FINAL

Evaluation of Larval Fish Density and Diversity within Main Channel and Main Channel Border Habitats of Pools 18, 22, and 26 of the Upper Mississippi River

Prepared for:
U.S. Army Corps of Engineers, Rock Island District
Contract No. DACW25-00-D-0005 Delivery Order No. 0005

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July 19, 2002

Harding ESE Project No. 510206

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	July 2002	Final Report, June 2001-July 2002

4. TITLE AND SUBTITLE

Evaluation of Larval Fish Density and Diversity within the Main Channel and Main Channel Border Habitats of Pools 18, 22, and 26 of the Upper Mississippi River

5. FUNDING NUMBERS

Contract No. DACW-00-D-0005, Delivery Order No. 0005

6. AUTHOR(S)

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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

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8. PERFORMING ORGANIZATION REPORT NUMBER

510206.0200

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

U.S. Army Corps of Engineers-Rock Island District
P.O. Box 2004
Rock Island, IL 61204-2004

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

Prepared for U.S. Army Corps of Engineers, Rock Island District

12a. DISTRIBUTION/AVAILABILITY STATEMENT

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

Larval fish sampling was conducted on the Upper Mississippi River (UMR) within main channel and main channel border habitats of Pools 18, 22, and 26 from June 13 through August 25, 2001. Ichthyoplankton sampling resulted in the collection of 94,279 larval fish representing 18 taxa. Freshwater drum (*Aplodinotus grunniens*) and members of the family Cyprinidae were the dominant taxa in each sample. Mean larval fish densities were highest in July (0.99 fish/m^3) and lowest in the month of June (0.39 fish/m^3). Overall mean fish densities were similar among the three pools sampled, with Pool 22 having the highest mean density (0.71 fish/m^3) and Pool 26 the lowest (0.62 fish/m^3).

14. SUBJECT TERMS

15. NUMBER OF PAGES
37

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
			SAR

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1.0 Introduction

The U.S. Army Corps of Engineers, Rock Island District (District) is directed by Congress to maintain a 2.75 meter (m) (9-foot) navigation channel on the Upper Mississippi River (UMR) and Illinois Waterway (IWW). Maintenance of the navigation channel involves operating a series of Locks and Dams to maintain minimum pool elevations.

The Upper Mississippi River-Illinois Waterway System Navigation Study, ('Navigation Study') is a feasibility study addressing navigation improvement planning for the UMR and IWW navigation systems for the years 2000-2050. The study assesses the need for navigation improvements at 29 lock and dam facilities (35 locks) on the UMR and 8 locks on the IWW and the impacts of providing these improvements.

Navigation improvements associated with the Navigation Study would likely result in an increase in commercial navigation traffic in the UMR and IWW. This increase in navigation traffic could result in adverse impacts to fisheries communities of the UMR and IWW. One way that fisheries communities may be adversely affected is through propeller entrainment mortality of larval fish. To help characterize potential impacts from larval fish entrainment, the Corps has reviewed available data and has contracted with Harding ESE to conduct additional larval fish sampling to characterize larval fish drift within the UMR.

The purpose of this project is to evaluate larval fish density and diversity within the planktonic drift of main channel and main channel boarder habitats of Pools 18, 22, and 26 of the UMR. Primary tasks to be performed included:

1) Perform a series larval drift transect samples across main channel (MC) and main channel border (MCB) habitats of Pools 18, 22, and 26 of the Upper Mississippi River; and
2) Prepare a short technical report describing results of the survey. MC and MCB habitats are as defined in the Habitat Needs Assessment for the Upper Mississippi River Technical Report (Corps of Engineers 2000).

2.2 Laboratory Processing

Upon return to the laboratory, samples were logged and entered into Harding ESE's sample tracking system. The samples were sorted by first washing each sample in a 500-micron sieve to remove excess formalin, rose bengal, and silt. A small portion of the sample was then placed in a white sorting pan and examined under a 2x-lighted magnifier. Using forceps, all fish (larvae, juveniles, and adults) were removed, enumerated, and placed in a pre-labeled jar containing 40% isopropyl alcohol. Sorting efficiency was monitored through quality assurance checks conducted by Harding ESE fisheries biologists and fisheries interns. Ten percent of the samples collected were checked for quality assurance. Harding ESE, Inc. Quality Assurance protocols mandate a 90 percent sorting efficiency to pass each lot of samples.

Larval fish were identified, enumerated, and measured using dissecting microscopes equipped with cross-polarized light. Ichthyoplankton taxonomic identifications were made to the lowest level possible (usually family) according to Hogue, et.al. (1976), Auer (1982), and Holland-Bartels (1999). Each taxonomist developed a reference collection for all species collected. Damaged or degraded specimens were placed in an unknown category. For each sample the first twenty-five fish of each species was randomly measured in total length to the nearest millimeter.

2.3 Data Analysis

Fish densities were calculated using the number of fish collected in a given sample divided by the total volume of water sampled (No. Fish/m^3). Mean fish densities were calculated by averaging the individual fish densities (Sum of Fish Densities/Number of Samples) or by averaging mean fish densities (Sum of Mean Fish Densities/Number of Samples). The Shannon-Wiener Diversity Index (H') was used to describe the diversity of taxa collected. This diversity index has two properties: (1) H' = 0 if and only if there is one species in a sample, and (2) H' is maximum only when all species are represented by the same number of individuals, that is, a perfectly even distribution of abundance. The Shannon-Wiener Diversity equation using natural logarithms is:

$$H' = -\sum_{i=1}^{S^*} (p_i \ln p_i)$$ (Ludwig and Reynolds 1988).

pools was undoubtedly due to the high abundance of the two dominant taxa (freshwater drum, Cyprinidae).

Other taxa that were common in collections from each of the pools, albeit in low abundance, included Centrarchidae, Catastomidae, and *Ictiobus/Carpiodes* sp. from Pool 18; *Ictiobus/Carpiodes* sp., Catastomidae, Common Carp (*Cyprinus carpio*), and Centrarchidae from Pool 22; and Centrarchidae, *Ictiobus/Carpiodes* sp., and Clupeidae from Pool 26.

3.3 Temporal and Spatial Results

3.3.1 Temporal Summary

A presentation of seasonal sampling results is provided in Table 6. July was observed to be the peak month for larval fish collection, as densities averaged 0.99 fish/m^3 (>47,000 specimens collected). This result was consistent among the three pools sampled in which the combined fish density resulted in over 0.95 fish/m^3 (over 15,000 larval fish collected per pool) during the month of July. Within Pool 18, larval fish densities were slightly lower in August (0.87 fish/m^3) and lowest in June (0.24 fish/m^3). In contrast, Pool 26 larval fish densities were similar in June and August, with June densities (0.46 fish/m^3) slightly higher than August densities (0.38 fish/m^3).

For dates with both day and night sample collections, larval fish densities were greater for samples collected during the daytime (Table 7). Diurnal samples contained an overall mean density of 0.68 fish/m^3, while nocturnal samples contained an overall mean density of 0.44 fish/m^3 (Table 7). Mean diurnal densities (0.64 - 0.70/m^3) were consistently higher than that of nighttime samples (0.31 - 0.53/m^3). There were no considerable differences in species composition between day and night samples during the diurnal/nocturnal sample periods. For all pools over the entire sampling period, diurnal samples contained an average density of 0.79 fish/m^3, while nocturnal samples contained an average density of 0.44 fish/m^3.

3.3.2 Spatial Summary

Monthly sampling results for the upper and lower portions of each pool are presented in Table 8. Samples collected from the lower section of Pool 18 had lower mean densities in both June and August collections, relative to the upper pool. In contrast, July samples had a greater mean density within the lower portion of the pool relative to the upper pool.

dominant taxa (i.e., freshwater drum, Cyprinidae, common carp, *Ictiobus/Carpiodes* sp., etc.). There were however, notable exceptions to this general trend. For example, channel catfish (*Ictalurus punctatus*) specimens were typically found to have mean lengths between 15 and 17 mm, mean lengths of Hiodontidae were typically 19-22 mm, mean lengths of Lepisosteidae were between 20 and 25 mm, and *Morone* sp. had a mean length between 12-15 mm.

Table 1. Mean total density of larval fish (expressed as No./m^3) collected in Pools 18, 22, and 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

	Average Density (No./m^3)		
Species	**June**	**July**	**August**
Cycleptus elongatus juvenile		0.001	
Catostomidae	0.005	0.018	0.011
Catostomidae juvenile	0.001	0.002	
Centrarchidae	0.006	0.018	0.009
Centrarchidae juvenile		0.002	
Ictalurus punctatus	0.016	0.003	0.003
Clupeidae	0.010	0.005	0.002
Clupeidae juvenile	0.002	0.003	0.001
Cyprinus carpio	0.014	0.007	0.003
Cyprinus carpio juvenile	0.003		
Cyprinidae	0.047	0.433	0.369
Cyprinidae juvenile	0.002	0.008	0.015
Notropis atherinoides juvenile		0.001	
Pylodictis olivaris	0.001	0.001	
Hiodontidae	0.006		
Hiodontidae juvenile		0.001	
Ictiobus/Carpiodes sp.	0.016	0.011	0.003
Micropterus salmoides	0.001		
Micropterus salmoides juvenile	0.001		
Lepisosteidae	0.001	0.001	
Lepisosteidae juvenile		0.001	
Lepomis sp. juvenile		0.006	
Morone sp.	0.006	0.004	
Morone sp. juvenile	0.001	0.001	
Percidae	0.002	0.003	0.002
Polydon spathula juvenile	0.001		
Sciaenidae	0.294	0.497	0.232
Sciaenidae juvenile			0.001
Unknown	0.013	0.013	0.015

Table 2. Monthly density of larval fish (No. fish/m^3) collected in Pools 18, 22, and 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Sample Location	Sample ID	Date	Tow Time (Seconds)	Volume Sampled Net 1 (m^3)	Volume Sampled Net 2 (m^3)	No. Fish	Fish Density (No./m^3)
Diurnal							
Pool 18 - Upper	P18-U-RDB	6/13/01	600	356.17	355.88	45	0.06
Pool 18 - Upper	P18-U-MC	6/13/01	600	474.60	476.06	58	0.06
Pool 18 - Upper	P18-U-LDB	6/13/01	600	481.16	472.85	84	0.09
Diurnal							
Pool 18 - Lower	P18-L-LDB	6/13/01	600	432.83	472.94	114	0.13
Pool 18 - Lower	P18-L-MC	6/13/01	600	448.30	467.98	329	0.36
Pool 18 - Lower	P18-L-RDB	6/13/01	600	424.67	473.53	32	0.04
Diurnal							
Pool 22 - Upper	P22-U-LDB	6/14/01	615	504.81	568.88	294	0.27
Pool 22 - Upper	P22-U-MC	6/14/01	600	448.42	453.09	169	0.19
Pool 22 - Upper	P22-U-RDB	6/14/01	600	425.79	418.91	173	0.20
Diurnal							
Pool 22 - Lower	P22-L-LDB	6/15/01	600	410.14	407.33	497	0.61
Pool 22 - Lower	P22-L-MC	6/15/01	600	421.93	449.90	204	0.23
Pool 22 - Lower	P22-L-RDB	6/15/01	600	444.31	420.11	175	0.20
Diurnal							
Pool 26 - Upper	P26-U-LDB	6/15/01	600	437.92	454.37	436	0.49
Pool 26 - Upper	P26-U-MC	6/15/01	585	480.95	451.21	770	0.83
Pool 26 - Upper	P26-U-RDB	6/15/01	600	415.07	402.92	314	0.38
Diurnal							
Pool 26 - Lower	P26-L-RDB	6/16/01	660	426.55	442.58	398	0.46
Pool 26 - Lower	P26-L-MC	6/16/01	600	456.02	436.57	237	0.27
Pool 26 - Lower	P26-L-LDB	6/16/01	675	476.90	476.71	275	0.29
				Mean Density (No./m^3) for 6/13/01 Diurnal Sample Period			**0.29**

Table 2. (cont.) Monthly density of larval fish (No. fish/m^3) collected in pools 18, 22, and 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Sample Location	Sample ID	Date	Tow Time (Seconds)	Volume Sampled Net 1 (m^3)	Volume Sampled Net 2 (m^3)	No. Fish	Fish Density (No./m^3)
Diurnal							
Pool 18 - Upper	P18-UD-RDB	6/27/01	600	473.40	465.85	93	0.10
Pool 18 - Upper	P18-UD-MC	6/27/01	600	467.20	465.85	239	0.26
Pool 18 - Upper	P18-UD-LDB	6/27/01	600	476.80	472.16	233	0.25
Nocturnal							
Pool 18 - Upper	P18-UN-LDB	6/27/01	600	477.30	429.10	713	0.79
Pool 18 - Upper	P18-UN-MC	6/27/01	620	608.10	608.10	392	0.32
Pool 18 - Upper	P18-UN-RDB	6/27/01	600	463.10	391.28	436	0.51
Diurnal							
Pool 18 - Lower	P18-LD-LDB	6/27/01	600	480.90	459.29	206	0.22
Pool 18 - Lower	P18-LD-MC	6/27/01	600	471.70	448.70	346	0.38
Pool 18 - Lower	P18-LD-RDB	6/27/01	600	473.30	457.05	98	0.11
Nocturnal							
Pool 18 - Lower	P18-LN-RDB	6/28/01	600	448.60	448.60	386	0.43
Pool 18 - Lower	P18-LN-MC	6/28/01	600	468.21	468.21	88	0.09
Pool 18 - Lower	P18-LN-LDB	6/28/01	600	438.29	438.29	120	0.14
Diurnal							
Pool 22 - Upper	P22-UD-LDB	6/25/01	600	462.83	461.61	997	1.08
Pool 22 - Upper	P22-UD-MC	6/25/01	600	463.57	462.05	894	0.97
Pool 22 - Upper	P22-UD-RDB	6/25/01	600	468.99	458.51	543	0.59
Nocturnal							
Pool 22 - Upper	P22-UN-LDB	6/25/01	600	466.48	440.83	413	0.46
Pool 22 - Upper	P22-UN-MC	6/25/01	600	511.71	499.31	371	0.37
Pool 22 - Upper	P22-UN-RDB	6/25/01	600	484.60	462.98	586	0.62

Table 2. (cont.) Monthly density of larval fish (No. fish/m^3) collected in pools 18, 22, and 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Sample Location	Sample ID	Date	Tow Time (Seconds)	Volume Sampled Net 1 (m^3)	Volume Sampled Net 2 (m^3)	No. Fish	Fish Density (No./m^3)
Diurnal							
Pool 22 - Lower	P22-LD-LDB	6/25/01	600	444.39	394.84	391	0.47
Pool 22 - Lower	P22-LD-MC	6/25/01	620	466.76	426.74	585	0.65
Pool 22 - Lower	P22-LD-RDB	6/25/01	600	458.49	449.52	870	0.96
Nocturnal							
Pool 22 - Lower	P22-LN-RDB	6/26/01	630	545.63	518.61	495	0.47
Pool 22 - Lower	P22-LN-MC	6/26/01	600	487.93	475.47	151	0.16
Pool 22 - Lower	P22-LN-LDB	6/26/01	600	553.50	517.38	109	0.10
Diurnal							
Pool 26 - Upper	P26-UD-RDB	6/29/01	600	466.84	457.62	894	0.97
Pool 26 - Upper	P26-UD-MC	6/29/01	600	468.80	461.48	923	0.99
Pool 26 - Upper	P26-UD-LDB	6/29/01	600	476.88	453.40	135	0.15
Nocturnal							
Pool 26 - Upper	P26-UN-RDB	6/29/01	600	462.39	452.60	142	0.16
Pool 26 - Upper	P26-UN-MC	6/29/01	600	455.26	448.06	140	0.15
Pool 26 - Upper	P26-UN-LDB	6/29/01	600	461.29	454.56	584	0.64
Diurnal							
Pool 26 - Lower	P26-LD-RDB	6/29/01	600	475.93	465.49	266	0.28
Pool 26 - Lower	P26-LD-MC	6/29/01	600	491.04	461.67	459	0.48
Pool 26 - Lower	P26-LD-LDB	6/29/01	600	460.24	452.54	773	0.85
Nocturnal							
Pool 26 - Lower	P26-LN-RDB	6/30/01	600	539.75	478.91	219	0.21
Pool 26 - Lower	P26-LN-MC	6/30/01	600	471.04	458.34	190	0.20
Pool 26 - Lower	P26-LN-LDB	6/30/01	600	462.66	453.87	489	0.53
			Mean Density (No./m^3) for 6/27/01 Diurnal/Nocturnal Sample Period				**0.45**

Table 2. (cont.) Monthly density of larval fish (No. fish/m^3) collected in pools 18, 22, and 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Sample Location	Sample ID	Date	Tow Time (Seconds)	Volume Sampled Net 1 (m^3)	Volume Sampled Net 2 (m^3)	No. Fish	Fish Density (No./m^3)
Diurnal							
Pool 18 - Upper	P18-UD-LDB	7/10/01	600	440.34	440.13	868	0.99
Pool 18 - Upper	P18-UD-MC	7/10/01	600	452.64	451.17	541	0.60
Pool 18 - Upper	P18-UD-RDB	7/10/01	600	438.19	432.67	438	0.50
Diurnal							
Pool 18 - Lower	P18-LD-LDB	7/10/01	600	439.63	397.08	450	0.54
Pool 18 - Lower	P18-LD-MC	7/10/01	600	457.20	436.97	2,073	2.32
Pool 18 - Lower	P18-LD-RDB	7/10/01	600	456.80	453.17	274	0.30
Diurnal							
Pool 22 - Upper	P22-UD-LDB	7/9/01	600	427.64	423.74	4,556	5.35
Pool 22 - Upper	P22-UD-MC	7/9/01	600	431.88	406.78	482	0.57
Pool 22 - Upper	P22-UD-RDB	7/9/01	600	446.61	435.91	707	0.80
Diurnal							
Pool 22 - Lower	P22-LD-RDB	7/9/01	600	458.51	446.25	287	0.32
Pool 22 - Lower	P22-LD-MC	7/9/01	610	459.98	456.71	260	0.28
Pool 22 - Lower	P22-LD-LDB	7/9/01	600	438.11	435.87	134	0.15
Diurnal							
Pool 26 - Upper	P26-UD-LDB	7/12/01	600	421.40	420.43	1,244	1.48
Pool 26 - Upper	P26-UD-MC	7/12/01	600	450.85	450.64	1,191	1.32
Pool 26 - Upper	P26-UD-RDB	7/12/01	600	458.70	445.58	965	1.07
Diurnal							
Pool 26 - Lower	P26-LD-RDB	7/12/01	600	488.27	431.57	542	0.59
Pool 26 - Lower	P26-LD-MC	7/12/01	600	457.16	444.44	805	0.89
Pool 26 - Lower	P26-LD-LDB	7/12/01	600	437.41	432.07	1,330	1.53
				Mean Density (No./m^3) for 7/11/01 Diurnal Sample Period			**1.09**

Table 2. (cont.) Monthly density of larval fish (No. fish/m^3) collected in pools 18, 22, and 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Sample Location	Sample ID	Date	Tow Time (Seconds)	Volume Sampled Net 1 (m^3)	Volume Sampled Net 2 (m^3)	No. Fish	Fish Density (No./m^3)
Diurnal							
Pool 18 - Upper	P18-UD-LDB	7/25/01	600	461.71	442.26	1,129	1.25
Pool 18 - Upper	P18-UD-MC	7/25/01	600	450.45	448.59	489	0.54
Pool 18 - Upper	P18-UD-RDB	7/25/01	600	431.27	422.77	857	1.00
Nocturnal							
Pool 18 - Upper	P18-UN-LDB	7/25/01	600	444.44	443.36	842	0.95
Pool 18 - Upper	P18-UN-MC	7/25/01	600	459.44	447.03	296	0.33
Pool 18 - Upper	P18-UN-RDB	7/25/01	600	429.94	428.87	319	0.37
Diurnal							
Pool 18 - Lower	P18-LD-LDB	7/25/01	630	449.52	446.59	992	1.11
Pool 18 - Lower	P18-LD-MC	7/25/01	600	460.74	449.71	1,921	2.11
Pool 18 - Lower	P18-LD-RDB	7/25/01	600	453.59	451.65	2,843	3.14
Nocturnal							
Pool 18 - Lower	P18-LN-LDB	7/26/01	600	485.72	457.79	65	0.07
Pool 18 - Lower	P18-LN-MC	7/26/01	600	461.76	417.98	196	0.22
Pool 18 - Lower	P18-LN-RDB	7/26/01	600	435.83	434.82	675	0.78
Diurnal							
Pool 22 - Upper	P22-UD-LDB	7/23/01	600	439.84	439.46	1,682	1.91
Pool 22 - Upper	P22-UD-MC	7/23/01	600	451.63	451.12	1,183	1.31
Pool 22 - Upper	P22-UD-RDB	7/23/01	600	475.74	475.24	512	0.54
Nocturnal							
Pool 22 - Upper	P22-UN-LDB	7/24/01	600	436.74	465.64	887	0.98
Pool 22 - Upper	P22-UN-MC	7/24/01	600	469.58	450.20	384	0.42
Pool 22 - Upper	P22-UN-RDB	7/24/01	600	469.75	456.80	834	0.90

Table 2. (cont.) Monthly density of larval fish (No. fish/m^3) collected in pools 18, 22, and 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Sample Location	Sample ID	Date	Tow Time (Seconds)	Volume Sampled Net 1 (m^3)	Volume Sampled Net 2 (m^3)	No. Fish	Fish Density (No./m^3)
Diurnal							
Pool 22 - Lower	P22-LD-RDB	7/23/01	600	481.69	473.74	397	0.42
Pool 22 - Lower	P22-LD-MC	7/23/01	600	471.12	468.91	751	0.80
Pool 22 - Lower	P22-LD-LDB	7/23/01	600	471.21	468.21	684	0.73
Nocturnal							
Pool 22 - Lower	P22-LN-RDB	7/23/01	600	479.43	476.78	1,681	1.76
Pool 22 - Lower	P22-LN-MC	7/23/01	600	482.32	467.47	154	0.16
Pool 22 - Lower	P22-LN-LDB	7/23/01	600	472.89	451.27	680	0.74
Diurnal							
Pool 26 - Upper	P26-UD-LDB	7/27/01	600	421.93	419.33	1,658	1.97
Pool 26 - Upper	P26-UD-MC	7/27/01	600	443.25	419.35	783	0.91
Pool 26 - Upper	P26-UD-RDB	7/27/01	600	445.98	415.13	982	1.14
Nocturnal							
Pool 26 - Upper	P26-UN-LDB	7/27/01	600	461.04	451.50	1,694	1.86
Pool 26 - Upper	P26-UN-MC	7/27/01	600	441.99	422.05	977	1.13
Pool 26 - Upper	P26-UN-RDB	7/27/01	600	466.46	463.04	619	0.67
Diurnal							
Pool 26 - Lower	P26-LD-RDB	7/27/01	600	460.41	457.37	603	0.66
Pool 26 - Lower	P26-LD-MC	7/27/01	600	444.18	443.91	689	0.78
Pool 26 - Lower	P26-LD-LDB	7/27/01	600	455.93	454.90	543	0.60
Nocturnal							
Pool 26 - Lower	P26-LN-RDB	7/28/01	600	428.93	426.65	450	0.53
Pool 26 - Lower	P26-LN-MC	7/28/01	600	440.64	439.50	374	0.42
Pool 26 - Lower	P26-LN-LDB	7/28/01	600	451.29	428.74	480	0.55
			Mean Density (No./m^3) for 7/25/01 Diurnal/Nocturnal Sample Period				**0.94**

Table 2. (cont.) Monthly density of larval fish (No. fish/m^3) collected in pools 18, 22, and 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Sample Location	Sample ID	Date	Tow Time (Seconds)	Volume Sampled Net 1 (m^3)	Volume Sampled Net 2 (m^3)	No. Fish	Fish Density (No./m^3)
Diurnal							
Pool 18 - Upper	P18-UD-LDB	8/8/01	600	420.56	410.11	3,419	4.12
Pool 18 - Upper	P18-UD-MC	8/8/01	600	418.43	333.07	1,904	2.53
Pool 18 - Upper	P18-UD-RDB	8/8/01	600	443.42	421.61	916	1.06
Diurnal							
Pool 18 - Lower	P18-LD-LDB	8/8/01	610	443.28	430.37	1,213	1.39
Pool 18 - Lower	P18-LD-MC	8/8/01	600	413.66	408.09	1,370	1.67
Pool 18 - Lower	P18-LD-RDB	8/8/01	600	432.52	407.88	1,955	2.33
Diurnal							
Pool 22 - Upper	P22-UD-LDB	8/7/01	600	435.91	430.05	1,006	1.16
Pool 22 - Upper	P22-UD-MC	8/7/01	600	426.06	419.82	1,062	1.26
Pool 22 - Upper	P22-UD-RDB	8/7/01	600	447.60	442.18	823	0.92
Diurnal							
Pool 22 - Lower	P22-LD-RDB	8/7/01	600	471.48	459.10	987	1.06
Pool 22 - Lower	P22-LD-MC	8/7/01	600	463.61	437.52	1,335	1.48
Pool 22 - Lower	P22-LD-LDB	8/7/01	600	454.37	450.47	760	0.84
Diurnal							
Pool 26 - Upper	P26-UD-LDB	8/9/01	615	470.57	464.56	1,705	1.82
Pool 26 - Upper	P26-UD-MC	8/9/01	600	457.62	455.91	954	1.04
Pool 26 - Upper	P26-UD-RDB	8/9/01	600	459.94	452.12	555	0.61
Diurnal							
Pool 26 - Lower	P26-LD-RDB	8/9/01	600	469.75	464.14	44	0.05
Pool 26 - Lower	P26-LD-MC	8/9/01	600	468.97	456.71	103	0.11
Pool 26 - Lower	P26-LD-LDB	8/9/01	600	460.05	463.82	181	0.20
				Mean Density (No./m^3) for 8/08/01 Diurnal Sample Period			**1.31**

Table 2. (cont.) Monthly density of larval fish (No. fish/m^3) collected in pools 18, 22, and 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Sample Location	Sample ID	Date	Tow Time (Seconds)	Volume Sampled Net 1 (m^3)	Volume Sampled Net 2 (m^3)	No. Fish	Fish Density (No./m^3)
Diurnal							
Pool 18 - Upper	P18-UD-LDB	8/22/01	630	163.24	112.27	23	0.08
Pool 18 - Upper	P18-UD-MC	8/22/01	630	146.46	91.64	9	0.04
Pool 18 - Upper	P18-UD-RDB	8/22/01	630	137.86	119.10	72	0.28
Nocturnal							
Pool 18 - Upper	P18-UN-LDB	8/23/01	615	154.76	109.23	23	0.09
Pool 18 - Upper	P18-UN-MC	8/23/01	600	132.86	102.82	13	0.06
Pool 18 - Upper	P18-UN-RDB	8/23/01	615	165.91	147.84	38	0.12
Diurnal							
Pool 18 - Lower	P18-LD-LDB	8/22/01	630	110.16	108.68	60	0.27
Pool 18 - Lower	P18-LD-MC	8/22/01	615	109.06	96.81	51	0.25
Pool 18 - Lower	P18-LD-RDB	8/22/01	615	96.13	80.92	190	1.07
Nocturnal							
Pool 18 - Lower	P18-LN-LDB	8/23/01	600	135.75	95.01	26	0.11
Pool 18 - Lower	P18-LN-MC	8/23/01	600	135.77	106.11	9	0.04
Pool 18 - Lower	P18-LN-RDB	8/23/01	615	147.18	105.54	26	0.10
Diurnal							
Pool 22 - Upper	P22-UD-LDB	8/20/01	600	405.43	402.79	199	0.25
Pool 22 - Upper	P22-UD-MC	8/20/01	600	440.43	436.61	342	0.39
Pool 22 - Upper	P22-UD-RDB	8/20/01	600	455.49	431.80	709	0.80
Nocturnal							
Pool 22 - Upper	P22-UN-LDB	8/21/01	600	346.85	328.58	281	0.42
Pool 22 - Upper	P22-UN-MC	8/21/01	600	418.47	401.49	398	0.49
Pool 22 - Upper	P22-UN-RDB	8/21/01	600	431.17	419.82	636	0.75

Table 2. (cont.) Monthly density of larval fish (No. fish/m^3) collected in pools 18, 22, and 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Sample Location	Sample ID	Date	Tow Time (Seconds)	Volume Sampled Net 1 (m^3)	Volume Sampled Net 2 (m^3)	No. Fish	Fish Density (No./m^3)
Diurnal							
Pool 22 - Lower	P22-LD-RDB	8/20/01	600	418.21	413.72	306	0.37
Pool 22 - Lower	P22-LD-MC	8/20/01	600	412.41	405.30	277	0.34
Pool 22 - Lower	P22-LD-LDB	8/20/01	600	420.98	295.04	52	0.07
Nocturnal							
Pool 22 - Lower	P22-LN-RDB	8/20/01	600	442.37	422.79	202	0.23
Pool 22 - Lower	P22-LN-MC	8/20/01	600	439.84	426.38	217	0.25
Pool 22 - Lower	P22-LN-LDB	8/21/01	600	362.59	352.48	211	0.30
Diurnal							
Pool 26 - Upper	P26-UD-LDB	8/24/01	600	414.23	408.38	368	0.45
Pool 26 - Upper	P26-UD-MC	8/24/01	600	431.13	427.71	325	0.38
Pool 26 - Upper	P26-UD-RDB	8/24/01	600	434.12	411.76	263	0.31
Nocturnal							
Pool 26 - Upper	P26-UN-LDB	8/25/01	600	425.83	406.00	466	0.56
Pool 26 - Upper	P26-UN-MC	8/24/01	600	434.25	428.15	157	0.18
Pool 26 - Upper	P26-UN-RDB	8/24/01	600	436.19	429.14	162	0.19
Diurnal							
Pool 26 - Lower	P26-LD-RDB	8/24/01	600	418.36	404.76	56	0.07
Pool 26 - Lower	P26-LD-MC	8/24/01	600	417.37	430.77	131	0.15
Pool 26 - Lower	P26-LD-LDB	8/24/01	600	427.77	411.08	270	0.32
Nocturnal							
Pool 26 - Lower	P26-LN-RDB	8/25/01	600	427.52	418.07	248	0.29
Pool 26 - Lower	P26-LN-MC	8/25/01	600	439.29	428.17	52	0.06
Pool 26 - Lower	P26-LN-LDB	8/25/01	600	444.69	435.05	94	0.11
				Mean Density (No./m^3) for 8/22/01 Diurnal/Nocturnal Sample Period			**0.28**

*Note: P18-UN-MC (6/27/01), P18-LN-RDB (6/28/01), P18-LN-MC (6/28/01), and P18-LN-LDB (6/28/01) - Volume sampled is the same for both nets due to mechanical problems with one of the Flowmeters.

Table 3. Mean density of larval fish (No. fish/m^3) collected in Pool 18 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Species	Total Abundance	Mean Density (No./m^3)
Cycleptus elongatus juvenile	1	0.001
Catostomidae	418	0.017
Catostomidae juvenile	7	0.002
Centrarchidae	636	0.021
Centrarchidae juvenile	3	0.002
Ictalurus punctatus	19	0.003
Clupeidae	98	0.006
Clupeidae juvenile	6	0.007
Cyprinus carpio	378	0.013
Cyprinidae	18,218	0.403
Cyprinidae juvenile	67	0.008
Notropis atherinoides juvenile	1	0.001
Pylodictis olivaris	1	0.001
Hiodontidae	27	0.005
Hiodontidae juvenile	1	0.001
Ictiobus/Carpiodes sp.	242	0.010
Micropterus salmoides juvenile	1	0.001
Lepisosteidae	2	0.001
Lepisosteidae juvenile	1	0.001
Lepomis sp. juvenile	5	0.006
Morone sp.	69	0.005
Morone sp. juvenile	1	0.001
Percidae	16	0.003
Sciaenidae	9,665	0.227
Unknown	714	0.022
Total Abundance	**30,597**	
Species Richness	**14**	
Mean Density (No./m^3)	**0.69**	
Shannon Diversity Index	**1.06**	

Table 4. Mean density of larval fish (No. fish/m^3) collected in Pool 22 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Species	Total Abundance	Mean Density (No./m^3)
Catastomidae	302	0.010
Centrarchidae	219	0.005
Centrarchidae juvenile	5	0.002
Ictalurus punctatus	9	0.002
Clupeidae	95	0.005
Clupeidae juvenile	4	0.001
Cyprinus carpio	226	0.007
Cyprinus carpio juvenile	1	0.001
Cyprinidae	13,639	0.286
Cyprinidae juvenile	192	0.016
Pylodictis olivaris	1	0.001
Hiodontidae	67	0.006
Ictiobus/Carpiodes sp.	637	0.016
Micropterus salmoides	1	0.001
Lepisosteidae	5	0.001
Morone sp.	76	0.007
Morone sp. juvenile	1	0.001
Percidae	31	0.003
Polydon spathala juvenile	1	0.001
Sciaenidae	17,957	0.371
Sciaenidae juvenile	1	0.001
Unknown	505	0.013
Total	**33,975**	
Species Richness	**12**	
Mean Density (No./m^3)	**0.71**	
Shannon Diversity Index	**1.03**	

Table 5. Mean density of larval fish (No. fish/m^3) collected in Pool 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Species	Total Abundance	Mean Density (No./m^3)
Catastomidae	74	0.003
Catastomidae juvenile	2	0.001
Centrarchidae	440	0.011
Centrarchidae juvenile	2	0.002
Ictalurus punctatus	111	0.013
Clupeidae	267	0.011
Clupeidae juvenile	9	0.003
Cyprinus carpio	139	0.009
Cyprinus carpio juvenile	10	0.004
Cyprinidae	7,559	0.159
Cyprinidae juvenile	6	0.002
Hiodontidae	51	0.007
Ictiobus/Carpiodes sp.	235	0.008
Lepisosteidae	3	0.001
Lepisosteidae juvenile	1	0.001
Morone sp.	37	0.007
Morone sp. juvenile	1	0.001
Percidae	18	0.003
Sciaenidae	20,472	0.423
Unknown	270	0.007
Total	**29,707**	
Species Richness	**10**	
Mean Density (No./m^3)	**0.62**	
Shannon Diversity Index	**0.89**	

Table 6. Summary of temporal sampling results of larval fish within Pools 18, 22, and 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Location		June	July	August
Pool 18	Total Fish	4,012	15,268	11,317
	Mean Density (No. fish/m^3)	0.24	0.95	0.87
Pool 22	Total Fish	7,917	16,255	9,803
	Mean Density (No. fish/m^3)	0.48	1.01	0.63
Pool 26	Total Fish	7,644	15,929	6,134
	Mean Density (No. fish/m^3)	0.46	1.00	0.38
	Total Fish	19,573	47,452	27,254
	Mean Density (No. fish/m^3)	0.39	0.99	0.63

Table 7. Summary of diurnal and nocturnal sampling results for dates with both diurnal and nocturnal sampling of larval fish in Pools 18, 22, and 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Location		Diurnal Sampling	Nocturnal Sampling
Pool 18	Total Fish	9,851	4,663
	Mean Density (No. fish/m^3)	0.69	0.31
Pool 22	Total Fish	11,374	8,690
	Mean Density (No. fish/m^3)	0.70	0.53
Pool 26	Total Fish	10,121	7,537
	Mean Density (No. fish/m^3)	0.64	0.47
	Total Fish	31,346	20,890
	Mean Density (No. fish/m^3)	0.68	0.44

Table 8. Summary of temporal sampling results of larval fish within upper and lower reaches in Pools 18, 22, and 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Location		June	July	August
Pool 18 - Upper	Total Fish	2,293	5,779	6,417
	Mean Density (No. fish/m^3)	0.27	0.73	0.93
Pool 18 - Lower	Total Fish	1,719	9,489	4,900
	Mean Density (No. fish/m^3)	0.21	1.18	0.80
Pool 22 - Upper	Total Fish	4,440	11,227	5,456
	Mean Density (No. fish/m^3)	0.53	1.42	0.71
Pool 22 - Lower	Total Fish	3,477	5,028	4,347
	Mean Density (No. fish/m^3)	0.43	0.59	0.55
Pool 26 - Upper	Total Fish	4,338	10,113	4,955
	Mean Density (No. fish/m^3)	0.53	1.28	0.62
Pool 26 - Lower	Total Fish	3,306	5,816	1,179
	Mean Density (No. fish/m^3)	0.40	0.73	0.15
	Total Fish	19,573	47,452	27,254
	Mean Density (No. fish/m^3)	0.39	0.99	0.63

Table 9. Summary of spatial and diurnal and nocturnal sampling results of larval fish in Pools 18, 22, and 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Location		Diurnal Sampling			Nocturnal Sampling		
		Left Bank*	Main Channel	Right Bank**	Left Bank*	Main Channel	Right Bank**
Pool 18 - Upper	Total Fish	5,756	3,240	2,421	1,578	701	793
	Mean Density (No. fish/m^3)	1.13	0.67	0.50	0.61	0.23	0.33
Pool 18 - Lower	Total Fish	3,035	6,090	5,392	211	293	1,087
	Mean Density (No. fish/m^3)	0.61	1.18	1.16	0.11	0.12	0.44
Pool 22 - Upper	Total Fish	8,734	4,132	3,467	1,581	1,153	2,056
	Mean Density (No. fish/m^3)	1.67	0.78	0.64	0.62	0.42	0.76
Pool 22 - Lower	Total Fish	2,518	3,412	3,022	1,000	522	2,378
	Mean Density (No. fish/m^3)	0.48	0.63	0.55	0.38	0.19	0.82
Pool 26 - Upper	Total Fish	5,546	4,946	3,973	2,744	1,274	923
	Mean Density (No. fish/m^3)	1.06	0.91	0.75	1.02	0.49	0.34
Pool 26 - Lower	Total Fish	3,372	2,424	1,909	1,063	616	917
	Mean Density (No. fish/m^3)	0.63	0.45	0.35	0.40	0.23	0.34
Total Fish		28,961	24,244	20,184	8,177	4,559	8,154
Mean Density (No. fish/m^3)		0.93	0.77	0.66	0.52	0.28	0.50

*Left Bank = Left Descending Bank

**Right Bank = Right Descending Bank

Table 10. Daytime larval fish density expressed as No. fish/m^3 for taxa collected during the June 13, 2001 sample period (+/- 3 days) on the Upper Mississippi River. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Pool 18

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae	0.003		0.001	0.012	0.007	0.004
Centrarchidae	0.001		0.002			
Clupeidae	0.003	0.002		0.004	0.004	0.021
Cyprinus carpio	0.004	0.001	0.002	0.001	0.003	0.001
Cyprinidae	0.022	0.032	0.001	0.037	0.001	0.003
Hiodontidae	0.004	0.004	0.016	0.003	0.001	
Lepisosteidae				0.001		
Morone sp.	0.001	0.002		0.006	0.013	0.031
Percidae			0.002	0.003		
Sciaenidae	0.062	0.117	0.008	0.017	0.031	
Unknown	0.024	0.199	0.003	0.004	0.001	0.003
Total Density (No./m^3)	**0.13**	**0.36**	**0.04**	**0.09**	**0.06**	**0.06**

Pool 22

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae	0.012		0.006	0.002	0.012	0.005
Centrarchidae		0.002	0.003	0.005		0.002
Clupeidae		0.006	0.034	0.009	0.002	0.001
Cyprinus carpio	0.017	0.009	0.073	0.033	0.011	0.005
Cyprinidae	0.067	0.028	0.014	0.140	0.050	0.047
Hiodontidae	0.002	0.010	0.008	0.016	0.008	0.019
Ictiobus/Carpoides sp.	0.005	0.011	0.001	0.001		0.001
Morone sp.		0.006	0.020	0.008	0.002	0.011
Percidae	0.001		0.001	0.007	0.001	0.005
Sciaenidae	0.482	0.125	0.035	0.053	0.071	0.095
Unknown	0.021	0.037	0.008		0.030	0.014
Total Density (No./m^3)	**0.61**	**0.23**	**0.20**	**0.27**	**0.19**	**0.20**

Pool 26

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae	0.008		0.009	0.006	0.002	
Catostomidae juvenile		0.001				
Centrarchidae	0.010	0.021	0.046	0.009	0.008	0.005
Clupeidae	0.013	0.004	0.020	0.105	0.012	
Cyprinus carpio	0.014	0.024	0.045	0.012	0.020	0.011
Cyprinus carpio juvenile		0.001				0.009
Cyprinidae	0.029	0.004	0.017	0.188	0.020	0.002
Hiodontidae	0.003	0.006	0.006	0.015	0.017	0.009
Ictiobus/Carpoides sp.	0.002	0.006	0.003			
Morone sp.				0.031	0.004	0.001
Percidae		0.001	0.001	0.004		
Sciaenidae	0.208	0.189	0.304	0.111	0.709	0.323
Unknown	0.001	0.008	0.007	0.007	0.033	0.024
Total Density (No./m^3)	**0.29**	**0.27**	**0.46**	**0.49**	**0.83**	**0.38**

Table 11. Daytime larval fish density expressed as No. fish/m^3 for taxa collected during the June 27, 2001 sample period (+/- 3 days) on the Upper Mississippi River. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Pool 18

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae				0.006		
Catostomidae juvenile				0.002		
Centrarchidae	0.001	0.003	0.003	0.002		0.002
Ictalurus punctatus						0.001
Clupeidae		0.001			0.001	0.005
Cyprinus carpio	0.002	0.003	0.001	0.024	0.019	0.014
Cyprinidae	0.005	0.010	0.024	0.045	0.015	0.031
Cyprinidae juvenile				0.003		
Hiodontidae					0.001	
Ictiobus/Carpoides sp.	0.001	0.001		0.006	0.002	0.001
Morone sp.		0.001		0.003	0.002	0.003
Percidae				0.001		
Sciaenidae	0.210	0.356	0.076	0.152	0.213	0.040
Unknown			0.001		0.002	0.001
Total Density (No./m^3)	**0.22**	**0.38**	**0.11**	**0.25**	**0.26**	**0.10**

Pool 22

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae	0.004	0.001	0.003	0.001	0.002	0.004
Centrarchidae	0.001	0.001	0.012	0.001	0.005	0.002
Clupeidae			0.010	0.004		0.003
Cyprinus carpio	0.005	0.001	0.012	0.002		0.004
Cyprinus carpio juvenile						0.001
Cyprinidae	0.023	0.022	0.084	0.333	0.025	0.023
Hiodontidae	0.001	0.001	0.002	0.002	0.001	0.002
Ictiobus/Carpoides sp.	0.021	0.013	0.011	0.015	0.029	0.017
Micropterus salmoides						0.001
Lepisosteidae		0.001		0.001		0.002
Morone sp.			0.009	0.005		0.005
Percidae			0.001			
Sciaenidae	0.408	0.613	0.813	0.696	0.902	0.520
Unknown	0.004		0.001	0.017	0.001	
Total Density (No./m^3)	**0.47**	**0.65**	**0.96**	**1.08**	**0.97**	**0.59**

Pool 26

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae						0.002
Centrarchidae	0.004	0.006		0.001		0.002
Clupeidae	0.033	0.028	0.017	0.002		0.001
Cyprinus carpio				0.002		
Cyprinidae	0.023	0.020	0.006	0.027	0.002	0.005
Hiodontidae				0.001		
Ictiobus/Carpoides sp.	0.001	0.002				0.003
Lepisosteidae			0.001		0.001	0.001
Morone sp.				0.002		0.001
Morone sp. juvenile				0.001		
Sciaenidae	0.784	0.424	0.253	0.107	0.982	0.951
Unknown	0.001	0.001		0.001	0.006	
Total Density (No./m^3)	**0.85**	**0.48**	**0.28**	**0.15**	**0.99**	**0.97**

Table 12. Nighttime larval fish density expressed as No. fish/m^3 for taxa collected during the June 27, 2001 sample period (+/- 3 days) on the Upper Mississippi River. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Pool 18

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae	0.001	0.003	0.007	0.004	0.002	0.012
Catostomidae juvenile		0.001				
Centrarchidae		0.003	0.011		0.003	0.009
Clupeidae	0.001		0.001	0.001		0.005
Cyprinus carpio	0.010		0.118	0.006	0.020	0.034
Cyprinidae	0.008	0.004	0.040	0.183	0.010	0.198
Ictiobus/Carpoides sp.	0.008	0.002	0.031	0.028	0.016	0.071
Micropterus salmoides juvenile		0.001				
Lepisosteidae					0.001	
Morone sp.	0.001	0.001	0.001		0.001	0.001
Percidae			0.002			
Sciaenidae	0.106	0.075	0.215	0.549	0.270	0.178
Unknown	0.001	0.003	0.003	0.015		0.002
Total Density (No./m^3)	**0.14**	**0.09**	**0.43**	**0.79**	**0.32**	**0.51**

Pool 22

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae	0.003	0.003	0.002	0.002	0.009	0.008
Centrarchidae		0.001	0.005	0.006	0.002	0.004
Clupeidae			0.003	0.003		
Cyprinus carpio	0.004	0.001	0.001	0.004		
Cyprinidae	0.007	0.018	0.181	0.197	0.020	0.032
Polydictis olivaris						0.001
Ictiobus/Carpoides sp.	0.022	0.018	0.087	0.040	0.016	0.041
Morone sp.			0.005	0.004		0.004
Morone sp. juvenile				0.001		
Percidae			0.001	0.001		
Polydon spathula juvenile			0.001			
Sciaenidae	0.065	0.106	0.178	0.192	0.312	0.526
Unknown		0.010	0.002	0.004	0.009	0.002
Total Density (No./m^3)	**0.10**	**0.16**	**0.47**	**0.46**	**0.37**	**0.62**

Pool 26

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae	0.004	0.001		0.005	0.004	0.004
Catostomidae juvenile					0.001	
Centrarchidae			0.001	0.007		0.003
Ictalurus punctatus	0.005	0.015	0.060	0.015	0.008	0.007
Clupeidae	0.004	0.004	0.004	0.002	0.001	
Clupeidae juvenile			0.002			
Cyprinus carpio		0.001	0.002	0.003		
Cyprinus carpio juvenile		0.002				
Cyprinidae	0.010	0.006	0.003	0.151	0.013	0.009
Cyprinidae juvenile				0.001		
Hiodontidae					0.001	
Ictiobus/Carpoides sp.	0.008	0.004	0.014	0.029	0.030	0.045
Morone sp.			0.001			
Sciaenidae	0.491	0.170	0.129	0.416	0.093	0.087
Unknown	0.003			0.008	0.003	
Total Density (No./m^3)	**0.53**	**0.20**	**0.21**	**0.64**	**0.15**	**0.16**

Table 13. Daytime larval fish density expressed as No. fish/m^3 for taxa collected during the July 11, 2001 sample period (+/- 3 days) on the Upper Mississippi River. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Pool 18

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Cycleptus elongatus juvenile					0.001	
Catostomidae	0.001	0.008	0.018	0.005	0.003	0.083
Catostomidae juvenile						0.001
Centrarchidae	0.031	0.013	0.036	0.049	0.044	0.123
Clupeidae	0.013	0.002	0.007	0.020	0.004	0.014
Clupeidae juvenile	0.007					
Cyprinus carpio	0.019	0.011	0.008	0.017	0.017	0.007
Cyprinidae	0.072	0.054	0.080	0.410	0.143	0.145
Cyprinidae juvenile	0.010			0.001		0.001
Notropis atherinoides juvenile					0.001	
Polydictis olivaris		0.001				
Hiodontidae juvenile				0.001		
Ictiobus/Carpoides sp.	0.004	0.002	0.003	0.010		0.029
Lepisosteidae juvenile	0.001					
Morone sp.	0.008	0.003		0.001		
Morone sp. juvenile	0.001					
Percidae	0.001					
Sciaenidae	0.371	2.219	0.147	0.471	0.378	0.078
Unknown		0.004	0.002		0.007	0.023
Total Density (No./m^3)	**0.54**	**2.32**	**0.30**	**0.99**	**0.60**	**0.50**

Pool 22

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae				0.018	0.016	0.016
Centrarchidae	0.003	0.001	0.010	0.035	0.005	0.002
Centrarchidae juvenile				0.001		
Clupeidae		0.001	0.003	0.006	0.001	0.006
Cyprinus carpio		0.002	0.011	0.007	0.001	0.005
Cyprinidae	0.009	0.022	0.150	3.553	0.085	0.238
Cyprinidae juvenile				0.001		
Ictiobus/Carpoides sp.	0.005	0.005	0.002	0.002	0.002	0.006
Lepisosteidae			0.001			
Morone sp.				0.004		
Percidae			0.007			0.003
Sciaenidae	0.134	0.252	0.133	1.704	0.465	0.523
Unknown	0.002			0.020		0.002
Total Density (No./m^3)	**0.15**	**0.28**	**0.32**	**5.35**	**0.57**	**0.80**

Pool 26

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae				0.001	0.006	0.007
Centrarchidae	0.005	0.006	0.010	0.014	0.004	0.012
Centrarchidae juvenile					0.002	
Clupeidae	0.014	0.002		0.013	0.003	0.002
Clupeidae juvenile	0.003				0.004	
Cyprinus carpio			0.004		0.001	
Cyprinidae	0.047	0.016	0.011	0.588	0.113	0.066
Cyprinidae juvenile					0.002	
Ictiobus/Carpoides sp.	0.007	0.004	0.005	0.005	0.006	0.003
Lepisosteidae juvenile					0.001	
Sciaenidae	1.451	0.864	0.559	0.855	1.176	0.974
Unknown	0.002	0.001		0.001	0.002	0.002
Total Density (No./m^3)	**1.53**	**0.89**	**0.59**	**1.48**	**1.32**	**1.07**

Table 14. Daytime larval fish density expressed as No. fish/m^3 for taxa collected during the July 25, 2001 sample period (+/- 3 days) on the Upper Mississippi River. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Pool 18

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae	0.008	0.080	0.116	0.009	0.002	0.004
Centrarchidae	0.059	0.063	0.052	0.034	0.008	0.011
Centrarchidae juvenile	0.001					
Clupeidae		0.001	0.002			
Cyprinus carpio				0.001	0.002	
Cyprinidae	0.789	1.075	2.474	0.907	0.407	0.896
Cyprinidae juvenile	0.001				0.001	
Ictiobus/Carpoides sp.				0.002	0.002	0.009
Percidae			0.004			0.004
Sciaenidae	0.247	0.842	0.444	0.279	0.119	0.074
Unknown	0.002	0.048	0.048	0.017	0.002	0.007
Total Density (No./m^3)	**1.11**	**2.11**	**3.14**	**1.25**	**0.54**	**1.00**

Pool 22

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae	0.050	0.053		0.001		0.006
Centrarchidae	0.001	0.010	0.009	0.016	0.002	0.003
Clupeidae			0.002	0.003		0.004
Clupeidae juvenile			0.001			
Cyprinus carpio		0.002	0.002	0.002	0.001	0.001
Cyprinidae	0.310	0.356	0.331	0.544	0.092	0.172
Ictiobus/Carpoides sp.	0.013	0.011	0.001	0.008	0.002	0.001
Percidae						0.001
Sciaenidae	0.350	0.362	0.052	1.327	1.207	0.323
Unknown	0.004	0.005	0.017	0.011	0.006	0.026
Total Density (No./m^3)	**0.73**	**0.80**	**0.42**	**1.91**	**1.31**	**0.54**

Pool 26

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae		0.001				
Centrarchidae	0.016	0.015	0.017	0.055	0.007	0.013
Clupeidae	0.001			0.001	0.002	
Cyprinidae	0.446	0.313	0.386	0.611	0.326	0.331
Ictiobus/Carpoides sp.	0.001	0.001				0.001
Percidae		0.001		0.007		
Sciaenidae	0.120	0.440	0.248	1.294	0.573	0.783
Unknown	0.012	0.005	0.005	0.002		0.013
Total Density (No./m^3)	**0.60**	**0.78**	**0.66**	**1.97**	**0.91**	**1.14**

Table 15. Nighttime larval fish density expressed as No. fish/m^3 for taxa collected during the July 25, 2001 sample period (+/- 3 days) on the Upper Mississippi River. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Pool 18

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae			0.005		0.004	
Catostomidae juvenile		0.001				0.002
Centrarchidae		0.009	0.025	0.003	0.008	0.006
Centrarchidae juvenile				0.002		
Ictalurus punctatus	0.001	0.001		0.001	0.001	0.015
Cyprinus carpio	0.001		0.060			
Cyprinidae	0.046	0.157	0.508	0.616	0.227	0.289
Cyprinidae juvenile		0.001	0.047	0.010		
Ictiobus/Carpoides sp.	0.001		0.005		0.004	0.029
Lepomis sp. juvenile			0.006			
Sciaenidae	0.019	0.044	0.079	0.255	0.070	0.024
Unknown	0.001	0.009	0.041	0.061	0.012	0.006
Total Density (No./m^3)	**0.07**	**0.22**	**0.78**	**0.95**	**0.33**	**0.37**

Pool 22

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae	0.005					
Centrarchidae			0.007	0.003	0.004	0.018
Centrarchidae juvenile			0.002			0.002
Ictalurus punctatus		0.001		0.003	0.003	0.002
Clupeidae				0.001		
Clupeidae juvenile			0.001			0.001
Cyprinus carpio	0.002	0.002	0.010		0.003	0.001
Cyprinidae	0.413	0.099	1.125	0.482	0.082	0.452
Cyprinidae juvenile				0.007		0.008
Ictiobus/Carpoides sp.	0.024	0.014	0.176	0.016	0.002	0.004
Percidae						0.002
Sciaenidae	0.255	0.036	0.408	0.451	0.312	0.407
Unknown	0.036	0.011	0.028	0.020	0.011	0.002
Total Density (No./m^3)	**0.74**	**0.16**	**1.76**	**0.98**	**0.42**	**0.90**

Pool 26

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae			0.001	0.002	0.001	
Centrarchidae	0.003		0.011	0.009	0.001	0.009
Ictalurus punctatus	0.001			0.001	0.002	
Clupeidae				0.001		
Cyprinidae	0.202	0.122	0.144	1.013	0.582	0.265
Ictiobus/Carpoides sp.	0.002	0.007	0.001	0.026	0.008	0.020
Sciaenidae	0.335	0.294	0.368	0.765	0.493	0.365
Unknown	0.001	0.002	0.001	0.039	0.043	0.008
Total Density (No./m^3)	**0.55**	**0.42**	**0.53**	**1.86**	**1.13**	**0.67**

Table 16. Daytime larval fish density expressed as No. fish/m^3 for taxa collected during the August 8, 2001 sample period (+/- 3 days) on the Upper Mississippi River. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Pool 18

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae	0.008	0.017	0.007			0.008
Centrarchidae	0.030	0.009	0.032	0.014	0.015	0.005
Cyprinus carpio			0.001		0.005	0.001
Cyprinidae	1.158	1.328	2.076	3.501	2.053	0.993
Sciaenidae	0.183	0.256	0.201	0.450	0.456	0.044
Unknown	0.009	0.058	0.008	0.150	0.004	0.008
Total Density (No./m^3)	**1.39**	**1.67**	**2.33**	**4.12**	**2.53**	**1.06**

Pool 22

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae	0.056	0.011	0.001	0.006		
Centrarchidae	0.003	0.002	0.002	0.008	0.002	0.008
Clupeidae						0.001
Cyprinidae	0.190	0.276	0.482	0.582	0.352	0.462
Cyprinidae juvenile	0.007		0.045			
Ictiobus/Carpoides sp.	0.018			0.001		0.001
Percidae				0.001		
Sciaenidae	0.559	1.160	0.469	0.546	0.891	0.435
Unknown	0.007	0.032	0.061	0.017	0.009	0.018
Total Density (No./m^3)	**0.84**	**1.48**	**1.06**	**1.16**	**1.26**	**0.92**

Pool 26

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae						0.001
Centrarchidae	0.016	0.009	0.005	0.025	0.008	0.011
Cyprinidae	0.098	0.027	0.039	0.233	0.140	0.120
Percidae				0.004		0.001
Sciaenidae	0.080	0.076	0.010	1.559	0.882	0.474
Unknown	0.001			0.002	0.014	0.002
Total Density (No./m^3)	**0.20**	**0.11**	**0.05**	**1.82**	**1.04**	**0.61**

Table 17. Daytime larval fish density expressed as No. fish/m^3 for taxa collected during the August 22, 2001 sample period (+/- 3 days) on the Upper Mississippi River. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Pool 18

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae						0.070
Cyprinidae	0.110	0.039	0.271	0.058	0.013	0.058
Sciaenidae	0.165	0.209	0.734	0.022	0.025	0.152
Unknown			0.068	0.004		
Total Density (No./m^3)	**0.27**	**0.25**	**1.07**	**0.08**	**0.04**	**0.28**

Pool 22

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae				0.007	0.001	
Centrarchidae		0.006	0.006	0.002	0.002	0.007
Cyprinus carpio				0.001		
Cyprinidae	0.047	0.285	0.313	0.202	0.307	0.713
Cyprinidae juvenile	0.001	0.013	0.007			
Sciaenidae	0.022	0.034	0.025	0.033	0.072	0.078
Unknown	0.001		0.017		0.008	0.001
Total Density (No./m^3)	**0.07**	**0.34**	**0.37**	**0.25**	**0.39**	**0.80**

Pool 26

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae	0.005		0.002	0.001		0.001
Centrarchidae	0.012	0.005	0.007	0.024	0.009	0.013
Clupeidae	0.002		0.001			
Cyprinus carpio				0.002		0.002
Cyprinidae	0.228	0.105	0.044	0.154	0.231	0.150
Ictiobus/Carpoides sp.	0.001					
Percidae						0.001
Sciaenidae	0.074	0.044	0.012	0.264	0.134	0.141
Unknown		0.001	0.001	0.001	0.005	0.002
Total Density (No./m^3)	**0.32**	**0.15**	**0.07**	**0.45**	**0.38**	**0.31**

Table 18. Nighttime larval fish density expressed as No. fish/m^3 for taxa collected during the August 22, 2001 sample period (+/- 3 days) on the Upper Mississippi River. Contract No. DACW25-00-D-0005, Work Order No. 0005.

Pool 18

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Ictalurus punctatus						0.003
Cyprinus carpio		0.004		0.004		
Cyprinidae	0.035	0.004	0.059	0.008	0.013	0.048
Cyprinidae juvenile	0.004					
Sciaenidae	0.074	0.029	0.032	0.076	0.042	0.070
Unknown			0.012			
Total Density (No./m^3)	**0.11**	**0.04**	**0.10**	**0.09**	**0.06**	**0.12**

Pool 22

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae	0.003				0.002	
Centrarchidae	0.001				0.001	0.007
Clupeidae juvenile						0.001
Cyprinus carpio		0.001	0.001	0.001	0.001	0.007
Cyprinidae	0.169	0.119	0.073	0.265	0.284	0.478
Cyprinidae juvenile	0.010	0.039	0.058	0.009	0.006	0.012
Ictiobus/Carpoides sp.	0.001			0.001		0.002
Sciaenidae	0.103	0.082	0.097	0.136	0.185	0.240
Sciaenidae juvenile			0.001			
Unknown	0.007	0.009	0.003	0.003	0.005	
Total Density (No./m^3)	**0.30**	**0.25**	**0.23**	**0.42**	**0.49**	**0.75**

Pool 26

	Lower Pool			Upper Pool		
Species	Left Bank	Main Channel	Right Bank	Left Bank	Main Channel	Right Bank
Catostomidae			0.001	0.005		
Centrarchidae	0.001		0.007	0.010	0.007	0.001
Cyprinus carpio	0.002	0.006	0.001	0.002		
Cyprinidae	0.070	0.020	0.174	0.428	0.089	0.136
Cyprinidae juvenile					0.002	
Ictiobus/Carpoides sp.	0.001		0.001			
Sciaenidae	0.032	0.033	0.106	0.105	0.079	0.045
Unknown		0.001	0.002	0.011	0.005	0.005
Total Density (No./m^3)	**0.11**	**0.06**	**0.29**	**0.56**	**0.18**	**0.19**

Table 19. Average lengths (mm) and length ranges of larval fish collected from Pool 18 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

	June		July		August	
Species	**Mean**	**(Min - Max)**	**Mean**	**(Min - Max)**	**Mean**	**(Min - Max)**
Cycleptus elongatus juvenile			54.00	N/A		
Catastomidae	7.93	(3-27)	3.57	(2-18)	2.69	(2-3)
Catastomidae juvenile	29.33	(28-31)	26.33	(16-43)		
Centrarchidae	8.13	(5-14)	9.81	(4-58)	5.18	(4-12)
Centrarchidae juvenile			21.00	(16-26)		
Ictalurus punctatus	16.00	N/A	17.18	(15-20)	17.00	N/A
Clupeidae	12.37	(4-21)	16.34	(7-24)		
Clupeidae juvenile			25.17	(22-28)		
Cyprinus carpio	6.63	(4-16)	6.52	(5-9)	7.14	(7-8)
Cyprinidae	6.00	(4-11)	6.58	(3-43)	5.79	(4-58)
Cyprinidae juvenile	53.67	(47-59)	31.94	(18-74)	25.00	N/A
Notropis atherinoides juvenile			68.00	N/A		
Pylodictis olivaris			10.00	N/A		
Hiodontidae	20.00	(13-27)				
Hiodontidae juvenile			70.00	N/A		
Ictiobus/Carpiodes sp.	7.08	(5-11)	6.84	(4-9)		
Micropterus salmoides juvenile	44.00	N/A				
Lepisosteidae	22.50	(21-24)				
Lepisosteidae juvenile			75.00	N/A		
Lepomis sp. juvenile			23.80	(20-33)		
Morone sp.	13.24	(7-27)	14.20	(11-22)		
Morone sp. juvenile			40.00	N/A		
Percidae	14.38	(4-33)	6.00	(5-7)		
Sciaenidae	8.53	(3-16)	5.29	(3-11)	5.82	(3-11)

Table 20. Average lengths (mm) and length ranges of larval fish collected from Pool 22 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

	June		July		August	
Species	**Mean**	**(Min - Max)**	**Mean**	**(Min - Max)**	**Mean**	**(Min - Max)**
Catastomidae	6.55	(3-23)	3.0	(2-6)	3.29	(2-13)
Centrarchidae	6.72	(4-25)	6.91	(4-16)	5.55	(4-11)
Centrarchidae juvenile			22.00	(14-39)		
Ictalurus punctatus			16.44	(14-18)		
Clupeidae	7.03	(4-14)	14.36	(4-25)	7.00	N/A
Clupeidae juvenile			24.33	(21-27)	68.00	N/A
Cyprinus carpio	6.78	(4-50)	7.31	(5-12)	7.18	(6-8)
Cyprinus carpio juvenile	30.00	N/A				
Cyprinidae	6.04	(4-12)	6.41	(3-24)	6.12	(4-15)
Cyprinidae juvenile			24.14	(18-30)	26.72	(16-71)
Pylodictis olivaris	13.00	N/A				
Hiodontidae	19.98	(9-37)				
Ictiobus/Carpiodes sp.	7.25	(4-10)	7.44	(5-9)	5.95	(4-8)
Micropterus salmoides	31.00	N/A				
Lepisosteidae	21.75	(21-22)	25.00	N/A		
Morone sp.	15.34	(4-26)	12.67	(11-16)		
Morone sp. juvenile	33.00	N/A				
Percidae	5.94	(4-15)	6.00	(4-8)	7.00	N/A
Polydon spathula juvenile	N/A					
Sciaenidae	7.72	(3-18)	8.27	(3-15)	6.42	(3-15)
Sciaenidae juvenile					19.00	N/A

Table 21. Average lengths (mm) and length ranges of larval fish collected from Pool 26 of the Upper Mississippi River, Summer 2001. Contract No. DACW25-00-D-0005, Work Order No. 0005.

	June		July		August	
Species	**Mean**	**(Min - Max)**	**Mean**	**(Min - Max)**	**Mean**	**(Min - Max)**
Catastomidae	7.73	(3-21)	4.53	(2-15)	7.79	(2-20)
Catastomidae juvenile	43.00	(32-54)				
Centrarchidae	5.43	(4-12)	6.06	(3-16)	5.10	(3-10)
Centrarchidae juvenile			15.00	(14-16)		
Ictalurus punctatus	17.21	(15-26)	15.75	(15-16)		
Clupeidae	10.28	(4-25)	13.31	(5-27)	10.00	(8-12)
Clupeidae juvenile	62.50	(62-63)	24.14	(19-29)		
Cyprinus carpio	6.95	(5-23)	7.40	(7-8)	8.21	(6-11)
Cyprinus carpio juvenile	27.00	(19-37)				
Cyprinidae	6.18	(4-15)	5.40	(3-16)	5.51	(3-16)
Cyprinidae juvenile	23.00	N/A	16.50	(15-18)	25.33	(21-31)
Hiodontidae	21.20	(8-49)				
Ictiobus/Carpiodes sp.	7.52	(5-12)	7.07	(4-9)	7.00	(5-8)
Lepisosteidae	23.00	(19-27)				
Lepisosteidae juvenile			30.00	N/A		
Morone sp.	15.21	(4-23)				
Morone sp. juvenile	42.00	N/A				
Percidae	12.67	(5-29)	5.86	(4-7)	5.20	(5-6)
Sciaenidae	8.84	(3-19)	6.35	(3-75)	6.38	(3-55)

Appendix A

Project Correspondence

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

http://www.mvr.usace.army.mil

May 14, 2001

SUBJECT: Task Order for Contract No. DACW25-00-D-0005. For the Evaluation of Larval Fish Diversity and Abundance, Upper Mississippi River

Environmental Science & Engineering Inc.
ATTN: Stephen R. Carter
3199 Riverport Tech Center Drive
St. Louis, Missouri 63043

Dear Mr. Carter:

Enclosed is the scope of work for subject task order. We now request that you submit your proposal for the required services in accordance with the attached scope of work.

It is requested that your proposal be returned to this office by close of business May 21, or sooner. Your proposal may be mailed to the above address, faxed to (309) 794-5172, Attn: Beth Crawford or e-mailed to Beth.A.Crawford@usace.army.mil. The proposal should be based upon hourly rates and percentages in the basic contract and all materials required for this project should be itemized under "Other Significant Cost".

Should you have additional questions please do not hesitate to contact Beth Crawford, Contract Specialist at 309/794-5828.

Sincerely,

Enclosures

Elizabeth A. Crawford
Contract Specialist
Contracting Division

Harding ESE
A MACTEC COMPANY

Harding ESE, Inc.
3199 Riverport Tech Center Drive
St. Louis, MO 63043

Telephone: 314/209-5900
Fax: 314/209-5929
Home Page: www.mactec.com

May 21, 2001

Ms. Elizabeth A. Crawford
Contract Specialist
Rock Island District, Corps of Engineers
Contracting Division
Clock Tower Building – P.O. Box 2004
Rock Island, IL 61204-2004

Re: Evaluation of Larval Fish Diversity and Abundance, Upper Mississippi River. Task Order for Contract No. DACW25-00-D-005

Dear Ms. Crawford:

Enclosed please find the cost estimates to perform Upper Mississippi River larval fish field sampling, laboratory analysis and report preparation.

Per our telephone conversation with Mr. Ronald Pulcher on May 18, 2001, please make the following changes to the final scope of work:

1. Delete paragraph number 5.2.10.10. This is the same as paragraph number 5.2.10.6,

2. Change the second to last sentence in paragraph 5.2.3 to "Every sampling date marked with an asterisk in para. 5.2.1, the contractor shall, in addition to the samples collected during the day, collect one nocturnal sample at each of the eighteen (18) sampling sites between 2200 hours (on the date **prior to or** of the diurnal sample) and 0500 hours on the date **of or** following the diurnal sample."

Additionally, Harding ESE will use Rose Bengal stain to facilitate the removal of ichthyoplankton larvae from collected debris.

Due to the minimal time frame provided for project mobilization, present high-water conditions and resulting limited river launch access, Harding ESE anticipates that the May sampling event will not be able to be conducted. Therefore, Harding ESE has provided an additional cost estimate worksheet omitting the May field effort as well as the associated data analysis and report preparation.

To assure that all field sampling is performed safely and in accordance with Harding ESE's health and safety requirements, the Corps' proposed field personnel have been upgraded to include a Fisheries Biologist I during daytime field efforts. Additionally, we have upgraded both team members for the night sampling, to increase the level of experience needed to efficiently and safely perform tasks during the more hazardous and disorienting conditions.

A category was not provided for an "appropriate" ichthyoplankton identification specialist, therefore we have chosen to use the Wildlife/Endangered Sp. Biologist I category as it most closely agrees with the rate of our ichthyoplankton taxonomic specialist's rate.

If you need additional information or clarification, please feel free to contact us at 314-209-5900.

Sincerely,

Harding ESE, Inc.

M. Brent McClane
Senior Project Scientist

Stephen R. Carter
Vice President

Enclosures

Harding ESE
A MACTEC COMPANY

Harding ESE, Inc.
3199 Riverport Tech Center Drive
St. Louis, MO 63043

Telephone: 314/209-5900
Fax: 314/209-5929
Home Page: www.mactec.com

May 25, 2001

Ms. Elizabeth A. Crawford
Contract Specialist
Rock Island District, Corps of Engineers
Contracting Division
Clock Tower Building – P.O. Box 2004
Rock Island, IL 61204-2004

Re: Evaluation of Larval Fish Diversity and Abundance, Upper Mississippi River.
Task Order for Contract No. DACW25-00-D-005

Dear Ms. Crawford:

Please find enclosed our final negotiated cost proposal to perform Upper Mississippi River larval fish field sampling, laboratory analysis and report preparation agreed upon by Harding ESE and Rock Island District on May 25, 2001.

During our telephone negotiations, Mr. Ronald Pulcher made numerous changes to the scope of work (SOW) that were agreed upon by both parties. Following negotiations, Mr. Pulcher sent us the revised SOW via e-mail. We have reviewed the revised SOW and find everything in order. I am enclosing the final SOW with this correspondence to provide confirmation of the SOW that we have agreed to.

Once again, we appreciate that opportunity to provide technical assistance to the Rock Island District. If you need additional information or clarification, please feel free to contact us at 314-209-5900.

Sincerely,

Harding ESE, Inc.

M. Brent McClane
Senior Project Scientist

Stephen R. Carter
Vice President

Enclosures

Harding ESE
A MACTEC COMPANY

Harding ESE, Inc.
3199 Riverport Tech Center Dr.
St. Louis, MO 63043

Telephone: 314/209-5900
Fax: 314/209-5929
Home Page: www.mactec.com

August 27, 2001

US Army Corps of Engineers, Rock Island
Attn: Elizabeth Crawford
P.O. Box 2004
Clock Tower Bldg.
Rock Island, IL 61204-2004

Re: Upper Mississippi River Ichthyoplankton Study Contract # DACW25-00-D-0005

Dear Ms. Crawford:

Please find enclosed with this letter a Harding ESE, Inc. invoice for costs associated with the 2001 Upper Mississippi River Ichthyoplankton Survey. These charges are labor and other direct costs associated with the field surveys conducted in late July and August.

If you have any questions please feel free to contact me at 314/209-5913.

Sincerely,

Harding ESE, Inc.

John S. Vile

John S. Vile
Project Manager

Enclosure

Harding ESE
A MACTEC COMPANY

Harding ESE, Inc.
3199 Riverport Tech Center Dr.
St. Louis, MO 63043

Telephone: 314/209-5900
Fax: 314/209-5929
Home Page: www.mactec.com

October 11, 2001

US Army Corps of Engineers, Rock Island
Attn: Elizabeth Crawford
P.O. Box 2004
Clock Tower Bldg.
Rock Island, IL 61204-2004

Re: Upper Mississippi River Ichthyoplankton Study Contract # DACW25-00-D-0005

Dear Ms. Crawford:

Please find enclosed with this letter a Harding ESE, Inc. invoice for costs associated with the 2001 Upper Mississippi River Ichthyoplankton Survey. These charges are labor costs associated with the laboratory sample evaluation of larval fish collected in the field surveys conducted in late July and August. The invoice reflects the charges for the first fifty liters of pre-preservation sample evaluated.

If you have any questions please feel free to contact me at 314/209-5913.

Sincerely,

Harding ESE, Inc.

John S. Vile
Project Manager

Enclosure

Harding ESE
A MACTEC COMPANY

Harding ESE, Inc.
3199 Riverport Tech Center Dr.
St. Louis, MO 63043
Telephone: 314/209-5900
Fax: 314/209-5929

October 18, 2001

ATTN: Mr. Ron Pulcher, PM-A
US Army Corps of Engineers
Rock Island District
P.O. Box 2004
Clock Tower Building
Rock Island, IL 61204-2004

Re: Contract DACW25-00-D-0005
Delivery Order No.: 0005

Dear Mr. Pulcher:

As requested, please find enclosed a resubmitted invoice for the above referenced project for the period of May 30, 2001 to October 11, 2001.

Please feel free to contact either me or John Vile if you need additional information or clarification regarding this issue.

Sincerely,

William Elzinga, MS
Principal Investigator

COPY

Harding ESE
A MACTEC COMPANY

Harding ESE, Inc.
3199 Riverport Tech Center Dr.
St. Louis, MO 63043

Telephone: 314/209-5900
Fax: 314/209-5929
Home Page: www.mactec.com

November 5, 2001

US Army Corps of Engineers, Rock Island
Attn: Elliott Stefanik
P.O. Box 2004
Rock Island, IL 61204-2004

Re: Upper Mississippi River Ichthyoplankton Study Contract # DACW25-00-D-0005

Dear Mr. Stefanik:

Please find enclosed the larval fish density information for the selected samples, along with the proposed revision to the larval fish sample processing protocol. In addition, I have provided comparison data pertaining to splitting picked samples. To date, Harding ESE, Inc. has completed the picking of 94 samples and the identification of 89 samples.

Should you require any additional information or if you have any questions please feel free to contact me at 314/209-5913.

Sincerely,

Harding ESE, Inc.

John S. Vile
Project Manager

Enclosure

Harding ESE
A MACTEC COMPANY

Harding ESE, Inc.
3199 Riverport Tech Center Dr.
St. Louis, MO 63043

Telephone: 314/209-5900
Fax: 314/209-5929
Home Page: www.mactec.com

December 1, 2001

US Army Corps of Engineers, Rock Island
Attn: Elliott Stefanik
P.O. Box 2004
Rock Island, IL 61204-2004

Re: Upper Mississippi River Ichthyoplankton Study Contract # DACW25-00-D-0005

Dear Mr. Stefanik:

Please find enclosed the density data outlined in section 5.4.1 of the Scope of Work. Although the processing of the samples has been completed, this data is still preliminary, as the QA/QC procedures are still ongoing. The final invoices for the sample evaluation will be sent out Monday 12/3/01.

If you have any questions please feel free to contact me at 314/209-5913.

Sincerely,

Harding ESE, Inc.

John S. Vile
Project Manager

Enclosure

Harding ESE
A MACTEC COMPANY

Harding ESE, Inc.
3199 Riverport Tech Center Dr.
St. Louis, MO 63043

Telephone: 314/209-5900
Fax: 314/209-5929
Home Page: www.mactec.com

December 3, 2001

Attn: Mr. Ronald Pulcher, PM-A
US Army Corps of Engineers
Rock Island District
P.O. Box 2004
Clock Tower Bldg.
Rock Island, IL 61204-2004

Re: Upper Mississippi River Ichthyoplankton Study Contract # DACW25-00-D-0005

Dear Mr. Pulcher:

Please find enclosed with this letter a Harding ESE, Inc. invoice for costs associated with the 2001 Upper Mississippi River Ichthyoplankton Survey. These charges are labor costs associated with the laboratory sample evaluation of larval fish collected in the field surveys conducted in late July and August. The invoice reflects the charges for the remaining 2.4 liters of pre-preservation sample evaluated.

If you have any questions please feel free to contact me at 314/209-5913.

Sincerely,

Harding ESE, Inc.

John S. Vile
Project Manager

Enclosure

Harding ESE
A MACTEC COMPANY

Harding ESE, Inc.
3199 Riverport Tech Center Dr.
St. Louis, MO 63043

Telephone: 314/209-5900
Fax: 314/209-5929
Home Page: www.mactec.com

December 3, 2001

Attn: Mr. Ronald Pulcher, PM-A
US Army Corps of Engineers
Rock Island District
P.O. Box 2004
Clock Tower Bldg.
Rock Island, IL 61204-2004

Re: Upper Mississippi River Ichthyoplankton Study Contract # DACW25-00-D-0005

Dear Mr. Pulcher:

Please find enclosed with this letter a Harding ESE, Inc. invoice for costs associated with the 2001 Upper Mississippi River Ichthyoplankton Survey. These charges are labor costs associated with the laboratory sample evaluation of larval fish collected in the field surveys conducted in late July and August. The invoice reflects the charges for the second fifty liters of pre-preservation sample evaluated.

If you have any questions please feel free to contact me at 314/209-5913.

Sincerely,

Harding ESE, Inc.

John S. Vile
Project Manager

Enclosure

Harding ESE
A MACTEC COMPANY

Harding ESE, Inc.
3199 Riverport Tech Center Dr.
St. Louis, MO 63043

Telephone: 314/209-5900
Fax: 314/209-5929
Home Page: www.mactec.com

December 21, 2001

US Army Corps of Engineers, Rock Island District
Mr. Elliott Stefanik
Clock Tower Building
P.O. Box 2004
Rock Island, IL 61204-2004

RE: Evaluation of Larval Fish Diversity and Abundance within Main Channel and Main Channel Border Habitats of Pools 18, 22, and 26 of the Upper Mississippi River

Dear Mr. Stefanik:

Please find enclosed with this letter 10 copies of the draft report for the evaluation of larval fish diversity and abundance within main channel and main channel border habitats of Pools 18, 22, and 26 of the Upper Mississippi River, produced under contract no. DACW25-00-D-0005, delivery order no. 0005.

Should you have any questions regarding this draft report please contact John Vile or Bill Elzinga at 314/209.5900.

Sincerely,

Harding ESE, Inc.

Christine D. DuMey
Project Biologist

Enclosure

Harding ESE
A MACTEC COMPANY

Harding ESE, Inc.
3199 Riverport Tech Center Dr.
St. Louis, MO 63043

Telephone: 314/209-5900
Fax: 314/209-5929
Home Page: www.mactec.com

January 4, 2002

Attn: Mr. Ronald Pulcher, PM-A
US Army Corps of Engineers
Rock Island District
P.O. Box 2004
Clock Tower Bldg.
Rock Island, IL 61204-2004

Re: Upper Mississippi River Ichthyoplankton Study Contract # DACW25-00-D-0005

Dear Mr. Pulcher:

Please find enclosed with this letter a Harding ESE, Inc. invoice for costs associated with the 2001 Upper Mississippi River Ichthyoplankton Survey. These charges are labor costs associated with the draft report preparation and submittal.

If you have any questions please feel free to contact me at 314/209-5913.

Sincerely,

Harding ESE, Inc.

John S. Vile
Project Manager

Enclosure

COPY

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

March 11, 2002

Planning, Programs, and
Project Management Division

Mr. William Elzinga
Principal Investigator
Harding ESE, Inc.
3199 Riverport Tech Center Drive
St. Louis, Missouri 63043

Dear Mr. Elzinga:

The Rock Island District of the U.S. Army Corps of Engineers (Corps) has reviewed your draft report entitled *Evaluation of Larval Fish Diversity and Abundance within Main Channel and Main Channel Border Habitats of Pools 18, 22, and 26 of the Upper Mississippi River* dated December 21, 2001. Harding ESE, Inc., St. Louis, Missouri, prepared the report under Corps Contract DACW25-00-D-0005, Work Order No. 0005.

This draft report is rejected under Paragraphs 7.1.4, 7.1.5 and 7.3 of the main contract Scope of Work because of the significant number of minor changes required and because of the omission of Standard Form 298. Please prepare and submit two corrected draft reports—within 14 calendar days following the date of this letter — after adding Standard Form 298 and after making the editorial changes marked on the draft report copy found at Enclosure 1. One larger editorial change is found on the diskette at Enclosure 2.

If you have any questions regarding this matter, please call me at telephone 309/794-5384, or write to me at our address above, ATTN: Planning, Programs, and Project Management Division (Ron Pulcher).

Sincerely,

Ronald E. Pulcher
Authorized Representative
of the Contracting Officer

Enclosures

Harding ESE
A MACTEC COMPANY

Harding ESE, Inc.
3199 Riverport Tech Center Dr.
St. Louis, MO 63043

Telephone: 314/209-5900
Fax: 314/209-5929
Home Page: www.mactec.com

March 27, 2002

US Army Corps of Engineers, Rock Island
Attn: Elliott Stefanik
P.O. Box 2004
Rock Island, IL 61204-2004

Re: Evaluation of Larval Fish Density and Diversity within Main Channel and Main Channel Border Habitats of Pools 18, 22, and 26 of the Upper Mississippi River.
Contract No. DACW25-00-D-0005 Delivery Order No. 0005

Dear Mr. Stefanik:

Please find enclosed with this letter 2 copies of the revised draft report for the evaluation of larval fish density and diversity within main channel and main channel border habitats of Pools 18, 22, and 26 of the Upper Mississippi River.

If you have any questions regarding this draft report, please contact me at 314/209-5913.

Sincerely,

Harding ESE, Inc.

John S. Vile
Project Manager

Enclosure

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT. CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

June 28, 2002

Planning, Programs, and
Project Management Division

Mr. William Elzinga
Principal Investigator
Harding ESE, Inc.
3199 Riverport Tech Center Drive
St. Louis, Missouri 63043

Dear Mr. Elzinga:

The Rock Island District of the U.S. Army Corps of Engineers (Corps) has reviewed the draft report entitled Evaluation of Larval Fish Density and Diversity within Main Channel and Main Channel Border Habitats of Pools 18, 22, and 26 of the Upper Mississippi River. Harding ESE, Inc., St. Louis, Missouri, prepared the report under Corps Contract DACW25-00-D-0005, Work Order No. 0005.

Please submit the final reports after including an appendix for correspondence containing this letter (without enclosure), and incorporating the final edits made at Enclosure 1.

If you have any questions regarding this matter, please call Mr. Ron Pulcher of our Economic and Environmental Analysis Branch, telephone 309/794-5384, or write to our address above, ATTN: Planning, Programs, and Project Management Division (Ron Pulcher).

Sincerely,

Ronald E. Pulcher
Authorized Representative
of the Contracting Officer

Enclosure

Appendix B

Scope of Work

SCOPE OF WORK

EVALUATION OF LARVAL FISH DIVERSITY AND ABUNDANCE WITHIN MAIN CHANNEL AND MAIN CHANNEL BOARDER HABITATS OF POOLS 18, 22 AND 26 OF THE UPPPER MISSISSIPPI RIVER

Contract No. DACW25-00-D-0005 Delivery Order No. _____

May 2001

I. CONTRACT PROVISIONS IN FORCE

Provisions of the Scope of Work (SOW) in the main contract shall apply to this Work Order as required to fulfill the requirements of the main contract and to accomplish the work set out in the Specifications, below, and are not repeated here.

II. PROJECT OBJECTIVE AND LOCATION

The purpose of this project is to evaluate larval fish diversity and abundance within the planktonic drift of main channel and main channel boarder habitats of Pools 18, 22 and 26 of the UMR (Upper Mississippi River). Primary tasks to be performed include: (1) perform a series larval drift transect samples across main channel (MC) and main channel boarder (MCB) habitats of Pools 18, 22 and 26 of the Upper Mississippi River; and (2) prepare a short technical report describing results of the survey. MC and MCB habitats are defined as in the Habitat Needs Assessment for the Upper Mississippi River Technical Report (Corps of Engineers 2000).

III. REGULATORY REQUIREMENTS AND AUTHORITIES

3.1 This study is being conducted to fulfill regulatory requirements stipulated under the provisions of the National Environmental Policy Act of 1969 (NEPA) and associated regulations.

3.2 The Contractor shall be responsible for securing all applicable sampling permits from the State and federal Governments.

IV. BACKGROUND

The District (U.S. Army Corps of Engineers, Rock Island District) is directed by Congress to maintain a 2.75 meter (m) (9-foot) navigation channel on the UMR and IWW (Illinois Waterway). Maintenance of the navigation channel involves operating a series of Locks and Dams to maintain minimum pool elevations.

The Upper Mississippi River-Illinois Waterway System Navigation Study ('UMR-IWW System Navigation Study', 'Navigation Study') is a feasibility study addressing navigation improvement planning for the UMR and IWW navigation system for the years 2000-2050. The study assesses the need for navigation improvements at 29 lock and dam facilities (35 locks) on the UMR and 8 locks on the IWW and the impacts of providing these improvements.

Navigation improvements associated with the Navigation Study would likely result in an increase in commercial navigation traffic in the UMR and IWW. This increase in navigation traffic could result in adverse impacts to fisheries communities of the UMR and IWW. One way that fisheries communities may be adversely affected is through mortality of larval fish through propeller entrainment. To help characterize potential impacts from larval fish entrainment, the Corps has reviewed available data and pursued additional larval fish sampling to characterize larval fish drift within the UMR and IWW (Corps of Engineers 1999). Work performed under this SOW shall further augment this effort.

V. STATEMENT OF WORK/SPECIFICATIONS

5.1 Sampling Sites. Eighteen (18) separate sampling sites shall be divided evenly among six (6) separate linear sampling transects in UMR Pools 18, 22 and 26.

5.1.1 One linear transect is located in the upstream and one in the downstream section of each Pool. The location of each transect is found at Exhibit 1.

5.1.2 At, or as close as practical to, each transect the Contractor shall establish one (1) sampling site within the MCB along the right side of the channel, one (1) MC sampling site within the MC, and one (1) sampling site within the MCB along the left side of the channel. MC and MCB on the Exhibit 1 maps date to the late 1980s; therefore, the Contractor shall rely upon the definitions of MC and MCB (as per the report referenced at Corps of Engineers 2000) more so than on the details of the Exhibit 1 maps when establishing sampling sites.

5.1.3 The Contractor shall utilize the same sample sites, to the extent possible, for each sampling date in the Sampling Schedule, below.

5.1.4 Each sample collected shall be assigned a unique identification number.

5.2 Sampling Collection Technique: The Contractor shall perform larval fish sampling at each of the eighteen (18) separate sampling sites. The Corps anticipates that sampling shall be performed by one (1) Fisheries Biologist II, and one (1) Fisheries Biologist Intern. The following specifications shall apply for larval fish sampling at each of the sampling sites:

5.2.1 **Sampling Schedule:** Sampling shall follow this schedule such that all sampling is conducted within +/- two days of the dates shown:

June	July	August
13	11	8
27*	25*	22*

5.2.2 **Recordation of GPS Coordinates and Average River Depth:**

5.2.2.1 The Contractor shall record GPS coordinates at the starting point of each sampling site for each sample collected.

5.2.2.2 Average River Depth at the sample collection site shall be recorded from measurements taken at the start, middle, and end of the sample run

5.2.3 **Diurnal and Nocturnal Sampling:** For each sampling date shown in Para. 5.2.1, one sample shall be collected at each of the eighteen (18) sampling sites between 0900 and 1800 hours (diurnal sampling). For every sampling date marked with an asterisk in Para. 5.2.1, the Contractor shall, in addition to the samples collected during the day, collect one nocturnal sample at each of the eighteen (18) sampling sites between 2200 hours (on the date prior to or of the diurnal sample) and 0500 hours on the date of or following the diurnal sample. There shall be no difference in sampling protocol between diurnal and nocturnal sampling.

5.2.4 **Sampling Direction:** Larval fish sampling at each site shall occur with net openings facing in an upstream direction.

5.2.5 **Sampling with Paired Nets Combined As Single Sample:** Sampling shall occur using two, 1-m diameter, 500-μm mesh ichthyoplankton nets. Contents collected from the two nets at each sampling site shall be combined immediately upon collection and treated as a single sample.

5.2.5.1 Nets shall be as long as possible to minimize the pressure wave at the front of the net.

5.2.5.2 Net dimensions shall be constant throughout execution of this Scope of Work.

5.2.5.3 Nets shall be mounted from a boom attached to the bow of a boat and maintained so that the top of each net shall be approximately 10 cm below water surface.

5.2.6 **Pre-Preservation Sample Volume:**

5.2.6.1 Pre-Preservation Sample Volume shall not be calculated for each paired net, but for the two nets after combined and treated as a single sample (see Para. 5.2.5).

5.2.6.2 The Pre-Preservation Sample Volume shall be measured and recorded to the nearest one-tenth (0.1) liter as measured before addition of the preservative solution.

5.2.7 **Sample Water Volume Measurement/Flow Meter:** Total water volume for each sample shall be recorded as calculated from a flow meter placed in the mouth of a sample net for the duration of collection of each sample.

5.2.7.1 Water entering the mouth of the net shall be maintained at velocities of approximately 1.0-1.5 meters/second.

5.2.7.2 In high flow conditions, particularly in the MC, it may be necessary to allow the boat to partially flow with the current while still maintaining net openings facing in an upstream direction.

5.2.8 **Sample Collection Duration:** Each sampling event at each individual sampling site shall last approximately 10 minutes (exact time shall be recorded to the nearest second by stopwatch).

5.2.9 **Sample Preservation:** Each sample's larval fishes and drifting debris shall be preserved in 10% formalin or 95% ethanol.

5.2.10 **Sampling Log:** A sampling log shall be maintained to record the following information for each sample collected [Water quality parameters **(bold type)** shall be measured at a depth of 30 cm]:

5.2.10.1 unique identification number assigned to sample,
5.2.10.2 technician(s) collecting the sample,
5.2.10.3 GPS coordinates at starting point,
5.2.10.4 time and date of sample collection,
5.2.10.5 sample collection duration in seconds (start/end),
5.2.10.6 volume of water sampled,
5.2.10.7 Pre-Preservation Sample Volume (nearest 0.1 liter)-see Paras. 5.2.5 & 5.2.6,
5.2.10.8 Average River Depth at sample collection site from measurements at start, middle, and end of sample run,
5.2.10.9 **surface current velocity,**

5.2.10.10 **water temperature,**
5.2.10.11 **dissolved oxygen, and**
5.2.10.12 **total suspended solids (as measured in Nephelometric turbidity units (NTUs)).**

5.3 **Sample Evaluation** Sample evaluation shall be conducted on up to 324 liters of the Pre-Preservation Sample Volume. Sample Evaluation consists of sample sorting, fish identification, and fish measurement as set out below:

5.3.1 **Sample Sorting**: Sample contents shall first be sorted to separate fish from other organic materials. Sorting of samples shall be performed by Fisheries Interns.

5.3.2 **Fish Identification**: Fish sorted from within each sample shall then be identified by the appropriate specialist(s), following the keys of Auer (1982) and Holland-Bartels et al. (1990), to the lowest possible taxonomic category (most often to family or genus).

5.3.3 **Fish Measurements**: Twenty-five (25) larval fish of each taxon identified shall be randomly selected from each sample and their individual total lengths shall be measured to the nearest 0.1 mm by Fisheries Interns. All fish from each taxon containing less than twenty-five (25) individuals within each sample shall be measured (total length) to the nearest 0.1 mm.

5.4 **Data analysis.**

5.4.1 **Measurement of Larval Fish Density**. Data analysis for this project, including that for the technical report (as discussed below), shall include calculation of larval fish density (total and by taxon).

5.4.1.1 Density shall be expressed as the number of individuals per cubic meter of water sampled (D = number/m^3).

5.4.1.2 Density shall be calculated and recorded for each sample.

5.4.2 **Data in Technical Report**.

5.4.2.1 The technical report shall summarize and discuss larval fish diversity and densities observed within and amongst the three pools sampled. The report also shall discuss diversity and densities observed over time (sampling dates); between different sampling periods (i.e., diurnal vs. nocturnal samples); and habitat types (i.e., MC vs. MCB).

5.4.2.2 Data shall be provided in a manner similar, but not limited, to that presented in Tables 7, 8, and 10, Table B and Table C of Exhibit 2.

5.4.2.3 The Contractor shall include the sample log as an Appendix to the Technical Report.

5.4.2.3.1 The technical report shall include no less than 12 tables.

5.5 **Quality Assurance/Quality Control.** Following Sample Evaluation, all samples shall be saved for future reference until acceptance of the final report by the Corps.

5.5.1 Samples shall be saved with at least one container for sorted and identified fish and one container for the remaining organic materials.

5.5.2 Following receipt of the raw data from Sample Evaluation that accompanies billings as per paragraph 8.3.4, the District will request the contractor to transmit up to 3 samples (containers for both fish and organic materials) for daytime samples, and up to 6 samples (fish and organic materials) for day/nighttime samples, back to the District for external QA/QC review.

5.5.3 Choice of samples to be transmitted shall be determined by the Project Biologist.

VI. SPECIAL CONDITIONS

6.1. The Contractor shall carry a marine band radio and cell phone while conducting field work to facilitate communication with the Lockmasters and approaching towboats.

6.2. The marine band radio shall, at a minimum, be equipped with "safety and calling" channel 16 (frequency 156.8 mhz), operating channel 14 (frequency 156.7 mhz) and bridge to bridge" channel 13 (frequency 156.65 mhz).

6.3. When not being used to receive or transmit a message, the radio shall simultaneously monitor channels 13 and 16.

VII. REPORTS

7.1 **General:** The Contractor shall prepare a brief technical report describing the survey methodology and results of the investigation outlined in Section V, above. Reporting requirements in the main contract Scope of Work shall apply unless otherwise set out in the Scope of Work for this delivery order.

7.2 **Interim Reports:** Seven Interim Reports are required.

7.2.1 Interim Reports shall be submitted by facsimile to the Corps Project Biologist within three (3) working days following each sampling date in paragraph 5.2.1, above. A hard copy of Interim Reports shall be mailed to the COR.

7.2.2 Interim Reports shall consist of:

7.2.2.1 the Sampling Logs,

7.2.2.2 a table summarizing the total Pre-Preservation Sample Volume (see Para. 5.2.6) of all samples collected for the sampling date covered by the report,

7.2.2.3 other information deemed relevant by the Contractor regarding the work accomplished.

7.3 **Draft and Final Reports:** Ten (10) copies of the draft report are required. Thirty (30) copies of the final report are required.

7.4 **Scope of Work a Mandatory Report Appendix:** This delivery order Scope of Work shall be included as a report appendix.

VIII. SCHEDULE

8.1 **Project Schedule** - The following Project Schedule shall apply:

Tasks	Date
Date of Award	Block 3 of Form DD Form 1155
Interim Report Submittals	Within 3 working days following each sampling date
Complete Field Work	25 Aug 01
Progress Phone Conference	15 July 01
Raw Data form Sample Evaluation	As per Para. 8.3.4, below
Draft Report Submittal	15 Nov 01
Final Report Submittal	15 Dec 01

8.2 **Payment Schedule** – The payment schedule shall be as follows:

PAYMENT SCHEDULE	
Tasks	**Percent of Contract Amount***
1) 50% field work completion	40
2) 100% field work completion	40
3) draft report submittal	10
4) final report acceptance by Corps	10

*: These percentages are applied to the contract amount **MINUS** the Sample Evaluatoin costs (Sample Evaluation is defined at Para. 5.3, above).

8.3 Sample Evaluation Payment Schedule.

8.3.1 Sample Evaluation costs shall be billed on actual liters of Pre-Preservation Sample Volume evaluated and at the per liter rate set out elsewhere in this delivery order.

8.3.2 Billing may occur at any time the number of unbilled liters evaluated reaches fifty (50), the last billing excepted.

8.3.3 In no case shall the number of liters evaluated/billed exceed the 324 liters set out at Para. 5.3.

8.3.4 The raw data from Sample Evaluation for all samples making up the liters billed must be furnished to the Project Biologist at the time of billing.

IX. COORDINATION

9.1 Elliott Stefanik is the Project Biologist for this work. He may be reached by phone: 309/794-5285, FAX: 309/794-5157, or E-mail: Elliott.L.Stefanik@usace.army.mil.

9.2 Ronald E. Pulcher is the Contracting Officer's Representative (COR) for this work. He may be reached by email ronald.e.pulcher@usace.army.mil, PH: 309/794-5384, FAX: 309/794-5157, or US mail at Corps of Engineers, PO Box 2004, Rock Island, Illinois 61204-2004.

9.3 The Project Biologist shall be notified by the Contractor at least 48 hours prior to the commencement of field work within each Pool.

9.4 Lockmasters at Lock and Dams 18, 22 and 26 shall be notified by the Contractor at least 24 hours prior to the commencement of fieldwork. Each Lockmaster also shall be contacted the day(s) of the survey to assure that they know the location of the survey team while on site. Phone numbers for Lock and Dam 26 is 636/899-1543. The phone number for Lock and Dam 22 is 573/221-0294. The phone number for Lock and Dam 18 is 309/873-2246.

9.5 It is the Contractor's responsibility to contact the Project Biologist or other Corps personnel to determine current field conditions regarding water levels and other conditions that might affect initiation or completion of the survey.

X. EXHIBITS

1. Six Maps Showing Sampling Transects for Use in Determining the Sampling Sites. (The Corps shall provide electronic version of these exhibits in ARC View format by close of business Friday, June 1, 2001.)

2. Corps of Engineers. 1999. Abundance of Fishes in the Navigation Channels of the Mississippi and Illinois Rivers and Entrainment mortality of adult fish caused by towboats. Prepared for the U.S. Army Corps of Engineers, St. Paul, Rock Island and St. Louis Districts. ENV Report 29, December 1999.

XI. REFERENCES

Auer, N.A. 1982. Identification of larval fishes of the Great Lakes basin with emphasis on the Lake Michigan drainage. Great Lakes Fishery Commission, Special Publication 82-3, Ann Arbor, Michigan.

Corps of Engineers. 2000. Habitat Needs Assessment for the Upper Mississippi River System: Technical Report. Prepared for the U.S. Army Corps of Engineers, St. Louis District, St. Louis, Missouri. October, 2000.

Corps of Engineers. 1999. Abundance of Fishes in the Navigation Channels of the Mississippi and Illinois Rivers and Entrainment mortality of adult fish caused by towboats. Prepared for the U.S. Army Corps of Engineers, St. Paul, Rock Island and St. Louis Districts. ENV Report 29, December 1999.

Holland-Bartels, L., S. Littlejoh, and M. Hutson. 1990. A guide to larval fishes of the Upper Mississippi River. Minnesota Extension Service, University of Minnesota, St. Paul. 107 pp.

FIELD AND LABORATORY NOTES

EVALUATION OF LARVAL FISH DENSITY AND DIVERSITY WITHIN MAIN CHANNEL AND MAIN CHANNEL BORDER HABITATS OF POOLS 18, 22, AND 26 OF THE UPPER MISSISSIPPI RIVER

Prepared for:
U.S. Army Corps of Engineers, Rock Island District
Rock Island, Illinois
Contract No. DACW25-00-D-0005, Work Order No. 0005

Prepared by
Harding ESE, Inc.
St. Louis, Missouri
Principal Investigator: William Elzinga
Project Manager: John S. Vile

July 19, 2002

Harding ESE
A MACTEC COMPANY

QA/QC Audit

QAQC AUDIT FORM

Project Name: Rock Island Larval Fish Sampling
Date: 9/27/01
Project Number: 510206
Crew/Sampling Personnel: B. Fuhr, E. Westhus, J. Stahl, S. Sanborn (pickers)
Auditor/Reviewers Name:

Description of Work Performed:
Conducted QA/QC analysis of logbook, sample jars and labeling, and proper placement of picked samples. Examined log book and samples from 6/13/01 – 6/26/01.

Review/Assessment of Performance:
Technical Performance:
Pickers have entered the date of picking, the initials of the pickers, how long it took to pick the sample, and the number of fish picked from each sample jar. The pickers placed a label on each jar of fish identifying the sample and the number of fish picked and the pickers intials. The picked samples were taken from the shelf with samples to be picked and placed on a picked shelf ready for QA/QC analysis. Log book, specimen jars, and picked sample jar were in order and properly arranged.

Safety:
Proper procedures and precautions have been taken to avoid inhalation and contact with formalin. These procedures include the use of the hood, thoroughly rinsing sample, wearing latex or nitrile gloves, and proper placement and storage of samples in a labeled ventilated area.
Other:
NA

Corrective Measures Taken:
Pickers shall place tape over stickers with picking info. to stickers do not come off of the appropriate sample jar.

Auditor: John S. Vile Date: 9/27/01

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A MACTEC COMPANY

QAQC AUDIT FORM

Project Name: Rock Island Larval Fish Sampling
Date: 10/4/01
Project Number: 510206.0100
Crew/Sampling Personnel: John Vile, Christy Dumey, Bryan Fuhr
Auditor/Reviewers Name: Bryan Fuhr

Description of Work Performed:
A total of 96 sample jars from were sent to Illinois Natural History Survey for picking. Conducted QA/QC analysis of logbook, sample jars and labeling, and proper placement of sample jars for picking.

Review/Assessment of Performance:
Technical Performance:
Each jar label was matched exactly to information from the ichthyoplankton QA/QC logbook and original field data sheets (sample code, number of jars, collector initials, collection date and time). A chain of custody was completed and rechecked, and was signed by INHS employee when he picked up the samples.

Safety:
Jars were stored in a properly ventilated warehouse on shelves labeled "all jars contain 10% formalin solution." IHNS employee was also informed of the formalin solution.

Other:
NA

Corrective Measures Taken:
Five jars were missing the time of sampling on the label. This information was found from original field data sheets and written on the label.

Auditor: Bryan W Fuhr Date: 10/11/01

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A MACTEC Company

QAQC AUDIT FORM

Project Name:	Rock Island District Larval Fish Sampling
Date:	9-28-01
Project Number:	510206
Laboratory Personnel:	J. Vile, B. Fuhr (taxonomists)
Auditor/Reviewers Name:	W. Elzinga

Description of Work Performed:
Conducted QA/QC analysis of larval fish taxonomy. Examined all sorted and identified specimens from the following samples:

P18-U-MC (6-13-01)
P18-U-RDB (6-13-01)
P18-U-LDB (6-13-01)
P18-L-MC (6-13-01)
P18-L-RDB (6-13-01)
P18-L-LDB (6-13-01)
P22-U-MC (6-14-01)

Review/Assessment of Performance:
Technical Performance:
Specimens that had been processed had been sorted and placed into separate vials, labeled according to family. In most cases, larval fish had been correctly identified and enumerated. Several vials within each sample had been set aside as they contained either unidentified fish or specimens with tentative identifications. These specimens were examined and identified to correct family/group. Several specimens placed in the "unidentified" vial were observed to be degraded or damaged and were therefore correctly, unidentifiable. Specimens tentatively set aside as "indeterminate" were determined to be readily identifiable below the family level. Examples of such taxa included Common Carp and *Ictiobus/Carpiodes*.

Safety:
Not observed

Other:
NA

Corrective Measures Taken:
Taxonomic characteristics of those identifiable taxa described above as "indeterminant" were discussed by examination of representative sample specimens and by examining reference collection specimens, as needed. Consequently, such taxa were determined to be readily discernable in future samples by both taxonomists.

Auditor: W. Elzinga Date: 9/28/01

Harding ESE
A MACTEC COMPANY

Field Datasheets

Collectors MBM, JSV
Site P18-L

Contract No. DACW25-00-D-0005, Work Order No. 0005

Site Information Weather Conditions: Sunny Windy
Station: P18-L-2DB Date: 061301 Time: 1815

Net Flow Meter 089518 Volume of Water Sampled: 760419
End Units: 069000 Begin Units: 738000 Total Units:
~~089518~~ 22419

Tow & Sample Information Pre-Preservation Sample Volume (L): 600+600=1.2l
Tow Time: 600s Depth of Tow: 15 Number of Jars Preserved: 2
Average River Depth (ft): Start: 16 Middle: 15 End: 15

Water Quality Total Suspended Solids (NTU's): 30 Temp (C): 23.12
Surface Current Velocity (m/s): ~~0.6~~ 1.1 DO (ppm): 7.39 Conductivity: 449

pH 7.39 for DO.

Site Information Weather Conditions:
Station: P18-L-MC Date: 061301 Time: ~~1900~~ 1920

Net Flow Meter 110251 Volume of Water Sampled: ~~700+700~~ 1.4l
End Units: 089000 Begin Units: 760000 Total Units:
21251 22184

Tow & Sample Information Pre-Preservation Sample Volume (L): 700+700 1.4l
Tow Time: 600s Depth of Tow: 18 Number of Jars Preserved: 3
Average River Depth (ft): Start: 16 Middle: 19 End: 18

Water Quality Total Suspended Solids (NTU's): 30 Temp (C): 23.13
Surface Current Velocity (m/s): ~~0.6~~ 1.1 DO (ppm): 7.34 Conductivity: 424

pH 7.36

Site Information Weather Conditions: Heavy Waves Lots Debris Flotsam
Station: P18-L-RDB Date: 061301 Time: 2000

Net Flow Meter 130131 Volume of Water Sampled: 804447
End Units: 110000 Begin Units: 782000 Total Units:
20131 22447

Tow & Sample Information Pre-Preservation Sample Volume (L): 800+800 1.6l
Tow Time: 600s Depth of Tow: Number of Jars Preserved: 3
Average River Depth (ft): Start: 10 Middle: 25 End: 20

Water Quality Total Suspended Solids (NTU's): Temp (C): 23.26
Surface Current Velocity (m/s): ~~0.6~~ 1.1 DO (ppm): 7.09 Conductivity: 423

7.33

Collectors MBMJTSV
Site Pool 18 upper

Contract No. DACW25-00-D-0005, Work Order No. 0005

GPS: Yes / No

Site Information Weather Conditions: Windy as - 30+ Knots Sunny 85°F
Station: RDB (P18-U-RDB Date: 6-13-01 Time: 1340

Winds over 20 knots R L

Net Flow Meter Volume of Water Sampled:
End Units: 558000 000000 Begin Units: 685870 016884 Total Units: 16884

685870
558000
127870

Tow & Sample Information Pre-Preservation Sample Volume (L): 2.2
Tow Time: 600s Depth of Tow: 13 Number of Jars Preserved: 3
Average River Depth (ft): Start: 14 Middle: 13 End: 12

2.65 m/s 2000 RPM

Water Quality Total Suspended Solids (NTU's): 40 Temp (C): 23.33
Surface Current Velocity (m/s): 0.6 1.1 DO (ppm): 8.17 Conductivity: 530

pH 7.68

685870
669000
16870

Site Information Weather Conditions: SAME
Station: P18-U-MC Date: 6-13-01 Time: 1530

2.9 m/s 2200 RPM

Net Flow Meter Volume of Water Sampled:
End Units: 047498 025000 22498 Begin Units: 716567 694000 22567 Total Units:

Tow & Sample Information Pre-Preservation Sample Volume (L): 6200 ml
Tow Time: 600s Depth of Tow: 16 Number of Jars Preserved: 3
Average River Depth (ft): Start: 18' Middle: 18' End: 18'

Water Quality Total Suspended Solids (NTU's): 30 Temp (C): 23.32
Surface Current Velocity (m/s): 0.9 1.4 DO (ppm): 6.99 Conductivity: 414

pH 7.15

Site Information Weather Conditions: SAME
Station: P18-U-LDB Date: 6-13-01 Time: 1600

2.8 m/s 2300 RPM

Net Flow Meter Volume of Water Sampled:
End Units: 069809 047000 22809 Begin Units: 738415 716600 22413 Total Units:

Tow & Sample Information Pre-Preservation Sample Volume (L): .7 L (700 ml)
Tow Time: 600s Depth of Tow: 12 Number of Jars Preserved: 1
Average River Depth (ft): Start: 11 Middle: 12 End: 12

Water Quality Total Suspended Solids (NTU's): 35 Temp (C): 23.10
Surface Current Velocity (m/s): 0.8 1.3 DO (ppm): 7.20 Conductivity: 472

7.31

Collectors JSV / mBM
Site Pool 22 Lower

Contract No. DACW25-00-D-0005, Work Order No. 0005

Site Information Weather Conditions: Cloudy ~80°
Station: Pool 22-L-LDB Date: 6/15/01 Time: 0930

Net Flow Meter Volume of Water Sampled: _____
End Units: 210442 / 191000 / 19,442 Begin Units: 890309 / 871000 / 19,309 Total Units: _____

Tow & Sample Information Pre-Preservation Sample Volume (L): 1,100 + 1,100 = 2,200 ml
Tow Time: _____ Depth of Tow: Surface Number of Jars Preserved: 4
Average River Depth (ft): Start: 12 Middle: 11 End: 12

Water Quality Total Suspended Solids (NTU's): N/A Temp (C): 23.5° pH 7.45
Surface Current Velocity (m/s): 1.1 DO (ppm): 7.21 Conductivity: 450

Site Information Weather Conditions: Partly cloudy
Station: P22-L-RDB Date: 6/14/01 Time: 1045

Net Flow Meter Volume of Water Sampled: _____
End Units: 230001 / 210000 / 20,001 Begin Units: 910915 / 891000 / 19,915 Total Units: _____

Tow & Sample Information Pre-Preservation Sample Volume (L): 300 + 300 = 600ml
Tow Time: 600 s Depth of Tow: Surface Number of Jars Preserved: 1
Average River Depth (ft): Start: 21 Middle: 27 End: 30

Water Quality Total Suspended Solids (NTU's): N/A Temp (C): 23.45° pH 7.35
Surface Current Velocity (m/s): ~~0.6~~ 1.1 DO (ppm): 6.70 Conductivity: 472

Site Information Weather Conditions: Sunny ~ 85°C
Station: P22-L-MC Date: 6/14/01 Time: 1130

Net Flow Meter Volume of Water Sampled: _____
End Units: 231062 / 230000 / 1062 Begin Units: 932827 / 911000 / 21327 Total Units: _____

Tow & Sample Information Pre-Preservation Sample Volume (L): 600+600=1.2l
Tow Time: 600 s Depth of Tow: Surface Number of Jars Preserved: 2
Average River Depth (ft): Start: 27 Middle: 28 End: 28

Water Quality Total Suspended Solids (NTU's): N/A Temp (C): 23.43 pH
Surface Current Velocity (m/s): 1.1 DO (ppm): 7.07 Conductivity: ~~550~~ 461 7.43

Collectors MBM, JSV
Site Pool 22 Upper

Contract No. DACW25-00-D-0005, Work Order No. 0005

Site Information Weather Conditions: Sunny Windy ~95°F
Station: P22-U-LDB Date: 06-14-01 Time: 1450

Net Flow Meter Volume of Water Sampled:
End Units: 153930 / 130000 / 23930 Begin Units: 826967 / 840000 / 24967 Total Units:

Tow & Sample Information Pre-Preservation Sample Volume (L): 500+500=1Q
Tow Time: 615s Depth of Tow: Surface Number of Jars Preserved: 2
Average River Depth (ft): Start: 23 Middle: 23 End: 23

Water Quality Total Suspended Solids (NTU's): 42 Temp (C): 23.68
Surface Current Velocity (m/s): 0.6 1.1 DO (ppm): 7.73 Conductivity: 448

pH 7.35

Site Information Weather Conditions: Cloudy/Windy
Station: P22-U-MC Date: 6/14/01 Time: 1536

Net Flow Meter Volume of Water Sampled: 478
End Units: 174257 / 153006 / 21257 Begin Units: 827000 / 821478 Total Units:

Tow & Sample Information Pre-Preservation Sample Volume (L): 600+900=1.5Q
Tow Time: 600s Depth of Tow: Surface Number of Jars Preserved: 3
Average River Depth (ft): Start: 28 Middle: 29 End: 29

Water Quality Total Suspended Solids (NTU's): 37 Temp (C): 23.71
Surface Current Velocity (m/s): 0.6 1.1 DO (ppm): 8100 Conductivity: 457

pH 7.40

Site Information Weather Conditions: Cloudy/Windy
Station: P22-U-RDB Date: 06-14-01 Time: 1615

Net Flow Meter Volume of Water Sampled:
End Units: 193184 / 848000 / 184 Begin Units: 867358 / 173000 Total Units: 20184, 19858

Tow & Sample Information Pre-Preservation Sample Volume (L): 400+400=0.8L
Tow Time: 600s Depth of Tow: Surface Number of Jars Preserved: 2
Average River Depth (ft): Start: 32 Middle: 35 End: 34

Water Quality Total Suspended Solids (NTU's): 40 Temp (C): 23.62
Surface Current Velocity (m/s): 0.65 DO (ppm): 7.33 Conductivity: 479

pH 7.45

1.1

Collectors MBM, TSV
Site POOL 26 LOWER

Contract No. DACW25-00-D-0005, Work Order No. 0005

Site Information Weather Conditions: Sunny, lt, breeze 80°F
Station: P26-L-RDB Date: 06-16-01 Time: 1025

Net Flow Meter Volume of Water Sampled:
End Units: 338220 / 3/8000 / 20220 Begin Units: 014463 / 994000 / 20980 Total Units:

Tow & Sample Information Pre-Preservation Sample Volume (L): 500+600=1.1L
Tow Time: 660 Depth of Tow: Surface Number of Jars Preserved: 2
Average River Depth (ft): Start: 25 Middle: 26 End: 26

Water Quality Total Suspended Solids (NTU's): 51 Temp (C): 24.21
Surface Current Velocity (m/s): 1.0 DO (ppm): 5.88 Conductivity: 416

pH 7.21

Site Information Weather Conditions: Same as above
Station: P26-L-MC Date: 06-16-01 Time: 1110

Net Flow Meter Volume of Water Sampled:
End Units: 3/20617 / 33000 / 21617 Begin Units: 035695 / 015000 / 20695 Total Units:

Tow & Sample Information Pre-Preservation Sample Volume (L): 500+500=1L
Tow Time: 600 Depth of Tow: Surface Number of Jars Preserved: 2
Average River Depth (ft): Start: 19 Middle: 16 End: 19

Water Quality Total Suspended Solids (NTU's): 41 Temp (C): 24.12
Surface Current Velocity (m/s): 1.0 DO (ppm): 6.75 Conductivity: 488

7.29

Site Information Weather Conditions: Sunny, Wndy 95°
Station: P26-L-LDB Date: Time: 1135

Net Flow Meter Volume of Water Sampled:
End Units: 364607 / 362000 / 22607 Begin Units: 059598 / 037000 / 22598 Total Units:

Tow & Sample Information Pre-Preservation Sample Volume (L): 800+700=1.5L
Tow Time: 11m 15s Depth of Tow: Surface Number of Jars Preserved: 2 3
Average River Depth (ft): Start: 16 Middle: 16 End: 16

Water Quality Total Suspended Solids (NTU's): 41 Temp (C): 23.99
Surface Current Velocity (m/s): 1.1 DO (ppm): 6.50 Conductivity: 451

7.38

Had to slow due to plasma craft waves. added 1 min

Collectors JSV / mBM
Site Pool 26 Upper

Contract No. DACW25-00-D-0005, Work Order No. 0005

GPS: Yes / No

Site Information Weather Conditions: Sunny ~85°
Station: P26-U-LDB Date: 6/15/01 Time: 16^00

Net Flow Meter Volume of Water Sampled: _____
End Units: _____ Begin Units: _____ Total Units: _____

Tow & Sample Information Pre-Preservation Sample Volume (L): 500 + 500
Tow Time: 932000 (953539) Depth of Tow: 251000 (271734) Number of Jars Preserved: 2
Average River Depth (ft): Start: 20 (21539) Middle: 19 (20759) End: 21

Water Quality Total Suspended Solids (NTU's): 42 Temp (C): 24.43
Surface Current Velocity (m/s): 0.7 1.2 DO (ppm): 6.68 Conductivity: 446
pH 7.34

Site Information Weather Conditions: _____
Station: P26-U-MC Date: 6/15/01 Time: ~~17:00~~ 16^55

Net Flow Meter Volume of Water Sampled: _____
End Units: 654000 (975389) Begin Units: 274000 (296799) Total Units: _____
(21389) (22799)

Tow & Sample Information Pre-Preservation Sample Volume (L): 800 + 700 = 1.5 L
Tow Time: 9 min 45 s Depth of Tow: Surface Number of Jars Preserved: 3
Average River Depth (ft): Start: 33 Middle: 34 End: 35

Water Quality Total Suspended Solids (NTU's): N/A Temp (C): 24.09
Surface Current Velocity (m/s): ~~0.7~~ 1.2 DO (ppm): 6.89 Conductivity: 454
7.39

Site Information Weather Conditions: Sunny, Windy, ~~1~~ 1/2 chop
Station: P26-U-RDB Date: _____ Time: 17^45

Net Flow Meter Volume of Water Sampled: _____
End Units: 975000 (994100) Begin Units: 299008 (318676) Total Units: 19676 19100
(19100)

Tow & Sample Information Pre-Preservation Sample Volume (L): 900+900 = 1.8L
Tow Time: 600s Depth of Tow: Surface Number of Jars Preserved: ~~2~~ 3
Average River Depth (ft): Start: 21 Middle: 19 End: 20

Water Quality Total Suspended Solids (NTU's): N/A Temp (C): 24.11
Surface Current Velocity (m/s): 0.7 1.2 DO (ppm): 6.86 Conductivity: 454
pH 7.38

Site/Pool: Pool 22 Upper Collectors: MBM, JSV Project #: 510206 Sample Period: (Day) or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P22-UD-LDR Date: 6-25-01 Time: 1513 Weather Conditions: Sunny Breezy 10mph Gusts

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UDL
End Units: 149940 Good meter	End Units: 472882	Start: 26	Tow Time: 600
Begin Units: 128000	Begin Units: 451000	Middle: 22	Sample Volume (L): 1000+1000+300+1200 2.5
Total Units: 21940	Total Units: 21882	End: 25	# of Jars Preserved: 5

Temp (C): 24.13 DO (ppm): 7.64 Cond: 448 pH: 7.78 Turbidity (NTU's): 52.3 Surface Current Velocity (m/s): 1.2

Comments:

Station: P22-UD-MC Date: 06-25-01 Time: 1600 Weather Conditions: 11

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UMD
End Units: 171975	End Units: 494903	Start: 27	Tow Time(sec): 600
Begin Units: 150000	Begin Units: 473000	Middle: 27	Sample Volume (L): 600+600 = 1.2
Total Units: 21975	Total Units: 21903	End: 28	# of Jars Preserved: 2

Temp (C): 23.89 DO (ppm): 7.45 Cond: 456 pH: 7.82 Turbidity (NTU's): 41.2 Surface Current Velocity (m/s): 1.3

Comments: Near Red buoys due to Commercial Traffic

Station: P22-UD-MDR Date: 06-25-01 Time: 1624 Weather Conditions: Sunny Lt Breeze

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UDR
End Units: 194232	End Units: 516735	Start: 34	Tow Time: 600
Begin Units: 172000	Begin Units: 495000	Middle: 35	Sample Volume (L): 300+300 = 0.6
Total Units: 22232	Total Units: 21735	End: 35	# of Jars Preserved: 2

Temp (C): 23.74 DO (ppm): 7.49 Cond: 473 pH: 7.72 Turbidity (NTU's): 45.0 Surface Current Velocity (m/s): 1.3

Comments:

Site/Pool: Pool 22 Upper Collectors: MBM, JSV Project #: 510206 Sample Period: Day or (Night) (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P22-UN-LDB Date: 062501 Time: 0330 Weather Conditions: Calm - Black

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UNL
End Units: 291113	End Units: 609897	Start: 23	Tow Time: 600s
Begin Units: 268000	Begin Units: 589000	Middle: 22	Sample Volume (L): 800 + 900 = 1.7 L
Total Units: 22113	Total Units: 20597	End: 22	# of Jars Preserved: 3

Temp (C): 24.01 DO (ppm): 7.79 Cond: 445 pH: 7.80 Turbidity (NTU's): 45.3 Surface Current Velocity (m/s): 1.0

Comments:

Station: P22-UN-MC Date: 062501 Time: 0409 Weather Conditions:

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UNR
End Units: 314257	End Units: 633669	Start: 32	Tow Time(sec): 600
Begin Units: 290000	Begin Units: 610000	Middle: 34	Sample Volume (L): 300+300 0.6L
Total Units: 24257	Total Units: 23669	End: 34	# of Jars Preserved: 3

Temp (C): 23.36 DO (ppm): 7.03 Cond: 480 pH: 7.86 Turbidity (NTU's): 46.4 Surface Current Velocity (m/s): 1.1

Comments: Had to Conduct Sample Tow Along Barge Tie Up to Shore

Station: P22-UN-RDB Date: 062501 Time: ~~0444~~ 0444 Weather Conditions:

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UNM
End Units: 336972	End Units: 654947	Start: 27	Tow Time: 600
Begin Units: 314000	Begin Units: 633000	Middle: 27	Sample Volume (L): 700+700 = 1.4L
Total Units: 22972	Total Units: 21947	End: 27	# of Jars Preserved: 2

Temp (C): 23.54 DO (ppm): 7.43 Cond: 445 pH: 7.82 Turbidity (NTU's): 43.0 Surface Current Velocity (m/s): 1.2

Comments:

Site/Pool: Pool 22 Lower Collectors: MBM, TSV Project #: 510206 Sample Period: (Day) or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P22-L-LDB Date: 6-25-01 Time: 1151 Weather Conditions: Sunny Breezy 15mph Gusts

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 6mm 22LLD
End Units: 407717	End Units: 084066	Start: 12	Tow Time: 600
Begin Units: 389000	Begin Units: 063000	Middle: 11	Sample Volume (L): 800 + 800 = 1600
Total Units: 18,717	Total Units: 21,066	End: 11	# of Jars Preserved: 3

Temp (C): 23.64 DO (ppm): 7.49 Cond: 453 pH: 7.9 Turbidity (NTU's): 43.6 Surface Current Velocity (m/s): 1.0

Comments:

Station: P22-LD-MC Date: 6/25/01 Time: 12 31 Weather Conditions: Sunny Breezy/Windy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22LMD
End Units: 428229	End Units: 106126	Start: 25	Tow Time(sec): 620
Begin Units: 408000	Begin Units: 084000	Middle: 21	Sample Volume (L): 600 + 600 = 1,200
Total Units: 20229	Total Units: 22126	End: 19	# of Jars Preserved: 2

Temp (C): 23.46 DO (ppm): 7.48 Cond: 453 pH: 7.80 Turbidity (NTU's): 53.2 Surface Current Velocity (m/s): 1.2

Comments:

Station: P22-LD-RDB Date: 6/25/01 Time: 13 25 Weather Conditions: Sunny Breezy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22LRD
End Units: 450309	End Units: 127734	Start: 30	Tow Time: 600s
Begin Units: 429000	Begin Units: 106000	Middle: 28	Sample Volume (L): 200 + 200 = 400
Total Units: 21309	Total Units: 21734	End: 26	# of Jars Preserved: 1

Temp (C): 23.35 DO (ppm): 6.84 Cond: 461 pH: 7.76 Turbidity (NTU's): 60 Surface Current Velocity (m/s): 1.4

Comments: Took Sample ~170' offShore due to barge packed along Sample Shore (Phyllis) - Barge - alot of Ichthyoplankton - very little sample

Site/Pool: Pool 22 Low12 Collectors: [illegible] JSW Project #: 510206 Sample Period: Day or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P22-LN-RDB Date: 6-26-01 Time: 0000 Weather Conditions: Calm LT [illegible]

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22LNR
End Units: 591584	End Units: 219865	Start: 24	Tow Time: 630
Begin Units: 517000	Begin Units: 194000	Middle: 22	Sample Volume (L): 300+300 = 3.6L
Total Units: 24584	Total Units: 25865	End: 21	# of Jars Preserved: 2

Temp (C): 23.64 DO (ppm): 7.06 Cond: 470 pH: 7.90 Turbidity (NTU's): 50.3 Surface Current Velocity (m/s): 1.2

Comments: Sampled D.S. of Normal position due to Barges waiting to Lock South Bound

Station: P22-LN-MC Date: 062601 Time: 0042 Weather Conditions: Calm LT [illegible]

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22LNM
End Units: 564539	End Units: 243136	Start: 28	Tow Time(sec): 600
Begin Units: 542000	Begin Units: 220000	Middle: 24	Sample Volume (L): 600+600 = 1.2
Total Units: 22539	Total Units: 23136	End: 24	# of Jars Preserved: 2

Temp (C): 23.99 DO (ppm): 7.41 Cond: 452 pH: 7.92 Turbidity (NTU's): 31.5 Surface Current Velocity (m/s): 1.1

Comments: Sampled more toward RDB to make sure we did not back into a buoy due to No moon or other lights

Station: P22-LN-LDB Date: 062601 Time: 0109 Weather Conditions: [illegible]

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22LNL
End Units: 569526	End Units: 266239	Start: 12	Tow Time: 600
Begin Units: 565000	Begin Units: 244000	Middle: 10	Sample Volume (L): 1500 + 1400 = 2.9 L
Total Units: [illegible]	Total Units: 22239	End: 10	# of Jars Preserved: 6

Temp (C): 24.03 DO (ppm): 7.30 Cond: 450 pH: 7.82 Turbidity (NTU's): 50.5 Surface Current Velocity (m/s): 1.0

Comments:

1100

Contract No DACW25-00-D-0005, Work Order No 0005

Site/Pool _____ Collectors: _____ Project #: _____ Sample Period: Day or Night (Circle One)

Station: _____ Date: _____ Time: _____ Weather Conditions: _____

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: _____
End Units: _____	End Units: _____	Start: _____	Tow Time: _____
Begin Units: _____	Begin Units: _____	Middle: _____	Sample Volume (L): _____
Total Units: _____	Total Units: _____	End: _____	# of Jars Preserved: _____

Temp (C): _____ DO (ppm): _____ Cond: _____ pH: _____ Turbidity (NTU's): _____ Surface Current Velocity (m/s): _____

Comments: _____

Station: _____ Date: _____ Time: _____ Weather Conditions: _____

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: _____
End Units: _____	End Units: _____	Start: _____	Tow Time(sec): _____
Begin Units: _____	Begin Units: _____	Middle: _____	Sample Volume (L): _____
Total Units: _____	Total Units: _____	End: _____	# of Jars Preserved: _____

Temp (C): _____ DO (ppm): _____ Cond: _____ pH: _____ Turbidity (NTU's): _____ Surface Current Velocity (m/s): _____

Comments: _____

Station: _____ Date: _____ Time: _____ Weather Conditions: _____

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: _____
End Units: _____	End Units: _____	Start: _____	Tow Time: _____
Begin Units: _____	Begin Units: _____	Middle: _____	Sample Volume (L): _____
Total Units: _____	Total Units: _____	End: _____	# of Jars Preserved: _____

Temp (C): _____ DO (ppm): _____ Cond: _____ pH: _____ Turbidity (NTU's): _____ Surface Current Velocity (m/s): _____

Comments: _____

Contract No. DACW25-00-D-0005, Work Order No. 0005

Site/Pool: 18 upper   Collectors: [illegible]   Project #: [illegible]   Sample Period: Day or Night (Circle One)

Station: P18-UN-LDB Date: [illegible] Time: 2200 Weather Conditions: [illegible]

Left Meter	Right Meter	Water Depths (ft)	
End Units: 19462.4	End Units: [illegible]	Start: [illegible]	GPS Coords: [illegible]
Begin Units: 48000	Begin Units: [illegible]	Middle: [illegible]	Tow Time: [illegible]
Total Units: [illegible]	Total Units: [illegible]	End: 15	Sample Volume (L): [illegible]
			# of Jars Preserved: 2

Temp (C): [illegible] DO (ppm): [illegible] Cond: [illegible] pH: [illegible] Turbidity (NTU's): [illegible] Surface Current Velocity (m/s): [illegible]

Comments:

Station: P18-UN-MC Date: [illegible] Time: [illegible] Weather Conditions: [illegible]

Left Meter	Right Meter	Water Depths (ft)	
End Units: [illegible]	End Units:	Start: 20	GPS Coords: 18-UN-M
Begin Units: [illegible]	Begin Units: [illegible]	Middle: [illegible]	Tow Time(sec): [illegible]
Total Units: [illegible]	Total Units:	End: [illegible]	Sample Volume (L): [illegible]
			# of Jars Preserved: 2

Temp (C): [illegible] DO (ppm): [illegible] Cond: [illegible] pH: [illegible] Turbidity (NTU's): [illegible] Surface Current Velocity (m/s): [illegible]

Comments:

Station: P18-LN-MC Date: [illegible] Time: 22[illegible] Weather Conditions:

Left Meter	Right Meter	Water Depths (ft)	
End Units: [illegible]	End Units: [illegible]	Start: 17	GPS Coords: 18-UN-R
Begin Units: [illegible]	Begin Units: [illegible]	Middle: 19	Tow Time: [illegible]
Total Units: [illegible]	Total Units: [illegible]	End: 16	Sample Volume (L): [illegible]
			# of Jars Preserved:

Temp (C): [illegible] DO (ppm): [illegible] Cond: [illegible] pH: [illegible] Turbidity (NTU's): [illegible] Surface Current Velocity (m/s):

Comments:

Site/Pool: Pool 18-Lower Collectors: JSV/MBM Project #: 510206 Sample Period: (Day) or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P18-LD-LDB Date: 6/27/01 Time: 1415 Weather Conditions: Partly Cloudy ~85°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18LDL
End Units: 426797	End Units: 743772	Start: 17	Tow Time: 600S
Begin Units: 404000	Begin Units: 722000	Middle: 17	Sample Volume (L): 500 + 500 = 1.0L
Total Units: 22797	Total Units: 21772	End: 17	# of Jars Preserved: 2

Temp (C): 24.97 DO (ppm): 6.96 Cond: 431 pH: 7.76 Turbidity (NTU's): 25.9 Surface Current Velocity (m/s): 0.9

Comments: Had to sample just outside channel due to shallow H2O

Station: P18-LD-MC Date: 6/27/01 Time: 1500 Weather Conditions: Cloudy/Breezy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18LDM
End Units: 449360	End Units: 765270	Start: 21	Tow Time(sec): 600S
Begin Units: 427000	Begin Units: 744000	Middle: 20	Sample Volume (L): 600+600=1.2L
Total Units: 22360	Total Units: 21270	End: 19	# of Jars Preserved: 2

Temp (C): 24.89 DO (ppm): 6.72 Cond: 418 pH: 7.77 Turbidity (NTU's): 25.6 Surface Current Velocity (m/s): 1.0

Comments:

Station: P18-LD-RDB Date: 6/27/01 Time: 1528 Weather Conditions: Partly Cloudy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18LDR
End Units: 472438	End Units: 786666	Start: 25	Tow Time: 600S
Begin Units: 450000	Begin Units: 765000	Middle: 26	Sample Volume (L): 250+250=0.5L
Total Units: 22438	Total Units: 21666	End: 25	# of Jars Preserved: 1

Temp (C): 25.32 DO (ppm): 7.22 Cond: 408 pH: 7.79 Turbidity (NTU's): 23.2 Surface Current Velocity (m/s): 1.0

Comments: Had to sample just outside channel due to shallow H2O

Site/Pool: Pool 26- Lower Collectors: MBM/JSV/CDD Project #: 510206 Sample Period: Day or (Night) (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P26-LN-RB Date: 6/30/01 Time: 0110 Weather Conditions: Calm, Very Dark

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26LNR
End Units: ~~81670~~ 819797	End Units: 2 B1 59 625325 2	Start: 21	Tow Time: 600
Begin Units: 794000 ~~819000~~ 821797	Begin Units: 206000 231000 222527	Middle: 19	Sample Volume (L): 400+400= 0,8L
Total Units: 22702	Total Units: 25586	End: 20	# of Jars Preserved: 2

Temp (C): 25.32 DO (ppm): 6.72 Cond: 460 pH: 7.82 Turbidity (NTU's): 43.4 Surface Current Velocity (m/s): 1.2

Comments:

Station: P26-LN-MC Date: 6/30/01 Time: 0250 Weather Conditions: Calm, Very Dark

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26LNM
End Units: 2953329	End Units: 296727	Start: 13	Tow Time(sec): 600
Begin Units: 963000	Begin Units: 275000	Middle: 14	Sample Volume (L): 500+500= 1L
Total Units: 22329	Total Units: 21727	End: 15	# of Jars Preserved: 2

Temp (C): 25.37 DO (ppm): 6.70 Cond: 457 pH: 7.83 Turbidity (NTU's): 45.1 Surface Current Velocity (m/s): 1.2

Comments:

Station: P26-LN-LB Date: 6/30/01 Time: 0200 Weather Conditions: Calm

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26LNL
End Units: 9629115	End Units: 2719732	Start: 17	Tow Time: 600
Begin Units: 941000	Begin Units: 253000	Middle: 18	Sample Volume (L): 700+700= 1,4L
Total Units: 21315	Total Units: 21932	End: 19	# of Jars Preserved: 3

Temp (C): 25.47 DO (ppm): 6.94 Cond: 458 pH: 7.84 Turbidity (NTU's): 45.2 Surface Current Velocity (m/s): 1.2

Comments:

Site/Pool Pool 22-upper Collectors: JSV/CDD Project #: 510206 Sample Period: (Day) or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P22-UD-LDB Date: 7/9/01 Time: 1600 Weather Conditions: Sunny / 98°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P22UDL2
End Units: 936087	End Units: 971272	Start: 21	Tow Time: 600s
Begin Units: 916000	Begin Units: 951000	Middle: 23	Sample Volume (L): 300 + 300 = .6L
Total Units: 20087	Total Units: 20272	End: 20	# of Jars Preserved: 1

Temp (C): 27.85 DO (ppm): 7.82 Cond: 421 pH: 7.83 Turbidity (NTU's): 28.1 Surface Current Velocity (m/s): 1.0

Comments:

Station: P22-UD-MC Date: 7/9/01 Time: 1635 Weather Conditions: Sunny / 98°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P22UDM
End Units: 991473	End Units: 955283	Start: 26	Tow Time(sec): 600
Begin Units: 971000	Begin Units: 936000	Middle: 25	Sample Volume (L): 400 + 500 = 0.9L
Total Units: 20473	Total Units: 19283	End: 26	# of Jars Preserved: 2

Temp (C): 27.58 DO (ppm): 8.04 Cond: 428 pH: 7.94 Turbidity (NTU's): 21.7 Surface Current Velocity (m/s): 1.2

Comments:

Station: P22-UD-RDB Date: 7/9/01 Time: 1706 Weather Conditions: Sunny / 98°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P22UDR2
End Units: 975664	End Units: 012171	Start: 29	Tow Time: 600s
Begin Units: 955000	Begin Units: 991000	Middle: 33	Sample Volume (L): 200+200 = 0.4L
Total Units: 20664	Total Units: 21171	End: 30	# of Jars Preserved: 1

Temp (C): 27.53 DO (ppm): 7.27 Cond: 474 pH: 7.97 Turbidity (NTU's): 26.0 Surface Current Velocity (m/s): 1.3

Comments: Sampled ~60 yds off shore due to barges parked along Sample area (Del Butcher)

Site/Pool: Pool 22-Lower Collectors: JSV/CDD Project #: 510206 Sample Period: Day or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P22-LD-RDB Date: 7/9/01 Time: 1150 Weather Conditions: Sunny / ~90°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P22LDR
End Units: 873154	End Units: 907735	Start: 29	Tow Time: 600 s
Begin Units: 852000	Begin Units: 886000	Middle: 27	Sample Volume (L): 100+100 = 0.2L
Total Units: 21154	Total Units: 21735	End: 21	# of Jars Preserved: 1

Temp (C): 27.42 DO (ppm): 6.96 Cond: 480 pH: 7.72 Turbidity (NTU's): 19.4 Surface Current Velocity (m/s): 1.1

Comments: Sampled close to green buoy just outside main Channel due to several barges parked along sample shore near sample location

Station: P22-LD-MC Date: 7/9/01 Time: 1256 Weather Conditions: Sunny / ~90°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P22LDM
End Units: 915805	End Units: 950650	Start: 26	Tow Time(sec): 6105
Begin Units: 894000	Begin Units: 929000	Middle: 30	Sample Volume (L): 200+200 = 0.4L
Total Units: 21805	Total Units: 21650	End: 29	# of Jars Preserved: 1

Temp (C): 27.31 DO (ppm): 7.46 Cond: 452 pH: 7.93 Turbidity (NTU's): 25.5 Surface Current Velocity (m/s): 1.1

Comments: Sampled just outside green buoy in Channel due to barge traffic, Sampled extra 10 s due to pleasure craft

Station: P22-LD-LDB Date: 7/9/01 Time: 1228 Weather Conditions: Sunny / ~90°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P22LDL
End Units: 893768	End Units: 928662	Start: 10	Tow Time: 600s
Begin Units: 873000	Begin Units: 908000	Middle: 9	Sample Volume (L): 500+600 = 1.1L
Total Units: 20768	Total Units: 20662	End: 9	# of Jars Preserved: 2

Temp (C): 27.40 DO (ppm): 7.58 Cond: 424 pH: 7.92 Turbidity (NTU's): 25.5 Surface Current Velocity (m/s): 0.9

Comments: Sampled just outside Red [illegible] to Shallow H_2O

Site/Pool: 18-upper | Collectors: JSV/CDD | Project #: 510206 | Sample Period: (Day) or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P18-UD-LDB | Date: 7/10/01 | Time: 10 30 | Weather Conditions: Sunny / ~85°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P18UDL2
End Units: 996864	End Units: 032874	Start: 12	Tow Time: 600s
Begin Units: 976000	Begin Units: 012000	Middle: 13	Sample Volume (L): 300 + 300 = 0.6L
Total Units: 20864	Total Units: 20874	End: 12	# of Jars Preserved: 1

Temp (C): 26.61 | DO (ppm): 6.75 | Cond: 459 | pH: 7.97 | Turbidity (NTU's): 25.0 | Surface Current Velocity (m/s): 1.0

Comments:

Station: P18-UD-MC | Date: 7/10/01 | Time: 11 11 | Weather Conditions: Sunny / ~85°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P18UDM2
End Units: 020387	End Units: 056457	Start: 15	Tow Time(sec): 600s
Begin Units: 999000	Begin Units: 035000	Middle: 18	Sample Volume (L): 200 + 200 = .4L
Total Units: 21387	Total Units: 21457	End: 17	# of Jars Preserved: 1

Temp (C): 26.79 | DO (ppm): 6.22 | Cond: 413 | pH: 7.74 | Turbidity (NTU's): 18.9 | Surface Current Velocity (m/s): 0.9

Comments:

Station: P18-UD-RDB | Date: 7/10/01 | Time: 11 39 | Weather Conditions: Sunny / ~85°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P18UDR2
End Units: 040510	End Units: 076772	Start: 12	Tow Time: 600s
Begin Units: 020000	Begin Units: 056000	Middle: 12	Sample Volume (L): 500 + 600 = 1.1L
Total Units: 20510	Total Units: 20772	End: 11	# of Jars Preserved: 2

Temp (C): 27.10 | DO (ppm): 6.82 | Cond: 470 | pH: 7.94 | Turbidity (NTU's): 64.9 | Surface Current Velocity (m/s): 0.9

Comments: * Turbidity was checked 2x & 64.9 is accurate measurement

Site/Pool: Pool 18 - Lower Collectors: GDB/JSV Project #: 510206 Sample Period: (Day) or Night (Circle One)

Station: P18-LD-LDB Date: 7/10/01 Time: 1438 Weather Conditions: Sunny ~ 95°F / windy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P18LDL
End Units: 097840	End Units: 059823	Start: 17	Tow Time: 600s
Begin Units: 077000	Begin Units: 041000	Middle: 10	Sample Volume (L): 300 + 300 = 0.6L
Total Units: 20840	Total Units: 18823	End: 8	# of Jars Preserved: 1

Temp (C): 27.15 DO (ppm): 7.17 Cond: 446 pH: 7.93 Turbidity (NTU's): 23.7 Surface Current Velocity (m/s): 0.7

Comments: Had to sample just outside channel (~10') due to shallow H2O, 3' depths ~ 30yds from channel, started sample at red buoy & finish off Tip of Island

Station: P18-LD-MC Date: 7/10/01 Time: 1602 Weather Conditions: sunny ~ 95°F windy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P18LDM
End Units: 142673	End Units: 102714	Start: 21	Tow Time(sec): 600s
Begin Units: 121660	Begin Units: 082060	Middle: 19	Sample Volume (L): 300 + 300 = .6L
Total Units: 21673	Total Units: 20714	End: 16	# of Jars Preserved: 1

Temp (C): 27.30 DO (ppm): 7.11 Cond: 437 pH: 7.95 Turbidity (NTU's): 20.6 Surface Current Velocity (m/s): 0.7

Comments: NOTE - Check sample volume (QAQC protocol)

Station: P18-LD-RDB Date: 7/10/01 Time: 1505 Weather Conditions: Sunny / windy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P18LDR
End Units: 120654	End Units: 082482	Start: 25	Tow Time: 600s
Begin Units: 099000	Begin Units: 061000	Middle: 25	Sample Volume (L): 100 + 100 = 0.2L
Total Units: 21654	Total Units: 21482	End: 24	# of Jars Preserved: 1

Temp (C): 27.65 DO (ppm): 7.14 Cond: 418 pH: 7.90 Turbidity (NTU's): 16.3 Surface Current Velocity (m/s): 0.7

Comments: Started Sample at green buoy ~ 40 yds outside channel - moved upstream to tip of Island due to low flow

Contract No. DACW25-00-D-0005, Work Order No. 0005

Site/Pool: Pool 26 Upper Collectors: JSV, CDP, BWR Project #: 510206 Sample Period: (Day) or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P26-UD-LDB Date: 7/12/01 Time: 1402 Weather Conditions: Rainy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26UDL
End Units: 184930	End Units: 225976	Start: 25	Tow Time: 600s
Begin Units: 165000	Begin Units: 206000	Middle: 27	Sample Volume (L): 300+300 = 0.6L
Total Units: 19930	Total Units: 19976	End: 26	# of Jars Preserved: 2

Temp (C): 27.26 DO (ppm): 7.00 Cond: 443 pH: 7.98 Turbidity (NTU's): 33.2 Surface Current Velocity (m/s): 1.1

Comments:

Station: P26-UD-MC Date: 7/12/01 Time: 1428 Weather Conditions: Rain / cloudy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26UDM
End Units: 206377	End Units: 247362	Start: 23	Tow Time(sec): 600s
Begin Units: 185000	Begin Units: 226000	Middle: 25	Sample Volume (L): 600+600 = 1.2L
Total Units: 21372	Total Units: 21362	End: 26	# of Jars Preserved: 2

Temp (C): 27.20 DO (ppm): 7.32 Cond: 446 pH: 7.98 Turbidity (NTU's): 27.1 Surface Current Velocity (m/s): 1.0

Comments:

Station: P26-UD-RDB Date: 7/12/01 Time: 1500 Weather Conditions: Rain / cloudy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26UDR
End Units: ~~228~~ 28122	End Units: 268744	Start: 16	Tow Time: 600s
Begin Units: 207000	Begin Units: 247000	Middle: 16	Sample Volume (L): 500+400 = 0.9L
Total Units: 21122	Total Units: 21744	End: 14	# of Jars Preserved: 2

Temp (C): 27.05 DO (ppm): 7.25 Cond: 449 pH: 7.97 Turbidity (NTU's): 27.4 Surface Current Velocity (m/s): 1.0

Comments: 1 ~~500 ft~~ shortnose gar collected in Net (~8" in total length) - gar released

Site/Pool Pool 26 Lower Collectors: JSV, CDD, BWF Project #: 510206 Sample Period: (Day) or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P26-LD-RDB Date: 7/12/01 Time: 10:49 Weather Conditions: Rainy & 65°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26 LDR
End Units: 163458	End Units: 123196	Start: 17	Tow Time: 6005
Begin Units: 143000	Begin Units: 103000	Middle: 18	Sample Volume (L): ~~2+.2~~ 200 + 200 (0.4 L)
Total Units: 20458	Total Units: 23196	End: 15	# of Jars Preserved: 1

Temp (C): 27.58 DO (ppm): 7.11 Cond: 456 pH: 7.94 Turbidity (NTU's): 26.9 Surface Current Velocity (m/s): 0.7

Comments:

Station: P26-LD-MC Date: 7/12/01 Time: 1120 Weather Conditions: Rainy & 65°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: ~~26 M~~ 26 LDM
End Units: 184671	End Units: 144068	Start: 15	Tow Time(sec): 6005
Begin Units: 163000	Begin Units: 123000	Middle: 13	Sample Volume (L): 200 + 200 = 0.4L
Total Units: 21671	Total Units: 21068	End: 14	# of Jars Preserved: 1

Temp (C): 27.64 DO (ppm): 6.94 Cond: 451 pH: 7.95 Turbidity (NTU's): 27.7 Surface Current Velocity (m/s): 0.9

Comments:

Station: P26-LD-LDB Date: 7/12/01 Time: 1148 Weather Conditions: Rainy & 65°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26 LDL
End Units: 205482	End Units: 164735	Start: 17	Tow Time: 6005
Begin Units: 185000	Begin Units: 144000	Middle: 17	Sample Volume (L): 400 + 400 = 0.8L
Total Units: 20482	Total Units: 20735	End: 16	# of Jars Preserved: 2

Temp (C): 27.68 DO (ppm): 7.04 Cond: 452 pH: 7.98 Turbidity (NTU's): 27.6 Surface Current Velocity (m/s): 0.7

Comments:

Contract No. DACW25-00-D-0005, Work Order No. 0005

Site/Pool: Pool 22-Lower Collectors: JSV/CPI Project #: 510206 Sample Period: Day or Night (Circle One) — Night circled

Station:	P22-LN-RDB	Date:	7/23/01	Time:	[illegible]	Weather Conditions:	humid
Left Meter		Right Meter		Water Depths (ft)		GPS Coords:	22LNR
End Units:	382601	End Units:	423721	Start:	32	Tow Time:	[illegible]
Begin Units:	360000	Begin Units:	401000	Middle:	29	Sample Volume (L):	[illegible]
Total Units:	22601	Total Units:	22721	End:	30	# of Jars Preserved:	1
Temp (C):	29.66	DO (ppm):	7.58	Cond:	505	pH:	8.23
Turbidity (NTU's):	12.4	Surface Current Velocity (m/s):	0.8				

Comments: [illegible] due to a number of [illegible] (4) parked along [illegible] - alot of mayfly [illegible]

Station:	P22-LN-MC	Date:	7/23/01	Time:	[illegible]	Weather Conditions:	[illegible]
Left Meter		Right Meter		Water Depths (ft)		GPS Coords:	22LNM
End Units:	40516[illegible]	End Units:	[illegible]	Start:	[illegible]	Tow Time(sec):	
Begin Units:	38[illegible]	Begin Units:	[illegible]4000	Middle:	[illegible]	Sample Volume (L):	
Total Units:	[illegible]	Total Units:	[illegible]	End:	[illegible]	# of Jars Preserved:	
Temp (C):	[illegible]	DO (ppm):	[illegible]	Cond:	[illegible]	pH:	[illegible]
Turbidity (NTU's):	[illegible]	Surface Current Velocity (m/s):	[illegible]				

Comments: [illegible] lot of mayfly larvae in sample

Station:	P22-LN-LDB	Date:	7/23/01	Time:	20:09	Weather Conditions:	[illegible]
Left Meter		Right Meter		Water Depths (ft)		GPS Coords:	22LNL
End Units:	[illegible]	End Units:	[illegible]	Start:	8	Tow Time:	[illegible]
Begin Units:	405000	Begin Units:	[illegible]4[illegible]	Middle:	10	Sample Volume (L):	[illegible]
Total Units:	[illegible]	Total Units:		End:	[illegible]	# of Jars Preserved:	[illegible]
Temp (C):	[illegible]	DO (ppm):	[illegible]	Cond:		pH:	[illegible]
Turbidity (NTU's):	[illegible]	Surface Current Velocity (m/s):	[illegible]				

Comments: [illegible] mayfly [illegible] sample

Site/Pool: Pool 22 - Lower Collectors: JSV / CDL Project #: 510206 Sample Period: (Day) or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P22-LD-RDB Date: 7/23/01 Time: 1100 Weather Conditions: Sunny / Hot

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P22LLR
End Units: 251457	End Units: 291834	Start: 24	Tow Time: 600 s
Begin Units: 229000	Begin Units: 269000	Middle: 26	Sample Volume (L): 100 total = 0.1 L
Total Units: 22457	Total Units: 22834	End: 25	# of Jars Preserved: 1

Temp (C): 29.21 DO (ppm): 6.83 Cond: 510 pH: 8.13 Turbidity (NTU's): 18.7 Surface Current Velocity (m/s): 0.8

Comments: Barge parked near sample area, low flow need to move into channel & go around barge

Station: P22-LD-MC Date: 7/23/01 Time: 1126 Weather Conditions: Sunny / Hot

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P22LDM
End Units: 273428	End Units: 314333	Start: 24	Tow Time(sec): 600 s
Begin Units: 251000	Begin Units: 292000	Middle: 22	Sample Volume (L): 100 + 100 = 0.2 L
Total Units: 22428	Total Units: 22333	End: 15	# of Jars Preserved: 1

Temp (C): 29.56 DO (ppm): 8.32 Cond: 471 pH: 7.99 Turbidity (NTU's): 13.8 Surface Current Velocity (m/s): 0.9

Comments: Started tow in middle of channel but [illegible] had to move to left bank due to barge moving downstream & moving upstream

Station: P22-LD-LPB Date: 7/23/01 Time: 1154 Weather Conditions: Sunny / Hot

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: P22LDL
End Units: 295195	End Units: 336337	Start: 9	Tow Time: 600 s
Begin Units: 273000	Begin Units: 314000	Middle: 12	Sample Volume (L): 200+200 = 0.4 L
Total Units: 22195	Total Units: 22337	End: 15	# of Jars Preserved: 1

Temp (C): 29.57 DO (ppm): 8.52 Cond: 466 pH: 8.37 Turbidity (NTU's): 18.2 Surface Current Velocity (m/s): 0.6

Comments:

Contract No. DACW25-00-D-0005, Work Order No. 0005

Site/Pool: Pool 22-upper Collectors: JSV/CDD Project #: 510206 Sample Period: Day or Night (Circle One)

Station: P22-UD-LDB Date: 7/23/01 Time: 1531 Weather Conditions: Cloudy / Rain

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UDL
End Units: 315832	End Units: 356850	Start: 17	Tow Time: 600 s
Begin Units: 295000	Begin Units: 336000	Middle: 14	Sample Volume (L): 200 + 200 = 0.4L
Total Units: 20832	Total Units: 20850	End: 13	# of Jars Preserved: 1

Temp (C): 29.70 DO (ppm): 8.67 Cond: 457 pH: 8.32 Turbidity (NTU's): 16.1 Surface Current Velocity (m/s): 0.6

Comments:

Station: P22-UD-MC Date: 7/23/01 Time: 1550 Weather Conditions: Cloudy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UDM
End Units: 337409	End Units: 378385	Start: 20	Tow Time(sec): 600 s
Begin Units: 316000	Begin Units: 357000	Middle: 20	Sample Volume (L): 100 + 100 = 0.2L
Total Units: 21409	Total Units: 21385	End: 17	# of Jars Preserved: 1

Temp (C): 29.70 DO (ppm): 8.00 Cond: 478 pH: 8.34 Turbidity (NTU's): 22.6 Surface Current Velocity (m/s): 0.6

Comments:

Station: P22-UD-RDB Date: 7/23/01 Time: 1619 Weather Conditions: Cloudy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UDR
End Units: 360528	End Units: 400552	Start: 25	Tow Time: 600s
Begin Units: 338000	Begin Units: 378000	Middle: 20	Sample Volume (L): 100 Total 0.1L
Total Units: 22528	Total Units: 22552	End: 18	# of Jars Preserved: 1

Temp (C): 29.56 DO (ppm): 7.44 Cond: 518 pH: 8.24 Turbidity (NTU's): 20.1 Surface Current Velocity (m/s): 0.7

Comments:

Contract No. DACW25-00-D-0005, Work Order No. 0005

Site/Pool [illegible] Collectors: CDD / JSV Project #: [illegible] Sample Period: Day or Night (Circle One)

Station: [illegible] Date: 7/24/2[illegible] Time: 2[illegible] Weather Conditions: [illegible]

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: [illegible]
End Units: [illegible]	End Units: [illegible]	Start: [illegible]	Tow Time: [illegible]
Begin Units: 469000	Begin Units: 426000	Middle: [illegible]	Sample Volume (L): [illegible]
Total Units: [illegible]	Total Units: [illegible]	End: [illegible]	# of Jars Preserved: [illegible]

Temp (C): 29.21 DO (ppm): 8.31 Cond: 455 pH: 8.40 Turbidity (NTU's): 15.0 Surface Current Velocity (m/s): 1.6

Comments: [illegible]

Station: [illegible] Date: [illegible] Time: [illegible] Weather Conditions: [illegible]

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: [illegible]
End Units: [illegible]	End Units: [illegible]	Start: [illegible]	Tow Time(sec): [illegible]
Begin Units: [illegible]	Begin Units: [illegible]	Middle: [illegible]	Sample Volume (L): [illegible]
Total Units: [illegible]	Total Units: [illegible]	End: [illegible]	# of Jars Preserved: [illegible]

Temp (C): [illegible] DO (ppm): [illegible] Cond: [illegible] pH: [illegible] Turbidity (NTU's): [illegible] Surface Current Velocity (m/s): [illegible]

Comments: [illegible]

Station: [illegible] Date: [illegible] Time: [illegible] Weather Conditions: [illegible]

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: [illegible]
End Units: [illegible]	End Units: [illegible]	Start: [illegible]	Tow Time: [illegible]
Begin Units: [illegible]	Begin Units: [illegible]	Middle: [illegible]	Sample Volume (L): [illegible]
Total Units: [illegible]	Total Units: [illegible] 2	End: 25	# of Jars Preserved: [illegible]

Temp (C): [illegible] DO (ppm): [illegible] Cond: [illegible] pH: [illegible] Turbidity (NTU's): [illegible] Surface Current Velocity (m/s): [illegible]

Comments: [illegible]

Site/Pool: Pool 18 - upper Collectors: JSV/CPL Projcct #: 5102.06 Sample Period: (Day) or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P18-UD-LDB Date: 7/25/01 Time: 1409 Weather Conditions: Overcast / Breezy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18UDL
End Units: 574827	End Units: 620365	Start: 9	Tow Time: 600 s
Begin Units: 553000	Begin Units: 600000	Middle: 10	Sample Volume (L): 100 + 100 = 0.2L
Total Units: 21827	Total Units: 20365	End: 9	# of Jars Preserved: 1

Temp (C): 30.19 DO (ppm): 7.94 Cond: 463 pH: 8.26 Turbidity (NTU's): 12.9 Surface Current Velocity (m/s): 0.9

Comments:

Station: P18-UD-MC Date: 7/25/01 Time: 1434 Weather Conditions: Overcast

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18UDM
End Units: 596353	End Units: 642265	Start: 12	Tow Time(sec): 600
Begin Units: 575000	Begin Units: 621000	Middle: 14	Sample Volume (L): 100 + 100 = 0.2L
Total Units: 21353	Total Units: 21265	End: 16	# of Jars Preserved: 7

Temp (C): 30.16 DO (ppm): 7.32 Cond: 429 pH: 8.21 Turbidity (NTU's): 11.9 Surface Current Velocity (m/s): 1.1

Comments:

Station: P18-UD-RDB Date: 7/25/01 Time: 1504 Weather Conditions: Overcast

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18UDR
End Units: 616444	End Units: 662041	Start: 10	Tow Time: 600 s
Begin Units: 596000	Begin Units: 642000	Middle: 10	Sample Volume (L): [illegible]
Total Units: 20444	Total Units: 20041	End: 10	# of Jars Preserved: 6

Temp (C): 29.16 DO (ppm): [illegible] Cond: [illegible] pH: 8.36 Turbidity (NTU's): [illegible] Surface Current Velocity (m/s): [illegible]

Comments:

Contract No. DACW25-00-D-0005, Work Order No. 0005

te/Pool Pool 8-Upper Collectors: CED/JSV Project #: 510206 Sample Period: Day or (Night)
(Circle One)

tation: P18-UN-RDB Date: 7/25/01 Time: 2206 Weather Conditions: Cloudy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18UNR
End Units: 637017	End Units: 683068	Start: 8	Tow Time: 600 s
Begin Units: 616000	Begin Units: 662000	Middle: 8	Sample Volume (L): 200+200=0.44
Total Units: 21017	Total Units: 21068	End: 8	# of Jars Preserved: 1

Temp (C): 29.81 DO (ppm): 6.69 Cond: 465 pH: 8.18 Turbidity (NTU's): 16.0 Surface Current Velocity (m/s): 0.7

Comments: released by LMR, Collected

tation: P18-UN-VNC Date: 7/25-26 Time: 2230 Weather Conditions: cloudy/windy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords:
End Units: 678779	End Units: 724191	Start: 13	Tow Time(sec):
Begin Units: 657600	Begin Units: 703600	Middle: 13	Sample Volume (L): 0.1L
Total Units: 21779	Total Units: 21191	End:	# of Jars Preserved: 1

Temp (C): 29.31 DO (ppm): 6.76 Cond: 4115 pH: 8.19 Turbidity (NTU's): Surface Current Velocity (m/s):

Comments:

Station: P18-UN-200 Date: 7/25/01 Time: 2302 Weather Conditions: Cloudy/windy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18UNR
End Units: 651381	End Units: 703330	Start: 9	Tow Time: 600 s
Begin Units: 631000	Begin Units: 683000	Middle: 9	Sample Volume (L): 800+800=1.6L
Total Units: 20381	Total Units: 20330	End: 10	# of Jars Preserved: 3

Temp (C): 28.42 DO (ppm): 7.22 Cond: 470 pH: 8.36 Turbidity (NTU's): 31.1 Surface Current Velocity (m/s): 0.6

Comments: add of Ng in sacks

Contract No. DACW25-00-D-0005, Work Order No. 0005

e/Pool: Pool 18-Lower Collectors: JSV/CDD Project #: 510206 Sample Period: (Day) or Night (Circle One)

Station:	P18 LD-LDB	Date:	7/25/01	Time:	1037	Weather Conditions:	overcast
Left Meter		Right Meter		Water Depths (ft)		GPS Coords:	18 LDL
End Units:	556170	End Units:	511309	Start:	17	Tow Time:	630 s
Begin Units:	535000	Begin Units:	490000	Middle:	10	Sample Volume (L):	50 + 50 = 0.1 L
Total Units:	[illegible]	Total Units:	[illegible]	End:	11	# of Jars Preserved:	1
Temp (C):	30.26	DO (ppm):	7.72	Cond:	463	pH:	8.25
Turbidity (NTU's):	14.4	Surface Current Velocity (m/s):	0.3				

Comments: Drifted into shallow [illegible] when started, so added extra 30 s to tow bcs had to slowly move out of [illegible] [illegible]

Station:	P18 LL-MC	Date:	7/25/01	Time:	[illegible]	Weather Conditions:	overcast
Left Meter		Right Meter		Water Depths (ft)		GPS Coords:	18 LDM
End Units:	577841	End Units:	532318	Start:	18	Tow Time(sec):	600
Begin Units:	556000	Begin Units:	511000	Middle:	19	Sample Volume (L):	50 + 50 = 0.1 L
Total Units:	21841	Total Units:	21318	End:	14	# of Jars Preserved:	1
Temp (C):	30.31	DO (ppm):	7.66	Cond:	464	pH:	8.34
Turbidity (NTU's):	11.8	Surface Current Velocity (m/s):	0.[illegible]				

Comments:

Station:	P18 LD-RBR	Date:	7/25/01	Time:	1135	Weather Conditions:	[illegible]
Left Meter		Right Meter		Water Depths (ft)		GPS Coords:	18 LDR
End Units:	599502	End Units:	553410	Start:	10	Tow Time:	[illegible]
Begin Units:	578000	Begin Units:	532600	Middle:	30	Sample Volume (L):	[illegible]
Total Units:	21502	Total Units:	21010	End:	24	# of Jars Preserved:	1
Temp (C):	30.26	DO (ppm):	8.24	Cond:	443	pH:	8.37
Turbidity (NTU's):	14.7	Surface Current Velocity (m/s):	0.3				

Comments:

Contract No. DACW25-00-D-0005, Work Order No. 0005

Reach/Pool: Pool 18-Lower Collectors: [illegible] Project #: 510504 Sample Period: Day or Night (Circle One)

Station: P18-LN-LRB Date: 7/26/01 Time: 0143 Weather Conditions: Windy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18LNL
End Units: 746701	End Units: 703025	Start: 15	Tow Time: 600S
Begin Units: 725000	Begin Units: 680000	Middle: 10	Sample Volume (L): 100 + 100 = 0.2L
Total Units: 21701	Total Units: 23025	End: 8	# of Jars Preserved: 2

Temp (C): 29.47 DO (ppm): 6.86 Cond: 466 pH: 8.29 Turbidity (NTU's): 13.6 Surface Current Velocity (m/s): 0.8

Comments: Strong wind = caused problems to keep in a line with cover be placed in H2O

Station: P18-LN-MC Date: 7/26/01 Time: 0216 Weather Conditions: Windy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18LNM
End Units: 766814	End Units: 723889	Start: 17	Tow Time(sec): 600
Begin Units: 747000	Begin Units: 704000	Middle: 13	Sample Volume (L): 50 + 50 = 0.1L
Total Units: 19814	Total Units: 19889	End: 15	# of Jars Preserved: 1

Temp (C): 29.50 DO (ppm): 6.86 Cond: 461 pH: 8.25 Turbidity (NTU's): 11.9 Surface Current Velocity (m/s): 0.5

Comments: Strong Winds made current variation difficult to maintain

Station: P18-LN-RDB Date: 7/26/01 Time: 0249 Weather Conditions: Windy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18LNR
End Units: 788660	End Units: 745612	Start: 17	Tow Time: 600
Begin Units: 768000	Begin Units: 725000	Middle: 23	Sample Volume (L): 50 + 50 = 0.1L
Total Units: 20660	Total Units: 20612	End: 24	# of Jars Preserved: 2

Temp (C): 29.24 DO (ppm): 6.89 Cond: 448 pH: 8.22 Turbidity (NTU's): 7.78 Surface Current Velocity (m/s): 0.5

Comments:

Site/Pool: Pool 26 - Upper Collectors: JSV/ SDD/ BWF Project #: 510206 Sample Period: (Day) or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P26-UD-LDB Date: 7/27/01 Time: 1317 Weather Conditions: Cloudy, windy, few sprinkles

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26ULL
End Units: 837878	End Units: 876001	Start: 23	Tow Time: 6005
Begin Units: 818000	Begin Units: 856000	Middle: 20	Sample Volume (L): 100 + 100 = 0.2 L
Total Units: 19878	Total Units: 20001	End: 14	# of Jars Preserved: 1

Temp (C): 28.52 DO (ppm): 8.01 Cond: 457 pH: 8.40 Turbidity (NTU's): 19.0 Surface Current Velocity (m/s): 0.9

Comments:

Station: P26-UD-MC Date: 7/27/01 Time: 1338 Weather Conditions: cloudy, wind, sprinkles

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26ULM
End Units: 857879	End Units: 897012	Start: 26	Tow Time(sec): 6005
Begin Units: 838000	Begin Units: 876000	Middle: 25	Sample Volume (L): 100 + 100 = 0.2L
Total Units: 19879	Total Units: 21012	End: 21	# of Jars Preserved: 1

Temp (C): 28.71 DO (ppm): 7.75 Cond: 464 pH: 8.39 Turbidity (NTU's): 21.1 Surface Current Velocity (m/s): 0.9

Comments:

Station: P26-UD-RDR Date: 7/27/01 Time: 1408 Weather Conditions: cloudy, windy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26ULR
End Units: 877679	End Units: 918141	Start: 12	Tow Time: 6005
Begin Units: 858000	Begin Units: 897000	Middle: 12	Sample Volume (L): 100+100 = 0.2 L
Total Units: 19679	Total Units: 21141	End: 13	# of Jars Preserved: 1

Temp (C): 28.78 DO (ppm): 7.84 Cond: [illegible] pH: 8.43 Turbidity (NTU's): 18.8 Surface Current Velocity (m/s): 0.8

Comments:

Contract No. DACW25-00-D-0005, Work Order No. 0005

Site/Pool: Pool 26 upper   Collectors: JSV/CDO/BWF   Project #: 510206   Sample Period: Day or Night (Circle One) — Night circled

Station:	P26-UN-LDB	Date:	7/27/01	Time:	2201	Weather Conditions:	[illegible]
Left Meter		Right Meter		Water Depths (ft)		GPS Coords:	26UNL
End Units:	899403	End Units:	933855	Start:	16	Tow Time:	600S
Begin Units:	878000	Begin Units:	912000	Middle:	17	Sample Volume (L):	100 + 100 = 0.2L
Total Units:	21403	Total Units:	21855	End:	21	# of Jars Preserved:	1
Temp (C):	28.51	DO (ppm):	7.21	Cond:	460	pH:	[illegible]
Turbidity (NTU's):	22.9	Surface Current Velocity (m/s):	0.9				
Comments:							

Station:	P26-UN-MC	Date:	7/27/01	Time:	[illegible]	Weather Conditions:	[illegible]
Left Meter		Right Meter		Water Depths (ft)		GPS Coords:	26UNM
End Units:	941005	End Units:	932952	Start:	[illegible]	Tow Time(sec):	600S
Begin Units:	921000	Begin Units:	[illegible]	Middle:	[illegible]	Sample Volume (L):	[illegible]
Total Units:	20005	Total Units:	20952	End:	[illegible]	# of Jars Preserved:	1
Temp (C):	[illegible]	DO (ppm):	[illegible]	Cond:	[illegible]	pH:	[illegible]
Turbidity (NTU's):	[illegible]	Surface Current Velocity (m/s):	[illegible]				
Comments:							

Station:	P26-UN-RDB	Date:	7/27/01	Time:	2228	Weather Conditions:	[illegible]
Left Meter		Right Meter		Water Depths (ft)		GPS Coords:	26UNR
End Units:	[illegible]	End Units:	[illegible]	Start:	10	Tow Time:	600S
Begin Units:	[illegible]	Begin Units:	910000	Middle:	[illegible]	Sample Volume (L):	[illegible]
Total Units:	21950	Total Units:	22112	End:	13	# of Jars Preserved:	[illegible]
Temp (C):	28.70	DO (ppm):	7.97	Cond:	469	pH:	[illegible]
Turbidity (NTU's):	17.5	Surface Current Velocity (m/s):	0.7				
Comments:	[illegible] were [illegible]						

Site/Pool: Pool 26 Lower Collectors: JSV/CRB/CWF Project #: 510206 Sample Period: (Day) or Night (Circle One)

Station: P26-LD-RDB Date: 7/10/01 Time: 1022 Weather Conditions: Cloudy/humid

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26LDL
End Units: 810805	End Units: 767621	Start: 20	Tow Time: 6005
Begin Units: 789000	Begin Units: 746000	Middle: 19	Sample Volume (L): 25+1.85=26.85L
Total Units: 21805	Total Units: 21681	End: 15	# of Jars Preserved: 1

Temp (C): 28.45 DO (ppm): 7.58 Cond: 472 pH: 8.34 Turbidity (NTU's): 13.6 Surface Current Velocity (m/s): 0.3

Comments:

Station: P26-LD-RDB Date: 7/27/01 Time: 1043 Weather Conditions: Cloudy/humid

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26LDM
End Units: 835043	End Units: 795056	Start: 16	Tow Time(sec): 6005
Begin Units: 814000	Begin Units: 774000	Middle: 13	Sample Volume (L): 25+1.85=26.85L
Total Units: 21043	Total Units: 21056	End: 14	# of Jars Preserved: 1

Temp (C): 28.56 DO (ppm): 7.67 Cond: 467 pH: 8.36 Turbidity (NTU's): 14.0 Surface Current Velocity (m/s): 0.6

Comments:

Station: P26-LD-LDB Date: 8/1/01 Time: 1107 Weather Conditions: Cloudy/humid

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26LDL
End Units: 856564	End Units: 817613	Start: 17	Tow Time: 6005
Begin Units: 835000	Begin Units: [illegible]	Middle: 17	Sample Volume (L): 25+1.85=26.85L
Total Units: 21564	Total Units: 21613	End: 15	# of Jars Preserved: 1

Temp (C): 28.57 DO (ppm): 7.51 Cond: 475 pH: 8.36 Turbidity (NTU's): 11.4 Surface Current Velocity (m/s): 0.4

Comments:

Contract No. DACW25-00-D-0005, Work Order No. 0005

Contract No. DACW25-00-D-0005, Work Order No. 0005

Site/Pool: Pool 26-Lower Collectors: Project #: Sample Period: Day or Night (Circle One)

Station: P26-LN-RDC Date: 7/26 Time: Weather Conditions: Breezy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords:
End Units:	End Units:	Start: 16	Tow Time:
Begin Units:	Begin Units:	Middle:	Sample Volume (L):
Total Units: 20825	Total Units:	End: 2	# of Jars Preserved: 1
Temp (C):	DO (ppm):	Cond:	pH:	Turbidity (NTU's):	Surface Current Velocity (m/s):

Comments:

Station: P26-LN-MC Date: 7/26 Time: Weather Conditions:

Left Meter	Right Meter	Water Depths (ft)	GPS Coords:
End Units:	End Units:	Start: 5	Tow Time(sec):
Begin Units:	Begin Units:	Middle:	Sample Volume (L):
Total Units:	Total Units:	End:	# of Jars Preserved:
Temp (C): 28.6	DO (ppm): 7.54	Cond: 491	pH: 8.30	Turbidity (NTU's):	Surface Current Velocity (m/s):

Comments:

Station: P26-LN-IRC Date: Time: Weather Conditions:

Left Meter	Right Meter	Water Depths (ft)	GPS Coords:
End Units:	End Units:	Start: 17	Tow Time:
Begin Units:	Begin Units:	Middle: 18	Sample Volume (L):
Total Units:	Total Units:	End:	# of Jars Preserved:
Temp (C):	DO (ppm):	Cond: 476	pH:	Turbidity (NTU's):	Surface Current Velocity (m/s):

Comments:

Site/Pool: Pool 22-upper Collectors: JSV/BWF Project #: 510206 Sample Period: (Day) 0.
(Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P22-UD-LDB Date: 8/7/01 Time: 1506 Weather Conditions: Sunny ~ 95°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 20 DL2
End Units: 129386	End Units: 088664	Start: 12	Tow Time: 600S
Begin Units: 109000	Begin Units: 068000	Middle: 12	Sample Volume (L): 0.05+0.05=0.1 L
Total Units: 20386	Total Units: (20664)	End: 12	# of Jars Preserved: 1

Temp (C): 30.10 DO (ppm): 7.22 Cond: 478 pH: 8.19 Turbidity (NTU's): 28.3 Surface Current Velocity (m/s): 0.4

Comments:

Station: P22-UD-MC Date: 8/7/01 Time: 1533 Weather Conditions: Sunny ~ 95°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 20 DL2
End Units: 108901	End Units: 149197	Start: 20	Tow Time(sec): 600 S
Begin Units: 089000	Begin Units: 129000	Middle: 17	Sample Volume (L): 300 = 0.3L
Total Units: 19901	Total Units: (20197)	End: 18	# of Jars Preserved: 1

Temp (C): 30.43 DO (ppm): 7.10 Cond: 485 pH: 8.28 Turbidity (NTU's): 26.2 Surface Current Velocity (m/s): 0.8

Comments:

Station: P22-UDRDC Date: 8/7/01 Time: 1602 Weather Conditions: Sunny ~ 95°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords:
End Units: 129961	End Units: 170218	Start: 22	Tow Time: 600S
Begin Units: 109000	Begin Units: 149000	Middle: 18	Sample Volume (L): 100 = 0.1L
Total Units: 20961	Total Units: (21218)	End: 19	# of Jars Preserved: 1

Temp (C): 30.24 DO (ppm): [illegible] Cond: 482 pH: 8.17 Turbidity (NTU's): 44.9 Surface Current Velocity (m/s): 0.7

Comments:

Site/Pool: Pool 22 Lower Collectors: BWF/JSV Project #: 510206 Sample Period: Day or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P22-LD-RDB Date: 8-7-01 Time: 1048 Weather Conditions: Sunny & 90°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22LDR2
End Units: 066763	End Units: 024350	Start: 21	Tow Time: 600s
Begin Units: 045000	Begin Units: 002000	Middle: 17	Sample Volume (L): 50 + 50 = 100 ml = 0.1 L
Total Units: 21763	Total Units: 22350	End: 20	# of Jars Preserved: 1

Temp (C): 29.25 DO (ppm): 5.38 Cond: 456 pH: 7.98 Turbidity (NTU's): 50.7 Surface Current Velocity (m/s): 0.4

Comments: Barges parked [illegible] - started sample ~ 45 50 yds offshore then moved [illegible] stations once passed barge

Station: P22-LD-MC Date: 8/7/01 Time: 1115 Weather Conditions: Sunny ~ 90°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22LDM2
End Units: 087740	End Units: 045977	Start: 26	Tow Time(sec): 600s
Begin Units: 067000	Begin Units: 024000	Middle: 28	Sample Volume (L): 100 = 0.1L
Total Units: 20740	Total Units: 21977	End: 20	# of Jars Preserved: 1

Temp (C): 29.80 DO (ppm): 6.31 Cond: 474 pH: 8.09 Turbidity (NTU's): 53.6 Surface Current Velocity (m/s): 0.9

Comments:

Station: P22-LD-LPB Date: 8/7/01 Time: 1142 Weather Conditions: Sunny ~ 90°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22LDL2
End Units: 109354	End Units: 067539	Start: 10	Tow Time: 600s
Begin Units: 088000	Begin Units: 046000	Middle: 10	Sample Volume (L): 200 = 0.2L
Total Units: 21354	Total Units: 21539	End: 12	# of Jars Preserved: 1

Temp (C): 29.68 DO (ppm): 5.85 Cond: 475 pH: 8.09 Turbidity (NTU's): 55.1 Surface Current Velocity (m/s): 0.3

Comments:

Site/Pool: Pool 18-Upper Collectors: JSV/BWF Project #: 510006 Sample Period: (Day) or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P18-UD-LDB Date: 8/8/01 Time: 1451 Weather Conditions: Sunny ~ 90°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18UDL2
End Units: 215441	End Units: 253936	Start: 10	Tow Time: 600 s
Begin Units: 196000	Begin Units: 234000	Middle: 10	Sample Volume (L): 300 ml = 0.3L
Total Units: 19441	Total Units: 19936	End: 10	# of Jars Preserved: 1

Temp (C): 30.54 DO (ppm): 9.55 Cond: 462 pH: 8.56 Turbidity (NTU's): 19.8 Surface Current Velocity (m/s): 0.9

Comments: a lot of filamentous algae

Station: P18-UD-MC Date: 8/8 Time: 1541 Weather Conditions: Sunny ~ 90°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18UDM2
End Units: 250789	End Units: 294835	Start: 15	Tow Time(sec): 600s
Begin Units: 235000	Begin Units: 275000	Middle: 15	Sample Volume (L): 200 = 0.2L
Total Units: 15789	Total Units: 19835	End: 15	# of Jars Preserved: 1

Temp (C): 30.74 DO (ppm): 9.14 Cond: 441 pH: 8.50 Turbidity (NTU's): 16.3 Surface Current Velocity (m/s): 1.0

Comments:

Station: P18-UD-RDB Date: 8/8 Time: 1519 Weather Conditions:

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18UDR2
End Units: 234986	End Units: 275020	Start: 10	Tow Time: 600 s
Begin Units: 215000	Begin Units: 254000	Middle: 8	Sample Volume (L): 400 ml = 0.4L
Total Units: 19986	Total Units:	End:	# of Jars Preserved: 1

Temp (C): 31.21 DO (ppm): 10.76 Cond: pH: 8.66 Turbidity (NTU's): 24.7 Surface Current Velocity (m/s): 0.9

Comments:

Site/Pool: Pool 18-Lower Collectors: JSV/BWF Project #: 510206 Sample Period: (Day) or Night (Circle One)

Station: P18-LD-LDB Date: 8/8/01 Time: 1045 Weather Conditions: Sunny ~ 90°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18LDL2
End Units: 191013	End Units: 150401	Start: 17	Tow Time: 610 s
Begin Units: 170000	Begin Units: 130000	Middle: 10	Sample Volume (L): 100 ml = 0.1L
Total Units: 21013	Total Units: 20401	End: 10	# of Jars Preserved: 1

Temp (C): 30.27 DO (ppm): 8.11 Cond: 472 pH: 8.48 Turbidity (NTU's): 18.1 Surface Current Velocity (m/s): 0.1

Comments: Started sample near [illegible] Buoy

Station: P18-LD-MC Date: 8/8/01 Time: 1115 Weather Conditions: Sunny ~ 75°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18LDM2
End Units: 211345	End Units: 170609	Start: 19	Tow Time(sec): 600 s
Begin Units: 192000	Begin Units: 151000	Middle: 17	Sample Volume (L): 200 ml = 0.2L
Total Units: 19345	Total Units: 19609	End: 17	# of Jars Preserved: 1

Temp (C): 30.44 DO (ppm): 8.45 Cond: 464 pH: 8.46 Turbidity (NTU's): 17.6 Surface Current Velocity (m/s): 0.7

Comments: alot of algae [illegible]

Station: P18-LD-RIG Date: 8/8/01 Time: 1148 Weather Conditions: [illegible]

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: [illegible]2
End Units: 230335	End Units: 191503	Start: 23	Tow Time: 600 s
Begin Units: 211000	Begin Units: 171000	Middle: 23	Sample Volume (L): 100 ml = 0.1L
Total Units: 19335	Total Units: 20503	End: 23	# of Jars Preserved: 1

Temp (C): 30.75 DO (ppm): 9.64 Cond: 448 pH: 8.54 Turbidity (NTU's): 15.6 Surface Current Velocity (m/s): 0.4

Comments:

Contract No. DACW25-00-D-0005, Work Order No. 0005

Site/Pool: Pool 26 Upper Collectors: CDD / BWF Project #: 510206 Sample Period: (Day) or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P26-UD-LDB Date: 8/9/01 Time: 1241 Weather Conditions: Sunny & 95° or hotter

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26UDL2
End Units: 383022	End Units: 341307	Start: 20	Tow Time: 615
Begin Units: 361000	Begin Units: 319000	Middle: 27	Sample Volume (L): 50 + 50 = .1L
Total Units: 22022	Total Units: 22307	End: 27	# of Jars Preserved: 1

Temp (C): 30.68 DO (ppm): 6.75 Cond: 463 pH: 8.12 Turbidity (NTU's): 52.5 Surface Current Velocity (m/s): 0.7

Comments: Ran extra 15 sec – had to slow down ~~Ea~~ due to pleasurecraft wakes - didn't want to snap frames

Station: P26-UD-MC Date: 8/9/01 Time: 1304 Weather Conditions: Sunny 105°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26UDM
End Units: 404612	End Units: 362693	Start: 24	Tow Time(sec): 600s
Begin Units: 383000	Begin Units: 341000	Middle: 18	Sample Volume (L): 100 + 100 = 0.2L
Total Units: 21612	Total Units: 21693	End: 19	# of Jars Preserved: 1

Temp (C): 30.45 DO (ppm): 6.09 Cond: 463 pH: 8.05 Turbidity (NTU's): 54.5 Surface Current Velocity (m/s): 0.8

Comments: Fish caught in Christy's cod end 8"-10" long

Station: P26-UD-RDB Date: 8/9/01 Time: 1336 Weather Conditions: Sunny 110°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26UDR2
End Units: 426803	End Units: 384432	Start: 11	Tow Time: 600s
Begin Units: 405000	Begin Units: 363000	Middle: 13	Sample Volume (L): .1 + .1 = 0.2L
Total Units: 21803	Total Units: 21432	End: 13	# of Jars Preserved: 1

Temp (C): 30.46 DO (ppm): 6.27 Cond: 459 pH: 8.04 Turbidity (NTU's): 53.5 Surface Current Velocity (m/s): 0.7

Comments:

Site/Pool: Pool 26 Lower Collectors: BMF/CDD Project #: 516206 Sample Period: (Day) or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P26-LD-RDB Date: 8/9/01 Time: 933 Weather Conditions: Cloudy ~ 80°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26LDR
End Units: 317002	End Units: 275268	Start: 22	Tow Time: 600S
Begin Units: 295000	Begin Units: 253000	Middle: 18	Sample Volume (L): .05 + .05 = 0.1 L
Total Units: 22002	Total Units: (22268)	End: 17	# of Jars Preserved: 1

Temp (C): 30.17 DO (ppm): 7.11 Cond: 482 pH: 8.22 Turbidity (NTU's): 17.9 Surface Current Velocity (m/s): 0.3

Comments:

Station: P26-LD LDB Date: 8/9/01 Time: 955 Weather Conditions: ~~Clear~~ Clear ~ 80°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26 LDL3
End Units: 338987	End Units: 297231	Start: 19	Tow Time(sec): 600
Begin Units: 317000	Begin Units: 275000	Middle: 17	Sample Volume (L): 50 + 50 = 0.1 L
Total Units: 21987	Total Units: (22231)	End: 13	# of Jars Preserved: 1

Temp (C): 30.29 DO (ppm): 6.27 Cond: 505 pH: 8.14 Turbidity (NTU's): 30.1 Surface Current Velocity (m/s): 0.4

Comments:

Station: P26-LD MC Date: 8/9/01 Time: 1018 Weather Conditions: Clear ~ 85°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26LDM3
End Units: 360650	End Units: 318808	Start: 13	Tow Time: 600S
Begin Units: 339000	Begin Units: 297000	Middle: 14	Sample Volume (L): 50 + 50 = 0.1L
Total Units: 21650	Total Units: (21808)	End: 15	# of Jars Preserved: 1

Temp (C): 30.19 DO (ppm): 6.15 Cond: 482 pH: 8.11 Turbidity (NTU's): 25.4 Surface Current Velocity (m/s): 0.5

Comments:

Pool 22 Lower Collectors: CDD / BWR Project #: 510206 Sample Period: Day / Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P22-LD-RDB Date: 8/20/01 Time: 1101 Weather Conditions: Sunny & 90°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22LDR
End Units: 404825	End Units: 446612	Start: 23	Tow Time: 600
Begin Units: 385000	Begin Units: 427000	Middle: 23	Sample Volume (L): 50+50 = 0.1L
Total Units: 19825	Total Units: 19612	End: 26	# of Jars Preserved: 1

Temp (C): 25.42 DO (ppm): 10.07 Cond: 438 pH: 8.65 Turbidity (NTU's): 16.2 Surface Current Velocity (m/s): 0.4

Comments: Sample mostly algae.

Station: P22-LD-MC Date: 8/20/01 Time: 1133 Weather Conditions: Sunny 85°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22LDM
End Units: 425550	End Units: 466215	Start: 26	Tow Time(sec): 600s
Begin Units: 406000	Begin Units: 447000	Middle: 29	Sample Volume (L): 50+50=0.1L
Total Units: 19550	Total Units: 19213	End: 24	# of Jars Preserved: 1

Temp (C): 25.30 DO (ppm): 9.61 Cond: 433 pH: 8.72 Turbidity (NTU's): 14.3 Surface Current Velocity (m/s): 0.3

Comments: Sample mostly algae

Station: P22-LD-LDB Date: 8/20/01 Time: 1205 Weather Conditions: Sunny 85°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22LDL
End Units: 445956	End Units: 479986	Start: 10	Tow Time: 600s
Begin Units: 426000	Begin Units: 466000	Middle: 16	Sample Volume (L): 100+100=0.2L
Total Units: 19956	Total Units: 13986	End: 12	# of Jars Preserved: 1

Temp (C): 25.31 DO (ppm): 10.17 Cond: 433 pH: 8.73 Turbidity (NTU's): 16.1 Surface Current Velocity (m/s): 0.2

Comments:

Pool 22 Upper | Collectors: CDD/BWR | Project #: 510206 | Sample Period: Day or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: 22-UD-LDB Date: 8/20/01 Time: 1455 Weather Conditions: Sunny ~95°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UDL
End Units: 499219	End Units: 461094	Start: 14	Tow Time: 600s
Begin Units: 480000	Begin Units: 442000	Middle: 14	Sample Volume (L): 100+100= 0.2L
Total Units: 19219	Total Units: 19094	End: 14	# of Jars Preserved: 1

Temp (C): 25.44 DO (ppm): 10.23 Cond: 432 pH: 8.75 Turbidity (NTU's): 21.0 Surface Current Velocity (m/s): 0.4

Comments:

Station: 22-UD-MC Date: 8/20/01 Time: 1546 Weather Conditions: Sunny & 95°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UDM
End Units: 539697	End Units: 503878	Start: 17	Tow Time(sec): 600s
Begin Units: 519000	Begin Units: 483000	Middle: 15	Sample Volume (L): 50 + 50 = 0.1L
Total Units: 20697	Total Units: 20878	End: 13	# of Jars Preserved: 1

Temp (C): 25.34 DO (ppm): 9.86 Cond: 430 pH: 8.75 Turbidity (NTU's): 20.6 Surface Current Velocity (m/s): 0.6

Comments:

Station: 22-UD-RDB Date: 8/20/01 Time: 1524 Weather Conditions: Sunny ~95°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UDR
End Units: 519469	End Units: 482592	Start: 19	Tow Time: 600s
Begin Units: 499000	Begin Units: 461000	Middle: 18	Sample Volume (L): 50 + 50 = 0.1L
Total Units: 20469	Total Units: 21592	End: 16	# of Jars Preserved: 1

Temp (C): 25.53 DO (ppm): [illegible] Cond: [illegible] pH: 8.71 Turbidity (NTU's): 25.5 Surface Current Velocity (m/s): 0.3

Comments:

Pool 22 Lower Collectors: CDD/BWF Project #: 510206 Sample Period: [illegible]

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P22-LN-RDB Date: 8/20/01 Time: 2255 Weather Conditions: Clear & 65°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22LNR
End Units: 524042	End Units: 560970	Start: 23	Tow Time: 600s
Begin Units: 504000	Begin Units: 540000	Middle: 20	Sample Volume (L): 200 + 200 = 0.4L
Total Units: 20042	Total Units: 20970	End: 29	# of Jars Preserved: 1

Temp (C): 25.59 DO (ppm): 10.62 Cond: 439 pH: 8.71 Turbidity (NTU's): 18.6 Surface Current Velocity (m/s): 0.1

Comments: Took flow measurement @ mouth of net, 1.0 m/s. Sample was mostly macroinvertebrates & emerald shiners

Station: P22-LN-MC Date: 8/20/01 Time: 2328 Weather Conditions: Clear & 65°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22LNM
End Units: 544212	End Units: 581850	Start: 27	Tow Time(sec): 600s
Begin Units: 524000	Begin Units: 561000	Middle: 25	Sample Volume (L): 100 + 100 = 0.2L
Total Units: 20212	Total Units: 20850	End: 20	# of Jars Preserved: 1

Temp (C): 25.47 DO (ppm): 10.37 Cond: 432 pH: 8.79 Turbidity (NTU's): 17.4 Surface Current Velocity (m/s): 0.1

Comments: Took flow @ mouth of net during tow, read 0.9 m/s

Station: P22-LN-LDB Date: 8/21/01 Time: 0001 Weather Conditions: Clear & 65°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22LNL
End Units: 561188	End Units: 598709	Start: 9	Tow Time: 600s
Begin Units: 544000	Begin Units: 582000	Middle: 12	Sample Volume (L): 0.2 L
Total Units: 17188	Total Units: 16709	End: 12	# of Jars Preserved: 1

Temp (C): 25.52 DO (ppm): 11.34 Cond: 431 pH: 8.83 Turbidity (NTU's): 16.9 Surface Current Velocity (m/s): 0.1

Comments:

Pool 22 Upper Collectors: COB/BWF Project #: 510206 Sample Period:

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P22-UN-LDB Date: 8/21/01 Time: 0246 Weather Conditions: Clear, dark, cold ~ 60-65°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UNL
End Units: 615442	End Units: 576574	Start: 13	Tow Time: 600s
Begin Units: 599000	Begin Units: 561000	Middle: 12	Sample Volume (L): 100 + 100 = 0.2L
Total Units: 16442	Total Units: 15576	End: 11	# of Jars Preserved: 1

Temp (C): 25.42 DO (ppm): 10.47 Cond: 433 pH: 8.83 Turbidity (NTU's): 22.2 Surface Current Velocity (m/s): 0.3

Comments: Checked flow at ref. read 0.8 m/s

Station: P22-UN-MC Date: 8/21/01 Time: 0347 Weather Conditions: Clear 60-65°F

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UNM
End Units: 654837	End Units: 616032	Start: 16	Tow Time(sec): 600s
Begin Units: 635060	Begin Units: 597000	Middle: 17	Sample Volume (L): 0.1 L
Total Units: 19837	Total Units: 19032	End: 18	# of Jars Preserved: 1

Temp (C): 25.16 DO (ppm): 9.61 Cond: 429 pH: 8.79 Turbidity (NTU's): 21.9 Surface Current Velocity (m/s): 0.6

Comments:

Station: P22-UN-RDB Date: 8/21/01 Time: 0316 Weather Conditions: Clear ~ 60-65°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 22UNR
End Units: 635439	End Units: 596901	Start: 20	Tow Time: 600s
Begin Units: 615000	Begin Units: 577000	Middle: 19	Sample Volume (L): 100 + 100 = 0.2L
Total Units: 20439	Total Units: 19901	End: 13	# of Jars Preserved: 1

Temp (C): 25.21 DO (ppm): 9.29 Cond: 432 pH: 8.73 Turbidity (NTU's): 23.3 Surface Current Velocity (m/s): 0.4

Comments:

Contract No. DACW25-00-D-0005, Work Order No. 0005

Pool 18 Lower Collectors: CDD/BWK Project #: 510206 Sample Period: (Day) or Night (Circle One)

Station: P18-LD-LDB Date: 8/22/01 Time: 1603 Weather Conditions: Mostly cloudy & 80°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18LDL
End Units: 638152	End Units: 683222	Start: 15	Tow Time: 630s
Begin Units: 633000	Begin Units: 678000	Middle: 10	Sample Volume (L): 400 + 200 = 0.6L
Total Units: 5152	Total Units: (5222)	End: 10	# of Jars Preserved: 2

Temp (C): 25.06 DO (ppm): 10.57 Cond: 424 pH: 8.77 Turbidity (NTU's): 32.8 Surface Current Velocity (m/s): 0.1

Comments: Took RPM's down to 2000 @ about 5 min. Took flow after backing off & it was 0.9 at bow. Ran extra 30s as result of backing off Took flow at bow during tow - 0.9 m/s

Station: P18-LD-MC Date: 8/22/01 Time: 1810 Weather Conditions: Cloudy & 80

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18LDM
End Units: 653589	End Units: 699170	Start: 18	Tow Time(sec): 615s
Begin Units: 649000	Begin Units: 694000	Middle: 14	Sample Volume (L): 200 + 200 = 0.4L
Total Units: 4589	Total Units: (5170)	End: 14	# of Jars Preserved: 1

Temp (C): 24.80 DO (ppm): 10.17 Cond: 416 pH: 8.81 Turbidity (NTU's): 17.2 Surface Current Velocity (m/s): 0.3

Comments: @ 3 min, backed off from 2300 RPM to 2000 RPM

Station: P18-LD-RDB Date: 8/22/01 Time: 1852 Weather Conditions: Mostly cloudy & 80°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18LDR
End Units: [illegible]	End Units: [illegible]	Start: 24	Tow Time: 615.5
Begin Units: 653000	Begin Units: 699350	Middle: 25	Sample Volume (L): 250 + 350 = 0.6L
Total Units: (4[illegible])	Total Units: [illegible]	End: 18	# of Jars Preserved: 1

Temp (C): 25.02 DO (ppm): 10.49 Cond: 409 pH: 8.84 Turbidity (NTU's): 24.7 Surface Current Velocity (m/s): 0.3

Comments:

Site/Pool: Pool 18 Upper Collectors: CDD/BWR Project #: 510206 Sample Period: (Day) or Night (Circle One)

Station: P18-UD-LDB Date: 8/22/01 Time: 1130 Weather Conditions: Partly cloudy & 85°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 224DL2
End Units: 664738	End Units: 623322	Start: 8	Tow Time: 630 s
Begin Units: 657000	Begin Units: 618000	Middle: 7	Sample Volume (L): 500+400=0.9L
Total Units: (7738)	Total Units: 5322	End: 7	# of Jars Preserved: 2

Temp (C): 24.59 DO (ppm): 10.13 Cond: 423 pH: 8.73 Turbidity (NTU's): 21.7 Surface Current Velocity (m/s): 0.7

Comments: ran 30 s. over bc alot of mud in sample causing pressure on nets & frames so backed down to 2000 RPM's - See field book

Station: P18 UD-MC Date: 8/22-01 Time: 1235 Weather Conditions: Cloudy & 80°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 184DM2
End Units: 671943	End Units: 627344	Start: 13	Tow Time(sec): 630s
Begin Units: 665000	Begin Units: 623000	Middle: 12	Sample Volume (L): 400+500=0.9L
Total Units: (6943)	Total Units: 4344	End: 13	# of Jars Preserved: 2

Temp (C): 24.74 DO (ppm): 10.28 Cond: 405 pH: 8.70 Turbidity (NTU's): 15.3 Surface Current Velocity (m/s): 0.6

Comments: Lots of algae in nets during tow, so backed down to 2000 RPM. Made tow in MIDDLE of channel (wind was blowing us toward Red buoy), Ran 30s over.

Station: P18-UD-RDB Date: 8/22/01 Time: 1336 Weather Conditions: Mostly cloudy & 80°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 184DR2
End Units: 678535	End Units: 632646	Start: 9	Tow Time: 630s
Begin Units: 672000	Begin Units: 627000	Middle: 12	Sample Volume (L): 150+150=.3L
Total Units: (6535)	Total Units: 5646	End: 13	# of Jars Preserved: 1

Temp (C): 25.11 DO (ppm): 10.89 Cond: 433 pH: 8.85 Turbidity (NTU's): 24.8 Surface Current Velocity (m/s): 0.6

Comments: Started @ 2000 RPM, backed down to 1800 @ 5 min in.

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18 Upper Collectors: [illegible] Project #: 510206 Sample Period: [illegible]

Station: P18-UN-LDB Date: 8/23/01 Time: 0025 Weather Conditions: mostly cloudy, some heat lightning

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18UNL
End Units: 665336	End Units: 708172	Start: 10	Tow Time: 600
Begin Units: 658000	Begin Units: 703000	Middle: 10	Sample Volume (L): 250 + 350 = 0.6 L
Total Units: 7336	Total Units: 5172	End:	# of Jars Preserved: 1

Temp (C): 25.00 DO (ppm): 9.89 Cond: 400 pH: 8.73 Turbidity (NTU's): 18.9 Surface Current Velocity (m/s): 0.9

Comments: Took sample @ original [illegible] Dropped to 2000 RPM

50 RPM less over

Station: P18-UN-MC Date: 8/23/01 Time: 0109 Weather Conditions: Partly cloudy, some heat lightning 265°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18UNM
End Units: 671298	End Units: 712874	Start: 11	Tow Time(sec): 6005
Begin Units: 665000	Begin Units: 708000	Middle: 13	Sample Volume (L): 350 - 250 = 0.6 L
Total Units: 6298	Total Units: 4874	End: 11	# of Jars Preserved: 1

Temp (C): 25.12 DO (ppm): 9.63 Cond: 392 pH: 8.71 Turbidity (NTU's): 17.6 Surface Current Velocity (m/s): 0.7

Comments: Ran @ 2000 RPM

Station: P18-UN-RM Date: 8/23/01 Time: 0206 Weather Conditions: Partly cloudy & 65°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18UNR
End Units: 618865	End Units: 721508	Start: 9	Tow Time:
Begin Units: 671000	Begin Units: [illegible]	Middle: 11	Sample Volume (L): [illegible] = 0.5L
Total Units: [illegible]	Total Units: [illegible]	End: 13	# of Jars Preserved:

Temp (C): 25.48 DO (ppm): [illegible] Cond: [illegible] pH: 8.05 Turbidity (NTU's): 23.9 Surface Current Velocity (m/s): 0.3

Comments:

Contract No. DACW25-00-D-0005, Work Order No. 0005

Collectors: [illegible] Project #: [illegible] Sample Period: Day or (Night)
(Circle One)

Station: [illegible] Date: 8/23/01 Time: [illegible] Weather Conditions: [illegible]

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: [illegible]
End Units: [illegible]	End Units: [illegible]	Start: 24	Tow Time: 615S
Begin Units: 7[illegible]000	Begin Units: 679000	Middle: 22	Sample Volume (L): 250+350=0.6L
Total Units: 5003	Total Units: (6977)	End: 20	# of Jars Preserved: 1

Temp (C): 24.68 DO (ppm): 9.01 Cond: 412 pH: 8.74 Turbidity (NTU's): 15.9 Surface Current Velocity (m/s): 0.5

Comments:

Station: 24-LN-NL Date: 8/23/01 Time: 0550 Weather Conditions: Partly cloudy & 65°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18LNM
End Units: 7[illegible]030	End Units: 692436	Start: 18	Tow Time(sec): [illegible]
Begin Units: [illegible]6000	Begin Units: [illegible]6000	Middle: 16	Sample Volume (L): 450+250=0.7L
Total Units: 5030	Total Units: (6436)	End: 16	# of Jars Preserved: 1

Temp (C): 24.70 DO (ppm): 8.94 Cond: 415 pH: 8.74 Turbidity (NTU's): 15.5 Surface Current Velocity (m/s): 0.9

Comments:

Station: 24-LN-23 Date: 8/23/01 Time: 0625 Weather Conditions: Mostly cloudy ~65°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 18LNL
End Units: 7[illegible]504	End Units: [illegible]	Start: 16	Tow Time: 600S
Begin Units: 7[illegible]000	Begin Units: [illegible]	Middle: 13	Sample Volume (L): 400+100=0.5L
Total Units: 4504	Total Units: (6435)	End:	# of Jars Preserved: 1

Temp (C): 24.69 DO (ppm): [illegible] Cond: 418 pH: 8.74 Turbidity (NTU's): 14.2 Surface Current Velocity (m/s): 0.3

Comments:

Pool 26 Upper Collectors: JSV/CDD Project #: 510206 Sample Period: (Day) or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P26-UD-LDB Date: 8/24/01 Time: 1341 Weather Conditions: Cloudy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26UDL
End Units: 778359	End Units: 814636	Start: 14	Tow Time: 600 s
Begin Units: 759000	Begin Units: 795000	Middle: 22	Sample Volume (L): 100 + 100 = 0.2L
Total Units: 19359	Total Units: 19636	End: 21	# of Jars Preserved: 1

Temp (C): 26.14 DO (ppm): 7.73 Cond: 418 pH: 8.70 Turbidity (NTU's): 28.3 Surface Current Velocity (m/s): 0.7

Comments:

Station: P26-UD-MC Date: 8/24/01 Time: 1452 Weather Conditions: Cloudy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26UDM
End Units: 819437	End Units: [illegible]	Start: 22	Tow Time(sec): 600
Begin Units: 799000	Begin Units: 835000	Middle: 19	Sample Volume (L): 100 + 100 = 0.2L
Total Units: 20437	Total Units: 20275	End: 20	# of Jars Preserved: 1

Temp (C): 25.77 DO (ppm): 6.24 Cond: 414 pH: 8.62 Turbidity (NTU's): 24.5 Surface Current Velocity (m/s): 0.7

Comments:

Station: P26-UD-RDB Date: 8/24/01 Time: 1[illegible] Weather Conditions: Cloudy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26UDR
End Units: [illegible]	End Units: 831519	Start: 11	Tow Time: 600 s
Begin Units: 778000	Begin Units: 815000	Middle: 14	Sample Volume (L): 100 + 100 = 0.2L
Total Units: 20519	Total Units: [illegible]	End: 14	# of Jars Preserved: 1

Temp (C): 25.76 DO (ppm): 7.07 Cond: [illegible] pH: [illegible] Turbidity (NTU's): 22.9 Surface Current Velocity (m/s): 0.7

Comments:

Pool 26 Upper Collectors: [illegible] Project #: 5.0206 Sample Period: Day or Night (Circle One)

Contract No. DACW25-00-D-0005, Work Order No. 0005

Station: P26-UM-EDG Date: 8/24/01 Time: [illegible] Weather Conditions: Mostly Cloudy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: [illegible]
End Units: [illegible]	End Units: [illegible]	Start: 0	Tow Time: [illegible]
Begin Units: 755000	Begin Units: [illegible]	Middle: 9	Sample Volume (L): 100 + 100 = 0.2 L
Total Units: [illegible]	Total Units: [illegible]	End: [illegible]	# of Jars Preserved: 2

Temp (C): 25.78 DO (ppm): 7.05 Cond: 415 pH: 8.60 Turbidity (NTU's): 28.4 Surface Current Velocity (m/s): 0.7

Comments:

Station: P26-UM-EDG Date: 8/24/01 Time: 2259 Weather Conditions: Mostly cloudy & 65°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26UNM
End Units: 896585	End Units: [illegible]	Start: 23	Tow Time(sec): 600s
Begin Units: 876000	Begin Units: 839000	Middle: 20	Sample Volume (L): [illegible]
Total Units: [illegible]	Total Units: [illegible]	End: 19	# of Jars Preserved: 1

Temp (C): [illegible] DO (ppm): [illegible] Cond: [illegible] pH: 8.61 Turbidity (NTU's): 27.5 Surface Current Velocity (m/s): 0.6

Comments:

Station: P26-MM-EDG Date: 8/25/01 Time: 0001 Weather Conditions: Mostly cloud. & 63°

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26UNL
End Units: 917926	End Units: 878246	Start: 16	Tow Time: 600s
Begin Units: 897000	Begin Units: 859000	Middle: 17	Sample Volume (L): 100 + 100 = 0.2L
Total Units: 20186	Total Units: 19246	End: 14	# of Jars Preserved: 1

Temp (C): 25.79 DO (ppm): 6.41 Cond: 416 pH: 8.60 Turbidity (NTU's): 23.3 Surface Current Velocity (m/s): 0.6

Comments:

Contract No. DACW25-00-D-0005, Work Order No. 0005

Pool 26 Lower Collectors: JSV/CDD Project #: [illegible] Sample Period: Day or Night (Circle One)

Station: P26-LD-RDB Date: 8/24/01 Time: 10^04 Weather Conditions: Cloudy/Breezy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26LDR
End Units: 755187	End Units: 717832	Start: 0	Tow Time: 600s
Begin Units: 736000	Begin Units: 698000	Middle: 15	Sample Volume (L): 50+50=0.1L
Total Units: 19187	Total Units: 19832	End: 17	# of Jars Preserved: 1

Temp (C): 26.17 DO (ppm): 7.30 Cond: 425 pH: 8.76 Turbidity (NTU's): 14.7 Surface Current Velocity (m/s): 0.4

Comments:

Station: P26-LD-MC Date: 8/24/01 Time: 11^03 Weather Conditions: Cloudy/Breezy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26LDM
End Units: 795420	End Units: 758785	Start: 15	Tow Time(sec): 600 s
Begin Units: 775000	Begin Units: 739000	Middle: 15	Sample Volume (L): 50+50=0.1L
Total Units: 20420	Total Units: 19785	End: 16	# of Jars Preserved: 1

Temp (C): 26.22 DO (ppm): 7.46 Cond: 423 pH: 8.76 Turbidity (NTU's): 16.5 Surface Current Velocity (m/s): 0.5

Comments:

Station: P26-LD-LB Date: 8/24/01 Time: 10 27 Weather Conditions: Breezy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26-DL
End Units: 775487	End Units: 738278	Start: 19	Tow Time: 600 s
Begin Units: 756000	Begin Units: 718000	Middle: 18	Sample Volume (L): 50+50=0.1L
Total Units: 19487	Total Units: 20278	End: 17	# of Jars Preserved: 1

Temp (C): 26.26 DO (ppm): 7.48 Cond: 441 pH: 8.75 Turbidity (NTU's): 2.8 Surface Current Velocity (m/s): 0.4

Comments:

Contract No. DACW25-00-D-0005, Work Order No. 0005

Pool 26 Lower Collectors: CDD/BWR Project #: 510206 Sample Period: Day or Night (Circle One)

Station: P26-LN-RDB Date: 8/25/00 Time: 0157 Weather Conditions: Mostly cloudy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 2 LN2
End Units: 91-817	End Units: 0[illegible]	Start: 17	Tow Time: [illegible]
Begin Units: 878000	Begin Units: 917000	Middle: 16	Sample Volume (L): [illegible]
Total Units: 19817	Total Units: 20266	End: 13	# of Jars Preserved: 2

Temp (C): 26.13 DO (ppm): 6.75 Cond: 432 pH: 8.65 Turbidity (NTU's): 13.4 Surface Current Velocity (m/s): 0.3

Comments:

Station: P26-LN-MC Date: 8/25/01 Time: [illegible] Weather Conditions: [illegible]

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26LN1
End Units: 943227	End Units: 982824	Start: 15	Tow Time(sec): 555
Begin Units: 923000	Begin Units: [illegible]	Middle: 18	Sample Volume (L): 50+50=0.1
Total Units: 20297	Total Units: 20824	End: 15	# of Jars Preserved: 2

Temp (C): 26.01 DO (ppm): 6.50 Cond: 432 pH: 8.55 Turbidity (NTU's): 18.8 Surface Current Velocity (m/s): 0.3

Comments:

Station: P26-LN-LDB Date: 8/25/01 Time: 0238 Weather Conditions: Mostly cloudy

Left Meter	Right Meter	Water Depths (ft)	GPS Coords: 26LN2
End Units: [illegible]	End Units: [illegible]	Start: 18	Tow Time: [illegible]
Begin Units: 907000	Begin Units: 941000	Middle: [illegible]	Sample Volume (L): [illegible]
Total Units: [illegible]	Total Units: [illegible]	End: [illegible]	# of Jars Preserved: 2

Temp (C): 26.01 DO (ppm): [illegible] Cond: 419 pH: [illegible] Turbidity (NTU's): 32.[illegible] Surface Current Velocity (m/s): [illegible]

Comments:

Field Notes

2

6/13/01 13[46] JSV/mBon

RDB Pool 18 UPPER

Turbidity 40 NTU

River Flow ~0.6 m/s

start

Finish

Placed Two Red Reflectors on Large Maple on RDB Just U.S. of DAY Mark Side by Side ◉ ◉

~~LDB Point~~ is Just U.S. of ~~Old Bus~~?

Total Volume of sample 2,200mL 3 jars preserved

LDB START @ Cut Bank Between Brown wood sided House on top of Hill (B.? Picture Window) & Club house (downstream) @ base of Cut Bank & @ Sandy Beach

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6-13-01

Pool 18 Lower

LDB- Mainchnel Bader Just outside of main channel & Red Buoys @ point where Channel Slope begins to come up. Sample point just upstream of Island Head. Did not go Farther from channel because depths only 4-5'. Concerned about Net frames hitting Bottom Be cautious about when Sampling not to drift back into Red buoy. ~~~100m outed.~~

2nd Island D.S. of 413.5 concrete mark in River

RDB - Same situation Just U.S. of small Island that has duck blind on D.S. Tip

6-14-01 JSV & MBM

Pool 22 Upper

Ramp is just DS. of L&D 21 But unusable Today.

P22-U-LDB @ Red (Bottom) & White (Top) Club house along Shore. Actually about @ Flag pole. Performed Sample ~ 60m from shore, still Deep ~ 23' H_2O Today Pool is up 4-6'.

P22-U-RDB - put 2 reflectors on tree to mark Sample location

06-15-01 MBM, JSV

Pool 22 Lower @ Hamilton

P22-L-RDB: Spray Painted Rip-Rap w/ Pink & Orange Spray paint - willows between

Pink ▯ orange
willows

Line up RDB & Low Area in trees along

Perform RDB ~ 100m from shore
Perform LDB ~ 100m from Red Buoy ~~same~~

~~LDB~~

06-16-01

Pool 26 Upper

Sample Transect @ 223.5 Light & Daymark Along LDB.
LDB Sample only ~ 30-50m from shore

USED Daymark to ~~Line~~ up RDB Sample 30-50m outside of Buoy line.

Be careful during higher velocities (m/s or >), sampling will cause boat to drift D.S. Near Green buoy.

06-16-01

Pool 26 LOWER

Sample transect @ Dead trees (2) JUST D.S. of 211.2 Light & Day MARK.

RDB Sample location ~ 1/2 way between buoy line & Shore.

LDB Sample — line up w Dead trees. (Presently close to Red Buoy. However, Red buoy may be moved during summer.) Sample ~ 100m outside buoy line.

8 DACW25-00-D-0005, work order 0005 Exit 2 57 Marblehead

06-25-01

Doove to Hannibal
ARRIVED 11:00 @ Ramp
Sampled
FINISHED @ 1400

Directions To Hannibal

70 → 61 N → Hannibal
Bus 61 exit @ DAYS INN
Take Bus 61 To Broadway
@ Save-A-Lot & Dollar Store
Make (R) - Dead ENDS @ Ramp

To Quincy

Make (R) from Ramp & follow
Signs to 72/61/36
Make (R) onto 36-72 Toward
SPRINGFIELD/QUINCY
Take Ex - 2 - Hwy 57 Toward
Marble Head - After Over River
make (L) on 57 Toward Quincy
Make (L) @ Lock & Dam Road
Just after Propane Tank Plant
Ramp JUST PAST L&D

6/27/01 DACW25-00-D-0005, Work order 0005

Directions to New Boston
- Rt. 61 through Burlington, IA
turn ~~Left onto~~ Right onto Rt. 34 to Monmouth
head east into IL, just after Gladstone Rec. Area
take 164 North to Oquaka
* Caution Railroad tracks at Gladstone - GO SLOW!!
- make ~~left~~ Right at Citgo in Oquaka, ~~make right onto~~ 10th St.
make left onto Keithsburg Rd
left onto main St
make right onto 76th Street
Pass Mark Twain Forest
left at Stop onto 17 toward New Boston

- arrived at boat ramp @ 10:27

- put up 2 more reflectors on RDB in trees just above previous reflectors

06/28/01

Pool 18 LOWER

NOTE: BEGIN LDB @ or Below Red Buoy. Beginning @ transect Speed did not allow for Drift while setting Nets due to extremely Narrow AREA of operating Depth

DACW25-00-D-0005, work order 0005
7/9/01 JSV/CDD

Hours Pool 22
7-6 11 Hours

Lower Pool 22
- took RDB Sample just outside main channel due to shallow H_2O in RDB main channel border
- Barge parked along LDB Sample area - took LDB sample just outside green buoys due to barges parked along sample shore

Upper Pool 22
- Barges parked along LDB Sample area
- took LDB sample ~ 60-70 yds off shoreline, just next to barge parked along shore (Pel Butcher)

DACW25-00-D-0005, work order 0005
7/10/01 JSV/CDD

Pool 18
Upper
P18-UD-RDB - Turbidity sample take 2x + 64.9 NTU was correct, other 2 Sample areas were much lower
- amt. of sample was also much higher at RDB -

Lower

P18-UD-LDB - Started sample near red buoy due to Shallow H_2O in Left main Channel border
- sampled ~ 10' outside Channel
- Had depths of 3' at ~ 30 yd's outside channel
- traveled upstream during sampling

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P18-UD-RDB

- Started Sample at green buoy ~ 40yds. outside Channel
- traveled upstream during Sampling

Hours 7/10/01 07^{00} 21^{00}

14 Hours

7/12 Hours

09^{00}

* Collected 1 small (8" in TL) spotted gar in net - released

7/23/01 DACW25-00-D-0005, work order 0005

P22-LD-RDB

- Low flow ~ 0.4 m/s
- Had to go just inside of green buoys due to barge (John M. Rivers) parked on RDB
- Traveled upstream during sampling

P22-LD-MC

- Started tow in center of MC had to move close to Red Buoy as barge parked along RDB pulled out + a barge moved upstream out of Lock

* 13^{30} severe thunderstorm hit + had to wait until storm passed due to lightning

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Time M 7 a.m. - 6 p.m. 12 11
~~5:30 p.m. - 4:30 a.m.~~ 8
T 1
W 7 a.m. - 6 p.m. 11
3:30 p.m. - 4:30 8
Th 1 - 6 5
Fr 8-

7/27/01
Pool 26 Lower
marked P26-LD-RDB as
26LDR2
P26-LD-MC as
26LDM

8/7/01
Pool 22 Lower
* Watch for exposed
shoals on RDB
~2-3 miles downstream
of boat ramp
* Watch for concrete
obstruction ~ 100 yds
downstream of sample
location
- Barge (Roy E. Clavier)
parked along side sample
area

DACW25-00-D-0005, Work Order 0005
- Had to start RDB
sample ~ ~~5~~ 5-50 yds
from shore & move
in toward shore once
we passed barge

Hours T 7 - 5:30
W 7 - ~~4:30~~ 10:00

8/20/01 PACW25-00-D-0005, work order 0005

Day time

P22 upper & lower - lots of algae in sample, meters are running low, drove tow @ 2500 RPM to get desired counts on meters.

Hours - 7am - 5pm

Night start 8:30 pm
end 5:30 AM

8/22/01

Pool 18 daytime
started 7AM

Logbook

ICHTHYOPLANKTON QA/QC LOG

Sample Code #	Site/Station/Rep. (JARS)	Collection Date	Collectors	Picked By/Date/Time ★	QA/QC By/Date	I.D. By/Date	QA/QC By/Date	Voucher
P18-U-MC	Pool 18 upper x3	6/13/01	MBM, JSV	EJW/6/19/01/10:00am 3:30pm	MW I 3 fish [illegible] MW III 3 fish	BWF/8-14-01	WSE/9-28-01	
P18-U-RDB	Pool 18 upper x3	6/13/01	MBM, JSV	EJW 6/20/01 7/3/01 3.5 + 2.5 BWF	12-0-01 7 hrs 0 FISH RE-PICK AT	BWF/8-16-01	WSE/9-28-01	
P18-U-LDB	Pool 18 upper x1	6/13/01	MBM, JSV	EJW 6/20/01 2.3C	Failed 46 FISH 5hrs PH 12/3/01	JSV BWF/8/16/01	WSE/9-28-01	
P18-L-MC	Pool 18 Lower x3	6/13/01	MBM, JSV	BWF 7/10/01 4.5hrs (I) 3.5hrs (II) 7/11/01 5.0hrs (III)	12-6-01 14 FISH RE-PICK 5HRS AT	BWF JSV/9-5-01	WOE/9-28-01	
P18-L-RDB	Pool 18 Lower x3	6/13/01	MBM, JSV	JTS 7/12/01 3hrs (I) 3hrs (II) 7/13/01 BWF JTS 1.5hr	12/10/01 I II 5 Fish 0 Fish MSC [illegible]	BWF JSV/9-7-01	WOE/9-21-01	
P18-L-LDB	Pool 18 Lower x2	6/13/01	MBM, JSV	BWF ESW 7/6/01 1.5 7/9/01 6.5hrs 4hrs	[illegible]	BWF JSV/9-12-01	WOE/9-21-01	
P22-U-MC	Pool 22 Upper x3	6/14/01	MBM, JSV	JTS 7/13/01 7/16/01 5hr (I) 4hr (II) 4hr (III)	MW 12-8-01 I 1 fish II + III MW 1-2 fish	BWF JSV/9-17-01	WOE/9-21-01	
P22-U-RDB	Pool 22 Upper x2	6/14/01	MBM, JSV	JTS 7/17/01 3.5hr (I) 4.5hr (II)	Failed	BWF JSV/[illegible]	MSC 1/12/01	I 15 Fish I 7 " II 16.5 hr
P22-U-LDB	Pool 22 Upper x2	6/14/01	MBM, JSV	JTS 7/18/01 4.5hr (I) 3.5hr (II)	MW I 12-7-01 2 fish MW II 12-7-01 2 fish	JSV 10/2/01		
P22-L-LDB	Pool 22 Lower x4	6/15/01	MBM, JSV	JTS BWF 7/23/01 2.5hrs (I) JTS 7/24/01 4hrs (II) JTS BWF 3hrs (III)	12-10-01 4HRS 3 FISH AT	BWF/10/1/01		
P22-L-MC	Pool 22 Lower x2	6/15/01	MBM, JSV	JTS BWF 7/20/01 4hr (I) JTS 7/20 3hr (II)	12/10/01 7 hrs I 6 Fish II 38 Fish	WOY 10-2-01		
P22-L-RDB	Pool 22 Lower x1	6/15/01	MBM, JSV	7/19/01 JTS 4.5hr	Failed	JSV/9/27/01	MSC 11/13/01	I 35 FISH 6Hrs. ← ID's QA'd BWF 12/3/01
P26-U-RDB	Pool 26 Upper x3	6/15/01	MBM, JSV	7/31/01 JTS 4hrs (I) 8/1/01 JTS SWS EJW 1hrs (II) JTS SWS 1.5hr (III)	MW 12-10-01 7 fish MW 12-10-01 0 fish MW 12/10/01 4 fish	WSE/9-28-01		
P26-U-MC	Pool 26 Upper x3	6/15/01	MBM, JSV	JTS 7/24/01 4.5hrs (I) 7/30/01 3.5hrs (II) 7/31/01 4hrs (III)	[illegible]	BWF/9/28/01	↓	
P26-U-LDB	Pool 26 Upper x2	6/15/01	MBM, JSV	JTS 7/25/01 3.5hrs (I) BWF JTS 4hrs (II)	12-10-01 4HRS 21 FISH AT	BWF/10/3/01	↓	
P26-L-LDB	Pool 26 Lower x3	6/16/01	MBM, JSV	JTS SWS 8-3-01 2hr (III) 1.5hr (II) 2.0hr (I)	MW I 12-11-01 [illegible]	BWF/10/2/01	PASS	
P26-L-RDB	Pool 26 Lower x2	6/16/01	MBM, JSV	JTS SWS 8/2/01 2hr (I) 1.5hr (II)	12/4/01 43/60 [illegible]	[illegible]		
P26-L-MC	Pool 26 Lower x2	6/16/01	MBM, JSV	JTS 8/2/01 SWS 2.5hr (I) 2hrs (II)	12-11-01 11 FISH AT	WOE/[illegible]		
P22-UD-LDB	Pool 22 upper [illegible] x5	6/25/01	MBM, JSV	JEF 3.5hr (I) 8/17/01 III 8/21/01 [illegible]	MW, MF, JCD, EU I-III 321 Fish	JSV/10/[illegible]		
P22-UD-MC	Pool 22 upper [illegible] x2	[illegible]	MBM, JSV	SWS 8-9-01 3.5hrs (I) 3hrs (II)	12/12/01 I 1 FISH II 22 Fish 6hrs	BWF/10/5/01	↓	
P22-UD-RDB	Pool 22 [illegible]	6/25/01	MBM, JSV	SWS 9-8-01 2hrs (I) 3hrs (II)	passed 11/14/01 [illegible]	JSV 10/[illegible]	↑	
P22-UN-LDB	Pool 22 [illegible] x2	6/26/01	MBM, JSV	SWS 9-7-01 2hrs (I) 3hrs (II) 8-9-01 (III) 3.5hrs		BWF 10/12/01		
P22-UN-MC	Upper Night x3	6/26/01	MBM, JSV	SWS 8-8-01 2.5hrs (I) 2hrs (II) 2hrs (III)	pass 11/14/01 MSC	[illegible]	BWF 12/3/01	
P22-UN-[illegible]	x2	6/26/01	MBM, JSV	[illegible] 8/3/01 40mins (I) 1hr (II)		[illegible]/9/26/01	PASS	
P22-LP-LDB	Pool Lower 22 [illegible]	[illegible]	MBM, JSV	EJW 8/24/01 3hrs (I) JEF 8/27/01 4.6hrs (III) 3SW 8/27	✓ 1hr 14 fish	JSV 10/2/01		

★ 3rd Sample Picked EJW 6/20/01 8:45-12:00

(*) [illegible] 7/[illegible]/01 [illegible] (IV)

⇒ III. [illegible] (3.5 hr)

IV 8/23/01 [illegible]

V 8/23/01 JEF/(3.5hr)

Contract No. DACW25-00-D-0005, Work Order No. 0005

ICH...OPLANKTON QA/QC LOG

Sample Code #	Site/Station/Rep.	Collection Date	Collectors	Picked By/Date/Time	QA/QC By/Date	I.D. By/Date	QA/QC By/Date	Voucher
P22-LD-MC	Pool 22 Lower Day x 2	6/25/01	MBM, JSV	EJW, JEF (I) 237 fish 8/27/01 2 hrs / EJW, JEF (II) 305 fish 8/28/01 4 hrs		JSV 10/4/01		
P22-LD-RDB	Pool 22 Lower Day x 1	6/25/01	MBM, JSV	EJW 8/30/01 876 fish 5.5 hrs	11/14/01/55 fish I MEC 6hr	BWF 10/11/01		
P22-LN-RDB	Pool 22 Lower Night x 2	6/26/01	MBM, JSV	EJW (I) 8/30/01 2.5 hrs 224 fish / EJW (II) 8/31/01 3.5 hrs 272 fish		BWF 10/9/01		
P22-LN-MC	Pool 22 Lower Night x 2	6/26/01	MBM, JSV	EJW (I) 8/31/01 4 hrs 97 fish / JP (II) 9/6/01 6 hrs 65 fish		JSV 10/10/01		
P22-LN-LDB	Pool 22 Lower Night x 6	6/26/01	MBM, JSV	JP (I) 9/7/01 9 fish / JP (II) 9/10/01 19 fish / JP (III) 9/10/01 53 fish *		JSV 10/9/01	12/3/01 PASS	* Rest of picking info on bottom of page
P18-UD-LDB	Pool 18 Upper Day x 2	6/27/01	MBM, JSV	JP (I) 9/13/01 / JP (II) 9/25/01 Total (both yrs) = 923 fish		BWF 10/13/01		
P18-UD-MC	Pool 18 Upper Day x 3	6/27/01	MBM, JSV	MW (I) 9/28/01 79 fish / MW (II) 10/1/01 86 fish / MW, EJW (III) 10/1/01 83 fish		JSV 10/11/01		
P18-UD-RDB	Pool 18 Upper Day x 3	6/27/01	MBM, JSV	JP, MW I thru III picked on 9/17/01 Total fish = 129 (55+34+40)		BWF 10/12/01		
P18-UN-LDB	Pool 18 Upper Night x 2	6/27/01	MBM, JSV	JP (I) MW 9/19/01 440 fish / JP MW, GJ (II) 9/19/01 240 fish		JSV 9/24/01		
P18-UN-MC	Pool 18 Upper Night x 2	6/27/01	MBM, JSV	JP (I) 1.5 9/19/01 hrs 231 fish / JP, MW (II) 9/26/01 169 fish		BWF 9/25/01		
P18-UN-RDB	Pool 18 Upper Night x 2	6/27/01	MBM, JSV	JP, MW, GJ (I) 9/20/01 1.0 hr 118 fish / JP, MW, GJ (II) 9/26/01 96 fish		JSV 9/18/01		
P18-LD-LDB	Pool 18 Lower Day x 2	6/27/01	MBM, JSV	JP, MW, GJ (I) 9/20/01 101 fish / JP, MW GJ (II) 9/20/01 88 fish		BWF 10/13/01		
P18-LD-MC	Pool 18 Lower Day x 2	6/27/01	MBM, JSV	JP MW, GJ (I) 9/21/01 136 fish / JP, MW, GJ (II) 9/21/01 1.0 hrs 182 fish		JSV 9/24/01		
P18-LD-RDB	Pool 18 Lower Day x 1	6/27/01	MBM, JSV	JP, MW, GJ 1.0 hr 9/21/01 69 fish		JSV 10/11/01		
P18-LN-RDB	Pool 18 Lower Night x 1	6/28/01	MBM, JSV	JP, MW 9/17/01 255 fish		WJE 10/12/01		
P18-LN-MC	Pool 18 Lower Night x 3	6/28/01	MBM, JSV	JP (I) 9/13/01 28 fish / JP, MW, GJ (II) 9/14/01 43 fish 1hr / JP, MW, GJ (III) 9/14/01 18 fish 1hr		JSV 10/11/01		
P18-LN-LDB	Pool 18 Lower Night x 2	6/28/01	MBM, JSV	JP, MW, GJ (I) 9/13/01 1 hr 37 fish / JP MW, GJ (II) 9/27/01 33 fish		JSV 10/10/01	BWF 12/4/01	
P26-UD-RDB	Pool 26 Upper Day x 3	6/29/01	MBM, JSV, CDD	MW, EJW (I) 10/1/01 336 fish / MW, EJW (II) 10/1/01 260 fish 2hr / MW, EJW (III) 10/2/01 221 fish 2hr	12-04-01 11 HRS. 87 FISH AT	BWF 10/10/01	PASS	
P26-UD-MC	Pool 26 Upper Day x 4	6/29/01	MBM, JSV, CDD	JP, MW I thru IV picked on 9/24/01 Total fish = 923 ; 5hr total		JSV 10/4/01		
P26-UD-LDB	Pool 26 Upper Day x 3	6/29/01	MBM, JSV, CDD	JP, MW, GJ I thru III picked on 9/21/01 Total fish = 135 ; 2 hr total		JSV 10/11/01		
P26-UN-RDB	Pool 26 Upper Night x 3	6/29/01	MBM, JSV, CDD	JP, MW I thru III picked on 9/25/01 Total fish = 74 ; 3hr total		BWF 10/10/01		
P26-UN-MC	Pool 26 Upper Night x 3	6/29/01	MBM, JSV, CDD	JP, MW I thru III picked on 9/26/01 Total fish = 111		WJE 10/3/01		
P26-UN-LDB	Pool 26 Upper Night x 2	6/29/01	MBM, JSV, CDD	JP, MW (I) 9/25/01 1 hr 192 fish / MW, EJW (II) 10/2/01 2 hr 265 fish		BWF 10/8/01		
P26-LD-RDB	Pool 26 Lower Day x 2	6/29/01	MBM, JSV, CDD	MW, EJW (I) 10/3/01 2.5 hr 113 fish / MW, EJW (II) 10/4/01 2hr 120 fish		BWF 10/5/01		
P26-LD-MC	Pool 26 Lower Day x 2	6/29/01	MBM, JSV, CDD	MW, EJW (I) 10/4/01 1.5 hr 221 fish / MW, EJW (II) 10/4/01 1.5 hr 186 fish		BWF 10/10/01		

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Sample Code #	Site/Station/Rep.	Collection Date	Collectors	Picked By/Date/Time	QA/QC By/Date	I.D. By/Date	QA/QC By/Date	Voucher
P26-LD-LDB	Pool 26 Lower Day x3	6/29/01	MBM, JSV, CDD	2hrs 10-2-01 MW/EJW 271 fish I; 2hrs 10-3-01 MW/EJW 333 fish II; 2hrs 10-3-01 MW/EJW 173 fish III		BWF/10/8/01		
P26-LN-RDB	Pool 26 Night x2	6/30/01	MBM, JSV, CDD	3hrs 10-4-01 MW/EJW 109 fish I; 10-5-01 1.5hr MW/EJW 113 Fish II		BWF 10/13/01		
P26-LN-MC	Pool 26 Lower Night x2	6/30/01	MBM, JSV, CDD	2hr 10-5-01 MW/EJW 135 fish I; 2hr 10-5-01 MW/EJW 100 fish II		JSV/10/12/01	BWF 12/4/01	
P26-LN-LDB	Pool 26 Lower Night x3	6/30/01	MBM, JSV, CDD	4hr 10/6/01 MW/EJW 22 hrs 145 fish I; 2hr 10/8/01 MW/EJW 16 fish III; 2hr 10/8/01 MW/EJW 16 fish III		BWF/10/9/01	PASS	
P22-UD-LDB	Pool 22 Upper Day x1	7/9/01	JSV, CDD	22 hrs MW/EJW I 10/8/01-10/11/01 4544 fish	MTW Pass I 12-4-01 166 fish	BWF 10/23/01		
P22-UD-MC	Pool 22 Upper Day x2	7/9/01	JSV, CDD	10-11-01 MW EJW I 2hr 218 Fish; 10-12-01 MW/EJW II 2hr 272 Fish		BWF 10/19/01		
P22-UD-RDB	Pool 22 Upper Day x1	7/9/01	JSV, CDD	10/4/01 MW/EJW 4hrs 584 fish	12-05-01 5.5 hrs 44 Fish AT	BWF JSV 10/19/01	MSC 11/20/01 120 Fish	
P22-LD-LDB	Pool 22 Lower Day x2	7/9/01	JSV, CDD	10-15-01 MW 70 fish 6.5 hr I; 10-16-01 MW 65 Fish 7 hr II		BWF 10/17/01		
P22-LD-MC	Pool 22 Lower Day x1	7/9/01	JSV, CDD	10-16-01 / 10-17-01 MW 5 hrs 258 Fish I		BWF 10/17/01		
P22-LD-RDB	Pool 22 Lower Day x1	7/9/01	JSV, CDD	10-17-01 4.75 hr MW 284 fish I		BWF 10/18/01		
P18-LD-LDB	Pool 18 Lower Day x1	7/10/01	JSV, CDD	10-18-01 7 hrs MW 294 fish I	STW 11/13/01 157 fish 6 hrs	BWF 10/19/01		
P18-LD-MC	Pool 18 Lower Day x1	7/10/01	JSV, CDD	10-22-01 14.5 hrs MW, MC 1736 fish I	11/21/01 MSC MW 16 Fish 12-13-01 I	BWF 10/24/01		
P18-LD-RDB	Pool 18 Lower Day x1	7/10/01	JSV, CDD	10-23-01 4 hr MW, MC, PH 289 fish I		JSV/10/23/01		
P18-UD-LDB	Pool 18 Upper Day x1	7/10/01	JSV, CDD	10-23-01 10-24-01 3.75 hr MW, MC, PH 623 Fish I	12-14-01 9.5 HRS 236 FISH AT/MW	BWF 10/25/01		
P18-UD-MC	Pool 18 Upper Day x1	7/10/01	JSV, CDD	10-24-01 4.5 hrs PH, MW, MC 573 fish I	JSV 12/13/01	JSV/10/26/01	BWF 12/4/01	
P18-UD-RDB	Pool 18 Upper Day x2	7/10/01	JSV, CDD	10-26-01 I PH, MW, MC, AT 5 hr 196 fish; 10-25-01 II PH, MW, MC, AT 5 hr 275 fish		JSV/10/29/01	PASS	
P26-UD-LDB	Pool 26 Upper Day x2	7/12/01	JSV, CDD, BWF	10-26-01 I PH, MW, MC, AT 5 hr 175 fish; 10-29-01 II MW, MC, AT 5.25 hr 153 fish	PASS 12/6/01 PH/MC 41 FISH 4 hrs	BWF 10/30/01		
P26-UD-RDB	Pool 26 Upper Day x2	7/12/01	JSV, CDD, BWF	10-30-01 I MW, MC, PH, AT 5.75 hr 518 fish; 10-30-01 II MW, MC, PH, AT 4.30 hr 593 fish		BWF 10/31/01 *		
P26-UD-MC	Pool 26 Upper day x2	7/12/01	JSV, CDD, BWF	10-31-01 BWFS MW, MC, PH, AT 732 Fish I; 11-1-01 8 hr MW, MC, PH, AT 621 Fish II		BWF 11/1/01		
P26-LD-RDB	Pool 26 Lower Day x1	7/12/01	JSV, CDD, BWF	11-8-01 11-12-01 I MW 534 fish 16 hr		JSV/11/12/01		
P26-LD-MC	Pool 26 Lower Day x1	7/12/01	JSV, CDD, BWF	MW 12-01 15.5 HRS 82 fish AT		JSV/11/12/01		
P26-LD-LDB	Pool 26 Lower Day x2	7/12/01	JSV, CDD, BWF	11-12-01 MW I 11-13-01; 11-13-01 969 fish 11-10-01; 11-14-01 24 hr MW 360 I		BWF 11/16/01		
P22-LD-LDB	Pool 22 Lower Day x1	7/23/01	JSV/CDD	10/12/01 11.0 hrs RJC 1018 Fish		BWF 10/31/01 *		
P22-LD-RDB	Pool 22 Lower Day x1	7/23/01	JSV/CDD	10-11-01 2.0 hrs RJC 581 fish		JSV/10/24/01	BWF 12/4/01	
P22-LD-MC	Pool 22 Lower Day x1	7/23/01	JSV/CDD	10-11-01 6.0 hrs RJC 1333 fish		BWF 10/29/01	PASS	

Sent to be picked (all the rest)

* Sample split in half - both subsamples ID'd separately

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Sample Code #	Site/Station/Rep.	Collection Date	Collectors	Picked By/Date/Time	QA/QC By/Date	I.D. By/Date	QA/QC By/Date	Voucher
P22-UD-RDB	Pool 22 Upper DAY x 1	7/23/01	JSV/CDD	10-12-01 4.5 hrs RJC 666 fish		JSV/10/26/01		
P22-UD-LDB	Pool 22 Upper Day x 1	7/23/01	JSV/CDD	11-14-01 22.5 HRS PH 1707 FISH I		JSV/11/15/01	PASS	
P22-UD-MC	Pool 22 Upper Day x 1	7/23/01	JSV/CDD	14.5 HRS 11-14-01 1193 FISH AT		JSV/11/14/01		
P22-LN-RDB	Pool 22 Lower Night x 1	7/23/01	JSV/CDD	11.5 HRS BWF 11-15-01 1778 FISH PASSED AT	BWF 11-15-01 PASSED	BWF 11/20/01		
P22-LN-LDB	Pool 22 Lower night x 1	7/23/01	JSV/CDD	11-20-01 15 HRS 762 FISH AT		JSV/11/26/01		
P22-LN-MC	Pool 22 Lower Night x 1	7/23/01	JSV/CDD	10/12/01 2.0 hrs RJC 154 fish		JSV/10/29/01		
P22-UN-RDB	Pool 22 Upper Night x 1	7/24/01	JSV/CDD	[illegible] I	MSC 11/19/01 PASSED	BWF 11/26/01		
P22-UN-LDB	Pool 22 Upper Night x 1	7/24/01	JSV/CDD	11-20-01 11 HRS pH 887 FISH I		JSV/11/29/01		
P22-UN-MC	Pool 22 Upper Night x 1	7/24/01	JSV/CDD	11-21-01 8 HRS 397 FISH AT		JSV/11/26/01		
P18-LD-MC	Pool 18 Lower Day x 1	7/25/01	JSV/CDD	11-21-01 10 hrs 1947 FISH PH I		JSV/11/27/01		
P18-LD-LDB	Pool 18 Lower Day x 1	7/25/01	JSV/CDD	STW 11/21/01 8 hrs 995 fish		BWF 11/26/01		
P18-LD-RDB	Pool 18 Lower Day x 1	7/25/01	JSV/CDD	11-26-01 8.5 HRS 2918 FISH AT		JSV/11/27/01		
P18-UD-RDB	Pool 18 Upper Day x 2	7/25/01	JSV/CDD	11-28-01 21 HRS 415 FISH I / 11-30-01 PH BWF 18 HRS 471 fish		BWF 11/30/01		
P18-UD-LDB	Pool 18 Upper Day x 1	7/25/01	JSV/CDD	11-28-01 12 HRS 1170 FISH EW/AT		JSV/11/28/01	Pass	
P18-UD-MC	Pool 18 Upper Day x 1	7/25/01	JSV/CDD	11-27-01 11.0 HRS 513 FISH AT		BWF 11/27/01	JSV 12/5/01	
P18-UN-LDB	Pool 18 Upper Night x 1	7/25/01	JSV/CDD	11-28-01 16.0 HRS 975 FISH MSC		JSV/11/28/01		
P18-UN-MC	Pool 18 Upper Night x 1	7/25/01	JSV/CDD	11-29-01 12 HRS 347 FISH AT		JSV/11/29/01	Pass	
P18-UN-RDB	Pool 18 Upper Night x 3	7/25/01	JSV/CDD	MC, MW, AT / BWF, MW, AT, BWF 11-30-01 / 11-30-01 / 11-30-01 250 FISH I / 187 FISH II / 120 Fish III		BWF 11/30/01	JSV/12/6/01	
P18-LN-LDB	Pool 18 Lower Night x 1	7/25/01	JSV/CDD	11/29/01 7 hrs 128 fish CDD		JSV/11/29/01		
P18-LN-RDB	Pool 18 Lower Night x 1	7/26/01	JSV/CDD	10-12-01 3.0 hrs RJC 708 fish		JSV/10/26/01		
P18-LN-MC	Pool 18 Lower Night x 1	7/26/01	JSV/CDD	11-20-01 Jar I MW 7 hrs 207 Fish		JSV/11/25/01		
P26-UD-LDB	Pool 26 Upper Day x 1	7/27/01	JSV/CDD/BWF	16 hrs MW 1633 I 11-18-01 11-20 11-19-01	MSC 11/20/01 PASSED	BWF 11/20/01		
P26-UD-RDB	Pool 26 Upper Day x 1	7/27/01	JSV/CDD/BWF	MW 995 Fish Jar I 16hr 11-21-01 11-26-01		JSV/11/26/01		
P26-UD-MC	Pool 26 Upper Day x 1	7/27/01	JSV/CDD/BWF	MW 11-27-01 11-28-01 795 Fish 16hr I		BWF 11/28/01		
P26-LD-MC	Pool 26 Lower Day x 1	7/27/01	JSV/CDD/BWF	11-6-01 710 Fish 45min MW, MC, PH, At I		BWF 11/5/01		

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P26-LD-RDB	Pool 26 Lower Day x 1	7/27/01	JSV/CDD/BWF	11-1-01 mw, mc, PH, AT 630 fish 15min I		JSV 11/2/01		
P26-LD-LDB	Pool 26 Lower Day x 1	7/27/01	JSV/CDD/BWF	11-1-01 MC 591 Fish 3.5hrs I		JSV 11/4/01	BWF 12/10/01	
P26-LN-MC	Pool 26 Lower Night x1	7/28/01	JSV/CDD/BWF	11-1-01 MW 373 Fish 2.5hr I		JSV 11/2/01	PASS	
P26-LN-RDB	Pool 26 Lower Night x1	7/28/01	JSV/CDD/BWF	11-01-01 PH 454 FISH 2.5hrs I		BWF 11/2/01		
P26-LN-LDB	Pool 26 Lower Night x1	7/28/01	JSV/CDD/BWF	11-05-01 4½ HRS 493 FISH AT		BWF JSV 11/7/01		
P26-UN-RDB	Pool 26 Upper Night x1	7/27/01	JSV/CDD/BWF	11-5-01 10HRS I 711 FISH AT		BWF 11/6/01		
P26-UN-LDB	Pool 26 Upper Night x1	7/27/01	JSV/CDD/BWF	11-05-01 10 hrs 1732 FISH PH JAR I		JSV 11/13/01		
P26-UN-MC	Pool 26 Upper Night x1	7/27/01	JSV/CDD/BWF	11/05/01 15hrs 1045 FISH MC I		JSV 11/8/01		
P18-LD-LDB	Pool 18 Lower Day x1	8/8/01	JSV/BWF	11-29-01 CHRS 1238 FISH MC I	PH 11/29/01 Passed	BWF 11/29/01		
P18-LD-MC	Pool 18 Lower Day x1	8/8/01	JSV/BWF	11-27-01 12 hrs RJC, PB MD 1512 fish		JSV 11/29/01		
P18-LD-RDB	Pool 18 Lower Day x1	8/8/01	JSV/BWF	11/10/01 5 hrs. RJC 1993 fish	JSV 12/11/01 Pass	BWF 11/27/01		
P18-UD-LDB	Pool 18 Upper Day x1	8/8/01	JSV/BWF	RJC 17 hrs 10-26-01 2997 fish	PH 561 FISH 5.5hrs 12/4/01 FAIL	JSV 10/31/01		
P18-UD-MC	Pool 18 Upper Day x1	8/8/01	JSV/BWF	CDD, MW 6 hrs 11-30-01 1903 fish	JSV 12/ Pass	BWF 11/30/01		
P18-UD-RDB	Pool 18 Upper Day x1	8/8/01	JSV/BWF	11-23-01 11.5 hrs RJC, PB 789 fish	JSV 12/12/01 Pass	BWF 11/28/01		
P22-LD-LDB	Pool 22 Lower Day x1	8/7/01	JSV/BWF	RJC 6 hrs 10-26-01 881 fish	JSV 12/11/01 Pass	BWF 10/30/01	JSV 12/14/01 PASS	
P22-LD-MC	Pool 22 Lower Day x1	8/7/01	JSV/BWF	11/10/01 4 Hrs. RJC 1456 Fish		JSV 11/14/01		
P22-LD-RDB	Pool 22 Lower Day x1	8/7/01	JSV/BWF	11/10/01 3 Hrs RJC 1017 Fish		JSV 11/14/01		
P22-UD-LDB	Pool 22 Upper Day x1	8/7/01	JSV/BWF	11/10/01 7 Hrs. RJC 1016 fish		BWF 11/15/01		
P22-UD-MC	Pool 22 Upper Day x1	8/7/01	JSV/BWF	11/10/01 6 Hrs RJC 1363		BWF 11/16/01		
P22-UD-RDB	Pool 22 Upper Day x1	8/7/01	JSV/BWF	11-29-01 823 Fish MW 4hrs I	PH 12 Fish 1hr 12/3/01 PASS	JSV 11/30/01		
P26-LD-LDB	Pool 26 Lower Day x1	8/9/01	CDD/BWF	11/10/01 3½ Hrs RJC 187		JSV 11/14/01	BWF 12/10/01	
P26-LD-MC	Pool 26 Lower Day x1	8/9/01	CDD/BWF	RJC 0.75 hrs 10-28-01 107 fish		BWF 11/1/01	PASS	
P26-LD-RDB	Pool 26 Lower Day x1	8/9/01	CDD/BWF	RJC 0.75 hrs 10-28-01 54 fish		BWF 11/1/01		
P26-UD-LDB	Pool 26 Upper Day x1	8/9/01	CDD/BWF	11/10/01 5 Hrs RJC 1990 Fish		BWF 11/21/01		
P26-UD-MC	Pool 26 Upper Day x1	8/9/01	CDD/BWF	RJC 4.5 hrs 10-28-01 983 fish		JSV 11/21/01		

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P26-UD-RDB	Pool 26 Upper Day x 1	8/9/01	CDD/BWF	11-23-01 3.5 hrs RJC 563 fish		BWF 11/28/01		
P18-UD-LDB	Pool 18 Upper Day x 2	8/22/01	CDD/BWF	11-05-01 30 min JAR I 44 FISH; 11-05-01 30 min JAR II 11 FISH AT		BWF 11/5/01		
P18-UD-MC	Pool 18 Upper Day x 2	8/22/01	CDD/BWF	11-06-01 30 MIN PH 6 FISH; 11-05-01 10 MIN PH 4 FISH JAR II		BWF 11/7/01		
P18-UD-RDB	Pool 18 Upper Day x 1	8/22/01	CDD/BWF	11-06-01 3.5 HRS 78 FISH AT		BWF 11/6/01		
P18-UN-LDB	Pool 18 Upper Night x 1	8/23/01	CDD/BWF	11-05-01 45 MIN PH 23 FISH JAR I	12/4/01, MSC PASS: 0 FISH	BWF 11/7/01		
P18-UN-MC	Pool 18 Upper Night x 1	8/23/01	CDD/BWF	11-6-01 2 HRS 13 FISH MW I		BWF 11/7/01		
P18-UN-RDB	Pool 18 Upper Night x 1	8/23/01	CDD/BWF	11-6-01 2.5 HRS 42 FISH MC I		BWF 11/7/01		
P18-LD-LDB	Pool 18 Lower Day x 2	8/22/01	CDD/BWF	11-06-01 30 min 43 FISH AT; 11-06-01 30 min 18 FISH		BWF 11/7/01		
P18-LD-MC	Pool 18 Lower Day x 1	8/22/01	CDD/BWF	10-26-01 1.5 HRS MC/JW 59 FISH	PASS	JSV 12/10/01	BWF 12/10/01	
P18-LD-RDB	Pool 18 Lower Day x 1	8/22/01	CDD/BWF	11-06-01 1 HOUR PH 178 FISH JAR I	12-4-01 1/2 HR 9 FISH AT	BWF 11/6/01	PASS	
P18-LN-LDB	Pool 18 Lower Night x 1	8/23/01	CDD/BWF	11-6-01 30 mins MW 28 Fish I		BWF 11/7/01		
P18-LN-MC	Pool 18 Lower Night x 1	8/23/01	CDD/BWF	11-6-01 30 mins MW 9 Fish I		BWF 11/7/01		
P18-LN-RDB	Pool 18 Lower Night x 1	8/23/01	CDD/BWF	11-06-01 1.5 HR 26 FISH PH JAR I		BWF 11/8/01		
P22-UD-LDB	Pool 22 Upper Day x 1	8/20/01	CDD/BWF	11-6-01 3 HRS MW 207 Fish I		BWF 11/12/01		
P22-UD-MC	Pool 22 Upper Day x 1	8/20/01	CDD/BWF	11-6-01 8.5 hrs MC 543 FISH I		JSV 11/12/01; ~~BWF 11/8/01~~		
P22-UD-RDB	Pool 22 Upper Day x 1	8/20/01	CDD/BWF	10-12-01 2.0 HRS RJC 716 fish		BWF 10/25/01		
P22-UN-LDB	Pool 22 Upper Night x 1	8/21/01	CDD/BWF	11-06-01 3.0 HRS PH 276 FISH I	12/4/01	BWF 11/6/01		
P22-UN-MC	Pool 22 Upper Night x 1	8/21/01	CDD/BWF	11-06-01 3.5 HRS PH 394 FISH I	12-4-01 MSC PASS 6 FISH	BWF 11/8/01		
P22-UN-RDB	Pool 22 Upper Night x 1	8/21/01	CDD/BWF	10-25-01 1.5 HRS PH, MC, AT 650 FISH		BWF 10/29/01		
P22-LD-LDB	Pool 22 Lower Day x 1	8/20/01	CDD/BWF	11-6-01 2 HRS MW 52 Fish I		BWF 11/8/01		
P22-LD-MC	Pool 22 Lower Day x 1	8/20/01	CDD/BWF	11-07-01 2 1/2 HRS 299 FISH AT		BWF 11/8/01	JSV 12/10/01	
P22-LD-RDB	Pool 22 Lower Day x 1	8/20/01	CDD/BWF	11/6/01 1.5 HRS MC 315 FISH I	12/4/01	JSV 11/13/01	Pass	
P22-LN-LDB	Pool 22 Lower Night x 1	8/21/01	CDD/BWF	11-07-01 4.0 HRS PH 244 FISH I		BWF 11/14/01		
P22-LN-MC	Pool 22 Lower Night x 1	8/20/01	CDD/BWF	11/7/01 5.0 HRS MC 246 FISH I		BWF 11/14/01		
P22-LN-RDB	Pool 22 Lower Night x 1	8/20/01	CDD/BWF	11-7-01 3.25 hr MW 231 Fish I		BWF 11/13/01		

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• P26-UD-LDB	Pool 26 Upper Day x1	8/28/01	CDD/JSV	11-7-01 4hr I MW 364 Fish		JSV 11/8/01		
• P26-UD-MC	Pool 26 Upper Day x1	8/24/01	CDD/JSV	11-06-01 3HRS 334 FISH AT		BWF 11/8/01		
• P26-UD-RDB	Pool 26 Upper Day x1	8/24/01	CDD/JSV	11-07-01 5.5HRS 279 FISH AT		BWF 11/12/01		
• P26-UN-LDB	Pool 26 Upper Night x1	8/25/01	CDD/BWF	11-07-01 3.5 HRS 477 FISH PH I	12-04-01 1.5 HRS 14 FISH AT	JSV 11/12/01		
• P26-UN-MC	Pool 26 Upper Night x1	8/24/01	CDD/BWF	11-08-01 3 HRS 164 FISH AT		JSV 11/8/01		
• P26-UN-RDB	Pool 26 Upper Night x1	8/24/01	CDD/BWF	11-08-01 5.5HRS 1666 FISH MC. I		JSV 11/8/01		
• P26-LD-LDB	Pool 26 Lower Day x1	8/24/01	CDD/JSV	11-12-01 3.0 HRS 272 FISH PH I		BWF 11/12/01		
• P26-LD-MC	Pool 26 Lower Day x1	8/24/01	CDD/JSV	11-8-01 2hr. I MW 131 Fish		BWF 11/9/01		
• P26-LD-RDB	Pool 26 Lower Day x1	8/24/01	CDD/JSV	mw; mc; AT 15min 69 Fish I 10-29-01		JSV 10/29/01	BWF 12/10/01	
• P26-LN-LDB	Pool 26 Lower Night x1	8/25/01	CDD/BWF	AT 11-01-01 I 94 FISH 2½ HRS		BWF 11/2/01		
• P26-LN-MC	Pool 26 Lower Night x1	8/25/01	CDD/BWF	11-8-01 1.5 hr MW 51 Fish I		JSV 11/8/01		
• P26-LN-RDB	Pool 26 Lower Night x1	8/25/01	CDD/BWF	11-08-01 2.5 HRS 260 FISH AT		JSV 11/9/01		