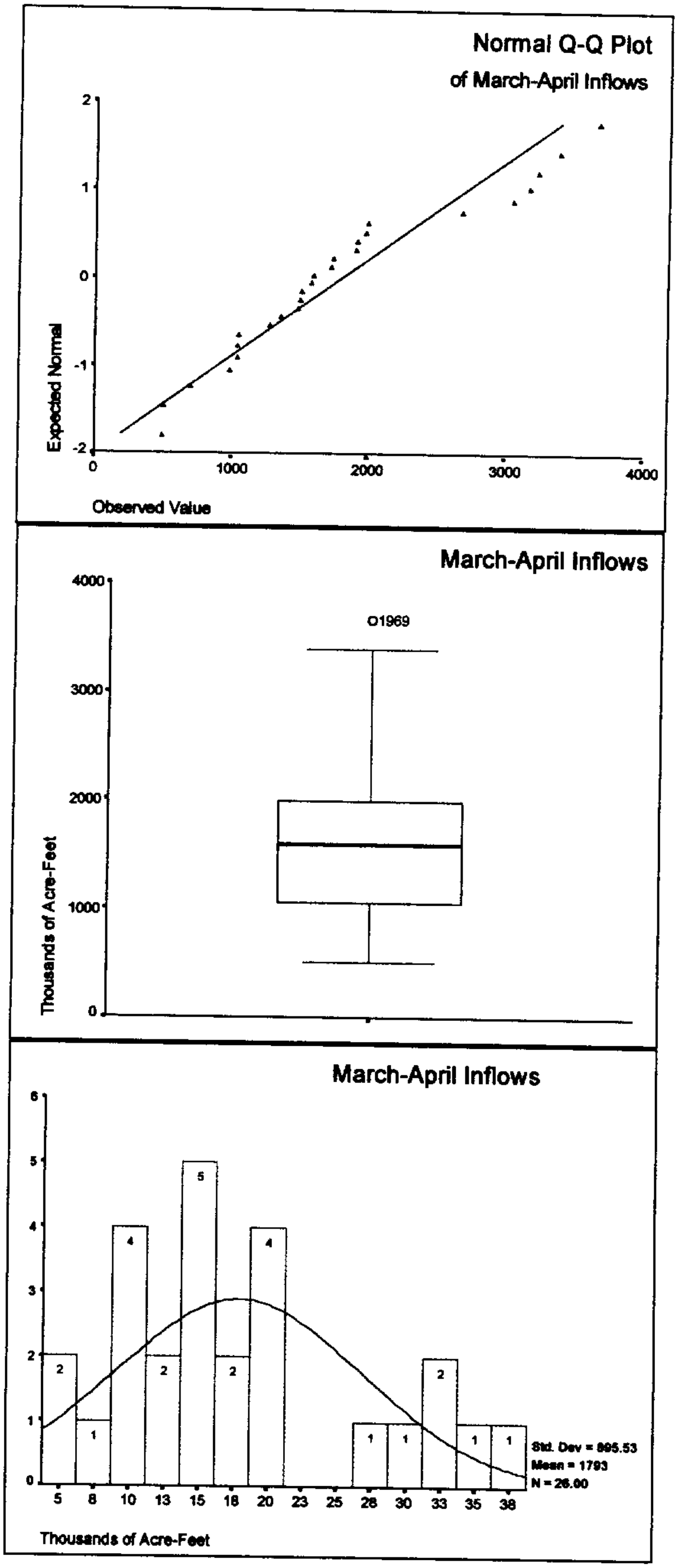


Fig. 1.3a. Exploratory Plots of March-April Inflows.

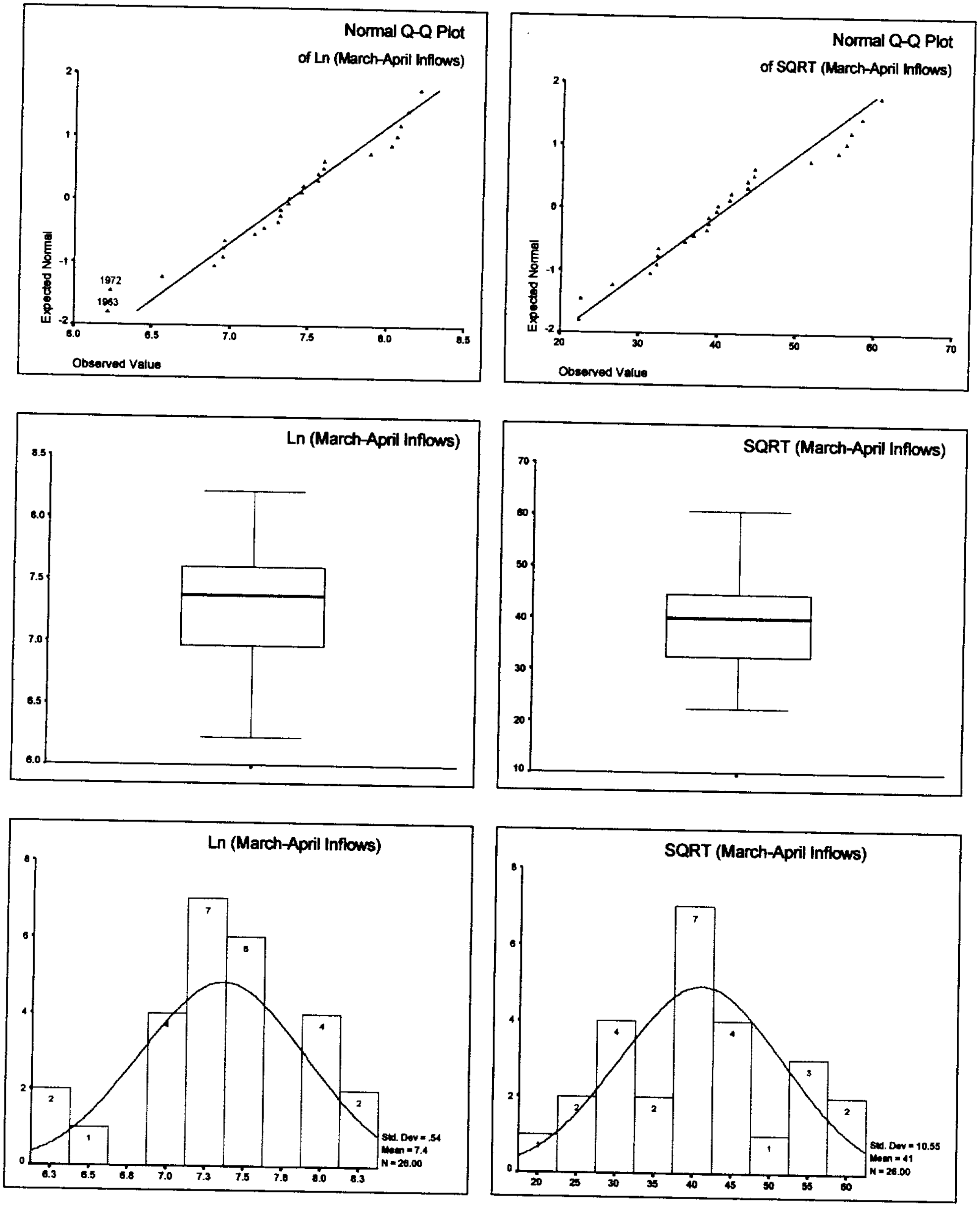


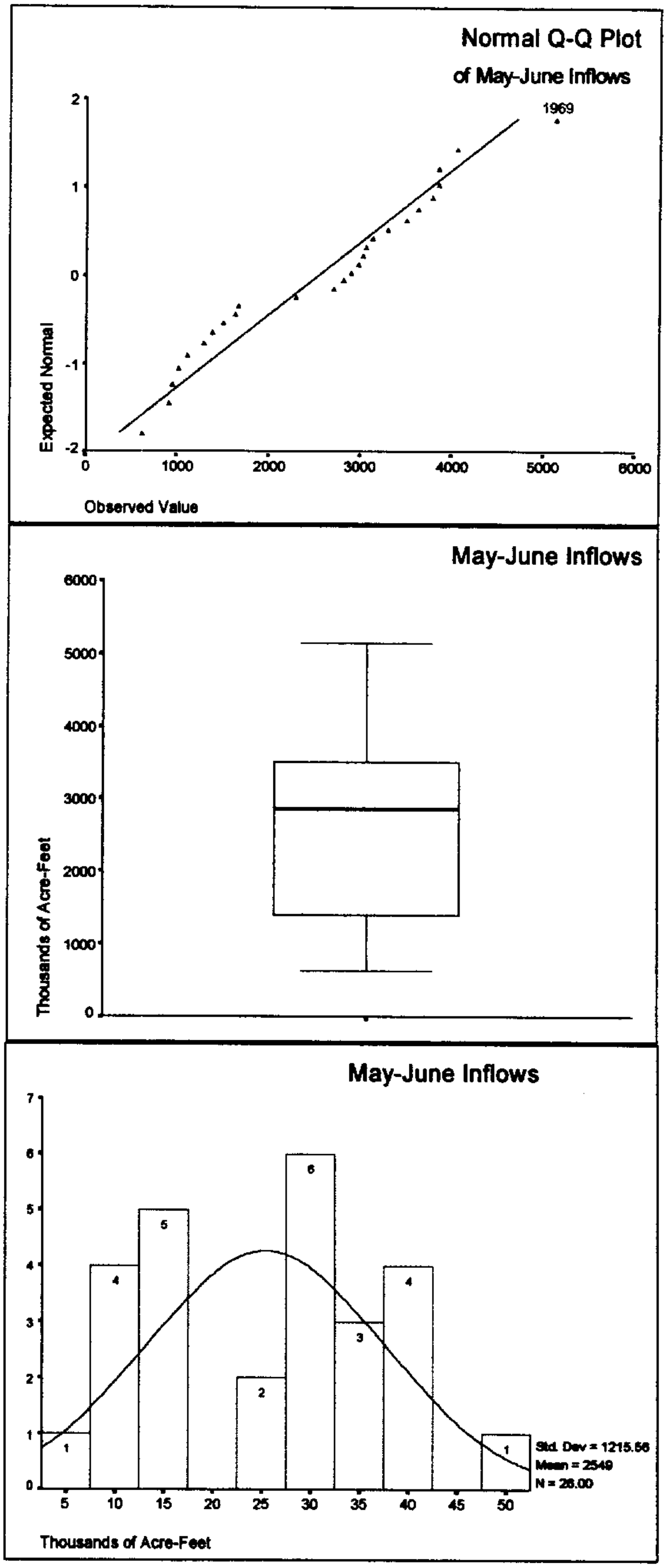
Fig. 1.3b. Exploratory Plots of Transformed March-April Inflows.

Descriptives

			Statistic	Std. Error
May-June Inflows	Mean		2549.27	238.3907
	95% Confidence Interval for Mean	Lower Bound	2058.29	
		Upper Bound	3040.24	
	5% Trimmed Mean		2522.40	
	Median		2862.90	
	Variance		1477583	
	Std. Deviation		1215.56	
	Minimum		620.95	
	Maximum		5140.75	
	Range		4519.80	
	Interquartile Range		2170.47	
	Skewness		.057	.456
	Kurtosis		-.940	.887

Extreme Values

			Case Number	Year	Value
May-June Inflows	Highest	1	8	1969	5140.75
		2	21	1982	4067.47
		3	5	1966	3868.55
		4	12	1973	3859.81
		5	26	1987	3793.13
	Lowest	1	3	1964	620.95
		2	2	1963	916.45
		3	10	1971	948.92
		4	17	1978	1027.73
		5	11	1972	1119.91



Normal Q-Q Plot of May-June Inflows

May-June Inflows

May-June Inflows

Fig. 1.4a. Exploratory Plots of May-June Inflows.

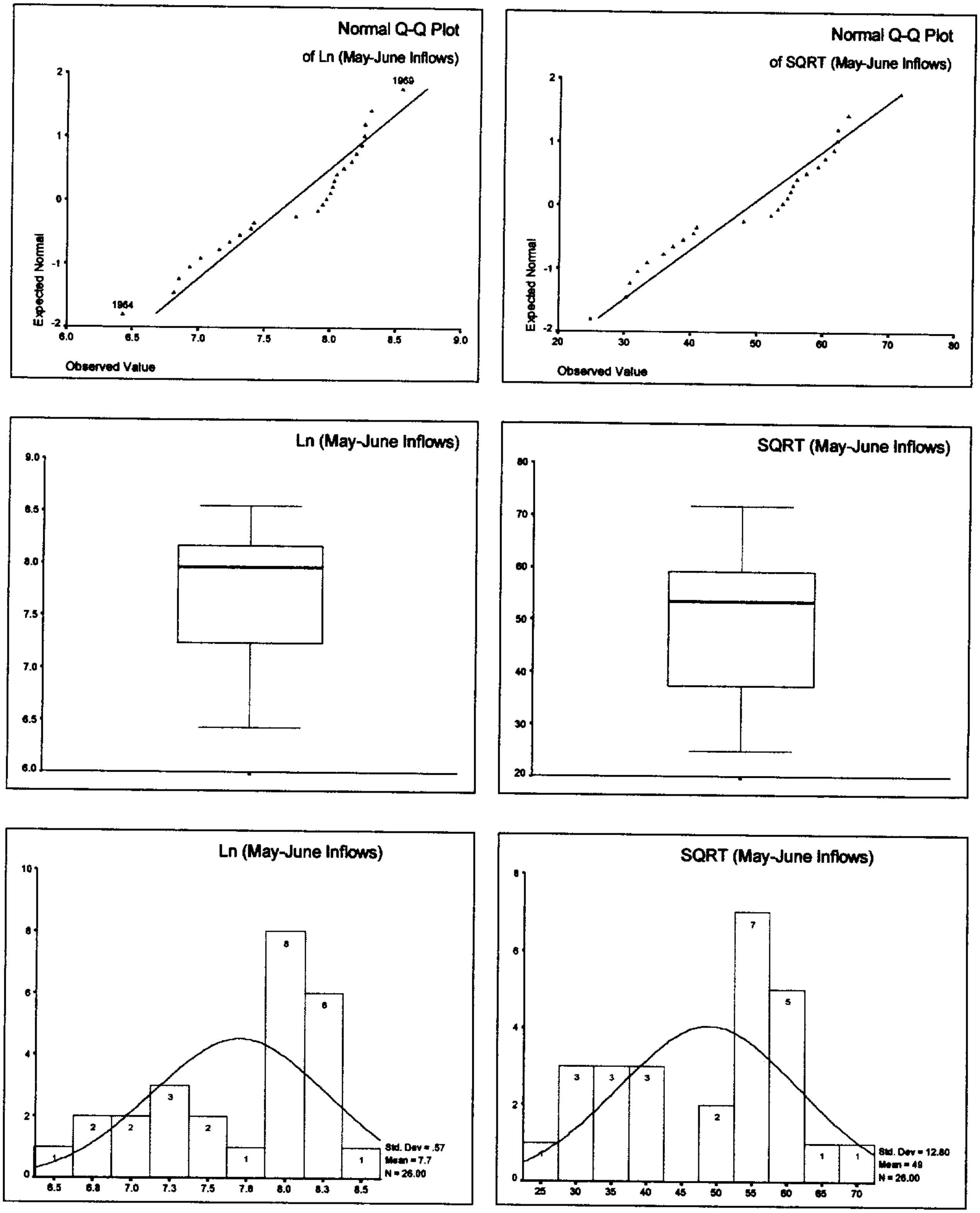


Fig. 1.4b. Exploratory Plots of Transformed May-June Inflows.

Descriptives

			Statistic	Std. Error
July-August Inflows	Mean		911.6129	104.5030
	95% Confidence Interval for Mean	Lower Bound	696.3850	
		Upper Bound	1126.84	
	5% Trimmed Mean		879.3051	
	Median		768.3225	
	Variance		283943	
	Std. Deviation		532.8626	
	Minimum		208.60	
	Maximum		2302.66	
	Range		2094.06	
	Interquartile Range		641.7063	
	Skewness		.968	.456
	Kurtosis		.512	.887

Extreme Values

			Case Number	Year	Value
July-August Inflows	Highest	1	22	1983	2302.66
		2	23	1984	1820.12
		3	18	1979	1705.39
		4	19	1980	1701.37
		5	21	1982	1572.64
	Lowest	1	3	1964	208.60
		2	4	1965	229.70
		3	2	1963	367.34
		4	17	1978	401.86
		5	10	1971	425.88

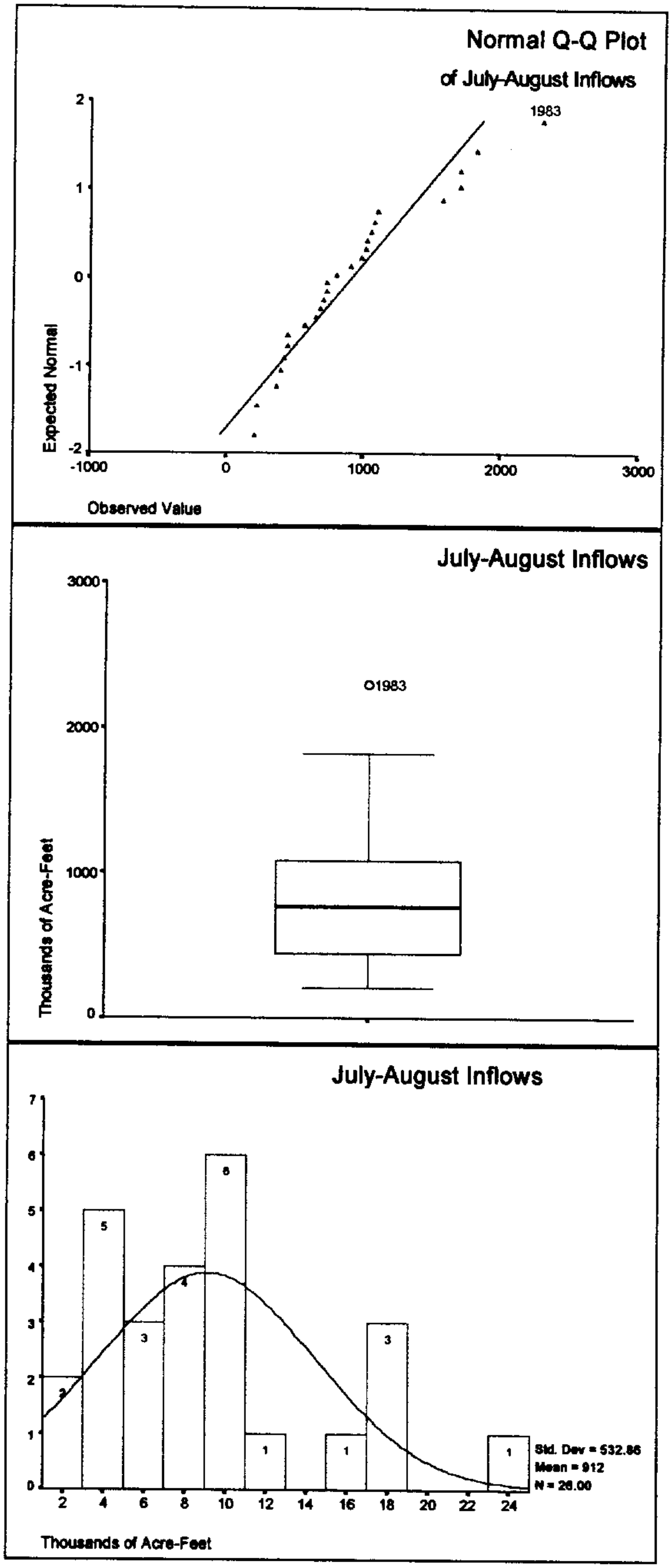


Fig. 1.5a. Exploratory Plots of July-August Inflows.

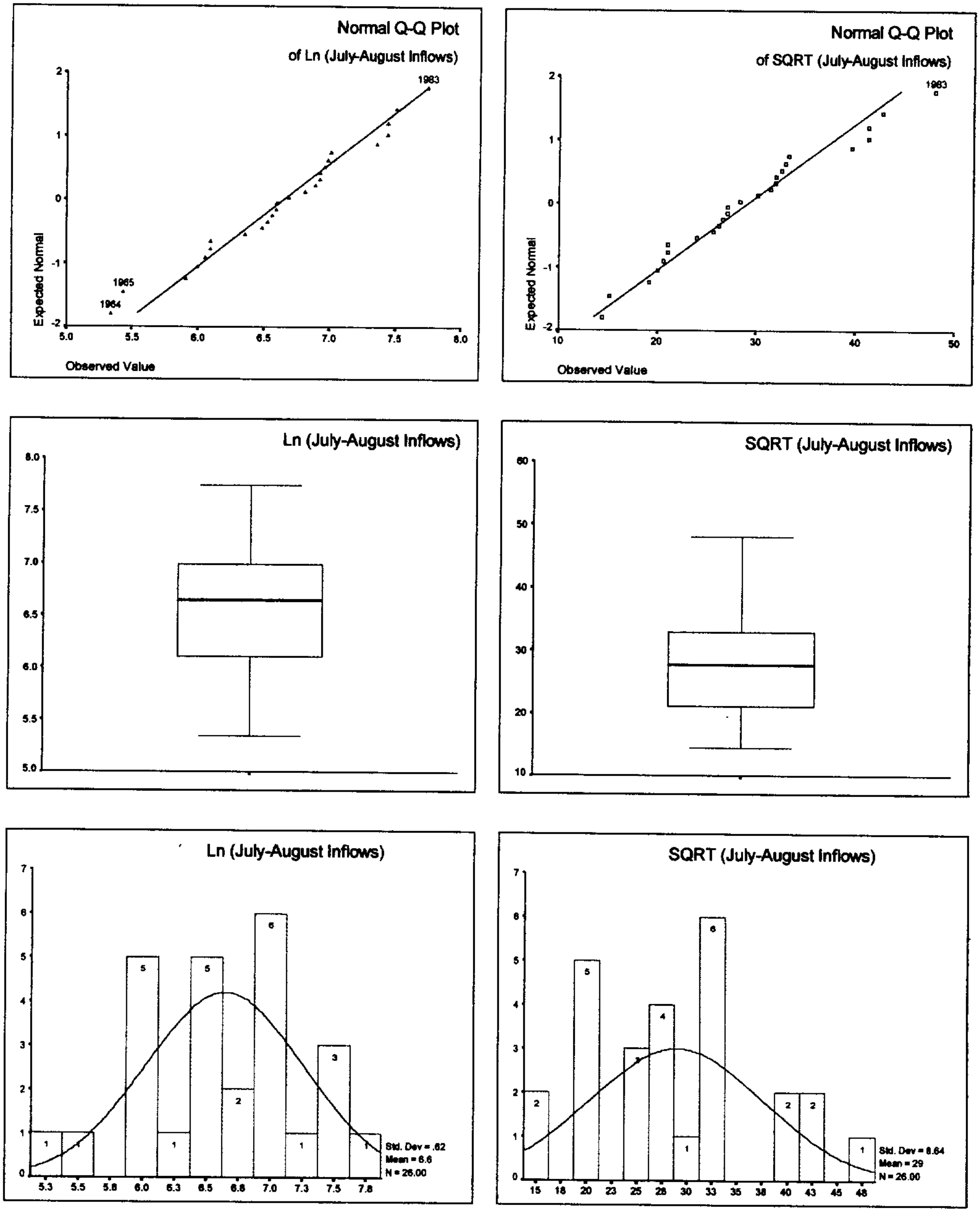


Fig. 1.5b. Exploratory Plots of Transformed July-August Inflows.

Descriptives

			Statistic	Std. Error
September-October Inflows	Mean		1179.31	139.3761
	95% Confidence Interval for Mean	Lower Bound	892.2641	
		Upper Bound	1466.37	
	5% Trimmed Mean		1126.95	
	Median		1181.70	
	Variance		505068	
	Std. Deviation		710.6816	
	Minimum		357.73	
	Maximum		3097.29	
	Range		2739.56	
	Interquartile Range		1128.05	
	Skewness		.825	.456
	Kurtosis		.432	.887

Extreme Values

			Case Number	Year	Value
September-October Inflows	Highest	1	14	1975	3097.29
		2	13	1974	2393.69
		3	24	1985	2018.63
		4	20	1981	1901.76
		5	25	1986	1690.87
	Lowest	1	4	1965	357.73
		2	6	1967	395.08
		3	5	1966	424.64
		4	18	1979	445.47
		5	9	1970	476.12

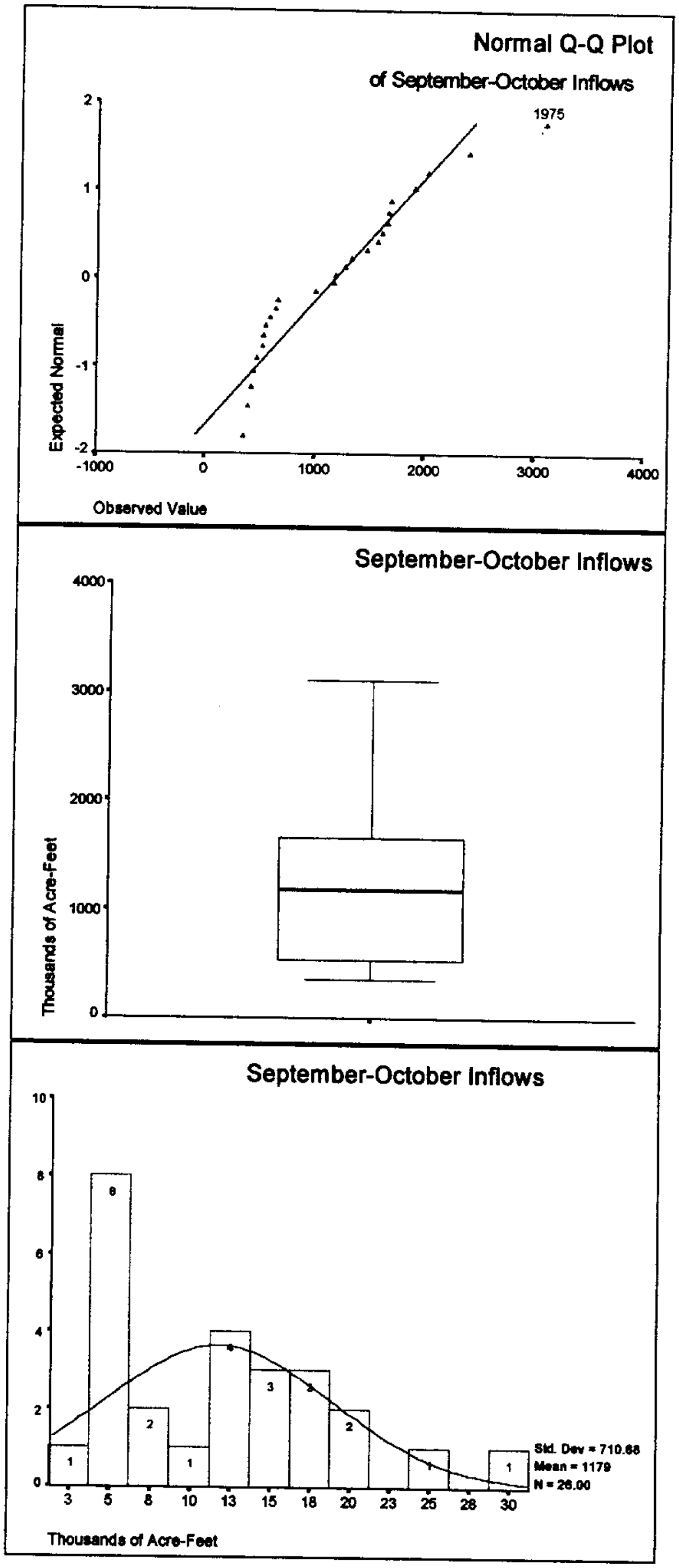


Fig. 1.6a. Exploratory Plots of September-October Inflows.

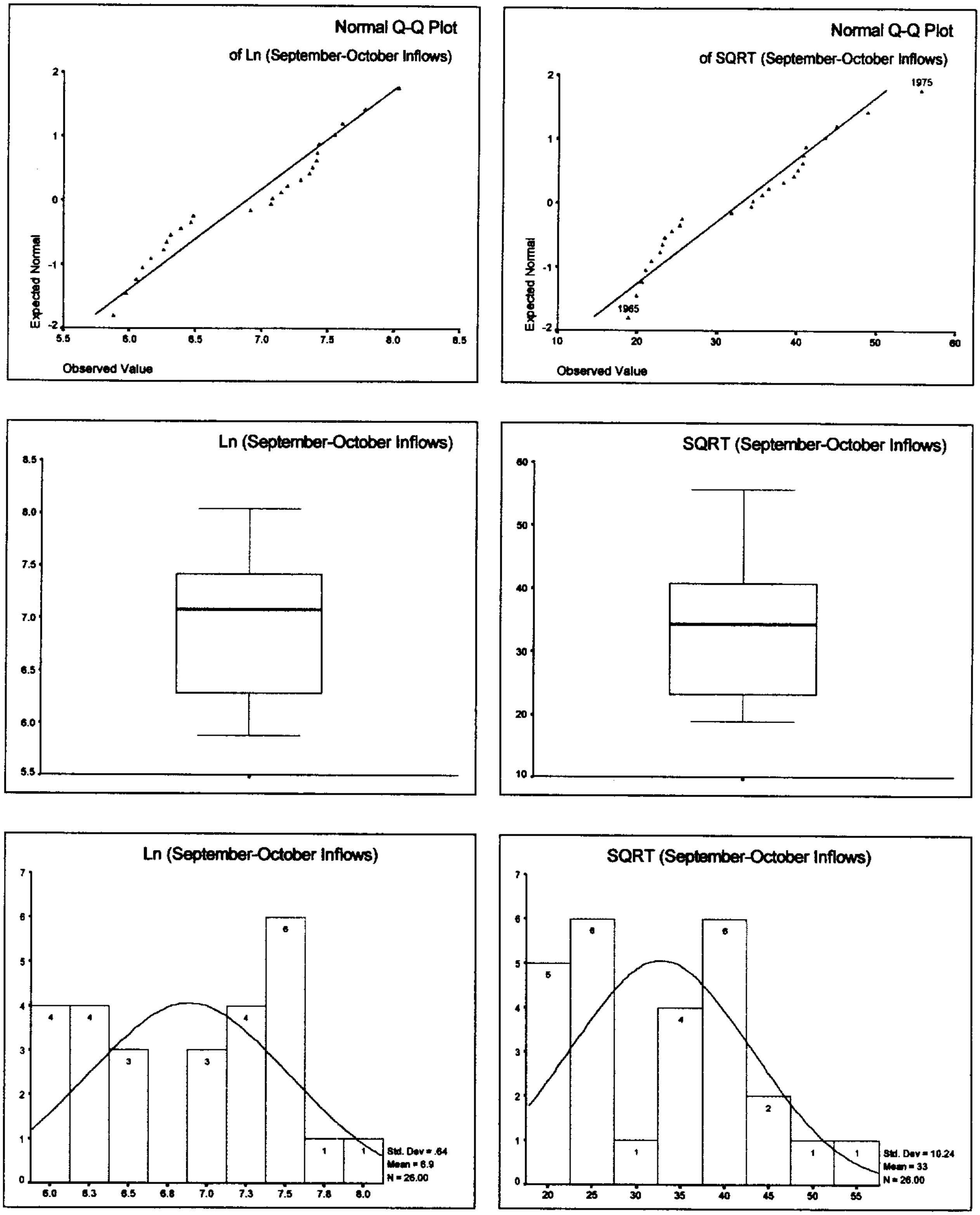


Fig. 1.6b. Exploratory Plots of Transformed September-October Inflows.

Descriptives

			Statistic	Std. Error
SQRT (November-December Inflows)	Mean		38.4032	2.1363
	95% Confidence Interval for Mean	Lower Bound	34.0034	
		Upper Bound	42.8031	
	5% Trimmed Mean		37.9963	
	Median		37.3369	
	Variance		118.664	
	Std. Deviation		10.8933	
	Minimum		22.17	
	Maximum		61.35	
	Range		39.18	
	Interquartile Range		15.5223	
	Skewness		.697	.456
	Kurtosis		-.342	.887

Extreme Values

			Case Number	Year	Value
November-December Inflows	Highest	1	14	1975	3763.55
		2	26	1987	3736.27
		3	15	1976	2834.55
		4	25	1986	2729.59
		5	22	1983	2629.44
	Lowest	1	10	1971	491.33
		2	7	1968	628.35
		3	20	1981	781.13
		4	9	1970	782.52
		5	6	1967	812.45

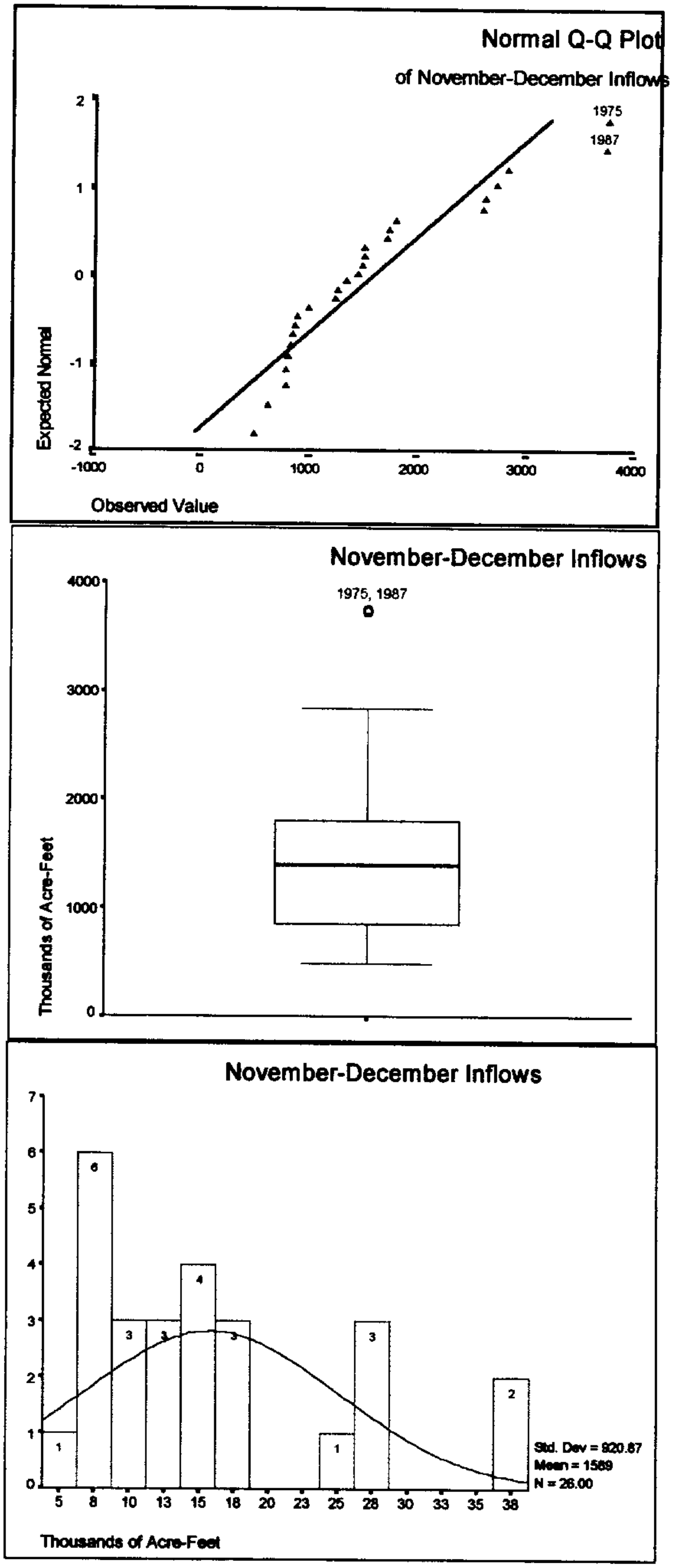


Fig. 1.7a. Exploratory Plots of November-December Inflows.

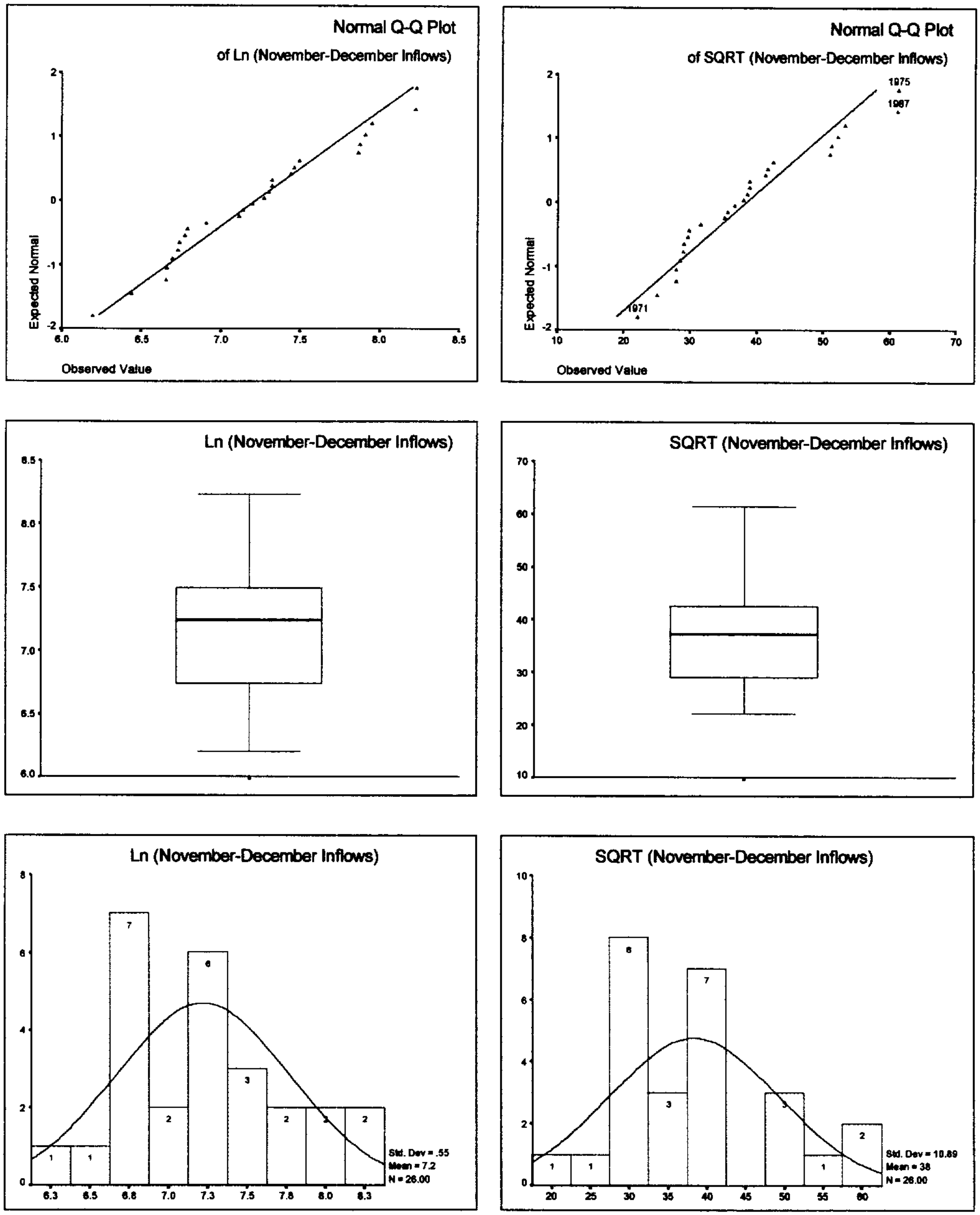


Fig. 1.7b. Exploratory Plots of Transformed November-December Inflows.

Percentiles

		Percentiles						
		5	10	25	50	75	90	95
Weighted Average (Definition 1)	Oyster Harvest	290.4800	810.6600	1196.80	2879.75	3470.68	4233.30	6132.77
	January-February Inflows	587.8903	897.5995	1159.24	1787.49	2080.80	2822.65	3140.29
	March-April Inflows	506.0215	649.7070	1054.26	1590.05	2163.14	3278.56	3570.99
	May-June Inflows	724.3750	939.1790	1365.59	2862.90	3536.06	3928.22	4765.10
	July-August Inflows	215.9818	326.0480	445.9275	768.3225	1087.63	1739.81	2133.77
	September-October Inflows	370.7975	415.7670	532.5713	1181.70	1660.62	2131.15	2851.03
	November-December Inflows	539.2820	735.2945	844.6875	1394.51	2001.71	3105.07	3754.00
	Ln (Oyster Harvest)	4.7633	6.6966	7.0856	7.9654	8.1520	8.3493	8.7024
	Ln (January-February Inflows)	6.3247	6.7993	7.0555	7.4886	7.6405	7.9450	8.0511
	Ln (March-April Inflows)	6.2266	6.4657	6.9606	7.3715	7.6708	8.0949	8.1799
	Ln (May-June Inflows)	6.5675	6.8449	7.2188	7.9595	8.1706	8.2757	8.4630
	Ln (July-August Inflows)	5.3741	5.7654	6.1002	6.6432	6.9917	7.4611	7.6595
	Ln (September-October Inflows)	5.9145	6.0296	6.2777	7.0747	7.4149	7.6613	7.9481
	Ln (November-December Inflows)	6.2832	6.5954	6.7390	7.2396	7.5883	8.0325	8.2306
	SQRT (Oyster Harvest)	13.8518	28.4633	34.5798	53.6619	58.9114	65.0405	77.9500
	SQRT (January-February Inflows)	23.9281	29.9565	34.0476	42.2786	45.6153	53.1225	56.0248
	SQRT (March-April Inflows)	22.4948	25.4224	32.4693	39.8754	46.4081	57.2553	59.7471
	SQRT (May-June Inflows)	26.7928	30.6451	36.9493	53.5048	59.4629	62.6714	68.9262
	SQRT (July-August Inflows)	14.6924	17.9630	21.1170	27.7118	32.9789	41.7063	46.1229
	SQRT (September-October Inflows)	19.2506	20.3876	23.0771	34.3757	40.7506	46.1280	53.2985
	SQRT (November-December Inflows)	23.1812	27.0841	29.0634	37.3369	44.5857	55.6059	61.2698
Tukey's Hinges	Oyster Harvest			1236.80	2879.75	3447.20		
	January-February Inflows			1159.28	1787.49	2068.95		
	March-April Inflows			1056.13	1590.05	1992.32		
	May-June Inflows			1390.30	2862.90	3503.55		
	July-August Inflows			446.0000	768.3225	1081.86		
	September-October Inflows			535.9950	1181.70	1658.99		
	November-December Inflows			847.0500	1394.51	1801.08		
	Ln (Oyster Harvest)			7.1203	7.9654	8.1453		
	Ln (January-February Inflows)			7.0556	7.4886	7.6348		
	Ln (March-April Inflows)			6.9624	7.3715	7.5971		
	Ln (May-June Inflows)			7.2373	7.9595	8.1615		
	Ln (July-August Inflows)			6.1003	6.6432	6.9864		
	Ln (September-October Inflows)			6.2841	7.0747	7.4140		
	Ln (November-December Inflows)			6.7418	7.2396	7.4961		
	SQRT (Oyster Harvest)			35.1682	53.6619	58.7129		
	SQRT (January-February Inflows)			34.0481	42.2786	45.4857		
	SQRT (March-April Inflows)			32.4982	39.8754	44.6354		
	SQRT (May-June Inflows)			37.2867	53.5048	59.1908		
	SQRT (July-August Inflows)			21.1187	27.7118	32.8916		
	SQRT (September-October Inflows)			23.1516	34.3757	40.7307		
	SQRT (November-December Inflows)			29.1041	37.3369	42.4391		

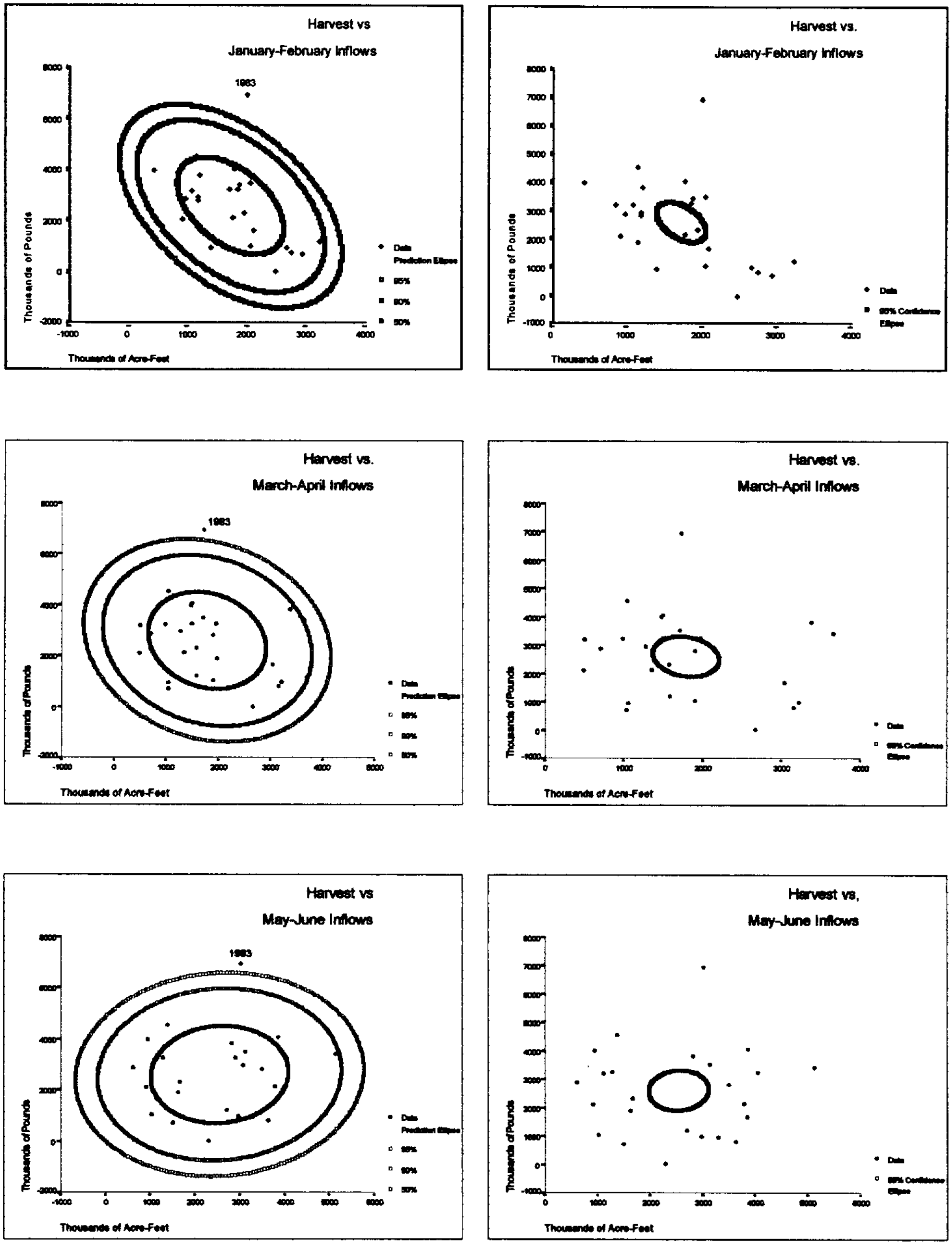


Fig. 2.1. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

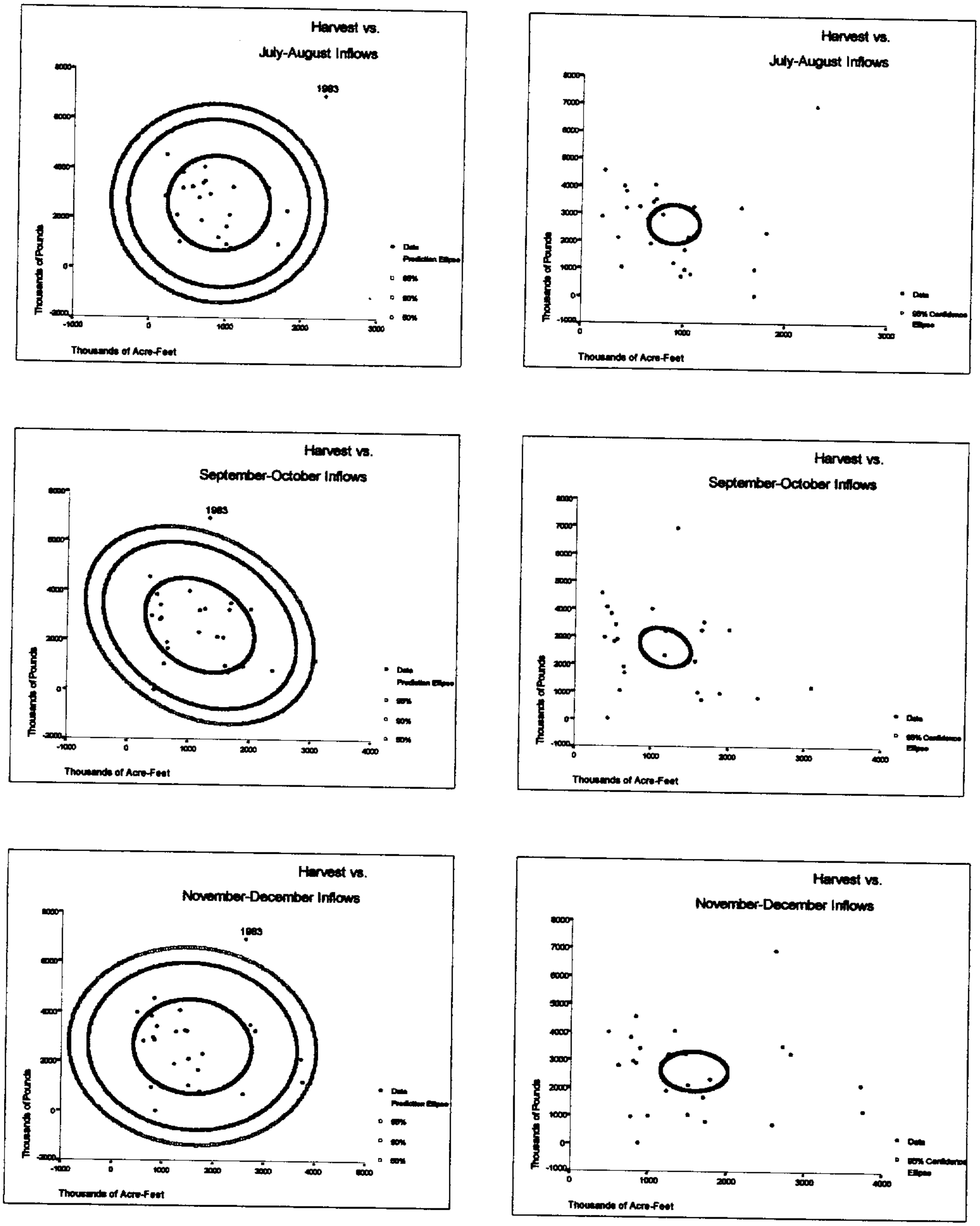
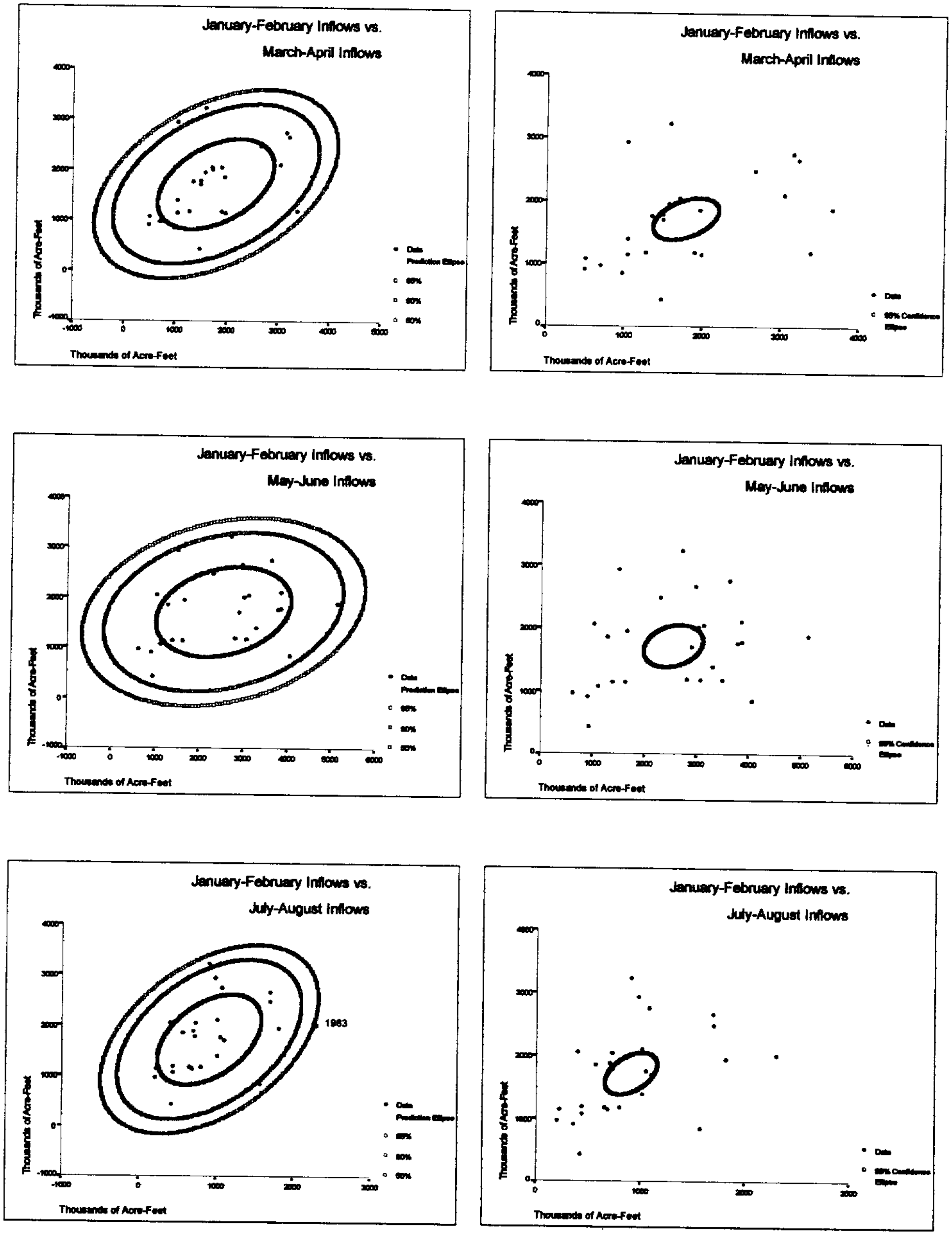


Fig. 2.2. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.


January-February Inflows vs. March-April Inflows

January-February Inflows vs. March-April Inflows

January-February Inflows vs. May-June Inflows

January-February Inflows vs. May-June Inflows

January-February Inflows vs. July-August Inflows

January-February Inflows vs. July-August Inflows

Fig. 2.3. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

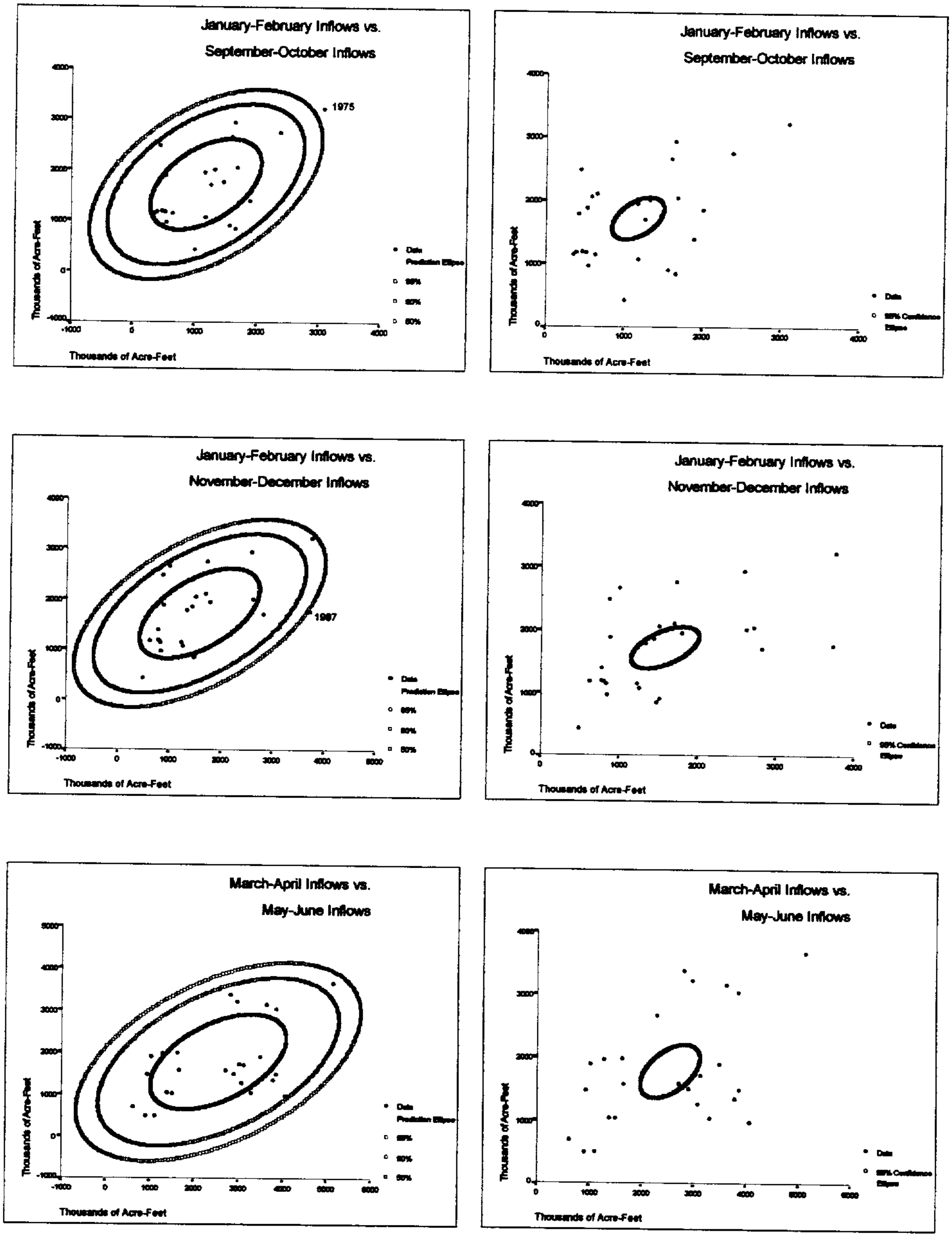


Fig. 2.4. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

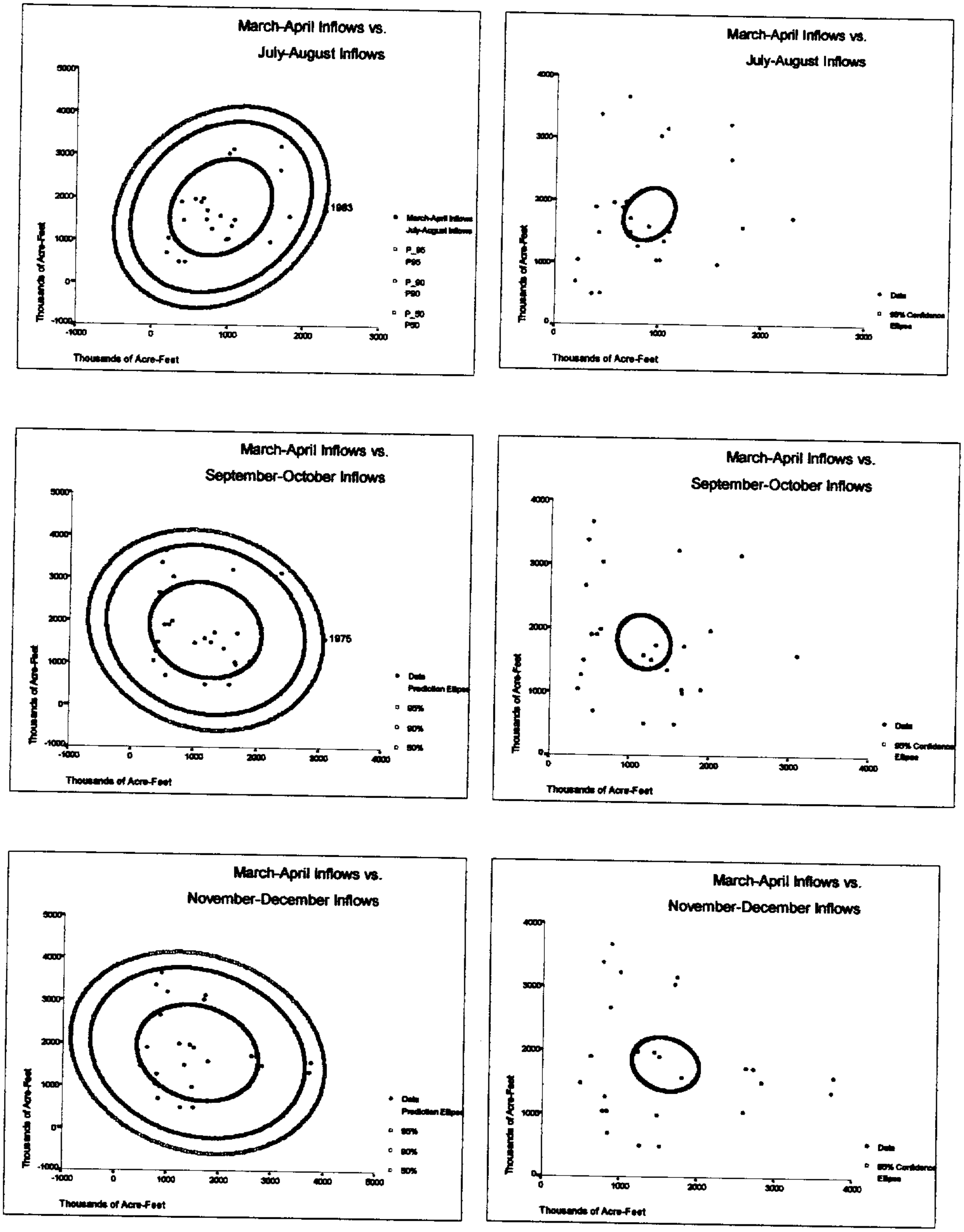


Fig. 2.5. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

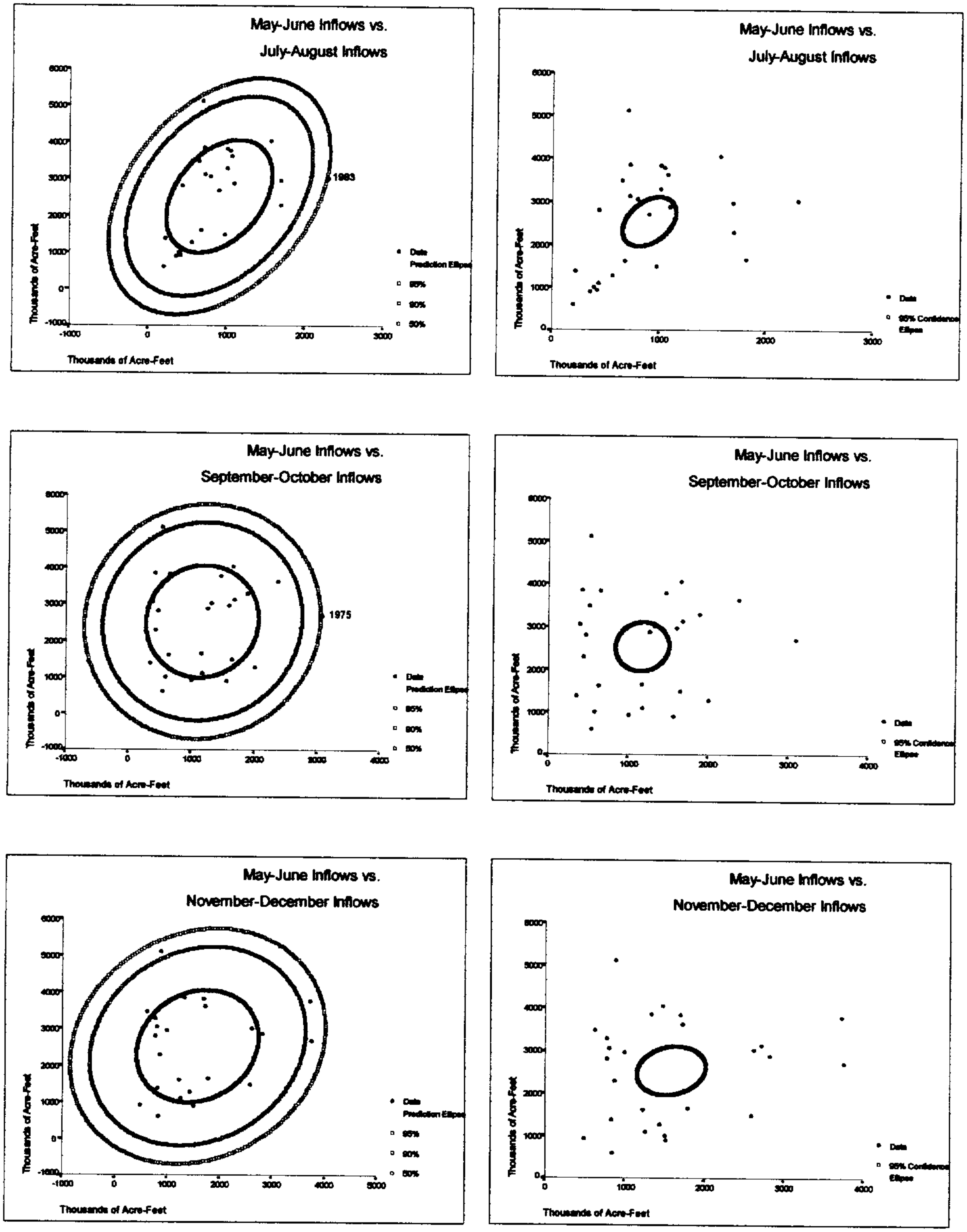


Fig. 2.6. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

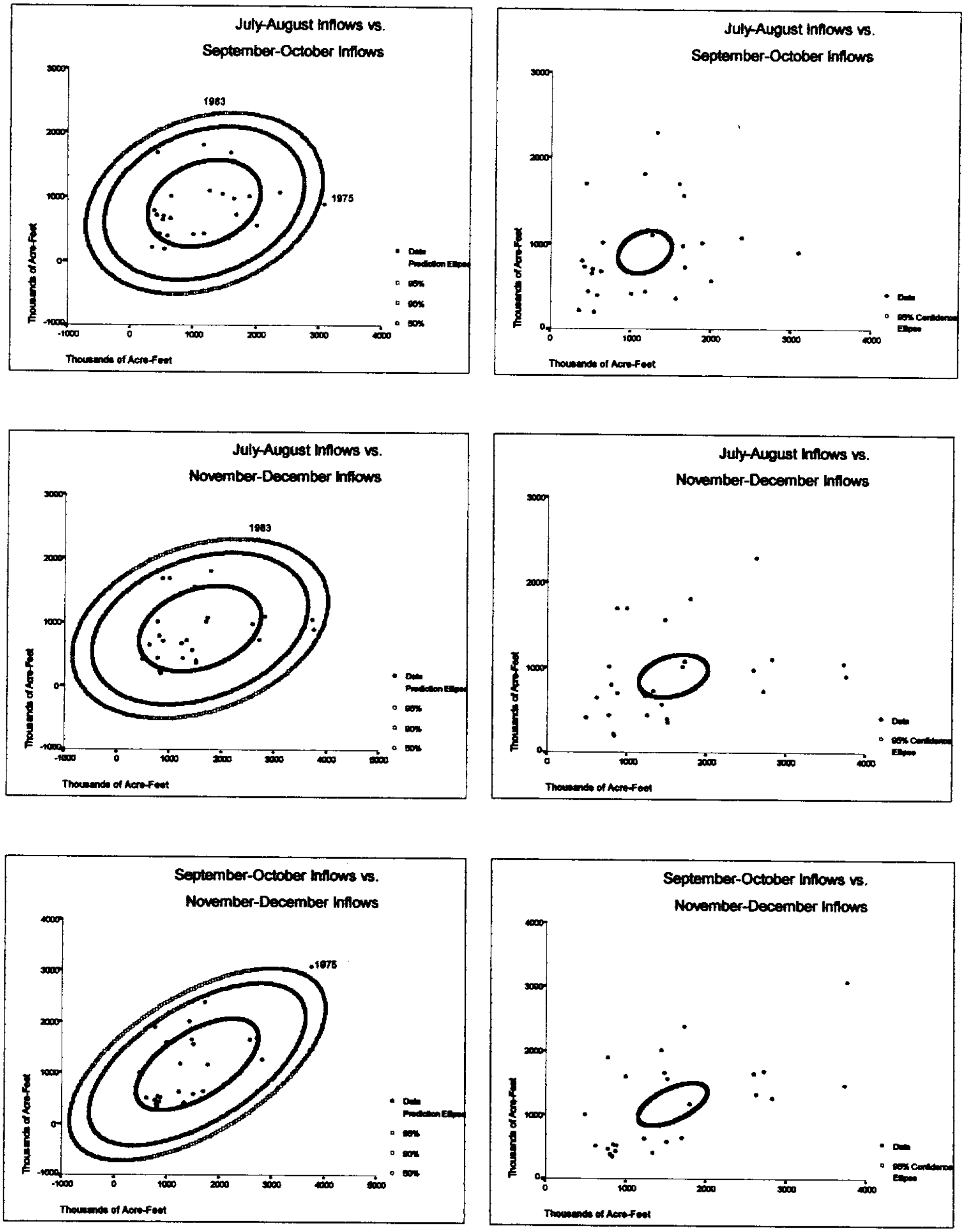


Fig. 2.7. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

Box-Cox Analysis

Numerical Results

Oyster	QJF_Lag	QMA_Lag	QMJ_Lag	QJA_Lag	QSO_Lag	QND_Lag	LAMBDA
1.901068118	.000036731	.000039694	.000095470	.000015678	.000011061	.000013979	-.000000020
.975143103	.000031443	.000034694	.000083047	.000013404	.000010104	.000012740	-.000000019
.502872485	.000027044	.000030436	.000072586	.000011511	.000009261	.000011661	-.000000018
.260858528	.000023377	.000026805	.000063756	.000009932	.000008518	.000010721	-.000000017
.136202069	.000020315	.000023707	.000056285	.000008613	.000007862	.000009902	-.000000016
.071632396	.000017753	.000021059	.000049948	.000007509	.000007284	.000009189	-.000000015
.037979414	.000015607	.000018795	.000044560	.000006584	.000006774	.000008568	-.000000014
.020320169	.000013805	.000016857	.000039970	.000005807	.000006325	.000008030	-.000000013
.010983733	.000012290	.000015199	.000036049	.000005155	.000005929	.000007564	-.000000012
.006006417	.000011015	.000013779	.000032695	.000004607	.000005581	.000007163	-.000000011
.003328478	.000009939	.000012563	.000029820	.000004146	.000005276	.000006819	-.000000010
.001872928	.000009032	.000011524	.000027351	.000003759	.000005009	.000006528	-.000000009
.001072819	.000008266	.000010637	.000025229	.000003434	.000004777	.000006284	-.000000008
.000627488	.000007619	.000009883	.000023404	.000003162	.000004577	.000006084	-.000000007
.000376195	.000007073	.000009243	.000021834	.000002935	.000004406	.000005924	-.000000006
.000232247	.000006613	.000008704	.000020483	.000002748	.000004263	.000005801	-.000000005
.000148433	.000006227	.000008255	.000019324	.000002595	.000004144	.000005715	-.000000004
.000098776	.000005904	.000007884	.000018331	.000002472	.000004050	.000005663	-.000000003
.000068815	.000005635	.000007583	.000017485	.000002375	.000003979	**.000005645**	**-.000000002**
.000050407	.000005414	.000007347	.000016768	.000002302	.000003930	.000005660	-.000000001
.000038901	.000005235	.000007169	.000016166	.000002252	.000003903	.000005709	.000000000
.000031608	.000005092	.000007044	.000015668	.000002222	**.000003898**	.000005792	**.000000001**
.000026949	.000004983	.000006970	.000015265	**.000002211**	.000003915	.000005911	**.000000002**
.000023984	.000004904	**.000006943**	.000014947	.000002220	.000003956	.000006066	**.000000003**
.000022147	.000004851	.000006962	.000014710	.000002247	.000004021	.000006262	.000000004
.000021096	.000004824	.000007026	.000014548	.000002293	.000004112	.000006500	.000000005
.000020619	**.000004821**	.000007134	.000014457	.000002358	.000004232	.000006783	**.000000006**
.000020592	.000004841	.000007286	**.000014436**	.000002444	.000004381	.000007118	**.000000007**
.000020940	.000004882	.000007483	.000014482	.000002552	.000004565	.000007508	.000000008
.000021627	.000004945	.000007727	.000014595	.000002683	.000004787	.000007959	.000000009
.000022640	.000005029	.000008020	.000014776	.000002839	.000005051	.000008480	.000000010
.000023987	.000005134	.000008363	.000015025	.000003025	.000005363	.000009078	.000000011
.000025692	.000005261	.000008761	.000015345	.000003242	.000005730	.000009764	.000000012
.000027791	.000005410	.000009217	.000015739	.000003495	.000006161	.000010549	.000000013
.000030339	.000005583	.000009737	.000016210	.000003788	.000006664	.000011446	.000000014
.000033404	.000005780	.000010324	.000016764	.000004128	.000007252	.000012471	.000000015
.000037073	.000006002	.000010987	.000017407	.000004520	.000007938	.000013642	.000000016
.000041455	.000006251	.000011731	.000018145	.000004974	.000008738	.000014981	.000000017
.000046680	.000006530	.000012566	.000018988	.000005497	.000009673	.000016513	.000000018
.000052912	.000006840	.000013500	.000019944	.000006102	.000010765	.000018265	.000000019
.000060348	.000007184	.000014545	.000021025	.000006800	.000012042	.000020272	.000000020

Model Choice Diagnostics

Untransformed Data

```
 N = 26     Regression Models for Dependent Variable: OYSTER

  R-square      Adj     C(p)       AIC      MSE       SBC Variables in Model
In              Rsq

1 0.220733 0.188264   1.5781    376.9  1837778    379.5 QJF_LAG

1 0.071809 0.033135   6.0841    381.5  2188992    384.0 QSO_LAG

1 0.028944 -.011516   7.3810    382.7  2290082    385.2 QMA_LAG

1 0.003210 -.038323   8.1597    383.3  2350773    385.9 QMJ_LAG
-------------------------------------------------------------------

2 0.285459 0.223325   1.6197    376.7  1758399    380.5 QJF_LAG QND_LAG

2 0.262295 0.198146   2.3206    377.5  1815404    381.3 QJF_LAG QJA_LAG

2 0.252134 0.187103   2.6280    377.9  1840407    381.6 QJF_LAG QMJ_LAG

2 0.223298 0.155758   3.5005    378.9  1911371    382.6 QJF_LAG QSO_LAG
---------------------------------------------------------------------------

3 0.319993 0.227265   2.5748    377.4  1749479    382.4 QJF_LAG QSO_LAG QND_LAG

3 0.319527 0.226735   2.5889    377.4  1750679    382.5 QJF_LAG QMA_LAG QND_LAG

3 0.319044 0.226187   2.6035    377.4  1751920    382.5 QJF_LAG QJA_LAG QND_LAG

3 0.314102 0.220571   2.7530    377.6  1764634    382.7 QJF_LAG QMJ_LAG QND_LAG
-----------------------------------------------------------------------------------

4 0.354402 0.231431   3.5337    378.1  1740046    384.3 QJF_LAG QJA_LAG QSO_LAG QND_LAG

4 0.346885 0.222482   3.7612    378.4  1760309    384.6 QJF_LAG QMA_LAG QJA_LAG QND_LAG

4 0.342734 0.217541   3.8867    378.5  1771495    384.8 QJF_LAG QMJ_LAG QSO_LAG QND_LAG

4 0.341693 0.216301   3.9182    378.6  1774301    384.8 QJF_LAG QMA_LAG QSO_LAG QND_LAG
-------------------------------------------------------------------------------------------

5 0.370853 0.213566   5.0360    379.4  1780494    386.9 QJF_LAG QMA_LAG QJA_LAG QSO_LAG

                                                          QND_LAG

5 0.363811 0.204763   5.2490    379.7  1800422    387.2 QJF_LAG QMJ_LAG QJA_LAG QSO_LAG

                                                          QND_LAG

5 0.349017 0.186271   5.6967    380.3  1842290    387.8 QJF_LAG QMA_LAG QMJ_LAG QSO_LAG

                                                          QND_LAG

5 0.347994 0.184993   5.7276    380.3  1845184    387.9 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG

                                                          QND_LAG

-----------------------------------------------------------------------------------------------

6 0.372041 0.173739   7.0000    381.3  1870663    390.1 QJF_LAG QMA_LAG QMJ_LAG QJA_LAG

                                                          QSO_LAG QND_LAG
-----------------------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_ _RMSE_  INTERCEP QJF_LAG   QMA_LAG QMJ_LAG QJA_LAG  QSO_LAG

  1 MODEL1  PARMS  OYSTER   1355.65  4362.54 -0.99686    .        .       .       .
  2 MODEL1  PARMS  OYSTER   1479.52  3305.49    .        .        .       .    -0.56735
  3 MODEL1  PARMS  OYSTER   1513.30  3148.94    .     -0.28585    .       .       .
  4 MODEL1  PARMS  OYSTER   1533.22  2457.62    .        .     0.07013    .       .
  5 MODEL1  PARMS  OYSTER   1326.05  4179.06 -1.34467    .        .       .       .
  6 MODEL1  PARMS  OYSTER   1347.37  4148.97 -1.21200    .        .    0.64293    .
  7 MODEL1  PARMS  OYSTER   1356.62  3950.35 -1.09191    .     0.22625    .       .
  8 MODEL1  PARMS  OYSTER   1382.52  4405.70 -0.93878    .        .       .    -0.12188
  9 MODEL1  PARMS  OYSTER   1322.68  4288.65 -1.23453    .        .       .    -0.50151
 10 MODEL1  PARMS  OYSTER   1323.13  3755.66 -1.70332  0.39630    .       .       .
 11 MODEL1  PARMS  OYSTER   1323.60  3997.47 -1.51775    .        .    0.57998    .
 12 MODEL1  PARMS  OYSTER   1328.40  3789.05 -1.42817    .     0.21619    .       .
 13 MODEL1  PARMS  OYSTER   1319.11  4106.14 -1.40842    .        .    0.58710 -0.50749
 14 MODEL1  PARMS  OYSTER   1326.77  3629.59 -1.82759  0.36010    .    0.52617    .
 15 MODEL1  PARMS  OYSTER   1330.98  3930.00 -1.31864    .     0.19368    .    -0.45912
 16 MODEL1  PARMS  OYSTER   1332.03  3922.67 -1.54764  0.32422    .       .    -0.41188
 17 MODEL1  PARMS  OYSTER   1334.35  3799.19 -1.66971  0.28391    .    0.54356 -0.42856
 18 MODEL1  PARMS  OYSTER   1341.80  3894.80 -1.43507    .     0.13135 0.48448 -0.47770
 19 MODEL1  PARMS  OYSTER   1357.31  3815.82 -1.48981  0.20598 0.12977    .    -0.41616
 20 MODEL1  PARMS  OYSTER   1358.38  3593.41 -1.79644  0.31439 0.05311 0.49167    .
 21 MODEL1  PARMS  OYSTER   1367.72  3762.03 -1.63720  0.23647 0.05498 0.50788 -0.42928

OBS QND_LAG  OYSTER  _IN_  _P_  _EDF_     _MSE_      _RSQ_   _ADJRSQ_     _CP_    _AIC_    _SBC_

  1  .           -1     1    2     24  1837777.70  0.22073   0.18826  1.57809  376.945  379.461
  2  .           -1     1    2     24  2188991.60  0.07181   0.03313  6.08406  381.492  384.008
  3  .           -1     1    2     24  2290082.12  0.02894  -0.01152  7.38101  382.665  385.182
  4  .           -1     1    2     24  2350772.61  0.00321  -0.03832  8.15965  383.346  385.862
  5 0.49451      -1     2    3     23  1758399.13  0.28546   0.22332  1.61971  376.690  380.464
  6  .           -1     2    3     23  1815403.59  0.26229   0.19815  2.32058  377.520  381.294
  7  .           -1     2    3     23  1840406.76  0.25213   0.18710  2.62800  377.875  381.650
  8  .           -1     2    3     23  1911370.53  0.22330   0.15576  3.50051  378.859  382.633
  9 0.67774      -1     3    4     22  1749478.84  0.31999   0.22726  2.57481  377.402  382.435
 10 0.70463      -1     3    4     22  1750678.63  0.31953   0.22674  2.58892  377.420  382.452
 11 0.46466      -1     3    4     22  1751919.79  0.31904   0.22619  2.60352  377.438  382.471
 12 0.48410      -1     3    4     22  1764634.45  0.31410   0.22057  2.75305  377.626  382.659
 13 0.64971      -1     4    5     21  1740046.08  0.35440   0.23143  3.53370  378.052  384.343
 14 0.65837      -1     4    5     21  1760308.56  0.34688   0.22248  3.76117  378.353  384.644
 15 0.65293      -1     4    5     21  1771494.87  0.34273   0.21754  3.88674  378.518  384.808
 16 0.81690      -1     4    5     21  1774301.36  0.34169   0.21630  3.91825  378.559  384.849
 17 0.77365      -1     5    6     20  1780494.08  0.37085   0.21357  5.03597  379.381  386.930
 18 0.63778      -1     5    6     20  1800422.43  0.36381   0.20476  5.24903  379.670  387.219
 19 0.74952      -1     5    6     20  1842289.94  0.34902   0.18627  5.69665  380.268  387.817
 20 0.63335      -1     5    6     20  1845183.66  0.34799   0.18499  5.72759  380.309  387.857
 21 0.74794      -1     6    7     19  1870662.79  0.37204   0.17374  7.00000  381.332  390.138
```

Logged Inflows

```
  N = 26      Regression Models for Dependent Variable: OYSTER

  R-square      Adj     C(p)        AIC       MSE       SBC Variables in Model
In              Rsq


1 0.171878 0.137373   1.9473     378.5  1952996     381.0 LN_QJF

1 0.048586 0.008943   5.5126     382.1  2243761     384.7 LN_QSO

1 0.026913 -.013633   6.1393     382.7  2294873     385.2 LN_QJA

1 0.018617 -.022274   6.3792     382.9  2314437     385.5 LN_QMA
 ------------------------------------------------------------------

2 0.222484 0.154874   2.4839     378.9  1913372     382.7 LN_QJF LN_QND

2 0.213720 0.145348   2.7373     379.2  1934939     383.0 LN_QJF LN_QMJ

2 0.182889 0.111836   3.6289     380.2  2010811     384.0 LN_QJF LN_QSO

2 0.176418 0.104802   3.8160     380.4  2026735     384.2 LN_QJF LN_QMA
-------------------------------------------------------------------------

3 0.294441 0.198228   2.4031     378.4  1815219     383.4 LN_QJF LN_QSO LN_QND

3 0.268832 0.169127   3.1436     379.3  1881103     384.3 LN_QJF LN_QMJ LN_QND

3 0.262621 0.162069   3.3232     379.5  1897082     384.5 LN_QJF LN_QMA LN_QND

3 0.223513 0.117629   4.4541     380.9  1997696     385.9 LN_QJF LN_QJA LN_QND
--------------------------------------------------------------------------------

4 0.334952 0.208276   3.2316     378.8  1792469     385.1 LN_QJF LN_QMJ LN_QSO LN_QND

4 0.323997 0.195235   3.5484     379.2  1821995     385.5 LN_QJF LN_QMA LN_QSO LN_QND

4 0.304718 0.172283   4.1059     380.0  1873958     386.3 LN_QJF LN_QJA LN_QSO LN_QND

4 0.280904 0.143934   4.7945     380.9  1938142     387.1 LN_QJF LN_QMA LN_QMJ LN_QND
---------------------------------------------------------------------------------------

5 0.342270 0.177837   5.0200     380.5  1861384     388.1 LN_QJF LN_QMA LN_QMJ LN_QSO LN_QND

5 0.335383 0.169228   5.2191     380.8  1880875     388.4 LN_QJF LN_QMJ LN_QJA LN_QSO LN_QND

5 0.326261 0.157827   5.4829     381.2  1906688     388.7 LN_QJF LN_QMA LN_QJA LN_QSO LN_QND

5 0.292614 0.115768   6.4559     382.4  2001909     390.0 LN_QJF LN_QMA LN_QMJ LN_QJA LN_QND
---------------------------------------------------------------------------------------------

6 0.342960 0.135474   7.0000     382.5  1957295     391.3 LN_QJF LN_QMA LN_QMJ LN_QJA LN_QSO

                                                          LN_QND
----------------------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_  INTERCEP  LN_QJF   LN_QMA   LN_QMJ  LN_QJA   LN_QSO

  1 MODEL1   PARMS   OYSTER  1397.50 12674.51 -1362.84     .        .        .        .
  2 MODEL1   PARMS   OYSTER  1497.92  6218.25     .        .        .        .     -520.077
  3 MODEL1   PARMS   OYSTER  1514.88  5293.16     .        .        .     -399.834    .
  4 MODEL1   PARMS   OYSTER  1521.33  5452.14     .    -382.402     .        .        .
  5 MODEL1   PARMS   OYSTER  1383.25 11162.54 -1901.89     .        .        .        .
  6 MODEL1   PARMS   OYSTER  1391.02 10303.49 -1653.93     .     585.931     .        .
  7 MODEL1   PARMS   OYSTER  1418.03 13687.79 -1258.55     .        .        .     -258.658
  8 MODEL1   PARMS   OYSTER  1423.63 11971.24 -1481.55  214.258     .        .        .
  9 MODEL1   PARMS   OYSTER  1347.30 13084.45 -1996.20     .        .        .     -784.636
 10 MODEL1   PARMS   OYSTER  1371.53  8596.84 -2232.68     .     617.339     .        .
 11 MODEL1   PARMS   OYSTER  1377.35  8038.24 -2568.01  726.682     .        .        .
 12 MODEL1   PARMS   OYSTER  1413.40 11059.65 -1956.80     .        .      92.718     .
 13 MODEL1   PARMS   OYSTER  1338.83 10605.33 -2302.13     .     577.987     .     -753.215
 14 MODEL1   PARMS   OYSTER  1349.81 10250.93 -2564.63  627.390     .        .     -729.071
 15 MODEL1   PARMS   OYSTER  1368.93 12933.77 -2184.34     .        .     302.359 -860.112
 16 MODEL1   PARMS   OYSTER  1392.17  7362.98 -2556.78  455.428  443.085     .        .
 17 MODEL1   PARMS   OYSTER  1364.33  9575.68 -2553.40  356.225  442.954     .     -729.007
 18 MODEL1   PARMS   OYSTER  1371.45 10458.08 -2277.44     .     621.197  -76.440 -731.785
 19 MODEL1   PARMS   OYSTER  1380.83 10448.58 -2603.44  567.051     .     150.233 -771.916
 20 MODEL1   PARMS   OYSTER  1414.89  6885.39 -2453.98  468.051  645.382 -376.156    .
 21 MODEL1   PARMS   OYSTER  1399.03  9368.49 -2527.01  363.247  495.137  -97.020 -701.330

OBS  LN_QND  OYSTER  _IN_  _P_  _EDF_     _MSE_      _RSQ_   _ADJRSQ_    _CP_     _AIC_    _SBC_

  1     .      -1      1    2     24   1952995.51  0.17188   0.13737  1.94729  378.526  381.042
  2     .      -1      1    2     24   2243760.84  0.04859   0.00894  5.51260  382.134  384.650
  3     .      -1      1    2     24   2294873.47  0.02691  -0.01363  6.13933  382.720  385.236
  4     .      -1      1    2     24   2314436.87  0.01862  -0.02227  6.37922  382.940  385.457
  5   759.12   -1      2    3     23   1913371.69  0.22248   0.15487  2.48387  378.886  382.660
  6     .      -1      2    3     23   1934939.00  0.21372   0.14535  2.73730  379.178  382.952
  7     .      -1      2    3     23   2010810.72  0.18289   0.11184  3.62886  380.178  383.952
  8     .      -1      2    3     23   2026734.98  0.17642   0.10480  3.81599  380.383  384.157
  9  1337.44   -1      3    4     22   1815219.04  0.29444   0.19823  2.40307  378.361  383.394
 10   793.05   -1      3    4     22   1881103.23  0.26883   0.16913  3.14361  379.288  384.321
 11  1130.19   -1      3    4     22   1897082.01  0.26262   0.16207  3.32321  379.508  384.540
 12   744.06   -1      3    4     22   1997695.74  0.22351   0.11763  4.45411  380.852  385.884
 13  1346.05   -1      4    5     21   1792469.24  0.33495   0.20828  3.23157  378.824  385.114
 14  1616.85   -1      4    5     21   1821995.11  0.32400   0.19523  3.54836  379.249  385.539
 15  1343.97   -1      4    5     21   1873958.15  0.30472   0.17228  4.10588  379.980  386.270
 16  1016.03   -1      4    5     21   1938141.88  0.28090   0.14393  4.79451  380.855  387.146
 17  1502.68   -1      5    6     20   1861384.14  0.34227   0.17784  5.01997  380.536  388.085
 18  1345.04   -1      5    6     20   1880874.55  0.33538   0.16923  5.21913  380.807  388.356
 19  1593.22   -1      5    6     20   1906688.08  0.32626   0.15783  5.48289  381.161  388.710
 20  1094.68   -1      5    6     20   2001909.08  0.29261   0.11577  6.45588  382.428  389.977
 21  1504.49   -1      6    7     19   1957294.55  0.34296   0.13547  7.00000  382.509  391.315
```

Logged All Variables

```
  N = 26     Regression Models for Dependent Variable: LN_OYSTE

  R-square      Adj     C(p)       AIC       MSE       SBC Variables in Model
In              Rsq

1 0.207950 0.174947   6.8987  -4.3707 0.785129  -1.8545 LN_QJF

1 0.104136 0.066809  10.6865  -1.1685 0.888035   1.3477 LN_QJA

1 0.054097 0.014684  12.5122   0.2447 0.937637   2.7609 LN_QMA

1 0.001627 -.039972  14.4266   1.6483 0.989648   4.1645 LN_QSO
 -------------------------------------------------------------------

2 0.332930 0.274924   4.3387  -6.8357 0.689990  -3.0614 LN_QJF LN_QND

2 0.241620 0.175674   7.6702  -3.5002 0.784438   0.2741 LN_QJF LN_QMJ

2 0.217565 0.149527   8.5479  -2.6883 0.809319   1.0860 LN_QJF LN_QJA

2 0.217114 0.149037   8.5644  -2.6733 0.809786   1.1010 LN_QJF LN_QSO
------------------------------------------------------------------------

3 0.373013 0.287515   4.8762  -6.4469 0.678008  -1.4145 LN_QJF LN_QMJ LN_QND

3 0.362449 0.275510   5.2617  -6.0125 0.689433  -0.9801 LN_QJF LN_QMA LN_QND

3 0.354886 0.266916   5.5376  -5.7058 0.697611  -0.6735 LN_QJF LN_QJA LN_QND

3 0.345534 0.256288   5.8788  -5.3316 0.707724  -0.2993 LN_QJF LN_QSO LN_QND
-------------------------------------------------------------------------------

4 0.470177 0.369259   3.3311  -8.8249 0.600220  -2.5344 LN_QJF LN_QMJ LN_QJA LN_QND

4 0.405160 0.291857   5.7033  -5.8154 0.673876   0.4751 LN_QJF LN_QMA LN_QJA LN_QND

4 0.383364 0.265910   6.4986  -4.8797 0.698568   1.4108 LN_QJF LN_QMJ LN_QSO LN_QND

4 0.380342 0.262312   6.6088  -4.7526 0.701992   1.5379 LN_QJF LN_QMA LN_QMJ LN_QND
--------------------------------------------------------------------------------------

5 0.479091 0.348864   5.0059  -7.2660 0.619628   0.2826 LN_QJF LN_QMA LN_QMJ LN_QJA LN_QND

5 0.470182 0.337727   5.3310  -6.8251 0.630226   0.7235 LN_QJF LN_QMJ LN_QJA LN_QSO LN_QND

5 0.406387 0.257984   7.6586  -3.8690 0.706111   3.6795 LN_QJF LN_QMA LN_QJA LN_QSO LN_QND

5 0.389167 0.236459   8.2868  -3.1255 0.726594   4.4230 LN_QJF LN_QMA LN_QMJ LN_QSO LN_QND
--------------------------------------------------------------------------------------------

6 0.479252 0.314805   7.0000  -5.2740 0.652038   3.5326 LN_QJF LN_QMA LN_QMJ LN_QJA LN_QSO
                                                       LN_QND
---------------------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_  INTERCEP  LN_QJF   LN_QMA   LN_QMJ   LN_QJA   LN_QSO

  1 MODEL1  PARMS  LN_OYSTE 0.88607  14.7701 -0.97186    .        .        .        .
  2 MODEL1  PARMS  LN_OYSTE 0.94236  11.0000   .         .        .    -0.50991    .
  3 MODEL1  PARMS  LN_OYSTE 0.96832  10.7236   .     -0.42261     .        .        .
  4 MODEL1  PARMS  LN_OYSTE 0.99481   8.0367   .         .        .        .    -0.06170
  5 MODEL1  PARMS  LN_OYSTE 0.83066  13.2296 -1.52107    .        .        .        .
  6 MODEL1  PARMS  LN_OYSTE 0.88568  13.3912 -1.14115    .    0.34076      .        .
  7 MODEL1  PARMS  LN_OYSTE 0.89962  15.0309 -0.84309    .        .    -0.18200    .
  8 MODEL1  PARMS  LN_OYSTE 0.89988  14.1708 -1.03354    .        .        .     0.15298
  9 MODEL1  PARMS  LN_OYSTE 0.82341  11.6827 -1.72051    .    0.37220      .        .
 10 MODEL1  PARMS  LN_OYSTE 0.83032  11.4926 -1.89143 0.40403    .        .        .
 11 MODEL1  PARMS  LN_OYSTE 0.83523  13.5378 -1.35664    .        .    -0.27766    .
 12 MODEL1  PARMS  LN_OYSTE 0.84126  13.7511 -1.54666    .        .        .    -0.21290
 13 MODEL1  PARMS  LN_OYSTE 0.77474  10.8550 -1.51184    .    0.75886 -0.70220    .
 14 MODEL1  PARMS  LN_OYSTE 0.82090  11.3105 -1.78638 0.55079    .    -0.40454    .
 15 MODEL1  PARMS  LN_OYSTE 0.83580  12.1979 -1.73833    .    0.36211      .    -0.19321
 16 MODEL1  PARMS  LN_OYSTE 0.83785  11.0595 -1.88423 0.23005 0.28418      .        .
 17 MODEL1  PARMS  LN_OYSTE 0.78716  10.1603 -1.69069 0.25382 0.66504 -0.70818    .
 18 MODEL1  PARMS  LN_OYSTE 0.79387  10.8422 -1.51098    .    0.75997 -0.70382  0.00411
 19 MODEL1  PARMS  LN_OYSTE 0.84030  11.5320 -1.79151 0.53367    .    -0.38357 -0.06989
 20 MODEL1  PARMS  LN_OYSTE 0.85240  11.6035 -1.88340 0.20566 0.28415      .    -0.17924
 21 MODEL1  PARMS  LN_OYSTE 0.80749  10.0693 -1.68801 0.25766 0.67055 -0.71841  0.02571

OBS  LN_QND LN_OYSTE _IN_ _P_ _EDF_  _MSE_   _RSQ_  _ADJRSQ_   _CP_    _AIC_    _SBC_

  1   .        -1      1   2   24  0.78513 0.20795  0.17495  6.8987 -4.37071 -1.85451
  2   .        -1      1   2   24  0.88803 0.10414  0.06681 10.6865 -1.16846  1.34773
  3   .        -1      1   2   24  0.93764 0.05410  0.01468 12.5122  0.24468  2.76088
  4   .        -1      1   2   24  0.98965 0.00163 -0.03997 14.4266  1.64835  4.16454
  5 0.77343    -1      2   3   23  0.68999 0.33293  0.27492  4.3387 -6.83570 -3.06141
  6   .        -1      2   3   23  0.78444 0.24162  0.17567  7.6702 -3.50016  0.27413
  7   .        -1      2   3   23  0.80932 0.21756  0.14953  8.5479 -2.68826  1.08602
  8   .        -1      2   3   23  0.80979 0.21711  0.14904  8.5644 -2.67328  1.10101
  9 0.79389    -1      3   4   22  0.67801 0.37301  0.28752  4.8762 -6.44690 -1.41451
 10 0.97974    -1      3   4   22  0.68943 0.36245  0.27551  5.2617 -6.01245 -0.98007
 11 0.81852    -1      3   4   22  0.69761 0.35489  0.26692  5.5376 -5.70585 -0.67346
 12 0.93034    -1      3   4   22  0.70772 0.34553  0.25629  5.8788 -5.33164 -0.29925
 13 0.92917    -1      4   5   21  0.60022 0.47018  0.36926  3.3311 -8.82486 -2.53438
 14 1.12038    -1      4   5   21  0.67388 0.40516  0.29186  5.7033 -5.81536  0.47512
 15 0.93574    -1      4   5   21  0.69857 0.38336  0.26591  6.4986 -4.87972  1.41077
 16 0.90652    -1      4   5   21  0.70199 0.38034  0.26231  6.6088 -4.75259  1.53789
 17 1.05459    -1      5   6   20  0.61963 0.47909  0.34886  5.0059 -7.26601  0.28257
 18 0.92647    -1      5   6   20  0.63023 0.47018  0.33773  5.3310 -6.82506  0.72352
 19 1.15973    -1      5   6   20  0.70611 0.40639  0.25798  7.6586 -3.86904  3.67954
 20 1.02617    -1      5   6   20  0.72659 0.38917  0.23646  8.2868 -3.12555  4.42303
 21 1.03957    -1      6   7   19  0.65204 0.47925  0.31481  7.0000 -5.27404  3.53263
```

Squared Root Inflows

```
 N = 26      Regression Models for Dependent Variable: OYSTER

  R-square       Adj      C(p)        AIC      MSE      SBC Variables in Model
In               Rsq

1 0.198202 0.164794   1.6690    377.7  1890913    380.2 SQR_QJF

1 0.059309 0.020114   5.7691    381.8  2218470    384.4 SQR_QSO

1 0.024769 -.015865   6.7888    382.8  2299928    385.3 SQR_QMA

1 0.010358 -.030877   7.2142    383.2  2333915    385.7 SQR_QJA
------------------------------------------------------------------

2 0.258625 0.194157   1.8854    377.6  1824435    381.4 SQR_QJF SQR_QND

2 0.236237 0.169822   2.5463    378.4  1879530    382.2 SQR_QJF SQR_QMJ

2 0.217780 0.149761   3.0911    379.0  1924949    382.8 SQR_QJF SQR_QJA

2 0.204259 0.135064   3.4902    379.5  1958223    383.3 SQR_QJF SQR_QSO
--------------------------------------------------------------------------

3 0.311677 0.217814   2.3193    377.7  1770875    382.8 SQR_QJF SQR_QSO SQR_QND

3 0.301050 0.205738   2.6330    378.1  1798215    383.1 SQR_QJF SQR_QMA SQR_QND

3 0.296898 0.201020   2.7555    378.3  1808897    383.3 SQR_QJF SQR_QMJ SQR_QND

3 0.271248 0.171872   3.5127    379.2  1874888    384.2 SQR_QJF SQR_QJA SQR_QND
----------------------------------------------------------------------------------

4 0.342497 0.217259   3.4094    378.5  1772133    384.8 SQR_QJF SQR_QMJ SQR_QSO SQR_QND

4 0.339632 0.213848   3.4940    378.6  1779855    384.9 SQR_QJF SQR_QMA SQR_QSO SQR_QND

4 0.332115 0.204899   3.7159    378.9  1800115    385.2 SQR_QJF SQR_QJA SQR_QSO SQR_QND

4 0.312269 0.181272   4.3018    379.7  1853607    386.0 SQR_QJF SQR_QMA SQR_QMJ SQR_QND
------------------------------------------------------------------------------------------

5 0.351926 0.189908   5.1311    380.2  1834055    387.7 SQR_QJF SQR_QMA SQR_QJA SQR_QSO
                                                      SQR_QND

5 0.350900 0.188625   5.1614    380.2  1836961    387.7 SQR_QJF SQR_QMA SQR_QMJ SQR_QSO
                                                      SQR_QND

5 0.347638 0.184548   5.2577    380.3  1846191    387.9 SQR_QJF SQR_QMJ SQR_QJA SQR_QSO
                                                      SQR_QND

5 0.313663 0.142079   6.2606    381.6  1942340    389.2 SQR_QJF SQR_QMA SQR_QMJ SQR_QJA
                                                      SQR_QND

----------------------------------------------------------------------------------------------

6 0.356367 0.153115   7.0000    382.0  1917355    390.8 SQR_QJF SQR_QMA SQR_QMJ SQR_QJA
                                                      SQR_QSO SQR_QND
----------------------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_  INTERCEP   SQR_QJF   SQR_QMA   SQR_QMJ   SQR_QJA   SQR_QSO

  1 MODEL1  PARMS   OYSTER  1375.10  5759.15   -76.686     .         .         .         .
  2 MODEL1  PARMS   OYSTER  1489.45  3811.03     .         .         .         .      -35.7692
  3 MODEL1  PARMS   OYSTER  1516.55  3557.74     .      -22.4386     .         .         .
  4 MODEL1  PARMS   OYSTER  1527.72  3150.32     .         .         .      -17.7329     .
  5 MODEL1  PARMS   OYSTER  1350.72  5357.33  -105.588     .         .         .         .
  6 MODEL1  PARMS   OYSTER  1370.96  5042.02   -88.188     .       24.2401     .         .
  7 MODEL1  PARMS   OYSTER  1387.43  5510.57   -90.626     .         .       28.1633     .
  8 MODEL1  PARMS   OYSTER  1399.37  5937.76   -71.081     .         .         .      -12.3891
  9 MODEL1  PARMS   OYSTER  1330.74  5750.94  -101.972     .         .         .      -42.2469
 10 MODEL1  PARMS   OYSTER  1340.98  4457.22  -141.067   38.3165     .         .         .
 11 MODEL1  PARMS   OYSTER  1344.95  4637.16  -117.183     .       24.3162     .         .
 12 MODEL1  PARMS   OYSTER  1369.27  5177.69  -115.324     .         .       22.7660     .
 13 MODEL1  PARMS   OYSTER  1331.21  5074.82  -112.670     .       21.9103     .      -39.3280
 14 MODEL1  PARMS   OYSTER  1334.11  4955.75  -131.733   31.6214     .         .      -36.6278
 15 MODEL1  PARMS   OYSTER  1341.68  5551.94  -114.175     .         .       29.2087  -45.6263
 16 MODEL1  PARMS   OYSTER  1361.47  4276.86  -137.633   26.7459   15.2672     .         .
 17 MODEL1  PARMS   OYSTER  1354.27  4909.12  -137.247   27.2037     .       23.1506  -40.0913
 18 MODEL1  PARMS   OYSTER  1355.35  4775.32  -128.286   20.0217   15.3001     .      -36.6508
 19 MODEL1  PARMS   OYSTER  1358.75  5102.06  -117.322     .       17.4072   16.3989  -41.8253
 20 MODEL1  PARMS   OYSTER  1393.68  4270.85  -140.489   27.1706   12.8938    8.4050     .
 21 MODEL1  PARMS   OYSTER  1384.69  4797.55  -133.391   20.4135   10.5253   16.9173  -39.1746

OBS SQR_QND  OYSTER  _IN_  _P_  _EDF_     _MSE_      _RSQ_    _ADJRSQ_    _CP_     _AIC_     _SBC_

  1    .       -1      1    2     24   1890913.33  0.19820   0.16479  1.66902  377.686   380.202
  2    .       -1      1    2     24   2218470.34  0.05931   0.02011  5.76913  381.839   384.356
  3    .       -1      1    2     24   2299928.09  0.02477  -0.01587  6.78875  382.777   385.293
  4    .       -1      1    2     24   2333915.06  0.01036  -0.03088  7.21418  383.158   385.675
  5 41.1088    -1      2    3     23   1824434.68  0.25862   0.19416  1.88535  377.649   381.423
  6    .       -1      2    3     23   1879529.52  0.23624   0.16982  2.54625  378.422   382.196
  7    .       -1      2    3     23   1924949.35  0.21778   0.14976  3.09109  379.043   382.817
  8    .       -1      2    3     23   1958222.88  0.20426   0.13506  3.49023  379.489   383.263
  9 63.1519    -1      3    4     22   1770875.38  0.31168   0.21781  2.31927  377.718   382.751
 10 61.2000    -1      3    4     22   1798215.23  0.30105   0.20574  2.63297  378.117   383.149
 11 41.1901    -1      3    4     22   1808896.93  0.29690   0.20102  2.75553  378.271   383.303
 12 38.9299    -1      3    4     22   1874888.14  0.27125   0.17187  3.51272  379.202   384.235
 13 61.7022    -1      4    5     21   1772132.79  0.34250   0.21726  3.40944  378.527   384.818
 14 76.8007    -1      4    5     21   1779854.94  0.33963   0.21385  3.49401  378.640   384.931
 15 62.1196    -1      4    5     21   1800114.88  0.33212   0.20490  3.71591  378.934   385.225
 16 55.1840    -1      4    5     21   1853606.90  0.31227   0.18127  4.30179  379.696   385.986
 17 74.0757    -1      5    6     20   1834055.18  0.35193   0.18991  5.13109  380.152   387.700
 18 70.7815    -1      5    6     20   1836961.11  0.35090   0.18862  5.16140  380.193   387.741
 19 61.4206    -1      5    6     20   1846191.19  0.34764   0.18455  5.25768  380.323   387.872
 20 54.5944    -1      5    6     20   1942339.83  0.31366   0.14208  6.26061  381.643   389.192
 21 70.6687    -1      6    7     19   1917355.40  0.35637   0.15311  7.00000  381.973   390.779
```

Squared Root All Variables

```
 N = 26     Regression Models for Dependent Variable: SQR_OYST

  R-square        Adj     C(p)       AIC       MSE       SBC Variables in Model
In                Rsq


1 0.265254 0.234639   2.9946    139.6  199.641     142.1 SQR_QJF
1 0.046862 0.007148  10.4238    146.4  258.981     148.9 SQR_QJA
1 0.044493 0.004680  10.5044    146.5  259.625     149.0 SQR_QSO
1 0.042755 0.002870  10.5636    146.5  260.097     149.0 SQR_QMA
-----------------------------------------------------------------------

2 0.356132 0.300143   1.9031    138.2  182.555     142.0 SQR_QJF SQR_QND
2 0.308118 0.247954   3.5365    140.1  196.168     143.8 SQR_QJF SQR_QMJ
2 0.267539 0.203846   4.9169    141.5  207.673     145.3 SQR_QJF SQR_QJA
2 0.266459 0.202673   4.9536    141.6  207.979     145.4 SQR_QJF SQR_QMA
------------------------------------------------------------------------------

3 0.402794 0.321357   2.3157    138.2  177.021     143.3 SQR_QJF SQR_QMA SQR_QND
3 0.399307 0.317394   2.4344    138.4  178.055     143.4 SQR_QJF SQR_QMJ SQR_QND
3 0.391409 0.308420   2.7030    138.7  180.396     143.8 SQR_QJF SQR_QSO SQR_QND
3 0.356305 0.268528   3.8972    140.2  190.801     145.2 SQR_QJF SQR_QJA SQR_QND
--------------------------------------------------------------------------------------

4 0.428125 0.319196   3.4541    139.1  177.585     145.4 SQR_QJF SQR_QMJ SQR_QSO SQR_QND
4 0.425708 0.316318   3.5363    139.2  178.335     145.5 SQR_QJF SQR_QMA SQR_QSO SQR_QND
4 0.415816 0.304543   3.8728    139.7  181.407     146.0 SQR_QJF SQR_QMA SQR_QMJ SQR_QND
4 0.406544 0.293505   4.1882    140.1  184.286     146.4 SQR_QJF SQR_QMJ SQR_QJA SQR_QND
---------------------------------------------------------------------------------------------

5 0.438770 0.298462   5.0919    140.6  182.993     148.2 SQR_QJF SQR_QMA SQR_QMJ SQR_QSO
                                                          SQR_QND
5 0.431092 0.288865   5.3531    141.0  185.496     148.5 SQR_QJF SQR_QMJ SQR_QJA SQR_QSO
                                                          SQR_QND
5 0.425708 0.282135   5.5363    141.2  187.252     148.8 SQR_QJF SQR_QMA SQR_QJA SQR_QSO
                                                          SQR_QND
5 0.421965 0.277457   5.6636    141.4  188.472     148.9 SQR_QJF SQR_QMA SQR_QMJ SQR_QJA
                                                          SQR_QND
-------------------------------------------------------------------------------------------------

6 0.441472 0.265095   7.0000    142.5  191.697     151.3 SQR_QJF SQR_QMA SQR_QMJ SQR_QJA
                                                          SQR_QSO SQR_QND
-------------------------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_ INTERCEP  SQR_QJF  SQR_QMA SQR_QMJ  SQR_QJA  SQR_QSO

  1 MODEL1   PARMS  SQR_OYST 14.1294  87.6187 -0.95224   .        .        .        .
  2 MODEL1   PARMS  SQR_OYST 16.0929  60.5760   .       .        .     -0.40486    .
  3 MODEL1   PARMS  SQR_OYST 16.1129  59.7628   .       .        .        .     -0.33254
  4 MODEL1   PARMS  SQR_OYST 16.1275  61.8354   .    -0.31644   .        .        .
  5 MODEL1   PARMS  SQR_OYST 13.5113  82.3293 -1.33269   .        .        .        .
  6 MODEL1   PARMS  SQR_OYST 14.0060  79.4471 -1.08331   .     0.27622     .        .
  7 MODEL1   PARMS  SQR_OYST 14.4109  86.7072 -1.00336   .        .      0.10327    .
  8 MODEL1   PARMS  SQR_OYST 14.4215  86.5190 -0.98561 0.05988    .        .        .
  9 MODEL1   PARMS  SQR_OYST 13.3049  72.1966 -1.73208 0.43133    .        .        .
 10 MODEL1   PARMS  SQR_OYST 13.3437  74.1190 -1.46489   .     0.27722     .        .
 11 MODEL1   PARMS  SQR_OYST 13.4311  85.7745 -1.30105   .        .        .     -0.36978
 12 MODEL1   PARMS  SQR_OYST 13.8131  82.1034 -1.34494   .        .      0.02862    .
 13 MODEL1   PARMS  SQR_OYST 13.3261  77.8536 -1.42638   .     0.25669     .     -0.33559
 14 MODEL1   PARMS  SQR_OYST 13.3542  76.3203 -1.65488 0.37595    .        .     -0.30298
 15 MODEL1   PARMS  SQR_OYST 13.4687  70.1109 -1.69238 0.29753 0.17655     .        .
 16 MODEL1   PARMS  SQR_OYST 13.5752  74.1259 -1.40308   .     0.33166 -0.20521    .
 17 MODEL1   PARMS  SQR_OYST 13.5275  74.2351 -1.61504 0.24189 0.17682     .     -0.30324
 18 MODEL1   PARMS  SQR_OYST 13.6197  77.6315 -1.38844   .     0.29341 -0.13374 -0.31522
 19 MODEL1   PARMS  SQR_OYST 13.6840  76.3236 -1.65450 0.37626    .     -0.00161 -0.30274
 20 MODEL1   PARMS  SQR_OYST 13.7285  70.2463 -1.62801 0.28796 0.23004 -0.18942    .
 21 MODEL1   PARMS  SQR_OYST 13.8455  74.0673 -1.57652 0.23894 0.21286 -0.12767 -0.28420
```

```
OBS SQR_QND  SQR_OYST  _IN_  _P_  _EDF_   _MSE_    _RSQ_   _ADJRSQ_    _CP_    _AIC_    _SBC_

  1  .          -1       1    2     24   199.641  0.26525  0.23464   2.9946  139.628  142.145
  2  .          -1       1    2     24   258.981  0.04686  0.00715  10.4238  146.395  148.911
  3  .          -1       1    2     24   259.625  0.04449  0.00468  10.5044  146.459  148.975
  4  .          -1       1    2     24   260.097  0.04276  0.00287  10.5636  146.506  149.023
  5 0.54115     -1       2    3     23   182.555  0.35613  0.30014   1.9031  138.196  141.970
  6  .          -1       2    3     23   196.168  0.30812  0.24795   3.5365  140.066  143.840
  7  .          -1       2    3     23   207.673  0.26754  0.20385   4.9169  141.547  145.322
  8  .          -1       2    3     23   207.979  0.26646  0.20267   4.9536  141.586  145.360
  9 0.76732     -1       3    4     22   177.021  0.40279  0.32136   2.3157  138.240  143.272
 10 0.54208     -1       3    4     22   178.055  0.39931  0.31739   2.4344  138.391  143.423
 11 0.73409     -1       3    4     22   180.396  0.39141  0.30842   2.7030  138.731  143.763
 12 0.53841     -1       3    4     22   190.801  0.35630  0.26853   3.8972  140.189  145.221
 13 0.71711     -1       4    5     21   177.585  0.42812  0.31920   3.4541  139.113  145.403
 14 0.89636     -1       4    5     21   178.335  0.42571  0.31632   3.5363  139.222  145.513
 15 0.69775     -1       4    5     21   181.407  0.41582  0.30454   3.8728  139.666  145.957
 16 0.56190     -1       4    5     21   184.286  0.40654  0.29350   4.1882  140.076  146.366
 17 0.82680     -1       5    6     20   182.993  0.43877  0.29846   5.0919  140.624  148.173
 18 0.71940     -1       5    6     20   185.496  0.43109  0.28887   5.3531  140.977  148.526
 19 0.89655     -1       5    6     20   187.252  0.42571  0.28214   5.5363  141.222  148.771
 20 0.71104     -1       5    6     20   188.472  0.42197  0.27746   5.6636  141.391  148.940
 21 0.82765     -1       6    7     19   191.697  0.44147  0.26510   7.0000  142.499  151.305
```

Untransformed and Logged Inflows

```
  N = 26     Regression Models for Dependent Variable: OYSTER

  R-square        Adj      C(p)       AIC       MSE       SBC Variables in Model
In                Rsq

1 0.220733 0.188264    1.1908     376.9  1837778     379.5 QJF_LAG
1 0.048586 0.008943    6.3138     382.1  2243761     384.7 LN_QSO
1 0.026913 -.013633    6.9588     382.7  2294873     385.2 LN_QJA
1 0.018617 -.022274    7.2057     382.9  2314437     385.5 LN_QMA
--------------------------------------------------------------------
2 0.283735 0.221451    1.3159     376.8  1762642     380.5 QJF_LAG LN_QND
2 0.252134 0.187103    2.2563     377.9  1840407     381.6 QJF_LAG QMJ_LAG
2 0.229727 0.162747    2.9231     378.6  1895549     382.4 QJF_LAG LN_QJA
2 0.229382 0.162372    2.9334     378.7  1896398     382.4 QJF_LAG LN_QMA
----------------------------------------------------------------------------
3 0.337873 0.247583    1.7047     376.7  1703478     381.7 QJF_LAG LN_QMA LN_QND
3 0.319245 0.226415    2.2591     377.4  1751403     382.5 QJF_LAG LN_QSO LN_QND
3 0.315169 0.221783    2.3804     377.6  1761889     382.6 QJF_LAG QMJ_LAG LN_QND
3 0.287046 0.189825    3.2173     378.6  1834243     383.7 QJF_LAG LN_QJA LN_QND
-----------------------------------------------------------------------------------
4 0.356852 0.234348    3.1399     378.0  1733442     384.2 QJF_LAG LN_QMA LN_QSO LN_QND
4 0.344143 0.219218    3.5181     378.5  1767697     384.8 QJF_LAG QMJ_LAG LN_QSO LN_QND
4 0.342271 0.216990    3.5738     378.5  1772742     384.8 QJF_LAG LN_QMA QMJ_LAG LN_QND
4 0.338004 0.211909    3.7008     378.7  1784244     385.0 QJF_LAG LN_QMA LN_QJA LN_QND
------------------------------------------------------------------------------------------
5 0.361541 0.201926    5.0004     379.8  1806846     387.3 QJF_LAG LN_QMA QMJ_LAG LN_QSO
                                                          LN_QND
5 0.357543 0.196929    5.1193     379.9  1818160     387.5 QJF_LAG LN_QMA LN_QJA LN_QSO
                                                          LN_QND
5 0.344276 0.180345    5.5142     380.5  1855705     388.0 QJF_LAG QMJ_LAG LN_QJA LN_QSO
                                                          LN_QND
5 0.344134 0.180167    5.5184     380.5  1856109     388.0 QJF_LAG LN_QMA QMJ_LAG LN_QJA
                                                          LN_QND
-------------------------------------------------------------------------------------------------
6 0.361553 0.159938    7.0000     381.8  1901907     390.6 QJF_LAG LN_QMA QMJ_LAG LN_QJA
                                                          LN_QSO LN_QND
-------------------------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_  INTERCEP  QJF_LAG  LN_QMA  QMJ_LAG  LN_QJA   LN_QSO

  1 MODEL1   PARMS   OYSTER  1355.65  4362.54 -0.99686     .        .        .        .
  2 MODEL1   PARMS   OYSTER  1497.92  6218.25   .          .        .        .    -520.077
  3 MODEL1   PARMS   OYSTER  1514.88  5293.16   .          .        .    -399.834     .
  4 MODEL1   PARMS   OYSTER  1521.33  5452.14   .      -382.402     .        .        .
  5 MODEL1   PARMS   OYSTER  1327.65 -1018.48 -1.36761     .        .        .        .
  6 MODEL1   PARMS   OYSTER  1356.62  3950.35 -1.09191     .     0.22625     .        .
  7 MODEL1   PARMS   OYSTER  1376.79  2775.59 -1.11982     .        .     270.874     .
  8 MODEL1   PARMS   OYSTER  1377.10  2373.78 -1.10067  294.504     .        .        .
  9 MODEL1   PARMS   OYSTER  1305.17 -9154.79 -1.83487  827.447     .        .        .
 10 MODEL1   PARMS   OYSTER  1323.41   205.22 -1.33153     .        .        .    -550.661
 11 MODEL1   PARMS   OYSTER  1327.36 -1432.32 -1.46280     .     0.22637     .        .
 12 MODEL1   PARMS   OYSTER  1354.34 -1803.93 -1.43008     .        .     166.275     .
 13 MODEL1   PARMS   OYSTER  1316.60 -7073.63 -1.74107  709.382     .        .    -414.098
 14 MODEL1   PARMS   OYSTER  1329.55  -277.06 -1.42005     .     0.20266     .    -500.354
 15 MODEL1   PARMS   OYSTER  1331.44 -7930.59 -1.79580  684.541  0.09900     .        .
 16 MODEL1   PARMS   OYSTER  1335.76 -9114.63 -1.82895  839.955     .     -34.540     .
 17 MODEL1   PARMS   OYSTER  1344.19 -5793.40 -1.70000  560.902  0.10223     .    -417.304
 18 MODEL1   PARMS   OYSTER  1348.39 -7059.61 -1.75023  673.295     .      82.438 -435.962
 19 MODEL1   PARMS   OYSTER  1362.24  -427.45 -1.43055     .     0.19350   39.843 -509.837
 20 MODEL1   PARMS   OYSTER  1362.39 -7396.25 -1.75948  693.696  0.12871 -143.667     .
 21 MODEL1   PARMS   OYSTER  1379.10 -5764.14 -1.69764  562.618  0.10473  -12.220 -414.142

OBS  LN_QND  OYSTER  _IN_  _P_  _EDF_     _MSE_      _RSQ_   _ADJRSQ_    _CP_    _AIC_    _SBC_

  1     .      -1      1    2     24   1837777.70  0.22073   0.18826  1.19076  376.945  379.461
  2     .      -1      1    2     24   2243760.84  0.04859   0.00894  6.31383  382.134  384.650
  3     .      -1      1    2     24   2294873.47  0.02691  -0.01363  6.95882  382.720  385.236
  4     .      -1      1    2     24   2314436.87  0.01862  -0.02227  7.20568  382.940  385.457
  5  833.97    -1      2    3     23   1762641.92  0.28373   0.22145  1.31585  376.753  380.527
  6     .      -1      2    3     23   1840406.76  0.25213   0.18710  2.25627  377.875  381.650
  7     .      -1      2    3     23   1895548.81  0.22973   0.16275  2.92311  378.643  382.417
  8     .      -1      2    3     23   1896398.18  0.22938   0.16237  2.93339  378.654  382.429
  9 1228.96    -1      3    4     22   1703477.99  0.33787   0.24758  1.70471  376.709  381.742
 10 1181.00    -1      3    4     22   1751402.80  0.31925   0.22642  2.25907  377.431  382.463
 11  834.19    -1      3    4     22   1761889.30  0.31517   0.22178  2.38037  377.586  382.618
 12  804.72    -1      3    4     22   1834242.70  0.28705   0.18983  3.21731  378.632  383.665
 13 1433.57    -1      4    5     21   1733442.36  0.35685   0.23435  3.13989  377.953  384.244
 14 1149.50    -1      4    5     21   1767697.44  0.34414   0.21922  3.51812  378.462  384.752
 15 1160.84    -1      4    5     21   1772742.18  0.34227   0.21699  3.57382  378.536  384.827
 16 1241.01    -1      4    5     21   1784244.22  0.33800   0.21191  3.70082  378.704  384.995
 17 1364.81    -1      5    6     20   1806846.28  0.36154   0.20193  5.00037  379.763  387.312
 18 1415.63    -1      5    6     20   1818160.08  0.35754   0.19693  5.11934  379.925  387.474
 19 1148.46    -1      5    6     20   1855705.37  0.34428   0.18035  5.51416  380.457  388.005
 20 1190.51    -1      5    6     20   1856109.00  0.34413   0.18017  5.51840  380.462  388.011
 21 1365.79    -1      6    7     19   1901906.61  0.36155   0.15994  7.00000  381.762  390.569
```

Regression -Untransformed Data

ANOVA and Parameter Estimates

Model Summary^{a,b}

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	November-December Inflows, March-April Inflows, July-August Inflows, May-June Inflows, September-October Inflows, January-February Inflows^{c,d}	.	.610	.372	.174	1367.72	1.729

a. Dependent Variable: Oyster Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, March-April Inflows, July-August Inflows, May-June Inflows, September-October Inflows, January-February Inflows

d. All requested variables entered.

Model Summary^{a,b}

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	November-December Inflows, March-April Inflows, July-August Inflows, May-June Inflows, September-October Inflows, January-February Inflows^{c,d}	.	.610	.372	.174	1367.72	1.729

a. Dependent Variable: Oyster Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, March-April Inflows, July-August Inflows, May-June Inflows, September-October Inflows, January-February Inflows

d. All requested variables entered.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	3762.032	898.020		4.189	.000	1882.455	5641.610
	January-February Inflows	-1.637	.646	-.772	-2.533	.020	-2.990	-.284
	March-April Inflows	.236	.474	.141	.499	.623	-.755	1.228
	May-June Inflows	5.5E-02	.290	.044	.190	.852	-.552	.662
	July-August Inflows	.508	.608	.180	.835	.414	-.766	1.781
	September-October Inflows	-.429	.503	-.203	-.853	.404	-1.483	.624
	November-December Inflows	.748	.455	.458	1.644	.117	-.204	1.700

a. Dependent Variable: Oyster Harvest

Collinearity Diagnostics

```
                              Parameter Estimates

                   Parameter       Standard    T for H0:                   Variance
Variable   DF       Estimate          Error   Parameter=0   Prob > |T|    Inflation

INTERCEP    1    3762.032283   898.02008478         4.189       0.0005   0.00000000
QJF_LAG     1      -1.637196     0.64634877        -2.533       0.0203   2.80771323
QMA_LAG     1       0.236465     0.47384835         0.499       0.6235   2.40646961
QMJ_LAG     1       0.054978     0.28987910         0.190       0.8516   1.65932002
QJA_LAG     1       0.507883     0.60849194         0.835       0.4143   1.40502695
QSO_LAG     1      -0.429280     0.50326444        -0.853       0.4043   1.70957076
QND_LAG     1       0.747943     0.45495372         1.644       0.1166   2.34574136


                   Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
Number  Eigenvalue     Index   QJF_LAG   QMA_LAG   QMJ_LAG   QJA_LAG   QSO_LAG   QND_LAG

     1     2.51838   1.00000    0.0401    0.0098    0.0268    0.0526    0.0377    0.0332
     2     1.59734   1.25563    0.0000    0.1033    0.0802    0.0078    0.0725    0.0467
     3     0.70621   1.88839    0.1165    0.1314    0.1432    0.3558    0.0158    0.0035
     4     0.59010   2.06584    0.0342    0.0003    0.4207    0.5056    0.0307    0.0584
     5     0.41533   2.46244    0.0536    0.0099    0.0037    0.0148    0.8214    0.3420
     6     0.17264   3.81934    0.7556    0.7452    0.3253    0.0634    0.0219    0.5163
```

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	930.0552	4080.625	2636.40	917.7718	26
Std. Predicted Value	-1.859	1.574	.000	1.000	26
Standard Error of Predicted Value	507.1635	910.9368	697.9301	131.1295	26
Adjusted Predicted Value	685.5081	5384.494	2631.23	1095.994	26
Residual	-1905.72	3376.760	-3.E-13	1192.352	26
Std. Residual	-1.393	2.469	.000	.872	26
Stud. Residual	-1.808	3.192	.002	1.063	26
Deleted Residual	-3209.59	5644.624	5.1773	1789.533	26
Stud. Deleted Residual	-1.934	4.562	.050	1.260	26
Mahal. Distance	2.476	10.128	5.769	2.452	26
Cook's Distance	.000	.978	.080	.196	26
Centered Leverage Value	.099	.405	.231	.098	26

a. Dependent Variable: Oyster Harvest

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE[1]	SDR[2]
1962	991.04213	-241.14213	-361.47762	1111.37762	-1.79278	-.17631	-.21586	-.21036
1963	3081.46965	-950.16965	-1187.95349	3319.25349	.48494	-.69471	-.77679	-.76837
1964	2866.52947	54.27053	67.46793	2853.33207	.25074	.03968	.04424	.04306
1965	2778.05060	1805.24940	2183.40429	2399.89571	.15434	1.31990	1.45157	1.49838
1966	2584.35772	1498.94228	2133.63223	1949.66777	-.05671	1.09594	1.30754	1.33410
1967	3128.06973	-135.46973	-163.80851	3156.40851	.53572	-.09905	-.10892	-.10604
1968	3031.83141	-193.13141	-227.06070	3065.76070	.43086	-.14121	-.15311	-.14912
1969	2604.86133	842.33867	1320.20534	2126.99466	-.03437	.61587	.77102	.76248
1970	3348.64394	501.55606	762.26035	3087.93965	.77605	.36671	.45208	.44241
1971	3590.43829	431.26171	612.78039	3408.91961	1.03951	.31531	.37586	.36720
1972	2825.79003	416.80997	488.16151	2754.43849	.20635	.30475	.32980	.32193
1973	2744.04488	-1040.74488	-1247.31896	2950.61896	.11729	-.76093	-.83303	-.82604
1974	1002.62259	-165.92259	-244.58930	1081.28930	-1.78016	-.12131	-.14729	-.14344
1975	930.05521	306.74479	551.29195	685.50805	-1.85923	.22427	.30066	.29334
1976	3598.61784	-299.71784	-361.22231	3660.12231	1.04842	-.21914	-.24057	-.23451
1977	3421.82859	-1504.32859	-1765.62190	3683.12190	.85580	-1.09988	-1.19158	-1.20572
1978	1967.28038	-890.48038	-1152.13026	2228.93026	-.72907	-.65107	-.74057	-.73145
1979	1767.45479	-1724.35479	-2649.92722	2693.02722	-.94680	-1.26075	-1.56290	-1.62957
1980	1228.47074	-224.27074	-324.30001	1328.50001	-1.53408	-.16397	-.19718	-.19212
1981	2174.39935	-1188.99935	-1870.88027	2856.28027	-.50340	-.86933	-1.09048	-1.09625
1982	4013.99767	-760.19767	-1286.91699	4540.71699	1.50102	-.55581	-.72317	-.71377
1983	3590.34026	3376.75974	5644.62346	1322.47654	1.03940	2.46889	**3.19205**	**4.56245**
1984	2781.87098	-421.67098	-566.97475	2927.17475	.15850	-.30830	-.35750	-.34914
1985	1755.89940	1529.20060	1966.56969	1318.53031	-.95939	1.11806	1.26791	1.28987
1986	2657.90844	883.19156	1023.98939	2517.11061	.02343	.64574	.69531	.68554
1987	4080.62457	-1905.72457	-3209.59416	5384.49416	1.57362	-1.39336	-1.80825	-1.93431

PRE	Predicted value of harvest
RES	Ordinary residual of harvest; observed minus predicted
DRE	Deleted residual; residual obtained when the model is fitted without that observation
ADJ	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR	Z-score of the predicted value of harvest
ZRE	Z-score of the residual
SRE	Studentized residual
SDR	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$

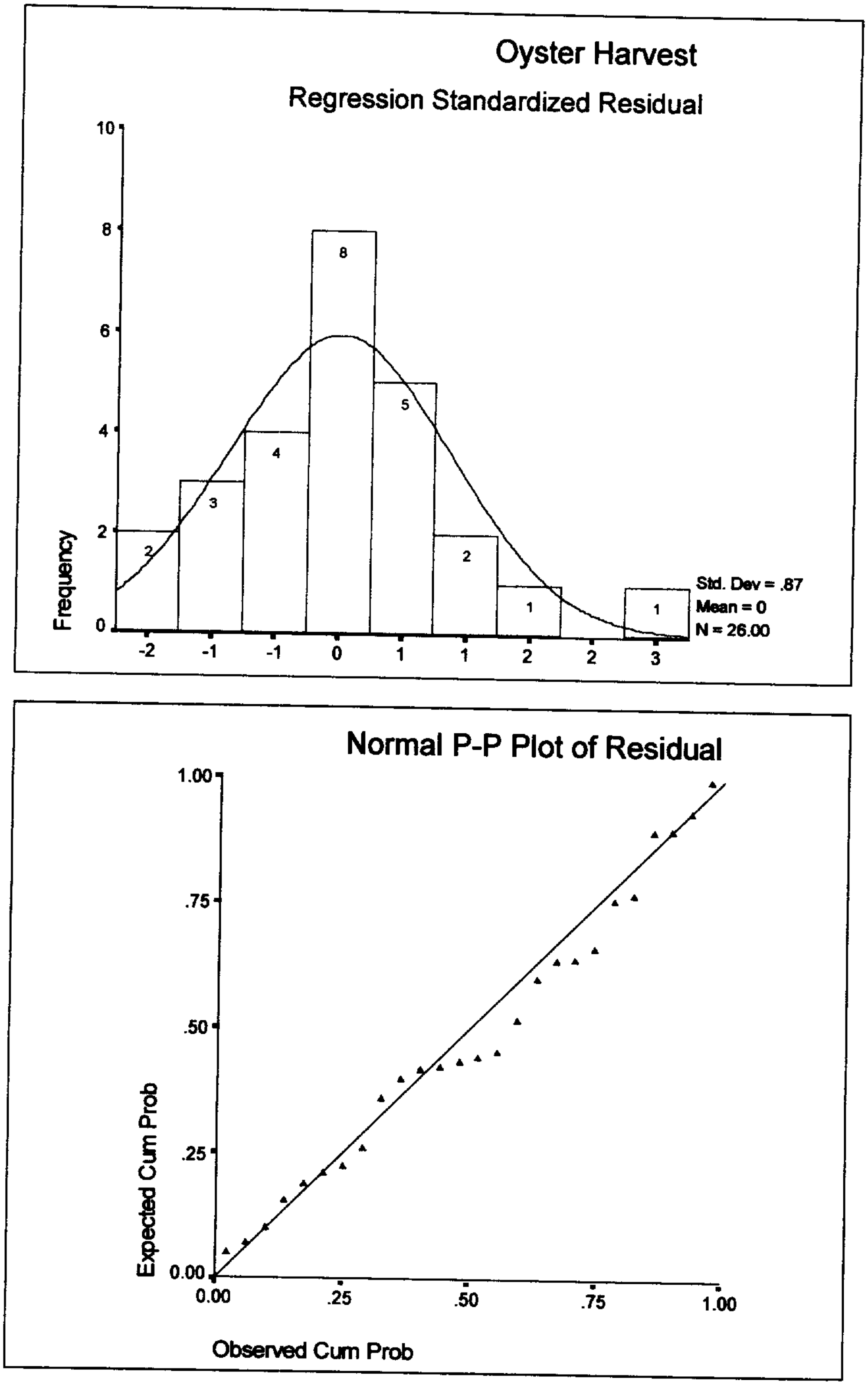


Fig. 3.1. Exploratory Plots of Oyster Harvest Standardized Residual.

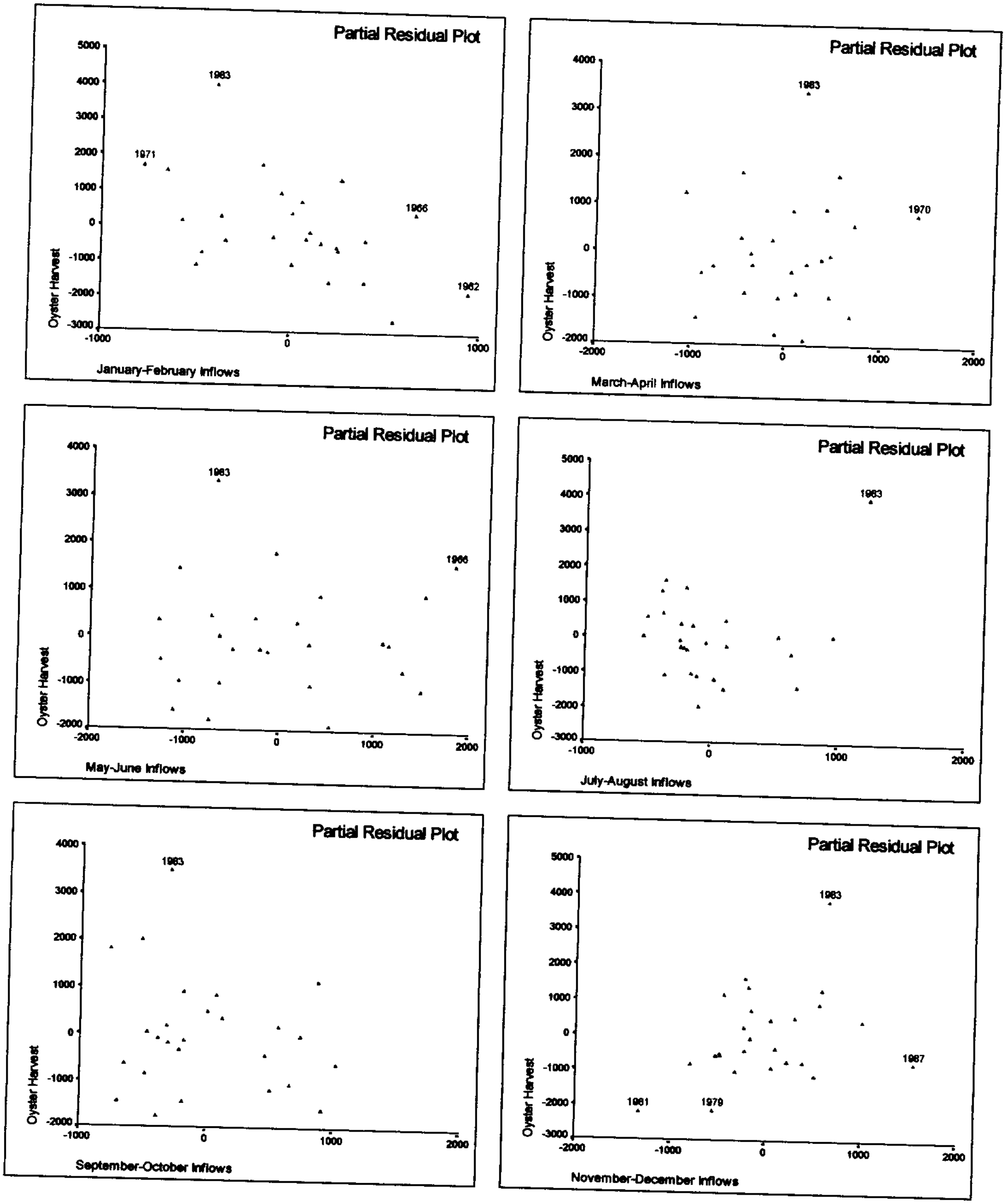


Fig. 3.2. Partial Residual Plots of Oyster Harvest vs. Inflows

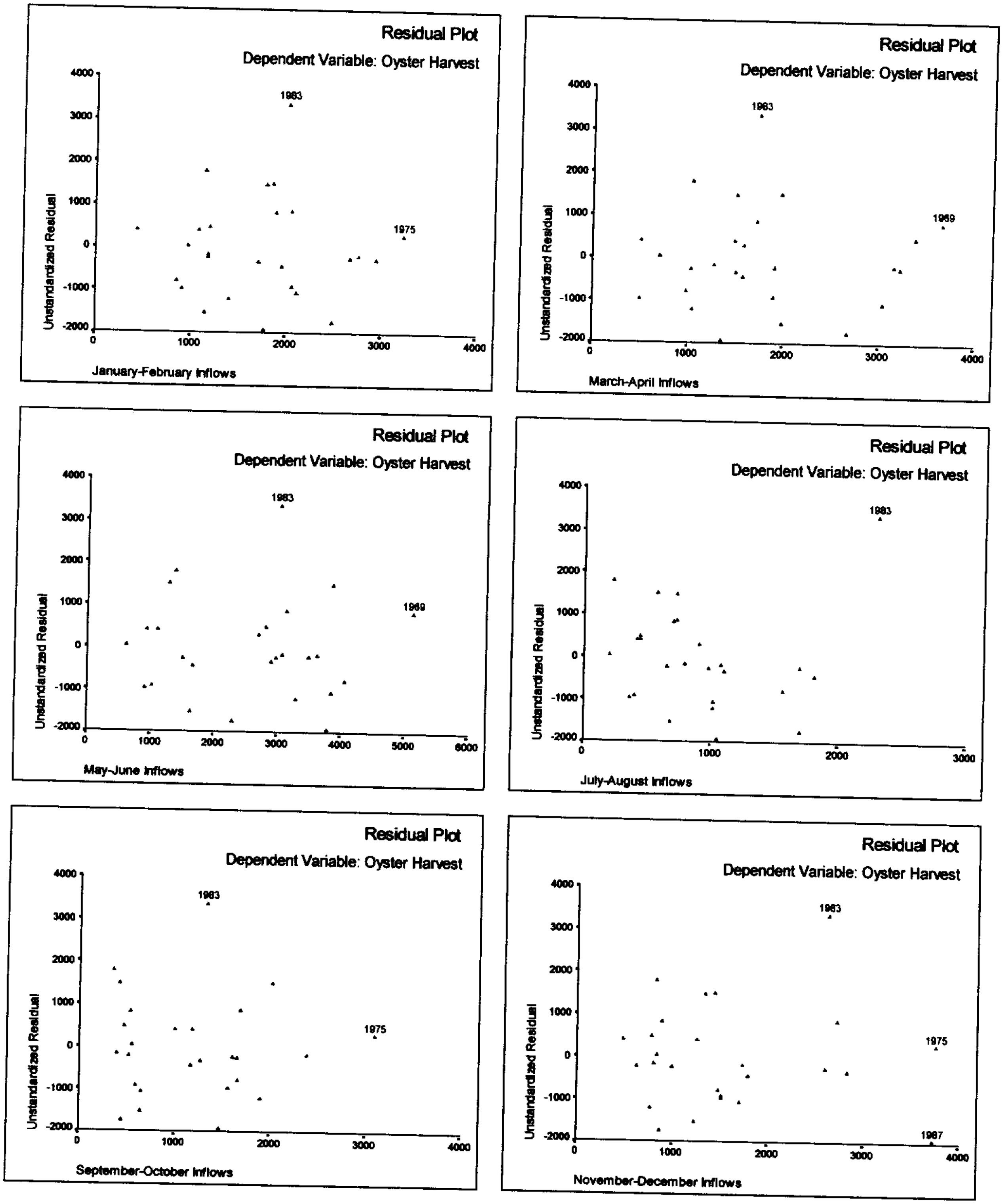


Fig. 3.3. Residual Plots of Oyster Harvest vs. Inflows

Prediction Intervals for Oyster Harvest

YEAR	OYSTER	LICI	UICI
1962	749.90	-3526.52156	5508.60582
1963	2131.30	-1205.25638	7368.19567
1964	2920.80	-1412.05853	7145.11748
1965	4583.30	-1460.24070	7016.34190
1966	4083.30	-1872.76118	7041.47663
1967	2992.60	-1109.86819	7366.00765
1968	2838.70	-1163.31024	7226.97305
1969	3447.20	-1961.69147	7171.41414
1970	3850.20	-1184.34157	7881.62945
1971	4021.70	-864.53683	8045.41342
1972	3242.60	-1363.39002	7014.97008
1973	1703.30	-1480.53134	6968.62111
1974	836.70	-3495.80012	5501.04530
1975	1236.80	-3771.34798	5631.45839
1976	3298.90	-634.38233	7831.61800
1977	1917.50	-770.68638	7614.34356
1978	1076.80	-2367.28774	6301.84850
1979	43.10	-2777.78795	6312.69753
1980	1004.20	-3247.46354	5704.40502
1981	985.40	-2396.35396	6745.15265
1982	3253.80	-631.21412	8659.20946
1983	6967.10	-1042.47206	8223.15258
1984	2360.20	-1603.92826	7167.67023
1985	3285.10	-2570.36160	6082.16039
1986	3541.10	-1515.40741	6831.22429
1987	2174.90	-559.56372	8720.81286

OYSTER	Oyster harvest
LICI	Lower limit for 99% prediction interval for oyster harvest
UICI	Upper limit for 99% prediction interval for oyster harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	7.36093	.00332	.29444	.392	.000
1963	4.04253	.02157	.16170	.775	.000
1964	3.92871	.00007	.15715	.788	.000
1965	3.36834	.06305	.13473	.849	.001
1966	6.47519	.10342	.25901	.485	.003
1967	3.36345	.00035	.13454	.849	.000
1968	2.77417	.00059	.11097	.905	.000
1969	8.08756	.04818	.32350	.325	.000
1970	7.58883	.01518	.30355	.370	.000
1971	6.44400	.00849	.25776	.489	.000
1972	2.69256	.00266	.10770	.912	.000
1973	3.17882	.01968	.12715	.868	.000
1974	7.07916	.00147	.28317	.421	.000
1975	10.12819	.01030	.40513	.181	.000
1976	3.29515	.00170	.13181	.856	.000
1977	2.73820	.03523	.10953	.908	.000
1978	4.71599	.02302	.18864	.695	.000
1979	7.77052	.18731	.31082	.353	.015
1980	6.74963	.00248	.26999	.455	.000
1981	8.15023	.09742	.32601	.320	.002
1982	9.27065	.05177	.37083	.234	.000
1983	9.08281	.97759	.36331	.247	**.525**
1984	5.44544	.00629	.21782	.606	.000
1985	4.59851	.06568	.18394	.709	.001
1986	2.47594	.01101	.09904	.929	.000
1987	9.19449	.31959	.36778	.239	.064

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	**SDFFIT**	**SDFB_0**	**SDFB_1**	**SDFB_2**	**SDFB_3**	**SDFB_4**	**SDFB_5**	**SDFB_6**
1962	-.14860	-.00710	-.11514	.07837	.01104	.02154	.03590	.01895
1963	-.38438	-.25177	.13840	.02099	.11326	.05895	-.16023	-.01818
1964	.02124	.01968	.00240	-.00598	-.00639	-.00527	-.00549	-.00256
1965	.68578	.57153	.20680	-.26638	-.01762	-.26853	-.31110	-.11770
1966	.86812	.16755	.49533	-.58144	.62261	-.27569	-.44756	-.23329
1967	-.04850	-.02609	-.01353	.03046	-.02703	.00199	.02008	.01869
1968	-.06250	-.02335	-.00646	.01894	-.03968	.01528	.01036	.02532
1969	.57430	-.15444	.02773	.13959	.31061	-.21251	-.06364	-.04787
1970	.31896	.01361	-.16816	.26234	-.08359	-.05766	.00248	.10248
1971	.23823	.13804	-.16075	.10941	-.11784	.02208	.09233	.00838
1972	.13320	.11096	.00186	-.05619	-.01845	-.02246	.01598	-.02634
1973	-.36802	.10533	-.00419	-.14514	-.06417	.04342	.15935	-.11812
1974	-.09877	.05079	-.01337	-.02847	-.01168	.01853	-.06593	.03025
1975	.26192	-.10999	.07376	-.01845	.01558	-.09319	.10724	.04027
1976	-.10623	.00376	.04416	-.02049	.00643	-.01392	.02818	-.08673
1977	-.50250	-.23203	.28700	-.31062	.30565	-.05883	.08726	-.22503
1978	-.39649	-.14112	-.15396	-.03331	.18522	.13375	.19727	-.06166
1979	**-1.19389**	-.04137	-.52441	.06611	.31129	-.61291	.51785	.36553
1980	-.12830	.04098	-.02744	-.03056	.02406	-.05430	-.03949	.06018
1981	-.83018	-.13653	-.13561	.43938	-.43706	-.01833	-.46403	.60491
1982	-.59414	-.05178	.24938	.13746	-.25697	-.26070	-.22576	.09717
1983	**3.73901**	-.52664	**-1.10219**	.39010	-.85438	**3.21227**	-.64544	**1.26984**
1984	-.20495	-.02789	.01677	-.00927	.10732	-.17248	.03196	-.01347
1985	.68982	.06293	-.10507	.27827	-.32997	-.12978	.47370	-.08814
1986	.27372	-.05818	-.01864	.01938	.06576	-.12491	.02074	.14367
1987	**-1.59997**	.27996	.58570	-.17732	-.28688	.10072	.35567	**-1.30490**

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the January-February inflows
SDFB_2	Standardized dfbeta for the March-April inflows
SDFB_3	Standardized dfbeta for the May-June inflows
SDFB_4	Standardized dfbeta for the July-August inflows
SDFB_5	Standardized dfbeta for the September-October inflows
SDFB_6	Standardized dfbeta for the November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

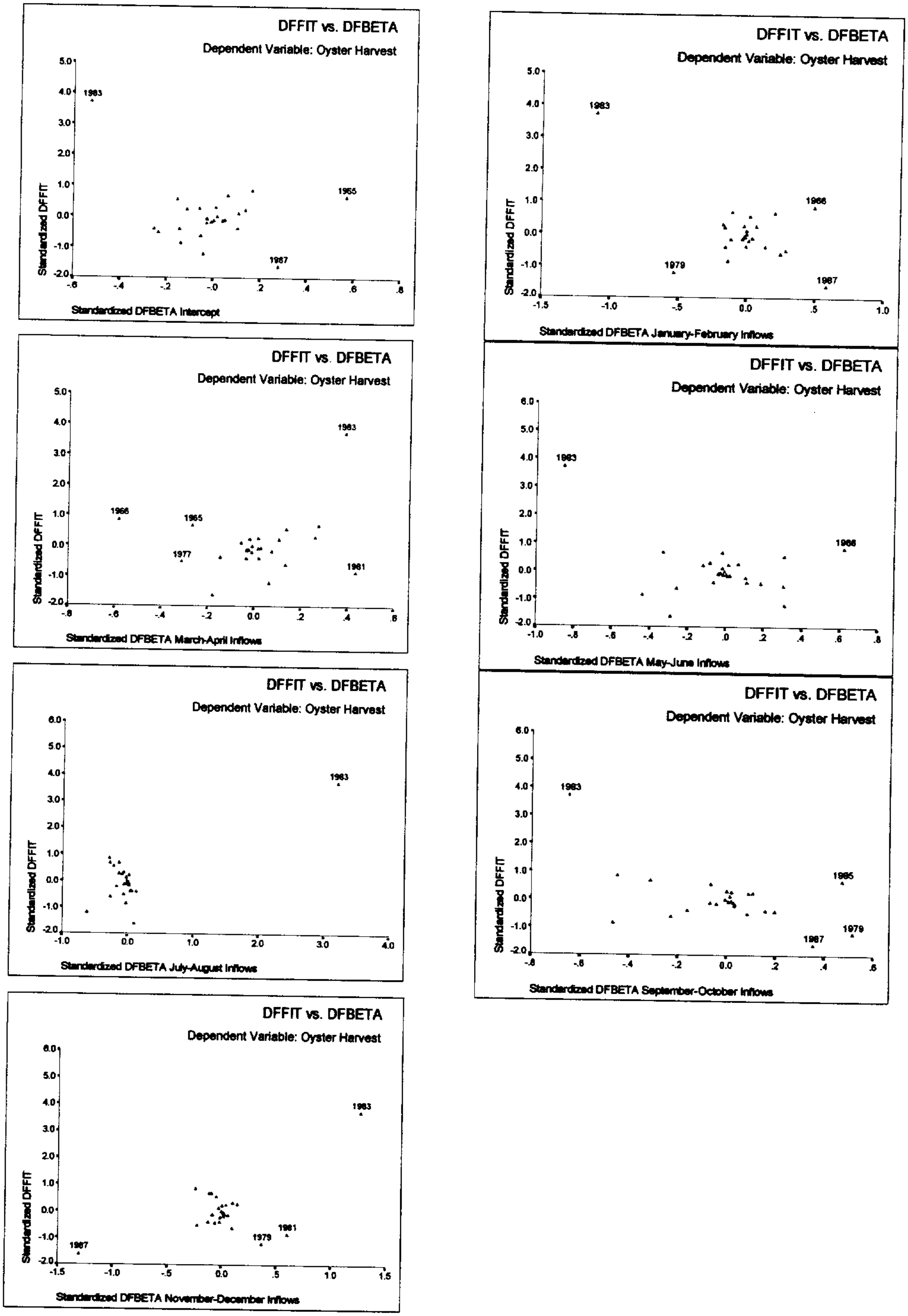


Fig. 3.4. Standardized DFFIT vs. Standardized DFBETA.

Regression –Harvest and Logged Inflows
(Box-Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	Ln (November-December Inflows), Ln (March-April Inflows), Ln (July-August Inflows), Ln (September-October Inflows), Ln (May-June Inflows), Ln (January-February Inflows)[c,d]	.	.586	.343	.135	1399.03	1.696

a. Dependent Variable: Oyster Harvest

b. Method: Enter

c. Independent Variables: (Constant), Ln (November-December Inflows), Ln (March-April Inflows), Ln (July-August Inflows), Ln (September-October Inflows), Ln (May-June Inflows), Ln (January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.9E+07	6	3235270	1.653	.187[b]
	Residual	3.7E+07	19	1957295		
	Total	5.7E+07	25			

a. Dependent Variable: Oyster Harvest

b. Independent Variables: (Constant), Ln (November-December Inflows), Ln (March-April Inflows), Ln (July-August Inflows), Ln (September-October Inflows), Ln (May-June Inflows), Ln (January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	9368.492	6007.651		1.559	.135	-3205.67	21942.6
	Ln (January-February Inflows)	-2527.01	994.815	-.769	-2.540	.020	-4609.19	-444.844
	Ln (March-April Inflows)	363.247	775.988	.130	.468	.645	-1260.91	1987.408
	Ln (May-June Inflows)	495.137	712.524	.188	.695	.496	-996.193	1986.466
	Ln (July-August Inflows)	-97.020	686.557	-.040	-.141	.889	-1534.00	1339.959
	Ln (September-October Inflows)	-701.330	581.245	-.297	-1.207	.242	-1917.89	515.231
	Ln (November-December Inflows)	1504.494	818.955	.552	1.837	.082	-209.598	3218.587

a. Dependent Variable: Oyster Harvest

Collinearity Diagnostics

```
                             Parameter Estimates

                    Parameter      Standard    T for H0:                  Variance
Variable  DF         Estimate         Error   Parameter=0    Prob > |T|   Inflation

INTERCEP   1      9368.491708  6007.6505358         1.559        0.1354  0.00000000
LN_QJF     1     -2527.014954  994.81458499        -2.540        0.0200  2.64836975
LN_QMA     1       363.246987  775.98766906         0.468        0.6450  2.21689358
LN_QMJ     1       495.136789  712.52385629         0.695        0.4955  2.12463263
LN_QJA     1       -97.020017  686.55651251        -0.141        0.8891  2.29461527
LN_QSO     1      -701.329618  581.24528943        -1.207        0.2424  1.75490557
LN_QND     1      1504.494334  818.95495488         1.837        0.0819  2.60822341



                      Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
Number  Eigenvalue        Index  LN_QJF    LN_QMA    LN_QMJ    LN_QJA    LN_QSO    LN_QND

     1     2.83834      1.00000    0.0314    0.0160    0.0295    0.0379    0.0170    0.0208
     2     1.58514      1.33813    0.0000    0.0902    0.0390    0.0008    0.1144    0.0557
     3     0.66112      2.07202    0.2207    0.0499    0.1333    0.1340    0.0710    0.0392
     4     0.43241      2.56204    0.0002    0.2660    0.1818    0.0006    0.5048    0.1721
     5     0.30215      3.06493    0.0591    0.0833    0.3867    0.7304    0.1828    0.0575
     6     0.18084      3.96169    0.6886    0.4946    0.2297    0.0962    0.1101    0.6547
```

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	814.8476	3998.415	2636.40	881.1724	26
Std. Predicted Value	-2.067	1.546	.000	1.000	26
Standard Error of Predicted Value	538.7929	1069.926	716.7382	117.3896	26
Adjusted Predicted Value	730.2727	4453.173	2662.42	945.0065	26
Residual	-1588.72	4106.213	8.3E-13	1219.649	26
Std. Residual	-1.136	2.935	.000	.872	26
Stud. Residual	-1.351	3.381	-.007	1.011	26
Deleted Residual	-2450.88	5448.506	-26.0187	1644.783	26
Stud. Deleted Residual	-1.383	5.214	.062	1.287	26
Mahal. Distance	2.746	13.660	5.769	2.355	26
Cook's Distance	.000	.534	.050	.106	26
Centered Leverage Value	.110	.546	.231	.094	26

a. Dependent Variable: Oyster Harvest

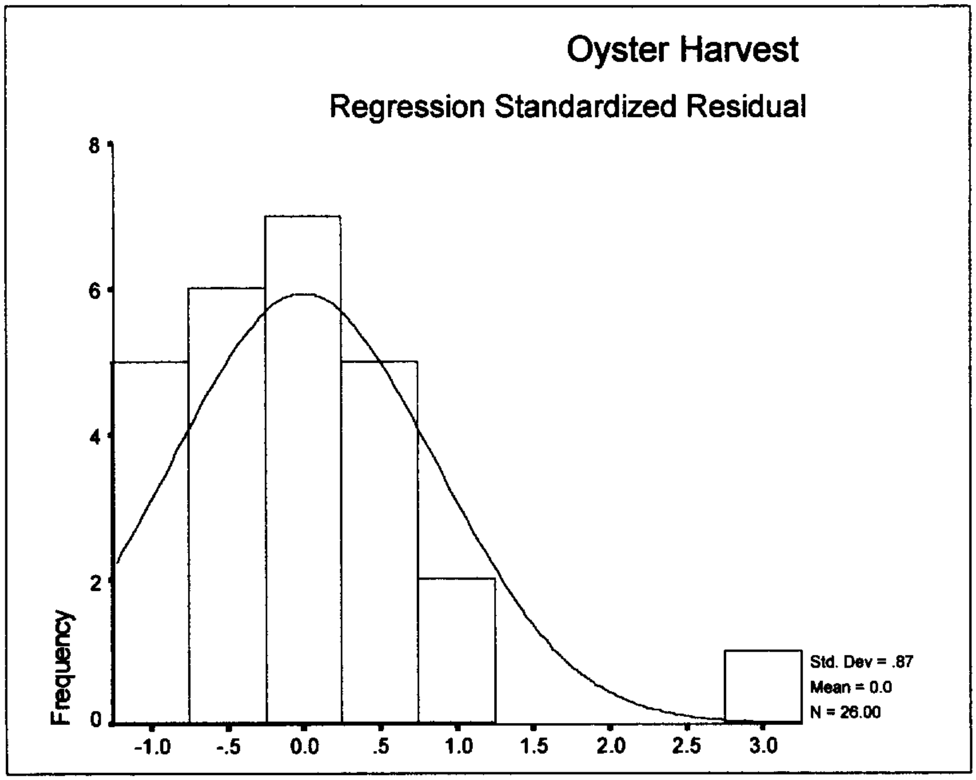
Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE[1]	SDR[2]
1962	1287.65734	-537.75734	-710.15205	1460.05205	-1.53063	-.38438	-.44171	-.43216
1963	3060.70536	-929.40536	-1240.22247	3371.52247	.48152	-.66432	-.76740	-.75879
1964	2736.06977	184.73023	261.27333	2659.52667	.11311	.13204	.15703	.15294
1965	3123.86033	1459.43967	1972.59224	2610.70776	.55319	1.04318	1.21278	1.22896
1966	3133.45983	949.84017	1229.15573	2854.14427	.56408	.67893	.77233	.76381
1967	3282.52428	-289.92428	-369.02899	3361.62899	.73325	-.20723	-.23380	-.22789
1968	2926.33726	-87.63726	-107.07512	2945.77512	.32903	-.06264	-.06924	-.06740
1969	2683.76108	763.43892	1018.49896	2428.70104	.05374	.54569	.63029	.61999
1970	3430.12539	420.07461	566.96426	3283.23574	.90076	.30026	.34883	.34062
1971	3900.28312	121.41688	292.47120	3729.22880	1.43432	.08679	.13470	.13117
1972	2630.34799	612.25201	797.46421	2445.13579	-.00687	.43763	.49945	.48935
1973	2997.61423	-1294.31423	-1519.71155	3223.01155	.40992	-.92515	-1.00247	-1.00261
1974	1417.25957	-580.55957	-790.24490	1626.94490	-1.38355	-.41497	-.48415	-.47417
1975	1622.87722	-386.07722	-538.04168	1774.84168	-1.15020	-.27596	-.32577	-.31797
1976	3416.53456	-117.63456	-139.62739	3438.52739	.88533	-.08408	-.09161	-.08918
1977	3506.22375	-1588.72375	-1924.61438	3842.11438	.98712	-1.13559	-1.24988	-1.26987
1978	2212.67200	-1135.87200	-1541.52937	2618.32937	-.48087	-.81190	-.94583	-.94307
1979	1501.09420	-1457.99420	-2450.87718	2493.97718	-1.28841	-1.04214	-1.35117	-1.38327
1980	814.84758	189.35242	273.92727	730.27273	-2.06720	.13535	.16279	.15856
1981	1643.27719	-657.87719	-1157.05735	2142.45735	-1.12705	-.47024	-.62362	-.61330
1982	3998.41461	-744.61461	-1199.37345	4453.17345	1.54568	-.53224	-.67548	-.66551
1983	2860.88716	4106.21284	5448.50656	1518.59344	.25476	2.93504	**3.38089**	**5.21353**
1984	2150.84371	209.35629	286.43575	2073.76425	-.55104	.14964	.17504	.17051
1985	1635.92983	1649.17017	2150.26817	1134.83183	-1.13539	1.17879	1.34602	1.37744
1986	2829.65670	711.44330	858.04673	2683.05327	.21931	.50852	.55847	.54809
1987	3743.23593	-1568.33593	-2144.53491	4319.43491	1.25609	-1.12101	-1.31087	-1.33783

PRE	Predicted value of harvest
RES	Ordinary residual of harvest; observed minus predicted
DRE	Deleted residual; residual obtained when the model is fitted without that observation
ADJ	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR	Z-score of the predicted value of harvest
ZRE	Z-score of the residual
SRE	Studentized residual
SDR	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$



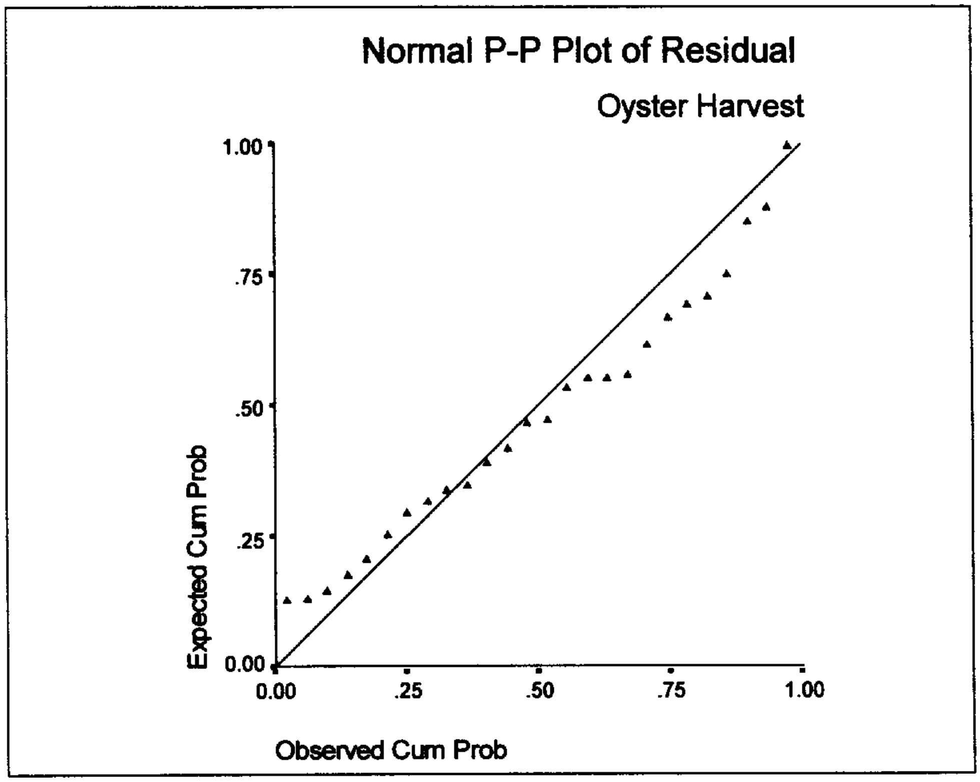


Fig. 4.1. Exploratory Plots of Oyster Harvest Standardized Residual.

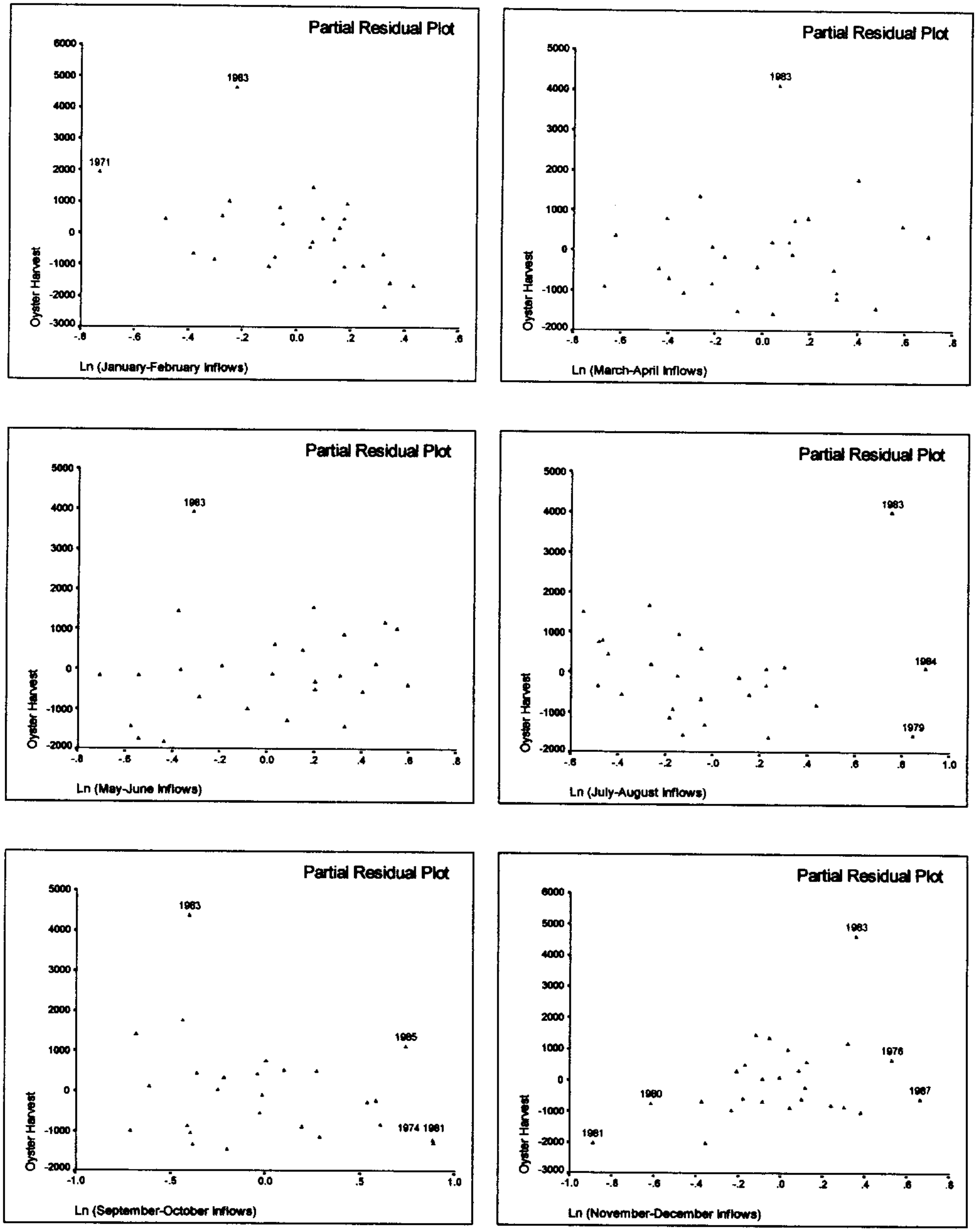


Fig. 4.2. Partial Residual Plots of Oyster Harvest vs. Logged Inflows

Prediction Intervals for Oyster Harvest

YEAR	OYSTER	LICI	UICI
1962	749.90	-3174.33904	5749.65372
1963	2131.30	-1415.37285	7536.78357
1964	2920.80	-1815.16116	7287.30071
1965	4583.30	-1369.23502	7616.95568
1966	4083.30	-1300.59535	7567.51501
1967	2992.60	-1128.19667	7693.24523
1968	2838.70	-1424.36422	7277.03874
1969	3447.20	-1791.98319	7159.50534
1970	3850.20	-1061.07935	7921.33013
1971	4021.70	-1138.56533	8939.13158
1972	3242.60	-1812.74794	7073.44392
1973	1703.30	-1291.49104	7286.71949
1974	836.70	-3085.09840	5919.61754
1975	1236.80	-2909.79740	6155.55183
1976	3298.90	-889.70864	7722.77777
1977	1917.50	-831.55001	7843.99752
1978	1076.80	-2285.78863	6711.13263
1979	43.10	-3243.41943	6245.60783
1980	1004.20	-3764.08506	5393.78022
1981	985.40	-3145.44773	6432.00210
1982	3253.80	-702.08399	8698.91322
1983	6967.10	-1607.57170	7329.34602
1984	2360.20	-2358.19231	6659.87973
1985	3285.10	-2808.58712	6080.44678
1986	3541.10	-1501.34129	7160.65469
1987	2174.90	-765.06084	8251.53270

OYSTER	Oyster harvest
LICI	Lower limit for 99% prediction interval for oyster harvest
UICI	Upper limit for 99% prediction interval for oyster harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV[1]	MAHA_PV[2]	COOK_PV[3]
1962	5.10740	.00894	.20430	.647	.000
1963	5.30381	.02814	.21215	.623	.000
1964	6.36251	.00146	.25450	.498	.000
1965	5.54199	.07388	.22168	.594	.001
1966	4.71951	.02506	.18878	.694	.000
1967	4.39744	.00213	.17590	.733	.000
1968	3.57683	.00015	.14307	.827	.000
1969	5.29915	.01896	.21197	.624	.000
1970	5.51549	.00608	.22062	.597	.000
1971	13.65993	.00365	**.54640**	.058	.000
1972	4.84475	.01078	.19379	.679	.000
1973	2.74636	.02500	.10985	.907	.000
1974	5.67202	.01209	.22688	.579	.000
1975	6.09946	.00597	.24398	.528	.000
1976	2.97623	.00022	.11905	.887	.000
1977	3.40155	.04718	.13606	.846	.000
1978	5.61728	.04564	.22469	.585	.000
1979	9.16629	.17761	.36665	.241	.013
1980	6.75719	.00169	.27029	.455	.000
1981	9.82402	.04216	.39296	.199	.000
1982	8.51755	.03981	.34070	.289	.000
1983	5.19746	.53379	.20790	.636	.202
1984	5.76593	.00161	.23064	.567	.000
1985	4.86446	.07864	.19458	.677	.001
1986	3.30989	.00918	.13240	.855	.000
1987	5.75552	.09019	.23022	.569	.002

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

---

[1] This is flagged if it exceeds $(2p+1)/n$ or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degree of freedom and $n - p - 1$ denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	-.24469	.01391	-.15326	.10864	.07237	-.03765	.00557	.02436
1963	-.43880	-.21648	.04883	.16149	.03670	.07212	-.10502	-.02319
1964	.09845	.06787	.01802	-.02131	-.03373	-.02301	-.01626	-.00895
1965	.72873	.34830	.19130	-.20937	.14493	-.38245	-.25706	-.04109
1966	.41420	.04408	.10934	-.19360	.22202	-.05948	-.24553	.02066
1967	-.11904	-.06000	-.00951	.06200	-.04062	-.02882	.06525	.02626
1968	-.03174	-.00734	-.00318	.00657	-.01753	.00535	.00043	.01622
1969	.35836	-.12044	.04970	.07700	.20086	-.16250	.00141	-.06919
1970	.20142	-.02283	-.06949	.12973	.03084	-.08533	-.00660	.02920
1971	.15569	.05898	-.10541	.07885	-.05602	.02266	.04591	-.00018
1972	.26915	.16141	.06365	-.19222	.01002	-.01290	.02360	-.06735
1973	-.41840	.18059	.07783	-.18957	-.04890	.01686	.17794	-.19464
1974	-.28497	.20315	-.06948	-.09245	-.05799	.10448	-.20366	.07510
1975	-.19949	.13076	-.06563	.00430	-.03924	.08897	-.09557	-.02658
1976	-.03856	.01049	.01901	-.00676	-.00119	-.00533	.01010	-.03018
1977	-.58389	-.11664	.37879	-.37121	.30893	-.16417	.22009	-.31402
1978	-.56359	-.03078	-.11192	-.19109	.32094	.09731	.18728	-.15522
1979	**-1.14151**	-.20813	-.41791	.10334	.49392	-.74583	.53032	.37081
1980	.10597	-.03117	.04351	.01185	-.01836	.02854	.04659	-.06846
1981	-.53423	-.05015	-.20193	.30051	-.24813	.01987	-.30150	.42247
1982	-.52009	-.06684	.29154	.10017	-.17430	-.18150	-.06798	-.04994
1983	**2.98082**	-.40254	-.95598	.22800	-.94847	**2.22481**	**-1.00514**	**1.27237**
1984	.10346	.01410	-.00701	.00464	-.07180	.08795	-.02971	.01062
1985	.75928	-.19810	.07117	.35060	-.29806	-.20542	.48445	-.10409
1986	.24880	-.14823	-.02646	.04564	.10040	-.14134	.06893	.11388
1987	-.81090	.28953	.33875	-.03869	-.26440	.09584	.13010	-.60714

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the logged January-February inflows
SDFB_2	Standardized dfbeta for the logged March-April inflows
SDFB_3	Standardized dfbeta for the logged May-June inflows
SDFB_4	Standardized dfbeta for the logged July-August inflows
SDFB_5	Standardized dfbeta for the logged September-October inflows
SDFB_6	Standardized dfbeta for the logged November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

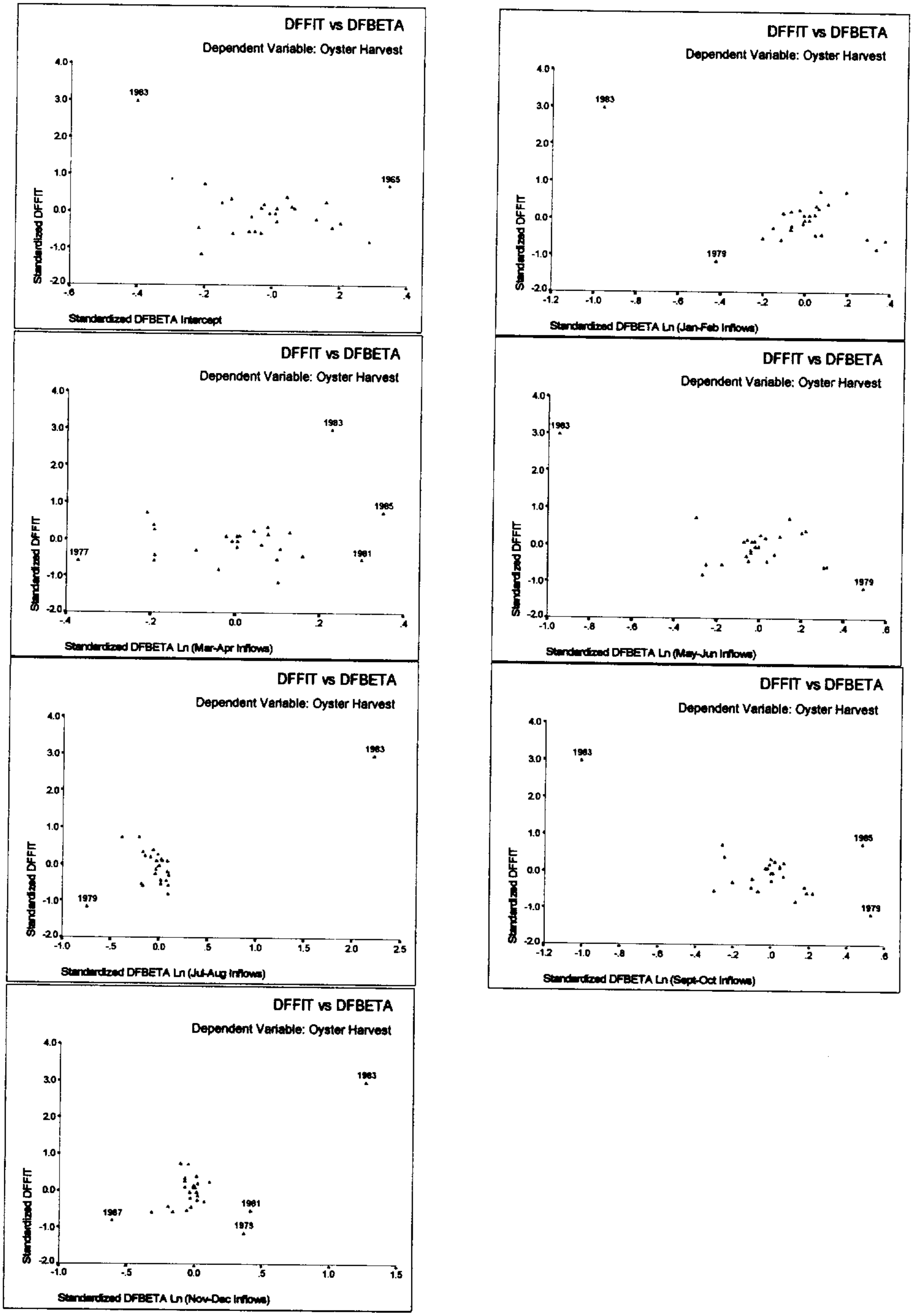


Fig. 4.4. Standardized DFFIT vs. Standardized DFBETA.

Regression –Logged All Variables
Box-Cox Transformation

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	Ln (November-December Inflows), Ln (March-April Inflows), Ln (July-August Inflows), Ln (September-October Inflows), Ln (May-June Inflows), Ln (January-February Inflows)[c,d]	.	.692	.479	.315	.8075	1.673

a. Dependent Variable: Ln (Oyster Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln (November-December Inflows), Ln (March-April Inflows), Ln (July-August Inflows), Ln (September-October Inflows), Ln (May-June Inflows), Ln (January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.402	6	1.900	2.914	.035[b]
	Residual	12.389	19	.652		
	Total	23.790	25			

a. Dependent Variable: Ln (Oyster Harvest)

b. Independent Variables: (Constant), Ln (November-December Inflows), Ln (March-April Inflows), Ln (July-August Inflows), Ln (September-October Inflows), Ln (May-June Inflows), Ln (January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	10.069	3.467		2.904	.009	2.812	17.327
	Ln (January-February Inflows)	-1.688	.574	-.792	-2.940	.008	-2.890	-.486
	Ln (March-April Inflows)	.258	.448	.142	.575	.572	-.680	1.195
	Ln (May-June Inflows)	.671	.411	.393	1.631	.119	-.190	1.531
	Ln (July-August Inflows)	-.718	.396	-.455	-1.813	.086	-1.548	.111
	Ln (September-October Inflows)	2.6E-02	.335	.017	.077	.940	-.676	.728
	Ln (November-December Inflows)	1.040	.473	.588	2.199	.040	.050	2.029

a. Dependent Variable: Ln (Oyster Harvest)

Collinearity Diagnostics

```
                              Parameter Estimates

                   Parameter      Standard    T for H0:                   Variance
Variable   DF       Estimate         Error   Parameter=0   Prob > |T|    Inflation

INTERCEP    1      10.069304    3.46747359         2.904       0.0091   0.00000000
LN_QJF      1      -1.688009    0.57418342        -2.940       0.0084   2.64836975
LN_QMA      1       0.257659    0.44788170         0.575       0.5719   2.21689358
LN_QMJ      1       0.670550    0.41125189         1.631       0.1195   2.12463263
LN_QJA      1      -0.718413    0.39626416        -1.813       0.0857   2.29461527
LN_QSO      1       0.025708    0.33548101         0.077       0.9397   1.75490557
LN_QND      1       1.039570    0.47268140         2.199       0.0404   2.60822341


                     Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
Number  Eigenvalue       Index    LN_QJF    LN_QMA    LN_QMJ    LN_QJA    LN_QSO    LN_QND

   1       2.83834     1.00000    0.0314    0.0160    0.0295    0.0379    0.0170    0.0208
   2       1.58514     1.33813    0.0000    0.0902    0.0390    0.0008    0.1144    0.0557
   3       0.66112     2.07202    0.2207    0.0499    0.1333    0.1340    0.0710    0.0392
   4       0.43241     2.56204    0.0002    0.2660    0.1818    0.0006    0.5048    0.1721
   5       0.30215     3.06493    0.0591    0.0833    0.3867    0.7304    0.1828    0.0575
   6       0.18084     3.96169    0.6886    0.4946    0.2297    0.0962    0.1101    0.6547
```

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	5.9484	8.5584	7.6118	.6753	26
Std. Predicted Value	-2.463	1.402	.000	1.000	26
Standard Error of Predicted Value	.3110	.6175	.4137	6.78E-02	26
Adjusted Predicted Value	5.9123	8.8793	7.6583	.7198	26
Residual	-2.1849	1.5220	1.2E-15	.7040	26
Std. Residual	-2.706	1.885	.000	.872	26
Stud. Residual	-3.508	2.171	-.023	1.062	26
Deleted Residual	-3.6727	2.0195	-5.E-02	1.0510	26
Stud. Deleted Residual	-5.753	2.437	-.097	1.415	26
Mahal. Distance	2.746	13.660	5.769	2.355	26
Cook's Distance	.000	1.197	.078	.233	26
Centered Leverage Value	.110	.546	.231	.094	26

a. Dependent Variable: Ln (Oyster Harvest)

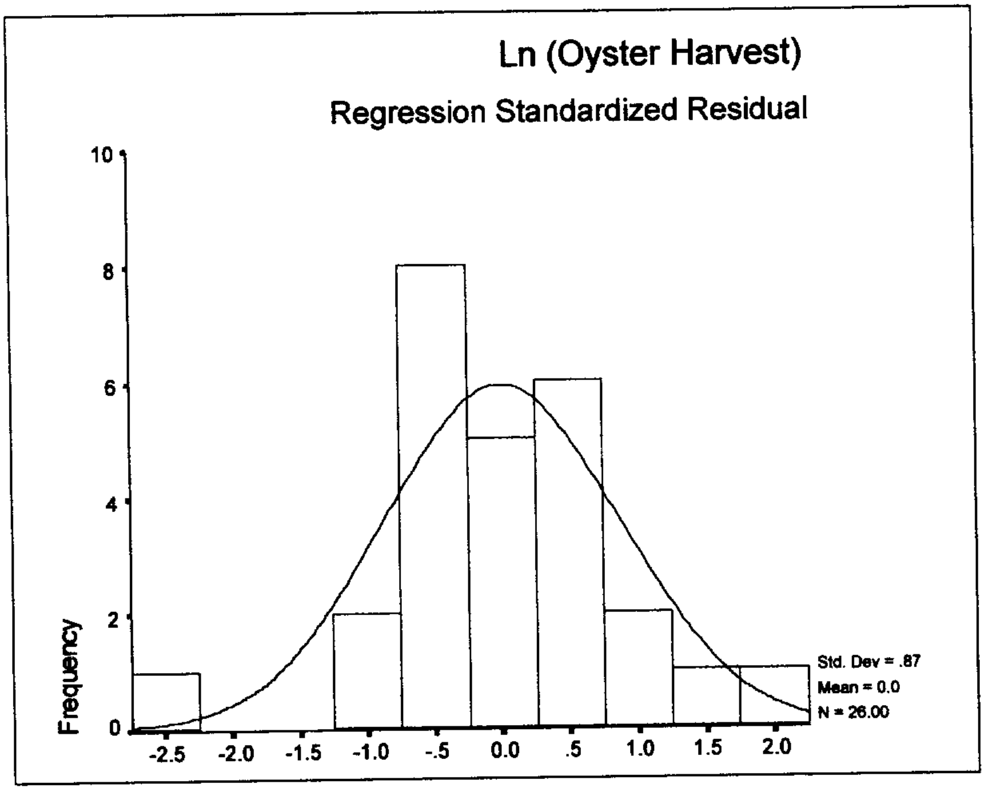
Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	6.69304	-.07310	-.09653	6.71647	-1.36044	-.09053	-.10403	-.10129
1963	8.29690	-.63241	-.84391	8.50839	1.01451	-.78318	-.90471	-.90018
1964	7.78623	.19338	.27351	7.70610	.25832	.23949	.28481	.27781
1965	8.04668	.38349	.51833	7.91185	.64400	.47492	.55213	.54177
1966	7.74952	.56514	.73133	7.58334	.20397	.69987	.79615	.78818
1967	7.65603	.34786	.44278	7.56112	.06553	.43080	.48603	.47603
1968	7.72847	.22263	.27201	7.67910	.17280	.27570	.30475	.29735
1969	7.68099	.46432	.61945	7.52587	.10249	.57502	.66417	.65409
1970	8.21493	.04095	.05527	8.20061	.89313	.05071	.05891	.05735
1971	8.53245	-.23299	-.56122	8.86068	1.36330	-.28853	-.44781	-.43819
1972	7.80687	.27727	.36114	7.72299	.28888	.34337	.39188	.38298
1973	7.67601	-.23569	-.27673	7.71706	.09512	-.29188	-.31627	-.30865
1974	7.20147	-.47200	-.64248	7.37195	-.60757	-.58453	-.68197	-.67206
1975	7.49699	-.37671	-.52498	7.64526	-.16998	-.46651	-.55073	-.54037
1976	8.13947	-.03813	-.04525	8.14660	.78139	-.04722	-.05144	-.05007
1977	7.95539	-.39661	-.48046	8.03924	.50880	-.49116	-.54060	-.53027
1978	7.25038	-.26863	-.36457	7.34632	-.53515	-.33267	-.38755	-.37872
1979	5.94838	-2.18486	-3.67273	7.43626	-2.46311	-2.70575	**-3.50808**	**-5.75287**
1980	6.22093	.69101	.99966	5.91229	-2.05953	.85576	1.02928	1.03098
1981	7.20137	-.30832	-.54227	7.43532	-.60772	-.38183	-.50638	-.49623
1982	8.51741	-.42983	-.69235	8.77993	1.34104	-.53231	-.67558	-.66560
1983	7.32700	1.52196	2.01947	6.82948	-.42170	1.88480	2.17112	2.43703
1984	6.72696	1.03954	1.42227	6.34423	-1.31021	1.28737	1.50582	1.56182
1985	7.31090	.78625	1.02515	7.07200	-.44553	.97370	1.11183	1.11920
1986	8.18310	-.01091	-.01315	8.18535	.84599	-.01351	-.01483	-.01444
1987	8.55835	-.87362	-1.19458	8.87932	1.40166	-1.08189	-1.26512	-1.28676

PRE	Predicted value of harvest
RES	Ordinary residual of harvest; observed minus predicted
DRE	Deleted residual; residual obtained when the model is fitted without that observation
ADJ	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR	Z-score of the predicted value of harvest
ZRE	Z-score of the residual
SRE	Studentized residual
SDR	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$



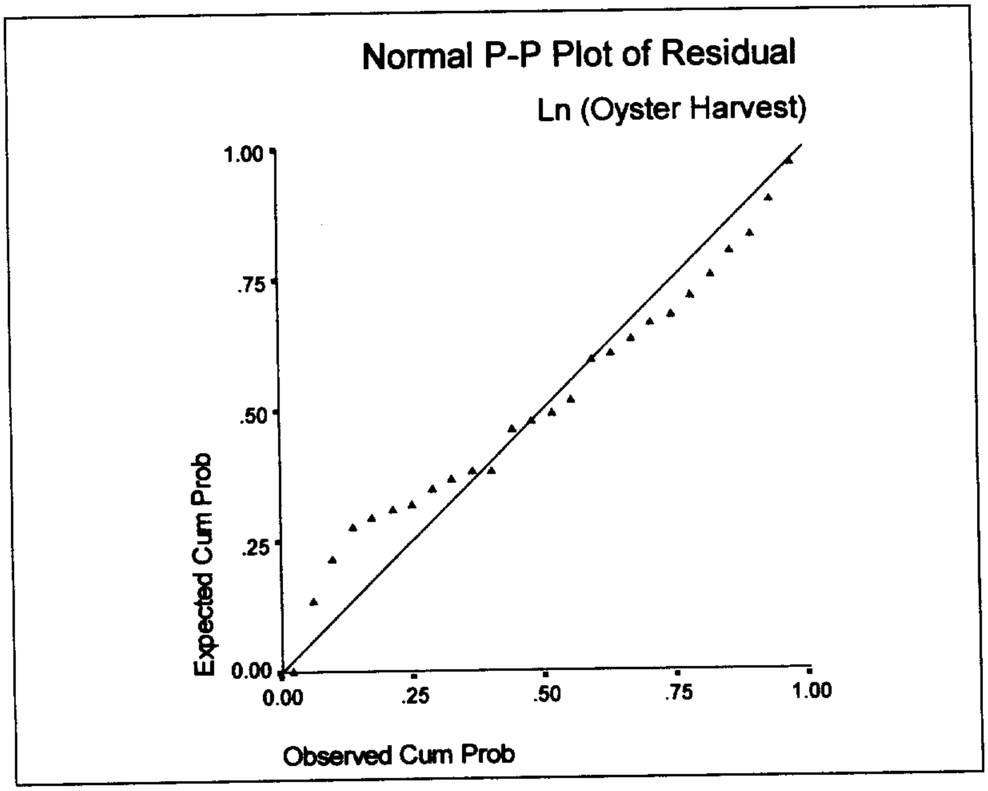


Fig. 5.1. Exploratory Plots of Ln (Oyster Harvest) Standardized Residual.

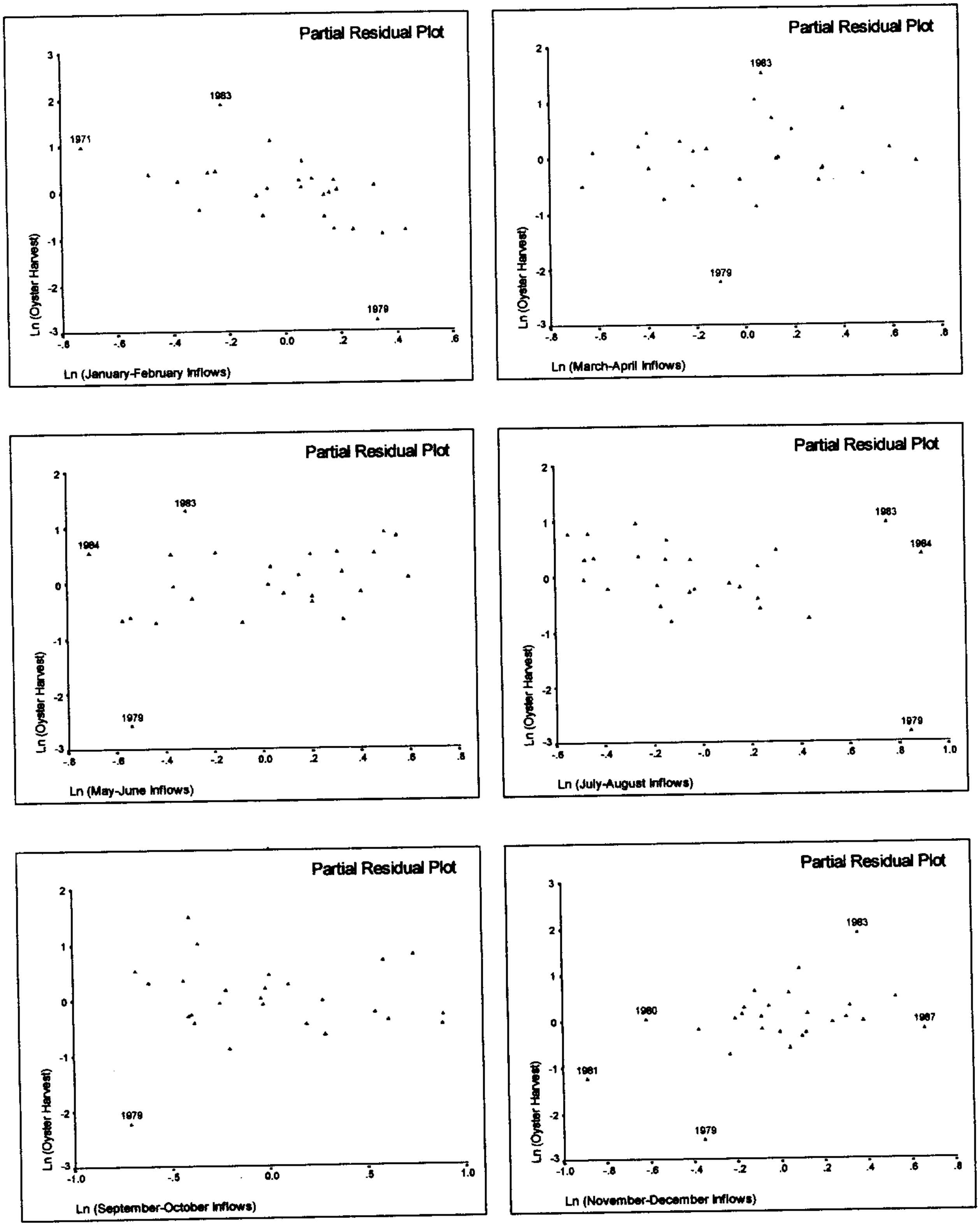


Fig 5.2. Partial Residual Plots of Ln (Oyster Harvest) vs. Logged Inflows.

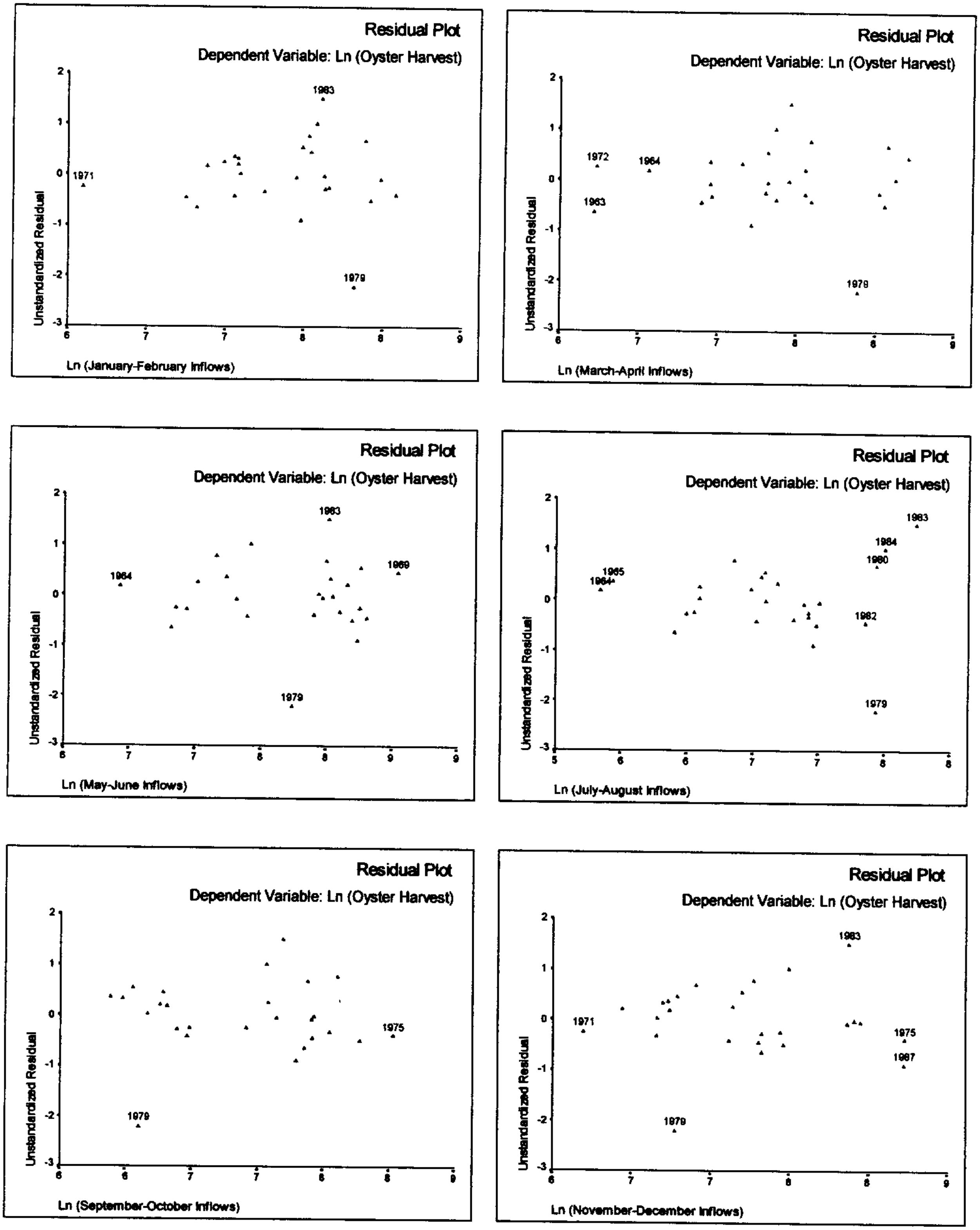


Fig 5.3. Residual Plots of Ln (Oyster Harvest) vs. Logged Inflows.

Prediction Intervals for Oyster Harvest

YEAR	Ln_OYSTER	LICI	UICI
1962	6.62	4.11768	9.26840
1963	7.66	5.71341	10.88038
1964	7.98	5.15937	10.41309
1965	8.43	5.45338	10.63999
1966	8.31	5.19029	10.30875
1967	8.00	5.11027	10.20180
1968	7.95	5.21735	10.23960
1969	8.15	5.09770	10.26429
1970	8.26	5.62272	10.80715
1971	8.30	5.62414	11.44075
1972	8.08	5.24242	10.37132
1973	7.44	5.20044	10.15158
1974	6.73	4.60282	9.80012
1975	7.12	4.88084	10.11314
1976	8.10	5.65401	10.62493
1977	7.56	5.45173	10.45905
1978	6.98	4.65397	9.84678
1979	3.76	3.20996	8.68680
1980	6.91	3.57808	8.86378
1981	6.89	4.43743	9.96531
1982	8.09	5.80440	11.23043
1983	8.85	4.74791	9.90609
1984	7.77	4.12446	9.32947
1985	8.10	4.74563	9.87617
1986	8.17	5.68335	10.68285
1987	7.68	5.95627	11.16044

Ln_OYSTER	Logged oyster harvest
LICI	Lower limit for 99% prediction interval for oyster harvest
UICI	Upper limit for 99% prediction interval for oyster harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	5.10740	.00050	.20430	.647	.0000
1963	5.30381	.03910	.21215	.623	.0001
1964	6.36251	.00480	.25450	.498	.0000
1965	5.54199	.01531	.22168	.594	.0000
1966	4.71951	.02663	.18878	.694	.0000
1967	4.39744	.00921	.17590	.733	.0000
1968	3.57683	.00294	.14307	.827	.0000
1969	5.29915	.02105	.21197	.624	.0000
1970	5.51549	.00017	.22062	.597	.0000
1971	13.65993	.04036	**.54640**	.058	.0001
1972	4.84475	.00664	.19379	.679	.0000
1973	2.74636	.00249	.10985	.907	.0000
1974	5.67202	.02400	.22688	.579	.0000
1975	6.09946	.01705	.24398	.528	.0000
1976	2.97623	.00007	.11905	.887	.0000
1977	3.40155	.00883	.13606	.846	.0000
1978	5.61728	.00766	.22469	.585	.0000
1979	9.16629	1.19725	.36665	.241	**.6491**
1980	6.75719	.06760	.27029	.455	.0007
1981	9.82402	.02779	.39296	.199	.0000
1982	8.51755	.03982	.34070	.289	.0001
1983	5.19746	.22013	.20790	.636	.0241
1984	5.76593	.11926	.23064	.567	.0040
1985	4.86446	.05366	.19458	.677	.0003
1986	3.30989	.00001	.13240	.855	.0000
1987	5.75552	.08400	.23022	.569	.0013

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	-.05735	.00326	-.03592	.02546	.01696	-.00882	.00131	.00571
1963	-.52057	-.25682	.05792	.19158	.04354	.08555	-.12459	-.02752
1964	.17883	.12329	.03273	-.03871	-.06127	-.04180	-.02954	-.01627
1965	.32125	.15354	.08433	-.09230	.06389	-.16860	-.11332	-.01812
1966	.42741	.04549	.11282	-.19978	.22910	-.06138	-.25337	.02132
1967	.24865	.12533	.01986	-.12950	.08485	.06019	-.13629	-.05486
1968	.14004	.03238	.01401	-.02899	.07734	-.02359	-.00191	-.07157
1969	.37807	-.12706	.05244	.08123	.21191	-.17144	.00149	-.07300
1970	.03391	-.00384	-.01170	.02184	.00519	-.01437	-.00111	.00492
1971	-.52010	-.19702	.35213	-.26340	.18716	-.07570	-.15337	.00060
1972	.21064	.12632	.04981	-.15043	.00784	-.01010	.01847	-.05271
1973	-.12880	.05559	.02396	-.05836	-.01505	.00519	.05478	-.05992
1974	-.40390	.28793	-.09848	-.13104	-.08219	.14808	-.28866	.10645
1975	-.33902	.22222	-.11154	.00731	-.06669	.15119	-.16241	-.04518
1976	-.02165	.00589	.01067	-.00379	-.00067	-.00299	.00567	-.01695
1977	-.24382	-.04871	.15817	-.15501	.12900	-.06855	.09190	-.13113
1978	-.22632	-.01236	-.04494	-.07674	.12888	.03908	.07521	-.06233
1979	**-4.74740**	-.86559	**-1.73806**	.42977	**2.05418**	**-3.10184**	**2.20556**	**1.54217**
1980	.68903	-.20269	.28293	.07704	-.11937	.18560	.30292	-.44515
1981	-.43226	-.04058	-.16338	.24315	-.20077	.01608	-.24395	.34183
1982	-.52016	-.06685	.29159	.10019	-.17433	-.18153	-.06799	-.04995
1983	**1.39336**	-.18816	-.44687	.10658	-.44335	**1.03997**	-.46984	.59476
1984	.94767	.12918	-.06423	.04248	-.65768	.80563	-.27215	.09728
1985	.61693	-.16096	.05783	.28487	-.24218	-.16691	.39362	-.08458
1986	-.00655	.00390	.00070	-.00120	-.00264	.00372	-.00182	-.00300
1987	-.77995	.27848	.32582	-.03722	-.25431	.09218	.12513	-.58397

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the logged January-February inflows
SDFB_2	Standardized dfbeta for the logged March-April inflows
SDFB_3	Standardized dfbeta for the logged May-June inflows
SDFB_4	Standardized dfbeta for the logged July-August inflows
SDFB_5	Standardized dfbeta for the logged September-October inflows
SDFB_6	Standardized dfbeta for the logged November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

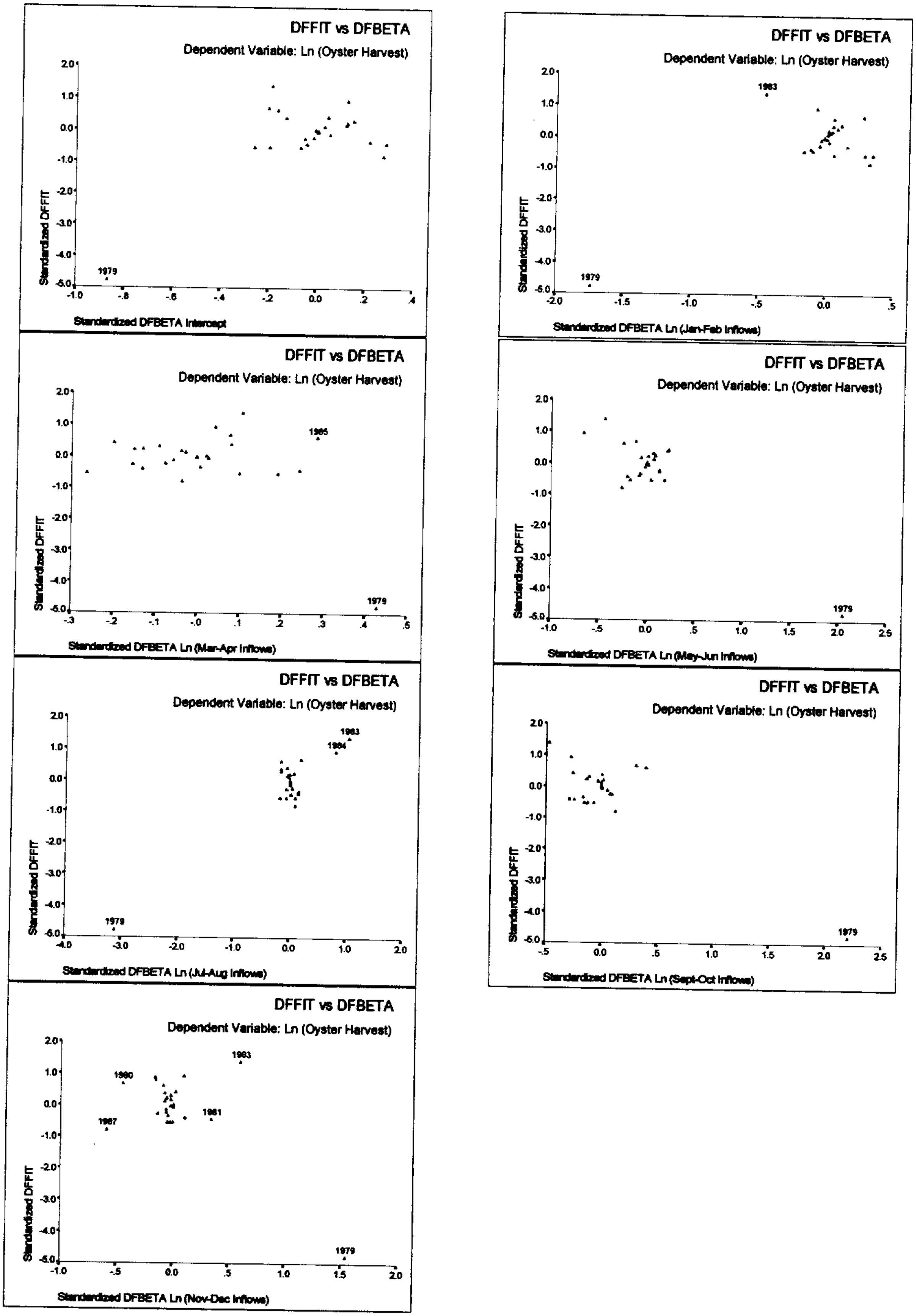


Fig. 5.4. Standardized DFFIT vs. Standardized DFBETA.

Regression –Squared Root Inflows
Box-Cox Transformation

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	Entered	Removed					
1	SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows)[c,d]	.	.597	.356	.153	1384.69	1.733

a. Dependent Variable: Oyster Harvest

b. Method: Enter

c. Independent Variables: (Constant), SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.0E+07	6	3361744	1.753	.163[b]
	Residual	3.6E+07	19	1917355		
	Total	5.7E+07	25			

a. Dependent Variable: Oyster Harvest

b. Independent Variables: (Constant), SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	4797.552	1672.428		2.869	.010	1297.120	8297.983
	SQRT (January-February Inflows)	-133.391	52.461	-.774	-2.543	.020	-243.193	-23.589
	SQRT (March-April Inflows)	20.413	40.214	.143	.508	.618	-63.755	104.582
	SQRT (May-June Inflows)	10.525	29.070	.090	.362	.721	-50.319	71.369
	SQRT (July-August Inflows)	16.917	42.109	.097	.402	.692	-71.217	105.052
	SQRT (September-October Inflows)	-39.175	34.891	-.267	-1.123	.276	-112.202	33.853
	SQRT (November-December Inflows)	70.669	39.906	.512	1.771	.093	-12.855	154.192

a. Dependent Variable: Oyster Harvest

Collinearity Diagnostics

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                           Parameter Estimates

                 Parameter       Standard    T for H0:                  Variance
Variable  DF      Estimate          Error   Parameter=0   Prob > |T|   Inflation

INTERCEP   1   4797.551692   1672.4276015        2.869       0.0098   0.00000000
SQR_QJF    1   -133.390981    52.46090641       -2.543       0.0199   2.73816974
SQR_QMA    1     20.413477    40.21365283        0.508       0.6176   2.34845703
SQR_QMJ    1     10.525271    29.06995157        0.362       0.7213   1.80405860
SQR_QJA    1     16.917289    42.10882411        0.402       0.6923   1.72413316
SQR_QSO    1    -39.174601    34.89101647       -1.123       0.2755   1.66589742
SQR_QND    1     70.668701    39.90555424        1.771       0.0926   2.46389117


                  Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
Number Eigenvalue     Index   SQR_QJF   SQR_QMA   SQR_QMJ   SQR_QJA   SQR_QSO   SQR_QND

   1     2.69228    1.00000    0.0350    0.0130    0.0303    0.0483    0.0261    0.0259
   2     1.59322    1.29994    0.0000    0.0951    0.0573    0.0028    0.0995    0.0528
   3     0.66487    2.01229    0.1812    0.1146    0.2175    0.1941    0.0032    0.0026
   4     0.44998    2.44604    0.0016    0.0071    0.3617    0.4946    0.0703    0.2349
   5     0.42278    2.52350    0.0469    0.0967    0.0608    0.1947    0.7968    0.0963
   6     0.17687    3.90150    0.7353    0.6736    0.2723    0.0656    0.0041    0.5874
```

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	992.8782	4005.259	2636.40	898.2308	26
Std. Predicted Value	-1.830	1.524	.000	1.000	26
Standard Error of Predicted Value	546.0120	903.5179	710.0881	111.6484	26
Adjusted Predicted Value	987.6855	4832.696	2650.74	1008.990	26
Residual	-1765.38	3734.285	-8.E-13	1207.141	26
Std. Residual	-1.275	2.697	.000	.872	26
Stud. Residual	-1.564	3.287	-.004	1.037	26
Deleted Residual	-2657.80	5548.712	-14.3378	1716.019	26
Stud. Deleted Residual	-1.631	4.873	.055	1.269	26
Mahal. Distance	2.926	9.683	5.769	2.083	26
Cook's Distance	.000	.750	.063	.149	26
Centered Leverage Value	.117	.387	.231	.083	26

a. Dependent Variable: Oyster Harvest

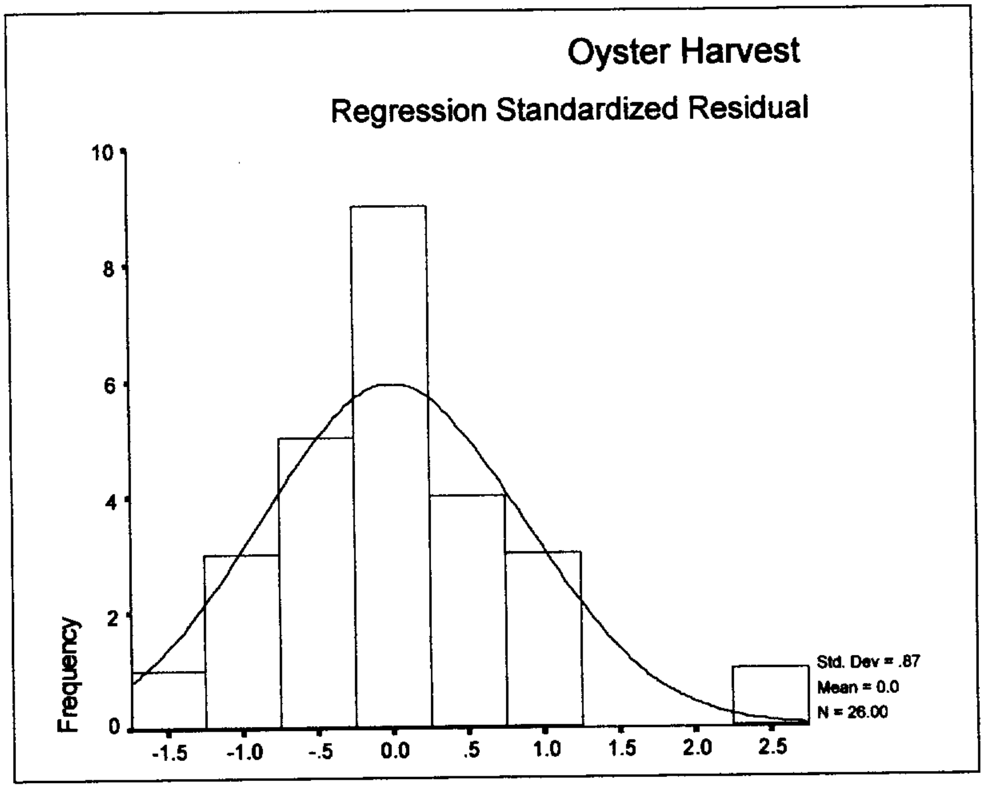
Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	1157.26008	-407.36008	-572.06663	1321.96663	-1.64673	-.29419	-.34863	-.34042
1963	3064.69617	-933.39617	-1195.71268	3327.01268	.47682	-.67409	-.76295	-.75424
1964	2814.13679	106.66321	139.97236	2780.82764	.19787	.07703	.08824	.08591
1965	2870.04635	1713.25365	2165.71664	2417.58336	.26011	1.23729	1.39111	1.42872
1966	2831.68329	1251.61671	1699.49484	2383.80516	.21740	.90390	1.05328	1.05650
1967	3221.37909	-228.77909	-283.18982	3275.78982	.65125	-.16522	-.18382	-.17908
1968	3014.40672	-175.70672	-210.14522	3048.84522	.42083	-.12689	-.13877	-.13514
1969	2633.84696	813.35304	1171.22625	2275.97375	-.00285	.58739	.70487	.69522
1970	3388.84664	461.35336	656.51462	3193.68538	.83769	.33318	.39745	.38847
1971	3771.01946	250.68054	436.54769	3585.15231	1.26317	.18104	.23890	.23288
1972	2731.86685	510.73315	622.05882	2620.54118	.10628	.36884	.40706	.39794
1973	2899.25880	-1195.95880	-1423.75705	3127.05705	.29264	-.86370	-.94238	-.93946
1974	1150.09475	-313.39475	-446.34327	1283.04327	-1.65471	-.22633	-.27010	-.26340
1975	1232.93262	3.86738	6.05936	1230.74064	-1.56248	.00279	.00350	.00340
1976	3554.14253	-255.24253	-307.18877	3606.08877	1.02172	-.18433	-.20222	-.19704
1977	3527.07974	-1609.57974	-1929.86259	3847.36259	.99159	-1.16241	-1.27282	-1.29533
1978	2097.25519	-1020.45519	-1353.20186	2430.00186	-.60023	-.73696	-.84865	-.84213
1979	1661.78101	-1618.68101	-2607.21876	2650.31876	-1.08505	-1.16899	-1.48360	-1.53573
1980	992.87822	11.32178	16.51454	987.68546	-1.82974	.00818	.00988	.00961
1981	1868.20534	-882.80534	-1486.16890	2471.56890	-.85524	-.63755	-.82721	-.82005
1982	4005.25843	-751.45843	-1249.14335	4502.94335	1.52395	-.54269	-.69969	-.68998
1983	3232.81536	3734.28464	5548.71262	1418.38738	.66398	2.69685	3.28737	4.87257
1984	2508.37068	-148.17068	-203.22351	2563.42351	-.14254	-.10701	-.12532	-.12203
1985	1657.18524	1627.91476	2116.87528	1168.22472	-1.09016	1.17566	1.34064	1.37136
1986	2719.77760	821.32240	972.54281	2568.55719	.09282	.59315	.64545	.63523
1987	3940.27610	-1765.37610	-2657.79605	4832.69605	1.45160	-1.27493	-1.56433	-1.63128

PRE	Predicted value of harvest
RES	Ordinary residual of harvest; observed minus predicted
DRE	Deleted residual; residual obtained when the model is fitted without that observation
ADJ	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR	Z-score of the predicted value of harvest
ZRE	Z-score of the residual
SRE	Studentized residual
SDR	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$



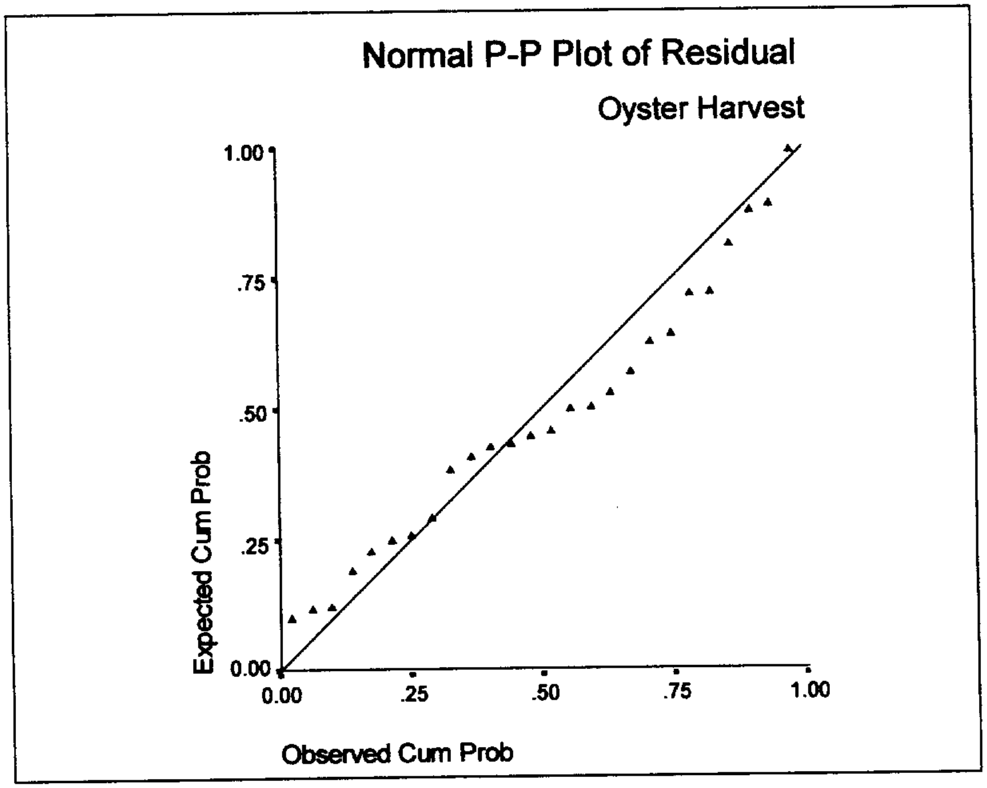


Fig. 6.1. Exploratory Plots of Oyster Harvest Standardized Residual.

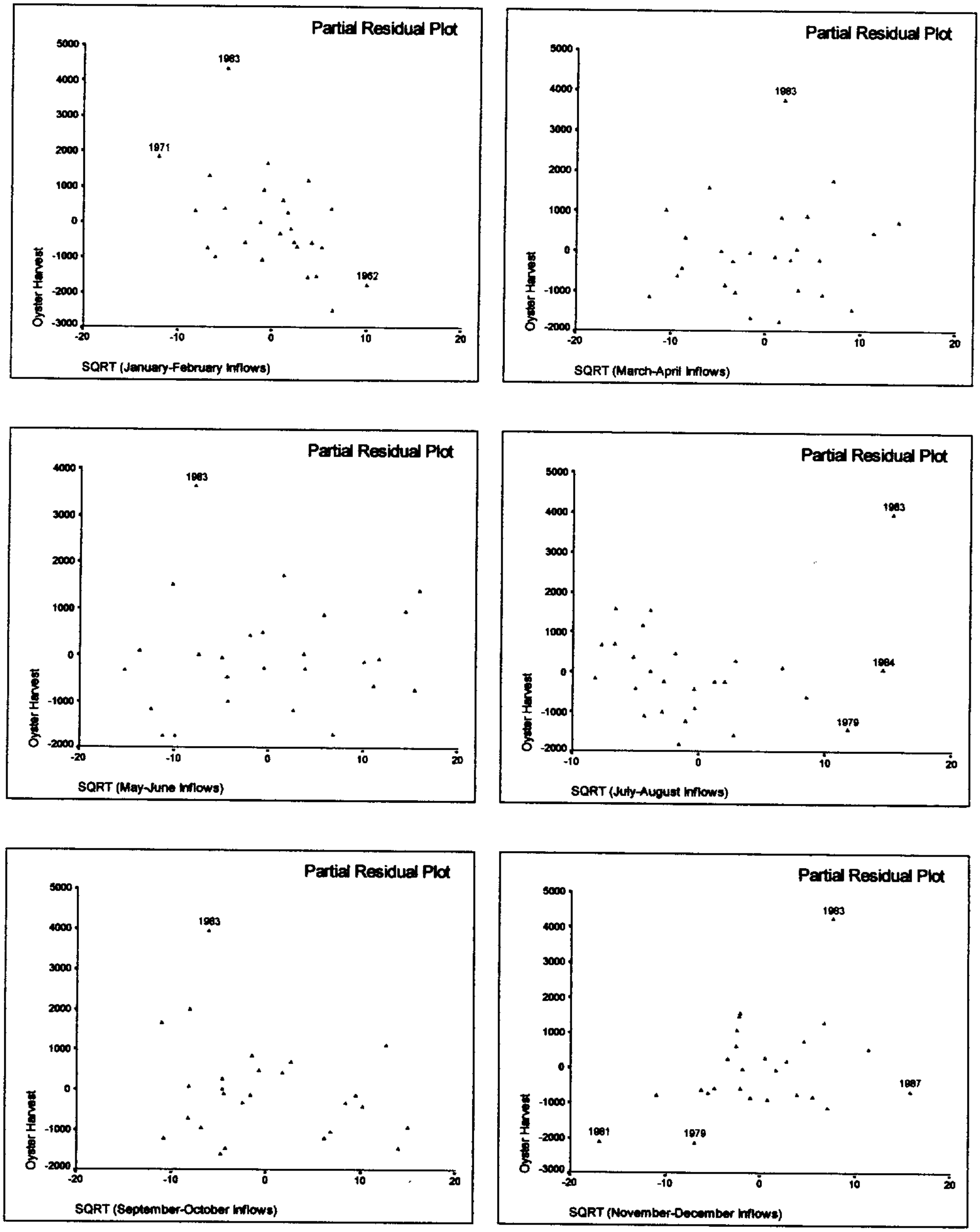


Fig. 6.2. Partial Residual Plots of Oyster Harvest vs. Squared Root Inflows

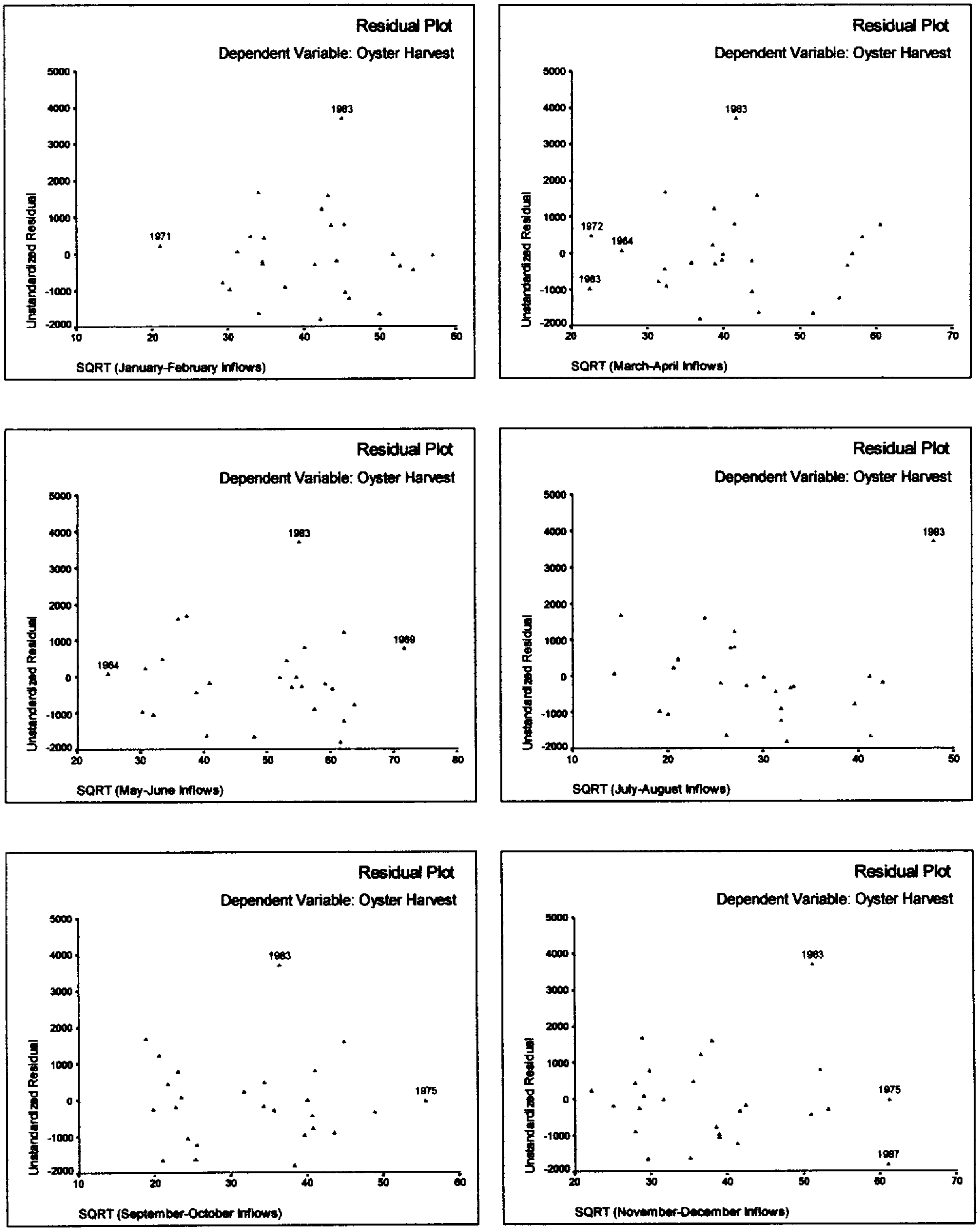


Fig. 6.3. Residual Plots of Oyster Harvest vs. Squared Root Inflows

Prediction Intervals for Oyster Harvest

YEAR	OYSTER	LICI	UICI
1962	749.90	-3338.49704	5653.01719
1963	2131.30	-1309.80901	7439.20135
1964	2920.80	-1593.58541	7221.85900
1965	4583.30	-1485.65551	7225.74820
1966	4083.30	-1621.32043	7284.68701
1967	2992.60	-1103.97831	7546.73648
1968	2838.70	-1259.38402	7288.19746
1969	3447.20	-1892.59245	7160.28637
1970	3850.20	-1123.20660	7900.89988
1971	4021.70	-959.22259	8501.26152
1972	3242.60	-1569.52866	7033.26237
1973	1703.30	-1367.39945	7165.91705
1974	836.70	-3362.98944	5663.17894
1975	1236.80	-3389.89919	5855.76443
1976	3298.90	-729.22606	7837.51112
1977	1917.50	-750.53181	7804.69129
1978	1076.80	-2324.55508	6519.06547
1979	43.10	-2990.49682	6314.05885
1980	1004.20	-3548.93174	5534.68819
1981	985.40	-2829.11002	6565.52070
1982	3253.80	-679.40299	8689.91985
1983	6967.10	-1330.64910	7796.27982
1984	2360.20	-1957.58674	6974.32810
1985	3285.10	-2738.08041	6052.45090
1986	3541.10	-1538.58154	6978.13673
1987	2174.90	-638.25117	8518.80336

OYSTER	Oyster harvest
LICI	Lower limit for 99% prediction interval for oyster harvest
UICI	Upper limit for 99% prediction interval for oyster harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV[1]	MAHA_PV[2]	COOK_PV[3]
1962	6.23634	.00702	.24945	.512	.0000
1963	4.52298	.02337	.18092	.718	.0000
1964	4.98770	.00035	.19951	.661	.0000
1965	4.26148	.07301	.17046	.749	.0008
1966	5.62686	.05671	.22507	.584	.0004
1967	3.84184	.00115	.15367	.798	.0000
1968	3.13545	.00054	.12542	.872	.0000
1969	6.67732	.03123	.26709	.463	.0001
1970	6.47018	.00955	.25881	.486	.0000
1971	9.68261	.00605	.38730	.207	.0000
1972	3.51254	.00516	.14050	.834	.0000
1973	3.03841	.02416	.12154	.881	.0000
1974	6.48500	.00442	.25940	.484	.0000
1975	8.08224	.00000	.32329	.325	.0000
1976	3.26601	.00119	.13064	.859	.0000
1977	3.18750	.04605	.12750	.867	.0002
1978	5.18586	.03355	.20743	.637	.0001
1979	8.51731	.19203	.34069	.289	.0164
1980	6.89936	.00001	.27597	.439	.0000
1981	9.18811	.06681	.36752	.239	.0006
1982	8.99899	.04632	.35996	.253	.0002
1983	7.21346	.75012	.28854	.407	.3660
1984	5.81091	.00083	.23244	.562	.0000
1985	4.81302	.07712	.19252	.683	.0010
1986	2.92570	.01096	.11703	.892	.0000
1987	7.43282	.17672	.29731	.385	.0129

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	-.21646	.00378	-.15417	.10848	.03628	.00393	.02437	.02488
1963	-.39984	-.23055	.09155	.07952	.07590	.07390	-.13453	-.02004
1964	.04801	.04047	.00756	-.01339	-.01516	-.01135	-.01136	-.00525
1965	.73422	.52798	.23412	-.27772	.05300	-.32204	-.32498	-.09723
1966	.63199	.11484	.29342	-.37408	.41314	-.16429	-.34069	-.08625
1967	-.08733	-.04591	-.01767	.05085	-.04244	-.00752	.04091	.02780
1968	-.05983	-.01919	-.00482	.01451	-.03645	.01239	.00590	.02643
1969	.46116	-.12703	.03842	.10709	.25485	-.19487	-.03022	-.05997
1970	.25266	-.00591	-.11574	.18926	-.01888	-.07253	-.00859	.06167
1971	.20053	.08752	-.13949	.10196	-.08784	.02715	.07344	.00471
1972	.18579	.13429	.02771	-.10758	-.00599	-.02443	.01971	-.04374
1973	-.41001	.15065	.03945	-.17887	-.05803	.03079	.17485	-.16372
1974	-.17156	.10608	-.03198	-.05194	-.02602	.04734	-.11920	.04941
1975	.00256	-.00134	.00086	-.00019	.00033	-.00106	.00110	.00035
1976	-.08889	.01500	.04099	-.01701	.00187	-.01357	.02412	-.07166
1977	-.57782	-.16726	.36301	-.37733	.33181	-.12167	.15135	-.29033
1978	-.48088	-.09878	-.14071	-.09821	.25297	.12677	.19979	-.10894
1979	**-1.20013**	-.08076	-.47707	.08389	.40385	-.70144	.52578	.38586
1980	.00651	-.00220	.00188	.00114	-.00119	.00235	.00247	-.00366
1981	-.67795	-.09190	-.19025	.37705	-.34669	.00799	-.37647	.51900
1982	-.56151	-.05720	.27408	.10863	-.20878	-.23057	-.15478	.02543
1983	**3.39644**	-.56259	**-1.07296**	.33870	-.96586	**2.77273**	-.90311	**1.31439**
1984	-.07438	-.00631	.00665	-.00417	.04559	-.06342	.01632	-.00684
1985	.75157	-.07744	-.02479	.32325	-.33276	-.18035	.50009	-.09645
1986	.27257	-.10844	-.02346	.03321	.08568	-.13907	.04649	.13579
1987	**-1.15983**	.29646	.45303	-.09030	-.29021	.09389	.23971	-.91205

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the squared root January-February inflows
SDFB_2	Standardized dfbeta for the squared root March-April inflows
SDFB_3	Standardized dfbeta for the squared root May-June inflows
SDFB_4	Standardized dfbeta for the squared root July-August inflows
SDFB_5	Standardized dfbeta for the squared root September-October inflows
SDFB_6	Standardized dfbeta for the squared root November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

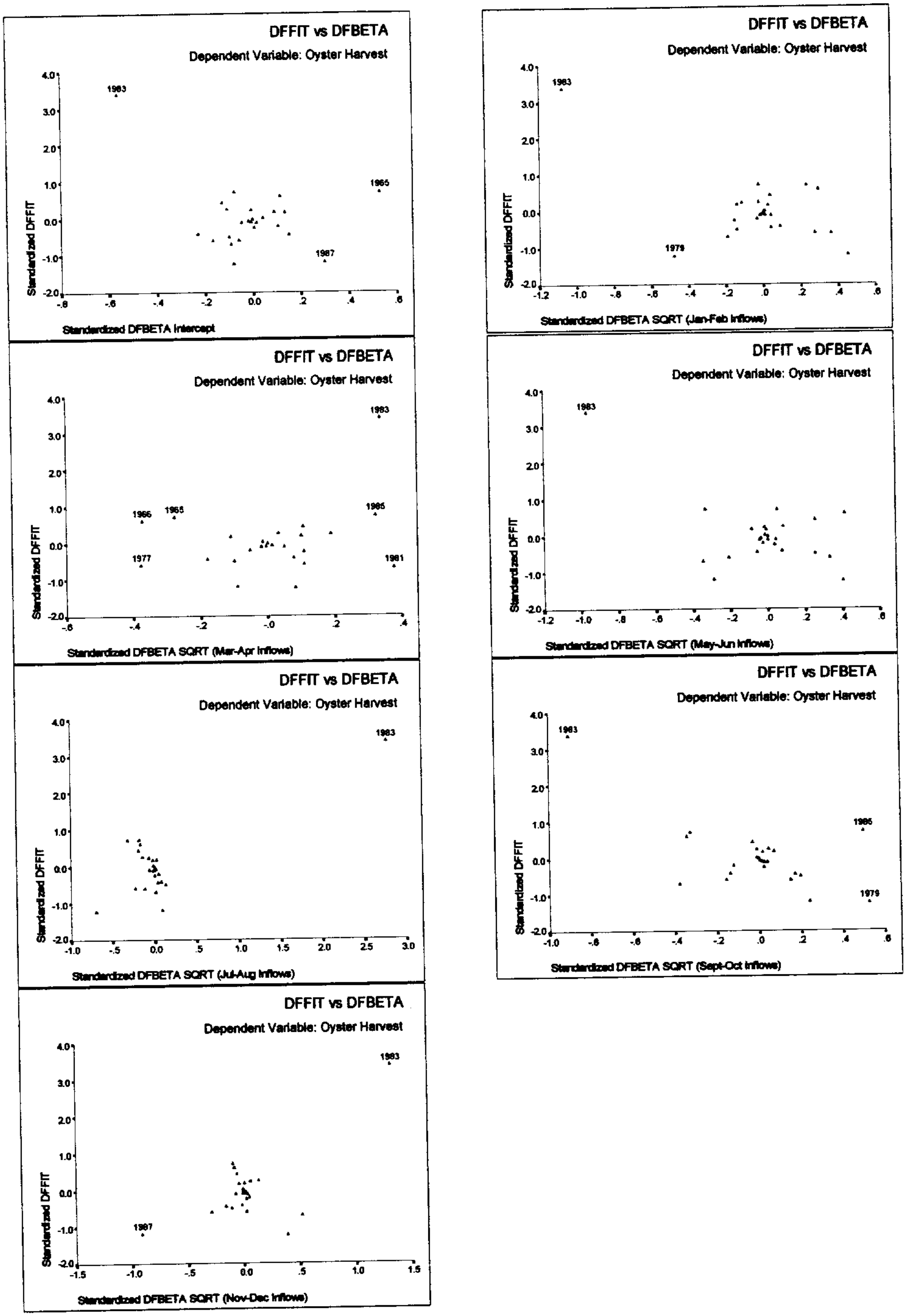


Fig. 6.4. Standardized DFFIT vs. Standardized DFBETA.

Regression –Squared Root all Variables
(Box-Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows)[c,d]	.	.664	.441	.265	13.8455	1.541

a. Dependent Variable: SQRT (Oyster Harvest)

b. Method: Enter

c. Independent Variables: (Constant), SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2878.902	6	479.817	2.503	.059[b]
	Residual	3642.238	19	191.697		
	Total	6521.140	25			

a. Dependent Variable: SQRT (Oyster Harvest)

b. Independent Variables: (Constant), SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	74.067	16.723		4.429	.000	39.066	109.068
	SQRT (January-February Inflows)	-1.577	.525	-.853	-3.005	.007	-2.674	-.479
	SQRT (March-April Inflows)	.239	.402	.156	.594	.559	-.603	1.081
	SQRT (May-June Inflows)	.213	.291	.169	.732	.473	-.396	.821
	SQRT (July-August Inflows)	-.128	.421	-.068	-.303	.765	-1.009	.754
	SQRT (September-October Inflows)	-.284	.349	-.180	-.815	.425	-1.014	.446
	SQRT (November-December Inflows)	.828	.399	.558	2.074	.052	-.007	1.663

a. Dependent Variable: SQRT (Oyster Harvest)

Collinearity Diagnostics

```
                           Parameter Estimates

                  Parameter      Standard     T for H0:                   Variance
Variable   DF      Estimate         Error   Parameter=0    Prob > |T|    Inflation

INTERCEP    1     74.067260   16.72258262         4.429        0.0003   0.00000000
SQR_QJF     1     -1.576520    0.52455595        -3.005        0.0073   2.73816974
SQR_QMA     1      0.238936    0.40209581         0.594        0.5594   2.34845703
SQR_QMJ     1      0.212858    0.29067008         0.732        0.4729   1.80405860
SQR_QJA     1     -0.127667    0.42104560        -0.303        0.7650   1.72413316
SQR_QSO     1     -0.284197    0.34887484        -0.815        0.4254   1.66589742
SQR_QND     1      0.827652    0.39901514         2.074        0.0519   2.46389117


                     Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
Number  Eigenvalue       Index   SQR_QJF   SQR_QMA   SQR_QMJ   SQR_QJA   SQR_QSO   SQR_QND

    1      2.69228     1.00000    0.0350    0.0130    0.0303    0.0483    0.0261    0.0259
    2      1.59322     1.29994    0.0000    0.0951    0.0573    0.0028    0.0995    0.0528
    3      0.66487     2.01229    0.1812    0.1146    0.2175    0.1941    0.0032    0.0026
    4      0.44998     2.44604    0.0016    0.0071    0.3617    0.4946    0.0703    0.2349
    5      0.42278     2.52350    0.0469    0.0967    0.0608    0.1947    0.7968    0.0963
    6      0.17687     3.90150    0.7353    0.6736    0.2723    0.0656    0.0041    0.5874
```

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	27.2186	65.0417	48.8425	10.7311	26
Std. Predicted Value	-2.015	1.510	.000	1.000	26
Standard Error of Predicted Value	5.4596	9.0343	7.1002	1.1164	26
Adjusted Predicted Value	25.1682	74.3461	49.1752	11.7511	26
Residual	-24.5888	32.6988	-4.E-15	12.0702	26
Std. Residual	-1.776	2.362	.000	.872	26
Stud. Residual	-2.254	2.879	-.010	1.045	26
Deleted Residual	-39.6053	48.5866	-.3326	17.4288	26
Stud. Deleted Residual	-2.563	3.732	.010	1.180	26
Mahal. Distance	2.926	9.683	5.769	2.083	26
Cook's Distance	.000	.575	.068	.138	26
Centered Leverage Value	.117	.387	.231	.083	26

a. Dependent Variable: SQRT (Oyster Harvest)

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	31.01481	-3.63051	-5.09842	32.48272	-1.66131	-.26222	-.31074	-.30322
1963	56.72627	-10.56027	-13.52806	59.69407	.73467	-.76272	-.86327	-.85723
1964	52.01969	2.02474	2.65703	51.38739	.29607	.14624	.16752	.16318
1965	52.70719	14.99288	18.95244	48.74764	.36014	1.08287	1.21750	1.23414
1966	50.78634	13.11437	17.80721	46.09350	.18114	.94720	1.10373	1.11049
1967	54.32031	.38436	.47577	54.22889	.51046	.02776	.03089	.03006
1968	53.62930	-.34984	-.41841	53.69787	.44607	-.02527	-.02763	-.02690
1969	49.88567	8.82719	12.71113	46.00173	.09721	.63755	.76506	.75640
1970	58.75490	3.29508	4.68896	57.36102	.92371	.23799	.28390	.27691
1971	63.32782	.08906	.15509	63.26179	1.34985	.00643	.00849	.00826
1972	51.53812	5.40571	6.58401	50.35982	.25120	.39043	.43089	.42146
1973	50.80666	-9.53560	-11.35188	52.62294	.18303	-.68872	-.75145	-.74253
1974	33.81717	-4.89141	-6.96644	35.89221	-1.40017	-.35329	-.42161	-.41230
1975	36.06088	-.89272	-1.39869	36.56686	-1.19108	-.06448	-.08071	-.07857
1976	59.12672	-1.69067	-2.03475	59.47080	.95836	-.12211	-.13396	-.13045
1977	58.21573	-14.42646	-17.29712	61.08638	.87346	-1.04196	-1.14093	-1.15062
1978	42.38472	-9.57009	-12.69067	45.50530	-.60178	-.69121	-.79596	-.78798
1979	31.15386	-24.58880	-39.60532	46.17038	-1.64836	-1.77595	-2.25392	**-2.56305**
1980	27.21862	4.47049	6.52090	25.16822	-2.01507	.32289	.38996	.38109
1981	41.58251	-10.19143	-17.15687	48.54796	-.67654	-.73608	-.95506	-.95273
1982	64.28520	-7.24311	-12.04017	69.08226	1.43906	-.52314	-.67448	-.66450
1983	50.77039	32.69877	48.58657	34.88259	.17965	2.36170	2.87883	**3.73174**
1984	42.36794	6.21395	8.52274	40.05915	-.60335	.44881	.52561	.51535
1985	39.91379	17.40200	22.62887	34.68692	-.83204	1.25687	1.43326	1.47717
1986	52.44894	7.05820	8.35774	51.14940	.33607	.50978	.55473	.54436
1987	65.04173	-18.40590	-27.71032	74.34615	1.50956	-1.32938	-1.63114	-1.71203

PRE	Predicted value of harvest
RES	Ordinary residual of harvest; observed minus predicted
DRE	Deleted residual; residual obtained when the model is fitted without that observation
ADJ	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR	Z-score of the predicted value of harvest
ZRE	Z-score of the residual
SRE	Studentized residual
SDR	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$

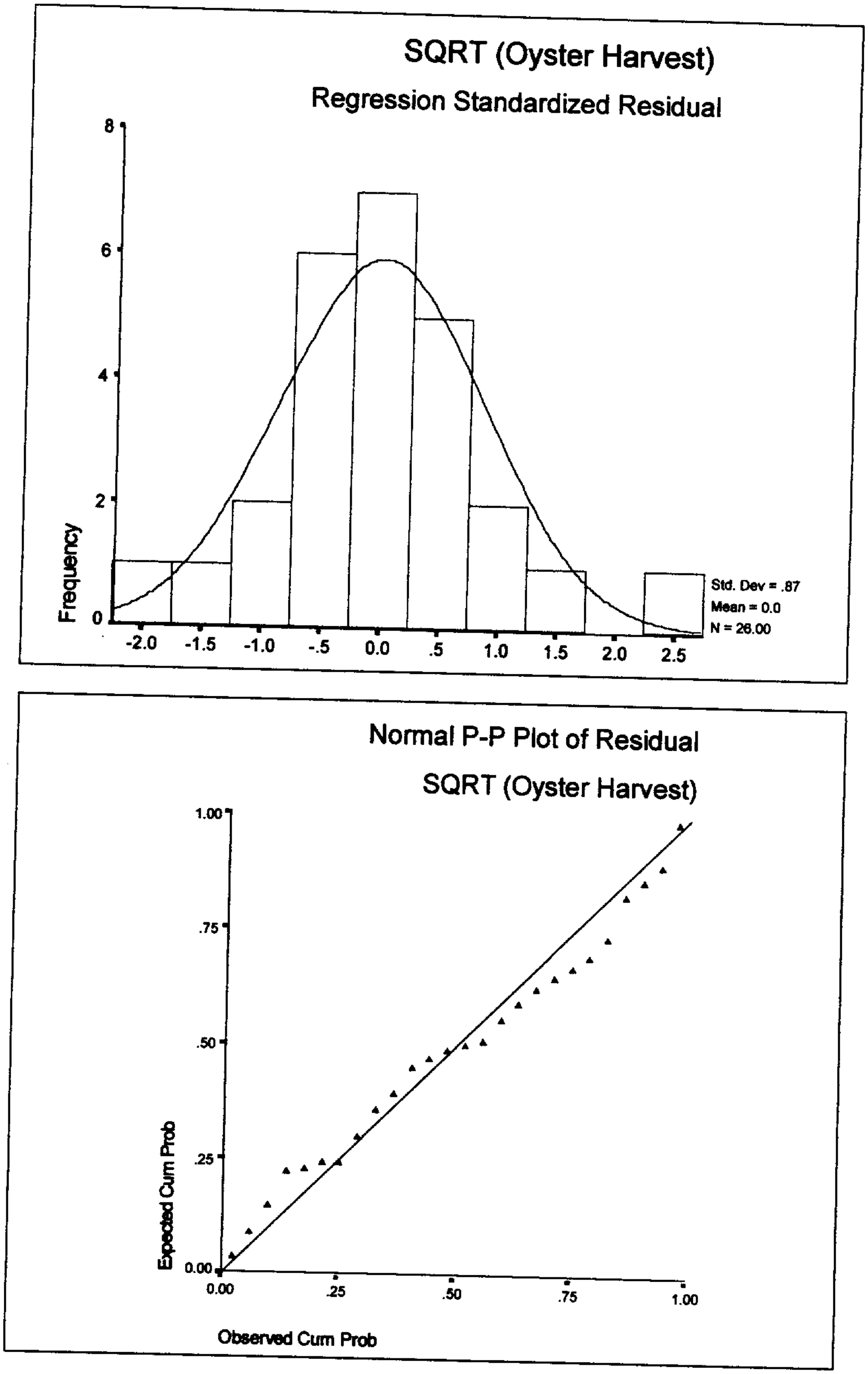


Fig. 7.1. Exploratory Plots of SQRT (Oyster Harvest) Standardized Residual.

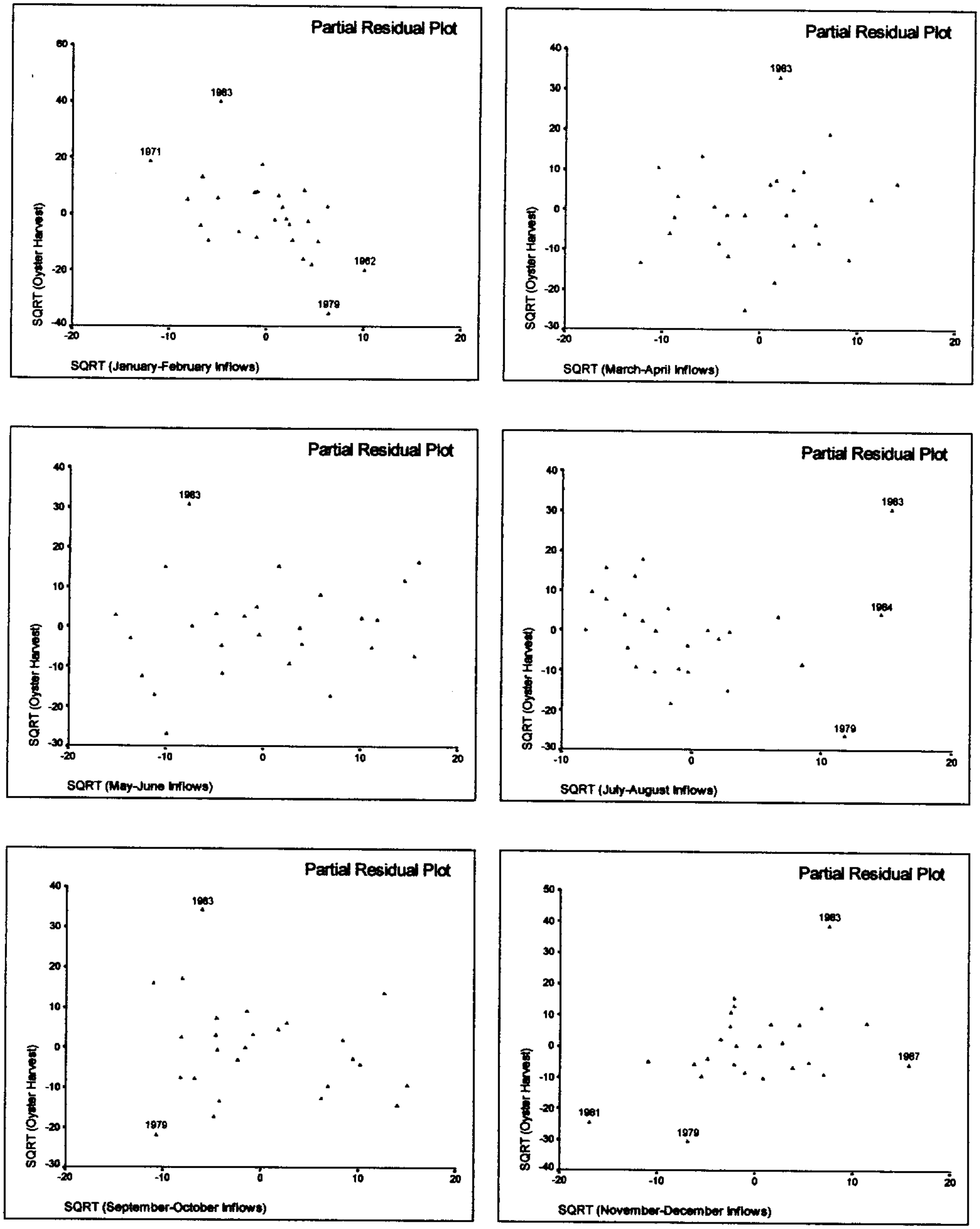


Fig. 7.2. Partial Residual Plots of SQRT (Oyster Harvest) vs. Squared Root Inflows.

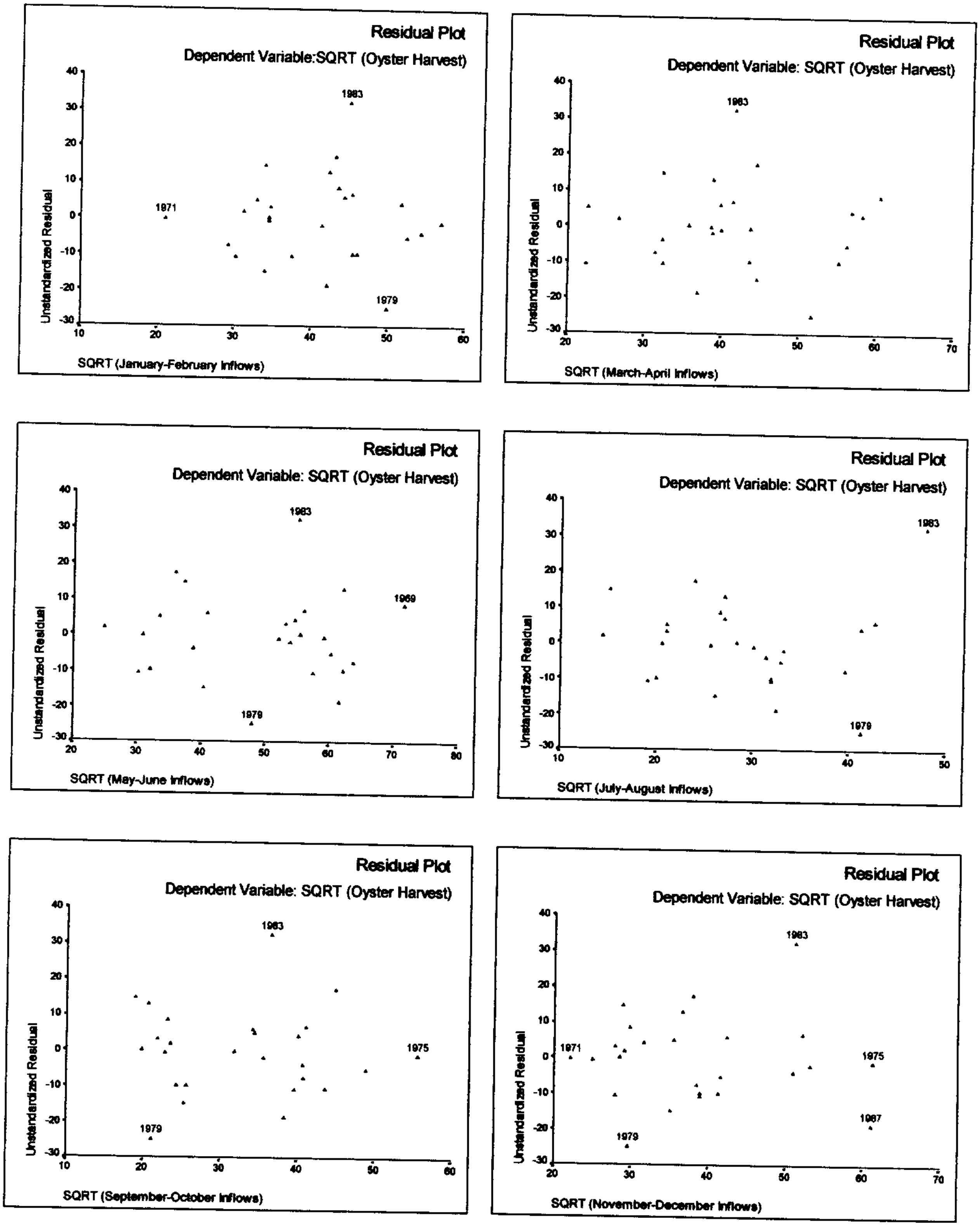


Fig. 7.3. Residual Plots of SQRT (Oyster Harvest) vs. Squared Root Inflows.

Prediction Intervals for Oyster Harvest

YEAR	SQRT_OYSTER	LICI	UICI
1962	27.38	-13.93821	75.96783
1963	46.17	12.98565	100.46689
1964	54.04	7.94693	96.09244
1965	67.70	9.15458	96.25980
1966	63.90	6.26081	95.31186
1967	54.70	11.07111	97.56950
1968	53.28	10.89572	96.36288
1969	58.71	4.62586	95.14548
1970	62.05	13.63894	103.87086
1971	63.42	16.03019	110.62545
1972	56.94	8.52852	94.54772
1973	41.27	8.14440	93.46892
1974	28.93	-11.30910	78.94344
1975	35.17	-10.16275	82.28452
1976	57.44	16.29737	101.95607
1977	43.79	15.44395	100.98751
1978	32.81	-1.82891	86.59834
1979	6.57	-15.36421	77.67192
1980	31.69	-18.19488	72.63212
1981	31.39	-5.38589	88.55091
1982	57.04	17.44333	111.12708
1983	83.47	5.14036	96.40041
1984	48.58	-2.28711	87.02299
1985	57.32	-4.03442	83.86199
1986	59.51	9.86966	95.02822
1987	46.64	19.26109	110.82236

OYSTER	Squared Root Oyster harvest
LICI	Lower limit for 99% prediction interval for oyster harvest
UICI	Upper limit for 99% prediction interval for oyster harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	6.23634	.00558	.24945	.512	.0000
1963	4.52298	.02992	.18092	.718	.0000
1964	4.98770	.00125	.19951	.661	.0000
1965	4.26148	.05592	.17046	.749	.0004
1966	5.62686	.06228	.22507	.584	.0005
1967	3.84184	.00003	.15367	.798	.0000
1968	3.13545	.00002	.12542	.872	.0000
1969	6.67732	.03679	.26709	.463	.0001
1970	6.47018	.00487	.25881	.486	.0000
1971	9.68261	.00001	.38730	.207	.0000
1972	3.51254	.00578	.14050	.834	.0000
1973	3.03841	.01537	.12154	.881	.0000
1974	6.48500	.01077	.25940	.484	.0000
1975	8.08224	.00053	.32329	.325	.0000
1976	3.26601	.00052	.13064	.859	.0000
1977	3.18750	.03700	.12750	.867	.0001
1978	5.18586	.02951	.20743	.637	.0000
1979	8.51731	.44321	.34069	.289	.1374
1980	6.89936	.00996	.27597	.439	.0000
1981	9.18811	.08906	.36752	.239	.0016
1982	8.99899	.04304	.35996	.253	.0001
1983	7.21346	.57526	.28854	.407	.2328
1984	5.81091	.01466	.23244	.562	.0000
1985	4.81302	.08814	.19252	.683	.0015
1986	2.92570	.00809	.11703	.892	.0000
1987	7.43282	.19214	.29731	.385	.0165

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	-.19281	.00337	-.13732	.09663	.03231	.00350	.02171	.02216
1963	-.45444	-.26203	.10405	.09038	.08626	.08399	-.15289	-.02277
1964	.09119	.07687	.01435	-.02544	-.02880	-.02156	-.02157	-.00998
1965	.63423	.45608	.20224	-.23990	.04578	-.27818	-.28072	-.08399
1966	.66429	.12071	.30842	-.39319	.43425	-.17268	-.35810	-.09066
1967	.01466	.00771	.00297	-.00854	.00713	.00126	-.00687	-.00467
1968	-.01191	-.00382	-.00096	.00289	-.00726	.00247	.00118	.00526
1969	.50174	-.13821	.04180	.11651	.27728	-.21202	-.03288	-.06524
1970	.18011	-.00421	-.08251	.13491	-.01346	-.05170	-.00612	.04396
1971	.00711	.00310	-.00495	.00362	-.00312	.00096	.00261	.00017
1972	.19677	.14223	.02934	-.11393	-.00634	-.02587	.02087	-.04632
1973	-.32406	.11907	.03118	-.14137	-.04586	.02434	.13820	-.12940
1974	-.26854	.16605	-.05006	-.08130	-.04072	.07410	-.18658	.07734
1975	-.05915	.03104	-.01976	.00447	-.00766	.02452	-.02529	-.00807
1976	-.05885	.00993	.02714	-.01126	.00124	-.00899	.01597	-.04744
1977	-.51326	-.14857	.32246	-.33517	.29474	-.10808	.13444	-.25789
1978	-.44996	-.09243	-.13166	-.09190	.23670	.11862	.18694	-.10194
1979	**-2.00296**	-.13479	-.79620	.14001	.67400	**-1.17067**	.87750	.64397
1980	.25809	-.08709	.07438	.04510	-.04712	.09313	.09797	-.14493
1981	-.78764	-.10677	-.22103	.43806	-.40278	.00929	-.43739	.60298
1982	-.54078	-.05509	.26396	.10462	-.20107	-.22205	-.14907	.02449
1983	**2.60122**	-.43087	-.82175	.25940	-.73972	**2.12354**	-.69166	**1.00665**
1984	.31413	.02667	-.02810	.01760	-.19252	.26786	-.06892	.02891
1985	.80956	-.08342	-.02670	.34819	-.35843	-.19426	.53868	-.10389
1986	.23358	-.09293	-.02010	.02846	.07343	-.11918	.03984	.11637
1987	**-1.21724**	.31113	.47545	-.09477	-.30458	.09854	.25158	-.95720

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the squared root January-February inflows
SDFB_2	Standardized dfbeta for the squared root March-April inflows
SDFB_3	Standardized dfbeta for the squared root May-June inflows
SDFB_4	Standardized dfbeta for the squared root July-August inflows
SDFB_5	Standardized dfbeta for the squared root September-October inflows
SDFB_6	Standardized dfbeta for the squared root November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

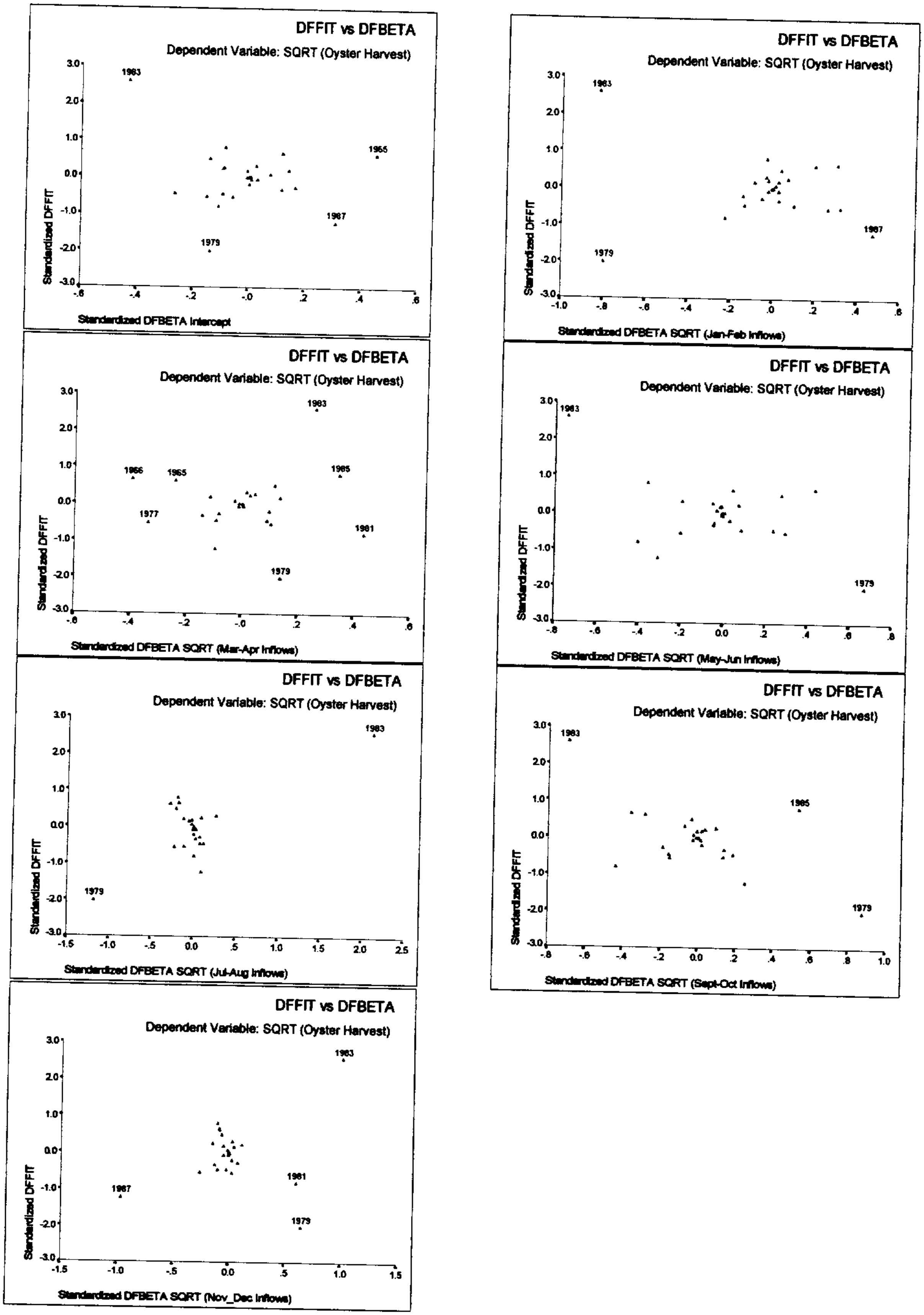


Fig. 7.4. Standardized DFFIT vs. Standardized DFBETA.

Regression –Untransformed and Logged Variables
(Box-Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	Ln (November-December Inflows), Ln (March-April Inflows), May-June Inflows, Ln (September-October Inflows), Ln (July-August Inflows), January-February Inflows[c,d]	.	.601	.362	.160	1379.10	1.721

a. Dependent Variable: Oyster Harvest

b. Method: Enter

c. Independent Variables: (Constant), Ln (November-December Inflows), Ln (March-April Inflows), May-June Inflows, Ln (September-October Inflows), Ln (July-August Inflows), January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.0E+07	6	3410665	1.793	.154[b]
	Residual	3.6E+07	19	1901907		
	Total	5.7E+07	25			

a. Dependent Variable: Oyster Harvest

b. Independent Variables: (Constant), Ln (November-December Inflows), Ln (March-April Inflows), May-June Inflows, Ln (September-October Inflows), Ln (July-August Inflows), January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-5764.14	8876.900		-.649	.524	-24343.7	12815.4
	January-February Inflows	-1.698	.635	-.800	-2.674	.015	-3.026	-.369
	Ln (March-April Inflows)	562.618	784.630	.201	.717	.482	-1079.63	2204.868
	May-June Inflows	.105	.303	.085	.345	.734	-.530	.739
	Ln (July-August Inflows)	-12.220	636.990	-.005	-.019	.985	-1345.46	1321.016
	Ln (September-October Inflows)	-414.142	575.195	-.176	-.720	.480	-1618.04	789.755
	Ln (November-December Inflows)	1365.792	760.524	.501	1.796	.088	-226.002	2957.586

a. Dependent Variable: Oyster Harvest

Collinearity Diagnostics

```
                         Parameter Estimates

                 Parameter       Standard     T for H0:                   Variance
Variable  DF      Estimate          Error    Parameter=0   Prob > |T|    Inflation

INTERCEP   1  -5764.144584   8876.9000814         -0.649       0.5239   0.00000000
QJF_LAG    1     -1.697640     0.63477763         -2.674       0.0150   2.66359652
LN_QMA     1    562.618102   784.63040651          0.717       0.4821   2.33255810
QMJ_LAG    1      0.104735     0.30317589          0.345       0.7335   1.78522100
LN_QJA     1    -12.219564   636.99025611         -0.019       0.9849   2.03277763
LN_QSO     1   -414.141526   575.19479945         -0.720       0.4803   1.76860870
LN_QND     1   1365.792104   760.52351765          1.796       0.0884   2.31481908


                    Condition  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop  Var Prop
Number  Eigenvalue      Index   QJF_LAG    LN_QMA   QMJ_LAG    LN_QJA    LN_QSO    LN_QND

    1      2.72132    1.00000    0.0341    0.0147    0.0254    0.0452    0.0237    0.0273
    2      1.60919    1.30043    0.0004    0.0878    0.0676    0.0029    0.0960    0.0515
    3      0.69651    1.97663    0.1914    0.0996    0.2692    0.0798    0.0278    0.0008
    4      0.44315    2.47807    0.0051    0.0414    0.1641    0.1535    0.3584    0.3920
    5      0.34037    2.82757    0.0048    0.1080    0.2138    0.6936    0.4940    0.0034
    6      0.18945    3.79003    0.7642    0.6485    0.2599    0.0250    0.0000    0.5251
```

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	836.2997	3903.824	2636.40	904.7429	26
Std. Predicted Value	-1.990	1.401	.000	1.000	26
Standard Error of Predicted Value	535.3875	902.5812	709.1658	97.4736	26
Adjusted Predicted Value	763.5756	4430.541	2650.58	979.1477	26
Residual	-1762.32	3971.259	-1.E-12	1202.268	26
Std. Residual	-1.278	2.880	.000	.872	26
Stud. Residual	-1.451	3.319	-.004	1.016	26
Deleted Residual	-2270.90	5275.292	-14.1740	1639.128	26
Stud. Deleted Residual	-1.497	4.983	.056	1.262	26
Mahal. Distance	2.806	9.747	5.769	1.833	26
Cook's Distance	.000	.517	.052	.103	26
Centered Leverage Value	.112	.390	.231	.073	26

a. Dependent Variable: Oyster Harvest

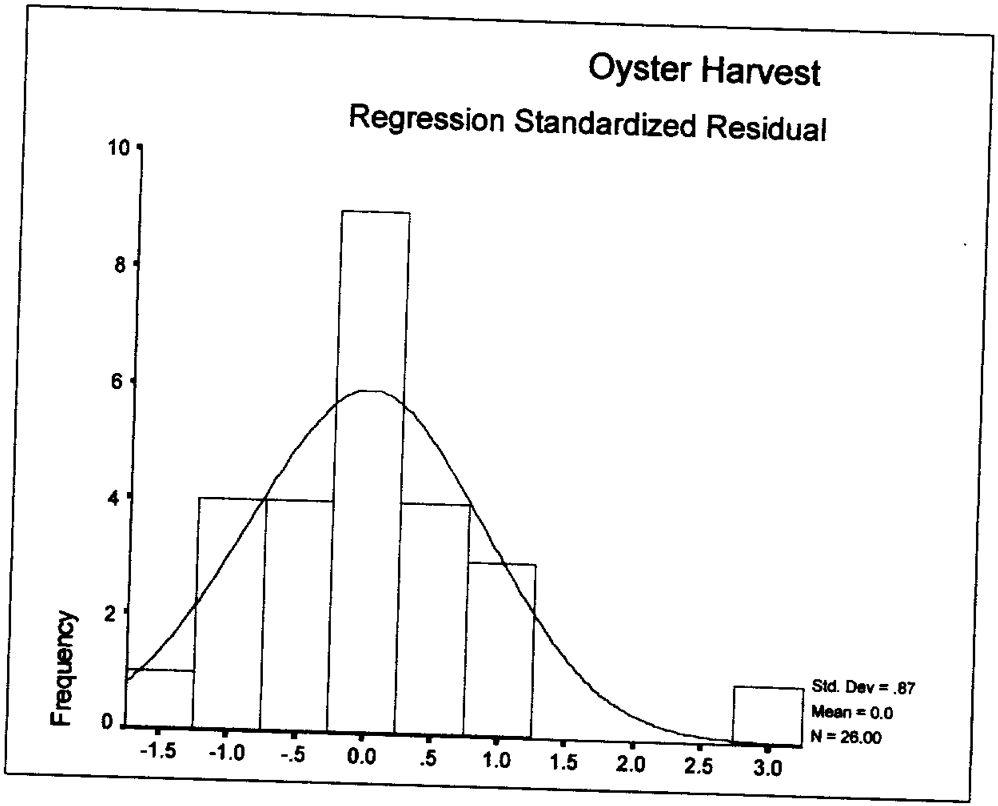
Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE[1]	SDR[2]
1962	876.53699	-126.63699	-184.69206	934.59206	-1.94516	-.09183	-.11089	-.10797
1963	3164.09155	-1032.79155	-1379.76781	3511.06781	.58325	-.74889	-.86560	-.85963
1964	2862.74011	58.05989	78.51199	2842.28801	.25017	.04210	.04896	.04765
1965	3017.62043	1565.67957	2086.67849	2496.62151	.42135	1.13529	1.31064	1.33758
1966	2959.53899	1123.76101	1484.27101	2599.02899	.35716	.81485	.93648	.93330
1967	3153.12743	-160.52743	-201.04744	3193.64744	.57113	-.11640	-.13027	-.12685
1968	2956.37061	-117.67061	-140.52907	2979.22907	.35365	-.08532	-.09324	-.09078
1969	2768.06716	679.13284	1046.19823	2401.00177	.14553	.49245	.61121	.60084
1970	3525.99702	324.20298	444.22305	3405.97695	.98326	.23508	.27518	.26837
1971	3218.05816	803.64184	1330.51473	2691.18527	.64289	.58273	.74980	.74085
1972	2763.94997	478.65003	616.66952	2625.93048	.14097	.34708	.39395	.38502
1973	2955.52008	-1252.22008	-1474.43475	3177.73475	.35271	-.90800	-.98528	-.98448
1974	1336.28149	-499.58149	-688.83963	1525.53963	-1.43701	-.36225	-.42537	-.41601
1975	1000.32434	236.47566	362.81772	873.98228	-1.80834	.17147	.21239	.20698
1976	3549.97236	-251.07236	-303.68979	3602.58979	1.00975	-.18206	-.20023	-.19509
1977	3679.81682	-1762.31682	-2270.89750	4188.39750	1.15327	-1.27788	-1.45059	-1.49725
1978	2367.71040	-1290.91040	-1692.30064	2769.10064	-.29698	-.93606	-1.07175	-1.07620
1979	1321.95791	-1278.85791	-2237.07525	2280.17525	-1.45284	-.92732	-1.22647	-1.24402
1980	836.29967	167.90033	240.62436	763.57564	-1.98963	.12175	.14575	.14194
1981	1994.98843	-1009.58843	-1583.46676	2568.86676	-.70895	-.73207	-.91682	-.91278
1982	3903.82452	-650.02452	-1029.97647	4283.77647	1.40086	-.47134	-.59331	-.58291
1983	2995.84096	3971.25904	5275.29130	1691.80870	.39728	2.87961	**3.31889**	**4.98302**
1984	2442.79425	-82.59425	-113.12604	2473.32604	-.21399	-.05989	-.07009	-.06823
1985	2185.27739	1099.82261	1464.04792	1821.05208	-.49862	.79750	.92012	.91622
1986	2906.70041	634.39959	757.11239	2783.98761	.29876	.46001	.50254	.49242
1987	3803.09255	-1628.19255	-2255.64078	4430.54078	1.28953	-1.18062	-1.38961	-1.42701

PRE	Predicted value of harvest
RES	Ordinary residual of harvest; observed minus predicted
DRE	Deleted residual; residual obtained when the model is fitted without that observation
ADJ	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR	Z-score of the predicted value of harvest
ZRE	Z-score of the residual
SRE	Studentized residual
SDR	Studentized deleted residuals

[1] Values greater than 3 are flagged.

[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$



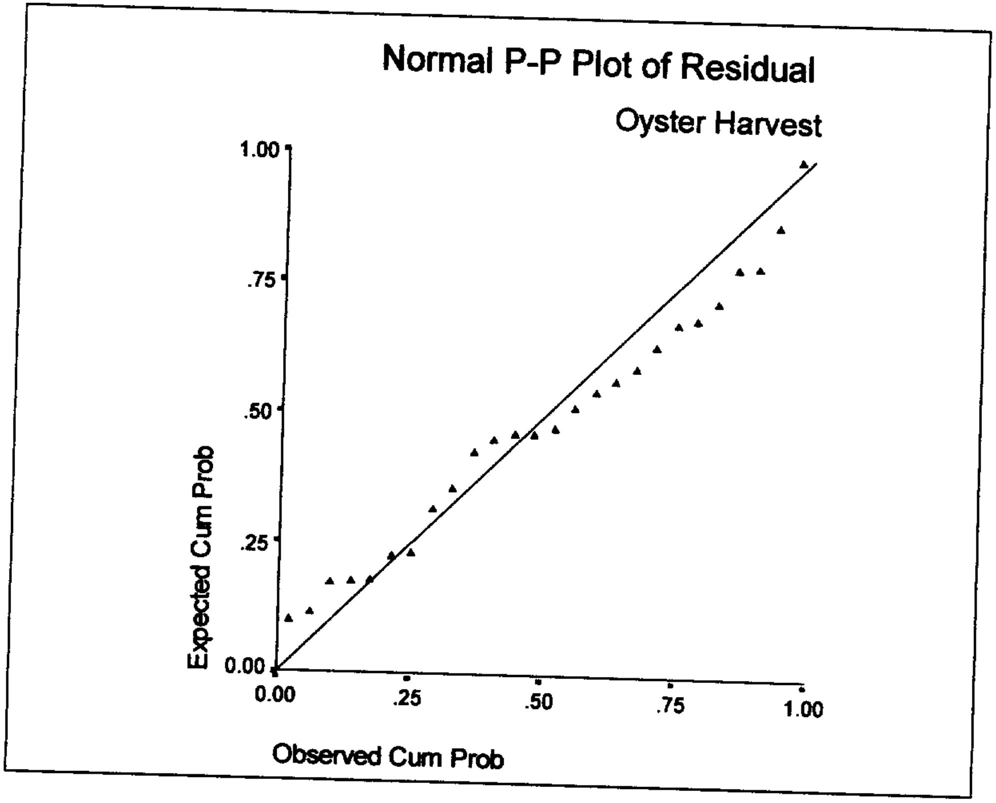


Fig. 8.1. Exploratory Plots of Oyster Harvest Standardized Residual.

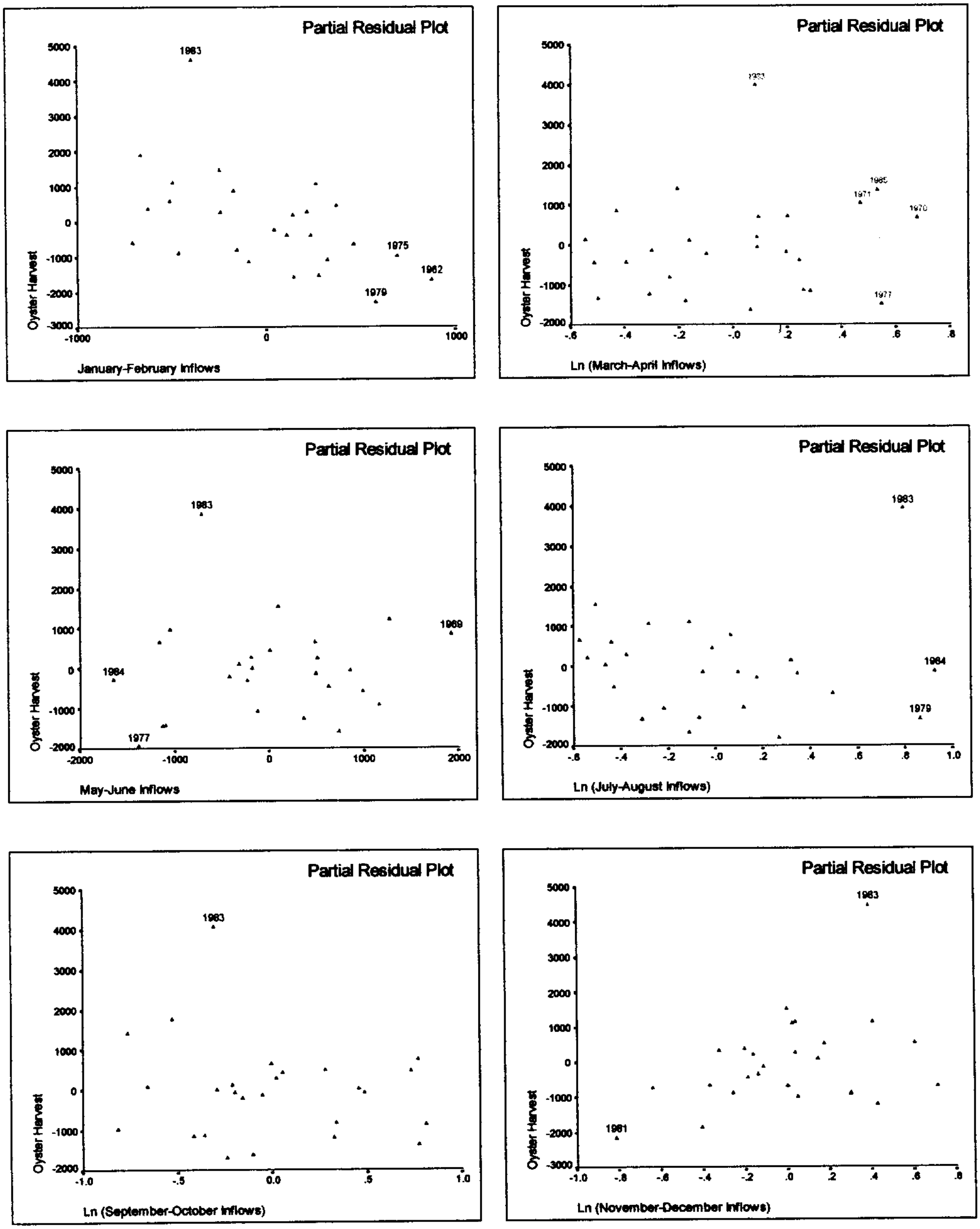


Fig. 8.2. Partial Residual Plots of Oyster Harvest vs. Untransformed and Logged Inflows.

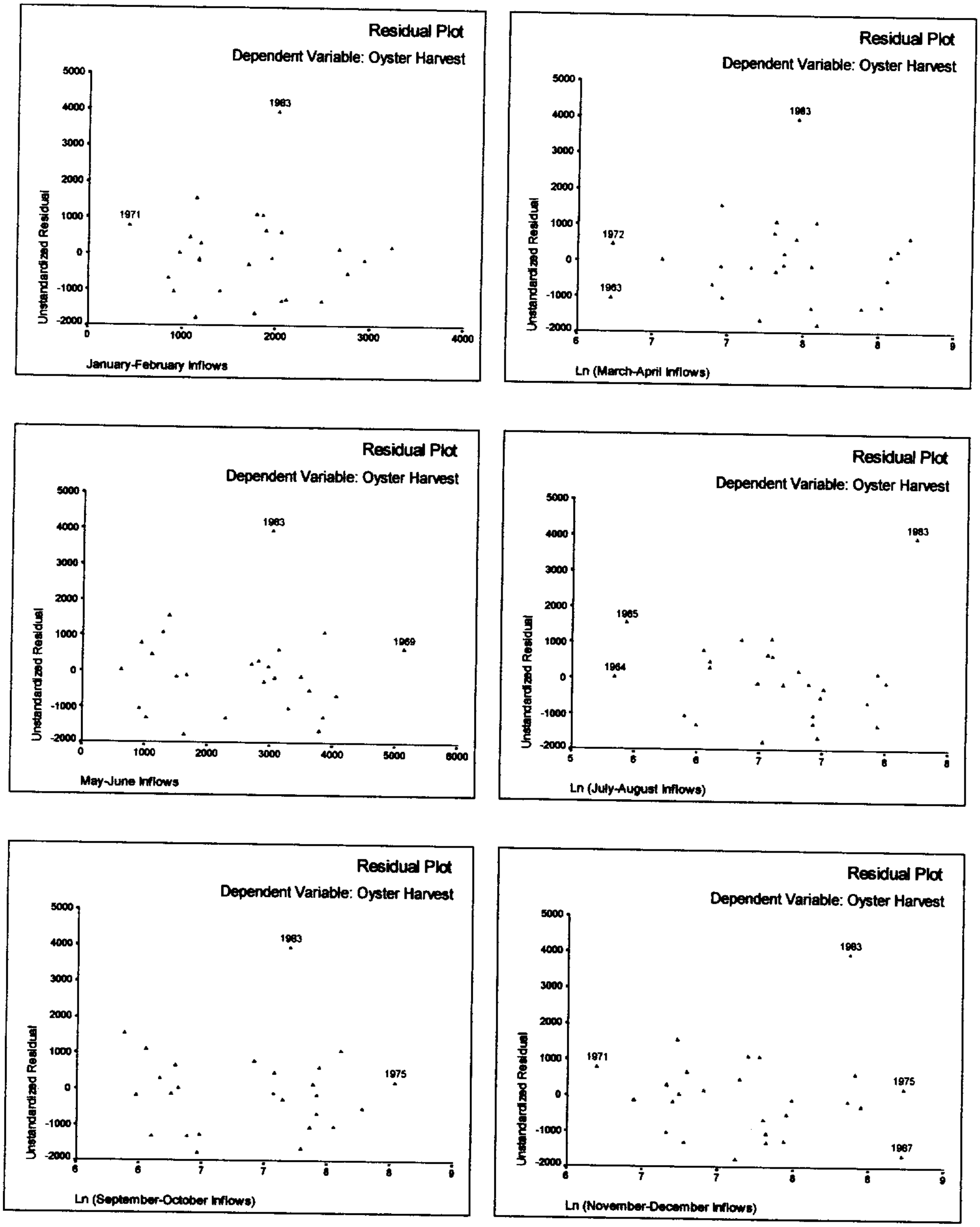


Fig. 8.3. Residual Plots of Oyster Harvest vs. Untransformed and Logged Inflows.

Prediction Intervals for Oyster Harvest

YEAR	OYSTER	LICI	UICI
1962	749.90	-3646.76377	5399.83775
1963	2131.30	-1249.71717	7577.90026
1964	2920.80	-1566.94998	7292.43020
1965	4583.30	-1393.02034	7428.26121
1966	4083.30	-1439.10013	7358.17811
1967	2992.60	-1171.73662	7477.99148
1968	2838.70	-1297.93705	7210.67827
1969	3447.20	-1817.64852	7353.78283
1970	3850.20	-920.67519	7972.66922
1971	4021.70	-1443.63791	7879.75422
1972	3242.60	-1600.80931	7128.70925
1973	1703.30	-1276.87112	7187.91129
1974	836.70	-3118.38197	5790.94495
1975	1236.80	-3580.92207	5581.57076
1976	3298.90	-723.68540	7823.63012
1977	1917.50	-685.19469	8044.82834
1978	1076.80	-2020.82946	6756.25026
1979	43.10	-3393.43130	6037.34711
1980	1004.20	-3666.12511	5338.72446
1981	985.40	-2610.31086	6600.28773
1982	3253.80	-712.40513	8520.05417
1983	6967.10	-1410.41706	7402.09898
1984	2360.20	-2003.37395	6888.96244
1985	3285.10	-2223.77673	6594.33151
1986	3541.10	-1346.54600	7159.94681
1987	2174.90	-657.54137	8263.72646

OYSTER	Oyster harvest
LICI	Lower limit for 99% prediction interval for oyster harvest
UICI	Upper limit for 99% prediction interval for oyster harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	6.89682	.00081	.27587	.440	.0000
1963	5.32532	.03596	.21301	.620	.0001
1964	5.55087	.00012	.22203	.593	.0000
1965	5.28043	.08166	.21122	.626	.0012
1966	5.11063	.04019	.20443	.646	.0001
1967	4.07707	.00061	.16308	.771	.0000
1968	3.10496	.00024	.12420	.875	.0000
1969	7.80987	.02884	.31239	.350	.0000
1970	5.79295	.00400	.23172	.564	.0000
1971	8.93826	.05265	.35753	.257	.0003
1972	4.63382	.00639	.18535	.705	.0000
1973	2.80626	.02461	.11225	.902	.0000
1974	5.90719	.00979	.23629	.551	.0000
1975	7.74408	.00344	.30976	.356	.0000
1976	3.36997	.00120	.13480	.849	.0000
1977	4.63736	.08675	.18549	.704	.0015
1978	4.96811	.05102	.19872	.664	.0003
1979	9.74683	.16101	.38987	.203	.0099
1980	6.59423	.00131	.26377	.472	.0000
1981	8.09893	.06826	.32396	.324	.0007
1982	8.26081	.02939	.33043	.310	.0000
1983	5.21837	.51671	.20873	.633	.1892
1984	5.78576	.00026	.23143	.565	.0000
1985	5.25795	.04005	.21032	.629	.0001
1986	3.09046	.00698	.12362	.877	.0000
1987	5.99267	.10631	.23971	.541	.0028

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

---

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	**SDFFIT**	**SDFB_0**	**SDFB_1**	**SDFB_2**	**SDFB_3**	**SDFB_4**	**SDFB_5**	**SDFB_6**
1962	-.07311	-.02824	-.05252	.03803	.01186	-.00574	.01072	.00990
1963	-.49826	-.09958	.07142	.17407	.02615	.09934	-.13625	-.02801
1964	.02828	.01584	.00606	-.00942	-.00213	-.01190	-.00478	-.00345
1965	.77159	.42293	.18916	-.17830	.03412	-.35847	-.33924	-.00280
1966	.52862	.29088	.18427	-.26214	.30150	-.05292	-.34011	.02276
1967	-.06373	-.03499	-.00723	.03190	-.01547	-.02265	.03881	.01471
1968	-.04001	-.01687	-.00189	.00545	-.01883	.00233	.00219	.02023
1969	.44173	.08649	.07375	.04098	.31691	-.19670	-.00096	-.08276
1970	.16329	-.06161	-.07119	.12182	-.01301	-.05444	.00319	.03020
1971	.59986	-.14309	-.28936	.25577	-.24297	.02993	.29222	-.17030
1972	.20675	.10774	.02890	-.13511	.00085	-.00268	.01015	-.03895
1973	-.41472	.12215	.04512	-.15873	-.08524	.03296	.15863	-.17760
1974	-.25605	.04159	-.07291	-.06854	-.06785	.09666	-.16563	.06926
1975	.15129	.00923	.08198	-.02336	.02912	-.06369	.04893	.00542
1976	-.08931	.05350	.05038	-.02407	.01068	-.01723	.01388	-.07154
1977	-.80432	.49539	.55250	-.53049	.51653	-.21000	.16686	-.40081
1978	-.60011	.05528	-.08259	-.20030	.30362	.17536	.21349	-.20586
1979	**-1.07683**	-.25949	-.43911	.16358	.39503	-.65670	.55885	.36670
1980	.09341	.00170	.03611	.00867	-.01176	.02501	.03453	-.05998
1981	-.68818	-.29579	-.14669	.32308	-.29354	-.06312	-.37028	.51354
1982	-.44566	.04684	.20993	.09739	-.16043	-.16797	-.10400	-.00022
1983	**2.85543**	**-1.38263**	**-1.04063**	.27446	-.89214	**2.11040**	-.72170	**1.22937**
1984	-.04148	.01459	.00881	-.00414	.02877	-.03420	.00969	-.00644
1985	.52726	-.26138	-.11820	.32023	-.24260	-.13703	.33993	.01402
1986	.21657	-.08731	-.04206	.06188	.05775	-.10896	.06308	.11997
1987	-.88585	.34557	.35854	-.06085	-.27310	.08501	.06929	-.65952

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the January-February inflows
SDFB_2	Standardized dfbeta for the logged March-April inflows
SDFB_3	Standardized dfbeta for the May-June inflows
SDFB_4	Standardized dfbeta for the logged July-August inflows
SDFB_5	Standardized dfbeta for the logged September-October inflows
SDFB_6	Standardized dfbeta for the logged November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

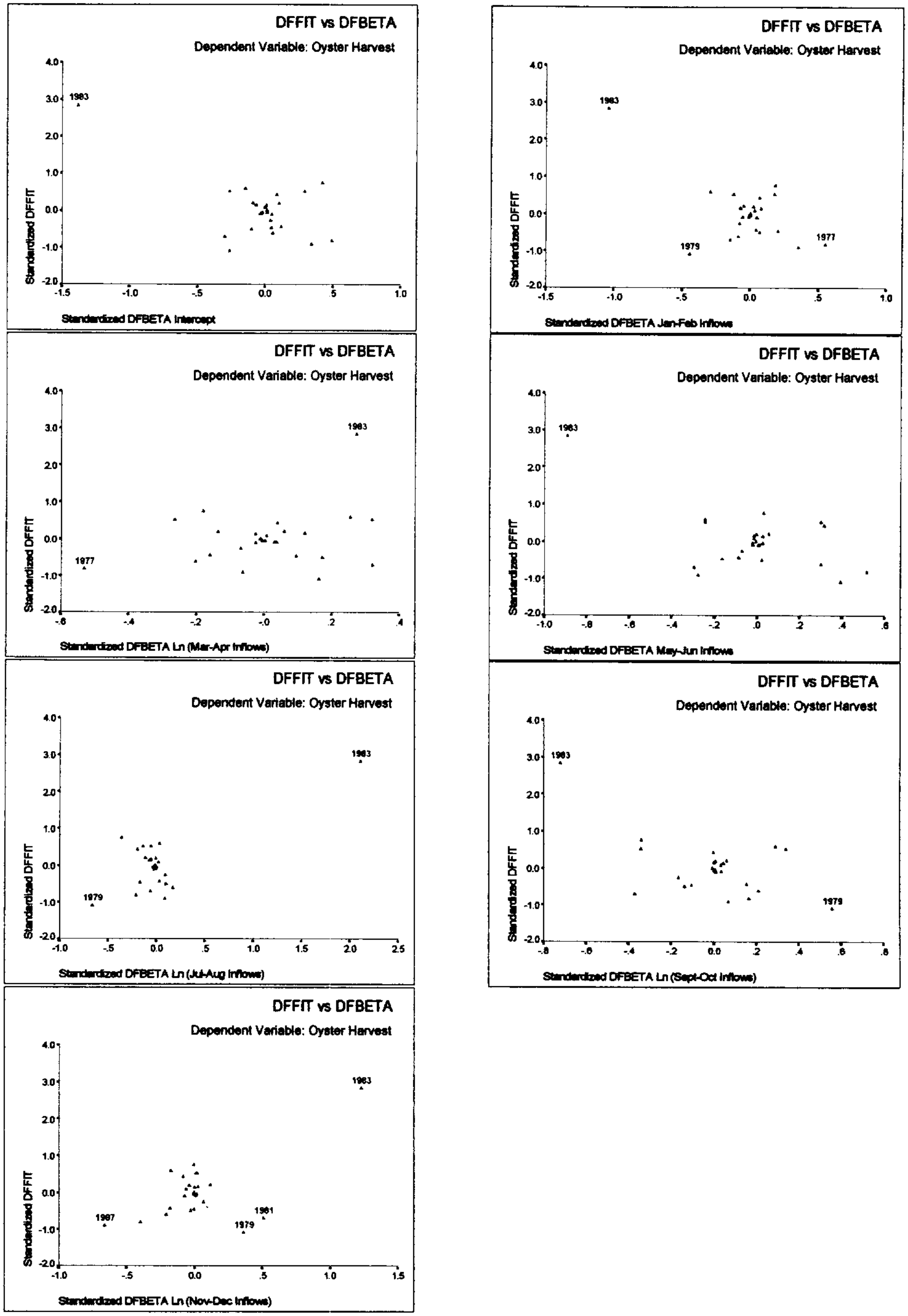


Fig. 5.4. Standardized DFFIT vs. Standardized DFBETA.

Examining Subsets of the Data

All Variables Logged: 1979 Omitted

```
  N = 25     Regression Models for Dependent Variable: LN_OYSTE

  R-square       Adj      C(p)       AIC       MSE      SBC Variables in Model
In               Rsq

1 0.252635 0.220141   4.8577 -30.5794 0.272588 -28.1417 LN_QJF
1 0.178995 0.143299   7.4056 -28.2300 0.299447 -25.7922 LN_QSO
1 0.038347 -.003464  12.2717 -24.2769 0.350745 -21.8392 LN_QND
1 0.037456 -.004393  12.3026 -24.2538 0.351070 -21.8160 LN_QJA
-------------------------------------------------------------
2 0.320083 0.258273   4.5241 -30.9440 0.259259 -27.2874 LN_QJF LN_QSO
2 0.299937 0.236295   5.2211 -30.2140 0.266941 -26.5574 LN_QJF LN_QMJ
2 0.280688 0.215296   5.8871 -29.5358 0.274281 -25.8792 LN_QJF LN_QND
2 0.266215 0.199507   6.3879 -29.0378 0.279800 -25.3812 LN_QJF LN_QMA
--------------------------------------------------------------------
3 0.429744 0.348279   2.7300 -33.3411 0.227799 -28.4656 LN_QJF LN_QSO LN_QND
3 0.357046 0.265196   5.2452 -30.3414 0.256840 -25.4659 LN_QJF LN_QMJ LN_QSO
3 0.350413 0.257615   5.4747 -30.0848 0.259489 -25.2093 LN_QJF LN_QJA LN_QSO
3 0.334264 0.239159   6.0335 -29.4709 0.265940 -24.5954 LN_QJF LN_QMJ LN_QND
----------------------------------------------------------------------
4 0.471415 0.365698   3.2882 -33.2382 0.221711 -27.1438 LN_QJF LN_QMJ LN_QSO LN_QND
4 0.460648 0.352778   3.6608 -32.7340 0.226227 -26.6397 LN_QJF LN_QMA LN_QSO LN_QND
4 0.453795 0.344555   3.8979 -32.4184 0.229101 -26.3240 LN_QJF LN_QJA LN_QSO LN_QND
4 0.361113 0.233335   7.1045 -28.5000 0.267976 -22.4057 LN_QJF LN_QMJ LN_QJA LN_QSO
----------------------------------------------------------------------------
5 0.479375 0.342368   5.0128 -31.6175 0.229865 -24.3042 LN_QJF LN_QMA LN_QMJ LN_QSO
                                                         LN_QND
5 0.472164 0.333259   5.2623 -31.2736 0.233049 -23.9603 LN_QJF LN_QMJ LN_QJA LN_QSO
                                                         LN_QND
5 0.469903 0.330403   5.3406 -31.1667 0.234047 -23.8535 LN_QJF LN_QMA LN_QJA LN_QSO
                                                         LN_QND
5 0.370736 0.205140   8.7716 -26.8795 0.277831 -19.5662 LN_QJF LN_QMA LN_QMJ LN_QJA
                                                         LN_QND
-----------------------------------------------------------------------------
6 0.479746 0.306328   7.0000 -29.6353 0.242462 -21.1032 LN_QJF LN_QMA LN_QMJ LN_QJA
                                                         LN_QSO LN_QND
-----------------------------------------------------------------------------
```

```
OBS _MODEL_  _TYPE_  _DEPVAR_  _RMSE_ INTERCEP   LN_QJF   LN_QMA   LN_QMJ   LN_QJA   LN_QSO

  1 MODEL1   PARMS   LN_OYSTE 0.52210  12.5393 -0.64970        .        .        .        .
  2 MODEL1   PARMS   LN_OYSTE 0.54722  10.5133        .        .        .        . -0.39712
  3 MODEL1   PARMS   LN_OYSTE 0.59224   9.2744        .        .        .        .        .
  4 MODEL1   PARMS   LN_OYSTE 0.59251   9.0105        .        .        . -0.18824        .
  5 MODEL1   PARMS   LN_OYSTE 0.50918  13.3963 -0.52033        .        .        . -0.26125
  6 MODEL1   PARMS   LN_OYSTE 0.51666  11.5959 -0.77351        .  0.24052        .        .
  7 MODEL1   PARMS   LN_OYSTE 0.52372  12.1923 -0.83215        .        .        .        .
  8 MODEL1   PARMS   LN_OYSTE 0.52896  12.0416 -0.72558  0.14371        .        .        .
  9 MODEL1   PARMS   LN_OYSTE 0.47728  13.2079 -0.84122        .        .        . -0.44169
 10 MODEL1   PARMS   LN_OYSTE 0.50679  12.4937 -0.64006        .  0.21371        . -0.24163
 11 MODEL1   PARMS   LN_OYSTE 0.50940  13.2581 -0.62521        .        .  0.21030 -0.33091
 12 MODEL1   PARMS   LN_OYSTE 0.51569  11.1470 -0.98434        .  0.25678        .        .
 13 MODEL1   PARMS   LN_OYSTE 0.47086  12.2448 -0.97545        .  0.22705        . -0.42479
 14 MODEL1   PARMS   LN_OYSTE 0.47563  12.0956 -1.07498  0.24785        .        . -0.41675
 15 MODEL1   PARMS   LN_OYSTE 0.47864  13.0898 -0.92598        .        .  0.18759 -0.49888
 16 MODEL1   PARMS   LN_OYSTE 0.51766  12.6864 -0.65644        .  0.15222  0.10194 -0.28104
 17 MODEL1   PARMS   LN_OYSTE 0.47944  11.8310 -1.07859  0.14312  0.17319        . -0.41440
 18 MODEL1   PARMS   LN_OYSTE 0.48275  12.3302 -0.97957        .  0.20040  0.04399 -0.44018
 19 MODEL1   PARMS   LN_OYSTE 0.48378  12.2627 -1.07997  0.19301        .  0.12551 -0.46054
 20 MODEL1   PARMS   LN_OYSTE 0.52710  10.3649 -1.11436  0.20990  0.29713 -0.20711        .
 21 MODEL1   PARMS   LN_OYSTE 0.49240  11.8996 -1.07945  0.14028  0.15540  0.03112 -0.42549

OBS   LN_QND LN_OYSTE _IN_ _P_ _EDF_   _MSE_   _RSQ_ _ADJRSQ_    _CP_    _AIC_    _SBC_
  1        .       -1    1   2    23 0.27259 0.25264  0.22014  4.8577 -30.5794 -28.1417
  2        .       -1    1   2    23 0.29945 0.17899  0.14330  7.4056 -28.2300 -25.7922
  3 -0.20839       -1    1   2    23 0.35075 0.03835 -0.00346 12.2717 -24.2769 -21.8392
  4        .       -1    1   2    23 0.35107 0.03746 -0.00439 12.3026 -24.2538 -21.8160
  5        .       -1    2   3    22 0.25926 0.32008  0.25827  4.5241 -30.9440 -27.2874
  6        .       -1    2   3    22 0.26694 0.29994  0.23630  5.2211 -30.2140 -26.5574
  7  0.23309       -1    2   3    22 0.27428 0.28069  0.21530  5.8871 -29.5358 -25.8792
  8        .       -1    2   3    22 0.27980 0.26621  0.19951  6.3879 -29.0378 -25.3812
  9  0.52411       -1    3   4    21 0.22780 0.42974  0.34828  2.7300 -33.3411 -28.4656
 10        .       -1    3   4    21 0.25684 0.35705  0.26520  5.2452 -30.3414 -25.4659
 11        .       -1    3   4    21 0.25949 0.35041  0.25761  5.4747 -30.0848 -25.2093
 12  0.25865       -1    3   4    21 0.26594 0.33426  0.23916  6.0335 -29.4709 -24.5954
 13  0.53558       -1    4   5    20 0.22171 0.47142  0.36570  3.2882 -33.2382 -27.1438
 14  0.63979       -1    4   5    20 0.22623 0.46065  0.35278  3.6608 -32.7340 -26.6397
 15  0.50976       -1    4   5    20 0.22910 0.45380  0.34455  3.8979 -32.4184 -26.3240
 16        .       -1    4   5    20 0.26798 0.36111  0.23334  7.1045 -28.5000 -22.4057
 17  0.59966       -1    5   6    19 0.22987 0.47937  0.34237  5.0128 -31.6175 -24.3042
 18  0.53087       -1    5   6    19 0.23305 0.47216  0.33326  5.2623 -31.2736 -23.9603
 19  0.60459       -1    5   6    19 0.23405 0.46990  0.33040  5.3406 -31.1667 -23.8535
 20  0.43200       -1    5   6    19 0.27783 0.37074  0.20514  8.7716 -26.8795 -19.5662
 21  0.59505       -1    6   7    18 0.24246 0.47975  0.30633  7.0000 -29.6353 -21.1032
```

All Variables Squared Root: 1983 Omitted

```
 N = 25      Regression Models for Dependent Variable: SQRT_OYSTER

  R-square        Adj      C(p)       AIC       MSE       SBC Variables in Model
In                Rsq

1 0.389638 0.363101   7.2173     125.4   139.963     127.9 SQR_QJF
1 0.263803 0.231794  13.0348     130.1   168.819     132.6 SQR_QJA
1 0.073333 0.033043  21.8403     135.9   212.496     138.3 SQR_QSO
1 0.055569 0.014507  22.6616     136.4   216.569     138.8 SQR_QMA
-------------------------------------------------------------------------
2 0.440451 0.389583   6.8682     125.3   134.144     128.9 SQR_QJF SQR_QJA
2 0.437138 0.385969   7.0214     125.4   134.938     129.1 SQR_QJF SQR_QND
2 0.426562 0.374431   7.5104     125.9   137.473     129.5 SQR_QJF SQR_QMJ
2 0.393201 0.338037   9.0527     127.3   145.471     131.0 SQR_QJF SQR_QMA
---------------------------------------------------------------------------------
3 0.548147 0.483597   3.8894     121.9   113.483     126.8 SQR_QJF SQR_QMJ SQR_QJA
3 0.489214 0.416245   6.6139     125.0   128.284     129.9 SQR_QJF SQR_QJA SQR_QND
3 0.476361 0.401555   7.2081     125.6   131.513     130.5 SQR_QJF SQR_QMA SQR_QND
3 0.475675 0.400772   7.2398     125.7   131.685     130.5 SQR_QJF SQR_QMJ SQR_QND
-------------------------------------------------------------------------------------------
4 0.601020 0.521224   3.4450     120.8   105.214     126.9 SQR_QJF SQR_QMJ SQR_QJA
                                                           SQR_QND
4 0.552098 0.462517   5.7068     123.7   118.116     129.8 SQR_QJF SQR_QMJ SQR_QJA
                                                           SQR_QSO
4 0.551710 0.462051   5.7247     123.7   118.218     129.8 SQR_QJF SQR_QMA SQR_QMJ
                                                           SQR_QJA
4 0.545064 0.454077   6.0319     124.1   119.971     130.2 SQR_QJF SQR_QMA SQR_QJA
                                                           SQR_QND
-------------------------------------------------------------------------------------------
5 0.607872 0.504680   5.1283     122.4   108.850     129.7 SQR_QJF SQR_QMA SQR_QMJ
                                                           SQR_QJA SQR_QND
5 0.605028 0.501088   5.2597     122.6   109.639     129.9 SQR_QJF SQR_QMJ SQR_QJA
                                                           SQR_QSO SQR_QND
5 0.553594 0.436119   7.6376     125.6   123.917     132.9 SQR_QJF SQR_QMA SQR_QMJ
                                                           SQR_QJA SQR_QSO
5 0.551275 0.433189   7.7448     125.8   124.561     133.1 SQR_QJF SQR_QMA SQR_QJA
                                                           SQR_QSO SQR_QND
-------------------------------------------------------------------------------------------
6 0.610647 0.480862   7.0000     124.2   114.084     132.7 SQR_QJF SQR_QMA SQR_QMJ
                                                           SQR_QJA SQR_QSO SQR_QND
-------------------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_  INTERCEP  SQR_QJF   SQR_QMA  SQR_QMJ   SQR_QJA   SQR_QSO

  1 MODEL1   PARMS  SQR_OYST 11.8306  89.7556 -1.04310     .        .         .         .
  2 MODEL1   PARMS  SQR_OYST 12.9930  74.7398   .          .        .      -0.96674     .
  3 MODEL1   PARMS  SQR_OYST 14.5772  60.0430   .          .        .         .      -0.38497
  4 MODEL1   PARMS  SQR_OYST 14.7163  60.7716   .      -0.32445     .         .         .
  5 MODEL1   PARMS  SQR_OYST 11.5820  94.5789 -0.81810     .        .      -0.49421     .
  6 MODEL1   PARMS  SQR_OYST 11.6163  86.0290 -1.28860     .        .         .         .
  7 MODEL1   PARMS  SQR_OYST 11.7249  82.8647 -1.15051     .     0.23113      .         .
  8 MODEL1   PARMS  SQR_OYST 12.0611  88.0630 -1.09512  0.09265     .         .         .
  9 MODEL1   PARMS  SQR_OYST 10.6529  84.9355 -0.85891     .     0.44168 -0.85541     .
 10 MODEL1   PARMS  SQR_OYST 11.3263  90.8627 -1.06406     .        .      -0.50036     .
 11 MODEL1   PARMS  SQR_OYST 11.4679  77.5058 -1.62083  0.35706     .         .         .
 12 MODEL1   PARMS  SQR_OYST 11.4754  78.9244 -1.40253     .     0.23617      .         .
 13 MODEL1   PARMS  SQR_OYST 10.2574  80.8784 -1.11591     .     0.45020 -0.86877     .
 14 MODEL1   PARMS  SQR_OYST 10.8681  83.3855 -0.89408     .     0.45715 -0.89212   0.09970
 15 MODEL1   PARMS  SQR_OYST 10.8728  85.8013 -0.81273 -0.10375 0.48051 -0.86852     .
 16 MODEL1   PARMS  SQR_OYST 10.9531  81.3538 -1.42883  0.43129     .     -0.58176     .
 17 MODEL1   PARMS  SQR_OYST 10.4331  78.4486 -1.25534  0.17342 0.38736 -0.85008     .
 18 MODEL1   PARMS  SQR_OYST 10.4709  82.0310 -1.11669     .     0.43347 -0.82796 -0.11676
 19 MODEL1   PARMS  SQR_OYST 11.1318  84.3847 -0.85282 -0.07270 0.48044 -0.89202   0.07446
 20 MODEL1   PARMS  SQR_OYST 11.1607  83.0087 -1.40619  0.40052     .     -0.54207 -0.14585
 21 MODEL1   PARMS  SQR_OYST 10.6810  79.6258 -1.24399  0.15847 0.37873 -0.81742 -0.09804

OBS SQR_QND  SQR_OYST  _IN_  _P_  _EDF_   _MSE_    _RSQ_   _ADJRSQ_    _CP_     _AIC_    _SBC_

  1    .        -1       1    2     23   139.963  0.38964   0.36310    7.2173  125.450  127.888
  2    .        -1       1    2     23   168.819  0.26380   0.23179   13.0348  130.136  132.574
  3    .        -1       1    2     23   212.496  0.07333   0.03304   21.8403  135.889  138.326
  4    .        -1       1    2     23   216.569  0.05557   0.01451   22.6616  136.363  138.801
  5    .        -1       2    3     22   134.144  0.44045   0.38958    6.8682  125.277  128.934
  6 0.36110     -1       2    3     22   134.938  0.43714   0.38597    7.0214  125.425  129.081
  7    .        -1       2    3     22   137.473  0.42656   0.37443    7.5104  125.890  129.547
  8    .        -1       2    3     22   145.471  0.39320   0.33804    9.0527  127.304  130.960
  9    .        -1       3    4     21   113.483  0.54815   0.48360    3.8894  121.933  126.808
 10 0.36590     -1       3    4     21   128.284  0.48921   0.41624    6.6139  124.997  129.873
 11 0.55492     -1       3    4     21   131.513  0.47636   0.40156    7.2081  125.619  130.494
 12 0.36725     -1       3    4     21   131.685  0.47568   0.40077    7.2398  125.651  130.527
 13 0.38116     -1       4    5     20   105.214  0.60102   0.52122    3.4450  120.821  126.916
 14    .        -1       4    5     20   118.116  0.55210   0.46252    5.7068  123.713  129.807
 15    .        -1       4    5     20   118.218  0.55171   0.46205    5.7247  123.735  129.829
 16 0.60079     -1       4    5     20   119.971  0.54506   0.45408    6.0319  124.103  130.197
 17 0.47347     -1       5    6     19   108.850  0.60787   0.50468    5.1283  122.388  129.702
 18 0.44340     -1       5    6     19   109.639  0.60503   0.50109    5.2597  122.569  129.882
 19    .        -1       5    6     19   123.917  0.55359   0.43612    7.6376  125.629  132.943
 20 0.66249     -1       5    6     19   124.561  0.55127   0.43319    7.7448  125.759  133.072
 21 0.51779     -1       6    7     18   114.084  0.61065   0.48086    7.0000  124.211  132.743
```

All Variables Squared Root: 1979 Omitted

```
 N = 25     Regression Models for Dependent Variable: SQR_OYST

  R-square      Adj     C(p)      AIC      MSE      SBC Variables in Model
In              Rsq

1 0.234539 0.201258   3.0737    128.0  155.164    130.5 SQR_QJF
1 0.166674 0.130442   5.2081    130.2  168.921    132.6 SQR_QSO
1 0.023867 -.018574   9.6993    134.1  197.869    136.5 SQR_QND
1 0.013664 -.029220  10.0202    134.4  199.937    136.8 SQR_QMA
-------------------------------------------------------------------
2 0.278288 0.212678   3.6978    128.6  152.946    132.2 SQR_QJF SQR_QSO
2 0.274168 0.208184   3.8274    128.7  153.819    132.4 SQR_QJF SQR_QMJ
2 0.269651 0.203256   3.9694    128.9  154.776    132.5 SQR_QJF SQR_QND
2 0.263906 0.196989   4.1501    129.0  155.994    132.7 SQR_QJF SQR_QJA
--------------------------------------------------------------------------
3 0.371470 0.281680   2.7672    127.1  139.541    132.0 SQR_QJF SQR_QSO SQR_QND
3 0.333800 0.238628   3.9520    128.6  147.905    133.4 SQR_QJF SQR_QJA SQR_QSO
3 0.321533 0.224610   4.3377    129.0  150.628    133.9 SQR_QJF SQR_QMA SQR_QND
3 0.312169 0.213907   4.6322    129.4  152.707    134.2 SQR_QJF SQR_QMJ SQR_QND
----------------------------------------------------------------------------------
4 0.412680 0.295216   3.4712    127.4  136.912    133.5 SQR_QJF SQR_QJA SQR_QSO
                                                        SQR_QND
4 0.400604 0.280724   3.8510    127.9  139.727    134.0 SQR_QJF SQR_QMJ SQR_QSO
                                                        SQR_QND
4 0.399447 0.279337   3.8873    128.0  139.997    134.1 SQR_QJF SQR_QMA SQR_QSO
                                                        SQR_QND
4 0.337735 0.205282   5.8282    130.4  154.383    136.5 SQR_QJF SQR_QMJ SQR_QJA
                                                        SQR_QSO
----------------------------------------------------------------------------------
5 0.426912 0.276100   5.0236    128.8  140.625    136.1 SQR_QJF SQR_QMA SQR_QJA
                                                        SQR_QSO SQR_QND
5 0.418563 0.265554   5.2861    129.2  142.674    136.5 SQR_QJF SQR_QMJ SQR_QJA
                                                        SQR_QSO SQR_QND
5 0.409718 0.254381   5.5643    129.5  144.845    136.8 SQR_QJF SQR_QMA SQR_QMJ
                                                        SQR_QSO SQR_QND
5 0.339720 0.165962   7.7658    132.3  162.021    139.6 SQR_QJF SQR_QMA SQR_QMJ
                                                        SQR_QJA SQR_QSO
----------------------------------------------------------------------------------
6 0.427662 0.236882   7.0000    130.8  148.244    139.3 SQR_QJF SQR_QMA SQR_QMJ
                                                        SQR_QJA SQR_QSO SQR_QND
----------------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_  INTERCEP  SQR_QJF   SQR_QMA SQR_QMJ SQR_QJA  SQR_QSO

  1 MODEL1   PARMS  SQR_OYST 12.4565  81.8209 -0.77537   .        .       .        .
  2 MODEL1   PARMS  SQR_OYST 12.9970  69.1762   .        .        .       .      -0.55970
  3 MODEL1   PARMS  SQR_OYST 14.0666  58.1419   .        .        .       .        .
  4 MODEL1   PARMS  SQR_OYST 14.1399  56.8146   .      -0.15458   .       .        .
  5 MODEL1   PARMS  SQR_OYST 12.3671  85.5854 -0.60218   .        .       .      -0.32283
  6 MODEL1   PARMS  SQR_OYST 12.4024  75.3555 -0.88866   .      0.22550   .        .
  7 MODEL1   PARMS  SQR_OYST 12.4409  79.6514 -1.01367   .        .       .        .
  8 MODEL1   PARMS  SQR_OYST 12.4897  78.5607 -0.92096   .        .     0.32066    .
  9 MODEL1   PARMS  SQR_OYST 11.8128  84.2612 -0.91236   .        .       .      -0.54411
 10 MODEL1   PARMS  SQR_OYST 12.1616  82.1072 -0.75593   .        .     0.45739 -0.42334
 11 MODEL1   PARMS  SQR_OYST 12.2731  70.6974 -1.38267 0.38547   .       .        .
 12 MODEL1   PARMS  SQR_OYST 12.3575  72.8609 -1.14087   .      0.23374   .        .
 13 MODEL1   PARMS  SQR_OYST 11.7009  81.3440 -1.02264   .        .     0.39653 -0.61483
 14 MODEL1   PARMS  SQR_OYST 11.8206  78.3177 -1.02462   .      0.19477   .      -0.51046
 15 MODEL1   PARMS  SQR_OYST 11.8320  77.0562 -1.19979 0.28892   .       .      -0.48581
 16 MODEL1   PARMS  SQR_OYST 12.4251  80.1105 -0.78057   .      0.08355 0.38404 -0.39360
 17 MODEL1   PARMS  SQR_OYST 11.8586  76.4819 -1.21755 0.21316   .     0.33486 -0.56082
 18 MODEL1   PARMS  SQR_OYST 11.9446  78.8893 -1.05639   .      0.10229 0.30592 -0.58100
 19 MODEL1   PARMS  SQR_OYST 12.0351  75.4756 -1.17762 0.18960 0.13296   .      -0.48288
 20 MODEL1   PARMS  SQR_OYST 12.7287  81.2043 -0.73669 -0.07877 0.11055 0.37852 -0.41844
 21 MODEL1   PARMS  SQR_OYST 12.1755  76.0495 -1.20924 0.18943 0.04057 0.30579 -0.55341

OBS  SQR_QND  SQR_OYST  _IN_  _P_  _EDF_   _MSE_    _RSQ_   _ADJRSQ_    _CP_    _AIC_    _SBC_

  1    .         -1       1    2     23   155.164  0.23454   0.20126   3.0737  128.028  130.465
  2    .         -1       1    2     23   168.921  0.16667   0.13044   5.2081  130.151  132.589
  3 -0.19633     -1       1    2     23   197.869  0.02387  -0.01857   9.6993  134.106  136.543
  4    .         -1       1    2     23   199.937  0.01366  -0.02922  10.0202  134.366  136.803
  5    .         -1       2    3     22   152.946  0.27829   0.21268   3.6978  128.556  132.213
  6    .         -1       2    3     22   153.819  0.27417   0.20818   3.8274  128.699  132.355
  7  0.30411     -1       2    3     22   154.776  0.26965   0.20326   3.9694  128.854  132.510
  8    .         -1       2    3     22   155.994  0.26391   0.19699   4.1501  129.050  132.706
  9  0.54733     -1       3    4     21   139.541  0.37147   0.28168   2.7672  127.100  131.976
 10    .         -1       3    4     21   147.905  0.33380   0.23863   3.9520  128.555  133.431
 11  0.51521     -1       3    4     21   150.628  0.32153   0.22461   4.3377  129.011  133.887
 12  0.31659     -1       3    4     21   152.707  0.31217   0.21391   4.6322  129.354  134.230
 13  0.50671     -1       4    5     20   136.912  0.41268   0.29522   3.4712  127.405  133.499
 14  0.54269     -1       4    5     20   139.727  0.40060   0.28072   3.8510  127.914  134.008
 15  0.67949     -1       4    5     20   139.997  0.39945   0.27934   3.8873  127.962  134.056
 16    .         -1       4    5     20   154.383  0.33773   0.20528   5.8282  130.407  136.502
 17  0.61053     -1       5    6     19   140.625  0.42691   0.27610   5.0236  128.792  136.105
 18  0.51355     -1       5    6     19   142.674  0.41856   0.26555   5.2861  129.153  136.466
 19  0.63089     -1       5    6     19   144.845  0.40972   0.25438   5.5643  129.531  136.844
 20    .         -1       5    6     19   162.021  0.33972   0.16596   7.7658  132.332  139.645
 21  0.60169     -1       6    7     18   148.244  0.42766   0.23688   7.0000  130.759  139.291
```

All Variables Squared Root: 1983 and 1979 Omitted

```
N = 24     Regression Models for Dependent Variable: SQR_OYST

 R-square        Adj      C(p)       AIC       MSE       SBC Variables in Model
In               Rsq

1 0.388080 0.360265   3.4326    112.0    98.250    114.4 SQR_QJF
1 0.257275 0.223515   8.4415    116.7   119.252    119.0 SQR_QSO
1 0.168128 0.130316  11.8553    119.4   133.565    121.7 SQR_QJA
1 0.103216 0.062453  14.3410    121.2   143.987    123.5 SQR_QND
-------------------------------------------------------------------------
2 0.450983 0.398696   3.0238    111.4    92.348    114.9 SQR_QJF SQR_QSO
2 0.423400 0.368486   4.0800    112.6    96.987    116.1 SQR_QJF SQR_QMJ
2 0.407723 0.351316   4.6804    113.2    99.624    116.8 SQR_QJF SQR_QMA
2 0.404598 0.347893   4.8000    113.4   100.150    116.9 SQR_QJF SQR_QJA
-------------------------------------------------------------------------
3 0.494657 0.418856   3.3514    111.4    89.251    116.1 SQR_QJF SQR_QSO SQR_QND
3 0.488228 0.411462   3.5976    111.7    90.387    116.4 SQR_QJF SQR_QMJ SQR_QJA
3 0.476182 0.397609   4.0588    112.3    92.514    117.0 SQR_QJF SQR_QMJ SQR_QSO
3 0.454206 0.372337   4.9004    113.3    96.396    118.0 SQR_QJF SQR_QJA SQR_QSO
-------------------------------------------------------------------------
4 0.519894 0.418819   4.3850    112.2    89.257    118.1 SQR_QJF SQR_QMJ SQR_QSO
                                                         SQR_QND

4 0.517122 0.415464   4.4911    112.3    89.772    118.2 SQR_QJF SQR_QMA SQR_QSO
                                                         SQR_QND

4 0.506967 0.403171   4.8800    112.8    91.660    118.7 SQR_QJF SQR_QMJ SQR_QJA
                                                         SQR_QSO

4 0.506617 0.402747   4.8934    112.8    91.725    118.7 SQR_QJF SQR_QMJ SQR_QJA
                                                         SQR_QND

-------------------------------------------------------------------------
5 0.550093 0.425119   5.2285    112.6    88.290    119.7 SQR_QJF SQR_QMJ SQR_QJA
                                                         SQR_QSO SQR_QND

5 0.526703 0.395232   6.1242    113.8    92.880    120.9 SQR_QJF SQR_QMA SQR_QMJ
                                                         SQR_QSO SQR_QND

5 0.526386 0.394827   6.1363    113.9    92.942    120.9 SQR_QJF SQR_QMA SQR_QJA
                                                         SQR_QSO SQR_QND

5 0.517737 0.383775   6.4675    114.3    94.639    121.4 SQR_QJF SQR_QMA SQR_QMJ
                                                         SQR_QJA SQR_QND

-------------------------------------------------------------------------
6 0.556061 0.399376   7.0000    114.3    92.243    122.6 SQR_QJF SQR_QMA SQR_QMJ
                                                         SQR_QJA SQR_QSO SQR_QND
-------------------------------------------------------------------------
```

```
OBS _MODEL_ _TYPE_ _DEPVAR_  _RMSE_ INTERCEP  SQR_QJF  SQR_QMA  SQR_QMJ  SQR_QJA  SQR_QSO

  1 MODEL1  PARMS  SQR_OYST  9.9121  84.2411 -0.87354   .        .        .        .
  2 MODEL1  PARMS  SQR_OYST 10.9202  69.2845   .        .        .        .      -0.60658
  3 MODEL1  PARMS  SQR_OYST 11.5570  67.7914   .        .        .      -0.67315   .
  4 MODEL1  PARMS  SQR_OYST 11.9995  63.1494   .        .        .        .        .
  5 MODEL1  PARMS  SQR_OYST  9.6098  88.1867 -0.69340   .        .        .      -0.33699
  6 MODEL1  PARMS  SQR_OYST  9.8482  78.8698 -0.96492   .       0.18570   .        .
  7 MODEL1  PARMS  SQR_OYST  9.9812  80.7921 -0.96895  0.17937   .        .        .
  8 MODEL1  PARMS  SQR_OYST 10.0075  86.9582 -0.77576   .        .      -0.24005   .
  9 MODEL1  PARMS  SQR_OYST  9.4473  87.1712 -0.87627   .        .        .      -0.47144
 10 MODEL1  PARMS  SQR_OYST  9.5072  80.9261 -0.81249   .       0.32865 -0.54695   .
 11 MODEL1  PARMS  SQR_OYST  9.6184  83.3116 -0.78506   .       0.15801   .      -0.31097
 12 MODEL1  PARMS  SQR_OYST  9.8181  89.1663 -0.66083   .        .      -0.11102 -0.31333
 13 MODEL1  PARMS  SQR_OYST  9.4476  82.2921 -0.96808   .       0.15813   .      -0.44546
 14 MODEL1  PARMS  SQR_OYST  9.4748  81.4780 -1.10180  0.22599   .        .      -0.42728
 15 MODEL1  PARMS  SQR_OYST  9.5739  83.3309 -0.73196   .       0.27574 -0.41377 -0.20341
 16 MODEL1  PARMS  SQR_OYST  9.5773  79.3674 -0.95349   .       0.34901 -0.59734   .
 17 MODEL1  PARMS  SQR_OYST  9.3962  82.3180 -0.91425   .       0.27473 -0.40982 -0.33803
 18 MODEL1  PARMS  SQR_OYST  9.6374  80.1225 -1.08373  0.14281  0.11184   .      -0.42516
 19 MODEL1  PARMS  SQR_OYST  9.6406  82.2444 -1.08190  0.26383   .      -0.19452 -0.37798
 20 MODEL1  PARMS  SQR_OYST  9.7283  76.8271 -1.09816  0.18082  0.28305 -0.57665   .
 21 MODEL1  PARMS  SQR_OYST  9.6043  80.2857 -1.02330  0.13376  0.22979 -0.40426 -0.32047

OBS  SQR_QND SQR_OYST _IN_ _P_ _EDF_    _MSE_    _RSQ_ _ADJRSQ_    _CP_   _AIC_   _SBC_

  1   .            -1    1   2    22   98.250  0.38808  0.36027  3.4326 112.012 114.368
  2   .            -1    1   2    22  119.252  0.25728  0.22352  8.4415 116.661 119.017
  3   .            -1    1   2    22  133.565  0.16813  0.13032 11.8553 119.382 121.738
  4 -0.36588       -1    1   2    22  143.987  0.10322  0.06245 14.3410 121.185 123.541
  5   .            -1    2   3    21   92.348  0.45098  0.39870  3.0238 111.409 114.943
  6   .            -1    2   3    21   96.987  0.42340  0.36849  4.0800 112.585 116.119
  7   .            -1    2   3    21   99.624  0.40772  0.35132  4.6804 113.229 116.763
  8   .            -1    2   3    21  100.150  0.40460  0.34789  4.8000 113.355 116.889
  9  0.33531       -1    3   4    20   89.251  0.49466  0.41886  3.3514 111.419 116.131
 10   .            -1    3   4    20   90.387  0.48823  0.41146  3.5976 111.723 116.435
 11   .            -1    3   4    20   92.514  0.47618  0.39761  4.0588 112.281 116.993
 12   .            -1    3   4    20   96.396  0.45421  0.37234  4.9004 113.267 117.980
 13  0.33546       -1    4   5    19   89.257  0.51989  0.41882  4.3850 112.190 118.080
 14  0.44288       -1    4   5    19   89.772  0.51712  0.41546  4.4911 112.328 118.218
 15   .            -1    4   5    19   91.660  0.50697  0.40317  4.8800 112.827 118.718
 16  0.19944       -1    4   5    19   91.725  0.50662  0.40275  4.8934 112.844 118.735
 17  0.33321       -1    5   6    18   88.290  0.55009  0.42512  5.2285 112.631 119.699
 18  0.40339       -1    5   6    18   92.880  0.52670  0.39523  6.1242 113.847 120.915
 19  0.45978       -1    5   6    18   92.942  0.52639  0.39483  6.1363 113.863 120.931
 20  0.29489       -1    5   6    18   94.639  0.51774  0.38378  6.4675 114.297 121.366
 21  0.39687       -1    6   7    17   92.243  0.55606  0.39938  7.0000 114.310 122.556
```

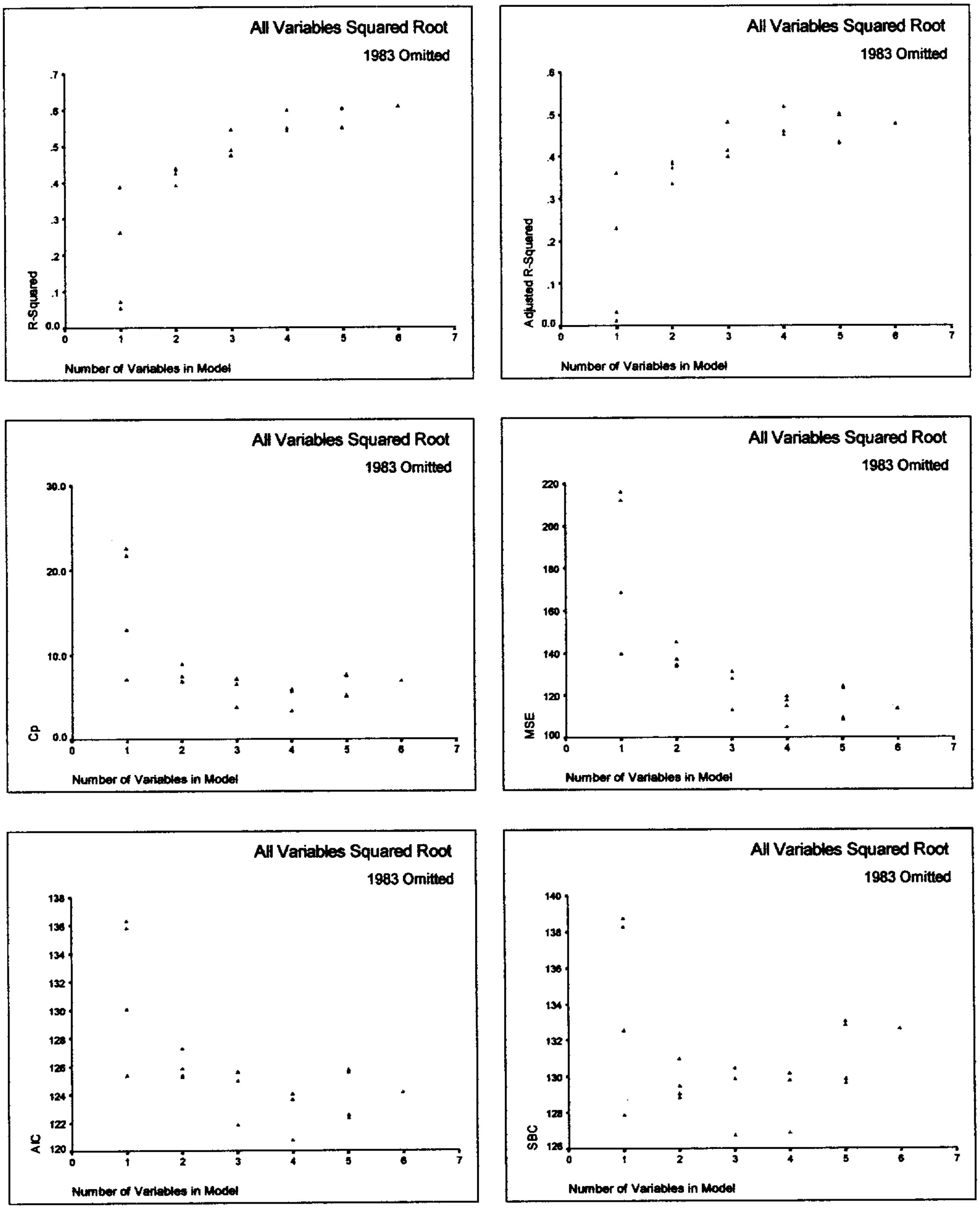


Fig. 6. Examining Subsets of All Variables Squared Root Data: 1983 Omitted.