# III. ENTRAINMENT AT MONROE POWER PLANT

## A. Sampling Methods Used by Detroit Edison

The methods used by Detroit Edison for entrainment sampling are stated on p. 4.4-1 of the 316(b) as follows:

> **Samples of fish eggs and larvae were collected during a 58-week period: April 1975 through May 1976. The annual entrainment estimate is based upon the last 52 weeks of sampling.**
>
> Samples were collected at two depths (1 m and 3 m) at each of three stations in 1975 and at seven of the nine stations sampled in 1976 (Figure 4.4-1 and Table 4.4-1). Samples were collected using high capacity, Kenco Model 139 submersible sump pumps. The pumps were fitted with 5.1-cm flexible hoses, and water was pumped through a 1-x-3 m oceanographic plankton net with a mesh size of 571 μ. A five-foot head was usually maintained, and provided a measured flow of approximately 530 l/min. This flow yielded a 763,200-liter sample for the 24-hour collecting period. Flow was occasionally reduced when the pump became clogged with fish, and sample periods were started again if flows were significantly impeded. Since no inhose measuring device could be used, **it was impossible to continuously monitor flow, and thus the assumption was made that all samples collected were based on the rated flow of 530 l/min.**

### 1. Gear

The Michigan Water Resources Commission (MWRC) recommends a pump system for sampling nonscreenable organisms because such a system can be automated for continuous operation and the filtering of large, readily quantified sample volumes of cooling water (MWRC 1975a). Despite their usefulness, pump systems, like other sampling systems, have inherent disadvantages (MWRC 1975a; Brooks et al. 1975; U.S. EPA 1977),none of which was mentioned in the 316(b). One major disadvantage is the possible destruction of fragile organisms or life stages causing them to be undetected in the samples. Cole (1977) found that 40% of fish larvae collected by the Kenco[4/] pump were damaged and that 10% were so badly damaged that they could not be identified. A high incidence of damaged organisms would perhaps indicate some specimens were also lost and not counted.

Cole (1977) found that the Kenco pump is less effective for sampling fish larvae in the vicinity of the Monroe plant than either a 1-m plankton

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[4/] Reference to trade names or manufacturer's names in this report does not constitute endorsement of any commercial product.

net (571 μ) or a high speed plankton sampler. The lower efficiency of the pump system suggests that organisms are possibly being destroyed and not counted. It could also be due to avoidance of the pump intake by larger, more motile organisms or life stages, thus leading to an underestimate of the abundance of these forms. To prevent avoidance by fish larvae, the Lake Michigan Cooling Water Intake Technical Committee (1973) recommends that the sampling pump capacity be 100-200 gpm. The capacity of the pumps used by Detroit Edison (approximately 530 l/min or 140 gpm) was within this recommended range.

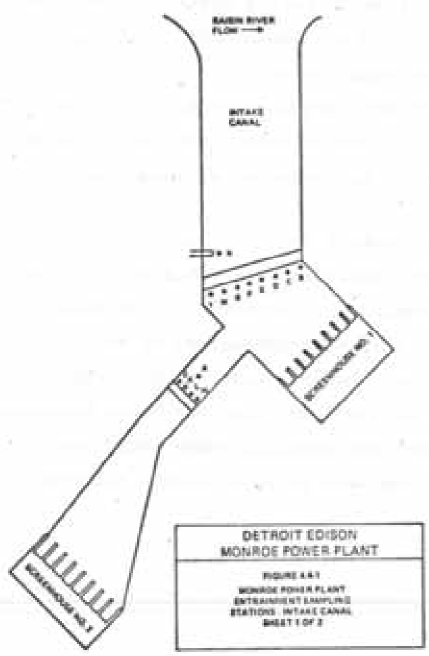
The 316(b) does not demonstrate, however, that the volume of water that passed through the Kenco sampling pumps was large enough to provide a reliable estimate of the target populations. When the Monroe plant was operating at full capacity (cooling water flow of 3,248 cfs) and eight sampling pumps were operating simultaneously (the maximum number used for sampling the cooling water flow in the main intake canal), 0.08% of the cooling water flow passed through these pumps. During periods of minimum cooling water flow (listed in Table 3.3-1 of the 316(b) as 870 cfs on May 1, 1975), the portion of the cooling water passing through the eight sampling pumps increased to 0.3%. Although the pump system used at the Monroe plant sampled a relatively large volume of water, the sample volume may not have been sufficient to adequately estimate the cooling water densities of less abundant organisms.

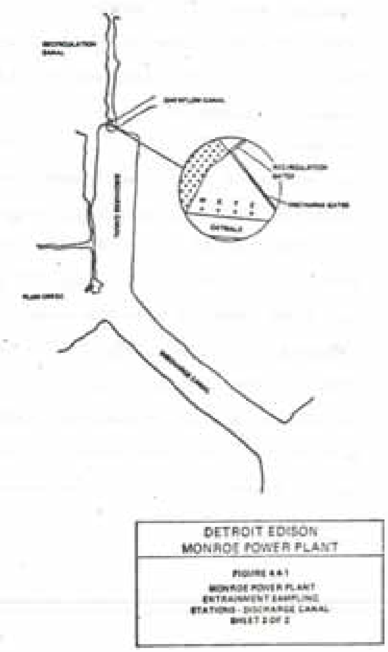
Detroit Edison states in the above excerpt from p. 4.4-1 of the 316(b) that flow through the sampling pumps was occasionally reduced by clogging and that "sample periods were started again if flows were significantly impeded." Detroit Edison did not state what they considered to be a significant reduction in flow, and samples therefore may not have been collected at the continuous rated flow of 530 l/min upon which the estimates are based. Any reduction in flow through the sampling pumps would result in an underestimate of the numbers of organisms being entrained through the plant.

The 571-μ mesh used in the plankton nets was probably satisfactory for the collection of eggs of any Lake Erie fish species. However, 351-μ mesh is approximately the largest that will permit collection of the smallest Great Lakes fish larvae (Brooks et al. 1975), and the youngest larvae of some species may therefore have been lost through the 571-μ net. The 571-μ mesh is also too coarse to provide adequate sampling of the smaller zooplankton, such as rotifers and copepod nauplii. Brooks et al. (1975) recommend a maximum mesh size of 160 μ for sampling zooplankton and also entrainable benthos. Netting of 76 μ has previously been used to concentrate zooplankton from west-central Lake Erie (Heberger and Reynolds 1977).

2. Location

During the period of April 1975 through May 1976, entrainment sampling was conducted at stations A-M in the intake canals and stations W-Z in the discharge canal, as shown below in Figure 4.4-1 of the 316(b).



These sampling locations do not permit an accurate estimate of the kinds and numbers of organisms entrained by the Monroe plant as discussed below.

a. Sampling depths. According to Table 4.4-1 (below) of the 316(b), entrainment samples were taken only at 1 m (3 ft) and 3 m (10 ft), although Figure 3.2-2 of the 316(b) shows that the canal is 7 m (23 ft) deep at normal high water and 5 m (17 ft) deep at normal low water.

TABLE 4.4-1 ENTRAINMENT SAMPLING SCHEDULE AT THE MONROE POWER PLANT WITH REFERENCE TO STATION LOCATION

| Station[a] | Location and Depth | Sampling Schedule | |
|---|---|---|---|
| | | Commencement | Termination |
| A | (Intake -1 and 3m) | 05/01/75 | 12/13/75 |
| B | (Intake north extra - 3m) | 12/19/75 | 05/15/76[b] |
| C | (Intake north - 1m) | 12/12/75 | 05/15/76 |
| D | (Intake north - 3m) | 12/12/75 | 05/15/76 |
| E | (Intake center - 1m) | 12/12/75 | 05/15/76 |
| F | (Intake center - 3m) | 12/12/75 | 05/15/76 |
| G | (Intake south - 1m) | 12/12/75 | 05/15/76 |
| H | (Intake south - 3m) | 12/12/75 | 05/15/76 |
| I | (Intake south extra - 1m) | 12/19/75 | 05/15/76 |
| J | (Secondary west - 3m) | 12/12/75 | 05/15/76 |
| K | (Secondary west - 1m) | 12/12/75 | 05/15/76 |
| L | (Secondary east - 1m) | 12/12/75 | 05/15/76 |
| M | (Secondary east - 3m) | 12/12/75 | 05/15/76 |
| N | (Fish pump pool discharge)[c] | 11/13/75 | 05/15/76 |
| W | (Discharge west - 3m) | 04/15/75 | 12/15/75 |
| | | 04/15/76 | 05/15/76 |
| X | (Discharge west - 1m) | 04/15/75 | 12/15/75 |
| | | 04/15/76 | 05/15/76 |
| Y | (Discharge east - 1m) | 04/15/75 | 12/15/75 |
| | | 04/15/76 | 05/15/76 |
| Z | (Discharge east - 3m) | 04/15/75 | 12/15/75 |
| | | 04/15/76 | 05/15/76 |

a. Corresponds to sampling stations on Figure 4.4-1.
b. May 15, 1976, is last day of data used for period of record.
c. Data not used in entrainment estimate.

The depths at which these samples were taken are of concern because the available evidence shows that most entrainable organisms are more abundant near the bottom of the water column than near the surface. Collections by Cole (1977) with a 571-μ mesh net fished near the bottom included many more larvae of important fishes than did collections nearer the surface.

One-way analyses of variance (ANOVA) were conducted on data from Detroit Edison's daily entrainment data sheets [transformed by $\log_{10}(x + 1)$ to help normalize the data[5/]] to determine whether daily entrainment estimates based on samples collected at a depth of 1 m were significantly different from estimates based on samples collected from 3 m in the main intake canal. The mean number of fish larvae entrained from 3 m was higher than that from 1 m (except for smelt), although our ANOVA's show no significant differences at P = 0.05 (Table 6).

The mean number of fish eggs entrained (all species combined) was higher based on collections made from 1 m than from 3 m, although the difference was not significant at the P = 0.05 level (Table 7). The presence of large numbers of eggs at the 1- and 3-m depths is surprising because most species in western Lake Erie have demersal or semi-demersal eggs (Scott and Crossman 1973). Many of these eggs could have been drum eggs, which are pelagic (Davis 1959, refer to p. 104 of this report), or burbot eggs, which are semi-pelagic (Scott and Crossman 1973), but this cannot be stated with certainty because less than 1 percent of the eggs collected during the period of the ANOVA (December 1975-May 1976; refer to Table 4.4-1 on p. 43 ) were identified to taxon.

Cole (1977) found in studies at the Monroe plant that cladocerans, copepods, and chironomids are also more abundant near bottom. Our ANOVA's carried out for the most commonly entrained macrozoobenthic organisms show that significantly higher numbers (P = 0.05) of Chironomidae and all species combined were entrained from 3 m than from 1 m (Table 8). For Simuliidae, _Hydropsyche_, and _Gammarus_ mean entrainment estimates based on 3-m samples were much higher than those based on 1-m samples, although the difference was not significant at the P = 0.05 level.

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[5/] Although our $\log_{10}(x + 1)$ transformation did help to normalize much of the Detroit Edison entrainment data, the ANOVA tables indicate that in some cases this transformation did not make the variances completely homogeneous and that the requirements for parametric statistics tests might not have been met.

Table 6. ANOVA tables showing differences between daily entrainment estimates for fish larvae from 1-m depth and from 3-m depth in the main intake canal; calculated from counts on Detroit Edison's daily entrainment data sheets [transformed by $\log_{10}(x + 1)$].

UNIVARIATE 1-WAY ANOVA CASES=SPEC 900*DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 3.LARV N= 98 OUT OF 98 LARVAE - ALL SPECIES COMBINED

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .10445 +9 | .10445 +9 | .24122 | .6246 |
| WITHIN | 96 | .41567+11 | .43311 +9 | | |
| TOTAL | 97 | .41672+11 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .0501 ETA-SQR= .0025 (VAR COMP= -.67334 +7 VAR AMONG= =0.1

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| 1 M | 49 | 7561.9 | .23936 +9 | 15450. |
| 3 M | 49 | 9667.0 | .62734 +9 | 25047. |
| GRAND | 98 | 8614.5 | .42978 +9 | 20731. |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 801*DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 3.LARV N= 98 OUT OF 98 PERCH LARVAE

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .17151 +9 | .17151 +9 | .91761 | .3405 |
| WITHIN | 96 | .17943+11 | .18691 +9 | | |
| TOTAL | 97 | .18115+11 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .0973 ETA-SQR= .0095 (VAR COMP= -.31429 +6 VAR AMONG= -0.1

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| 1 M | 49 | 2325.8 | .66739 +8 | 8169.4 |
| 3 M | 49 | 4971.6 | .30709 +9 | 17524. |
| GRAND | 98 | 3648.7 | .18675 +9 | 13666. |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 135*DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 3.LARV N= 98 OUT OF 98 CLUPEID LARVAE

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .17073 +8 | .17073 +8 | 1.6571 | .2011 |
| WITHIN | 96 | .98904 +9 | .10303 +8 | | |
| TOTAL | 97 | .10060+10 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1305 ETA-SQR= .0170 (VAR COMP= .13619 +6 VAR AMONG= 1.321

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| 1 M | 49 | 713.67 | .30122 +7 | 1735.6 |
| 3 M | 49 | 1548.4 | .17591 +8 | 4194.1 |
| GRAND | 98 | 1131.1 | .10371 +8 | 3220.4 |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 119*DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 3.LARV N= 98 OUT OF 98 CATFISH LARVAE

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .12453 +7 | .12453 +7 | 2.6420 | .1073 |
| WITHIN | 96 | .45248 +8 | .47133 +6 | | |
| TOTAL | 97 | .46493 +8 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1637 ETA-SQR= .0268 (VAR COMP= 15775. VAR AMONG= 3.241

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| 1 M | 49 | 92.918 | .13286 +6 | 364.50 |
| 3 M | 49 | 298.37 | .80761 +6 | 898.69 |
| GRAND | 98 | 195.64 | .47931 +6 | 692.32 |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 154*DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 3.LARV N= 98 OUT OF 98 FRESHWATER DRUM LARVAE

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .19300 +6 | .19300 +6 | 1.3036 | .2564 |
| WITHIN | 96 | .14215 +8 | .14807 +6 | | |
| TOTAL | 97 | .14408 +8 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1157 ETA-SQR= .0134 (VAR COMP= 914.92 VAR AMONG= .621

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| 1 M | 49 | 32.347 | 25159. | 158.62 |
| 3 M | 49 | 121.10 | .27298 +6 | 522.48 |
| GRAND | 98 | 76.724 | .14853 +6 | 385.40 |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 109*DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 3.LARV N= 98 OUT OF 98 SMELT LARVAE

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .59698 +6 | .59698 +6 | .26172 -1 | .8718 |
| WITHIN | 96 | .21897+10 | .22810 +8 | | |
| TOTAL | 97 | .21903+10 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .0165 ETA-SQR= .0003 (VAR COMP= -.45181 +6 VAR AMONG= -0.1

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| 1 M | 49 | 1439.3 | .22330 +8 | 4725.4 |
| 3 M | 49 | 1221.5 | .23137 +8 | 4810.1 |
| GRAND | 98 | 1330.4 | .22505 +8 | 4744.0 |

Table 7. ANOVA table showing difference between daily entrainment estimates for fish eggs from 1-m depth and from 3-m depth in the main intake canal; calculated from counts on Detroit Edison's daily entrainment data sheets [transformed by $\log_{10}(x+1)$].

UNIVARIATE 1-WAY ANOVA CASES=SPEC 900*DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 2.EGGS N= 98 OUT OF 98 EGGS - ALL SPECIES COMBINED

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .13455 +9 | .13455 +9 | 2.0962 | .1509 |
| WITHIN | 96 | .61617+10 | .64184 +8 | | |
| TOTAL | 97 | .62962+10 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1462 ETA-SQR= .0214 (VAR COMP= .14359 +7 VAR AMONG= 2.19)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| 1 m | 49 | 3708.7 | .10106 +9 | 10053. |
| 3 m | 49 | 1365.3 | .27304 +8 | 5225.4 |
| GRAND | 98 | 2537.0 | .64910 +8 | 8056.7 |

Table 8. ANOVA tables showing differences between daily entrainment estimates for macrozoobenthos from 1-m depth and from 3-m depth in the main intake canal; calculated from counts on Detroit Edison's daily entrainment data sheets [transformed by $\log_{10}$ (x + 1)].

UNIVARIATE 1-WAY ANOVA CASES=SPEC 900=DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 2.EST N= 98 OUT OF 98 MACROZOOBENTHOS - ALL SPECIES COMBINED

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .75478+10 | .75478+10 | 4.2481 | .0420 |
| WITHIN | 96 | .17147+12 | .17562+10 | | |
| TOTAL | 97 | .17906+12 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .2358 ETA-SQR= .0424 (VAR COMP= .11848 +9 VAR AMONG= 6.22)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| 1 m | 49 | 17117. | .64508 +9 | 25399. |
| 3 m | 49 | 34715. | .29273+10 | 54105. |
| GRAND | 98 | 25916. | .18440+10 | 42965. |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 412=DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 2.EST N= 98 OUT OF 98 CHIRONOMIDAE

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .58396+10 | .58396+10 | 4.4892 | .0367 |
| WITHIN | 96 | .12488+12 | .13009+10 | | |
| TOTAL | 97 | .13072+12 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .2114 ETA-SQR= .0447 (VAR COMP= .92671 +8 VAR AMONG= 6.65)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| 1 m | 49 | 13423. | .42083 +9 | 20709. |
| 3 m | 49 | 28864. | .21725+10 | 46610. |
| GRAND | 98 | 21149. | .13477+10 | 36710. |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 414=DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 2.EST N= 98 OUT OF 98 SIMULIIDAE

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .25248 +7 | .25248 +7 | 2.8179 | .0965 |
| WITHIN | 96 | .86015 +8 | .87599 +6 | | |
| TOTAL | 97 | .88540 +8 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1689 ETA-SQR= .0285 (VAR COMP= 33241. VAR AMONG= 3.58)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| 1 m | 49 | 67.673 | 74054. | 272.13 |
| 3 m | 49 | 388.69 | .17179 +7 | 1310.7 |
| GRAND | 98 | 228.18 | .91279 +6 | 955.40 |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 471=DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 2.EST N= 98 OUT OF 98 EPHEMEROPTERA

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .49666 +6 | .49666 +6 | 1.0658 | .3043 |
| WITHIN | 96 | .43735 +8 | .45670 +6 | | |
| TOTAL | 97 | .44202 +8 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1046 ETA-SQR= .0110 (VAR COMP= 421.69 VAR AMONG= .14)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| 1 m | 49 | 84.714 | 90139. | 300.23 |
| 3 m | 49 | 225.65 | .82226 +6 | 906.78 |
| GRAND | 98 | 155.18 | .45651 +6 | 675.66 |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 205=DAY 365-399,401-571

ANALYSIS OF VARIANCE OF 2.EST N= 98 OUT OF 98 GAMMARUS

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .35744 +7 | .35744 +7 | 1.5425 | .2173 |
| WITHIN | 96 | .22246 +9 | .23173 +7 | | |
| TOTAL | 97 | .22603 +9 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1258 ETA-SQR= .0158 (VAR COMP= 25655. VAR AMONG= 1.10)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| 1 m | 49 | 315.22 | .49205 +6 | 701.45 |
| 3 m | 49 | 697.18 | .41429 +7 | 2035.3 |
| GRAND | 98 | 506.20 | .23302 +7 | 1526.5 |

Cole (1976, 1977) also found that most fish larvae concentrate at the bottom at least during the day. Larvae of some species move towards the surface at night, while others, such as yellow perch and shiners, tend to always remain near the bottom. During the routine 316(b) entrainment monitoring, Detroit Edison conducted diurnal sampling (12-h day and night collections) at four stations in the main intake canal on 5 days during April and May of 1976 (Tables 9 and 10). Paired t-tests conducted on the counts in Tables 9 and 10 [transformed by $\log_{10}(x + 1)$] show that significantly more (P = 0.01) fish larvae (of all species combined) and invertebrates (of all species combined) were collected at night than during the day. The larger catches of fish larvae at night may reflect increased sampling effectiveness due to reduced gear avoidance and to migration of the larvae toward the surface where more of them became vulnerable to capture in the sampling gear; the larger catches at night may also indicate that greater numbers of larvae were entrained at night. Samples taken in only the upper strata of the intake canal, especially during the daylight hours, were therefore probably not representative of the kinds and numbers of organisms that were actually being entrained.

b. Stratification of intake water. The difficulty in obtaining representative entrainment samples in the intake canal because of incomplete mixing of river and lake water in the canal is discussed by Cole (1976) as follows:

> The intake was particularly difficult to sample at the Monroe Power Plant because the actual intake canal was too short to allow complete mixing of Raisin River and lake waters before the water passed into the condensers (see Figure 3-2). Depending on the variation in river discharge, the intake water would have imperfectly mixed portions of river and lake water which would be difficult to sample representatively with a reasonable sampling intensity.

Both the vertical and horizontal stratification in the intake canal can vary seasonally as the portions of river and lake water in the intake flow change. The problem of vertical stratification may be accentuated by the presence of skimmer walls in both screenhouses, which extend from the surface to approximately mid-depth in the water column.

Table 9. Diurnal variations in numbers of total fish larvae collected during 12-h periods at stations in main intake canal (actual counts from Detroit Edison's daily entrainment data sheets). IC = intake center, IN = intake north, IS = intake south.

| DATE | STATION AND DEPTH | DAY | NIGHT |
|---|---|---|---|
| 4/09/76 | IC - 1m | 1 | 1 |
| 4/20/76 | IN - 3m | 0 | 0 |
| " | IC - 1m | 0 | 3 |
| " | IC - 3m | 0 | 2 |
| " | IS - 1m | 0 | 2 |
| 4/27/76 | IN - 3m | 11 | 9 |
| " | IC - 1m | 3 | 24 |
| " | IC - 3m | 9 | 8 |
| " | IS - 1m | 1 | 5 |
| 5/04/76 | IN - 3m | 6 | 30 |
| " | IC - 1m | 11 | 2 |
| " | IC - 3m | 9 | 25 |
| " | IS - 1m | 1 | 16 |
| 5/11/76 | IN - 3m | 3 | 0 |
| " | IC - 1m | 0 | 3 |
| " | IC - 3m | 0 | 3 |
| " | IS - 1m | 1 | 3 |

Table 10. Diurnal variations in numbers of total macrozoobenthic organisms collected during 12-h periods at stations in main intake canal (actual counts from Detroit Edison's daily entrainment data sheets). IC = intake center, IN = intake north, IS = intake south.

| DATE | STATION AND DEPTH | DAY | NIGHT |
|---|---|---|---|
| 4/09/76 | IC - 1m | 4 | 10 |
| 4/20/76 | IN - 3m | 1 | 5 |
| " | IC - 1m | 0 | 2 |
| " | IC - 3m | 4 | 9 |
| " | IS - 1m | 2 | 5 |
| 4/27/76 | IN - 3m | 3 | 20 |
| " | IC - 1m | 3 | 13 |
| " | IC - 3m | 12 | 16 |
| " | IS - 1m | 4 | 11 |
| 5/04/76 | IN - 3m | 30 | 40 |
| " | IC - 1m | 15 | 2 |
| " | IC - 3m | 19 | 27 |
| " | IS - 1m | 2 | 25 |
| 5/11/76 | IN - 3m | 15 | 45 |
| " | IC - 1m | 12 | 16 |
| " | IC - 3m | 26 | 40 |
| " | IS - 1m | 7 | 18 |

c. Location of sampling pumps in relation to intake screens. Most or all of the problems associated with the vertical stratification of flow and organisms probably could have been avoided by locating the pump intakes behind the traveling screens as suggested by R. S. Benda (1975):

> Comment of R.S. Benda, Aquinas College, Grand Rapids, Michigan:
>
> Pump Location - Pumps should be located behind the traveling screens if at all possible to avoid the problem of pumping adult fish in the collecting nets. We have experienced several pump cloggings when numerous adult fish inhabit the intake bays.

The location of the sampling pumps in front of the screenhouses probably accounts for much of the clogging problem discussed in Section III-A-1 of this report because of the pumping of adult fish, primarily shiners. The Monroe data base often lists adult fish as being found in the entrainment samples (see Table 11). Locating the sampling pump intakes in the turbulent areas immediately behind the intake screens would also probably result in reduced gear avoidance and more effective sampling of entrained organisms.

d. Sampling in the secondary intake canal. The reason for conducting sampling in the secondary intake canal at stations A and J-M (refer to Figure 4.4-1) is not explained in the 316(b). One-way ANOVA's [based on Detroit Edison's counts transformed by $\log_{10}(x + 1)$] show that for fish larvae of all species combined there is a significant difference ($P = 0.05$) between daily entrainment estimates based on samples from the main intake canal and those based on samples from the secondary canal (Table 12). Mean estimates for the entrainment of larvae of other commonly entrained species, except catfish (Table 12), and for the entrainment of eggs of all species combined (Table 13) were also considerably greater from the main intake, although the differences were not significant at the $P = 0.05$ level. For macrozoobenthos, the mean estimate from the secondary canal was higher than that from the main intake, but this difference was also not significant at $P = 0.05$ (Table 14). The differences in the kinds and numbers of organisms collected in the two intake canals may have been due to the horizontal stratification of the intake water previously discussed.

Table 11. Example of Detroit Edison's daily entrainment data sheets showing adult fish collected in samples.

Monroe Pl... Pump Sample Data — # of Pumps 8

Dates 12 / 3 - 4 / 75 Time 8AM-8AM # of Hours 24 Location Intake Level · 3 meter

INVERTEBRATES

| Organism | Total Number | Organism | Total Number | Organism | Total Number | Organism | Total Number |
|---|---|---|---|---|---|---|---|
| Order Acarina | | Order Diptera | | Order Gastropoda | | Order Oligochaeta | |
| Order Amphipoda | | Ceratopogonidae | | Order Gordiida | | Order Pelecypoda | |
| Pontoporeia affinis | | Bezzia | | Order Hemiptera | | Order Plecoptera | |
| Gammarus | | Chironomidae | | Corixidae | | Acroneuria | |
| Order Coleoptera | | Larvae | | Hebridae | | Order Tricoptera | |
| Curculionidae | | Pupae | | Notonectidae | | Hydropsyche | |
| Elmidae | | Culicidae | | Order Hirudinea | | Neureclipsis | |
| | | Chaoborus | | Order Isopoda | | Phylocentropus | |
| Order Copepoda | | Order Ephemeroptera | | Order Mysidacea | | Psychomyia | |
| Arcalus | | Baetisca | | Mysis relicta | | Order Tricladida | |
| Order Decapoda | | Hexagenia | | Order Odonata | | Order Diptera | |
| | | | | Amphiagrion | | Simulidae | 2 |

Diversity Index (Based on Orders) 1.0000 Number of Groups 1 Number of Individuals 2

FISH

| Species | # of Eggs | # of Egg Larvae | # of Yolk Sac Larvae | # of Larvae | # of Projuvenile | # of Juvenile | # of Adult | Notes |
|---|---|---|---|---|---|---|---|---|
| Emerald shiner | | | | | | | 5 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Table 12. ANOVA tables showing differences between daily entrainment estimates for fish larvae from the main intake canal (1) and from the secondary intake canal (2); calculated from counts on Detroit Edison's daily entrainment data sheets [transformed by $\log_{10}(x + 1)$].

UNIVARIATE 1-WAY ANOVA CASES=SPEC 900*DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 3.LARV N= 98 OUT OF 98 LARVAE - ALL SPECIES COMBINED

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .55720 +9 | .55720 +9 | 3.9386 | .0500 |
| WITHIN | 96 | .13581+11 | .14147 +9 | | |
| TOTAL | 97 | .14137+11 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1985 ETA-SQ= .0394 (VAR COMP= .84093 +7 VAR AMONG= 5.661

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| (1) | 49 | 7320.5 | .25816 +9 | 16067. |
| (2) | 49 | 2551.9 | .24790 +8 | 4979.0 |
| GRAND | 98 | 4936.0 | .14576 +9 | 12073. |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 108*DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 3.LARV N= 98 OUT OF 98 CLUPEID

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .59116 +7 | .59116 +7 | 1.4782 | .2270 |
| WITHIN | 96 | .38392 +9 | .39992 +7 | | |
| TOTAL | 97 | .38983 +9 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1231 ETA-SQ= .0152 (VAR COMP= 39030. VAR AMONG= .971

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| (1) | 49 | 1022.4 | .60551 +7 | 2459.5 |
| (2) | 49 | 531.20 | .19487 +7 | 1396.0 |
| GRAND | 98 | 776.81 | .40187 +7 | 2004.7 |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 801*DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 3.LARV N= 98 OUT OF 98 PERCH

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .15761 +9 | .15761 +9 | 3.2040 | .0765 |
| WITHIN | 96 | .47223+10 | .49167 +8 | | |
| TOTAL | 97 | .48799+10 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1796 ETA-SQ= .0323 (VAR COMP= .22135 +7 VAR AMONG= 4.311

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| (1) | 49 | 2929.5 | .94441 +8 | 9718.1 |
| (2) | 49 | 392.98 | .18928 +7 | 1375.0 |
| GRAND | 98 | 1661.2 | .50249 +8 | 7091.2 |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 109*DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 3.LARV N= 98 OUT OF 98 SMELT

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .21271 +8 | .21271 +8 | 1.7919 | .1839 |
| WITHIN | 96 | .11392+10 | .11872 +8 | | |
| TOTAL | 97 | .11610+10 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1354 ETA-SQ= .0183 (VAR COMP= .19186 +6 VAR AMONG= 1.591

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| (1) | 49 | 1315.4 | .21703 +8 | 4658.6 |
| (2) | 49 | 384.52 | .20410 +7 | 1428.6 |
| GRAND | 98 | 849.91 | .11969 +8 | 3459.6 |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 119*DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 3.LARV N= 98 OUT OF 98 CATFISH

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .13471 +7 | .13471 +7 | 2.0444 | .1558 |
| WITHIN | 96 | .62573 +8 | .65181 +6 | | |
| TOTAL | 97 | .63920 +8 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1452 ETA-SQ= .0211 (VAR COMP= 14191. VAR AMONG= 2.131

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| (1) | 49 | 185.24 | .31772 +6 | 563.67 |
| (2) | 49 | 419.73 | .98547 +6 | 992.71 |
| GRAND | 98 | 302.49 | .65897 +6 | 811.77 |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 194*DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 3.LARV N= 98 OUT OF 98 FRESHWATER DRUM

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | 87574. | 87574. | 1.4709 | .1616 |
| WITHIN | 96 | .57153 +7 | 59535. | | |
| TOTAL | 97 | .58029 +7 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1418 ETA-SQ= .0201 (VAR COMP= 632.66 VAR AMONG= 1.961

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| (1) | 49 | 73.551 | 72415. | 269.10 |
| (2) | 49 | 15.408 | 11433. | 107.00 |
| GRAND | 98 | 44.480 | 42449. | 206.02 |

Table 13. ANOVA tables showing differences between daily entrainment estimates for fish eggs from the main intake canal (1) and from the secondary intake canal (2); calculated from counts on Detroit Edison's daily entrainment data sheets [transformed by $\log_{10}(x + 1)$].

UNIVARIATE 1-WAY ANOVA CASES=SPEC 900*DAY 365-399,401-500

ANALYSIS OF VARIANCE OF 2.EGGS N= 98 OUT OF 98 EGGS - ALL SPECIES COMBINED

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .22923 +8 | .22923 +8 | 2.0637 | .1541 |
| WITHIN | 96 | .10664+10 | .11108 +8 | | |
| TOTAL | 97 | .10893+10 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1451 ETA-SQR= .0210 (VAR COMP= .24113 +6 VAR AMONG= 2.12)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| (1) | 49 | 1698.0 | .15193 +8 | 3897.8 |
| (2) | 49 | 730.76 | .70230 +7 | 2650.1 |
| GRAND | 98 | 1214.4 | .11230 +8 | 3351.1 |

Table 14. ANOVA tables showing differences between daily entrainment estimates for macrozoobenthos from the main intake canal (1) and from the secondary intake canal (2); calculated from counts on Detroit Edison's daily entrainment data sheets [transformed by $\log_{10}(x + 1)$].

UNIVARIATE 1-WAY ANOVA CASES+SPEC 909+DAY 365-399,401-500

ANALYSIS OF VARIANCE OF Z.EST N= 98 OUT OF 98 MACROZOOBENTHOS - ALL SPECIES COMBINED

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .19038+10 | .19038+10 | .92256 | .3392 |
| WITHIN | 96 | .19811+12 | .20637+10 | | |
| TOTAL | 97 | .20001+12 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .0976 ETA-SQR= .0095 (VAR COMP= -.32616 +7 VAR AMONG= -0.1)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| (1) | 49 | 23656. | .12611+10 | 35512. |
| (2) | 49 | 37469. | .28667+10 | 53537. |
| GRAND | 98 | 26642. | .20420+10 | 45439. |

UNIVARIATE 1-WAY ANOVA CASES+SPEC 412+DAY 365-399,401-500

ANALYSIS OF VARIANCE OF Z.EST N= 98 OUT OF 98 CHIRONOMIDAE

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .47934 +9 | .47934 +9 | .39218 | .5326 |
| WITHIN | 96 | .11734+12 | .12222+10 | | |
| TOTAL | 97 | .11781+12 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .0638 ETA-SQR= .0041 (VAR COMP= -.15161 +8 VAR AMONG= -0.1)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| (1) | 49 | 19135. | .87475 +9 | 29576. |
| (2) | 49 | 23559. | .15697+10 | 39620. |
| GRAND | 98 | 21357. | .12156+10 | 34851. |

UNIVARIATE 1-WAY ANOVA CASES+SPEC 414+DAY 365-399,401-500

ANALYSIS OF VARIANCE OF Z.EST N= 98 OUT OF 98 EPHEMERIDAE

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .14925 +7 | .14925 +7 | .84135 | .3679 |
| WITHIN | 96 | .18229 +9 | .18989 +7 | | |
| TOTAL | 97 | .18378 +9 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .0959 ETA-SQR= .0092 (VAR COMP= -4210.3 VAR AMONG= -0.1)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| (1) | 49 | 202.29 | .41642 +6 | 645.82 |
| (2) | 49 | 465.54 | .33959 +7 | 1838.7 |
| GRAND | 98 | 333.62 | .18967 +7 | 1377.2 |

UNIVARIATE 1-WAY ANOVA CASES+SPEC 471+DAY 365-399,401-500

ANALYSIS OF VARIANCE OF Z.EST N= 98 OUT OF 98 HYDROPSYCHE

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .11602 +6 | .11602 +6 | .21761 | .6419 |
| WITHIN | 96 | .51184 +8 | .53317 +6 | | |
| TOTAL | 97 | .51300 +8 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .0476 ETA-SQR= .0023 (VAR COMP= -8513.1 VAR AMONG= -0.1)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| (1) | 49 | 132.10 | .26225 +6 | 512.13 |
| (2) | 49 | 231.52 | .80406 +6 | 896.69 |
| GRAND | 98 | 172.51 | .52887 +6 | 727.23 |

UNIVARIATE 1-WAY ANOVA CASES+SPEC 279+DAY 365-399,401-500

ANALYSIS OF VARIANCE OF Z.EST N= 98 OUT OF 98 GAMMARUS

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .64013 +8 | .64013 +8 | 2.7755 | .0990 |
| WITHIN | 96 | .22140+10 | .23062 +8 | | |
| TOTAL | 97 | .22780+10 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1676 ETA-SQR= .0281 (VAR COMP= .83566 +6 VAR AMONG= 3.501)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| (1) | 49 | 627.73 | .15326 +7 | 1238.0 |
| (2) | 49 | 2094.1 | .44572 +8 | 6677.7 |
| GRAND | 98 | 1283.9 | .23484 +8 | 4846.1 |

e. Sampling in the discharge canal. Sampling for entrained organisms in the discharge was done by Detroit Edison at stations W-Z, which were approximately 305 m (1,000 ft) downstream from the point of condenser discharge at the junction of the overflow canal with the discharge canal (see Figure 4.4-1). No reason was given in the 316(b) for selecting this sampling location. The 316(b) assumes 100% mortality of entrained organisms; discharge samples therefore were not necessary for estimating mortality through the plant. If discharge samples were taken to estimate the kinds and numbers of organisms entrained, the samples should have been taken close to the point of condenser discharge before the organisms in the discharge water began to stratify vertically. This is especially critical because, as discussed previously, the greatest depth at which 316(b) samples were collected was 3 m (10 ft); but according to Cole (undated (a) and Detroit Edison 1976(b)), depths in the upper discharge canal vary from approximately 5 m (15 ft) to 8 m (25 ft). Cole (1977) calculated that at full plant operation the passage time through the overflow canal is 20 min. At a mean plant capacity of 55.8% (Table 3.3-2 of the 316(b)), the passage time is approximately 36 min. An organism that was discharged into the surface waters at the head of the overflow canal would only need to settle at a rate of approximately 0.3 ft/min (10 ft/36 min) to be below the 3-m (10-ft) depth at the end of the overflow canal and to be invulnerable to collection in the entrainment samples.

Counts from Detroit Edison's daily entrainment data sheets for the 12 days in April and May 1976 when all four discharge stations were sampled simultaneously (Table 15) show that the average number of fish larvae collected from 3 m was higher than that collected from 1 m. This suggests that vertical stratification may have occurred in the overflow canal upstream from the sampling stations, and a paired t-test (one-tailed) conducted on the counts [transformed by $\log_{10}(x + 1)$] supported this interpretation at $P = 0.07$, but not at $P = 0.05$.

3. Schedule

The entrainment data in the 316(b) is based on samples taken from mid-April 1975 through mid-May 1976 (refer to 316(b) Table 4.4-1 presented

Table 15. Variations in numbers of fish larvae collected at 1-m and 3-m depths in discharge canal (actual counts from Detroit Edison's daily entrainment data sheets).

| Date | Depth | |
|---|---|---|
| | 1 m | 3 m |
| 4/20/76 | 20 | 30 |
| 4/27/76 | 13 | 11 |
| 4/28/76 | 5 | 20 |
| 4/30/76 | 8 | 43 |
| 5/04/76 | 3 | 105 |
| 5/05/76 | 0 | 8 |
| 5/07/76 | 2 | 34 |
| 5/08/76 | 73 | 16 |
| 5/09/76 | 12 | 8 |
| 5/11/76 | 7 | 8 |
| 5/12/76 | 6 | 3 |
| 5/15/76 | 2 | 0 |

on p. 43). Detroit Edison's daily entrainment data sheets show that an average of four samples (range of 1-6) were taken each week from April to December 1975; an average of two samples (range of 1-4) each week from December 1975 to mid-April 1976; and an average of three each week (range of 1-5) during the month of mid-April to mid-May 1976. No samples were collected during the weeks of December 7-13, 1976, and February 15-21, 1976.

A major concern with the 316(b) entrainment sampling schedule shown in Table 4.4-1 is the nonsystematic manner in which the sampling effort was distributed among the stations: from April to December 1975, samples were collected only in the discharge canal (stations W, X, Y, Z) and at one station (A) in the secondary intake canal (see Figure 4.4-1 on p. 42 for station locations); from December 1975 to April 1976, samples were collected in both the main and secondary intake canals; and from April 15 to May 15, 1976, sampling was conducted simultaneously in both intake canals and the discharge canal.

One-way ANOVA's of daily estimates calculated from the daily entrainment data sheets [counts transformed by $\log_{10}(x + 1)$] show that estimates based on discharge samples differed significantly ($P = 0.05$) from those based on intake samples for many of the taxa considered (Tables 16-18) and that the direction of the variation differed among groups of organisms. Entrainment estimates for the larvae of perch and freshwater drum are significantly higher from the intake samples than from the discharge samples, while estimates for catfish larvae are significantly higher from the discharge (Table 16). The mean estimates for the larvae of smelt, clupeids, and all species combined were lower from the discharge than from the intake, but the differences were not significant at $P = 0.05$. The mean estimate for the eggs of all species combined was significantly higher from the discharge samples at the $P = 0.06$ level but not at the $P = 0.05$ level (Table 17). All of the commonly entrained benthic organisms except _Hydropsyche_ were significantly more abundant ($P = 0.05$) in samples from the intake (Table 18).

Table 16. ANOVA tables showing differences between daily entrainment estimates for fish larvae from the main intake canal and from the discharge canal; calculated from counts on Detroit Edison's daily entrainment data sheets [transformed by $\log_{10}(x + 1)$].

UNIVARIATE 1-WAY ANOVA CASES=SPEC 100*DAY 476-498

ANALYSIS OF VARIANCE OF 3.LARV N= 26 OUT OF 26 LARVAE - ALL SPECIES COMBINED

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .19207 +8 | .19207 +8 | .44985 -1 | .8338 |
| WITHIN | 24 | .10247+11 | .42697 +9 | | |
| TOTAL | 25 | .10267+11 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .0433 ETA-SQR= .0019 (VAR COMP= -.31367 +8 VAR AMONG= -5.1)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| INTAKE | 13 | 25037. | .53725 +9 | 23180. |
| DISCHARGE | 13 | 23332. | .31449 +9 | 17735. |
| GRAND | 26 | 24187. | .41106 +9 | 20265. |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 109*DAY 476-498

ANALYSIS OF VARIANCE OF 3.LARV N= 26 OUT OF 26 SMELT

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .57318 +8 | .57318 +8 | 1.5410 | .2265 |
| WITHIN | 24 | .89269 +9 | .37195 +8 | | |
| TOTAL | 25 | .95000 +9 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .2456 ETA-SQR= .0603 (VAR COMP= .15479 +7 VAR AMONG= 4.00)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| INTAKE | 13 | 4767.6 | .68792 +8 | 8294.1 |
| DISCHARGE | 13 | 1819.1 | .55980 +7 | 2366.0 |
| GRAND | 26 | 3342.8 | .38230 +8 | 6184.4 |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 109*DAY 476-498

ANALYSIS OF VARIANCE OF 3.LARV N= 26 OUT OF 26 CLUPEID

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .66560 +6 | .66560 +6 | .40190 -1 | .8428 |
| WITHIN | 24 | .39747 +9 | .16561 +8 | | |
| TOTAL | 25 | .39814 +9 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .0409 ETA-SQR= .0017 (VAR COMP= -.12227 +7 VAR AMONG= -8.1)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| INTAKE | 13 | 3762.6 | .13011 +8 | 3607.1 |
| DISCHARGE | 13 | 3442.6 | .20111 +8 | 4484.6 |
| GRAND | 26 | 3602.6 | .15925 +8 | 3990.7 |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 119*DAY 476-498

ANALYSIS OF VARIANCE OF 3.LARV N= 26 OUT OF 26 CATFISH

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .64950 +9 | .64950 +9 | 10.501 | .0035 |
| WITHIN | 24 | .14844+10 | .61852 +8 | | |
| TOTAL | 25 | .21339+10 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .5517 ETA-SQR= .3044 (VAR COMP= .45204 +8 VAR AMONG= 47.23)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| INTAKE | 13 | 670.46 | .71318 +6 | 845.43 |
| DISCHARGE | 13 | 10667. | .12779 +9 | 11304. |
| GRAND | 26 | 5668.5 | .85150 +8 | 9228.0 |

UNIVARIATE 1-WAY ANOVA CASES=SPEC [illegible]*DAY 476-498

ANALYSIS OF VARIANCE OF 3.LARV N= 26 OUT OF 26 YELLOW PERCH

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .73976 +9 | .73976 +9 | 5.2449 | .0311 |
| WITHIN | 24 | .33850+10 | .14104 +9 | | |
| TOTAL | 25 | .41248+10 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .4235 ETA-SQR= .1793 (VAR COMP= .46055 +8 VAR AMONG= 24.62)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| INTAKE | 13 | 11014. | .28135 +9 | 16774. |
| DISCHARGE | 13 | 346.00 | .71065 +6 | 843.00 |
| GRAND | 26 | 5680.1 | .16499 +9 | 12845. |

UNIVARIATE 1-WAY ANOVA CASES=SPEC [illegible]*DAY 476-498

ANALYSIS OF VARIANCE OF 3.LARV N= 26 OUT OF 26 FRESHWATER DRUM

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .49957 +6 | .49957 +6 | 4.3728 | .0473 |
| WITHIN | 24 | .27419 +7 | .11425 +6 | | |
| TOTAL | 25 | .32414 +7 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .3926 ETA-SQR= .1541 (VAR COMP= 29640. VAR AMONG= 20.60)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| INTAKE | 13 | 277.23 | .22849 +6 | 478.01 |
| DISCHARGE | 13 | 0. | 0. | 0. |
| GRAND | 26 | 138.62 | .12966 +6 | 360.08 |

Table 17. ANOVA table showing difference between daily entrainment estimates for fish eggs from the main intake canal and from the discharge canal; calculated from counts on Detroit Edison's daily entrainment data sheets [transformed by $\log_{10}(x + 1)$].

UNIVARIATE 1-WAY ANOVA CASES=SPEC 900*DAY 476-498

ANALYSIS OF VARIANCE OF 7.EGGS N= 26 OUT OF 26 EGGS - ALL SPECIES COMBINED

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .96623+14 | .96623+14 | 3.8681 | .0609 |
| WITHIN | 24 | .59950+15 | .24979+14 | | |
| TOTAL | 25 | .69612+15 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .3726 ETA-SQR= .1388 (VAR COMP= .55111+13 VAR AMONG= 18.07)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| INTAKE | 13 | 4423.8 | .40720 +8 | 6381.2 |
| DISCHARGE | 13 | .38599 +7 | .49958+14 | .70681 +7 |
| GRAND | 26 | .19322 +7 | .27845+14 | .52768 +7 |

Table 18. ANOVA tables showing differences between daily entrainment estimates for macrozoobenthos from the main intake canal and from the discharge canal; calculated from counts on Detroit Edison's daily entrainment data sheets [transformed by $\log_{10}(x + 1)$].

UNIVARIATE 1-WAY ANOVA CASES=SPEC 90/DAY 476-498

ANALYSIS OF VARIANCE OF 2.EST N= 26 OUT OF 26 MACROZOOBENTHOS - ALL SPECIES COMBINED

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .83944+10 | .83944+10 | 11.419 | .0025 |
| WITHIN | 24 | .17642+11 | .73512+9 | | |
| TOTAL | 25 | .26037+11 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .5678 ETA-SQ= .3224 (VAR COMP= .50917+9 VAR AMONG= 40.49)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| INTAKE | 13 | 55547. | .13516+10 | 36764. |
| DISCHARGE | 13 | 23641. | .11859+9 | 10890. |
| GRAND | 26 | 41579. | .10419+10 | 32272. |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 41/DAY 476-498

ANALYSIS OF VARIANCE OF 2.EST N= 26 OUT OF 26 CHIRONOMIDAE

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .53507+10 | .53507+10 | 9.1726 | .0058 |
| WITHIN | 24 | .14000+11 | .58334+9 | | |
| TOTAL | 25 | .19351+11 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .5258 ETA-SQ= .2765 (VAR COMP= .36672+9 VAR AMONG= 38.60)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| INTAKE | 13 | 49621. | .15561+10 | 39446. |
| DISCHARGE | 13 | 20930. | .17052+9 | 10978. |
| GRAND | 26 | 35275. | .77403+9 | 27821. |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 41/DAY 476-498

ANALYSIS OF VARIANCE OF 2.EST N= 26 OUT OF 26 SIMULIIDAE

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .33177+6 | .33177+6 | 4.4158 | .0463 |
| WITHIN | 24 | .18032+7 | 75133. | | |
| TOTAL | 25 | .21350+7 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .3942 ETA-SQ= .1554 (VAR COMP= 19741. VAR AMONG= 20.81)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| INTAKE | 13 | 225.92 | .15027+6 | 387.65 |
| DISCHARGE | 13 | 0. | 0. | 0. |
| GRAND | 26 | 112.96 | 85394. | 292.23 |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 47/DAY 476-498

ANALYSIS OF VARIANCE OF 2.EST N= 26 OUT OF 26 HYDROPSYCHE

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .44311+6 | .44311+6 | .91596 | .3481 |
| WITHIN | 24 | .12135+8 | .50561+6 | | |
| TOTAL | 25 | .12578+8 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .1917 ETA-SQ= .0368 (VAR COMP= -3768.6 VAR AMONG= -0.7)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| INTAKE | 13 | 352.54 | .89236+6 | 944.65 |
| DISCHARGE | 13 | 95.615 | .11885+6 | 344.75 |
| GRAND | 26 | 224.08 | .50390+6 | 709.86 |

UNIVARIATE 1-WAY ANOVA CASES=SPEC 20/DAY 476-498

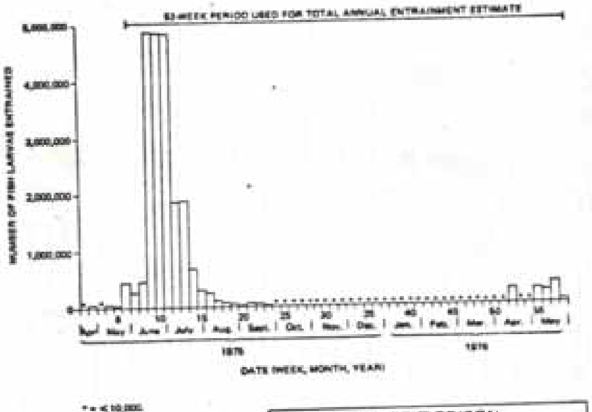
ANALYSIS OF VARIANCE OF 2.EST N= 26 OUT OF 26 GAMMARUS

| SOURCE | DF | SUM OF SQRS | MEAN SQR | F-STATISTIC | SIGNIF |
|---|---|---|---|---|---|
| BETWEEN | 1 | .11012+8 | .11012+8 | 5.0633 | .0339 |
| WITHIN | 24 | .52197+8 | .21749+7 | | |
| TOTAL | 25 | .63211+8 | (RANDOM EFFECTS STATISTICS) | | |

ETA= .4174 ETA-SQ= .1742 (VAR COMP= .67980+6 VAR AMONG= 23.81)

| STA | N | MEAN | VARIANCE | STD DEV |
|---|---|---|---|---|
| INTAKE | 13 | 1590.3 | .41219+7 | 2030.2 |
| DISCHARGE | 13 | 294.69 | .22601+6 | 475.41 |
| GRAND | 26 | 944.50 | .25284+7 | 1590.1 |

During the period of April to December 1975 when the main intake canal was not sampled (refer to Table 4.4-1), Detroit Edison based entrainment estimates on samples from the secondary intake canal and the discharge canal. As discussed above, entrainment estimates for several species of fish larvae based on samples from the secondary intake and the discharge are lower than those from the main intake (Tables 12 and 16). Thus, when only these two groups of stations are used, entrainment is underestimated. Even when the main intake canal was sampled during spring 1976, the monitoring ended in mid-May. Available evidence, including 316(b) Figure 4.4-2 shown below[6/], indicates that the larvae of most western Lake Erie fishes are




DETROIT EDISON
MONROE POWER PLANT

FIGURE 4.4-2
TOTAL EXTRAPOLATED NUMBERS OF FISH LARVAE ENTRAINED ON A WEEKLY BASIS AT THE MONROE POWER PLANT

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[6/] The data in Figure 4.4-2 are displaced to the right by 2 weeks. For example, Table 4.4-2 of the 316(b) (shown on the following page) and the daily entrainment data sheets indicate that peak larval entrainment occurred during the first 3 weeks of June 1975; whereas Figure 4.4-2 shows that peak entrainment occurred during the last 2 weeks of June and the first week of July 1975.

TABLE 4.4-2 EXTRAPOLATED MEAN WEEKLY ENTRAINMENT OF FISH EGGS AND LARVAE AT THE MONROE POWER PLANT[a]

| [illegible] |
| --- |
| [illegible] |

[illegible]

most abundant after mid-May and therefore would not be adequately represented by samples taken according to the 316(b) schedule (Cole 1977, Cole, undated (b); Patterson, undated; Herdendorf et al. 1976).

The reliability of the 316(b) estimates of egg entrainment is also in question. Detroit Edison stated that they only used data from intake stations in the calculation of egg entrainment (refer to Section III-B-2) because they were concerned that spawning may have taken place in the discharge canal. Therefore, during the period of peak egg abundance, the 316(b) estimates of egg entrainment are based on samples from only Station A in the secondary intake canal (refer to Figure 4.4-1 on p. 42 and Table 4.4-1 on p. 43 ). We consider this to be inadequate because the mean daily estimate of egg entrainment from the secondary canal was lower than that from the main intake canal, even though the ANOVA (Table 13) failed to support this argument at the P = 0.05 level. The 316(b), however, did not demonstrate that collections made at the one location in the secondary canal accurately represented the entrainment of fish eggs.

B. Data Analysis

1. Fish larvae

a. Verification of 316(b) estimates. The method used for calculating the numbers of larvae entrained is given on 316(b) p. 4.4-1 as follows:

> In order to accurately describe larval fish entrainment, numbers collected for all species and for selected individual species at each station were graphed against time. Variability from station to station was such that trends were obscured. It was therefore decided that a mean density of all sampling stations would best describe actual entrainment within a particular sampling week. Therefore, numbers of fish larvae collected at each station for each 24-hour sampling period were pooled to calculate a total for each sampling week. The total was divided by the number of collections and by the volume of water filtered. Plant flow for the sampling week was then multiplied by the density to give total entrainment for each week. This procedure was repeated for each species.

This reduces to the following formula:

$$\frac{\text{Number of fish larvae entrained}}{\text{week}} = \frac{\text{Number of larvae collected}}{\text{Number of stations sampled X (volume sampled/station)}} \quad (7)$$

$$\text{X plant flow for week}$$

Our estimates of the numbers of fish larvae entrained, based on the 316(b) calculation above and on counts from the entrainment data sheets (Table 19), agree closely with those in Table 4.4-2 of the 316(b), shown on page 62 of this report.[7/] Differences between the two sets of weekly estimates in Table 19 and Table 4.4-2 are minor, and the annual estimates differ by only 0.7 million, or approximately 3% (Table 20). Any discrepancies between the two sets of estimates in Table 20 are probably due to illegibility of the daily entrainment data sheets or to a minor difference in the method used to calculate weekly plant flow. To determine the weekly flow, we calculated the mean plant flow (cfs) for the sample days in the given week and extrapolated that value to a weekly total flow, whereas the manner in which Detroit Edison calculated its plant flow value is not given in the 316(b). The estimates, however, presented by week in Figure 11, show the same general pattern as that in Figure 4.4-2 of the 316(b). The most apparent difference occurs in the second week of June, when our estimate is 19% lower than the 316(b) estimate. The 316(b) shows the entrainment peak in the first week in June (refer to Table 4.4-2), whereas our estimates show the greatest entrainment occurring during the third week in June.

Cole's (1977) estimate of annual larval entrainment at the Monroe plant during 1975 (144.5 million larvae with 95% confidence limits of 59.4 million and 232.2 million) is almost seven times the 316(b) estimate for May 1975-May 1976. Cole's estimate may be higher because it is based on samples collected throughout the entire water column rather than only in the upper 3 m (refer to discussion of Detroit Edison's sampling depths in Section III-A-2).

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[7/] In most cases, the daily entrainment data for all groups of organisms (fish larvae, fish eggs, and macrozoobenthos) could be normalized by a $\log_{10}(x + 1)$ transformation (refer to Appendix D). However, in order to verify the 316(b) estimates, which were based only on the untransformed arithmetic data, entrainment estimates in the present report are also based on the untransformed counts for comparison. Larval entrainment estimates based on the $\log_{10}(x + 1)$ transformation are presented in Appendix E, Table E-2. The transformation reduces the annual estimates by approximately 60%.

Table 19. Weekly estimates of entrainment of fish eggs and larvae at the Monroe Power Plant for April 1975-May 1976, based on counts from Detroit Edison's daily entrainment data sheets. S.E. = standard error, $s_v$; CI = absolute value of $ts_v$.

| WEEK OF | CLUPEIDAE (undd.) EGGS | LARVAE | ALEWIFE EGGS | LARVAE | GIZZARD SHAD EGGS | LARVAE | SMELT EGGS | LARVAE | NORTHERN PIKE EGGS | LARVAE | CHANNEL CAT EGGS | LARVAE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4/ 6 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 0. N (LARVAE) = 1. | | | | | | | | | | | | |
| 4/13 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 0. N (LARVAE) = 1. | | | | | | | | | | | | |
| 4/20 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 1. N (LARVAE) = 3. | | | | | | | | | | | | |
| 4/27 | 0. | 5232. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 5232. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 16657. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 12310. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 2. N (LARVAE) = 4. | | | | | | | | | | | | |
| 5/ 4 | 0. | 0. | 0. | 0. | 0. | 0. | 524598. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 524598. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 6665545. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 3312313. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 2. N (LARVAE) = 5. | | | | | | | | | | | | |
| 5/11 | 192475. | 11665. | 68119. | 0. | 0. | 0. | 0. | 8749. | 0. | 23330. | 0. | 90405. |
| S.E. | 192475. | 4880. | 48119. | 0. | 0. | 0. | 0. | 8749. | 0. | 23330. | 0. | 41448. |
| .95 CI | 612456. | 10872. | 153116. | 0. | 0. | 0. | 0. | 19492. | 0. | 51977. | 0. | 92347. |
| .90 CI | 452894. | 8847. | 113224. | 0. | 0. | 0. | 0. | 15853. | 0. | 42275. | 0. | 75104. |
| N (EGGS) = 4. N (LARVAE) = 11. | | | | | | | | | | | | |
| 5/18 | 109971. | 68460. | 0. | 0. | 0. | 0. | 0. | 10175. | 0. | 0. | 0. | 16253. |
| S.E. | 109871. | 20465. | 0. | 0. | 0. | 0. | 0. | 5590. | 0. | 0. | 0. | 12148. |
| .95 CI | 349613. | 45102. | 0. | 0. | 0. | 0. | 0. | 12304. | 0. | 0. | 0. | 26738. |
| .90 CI | 258574. | 36715. | 0. | 0. | 0. | 0. | 0. | 10040. | 0. | 0. | 0. | 21818. |
| N (EGGS) = 4. N (LARVAE) = 12. | | | | | | | | | | | | |
| 5/25 | 0. | 75535. | 0. | 0. | 0. | 0. | 0. | 4443. | 0. | 0. | 0. | 66556. |
| S.E. | 0. | 27027. | 0. | 0. | 0. | 0. | 0. | 4443. | 0. | 0. | 0. | 33984. |
| .95 CI | 0. | 62325. | 0. | 0. | 0. | 0. | 0. | 10244. | 0. | 0. | 0. | 78362. |
| .90 CI | 0. | 50270. | 0. | 0. | 0. | 0. | 0. | 8264. | 0. | 0. | 0. | 63211. |
| N (EGGS) = 3. N (LARVAE) = 9. | | | | | | | | | | | | |
| 6/ 1 | 4197976. | 1150031. | 4237210. | 0. | 0. | 0. | 0. | 313867. | 0. | 0. | 0. | 61593. |
| S.E. | 4197976. | 554849. | 4237209. | 0. | 0. | 0. | 0. | 254649. | 0. | 0. | 0. | 36663. |
| .95 CI | 13357956. | 1221222. | 13482796. | 0. | 0. | 0. | 0. | 560481. | 0. | 0. | 0. | 83553. |
| .90 CI | 9877836. | 996509. | 9970151. | 0. | 0. | 0. | 0. | 457349. | 0. | 0. | 0. | 65234. |
| N (EGGS) = 4. N (LARVAE) = 12. | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6/8 | 0. | 2658925. | 0. | 0. | 0. | 0. | 0. | 134470. | 0. | 0. | 0. | 45557. |
| S.E. | 0. | 697547. | 0. | 0. | 0. | 0. | 0. | 88065. | 0. | 0. | 0. | 26607. |
| .95 CI | 0. | 1535305. | 0. | 0. | 0. | 0. | 0. | 193032. | 0. | 0. | 0. | 55562. |
| .90 CI | 0. | 1252778. | 0. | 0. | 0. | 0. | 0. | 158165. | 0. | 0. | 0. | 47786. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 6/15 | 0. | 1861426. | 0. | 0. | 0. | 0. | 0. | 30632. | 0. | 0. | 0. | 136944. |
| S.E. | 0. | 680666. | 0. | 0. | 0. | 0. | 0. | 21756. | 0. | 0. | 0. | 74612. |
| .95 CI | 0. | 1516526. | 0. | 0. | 0. | 0. | 0. | 48673. | 0. | 0. | 0. | 166235. |
| .90 CI | 0. | 1233367. | 0. | 0. | 0. | 0. | 0. | 39423. | 0. | 0. | 0. | 135197. |
| N (EGGS) = | 3. N (LARVAE) = | 11. | | | | | | | | | | |
| 6/22 | 0. | 854227. | 0. | 0. | 0. | 0. | 0. | 51151. | 0. | 0. | 0. | 86957. |
| S.E. | 0. | 339543. | 0. | 0. | 0. | 0. | 0. | 27067. | 0. | 0. | 0. | 48558. |
| .95 CI | 0. | 681304. | 0. | 0. | 0. | 0. | 0. | 59574. | 0. | 0. | 0. | 105277. |
| .90 CI | 0. | 555940. | 0. | 0. | 0. | 0. | 0. | 48612. | 0. | 0. | 0. | 86313. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 6/27 | 0. | 1323033. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 52061. |
| S.E. | 0. | 601547. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 39256. |
| .95 CI | 0. | 1397213. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 82286. |
| .90 CI | 0. | 1116914. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 71211. |
| N (EGGS) = | 3. N (LARVAE) = | 9. | | | | | | | | | | |
| 7/6 | 0. | 474532. | 0. | 0. | 0. | 0. | 0. | 12170. | 0. | 0. | 0. | 53532. |
| S.E. | 0. | 216322. | 0. | 0. | 0. | 0. | 0. | 12170. | 0. | 0. | 0. | 36205. |
| .95 CI | 0. | 491966. | 0. | 0. | 0. | 0. | 0. | 27115. | 0. | 0. | 0. | 80656. |
| .90 CI | 0. | 391976. | 0. | 0. | 0. | 0. | 0. | 22052. | 0. | 0. | 0. | 65603. |
| N (EGGS) = | 3. N (LARVAE) = | 11. | | | | | | | | | | |
| 7/13 | 0. | 124301. | 0. | 0. | 0. | 21618. | 0. | 0. | 0. | 0. | 0. | 10159. |
| S.E. | 0. | 66050. | 0. | 0. | 0. | 21618. | 0. | 0. | 0. | 0. | 0. | 7237. |
| .95 CI | 0. | 165375. | 0. | 0. | 0. | 42520. | 0. | 0. | 0. | 0. | 0. | 16339. |
| .90 CI | 0. | 112625. | 0. | 0. | 0. | 38025. | 0. | 0. | 0. | 0. | 0. | 13088. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 7/20 | 0. | 82768. | 0. | 5173. | 0. | 15519. | 0. | 0. | 0. | 0. | 0. | 15519. |
| S.E. | 0. | 38459. | 0. | 5173. | 0. | 15519. | 0. | 0. | 0. | 0. | 0. | 8105. |
| .95 CI | 0. | 64648. | 0. | 11386. | 0. | 34157. | 0. | 0. | 0. | 0. | 0. | 17833. |
| .90 CI | 0. | 69072. | 0. | 9291. | 0. | 27872. | 0. | 0. | 0. | 0. | 0. | 14556. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 7/27 | 0. | 16734. | 0. | 0. | 0. | 50201. | 0. | 0. | 0. | 0. | 0. | 11156. |
| S.E. | 0. | 12011. | 0. | 0. | 0. | 29849. | 0. | 0. | 0. | 0. | 0. | 7521. |
| .95 CI | 0. | 26435. | 0. | 0. | 0. | 65698. | 0. | 0. | 0. | 0. | 0. | 16555. |
| .90 CI | 0. | 21571. | 0. | 0. | 0. | 53609. | 0. | 0. | 0. | 0. | 0. | 13508. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 8/3 | 0. | 25302. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 16921. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 38276. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 31017. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE) = | 10. | | | | | | | | | | |
| 8/10 | 0. | 20248. | 0. | 0. | 0. | 0. | 0. | 5072. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 15550. | 0. | 0. | 0. | 0. | 0. | 5072. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 34055. | 0. | 0. | 0. | 0. | 0. | 11300. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 28177. | 0. | 0. | 0. | 0. | 0. | 9190. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 3. N (LARVAE) = | 11. | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8/17 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 4. | N (LARVAE) = 12. | | | | | | | | | | | |
| 8/24 | 0. | 16734. | 0. | 0. | 0. | 0. | 0. | 5578. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 12011. | 0. | 0. | 0. | 0. | 0. | 5578. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 26535. | 0. | 0. | 0. | 0. | 0. | 12277. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 21571. | 0. | 0. | 0. | 0. | 0. | 10018. | 0. | 0. | 0. | 0. |
| N (EGGS) = 4. | N (LARVAE) = 12. | | | | | | | | | | | |
| 8/31 | 0. | 25191. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 12243. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 28366. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 23210. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 3. | N (LARVAE) = 8. | | | | | | | | | | | |
| 9/ 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 4. | N (LARVAE) = 12. | | | | | | | | | | | |
| 9/14 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 4. | N (LARVAE) = 12. | | | | | | | | | | | |
| 9/21 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 4. | N (LARVAE) = 12. | | | | | | | | | | | |
| 9/28 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 4. | N (LARVAE) = 12. | | | | | | | | | | | |
| 10/ 5 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 4. | N (LARVAE) = 12. | | | | | | | | | | | |
| 10/12 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 2. | N (LARVAE) = 6. | | | | | | | | | | | |
| 10/19 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 4. | N (LARVAE) = 10. | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/26 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 11/ 2 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 2. N (LARVAE)= | 11. | | | | | | | | | | |
| 11/ 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 5. N (LARVAE)= | 15. | | | | | | | | | | |
| 11/16 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 11/23 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 11/30 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 10. | | | | | | | | | | |
| 12/ 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 0. N (LARVAE)= | 0. | | | | | | | | | | |
| 12/14 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 13. N (LARVAE)= | 13. | | | | | | | | | | |
| 12/21 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 3. N (LARVAE)= | 3. | | | | | | | | | | |
| 12/28 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 11. N (LARVAE)= | 11. | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/ 4 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 20. N (LARVAE)= 20. | | | | | | | | | | | | |
| 1/11 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 31. N (LARVAE)= 31. | | | | | | | | | | | | |
| 1/18 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 35. N (LARVAE)= 35. | | | | | | | | | | | | |
| 1/25 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 22. N (LARVAE)= 22. | | | | | | | | | | | | |
| 2/ 1 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 22. N (LARVAE)= 22. | | | | | | | | | | | | |
| 2/ 8 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 36. N (LARVAE)= 36. | | | | | | | | | | | | |
| 2/15 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 0. N (LARVAE)= 0. | | | | | | | | | | | | |
| 2/22 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 21. N (LARVAE)= 21. | | | | | | | | | | | | |
| 2/29 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 17. N (LARVAE)= 17. | | | | | | | | | | | | |
| 3/ 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 22. N (LARVAE)= 22. | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/14 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 35. N (LARVAE)= 35. | | | | | | | | | | | | |
| 3/21 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 32. N (LARVAE)= 32. | | | | | | | | | | | | |
| 3/28 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 8491. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 5467. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 11338. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 9386. | 0. | 0. | 0. | 0. |
| N (EGGS) = 23. N (LARVAE)= 23. | | | | | | | | | | | | |
| 4/ 4 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 32. N (LARVAE)= 32. | | | | | | | | | | | | |
| 4/11 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 5150. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 3487. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 7595. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 6213. |
| N (EGGS) = 12. N (LARVAE)= 13. | | | | | | | | | | | | |
| 4/18 | 0. | 24866. | 0. | 0. | 0. | 0. | 0. | 6865. | 0. | 0. | 0. | 18579. |
| S.E. | 0. | 13168. | 0. | 0. | 0. | 0. | 0. | 3725. | 0. | 0. | 0. | 6537. |
| .95 CI | 0. | 26353. | 0. | 0. | 0. | 0. | 0. | 7455. | 0. | 0. | 0. | 13201. |
| .90 CI | 0. | 22017. | 0. | 0. | 0. | 0. | 0. | 6228. | 0. | 0. | 0. | 11031. |
| N (EGGS) = 30. N (LARVAE)= 39. | | | | | | | | | | | | |
| 4/25 | 0. | 20731. | 0. | 0. | 0. | 0. | 0. | 131213. | 0. | 6530. | 0. | 27425. |
| S.E. | 0. | 8576. | 0. | 0. | 0. | 0. | 0. | 17511. | 0. | 4661. | 0. | 16626. |
| .95 CI | 0. | 17153. | 0. | 0. | 0. | 0. | 0. | 35039. | 0. | 9327. | 0. | 33254. |
| .90 CI | 0. | 14439. | 0. | 0. | 0. | 0. | 0. | 29278. | 0. | 7794. | 0. | 27796. |
| N (EGGS) = 35. N (LARVAE)= 47. | | | | | | | | | | | | |
| 5/ 2 | 0. | 80173. | 0. | 0. | 0. | 0. | 0. | 13465. | 0. | 421. | 0. | 95526. |
| S.E. | 0. | 16577. | 0. | 0. | 0. | 0. | 0. | 4524. | 0. | 421. | 0. | 37730. |
| .95 CI | 0. | 33175. | 0. | 0. | 0. | 0. | 0. | 9053. | 0. | 842. | 0. | 75432. |
| .90 CI | 0. | 27720. | 0. | 0. | 0. | 0. | 0. | 7564. | 0. | 704. | 0. | 63025. |
| N (EGGS) = 47. N (LARVAE)= 63. | | | | | | | | | | | | |
| 5/ 9 | 0. | 20949. | 0. | 0. | 0. | 0. | 0. | 3977. | 0. | 0. | 0. | 20460. |
| S.E. | 0. | 4157. | 0. | 0. | 0. | 0. | 0. | 1901. | 0. | 0. | 0. | 5559. |
| .95 CI | 0. | 2313. | 0. | 0. | 0. | 0. | 0. | 3605. | 0. | 0. | 0. | 11205. |
| .90 CI | 0. | 6950. | 0. | 0. | 0. | 0. | 0. | 3178. | 0. | 0. | 0. | 9362. |
| N (EGGS) = 47. N (LARVAE)= 63. | | | | | | | | | | | | |
| TOTALS | 4500342. | 8950419. | 4285429. | 5173. | 0. | 87338. | 524598. | 710047. | 0. | 30281. | 0. | 810486. |
| S.E. | 4203821. | 1330702. | 4237442. | 5173. | 0. | 39989. | 524595. | 272973. | 0. | 23795. | 0. | 133372. |
| .95 CI | 8411044. | 2662735. | 8579199. | 10351. | 0. | 80018. | 1049721. | 546219. | 0. | 47614. | 0. | 266077. |
| .90 CI | 7028744. | 2224034. | 7045049. | 8649. | 0. | 68662. | 877128. | 456411. | 0. | 39725. | 0. | 222995. |

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| LAST | | | | | | | | | | | | |
| 52 WEEKS | 4307867. | 8441542. | 4237210. | 5173. | 0. | 87338. | 0. | 701318. | 0. | 6951. | 0. | 720041. |
| S.E. | 4199412. | 1330683. | 4237209. | 5173. | 0. | 39989. | 0. | 272833. | 0. | 4680. | 0. | 126765. |
| .95 CI | 8433022. | 2662676. | 8470652. | 10351. | 0. | 80018. | 0. | 545938. | 0. | 9365. | 0. | 253663. |
| .90 CI | 7021417. | 2224902. | 7084612. | 8649. | 0. | 66862. | 0. | 456177. | 0. | 7825. | 0. | 211956. |

| WEEK OF | GOLDFISH EGGS | GOLDFISH LARVAE | CARP EGGS | CARP LARVAE | SUCKER EGGS | SUCKER LARVAE | EMERALD SHINER EGGS | EMERALD SHINER LARVAE | SPOTTAIL SHINER EGGS | SPOTTAIL SHINER LARVAE | LEPOMIS SP. EGGS | LEPOMIS SP. LARVAE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4/ 6 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 0. N (LARVAE)= | 1. | | | | | | | | | | |
| 4/13 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 0. N (LARVAE)= | 1. | | | | | | | | | | |
| 4/20 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 1. N (LARVAE)= | 3. | | | | | | | | | | |
| 4/27 | 0. | 0. | 0. | 5232. | 0. | 15695. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 5232. | 0. | 15695. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 16667. | 0. | 49941. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 12310. | 0. | 36930. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 2. N (LARVAE)= | 4. | | | | | | | | | | |
| 5/ 4 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 2. N (LARVAE)= | 5. | | | | | | | | | | |
| 5/11 | 0. | 0. | 0. | 8749. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 8749. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 19472. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 15853. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 11. | | | | | | | | | | |
| 5/18 | 0. | 0. | 0. | 4070. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 2744. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 6050. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 4928. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 5/25 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 71092. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 71092. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 163937. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 132231. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 3. N (LARVAE)= | 9. | | | | | | | | | | |
| 6/ 1 | 0. | 61030. | 0. | 13078. | 0. | 0. | 0. | 4359. | 0. | 4359. | 0. | 4359. |
| S.E. | 0. | 61333. | 0. | 13378. | 0. | 0. | 0. | 4359. | 0. | 4359. | 0. | 4359. |
| .95 CI | 0. | 134326. | 0. | 20704. | 0. | 0. | 0. | 9595. | 0. | 9595. | 0. | 9595. |
| .90 CI | 0. | 109609. | 0. | 23488. | 0. | 0. | 0. | 7829. | 0. | 7829. | 0. | 7829. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6/ 8 | 0. | 36211. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 30399. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 69228. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 55674. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 6/15 | 0. | 76080. | 0. | 5072. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 73681. | 0. | 5372. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 152470. | 0. | 11300. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 128074. | 0. | 9190. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 3. N (LARVAE)= | 11. | | | | | | | | | | |
| 6/22 | 0. | 5115. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 5115. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 11258. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 9147. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 6/29 | 0. | 74372. | 0. | 7437. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 50443. | 0. | 7437. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 134769. | 0. | 17150. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 108704. | 0. | 13833. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 3. N (LARVAE)= | 9. | | | | | | | | | | |
| 7/ 6 | 0. | 30425. | 0. | 0. | 0. | 0. | 0. | 6085. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 13876. | 0. | 0. | 0. | 0. | 0. | 6085. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 30916. | 0. | 0. | 0. | 0. | 0. | 13557. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 25143. | 0. | 0. | 0. | 0. | 0. | 11026. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 3. N (LARVAE)= | 11. | | | | | | | | | | |
| 7/13 | 0. | 5404. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 5434. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 11095. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 9706. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 7/20 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 15519. | 0. | 0. | 0. | 5173. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 11139. | 0. | 0. | 0. | 5173. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 24516. | 0. | 0. | 0. | 11325. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 20005. | 0. | 0. | 0. | 9291. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 7/27 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 16734. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 12011. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 26435. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 21571. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 8/ 3 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 12691. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 8461. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 19138. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 15509. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 10. | | | | | | | | | | |
| 8/10 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 10144. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 6805. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 15161. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 12330. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 3. N (LARVAE)= | 11. | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8/17 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 8/24 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 22312. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 17151. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 37750. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 30803. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 8/31 | 0. | 16734. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 16734. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 39575. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 31711. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 3. N (LARVAE)= | 8. | | | | | | | | | | |
| 9/ 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 10925. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 10925. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 24045. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 19621. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 9/14 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 9/21 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 9/28 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 10/ 5 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 10/12 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 2. N (LARVAE)= | 6. | | | | | | | | | | |
| 10/19 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 10. | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/26 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. | N (LARVAE)= | 12. | | | | | | | | | |
| 11/ 2 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 2. | N (LARVAE)= | 11. | | | | | | | | | |
| 11/ 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 5. | N (LARVAE)= | 15. | | | | | | | | | |
| 11/16 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 5. | N (LARVAE)= | 12. | | | | | | | | | |
| 11/23 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. | N (LARVAE)= | 12. | | | | | | | | | |
| 11/30 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. | N (LARVAE)= | 10. | | | | | | | | | |
| 12/ 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 0. | N (LARVAE)= | 0. | | | | | | | | | |
| 12/14 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 13. | N (LARVAE)= | 13. | | | | | | | | | |
| 12/21 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 1. | N (LARVAE)= | 3. | | | | | | | | | |
| 12/28 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 11. | N (LARVAE)= | 11. | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/ 4 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 20. N (LARVAE)= | 20. | | | | | | | | | | |
| 1/11 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 31. N (LARVAE)= | 31. | | | | | | | | | | |
| 1/18 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 35. N (LARVAE)= | 35. | | | | | | | | | | |
| 1/25 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 22. N (LARVAE)= | 22. | | | | | | | | | | |
| 2/ 1 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 22. N (LARVAE)= | 22. | | | | | | | | | | |
| 2/ 8 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 36. N (LARVAE)= | 36. | | | | | | | | | | |
| 2/15 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 0. N (LARVAE)= | 0. | | | | | | | | | | |
| 2/22 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 21. N (LARVAE)= | 21. | | | | | | | | | | |
| 2/29 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 17. N (LARVAE)= | 17. | | | | | | | | | | |
| 3/ 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 22. N (LARVAE)= | 22. | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/14 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 35. N (LARVAE)= 35. | | | | | | | | | | | | |
| 3/21 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 32. N (LARVAE)= 32. | | | | | | | | | | | | |
| 3/28 | 0. | 0. | 0. | 241135. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 109405. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 218610. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 180980. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 23. N (LARVAE)= 23. | | | | | | | | | | | | |
| 4/ 4 | 0. | 0. | 0. | 6975. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 3097. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 6197. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 5178. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 32. N (LARVAE)= 32. | | | | | | | | | | | | |
| 4/11 | 0. | 0. | 0. | 2575. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 2575. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 5611. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 4589. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 12. N (LARVAE)= 13. | | | | | | | | | | | | |
| 4/18 | 0. | 0. | 0. | 145326. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 32233. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 64598. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 53893. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 30. N (LARVAE)= 39. | | | | | | | | | | | | |
| 4/25 | 0. | 3910. | 7892. | 45709. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 2740. | 7892. | 9829. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 5583. | 15792. | 19667. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 4581. | 13195. | 16434. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 35. N (LARVAE)= 47. | | | | | | | | | | | | |
| 5/ 2 | 0. | 0. | 0. | 8037. | 0. | 421. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 3059. | 0. | 421. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 6121. | 0. | 842. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 5115. | 0. | 704. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 47. N (LARVAE)= 63. | | | | | | | | | | | | |
| 5/ 9 | 0. | 0. | 0. | 487. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 487. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 975. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 815. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 47. N (LARVAE)= 63. | | | | | | | | | | | | |
| TOTALS | 0. | 309209. | 7892. | 494382. | 0. | 16116. | 0. | 169861. | 0. | 4359. | 0. | 9532. |
| S.E. | 0. | 116758. | 7892. | 112406. | 0. | 15701. | 0. | 76975. | 0. | 4359. | 0. | 6765. |
| .95 CI | 0. | 233632. | 15792. | 224975. | 0. | 31417. | 0. | 153827. | 0. | 8723. | 0. | 13536. |
| .90 CI | 0. | 195219. | 13195. | 187943. | 0. | 26251. | 0. | 128535. | 0. | 7289. | 0. | 11311. |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LAST 52 WEEKS | 0. | 309239. | 7892. | 480401. | 0. | 421. | 0. | 169861. | 0. | 4359. | 0. | 9532. |
| S.E. | 0. | 116755. | 7892. | 111943. | 0. | 421. | 0. | 76875. | 0. | 4359. | 0. | 6765. |
| .95 CI | 0. | 233432. | 15792. | 223998. | 0. | 842. | 0. | 153827. | 0. | 8723. | 0. | 13536. |
| .90 CI | 0. | 195719. | 13195. | 187169. | 0. | 704. | 0. | 128535. | 0. | 7289. | 0. | 11311. |

| WEEK OF | BRINDLED MADTOM EGGS | BRINDLED MADTOM LARVAE | BURBOT EGGS | BURBOT LARVAE | TROUT-PERCH EGGS | TROUT-PERCH LARVAE | WHITE BASS EGGS | WHITE BASS LARVAE | FRESHWATER DRUM EGGS | FRESHWATER DRUM LARVAE | BROOK SILVERSIDE EGGS | BROOK SILVERSIDE LARVAE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4/ 6 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 0. | N (LARVAE) = | 1. | | | | | | | | | |
| 4/13 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 0. | N (LARVAE) = | 1. | | | | | | | | | |
| 4/20 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 1. | N (LARVAE) = | 3. | | | | | | | | | |
| 4/27 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 2. | N (LARVAE) = | 4. | | | | | | | | | |
| 5/ 4 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 2. | N (LARVAE) = | 5. | | | | | | | | | |
| 5/11 | 0. | 0. | 0. | 0. | 0. | 2916. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 2916. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 6497. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 5204. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. | N (LARVAE) = | 11. | | | | | | | | | |
| 5/18 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. | N (LARVAE) = | 12. | | | | | | | | | |
| 5/25 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 3. | N (LARVAE) = | 9. | | | | | | | | | |
| 6/ 1 | 0. | 0. | 0. | 0. | 0. | 4359. | 0. | 0. | 0. | 792071. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 4359. | 0. | 0. | 0. | 236977. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 9595. | 0. | 0. | 0. | 521586. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 7829. | 0. | 0. | 0. | 425610. | 0. | 0. |
| N (EGGS) = | 4. | N (LARVAE) = | 12. | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6/ 8 | 0. | 3. | 0. | 0. | 0. | 0. | 0. | 93114. | 0. | 5173. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 82119. | 0. | 5173. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 160744. | 0. | 11386. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 147485. | 0. | 9291. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 6/15 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 121728. | 0. | 1125985. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 49227. | 0. | 655444. | 0. | 3. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 109678. | 0. | 1460328. | 0. | C. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 89200. | 0. | 1167663. | 0. | 0. |
| N (EGGS) = | 3. N (LARVAE)= | 11. | | | | | | | | | | |
| 6/22 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 56266. | 0. | 276217. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 45621. | 0. | 199830. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 100412. | 0. | 439825. | 0. | 3. |
| .90 CI | 0. | 3. | 0. | 0. | 0. | 0. | 0. | 81935. | 0. | 358894. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 6/29 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 44623. | 0. | 3. |
| S.E. | 3. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 44623. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 107202. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 83000. | 0. | 0. |
| N (EGGS) = | 3. N (LARVAE)= | 9. | | | | | | | | | | |
| 7/ 6 | 0. | 0. | 0. | 0. | 0. | 12170. | 0. | 6085. | 0. | 12170. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 8164. | 0. | 6085. | 0. | 12170. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 18189. | 0. | 13557. | 0. | 27115. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 14793. | 0. | 11026. | 0. | 22052. | 0. | 0. |
| N (EGGS) = | 3. N (LARVAE)= | 11. | | | | | | | | | | |
| 7/13 | 0. | 5404. | 0. | 0. | 0. | 0. | 0. | 32426. | 0. | 59448. | 0. | 5404. |
| S.E. | 0. | 5404. | 0. | 0. | 0. | 0. | 0. | 14935. | 0. | 53023. | 0. | 5404. |
| .95 CI | 0. | 11635. | 0. | 0. | 0. | 0. | 0. | 32871. | 0. | 118463. | 0. | 11895. |
| .90 CI | 0. | 9706. | 0. | 0. | 0. | 0. | 0. | 26822. | 0. | 96665. | 0. | 9706. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 7/20 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 51730. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 25153. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 55355. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 45169. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 7/27 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 5578. | 0. | 5578. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 5578. | 0. | 5578. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 12277. | 0. | 12277. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 10018. | 0. | 10018. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 8/ 3 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 12691. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 12691. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 28707. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 23263. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 10. | | | | | | | | | | |
| 8/10 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | U. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 3. N (LARVAE)= | 11. | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8/17 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 8/24 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 8/31 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 3. N (LARVAE)= | 8. | | | | | | | | | | |
| 9/ 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 9/14 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 9/21 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 9/28 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 10/ 5 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 10/12 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 2. N (LARVAE)= | 6. | | | | | | | | | | |
| 10/19 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE)= | 10. | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/26 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. | N (LARVAE)= | 12. | | | | | | | | | |
| 11/ 2 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 2. | N (LARVAE)= | 11. | | | | | | | | | |
| 11/ 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 5. | N (LARVAE)= | 15. | | | | | | | | | |
| 11/16 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. | N (LARVAE)= | 12. | | | | | | | | | |
| 11/23 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. | N (LARVAE)= | 12. | | | | | | | | | |
| 11/30 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. | N (LARVAE)= | 10. | | | | | | | | | |
| 12/ 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 0. | N (LARVAE)= | 0. | | | | | | | | | |
| 12/14 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 13. | N (LARVAE)= | 13. | | | | | | | | | |
| 12/21 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 3. | N (LARVAE)= | 3. | | | | | | | | | |
| 12/28 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 11. | N (LARVAE)= | 11. | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/ 4 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 20. | N (LARVAE)= | 20. | | | | | | | | | |
| 1/11 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 31. | N (LARVAE)= | 31. | | | | | | | | | |
| 1/18 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 35. | N (LARVAE)= | 35. | | | | | | | | | |
| 1/25 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 22. | N (LARVAE)= | 22. | | | | | | | | | |
| 2/ 1 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 22. | N (LARVAE)= | 22. | | | | | | | | | |
| 2/ 8 | 0. | 0. | 17358. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 17358. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 34734. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 29323. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 30. | N (LARVAE)= | 30. | | | | | | | | | |
| 2/15 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 0. | N (LARVAE)= | 0. | | | | | | | | | |
| 2/22 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 21. | N (LARVAE)= | 21. | | | | | | | | | |
| 2/29 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 17. | N (LARVAE)= | 17. | | | | | | | | | |
| 3/ 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 22. | N (LARVAE)= | 22. | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/14 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 35. N (LARVAE)= 35. | | | | | | | | | | | | |
| 3/21 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 32. N (LARVAE)= 32. | | | | | | | | | | | | |
| 3/28 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 23. N (LARVAE)= 23. | | | | | | | | | | | | |
| 4/ 4 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 32. N (LARVAE)= 32. | | | | | | | | | | | | |
| 4/11 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 12. N (LARVAE)= 13. | | | | | | | | | | | | |
| 4/18 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 30. N (LARVAE)= 39. | | | | | | | | | | | | |
| 4/25 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 35. N (LARVAE)= 47. | | | | | | | | | | | | |
| 5/ 2 | 0. | 0. | 0. | 0. | 0. | 1683. | 0. | 0. | 0. | 3787. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 1017. | 0. | 0. | 0. | 1571. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 2035. | 0. | 0. | 0. | 3143. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 1700. | 0. | 0. | 0. | 2627. | 0. | 0. |
| N (EGGS) = 47. N (LARVAE)= 63. | | | | | | | | | | | | |
| 5/ 9 | 0. | 0. | 0. | 0. | 0. | 1461. | 0. | 0. | 0. | 974. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 1082. | 0. | 0. | 0. | 683. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 2166. | 0. | 0. | 0. | 1367. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 1310. | 0. | 0. | 0. | 1143. | 0. | 0. |
| N (EGGS) = 47. N (LARVAE)= 63. | | | | | | | | | | | | |
| TOTALS | 0. | 5404. | 17358. | 0. | 0. | 22589. | 0. | 379618. | 0. | 1926026. | 0. | 5404. |
| S.E. | 0. | 5536. | 17358. | 0. | 0. | 9516. | 0. | 111053. | 0. | 228556. | 0. | 5404. |
| .95 CI | 0. | 10614. | 34734. | 0. | 0. | 19663. | 0. | 222216. | 0. | 1457539. | 0. | 10614. |
| .90 CI | 0. | 9036. | 29023. | 0. | 0. | 16413. | 0. | 185681. | 0. | 1218145. | 0. | 9036. |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LAST 52 WEEKS | 0. | 5404. | 17358. | 0. | 0. | 19673. | 0. | 379618. | 0. | 1826026. | 1. | 5454. |
| S.E. | 0. | 5404. | 17358. | 0. | 0. | 9373. | 0. | 111053. | 0. | 728556. | 0. | 5404. |
| .95 CI | 0. | 10814. | 34734. | 0. | 0. | 18756. | 0. | 222218. | 0. | 1457839. | 0. | 10814. |
| .90 CI | 0. | 9034. | 29023. | 0. | 0. | 15672. | 0. | 185681. | 0. | 1218145. | 0. | 9036. |

| WEEK OF | JOHNNY DARTER EGGS | JOHNNY DARTER LARVAE | LOGPERCH EGGS | LOGPERCH LARVAE | YELLOW PERCH EGGS | YELLOW PERCH LARVAE | WALLEYE EGGS | WALLEYE LARVAE | UNIDENTIFIED EGGS | UNIDENTIFIED LARVAE | TOTAL EGGS | TOTAL LARVAE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4/ 6 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 0. N (LARVAE)= | 1. | | | | | | | | | | |
| 4/13 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 33468. | 0. | 33468. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 1. | 0. | 1. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 1. | 0. | 1. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 1. | 0. | 1. |
| N (EGGS) = | 0. N (LARVAE)= | 1. | | | | | | | | | | |
| 4/20 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 1. N (LARVAE)= | 3. | | | | | | | | | | |
| 4/27 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 26159. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 17351. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 55712. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 40826. |
| N (EGGS) = | 2. N (LARVAE)= | 4. | | | | | | | | | | |
| 5/ 4 | 0. | 0. | 0. | 0. | 0. | 0. | 167425. | 22323. | 0. | 0. | 692023. | 22323. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 167425. | 22323. | 0. | 0. | 550667. | 22323. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 2127301. | 61970. | 0. | 0. | 6996778. | 61970. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 1057121. | 47593. | 0. | 0. | 3476912. | 47593. |
| N (EGGS) = | 2. N (LARVAE)= | 5. | | | | | | | | | | |
| 5/11 | 0. | 0. | 0. | 0. | 0. | 379541. | 0. | 11665. | 104257. | 8749. | 366851. | 495769. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 202028. | 0. | 11665. | 104257. | 6255. | 224124. | 286640. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 678358. | 0. | 25990. | 331762. | 13936. | 713163. | 631633. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 511035. | 0. | 21137. | 245318. | 11334. | 527364. | 519392. |
| N (EGGS) = | 4. N (LARVAE)= | 11. | | | | | | | | | | |
| 5/18 | 0. | 0. | 0. | 2035. | 256413. | 172977. | 0. | 0. | 0. | 8140. | 366304. | 262517. |
| S.E. | 0. | 0. | 0. | 2035. | 256413. | 56353. | 0. | 0. | 0. | 8146. | 276969. | 81963. |
| .95 CI | 0. | 0. | 0. | 4479. | 815905. | 124032. | 0. | 0. | 0. | 17916. | 887678. | 136373. |
| .90 CI | 0. | 0. | 0. | 3655. | 603339. | 101209. | 0. | 0. | 0. | 14620. | 656413. | 111274. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |
| 5/25 | 0. | 0. | 0. | 0. | 0. | 217718. | 0. | 4443. | 0. | 4443. | 0. | 444322. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 111749. | 0. | 4443. | 0. | 4443. | 0. | 139591. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 257685. | 0. | 10246. | 0. | 10259. | 0. | 321577. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 207846. | 0. | 8264. | 0. | 8264. | 0. | 254639. |
| N (EGGS) = | 3. N (LARVAE)= | 9. | | | | | | | | | | |
| 6/ 1 | 0. | 0. | 0. | 0. | 0. | 2550891. | 0. | 226682. | 0. | 65389. | 8435188. | 4795555. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 1472037. | 0. | 98147. | 0. | 56548. | 5966640. | 1617408. |
| .95 CI | 0. | 0. | 0. | 0. | -0. | 3241647. | 0. | 216022. | 0. | 124463. | 18979478. | 3540070. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 2645161. | 0. | 176273. | 0. | 101561. | 14034795. | 2905006. |
| N (EGGS) = | 4. N (LARVAE)= | 12. | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6/ 8 | 0. | 0. | 0. | 0. | 0. | 377629. | 0. | 108633. | 0. | 342110. | 0. | 3422692. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 272031. | 0. | 92367. | 0. | 180631. | 0. | 786655. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 598741. | 0. | 203209. | 0. | 397570. | 0. | 1730172. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 480568. | 0. | 165893. | 0. | 324414. | 0. | 1411806. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 6/15 | 0. | 0. | 0. | 0. | 0. | 897744. | 0. | 15216. | 0. | 654289. | 0. | 4924916. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 470561. | 0. | 10878. | 0. | 387708. | 0. | 1130629. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 1048609. | 0. | 24237. | 0. | 863971. | 0. | 2519562. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 852656. | 0. | 19711. | 0. | 702671. | 0. | 2049700. |
| N (EGGS) = | 3. N (LARVAE) = | 11. | | | | | | | | | | |
| 6/22 | 0. | 0. | 0. | 20461. | 0. | 398980. | 0. | 25576. | 0. | 76727. | 0. | 1651677. |
| S.E. | 0. | 0. | 0. | 15728. | 0. | 249962. | 0. | 15953. | 0. | 49453. | 0. | 454125. |
| .95 CI | 0. | 0. | 0. | 34615. | 0. | 550156. | 0. | 35113. | 0. | 108845. | 0. | 959523. |
| .90 CI | 0. | 0. | 0. | 28243. | 0. | 448932. | 0. | 28652. | 0. | 87021. | 0. | 815607. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 6/27 | 0. | 0. | 0. | 7437. | 0. | 14374. | 0. | 0.12539198. | | 356988.12539198. | | 1881522. |
| S.E. | 0. | 0. | 0. | 7437. | 0. | 14074. | 0. | 0.12539197. | | 231602.12539197. | | 650174. |
| .95 CI | 0. | 0. | 0. | 17150. | 0. | 34301. | 0. | 0.53956159. | | 534024.53956157. | | 1499352. |
| .90 CI | 0. | 0. | 0. | 13833. | 0. | 27667. | 0. | 0.36614444. | | 430779.36614443. | | 1209324. |
| N (EGGS) = | 3. N (LARVAE) = | 9. | | | | | | | | | | |
| 7/ 6 | 0. | 0. | 0. | 0. | 0. | 24340. | 0. | 0. | 0. | 48680. | 0. | 475417. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 16328. | 0. | 0. | 0. | 30058. | 0. | 223596. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 36379. | 0. | 0. | 0. | 66319. | 0. | 492225. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 29986. | 0. | 0. | 0. | 54465. | 0. | 404793. |
| N (EGGS) = | 3. N (LARVAE) = | 11. | | | | | | | | | | |
| 7/13 | 0. | 0. | 0. | 0. | 0. | 16213. | 0. | 0. | 0. | 21618. | 0. | 332645. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 11637. | 0. | 0. | 0. | 14575. | 0. | 91683. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 25613. | 0. | 0. | 0. | 32079. | 0. | 202185. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 20900. | 0. | 0. | 0. | 26176. | 0. | 164981. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 7/20 | 0. | 0. | 0. | 0. | 0. | 5123. | 0. | 0. | 0. | 41384. | 0. | 237958. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 5173. | 0. | 0. | 0. | 23344. | 0. | 56240. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 11386. | 0. | 0. | 0. | 51220. | 0. | 123172. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 9291. | 0. | 0. | 0. | 41925. | 0. | 101276. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 7/27 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 105981. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 30332. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 73305. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 64713. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 8/ 3 | 0. | 0. | 0. | 0. | 0. | 12691. | 0. | 0. | 0. | 6346. | 0. | 69801. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 12691. | 0. | 0. | 0. | 6346. | 0. | 26639. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 28607. | 0. | 0. | 0. | 14354. | 0. | 60229. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 23263. | 0. | 0. | 0. | 11631. | 0. | 49145. |
| N (EGGS) = | 4. N (LARVAE) = | 13. | | | | | | | | | | |
| 8/10 | 0. | 0. | 0. | 0. | 0. | 5072. | 0. | 0. | 0. | 5072. | 0. | 45646. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 5072. | 0. | 0. | 0. | 5072. | 0. | 19113. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 11300. | 0. | 0. | 0. | 11300. | 0. | 42843. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 9190. | 0. | 0. | 0. | 9190. | 0. | 34832. |
| N (EGGS) = | 3. N (LARVAE) = | 11. | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8/17 | 0. | 0. | 0. | 5287. | 0. | 0. | 0. | 0. | 0. | 5269. | 0. | 10576. |
| S.E. | 0. | 0. | 0. | 5289. | 0. | 0. | 0. | 0. | 0. | 5289. | 0. | 7479. |
| .95 CI | 0. | 0. | 0. | 11640. | 0. | 0. | 0. | 0. | 0. | 11640. | 0. | 16662. |
| .90 CI | 0. | 0. | 0. | 9497. | 0. | 0. | 0. | 0. | 0. | 9499. | 0. | 13433. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 8/24 | 0. | 0. | 0. | 0. | 0. | 5578. | 0. | 0. | 0. | 5578. | 0. | 55780. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 5578. | 0. | 0. | 0. | 5578. | 0. | 23660. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 12277. | 0. | 0. | 0. | 12277. | 0. | 50755. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 10018. | 0. | 0. | 0. | 10018. | 0. | 41415. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 8/31 | 0. | 0. | 0. | 8367. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 50202. |
| S.E. | 0. | 0. | 0. | 8367. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 27361. |
| .95 CI | 0. | 0. | 0. | 19788. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 52065. |
| .90 CI | 0. | 0. | 0. | 15855. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 42375. |
| N (EGGS) = | 3. N (LARVAE) = | 8. | | | | | | | | | | |
| 9/ 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 10925. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 10925. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 24045. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 19621. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 9/14 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 9/21 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 9/28 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 10/ 5 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE) = | 12. | | | | | | | | | | |
| 10/12 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 6510. | 0. | 6510. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 6510. | 0. | 6510. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 16736. | 0. | 16736. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 13117. | 0. | 13117. |
| N (EGGS) = | 2. N (LARVAE) = | 6. | | | | | | | | | | |
| 10/19 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 4. N (LARVAE) = | 10. | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/26 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 4. | N (LARVAE) = 12. | | | | | | | | | | | |
| 11/ 2 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 2. | N (LARVAE) = 11. | | | | | | | | | | | |
| 11/ 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 5. | N (LARVAE) = 15. | | | | | | | | | | | |
| 11/16 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 4. | N (LARVAE) = 12. | | | | | | | | | | | |
| 11/23 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 4. | N (LARVAE) = 12. | | | | | | | | | | | |
| 11/30 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 4. | N (LARVAE) = 10. | | | | | | | | | | | |
| 12/ 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 0. | N (LARVAE) = 0. | | | | | | | | | | | |
| 12/14 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 13. | N (LARVAE) = 13. | | | | | | | | | | | |
| 12/21 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 3. | N (LARVAE) = 3. | | | | | | | | | | | |
| 12/28 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 11. | N (LARVAE) = 11. | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/ 4 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 20. N (LARVAE)= | 20. | | | | | | | | | | |
| 1/11 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 10798. | 0. | 10798. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 5771. | 0. | 5771. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 11547. | 0. | 11547. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 9649. | 0. | 9649. | 0. |
| N (EGGS) = | 31. N (LARVAE)= | 31. | | | | | | | | | | |
| 1/18 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 16739. | 0. | 16739. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 16739. | 0. | 16739. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 33494. | 0. | 33494. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 27987. | 0. | 27987. | 0. |
| N (EGGS) = | 35. N (LARVAE)= | 35. | | | | | | | | | | |
| 1/25 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 9194. | 0. | 9194. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 9194. | 0. | 9194. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 19124. | 0. | 19124. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 15823. | 0. | 15823. | 0. |
| N (EGGS) = | 22. N (LARVAE)= | 22. | | | | | | | | | | |
| 2/ 1 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 22. N (LARVAE)= | 22. | | | | | | | | | | |
| 2/ 8 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 17358. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 17359. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 34734. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 29023. | 0. |
| N (EGGS) = | 36. N (LARVAE)= | 36. | | | | | | | | | | |
| 2/15 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 0. N (LARVAE)= | 0. | | | | | | | | | | |
| 2/22 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 21. N (LARVAE)= | 21. | | | | | | | | | | |
| 2/29 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 17. N (LARVAE)= | 17. | | | | | | | | | | |
| 3/ 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = | 22. N (LARVAE)= | 22. | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/14 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 4543539. | 0. | 4543539. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 4542499. | 0. | 4542497. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 9008533. | 0. | 9085534. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 7595053. | 0. | 7595055. | 0. |
| N (EGGS) = 35. N (LARVAE)= 35. | | | | | | | | | | | | |
| 3/21 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| N (EGGS) = 32. N (LARVAE)= 32. | | | | | | | | | | | | |
| 3/28 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 3396. | 45850. | 0. | 45850. | 253022. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 3396. | 40694. | 0. | 40694. | 105601. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 7044. | 84403. | 0. | 84403. | 219017. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 5831. | 69872. | 0. | 69872. | 181318. |
| N (EGGS) = 23. N (LARVAE)= 23. | | | | | | | | | | | | |
| 4/ 4 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 65170. | 0. | 65100. | 6975. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 51753. | 0. | 51753. | 3097. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 103559. | 0. | 103558. | 6192. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 86531. | 0. | 86531. | 5178. |
| N (EGGS) = 32. N (LARVAE)= 32. | | | | | | | | | | | | |
| 4/11 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 7725. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 4335. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 9458. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 7724. |
| N (EGGS) = 12. N (LARVAE)= 13. | | | | | | | | | | | | |
| 4/18 | 0. | 0. | 0. | 858. | 0. | 45492. | 0. | 0. | 0. | 0. | 0. | 241795. |
| S.E. | 0. | 0. | 0. | 858. | 0. | 17922. | 0. | 0. | 0. | 0. | 0. | 39896. |
| .95 CI | 0. | 0. | 0. | 1717. | 0. | 35862. | 0. | 0. | 0. | 0. | 0. | 79532. |
| .90 CI | 0. | 0. | 0. | 1435. | 0. | 29965. | 0. | 0. | 0. | 0. | 0. | 65726. |
| N (EGGS) = 30. N (LARVAE)= 39. | | | | | | | | | | | | |
| 4/25 | 0. | 0. | 0. | 0. | 0. | 39179. | 0. | 0. | 425202. | 1959. | 433174. | 254664. |
| S.E. | 0. | 0. | 0. | 0. | 0. | 13150. | 0. | 0. | 261582. | 1447. | 261701. | 30946. |
| .95 CI | 0. | 0. | 0. | 0. | 0. | 26329. | 0. | 0. | 523425. | 2896. | 523663. | 61923. |
| .90 CI | 0. | 0. | 0. | 0. | 0. | 22000. | 0. | 0. | 437365. | 2420. | 437564. | 51742. |
| N (EGGS) = 35. N (LARVAE)= 47. | | | | | | | | | | | | |
| 5/ 2 | 0. | 0. | 0. | 2104. | 0. | 163753. | 0. | 421. | 2256. | 1683. | 2256. | 357275. |
| S.E. | 0. | 0. | 0. | 1391. | 0. | 38924. | 0. | 421. | 2256. | 1324. | 2256. | 57018. |
| .95 CI | 0. | 0. | 0. | 2764. | 0. | 77897. | 0. | 842. | 4515. | 2650. | 4515. | 114032. |
| .90 CI | 0. | 0. | 0. | 2310. | 0. | 65091. | 0. | 704. | 3773. | 2214. | 3773. | 95333. |
| N (EGGS) = 47. N (LARVAE)= 63. | | | | | | | | | | | | |
| 5/ 9 | 0. | 0. | 0. | 974. | 0. | 10239. | 0. | 0. | 1043480. | 1461. | 1043480. | 60892. |
| S.E. | 0. | 0. | 0. | 974. | 0. | 2598. | 0. | 0. | 829433. | 830. | 826432. | 7906. |
| .95 CI | 0. | 0. | 0. | 1950. | 0. | 5200. | 0. | 0. | 1657693. | 1661. | 1657693. | 15820. |
| .90 CI | 0. | 0. | 0. | 1629. | 0. | 4345. | 0. | 0. | 1385139. | 1360. | 1385139. | 13219. |
| N (EGGS) = 47. N (LARVAE)= 63. | | | | | | | | | | | | |
| TOTALS | 0. | 0. | 0. | 47525. | 256413. | 5293065. | 167425. | 418355. | 18605693. | 1715803. | 28565353. | 21319192. |
| S.E. | 0. | 0. | 0. | 23239. | 256413. | 1620233. | 167425. | 138575. | 13365460. | 494115. | 14650385. | 2308666. |
| .95 CI | 0. | 0. | 0. | 40438. | 513081. | 3242086. | 335017. | 277289. | 26744319. | 988724. | 29315412. | 4619644. |
| .90 CI | 0. | 0. | 0. | 33789. | 428722. | 2709030. | 279934. | 231698. | 22347082. | 826161. | 24495443. | 3860093. |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LAST 52 WEEKS | 0. | 0. | 0. | 47525. | 256513. | 4963524. | 0. | 384367. | 18701636. | 1673666. | 27528176. | 20741473. |
| S.E. | 0. | 0. | 0. | 20209. | 256413. | 1595499. | 0. | 136267. | 13365074. | 494076. | 14638317. | 2290630. |
| .95 CI | 0. | 0. | 0. | 40418. | 513081. | 3192592. | 0. | 272671. | 26743505. | 988645. | 27291263. | 4503559. |
| .90 CI | 0. | 0. | 0. | 33789. | 428722. | 2667674. | 0. | 227839. | 22346403. | 826094. | 24475264. | 3829934. |

Table 20. Comparison of weekly and annual estimates of entrainment of fish larvae, as shown in Table 4.4-2 of the 316(b) and Table 19 of the present report. N.S. = no sampling.

| SAMPLING WEEK | | Number of fish larvae entrained: 316(b) | Present report ± sampling error | |
|---|---|---|---|---|
| April | 06-12 | 0 | 0 | |
| | 13-19 | 33,472 | 33,468± | 0 |
| | 20-26 | 0 | 0 | |
| | 27-03 | 31,889 | 26,159± | 55,212 |
| May | 04-10 | 22,326 | 22,323± | 61,970 |
| | 11-17 | 431,131 | 495,769± | 638,635 |
| | 18-24 | 265,763 | 262,517± | 136,373 |
| | 25-31 | 442,901 | 444,322± | 321,897 |
| June | 01-07 | 4,854,107 | 4,799,555± | 3,560,090 |
| | 08-14 | 4,723,214 | 3,822,850± | 1,730,172 |
| | 15-21 | 4,620,997 | 4,924,916± | 2,519,042 |
| | 22-28 | 1,851,750 | 1,851,677± | 999,528 |
| | 29-05 | 1,881,883 | 1,881,622± | 1,499,302 |
| July | 06-12 | 667,522 | 675,437± | 497,725 |
| | 13-19 | 301,297 | 302,645± | 202,185 |
| | 20-26 | 241,408 | 237,958± | 123,872 |
| | 27-02 | 105,995 | 105,981± | 79,305 |
| Aug. | 03-09 | 71,015 | 69,801± | 60,709 |
| | 10-16 | 46,961 | 45,648± | 42,583 |
| | 17-23 | 10,628 | 10,578± | 16,462 |
| | 24-30 | 55,788 | 55,780± | 50,755 |
| | 31-06 | 50,208 | 50,202± | 52,885 |
| Sept. | 07-13 | 10,893 | 10,925± | 24,045 |
| | 14-20 | 0 | 0 | |
| | 21-27 | 0 | 0 | |
| | 28-04 | 0 | 0 | |
| Oct. | 05-11 | 0 | 0 | |
| | 12-18 | 5,980 | 6,510± | 16,736 |
| | 19-25 | 0 | 0 | |
| | 26-01 | 0 | 0 | |
| Nov. | 02-08 | 0 | 0 | |
| | 09-15 | 0 | 0 | |
| | 16-22 | 0 | 0 | |
| | 23-29 | 0 | 0 | |
| | 30-06 | 0 | 0 | |
| Dec. | 07-13 | N.S. | - | |
| | 14-20 | 0 | 0 | |
| | 21-27 | 0 | 0 | |
| | 28-03 | 0 | 0 | |
| Jan. | 04-10 | 0 | 0 | |
| | 11-17 | 0 | 0 | |
| | 18-24 | 0 | 0 | |
| | 25-31 | 0 | 0 | |
| Feb. | 01-07 | 0 | 0 | |
| | 08-14 | 0 | 0 | |
| | 15-21 | N.S. | - | |
| | 22-28 | 0 | 0 | |
| | 29-06 | 0 | 0 | |
| March | 07-13 | 0 | 0 | |
| | 14-20 | 0 | 0 | |
| | 21-27 | 0 | 0 | |
| | 28-03 | 258,282 | 253,022± | 219,017 |
| April | 04-10 | 7,026 | 6,975± | 6,197 |
| | 11-17 | 6,439 | 7,725± | 9,445 |
| | 18-24 | 242,888 | 241,996± | 79,832 |
| | 25-01 | 238,804 | 254,664± | 61,923 |
| May | 02-08 | 369,239 | 357,275± | 114,092 |
| | 09-15 | 61,691 | 60,892± | 15,820 |
| Total | | 21,911,497 | 21,319,192± | 4,619,644 |
| Last 52 weeks | | 21,392,679 | 20,741,473± | 4,583,550 |

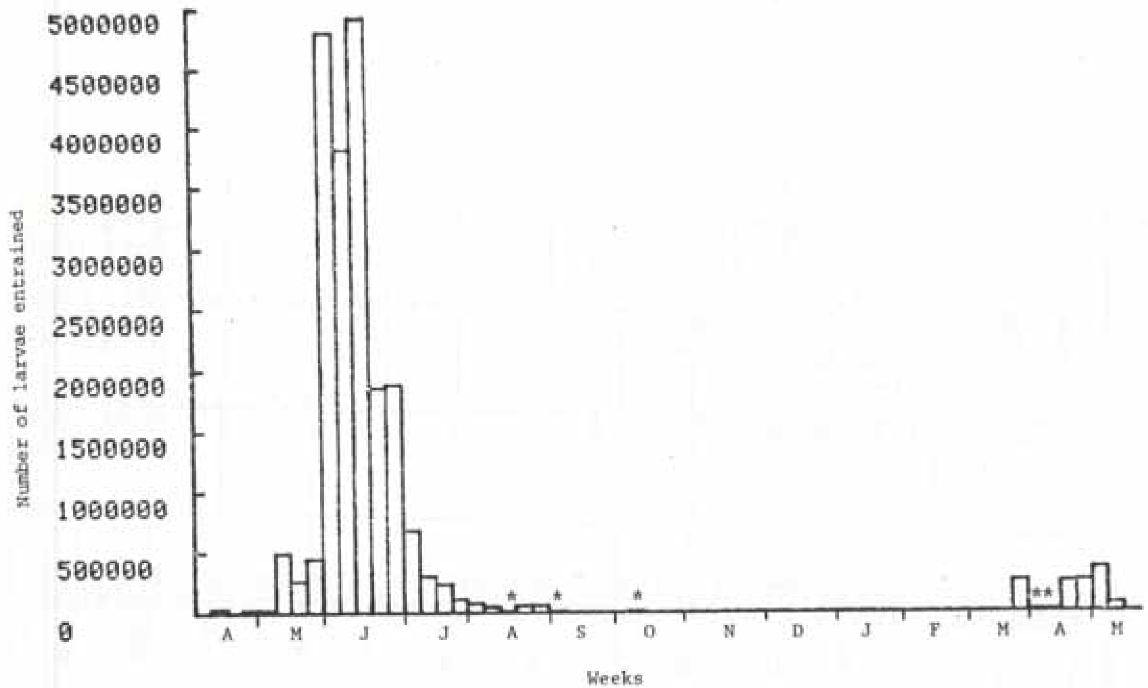


Figure 11. Entrainment of fish larvae (all species combined) by week for April 1976-May 1976, as calculated from Detroit Edison's daily entrainment data sheets. * = <20,000. No sampling was conducted during the weeks of December 7 and February 15.

b. Statistical analysis of larval entrainment estimates. According to our annual estimates for May 1975-May 1976, approximately 44% of the fish larvae entrained were clupeids, 24% were yellow perch, 9% were freshwater drum, and 8% were unidentified (Table 21).

Although the 95% CI's for many of the weekly larval entrainment estimates include zero (refer to Tables 19 and 20), the annual estimates for many taxa show a fairly high degree of precision. Sampling errors (at $P = 0.05$) as percentages of the annual entrainment estimates for total larvae and for clupeids, carp, and channel catfish (sampling errors of 22, 29, 47, and 35%, respectively; Table 22) meet the EPA (1977) recommendation that such estimates have sampling errors that are no larger than 50% of the estimate. For all other taxa, shown in Table 22, the sampling errors are larger than 50% of the estimate, and several exceed 100%.

The confidence intervals indicate that the portions of the population of entrained larvae (all species combined) present at 1-m and 3-m depths in the intake water were sampled intensively enough to provide reliable estimates of the numbers entrained from these strata. However, we do not believe that these samples are representative of the population entrained at depths greater than 3 m in the intake canal (refer to Section III-A-2).

Correlation analyses were conducted to compare our daily entrainment estimates for fish larvae [based on counts from the daily entrainment data sheets transformed by $\log_{10}(x + 1)$] with the river and lake components of intake flow (Table 23). The only significant ($P = 0.05$) correlations found were those of clupeid larvae and the larvae of all species combined with the lake component of intake flow.

2. Fish eggs

a. Verification of 316(b) estimates. The method used by Detroit Edison for calculating the numbers of eggs entrained was similar to that used for larvae (Eq. 7), as stated on 316(b) p. 4.4-1:

> Identical calculations were made for fish eggs, with one exception: fish egg samples included in the analyses were from the intake sampling only. The exclusion of discharge samples was necessary because of probable contamination of these samples by fish decomposition at the intake and sluiceway baskets and by the spawning of certain species in the discharge canal.

Table 21. Percentage composition by taxon of fish larvae entrained annually.

| Taxon | Composition of entrained larvae (percent) |
|---|---|
| Clupeidae | 43.6 |
| Smelt | 3.4 |
| Northern pike | <0.1 |
| Goldfish | 1.5 |
| Carp | 2.3 |
| Emerald shiner | 0.8 |
| Spottail shiner | <0.1 |
| White sucker | <0.1 |
| Channel catfish | 3.5 |
| Brindled madtom | <0.1 |
| Brook silverside | <0.1 |
| Trout-perch | 0.1 |
| White bass | 1.8 |
| *Lepomis* sp. | <0.1 |
| Yellow perch | 23.9 |
| Walleye | 1.8 |
| Logperch | 0.2 |
| Freshwater drum | 8.8 |
| Unidentified | 8.1 |

Table 22. Sampling errors for annual fish larvae entrainment estimates, expressed as percentages of those estimates. Sampling error = absolute value of $ts_v$ at P = 0.05 significance level, where t = Student's t-statistic, $s_v$ = standard error.

| Taxon | Sampling error (percent) |
|---|---|
| Clupeidae | 29 |
| Smelt | 78 |
| Northern pike | 135 |
| Goldfish | 76 |
| Carp | 47 |
| Emerald shiner | 91 |
| Spottail shiner | 200 |
| White sucker | 200 |
| Channel catfish | 35 |
| Brindled madtom | 200 |
| Brook silverside | 200 |
| Trout-perch | 95 |
| White bass | 59 |
| *Lepomis* sp. | 142 |
| Logperch | 85 |
| Yellow perch | 64 |
| Walleye | 71 |
| Freshwater drum | 80 |
| Unidentified | 59 |
| Total larvae | 22 |

Table 23. Correlation matrices for daily estimates of fish larvae entrained vs. intake flow components based on counts from Detroit Edison's daily entrainment data sheets [transformed by $\log_{10}(x + 1)$]. LARV = larval entrainment estimate, RFLOW = river flow, LKCOMP = lake component of intake flow.

CORRELATION MATRIX 1 SPEC 900 LARVAE - ALL SPECIES COMBINED

N= 180 DF= 178 R .0500= .1463 R .0100= .1915

| VARIABLE | 3. LARV | 4. RFLOW | 5. LKCOMP |
|---|---|---|---|
| 3.LARV | 1.0000 | | |
| 4.RFLOW | -.0491 | 1.0000 | |
| 5.LKCOMP | .1602 | -.8901 | 1.0000 |

CORRELATION MATRIX 2 SPEC 801 YELLOW PERCH

N= 180 DF= 178 R .0500= .1463 R .0100= .1915

| VARIABLE | 3. LARV | 4. RFLOW | 5. LKCOMP |
|---|---|---|---|
| 3.LARV | 1.0000 | | |
| 4.RFLOW | -.0293 | 1.0000 | |
| 5.LKCOMP | .0768 | -.8901 | 1.0000 |

CORRELATION MATRIX 3 SPEC 119 CATFISH

N= 180 DF= 178 R .0500= .1463 R .0100= .1915

| VARIABLE | 3. LARV | 4. RFLOW | 5. LKCOMP |
|---|---|---|---|
| 3.LARV | 1.0000 | | |
| 4.RFLOW | -.0258 | 1.0000 | |
| 5.LKCOMP | .0761 | -.8901 | 1.0000 |

CORRELATION MATRIX 4 SPEC 134 FRESHWATER DRUM

N= 180 DF= 178 R .0500= .1463 R .0100= .1915

| VARIABLE | 3. LARV | 4. RFLOW | 5. LKCOMP |
|---|---|---|---|
| 3.LARV | 1.0000 | | |
| 4.RFLOW | -.0160 | 1.0000 | |
| 5.LKCOMP | .0926 | -.8901 | 1.0000 |

CORRELATION MATRIX 5 SMELT

N= 180 DF= 178 R .0500= .1463 R .0100= .1915

| VARIABLE | 3. LARV | 4. RFLOW | 5. LKCOMP |
|---|---|---|---|
| 3.LARV | 1.0000 | | |
| 4.RFLOW | .0087 | 1.0000 | |
| 5.LKCOMP | .0288 | -.8901 | 1.0000 |

CORRELATION MATRIX 6 SPEC 108 CLUPEID

N= 180 DF= 178 R .0500= .1463 R .0100= .1915

| VARIABLE | 3. LARV | 4. RFLOW | 5. LKCOMP |
|---|---|---|---|
| 3.LARV | 1.0000 | | |
| 4.RFLOW | -.0460 | 1.0000 | |
| 5.LKCOMP | .1527 | -.8901 | 1.0000 |

In many cases, the estimates of the numbers of eggs entrained (Table 19), as calculated in the present report from the daily entrainment data sheets by the method described in the above 316(b) excerpt, differ considerably from the estimates in Table 4.4-2 of the 316(b). For example, as shown in Table 24, the estimate for the last week in June is three times the 316(b) estimates and the estimate of annual egg entrainment (27.5 million eggs) is more than twice the 316(b) estimate (13.1 million eggs)[8/]. The disagreement between the two estimates has been traced to an apparent error in the sample volume used by Detroit Edison to calculate mean egg density in the intake water. Detroit Edison conducted entrainment sampling in both the intake and discharge canals (refer to Section III-A-2), but because of concern that spawning in the discharge canal might have contaminated the discharge samples, only samples from the intake canal were used in estimating egg entrainment (refer to above excerpt from p. 4.4-1). The data in Table 25 suggest, however, that Detroit Edison calculated mean egg density by dividing the number of eggs found in samples from the intake stations by the volume of water collected at all stations (intake plus discharge stations). When entrainment is computed in this manner, the results obtained correspond closely to those presented in the 316(b), as shown by the examples in Table 25. The 316(b) estimates are thus serious underestimates of egg entrainment. For the weeks when the estimates are fairly similar, no data were collected at the discharge stations, and the error did not occur.

Detroit Edison's assumption that the entrainment samples collected at the head of the discharge canal were contaminated by spawning in the discharge canal does not seem to be supported by the Monroe data base. Although ripe, spawning, and spent fish and large numbers of fish larvae have been observed in the upper discharge canal (Cole 1976; Nelson 1975), none have been reported for the overflow canal upstream from the point where the discharge entrainment samples were taken (refer to discussion of sampling locations in Section III-A-2).

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8/ Estimates are based on Detroit Edison's untransformed counts in order to verify the 316(b) estimates. Egg entrainment estimates based on the counts transformed by $\log_{10}$ (x + 1) are presented in Appendix E, Table E-2.

Table 24. Comparison of weekly and annual estimates of entrainment of fish eggs as shown in Table 4.4-2 of 316(b) and Table 19 of the present report. N.S. = no sampling.

| SAMPLING WEEK | | Number of fish larvae entrained: 316(b) | Number of fish larvae entrained: Present report ± sampling error |
|---|---|---|---|
| April | 06-12 | 0 | 0 |
| | 13-19 | 0 | 0 |
| | 20-26 | 0 | 0 |
| | 27-03 | 0 | 0 |
| May | 04-10 | 276,847 | 692,023± 6,996,778 |
| | 11-17 | 109,051 | 344,851± 713,163 |
| | 18-24 | 123,611 | 366,304± 887,678 |
| | 25-31 | 0 | 0 |
| June | 01-07 | 2,828,274 | 8,435,186±18,979,478 |
| | 08-14 | 0 | 0 |
| | 15-21 | 0 | 0 |
| | 22-28 | 0 | 0 |
| | 29-05 | 4,180,309 | 12,539,198±53,956,157 |
| July | 06-12 | 0 | 0 |
| | 13-19 | 0 | 0 |
| | 20-26 | 0 | 0 |
| | 27-02 | 0 | 0 |
| Aug. | 03-09 | 0 | 0 |
| | 10-16 | 0 | 0 |
| | 17-23 | 0 | 0 |
| | 24-30 | 0 | 0 |
| | 31-06 | 0 | 0 |
| Sept. | 07-13 | 0 | 0 |
| | 14-20 | 0 | 0 |
| | 21-27 | 0 | 0 |
| | 28-04 | 0 | 0 |
| Oct. | 05-11 | 0 | 0 |
| | 12-18 | 0 | 0 |
| | 19-25 | 0 | 0 |
| | 26-01 | 0 | 0 |
| Nov. | 02-08 | 0 | 0 |
| | 09-15 | 0 | 0 |
| | 16-22 | 0 | 0 |
| | 23-29 | 0 | 0 |
| | 30-06 | 0 | 0 |
| Dec. | 07-13 | N.S. | - |
| | 14-20 | 0 | 0 |
| | 21-27 | 0 | 0 |
| | 28-03 | 0 | 0 |
| Jan. | 04-10 | 0 | 0 |
| | 11-17 | 10,413 | 10,798± 11,547 |
| | 18-24 | 16,399 | 16,739± 33,494 |
| | 25-31 | 8,878 | 9,194± 19,124 |
| Feb. | 01-07 | 0 | 0 |
| | 08-14 | 16,740 | 17,358± 34,734 |
| | 15-21 | N.S. | - |
| | 22-28 | 0 | 0 |
| | 29-06 | 0 | 0 |
| March | 07-13 | 0 | 0 |
| | 14-20 | 4,684,200 | 4,543,539± 9,089,534 |
| | 21-27 | 0 | 0 |
| | 28-03 | 58,990 | 45,850± 84,400 |
| April | 04-10 | 65,573 | 65,100± 103,558 |
| | 11-17 | 0 | 0 |
| | 18-24 | 0 | 0 |
| | 25-01 | 295,604 | 433,174± 523,663 |
| May | 02-08 | 5,507 | 2,256± 4,515 |
| | 09-15 | 788,633 | 1,043,480± 1,637,693 |
| Total | | 13,469,029 | 28,565,050±29,315,412 |
| Last 52 weeks | | 13,083,131 | 27,528,176±29,291,263 |

Table 25. Examples comparing egg entrainment estimates calculated in the present report with those calculated in the 316(b). Estimates were calculated using the equation below*, where sample volume is intake volume only ($V_I$) or intake volume plus discharge volume ($V_{I+D}$).

| Week of (1975) | Number of eggs collected at intake | Number of stations sampled: Intake | Number of stations sampled: Discharge | Volume sampled per station | Plant flow as calculated in present report ($ft^3$/week) | Egg entrainment estimates: Present report using $V_I$ | Egg entrainment estimates: Present report using $V_{I+D}$ | Egg entrainment estimates: 316(b) |
|---|---|---|---|---|---|---|---|---|
| May 4-10 | 62 | 2 | 3 | 530 liter/min (26,953.2 $ft^3$/day) | 601,685,280 | 692,023 | 276,809 | 276,847 |
| May 18-24 | 60 | 4 | 8 | " | 658,203,840 | 366,304 | 122,101 | 123,611 |
| June 1-7 | 645 | 4 | 8 | " | 1,409,955,120 | 8,435,186 | 2,811,729 | 2,828,274 |

$$^{*}\ \frac{\text{Number of eggs entrained}}{\text{week}} = \frac{\text{Number of eggs collected at intake stations}}{\text{Sample volume}} \times \text{plant flow for week} \qquad (8)$$

where sample volume = number of stations sampled X volume sampled per station

The ANOVA conducted to compare the total numbers of eggs collected at the intake and discharge stations showed more eggs at the discharge than at the intake, with the difference significant at P = 0.06 but not at P = 0.05 (refer to Section III-A-3 and Table 17). The data presented in Table 26 as average numbers of eggs collected for each station at the intake and discharge demonstrate the greater numbers of eggs found at the discharge stations. If spawning occurred in the discharge canal, however, eggs should have been collected when the temperature of the water in the discharge canal was within the range for spawning of the given species and that spawning temperature would occur earlier in the discharge canal than in the intake canal. Clupeid eggs, however, were not found earlier at the discharge (Table 26). When they did appear in the discharge collections the water temperatures were 83-89°F, which are above the maximum spawning temperatures for either alewife (82°F) or gizzard shad (73°F), while intake temperatures during this period were within the normal spawning range for these species (Edsall 1970; Bodola 1966). Smelt and yellow perch eggs were collected first in the discharge; however, water temperatures in the discharge canal were 80°F and above, while maximum spawning temperatures for perch and smelt are approximately 55°F and 65°F, respectively (Cole 1976; MWRC 1975a; Scott and Crossman 1973). The intake temperatures listed in Table 26 for 1975 were also above the maximum spawning temperature for perch and in late May were also above that for smelt. Intake temperatures, however, may have been measured at a point where warmer river water had mixed with lake water from which the perch and smelt eggs would have originated.

Although some species undoubtedly spawned in some portions of the discharge canal downstream from the discharge sampling locations, the evidence in Table 26 suggests that the eggs observed in the discharge samples are not the result of spawning upstream from the sampling points. More eggs may have been collected at the discharge stations because the water mass at the sampling stations in the discharge canal was more thoroughly mixed and therefore a greater portion of the entrained eggs was in the upper 3 m of the water column where they could be collected (refer to Section III-A-2). If the samples taken at the head of the discharge canal

Table 26. Number of eggs collected per station at intake (I) and discharge (D), from Detroit Edison's daily entrainment data sheets. Dashes = temperature not reported in Table 3.3-1.

| Date | Water temperature (°F) | | Number of eggs | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Clupeids | | Yellow perch | | Smelt | |
| | I[a] | D[b] | I | D | I | D | I | D |
| 1975 | | | | | | | | |
| May 1 | 56 | 80 | 0 | 0 | 0 | 0 | 0 | 2400 |
| 6 | - | - | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 62 | 87 | 0 | 0 | 0 | 0 | 47 | 230 |
| 13 | - | - | 6 | 0 | 0 | 4 | 0 | 0 |
| 14 | - | - | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | - | - | 24 | 0 | 0 | 0 | 0 | 0 |
| 16 | 63 | 83 | 0 | 0 | 0 | 171 | 0 | 243 |
| 20 | 64 | 84 | 0 | 270 | 0 | 143 | 0 | 0 |
| 21 | 64 | 87 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | 64 | 89 | 0 | 867 | 42 | 170 | 0 | 0 |
| 23 | 64 | 89 | 18 | 7 | 0 | 0 | 0 | 0 |
| 28 | 70 | 83 | 0 | 317 | 0 | 120 | 0 | 0 |
| 29 | 72 | 85 | 0 | 19 | 0 | 0 | 0 | 0 |
| 30 | 73 | 86 | 0 | 105 | 0 | 2 | 0 | 0 |
| June 3 | 69 | 81 | 321 | 0 | 0 | 205 | 0 | 825 |
| 4 | 69 | 83 | 324 | 270 | 0 | 240 | 0 | 0 |
| 5 | 70 | 83 | 0 | 310 | 0 | 392 | 0 | 0 |
| 1976 | | | | | | | | |
| April 30 | 54 | 71 | 0 | 0 | 0 | 0 | 0 | 270 |
| May 4 | 56 | 77 | 0 | 0 | 0 | 0 | 0 | 675 |

[a] From Table 3.3-1

[b] Discharge temperatures are actually temperatures at the condenser outlet. Figures 3.7-4 through 3.7-6 of the Thermal Discharge Demonstration for the Monroe plant (Detroit Edison 1976b) show that there is little temperature decay between the point of condenser outlet and the sampling locations at the head of the discharge canal.

(see Figure 4.4-1 on p. 42 ) were used in addition to those taken at the intake stations in order to calculate egg entrainment, the annual estimate for total egg entrainment would increase from 27.5 million to 96.9 million. The larger number of eggs in the discharge may have also been due, in part, to decomposition of fish in the screenwells as mentioned on p. 4.4-1 of the 316(b) and to the release of eggs from impinged fish.

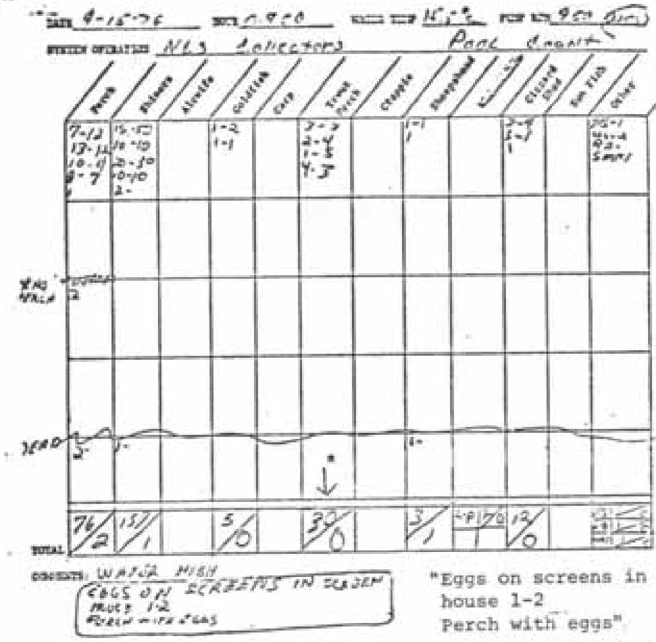
b. Statistical analysis of egg entrainment estimates. Of the approximately 27.5 million fish eggs entrained during May 1975-May 1976, about 18.7 million or 68% of the total were not identified taxonomically (Tables 19 and 27). One large group of unidentified eggs (about 4.7 million) were entrained during January-March 1976 (Table 19) and, as indicated in the 316(b), may have been the eggs of burbot, smelt, or walleyes. A second, larger group of unidentified eggs (about 12.5 million) was entrained during the last week of June 1975 (Table 19); many of these may have been the eggs of freshwater drum. Although no drum eggs were identified, approximately 9% of the entrained larvae were drum (Table 21), suggesting that drum eggs may have been present in the Monroe area. Because drum eggs are buoyant (Davis 1959), they are probably quite vulnerable to entrainment and to capture by the sampling methods used by Detroit Edison.

Based on calculations from Detroit Edison's daily entrainment data sheets, 31% of the annual total number of eggs entrained were identified as clupeid eggs (Table 27). Yellow perch eggs comprised only 1% of the total and were collected at the intake on only 1 day (May 22, 1975) during the sampling period (Table 19; 316(b) Table 4.4-2). Because perch eggs are demersal and embedded in large, gelatinous masses that help anchor them to the substrate, none were likely to be in the upper 3 m of water where the intake samples were collected. However, several notations on the test screenwell tally sheets (for April 1976) indicate that ripe perch and eggs (presumably yellow perch) were found on the traveling screens and in the collecting pool (see examples in Table 28). Entrainment of perch eggs could probably be estimated from the number of egg masses impinged on the intake screens.

Table 27. Percentage composition by taxon of fish eggs entrained annually.

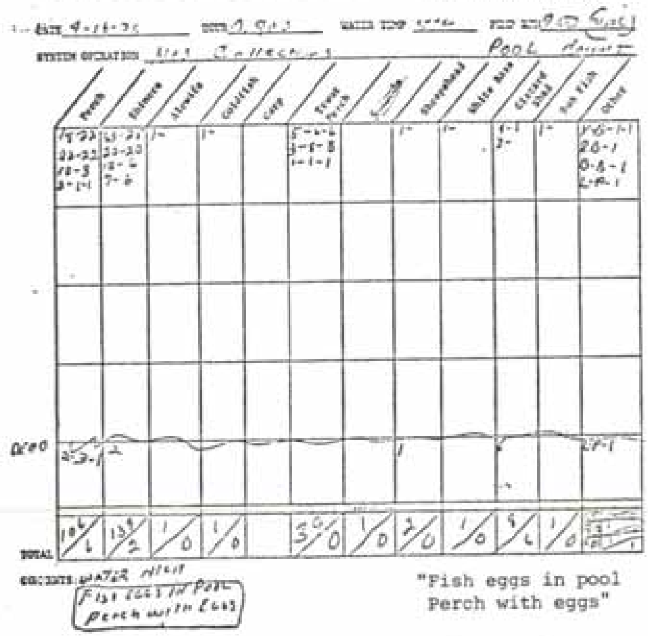
| Taxon | Composition of eggs entrained (percent) |
|---|---|
| Clupeidae | 31.0 |
| Carp | <0.1 |
| Burbot | 0.1 |
| Yellow perch | 0.9 |
| Unidentified | 67.9 |

Table 28. Examples of Detroit Edison's test screenwell tally sheets showing eggs observed on test screens and in holding pool. * = correction made by GLFL.




*Total = 28, not 30

"Eggs on screens in screen house 1-2
Perch with eggs"




"Fish eggs in pool
Perch with eggs"

All of the 95% CI's for the weekly entrainment estimates for total fish eggs (refer to Tables 19 and 24) and for the annual estimates for each taxon (Table 29) include zero and do not meet the EPA (1977) criterion of a maximum sampling error of 50%. The great variability in the estimates of weekly numbers of eggs entrained is further illustrated by Figure 12. These measures of precision are based on Detroit Edison's data which are subject to a degree of error due to the limitations of the collection methods (see Section III-A).

Correlation analyses conducted to compare daily estimates of total egg entrainment [based on $\log_{10}(x + 1)$ transformation] with the river and lake components of intake flow showed no significant correlations with either component ($P = 0.05$).

3. Macrozoobenthos

a. Verification of 316(b) estimates. The 316(b) presents daily estimates only for the period of April-September 1975 (Table 4.4-3). The method used by Detroit Edison to calculate the estimates apparently was similar to that used for fish larvae (Eq. 7), except it was based on daily, instead of weekly, counts. In most cases, the estimates, based on the counts from the daily entrainment data sheets, agree closely with the 316(b) estimates (Table 30). Both sets of estimates, however, are subject to the limitations of the sampling methods discussed in Section III-A. The greatest number of discrepancies between our estimates and those of the 316(b) occurs in the estimates for chironomids, where only 74% of our daily estimates are within 5% of the 316(b) estimates. The remaining estimates are up to 136% higher than the 316(b) estimates. Also, in some cases where Detroit Edison shows that no organisms were entrained, the daily entrainment data sheets revealed that organisms actually were collected in the entrainment samples (refer to Table 30, August 12-13).

The 316(b) presents no monthly or annual estimates for the entrainment of macrozoobenthos. These estimates were calculated for 1975-76 (Table 31) using the following equation:

$$\frac{\text{Sum of daily estimates/month}}{\text{Number of sampling days/month}} \times \text{Number of days in month} = \frac{\text{Number entrained}}{\text{month}} \quad (9)$$

Table 29. Sampling errors for annual fish egg entrainment estimates, expressed as percentages of those estimates. Sampling error = absolute value of $ts_v$ at $P = 0.05$ significance level, where $t$ = Student's t-statistic, $s_v$ = standard error.

| Taxon | Sampling error (percent) |
|---|---|
| Clupeidae | 136 |
| Carp | 200 |
| Burbot | 200 |
| Yellow perch | 200 |
| Unidentified | 143 |
| Total eggs | 106 |

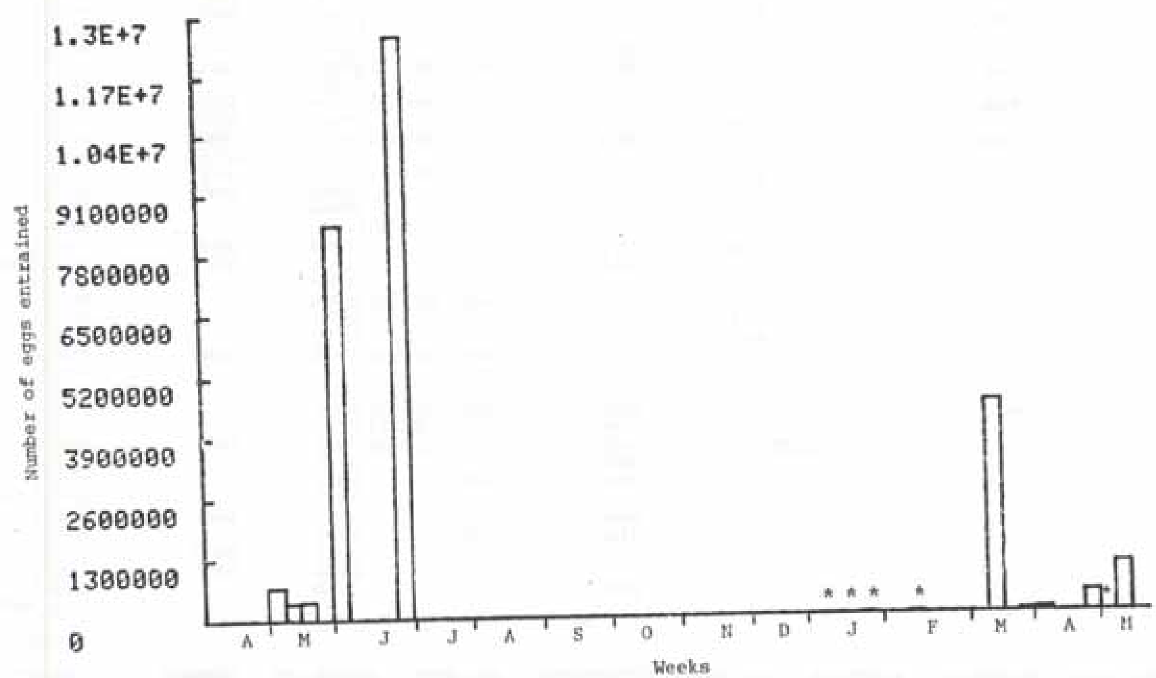



Figure 12. Entrainment of fish eggs (all species combined) by week for April 1975–May 1976, as calculated from Detroit Edison's daily entrainment data sheets. * = < 20,000. No sampling was conducted during the weeks of December 7 and February 15.

Table 30. Comparison of Detroit Edison's 24-h estimates of macrozoobenthos entrainment at the Monroe Power Plant (as presented in Table 4.4-3 of the 316(b)) with 24-h estimates from the present report. Numbers in parentheses are estimates from the present report which differ by 5% or more from the 316(b) estimates; the remaining estimates differ from the 316(b) estimates by less than 5%.

| Period | Gammarus | Chironomidae | Chaoborus | Ephemeroptera | Stenonema | Gastropoda | Hydropsyche | Simuliidae | Others ** |
|---|---|---|---|---|---|---|---|---|---|
| 1975 | | | | | | | | | |
| Apr. 10-11 | | | | | | | 4781 | | 4781 |
| 14-15 | | 124327 | | 9562 | | | | | 4781 |
| 21-22 | 4781 | 124327 | | | | | | | 4781 |
| 24-25 | 10356 | 69906 | | | 10356 | | | | 12945 |
| 29-30 | | 27108 | 1594 | 7973 | 19135 | | | | 9567 |
| 30-May 01 | 5575 | 4181 | | 1393 | 19512 | | | | 2787 |
| May 05-06 | | 6378 | | | 6378 | | | | 1594 |
| 06-07 | | 27636 | 1062. | 1062 | 7440 | | 6377 | | 2125 |
| 12-13 | | 65345 | | 3187 | 7968 | | | | 9561 |
| 13-14 | 1593 | 27092 (41437) | | 6374 | 3187 (4781) | | | | 1593 |
| 14-15 | | 138666 (162559) | | 9562 | 9562 | | | | 7172 |
| 15-16 | | 90557 (97036) | 2658 | 2658 | 9304 | | 2658 | | 3987 |
| 19-20 | | 130256 (164828) | | | 1329 | | | | |
| 20-21 | | 54991 | 1195 | | | | | | 5976 |
| 21-22 | 1062 | 107364 (127570) | 3188 | | | | | | 2125 |
| 22-23 | | 52085 | | 1062 | 1062 | | | | 2125 |
| 27-28 | | 191205 | 4248 | 2124 | 2124 | | | | |
| 28-29 | | 801067 (844391) | 1858 | | | | | | |
| 29-30 | | 479881 | | | | | | | 6904 |
| June 02-03 | 4248 | 367541 | | 2124 | | | | | 2124 |
| 03-04 | 2256 | 279856 | | 2256 | 9027 | | | | 2256 |
| 04-05 | | 82313 (90331) | | | | | | | 10520 |
| 05-06 | | 409025 | | | | | | | |
| 09-10 | 5842 | 148999 | | | 5842 | | | | 2921 |
| 10-11 | 37978 | 163612 (187070) | | | 11685 | | | | 14607 |
| 11-12 | 14607 | 90564 | | | | | | | |
| 12-13 | 3053 | 174083 (198592) | | (6111) | | | (6111) | | 9161 |
| 16-17 | 8764 | 277554 | | | 5842 | | | | 2921 |
| 17-18 | 18585 | 103553 (244426) | | | | | 2655 | | 5310 |
| 18-19 | | 35845 | | | | | | | 7965 |
| 19-20 | 14335 | 90800 (121922) | 2389 | 7167 | | | 4778 | | 14335 |
| 23-24 | 26292 | 470381 | | 2921 | | | | | 2921 (5846) |
| 24-25 | 2921 | 117040 | | | | | | | 23371 |
| 25-26 | 40900 | 146083 | | | 5842 | | 5842 | | 14607 |
| 26-27 | 5842 | 93491 | | | | | | | 11685 |
| 30-July 01 | 6371 | 136976 (184871) | | | | | | | 19114 (22311) |
| July 01-02 | 3185 | 223019 | | | 3185 | | | | 12743 |
| 02-03 | 15929 | 137002 (146622) | | 3185 | | | 6371 | | 28672 |
| 07-08 | 15938 | 736405 | | | | 6375 | 9563 | | 31877 |
| 08-09 | | 366387 | | | | | | | 31858 |

| Period | Gammarus | Chironomidae | Chaoborus | Ephemeroptera | Stenonema | Gastropoda | Hydropsyche | Simuliidae | Others |
|---|---|---|---|---|---|---|---|---|---|
| July 09-10 | 12743 | (458991) | | | 6371 | | | | 12743 |
| 10-11 | | 143378 | | | | 19115 | | | 9557 |
| 14-15 | 29214 | 403189 | 5842 (8769) | 2921 | | 8764 (2923) | | | 8764 (15408) |
| 15-16 | 12215 | 1017007 | | | 3053 | 3053 | | | 15269 |
| 16-17 | 3185 | 286741 | | 3185 | | 12743 | | | 6371 |
| 17-18 | 6371 | 38229 (86061) | | | | 12743 | 3185 | | |
| 21-22 | 15269 | 867355 | | | | 18323 | | | 6107 |
| 22-23 | 14607 | 575564 | 26292 | | | | | | 8764 |
| 23-24 | 20450 | 969976 | 37978 | 2921 | | 2921 | 32135 | | 11685 |
| 24-25 | 23371 | 388575 | | | | | 26292 | | 17528 |
| 28-29 | 28672 | 917570 | 22300 | | | 6371 | 9557 | | 12743 |
| 29-30 | | 63716 | | 3185 | | 6371 | | | 3185 |
| 30-31 | 3185 | 245320 | | | | 3185 | | | |
| 31-Aug. 01 | | 57344 | | | | | 6371 | | 15929 |
| Aug. 04-05 | 41415 | 76459 | | 3185 | | 3185 | | | 6371 |
| 05-06 | 52585 | 350599 (372571) | | | | | 4382 | | 4382 |
| 06-07 | 14607 | 87649 | | | | | 17528 | | |
| 07-08 | 32063 | 480986 | 64127 | | | | 27483 | | 4580 |
| 11-12 | 5310 | 63727 | 2655 | | | 2655 | 7965 | | 7965 |
| 12-13 | (2657) | (579183) | (130154) | | | (10627) | (5314) | | |
| 13-14 | 3982 | 87623 | 3982 | | | 7965 | | | 3982 |
| 14-15 | | 106208 (143467) | 2655 | | | 26550 | 18585 | | 2655 |
| 18-19 | 2921 | 81806 (102304) | 2921 | | | 2921 | 2921 | | 5842 |
| 19-20 | 14607 | 113942 | 20450 | | | 20450 | | | 2921 |
| 20-21 | | 97730 (103879) | 79406 | | | 6107 | 9161 | 3053 | 3053 |
| 21-22 | 3185 | 159303 | 28672 | | | 6371 | 12743 | | |
| 25-26 | 12743 | 175232 | 28672 | | | 6371 | 6371 | | 12743 |
| 26-27 | 9557 | 152925 (258183) | 12743 | | | 6371 | | | |
| 27-28 | 3185 | 175225 | 15929 | | 3185 | 25486 | 6371 | | 6371 |
| 28-29 | | 213461 | 6371 | 3185 | | 12743 | | | 3185 |
| Sept. 02-03 | 9557 | 76652 (111560) | 3185 | 31858 | | 12743 | 6371 | | 9557 |
| 03-04 | 267641 | 492271 | | 28673 | | | 28673 | | 109916 |
| 04-05 | | 101952 | | | 3185 | | 12743 | | 15929 |
| 08-09 | | 159296 | 3185 | | | 3185 | 6371 | | 6371 (3187) |
| 09-10 | 3185 | 289927 | | | | 6371 | | | 6371 |
| 10-11 | | 116053 | | | | 6107 | (6110) | | 9161 |
| 11-12 | | 116053 | 12215 | | 3053 | | 9161 | | 6107 |
| 15-16 | | 181141 | 2921 | 5842 | 2921 | | 26292 | | 2921 |
| 16-17 | 5578 | 136667 | 8367 | | | 2789 | 8367 | | |
| 17-18 | 2655 | 225693 | | | | 5310 | 5310 | | |
| 18-19 | | | | | | | | | |
| 19-20 | 5842 | 163612 | 2921 | | | | 17528 | | 5842 |
| 22-23 | 5842 | 75963 | 5842 | | | 2921 | 5842 | | |
| 23-24 | | 140235 | | | | 5842 | 35057 | | 17528 |

Table 31. Monthly entrainment estimates for macrozoobenthos, May 1975-April 1976, based on counts from Detroit Edison's daily entrainment data sheets. S.E. = standard error, $s_v$; CI = absolute value of $ts_v$.

| | | MAY | JUNE | JULY | AUGUST | SEPT. | OCT. | NOV. | DEC. | JAN. | FEB. | MARCH | APRIL | TOTALS | PC. OF TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | 14 | 16 | 18 | 17 | 16 | 17 | 18 | 9 | 10 | 8 | 11 | 12 | | |
| Tricladida | | 2354. | 0. | 0. | 11384. | 20425. | 44825. | 10851. | 6406. | 2842. | 3732. | 1430. | 0. | 104244. | 0.2 |
| | S.E. | 2354. | 0. | 0. | 8051. | 15918. | 14687. | 6267. | 6406. | 2027. | 2651. | 1430. | 0. | 25159. | |
| | .95 C.I. | 5085. | 0. | 0. | 17069. | 33921. | 31150. | 13224. | 14773. | 4584. | 6270. | 3185. | 0. | 50344. | |
| | .90 C.I. | 4149. | 0. | 0. | 14050. | 27904. | 25646. | 10905. | 11916. | 3715. | 5024. | 2590. | 0. | 42067. | |
| Nematoda | | 0. | 5431. | 0. | 0. | 0. | 3877. | 0. | 0. | 0. | 0. | 0. | 0. | 9356. | <0.1 |
| | S.E. | 0. | 5481. | 0. | 0. | 0. | 3877. | 0. | 0. | 0. | 0. | 0. | 0. | 6713. | |
| | .95 C.I. | 0. | 11679. | 0. | 0. | 0. | 8219. | 0. | 0. | 0. | 0. | 0. | 0. | 13433. | |
| | .90 C.I. | 0. | 9607. | 0. | 0. | 0. | 6769. | 0. | 0. | 0. | 0. | 0. | 0. | 11225. | |
| Bryozoa | | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 2325. | 2324. | <0.1 |
| | S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 2325. | 2325. | |
| | .95 C.I. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 5117. | 4652. | |
| | .90 C.I. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 4175. | 3857. | |
| Oligochaeta | | 0. | 0. | 0. | 0. | 5976. | 0. | 6230. | 1647. | 3047. | 0. | 3235. | 1087. | 21249. | <0.1 |
| | S.E. | 0. | 0. | 0. | 0. | 5976. | 0. | 4478. | 1647. | 2158. | 0. | 2339. | 1087. | 8328. | |
| | .95 C.I. | 0. | 0. | 0. | 0. | 12735. | 0. | 9354. | 3798. | 4881. | 0. | 5212. | 2393. | 16664. | |
| | .90 C.I. | 0. | 0. | 0. | 0. | 10477. | 0. | 7706. | 3063. | 3956. | 0. | 4239. | 1953. | 13924. | |
| Hirudinea | | 22946. | 60782. | 0. | 7267. | 17929. | 2544. | 9742. | 0. | 0. | 1686. | 1123. | 7895. | 131909. | 0.2 |
| | S.E. | 9451. | 35597. | 0. | 7267. | 17929. | 2544. | 5679. | 0. | 0. | 1686. | 1123. | 2440. | 47151. | |
| | .95 C.I. | 20413. | 75773. | 0. | 15406. | 38207. | 5393. | 11984. | 0. | 0. | 3986. | 2502. | 5370. | 84344. | |
| | .90 C.I. | 16737. | 62332. | 0. | 12680. | 31413. | 4441. | 9882. | 0. | 0. | 3194. | 2035. | 4382. | 70476. | |
| Mysis | | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 854. | 853. | <0.1 |
| | S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 854. | 854. | |
| | .95 C.I. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 1877. | 1730. | |
| | .90 C.I. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 1533. | 1428. | |
| Anostraca | | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 2047. | 0. | 0. | 2046. | <0.1 |
| | S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 2047. | 0. | 0. | 2047. | |
| | .95 C.I. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 4840. | 0. | 0. | 4335. | |
| | .90 C.I. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 3878. | 0. | 0. | 3422. | |
| Argulus | | 0. | 0. | 5483. | 0. | 5727. | 11145. | 0. | 6406. | 2472. | 0. | 0. | 0. | 31240. | 0.1 |
| | S.E. | 0. | 0. | 5489. | 0. | 5727. | 8663. | 0. | 6406. | 1648. | 0. | 0. | 0. | 13354. | |
| | .95 C.I. | 0. | 0. | 11583. | 0. | 12203. | 17942. | 0. | 14773. | 3728. | 0. | 0. | 0. | 25722. | |
| | .90 C.I. | 0. | 0. | 9557. | 0. | 10342. | 14777. | 0. | 11916. | 3021. | 0. | 0. | 0. | 22378. | |
| Isopoda | | 0. | 0. | 0. | 17637. | 5481. | 8230. | 2656. | 1647. | 0. | 0. | 2777. | 747. | 38977. | 0.1 |
| | S.E. | 0. | 0. | 0. | 12997. | 5481. | 5835. | 2656. | 1647. | 0. | 0. | 1964. | 747. | 15722. | |
| | .95 C.I. | 0. | 0. | 0. | 27553. | 11679. | 12370. | 5605. | 3798. | 0. | 0. | 4177. | 1644. | 31463. | |
| | .90 C.I. | 0. | 0. | 0. | 22693. | 9697. | 10188. | 4672. | 3063. | 0. | 0. | 3560. | 1342. | 26279. | |
| Amphipoda | | 0. | 0. | 0. | 0. | 0. | 2544. | 0. | 0. | 0. | 0. | 0. | 0. | 2543. | <0.1 |
| | S.E. | 0. | 0. | 0. | 0. | 0. | 2544. | 0. | 0. | 0. | 0. | 0. | 0. | 2544. | |
| | .95 C.I. | 0. | 0. | 0. | 0. | 0. | 5393. | 0. | 0. | 0. | 0. | 0. | 0. | 5393. | |
| | .90 C.I. | 0. | 0. | 0. | 0. | 0. | 4441. | 0. | 0. | 0. | 0. | 0. | 0. | 4253. | |
| Gammarus | | 18238. | 348249. | 363061. | 362711. | 610123. | 156876. | 113585. | 67267. | 42165. | 108082. | 51409. | 17502. | 2259262. | 4.1 |
| | S.E. | 13063. | 92294. | 94707. | 131691. | 467410. | 23317. | 24613. | 19234. | 8029. | 28536. | 12110. | 4655. | 506022. | |
| | .95 C.I. | 28216. | 196679. | 200043. | 279185. | 996050. | 49437. | 51933. | 44355. | 18161. | 67407. | 27033. | 10247. | 1012553. | |
| | .90 C.I. | 23134. | 161792. | 164364. | 229933. | 819369. | 40711. | 42827. | 35776. | 14716. | 54076. | 21958. | 8361. | 846069. | |
| Pontoporeia | | 0. | 0. | 15102. | 0. | 0. | 0. | 5977. | 1647. | 1806. | 0. | 0. | 0. | 24323. | <0.1 |
| | S.E. | 0. | 0. | 15102. | 0. | 0. | 0. | 5977. | 1647. | 1806. | 0. | 0. | 0. | 16404. | |
| | .95 C.I. | 0. | 0. | 31865. | 0. | 0. | 0. | 12611. | 3798. | 3633. | 0. | 0. | 0. | 32824. | |
| | .90 C.I. | 0. | 0. | 26278. | 0. | 0. | 0. | 10399. | 3063. | 2944. | 0. | 0. | 0. | 27427. | |
| Decapoda | | 0. | 14945. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 14944. | <0.1 |
| | S.E. | 0. | 9628. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 9628. | |
| | .95 C.I. | 0. | 18337. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 17265. | |
| | .90 C.I. | 0. | 15124. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 14426. | |
| Acarina | | 0. | 38364. | 75714. | 11625. | 8965. | 7269. | 0. | 0. | 0. | 0. | 0. | 0. | 141934. | 0.3 |
| | S.E. | 0. | 30519. | 31263. | 11625. | 8965. | 5151. | 0. | 0. | 0. | 0. | 0. | 0. | 46374. | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .95 C.I. | 0. | 65327. | 65966. | 24645. | 19104. | 10920. | 0. | 0. | 0. | 0. | 0. | 0. | 92795. | |
| .90 C.I. | 0. | 53492. | 54198. | 20297. | 15715. | 8994. | 0. | 0. | 0. | 0. | 0. | 0. | 77538. | |
| Diptera (unid.) | 0. | 4234. | 23737. | 5812. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 33782. | 0.1 |
| S.E. | 0. | 4234. | 15615. | 5812. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 17141. | |
| .95 C.I. | 0. | 8024. | 32947. | 12372. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 34399. | |
| .90 C.I. | 0. | 7423. | 27169. | 10148. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 28743. | |
| Ceratopogonidae | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 2233. | 2994. | 0. | 5226. | <0.1 |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 2233. | 1981. | 0. | 2985. | |
| .95 C.I. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 5280. | 4413. | 0. | 5372. | |
| .90 C.I. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 4231. | 3589. | 0. | 4990. | |
| Chironomidae | 5136901. | 4176604. | 14086688. | 5071365. | 5077658. | 1059279. | 217520. | 404026. | 280696. | 1206065. | 1808138. | 1252122. | 42672064. | 76.7 |
| S.E. | 1308043. | 790870. | 2429022. | 1367868. | 594324. | 146396. | 32743. | 45987. | 33597. | 193409. | 136253. | 69881. | 3247689. | |
| .95 C.I. | 2825372. | 1685344. | 5125235. | 2899879. | 1266504. | 310359. | 69088. | 106046. | 75996. | 457413. | 303573. | 153809. | 6498623. | |
| .90 C.I. | 2316544. | 1386395. | 4226497. | 2388296. | 1041849. | 255607. | 56973. | 85536. | 61583. | 366511. | 246891. | 125507. | 5430135. | |
| Chaoborus | 31685. | 4482. | 164277. | 741930. | 77963. | 7995. | 3543. | 46220. | 0. | 0. | 13333. | 13281. | 1110516. | 2.0 |
| S.E. | 12362. | 4482. | 78838. | 257876. | 29814. | 5677. | 3543. | 10877. | 0. | 0. | 5088. | 5616. | 272026. | |
| .95 C.I. | 26702. | 9552. | 166348. | 546698. | 63533. | 12035. | 7477. | 25082. | 0. | 0. | 11337. | 12362. | 544323. | |
| .90 C.I. | 21893. | 7858. | 137178. | 450252. | 52263. | 9912. | 6166. | 20231. | 0. | 0. | 9220. | 10087. | 454927. | |
| Simuliidae | 0. | 0. | 0. | 5571. | 0. | 0. | 0. | 349558. | 15080. | 675736. | 1957043. | 28925. | 3031911. | 5.4 |
| S.E. | 0. | 0. | 0. | 5571. | 0. | 0. | 0. | 73073. | 5519. | 143218. | 187181. | 10102. | 247085. | |
| .95 C.I. | 0. | 0. | 0. | 11811. | 0. | 0. | 0. | 168507. | 12484. | 338710. | 417039. | 22235. | 494418. | |
| .90 C.I. | 0. | 0. | 0. | 9720. | 0. | 0. | 0. | 135916. | 10116. | 271398. | 339171. | 18143. | 413127. | |
| Tabanidae | 0. | 0. | 0. | 0. | 8965. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 8964. | <0.1 |
| S.E. | 0. | 0. | 0. | 0. | 8965. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 8965. | |
| .95 C.I. | 0. | 0. | 0. | 0. | 19134. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 17338. | |
| .90 C.I. | 0. | 0. | 0. | 0. | 15715. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 14939. | |
| Plecoptera | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 6698. | 6551. | 2325. | 15573. | <0.1 |
| S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 3459. | 4354. | 1644. | 5738. | |
| .95 C.I. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 8180. | 9730. | 3618. | 11603. | |
| .90 C.I. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 6555. | 7809. | 2952. | 9695. | |
| Ephemeroptera (unid.) | 24266. | 24160. | 5489. | 0. | 17929. | 0. | 0. | 89243. | 1854. | 199301. | 536517. | 107997. | 1306753. | 2.3 |
| S.E. | 7195. | 13608. | 5489. | 0. | 17929. | 0. | 0. | 27460. | 1854. | 43971. | 74823. | 12222. | 94969. | |
| .95 C.I. | 15541. | 28899. | 11593. | 0. | 38207. | 0. | 0. | 63322. | 4193. | 133872. | 166706. | 26901. | 190073. | |
| .90 C.I. | 12742. | 23855. | 9552. | 0. | 31430. | 0. | 0. | 51075. | 3397. | 83229. | 135580. | 21951. | 158822. | |
| Baetisca | 32943. | 5481. | 5489. | 0. | 0. | 0. | 0. | 0. | 1347. | 0. | 3369. | 4741. | 53368. | 0.1 |
| S.E. | 6766. | 5491. | 5489. | 0. | 0. | 0. | 0. | 0. | 1347. | 0. | 2418. | 2169. | 12222. | |
| .95 C.I. | 18934. | 11679. | 11533. | 0. | 0. | 0. | 0. | 0. | 3048. | 0. | 5387. | 4774. | 24456. | |
| .90 C.I. | 15524. | 9607. | 9557. | 0. | 0. | 0. | 0. | 0. | 2470. | 0. | 4381. | 3896. | 20435. | |
| Caenis | 3529. | 0. | 15558. | 5812. | 97670. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 122516. | 0.2 |
| S.E. | 3529. | 0. | 9390. | 5812. | 50035. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 51269. | |
| .95 C.I. | 7623. | 0. | 16963. | 12322. | 106625. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 102629. | |
| .90 C.I. | 6750. | 0. | 15642. | 10148. | 87711. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 85755. | |
| Hexagenia | 0. | 8965. | 0. | 5812. | 8965. | 0. | 0. | 20595. | 1441. | 15151. | 69449. | 49748. | 183722. | 0.3 |
| S.E. | 0. | 8965. | 0. | 5812. | 8965. | 0. | 0. | 0. | 1441. | 11687. | 11633. | 13019. | 25259. | |
| .95 C.I. | 0. | 19104. | 0. | 12322. | 19104. | 0. | 0. | 0. | 3260. | 27639. | 25918. | 28655. | 50542. | |
| .90 C.I. | 0. | 15715. | 0. | 10148. | 15715. | 0. | 0. | 0. | 2642. | 22146. | 21078. | 23393. | 42232. | |
| Stenonema | 153857. | 71743. | 21730. | 5812. | 17186. | 11388. | 13065. | 120990. | 10442. | 109895. | 257029. | 74670. | 866807. | 1.6 |
| S.E. | 52165. | 26253. | 13355. | 5812. | 9928. | 5314. | 6573. | 15845. | 4390. | 28217. | 33606. | 10102. | 76761. | |
| .95 C.I. | 108356. | 55518. | 28177. | 12322. | 21157. | 11266. | 13869. | 36539. | 9948. | 66733. | 74875. | 23395. | 153598. | |
| .90 C.I. | 88842. | 45670. | 23733. | 13148. | 17404. | 9270. | 11437. | 29472. | 8061. | 53471. | 60595. | 19580. | 128344. | |
| Coleoptera | 25300. | 21318. | 53384. | 18650. | 34368. | 10903. | 3543. | 0. | 0. | 18100. | 15305. | 3033. | 205158. | 0.4 |
| S.E. | 8927. | 10294. | 19302. | 11006. | 20299. | 6295. | 3543. | 0. | 0. | 10252. | 4458. | 1569. | 35651. | |
| .95 C.I. | 19282. | 21336. | 40723. | 23334. | 43256. | 13345. | 7477. | 0. | 0. | 24246. | 9932. | 3453. | 71338. | |
| .90 C.I. | 15809. | 16045. | 33586. | 19217. | 35583. | 10991. | 6166. | 0. | 0. | 19428. | 8077. | 2818. | 59609. | |
| Curculionidae | 16969. | 5481. | 31516. | 15502. | 17682. | 4361. | 11292. | 6865. | 0. | 0. | 3080. | 1162. | 121911. | 0.2 |
| S.E. | 8656. | 5481. | 13174. | 11297. | 13255. | 4361. | 11292. | 6865. | 0. | 0. | 2264. | 1162. | 27984. | |
| .95 C.I. | 18696. | 11679. | 27796. | 23954. | 28266. | 9245. | 23826. | 15830. | 0. | 0. | 5043. | 2559. | 55957. | |
| .90 C.I. | 15379. | 9807. | 22924. | 19728. | 23236. | 7614. | 19648. | 12769. | 0. | 0. | 4102. | 2084. | 46756. | |
| Dytiscidae | 2943. | 0. | 0. | 0. | 8965. | 0. | 0. | 6406. | 0. | 0. | 1347. | 0. | 19660. | <0.1 |
| S.E. | 2943. | 0. | 0. | 0. | 8965. | 0. | 0. | 6406. | 0. | 0. | 1347. | 0. | 11484. | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .95 C.I. | 6358. | 0. | C. | 0. | 19104. | 0. | 0. | 14773. | 0. | 0. | 3002. | 0. | 22980. | |
| | .90 C.I. | 5213. | 0. | 0. | 0. | 15715. | 0. | 0. | 11916. | 0. | 0. | 2442. | 0. | 19231. | |
| Elmidae | | 12355. | 44832. | 25203. | 0. | 68231. | 0. | 0. | 1647. | 0. | 0. | 1123. | 4442. | 157330. | 0.3 |
| | S.E. | 4412. | 22858. | 14417. | 0. | 62992. | 0. | 0. | 1647. | 0. | 0. | 1123. | 2034. | 67692. | |
| | .95 C.I. | 9531. | 48711. | 38850. | 0. | 134235. | 0. | 0. | 3798. | 0. | 0. | 2502. | 4477. | 139454. | |
| | .90 C.I. | 7814. | 40370. | 32037. | 0. | 110474. | 0. | 0. | 3063. | 0. | 0. | 2035. | 3653. | 116526. | |
| Hemiptera | | 3309. | 0. | 21047. | 5812. | 5481. | 4361. | 3764. | 0. | 0. | 0. | 0. | 0. | 43550. | 0.1 |
| | S.E. | 3089. | 0. | 9119. | 5812. | 5481. | 4361. | 3764. | 0. | 0. | 0. | 0. | 0. | 13773. | |
| | .95 C.I. | 6622. | 0. | 19242. | 12322. | 11679. | 9245. | 7942. | 0. | 0. | 0. | 0. | 0. | 27561. | |
| | .90 C.I. | 5470. | 0. | 15860. | 13148. | 9627. | 7614. | 6549. | 0. | 0. | 0. | 0. | 0. | 23029. | |
| Corixidae | | 5003. | 5481. | 38426. | 28580. | 61761. | 14204. | 9740. | 0. | 0. | 6857. | 7486. | 0. | 227533. | 0.4 |
| | S.E. | 3543. | 5481. | 23928. | 15202. | 28617. | 44577. | 7063. | 0. | 0. | 3806. | 3590. | 0. | 61070. | |
| | .95 C.I. | 7654. | 11679. | 50488. | 32229. | 60984. | 94503. | 14903. | 0. | 0. | 9332. | 7999. | 0. | 122231. | |
| | .90 C.I. | 6275. | 9607. | 41635. | 26543. | 50166. | 77831. | 12290. | 0. | 0. | 7213. | 6506. | 0. | 102109. | |
| Hebridae | | 0. | 0. | 42094. | 0. | 5976. | 3392. | 0. | 0. | 0. | 0. | 0. | 0. | 51460. | 0.1 |
| | S.E. | 0. | 0. | 26170. | 0. | 5976. | 3392. | 0. | 0. | 0. | 0. | 0. | 0. | 27057. | |
| | .95 C.I. | 0. | 0. | 55219. | 0. | 12736. | 7192. | 0. | 0. | 0. | 0. | 0. | 0. | 54142. | |
| | .90 C.I. | 0. | 0. | 45536. | 0. | 10477. | 5922. | 0. | 0. | 0. | 0. | 0. | 0. | 45240. | |
| Notonectidae | | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 1441. | 0. | 0. | 0. | 1441. | <0.1 |
| | S.E. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 1441. | 0. | 0. | 0. | 1441. | |
| | .95 C.I. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 3260. | 0. | 0. | 0. | 2884. | |
| | .90 C.I. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 2642. | 0. | 0. | 0. | 2410. | |
| Odonata (unid.) | | 5293. | 10462. | 0. | 0. | 22911. | 7511. | 0. | 0. | 0. | 0. | 3982. | 2574. | 52731. | 0.1 |
| | S.E. | 5293. | 7406. | 0. | 0. | 9811. | 5314. | 0. | 0. | 0. | 0. | 2222. | 1533. | 14651. | |
| | .95 C.I. | 11435. | 15783. | 0. | 0. | 20907. | 11266. | 0. | 0. | 0. | 0. | 4951. | 3375. | 29317. | |
| | .90 C.I. | 9375. | 12943. | 0. | 0. | 17198. | 9278. | 0. | 0. | 0. | 0. | 4027. | 2754. | 24497. | |
| Amphiagrion | | 7649. | 27651. | 49405. | 8357. | 62759. | 3877. | 0. | 0. | 7297. | 13528. | 4211. | 8935. | 193665. | 0.3 |
| | S.E. | 5475. | 14253. | 17359. | 8357. | 21607. | 3877. | 0. | 0. | 3218. | 6869. | 2527. | 3272. | 35921. | |
| | .95 C.I. | 11717. | 30830. | 36520. | 17717. | 46046. | 8213. | 0. | 0. | 7280. | 16246. | 5630. | 7202. | 71879. | |
| | .90 C.I. | 9607. | 31998. | 30205. | 14591. | 37878. | 6769. | 0. | 0. | 5999. | 13017. | 4579. | 5877. | 60061. | |
| Trichoptera (unid.) | | 0. | 0. | 15556. | 15505. | 28395. | 28592. | 0. | 0. | 0. | 0. | 0. | 0. | 89048. | 0.2 |
| | S.E. | 0. | 0. | 11467. | 8961. | 18683. | 8238. | 0. | 0. | 0. | 0. | 0. | 0. | 24228. | |
| | .95 C.I. | 0. | 0. | 25136. | 19296. | 39396. | 17565. | 0. | 0. | 0. | 0. | 0. | 0. | 49882. | |
| | .90 C.I. | 0. | 0. | 19993. | 15645. | 32408. | 14384. | 0. | 0. | 0. | 0. | 0. | 0. | 41660. | |
| Hydropsyche | | 20011. | 36365. | 150086. | 228412. | 459809. | 295441. | 82582. | 12354. | 8210. | 81174. | 32676. | 20525. | 1426659. | 2.6 |
| | S.E. | 7161. | 18884. | 46507. | 70964. | 73914. | 35150. | 19419. | 8790. | 3680. | 16811. | 9837. | 5623. | 123725. | |
| | .95 C.I. | 15467. | 42251. | 98129. | 150443. | 157510. | 74519. | 40975. | 20269. | 8323. | 39757. | 21917. | 12376. | 246572. | |
| | .90 C.I. | 12682. | 33103. | 80922. | 123903. | 129571. | 61372. | 33790. | 16349. | 6745. | 31856. | 17825. | 10097. | 206031. | |
| Gastropoda | | 0. | 0. | 152180. | 251425. | 109936. | 38283. | 59109. | 68070. | 54948. | 27526. | 36573. | 45180. | 853124. | 1.5 |
| | S.E. | 0. | 0. | 47032. | 59489. | 34555. | 12125. | 13108. | 9020. | 12618. | 11252. | 9565. | 9904. | 85879. | |
| | .95 C.I. | 0. | 0. | 58657. | 126117. | 73637. | 25704. | 27658. | 20800. | 28543. | 26611. | 21310. | 21796. | 171845. | |
| | .90 C.I. | 0. | 0. | 73135. | 103868. | 60575. | 21169. | 22808. | 16777. | 23130. | 21322. | 17331. | 17787. | 143590. | |
| Pelecypoda | | 0. | 0. | 5034. | 0. | 5723. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 10762. | <0.1 |
| | S.E. | 0. | 0. | 5034. | 0. | 5723. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 7626. | |
| | .95 C.I. | 0. | 0. | 13622. | 0. | 12208. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 15280. | |
| | .90 C.I. | 0. | 0. | 8759. | 0. | 10042. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 12751. | |
| TOTALS | | 5527120. | 6915669. | 15389356. | 7724783. | 6864403. | 1776912. | 553178. | 1219993. | 434664. | 2478490. | 5121035. | 1656321. | 55654444. | |
| | S.E. | 1339337. | 792212. | 2433070. | 1401688. | 767012. | 161199. | 51192. | 96372. | 38074. | 249402. | 246819. | 75155. | 3376570. | |
| | .95 C.I. | 2808528. | 1694329. | 5113577. | 2957562. | 1627762. | 340108. | 107554. | 217993. | 84828. | 575122. | 543248. | 163764. | 6636336. | |
| | .90 C.I. | 2305741. | 1395423. | 4220342. | 2438939. | 1340599. | 280468. | 88767. | 176650. | 68909. | 463089. | 443286. | 133727. | 5596269. | |

EXECUTION TERMINATED 02 09 37 T=7.22 RC=0 41.54

Estimates, based on counts from Detroit Edison's daily entrainment data sheets, show that 55.6 million organisms were entrained from May 1975-April 1976[9/]. Of these, 77% (42.7 million) were chironomids. Chironomid entrainment was highest in July (14 million) and lowest in November (0.2 million).

Cole (1977) estimated chironomid entrainment at 700,000 a day or 255.5 million a year, which is six times our estimate based on Detroit Edison's data. Cole's estimate is probably higher because he sampled deeper in the water column than Detroit Edison did (refer to Section III-A-2 of this report). Cole states that even his estimate is low because his deepest samples, in which most of the chironomids were collected, were still 2 m or more above the bottom.

b. Statistical analysis of macrozoobenthos entrainment estimates. The annual totals for the most commonly entrained taxa can be estimated with fairly high degrees of precision (Table 32). For example, the sampling error for the total of all species combined is only 12% of the estimate and that for chironomids is 15% of the annual estimate. However, for uncommon organisms, such as Pelecypoda, the 95% CI's include zero (Table 31). These confidence intervals, however, apply only to the population sampled at the 1-m and 3-m depths and, considering the sampling deficiencies discussed in Section III-A, are probably not representative of the entire entrained population.

Correlation analyses were conducted to compare daily estimates of the macrozoobenthos commonly entrained [based on $\log_{10}$ (x + 1) transformation] with the river and lake components of the intake flow (Table 33). Simuliidae (black flies) show a highly significant (P = 0.01) positive correlation with river flow and a highly significant negative correlation with the lake component. This suggests that the black fly larvae, filter feeders which

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[9/] The estimates are based on untransformed data. The estimates based on counts transformed by $\log_{10}$ (x + 1) are presented in Appendix E, Table E-3 and are approximately 30% lower than those based on untransformed data.

Table 32. Sampling errors for annual macrozoobenthos entrainment estimates, expressed as percentages of those estimates. Sampling error = absolute value of $ts_v$, at $P = 0.05$ significance level, where t = Student's t-statistic, $s_v$ = standard error.

| Taxon | Sampling error (percent) |
|---|---|
| *Gammarus* | 44.8 |
| Chironomidae | 15.2 |
| *Chaoborus* | 49.0 |
| Simuliidae | 16.3 |
| Ephemeroptera | 14.5 |
| *Hydropsyche* | 17.3 |
| Total macrozoobenthos | 11.9 |

Table 33. Correlation matrices for daily estimates of macrozoobenthos entrained vs. intake components, based on counts from Detroit Edison's daily entrainment data sheets [transformed by $\log_{10}(x + 1)$]. EST = daily estimate, RFLOW = river flow, LKCOMP = lake component of intake flow.

CORRELATION MATRIX 1 SPEC 205 GAMMARUS

N= 180 DF= 178 R .0500= .1463 R .0100= .1915

| VARIABLE | | | |
|---|---|---|---|
| 2.EST | 1.0000 | | |
| 3.RFLOW | -.0159 | 1.0000 | |
| 4.LKCOMP | .1585 | -.8901 | 1.0000 |
| | 2. EST | 3. RFLOW | 4. LKCOMP |

CORRELATION MATRIX 2 SPEC 412 CHIRONOMIDAE

N= 180 DF= 178 R .0500= .1463 R .0100= .1915

| VARIABLE | | | |
|---|---|---|---|
| 2.EST | 1.0000 | | |
| 3.RFLOW | -.0736 | 1.0000 | |
| 4.LKCOMP | .2998 | -.8901 | 1.0000 |
| | 2. EST | 3. RFLOW | 4. LKCOMP |

CORRELATION MATRIX 3 SPEC 414 SIMULIIDAE

N= 180 DF= 178 R .0500= .1463 R .0100= .1915

| VARIABLE | | | |
|---|---|---|---|
| 2.EST | 1.0000 | | |
| 3.RFLOW | .6363 | 1.0000 | |
| 4.LKCOMP | -.5528 | -.8901 | 1.0000 |
| | 2. EST | 3. RFLOW | 4. LKCOMP |

CORRELATION MATRIX 4 SPEC 471 HYDROPSYCHE

N= 180 DF= 178 R .0500= .1463 R .0100= .1915

| VARIABLE | | | |
|---|---|---|---|
| 2.EST | 1.0000 | | |
| 3.RFLOW | -.1111 | 1.0000 | |
| 4.LKCOMP | .2321 | -.8901 | 1.0000 |
| | 2. EST | 3. RFLOW | 4. LKCOMP |

CORRELATION MATRIX 5 SPEC 900 MACROZOOBENTHOS - ALL SPECIES COMBINED

N= 180 DF= 178 R .0500= .1463 R .0100= .1915

| VARIABLE | | | |
|---|---|---|---|
| 2.EST | 1.0000 | | |
| 3.RFLOW | -.0164 | 1.0000 | |
| 4.LKCOMP | .2410 | -.8921 | 1.0200 |
| | 2. EST | 3. RFLOW | 4. LKCOMP |

anchor themselves to the substrate in areas of strong current (Pennak 1953), became detached from the substrate during periods of high river flow and were thus vulnerable to entrainment. The other taxa examined show significant positive correlations with the lake portion of the intake flow (total macrozoobenthos, chironomids, and Hydropsyche at P = 0.01; Gammarus at P = 0.05). The only surprising result is the highly significant correlation between the lake component of intake flow and the entrainment of the caddisfly Hydropsyche, a genus usually classified as an obligate stream form (Hynes 1970; Wiggins 1977; Borror and DeLong 1964). Detroit Edison did not identify the particular species of Hydropsyche entrained; however, according to Wiggins (1977), one species (H. retrocurva) has been found along the shore of Lake Michigan, and H. retrocurva is possibly the species that was entrained.

4. Zooplankton

The 316(b) presents no data on the entrainment of zooplankton by the Monroe plant. However, Detroit Edison's daily entrainment data sheets indicate that Leptodora was frequently observed in the samples collected from mid-June to mid-October 1975, but no quantitative information is given on the entrainment of any zooplankton species.

The zooplankton present in the vicinity of the Monroe plant (Cole 1976, 1977) and probably entrained are listed in Table 34. Rotifers were 9 of the 12 most abundant taxa listed by Cole (1976). The most recent quantitative density data for the intake site are 1975 estimates from Cole (1977) which show that the zooplankton were composed of 77% rotifers, 12% cladocerans, and 11% copepods (Table 35). These data are in reasonable agreement with 1974 data, presented in Detroit Edison's Thermal Discharge Demonstration for the Monroe Power Plant (Detroit Edison 1976b), which show that the zooplankton was 73% rotifers, 19% copepods, and 8% cladocerans. Although rotifers were numerically dominant in the zooplankton, cladocerans comprised 74% of the biomass (Table 35).

An estimate of the biomass of total zooplankton entrained annually, made on the basis of a mean biomass of 85.5 μg/l at the plant intake (Table 35) and the mean cooling water use rate of 2,086 cfs during

Table 34. Zooplankton species collected in the vicinity of the Monroe plant between 1970 and 1975. Compiled from Table 3-40 of Cole (1976) and Table B23 of Cole (1977). Numbers in parentheses indicate order of relative abundance as listed in Table 3-40 (Cole, 1976).

CLADOCERA

*Alona* sp.
(7) *Bosmina* sp.
(30) { *Ceriodaphnia lacustris*
*C.* sp.
(29) *Chydorus sphaericus*
(15) *Daphnia galeata mendotae*
*D. pulex*
(8) *D. retrocurva*
(31) *Diaphanosoma leuchtenbergiana*
(40) *Leptodora kindtii*
*Macrothrix* sp.

COPEPODA

(41) *Canthocamptus robertcokeri*
(34) *Cyclops bicuspidatus*
(32) *C. vernalis*
(35) *Diaptomus ashlandi*
(39) *D. minutus*
(38) *D. oregonensis*
(36) *D. sicilis*
(37) *D. siciloides*
(42) *Eurytemora affinis*
(33) *Tropocyclops prasinus*
(5) Nauplii
(13) Juvenile cyclopoid
(14) Juvenile diaptomid

ROTIFERA

*Ascomorpha ecaudis*
*A. saltans*
*A.* sp.
*Ascomorphella volvocicola*
(12) { *Asplanchna priodonta*
*A.* sp.
(9) *Brachionus angularis*
(21) *B. bidenta*
*B. budapestinensis*
(3) *B. calyciflorus*
(10) *B. caudatus*
(22) *B. diversicornis*
(6) *B. havanaensis*
(11) *B. plicatilis*
(23) *B. quadridentata*
(26) *B. rubens*
(25) *B. urceolaris*
*Cephalodella* sp.
*Chromogaster* sp.
(24) *Conochilus unicornis*
*Eosphora* sp.
*Epiphanes* sp.
(20) { *Euchlanis dilatata*
*E.* sp.
(19) *Filinia brachiata*
*F. longiseta*
*Gastropus* sp.
(27) *Kellicottia longicornis*
*K. longispina*
(1) *Keratella cochlearis*
*K. earlinae*
*K. hiemalis*
(4) *K. quadrata*
*K. serrulata*
*K. vulga*
*Lecane* sp.
*Lepadella* sp.
*Monostyla* sp.
(28) *Notholca acuminata*
*Platyias* sp.
*Ploesoma* sp.
(2) { *Polyarthra vulgaris*
*P.* sp.
(18) *Pompholyx sulcata*
*Rotaria neptunia*
*R.* sp.
(17) *Synchaeta stylata*
(16) { *Trichocerca cylindrica*
*T. multicrinis*
*Trichotria* sp.

Table 35. Mean annual abundance of zooplankton at the Monroe plant intake in 1975. Data from station 18 of Cole (1977).

| Taxon | Number/liter | Percentage of total | μg/liter | Percentage of total |
|---|---|---|---|---|
| Rotifera | 109.0 | 76.9 | 10.2 | 11.9 |
| Cladocera | 16.5 | 11.6 | 63.4 | 74.2 |
| Copepoda | 16.2 | 11.5 | 11.9 | 13.9 |
| Total | 141.7 | | 85.5 | |

April 1975-May 1976 (Table 3.3-1 of the 316(b)), is approximately 159,000 kg (175 tons). At the maximum cooling water use rate of 3,248 cfs, approximately 247,000 kg (273 tons) of zooplankton would be entrained.

Zooplankton density is negligible in the winter, and nearly all entrainment occurs from April to November (Nalepa 1972; Cole 1977). Most of the entrainment would occur during summer and early fall when the population peaks (Nalepa 1972; Cole 1977) and when intake flows are highest (316(b) Table 3.3-1).

According to Cole (1977), the zooplankton entrained by the Monroe plant could originate anywhere in the western basin, but the majority is probably drawn from the southwestern corner.

C. Evaluation of 316(b) Impact Analysis

1. Fish larvae

Detroit Edison used two approaches for analyzing entrainment impact in the 316(b).

a. The first approach assumes 100% mortality of entrained larvae and estimates the percentage of the larval population entrained by the following equation:

$$\text{percentage entrained} = \frac{\text{annual number entrained}}{\text{standing stock estimate}} \qquad (10)$$

The standing stock estimates of fish larvae were calculated in the 316(b) using data from CLEAR, the Center for Lake Erie Area Research (Herdendorf et al. 1976), and from MDNR (MWRC 1975b, MWRC undated[10/]). We compared the data in 316(b) Tables 4.2-21 through 4.2-31 with that in the above references, and the few discrepancies found are listed in

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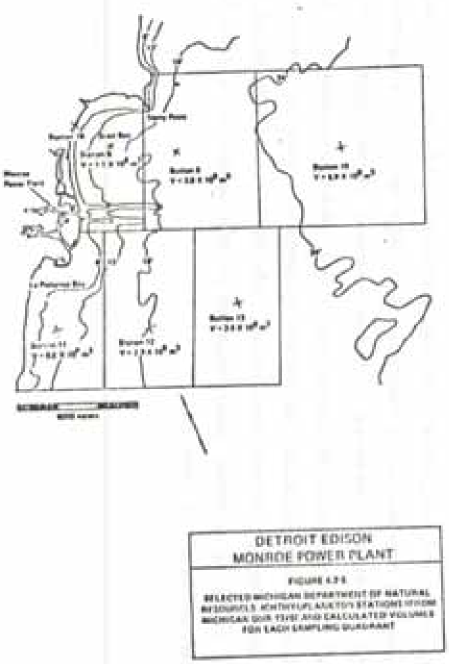
[10/] The MDNR data are referenced in the 316(b) as 1976 unpublished data from the Institute for Fisheries Research. The Institute, however, has no record of these data, and the report forwarded to us by the MDNR as the source of these data (in addition to the computer printouts) is undated.

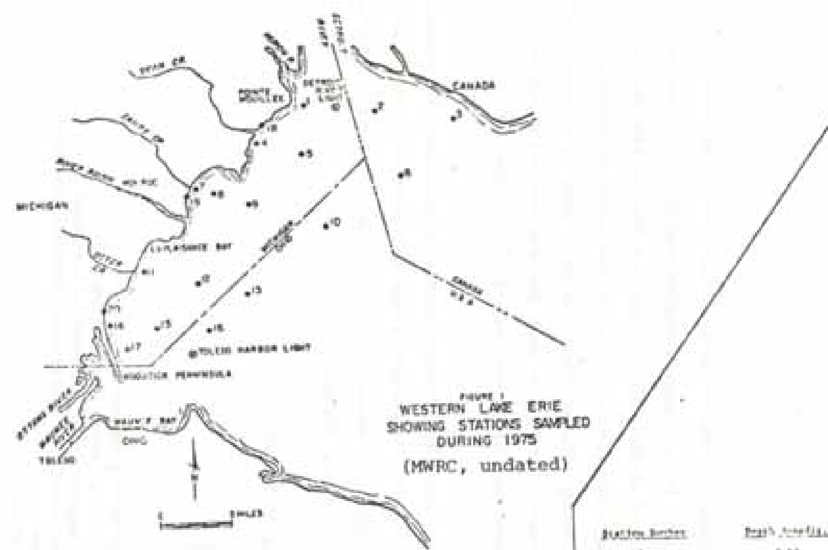
Appendix F. These discrepancies result in only minor errors in the population estimates presented in Tables 4.2-21, 4.2-29, and 5.3-1 of the 316(b). Four points of concern, however, were uncovered in relation to the 316(b) standing stock estimates:

1) MDNR and CLEAR used nets with different mesh sizes (471-µ and 760-µ , respectively) for collecting larval samples (MWRC undated; C. E. Herdendorf, personal communication, August 31, 1977), and these nets may have sampled the populations of larvae with different efficiencies.

2) Detroit Edison compared its entrainment data, which were collected with Kenco pumps, to the MDNR and CLEAR data, which were collected with plankton nets. Because Kenco pumps have been found less effective than nets for collecting fish larvae (refer to p.40), the percentage of the larval population entrained is probably underestimated.

3) The 316(b) used data from only six stations (Stations 8-10 on a transect north of the plant and Stations 11-13 south of the plant) of the 17 offshore stations sampled by the MDNR. Figure 13 shows the six stations considered in the 316(b) in relation to all of the stations used in the MDNR larval fish survey. The transect south of the plant included all three depth zones sampled by the DNR (0-12, 12-24, and 24-30 ft). The northern transect, however, includes one station (10) in the 24-30 ft zone and two stations (8 and 9) in the 12-24 ft zone, but not Station 7 in the 0-12 ft zone. The lake volumes for the areas represented by MDNR Stations 7 and 8 were probably combined to yield the Station 8 volume in 316(b) Figure 4.2-5. The densities of larvae at MDNR Station 7, however, were not included in the data presented in 316(b) Tables 4.2-22 through 4.2-27. If the data from Station 7 had been used to estimate larval densities at 316(b) Station 8 (mean of densities at MDNR Stations 7 and 8), the densities and therefore the abundances in that quadrant would have been lower for all the species considered except yellow perch, which would have increased very slightly. The maximum reduction would be for the larvae of freshwater drum, none of which were collected at MDNR Station 7.




(MWRC, undated)

| Station Number | Depth Interval (ft.) |
|---|---|
| 1 | 0-12 |
| 2 | 12-24 |
| 3 | 24-30 |
| 4 | 0-12 |
| 5 | 12-24 |
| 6 | 24-30 |
| 7 | 0-12 |
| 8 | 12-24 |
| 9 | 12-24 |
| 10 | 24-30 |
| 11 | 0-12 |
| 12 | 12-24 |
| 13 | 24-30 |
| 14 | 0-12 |
| 15 | 12-24 |
| 16 | 12-24 |
| 17 | 0-12 |
| 18 | Beach Area |
| 19 | Beach Area |
| 20 | Beach Area |

(from Table 2, MWRC, undated)

Figure 13. Comparison of stations sampled in 1975 MDNR larval fish survey with stations selected by Detroit Edison for use in the 316(b).

4) Detroit Edison presents data on larval fish densities from Cole (1976) in Tables 4.2-30 and 4.2-31. Cole's survey was the only one to include stations in the Raisin River and the mesh of the collection net used by Cole (541-μ) was more similar in size to that used in Detroit Edison's entrainment monitoring (571-μ) than the mesh used by either MDNR or CLEAR. Cole's data, however, were not used for estimating standing stocks or entrainment impact, and no reason was given in the 316(b) for excluding his data.

b. The second approach used by Detroit Edison to evaluate entrainment impact assumes 100% mortality of entrained larvae and projects this loss to an equivalent loss of adults by means of the following fecundity-based model presented on p. 5.3-2 of the 316(b):

$$LA = \frac{F \times (1.00 - M)}{2}$$

$$SA = \frac{LE}{LA}$$

where:

LA = larvae producing one spawning adult
F = fecundity of a species (see Section 4.2)
M = percent egg mortality expressed as a decimal
SA = spawning adults potentially lost through entrainment of larvae
LE = larvae entrained.

The above model, a variation of the Horst equivalent adult model (Horst 1975), is very simplistic and considers only egg mortality. LA, which is calculated from fecundity and egg mortality values, is in fact only the proportion of eggs hatching and thus represents only the youngest larval stage. LA is then compared to the number of larvae entrained, which includes all larval classes. Because the mortality of larvae between the time of hatching and the time of entrainment is not considered, the analysis is not valid, and SA is likely to be an extreme underestimate of the number of adults lost due to the entrainment of larvae.

Detroit Edison does not describe how the fecundity (F) values used in its model were derived. The fecundity value should be equal to the total number of eggs produced by an average adult female throughout her lifetime (Goodyear 1977, Horst 1975). Apparently, the fecundity value used in the 316(b) calculations represents only the number of eggs spawned by an average adult female in 1 year. Also, because fecundity values are specific to a given population, some of the values apparently used in the 316(b), which were taken from the literature and presented on pp. 4.2-1 through 4.2-15 of the 316(b), might not be representative of the fish populations in western Lake Erie.

2. Fish eggs

Detroit Edison evaluates the impact of egg entrainment by considering the estimated numbers of eggs entrained as the equivalent number of adult females required to produce the eggs according to the following equation:

$$\text{equivalent number of spawning females} = \frac{\text{number of eggs entrained}}{\text{number of eggs/spawning female}} \quad (11)$$

The 316(b) estimates of the numbers of spawning females are low for two reasons. First, the error made by Detroit Edison in calculating the numbers of eggs entrained resulted in an underestimate of egg entrainment (refer to Section III-B-2); and secondly, the natural mortality of the eggs from the time of spawning to the time of entrainment was not considered. Also, the 316(b) does not give the source of the fecundity values used in the calculation (refer to Section III-C-1-b above).

3. Macrozoobenthos

Although the 316(b) presents daily estimates of macrozoobenthos entrainment for April-September 1975 (see Table 30), it does not discuss the impact upon the macrozoobenthos community. Significant mortalities of some benthic organisms can occur as a result of exposure to chlorine, elevated temperatures, and mechanical stresses during entrainment (Nalco Environmental Sciences 1976, King and Mancini 1976, Ginn et al. 1974, Lauer et al. 1974). Mortality can be quite high for mayfly larvae, which comprised 5% of the macrozoobenthos entrained at the Monroe plant (Table 31) and are important food organisms for some fish species in Lake Erie (Price 1963). For example, Stenonema sp., a mayfly entrained at Monroe, has been found to suffer 25% entrainment mortality (King and Mancini 1976). The amphipods Gammarus sp. and Pontoporeia affinis, which together comprised about 4% of the macrozoobenthos entrained at the Monroe plant, are also killed by exposure to high cooling system temperatures and to chlorine in the cooling water (Ginn et al. 1974, Lauer et al. 1974, Nalco Environmental Sciences 1976).

Of the 18 most abundant benthic organisms in the vicinity of the Monroe plant, 14 were oligochaetes of the order Tubificidae, as shown below in Table 3-46 from Cole 1976.

Table 3-46[a] List of zoobenthic animals in order of relative abundance.

| Taxonomic category | Classification[b] Phylum: Class, Order |
|---|---|
| *Limnodrilus hoffmeisteri* | Annelida: Oligochaeta, Tubificidae |
| *Chironomus* sp. | Arthropoda: Insecta, Diptera |
| *Limnodrilus cervix* variant | Annelida: Oligochaeta, Tubificidae |
| *Limnodrilus maumeensis* | Annelida: Oligochaeta, Tubificidae |
| *Procladius* sp. | Arthropoda: Insecta, Diptera |
| *Limnodrilus cervix* | Annelida: Oligochaeta, Tubificidae |
| *Limnodrilus udekemianus* | Annelida: Oligochaeta, Tubificidae |
| *Limnodrilus claparedianus* | Annelida: Oligochaeta, Tubificidae |
| *Coelotanypus* sp. | Arthropoda: Insecta, Diptera |
| *Branchiura sowerbyi* | Annelida: Oligochaeta, Tubificidae |
| *Limnodrilus profundicola* | Annelida: Oligochaeta, Tubificidae |
| *Potamothrix moldaviensis* | Annelida: Oligochaeta, Tubificidae |
| *Cryptochironomus* sp. | Arthropoda: Insecta, Diptera |
| *Aulodrilus pluriseta* | Annelida: Oligochaeta, Tubificidae |
| *Potamothrix vejdovskyi* | Annelida: Oligochaeta, Tubificidae |
| *Aulodrilus americanus* | Annelida: Oligochaeta, Tubificidae |
| *Aulodrilus pigueti* | Annelida: Oligochaeta, Tubificidae |
| *Rhyacodrilus coccineus* | Annelida: Oligochaeta, Tubificidae |
| Glossiphoniidae | Annelida: Hirudinea, Rhynchobdellida |
| Sphaeriidae | Mollusca: Pelecypoda, Eulamellibranchia |
| Gammaridae | Arthropoda: Crustacea, Amphipoda |
| *Hexagenia* sp. | Arthropoda: Insecta, Ephemeroptera |
| Elmidae | Arthropoda: Insecta, Coleoptera |
| Asellidae | Arthropoda: Crustacea, Isopoda |
| Unionidae | Mollusca: Pelecypoda, Eulamellibranchia |
| Bulimidae | Mollusca: Gastropoda, Mesogastropoda |

[a] Table 3-46 from Cole, 1976.
[b] Classification added by GLFL.

The oligochaetes comprised over 70% of the standing stock of macrozoobenthos in the vicinity of the Monroe plant (Table 36) but less than 0.1% of the total organisms entrained (Table 31) and were not used as food by any of the fish examined by Kenega and Cole (1975).

On the other hand, comparison of our annual entrainment estimates (Table 31) with the most recent density estimates for macrozoobenthos in the vicinity of the Monroe plant (Table 36) shows that, although chironomids make up less than 30% of the organisms in the area, they comprise 77% of the total macrozoobenthos entrained, which indicates that they are particularly vulnerable to entrainment. Chironomids are a major food for older fish (Pennak 1953, Price 1963), and in western Lake Erie juveniles (longer than 30 mm) specifically select two larger chironomids, Chironomus and Procladius (Cole 1977, Kenega and Cole 1975). The chironomids in the 316(b) were not identified to genus; therefore, we cannot determine what proportions of these two genera were entrained. Mortality of chironomids at the Monroe plant could reduce the amount of food available locally to fish; however, chironomid mortality due to entrainment appears to be minimal (Jensen et al. 1969; King and Mancini 1976).

4. Zooplankton

The 316(b) includes no discussion of the impact of zooplankton entrainment at the Monroe plant (refer to Section III-B-4). Under some operating conditions, mortality of entrained zooplankton is size related, with a greater proportion of the large organisms, such as cladocerans, being killed than the smaller forms (Cole 1977, Commonwealth Edison 1976). Cole (1977) found that only cladocerans were measurably affected by passage through the plant. The largest cladocerans, such as Leptodora kindtii, were most severely affected because of their greater susceptibility to mechanical damage and relatively long regeneration time. Cole (1977) found that 60% of the Leptodora in the Monroe discharge were dead, while only 10% were dead at the intake. This mortality estimate was based on samples taken during July 6-9, 1976, when the discharge temperature was probably higher than 90°F. Temperature data for the Monroe plant in 1975 (316(b) Table 3.3-1) shows that on July 31-August 1, 1975, the temperature of the cooling water

Table 36. Density of benthic invertebrates in the vicinity of the Monroe plant (Kelly and Cole 1976).

| | Mean Density (number/$m^2$) | |
|---|---|---|
| | 1974 | 1970-74 |
| Oligochaeta | 214.3 (76.5%) | 324.2 (70.8%) |
| Chironomidae | 65.9 (23.5%) | 133.9 (29.2%) |
| Pelecypoda | 0.05 | 0.03 |
| Hirudinea | 0.02 | 0.03 |
| Elmidae | 0.04 | 0.01 |
| Gammaridae | 0.01 | 0.01 |
| Asellidae | 0.00 | 0.01 |
| Total | 280.3/$m^2$ | 458.2/$m^2$ |

reached a maximum of 99°F. Zooplankton mortality at temperatures near 100°F can approach 100% (Carlson 1974, Benda and Gulvas 1976, Storr 1974). The time of the year when cooling water temperatures rise to acutely lethal levels coincides with the time when most zooplankton are entrained (refer to Section III-B-4); therefore the mortality of zooplankton due to elevated temperature alone is high. At other times, when temperatures are not acutely lethal, mortality of entrained zooplankton may be due primarily to mechanical and hydraulic stresses (Commonwealth Edison 1976, Carpenter et al. 1974); however high mortalities due to chlorination of the cooling water have also been observed (Polgar et al. 1976, Davies and Jensen 1974).

The large cladocerans, such as Leptodora, Diaphanosoma leuchtenbergiana, and Ceriodaphnia sp., are relatively rare among the zooplankton (refer to Table 34). According to Hubschman (1960), Leptodora comprised only 1% or less by number of the zooplankton in western Lake Erie on 31 of 52 sampling days during June-August 1959 and more than 5% (maximum of 7%) on only 2 days. Reutter and Reutter (1975) found that Leptodora was even less abundant during 1973-74, when it comprised less than 0.1% of the mean zooplankton density in the summer and fall months when it was collected. Although they are not common in western Lake Erie, the large cladocerans, especially Leptodora, are highly favored as food by fishes in the area, such as yellow perch and white bass (Nalepa 1972; Kenaga and Cole 1975). According to Cole (1977), 60-95% of the food volume of fishes over 30 mm long was composed of Leptodora and the two chironomids Procladius and Chironomus (refer to Section III-C-3 above). The high susceptibility of the large cladocerans to destruction in the cooling system could have an adverse impact on the food supply of fishes in the area of the Monroe plant.