

Table D1. *Illex illecebrosus* landings (mt) in NAFO Subareas 5+6 (U.S. EEZ) and Subareas 3+4 during 1963-2002<sup>1,2,3,4,5</sup> and TACs.

Year	Cape Hatteras to the Gulf of Maine (Subareas 5+6)			Subareas (3+4)	All Subareas (3-6)	TAC (mt)	
	Domestic (mt)	Foreign (mt)	Total (mt)	Total (mt)	Total (mt)	3+4	5+6
1963	810		<b>810</b>	2,222	<b>3,032</b>		
1964	358	2	<b>360</b>	10,777	<b>11,137</b>		
1965	444	78	<b>522</b>	8,264	<b>8,786</b>		
1966	452	118	<b>570</b>	5,218	<b>5,788</b>		
1967	707	288	<b>995</b>	7,033	<b>8,028</b>		
1968	678	2,593	<b>3,271</b>	56	<b>3,327</b>		
1969	562	975	<b>1,537</b>	86	<b>1,623</b>		
1970	408	2,418	<b>2,826</b>	1,385	<b>4,211</b>		
1971	455	6,159	<b>6,614</b>	8,906	<b>15,520</b>		
1972	472	17,169	<b>17,641</b>	1,868	<b>19,509</b>		
1973	530	18,625	<b>19,155</b>	9,877	<b>29,032</b>		
1974	148	20,480	<b>20,628</b>	437	<b>21,065</b>		71,000
1975	107	17,819	<b>17,926</b>	17,696	<b>35,622</b>	25,000	71,000
1976	229	24,707	<b>24,936</b>	41,767	<b>66,703</b>	25,000	30,000
1977	1,024	23,771	<b>24,795</b>	83,480	<b>108,275</b>	25,000	35,000
1978	385	17,207	<b>17,592</b>	94,064	<b>111,656</b>	100,000	30,000
1979	1,493	15,748	<b>17,241</b>	162,092	<b>179,333</b>	120,000	30,000
1980	299	17,529	<b>17,828</b>	69,606	<b>87,434</b>	150,000	30,000
1981	615	14,956	<b>15,571</b>	32,862	<b>48,433</b>	150,000	30,000
1982	5,871	12,762	<b>18,633</b>	12,908	<b>31,541</b>	150,000	30,000
1983	9,775	1,809	<b>11,584</b>	426	<b>12,010</b>	150,000	30,000
1984	9,343	576	<b>9,919</b>	715	<b>10,634</b>	150,000	30,000
1985	5,033	1,082	<b>6,115</b>	673	<b>6,788</b>	150,000	30,000
1986	6,493	977	<b>7,470</b>	111	<b>7,581</b>	150,000	30,000
1987	10,102	0	<b>10,102</b>	562	<b>10,664</b>	150,000	30,000
1988	1,958	0	<b>1,958</b>	811	<b>2,769</b>	150,000	30,000
1989	6,801	0	<b>6,801</b>	5,971	<b>12,772</b>	150,000	30,000
1990	11,670	0	<b>11,670</b>	10,975	<b>22,645</b>	150,000	30,000
1991	11,908	0	<b>11,908</b>	2,913	<b>14,821</b>	150,000	30,000
1992	17,827	0	<b>17,827</b>	1,578	<b>19,405</b>	150,000	30,000
1993	18,012	0	<b>18,012</b>	2,686	<b>20,698</b>	150,000	30,000
1994	18,350	0	<b>18,350</b>	5,951	<b>24,301</b>	150,000	30,000
1995	14,058	0	<b>14,058</b>	1,055	<b>15,113</b>	150,000	30,000
1996	16,969	0	<b>16,969</b>	8,742	<b>25,711</b>	150,000	21,000
1997	13,629	0	<b>13,629</b>	15,614	<b>29,243</b>	150,000	19,000
1998	23,597	0	<b>23,597</b>	1,902	<b>25,499</b>	150,000	19,000
1999	7,388	0	<b>7,388</b>	305	<b>7,693</b>	75,000	19,000
2000	9,011	0	<b>9,011</b>	366	<b>9,377</b>	34,000	24,000
2001	4,009	0	<b>4,009</b>	57	<b>4,066</b>	34,000	24,000
2002	2,723	0	<b>2,723</b>	249	<b>2,972</b>	34,000	24,000
Avg. 1963-1967	554	122	651	6,703	7,354		
1968-1982	885	14,195	15,080	35,806	50,886		
1983-2002	10,933	222	11,155	3,083	14,238		
1999-2002	5,783	0	5,783	244	6,027		

<sup>1</sup> Landings during 1963-1978 were not reported by species, but are proration-based estimates by Lange and Sissenwine (1980)

<sup>2</sup> Landings during 1979-1997 are from the NEFSC Weighout Database and the Joint Venture Database

<sup>3</sup> Domestic landings during 1982-1991 include Joint-Venture landings

<sup>4</sup> Includes landings from Subarea 2

<sup>5</sup> Landings during 2002 are preliminary for all Subareas

Table D2. Estimates of kept weight (mt), discarded weight (mt) and discard ratios (discard/kept weight) of *Illex illecebrosus* sampled in the *Illex* fishery, by observers from the NEFSC Observer Program, during 1995-2002. *Illex* trips were defined as trips where *Illex* landings were  $\geq 25\%$ , by weight, of the total trip landings. Total discard estimates are the product of discard ratios and total *Illex* landings, for *Illex* trips in the Weighout database, for all months sampled.

	May	June	July	Aug	Sept	Oct	Total
<b>1995</b>							
Trips	0	0	0	0	1	1	2
Total Kept(mt)					0.902	0.113	1.015
Total Discard(mt)					0.007	0.023	0.030
Ratio discard/kept					0.008	0.204	0.030
Total Landings					1,263.819	905.822	2,169.641
Total Discards(mt)					9.808	184.371	64.127
<b>1996</b>							
Trips	0	4	3	6	1	1	15
Total Kept(mt)		112.696	236.297	182.447	136.617	166.106	834.163
Total Discard(mt)		0.769	3.499	0.045	0.163	0.000	4.476
Ratio discard/kept		0.007	0.015	0.000	0.001	0.000	0.005
Total Landings		3,817.659	2,736.593	3,787.278	2,455.642	2,436.032	15,233.204
Total Discards(mt)		26.050	40.522	0.936	2.930	0.000	81.741
<b>1997</b>							
Trips	0	0	7	3	0	0	10
Total Kept(mt)			773.388	343.904			1,117.292
Total Discard(mt)			1.941	5.286			7.227
Ratio discard/kept			0.003	0.015			0.006
Total Landings			5,077.722	3,600.592			8,678.314
Total Discards(mt)			12.744	55.343			56.134
<b>1998</b>							
Trips	0	0	2	2	0	0	4
Total Kept(mt)			106.141	48.761			154.902
Total Discard(mt)			1.656	0.000			1.656
Ratio discard/kept			0.016	0.000			0.011

Total Landings			7,526.991	6,501.153			14,028.144
Total Discards(mt)			117.435	0.000			149.970

Table D2. (continued)

**1999**

Trips	0	0	1	2	1	0	4
Total Kept(mt)			26.218	50.723	14.011		90.952
Total Discard(mt)			0.000	0.907	0.068		0.975
Ratio discard/kept			0.000	0.018	0.005		0.011
Total Landings			2,249.614	2,550.402	596.029		5,396.045
Total Discards(mt)			0.000	45.605	2.893		57.845

**2000**

Trips	0	2	4	7	0	0	13
Total Kept(mt)		85.820	135.459	182.796			404.075
Total Discard(mt)		0.000	0.680	1.198			1.878
Ratio discard/kept		0.000	0.005	0.007			0.005
Total Landings		1,409.981	2,753.821	2,122.142			6,285.944
Total Discards(mt)		0.000	13.824	13.908			29.215

**2001**

Trips	0	0	0	0	0	0	0
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**2002**

Trips	0	0	0	0	0	0	0
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Table D3. Estimates of kept weight (mt), discarded weight (mt) and discard ratios (discard/kept weight) of *Illex illecebrosus* sampled in the *Loligo* fishery, by observers from the NEFSC Observer Program, during 1995-2002. *Loligo* trips were defined as trips where *Loligo* landings were  $\geq 25\%$ , by weight, of the total trip landings. Estimates of total discards are based the product of discard ratios and reported *Loligo* landings, by month, for *Loligo* trips in the Weighout database.

	Nov	Dec	Jan	Feb	Mar	Apr	Total
<b>1995</b>							
Trips	0	1	1	1	0	0	3
Total Kept(mt)		1.195	0.513	2.971			4.679
Total Discard(mt)		0.000	0.000	0.002			0.002
Ratio discard/kept		0.000	0.000	0.001			0.000
Total Landings		537.991	981.273	1,407.113			2,926.377
Total Discards(mt)		0.000	0.000	0.947			1.251
<b>1996</b>							
Trips	1	1	1	2	1	0	6
Total Kept(mt)	3.009	0.335	0.760	11.952	10.972		27.028
Total Discard(mt)	1.100	0.000	0.000	0.068	0.069		1.237
Ratio discard/kept	0.366	0.000	0.000	0.006	0.006		0.046
Total Landings	347.441	306.178	2,077.435	1,933.899	1,462.509		6,127.462
Total Discards(mt)	127.014	0.000	0.000	11.003	9.197		280.438
<b>1997</b>							
Trips	0	0	1	2	1	1	5
Total Kept(mt)			2.220	23.071	8.137	12.084	45.512
Total Discard(mt)			0.318	0.206	0.278	0.687	1.489
Ratio discard/kept			0.143	0.009	0.034	0.057	0.033
Total Landings			602.383	1,192.511	752.883	735.620	3,283.397
Total Discards(mt)			86.287	10.648	25.722	41.821	107.422
<b>1998</b>							
Trips	2	0	3	3	7	3	18
Total Kept(mt)	3.629		21.514	25.045	100.520	25.540	176.248
Total Discard(mt)	0.003		0.372	0.078	0.976	3.395	4.824
<b>Table D3. (continued)</b>							
Ratio discard/kept	0.001		0.017	0.003	0.010	0.133	0.027

Total Landings	1,442.321		1,202.271	3,697.553	3,720.621	1,009.754	11,072.520
Total Discards(mt)	1.192		20.789	11.516	36.125	134.225	303.061
<b>1999</b>							
Trips	2	3	0	0	4	5	14
Total Kept(mt)	40.183	14.411			31.508	37.670	123.772
Total Discard(mt)	0.032	0.155			2.015	2.376	4.578
Ratio discard/kept	0.001	0.011			0.064	0.063	0.037
Total Landings	1,783.164	1,286.115			1,197.348	1,343.383	5,610.010
Total Discards(mt)	1.420	13.833			76.573	84.733	207.499
<b>2000</b>							
Trips	1	0	4	5	5	0	15
Total Kept(mt)	0.429		14.527	63.171	53.083		131.210
Total Discard(mt)	0.000		0.005	0.492	0.530		1.027
Ratio discard/kept	0.000		0.000	0.008	0.010		0.008
Total Landings	292.562		1,232.910	2,182.140	1,769.293		5,476.905
Total Discards(mt)	0.000		0.424	16.995	17.665		42.869
<b>2001</b>							
Trips	2	1	1	4	5	1	14
Total Kept(mt)	21.32	11.05	2.864	29.828	61.793	23.918	150.773
Total Discard(mt)	0.227	0	0.906	1.789	0.402	0.228	3.552
Ratio discard/kept	0.011	0.000	0.316	0.060	0.007	0.010	0.024
Total Landings	1,908.420	1,691.437	519.057	850.685	1,557.575	979.096	7,506.270
Total Discards(mt)	20.319	0.000	164.199	51.022	10.133	9.333	176.837
<b>2002</b>							
Trips	0	0	1	3	0	3	7
Total Kept(mt)			20.117	24.937		15.183	60.237
Total Discard(mt)			0.15	1.026		0	1.176
Ratio discard/kept			0.007	0.041		0	0.020
Total Landings			1,272.791	1,338.373		111.488	2,722.652
Total Discards(mt)			9.490	55.066		0	53.154

Table D4. Summary of *Illex* discards (mt), by year and fishery, estimated from data collected by observers from the NEFSC Observer Program during 1995-2002.

Year	Percentage of landings sampled for <i>Illex</i> discards				<i>Illex</i> Discards (mt)			Total <i>Illex</i> Landings (mt)	<i>Illex</i> Discards (% of <i>Illex</i> landings)
	<i>Illex</i> Fishery		<i>Loligo</i> Fishery		<i>Illex</i> Fishery	<i>Loligo</i> Fishery	Total		
	<i>Illex</i> Landings (May-Oct, mt)	%	<i>Loligo</i> Landings (Jan-April and Nov-Dec, mt)	%					
1995	13,494	0.01%	6,702	0.07%	64.1	1.3	65	14,058	0.5%
1996	15,563	5.36%	7,070	0.38%	81.7	280.4	362	16,969	2.1%
1997	12,709	8.79%	6,484	0.69%	56.1	107.4	164	13,629	1.2%
1998	23,091	0.67%	12,755	1.38%	150.0	303.1	453	23,597	1.9%
1999	7,115	1.28%	7,811	1.59%	57.8	207.5	265	7,388	3.6%
2000	8,901	4.54%	5,810	2.25%	29.2	42.9	72	9,011	0.8%
2001	3,452	0.00%	7,506	2.01%	0.0	176.8	177	4,009	4.4%
2002	2,342	0.00%	6,107	0.98%	0.0	53.2	53	2,723	2.0%

Table D5. Numbers of *Illex* sampled weekly in the directed fishery (landings), for body weight (BW, g) and dorsal mantle length (DML, cm), during 1999-2002.

Week	1999		2000		2001		2002	
	DML	BW	DML	BW	DML	BW	DML	BW
22	520	520	0	0	0	0	0	0
23	1,299	1299	0	0	0	0	95	95
24	1,165	1165	0	0	502	403	511	511
25	1,112	1112	1,753	1753	592	374	496	496
26	1,275	1275	0	0	250	250	304	304
27	1,289	1289	1,384	1384	720	570	100	100
28	717	717	250	250	1,130	530	48	48
29	975	975	1,942	1942	1,482	480	200	200
30	1,329	1329	650	650	590	340	153	153
31	1,220	1220	1,076	1076	0	0	1,267	1267
32	929	929	250	250	0	0	45	45
33	960	960	0	0	0	0	418	418
34	800	800	719	719	450	450	683	683
35	0	0	717	717	1,052	1052	411	411
36	540	540	786	786	350	350	503	503
37	240	240	0	0	0	0	0	0
38	40	40	1,603	1603	0	0	738	738
39	40	40	100	100	0	0	0	0
40	0	0	988	988	0	0	0	0
41	0	0	275	275	0	0	923	923
42	0	0	0	0	0	0	295	295
43	0	0	0	0	0	0	874	874
Total	14,450	14,450	12,493	12,493	7,118	4,799	8,064	8,064

Table D6. Standardized, stratified mean catch per tow (delta-transformed) in numbers/tow, and kg/tow of *Illex illecebrosus*, pre-recruits ( $\leq 10$  cm) and recruits ( $\geq 11$  cm), caught during autumn research bottom trawl surveys in offshore strata 1-40 and 61-76 from Cape Hatteras to the Gulf of Maine during 1967-2002.

Year	All sizes (no./tow)	CV (%)	All sizes (kg/tow)	CV (%)	Individual Mean Weight (g)	Pre-recruits (no./tow)	Recruits (no./tow)
1967	1.57	17	0.242	17	147	0.04	1.53
1968	1.64	21	0.307	17	186	0.10	1.54
1969	0.59	23	0.073	26	121	0.09	0.50
1970	2.26	21	0.268	15	110	0.85	1.41
1971	1.68	12	0.337	14	206	0.20	1.48
1972	2.19	25	0.292	15	123	0.48	1.71
1973	1.47	24	0.353	25	242	0.04	1.43
1974	2.82	40	0.392	30	145	1.20	1.62
1975	8.74	36	1.417	18	143	3.98	4.76
1976	20.55	16	7.018	19	317	0.42	20.13
1977	12.62	18	3.740	18	299	0.72	11.90
1978	19.25	21	4.529	26	219	3.29	15.96
1979	19.42	11	6.053	11	305	1.31	18.11
1980	13.81	15	3.285	18	238	0.43	13.38
1981	27.10	32	9.340	40	327	0.22	26.88
1982	3.94	15	0.602	13	155	0.71	3.23
1983	1.73	14	0.233	13	134	0.16	1.57
1984	4.54	17	0.519	19	113	0.32	4.22
1985	2.38	17	0.355	18	147	0.19	2.19
1986	2.10	15	0.257	17	119	0.26	1.84
1987	15.83	31	1.527	29	92	0.84	14.99
1988	23.22	25	2.997	24	121	0.41	22.81
1989	22.43	45	3.307	57	118	1.05	21.38
1990	16.61	12	2.401	13	141	0.61	16.00
1991	5.21	17	0.691	18	129	0.22	4.99
1992	8.24	15	0.804	16	98	1.79	6.45
1993	10.42	19	1.595	20	159	0.15	10.27
1994	6.83	24	0.860	25	128	0.22	6.61
1995	8.01	30	0.700	39	84	0.82	7.19
1996	10.76	22	0.926	19	87	0.60	10.16
1997	5.83	24	0.521	17	89	0.74	5.09
1998	14.60	51	1.400	50	94	1.18	13.42
1999	1.39	16	0.192	17	136	0.15	1.24
2000	7.41	28	0.706	22	94	0.95	6.46
2001	4.49	27	0.323	23	72	0.46	4.03
2002	6.36	20	0.444	19	70	1.01	5.35
Average							
1967-1981	9.05	22	2.510	21	209	0.89	8.16
1982-2002	8.68	23	1.02	23	113	0.61	8.07
1967-2002	8.83	23	1.639	22	153	0.73	8.11
1999-2002	4.91	23	0.416	20	93	0.64	4.27



Table D7. Pearson correlation coefficients and p-values for the null hypothesis of no correlation between surface and bottom temperature anomalies and *Illex illecebrosus* abundance and biomass indices for the NEFSC spring and autumn bottom trawl surveys during 1982-2002. Correlations that are significant at the 5% level are bold-faced.

	Spring SST Anomaly	Spring BT Anomaly	Autumn Survey SST Anomaly	Autumn BT Anomaly	Spring no./tow	Spring kg/tow	Spring Body Wt	Spring Propor. of <i>Illex</i> Tows	Autumn no./tow	Autumn kg/tow	Autumn Body Wt	Autumn Propor. of <i>Illex</i> Tows
Spring SST Anomaly	1.00000 0.0000	0.91038 <b>0.0001</b>	0.25890 0.2571	0.66079 <b>0.0011</b>	0.20286 0.3778	0.02682 0.9081	-0.35953 0.1094	0.04308 0.8529	-0.23921 0.2963	-0.23329 0.3088	-0.23704 0.3009	-0.07886 0.7340
Spring BT Anomaly		1.00000 0.0000	0.18391 0.4249	0.48899 <b>0.0245</b>	0.40871 0.0658	0.23933 0.2961	-0.30576 0.1777	0.13421 0.5619	-0.18468 0.4229	-0.19672 0.3927	-0.28563 0.2094	0.02864 0.9019
Autumn Survey SST Anomaly			1.00000 0.0000	0.19833 0.3888	0.00637 0.9781	0.01406 0.9518	0.13912 0.5476	0.02671 0.9085	-0.03353 0.8853	0.01356 0.9535	0.01271 0.9564	-0.21011 0.3606
Autumn BT Anomaly				1.00000 0.0000	0.20094 0.3824	0.01582 0.9457	-0.52887 <b>0.0137</b>	0.24008 0.2945	-0.54413 <b>0.0108</b>	-0.55161 <b>0.0095</b>	-0.16906 0.4638	-0.33556 0.1370
Spring no./tow					1.00000 0.0000	0.90963 <b>0.0001</b>	-0.22895 0.3181	0.39864 0.0735	-0.18019 0.4344	-0.22428 0.3284	-0.16334 0.4793	0.30221 0.1830
Spring kg/tow						1.00000 0.0000	0.13984 0.5455	0.55726 <b>0.0087</b>	-0.55000 0.8128	-0.02711 0.9072	0.07267 0.7542	0.36229 0.1065
Spring Body Wt							1.00000 0.0000	0.14016 0.5445	0.60788 <b>0.0035</b>	0.75478 <b>0.0001</b>	0.41047 0.0646	0.12941 0.5761
Spring Propor. of <i>Illex</i> Tows								1.00000 0.0000	-0.20954 0.3620	-0.14033 0.5440	0.30527 0.1784	-0.04143 0.8585
Autumn no./tow									1.00000 0.0000	0.95865 <b>0.0001</b>	-0.08363 0.7185	0.36906 0.0997
Autumn kg/tow										1.00000 0.0000	0.15168 0.5116	0.36850 0.1002
Autumn Body Wt											1.00000 0.0000	0.03543 0.8788
Autumn Propor. of <i>Illex</i> Tows												1.00000 0.0000

Table D8. Total fishing effort (days fished), landings (mt) and LPUE (mt/df) in the *Illex illecebrosus* fishery, during 1999-2002, based on Vessel Trip Reports.

Year	Effort (days fished)	Landings (mt)	LPUE (mt/df)
1999	220	6,211	28
2000	196	6,065	31
2001	76	2,866	38
2002	57	1,752	31

Table D9. Summary of average trip duration (days), nominal fishing effort (days fished), landings (mt), and LPUE (mt per day fished), for freezer trawlers versus trawlers with recirculating seawater systems (RSW), during the 1999-2002 *Illex* fishery.

Year	Freezer Trawlers				RSW Trawlers			
	Average				Average			
	Trip Duration (days)	Nominal Effort (days fished)	Landings (mt)	LPUE (mt/df)	Trip Duration (days)	Nominal Effort (days fished)	Landings (mt)	LPUE (mt/df)
1999	9.0	2.9	84.0	27.6	3.1	1.0	17.7	23.9
2000	9.1	2.1	71.4	38.8	2.2	0.8	17.8	12.3
2001	11.1	2.6	80.8	25.8	2.7	0.9	12.1	12.3
2002	10.4	3.0	98.3	36.8	3.5	1.2	5.8	7.3

Table D10. Probability values from General Linear Models used to standardize catch rates in the *Illex illecebrosus* fishery during 1999-2002. Vessel types were characterized as freezer trawler or recirculating seawater system (RSW) trawler.

<b>Effect</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Week of the year	<b>0.0001</b>	<b>0.0165</b>	<b>0.0119</b>	0.1126
Vessel Type	0.9877	<b>0.0046</b>	<b>0.0413</b>	<b>0.0287</b>
Quarter-degree Square	0.1723	<b>0.0409</b>	0.4783	0.1041
Model	<b>0.0001</b>	<b>0.0019</b>	<b>0.0148</b>	0.0723
N	102	185	65	18

Table D11. Results of a General Linear Model that incorporated log-transformed landings per unit effort (LPUE) data from the 1999 U.S. *Illex illecebrosus* fishery as the dependent variable and week of year, vessel type (freezer trawler or recirculating seawater system trawler), and quarter-degree square as the effects.

Dependent Variable: LNLPUENT					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	34	155.89767730	4.58522580	4.54	0.0001
Error	67	67.72960944	1.01088969		
Corrected Total	101	223.62728674			
	R-Square	C.V.	Root MSE	LNLPUENT Mean	
	0.697132	36.75573	1.00543010	2.73543737	
Source	DF	Type I SS	Mean Square	F Value	Pr > F
WKOFYR	23	140.59610413	6.11287409	6.05	0.0001
VESSCD	1	0.49370662	0.49370662	0.49	0.4871
QDSQ2	10	14.80786656	1.48078666	1.46	0.1723
Source	DF	Type III SS	Mean Square	F Value	Pr > F
WKOFYR	22	99.50833141	4.52310597	4.47	0.0001
VESSCD	1	0.00024126	0.00024126	0.00	0.9877
QDSQ2	10	14.80786656	1.48078666	1.46	0.1723

  

Parameter	Estimate	T for H0: Parameter=0	Pr >  T	Std Error of Estimate
INTERCEPT	3.544734824 B	6.24	0.0001	0.56820403
WKOFYR 18	-3.070705713 B	-2.66	0.0098	1.15496395
22	-1.304969553 B	-1.48	0.1425	0.87928524
23	-0.914839875 B	-1.33	0.1879	0.68759038
25	0.025191998 B	0.03	0.9751	0.80492072
26	-0.639377646 B	-0.79	0.4331	0.81070705
27	-0.221468011 B	-0.32	0.7484	0.68766738
28	-0.377876402 B	-0.47	0.6409	0.80638889
29	-0.140754720 B	-0.21	0.8314	0.65860392
30	-0.828994713 B	-1.35	0.1805	0.61257319
31	-0.189240548 B	-0.31	0.7609	0.61945774
32	-0.767451782 B	-1.10	0.2740	0.69581488
33	0.205063225 B	0.28	0.7786	0.72656386
34	-0.262353255 B	-0.42	0.6777	0.62841400
35	0.730323821 B	0.58	0.5648	1.26214307
36	1.216478837 B	1.02	0.3093	1.18733301
37	-0.224532115 B	-0.28	0.7802	0.80142980
38	-0.719627397 B	-0.94	0.3487	0.76249624
39	-1.283708701 B	-1.09	0.2790	1.17613667
41	-5.066227950 B	-5.65	0.0001	0.89717568
43	-3.555742230 B	-3.02	0.0035	1.17613667
44	-2.948739665 B	-3.20	0.0021	0.92023766

  

Dependent Variable: LNLPUENT					
Parameter	Estimate	T for H0: Parameter=0	Pr >  T	Std Error of Estimate	
WKOFYR 45	-5.628746536 B	-4.60	0.0001	1.22251188	
46	-6.014237820 B	-5.29	0.0001	1.13593343	
924	0.000000000 B	.	.	.	
VESSCD 1	-0.004257349 B	-0.02	0.9877	0.27558085	
90	0.000000000 B	.	.	.	
QDSQ2 36742	-0.317264089 B	-0.86	0.3903	0.36695291	
36744	-0.997386666 B	-1.76	0.0832	0.56721324	
37741	0.000000000 B	.	.	.	
37742	-0.823232945 B	-1.76	0.0832	0.46811852	
37743	-0.114377083 B	-0.19	0.8527	0.61345695	
37744	0.530468816 B	1.00	0.3218	0.53149016	
38731	-0.166007781 B	-0.45	0.6519	0.36636515	
38733	0.111292846 B	0.30	0.7649	0.37059476	
38741	1.309409732 B	1.08	0.2849	1.21471834	
39693	1.108356898 B	1.35	0.1810	0.81989344	
39694	1.131082892 B	1.36	0.1797	0.83422478	
938732	0.000000000 B	.	.	.	

Table D12. Standardized fishing effort and LPUE, by week, in the U.S. *Illex illecebrosus* fishery during 1999.

GLM Model Results (Sub-fleet)						
Week	Landings (mt)	Standardized Effort (Days fished)	LPUE (mt/df)	Total Landings (mt)	Ratio Total Landings/ Model Landings	Standardized Effort (days fished)
22	16.2	0.41	39.9	27.1	1.7	0.7
23	73.2	2.06	35.6	73.2	1.0	2.1
24	673.6	17.27	39.0	679.6	1.0	17.4
25	534.6	21.16	25.3	555.8	1.0	22.0
26	443.3	6.11	72.6	443.2	1.0	6.1
27	397.7	11.33	35.1	432.8	1.1	12.3
28	87.7	2.67	32.9	271.8	3.1	8.3
29	772.6	17.16	45.0	843.0	1.1	18.7
30	463.1	11.60	39.9	476.7	1.0	11.9
31	744.6	16.45	45.3	1,040.4	1.4	23.0
32	524.8	6.78	77.4	579.2	1.1	7.5
33	320.2	12.63	25.4	319.9	1.0	12.6
34	420.1	15.12	27.8	428.7	1.0	15.4
35	236.3	7.68	30.8	236.3	1.0	7.7
36	29.3	1.16	25.2	81.2	2.8	3.2
37	339.0	9.00	37.6	339.0	1.0	9.0
38	71.2	3.96	18.0	56.2	0.8	3.1
39	60.4	2.45	24.7	68.6	1.1	2.8
40	3.2	2.91	1.1	41.4	13.1	37.9

Table D13. Estimates of *Illex illecebrosus* spawning mortality ( $M_{sp}$ ) and the logistic function parameters "half" and "shape" from a maturation model for various values of non-spawning natural mortality ( $M_{NS}$ ) and various probabilities of mature female survival from week t to week t+1. The "half" parameter (h) represents the age, in weeks, at which the probability of becoming mature is 50% and the "shape" (a) parameter is a shape factor. Bold- faced values represent best fit parameter estimates.

Probability of survival of a mature female in week t to week t+1	$M_{NS}$	$M_{SP}$	Half	Shape
*Optimal (fit by model)	<b>0.01</b>	<b>0.80</b>	<b>19.40</b>	<b>0.33</b>
0.25	0.01	0.69	19.80	0.31
0.50	0.01	1.39	17.60	0.40
Optimal (fit by model)	<b>0.03</b>	<b>0.84</b>	<b>19.20</b>	<b>0.33</b>
0.25	0.03	0.69	19.90	0.31
0.50	0.03	1.39	17.60	0.40
Optimal (fit by model)	<b>0.06</b>	<b>0.91</b>	<b>18.90</b>	<b>0.34</b>
0.25	0.06	0.69	19.90	0.31
0.50	0.06	1.39	17.60	0.40

\* Overall best estimates used in per-recruit models

Table D14. Input data for *Illex illecebrosus* yield-per-recruit and egg-per-recruit analyses.

Age (weeks)	Selectivity	M non-spawning females			Catch mean weights (kg)	Proportion of predicted female body weight in relation to week 31 body weight (kg)
		0.01 Estimated M of spawning females	0.03	0.06		
		0.80	0.84	0.91		
		Probability of Maturation				
12	0.00	0.00	0.00	0.00	0.009	0.00
13	0.00	0.08	0.09	0.09	0.011	0.02
14	0.00	0.11	0.11	0.12	0.015	0.04
15	0.00	0.15	0.15	0.16	0.019	0.05
16	0.00	0.19	0.20	0.21	0.024	0.06
17	0.14	0.25	0.26	0.27	0.030	0.08
18	0.28	0.32	0.33	0.34	0.037	0.10
19	0.42	0.39	0.40	0.42	0.045	0.13
20	0.56	0.47	0.48	0.51	0.054	0.16
21	0.70	0.55	0.57	0.59	0.065	0.20
22	0.84	0.63	0.64	0.67	0.076	0.24
23	0.98	0.70	0.72	0.74	0.090	0.29
24	1.00	0.77	0.78	0.80	0.104	0.35
25	1.00	0.82	0.83	0.85	0.121	0.41
26	1.00	0.86	0.87	0.89	0.139	0.50
27	1.00	0.90	0.90	0.92	0.160	0.58
28	1.00	0.92	0.93	0.94	0.182	0.66
29	1.00	0.94	0.95	0.96	0.206	0.77
30	1.00	0.96	0.96	0.97	0.233	0.89
31	1.00	0.97	0.97	0.98	0.262	1.00



Table D15. Results of egg-per-recruit and yield-per-recruit models, for *Illex illecebrosus*, at three levels of non-spawning ( $M_{NS} = 0.01, 0.03$  and  $0.06$ ) and spawning mortality ( $M_{SP} = 0.80, 0.84$  and  $0.91$ ). Estimates for models with the best fit are bold-faced.

F	Eggs per recruit			Yield per recruit (g)		
	$M_{NS}$			$M_{NS}$		
	0.01	0.03	0.06	0.01	0.03	0.06
	$M_{SP}$			$M_{SP}$		
	0.80	0.84	0.91	0.80	0.84	0.91
0.00	<b>8,363</b>	6,884	5,208	<b>0</b>	0	0
0.05	<b>6,927</b>	5,762	4,426	<b>3.3</b>	2.7	2.0
0.10	<b>5,819</b>	4,884	3,801	<b>5.7</b>	4.8	3.6
0.15	<b>4,947</b>	4,185	3,296	<b>7.6</b>	6.3	4.8
0.20	<b>4,250</b>	3,620	2,880	<b>9.0</b>	7.6	5.8
0.25	<b>3,684</b>	3,158	2,536	<b>10.1</b>	8.5	6.6
0.30	<b>3,219</b>	2,775	2,246	<b>10.9</b>	9.3	7.2
0.35	<b>2,832</b>	2,453	2,001	<b>11.6</b>	9.8	7.7
0.40	<b>2,507</b>	2,182	1,791	<b>12.1</b>	10.3	8.1
0.45	<b>2,232</b>	1,950	1,610	<b>12.5</b>	10.7	8.5
0.50	<b>1,996</b>	1,750	1,453	<b>12.8</b>	11	8.8
0.55	<b>1,793</b>	1,578	1,316	<b>13.1</b>	11.3	9.0
0.60	<b>1,617</b>	1,427	1,196	<b>13.3</b>	11.5	9.2
0.70	<b>1,329</b>	1,179	996	<b>13.6</b>	11.8	9.6
0.80	<b>1,105</b>	985	838	<b>13.9</b>	12.1	9.8
0.90	<b>927</b>	830	710	<b>14.0</b>	12.2	10.0
1.00	<b>785</b>	705	606	<b>14.1</b>	12.4	10.2

Table D16. Biological reference points from a new per-recruit model for *Illex illecebrosus* and results of a sensitivity analysis. Reference points from SARC 29 (NEFSC 1999b), a different model, are also shown but are not comparable (see text). The new per recruit model uses different natural mortality rates for non-spawning ( $M_{NS}$ ) and spawning ( $M_{SP}$ ) individuals. Reference points from the new model are maximum values for fully-recruited individuals while reference points from SARC 29 are average values for a 31-week fishing season. Best estimates of reference points from the new model, with  $M_{SP}=0.80$  and  $M_{NS}=0.01$ , are shown in bold-faced text.

Weekly Input Data	<b>Models and Input Data</b>					
	Semelparous Life History Model			Semelparous Life History Model		Constant M Model
	SARC 37			SARC 37		SARC 29
$M_{NS}$	<b>0.01</b>	0.03	0.06	NA		NA
$M_{SP}$	<b>0.80</b>	0.84	0.91	NA		NA
$M_{TOT}$	<b>NA</b>	NA	NA	0.06		0.06
<b>Reference Points (per week)</b>						
						(estimates not comparable to SARC 37 model)
$F_{50\%}$	<b>0.21</b>	0.22	0.24	0.08		0.02
$F_{40\%}$	<b>0.27</b>	0.30	0.33	0.11		0.03
$F_{0.1}$	<b>0.45</b>	0.48	0.55	0.14		0.07
$F_{MAX}$	<b>inf</b>	inf	inf	0.20		0.14

Table D17. Comparison of landings (mt) and nominal effort (df) in the *Illex* fishery as reported in the Weighout (WO), Vessel Trip Reports (VTR), and real-time data collection (RTM) databases during 1999-2002.

	VTR		RTM		WO
	Landings (mt)	Effort (df)	Landings (mt)	Effort (df)	Landings (mt)
1999	6,211	220	5,901	150	6,987
2000	6,065	196	2,969	24	8,281
2001	2,866	76	2,594	60	3,450
2002	1,752	57	*	*	2,062

\* data not presented due to Federal law confidentiality requirements