
APPENDIX A
EVALUATION REPORT
DUNGENESS CRAB (REVISED)

SUMMARY OF CALCULATION OF ADULT EQUIVALENT LOSS BASED ON MODIFIED DREDGE IMPACT MODEL AND DIRECT MEASUREMENT OF ENTRAINMENT RATES at Desdemona Shoals, June 2002.

WH Pearson and GD Williams First Version: **24-Jul-02** Revised: **4-Dec-02**
 Battelle Marine Sciences Laboratory NOTE: Shaded cells are input.
 Sequim, Washington

This calculation run is for

| Location | Start Date | End Date | Total Volume Dredged (cy) |
|------------------|------------------|------------------|---------------------------|
| Desdemona | 11-Jun-02 | 15-Jun-02 | 186737 |

Overall Summary Statements

Adult Equivalent Loss of all age classes taken to 2+ is **6314** with 95% CI **912**
 We are 95% confident that the true value lies between **5402** and **7226**

Adult Equivalent Loss of all age classes taken to 3+ is **2841** with 95% CI **410**
 We are 95% confident that the true value lies between **2431** and **3252**

Number of MALE recruits lost to fishery is estimated to be **1194** with 95% CI **190**
 We are 95% confident that the true value lies between **1004** and **1384**

Sex Ratios by Age Class, Derived from June Data

| Age Class | Total | | | Proportion | |
|-----------|-------|--------|-------|------------|--------|
| | Male | Female | Sexed | Male | Female |
| YOY | 1 | 0 | 1 | 0.50 | 0.50 |
| 1+ | 70 | 68 | 138 | 0.51 | 0.49 |
| 2+ | 12 | 4 | 16 | 0.75 | 0.25 |
| 3+ | 0 | 0 | 0 | 0.50 | 0.50 |

* binomial distribution p>0.05; low sample size - assumed to be 1:1
 * binomial distribution p=0.067 - not sign different from 1:1
 * binomial distribution p<0.05
 * low sample size - assumed to be 1:1.

Estimates of Crab Entrainment Rate (R), Number of Crabs Entrained (E), Adult Equivalent Loss (AEL), and Variance (AEL)

| Age Class | R | E | Var(E) | M | S to 2+ | AEL at 2+ | VAR(AEL 2+) | AEL at 3+ | VAR(AEL 3+) |
|-----------|---------|----------------|-------------------|------|---------|----------------|------------------|----------------|-----------------|
| YOY | 0.00517 | 966.0 | 77194.21 | 0.10 | 0.017 | 1.59 | 0.210161229 | 0.72 | 0.042557649 |
| 1+ | 0.19327 | 36091.1 | 3868086.21 | 0.60 | 0.160 | 3464.75 | 35648.28247 | 1559.14 | 7218.777201 |
| 2+ | 0.02429 | 4536.4 | 415537.73 | 0.86 | 0.649 | 2531.95 | 129448.4214 | 1139.38 | 26213.30533 |
| 3+ | 0.00088 | 165.3 | 14071.33 | 0.86 | 2.222 | 315.80 | 51383.08867 | 142.11 | 10405.07545 |
| All | | 41758.8 | 4374889.47 | | | 6314.09 | 216480.00 | 2841.34 | 43837.20 |

Note: Entrained 3+ crab are back-calculated to provide AEL at 2+.

AGE 2+ Calculations

Contribution to Adult Equivalent Loss (AEL at 2+) and Variance (AEL at 2+) by Sex (MALE/FEMALE) and Age Class

| Age Class | Female | | | Male | | |
|-----------|------------|----------------|-----------------|------------|----------------|-----------------|
| | Proportion | AEL | VAR(AEL) | Proportion | AEL | VAR(AEL) |
| YOY | 0.50 | 0.80 | 0.052540307 | 0.50 | 0.80 | 0.052540307 |
| 1+ | 0.50 | 1732.38 | 8912.070618 | 0.50 | 1732.38 | 8912.070618 |
| 2+ | 0.25 | 632.99 | 8090.526337 | 0.75 | 1898.96 | 72814.73704 |
| 3+ | 0.50 | 157.90 | 12845.77217 | 0.50 | 157.90 | 12845.77217 |
| All | | 2524.06 | 29848.42 | | 3790.03 | 94572.63 |

R = Crab Entrainment Rate (crabs/cy)
 E = Crabs Entrained (number of Crabs)
 M = Post-Entrainment Mortality (proportion)
 S = Natural Survivorship (proportion); survival to 3+ is assumed to be 45% (Armstrong et al. 1991)
 AEL = Adult Equivalent Loss
 VAR(AEL) = AEL Variance

Age Class Distribution

| Age Class | % of Total | |
|-----------|--------------|--------|
| | of Entrained | of AEL |
| YOY | 2.31 | 0.00 |
| 1+ | 86.43 | 54.87 |
| 2+ | 10.86 | 40.10 |
| 3+ | 0.40 | 5.00 |

| Age Class | Proportion of Total AEL | |
|-----------|-------------------------|--------|
| | Male | Female |
| YOY | 0.0001 | 0.0001 |
| 1+ | 0.2744 | 0.2744 |
| 2+ | 0.3007 | 0.1002 |
| 3+ | 0.0250 | 0.0250 |
| ALL | 0.60 | 0.40 |

AGE 3+ Calculations

Contribution to Adult Equivalent Loss (AEL at 3+) and Variance (AEL at 3+) by Sex (MALE/FEMALE) and Age Class

| Age Class | Female | Male |
|-----------|--------|------|
| | | |

| Age Class | Proportion | AEL | VAR(AEL) | Proportion | AEL | VAR(AEL) |
|-----------|------------|----------------|----------------|------------|----------------|-----------------|
| YOY | 0.50 | 0.36 | 0.010639412 | 0.50 | 0.36 | 0.010639412 |
| 1+ | 0.50 | 779.57 | 1804.6943 | 0.50 | 779.57 | 1804.6943 |
| 2+ | 0.25 | 284.84 | 1638.331583 | 0.75 | 854.53 | 14744.98425 |
| 3+ | 0.50 | 71.05 | 2601.268864 | 0.50 | 71.05 | 2601.268864 |
| All | | 1135.83 | 6044.31 | | 1705.51 | 19150.96 |
| | | | | | 2841.340 | 25195.263 |

R = Crab Entrainment Rate (crabs/cy)
 E = Crabs Entrained (number of Crabs)
 M = Post-Entrainment Mortality (proportion)
 S = Natural Survivorship (proportion); survival to 3+ is assumed to be 45% (Armstrong et al. 1987)
 AEL = Adult Equivalent Loss
 VAR(AEL) = AEL Variance

Age Class Distribution

| Age Class | % of Total | |
|-----------|--------------|--------------|
| | of Entrained | of AEL at 3+ |
| YOY | 2.31 | 0.03 |
| 1+ | 86.43 | 54.87 |
| 2+ | 10.86 | 40.10 |
| 3+ | 0.40 | 5.00 |

| Age Class | Proportion of Total AEL at 3+ | |
|-----------|-------------------------------|--------|
| | Male | Female |
| YOY | 0.0001 | 0.0001 |
| 1+ | 0.2744 | 0.2744 |
| 2+ | 0.3007 | 0.1002 |
| 3+ | 0.0250 | 0.0250 |
| ALL | 0.60 | 0.40 |

SUMMARY VARIANCE DATA

Entrainment with Confidence Limits

| | |
|------------|-----------|
| E | 41758.8 |
| Var(E) | 4374889.5 |
| SE E | 2091.6 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 4099.5 |
| CV E (%) | 5.01 |

TOTAL AEL at 2+ with Confidence Limits

| | |
|------------|----------|
| AEL at 2+ | 6314.1 |
| Var(AEL2+) | 216480.0 |
| SE AEL | 465.3 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 911.9 |
| CV AEL (%) | 7.37 |

TOTAL AEL at 3+ with Confidence Limits

| | |
|------------|---------|
| AEL at 3+ | 2841.3 |
| Var(AEL3+) | 43837.2 |
| SE AEL | 209.4 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 410.4 |
| CV AEL (%) | 7.37 |

SE = Standard Error

Z = Value of Z from Normal Distribution

C.I. = Confidence Interval

CV = Coefficient of Variation in %

MALE AEL at 3+ with Confidence Limits

| | |
|------------|---------|
| AEL at 3+ | 1705.5 |
| Var(AEL) | 19151.0 |
| SE AEL | 138.4 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 271.2 |
| CV AEL (%) | 8.11 |

FEMALE AEL at 3+ with Confidence Limits

| | |
|------------|---------|
| AEL at 3+ | 1135.8 |
| Var(AEL) | 6044.3 |
| SE AEL | 77.7 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 152.4 |
| CV AEL (%) | 6.84 |

TOTAL LOSS TO MALE FISHERY

(This total would be distributed over 3-4 years)

| Male Age 3+ (number of crab) | Harvest Rate (proportion) | Lost to Fishery (number of crab) |
|---------------------------------|------------------------------|-------------------------------------|
| 1705.5 | 0.70 | 1193.9 |

Harvest rate of 0.70 is taken from Armstrong et al. (1987).

Loss to Fishery with Confidence Limits

| | |
|-----------------|-------------|
| Loss to Fishery | 1193.9 |
| Var(AEL) | 9383.969446 |
| SE LF | 96.9 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 189.9 |
| CV LF (%) | 8.11 |

ADDITIONAL NOTES:

Mortality Rates (M) for crabs collected in June-September are from Armstrong et al. 1987 (Table 3.3, p. 61)

Survival rates (S) to age 2+ for crab collected from June-September are from Wainwright et al. 1992 (Table 6, p. 178), and

thereafter survival rate from 2+ to age 3+ is 0.45 (Armstrong et al. 1987).

Sex ratios used were those observed or assumed to be 1:1 where sample size was low.

Estimating Entrainment Rate, Total Entrainment, and Variance
Lower Desdemona Shoals 6/11/02 - 6/15/02

WH Pearson and GD Williams

Summary

| | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 | Total |
|--------|-------------|--------------|---------------|------------|-----------|
| R | 0.005 | 0.193 | 0.024 | 0.001 | 0.224 |
| E | 966.0 | 36091.1 | 4536.4 | 165.3 | 41758.788 |
| Var(E) | 77194.21 | 3868086.21 | 415537.73 | 14071.33 | |
| SE (E) | 277.84 | 1966.75 | 644.62 | 118.62 | |
| CV(E) | 0.29 | 0.05 | 0.14 | 0.72 | |

Calculations

| Load # (j) | V | Rj | | | | Variance Rj (Variance x Load Sheet) | | | | Entrainment (Rj x V) | | | |
|------------|------|-------------|--------------|---------------|------------|-------------------------------------|--------------|---------------|------------|----------------------|--------------|---------------|------------|
| | | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 |
| 1 | 4843 | 0.0370 | 0.2034 | 0.0000 | 0.0000 | 0.0006 | 0.0075 | 0.0000 | 0.0000 | 179.144 | 985.294 | 0 | 0 |
| 2 | 5752 | 0.0146 | 0.1463 | 0.0146 | 0.0146 | 0.0002 | 0.0018 | 0.0002 | 0.0002 | 84.1727 | 841.727 | 84.1727 | 84.1727 |
| 5 | 5605 | 0.0167 | 0.2172 | 0.0334 | 0.0000 | 0.0003 | 0.0065 | 0.0005 | 0.0000 | 93.6479 | 1217.42 | 187.296 | 0 |
| 8 | 4482 | 0.0000 | 0.1293 | 0.0259 | 0.0000 | 0.0000 | 0.0034 | 0.0007 | 0.0000 | 0 | 579.577 | 115.915 | 0 |
| 9 | 5605 | 0.0000 | 0.2125 | 0.0607 | 0.0000 | 0.0000 | 0.0032 | 0.0006 | 0.0000 | 0 | 1191.04 | 340.299 | 0 |
| 11 | 5605 | 0.0100 | 0.0603 | 0.0201 | 0.0000 | 0.0001 | 0.0007 | 0.0002 | 0.0000 | 56.3017 | 337.81 | 112.603 | 0 |
| 12 | 5617 | 0.0000 | 0.0819 | 0.0117 | 0.0000 | 0.0000 | 0.0012 | 0.0001 | 0.0000 | 0 | 460.167 | 65.7382 | 0 |
| 14 | 5617 | 0.0140 | 0.2664 | 0.0280 | 0.0000 | 0.0002 | 0.0050 | 0.0004 | 0.0000 | 78.7431 | 1496.12 | 157.486 | 0 |
| 15 | 5617 | 0.0000 | 0.3189 | 0.0319 | 0.0000 | 0.0000 | 0.0090 | 0.0010 | 0.0000 | 0 | 1791.04 | 179.104 | 0 |
| 16 | 5617 | 0.0000 | 0.0307 | 0.0153 | 0.0000 | 0.0000 | 0.0004 | 0.0002 | 0.0000 | 0 | 172.388 | 86.194 | 0 |
| 17 | 5617 | 0.0000 | 0.1268 | 0.0254 | 0.0000 | 0.0000 | 0.0026 | 0.0003 | 0.0000 | 0 | 712.347 | 142.469 | 0 |
| 18 | 5867 | 0.0000 | 0.2756 | 0.0459 | 0.0000 | 0.0000 | 0.0051 | 0.0011 | 0.0000 | 0 | 1617.01 | 269.501 | 0 |
| 23 | 5867 | 0.0000 | 0.2377 | 0.0170 | 0.0000 | 0.0000 | 0.0021 | 0.0003 | 0.0000 | 0 | 1394.78 | 99.6269 | 0 |
| 24 | 5867 | 0.0000 | 0.4007 | 0.0321 | 0.0000 | 0.0000 | 0.0030 | 0.0005 | 0.0000 | 0 | 2350.75 | 188.06 | 0 |
| 27 | 5867 | 0.0000 | 0.2656 | 0.0332 | 0.0000 | 0.0000 | 0.0069 | 0.0005 | 0.0000 | 0 | 1558.21 | 194.776 | 0 |
| 28 | 5867 | 0.0000 | 0.1042 | 0.0149 | 0.0000 | 0.0000 | 0.0020 | 0.0002 | 0.0000 | 0 | 611.194 | 87.3134 | 0 |
| 29 | 5800 | 0.0000 | 0.1837 | 0.0000 | 0.0000 | 0.0000 | 0.0016 | 0.0000 | 0.0000 | 0 | 1065.67 | 0 | 0 |

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Estimating E

| | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 |
|-------------|-------------|--------------|---------------|------------|
| numerator | 492.00978 | 18382.544 | 2310.5552 | 84.172662 |
| denominator | 95112 | 95112 | 95112 | 95112 |
| R | 0.005 | 0.193 | 0.024 | 0.001 |
| E | 966.0 | 36091.1 | 4536.4 | 165.3 |

Estimating Variance and CV

| | | YOY | 1+ | 2+ | 3+ |
|---|---------|-----------|-----------|-----------|-----------|
| | | 0-50 | 51-100 | 101-150 | >150 |
| first term (Load to load variability) | | | | | |
| step 1 | 0.48485 | | | | |
| step 2 | | 23744.277 | 2428.0157 | 13841.75 | 18.369631 |
| | | 2961.3018 | 72887.795 | 3086.9842 | 6253.9991 |
| | | 4180.0775 | 17990.837 | 2614.6449 | 24.604964 |
| | | 537.55207 | 82180.258 | 49.479514 | 15.733132 |
| | | 840.67488 | 11610.458 | 41671.621 | 24.604964 |
| | | 745.69158 | 555744.09 | 555.01382 | 24.604964 |
| | | 844.27841 | 391181.55 | 5000.6935 | 24.710432 |
| | | 2468.7581 | 168515.25 | 442.36158 | 24.710432 |
| | | 844.27841 | 497635.1 | 1819.0852 | 24.710432 |
| | | 844.27841 | 833978.36 | 2526.0388 | 24.710432 |
| | | 844.27841 | 139326.66 | 36.18898 | 24.710432 |
| | | 921.10473 | 233361.63 | 16122.38 | 26.958993 |
| | | 921.10473 | 68040.508 | 1840.4208 | 26.958993 |
| | | 921.10473 | 1480640.9 | 2073.2277 | 26.958993 |
| | | 921.10473 | 180012.32 | 2729.9714 | 26.958993 |
| | | 921.10473 | 273253.28 | 3048.5371 | 26.958993 |
| | | 900.18718 | 3059.1362 | 19852.63 | 26.346776 |
| step 3 (total) | | 44361.157 | 5011846.2 | 117311.03 | 6646.6107 |
| step 4 | 16 | | | | |
| step 5 | | 1344.2775 | 151874.13 | 3554.8796 | 201.41244 |
| second term (Basket to basket variability) | | | | | |
| step 1 | 1.94118 | | | | |
| step 2 | | 13779.057 | 174772.7 | 0 | 0 |
| | | 7074.3161 | 58366.328 | 7145.1098 | 7145.1098 |
| | | 8827.4797 | 205587.43 | 15821.182 | 0 |
| | | 0 | 68244.316 | 13204.182 | 0 |
| | | 0 | 99719.314 | 19300.512 | 0 |
| | | 3179.913 | 22902.358 | 5675.4589 | 0 |
| | | 0 | 39116.577 | 4326.0574 | 0 |
| | | 6213.4408 | 156400.77 | 11074.939 | 0 |
| | | 0 | 285141.46 | 32078.414 | 0 |
| | | 0 | 13207.841 | 7429.4108 | 0 |
| | | 0 | 83219.955 | 9133.8976 | 0 |
| | | 0 | 175251.06 | 36915.639 | 0 |
| | | 0 | 70581.421 | 9925.5124 | 0 |
| | | 0 | 103152.15 | 15718.423 | 0 |
| | | 0 | 236057.03 | 16861.216 | 0 |
| | | 0 | 68612.72 | 7623.6356 | 0 |
| | | 0 | 54078.859 | 0 | 0 |
| step 3 (total) | | 39074.206 | 1914412.3 | 212233.59 | 7145.1098 |
| step 4 | | 75849.93 | 3716212.1 | 411982.85 | 13869.919 |
| Var(E) | | 77194.207 | 3868086.2 | 415537.73 | 14071.332 |
| SE (E) | | 277.83845 | 1966.7451 | 644.62216 | 118.62264 |
| CV(E) | | 0.287623 | 0.0544938 | 0.1420999 | 0.7177967 |

| | | | | | | | | | | |
|-----------|--------|----|-------|-------|---|---------|---------|--------|--------|--------|
| 9 total | 10 | 0 | 20 | 2 | 0 | 62.7232 | 0 | 32 | 3.6 | 0 |
| mean (ci) | | 0 | 2 | 0.2 | 0 | | Rj | 0 | 0.3189 | 0.0319 |
| | | | | | | | Var Rj | 0 | 0.009 | 0.001 |
| 16 | 6/1302 | 1 | 0 | 1 | 0 | 0 | 6.517 | 0 | 0.04 | 0.01 |
| 16 | 6/1302 | 2 | 0 | 0 | 0 | 0 | 6.517 | 0 | 0.04 | 0.01 |
| 16 | 6/1302 | 3 | 0 | 0 | 0 | 0 | 6.517 | 0 | 0.04 | 0.01 |
| 16 | 6/1302 | 4 | 0 | 0 | 1 | 0 | 6.517 | 0 | 0.04 | 0.81 |
| 16 | 6/1302 | 5 | 0 | 0 | 0 | 0 | 6.517 | 0 | 0.04 | 0.01 |
| 16 | 6/1302 | 6 | 0 | 1 | 0 | 0 | 6.517 | 0 | 0.04 | 0.01 |
| 16 | 6/1302 | 7 | 0 | 0 | 0 | 0 | 6.517 | 0 | 0.04 | 0.01 |
| 16 | 6/1302 | 8 | 0 | 0 | 0 | 0 | 6.517 | 0 | 0.04 | 0.01 |
| 16 | 6/1302 | 9 | 0 | 0 | 0 | 0 | 6.517 | 0 | 0.04 | 0.01 |
| 16 | 6/1302 | 10 | 0 | 0 | 0 | 0 | 6.517 | 0 | 0.04 | 0.01 |
| 10 total | 10 | 0 | 2 | 1 | 0 | 65.1666 | 0 | 1.6 | 3.9 | 0 |
| mean (ci) | | 0 | 0.2 | 0.1 | 0 | | Rj | 0 | 0.0307 | 0.0153 |
| | | | | | | | Var Rj | 0 | 0.0004 | 0.0002 |
| 17 | 6/1302 | 1 | 0 | 1 | 0 | 0 | 7.168 | 0 | 0.0083 | 0.0331 |
| 17 | 6/1302 | 2 | 0 | 0 | 0 | 0 | 7.168 | 0 | 0.8264 | 0.0331 |
| 17 | 6/1302 | 3 | 0 | 0 | 1 | 0 | 7.168 | 0 | 0.8264 | 0.6684 |
| 17 | 6/1302 | 4 | 0 | 0 | 0 | 0 | 7.168 | 0 | 0.8264 | 0.0331 |
| 17 | 6/1302 | 5 | 0 | 0 | 0 | 0 | 7.168 | 0 | 0.8264 | 0.0331 |
| 17 | 6/1302 | 6 | 0 | 0 | 0 | 0 | 7.168 | 0 | 0.8264 | 0.0331 |
| 17 | 6/1302 | 7 | 0 | 4 | 1 | 0 | 7.168 | 0 | 2.8337 | 0.6684 |
| 17 | 6/1302 | 8 | 0 | 2 | 0 | 0 | 7.168 | 0 | 1.1901 | 0.0331 |
| 17 | 6/1302 | 9 | 0 | 1 | 0 | 0 | 7.168 | 0 | 0.0083 | 0.0331 |
| 17 | 6/1302 | 10 | 0 | 1 | 0 | 0 | 7.168 | 0 | 0.0083 | 0.0331 |
| 17 | 6/1302 | 11 | 0 | 1 | 0 | 0 | 7.168 | 0 | 0.0083 | 0.0331 |
| 11 total | 11 | 0 | 9 | 2 | 0 | 78.852 | 0 | 14.300 | 1.6364 | 0 |
| mean (ci) | | 0 | 0.818 | 0.182 | 0 | | Rj | 0 | 0.1266 | 0.0254 |
| | | | | | | | Var Rj | 0 | 0.0028 | 0.0003 |
| 18 | 6/1302 | 1 | 0 | 1 | 0 | 0 | 6.471 | 0 | 0.6137 | 0.0883 |
| 18 | 6/1302 | 2 | 0 | 0 | 0 | 0 | 6.471 | 0 | 3.1804 | 0.0883 |
| 18 | 6/1302 | 3 | 0 | 2 | 0 | 0 | 6.471 | 0 | 0.6469 | 0.0883 |
| 18 | 6/1302 | 4 | 0 | 3 | 0 | 0 | 6.471 | 0 | 1.2847 | 0.0968 |
| 18 | 6/1302 | 5 | 0 | 5 | 0 | 0 | 6.471 | 0 | 10.347 | 0.0883 |
| 18 | 6/1302 | 6 | 0 | 3 | 2 | 0 | 6.471 | 0 | 1.4802 | 2.8984 |
| 18 | 6/1302 | 7 | 0 | 1 | 0 | 0 | 6.471 | 0 | 0.6137 | 0.0883 |
| 18 | 6/1302 | 8 | 0 | 1 | 1 | 0 | 6.471 | 0 | 0.6137 | 0.4939 |
| 18 | 6/1302 | 9 | 0 | 1 | 0 | 0 | 6.471 | 0 | 0.7509 | 0.0968 |
| 18 | 6/1302 | 10 | 0 | 1 | 0 | 0 | 6.471 | 0 | 0.6137 | 0.0883 |
| 12 total | 10 | 0 | 16 | 3 | 0 | 65.3056 | 0 | 19.545 | 4.1169 | 0 |
| mean (ci) | | 0 | 1.6 | 0.3 | 0 | | Rj | 0 | 0.2756 | 0.0459 |
| | | | | | | | Var Rj | 0 | 0.0081 | 0.0011 |
| 23 | 6/1402 | 1 | 0 | 1 | 0 | 0 | 5.889 | 0 | 0.16 | 0.01 |
| 23 | 6/1402 | 2 | 0 | 1 | 0 | 0 | 5.889 | 0 | 0.16 | 0.01 |
| 23 | 6/1402 | 3 | 0 | 2 | 0 | 0 | 5.889 | 0 | 0.36 | 0.01 |
| 23 | 6/1402 | 4 | 0 | 1 | 0 | 0 | 5.889 | 0 | 0.16 | 0.01 |
| 23 | 6/1402 | 5 | 0 | 2 | 1 | 0 | 5.889 | 0 | 0.36 | 0.81 |
| 23 | 6/1402 | 6 | 0 | 3 | 0 | 0 | 5.889 | 0 | 2.56 | 0.01 |
| 23 | 6/1402 | 7 | 0 | 1 | 0 | 0 | 5.889 | 0 | 0.16 | 0.01 |
| 23 | 6/1402 | 8 | 0 | 2 | 0 | 0 | 5.889 | 0 | 0.36 | 0.01 |
| 23 | 6/1402 | 9 | 0 | 0 | 0 | 0 | 5.889 | 0 | 1.96 | 0.01 |
| 23 | 6/1402 | 10 | 0 | 1 | 0 | 0 | 5.889 | 0 | 0.16 | 0.01 |
| 13 total | 10 | 0 | 14 | 1 | 0 | 68.8897 | 0 | 8.4 | 3.9 | 0 |
| mean (ci) | | 0 | 1.4 | 0.1 | 0 | | Rj | 0 | 0.2377 | 0.017 |
| | | | | | | | Var Rj | 0 | 0.0021 | 0.0003 |
| 24 | 6/1402 | 1 | 0 | 2 | 0 | 0 | 6.23951 | 0 | 0.25 | 0.04 |
| 24 | 6/1402 | 2 | 0 | 3 | 1 | 0 | 6.23951 | 0 | 0.25 | 0.64 |
| 24 | 6/1402 | 3 | 0 | 1 | 0 | 0 | 6.23951 | 0 | 2.25 | 0.04 |
| 24 | 6/1402 | 4 | 0 | 2 | 0 | 0 | 6.23951 | 0 | 0.25 | 0.04 |
| 24 | 6/1402 | 5 | 0 | 3 | 0 | 0 | 6.23951 | 0 | 0.25 | 0.04 |
| 24 | 6/1402 | 6 | 0 | 2 | 1 | 0 | 6.23951 | 0 | 0.25 | 0.64 |
| 24 | 6/1402 | 7 | 0 | 5 | 0 | 0 | 6.23951 | 0 | 6.25 | 0.04 |
| 24 | 6/1402 | 8 | 0 | 2 | 0 | 0 | 6.23951 | 0 | 0.25 | 0.04 |
| 24 | 6/1402 | 9 | 0 | 3 | 0 | 0 | 6.23951 | 0 | 0.25 | 0.04 |
| 24 | 6/1402 | 10 | 0 | 2 | 0 | 0 | 6.23951 | 0 | 0.25 | 0.04 |
| 14 total | 10 | 0 | 25 | 2 | 0 | 62.3951 | 0 | 10.5 | 1.6 | 0 |
| mean (ci) | | 0 | 2.5 | 0.2 | 0 | | Rj | 0 | 0.4007 | 0.0321 |
| | | | | | | | Var Rj | 0 | 0.003 | 0.0005 |
| 27 | 6/1402 | 1 | 0 | 0 | 0 | 0 | 6.024 | 0 | 2.56 | 0.04 |
| 27 | 6/1402 | 2 | 0 | 3 | 0 | 0 | 6.024 | 0 | 1.96 | 0.04 |
| 27 | 6/1402 | 3 | 0 | 3 | 0 | 0 | 6.024 | 0 | 1.96 | 0.04 |
| 27 | 6/1402 | 4 | 0 | 5 | 1 | 0 | 6.024 | 0 | 11.56 | 0.64 |
| 27 | 6/1402 | 5 | 0 | 0 | 0 | 0 | 6.024 | 0 | 2.56 | 0.04 |
| 27 | 6/1402 | 6 | 0 | 1 | 0 | 0 | 6.024 | 0 | 0.36 | 0.04 |
| 27 | 6/1402 | 7 | 0 | 1 | 0 | 0 | 6.024 | 0 | 0.36 | 0.04 |
| 27 | 6/1402 | 8 | 0 | 1 | 0 | 0 | 6.024 | 0 | 0.36 | 0.04 |
| 27 | 6/1402 | 9 | 0 | 1 | 1 | 0 | 6.024 | 0 | 0.36 | 0.64 |
| 27 | 6/1402 | 10 | 0 | 1 | 0 | 0 | 6.024 | 0 | 0.36 | 0.04 |
| 16 total | 10 | 0 | 16 | 2 | 0 | 61.2432 | 0 | 22.4 | 1.6 | 0 |
| mean (ci) | | 0 | 1.6 | 0.2 | 0 | | Rj | 0 | 0.2656 | 0.0332 |
| | | | | | | | Var Rj | 0 | 0.0069 | 0.0005 |
| 28 | 6/1402 | 1 | 0 | 0 | 0 | 0 | 6.719 | 0 | 0.49 | 0.01 |
| 28 | 6/1402 | 2 | 0 | 1 | 1 | 0 | 6.719 | 0 | 0.09 | 0.81 |
| 28 | 6/1402 | 3 | 0 | 0 | 0 | 0 | 6.719 | 0 | 0.49 | 0.01 |
| 28 | 6/1402 | 4 | 0 | 0 | 0 | 0 | 6.719 | 0 | 0.49 | 0.01 |
| 28 | 6/1402 | 5 | 0 | 1 | 0 | 0 | 6.719 | 0 | 0.09 | 0.01 |
| 28 | 6/1402 | 6 | 0 | 0 | 0 | 0 | 6.719 | 0 | 0.49 | 0.01 |
| 28 | 6/1402 | 7 | 0 | 1 | 0 | 0 | 6.719 | 0 | 0.09 | 0.01 |
| 28 | 6/1402 | 8 | 0 | 1 | 0 | 0 | 6.719 | 0 | 0.09 | 0.01 |
| 28 | 6/1402 | 9 | 0 | 3 | 0 | 0 | 6.719 | 0 | 5.29 | 0.01 |
| 28 | 6/1402 | 10 | 0 | 0 | 0 | 0 | 6.719 | 0 | 0.49 | 0.01 |
| 16 total | 10 | 0 | 7 | 1 | 0 | 67.1947 | 0 | 8.1 | 3.9 | 0 |
| mean (ci) | | 0 | 0.7 | 0.1 | 0 | | Rj | 0 | 0.1042 | 0.0149 |
| | | | | | | | Var Rj | 0 | 0.002 | 0.0002 |
| 29 | 6/1402 | 1 | 0 | 1 | 0 | 0 | 7.620 | 0 | 0.16 | 0 |
| 29 | 6/1402 | 2 | 0 | 3 | 0 | 0 | 7.620 | 0 | 2.56 | 0 |
| 29 | 6/1402 | 3 | 0 | 0 | 0 | 0 | 7.620 | 0 | 1.96 | 0 |
| 29 | 6/1402 | 4 | 0 | 2 | 0 | 0 | 7.620 | 0 | 0.36 | 0 |
| 29 | 6/1402 | 5 | 0 | 0 | 0 | 0 | 7.620 | 0 | 1.96 | 0 |
| 29 | 6/1402 | 6 | 0 | 2 | 0 | 0 | 7.620 | 0 | 0.36 | 0 |
| 29 | 6/1402 | 7 | 0 | 2 | 0 | 0 | 7.620 | 0 | 0.16 | 0 |
| 29 | 6/1402 | 8 | 0 | 1 | 0 | 0 | 7.620 | 0 | 0.16 | 0 |
| 29 | 6/1402 | 9 | 0 | 2 | 0 | 0 | 7.620 | 0 | 0.36 | 0 |
| 29 | 6/1402 | 10 | 0 | 2 | 0 | 0 | 7.620 | 0 | 0.36 | 0 |
| 17 total | 10 | 0 | 14 | 0 | 0 | 76.1961 | 0 | 8.4 | 0 | 0 |
| mean (ci) | | 0 | 1.4 | 0 | 0 | | Rj | 0 | 0.1837 | 0 |
| | | | | | | | Var Rj | 0 | 0.0016 | 0 |

Total Entrainment by Load
 WH Pearson and GD Williams

Lower Desdemona Shoals
 6/11/02 - 6/15/02

| Load # (j) | Total Load Volume (V) | # Samples (b) | Total Sample Volume (v) | Totals by Age Class i | | | | Rij | | | |
|---------------|-----------------------|---------------|-------------------------|-----------------------|--------|---------|------|--------|--------|---------|--------|
| | | | | YOY | 1+ | 2+ | 3+ | YOY | 1+ | 2+ | 3+ |
| | | | | 0-50 | 51-100 | 101-150 | >150 | 0-50 | 51-100 | 101-150 | >150 |
| 1 | 4843 | 8 | 54.068119 | 2 | 11 | 0 | 0 | 0.0370 | 0.2034 | 0.0000 | 0.0000 |
| 2 | 5752 | 10 | 68.335726 | 1 | 10 | 1 | 1 | 0.0146 | 0.1463 | 0.0146 | 0.0146 |
| 5 | 5605 | 10 | 59.851841 | 1 | 13 | 2 | 0 | 0.0167 | 0.2172 | 0.0334 | 0.0000 |
| 8 | 4482 | 10 | 38.666143 | 0 | 5 | 1 | 0 | 0.0000 | 0.1293 | 0.0259 | 0.0000 |
| 9 | 5605 | 10 | 65.883333 | 0 | 14 | 4 | 0 | 0.0000 | 0.2125 | 0.0607 | 0.0000 |
| 11 | 5605 | 10 | 99.552859 | 1 | 6 | 2 | 0 | 0.0100 | 0.0603 | 0.0201 | 0.0000 |
| 12 | 5617 | 10 | 85.445042 | 0 | 7 | 1 | 0 | 0.0000 | 0.0819 | 0.0117 | 0.0000 |
| 14 | 5617 | 10 | 71.333263 | 1 | 19 | 2 | 0 | 0.0140 | 0.2664 | 0.0280 | 0.0000 |
| 15 | 5617 | 10 | 62.723167 | 0 | 20 | 2 | 0 | 0.0000 | 0.3189 | 0.0319 | 0.0000 |
| 16 | 5617 | 10 | 65.166926 | 0 | 2 | 1 | 0 | 0.0000 | 0.0307 | 0.0153 | 0.0000 |
| 17 | 5617 | 11 | 78.851981 | 0 | 10 | 2 | 0 | 0.0000 | 0.1268 | 0.0254 | 0.0000 |
| 18 | 5867 | 10 | 65.309609 | 0 | 18 | 3 | 0 | 0.0000 | 0.2756 | 0.0459 | 0.0000 |
| 23 | 5867 | 10 | 58.889738 | 0 | 14 | 1 | 0 | 0.0000 | 0.2377 | 0.0170 | 0.0000 |
| 24 | 5867 | 10 | 62.395079 | 0 | 25 | 2 | 0 | 0.0000 | 0.4007 | 0.0321 | 0.0000 |
| 27 | 5867 | 10 | 60.243525 | 0 | 16 | 2 | 0 | 0.0000 | 0.2656 | 0.0332 | 0.0000 |
| 28 | 5867 | 10 | 67.194701 | 0 | 7 | 1 | 0 | 0.0000 | 0.1042 | 0.0149 | 0.0000 |
| 29 | 5800 | 10 | 76.196078 | 0 | 14 | 0 | 0 | 0.0000 | 0.1837 | 0.0000 | 0.0000 |

| | | | | | | | | | | | |
|----|---------|----|-------|-----------|-------|---------|----|---|---|---|---|
| 15 | 6/13/02 | 5 | 17:32 | 17.553125 | 21.44 | 6.27232 | nd | 0 | 3 | 0 | 0 |
| 15 | 6/13/02 | 6 | 17:38 | 17.553125 | 21.44 | 6.27232 | nd | 0 | 2 | 0 | 0 |
| 15 | 6/13/02 | 7 | 18:02 | 17.553125 | 21.44 | 6.27232 | nd | 0 | 4 | 0 | 0 |
| 15 | 6/13/02 | 8 | 18:09 | 17.553125 | 21.44 | 6.27232 | nd | 0 | 1 | 0 | 0 |
| 15 | 6/13/02 | 9 | 18:16 | 17.553125 | 21.44 | 6.27232 | nd | 0 | 1 | 0 | 0 |
| 15 | 6/13/02 | 10 | 18:23 | 17.553125 | 21.44 | 6.27232 | nd | 0 | 1 | 0 | 0 |
| 16 | 6/13/02 | 1 | 19:09 | 18.237013 | 21.44 | 6.51669 | nd | 0 | 1 | 0 | 0 |
| 16 | 6/13/02 | 2 | 19:17 | 18.237013 | 21.44 | 6.51669 | nd | 0 | 0 | 0 | Y |
| 16 | 6/13/02 | 3 | 19:25 | 18.237013 | 21.44 | 6.51669 | nd | 0 | 0 | 0 | 0 |
| 16 | 6/13/02 | 4 | 19:30 | 18.237013 | 21.44 | 6.51669 | nd | 0 | 0 | 1 | 0 |
| 16 | 6/13/02 | 5 | 19:36 | 18.237013 | 21.44 | 6.51669 | nd | 0 | 0 | 0 | 0 |
| 16 | 6/13/02 | 6 | 19:40 | 18.237013 | 21.44 | 6.51669 | nd | 0 | 1 | 0 | 0 |
| 16 | 6/13/02 | 7 | 19:45 | 18.237013 | 21.44 | 6.51669 | nd | 0 | 0 | 0 | 0 |
| 16 | 6/13/02 | 8 | 20:01 | 18.237013 | 21.44 | 6.51669 | nd | 0 | 0 | 0 | 0 |
| 16 | 6/13/02 | 9 | 20:08 | 18.237013 | 21.44 | 6.51669 | nd | 0 | 0 | 0 | Y |
| 16 | 6/13/02 | 10 | 20:15 | 18.237013 | 21.44 | 6.51669 | nd | 0 | 0 | 0 | 0 |
| 17 | 6/13/02 | 1 | 20:58 | 20.060714 | 21.44 | 7.16836 | nd | 0 | 1 | 0 | 0 |
| 17 | 6/13/02 | 2 | 21:03 | 20.060714 | 21.44 | 7.16836 | nd | 0 | 0 | 0 | 0 |
| 17 | 6/13/02 | 3 | 21:08 | 20.060714 | 21.44 | 7.16836 | nd | 0 | 0 | 1 | 0 |
| 17 | 6/13/02 | 4 | 21:13 | 20.060714 | 21.44 | 7.16836 | nd | 0 | 0 | 0 | Y |
| 17 | 6/13/02 | 5 | 21:17 | 20.060714 | 21.44 | 7.16836 | nd | 0 | 0 | 0 | Y |
| 17 | 6/13/02 | 6 | 21:22 | 20.060714 | 21.44 | 7.16836 | nd | 0 | 0 | 0 | 0 |
| 17 | 6/13/02 | 7 | 21:38 | 20.060714 | 21.44 | 7.16836 | nd | 0 | 4 | 1 | 0 |
| 17 | 6/13/02 | 8 | 21:44 | 20.060714 | 21.44 | 7.16836 | nd | 0 | 2 | 0 | 0 |
| 17 | 6/13/02 | 9 | 21:53 | 20.060714 | 21.44 | 7.16836 | nd | 0 | 1 | 0 | 0 |
| 17 | 6/13/02 | 10 | 21:58 | 20.060714 | 21.44 | 7.16836 | nd | 0 | 1 | 0 | 0 |
| 17 | 6/13/02 | 11 | 22:09 | 20.060714 | 21.44 | 7.16836 | nd | 0 | 1 | 0 | 0 |
| 18 | 6/13/02 | 1 | 22:43 | 18.108025 | 21.44 | 6.4706 | nd | 0 | 1 | 0 | 0 |
| 18 | 6/13/02 | 2 | 22:47 | 18.108025 | 21.44 | 6.4706 | nd | 0 | 0 | 0 | Y |
| 18 | 6/13/02 | 3 | 22:53 | 18.108025 | 21.44 | 6.4706 | nd | 0 | 2 | 0 | Y |
| 18 | 6/13/02 | 4 | 22:57 | 18.108025 | 22.44 | 6.7724 | nd | 0 | 3 | 0 | 0 |
| 18 | 6/13/02 | 5 | 23:02 | 18.108025 | 21.44 | 6.4706 | nd | 0 | 5 | 0 | 0 |
| 18 | 6/13/02 | 6 | 23:07 | 18.108025 | 21.44 | 6.4706 | nd | 0 | 3 | 2 | 0 |
| 18 | 6/13/02 | 7 | 23:11 | 18.108025 | 21.44 | 6.4706 | nd | 0 | 1 | 0 | Y |
| 18 | 6/13/02 | 8 | 23:15 | 18.108025 | 21.44 | 6.4706 | nd | 0 | 1 | 1 | 0 |
| 18 | 6/13/02 | 9 | 23:26 | 18.108025 | 22.44 | 6.7724 | nd | 0 | 1 | 0 | 0 |
| 18 | 6/13/02 | 10 | 23:38 | 18.108025 | 21.44 | 6.4706 | nd | 0 | 1 | 0 | 0 |
| 23 | 6/14/02 | 1 | 10:03 | 16.480337 | 21.44 | 5.88897 | nd | 0 | 1 | 0 | Y |
| 23 | 6/14/02 | 2 | 10:10 | 16.480337 | 21.44 | 5.88897 | nd | 0 | 1 | 0 | 0 |
| 23 | 6/14/02 | 3 | 10:15 | 16.480337 | 21.44 | 5.88897 | nd | 0 | 2 | 0 | Y |
| 23 | 6/14/02 | 4 | 10:20 | 16.480337 | 21.44 | 5.88897 | nd | 0 | 1 | 0 | Y |
| 23 | 6/14/02 | 5 | 10:24 | 16.480337 | 21.44 | 5.88897 | nd | 0 | 2 | 1 | 0 |
| 23 | 6/14/02 | 6 | 10:29 | 16.480337 | 21.44 | 5.88897 | nd | 0 | 3 | 0 | 0 |
| 23 | 6/14/02 | 7 | 10:56 | 16.480337 | 21.44 | 5.88897 | nd | 0 | 1 | 0 | Y |
| 23 | 6/14/02 | 8 | 11:02 | 16.480337 | 21.44 | 5.88897 | nd | 0 | 2 | 0 | 0 |
| 23 | 6/14/02 | 9 | 11:07 | 16.480337 | 21.44 | 5.88897 | nd | 0 | 0 | 0 | Y |
| 23 | 6/14/02 | 10 | 11:11 | 16.480337 | 21.44 | 5.88897 | nd | 0 | 1 | 0 | 0 |
| 24 | 6/14/02 | 1 | 12:22 | 17.46131 | 21.44 | 6.23951 | nd | 0 | 2 | 0 | 0 |
| 24 | 6/14/02 | 2 | 12:26 | 17.46131 | 21.44 | 6.23951 | nd | 0 | 3 | 1 | 0 |
| 24 | 6/14/02 | 3 | 12:31 | 17.46131 | 21.44 | 6.23951 | nd | 0 | 1 | 0 | 0 |
| 24 | 6/14/02 | 4 | 12:34 | 17.46131 | 21.44 | 6.23951 | nd | 0 | 2 | 0 | 0 |
| 24 | 6/14/02 | 5 | 12:38 | 17.46131 | 21.44 | 6.23951 | nd | 0 | 3 | 0 | 0 |
| 24 | 6/14/02 | 6 | 12:51 | 17.46131 | 21.44 | 6.23951 | nd | 0 | 2 | 1 | 0 |
| 24 | 6/14/02 | 7 | 13:01 | 17.46131 | 21.44 | 6.23951 | nd | 0 | 5 | 0 | 0 |
| 24 | 6/14/02 | 8 | 13:08 | 17.46131 | 21.44 | 6.23951 | nd | 0 | 2 | 0 | 0 |
| 24 | 6/14/02 | 9 | 13:12 | 17.46131 | 21.44 | 6.23951 | nd | 0 | 3 | 0 | 0 |
| 24 | 6/14/02 | 10 | 13:18 | 17.46131 | 21.44 | 6.23951 | nd | 0 | 2 | 0 | 0 |
| 27 | 6/14/02 | 1 | 18:17 | 16.859195 | 21.44 | 6.02435 | nd | 0 | 0 | 0 | Y |
| 27 | 6/14/02 | 2 | 18:21 | 16.859195 | 21.44 | 6.02435 | nd | 0 | 3 | 0 | 0 |
| 27 | 6/14/02 | 3 | 18:25 | 16.859195 | 21.44 | 6.02435 | nd | 0 | 3 | 0 | 0 |
| 27 | 6/14/02 | 4 | 18:30 | 16.859195 | 21.44 | 6.02435 | nd | 0 | 5 | 0 | 0 |
| 27 | 6/14/02 | 5 | 18:45 | 16.859195 | 21.44 | 6.02435 | nd | 0 | 0 | 0 | Y |
| 27 | 6/14/02 | 6 | 18:53 | 16.859195 | 21.44 | 6.02435 | nd | 0 | 1 | 0 | 0 |
| 27 | 6/14/02 | 7 | 18:59 | 16.859195 | 21.44 | 6.02435 | nd | 0 | 1 | 0 | 0 |
| 27 | 6/14/02 | 8 | 19:04 | 16.859195 | 21.44 | 6.02435 | nd | 0 | 1 | 0 | Y |
| 27 | 6/14/02 | 9 | 19:09 | 16.859195 | 21.44 | 6.02435 | nd | 0 | 1 | 1 | 0 |
| 27 | 6/14/02 | 10 | 19:22 | 16.859195 | 21.44 | 6.02435 | nd | 0 | 1 | 0 | 0 |
| 28 | 6/14/02 | 1 | 20:13 | 18.804487 | 21.44 | 6.71947 | nd | 0 | 0 | 0 | Y |
| 28 | 6/14/02 | 2 | 20:18 | 18.804487 | 21.44 | 6.71947 | nd | 0 | 1 | 1 | 0 |
| 28 | 6/14/02 | 3 | 20:22 | 18.804487 | 21.44 | 6.71947 | nd | 0 | 0 | 0 | Y |
| 28 | 6/14/02 | 4 | 20:27 | 18.804487 | 21.44 | 6.71947 | nd | 0 | 0 | 0 | Y |
| 28 | 6/14/02 | 5 | 20:33 | 18.804487 | 21.44 | 6.71947 | nd | 0 | 1 | 1 | 0 |
| 28 | 6/14/02 | 6 | 20:36 | 18.804487 | 21.44 | 6.71947 | nd | 0 | 0 | 0 | 0 |
| 28 | 6/14/02 | 7 | 20:41 | 18.804487 | 21.44 | 6.71947 | nd | 0 | 1 | 0 | 0 |
| 28 | 6/14/02 | 8 | 20:46 | 18.804487 | 21.44 | 6.71947 | nd | 0 | 1 | 0 | 0 |
| 28 | 6/14/02 | 9 | 20:49 | 18.804487 | 21.44 | 6.71947 | nd | 0 | 3 | 0 | Y |
| 28 | 6/14/02 | 10 | 20:54 | 18.804487 | 21.44 | 6.71947 | nd | 0 | 0 | 0 | 0 |
| 29 | 6/14/02 | 1 | 22:16 | 21.323529 | 21.44 | 7.61961 | nd | 0 | 1 | 0 | 0 |
| 29 | 6/14/02 | 2 | 22:20 | 21.323529 | 21.44 | 7.61961 | nd | 0 | 3 | 0 | 0 |
| 29 | 6/14/02 | 3 | 22:24 | 21.323529 | 21.44 | 7.61961 | nd | 0 | 0 | 0 | 0 |
| 29 | 6/14/02 | 4 | 22:27 | 21.323529 | 21.44 | 7.61961 | nd | 0 | 2 | 0 | 0 |
| 29 | 6/14/02 | 5 | 22:31 | 21.323529 | 21.44 | 7.61961 | nd | 0 | 0 | 0 | Y |
| 29 | 6/14/02 | 6 | 22:35 | 21.323529 | 21.44 | 7.61961 | nd | 0 | 2 | 0 | 0 |
| 29 | 6/14/02 | 7 | 22:40 | 21.323529 | 21.44 | 7.61961 | nd | 0 | 1 | 0 | Y |
| 29 | 6/14/02 | 8 | 22:47 | 21.323529 | 21.44 | 7.61961 | nd | 0 | 1 | 0 | 0 |
| 29 | 6/14/02 | 9 | 23:03 | 21.323529 | 21.44 | 7.61961 | nd | 0 | 2 | 0 | 0 |
| 29 | 6/14/02 | 10 | 23:08 | 21.323529 | 21.44 | 7.61961 | nd | 0 | 2 | 0 | 0 |

Load Records And Rates

Lower Desdemona Shoals

Sample Volume assumes 25% of total load diverted to sampler; 50% if one drag arm

WH Pearson and GD Williams

6/11/02 - 6/15/02

| Load Sequence | Sampling Instructions | Date | Load Time | | # Passes | Wet Load Volume (cu yd) | Settled Solids Volume (cu yd) | Total Distance Travelled (ft) | No. Basket Samples Taken | Pumping Time (min) | No. Drag Arms in Operation | Ave. Load Rate per Arm (cu yd/min) | Sample Load Rate (cu yd/min) |
|---------------|-----------------------|---------|-----------|-------|----------|-------------------------|-------------------------------|-------------------------------|--------------------------|--------------------|----------------------------|------------------------------------|------------------------------|
| | | | Start | End | | | | | | | | | |
| 1 | Sample | 6/11/02 | 15:18 | 16:30 | 2 | 16000 | 4843 | 12000 | 8 | 67 | 2 | 36.141791 | 18.0708955 |
| 2 | Sample | 6/11/02 | 16:57 | 18:25 | 3 | 16545 | 5752 | 18000 | 10 | 78 | 2 | 36.8717949 | 18.4358974 |
| 3 | Off | 6/11/02 | 19:06 | 20:15 | 2 | 16510 | 5752 | 12000 | 0 | 64 | 2 | 44.9375 | 22.46875 |
| 4 | Off | 6/11/02 | 20:38 | 21:49 | 2 | 16510 | 5752 | 12000 | 0 | 66 | 2 | 43.5757576 | 21.7878788 |
| 5 | Sample | 6/11/02 | 22:17 | 0:32 | 2 | 16600 | 5605 | 18000 | 10 | 86 | 2 | 32.5872093 | 16.2936047 |
| 6 | Off | 6/12/02 | 0:50 | 2:04 | 3 | 16500 | 5605 | 16000 | 0 | 64 | 2 | 43.7890625 | 21.8945313 |
| 7 | Off | 6/12/02 | 2:23 | 3:56 | 3 | 16519 | 5605 | 16000 | 0 | 83 | 2 | 33.7650602 | 16.8825301 |
| 8 | Sample | 6/12/02 | 4:15 | 6:00 | 1 | 15319 | 4482 | 6000 | 10 | 105 | 2 | 21.3428571 | 10.6714286 |
| 9 | Sample | 6/12/02 | 15:30 | 16:56 | 3 | 16552 | 5605 | 16000 | 10 | 76 | 2 | 36.875 | 18.4375 |
| 10 | Off | 6/12/02 | 17:31 | 18:54 | 3 | 15900 | 5000 | 16000 | 0 | 73 | 2 | 34.2465753 | 17.1232877 |
| 11 | Sample | 6/12/02 | 20:30 | 22:32 | 5 | 16510 | 5605 | 22000 | 10 | 102 | 1 | 54.9509804 | 27.4754902 |
| 12 | Sample | 6/12/02 | 22:56 | 1:14 | 4 | 16500 | 5617 | 28000 | 10 | 118 | 1 | 47.6016949 | 23.8008475 |
| 13 | Off | 6/13/02 | 1:37 | 4:00 | 6 | 16520 | 5617 | 32000 | 0 | 118 | 1 | 47.6016949 | 23.8008475 |
| 14 | Sample | 6/13/02 | 15:15 | 16:36 | 3 | 16529 | 5617 | 15000 | 10 | 71 | 2 | 39.556338 | 19.778169 |
| 15 | Sample | 6/13/02 | 17:10 | 18:45 | 2 | 16524 | 5617 | 12000 | 10 | 80 | 2 | 35.10625 | 17.553125 |
| 16 | Sample | 6/13/02 | 19:04 | 20:31 | 2 | 16515 | 5617 | 10000 | 10 | 77 | 2 | 36.474026 | 18.237013 |
| 17 | Sample | 6/13/02 | 20:54 | 22:16 | 2 | 16531 | 5617 | 12000 | 11 | 70 | 2 | 40.1214286 | 20.0607143 |
| 18 | Sample | 6/13/02 | 22:38 | 0:09 | 3 | 16539 | 5867 | 16000 | 10 | 81 | 2 | 36.2160494 | 18.1080247 |

| | | | | | | | | | | | | | |
|----|--------|---------|-------|-------|---|-------|------|-------|----|-----|---|------------|------------|
| 19 | Off | 6/14/02 | 0:28 | 1:40 | 3 | 16500 | 5867 | 18000 | 0 | 62 | 2 | 47.3145161 | 23.6572581 |
| 20 | Off | 6/14/02 | 1:59 | 3:29 | 3 | 16500 | 5867 | 16000 | 0 | 80 | 2 | 36.66875 | 18.334375 |
| 21 | Off | 6/14/02 | 3:50 | 5:09 | 2 | 16519 | 5867 | 15000 | 0 | 73 | 2 | 40.1849315 | 20.0924658 |
| 22 | Off | 6/14/02 | 5:35 | 8:14 | 2 | 15800 | 4843 | 10000 | 0 | 141 | 1 | 34.3475177 | 17.1737589 |
| 23 | Sample | 6/14/02 | 9:54 | 11:38 | 2 | 16551 | 5867 | 12000 | 10 | 89 | 2 | 32.9606742 | 16.4803371 |
| 24 | Sample | 6/14/02 | 12:18 | 13:57 | 3 | 16546 | 5867 | 18000 | 10 | 84 | 2 | 34.922619 | 17.4613095 |
| 25 | Off | 6/14/02 | 14:18 | 15:47 | 3 | 16508 | 5867 | 18000 | 0 | 77 | 2 | 38.0974026 | 19.0487013 |
| 26 | Off | 6/14/02 | 16:07 | 17:47 | 3 | 16526 | 5867 | 18000 | 0 | 90 | 2 | 32.5944444 | 16.2972222 |
| 27 | Sample | 6/14/02 | 18:12 | 19:46 | 2 | 16537 | 5867 | 12000 | 10 | 87 | 2 | 33.7183908 | 16.8591954 |
| 28 | Sample | 6/14/02 | 20:10 | 21:48 | 2 | 16540 | 5867 | 12500 | 10 | 78 | 2 | 37.6089744 | 18.8044872 |
| 29 | Sample | 6/14/02 | 22:13 | 23:36 | 2 | 15900 | 5800 | 12000 | 10 | 68 | 2 | 42.6470588 | 21.3235294 |
| 30 | Off | 6/15/02 | 0:06 | 1:32 | 3 | 16533 | 6029 | 18000 | 0 | 74 | 2 | 40.7364865 | 20.3682432 |
| 31 | Off | 6/15/02 | 1:53 | 3:20 | 3 | 16200 | 6029 | 18000 | 0 | 75 | 2 | 40.1933333 | 20.0966667 |
| 32 | Off | 6/15/02 | 3:43 | 5:12 | 3 | 16524 | 6029 | 18000 | 0 | 77 | 2 | 39.1493506 | 19.5746753 |
| 33 | Off | 6/15/02 | 5:34 | 7:36 | 2 | 16516 | 6029 | 12000 | 0 | 107 | 2 | 28.1728972 | 14.0864486 |

| | | | |
|---------|----------------------|---------------------------|--------------------------|
| Summary | Total # Hauls (H) | # Hauls Sampled (h) | Total Haul Volume (V) |
| | 33 | 17 | 186737 |

SUMMARY OF CALCULATION OF ADULT EQUIVALENT LOSS BASED ON MODIFIED DREDGE IMPACT MODEL AND DIRECT MEASUREMENT OF ENTRAINMENT RATES at Desdemona Shoals, September 2002

WH Pearson and GD Williams First Version: **24-Jul-02** Revised: **4-Dec-02**
Battelle Marine Sciences Laboratory NOTE: Shaded cells are input.
Sequim, Washington

This calculation run is for

| Location | Start Date | End Date | Total Volume Dredged (cy) |
|-----------|------------|-----------|---------------------------|
| Desdemona | 9/17/2002 | 9/17/2002 | 30012 |

Overall Summary Statements

Adult Equivalent Loss of all age classes taken ≤ 2 is **3023** with 95% CI **1200**
We are 95% confident that the true value lies between **1823** and **4223**

Adult Equivalent Loss of all age classes taken ≥ 3 is **540** with 95% CI **540**
We are 95% confident that the true value lies between **820** and **1901**

Number of MALE recruits lost to fishery is estimated to be **476** with 95% CI **189**
We are 95% confident that the true value lies between **287** and **665**

Sex Ratios by Age Class Derived from Field Observations

| Age Class | Total | | | Proportion | |
|-----------|-------|--------|-------|------------|--------|
| | Male | Female | Sexed | Male | Female |
| YOY | 0 | 0 | 0 | 0.5* | 0.5* |
| 1+ | 0 | 0 | 0 | 0.5* | 0.5* |
| 2+ | 2 | 0 | 2 | 0.5* | 0.5* |
| 3+ | 0 | 1 | 1 | 0.5* | 0.5* |

* Sample sizes low, assumed to be 1:1.

Estimates of Crab Entrainment Rate (R), Number of Crabs Entrained (E), Adult Equivalent Loss (AEL), and Variance (AEL)

| Age Class | R | E | Var(E) | M | S to 2+ | AEL at 2+ | VAR(AEL 2+) | AEL at 3+ | VAR(AEL 3+) |
|-----------|---------|---------------|-------------------|------|---------|----------------|------------------|----------------|-----------------|
| YOY | 0.00000 | 0.0 | 0.00 | 0.10 | 0.017 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1+ | 0.02173 | 652.0 | 299175.46 | 0.60 | 0.160 | 62.59 | 2757.201073 | 28.17 | 558.3332174 |
| 2+ | 0.06518 | 1956.1 | 779430.81 | 0.86 | 0.649 | 1091.77 | 242808.4893 | 491.30 | 49168.71908 |
| 3+ | 0.03259 | 978.0 | 35428.67 | 0.86 | 2.222 | 1868.97 | 129371.8837 | 841.04 | 26197.80645 |
| All | | 3586.2 | 1114034.95 | | | 3023.34 | 374937.57 | 1360.50 | 75924.86 |

Note: Entrained 3+ crab are back-calculated to provide AEL at 2+.

AGE 2+ Calculations

Contribution to Adult Equivalent Loss (AEL at 2+) and Variance (AEL at 2+) by Sex (MALE/FEMALE) and Age Class

| Age Class | Proportion | Female | | | Male | | |
|-----------|------------|----------------|-----------------|----------|----------------|-----------------|----------|
| | | AEL | VAR(AEL) | VAR(AEL) | AEL | VAR(AEL) | VAR(AEL) |
| YOY | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1+ | 0.50 | 31.30 | 689.3002683 | 0.50 | 31.30 | 689.3002683 | |
| 2+ | 0.50 | 545.89 | 60702.12232 | 0.50 | 545.89 | 60702.12232 | |
| 3+ | 0.50 | 934.48 | 32342.97092 | 0.50 | 934.48 | 32342.97092 | |
| All | | 1511.67 | 93734.38 | | 1511.67 | 93734.38 | |

R = Crab Entrainment Rate (crabs/cy)
E = Crabs Entrained (number of Crabs)
M = Post-Entrainment Mortality (proportion)
S = Natural Survivorship (proportion); survival to 3+ is assumed to be 45% (Armstrong et al. 1991)
AEL = Adult Equivalent Loss
VAR(AEL) = AEL Variance

Age Class Distribution

| Age Class | % of Total | | Age Class | Proportion of Total AEL | |
|-----------|--------------|--------|-----------|-------------------------|--------|
| | of Entrained | of AEL | | Male | Female |
| YOY | 0.00 | 0.02 | YOY | 0.0000 | 0.0000 |
| 1+ | 18.18 | 2.07 | 1+ | 0.0104 | 0.0104 |
| 2+ | 54.55 | 36.11 | 2+ | 0.1806 | 0.1806 |
| 3+ | 27.27 | 61.82 | 3+ | 0.3091 | 0.3091 |
| | | | ALL | 0.50 | 0.50 |

AGE 3+ Calculations

Contribution to Adult Equivalent Loss (AEL at 3+) and Variance (AEL at 3+) by Sex (MALE/FEMALE) and Age Class

| Age Class | Proportion | Female | | | Male | | |
|-----------|------------|---------------|-----------------|----------|---------------|-----------------|----------|
| | | AEL | VAR(AEL) | VAR(AEL) | AEL | VAR(AEL) | VAR(AEL) |
| YOY | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1+ | 0.50 | 14.08 | 139.5833043 | 0.50 | 14.08 | 139.5833043 | |
| 2+ | 0.50 | 245.65 | 12292.17977 | 0.50 | 245.65 | 12292.17977 | |
| 3+ | 0.50 | 420.52 | 6549.451812 | 0.50 | 420.52 | 6549.451812 | |
| All | | 680.25 | 18981.21 | | 680.25 | 18981.21 | |

R = Crab Entrainment Rate (crabs/cy)
E = Crabs Entrained (number of Crabs)
M = Post-Entrainment Mortality (proportion)
S = Natural Survivorship (proportion); survival to 3+ is assumed to be 45% (Armstrong et al. 1987)
AEL = Adult Equivalent Loss
VAR(AEL) = AEL Variance

Age Class Distribution

| Age Class | % of Total | | Age Class | Proportion of Total AEL at 3+ | |
|-----------|--------------|--------------|-----------|-------------------------------|--------|
| | of Entrained | of AEL at 3+ | | Male | Female |
| YOY | 0.00 | 0.00 | YOY | 0.0000 | 0.0000 |
| 1+ | 18.18 | 2.07 | 1+ | 0.0104 | 0.0104 |
| 2+ | 54.55 | 36.11 | 2+ | 0.1806 | 0.1806 |
| 3+ | 27.27 | 61.82 | 3+ | 0.3091 | 0.3091 |
| | | | ALL | 0.50 | 0.50 |

SUMMARY VARIANCE DATA

| Entrainment with Confidence Limits | | TOTAL AEL at 2+ with Confidence Limits | | TOTAL AEL at 3+ with Confidence Limits | |
|------------------------------------|-----------|--|----------|--|---------|
| E | 3586.2 | AEL at 2+ | 3023.3 | AEL at 3+ | 1360.5 |
| Var(E) | 1114035.0 | Var(AEL2+) | 374937.6 | Var(AEL3+) | 75924.9 |
| SE E | 1055.5 | SE AEL | 612.3 | SE AEL | 275.5 |
| Z at 0.975 | 1.95996 | Z at 0.975 | 1.95996 | Z at 0.975 | 1.95996 |
| 95% C. I. | 2068.7 | 95% C. I. | 1200.1 | 95% C. I. | 540.1 |
| CV E (%) | 29.43 | CV AEL (%) | 20.25 | CV AEL (%) | 20.25 |

SE = Standard Error
Z = Value of Z from Normal Distribution
C.I. = Confidence Interval
CV = Coefficient of Variation in %

MALE AEL at 3+ with Confidence Limits

| | |
|------------|---------|
| AEL at 3+ | 680.3 |
| Var(AEL) | 18981.2 |
| SE AEL | 137.8 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 270.0 |
| CV AEL (%) | 20.25 |

FEMALE AEL at 3+ with Confidence Limits

| | |
|------------|---------|
| AEL at 3+ | 680.3 |
| Var(AEL) | 18981.2 |
| SE AEL | 137.8 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 270.0 |
| CV AEL (%) | 20.25 |

TOTAL LOSS TO MALE FISHERY

(This total would be distributed over 3-4 years)

| Male Age 3+ (number of crab) | Harvest Rate (proportion) | Fishery (number of crab) |
|------------------------------|---------------------------|--------------------------|
| 680.3 | 0.70 | 476.2 |

Harvest rate of 0.70 is taken from Armstrong et al. (1987).

Loss to Fishery with Confidence Limits

| | |
|-----------------|-------------|
| Loss to Fishery | 476.2 |
| Var(AEL) | 9300.795197 |
| SE LF | 96.4 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 189.0 |
| CV LF (%) | 20.25 |

ADDITIONAL NOTES:

Mortality Rates (M) for crabs collected in June-September are from Armstrong et al. 1987 (Table 3.3, p. 61)
Survival rates (S) to age 2+ for crab collected from June-September are from Wainwright et al. 1992 (Table 6, p. 178), and thereafter survival rate from 2+ to age 3+ is 0.45 (Armstrong et al. 1987).
Sex ratios used were those observed or assumed to be 1:1 where sample size was low.

Estimating Entrainment Rate, Total Entrainment, and Variance
Lower Desdemona Shoals 9/17/2002
 WH Pearson and GD Williams

Summary

| | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 | Total |
|--------|-------------|--------------|---------------|------------|----------|
| R | 0.000 | 0.022 | 0.065 | 0.033 | 0.119 |
| E | 0.0 | 652.0 | 1956.1 | 978.0 | 3586.169 |
| Var(E) | 0.00 | 299175.46 | 779430.81 | 35428.67 | |
| SE (E) | 0.00 | 546.97 | 882.85 | 188.23 | |
| CV(E) | 0.00 | 0.84 | 0.45 | 0.19 | |

Calculations

| Load # (j) | V | Rj | | | | Variance Rj (Variance x Load Sheet) | | | | Entrainment (Rj x V) | | | |
|------------|------|-------------|--------------|---------------|------------|-------------------------------------|--------------|---------------|------------|----------------------|--------------|---------------|------------|
| | | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 |
| | | 402 | 5002 | 0.0000 | 0.0869 | 0.2607 | 0.1304 | 0.0000 | 0.0076 | 0.0170 | 0.0000 | 0 | 434.6872 |
| 403 | 5002 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 | 0 |
| 406 | 5002 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 | 0 |
| 407 | 5002 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 | 0 |

h 4
 Vh 20008
 H 6
 VH 30012

Estimating E

| | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 |
|-------------|-------------|--------------|---------------|------------|
| numerator | 0 | 434.6872 | 1304.061 | 652.0307 |
| denominator | 20008 | 20008 | 20008 | 20008 |
| R | 0.000 | 0.022 | 0.065 | 0.033 |
| E | 0.0 | 652.0 | 1956.1 | 978.0 |

Estimating Variance and CV

| | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 |
|---|-------------|--------------|---------------|------------|
| first term (Load to load variability) | | | | |
| step 1 | 0.33333 | | | |
| step 2 | | 0 | 106286 | 956574.2 |
| | | 0 | 11809.56 | 106286 |
| | | 0 | 11809.56 | 106286 |
| | | 0 | 11809.56 | 106286 |
| step 3 (total) | | 0 | 141714.7 | 1275432 |
| step 4 | 3 | | | |
| step 5 | | 0 | 15746.08 | 141714.7 |
| second term (Basket to basket variability) | | | | |
| step 1 | 1.5 | | | |
| step 2 | | 0 | 188952.9 | 425144.1 |
| | | 0 | 0 | 0 |
| | | 0 | 0 | 0 |
| | | 0 | 0 | 0 |
| step 3 (total) | | 0 | 188952.9 | 425144.1 |
| step 4 | | 0 | 283429.4 | 637716.1 |
| Var(E) | | 0 | 299175.5 | 779430.8 |
| SE (E) | | 0 | 546.9693 | 882.8538 |
| CV(E) | | 0 | 0.83887 | 0.451335 |

Variance By Load
WH Pearson and GD Williams

Lower Desdemona Shoals
9/17/2002

| Load Sequence Number | Date | Sample Number | Number of Crabs | | | | Sample Volume (CY) (w) | Sum of Squares (by load - w2) | | | |
|----------------------|---------|---------------|-----------------|--------|---------|------|------------------------|-------------------------------|--------|---------|--------|
| | | | YOY | 1+ | 2+ | 3+ | | YOY | 1+ | 2+ | 3+ |
| | | | 0-50 | 51-100 | 101-150 | >150 | | 0-50 | 51-100 | 101-150 | >150 |
| 402 | 9/17/02 | 1 | 0 | 2 | 1 | 1 | 7.6714 | 0 | 1.7778 | 1 | 0 |
| 402 | 9/17/02 | 2 | 0 | 0 | 4 | 1 | 7.6714 | 0 | 0.4444 | 4 | 0 |
| 402 | 9/17/02 | 3 | 0 | 0 | 1 | 1 | 7.6714 | 0 | 0.4444 | 1 | 0 |
| | | 1 Total | 0 | 2 | 6 | 3 | 23.014 | 0 | 2.6667 | 6 | 0 |
| | | Mean (cij) | 0 | 0.667 | 2 | 1 | | | | | |
| | | | | | | | Rj | 0 | 0.0869 | 0.2607 | 0.1304 |
| | | | | | | | Var Rj | 0 | 0.0076 | 0.017 | 0 |
| 403 | 9/17/02 | 1 | 0 | 0 | 0 | 0 | 14.33 | 0 | 0 | 0 | 0 |
| 403 | 9/17/02 | 2 | 0 | 0 | 0 | 0 | 14.33 | 0 | 0 | 0 | 0 |
| 403 | 9/17/02 | 3 | 0 | 0 | 0 | 0 | 14.33 | 0 | 0 | 0 | 0 |
| | | 2 Total | 0 | 0 | 0 | 0 | 42.989 | 0 | 0 | 0 | 0 |
| | | Mean (cij) | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 406 | 9/17/02 | 1 | 0 | 0 | 0 | 0 | 14.605 | 0 | 0 | 0 | 0 |
| 406 | 9/17/02 | 2 | 0 | 0 | 0 | 0 | 14.605 | 0 | 0 | 0 | 0 |
| 406 | 9/17/02 | 3 | 0 | 0 | 0 | 0 | 14.605 | 0 | 0 | 0 | 0 |
| | | 3 Total | 0 | 0 | 0 | 0 | 43.816 | 0 | 0 | 0 | 0 |
| | | Mean (cij) | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 407 | 9/17/02 | 1 | 0 | 0 | 0 | 0 | 12.25 | 0 | 0 | 0 | 0 |
| 407 | 9/17/02 | 2 | 0 | 0 | 0 | 0 | 12.25 | 0 | 0 | 0 | 0 |
| 407 | 9/17/02 | 3 | 0 | 0 | 0 | 0 | 12.25 | 0 | 0 | 0 | 0 |
| | | 4 Total | 0 | 0 | 0 | 0 | 36.749 | 0 | 0 | 0 | 0 |
| | | Mean (cij) | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |

Total Entrainment by Load
 WH Pearson and GD Williams

Lower Desdemona Shoals
 9/17/2002

| Load # (j) | Total Load Volume (V) | # Samples (b) | Total Sample Volume (v) | Totals by Age Class i | | | | Rij | | | |
|---------------|--------------------------|------------------|-------------------------|-----------------------|--------|---------|------|--------|--------|---------|--------|
| | | | | YOY | 1+ | 2+ | 3+ | YOY | 1+ | 2+ | 3+ |
| | | | | 0-50 | 51-100 | 101-150 | >150 | 0-50 | 51-100 | 101-150 | >150 |
| 402 | 5002 | 3 | 23.014253 | 0 | 2 | 6 | 3 | 0.0000 | 0.0869 | 0.2607 | 0.1304 |
| 403 | 5002 | 3 | 42.988887 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 406 | 5002 | 3 | 43.815596 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 407 | 5002 | 3 | 36.748565 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Total Entrainment by Load
 WH Pearson and GD Williams

Lower Desdemona Shoals
 9/17/2002

| Load # (j) | Total Load Volume (V) | # Samples (b) | Total Sample Volume (v) | Totals by Age Class i | | | | Rij | | | |
|---------------|--------------------------|------------------|-------------------------|-----------------------|--------|---------|------|--------|--------|---------|--------|
| | | | | YOY | 1+ | 2+ | 3+ | YOY | 1+ | 2+ | 3+ |
| | | | | 0-50 | 51-100 | 101-150 | >150 | 0-50 | 51-100 | 101-150 | >150 |
| 402 | 5002 | 3 | 23.014253 | 0 | 2 | 6 | 3 | 0.0000 | 0.0869 | 0.2607 | 0.1304 |
| 403 | 5002 | 3 | 42.988887 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 406 | 5002 | 3 | 43.815596 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 407 | 5002 | 3 | 36.748565 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Within Load Record Lower Desdemona Shoals
 WH Pearson and GD Williams 9/17/2002

| Load Sequence Number (j) | Date | Sample Number (l) | Start Time (h:m) | Sample Load Rate (cu yd/min) | Effective Sample Time (sec) | Sample Volume (CY) (w) | Salinity (ppt) | Number of Crabs (c) by age class (i) | | | | |
|--------------------------|---------|-------------------|------------------|------------------------------|-----------------------------|------------------------|----------------|--------------------------------------|----|----|----|-----|
| | | | | | | | | YOY | 1+ | 2+ | 3+ | UID |
| 402 | 9/17/02 | 1 | 1345 | 12.631313 | 36.44 | 7.67142 | 31 | 0 | 2 | 1 | 1 | Y |
| 402 | 9/17/02 | 2 | 1402 | 12.631313 | 36.44 | 7.67142 | 31.29 | 0 | 0 | 4 | 1 | Y |
| 402 | 9/17/02 | 3 | 1436 | 12.631313 | 36.44 | 7.67142 | 32.9 | 0 | 0 | 1 | 1 | Y |
| 403 | 9/17/02 | 1 | 1720 | 23.59434 | 36.44 | 14.3296 | 24.98 | 0 | 0 | 0 | 0 | Y |
| 403 | 9/17/02 | 2 | 1732 | 23.59434 | 36.44 | 14.3296 | 23.99 | 0 | 0 | 0 | 0 | Y |
| 403 | 9/17/02 | 3 | 1803 | 23.59434 | 36.44 | 14.3296 | 21.12 | 0 | 0 | 0 | 0 | N |
| 406 | 9/17/02 | 1 | 2150 | 24.048077 | 36.44 | 14.6052 | 30.46 | 0 | 0 | 0 | 0 | N |
| 406 | 9/17/02 | 2 | 2205 | 24.048077 | 36.44 | 14.6052 | 30.29 | 0 | 0 | 0 | 0 | Y |
| 406 | 9/17/02 | 3 | 2213 | 24.048077 | 36.44 | 14.6052 | 30.28 | 0 | 0 | 0 | 0 | N |
| 407 | 9/17/02 | 1 | 2250 | 20.169355 | 36.44 | 12.2495 | 30.64 | 0 | 0 | 0 | 0 | N |
| 407 | 9/17/02 | 2 | 2339 | 20.169355 | 36.44 | 12.2495 | 30.14 | 0 | 0 | 0 | 0 | N |
| 407 | 9/17/02 | 3 | 2343 | 20.169355 | 36.44 | 12.2495 | 30.2 | 0 | 0 | 0 | 0 | N |

| Load # (j) | # Samples (b) | Total Sample Volume | Totals by Age Class i | | | |
|------------|---------------|---------------------|-----------------------|----|----|----|
| | | | YOY | 1+ | 2+ | 3+ |
| 402 | 3 | 23.01425 | 0 | 2 | 6 | 3 |
| 403 | 3 | 42.98889 | 0 | 0 | 0 | 0 |
| 406 | 3 | 43.8156 | 0 | 0 | 0 | 0 |
| 407 | 3 | 36.74856 | 0 | 0 | 0 | 0 |

Load Records And Rates **Lower Desdemona Shoals** **Sample Volume assumes 25% of total load diverted to sampler; 50% if one drag arm**
 WH Pearson and GD Williams **9/17/2002**

| Load Sequence | Sampling Instructions | Date | Load Time | | # Passes | Settled Solids Volume (cu yd) | Total Distance Travelled (ft) | No. Basket Samples Taken | Pumping Time (min) | No. Drag Arms in Operation | Ave. Load Rate per Arm (cu yd/min) | Sample Load Rate (cu yd/min) |
|---------------|-----------------------|---------|-----------|------|----------|-------------------------------|-------------------------------|--------------------------|--------------------|----------------------------|------------------------------------|------------------------------|
| | | | Start | End | | | | | | | | |
| 402 | Sample | 9/17/02 | 1345 | 1539 | 4 | 5002 | 20000 | 3 | 99 | 2 | 25.2626263 | 12.6313131 |
| 403 | Sample | 9/17/02 | 1711 | 1809 | 5 | 5002 | 9000 | 3 | 53 | 2 | 47.1886792 | 23.5943396 |
| 404 | Off | 9/17/02 | 1831 | 1925 | 2 | 5002 | 8000 | 0 | 49 | 2 | 51.0408163 | 25.5204082 |
| 405 | Off | 9/17/02 | 1946 | 2058 | 3 | 5002 | 9000 | 0 | 45 | 2 | 55.5777778 | 27.7888889 |
| 406 | Sample | 9/17/02 | 2125 | 2222 | 2 | 5002 | 9000 | 3 | 52 | 2 | 48.0961538 | 24.0480769 |
| 407 | Sample | 9/17/02 | 2250 | 2358 | 2 | 5002 | 9000 | 3 | 62 | 2 | 40.3387097 | 20.1693548 |

| | | | |
|---------|----------------------|------------------------|-----------------------|
| Summary | Total # Loads (H) | # Loads Sampled (h) | Total Load Volume (V) |
| | 6 | 4 | 30012 |

SUMMARY OF CALCULATION OF ADULT EQUIVALENT LOSS BASED ON MODIFIED DREDGE IMPACT MODEL AND DIRECT MEASUREMENT OF ENTRAINMENT RATES at Upper Sands in September 2002.

WH Pearson and GD Williams First Version: **24-Jul-02** Revised: **4-Dec-02**
 Battelle Marine Sciences Laboratory NOTE: Shaded cells are input.
 Sequim, Washington

This calculation run is for

| Location | Start Date | End Date | Total Volume Dredged (cy) |
|-------------|------------|-----------|---------------------------|
| Upper Sands | 23-Sep-02 | 23-Sep-02 | 54036 |

Overall Summary Statements

| | | | |
|--|-----------|-------------|------------|
| Adult Equivalent Loss of all age classes taken to 2+ is | 54 | with 95% CI | 103 |
| We are 95% confident that the true value lies between | 0 | and | 157 |
| Adult Equivalent Loss of all age classes taken to 3+ is | 24 | with 95% CI | 47 |
| We are 95% confident that the true value lies between | 0 | and | 71 |
| Number of MALE recruits lost to fishery is estimated to be | 8 | with 95% CI | 16 |
| We are 95% confident that the true value lies between | 0 | and | 25 |

Sex Ratios by Age Class, Derived from June Data

| Age Class | Total | | | Proportion | |
|-----------|-------|--------|-------|------------|--------|
| | Male | Female | Sexed | Male | Female |
| YOY | 1 | 0 | 1 | 0.5* | 0.5* |
| 1+ | 0 | 1 | 1 | 0.5* | 0.5* |
| 2+ | 0 | 0 | 0 | 0.5* | 0.5* |
| 3+ | 0 | 0 | 0 | 0.5* | 0.5* |

* Sample sizes low; assumed to be 1:1.

Estimates of Crab Entrainment Rate (R), Number of Crabs Entrained (E), Adult Equivalent Loss (AEL), and Variance (AEL)

| Age Class | R | E | Var(E) | M | S to 2+ | AEL at 2+ | VAR(AEL 2+) | AEL at 3+ | VAR(AEL 3+) |
|-----------|---------|---------------|------------------|------|---------|--------------|----------------|--------------|---------------|
| YOY | 0.01036 | 559.6 | 313164.14 | 0.10 | 0.017 | 0.92 | 0.852589376 | 0.42 | 0.172649349 |
| 1+ | 0.01018 | 549.9 | 302366.19 | 0.60 | 0.160 | 52.79 | 2786.606852 | 23.75 | 564.2878875 |
| 2+ | 0.00000 | 0.0 | 0.00 | 0.86 | 0.649 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3+ | 0.00000 | 0.0 | 0.00 | 0.86 | 2.222 | 0.00 | 0.00 | 0.00 | 0.00 |
| All | | 1109.5 | 615530.34 | | | 53.71 | 2787.46 | 24.17 | 564.46 |

Note: Entrained 3+ crab are back-calculated to provide AEL at 2+.

AGE 2+ Calculations

Contribution to Adult Equivalent Loss (AEL at 2+) and Variance (AEL at 2+) by Sex (MALE/FEMALE) and Age Class

| Age Class | Female | | | Male | | |
|-----------|------------|--------------|---------------|------------|--------------|---------------|
| | Proportion | AEL | VAR(AEL) | Proportion | AEL | VAR(AEL) |
| YOY | 0.50 | 0.46 | 0.213147344 | 0.50 | 0.46 | 0.213147344 |
| 1+ | 0.50 | 26.39 | 696.6517129 | 0.50 | 26.39 | 696.6517129 |
| 2+ | 0.50 | 0.00 | 0.00 | 0.50 | 0.00 | 0.00 |
| 3+ | 0.50 | 0.00 | 0.00 | 0.50 | 0.00 | 0.00 |
| All | | 26.86 | 696.86 | | 26.86 | 696.86 |

1393.73

Age Class Distribution

| Age Class | % of Total | | Proportion of Total AEL 2+ | |
|-----------|--------------|--------------|----------------------------|--------|
| | of Entrained | of AEL at 2+ | Male | Female |
| YOY | 50.44 | 1.72 | 0.0086 | 0.0086 |
| 1+ | 49.56 | 98.28 | 0.4914 | 0.4914 |
| 2+ | 0.00 | 0.00 | 0.0000 | 0.0000 |
| 3+ | 0.00 | 0.00 | 0.0000 | 0.0000 |
| ALL | | | 0.50 | 0.50 |

AGE 3+ Calculations

Contribution to Adult Equivalent Loss (AEL at 3+) and Variance (AEL at 3+) by Sex (MALE/FEMALE) and Age Class

| Age Class | Female | Male |
|-----------|--------|------|
| | | |

| Age Class | Proportion | AEL | VAR(AEL) | Proportion | AEL | VAR(AEL) |
|-----------|------------|-------|-------------|------------|-------|-------------|
| YOY | 0.50 | 0.21 | 0.043162337 | 0.50 | 0.21 | 0.043162337 |
| 1+ | 0.50 | 11.88 | 141.0719719 | 0.50 | 11.88 | 141.0719719 |
| 2+ | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 |
| 3+ | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 |
| All | | 12.09 | 141.12 | | 12.09 | 141.12 |

24.170 282.230

R = Crab Entrainment Rate (crabs/cy)
 E = Crabs Entrained (number of Crabs)
 M = Post-Entrainment Mortality (proportion)
 S = Natural Survivorship (proportion); survival to 3+ is assumed to be 45% (Armstrong et al. 1987)
 AEL = Adult Equivalent Loss
 VAR(AEL) = AEL Variance

Age Class Distribution

| Age Class | % of Total | |
|-----------|--------------|--------------|
| | of Entrained | of AEL at 3+ |
| YOY | 50.44 | 1.72 |
| 1+ | 49.56 | 98.28 |
| 2+ | 0.00 | 0.00 |
| 3+ | 0.00 | 0.00 |

| Age Class | Proportion of Total AEL at 3+ | |
|-----------|-------------------------------|--------|
| | Male | Female |
| YOY | 0.0086 | 0.0086 |
| 1+ | 0.4914 | 0.4914 |
| 2+ | 0.0000 | 0.0000 |
| 3+ | 0.0000 | 0.0000 |
| ALL | 0.50 | 0.50 |

SUMMARY VARIANCE DATA

Entrainment with Confidence Limits

| | |
|------------|----------|
| E | 1109.5 |
| Var(E) | 615530.3 |
| SE E | 784.6 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 1537.7 |
| CV E (%) | 70.71 |

TOTAL AEL at 2+ with Confidence Limits

| | |
|------------|---------|
| AEL at 2+ | 53.7 |
| Var(AEL2+) | 2787.5 |
| SE AEL | 52.8 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 103.5 |
| CV AEL (%) | 98.30 |

TOTAL AEL at 3+ with Confidence Limits

| | |
|------------|---------|
| AEL at 3+ | 24.2 |
| Var(AEL3+) | 564.5 |
| SE AEL | 23.8 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 46.6 |
| CV AEL (%) | 98.30 |

SE = Standard Error
 Z = Value of Z from Normal Distribution

C.I. = Confidence Interval
 CV = Coefficient of Variation in %

MALE AEL at 3+ with Confidence Limits

| | |
|------------|---------|
| AEL at 3+ | 12.1 |
| Var(AEL) | 141.1 |
| SE AEL | 11.9 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 23.3 |
| CV AEL (%) | 98.30 |

FEMALE AEL at 3+ with Confidence Limits

| | |
|------------|---------|
| AEL at 3+ | 12.1 |
| Var(AEL) | 141.1 |
| SE AEL | 11.9 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 23.3 |
| CV AEL (%) | 98.30 |

TOTAL LOSS TO MALE FISHERY

(This total would be distributed over 3-4 years)

| Male Age 3+ (number of crab) | Harvest Rate (proportion) | Lost to Fishery (number of crab) |
|------------------------------|---------------------------|----------------------------------|
| 12.1 | 0.70 | 8.5 |

Harvest rate of 0.70 is taken from Armstrong et al. (1987).

Loss to Fishery with Confidence Limits

| | |
|-----------------|-------------|
| Loss to Fishery | 8.5 |
| Var(AEL) | 69.14641576 |
| SE LF | 8.3 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 16.3 |
| CV LF (%) | 98.30 |

ADDITIONAL NOTES:

Mortality Rates (M) for crabs collected in June-September are from Armstrong et al. 1987 (Table 3.3, p. 61)
 Survival rates (S) to age 2+ for crab collected from June-September are from Wainwright et al. 1992 (Table 6, p. 178), and thereafter survival rate from 2+ to age 3+ is 0.45 (Armstrong et al. 1987).
 Sex ratios used were those observed or assumed to be 1:1 where sample size was low.

Estimating Entrainment Rate, Total Entrainment, and Variance
Upper Sands 9/23/2002
 WH Pearson and GD Williams Assuming Sample Volume 1 (25% of total load)

Summary

| | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 | Total |
|--------|-------------|--------------|---------------|------------|----------|
| R | 0.010 | 0.010 | 0.000 | 0.000 | 0.021 |
| E | 559.6 | 549.9 | 0.0 | 0.0 | 1109.489 |
| Var(E) | 313164.14 | 302366.19 | 0.00 | 0.00 | |
| SE (E) | 559.61 | 549.88 | 0.00 | 0.00 | |
| CV(E) | 1.00 | 1.00 | 0.00 | 0.00 | |

Calculations

| Load # (j) | V | Rj | | | | Variance Rj (Variance x Load Sheet) | | | | Entrainment (Rj x V) | |
|------------|------|-------------|--------------|---------------|------------|-------------------------------------|--------------|---------------|------------|----------------------|--------------|
| | | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 | YOY 0-50 | 1+ 51-100 |
| 453 | 6192 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 |
| 454 | 6192 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 |
| 455 | 6192 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 |
| 456 | 6192 | 0.0000 | 0.0888 | 0.0000 | 0.0000 | 0.0000 | 0.0079 | 0.0000 | 0.0000 | 0 | 549.87835 |
| 457 | 6192 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 |
| 458 | 6192 | 0.0904 | 0.0000 | 0.0000 | 0.0000 | 0.0082 | 0.0000 | 0.0000 | 0.0000 | 559.61071 | 0 |
| 459 | 6192 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 |
| 460 | 6192 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 |
| 461 | 4500 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 |

h 9
 Vh 54036
 H 9
 VH 54036

Estimating E

| | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 |
|-----------|-------------|--------------|---------------|------------|
| numerator | 559.61071 | 549.87835 | 0 | 0 |

| | | | | |
|-------------|-------|-------|-------|-------|
| denominator | 54036 | 54036 | 54036 | 54036 |
| R | 0.010 | 0.010 | 0.000 | 0.000 |
| E | 559.6 | 549.9 | 0.0 | 0.0 |

Estimating Variance and CV

| YOY | 1+ | 2+ | 3+ |
|------|--------|---------|------|
| 0-50 | 51-100 | 101-150 | >150 |

first term (Load to load variability)

| | | | | |
|----------------|-----------|-----------|---|---|
| step 1 | 0 | | | |
| step 2 | 4112.1366 | 3970.3496 | 0 | 0 |
| | 4112.1366 | 3970.3496 | 0 | 0 |
| | 4112.1366 | 3970.3496 | 0 | 0 |
| | 4112.1366 | 237040.09 | 0 | 0 |
| | 4112.1366 | 3970.3496 | 0 | 0 |
| | 245505.15 | 3970.3496 | 0 | 0 |
| | 4112.1366 | 3970.3496 | 0 | 0 |
| | 4112.1366 | 3970.3496 | 0 | 0 |
| step 3 (total) | 2171.8542 | 2096.9684 | 0 | 0 |
| step 4 | 8 | | | |
| step 5 | 0 | 0 | 0 | 0 |

second term (Basket to basket variability)

| | | | | |
|----------------|-----------|-----------|---|---|
| step 1 | 1 | | | |
| step 2 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 302366.19 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 313164.14 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| step 3 (total) | 313164.14 | 302366.19 | 0 | 0 |
| step 4 | 313164.14 | 302366.19 | 0 | 0 |
| Var(E) | 313164.14 | 302366.19 | 0 | 0 |
| SE (E) | 559.61071 | 549.87835 | 0 | 0 |
| CV(E) | 1 | 1 | 0 | 0 |

Variance By Load
 WH Pearson and GD Williams

Upper Sands
9/23/2002

| Load Sequence Number | Date | Sample Number | Number of Crabs | | | | Sample Volume (CY) (w) | Sum of Squares (by load - w ²) | | | |
|----------------------|---------|---------------|-----------------|--------|---------|------|------------------------|--|--------|---------|------|
| | | | YOY | 1+ | 2+ | 3+ | | YOY | 1+ | 2+ | 3+ |
| | | | 0-50 | 51-100 | 101-150 | >150 | | 0-50 | 51-100 | 101-150 | >150 |
| 453 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 12.864 | 0 | 0 | 0 | 0 |
| 453 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 12.864 | 0 | 0 | 0 | 0 |
| 453 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 12.864 | 0 | 0 | 0 | 0 |
| 1 Total | | 3 | 0 | 0 | 0 | 0 | 38.592 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 454 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 5.1726 | 0 | 0 | 0 | 0 |
| 454 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 5.1726 | 0 | 0 | 0 | 0 |
| 454 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 5.1726 | 0 | 0 | 0 | 0 |
| 2 Total | | 3 | 0 | 0 | 0 | 0 | 15.518 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 455 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 5.6554 | 0 | 0 | 0 | 0 |
| 455 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 5.6554 | 0 | 0 | 0 | 0 |
| 455 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 5.6554 | 0 | 0 | 0 | 0 |
| 3 Total | | 3 | 0 | 0 | 0 | 0 | 16.966 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 456 | 9/23/02 | 1 | 0 | 1 | 0 | 0 | 3.7536 | 0 | 0.4444 | 0 | 0 |
| 456 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 3.7536 | 0 | 0.1111 | 0 | 0 |
| 456 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 3.7536 | 0 | 0.1111 | 0 | 0 |
| 4 Total | | 3 | 0 | 1 | 0 | 0 | 11.261 | 0 | 0.6667 | 0 | 0 |
| Mean (cij) | | | 0 | 0.333 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0.0888 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0.0079 | 0 | 0 |
| 457 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 4.5608 | 0 | 0 | 0 | 0 |

| | | | | | | | | | | | |
|------------|---------|---|-------|---|---|---|--------|--------|---|---|---|
| 457 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 4.5608 | 0 | 0 | 0 | 0 |
| 457 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 4.5608 | 0 | 0 | 0 | 0 |
| 5 Total | | 3 | 0 | 0 | 0 | 0 | 13.682 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 458 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 3.6883 | 0.1111 | 0 | 0 | 0 |
| 458 | 9/23/02 | 2 | 1 | 0 | 0 | 0 | 3.6883 | 0.4444 | 0 | 0 | 0 |
| 458 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 3.6883 | 0.1111 | 0 | 0 | 0 |
| 6 Total | | 3 | 1 | 0 | 0 | 0 | 11.065 | 0.6667 | 0 | 0 | 0 |
| Mean (cij) | | | 0.333 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0.0904 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0.0082 | 0 | 0 | 0 |
| 459 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 5.1726 | 0 | 0 | 0 | 0 |
| 459 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 5.1726 | 0 | 0 | 0 | 0 |
| 459 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 5.1726 | 0 | 0 | 0 | 0 |
| 7 Total | | 3 | 0 | 0 | 0 | 0 | 15.518 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 460 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 4.5123 | 0 | 0 | 0 | 0 |
| 460 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 4.5123 | 0 | 0 | 0 | 0 |
| 460 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 4.5123 | 0 | 0 | 0 | 0 |
| 8 Total | | 3 | 0 | 0 | 0 | 0 | 13.537 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 461 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 4.4036 | 0 | 0 | 0 | 0 |
| 461 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 4.4036 | 0 | 0 | 0 | 0 |
| 461 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 4.4036 | 0 | 0 | 0 | 0 |
| 9 Total | | 3 | 0 | 0 | 0 | 0 | 13.211 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |

Total Entrainment by Load
 WH Pearson and GD Williams

Upper Sands
 9/23/2002

| Load # (j) | Total Load Volume (V) | # Samples (b) | Total Sample Volume (v) | Totals by Age Class i | | | | Rij | | | |
|---------------|--------------------------|------------------|-------------------------|-----------------------|--------|---------|------|--------|--------|---------|--------|
| | | | | YOY | 1+ | 2+ | 3+ | YOY | 1+ | 2+ | 3+ |
| | | | | 0-50 | 51-100 | 101-150 | >150 | 0-50 | 51-100 | 101-150 | >150 |
| 453 | 6192 | 3 | 38.592 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 454 | 6192 | 3 | 15.517756 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 455 | 6192 | 3 | 16.96608 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 456 | 6192 | 3 | 11.260673 | 0 | 1 | 0 | 0 | 0.0000 | 0.0888 | 0.0000 | 0.0000 |
| 457 | 6192 | 3 | 13.682323 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 458 | 6192 | 3 | 11.064835 | 1 | 0 | 0 | 0 | 0.0904 | 0.0000 | 0.0000 | 0.0000 |
| 459 | 6192 | 3 | 15.517756 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 460 | 6192 | 3 | 13.536766 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 461 | 4500 | 3 | 13.210714 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Within Load Record **Upper Sands**
 WH Pearson and GD Williams **9/23/2002**

Sample Volume = 25% of total load; 50% if one drag arm

| Load Sequence Number (j) | Date | Sample Number (l) | Start Time (h:m) | Sample Load Rate (cu yd/min) | Effective Sample Time (sec) | Sample Volume (CY) (w) | Salinity (ppt) | Number of Crabs (c) by age class (i) | | | | | UID | Load # (j) | # Samples (b) | Total Sample Volume | Total | |
|--------------------------|----------|-------------------|------------------|------------------------------|-----------------------------|------------------------|----------------|--------------------------------------|--------|---------|------|------|-----|------------|---------------|---------------------|-------|---------|
| | | | | | | | | YOY | 1+ | 2+ | 3+ | YO' | | | | | | |
| | | | | | | | | 0-50 | 51-100 | 101-150 | >150 | 0-5' | | | | | | |
| 453 | 09/23/02 | 1 | 2342 | 36 | 21.44 | 12.864 | 9.2 | 0 | 0 | 0 | 0 | N | | | | 453 | 3 | 38.592 |
| 453 | 09/23/02 | 2 | 0003 | 36 | 21.44 | 12.864 | 10.6 | 0 | 0 | 0 | 0 | N | | | | 454 | 3 | 15.5178 |
| 453 | 09/23/02 | 3 | nd | 36 | 21.44 | 12.864 | 12.9 | 0 | 0 | 0 | 0 | N | | | | 455 | 3 | 16.9661 |
| 454 | 09/23/02 | 1 | 0127 | 18.878049 | 16.44 | 5.17259 | 6.7 | 0 | 0 | 0 | 0 | Y | | | | 456 | 3 | 11.2607 |
| 454 | 09/23/02 | 2 | 0151 | 18.878049 | 16.44 | 5.17259 | 15.9 | 0 | 0 | 0 | 0 | N | | | | 457 | 3 | 13.6823 |
| 454 | 09/23/02 | 3 | 0215 | 18.878049 | 16.44 | 5.17259 | 16.3 | 0 | 0 | 0 | 0 | N | | | | 458 | 3 | 11.0648 |
| 455 | 09/23/02 | 1 | 0340 | 20.64 | 16.44 | 5.65536 | 15.9 | 0 | 0 | 0 | 0 | N | | | | 459 | 3 | 15.5178 |
| 455 | 09/23/02 | 2 | 0356 | 20.64 | 16.44 | 5.65536 | 18.3 | 0 | 0 | 0 | 0 | N | | | | 460 | 3 | 13.5368 |
| 455 | 09/23/02 | 3 | 0413 | 20.64 | 16.44 | 5.65536 | 18.8 | 0 | 0 | 0 | 0 | N | | | | 461 | 3 | 13.2107 |
| 456 | 09/23/02 | 1 | 0617 | 13.699115 | 16.44 | 3.75356 | 17.19 | 0 | 1 | 0 | 0 | N | | | | | | |
| 456 | 09/23/02 | 2 | 0653 | 13.699115 | 16.44 | 3.75356 | 15.59 | 0 | 0 | 0 | 0 | N | | | | | | |
| 456 | 09/23/02 | 3 | 0712 | 13.699115 | 16.44 | 3.75356 | 14.8 | 0 | 0 | 0 | 0 | N | | | | | | |
| 457 | 09/23/02 | 1 | 0836 | 16.645161 | 16.44 | 4.56077 | 14.1 | 0 | 0 | 0 | 0 | N | | | | | | |
| 457 | 09/23/02 | 2 | 0855 | 16.645161 | 16.44 | 4.56077 | 10.6 | 0 | 0 | 0 | 0 | N | | | | | | |
| 457 | 09/23/02 | 3 | 0909 | 16.645161 | 16.44 | 4.56077 | 9.85 | 0 | 0 | 0 | 0 | N | | | | | | |
| 458 | 09/23/02 | 1 | 1151 | 13.46087 | 16.44 | 3.68828 | 9.91 | 0 | 0 | 0 | 0 | Y | | | | | | |
| 458 | 09/23/02 | 2 | 1207 | 13.46087 | 16.44 | 3.68828 | 13.69 | 1 | 0 | 0 | 0 | Y | | | | | | |
| 458 | 09/23/02 | 3 | 1235 | 13.46087 | 16.44 | 3.68828 | 12.83 | 0 | 0 | 0 | 0 | N | | | | | | |
| 459 | 09/23/02 | 1 | 1532 | 18.878049 | 16.44 | 5.17259 | 0.17 | 0 | 0 | 0 | 0 | N | | | | | | |
| 459 | 09/23/02 | 2 | 1555 | 18.878049 | 16.44 | 5.17259 | 18 | 0 | 0 | 0 | 0 | N | | | | | | |
| 459 | 9/23/02 | 3 | 1607 | 18.878049 | 16.44 | 5.17259 | 19.3 | 0 | 0 | 0 | 0 | N | | | | | | |
| 460 | 9/23/02 | 1 | 1728 | 16.468085 | 16.44 | 4.51226 | 18.9 | 0 | 0 | 0 | 0 | N | | | | | | |
| 460 | 9/23/02 | 2 | 1752 | 16.468085 | 16.44 | 4.51226 | 17.7 | 0 | 0 | 0 | 0 | N | | | | | | |
| 460 | 9/23/02 | 3 | 1823 | 16.468085 | 16.44 | 4.51226 | 16.6 | 0 | 0 | 0 | 0 | N | | | | | | |
| 461 | 9/23/02 | 1 | 1951 | 16.071429 | 16.44 | 4.40357 | 5.2 | 0 | 0 | 0 | 0 | N | | | | | | |
| 461 | 9/23/02 | 2 | 2016 | 16.071429 | 16.44 | 4.40357 | 6.7 | 0 | 0 | 0 | 0 | N | | | | | | |
| 461 | 9/23/02 | 3 | 2024 | 16.071429 | 16.44 | 4.40357 | 14 | 0 | 0 | 0 | 0 | N | | | | | | |

Load Records And Rates
 WH Pearson and GD Williams

Upper Sands
9/23/2002

Sample Volume assumes 25% of total load diverted to sampler; 50% if one drag

| Load Sequence | Sampling Instructions | Date | Load Time | | # Passes | Settled Solids Volume (cu yd) | Total Distance Travelled (ft) | No. Basket Samples Taken | Pumping Time (min) | No. Drag Arms in Operation | Ave. Load Rate per Arm (cu yd/min) | Sample Load Rate (cu yd/min) |
|---------------|-----------------------|---------|-----------|------|----------|-------------------------------|-------------------------------|--------------------------|--------------------|----------------------------|------------------------------------|------------------------------|
| | | | Start | End | | | | | | | | |
| 453 | Sample | 9/23/02 | 0000 | 0053 | 2 | 6192 | 9000 | 3 | 43 | 2 | 72 | 36 |
| 454 | Sample | 9/23/02 | 0113 | 0255 | 3 | 6192 | 9000 | 3 | 82 | 2 | 37.7560976 | 18.8780488 |
| 455 | Sample | 9/23/02 | 0323 | 0453 | 4 | 6192 | 12000 | 3 | 75 | 2 | 41.28 | 20.64 |
| 456 | Sample | 9/23/02 | 0530 | 0751 | 4 | 6192 | 12000 | 3 | 113 | 2 | 27.3982301 | 13.699115 |
| 457 | Sample | 9/23/02 | 0836 | 1042 | 5 | 6192 | 15000 | 3 | 93 | 2 | 33.2903226 | 16.6451613 |
| 458 | Sample | 9/23/02 | 1134 | 1429 | 8 | 6192 | 20000 | 3 | 115 | 2 | 26.9217391 | 13.4608696 |
| 459 | Sample | 9/23/02 | 1506 | 1648 | 5 | 6192 | 15000 | 3 | 82 | 2 | 37.7560976 | 18.8780488 |
| 460 | Sample | 9/23/02 | 1726 | 1924 | 4 | 6192 | 12000 | 3 | 94 | 2 | 32.9361702 | 16.4680851 |
| 461 | Sample | 9/23/02 | 1951 | 2116 | 4 | 4500 | 10000 | 3 | 70 | 2 | 32.1428571 | 16.0714286 |

| | | | |
|---------|----------------------|------------------------|-----------------------|
| Summary | Total # Loads (H) | # Loads Sampled (h) | Total Load Volume (V) |
| | 9 | 9 | 54036 |

Variance By Load
 WH Pearson and GD Williams

Upper Sands
9/23/2002

| Load Sequence Number | Date | Sample Number | Number of Crabs | | | | Sample Volume (CY) (w) | Sum of Squares (by load - w ²) | | | |
|----------------------|---------|---------------|-----------------|--------|---------|------|------------------------|--|--------|---------|------|
| | | | YOY | 1+ | 2+ | 3+ | | YOY | 1+ | 2+ | 3+ |
| | | | 0-50 | 51-100 | 101-150 | >150 | | 0-50 | 51-100 | 101-150 | >150 |
| 453 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 12.864 | 0 | 0 | 0 | 0 |
| 453 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 12.864 | 0 | 0 | 0 | 0 |
| 453 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 12.864 | 0 | 0 | 0 | 0 |
| 1 Total | | 3 | 0 | 0 | 0 | 0 | 38.592 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 454 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 5.1726 | 0 | 0 | 0 | 0 |
| 454 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 5.1726 | 0 | 0 | 0 | 0 |
| 454 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 5.1726 | 0 | 0 | 0 | 0 |
| 2 Total | | 3 | 0 | 0 | 0 | 0 | 15.518 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 455 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 5.6554 | 0 | 0 | 0 | 0 |
| 455 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 5.6554 | 0 | 0 | 0 | 0 |
| 455 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 5.6554 | 0 | 0 | 0 | 0 |
| 3 Total | | 3 | 0 | 0 | 0 | 0 | 16.966 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 456 | 9/23/02 | 1 | 0 | 1 | 0 | 0 | 3.7536 | 0 | 0.4444 | 0 | 0 |
| 456 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 3.7536 | 0 | 0.1111 | 0 | 0 |
| 456 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 3.7536 | 0 | 0.1111 | 0 | 0 |
| 4 Total | | 3 | 0 | 1 | 0 | 0 | 11.261 | 0 | 0.6667 | 0 | 0 |
| Mean (cij) | | | 0 | 0.333 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0.0888 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0.0079 | 0 | 0 |
| 457 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 4.5608 | 0 | 0 | 0 | 0 |

| | | | | | | | | | | | |
|------------|---------|---|-------|---|---|---|--------|--------|---|---|---|
| 457 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 4.5608 | 0 | 0 | 0 | 0 |
| 457 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 4.5608 | 0 | 0 | 0 | 0 |
| 5 Total | | 3 | 0 | 0 | 0 | 0 | 13.682 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 458 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 3.6883 | 0.1111 | 0 | 0 | 0 |
| 458 | 9/23/02 | 2 | 1 | 0 | 0 | 0 | 3.6883 | 0.4444 | 0 | 0 | 0 |
| 458 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 3.6883 | 0.1111 | 0 | 0 | 0 |
| 6 Total | | 3 | 1 | 0 | 0 | 0 | 11.065 | 0.6667 | 0 | 0 | 0 |
| Mean (cij) | | | 0.333 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0.0904 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0.0082 | 0 | 0 | 0 |
| 459 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 5.1726 | 0 | 0 | 0 | 0 |
| 459 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 5.1726 | 0 | 0 | 0 | 0 |
| 459 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 5.1726 | 0 | 0 | 0 | 0 |
| 7 Total | | 3 | 0 | 0 | 0 | 0 | 15.518 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 460 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 4.5123 | 0 | 0 | 0 | 0 |
| 460 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 4.5123 | 0 | 0 | 0 | 0 |
| 460 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 4.5123 | 0 | 0 | 0 | 0 |
| 8 Total | | 3 | 0 | 0 | 0 | 0 | 13.537 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 461 | 9/23/02 | 1 | 0 | 0 | 0 | 0 | 4.4036 | 0 | 0 | 0 | 0 |
| 461 | 9/23/02 | 2 | 0 | 0 | 0 | 0 | 4.4036 | 0 | 0 | 0 | 0 |
| 461 | 9/23/02 | 3 | 0 | 0 | 0 | 0 | 4.4036 | 0 | 0 | 0 | 0 |
| 9 Total | | 3 | 0 | 0 | 0 | 0 | 13.211 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |

Total Entrainment by Load
 WH Pearson and GD Williams

Upper Sands
 9/23/2002

| Load # (j) | Total Load Volume (V) | # Samples (b) | Total Sample Volume (v) | Totals by Age Class i | | | | Rij | | | |
|---------------|--------------------------|------------------|-------------------------|-----------------------|--------|---------|------|--------|--------|---------|--------|
| | | | | YOY | 1+ | 2+ | 3+ | YOY | 1+ | 2+ | 3+ |
| | | | | 0-50 | 51-100 | 101-150 | >150 | 0-50 | 51-100 | 101-150 | >150 |
| 453 | 6192 | 3 | 38.592 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 454 | 6192 | 3 | 15.517756 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 455 | 6192 | 3 | 16.96608 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 456 | 6192 | 3 | 11.260673 | 0 | 1 | 0 | 0 | 0.0000 | 0.0888 | 0.0000 | 0.0000 |
| 457 | 6192 | 3 | 13.682323 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 458 | 6192 | 3 | 11.064835 | 1 | 0 | 0 | 0 | 0.0904 | 0.0000 | 0.0000 | 0.0000 |
| 459 | 6192 | 3 | 15.517756 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 460 | 6192 | 3 | 13.536766 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 461 | 4500 | 3 | 13.210714 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Within Load Record **Upper Sands**
 WH Pearson and GD Williams **9/23/2002**

Sample Volume = 25% of total load; 50% if one drag arm

| Load Sequence Number (j) | Date | Sample Number (l) | Start Time (h:m) | Sample Load Rate (cu yd/min) | Effective Sample Time (sec) | Sample Volume (CY) (w) | Salinity (ppt) | Number of Crabs (c) by age class (i) | | | | | UID | Load # (j) | # Samples (b) | Total Sample Volume | Tota | |
|--------------------------|----------|-------------------|------------------|------------------------------|-----------------------------|------------------------|----------------|--------------------------------------|--------|---------|------|------|-----|------------|---------------|---------------------|---------|--|
| | | | | | | | | YOY | 1+ | 2+ | 3+ | YO' | | | | | | |
| | | | | | | | | 0-50 | 51-100 | 101-150 | >150 | 0-5l | | | | | | |
| 453 | 09/23/02 | 1 | 2342 | 36 | 21.44 | 12.864 | 9.2 | 0 | 0 | 0 | 0 | N | | | 453 | 3 | 38.592 | |
| 453 | 09/23/02 | 2 | 0003 | 36 | 21.44 | 12.864 | 10.6 | 0 | 0 | 0 | 0 | N | | | 454 | 3 | 15.5178 | |
| 453 | 09/23/02 | 3 | nd | 36 | 21.44 | 12.864 | 12.9 | 0 | 0 | 0 | 0 | N | | | 455 | 3 | 16.9661 | |
| 454 | 09/23/02 | 1 | 0127 | 18.878049 | 16.44 | 5.17259 | 6.7 | 0 | 0 | 0 | 0 | Y | | | 456 | 3 | 11.2607 | |
| 454 | 09/23/02 | 2 | 0151 | 18.878049 | 16.44 | 5.17259 | 15.9 | 0 | 0 | 0 | 0 | N | | | 457 | 3 | 13.6823 | |
| 454 | 09/23/02 | 3 | 0215 | 18.878049 | 16.44 | 5.17259 | 16.3 | 0 | 0 | 0 | 0 | N | | | 458 | 3 | 11.0648 | |
| 455 | 09/23/02 | 1 | 0340 | 20.64 | 16.44 | 5.65536 | 15.9 | 0 | 0 | 0 | 0 | N | | | 459 | 3 | 15.5178 | |
| 455 | 09/23/02 | 2 | 0356 | 20.64 | 16.44 | 5.65536 | 18.3 | 0 | 0 | 0 | 0 | N | | | 460 | 3 | 13.5368 | |
| 455 | 09/23/02 | 3 | 0413 | 20.64 | 16.44 | 5.65536 | 18.8 | 0 | 0 | 0 | 0 | N | | | 461 | 3 | 13.2107 | |
| 456 | 09/23/02 | 1 | 0617 | 13.699115 | 16.44 | 3.75356 | 17.19 | 0 | 1 | 0 | 0 | N | | | | | | |
| 456 | 09/23/02 | 2 | 0653 | 13.699115 | 16.44 | 3.75356 | 15.59 | 0 | 0 | 0 | 0 | N | | | | | | |
| 456 | 09/23/02 | 3 | 0712 | 13.699115 | 16.44 | 3.75356 | 14.8 | 0 | 0 | 0 | 0 | N | | | | | | |
| 457 | 09/23/02 | 1 | 0836 | 16.645161 | 16.44 | 4.56077 | 14.1 | 0 | 0 | 0 | 0 | N | | | | | | |
| 457 | 09/23/02 | 2 | 0855 | 16.645161 | 16.44 | 4.56077 | 10.6 | 0 | 0 | 0 | 0 | N | | | | | | |
| 457 | 09/23/02 | 3 | 0909 | 16.645161 | 16.44 | 4.56077 | 9.85 | 0 | 0 | 0 | 0 | N | | | | | | |
| 458 | 09/23/02 | 1 | 1151 | 13.46087 | 16.44 | 3.68828 | 9.91 | 0 | 0 | 0 | 0 | Y | | | | | | |
| 458 | 09/23/02 | 2 | 1207 | 13.46087 | 16.44 | 3.68828 | 13.69 | 1 | 0 | 0 | 0 | Y | | | | | | |
| 458 | 09/23/02 | 3 | 1235 | 13.46087 | 16.44 | 3.68828 | 12.83 | 0 | 0 | 0 | 0 | N | | | | | | |
| 459 | 09/23/02 | 1 | 1532 | 18.878049 | 16.44 | 5.17259 | 0.17 | 0 | 0 | 0 | 0 | N | | | | | | |
| 459 | 09/23/02 | 2 | 1555 | 18.878049 | 16.44 | 5.17259 | 18 | 0 | 0 | 0 | 0 | N | | | | | | |
| 459 | 9/23/02 | 3 | 1607 | 18.878049 | 16.44 | 5.17259 | 19.3 | 0 | 0 | 0 | 0 | N | | | | | | |
| 460 | 9/23/02 | 1 | 1728 | 16.468085 | 16.44 | 4.51226 | 18.9 | 0 | 0 | 0 | 0 | N | | | | | | |
| 460 | 9/23/02 | 2 | 1752 | 16.468085 | 16.44 | 4.51226 | 17.7 | 0 | 0 | 0 | 0 | N | | | | | | |
| 460 | 9/23/02 | 3 | 1823 | 16.468085 | 16.44 | 4.51226 | 16.6 | 0 | 0 | 0 | 0 | N | | | | | | |
| 461 | 9/23/02 | 1 | 1951 | 16.071429 | 16.44 | 4.40357 | 5.2 | 0 | 0 | 0 | 0 | N | | | | | | |
| 461 | 9/23/02 | 2 | 2016 | 16.071429 | 16.44 | 4.40357 | 6.7 | 0 | 0 | 0 | 0 | N | | | | | | |
| 461 | 9/23/02 | 3 | 2024 | 16.071429 | 16.44 | 4.40357 | 14 | 0 | 0 | 0 | 0 | N | | | | | | |

Load Records And Rates
 WH Pearson and GD Williams

Upper Sands
9/23/2002

Sample Volume assumes 25% of total load diverted to sampler; 50% if one drag

| Load Sequence | Sampling Instructions | Date | Load Time | | # Passes | Settled Solids Volume (cu yd) | Total Distance Travelled (ft) | No. Basket Samples Taken | Pumping Time (min) | No. Drag Arms in Operation | Ave. Load Rate per Arm (cu yd/min) | Sample Load Rate (cu yd/min) |
|---------------|-----------------------|---------|-----------|------|----------|-------------------------------|-------------------------------|--------------------------|--------------------|----------------------------|------------------------------------|------------------------------|
| | | | Start | End | | | | | | | | |
| 453 | Sample | 9/23/02 | 0000 | 0053 | 2 | 6192 | 9000 | 3 | 43 | 2 | 72 | 36 |
| 454 | Sample | 9/23/02 | 0113 | 0255 | 3 | 6192 | 9000 | 3 | 82 | 2 | 37.7560976 | 18.8780488 |
| 455 | Sample | 9/23/02 | 0323 | 0453 | 4 | 6192 | 12000 | 3 | 75 | 2 | 41.28 | 20.64 |
| 456 | Sample | 9/23/02 | 0530 | 0751 | 4 | 6192 | 12000 | 3 | 113 | 2 | 27.3982301 | 13.699115 |
| 457 | Sample | 9/23/02 | 0836 | 1042 | 5 | 6192 | 15000 | 3 | 93 | 2 | 33.2903226 | 16.6451613 |
| 458 | Sample | 9/23/02 | 1134 | 1429 | 8 | 6192 | 20000 | 3 | 115 | 2 | 26.9217391 | 13.4608696 |
| 459 | Sample | 9/23/02 | 1506 | 1648 | 5 | 6192 | 15000 | 3 | 82 | 2 | 37.7560976 | 18.8780488 |
| 460 | Sample | 9/23/02 | 1726 | 1924 | 4 | 6192 | 12000 | 3 | 94 | 2 | 32.9361702 | 16.4680851 |
| 461 | Sample | 9/23/02 | 1951 | 2116 | 4 | 4500 | 10000 | 3 | 70 | 2 | 32.1428571 | 16.0714286 |

| | | | |
|---------|----------------------|------------------------|-----------------------|
| Summary | Total # Loads (H) | # Loads Sampled (h) | Total Load Volume (V) |
| | 9 | 9 | 54036 |

SUMMARY OF CALCULATION OF ADULT EQUIVALENT LOSS BASED ON MODIFIED DREDGE IMPACT MODEL AND DIRECT MEASUREMENT OF ENTRAINMENT RATES from Miller Sands, October 2002

WH Pearson and GD Williams First Version: **24-Jul-02** Revised: **4-Dec-02**
 Battelle Marine Sciences Laboratory
 Sequim, Washington

This calculation run is for

| Location | Start Date | End Date | Total Volume Dredged (cy) |
|--------------|------------|----------|---------------------------|
| Miller Sands | 1-Oct-02 | 8-Oct-02 | 443563 |

Overall Summary Statements

| | | | |
|--|---|-------------|---|
| Adult Equivalent Loss of all age classes taken to 2+ is | 0 | with 95% CI | 0 |
| We are 95% confident that the true value lies between | 0 | and | 0 |
| Adult Equivalent Loss of all age classes taken to 3+ is | 0 | with 95% CI | 0 |
| We are 95% confident that the true value lies between | 0 | and | 0 |
| Number of MALE recruits lost to fishery is estimated to be | 0 | with 95% CI | 0 |
| We are 95% confident that the true value lies between | 0 | and | 0 |

Sex Ratios by Age Class, Derived from June Date

| Age Class | Total | | | Proportion | |
|-----------|-------|--------|-------|------------|--------|
| | Male | Female | Sexed | Male | Female |
| YOY | 0 | 0 | 0 | 0.5* | 0.5* |
| 1+ | 0 | 0 | 0 | 0.5* | 0.5* |
| 2+ | 0 | 0 | 0 | 0.5* | 0.5* |
| 3+ | 0 | 0 | 0 | 0.5* | 0.5* |

* Sample sizes low; assumed to be 1:1.

Estimates of Crab Entrainment Rate (R), Number of Crabs Entrained (E), Adult Equivalent Loss (AEL), and Variance (AEL)

| Age Class | R | E | Var(E) | M | S to 2+ | AEL at 2+ | VAR(AEL 2+) | AEL at 3+ | VAR(AEL 3+) |
|-----------|---------|-----|--------|------|---------|-----------|-------------|-----------|-------------|
| YOY | 0.00000 | 0.0 | 0.00 | 0.10 | 0.017 | 0.00 | 0 | 0.00 | 0 |
| 1+ | 0.00000 | 0.0 | 0.00 | 0.60 | 0.160 | 0.00 | 0 | 0.00 | 0 |
| 2+ | 0.00000 | 0.0 | 0.00 | 0.86 | 0.649 | 0.00 | 0 | 0.00 | 0 |
| 3+ | 0.00000 | 0.0 | 0.00 | 0.86 | 2.222 | 0.00 | 0 | 0.00 | 0 |
| All | | 0.0 | 0.00 | | | 0.00 | 0.00 | 0.00 | 0.00 |

Note: Entrained 3+ crab are back-calculated to provide AEL at 2+.

AGE 2+ Calculations

Contribution to Adult Equivalent Loss (AEL at 2+) and Variance (AEL at 2+) by Sex (MALE/FEMALE) and Age Class

| Age Class | Female | | | Male | | |
|-----------|------------|------|----------|------------|------|----------|
| | Proportion | AEL | VAR(AEL) | Proportion | AEL | VAR(AEL) |
| YOY | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 |
| 1+ | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 |
| 2+ | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 |
| 3+ | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 |

| | | | | | | |
|-----|--|------|------|--|------|------|
| All | | 0.00 | 0.00 | | 0.00 | 0.00 |
|-----|--|------|------|--|------|------|

Age Class Distribution

| Age Class | % of Total | |
|-----------|--------------|--------------|
| | of Entrained | of AEL at 2+ |
| YOY | 0.00 | 0.00 |
| 1+ | 0.00 | 0.00 |
| 2+ | 0.00 | 0.00 |
| 3+ | 0.00 | 0.00 |

| Age Class | Proportion of Total AEL 2+ | |
|-----------|----------------------------|--------|
| | Male | Female |
| YOY | 0.0000 | 0.0000 |
| 1+ | 0.0000 | 0.0000 |
| 2+ | 0.0000 | 0.0000 |
| 3+ | 0.0000 | 0.0000 |
| ALL | 0.00 | 0.00 |

AGE 3+ Calculations

Contribution to Adult Equivalent Loss (AEL at 3+) and Variance (AEL at 3+) by Sex (MALE/FEMALE) and Age Class

| Age Class | Female | | | Male | | |
|-----------|------------|------|----------|------------|------|----------|
| | Proportion | AEL | VAR(AEL) | Proportion | AEL | VAR(AEL) |
| YOY | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 |
| 1+ | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 |
| 2+ | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 |
| 3+ | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 |
| All | | 0.00 | 0.00 | | 0.00 | 0.00 |

R = Crab Entrainment Rate (crabs/cy);
 E = Crabs Entrained (number of Crabs)
 M = Post-Entrainment Mortality (proportion)
 S = Natural Survivorship (proportion); survival to 3+ is assumed to be 45% (Ar
 AEL = Adult Equivalent Loss
 VAR(AEL) = AEL Variance

Age Class Distribution

| Age Class | % of Total | |
|-----------|--------------|--------------|
| | of Entrained | of AEL at 3+ |
| YOY | 0.00 | 0.00 |
| 1+ | 0.00 | 0.00 |
| 2+ | 0.00 | 0.00 |
| 3+ | 0.00 | 0.00 |

| Age Class | Proportion of Total AEL at 3+ | |
|-----------|-------------------------------|--------|
| | Male | Female |
| YOY | 0.0000 | 0.0000 |
| 1+ | 0.0000 | 0.0000 |
| 2+ | 0.0000 | 0.0000 |
| 3+ | 0.0000 | 0.0000 |
| ALL | 0.00 | 0.00 |

SUMMARY VARIANCE DATA

Entrainment with Confidence Limits

| | |
|------------|---------|
| E | 0.0 |
| Var(E) | 0.0 |
| SE E | 0.0 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 0.0 |
| CV E (%) | 0.00 |

TOTAL AEL at 2+ with Confidence Limits

| | |
|------------|---------|
| AEL at 2+ | 0.0 |
| Var(AEL2+) | 0.0 |
| SE AEL | 0.0 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 0.0 |
| CV AEL (%) | 0.00 |

TOTAL AEL at 3+ with Confidence Limits

| | |
|------------|---------|
| AEL at 3+ | 0.0 |
| Var(AEL3+) | 0.0 |
| SE AEL | 0.0 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 0.0 |
| CV AEL (%) | 0.00 |

SE = Standard Error
 Z = Value of Z from Normal Distribution

C.I. = Confidence Interval
 CV = Coefficient of Variation in %

MALE AEL at 3+ with Confidence Limits

| | |
|-----------|-----|
| AEL at 3+ | 0.0 |
| Var(AEL) | 0.0 |
| SE AEL | 0.0 |

FEMALE AEL at 3+ with Confidence Limits

| | |
|-----------|-----|
| AEL at 3+ | 0.0 |
| Var(AEL) | 0.0 |
| SE AEL | 0.0 |

| | |
|-------------------|---------|
| Z at 0.975 | 1.95996 |
| 95% C. I. | 0.0 |
| CV AEL (%) | 0.00 |

| | |
|-------------------|---------|
| Z at 0.975 | 1.95996 |
| 95% C. I. | 0.0 |
| CV AEL (%) | 0.00 |

TOTAL LOSS TO MALE FISHERY

(This total would be distributed over 3-4 years)

| Male Age 3+ (number of crab) | Harvest Rate (proportion) | Lost to Fishery (number of crab) |
|---------------------------------|------------------------------|-------------------------------------|
| 0.0 | 0.70 | 0.0 |

Harvest rate of 0.70 is taken from Armstrong et al. (1987)

Loss to Fishery with Confidence Limits

| | |
|------------------------|---------|
| Loss to Fishery | 0.0 |
| Var(AEL) | 0 |
| SE LF | 0.0 |
| Z at 0.975 | 1.95996 |
| 95% C. I. | 0.0 |
| CV LF (%) | 0.00 |

ADDITIONAL NOTES:

Mortality Rates (M) for crabs collected in June-September are from Armstrong et al. 1987 (Table 3.3, p. 61)

Survival rates (S) to age 2+ for crab collected from June-September are from Wainwright et al. 1992 (Table 6, p. 178), and thereafter survival rate from 2+ to age 3+ is 0.45 (Armstrong et al. 1987).

Sex ratios used were those observed or assumed to be 1:1 where sample size was low.

rmstrong et al. 1987

Estimating Entrainment Rate, Total Entrainment, and Variance
Miller Sands 10/1/02 - 10/8/02
 WH Pearson and GD Williams

Summary

| | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 | Total |
|--------|-------------|--------------|---------------|------------|-------|
| R | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| E | 0.0 | 0.0 | 0.0 | 0.0 | 0.000 |
| Var(E) | 0.00 | 0.00 | 0.00 | 0.00 | |
| SE (E) | 0.00 | 0.00 | 0.00 | 0.00 | |
| CV(E) | 0.00 | 0.00 | 0.00 | 0.00 | |

Calculations

| Load # (j) | V | Rj | | | | Variance Rj (Variance x Load Sheet) | | | | Entrainment (Rj x V) | | |
|------------|------|-------------|--------------|---------------|------------|-------------------------------------|--------------|---------------|------------|----------------------|--------------|---------------|
| | | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 | YOY 0-50 | 1+ 51-100 | 2+ 101-150 | 3+ >150 | YOY 0-50 | 1+ 51-100 | 2+ 101-150 |
| 462 | 5045 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 464 | 5045 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 465 | 4810 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 467 | 4928 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 470 | 3601 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 473 | 5903 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 475 | 5903 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 476 | 5903 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 478 | 5903 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 481 | 5903 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 484 | 5915 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 485 | 5915 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 487 | 6053 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 490 | 6017 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 492 | 6017 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 495 | 5940 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |

| | | | | | | | | | | | | |
|-----|------|--------|--------|--------|--------|--------|--------|--------|--------|---|---|---|
| 496 | 5940 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 499 | 6103 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 502 | 6103 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 503 | 6103 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 505 | 6217 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 507 | 6217 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 509 | 6091 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 511 | 6091 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 514 | 6257 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 515 | 6257 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 517 | 6257 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 519 | 6257 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 521 | 6243 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 522 | 6243 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 524 | 6270 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 525 | 6270 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 527 | 6243 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 530 | 6040 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 531 | 6040 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 534 | 5815 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |

h 36
Vh 211858
H 75
VH 443563

Estimating E

| | | | | |
|-------------|--------|--------|---------|--------|
| | | | | |
| | YOY | 1+ | 2+ | 3+ |
| | 0-50 | 51-100 | 101-150 | >150 |
| numerator | 0 | 0 | 0 | 0 |
| denominator | 211858 | 211858 | 211858 | 211858 |
| R | 0.000 | 0.000 | 0.000 | 0.000 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Estimating Variance and CV

| YOY | 1+ | 2+ | 3+ |
|------|--------|---------|------|
| 0-50 | 51-100 | 101-150 | >150 |

first term (Load to load variability)

| | | | | | |
|----------------|------|---|---|---|---|
| step 1 | 0.52 | | | | |
| step 2 | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| step 3 (total) | | 0 | 0 | 0 | 0 |
| step 4 | 35 | | | | |
| step 5 | | 0 | 0 | 0 | 0 |

second term (Basket to basket variability)

| | | | | | |
|--------|---------|---|---|---|---|
| step 1 | 2.08333 | | | | |
| step 2 | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 |

| | | | | |
|----------------|---|---|---|---|
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| step 3 (total) | 0 | 0 | 0 | 0 |
| step 4 | 0 | 0 | 0 | 0 |
| Var(E) | 0 | 0 | 0 | 0 |
| SE (E) | 0 | 0 | 0 | 0 |
| CV(E) | 0 | 0 | 0 | 0 |

Variance By Load
 WH Pearson and GD Williams
 Miller Sands
 10/1/02 - 10/8/02

| Load Sequence Number | Date | Sample Number | Number of Crabs | | | | Sample Volume (CY) (w) | Sum of Squares (by load - w2) | | | |
|----------------------|---------|---------------|-----------------|--------|---------|------|------------------------|-------------------------------|--------|---------|------|
| | | | YOY | 1+ | 2+ | 3+ | | YOY | 1+ | 2+ | 3+ |
| | | | 0-50 | 51-100 | 101-150 | >150 | | 0-50 | 51-100 | 101-150 | >150 |
| 462 | 10/1/02 | 1 | 0 | 0 | 0 | 0 | 6.4384 | 0 | 0 | 0 | 0 |
| 462 | 10/1/02 | 2 | 0 | 0 | 0 | 0 | 6.4384 | 0 | 0 | 0 | 0 |
| 462 | 10/1/02 | 3 | 0 | 0 | 0 | 0 | 6.4384 | 0 | 0 | 0 | 0 |
| 462 | 10/1/02 | 4 | 0 | 0 | 0 | 0 | 6.4384 | 0 | 0 | 0 | 0 |
| 1 Total | | 4 | 0 | 0 | 0 | 0 | 25.754 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 464 | 10/1/02 | 1 | 0 | 0 | 0 | 0 | 4.6078 | 0 | 0 | 0 | 0 |
| 464 | 10/1/02 | 2 | 0 | 0 | 0 | 0 | 4.6078 | 0 | 0 | 0 | 0 |
| 464 | 10/1/02 | 3 | 0 | 0 | 0 | 0 | 4.6078 | 0 | 0 | 0 | 0 |
| 464 | 10/1/02 | 4 | 0 | 0 | 0 | 0 | 4.6078 | 0 | 0 | 0 | 0 |
| 2 Total | | 4 | 0 | 0 | 0 | 0 | 18.431 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 465 | 10/1/02 | 1 | 0 | 0 | 0 | 0 | 5.4014 | 0 | 0 | 0 | 0 |
| 465 | 10/1/02 | 2 | 0 | 0 | 0 | 0 | 5.4014 | 0 | 0 | 0 | 0 |
| 465 | 10/1/02 | 3 | 0 | 0 | 0 | 0 | 5.4014 | 0 | 0 | 0 | 0 |
| 465 | 10/1/02 | 4 | 0 | 0 | 0 | 0 | 5.4014 | 0 | 0 | 0 | 0 |
| 3 Total | | 4 | 0 | 0 | 0 | 0 | 21.606 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 467 | 10/1/02 | 1 | 0 | 0 | 0 | 0 | 5.6261 | 0 | 0 | 0 | 0 |
| 467 | 10/1/02 | 2 | 0 | 0 | 0 | 0 | 5.6261 | 0 | 0 | 0 | 0 |
| 467 | 10/1/02 | 3 | 0 | 0 | 0 | 0 | 5.6261 | 0 | 0 | 0 | 0 |
| 467 | 10/1/02 | 4 | 0 | 0 | 0 | 0 | 5.6261 | 0 | 0 | 0 | 0 |
| 4 Total | | 4 | 0 | 0 | 0 | 0 | 22.505 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 470 | 10/1/02 | 1 | 0 | 0 | 0 | 0 | 5.6061 | 0 | 0 | 0 | 0 |
| 470 | 10/1/02 | 2 | 0 | 0 | 0 | 0 | 5.6061 | 0 | 0 | 0 | 0 |
| 470 | 10/1/02 | 3 | 0 | 0 | 0 | 0 | 5.6061 | 0 | 0 | 0 | 0 |
| 470 | 10/1/02 | 4 | 0 | 0 | 0 | 0 | 5.6061 | 0 | 0 | 0 | 0 |
| 5 Total | | 4 | 0 | 0 | 0 | 0 | 22.424 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 473 | 10/2/02 | 1 | 0 | 0 | 0 | 0 | 5.7765 | 0 | 0 | 0 | 0 |
| 473 | 10/2/02 | 2 | 0 | 0 | 0 | 0 | 5.7765 | 0 | 0 | 0 | 0 |
| 473 | 10/2/02 | 3 | 0 | 0 | 0 | 0 | 5.7765 | 0 | 0 | 0 | 0 |
| 473 | 10/2/02 | 4 | 0 | 0 | 0 | 0 | 5.7765 | 0 | 0 | 0 | 0 |
| 6 Total | | 4 | 0 | 0 | 0 | 0 | 23.106 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 475 | 10/2/02 | 1 | 0 | 0 | 0 | 0 | 5.9464 | 0 | 0 | 0 | 0 |
| 475 | 10/2/02 | 2 | 0 | 0 | 0 | 0 | 5.9464 | 0 | 0 | 0 | 0 |
| 475 | 10/2/02 | 3 | 0 | 0 | 0 | 0 | 5.9464 | 0 | 0 | 0 | 0 |
| 475 | 10/2/02 | 4 | 0 | 0 | 0 | 0 | 5.9464 | 0 | 0 | 0 | 0 |
| 7 Total | | 4 | 0 | 0 | 0 | 0 | 23.786 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 476 | 10/2/02 | 1 | 0 | 0 | 0 | 0 | 5.184 | 0 | 0 | 0 | 0 |
| 476 | 10/2/02 | 2 | 0 | 0 | 0 | 0 | 5.184 | 0 | 0 | 0 | 0 |
| 476 | 10/2/02 | 3 | 0 | 0 | 0 | 0 | 5.184 | 0 | 0 | 0 | 0 |
| 476 | 10/2/02 | 4 | 0 | 0 | 0 | 0 | 5.184 | 0 | 0 | 0 | 0 |
| 8 Total | | 4 | 0 | 0 | 0 | 0 | 20.736 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 478 | 10/2/02 | 1 | 0 | 0 | 0 | 0 | 6.4183 | 0 | 0 | 0 | 0 |
| 478 | 10/2/02 | 2 | 0 | 0 | 0 | 0 | 6.4183 | 0 | 0 | 0 | 0 |
| 478 | 10/2/02 | 3 | 0 | 0 | 0 | 0 | 6.4183 | 0 | 0 | 0 | 0 |
| 478 | 10/2/02 | 4 | 0 | 0 | 0 | 0 | 6.4183 | 0 | 0 | 0 | 0 |
| 9 Total | | 4 | 0 | 0 | 0 | 0 | 25.673 | 0 | 0 | 0 | 0 |
| Mean (cij) | | | 0 | 0 | 0 | 0 | | | | | |

| | | | | Rj | 0 | 0 | 0 | 0 |
|-----|------------|---|---|--------|---|---|---|---|
| | | | | Var Rj | 0 | 0 | 0 | 0 |
| 481 | 10/2/02 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 481 | 10/2/02 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 481 | 10/2/02 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | Total | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | Var Rj | 0 | 0 | 0 | 0 |
| 484 | 10/3/02 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 484 | 10/3/02 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 484 | 10/3/02 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 484 | 10/3/02 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | Total | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | Var Rj | 0 | 0 | 0 | 0 |
| 485 | 10/3/02 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 485 | 10/3/02 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 485 | 10/3/02 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 485 | 10/3/02 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | Total | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | Var Rj | 0 | 0 | 0 | 0 |
| 487 | 10/3/02 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 487 | 10/3/02 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 487 | 10/3/02 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | Total | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | Var Rj | 0 | 0 | 0 | 0 |
| 490 | 10/3/02 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 490 | 10/3/02 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 490 | 10/3/02 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 490 | 10/3/02 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | Total | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | Var Rj | 0 | 0 | 0 | 0 |
| 492 | 10/3/02 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 492 | 10/3/02 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 492 | 10/3/02 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 492 | 10/3/02 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | Total | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | Var Rj | 0 | 0 | 0 | 0 |
| 495 | 10/4/02 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 495 | 10/4/02 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 495 | 10/4/02 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 495 | 10/4/02 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | Total | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | Var Rj | 0 | 0 | 0 | 0 |
| 496 | 10/4/02 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 496 | 10/4/02 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 496 | 10/4/02 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 496 | 10/4/02 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | Total | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | Var Rj | 0 | 0 | 0 | 0 |
| 499 | 10/4/02 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 499 | 10/4/02 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 499 | 10/4/02 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | Total | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | Var Rj | 0 | 0 | 0 | 0 |
| 502 | 10/4/02 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 502 | 10/4/02 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 502 | 10/4/02 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 502 | 10/4/02 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | Total | 4 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | | | | | |
|---------------|---|---|---|---|--------|---|---|---|---|
| Mean (cij) | 0 | 0 | 0 | 0 | Rj | 0 | 0 | 0 | 0 |
| | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 503 10/4/02 1 | 0 | 0 | 0 | 0 | 5.5741 | 0 | 0 | 0 | 0 |
| 503 10/4/02 2 | 0 | 0 | 0 | 0 | 5.5741 | 0 | 0 | 0 | 0 |
| 503 10/4/02 3 | 0 | 0 | 0 | 0 | 5.5741 | 0 | 0 | 0 | 0 |
| 503 10/4/02 4 | 0 | 0 | 0 | 0 | 5.5741 | 0 | 0 | 0 | 0 |
| 20 Total | 0 | 0 | 0 | 0 | 22.296 | 0 | 0 | 0 | 0 |
| Mean (cij) | 0 | 0 | 0 | 0 | Rj | 0 | 0 | 0 | 0 |
| | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 505 10/5/02 1 | 0 | 0 | 0 | 0 | 5.9981 | 0 | 0 | 0 | 0 |
| 505 10/5/02 2 | 0 | 0 | 0 | 0 | 5.9981 | 0 | 0 | 0 | 0 |
| 505 10/5/02 3 | 0 | 0 | 0 | 0 | 5.9981 | 0 | 0 | 0 | 0 |
| 505 10/5/02 4 | 0 | 0 | 0 | 0 | 5.9981 | 0 | 0 | 0 | 0 |
| 21 Total | 0 | 0 | 0 | 0 | 23.992 | 0 | 0 | 0 | 0 |
| Mean (cij) | 0 | 0 | 0 | 0 | Rj | 0 | 0 | 0 | 0 |
| | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 507 10/5/02 1 | 0 | 0 | 0 | 0 | 4.4361 | 0 | 0 | 0 | 0 |
| 507 10/5/02 2 | 0 | 0 | 0 | 0 | 4.4361 | 0 | 0 | 0 | 0 |
| 507 10/5/02 3 | 0 | 0 | 0 | 0 | 4.4361 | 0 | 0 | 0 | 0 |
| 507 10/5/02 4 | 0 | 0 | 0 | 0 | 4.4361 | 0 | 0 | 0 | 0 |
| 22 Total | 0 | 0 | 0 | 0 | 17.744 | 0 | 0 | 0 | 0 |
| Mean (cij) | 0 | 0 | 0 | 0 | Rj | 0 | 0 | 0 | 0 |
| | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 509 10/5/02 1 | 0 | 0 | 0 | 0 | 4.9671 | 0 | 0 | 0 | 0 |
| 509 10/5/02 2 | 0 | 0 | 0 | 0 | 4.9671 | 0 | 0 | 0 | 0 |
| 509 10/5/02 3 | 0 | 0 | 0 | 0 | 4.9671 | 0 | 0 | 0 | 0 |
| 509 10/5/02 4 | 0 | 0 | 0 | 0 | 4.9671 | 0 | 0 | 0 | 0 |
| 23 Total | 0 | 0 | 0 | 0 | 19.868 | 0 | 0 | 0 | 0 |
| Mean (cij) | 0 | 0 | 0 | 0 | Rj | 0 | 0 | 0 | 0 |
| | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 511 10/5/02 1 | 0 | 0 | 0 | 0 | 6.2274 | 0 | 0 | 0 | 0 |
| 511 10/5/02 2 | 0 | 0 | 0 | 0 | 6.2274 | 0 | 0 | 0 | 0 |
| 511 10/5/02 3 | 0 | 0 | 0 | 0 | 6.2274 | 0 | 0 | 0 | 0 |
| 511 10/5/02 4 | 0 | 0 | 0 | 0 | 6.2274 | 0 | 0 | 0 | 0 |
| 24 Total | 0 | 0 | 0 | 0 | 24.909 | 0 | 0 | 0 | 0 |
| Mean (cij) | 0 | 0 | 0 | 0 | Rj | 0 | 0 | 0 | 0 |
| | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 514 10/5/02 1 | 0 | 0 | 0 | 0 | 5.4254 | 0 | 0 | 0 | 0 |
| 514 10/6/02 2 | 0 | 0 | 0 | 0 | 5.4254 | 0 | 0 | 0 | 0 |
| 514 10/6/02 3 | 0 | 0 | 0 | 0 | 5.4254 | 0 | 0 | 0 | 0 |
| 514 10/6/02 4 | 0 | 0 | 0 | 0 | 5.4254 | 0 | 0 | 0 | 0 |
| 25 Total | 0 | 0 | 0 | 0 | 21.701 | 0 | 0 | 0 | 0 |
| Mean (cij) | 0 | 0 | 0 | 0 | Rj | 0 | 0 | 0 | 0 |
| | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 515 10/6/02 1 | 0 | 0 | 0 | 0 | 5.3576 | 0 | 0 | 0 | 0 |
| 515 10/6/02 2 | 0 | 0 | 0 | 0 | 5.3576 | 0 | 0 | 0 | 0 |
| 515 10/6/02 3 | 0 | 0 | 0 | 0 | 5.3576 | 0 | 0 | 0 | 0 |
| 515 10/6/02 4 | 0 | 0 | 0 | 0 | 5.3576 | 0 | 0 | 0 | 0 |
| 26 Total | 0 | 0 | 0 | 0 | 21.43 | 0 | 0 | 0 | 0 |
| Mean (cij) | 0 | 0 | 0 | 0 | Rj | 0 | 0 | 0 | 0 |
| | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 517 10/6/02 1 | 0 | 0 | 0 | 0 | 5.6395 | 0 | 0 | 0 | 0 |
| 517 10/6/02 2 | 0 | 0 | 0 | 0 | 5.6395 | 0 | 0 | 0 | 0 |
| 517 10/6/02 3 | 0 | 0 | 0 | 0 | 5.6395 | 0 | 0 | 0 | 0 |
| 517 10/6/02 4 | 0 | 0 | 0 | 0 | 5.6395 | 0 | 0 | 0 | 0 |
| 27 Total | 0 | 0 | 0 | 0 | 22.558 | 0 | 0 | 0 | 0 |
| Mean (cij) | 0 | 0 | 0 | 0 | Rj | 0 | 0 | 0 | 0 |
| | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 519 10/6/02 1 | 0 | 0 | 0 | 0 | 5.7147 | 0 | 0 | 0 | 0 |
| 519 10/6/02 2 | 0 | 0 | 0 | 0 | 5.7147 | 0 | 0 | 0 | 0 |
| 519 10/6/02 3 | 0 | 0 | 0 | 0 | 5.7147 | 0 | 0 | 0 | 0 |
| 519 10/6/02 4 | 0 | 0 | 0 | 0 | 5.7147 | 0 | 0 | 0 | 0 |
| 28 Total | 0 | 0 | 0 | 0 | 22.859 | 0 | 0 | 0 | 0 |
| Mean (cij) | 0 | 0 | 0 | 0 | Rj | 0 | 0 | 0 | 0 |
| | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 521 10/6/02 1 | 0 | 0 | 0 | 0 | 4.9726 | 0 | 0 | 0 | 0 |

| | | | | | | | | | | | |
|-----|------------|---|---|---|---|---|--------|---|---|---|---|
| 521 | 10/6/02 | 2 | 0 | 0 | 0 | 0 | 4.9726 | 0 | 0 | 0 | 0 |
| 521 | 10/6/02 | 3 | 0 | 0 | 0 | 0 | 4.9726 | 0 | 0 | 0 | 0 |
| 521 | 10/6/02 | 4 | 0 | 0 | 0 | 0 | 4.9726 | 0 | 0 | 0 | 0 |
| 29 | Total | 4 | 0 | 0 | 0 | 0 | 19.89 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 522 | 10/6/02 | 1 | 0 | 0 | 0 | 0 | 4.7516 | 0 | 0 | 0 | 0 |
| 522 | 10/6/02 | 2 | 0 | 0 | 0 | 0 | 4.7516 | 0 | 0 | 0 | 0 |
| 522 | 10/6/02 | 3 | 0 | 0 | 0 | 0 | 4.7516 | 0 | 0 | 0 | 0 |
| 522 | 10/6/02 | 4 | 0 | 0 | 0 | 0 | 4.7516 | 0 | 0 | 0 | 0 |
| 30 | Total | 4 | 0 | 0 | 0 | 0 | 19.006 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 524 | 10/7/02 | 1 | 0 | 0 | 0 | 0 | 4.8806 | 0 | 0 | 0 | 0 |
| 524 | 10/7/02 | 2 | 0 | 0 | 0 | 0 | 4.8806 | 0 | 0 | 0 | 0 |
| 524 | 10/7/02 | 3 | 0 | 0 | 0 | 0 | 4.8806 | 0 | 0 | 0 | 0 |
| 524 | 10/7/02 | 4 | 0 | 0 | 0 | 0 | 4.8806 | 0 | 0 | 0 | 0 |
| 31 | Total | 4 | 0 | 0 | 0 | 0 | 19.523 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 525 | 10/7/02 | 1 | 0 | 0 | 0 | 0 | 4.4739 | 0 | 0 | 0 | 0 |
| 525 | 10/7/02 | 2 | 0 | 0 | 0 | 0 | 4.4739 | 0 | 0 | 0 | 0 |
| 525 | 10/7/02 | 3 | 0 | 0 | 0 | 0 | 4.4739 | 0 | 0 | 0 | 0 |
| 525 | 10/7/02 | 4 | 0 | 0 | 0 | 0 | 4.4739 | 0 | 0 | 0 | 0 |
| 32 | Total | 4 | 0 | 0 | 0 | 0 | 17.896 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 527 | 10/7/02 | 1 | 0 | 0 | 0 | 0 | 5.5538 | 0 | 0 | 0 | 0 |
| 527 | 10/7/02 | 2 | 0 | 0 | 0 | 0 | 5.5538 | 0 | 0 | 0 | 0 |
| 527 | 10/7/02 | 3 | 0 | 0 | 0 | 0 | 5.5538 | 0 | 0 | 0 | 0 |
| 527 | 10/7/02 | 4 | 0 | 0 | 0 | 0 | 5.5538 | 0 | 0 | 0 | 0 |
| 33 | Total | 4 | 0 | 0 | 0 | 0 | 22.215 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 530 | 10/7/02 | 1 | 0 | 0 | 0 | 0 | 5.3732 | 0 | 0 | 0 | 0 |
| 530 | 10/7/02 | 2 | 0 | 0 | 0 | 0 | 5.3732 | 0 | 0 | 0 | 0 |
| 530 | 10/7/02 | 3 | 0 | 0 | 0 | 0 | 5.3732 | 0 | 0 | 0 | 0 |
| 530 | 10/7/02 | 4 | 0 | 0 | 0 | 0 | 5.3732 | 0 | 0 | 0 | 0 |
| 34 | Total | 4 | 0 | 0 | 0 | 0 | 21.493 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 531 | 10/7/02 | 1 | 0 | 0 | 0 | 0 | 5.5911 | 0 | 0 | 0 | 0 |
| 531 | 10/7/02 | 2 | 0 | 0 | 0 | 0 | 5.5911 | 0 | 0 | 0 | 0 |
| 531 | 10/7/02 | 3 | 0 | 0 | 0 | 0 | 5.5911 | 0 | 0 | 0 | 0 |
| 531 | 10/7/02 | 4 | 0 | 0 | 0 | 0 | 5.5911 | 0 | 0 | 0 | 0 |
| 35 | Total | 4 | 0 | 0 | 0 | 0 | 22.364 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |
| 534 | 10/8/02 | 1 | 0 | 0 | 0 | 0 | 5.8578 | 0 | 0 | 0 | 0 |
| 534 | 10/8/02 | 2 | 0 | 0 | 0 | 0 | 5.8578 | 0 | 0 | 0 | 0 |
| 534 | 10/8/02 | 3 | 0 | 0 | 0 | 0 | 5.8578 | 0 | 0 | 0 | 0 |
| 36 | Total | 3 | 0 | 0 | 0 | 0 | 17.573 | 0 | 0 | 0 | 0 |
| | Mean (cij) | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | Rj | 0 | 0 | 0 | 0 |
| | | | | | | | Var Rj | 0 | 0 | 0 | 0 |

Total Entrainment by Load
 WH Pearson and GD Williams

Miller Sands
 10/1/02 - 10/8/02

| Load # (j) | Total Load Volume (V) | # Samples (b) | Total Sample Volume (v) | Totals by Age Class i | | | | R _{ij} | | | |
|---------------|--------------------------|------------------|----------------------------|-----------------------|--------|---------|------|-----------------|--------|---------|--------|
| | | | | YOY | 1+ | 2+ | 3+ | YOY | 1+ | 2+ | 3+ |
| | | | | 0-50 | 51-100 | 101-150 | >150 | 0-50 | 51-100 | 101-150 | >150 |
| 462 | 5045 | 4 | 25.753524 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 464 | 5045 | 4 | 18.431067 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 465 | 4810 | 4 | 21.605574 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 467 | 4928 | 4 | 22.504533 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 470 | 3601 | 4 | 22.424409 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 473 | 5903 | 4 | 23.106029 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 475 | 5903 | 4 | 23.785618 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 476 | 5903 | 4 | 20.736179 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 478 | 5903 | 4 | 25.673365 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 481 | 5903 | 3 | 16.392791 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 484 | 5915 | 4 | 23.153 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 485 | 5915 | 4 | 21.901486 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 487 | 6053 | 3 | 23.969133 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 490 | 6017 | 4 | 31.106755 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 492 | 6017 | 4 | 25.760281 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 495 | 5940 | 4 | 29.422105 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 496 | 5940 | 4 | 24.29194 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 499 | 6103 | 3 | 19.596352 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 502 | 6103 | 4 | 18.655507 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 503 | 6103 | 4 | 22.296293 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 505 | 6217 | 4 | 23.992366 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 507 | 6217 | 4 | 17.744354 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 509 | 6091 | 4 | 19.868262 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 511 | 6091 | 4 | 24.909463 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 514 | 6257 | 4 | 21.701494 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 515 | 6257 | 4 | 21.430225 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 517 | 6257 | 4 | 22.558132 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 519 | 6257 | 4 | 22.858907 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 521 | 6243 | 4 | 19.890488 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 522 | 6243 | 4 | 19.006467 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 524 | 6270 | 4 | 19.5225 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 525 | 6270 | 4 | 17.895625 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

| | | | | | | | | | | | |
|-----|------|---|-----------|---|---|---|---|--------|--------|--------|--------|
| 527 | 6243 | 4 | 22.215351 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 530 | 6040 | 4 | 21.492987 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 531 | 6040 | 4 | 22.364324 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 534 | 5815 | 3 | 17.573272 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Within Load Record **Miller Sands**
 WH Pearson and GD Williams **10/1/02 - 10/8/02**

| Load Sequence Number (j) | Date | Sample Number (l) | Start Time (h:m) | Sample Load Rate (cu yd/min) | Effective Sample Time (sec) | Sample Volume (CY) (w) | Salinity (ppt) | Number of Crabs (c) by age class (i) | | | | | Load # (j) | # Samples (b) | Total Volume | Totals by Age Class i | | | |
|--------------------------|---------|-------------------|------------------|------------------------------|-----------------------------|------------------------|----------------|--------------------------------------|--------|---------|------|-----|------------|---------------|--------------|-----------------------|--------|---------|------|
| | | | | | | | | YOY | 1+ | 2+ | 3+ | UID | | | | YOY | 1+ | 2+ | 3+ |
| | | | | | | | | 0-50 | 51-100 | 101-150 | >150 | | | | | 0-50 | 51-100 | 101-150 | >150 |
| 462 | 10/1/02 | 1 | 0013 | 18.017857 | 21.44 | 6.43838 | nd | 0 | 0 | 0 | 0 | N | 462 | 4 | 25.754 | 0 | 0 | 0 | 0 |
| 462 | 10/1/02 | 2 | 0039 | 18.017857 | 21.44 | 6.43838 | nd | 0 | 0 | 0 | 0 | N | 464 | 4 | 18.431 | 0 | 0 | 0 | 0 |
| 462 | 10/1/02 | 3 | 0114 | 18.017857 | 21.44 | 6.43838 | 0 | 0 | 0 | 0 | 0 | N | 465 | 4 | 21.606 | 0 | 0 | 0 | 0 |
| 462 | 10/1/02 | 4 | 0200 | 18.017857 | 21.44 | 6.43838 | 2 | 0 | 0 | 0 | 0 | N | 467 | 4 | 22.505 | 0 | 0 | 0 | 0 |
| 464 | 10/1/02 | 1 | 0443 | 16.816667 | 16.44 | 4.60777 | 10 | 0 | 0 | 0 | 0 | N | 470 | 4 | 22.424 | 0 | 0 | 0 | 0 |
| 464 | 10/1/02 | 2 | 0505 | 16.816667 | 16.44 | 4.60777 | 6 | 0 | 0 | 0 | 0 | N | 473 | 4 | 23.106 | 0 | 0 | 0 | 0 |
| 464 | 10/1/02 | 3 | 0529 | 16.816667 | 16.44 | 4.60777 | nd | 0 | 0 | 0 | 0 | N | 475 | 4 | 23.786 | 0 | 0 | 0 | 0 |
| 464 | 10/1/02 | 4 | 0558 | 16.816667 | 16.44 | 4.60777 | 12 | 0 | 0 | 0 | 0 | N | 476 | 4 | 20.736 | 0 | 0 | 0 | 0 |
| 465 | 10/1/02 | 1 | 0720 | 19.713115 | 16.44 | 5.40139 | 15 | 0 | 0 | 0 | 0 | N | 478 | 4 | 25.673 | 0 | 0 | 0 | 0 |
| 465 | 10/1/02 | 2 | 0727 | 19.713115 | 16.44 | 5.40139 | 15 | 0 | 0 | 0 | 0 | N | 481 | 3 | 16.393 | 0 | 0 | 0 | 0 |
| 465 | 10/1/02 | 3 | 0803 | 19.713115 | 16.44 | 5.40139 | 15 | 0 | 0 | 0 | 0 | N | 484 | 4 | 23.153 | 0 | 0 | 0 | 0 |
| 465 | 10/1/02 | 4 | 0824 | 19.713115 | 16.44 | 5.40139 | 15 | 0 | 0 | 0 | 0 | N | 485 | 4 | 21.901 | 0 | 0 | 0 | 0 |
| 467 | 10/1/02 | 1 | 1114 | 20.533333 | 16.44 | 5.62613 | 15 | 0 | 0 | 0 | 0 | N | 487 | 3 | 23.969 | 0 | 0 | 0 | 0 |
| 467 | 10/1/02 | 2 | 1127 | 20.533333 | 16.44 | 5.62613 | 16 | 0 | 0 | 0 | 0 | N | 490 | 4 | 31.107 | 0 | 0 | 0 | 0 |
| 467 | 10/1/02 | 3 | 1134 | 20.533333 | 16.44 | 5.62613 | nd | 0 | 0 | 0 | 0 | N | 492 | 4 | 25.76 | 0 | 0 | 0 | 0 |
| 467 | 10/1/02 | 4 | 1153 | 20.533333 | 16.44 | 5.62613 | 15 | 0 | 0 | 0 | 0 | N | 495 | 4 | 29.422 | 0 | 0 | 0 | 0 |
| 470 | 10/1/02 | 1 | 1740 | 20.460227 | 16.44 | 5.6061 | 8 | 0 | 0 | 0 | 0 | N | 496 | 4 | 24.292 | 0 | 0 | 0 | 0 |
| 470 | 10/1/02 | 2 | 1801 | 20.460227 | 16.44 | 5.6061 | 9 | 0 | 0 | 0 | 0 | N | 499 | 3 | 19.596 | 0 | 0 | 0 | 0 |
| 470 | 10/1/02 | 3 | 1817 | 20.460227 | 16.44 | 5.6061 | 10 | 0 | 0 | 0 | 0 | N | 502 | 4 | 18.656 | 0 | 0 | 0 | 0 |
| 470 | 10/1/02 | 4 | 1826 | 20.460227 | 16.44 | 5.6061 | 8 | 0 | 0 | 0 | 0 | N | 503 | 4 | 22.296 | 0 | 0 | 0 | 0 |
| 473 | 10/2/02 | 1 | 0126 | 21.082143 | 16.44 | 5.77651 | 10 | 0 | 0 | 0 | 0 | N | 505 | 4 | 23.992 | 0 | 0 | 0 | 0 |
| 473 | 10/2/02 | 2 | 0136 | 21.082143 | 16.44 | 5.77651 | 10 | 0 | 0 | 0 | 0 | N | 507 | 4 | 17.744 | 0 | 0 | 0 | 0 |
| 473 | 10/2/02 | 3 | 0151 | 21.082143 | 16.44 | 5.77651 | nd | 0 | 0 | 0 | 0 | N | 509 | 4 | 19.868 | 0 | 0 | 0 | 0 |
| 473 | 10/2/02 | 4 | 0212 | 21.082143 | 16.44 | 5.77651 | 10 | 0 | 0 | 0 | 0 | N | 511 | 4 | 24.909 | 0 | 0 | 0 | 0 |
| 475 | 10/2/02 | 1 | 0630 | 21.702206 | 16.44 | 5.9464 | 0 | 0 | 0 | 0 | 0 | N | 514 | 4 | 21.701 | 0 | 0 | 0 | 0 |
| 475 | 10/2/02 | 2 | 0642 | 21.702206 | 16.44 | 5.9464 | 0 | 0 | 0 | 0 | 0 | N | 515 | 4 | 21.43 | 0 | 0 | 0 | 0 |
| 475 | 10/2/02 | 3 | 0658 | 21.702206 | 16.44 | 5.9464 | 0 | 0 | 0 | 0 | 0 | N | 517 | 4 | 22.558 | 0 | 0 | 0 | 0 |
| 475 | 10/2/02 | 4 | 0711 | 21.702206 | 16.44 | 5.9464 | nd | 0 | 0 | 0 | 0 | N | 519 | 4 | 22.859 | 0 | 0 | 0 | 0 |
| 476 | 10/2/02 | 1 | 0914 | 18.919872 | 16.44 | 5.18404 | 0 | 0 | 0 | 0 | 0 | N | 521 | 4 | 19.89 | 0 | 0 | 0 | 0 |
| 476 | 10/2/02 | 2 | 0930 | 18.919872 | 16.44 | 5.18404 | 0 | 0 | 0 | 0 | 0 | N | 522 | 4 | 19.006 | 0 | 0 | 0 | 0 |
| 476 | 10/2/02 | 3 | 0946 | 18.919872 | 16.44 | 5.18404 | 0 | 0 | 0 | 0 | 0 | N | 524 | 4 | 19.523 | 0 | 0 | 0 | 0 |
| 476 | 10/2/02 | 4 | 1002 | 18.919872 | 16.44 | 5.18404 | 4 | 0 | 0 | 100 | 0 | N | 525 | 4 | 17.896 | 0 | 0 | 0 | 0 |
| 478 | 10/2/02 | 1 | 1438 | 23.424603 | 16.44 | 6.41834 | 8 | 0 | 0 | 0 | 0 | N | 527 | 4 | 22.215 | 0 | 0 | 0 | 0 |
| 478 | 10/2/02 | 2 | 1502 | 23.424603 | 16.44 | 6.41834 | nd | 0 | 0 | 0 | 0 | N | 530 | 4 | 21.493 | 0 | 0 | 0 | 0 |
| 478 | 10/2/02 | 3 | 1511 | 23.424603 | 16.44 | 6.41834 | 10 | 0 | 0 | 0 | 0 | N | 531 | 4 | 22.364 | 0 | 0 | 0 | 0 |
| 478 | 10/2/02 | 4 | 1534 | 23.424603 | 16.44 | 6.41834 | 10 | 0 | 0 | 0 | 0 | N | 534 | 3 | 17.573 | 0 | 0 | 0 | 0 |
| 481 | 10/2/02 | 1 | 2132 | 19.942568 | 16.44 | 5.46426 | 5 | 0 | 0 | 0 | 0 | N | | | | | | | |
| 481 | 10/2/02 | 2 | 2151 | 19.942568 | 16.44 | 5.46426 | 5 | 0 | 0 | 0 | 0 | N | | | | | | | |
| 481 | 10/2/02 | 3 | 2223 | 19.942568 | 16.44 | 5.46426 | 8 | 0 | 0 | 0 | 0 | N | | | | | | | |
| 484 | 10/3/02 | 1 | 0412 | 21.125 | 16.44 | 5.78825 | 2 | 0 | 0 | 0 | 0 | N | | | | | | | |
| 484 | 10/3/02 | 2 | 0428 | 21.125 | 16.44 | 5.78825 | 2 | 0 | 0 | 0 | 0 | N | | | | | | | |
| 484 | 10/3/02 | 3 | 0444 | 21.125 | 16.44 | 5.78825 | nd | 0 | 0 | 0 | 0 | N | | | | | | | |
| 484 | 10/3/02 | 4 | 0500 | 21.125 | 16.44 | 5.78825 | 0 | 0 | 0 | 0 | 0 | N | | | | | | | |
| 485 | 10/3/02 | 1 | 0632 | 19.983108 | 16.44 | 5.47537 | 0 | 0 | 0 | 0 | 0 | N | | | | | | | |
| 485 | 10/3/02 | 2 | 0641 | 19.983108 | 16.44 | 5.47537 | 0 | 0 | 0 | 0 | 0 | N | | | | | | | |

| | | | | | | | | | | | | |
|-----|---------|---|------|-----------|-------|---------|----|---|---|---|---|---|
| 485 | 10/3/02 | 3 | 0656 | 19.983108 | 16.44 | 5.47537 | 0 | 0 | 0 | 0 | 0 | N |
| 485 | 10/3/02 | 4 | 0712 | 19.983108 | 16.44 | 5.47537 | 0 | 0 | 0 | 0 | 0 | N |
| 487 | 10/3/02 | 1 | 1152 | 28.023148 | 16.44 | 7.67834 | 2 | 0 | 0 | 0 | 0 | N |
| 487 | 10/3/02 | 2 | 1228 | 28.023148 | 16.44 | 7.67834 | 2 | 0 | 0 | 0 | 0 | N |
| 487 | 10/3/02 | 3 | 1249 | 28.023148 | 18.44 | 8.61245 | 4 | 0 | 0 | 0 | 0 | N |
| 490 | 10/3/02 | 1 | 1728 | 28.382075 | 16.44 | 7.77669 | nd | 0 | 0 | 0 | 0 | N |
| 490 | 10/3/02 | 2 | 1744 | 28.382075 | 16.44 | 7.77669 | 0 | 0 | 0 | 0 | 0 | N |
| 490 | 10/3/02 | 3 | 1800 | 28.382075 | 16.44 | 7.77669 | 0 | 0 | 0 | 0 | 0 | N |
| 490 | 10/3/02 | 4 | 1816 | 28.382075 | 16.44 | 7.77669 | 0 | 0 | 0 | 0 | 0 | N |
| 492 | 10/3/02 | 1 | 2137 | 23.503906 | 16.44 | 6.44007 | 0 | 0 | 0 | 0 | 0 | N |
| 492 | 10/3/02 | 2 | 2153 | 23.503906 | 16.44 | 6.44007 | 0 | 0 | 0 | 0 | 0 | N |
| 492 | 10/3/02 | 3 | 2209 | 23.503906 | 16.44 | 6.44007 | 0 | 0 | 0 | 0 | 0 | N |
| 492 | 10/3/02 | 4 | 2226 | 23.503906 | 16.44 | 6.44007 | 0 | 0 | 0 | 0 | 0 | N |
| 495 | 10/4/02 | 1 | 0340 | 26.052632 | 18.44 | 8.00684 | 4 | 0 | 0 | 0 | 0 | N |
| 495 | 10/4/02 | 2 | 0353 | 26.052632 | 16.44 | 7.13842 | 3 | 0 | 0 | 0 | 0 | N |
| 495 | 10/4/02 | 3 | 0406 | 26.052632 | 16.44 | 7.13842 | 1 | 0 | 0 | 0 | 0 | N |
| 495 | 10/4/02 | 4 | 0431 | 26.052632 | 16.44 | 7.13842 | 0 | 0 | 0 | 0 | 0 | N |
| 496 | 10/4/02 | 1 | 0541 | 22.164179 | 16.44 | 6.07299 | 0 | 0 | 0 | 0 | 0 | N |
| 496 | 10/4/02 | 2 | 0554 | 22.164179 | 16.44 | 6.07299 | 0 | 0 | 0 | 0 | 0 | N |
| 496 | 10/4/02 | 3 | 0608 | 22.164179 | 16.44 | 6.07299 | 0 | 0 | 0 | 0 | 0 | N |
| 496 | 10/4/02 | 4 | 0627 | 22.164179 | 16.44 | 6.07299 | 0 | 0 | 0 | 0 | 0 | N |
| 499 | 10/4/02 | 1 | 1208 | 23.839844 | 16.44 | 6.53212 | 5 | 0 | 0 | 0 | 0 | N |
| 499 | 10/4/02 | 2 | 1237 | 23.839844 | 16.44 | 6.53212 | 8 | 0 | 0 | 0 | 0 | N |
| 499 | 10/4/02 | 3 | 1250 | 23.839844 | 16.44 | 6.53212 | 8 | 0 | 0 | 0 | 0 | N |
| 502 | 10/4/02 | 1 | 1831 | 16.766484 | 16.44 | 4.59402 | 0 | 0 | 0 | 0 | 0 | N |
| 502 | 10/4/02 | 2 | 1853 | 16.766484 | 16.44 | 4.59402 | 0 | 0 | 0 | 0 | 0 | N |
| 502 | 10/4/02 | 3 | 1909 | 16.766484 | 17.44 | 4.87346 | 0 | 0 | 0 | 0 | 0 | N |
| 502 | 10/4/02 | 4 | 1932 | 16.766484 | 16.44 | 4.59402 | 0 | 0 | 0 | 0 | 0 | N |
| 503 | 10/4/02 | 1 | 2048 | 20.343333 | 16.44 | 5.57407 | 0 | 0 | 0 | 0 | 0 | N |
| 503 | 10/4/02 | 2 | 2104 | 20.343333 | 16.44 | 5.57407 | 0 | 0 | 0 | 0 | 0 | N |
| 503 | 10/4/02 | 3 | 2128 | 20.343333 | 16.44 | 5.57407 | 0 | 0 | 0 | 0 | 0 | N |
| 503 | 10/4/02 | 4 | 2145 | 20.343333 | 16.44 | 5.57407 | 0 | 0 | 0 | 0 | 0 | N |
| 505 | 10/5/02 | 1 | 0059 | 21.890845 | 16.44 | 5.99809 | 2 | 0 | 0 | 0 | 0 | N |
| 505 | 10/5/02 | 2 | 0115 | 21.890845 | 16.44 | 5.99809 | 2 | 0 | 0 | 0 | 0 | N |
| 505 | 10/5/02 | 3 | 0131 | 21.890845 | 16.44 | 5.99809 | 2 | 0 | 0 | 0 | 0 | N |
| 505 | 10/5/02 | 4 | 0159 | 21.890845 | 16.44 | 5.99809 | 2 | 0 | 0 | 0 | 0 | N |
| 507 | 10/5/02 | 1 | 0548 | 16.190104 | 16.44 | 4.43609 | 0 | 0 | 0 | 0 | 0 | N |
| 507 | 10/5/02 | 2 | 0606 | 16.190104 | 16.44 | 4.43609 | 0 | 0 | 0 | 0 | 0 | N |
| 507 | 10/5/02 | 3 | 0632 | 16.190104 | 16.44 | 4.43609 | 0 | 0 | 0 | 0 | 0 | N |
| 507 | 10/5/02 | 4 | 0645 | 16.190104 | 16.44 | 4.43609 | 0 | 0 | 0 | 0 | 0 | N |
| 509 | 10/5/02 | 1 | 1044 | 18.127976 | 16.44 | 4.96707 | 0 | 0 | 0 | 0 | 0 | N |
| 509 | 10/5/02 | 2 | 1100 | 18.127976 | 16.44 | 4.96707 | 1 | 0 | 0 | 0 | 0 | N |
| 509 | 10/5/02 | 3 | 1118 | 18.127976 | 16.44 | 4.96707 | 1 | 0 | 0 | 0 | 0 | N |
| 509 | 10/5/02 | 4 | 1147 | 18.127976 | 16.44 | 4.96707 | 1 | 0 | 0 | 0 | 0 | N |
| 511 | 10/5/02 | 1 | 1549 | 22.727612 | 16.44 | 6.22737 | 2 | 0 | 0 | 0 | 0 | N |
| 511 | 10/5/02 | 2 | 1605 | 22.727612 | 16.44 | 6.22737 | 2 | 0 | 0 | 0 | 0 | N |
| 511 | 10/5/02 | 3 | 1629 | 22.727612 | 16.44 | 6.22737 | 2 | 0 | 0 | 0 | 0 | N |
| 511 | 10/5/02 | 4 | 1637 | 22.727612 | 16.44 | 6.22737 | 0 | 0 | 0 | 0 | 0 | N |
| 514 | 10/5/02 | 1 | 2336 | 19.800633 | 16.44 | 5.42537 | 0 | 0 | 0 | 0 | 0 | N |
| 514 | 10/6/02 | 2 | 0000 | 19.800633 | 16.44 | 5.42537 | nd | 0 | 0 | 0 | 0 | N |
| 514 | 10/6/02 | 3 | 0025 | 19.800633 | 16.44 | 5.42537 | nd | 0 | 0 | 0 | 0 | N |
| 514 | 10/6/02 | 4 | 0105 | 19.800633 | 16.44 | 5.42537 | nd | 0 | 0 | 0 | 0 | N |
| 515 | 10/6/02 | 1 | 0159 | 19.553125 | 16.44 | 5.35756 | 0 | 0 | 0 | 0 | 0 | N |
| 515 | 10/6/02 | 2 | 0218 | 19.553125 | 16.44 | 5.35756 | 0 | 0 | 0 | 0 | 0 | N |
| 515 | 10/6/02 | 3 | 0240 | 19.553125 | 16.44 | 5.35756 | 0 | 0 | 0 | 0 | 0 | N |

| | | | | | | | | | | | | |
|-----|---------|---|------|-----------|-------|---------|----|---|---|---|---|---|
| 515 | 10/6/02 | 4 | 0247 | 19.553125 | 16.44 | 5.35756 | 0 | 0 | 0 | 0 | 0 | N |
| 517 | 10/6/02 | 1 | 0709 | 20.582237 | 16.44 | 5.63953 | 0 | 0 | 0 | 0 | 0 | N |
| 517 | 10/6/02 | 2 | 0728 | 20.582237 | 16.44 | 5.63953 | 0 | 0 | 0 | 0 | 0 | N |
| 517 | 10/6/02 | 3 | 0747 | 20.582237 | 16.44 | 5.63953 | 0 | 0 | 0 | 0 | 0 | N |
| 517 | 10/6/02 | 4 | 0756 | 20.582237 | 16.44 | 5.63953 | 0 | 0 | 0 | 0 | 0 | N |
| 519 | 10/6/02 | 1 | 1219 | 20.856667 | 16.44 | 5.71473 | 2 | 0 | 0 | 0 | 0 | N |
| 519 | 10/6/02 | 2 | 1242 | 20.856667 | 16.44 | 5.71473 | 2 | 0 | 0 | 0 | 0 | N |
| 519 | 10/6/02 | 3 | 1256 | 20.856667 | 16.44 | 5.71473 | 2 | 0 | 0 | 0 | 0 | N |
| 519 | 10/6/02 | 4 | 1320 | 20.856667 | 16.44 | 5.71473 | 8 | 0 | 0 | 0 | 0 | N |
| 521 | 10/6/02 | 1 | 1739 | 18.148256 | 16.44 | 4.97262 | 0 | 0 | 0 | 0 | 0 | N |
| 521 | 10/6/02 | 2 | 1800 | 18.148256 | 16.44 | 4.97262 | 0 | 0 | 0 | 0 | 0 | N |
| 521 | 10/6/02 | 3 | 1813 | 18.148256 | 16.44 | 4.97262 | 0 | 0 | 0 | 0 | 0 | N |
| 521 | 10/6/02 | 4 | 1829 | 18.148256 | 16.44 | 4.97262 | 0 | 0 | 0 | 0 | 0 | N |
| 522 | 10/6/02 | 1 | 2029 | 17.341667 | 16.44 | 4.75162 | 0 | 0 | 0 | 0 | 0 | N |
| 522 | 10/6/02 | 2 | 2038 | 17.341667 | 16.44 | 4.75162 | 0 | 0 | 0 | 0 | 0 | N |
| 522 | 10/6/02 | 3 | 2058 | 17.341667 | 16.44 | 4.75162 | 0 | 0 | 0 | 0 | 0 | N |
| 522 | 10/6/02 | 4 | 2119 | 17.341667 | 16.44 | 4.75162 | 0 | 0 | 0 | 0 | 0 | N |
| 524 | 10/7/02 | 1 | 0144 | 17.8125 | 16.44 | 4.88063 | 0 | 0 | 0 | 0 | 0 | N |
| 524 | 10/7/02 | 2 | 0155 | 17.8125 | 16.44 | 4.88063 | nd | 0 | 0 | 0 | 0 | N |
| 524 | 10/7/02 | 3 | 0211 | 17.8125 | 16.44 | 4.88063 | 0 | 0 | 0 | 0 | 0 | N |
| 524 | 10/7/02 | 4 | 0233 | 17.8125 | 16.44 | 4.88063 | 0 | 0 | 0 | 0 | 0 | N |
| 525 | 10/7/02 | 1 | 0427 | 16.328125 | 16.44 | 4.47391 | 0 | 0 | 0 | 0 | 0 | N |
| 525 | 10/7/02 | 2 | 0450 | 16.328125 | 16.44 | 4.47391 | 0 | 0 | 0 | 0 | 0 | N |
| 525 | 10/7/02 | 3 | 0501 | 16.328125 | 16.44 | 4.47391 | 0 | 0 | 0 | 0 | 0 | N |
| 525 | 10/7/02 | 4 | 0514 | 16.328125 | 16.44 | 4.47391 | 0 | 0 | 0 | 0 | 0 | N |
| 527 | 10/7/02 | 1 | 1042 | 20.269481 | 16.44 | 5.55384 | 0 | 0 | 0 | 0 | 0 | N |
| 527 | 10/7/02 | 2 | 1115 | 20.269481 | 16.44 | 5.55384 | 0 | 0 | 0 | 0 | 0 | N |
| 527 | 10/7/02 | 3 | 1142 | 20.269481 | 16.44 | 5.55384 | 0 | 0 | 0 | 0 | 0 | N |
| 527 | 10/7/02 | 4 | 1205 | 20.269481 | 16.44 | 5.55384 | 0 | 0 | 0 | 0 | 0 | N |
| 530 | 10/7/02 | 1 | 1845 | 19.61039 | 16.44 | 5.37325 | 0 | 0 | 0 | 0 | 0 | N |
| 530 | 10/7/02 | 2 | 1855 | 19.61039 | 16.44 | 5.37325 | 0 | 0 | 0 | 0 | 0 | N |
| 530 | 10/7/02 | 3 | 1917 | 19.61039 | 16.44 | 5.37325 | 0 | 0 | 0 | 0 | 0 | N |
| 530 | 10/7/02 | 4 | 1930 | 19.61039 | 16.44 | 5.37325 | nd | 0 | 0 | 0 | 0 | N |
| 531 | 10/7/02 | 1 | 2117 | 20.405405 | 16.44 | 5.59108 | 0 | 0 | 0 | 0 | 0 | N |
| 531 | 10/7/02 | 2 | 2139 | 20.405405 | 16.44 | 5.59108 | 0 | 0 | 0 | 0 | 0 | N |
| 531 | 10/7/02 | 3 | 2156 | 20.405405 | 16.44 | 5.59108 | 0 | 0 | 0 | 0 | 0 | N |
| 531 | 10/7/02 | 4 | 2215 | 20.405405 | 16.44 | 5.59108 | 0 | 0 | 0 | 0 | 0 | N |
| 534 | 10/8/02 | 1 | 0424 | 21.378676 | 16.44 | 5.85776 | 0 | 0 | 0 | 0 | 0 | N |
| 534 | 10/8/02 | 2 | 0439 | 21.378676 | 16.44 | 5.85776 | 0 | 0 | 0 | 0 | 0 | N |
| 534 | 10/8/02 | 3 | 0502 | 21.378676 | 16.44 | 5.85776 | nd | 0 | 0 | 0 | 0 | N |

Load Records And Rates
WH Pearson and GD Williams

Miller Sands
10/1/02 - 10/8/02

Sample Volume assumes 25% of total load is diverted to sampler; 50% if one drag arm

| Load Sequence | Sampling Instructions | Date | Load Time | | # Passes | Settled Solids Volume (cu yd) | Total Distance Travelled (ft) | No. Basket Samples Taken | Pumping Time (min) | No. Drag Arms in Operation | Ave. Load Rate per Arm (cu yd/min) | Sample Load Rate (cu yd/min) |
|---------------|-----------------------|----------|-----------|------|----------|-------------------------------|-------------------------------|--------------------------|--------------------|----------------------------|------------------------------------|------------------------------|
| | | | Start | End | | | | | | | | |
| 462 | Sample | 10/01/02 | 0005 | 0215 | 5 | 5045 | 12500 | 4 | 70 | 2 | 36.0357143 | 18.0178571 |
| 463 | Off | 10/01/02 | 0245 | 0418 | 3 | 5045 | 7500 | 0 | 70 | 2 | 36.0357143 | 18.0178571 |
| 464 | Sample | 10/01/02 | 0440 | 0630 | 5 | 5045 | 10000 | 4 | 75 | 2 | 33.6333333 | 16.8166667 |
| 465 | Sample | 10/01/02 | 0710 | 0831 | 3 | 4810 | 8000 | 4 | 61 | 2 | 39.4262295 | 19.7131148 |
| 466 | Off | 10/01/02 | 0908 | 1017 | 3 | 4928 | 8000 | 0 | 51 | 2 | 48.3137255 | 24.1568627 |
| 467 | Sample | 10/01/02 | 1053 | 1203 | 3 | 4928 | 8000 | 4 | 60 | 2 | 41.0666667 | 20.5333333 |
| 468 | Off | 10/01/02 | 1237 | 1350 | 4 | 4928 | 9000 | 0 | 58 | 2 | 42.4827586 | 21.2413793 |
| 469 | Off | 10/01/02 | 1446 | 1542 | 2 | 5775 | 4500 | 0 | 51 | 2 | 56.6176471 | 28.3088235 |
| 470 | Sample | 10/01/02 | 1736 | 1830 | 3 | 3601 | 6000 | 4 | 44 | 2 | 40.9204545 | 20.4602273 |
| 471 | Off | 10/01/02 | 2052 | 2201 | 3 | 5775 | 6000 | 0 | 74 | 2 | 39.0202703 | 19.5101351 |
| 472 | Off | 10/02/02 | 2256 | 0015 | 4 | 5903 | 6000 | 0 | 69 | 2 | 42.7753623 | 21.3876812 |
| 473 | Sample | 10/02/02 | 0119 | 0244 | 4 | 5903 | 9000 | 4 | 70 | 2 | 42.1642857 | 21.0821429 |
| 474 | Off | 10/02/02 | 0331 | 0457 | 3 | 5903 | 8000 | 0 | 71 | 2 | 41.5704225 | 20.7852113 |
| 475 | Sample | 10/02/02 | 0622 | 0745 | 4 | 5903 | 9000 | 4 | 68 | 2 | 43.4044118 | 21.7022059 |
| 476 | Sample | 10/02/02 | 0905 | 1038 | 4 | 5903 | 9000 | 4 | 78 | 2 | 37.8397436 | 18.9198718 |
| 477 | Off | 10/02/02 | 1201 | 1319 | 4 | 5903 | 9000 | 0 | 63 | 2 | 46.8492063 | 23.4246032 |
| 478 | Sample | 10/02/02 | 1437 | 1550 | 3 | 5903 | 7500 | 4 | 63 | 2 | 46.8492063 | 23.4246032 |

| | | | | | | | | | | | | |
|-----|--------|----------|------|------|---|------|-------|---|----|---|------------|------------|
| 479 | Off | 10/02/02 | 1649 | 1805 | 4 | 5903 | 10000 | 0 | 61 | 2 | 48.3852459 | 24.192623 |
| 480 | Off | 10/02/02 | 1855 | 2040 | 4 | 5903 | 10000 | 0 | 75 | 2 | 39.3533333 | 19.6766667 |
| 481 | Sample | 10/02/02 | 2129 | 2258 | 4 | 5903 | 10000 | 3 | 74 | 2 | 39.8851351 | 19.9425676 |
| 482 | Off | 10/03/02 | 2350 | 0105 | 4 | 5915 | 10000 | 0 | 50 | 2 | 59.15 | 29.575 |
| 483 | Off | 10/03/02 | 0153 | 0305 | 3 | 5915 | 7500 | 0 | 62 | 2 | 47.7016129 | 23.8508065 |
| 484 | Sample | 10/03/02 | 0403 | 0523 | 3 | 5915 | 8000 | 4 | 70 | 2 | 42.25 | 21.125 |
| 485 | Sample | 10/03/02 | 0623 | 0752 | 4 | 5915 | 10000 | 4 | 74 | 2 | 39.9662162 | 19.9831081 |
| 486 | Off | 10/03/02 | 0854 | 1050 | 6 | 6053 | 11000 | 0 | 96 | 2 | 31.5260417 | 15.7630208 |
| 487 | Sample | 10/03/02 | 1145 | 1254 | 4 | 6053 | 9000 | 3 | 54 | 2 | 56.0462963 | 28.0231481 |
| 488 | Off | 10/03/02 | 1340 | 1439 | 3 | 6053 | 7500 | 0 | 49 | 2 | 61.7653061 | 30.8826531 |
| 489 | Off | 10/03/02 | 1530 | 1641 | 4 | 6017 | 9000 | 0 | 56 | 2 | 53.7232143 | 26.8616071 |
| 490 | Sample | 10/03/02 | 1727 | 1835 | 4 | 6017 | 10000 | 4 | 53 | 2 | 56.7641509 | 28.3820755 |
| 491 | Off | 10/03/02 | 1921 | 2042 | 4 | 6017 | 10000 | 0 | 66 | 2 | 45.5833333 | 22.7916667 |
| 492 | Sample | 10/03/02 | 2136 | 2255 | 4 | 6017 | 10000 | 4 | 64 | 2 | 47.0078125 | 23.5039063 |
| 493 | Off | 10/03/02 | 2340 | 0054 | 3 | 5940 | 7500 | 0 | 64 | 2 | 46.40625 | 23.203125 |
| 494 | Off | 10/04/02 | 0143 | 0245 | 3 | 5940 | 7500 | 0 | 52 | 2 | 57.1153846 | 28.5576923 |
| 495 | Sample | 10/04/02 | 0336 | 0443 | 3 | 5940 | 7500 | 4 | 57 | 2 | 52.1052632 | 26.0526316 |
| 496 | Sample | 10/04/02 | 0535 | 0657 | 4 | 5940 | 9000 | 4 | 67 | 2 | 44.3283582 | 22.1641791 |
| 497 | Off | 10/04/02 | 0754 | 0922 | 4 | 6006 | 10000 | 0 | 73 | 2 | 41.1369863 | 20.5684932 |
| 498 | Off | 10/04/02 | 1005 | 1145 | 7 | 6103 | 7000 | 0 | 64 | 2 | 47.6796875 | 23.8398438 |

| | | | | | | | | | | | | |
|-----|--------|----------|------|------|---|------|-------|---|-----|---|------------|------------|
| 499 | Sample | 10/04/02 | 1207 | 1336 | 6 | 6103 | 6000 | 3 | 64 | 2 | 47.6796875 | 23.8398438 |
| 500 | Off | 10/04/02 | 1354 | 1521 | 5 | 6103 | 5000 | 0 | 62 | 2 | 49.2177419 | 24.608871 |
| 501 | Off | 10/04/02 | 1546 | 1755 | 6 | 6103 | 6000 | 0 | 99 | 2 | 30.8232323 | 15.4116162 |
| 502 | Sample | 10/04/02 | 1819 | 2020 | 6 | 6103 | 6000 | 4 | 91 | 2 | 33.532967 | 16.7664835 |
| 503 | Sample | 10/04/02 | 2047 | 2227 | 6 | 6103 | 6000 | 4 | 75 | 2 | 40.6866667 | 20.3433333 |
| 504 | Off | 10/05/02 | 2248 | 0027 | 7 | 6217 | 8000 | 0 | 59 | 2 | 52.6864407 | 26.3432203 |
| 505 | Sample | 10/05/02 | 0058 | 0234 | 6 | 6217 | 7000 | 4 | 71 | 2 | 43.7816901 | 21.8908451 |
| 506 | Off | 10/05/02 | 0258 | 0514 | 6 | 6217 | 7000 | 0 | 106 | 2 | 29.3254717 | 14.6627358 |
| 507 | Sample | 10/05/02 | 0539 | 0745 | 6 | 6217 | 6000 | 4 | 96 | 2 | 32.3802083 | 16.1901042 |
| 508 | Off | 10/05/02 | 0809 | 1002 | 6 | 6217 | 6000 | 0 | 83 | 2 | 37.4518072 | 18.7259036 |
| 509 | Sample | 10/05/02 | 1035 | 1229 | 6 | 6091 | 7000 | 4 | 84 | 2 | 36.2559524 | 18.1279762 |
| 510 | Off | 10/05/02 | 1257 | 1507 | 5 | 6091 | 6000 | 0 | 70 | 2 | 43.5071429 | 21.7535714 |
| 511 | Sample | 10/05/02 | 1540 | 1727 | 5 | 6091 | 6000 | 4 | 67 | 2 | 45.4552239 | 22.7276119 |
| 512 | Off | 10/05/02 | 1814 | 2010 | 5 | 6091 | 10000 | 0 | 76 | 2 | 40.0723684 | 20.0361842 |
| 513 | Off | 10/05/02 | 2050 | 2250 | 5 | 6091 | 10000 | 0 | 80 | 2 | 38.06875 | 19.034375 |
| 514 | Sample | 10/05/02 | 2327 | 0116 | 6 | 6257 | 6500 | 4 | 79 | 2 | 39.6012658 | 19.8006329 |
| 515 | Sample | 10/06/02 | 0148 | 0356 | 7 | 6257 | 9000 | 4 | 80 | 2 | 39.10625 | 19.553125 |
| 516 | Off | 10/6/02 | 0437 | 0624 | 5 | 6257 | 9000 | 0 | 72 | 2 | 43.4513889 | 21.7256944 |
| 517 | Sample | 10/6/02 | 0706 | 0854 | 5 | 6257 | 9000 | 4 | 76 | 2 | 41.1644737 | 20.5822368 |
| 518 | Off | 10/6/02 | 0934 | 1134 | 6 | 6257 | 9400 | 0 | 85 | 2 | 36.8058824 | 18.4029412 |

| | | | | | | | | | | | | |
|-----|--------|-----------|------|------|---|------|-------|---|-----|---|------------|------------|
| 519 | Sample | 10/6/02 | 1209 | 1359 | 5 | 6257 | 6500 | 4 | 75 | 2 | 41.7133333 | 20.8566667 |
| 520 | Off | 10/6/02 | 1431 | 1658 | 8 | 6243 | 10400 | 0 | 82 | 2 | 38.0670732 | 19.0335366 |
| 521 | Sample | 10/6/02 | 1732 | 1928 | 6 | 6243 | 9500 | 4 | 86 | 2 | 36.2965116 | 18.1482558 |
| 522 | Sample | 10/6/02 | 2010 | 2210 | 6 | 6243 | 9000 | 4 | 90 | 2 | 34.6833333 | 17.3416667 |
| 523 | Off | 10/6-7/02 | 2240 | 0059 | 6 | 6270 | 7500 | 0 | 91 | 2 | 34.4505495 | 17.2252747 |
| 524 | Sample | 10/7/02 | 0130 | 0353 | 7 | 6270 | 9000 | 4 | 88 | 2 | 35.625 | 17.8125 |
| 525 | Sample | 10/7/02 | 0425 | 0641 | 7 | 6270 | 8000 | 4 | 96 | 2 | 32.65625 | 16.328125 |
| 526 | Off | 10/7/02 | 0727 | 0948 | 6 | 6270 | 8000 | 0 | 106 | 2 | 29.5754717 | 14.7877358 |
| 527 | Sample | 10/7/02 | 1033 | 1252 | 5 | 6243 | 8000 | 4 | 77 | 2 | 40.538961 | 20.2694805 |
| 528 | Off | 10/7/02 | 1325 | 1527 | 5 | 6053 | 6500 | 0 | 87 | 2 | 34.7873563 | 17.3936782 |
| 529 | Off | 10/7/02 | 1555 | 1808 | 7 | 6040 | 10000 | 0 | 90 | 2 | 33.5555556 | 16.7777778 |
| 530 | Sample | 10/7/02 | 1845 | 2037 | 6 | 6040 | 8000 | 4 | 77 | 2 | 39.2207792 | 19.6103896 |
| 531 | Sample | 10/7/02 | 2110 | 2255 | 4 | 6040 | 5000 | 4 | 74 | 2 | 40.8108108 | 20.4054054 |
| 532 | Off | 10/7/02 | 2327 | 0119 | 6 | 5815 | 8000 | 0 | 96 | 2 | 30.2864583 | 15.1432292 |
| 533 | Off | 10/8/02 | 0152 | 0348 | 6 | 5815 | 7000 | 0 | 71 | 2 | 40.9507042 | 20.4753521 |
| 534 | Sample | 10/8/02 | 0419 | 0537 | 5 | 5815 | 5000 | 3 | 68 | 2 | 42.7573529 | 21.3786765 |
| 535 | Off | 10/8/02 | 0628 | 0745 | 4 | 5815 | 4000 | 0 | 63 | 2 | 46.1507937 | 23.0753968 |
| 536 | Sample | 10/8/02 | 0827 | 1010 | 5 | 5815 | 5000 | 0 | 68 | 2 | 42.7573529 | 21.3786765 |

| | | |
|---------------|---------|--------------------------|
| | # Loads | |
| Total # Loads | Sampled | Total Load |
| Summary | (H) | (h) |
| | 75 | 36 |
| | | Total Load Volume (V) |
| | | 443563 |

Fish and Invertebrate Catch
 WH Pearson and GD Williams All Upriver Locations
 6/10/02 - 10/08/02

| Sampling Area | Load Sequence Number | Date | Sample Number | Start Time (h:m) | Fish Spp. | | | | | | | | | | | | | | | | | | |
|---------------|----------------------|----------|---------------|------------------|--------------------|----------|---------------|------------|---------------|---------------|-----------------|---------|----------------|------------------|---------|---------|-------------|------------|-------------------|-------------|----------------|-----------------------------|---|
| | | | | | Pacific Sanddancer | Eulachon | Stagh sculpin | Cumel spp. | UID smelt sp. | Longfin smelt | Slarty Flounder | Herring | Pacific tomcod | Shiner surfperch | Dogfish | Lamprey | UID sculpin | Surf smelt | Snake prickleback | Razor Clams | Crangon Shrimp | Other Inverts - Macoma spp. | |
| Desdemona | 1 | 06/11/02 | 1 | 1535 | | | | | | | | | | | | | | | | | 3 | | |
| Desdemona | 1 | 06/11/02 | 2 | 1540 | | | | | | | | | | | | | | | | | | 1 | |
| Desdemona | 1 | 06/11/02 | 3 | 1600 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 1 | 06/11/02 | 4 | 1607 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 1 | 06/11/02 | 5 | 1613 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 1 | 06/11/02 | 6 | 1618 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 1 | 06/11/02 | 7 | 1623 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 1 | 06/11/02 | 8 | 1630 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 2 | 06/11/02 | 1 | 1659 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 2 | 06/11/02 | 2 | 1705 | 2 | | | | | | | | | | | | | | | | | 3 | |
| Desdemona | 2 | 06/11/02 | 3 | 1710 | 2 | | | | | | | | | | | | | | | | | | |
| Desdemona | 2 | 06/11/02 | 4 | 1715 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 2 | 06/11/02 | 5 | 1720 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 2 | 06/11/02 | 6 | 1735 | 9 | | | | | | | | 1 | | | | | | | | | 1 | |
| Desdemona | 2 | 06/11/02 | 7 | 1758 | | | | | 1 | | | | | | | | | | | | | | |
| Desdemona | 2 | 06/11/02 | 8 | 1805 | 1 | | | | | | | | | | | | | | | | | | |
| Desdemona | 2 | 06/11/02 | 9 | 1812 | 2 | | | | | | | 1 | | | | | | | | | | | |
| Desdemona | 2 | 06/11/02 | 10 | 1820 | | | | 1 | | | | | | | | | | | | | | | |
| Desdemona | 5 | 06/11/02 | 1 | 2221 | 1 | | | | | | | | | | | | | | | | | | |
| Desdemona | 5 | 06/11/02 | 2 | 2225 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 5 | 06/11/02 | 3 | 2230 | 1 | | | | | | | | | | | | | | | | | | |
| Desdemona | 5 | 06/11/02 | 4 | 2239 | 1 | | 2 | | | | | | | | | | | | | | | | |
| Desdemona | 5 | 06/11/02 | 5 | 2248 | 2 | | | | | | | | | | | | | | | | | | |
| Desdemona | 5 | 06/11/02 | 6 | 2325 | | | | | | | | | | | | | | | | | | | 1 |
| Desdemona | 5 | 06/11/02 | 7 | 2333 | | | | | 1 | | | | | | | | | | | | | | |
| Desdemona | 5 | 06/11/02 | 8 | 2340 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 5 | 06/11/02 | 9 | 2345 | | | | | | | | | | | 1 | | | | | | | | |
| Desdemona | 5 | 06/12/02 | 10 | 0010 | | | | | | | | | | | | | | | | | | 1 | |
| Desdemona | 8 | 06/12/02 | 1 | 0419 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 8 | 06/12/02 | 2 | 0426 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 8 | 06/12/02 | 3 | 0434 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 8 | 06/12/02 | 4 | 0442 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 8 | 06/12/02 | 5 | 0449 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 8 | 06/12/02 | 6 | 0455 | | 1 | | | | | | | | | | | | | | | | 1 | |
| Desdemona | 8 | 06/12/02 | 7 | 0502 | | | | | | | | | | | | | | | | | | | 3 |
| Desdemona | 8 | 06/12/02 | 8 | 0509 | | | | | | | | | | | | | | | | | | | 3 |
| Desdemona | 8 | 06/12/02 | 9 | 0516 | | | | | | | | | | | | | | | | | | | 1 |
| Desdemona | 8 | 06/12/02 | 10 | 0523 | | | | | | | | | | | | | | | | 1 | | | 1 |
| Desdemona | 9 | 06/12/02 | 1 | 1533 | | | | 1 | 1 | | | | | | | | | | | | | | 1 |
| Desdemona | 9 | 06/12/02 | 2 | 1538 | | 4 | | | | | | | | | | | | | | | | | 1 |
| Desdemona | 9 | 06/12/02 | 3 | 1544 | | | | | | | | | | | | | | | | | | | 4 |
| Desdemona | 9 | 06/12/02 | 4 | 1551 | | | | | 2 | | | | | | | | | | | | | | 1 |
| Desdemona | 9 | 06/12/02 | 5 | 1608 | | | 6 | | 1 | | | | | | 1 | | | | | | | | 3 |
| Desdemona | 9 | 06/12/02 | 6 | 1615 | | | 2 | | 1 | | | | | | | | | | | | | | 5 |
| Desdemona | 9 | 06/12/02 | 7 | 1621 | | | 2 | | | | | | | | | | | | | | | | 2 |
| Desdemona | 9 | 06/12/02 | 8 | 1626 | | | | | | | | | | | | | | | | | | | 2 |
| Desdemona | 9 | 06/12/02 | 9 | 1641 | | | | | | | | | | | | | | | | | | | 2 |
| Desdemona | 9 | 06/12/02 | 10 | 1649 | | | | | | | | | | | | | | | | | | | 5 |
| Desdemona | 11 | 06/12/02 | 5 | 2123 | | | | | 1 | | | | | | | | | | | | | | |
| Desdemona | 11 | 06/12/02 | 6 | 2138 | | 1 | 2 | | | | | | | | | | | | | | | | |
| Desdemona | 11 | 06/12/02 | 7 | 2144 | | 2 | | | | | | | | | | | | | | | | | |
| Desdemona | 11 | 06/12/02 | 8 | 2149 | | 1 | | | | | | | | | | | | | | | | | |
| Desdemona | 11 | 06/12/02 | 9 | 2155 | | 1 | | | | | | | | | | | | | | | | | |
| Desdemona | 11 | 06/12/02 | 10 | 2159 | | 1 | | | | | | | | | | | | | | | | | |
| Desdemona | 11 | 06/12/02 | 11 | 2205 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 11 | 06/12/02 | 12 | 2219 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 11 | 06/12/02 | 13 | 2226 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 11 | 06/12/02 | 14 | 2231 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 12 | 06/12/02 | 1 | 2304 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 12 | 06/12/02 | 2 | 2310 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 12 | 06/12/02 | 3 | 2315 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 12 | 06/12/02 | 4 | 2321 | | | | | | 2 | | | | | | | | | | | | | 1 |
| Desdemona | 12 | 06/12/02 | 5 | 2341 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 12 | 06/12/02 | 6 | 2346 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 12 | 06/13/02 | 7 | 0010 | | | | | | 2 | | | | | | | | | | | | | |
| Desdemona | 12 | 06/13/02 | 8 | 0016 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 12 | 06/13/02 | 9 | 0026 | | 4 | | | | | | | | | | | | | | | | | |
| Desdemona | 12 | 06/13/02 | 10 | 0033 | | 1 | | | | | | | | | | | | | | | | | 1 |
| Desdemona | 14 | 06/13/02 | 1 | 1519 | | | | | | | | | | | | | | | | | | | 1 |
| Desdemona | 14 | 06/13/02 | 2 | 1527 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 14 | 06/13/02 | 3 | 1532 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 14 | 06/13/02 | 4 | 1538 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 14 | 06/13/02 | 5 | 1549 | | | | | | | | | | | | | | | | | | | 2 |
| Desdemona | 14 | 06/13/02 | 6 | 1555 | | | | | | | | | | | | | | | | | | 1 | 1 |
| Desdemona | 14 | 06/13/02 | 7 | 1601 | | | | | | | | | | | | | | | | | | | |
| Desdemona | 14 | 06/13/02 | 8 | 1611 | | | | | | | | | | | | | | | | | | | 1 |

