Prepared for:
US Fish and Wildlife Service, NJ Field Office
Galloway, New Jersey 08205
and
NJDEP Bureau of Marine Water Monitoring
Leeds Point, New Jersey 08220

2015 Wreck Pond Fish Inventory Study with Emphasis on Field Monitoring of Alewife and Blueback Herring

Spring Sampling Report

Wreck Pond, Spring Lake and Sea Girt, Monmouth County, New Jersey

February 2016

American Littoral Society

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NJDEP Bureau of Marine Water Monitoring
Leeds Point, New Jersey 08220

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1.0 INTRODUCTION

1.1 PURPOSE AND NEED

The United States Fish and Wildlife Service (USFWS) was awarded a grant in October 2013 through the Department of Interior (DOI) to reestablish fish passage for diadromous fishes to Wreck Pond while also restoring dune and beach habitat used by federally-listed threatened wildlife. Currently, the only connection between Wreck Pond and the Atlantic Ocean is an 800-foot long, 84-inch diameter pipe.

Wreck Pond is a 73-acre tidally influenced pond located at the easterly end of the Wreck Pond Brook Watershed. The Wreck Pond Brook Watershed drains approximately 12 square miles of land in the Boroughs of Spring Lake, Sea Girt, Spring Lake Heights, and Wall Township. Much of the land is residential or commercial property. There are several sand mining operations in the upper watershed. Like many of the coastal ponds in New Jersey, Wreck Pond has had issues with water quality, which has impacted the fish and wildlife populations within the pond, including river herring, alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*), which are species of special concern. Flooding has also been an issue from heavy rainfall and high tidal surges during severe storm events. The 2013 grant was awarded in order to address these issues.

As part of this grant, the USFWS drafted and executed a cooperative agreement with the American Littoral Society (the Society) to "Restore the Wreck Pond Inlet (Project)" by constructing and installing a secondary fish passage corridor consisting of a 5.5 x 8 x 600 foot concrete box culvert just north and parallel to the existing pipe. The completed Project will provide improved aquatic connectivity for fish passage for migratory fishes including anadromous alewife and blueback herring, and catadromous American eel (*Anguilla rostrata*), and has been designed to maximize access into and from Wreck Pond and its tributaries during spring migration and fall emigration. The USFWS will also advise on the potential reconstruction of the dune and berm system impacted by Hurricane Sandy to minimize impact to nesting habitat for the federally-listed threatened Piping Plover (*Charadrius melodus*) and the state-listed Least Tern (*Sterna antillarum*). Project construction began in December 2015 and must be completed by March 15 due to endangered species restrictions. Due to requirements of a grant received by the Borough of Spring Lake from the U.S. Department of Housing and Urban Development, the bid for construction was not awarded until October 2015, which delayed the project start date to December 2015. On-site work must be completed by March 15, 2016 due to endangered species restrictions.

After spring adult migratory fish surveys were performed in 2006, 2007, 2008 (NJDEP Permit 1300-04-0010.1; WFD 040001), the status of diadromous fishes in the Wreck Pond Brook Watershed remained unclear. The methods were inconsistent and the data did not provide a clear or current understanding of the use of Wreck Pond and its tributaries by diadromous species. In 2014, to better determine the success of the USFWS Project and to determine the presence of adult river herring post-Hurricane Sandy, the Wreck Pond Technical Advisory Committee (TAC) recommended that a spring and fall fish inventory study be initiated prior to construction. The Monmouth County Division of Engineering, through funding provided by the New Jersey Department of Environmental Protection (NJDEP) Division of Water Monitoring and Standards, contracted the American Littoral Society (the Society) to conduct a baseline fish inventory study in 2014 (NJDEP Permit #1444). Reports from the 2014 spring and fall fish surveys are available upon request and/or can be downloaded from the NJDEP Wreck Pond website: http://www.nj.gov/dep/wreckpond/documents.htm. This report covers pre-construction baseline monitoring conducted in spring 2015 by the Society through a cooperative agreement with USFWS (#F14AC00250; NJDEP Permit #1531, Appendix A). Fall juvenile surveys will be conducted in 2015 as well and results will be reported in an addendum following those surveys under separate cover.

Collected data was meant to provide baseline pre-construction data that could be compared with post-construction survey results. Specifically, the study was designed to provide the following:

1) Baseline data for river herring movement within Wreck Pond during spring adult immigration and fall juvenile emigration;

2) An inventory of aquatic species collected using both passive (fyke net) and active (seine net) sampling methods at various locations throughout Wreck Pond;
3) A comparison of movement and abundance from past surveys in 2006, 2007, 2008, and 2014 to be applied to current data and data to be collected post-construction;
4) Measurements, weights, and enumeration of collected species; and
5) Verification of anadromous spawning in Wreck Pond Brook Watershed.

1.2 SITE LOCATION AND HISTORY

Wreck Pond is a 73-acre tidally-influenced coastal pond located between the boroughs of Sea Girt and Spring Lake in Monmouth County, New Jersey (Figure 1) and is currently connected to the Atlantic Ocean by an 84-inch diameter, 800-foot long intake/outfall pipe. The pipe was originally 500-feet, however mandatory beach closures prior to 2006 due to high bacteria levels at the outfall during rainfall events led to the extension of the pipe by 300 feet into the Atlantic Ocean. Mandatory beach closures were suspended as of 2014; however the area where Wreck Pond interacts with nearshore waters is classified by the New Jersey Department of Environmental Protection (NJDEP) as "Prohibited for Shellfish Harvest" due to water quality issues.

The Wreck Pond Brook Watershed drains approximately 12.8 square miles (8,172 acres) of the Boroughs of Sea Girt, Spring Lake, Spring Lake Heights, and Wall Township. The pond is considered a shallow waterbody with depths ranging between one to one and a half feet deep under normal water level conditions (Najarian, 2011). There are three major tributaries in the watershed including Hannabrand Brook, Wreck Pond Brook, and Black Creek. There are several dams within the watershed that create some additional ponds within these tributaries. Land use consists of a mix of wooded areas, agricultural areas, low to medium density residential areas, and mixed-use areas. Drainage into the system originates from its tributary streams and from storm-water runoff through storm drains located in surrounding residential areas.

In winter 2015-2016, Monmouth County removed approximately 30,000 cubic yards of sediment from the pond west of the 1st Avenue Bridge as well as 5,000 cubic yards of sediment from the area between the 1st Avenue Bridge and the pipe. The County will remove an additional 7,000 cubic yards from the area west of the 1st Avenue Bridge before the end of the year. Removal of the sediment from the area east of the 1st Avenue Bridge increased the average depth in this area to about five feet. The removal of all of this sediment should allow for better water flow throughout this area, which in turn should improve water quality.

1.3 SUMMARY OF RESULTS FROM PREVIOUS SAMPLING EFFORTS

Wreck Pond has been identified and documented as a confirmed anadromous spawning ground for alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*); Zich, 1978; Byrne, 1986; NJDEP, 2000). In 2006, when the existing 500-foot pipe was extended 300 feet, conditions were incorporated into the NJDEP permit specifically to monitor alewife and blueback herring movement post-construction and to determine if the 300 foot extension would physically hinder, obstruct, and/or prevent herring from entering Wreck Pond to spawn. Results from the herring surveys performed during the spring of 2006 and 2007 using a fyke net indicated an unhindered, viable run of alewife within Wreck Pond. In 2006, a total of 229 adult alewife were captured during 3 events held between mid-April and mid-May, and in 2007, a total of 49 adult alewife were captured during 3 events held between early May and early June (ENSR, 2006; ENSR, 2007). Results were inconclusive in confirming if mass movements of blueback existed. One individual blueback was captured on May 15, 2006 and two individuals were captured on May 18, 2007. To increase catch probability for blueback, the 2008 survey utilized seine netting at numerous locations throughout the entire watershed from early May to early June. The results of the 2008 sampling program verified a small presence and migration of alewife in Wreck Pond at the beginning of the sampling event (4 adults were captured on May 5) and some juvenile emigration towards the end of the program (June 3, 2008; ENSR, 2008). No blueback herring were captured during the 2008 surveys. Declining numbers of alewife over the three year period could have been associated with a number of variables such changes in gear, catch effort, survey timing, spatiotemporal variability in general river herring population abundance, and a number of environmental parameters. In 2014, a total of 103 adult alewife were captured

in a fyke net during 3 events held between mid-May to mid-June (American Littoral Society, 2014). The largest runs occurred in mid-May in 2007 and 2014, and in mid-April in 2006. It is possible that larger runs occurred in mid-April in 2007 and 2014, but were not observed because the sampling period did not cover this time during those years. Future sampling efforts will start mid-April and should extend to June.

Figure 1. Project location vicinity map, Wreck Pond, Spring Lake and Sea Girt, New Jersey. The red star indicates fyke net sampling location.

2.0 RIVER HERRING LIFE HISTORY

2.1 SPECIES DESCRIPTIONS

Alewife and blueback herring are euryhaline, anadromous planktivores of the family Clupeidae. They are an important forage species that create an energy link between zooplankton and piscivores, as well as an important commercial fishery species, primarily harvested for fish meal, fish oil, fish protein, and for use as bait in the New England lobster fishery (Mullen et al., 1986).

Alewife and blueback are very similar morphologically, but are externally distinguishable by eye diameter and body color (when freshly caught) and internally by the color of their peritoneum and number of gill rakers on the lower limb of the first gill arch. Adult blueback herring usually have a black peritoneum, smaller eye diameter, and approximately 44 to 50 gill rakers on the first limb of the first gill arch, whereas alewife have a pale peritoneum, larger eye diameter (exceeds the length of the snout) and 39 to 41 gill rakers on the first limb of the first gill arch. Alewife also have a slightly deeper body (Odell, 1934; Loesch, 1987). Though it may appear that species have discernible characteristics, determinations without internal confirmation between the two species are often difficult due to an overlap in habitat (Smith, 1970).

2.2 LIFE HISTORY/SPAWNING CHARACTERISTICS

Alewife and blueback herring are sympatric species that exhibit an anadromous life history and are collectively referred to as river herring. They spawn in freshwater and migrate to the Atlantic Ocean as juveniles. After spending two to five years in the ocean, they return to freshwater to spawn. Alewife and blueback herring are iteroparous, returning to the ocean post-spawning. Post-spawning mortality of alewife, however, has been measured at 41% (Havey, 1961) and between 39 to 57% (Durbin et al., 1979). Although the majority of individuals exhibit this life history, there are landlocked populations of river herring (Rothschild, 1962; Jones et al., 1978; Klauda et al., 1991).

River herring are found in the Atlantic Ocean and spawn in coastal drainages of eastern North America. Alewife are distributed from at least Newfoundland to South Carolina (Jones et al., 1978; Scott and Scott, 1988) with higher abundance in the mid-Atlantic and northeastern states. Blueback herring are distributed from Nova Scotia to Florida (Hildebrand, 1963; Scott and Crossman, 1973; Williams et al., 1975) with higher abundance in warmer waters south of Chesapeake Bay (Manooch, 1988; Scott and Scott, 1988). New Jersey inshore waters up to 8km offshore are an important over-wintering area for juvenile blueback herring (Bigelow and Schroeder, 2002).

An anadromous clupeid inventory conducted by the New Jersey Department of Fish and Wildlife from 2002 to 2007 investigated the presence of anadromous clupeids in 115 locations (Smith, 2012). Alewife were confirmed in a total of 27 locations while blueback herring were confirmed in five locations. An additional 122 locations previously sampled were not re-sampled during this inventory. In total, there have been 147 locations from 60 drainages with a confirmed presence of river herring. One hundred and thirty two impediments to fish passage were documented within the 237 total sampling locations, 130 of which are man-made such as dams, flood gates, culverts and pipes. Seventy-two of the 130 locations have confirmation of a spawning clupeid run.

Initiation of spawning runs for alewife and blueback herring is temperature dependent thus spawning run timing varies throughout their range. In the southern end of their range, alewife begin spawning in late February, while at the northern end of their range, they may spawn through early June (Loesch, 1987). In the mid-Atlantic, alewife spawning runs typically occur from early to mid-March through May, when water temperatures warm and range from 10-18°C (Jones et al., 1978; Mowrer, 1982). Blueback initiate spawning runs about a month later, but the spawning peaks can differ by about 2-3 weeks (Hildebrand and Schroeder, 1928). Ordinarily in New Jersey, there is a three to four week time difference between alewife and blueback spawning runs in sympatric areas (Don Byrne, NJDEP, pers. comm., November 2005). Spawning times can also extend through August as long as temperatures remain below 27°C. Both species use similar hard ground habitats (gravel, packed sand, stones and sticks) and prefer lentic areas for spawning (Bigelow

and Welsh, 1925; Marcy, 1976). However, when overlap occurs, blueback herring will spawn in lotic waters allowing alewife to use their preferred lentic areas (Loesch, 1987). When eggs are deposited, they remain sticky and adhere to hard substrate up until about 24 hours when the eggs water hardens. Some eggs remain suspended and are dispersed by currents. Eggs require an incubation time of 50 hours at 20- 21°C (Kuntz and Radcliffe, 1917; Jones et al., 1978).

Results from previous spring fish sampling in Wreck Pond suggest that alewife spawning can begin around mid to late-April and peak around mid-May. Although several individual blueback herring were observed in 2006 and 2007, there have been no observed blueback runs which indicate spawning in Wreck Pond since then.

3.0 SURVEY METHODOLOGY AND MATERIALS

Prior to initiating herring sampling, the American Littoral Society (the Society) submitted a scientific collections permit application in preparation for a May 1, 2015 sample start date. A New Jersey Scientific Collections Permit (Permit #1531) was issued on March 17, 2015 (Appendix A). Wreck Pond herring sampling was completed during four lunar cycles from May 1 to June 18, 2015. Sample event scheduling was based on the confirmed presence of clupeids in nearshore waters adjacent to Wreck Pond, presence of species based on results from sampling conducted in 2006, 2007 and 2014, attainment of inshore water temperatures optimal for herring spawning, and the increased probability of herring movement relative to spring tide levels.

3.1 SAMPLING LOCATION

The sampling site was located underneath the railroad bridge located directly west of the First Avenue Bridge and east of Route 71 in Spring Lake, New Jersey (Figure 1; Appendix B). Sampling was performed in the same location as 2006, 2007 and 2014 surveys. Adjacent shoreline perpendicular to the sampling site consisted of sand, riprap, large woody debris (LWD) and some vegetation. Shoreline underneath the railroad bridge consisted mostly of riprap and was bounded by the railroad bridge tiers (Appendix B). Water depth ranged from 30- 100 cm (1-3 ft) dependent upon tide level, and substrate consisted of large rocks and riprap associated with railroad and bridge construction. The channel located underneath the railroad bridge was approximately 9-13 m (30-43 ft) in width and it was estimated that there was a tidal difference of approximately four hours between Belmar Atlantic Ocean and the Wreck Pond Railroad Bridge.

3.2 EQUIPMENT

To remain consistent with previous surveys, the Society used the same sampling equipment employed in the 2006, 2007 and 2014 surveys, which consisted of a 15-foot long fyke net with a four foot by four foot opening. The fyke net consisted of a series of five hoops with two funnel-shaped throats with one inch stretch mesh. The net was attached to two 25-foot leaders/wings that were used to guide the fish into the mouth of the net and its throats. Prior to use, the fyke net was inspected for tears and untied throats and repaired accordingly.

Water quality was obtained during each sampling event with a multi-probed YSI Professional Series Environmental Monitoring System. Calibration was completed weekly by the NJDEP Bureau of Marine Water Monitoring laboratory at Leeds Points, New Jersey. Parameters measured included specific conductivity (µS/cm), salinity (ppt), dissolved oxygen (% saturation and mg/L), water temperature (°C), air temperature (°C), pH, and turbidity.

3.3 SAMPLING METHODS

As stated previously, initiation of spawning runs for alewife and blueback is temperature dependent (Bigelow and Schroeder, 2002; Bozeman and Van Den Avyle, 1989; Loesch and Lund, 1977). Alewife initiate spawning runs when water temperatures are between 5°C and 10°C, whereas blueback spawning begins in water temperatures between 10°C and 15°C (approximately 3-4 weeks after initiation of alewife migration in sympatric areas). The Society monitored water temperatures and preliminary movement of alewife along the New Jersey coast via local Internet sites, interactions and reports provided by the Society's Fish Tagging Department, reports from Atlantic coast anglers from multiple states, and through marine forecasts.

3.3.1 PRELIMINARY GEAR INVESTIGATIONS

On April 29, 2015, the Society performed a preliminary gear set to ensure that the equipment was in proper working condition and to confirm that there were no major structural changes at the sample site. The

fyke net was staked and set against the outgoing tide with the wings extending nearly the entire width of the channel beneath the bridge. A gap of roughly two feet on either side of the wings was left open to ensure waterfowl and mammal access underneath the bridge. This shoreline gap was located above the mean low tide line and therefore only passable by aquatic organisms during high tide. The integrity of the net's exterior and wings, to include floats, lead-line, mesh, cod end security, and anchoring were inspected in-water. Gear was secure and net integrity was satisfactory. The fyke net was removed off-site after preliminary gear investigations were complete.

3.3.2 RIVER HERRING SAMPLING AND PROCESSING

Sampling protocol and processing for the 2015 survey replicated methodology used in 2006, 2007 and 2014. Sample event duration was conducted over five days surrounding the new or full moons. The net was set at 18:00 two days before the full/new moon and the net was checked at 06:00 and 18:00 the day before, the day of and the day after the new/full moon and checked and removed the fifth day at 06:00 (see Table 1 for sampling dates). Signage, provided by the NJDEP Bureau of Marine Water Monitoring was posted on the northern and southern shorelines of the sample site to inform local residents and anglers about the sampling and to give contact information in the event that net tampering during the sampling event was witnessed (Appendix B).

The net retrieval process consisted of untying the cod-end of the net from its stationary stake, swinging the southernmost wing northward in a counter-clockwise direction, and then pulling the net to the northern shore for fish processing. Once within a foot or two of the shoreline, the net was carefully lifted one hoop at a time to allow for sample accumulation within the cod end and to limit stress to captured species. Both the net's interior and wings were re-inspected for any remaining species that may have been missed during initial net retrieval. Species collected during re-inspection were processed with the original sample. During sorting, the cod end remained partially submerged to increase survivability of collected species. Herring were removed from the cod end first and transferred into partially submerged fish sorting baskets for processing (Appendix B). Sorting gloves were worn by processors to prevent further injury to the fish and remaining specimens were sorted by species, placed in either fish baskets or buckets according to size, and processed accordingly.

The processing of fish and aquatic species collected included confirmation of taxonomic identification, enumeration, individual length determination and individual weight and/or batch weight. To show representative size of collected assemblages and assist in determining possible age class, fork length (FL) and total length (TL) were recorded for herring species and TL was recorded for all other species (depending on caudal fin morphology). Since very few catches exceeded 25 individuals per species, length measurements to the nearest centimeter (cm) and individual weights to the nearest 0.1 gram (when applicable) were recorded for all processed species. In the event that species were batch weighed, sorting baskets or buckets were tared and weights were recorded in kilograms. In addition, species condition at time of release (i.e., live, fresh dead, or dead) was recorded. To minimize mortality, fish processing was expedient and did not require a significant amount of time per individual. Once individual processing was complete, live specimens were released upstream of the sample site. When necessary, individuals were revived by gently passing water through their gills. All data was recorded on data sheets updated by the Society (Appendix C).

4.0 RESULTS

A total of four sampling events were conducted in Wreck Pond between May 2nd and June 18th, 2015 (Table 1). Sampling dates were based around the full and new moons. On the first were based on local tide tables for the open Atlantic Ocean in the nearshore waters of Belmar, New Jersey. Due to the landward distance of the sampling site from the outfall, the timing of the ebb and flood tides were found to lag considerably from the published local tide charts (approximately 3-4 hours). Tidal information for each event is given in Table 1.

In total, the fyke net was deployed 28 times for an approximate soak time of 336 hours. A total of 108 alewife were collected over the four events. No blueback herring were collected during any of the events. Table 2 gives number and type of fish caught by event. Clupeid species collected during sampling were all released alive with no mortality as a result of delicate handling and reviving of each fish. Alewife ranged in length from 24-31cm and averaged 28cm (total) and from 21-27cm and averaged 24cm (fork). Individual lengths of all species captured and species conditions prior to release are given on the data sheets found in Appendix C.

All other species were processed, enumerated, weighed (when applicable), measured, and identified to the lowest practical taxonomical level (Appendix C). A total of 16 other fish species were collected in addition to alewife (Table 2; Figure 2). Forty-one blue crabs (*Callinectes sapidus*) were captured and catch per net ranged from 0-9 individuals with the greatest amount caught during the early April event. One painted turtle and four male ducks were also captured in the fyke nets over the four sampling events. All were released without harm.

Water quality data for each sampling event is given in Table 3. Air temperatures ranged from 5.6°C to 27.8°C and water temperatures ranged from 13.6°C to 30.8°C. Dissolved oxygen levels ranged from 5.34 mg/L to 10.51 mg/L and 58.5%saturation to 147.4%saturation, and spiked corresponding to spikes in temperature (Figure 3). Salinity was taken at mid-sampling depth at all events (Table 3) and at surface and bottom sampling depths at the 2nd, 3rd and 4th events (Figure 4). Salinity ranged from 0.03ppt to 14.91ppt. pH ranged from 6.11 to 8.53, and specific conductivity ranged from 72.5µS/cm to 15723µS/cm, generally corresponding to salinity levels. Visibility (turbidity) ranged from 32cm to 89cm.

Table 1. 2015 Sampling dates and tide table for Atlantic Ocean, Belmar, NJ.

	Low	High	Low	High	Moon Phase	Moon Set	Moon Rise
Sampling Event #1							
Fri 5/1	Net Set						
Sat 5/2	12:44/ 0.2	6:53/ 5.1	12:54/ 0.2	19:15/ 5.1		5:45	19:33
Sun 5/3	1:27/ 0.1	7:32/ 4.5	13:34/ 0.2	19:51/ 5.2	Full Moon	5:53	19:53
Mon 5/4	2:09/ 0.0	8:09/ 4.5	14:13/ 0.2	20:25/ 5.2		5:52	19:54
Tue 5/5	2:50/ -0.1	8:47/ 4.5	14:51/ 0.3	21:00/ 5.2		5:51	19:55
Sampling Event #2							
Fri 5/15	Net Set						
Sat 5/16	1:09/ -0.5	7:13/ 5.2	13:14/ -0.5	19;34/ 6.0		5:28	19:38
Sun 5/17	1:09/ -0.6	7:13/ 5.1	12:24/ -0.5	18:46/ 5.9	New Moon	5:39	21:06
Mon 5/18	2:00/ -0.7	8:03/ 5.1	14:03/ -0.5	20:21/ 5.9		5:38	21:07
Tue 5/19	2:50/ -0.6	8:53/ 5.0	14:51/ -0.3	21:08/ 5.7		5:37	21:08
Sampling Event #3							
Sun 5/31	Net Set						
Mon 6/1	12:59/ 0.2	7:01/ 4.4	13:00/ 0.3	19:20/ 5.3		5:29	20:19
Tue 6/2	1:44/ 0.0	7:43/ 4.5	13:44/ 0.2	19:59/ 5.4	Full Moon	5:28	20:20
Wed 6/3	2:29/ -0.2	8:25/ 4.5	14:28/ 0.2	20:39/ 5.5		5:28	20:21
Thur 6/4	3:12/ -0.2	9:09/ 4.5	15:12/ 0.2	21:23/ 5.5		5:28	20:21
Sampling Event #4							
Sun 6/14	Net Set						
Mon 6/15	00:52/ -0.3	6:55/ 4.8	12:52/ -0.2	19:15/ 5.8		5:26	20:27
Tue 6/16	1:42/ -0.4	7:45/ 4.8	13:41/ -0.1	20:01/ 5.7	New Moon	5:26	20:27
Wed 6/17	2:30/ -0.4	8:33/ 4.8	14:28/ 0.0	20:46/ 5.5		5:26	20:28
Thur 6/18	3:15/ -0.3	9:21/ 4.7	15:14/ 0.2	21:31/ 5.3		5:26	20:28

Table 2. Summary of species collected by event during 2015 spring fish sampling in Wreck Pond.

Common Name	Scientific Name	Event 1 5/1- 5/5	Event 2 5/15-5/19	Event 3 5/31-6/4	Event 4 6/14-6/18	TOTAL
Alewife	*Alosa pseudoharengus*	39	52	17	0	**108**
American eel	*Anguilla rostrata*	15	15	13	1	**44**
Atlantic croaker	*Micropogonias undulatus*	0	0	0	3	**3**
Atlantic silverside	*Menidia menidia*	12	0	0	0	**12**
Banded killifish	*Fundulus diaphanus*	0	13	0	6	**19**
Black crappie	*Pomoxis nigromaculatus*	0	0	1	2	**3**
Bluegill	*Lepomis macrochirus*	0	0	10	10	**20**
Brown bullhead	*Ameiurus nebulosus*	6	1	16	0	**23**
Common carp	*Cyprinus carpio*	3	2	3	1	**9**
Gizzard shad	*Dorosoma cepedianum*	32	8	9	10	**59**
Golden shiner	*Notemigonus crysoleucas*	0	15	1	5	**21**
Mummichog	*Fundulus heteroclitus*	2	0	0	0	**2**
Pumpkinseed	*Lepomis gibbosus*	0	16	56	107	**179**
Striped killifish	*Fundulus majalis*	15	0	0	1	**16**
White perch	*Morone americana*	76	48	36	23	**183**
White sucker	*Catostomus commersonii*	23	15	12	42	**92**
Yellow perch	*Perca flavescens*	1	3	3	4	**11**
Blue crab	*Callinectes sapidus*	1	3	23	14	**41**

Figure 2. Species captured by event during 2015 Wreck Pond spring fish sampling.

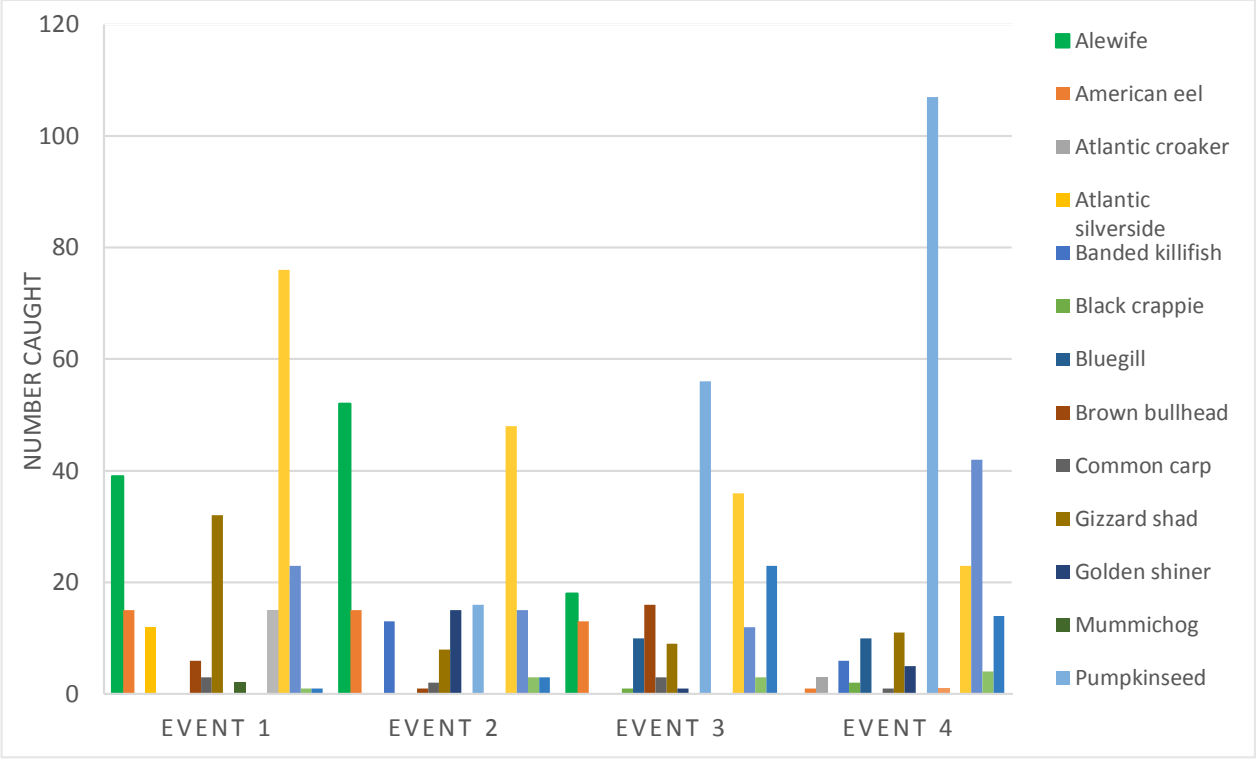


Table 3. Water quality data taken during 2015 Wreck Pond fyke net sampling events.

Date	Time	Depth	Air Temp	Water Temp	Dissolved Oxygen	Dissolved Oxygen	Salinity	pH	Specific Conductivity	Turbidity
M/D/Y	HH:MM	cm	°C	°C	mg/L	% sat.	ppt		uS/cm	secchi; cm
5/1/2015	18:45	40	11.2	17.5	8.73	92.2	1.28	7.12	2511	ND
5/2/2015	6:30	50	6.7	13.6	7.84	75.7	0.4	7.19	771	38
5/2/2015	18:25	50	12	19.8	9.17	100.8	0.94	6.75	1970	63
5/3/2015	6:25	50	5.6	14.3	7.63	74	0.44	7.26	852	62
5/3/2015	18:39	50	18.5	21.7	8.05	93.8	0.51	7.07	1051	59
5/4/2015	6:29	50	10	16.3	7.01	71.6	0.58	7.24	1151	70
5/4/2015	18:10	50	25	22.5	7.86	91.5	0.18	6.95	383.2	33
5/5/2015	6:08	55	18.9	17.1	6.53	68.2	0.75	7.4	1544	41
5/15/2015	18:23	50	17.8	22.7	7.95	93.8	3.3	7.2	4720	48
5/16/2015	6:09	50	15.5	19	5.34	58.5	2.89	7.42	5356	50
5/16/2015	18:11	50	20.6	23.1	6.91	82	2.48	7.58	3806	48
5/17/2015	6:28	50	20	19.5	6.07	66.4	0.65	7.29	1289	43
5/17/2015	18:28	50	22.8	26.7	6.41	81.5	0.91	7.1	1715	56
5/18/2015	6:05	50	20	22.6	5.51	66	0.88	7.07	1863	56
5/18/2015	18:04	50	13.9	19.8	6.77	74.3	0.95	7.05	1851	39
5/19/2015	6:03	50	20	17.8	5.67	60.2	1.25	7.04	2515	50
5/31/2015	18:30	50	21.4	28.6	7.91	103.8	0.03	7.49	77.4	32
6/1/2015	6:15	55	19.1	21.4	6.19	68.9	0.04	6.95	85	40
6/1/2015	18:07	50	16.7	20.5	5.67	61.8	0.04	6.11	90.8	39
6/2/2015	6:04	50	12.6	16.7	6.7	68.8	0.04	6.74	80.5	52
6/2/2015	18:07	55	14.2	16.9	6.67	68.7	0.04	6.78	77.5	38.5
6/3/2015	5:59	55	12.6	15.1	7.03	69.8	0.03	6.67	72.5	60
6/3/2015	18:06	55	16.1	19.4	7.93	85.3	0.2	6.5	407.3	52
6/4/2015	6:15	55	14	16	7.27	73.1	0.15	7.03	316.8	80
6/14/2015	19:17	60	23	30.8	10.51	147.4	9.02	8.53	15723	48
6/15/2015	6:08	55	22.4	23.5	5.65	66.5	0.49	7.47	976	56
6/15/2015	18:12	60	27.8	27.1	5.96	74.7	0.05	6.82	74	43
6/16/2015	6:19	60	20.9	23	5.66	65.9	0.04	6.8	77.1	65
6/16/2015	18:16	60	25.1	25.8	6.93	77.7	0.04	6.5	79.2	66
6/17/2015	6:22	60	19.3	22.3	5.59	65.3	0.04	6.74	80.4	67
6/17/2015	18:17	55	24.1	27.2	8.41	104.8	0.04	6.56	79	64
6/18/2015	6:10	60	19.1	22.3	6.29	73	0.04	6.85	85.6	89

Figure 3. Salinity (ppt), dissolved oxygen (mg/L) and temperatures (°C) taken during the four fyke net sampling events in Wreck Pond, 2015.

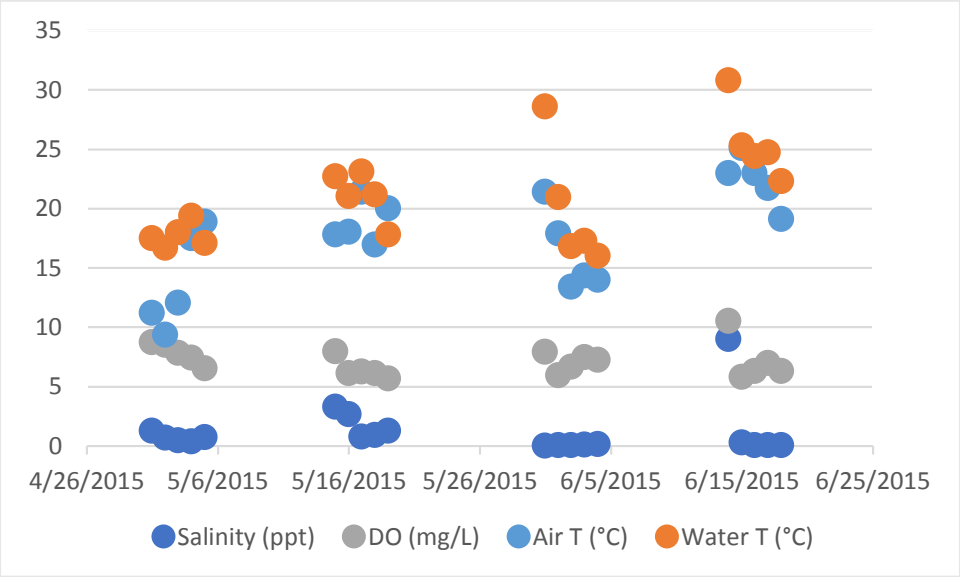
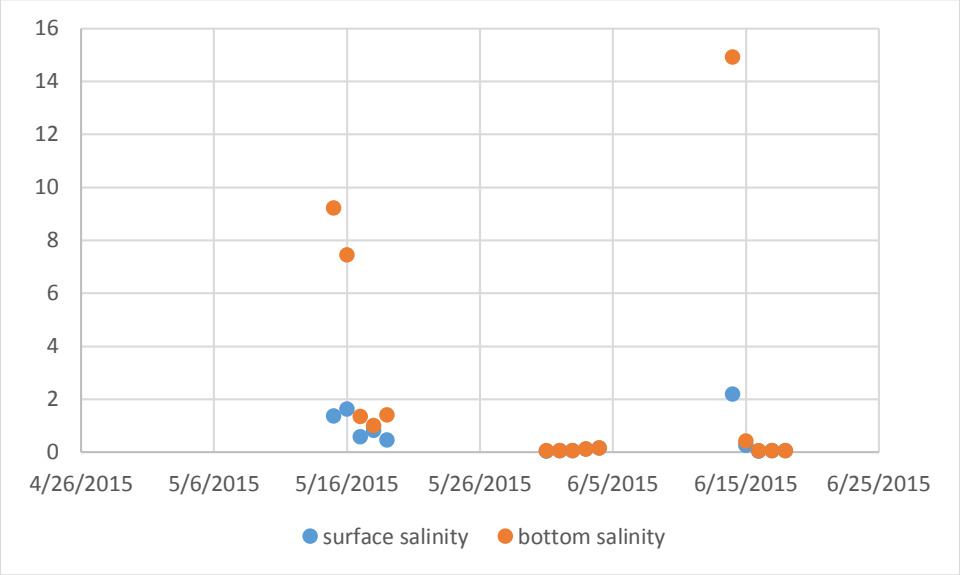


Figure 4. Surface and bottom salinity (ppt) taken during the 2nd, 3rd and 4th sampling events.



5.0 CONCLUSION

As summarized in Section 1.0, the objective for the 2015 Wreck Pond fish survey was to confirm if a viable herring run still exists within Wreck Pond and provide baseline pre-construction data to be compared with post-construction survey results. Overall, the primary goals of the spring survey were to provide the following:

1) Baseline data for anadromous movement within Wreck Pond during spring migration;

2) An inventory of aquatic species collected using passive sampling methods at one location located underneath the existing railroad bridge where previous studies using same gear were performed;

3) A comparison of movement and abundance from past surveys in 2006-2014 to be applied to current data and data to be collected post-construction; and

4) Measurements, weights, and enumeration of collected species; and

Although sampling hours were increased for the 2015 survey, the number of river herring captured was similar to 2014. Each of the surveys used the same gear, relative level of catch effort, and were stationed in the same geographic area. Sampling duration of 227 hours and level of effort in 2014 was comparable with 204 sample hours in 2006 and 217 hours in 2007. The 2014 sampling effort collected 103 alewife and no blueback; whereas 229 alewife and one blueback were collected in 2006 and 49 alewife and two blueback were collected in 2007. Figure 5 shows the number of alewife captured over time during the 2006, 2007, 2008, 2014 and 2015 sampling events. Results of each survey verify the inshore/offshore passage of adult clupeid species through the existing outfall. Results from each year suggests a run for alewife, however the stability of the run is unclear. The addition of the secondary box culvert will provide additional opportunity for fish migration as the new corridor/culvert, which has been designed for fish passage, is shorter (600' compared to 800') and incorporates ambient lighting.

The repetitive low number of blueback collected relatively at the same time in 2006 and 2007 and the lack of blueback in 2014 and 2015 suggests that a viable blueback run does not exist in Wreck Pond. Based on 2006 results, the NJDEP recommended that the 2007 events be scheduled roughly 3 to 4 weeks after the initiation of alewife migration to better target blueback movement and determine if a viable run of blueback existed in Wreck Pond. The 2014 and 2015 surveys were scheduled to reflect those 2006 recommendations and spanned over the proposed blueback spawning window. Possible reasons for the absence of blueback in 2014 and the small number of blueback collected in 2006 and 2007 could be associated with the following:

1) A viable run of blueback does not exist in Wreck Pond and therefore, this waterbody can no longer be categorized as a confirmed spawning ground for blueback. Over time, stressors such as overfishing, poor access to the water body, poor water quality, and loss of aquatic habitat may have either diminished the population or caused the Wreck Pond spawning population to go elsewhere. Unlike alewife, blueback prefer to spawn in swifter waters. A watershed-wide habitat assessment completed in spring 2015 verified that spawning habitat for blueback is present in at least two tributaries in the upper watershed, with decent access to one of those tributaries (Hannabrand Brook).

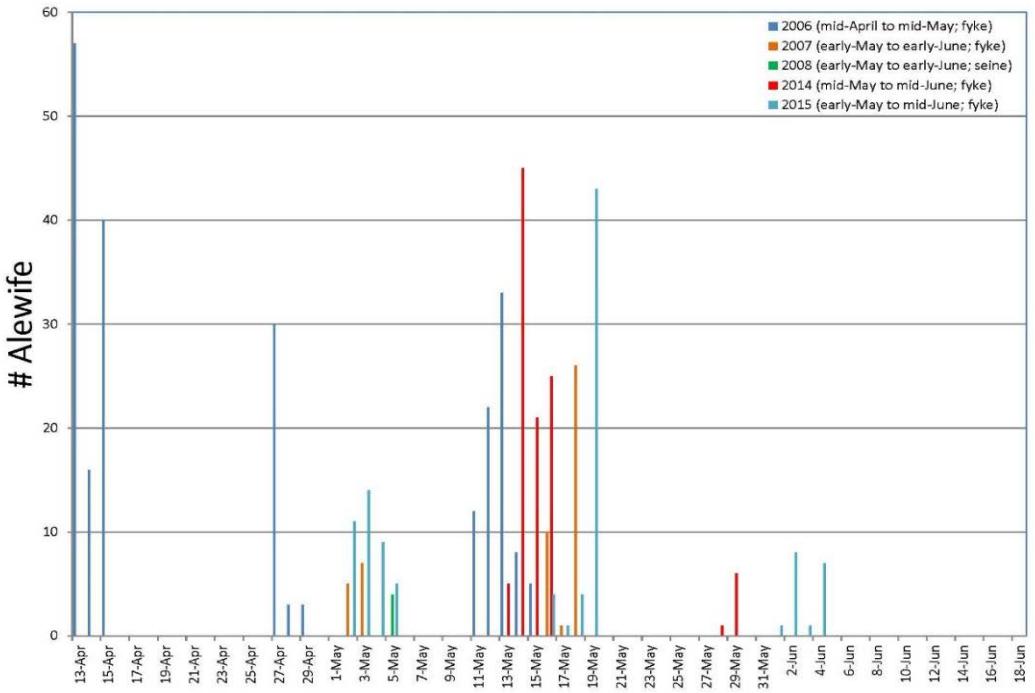
2) Blueback herring are hindered by the extended outfall structure and may not be able to access natal spawning grounds. Migration of clupeids is affected by the amount of light in a passageway. The 800 foot long 84" diameter pipe currently connecting Wreck Pond to the Atlantic Ocean does not have any infiltration of natural or artificial light. In North Carolina, an extensive gill net survey indicated that river herring (blueback herring and

alewife) no longer existed in streams where bridges have been replaced by pipes or box culverts (Moser and Terra, 1999). Herring are also reluctant to enter pipes due to shadowing (Hendricks, 2006). Even though alewife may access Wreck Pond and are subject to the same light limitations, blueback are known to be slightly more sensitive to light (Don Byrne, NJDEP, pers. comm. April, 2007) which may indicate a low presence. The new box culvert currently being installed will have manholes every 100 feet that will allow for natural light to permeate the culvert. The culvert was designed with fish passage as a priority and the amount of light that the manholes will let in should be enough to not deter fish movement.

3) Other anthropogenic and chemical barriers are deterring blueback movement. Wreck Pond has had a history of poor water quality, and development in the watershed is expanding, likely decreasing or possibly eliminating habitat and water quality necessary for blueback. Installation of the bypass culvert should allow for improved water quality, tidal mixing, and a more attractant flow. In addition to the box culvert, there are plans to install 6000 feet of nature-based living shorelines, which should further enhance natural habitat and water quality in the lower watershed.

Overall, the 2015 survey provided baseline data on anadromous movement within Wreck Pond during spring spawning migration. A total of 108 alewife were collected which could be indicative of a run. This number is approximately half of what was collected in 2006 and more than double the number collected in 2007. In comparison to results of the 2006, 2007 and 2014 spring sampling events which used the same survey methodology and gear, the 2015 spring survey further verified the continued presence and movement of alewife within Wreck Pond and most likely the unhindered inshore/offshore passage through the extended outfall. Even though results suggested a viable run for alewife, the stability of the population remains unclear. Further monitoring should be completed in order to better establish the long-term viability of the river herring run in the Wreck Pond Brook Watershed.

Figure 5. Number of alewife captured over time during sampling events, 2006 to 2014.



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Attachment 1

New Jersey Scientific Collections Permit

Date Issued: 03/17/15
MFA-SCP No.: 1531

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

Division of Fish and Wildlife
Mail Code 501-03
PO Box 420
Trenton, NJ 08625-0420
David Chanda, Director
njfishandwildlife.com
609-292-2965

03/17/15 to 12/31/015

SCIENTIFIC COLLECTING PERMIT

TO WHOM IT MAY CONCERN:

Under provisions of New Jersey Statutes Annotated Title 23:4-52, permission is hereby given to:

Captain Aleksandr C. Modjeski, American Littoral Society, 18 Hartshorne Drive, Highlands, NJ 07732 to conduct a Fish Inventory Study with emphasis on field monitoring of alewife and blueback herring in Wreck Pond, Monmouth County. Spring sampling, will be done from May 2nd to June 18th, will focus on adult migratory runs and collection will be done using a 15' deep, 4' high—modified fyke net (25' wings and 1" stretch mesh). There will also be a Fall sampling program, September - October to confirm presence of YOY herring and will use a 30' (1/4" nylon mesh bag seine with a 4'x4'x4' bag) and a 100' (1/4" nylon mesh bag seine with a 6'x6'x6' bag). Sampling will be done at various locations within the Wreck Pond Watershed. A small aluminum 12' skiff (Registration # NJ 8162HC)will be used to help deploy nets from the beach.

This permit is subject, but not limited to, the following conditions:

1. The person(s) named herein shall have this permit in their possession when collecting scientific specimens in marine, fresh, or estuarine waters of the State and must present it upon request to any official or citizen.

2. **The holder of this permit shall notify the Marine Law Enforcement Region Office of his/her scientific collecting activities in any of the State's marine, fresh, or estuarine waters at least 24 hours in advance of their activities. Notification can be made in writing to the Marine Enforcement Office, P.O. Box 418, Port Republic, NJ 08241, or by calling 609-748-2050.**

3. A **report** of the organisms collected (species, numbers, specific location where taken, dates of sampling) or a final report for the study for which the permit is requested shall be sent to the Administrator, Marine Fisheries, P.O. Box 400, Trenton, NJ 08625, within

four (4) weeks of the expiration date or upon request for permit renewal, whichever is earlier.

4. This permit does not authorize the collection of any species listed by the United States Government as endangered. Special provisions may apply for endangered species. It is the permittee's responsibility to obtain, from the United States Government, any required permits to interact with any Federally listed endangered species.

5. This permit does not convey the right to trespass.

6. Violation by the permittee or subsidiary permit holders of any condition of the permit or any state law or regulation promulgated pursuant to N.J.S.A. 23 or 50 or N.J.A.C. 7:25 or 7:25A shall render this permit null and void and subject all parties to prosecution in addition to permit revocation upon conviction. Applications for future permits may also be denied.

7. The holder of this Scientific Collecting Permit is also required to have in his/her possession a "Special Permit for Research" from the Division of Watershed Management, Bureau of Marine Water Monitoring, P.O. Box 405, Leeds Point, NJ 08220, prior to the taking of shellfish (clams, oysters, mussels) for scientific purposes from the marine or estuarine waters of the State that are designated "Prohibited," "Special Restricted," or "Seasonal Special Restricted" (N.J.S.A. 58:24-3, and N.J.A.C. 7:12-2). A chart of these designated waters may be obtained from the Bureau of Marine Water Monitoring or by visiting www.nj.gov/dep/wms/bmw.

Brandon Muffley

Brandon Muffley, Administrator
Marine Fisheries Administration

c: Capt. Dominick Fresco, Chief, Bureau of Law Enforcement-Marine Enforcement Region Office
Capt. Dennis Tully, NJ State Police-Marine Services Bureau
Deborah Watkins, Bureau of Marine Water Monitoring

Subsidiary Student or Employee Permit Holders:
Sheri Shifron
Katie Conrad
Jeff Derment
Jenna Krug
Quin Whitesall
Shane Godshall
Stevie Thorenson
Megan Molok

Attachment 2

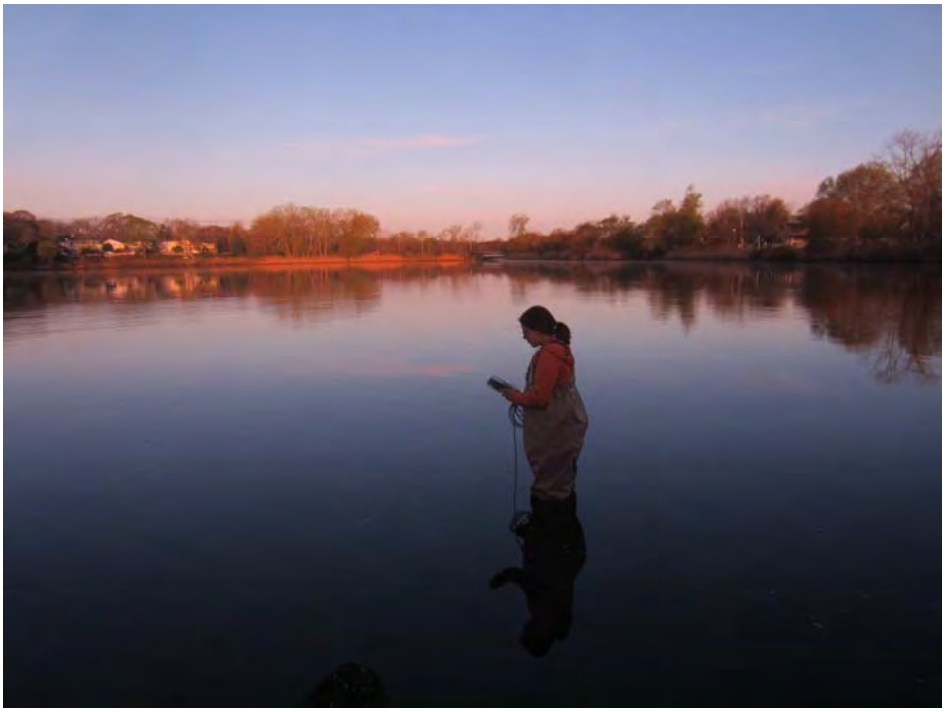
Photograph Log

APPENDIX B. 2015 Spring River Herring Survey Photographs

Checking the fyke net, May 2, 2015 0600. Photo credit-American Littoral Society.

Measuring an alewife, May 1, 2015 0600. Photo credit-Kathleen Devine.

Weighing the catch, May 2, 2015 0600. Photo credit-Thomas Yip.



Using the YSI Professional Series handheld multi-probe sonde to test water quality, May 3, 2015. Photo credit-American Littoral Society.

Collecting the catch, May 3, 2015. Photo credit-American Littoral Society.

Youth scientists assisting with measuring and weighing, May 16, 2015. Photo credit-American Littoral Society.

American eel caught on May 16, 2015. Photo credit-American Littoral Society.

Checking the net on May 17, 2015. Photo credit-American Littoral Society.

Attachment 3

Data Sheets

HERRING PROJECT DATA SHEET

Net set - event #1

✓ entered JK

Location: WP-RR Fyke Net Set | Field Crew: JK, KC, TL | Date: 5/1/15

Sample Number: ——— | Weather: Partly cloudy, breezy | Water Quality Taken (circle): (Y) N

Net Deployment Time: ~~10~~ 16:40 | Net Retrieval Time: ——— | Time Net Collecting: ———

Tides (time/ft) – Low: 12:14 / 0.3' | High (time/ft): 18:38 / 4.96' | Precipitation in Last 24 hrs (circle): Y (N)

Total Number of Species: ——— | Total Number of Individuals: ——— | T&E Species Collected (circle): ~~Y~~ ~~N~~

Data Recorder: Jenna Krug | Signature (team lead): [signature]

SPECIES	Total w/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES

WATER QUALITY: Time: 18:45 | Location/Depth: 40 cm | Recorders: JK, TL, KC | Equipment: YSI Prof Plus cal. 4/29

Air Temp. (°C): 11.2 | Water Temp. (°C): ~~17.5~~ 12.2 | Dissolved Oxygen (mg/L): 8.73 | Salinity (ppt): 1.28 | pH: 7.12 | Cond. (µS/cm): 25.11

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

HERRING PROJECT DATA SHEET

WP-YR Event Template

Alewives

V + entered JK

Location: Wf Bridge Fyke **Field Crew:** JK, AM, KC, KD, TL, JY **Date:** 5/2/15 (Am)

Sample Number: WP-150101 **Weather:** clear **Water Quality Taken (circle):** (Y) N

Net Deployment Time: 5/1 18:40 / 5/2 0730 **Net Retrieval Time:** 0635 **Time Net Collecting:** 11hr. 55min.

Tides (time/ft) – Low: 00:44 / 0.2 **High (time/ft):** 0653 / 5.1 **Precipitation in Last 24 hrs (circle):** Y (N)

Total Number of Species: 7 **Total Number of Individuals:** 55 **T&E Species Collected (circle):** Y (N)

Data Recorder: Kathleen Devine **Signature (team lead):**

Katy
Jenna
Thomas
Tom L
Dan

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
					L												
Alewife	10		24/26	170	L	24/26	177	L	24/27	1200	L	25/29	277	L	23/26	165	L
Alewife			26/29	253	L	23/29	130	L	26/30	251	L	25/28	192	L	27/30	257	L
W Perch	10		19/20	94	L	27/28	410	L	24/26	250	L	29/31	491	L	26/28	319	L
		L	25/26	302	L	15/16	60	L	16/17	74	L	15/15	68	L	24/26	247	L
Alewife	1		25/26	215	L												
striped killi			10	20	L												
Gizzard			36/40	776	L	32/36	491	L	50/56	1510	L	46/50	1650	L	46/49	1240	L
Gizzard			47/51	1560	L												
AMEEL			604	290	L												
Suckers			40/42	717	L	43/46	875	L	38/41	658	L	44/46	935	L	41/43	770	L
			38/40	610	L	41/43	840	L	37/39	800	L	37/40	700E	L	39/41	700E	
W Perch	10		31/33	600	L	34/36	720	Milk	19/20	111	L	32/33	590		14/15	46	
Common carp			17/18	82	L	25/27	309	L	34/36	1006 with eggs		28/30	361	Milk	24/26	242	
			48/52	2380	L	56/61	3210	L									

NOTES

Secc 38
T 13.6 c
D 50 c
Cond 757
DO 7.84
Sp 771 mg
Sal 0.4
ph 7.19

Amcel - 1
Alewife - 11, 12
WP - 20 32 38
Gizzard - 6
Common carp - 2 40
striped killi - 1 41
Suckers - 14 55

WATER QUALITY: Time: 6:30am **Location/Depth:** 50 **Recorders:** KD + AM **Equipment:** YSI proplus

Air Temp. (°C): 44° **Water Temp. (°C):** 13.6 **Dissolved Oxygen (mg/L):** 7.84 **Salinity (ppt):** .4 **pH:** 7.19 **Cond. (µS/cm):** 771

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

Thomas Nip

√ entered (TK)

HERRING PROJECT DATA SHEET

Location: WP Bridge Fyke **Field Crew:** JK, AM, KDL, KC, TK **Date:** 5/2/15 (AM)

Sample Number: WP150101 **Weather:** **Water Quality Taken (circle):** (Y) N

Net Deployment Time: **Net Retrieval Time:** see pg 1 **Time Net Collecting:**

Tides (time/ft) – Low: see pg 1 **High (time/ft):** **Precipitation in Last 24 hrs (circle):** Y N

Total Number of Species: 1 **Total Number of Individuals:** **T&E Species Collected (circle):** Y N

Data Recorder: **Signature (team lead):**

5/2 6AM

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
Sucker			41 43	~700		38 41	~700		38 41	~700		39 41	~700					

WATER QUALITY: Time: see pg 1 **Location/Depth:** **Recorders:** **Equipment:**

Air Temp. (°C): **Water Temp. (°C):** **Dissolved Oxygen (mg/L):** **Salinity (ppt):** **pH:** **Cond. (µS/cm):**

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

HERRING PROJECT DATA SHEET

V + entered JIC

Page 1 of 1

Location: WP RR Bridge Fyke **Field Crew:** JK, KC, TL, TY **Date:** 5/2/15 PM

Sample Number: WP150102 **Weather:** Sunny **Water Quality Taken (circle):** (Y) N

Net Deployment Time: ~~5/1~~ ~0930 **Net Retrieval Time:** 1830 **Time Net Collecting:** 11 hrs.

Tides (time/ft) – Low: 1254/0.2 rising @ 1840 **High (time/ft):** 1915/5.1 **Precipitation in Last 24 hrs (circle):** Y (N)

Total Number of Species: 1 **Total Number of Individuals:** 2 **T&E Species Collected (circle):** Y N

Data Recorder: KC/JK **Signature (team lead):**

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
Gizzard shad	[illegible]	2	36 41	804	L	38 41.5	1048	L										

search - 63 cm

WATER QUALITY: Time: 1825 **Location/Depth:** 50 cm **Recorders:** KC, JK **Equipment:** YSI ProPlus

Air Temp. (°C): 12 **Water Temp. (°C):** 19.8 **Dissolved Oxygen (mg/L):** 9.17 -100A **Salinity (ppt):** .94 **pH:** 6.75 **Cond. (µS/cm):** 19.70

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

HERRING PROJECT DATA SHEET

Watches (PM)

Location: WP RR Bridge Fyke **Field Crew:** JK, KC, TL, TY, KD **Date:** 5/3/15 (PM)
Sample Number: W.P150103 **Weather:** clear, cold **Water Quality Taken (circle):** (Y) N
Net Deployment Time: 5/2/15 1835 / 5/3/15 0805 **Net Retrieval Time:** 0635 **Time Net Collecting:** 12 Hrs
Tides (time/ft) – Low: 0127/0.11 **High (time/ft):** 0732/4.5 **Precipitation in Last 24 hrs (circle):** Y (N)
Total Number of Species: 9 **Total Number of Individuals:** 46L 6D **T&E Species Collected (circle):** Y (N)
Data Recorder: KD **Signature (team lead):**

Full moon
Clear night
46L
6D

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
Alewife			24/27	188	L	24/27	170	L	23.5/26	145	L	25/28.5	205	L	25/28	192	L	Secchi 62cm
		14	25/28	218	L	23/27	158	L	25/28	235	L	23/26	163	L	25/28	193	L	
			25/28	224	L	24/27	193	L	24/27	168	L	25/28	227	L				
Gizzard Shd			44/50	1850	L	46/51	1880	L	45/51	1860	L	40/45	1100	L	38/43	1050	L	
			38/44	960	L	39/44	1140	L	35/40	750	L	40/44	1060	L	38/43	990	L	
			40/45	1130	L	35/40	750	L										
Striped K Fi		2			D			D										
W. Perch			33/35	700	L	34/36	910	L	33/34	660	L	32/34	610	L	30/32	480	L	Lost W. Perch under 220
		20	36/37	320	L	31/32	550	L	25/26	330	L	30/31	440	L	24/25	240	L	
			25/26	260	L	26/25	270	L	22/23	190	L	25/26	260	L	24/25	260	L	
			19/20	120	L	20/21	120	L	19/20	120	L	17/18	70	L	18/19	100	L	
Y. Perch		1	28/29	270	L													
Sucker		3	37/40	670	L	36/39	560	L	37/39	600	L							
Silverside		4			D			D			D			D				

Carp otter? observed
several redwing bb
3 cormorant
4 duck
2 geese

WATER QUALITY: Time: 0625 **Location/Depth:** 50 cm **Recorders:** KC, JK, TL **Equipment:** Proplus
Air Temp. (°C): 42°F **Water Temp. (°C):** 14.3 **Dissolved Oxygen (mg/L):** 7.63/14 **Salinity (ppt):** .44 **pH:** 7.26 **Cond. (µS/cm):** 8.52

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

HERRING PROJECT DATA SHEET

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Location: WP RR Bridge Fyke Field Crew: JK, KC, TZ, TY, KD Date: 5/3/15 AM

Sample Number: WR150103 Weather: Water Quality Taken (circle): Y N see PS1

Net Deployment Time: Net Retrieval Time: Time Net Collecting:

Tides (time/ft) – Low: High (time/ft): Precipitation in Last 24 hrs (circle): Y N

Total Number of Species: Total Number of Individuals: T&E Species Collected (circle): Y N

Data Recorder: Signature (team lead):

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm)	FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm)	FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm)	FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm)	FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm)	FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
Brown Bullhead																							
BCatfish		4	31	460	L	29	330	L	28	280	L	26	300	L									
AEEL		5	59	448	L	50	420	L	65	550	L	67	700	L	45	400	L						

WATER QUALITY: Time: Location/Depth: Recorders: Equipment:

Air Temp. (°C): Water Temp. (°C): Dissolved Oxygen (mg/L): Salinity (ppt): pH: Cond. (µS/cm):

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

Volunteers (JK)

HERRING PROJECT DATA SHEET

Page 1 of 1

Location: WP RR Bridge Fyke **Field Crew:** JK, KC, LO, TY **Date:** 5/3/15 (DM)
Sample Number: NY150104 **Weather:** sunny, warm **Water Quality Taken (circle):** (Y) N
Net Deployment Time: 5/3 0925/5/3-1915 **Net Retrieval Time:** 1950 **Time Net Collecting:** 11 hrs. 25 min.
Tides (time/ft) – Low: 1334/0.2 **High (time/ft):** 1951/5.2 **Precipitation in Last 24 hrs (circle):** Y (N)
Total Number of Species: 2 + 1 turtle + 1 duck **Total Number of Individuals:** 4 (fish) **T&E Species Collected (circle):** Y (N)
Data Recorder: JK **Signature (team lead):**

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
painted turtle (photo)	1		25		L
striped killifish	3		73		L
silverside	1		105		D
mallards	4				

Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
75		L
75		L

NOTES: Secchi 59

WATER QUALITY: Time: 15:39 **Location/Depth:** 50 cm **Recorders:** LO, JK **Equipment:** Pro Plus
Air Temp. (°C): 18.5 **Water Temp. (°C):** 21.7 **Dissolved Oxygen (mg/L):** 9.04 93.6% **Salinity (ppt):** .51 **pH:** 7.07 **Cond. (µS/cm):** 1051

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

Entered (JK)

HERRING PROJECT DATA SHEET

Page 1 of 1

Location: WP AR Bridge Fyke **Field Crew:** JK, KC, KD, TL **Date:** 5/4/15 (AM)
Sample Number: WPIE0105 **Weather:** Clear **Water Quality Taken (circle):** (Y) N
Net Deployment Time: 5/3 1915 / 5/4 0720 **Net Retrieval Time:** 0615 **Time Net Collecting:** 11 hrs. 45 min.
Tides (time/ft) – Low: 0209/0.0 **High (time/ft):** 0809/4.5 **Precipitation in Last 24 hrs (circle):** Y (N)
Total Number of Species: ~~8~~ 7 **Total Number of Individuals:** 40 L/4 D **T&E Species Collected (circle):** Y (N)
Data Recorder: KD **Signature (team lead):**

40L
1 Barf + Dead
~~5 Species~~

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
Alewife		9	25/29	246	L	25/28	201	L	26/30	240	L	25/29	203	L	22/24	130	L	seen 70
			24/27	200	L	23/27	190	L	24/27	240	L	23/26	160					
																		wings full of debris
W. Perch			28/29	420	L	38/39	990	L	37/38	900	L	32/33	640	L	34/35	710	L	
			26/27	350	L	33/34	650	L	35/36	800	L	31/32	520	L	26/27	290	L	float line pulled under
		2	19/20	120	L	32/33	670	L	32/33	590	L	32/33	590	L	38/40	1040	L	
			26/27	300	L	20/21	120	L	19/20	120	L	31/33	550	L	19/20	100	L	tide going out
			17/18	80	L													
B. Shad		3	43/49	1590	L	41/46	1350	L	38/44	1000	L							
Silverside		4 Dead																
brown bullhead		1	~~28~~	300	L													1 sucker 1059
B Fish?, Eel Barf			10/11	8	D													
Eel		6	49	220														
Eel			~~60~~	920	L	~~56~~	410	L	~~64~~	580	L	~~52~~	330	L	~~56~~	400	L	

WATER QUALITY: Time: 0629 **Location/Depth:** 50 **Recorders:** JK, KC, KD **Equipment:** YSI Pro Plus
Air Temp. (°C): 50F **Water Temp. (°C):** 16.3 **Dissolved Oxygen (mg/L):** 7.01 / 71.4% **Salinity (ppt):** 0.58 **pH:** 7.84 **Cond. (µS/cm):** 1151

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

HERRING PROJECT DATA SHEET

Entered (JK)

Location: WP RR Bridge Fyke **Field Crew:** JK, AM, TL, PH, DH **Date:** 5/4/15 (PM)

Sample Number: WP150106 **Weather:** Sunny **Water Quality Taken (circle):** (Y) N

Net Deployment Time: 5/4 0720 / 1900 **Net Retrieval Time:** 1840 **Time Net Collecting:** 11hrs, 20min.

Tides (time/ft) – Low: 1413 / 0.7 **High (time/ft):** 2025 / 5.2 **Precipitation in Last 24 hrs (circle):** Y (N)

Total Number of Species: 3 **Total Number of Individuals:** 3 **T&E Species Collected (circle):** Y (N)

Data Recorder: JK **Signature (team lead):**

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
Gizzard shad	1		40 44	1190	L													
White sucker	1		36 39	540	L													Secchi 33cm
MUMMICHOG	1		8 8	8	L													

WATER QUALITY: Time: 18:10 **Location/Depth:** 50 cm **Recorders:** JK, TL **Equipment:** YSI, Pro Plus

Air Temp. (°C): 77°F **Water Temp. (°C):** 22.5 **Dissolved Oxygen (mg/L):** 7.86/91.5 **Salinity (ppt):** .18 **pH:** 6.95 **Cond. (µS/cm):** 383.2

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

HERRING PROJECT DATA SHEET

Event #1 Net Pull

Transferred (JC)

Page 1 of 1

Location: WPBR Bridge fyke **Field Crew:** JK, AM, MM **Date:** 5/5/15 (AM)

Sample Number: WP150107 **Weather:** clear **Water Quality Taken (circle):** (Y) N

Net Deployment Time: 5/4/15 pm 1900 **Net Retrieval Time:** 0615 **Time Net Collecting:** 11 hrs. 15 mins.

Tides (time/ft) – Low: 0750 / -0.1 **High (time/ft):** 0847 / 4.5 **Precipitation in Last 24 hrs (circle):** Y (N)

Total Number of Species: 9 + 1 crab **Total Number of Individuals:** 41 + 1 crab **T&E Species Collected (circle):** Y (N)

Data Recorder: MM **Signature (team lead):**

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
Alewife		(5)	24 28	190	L	25 29	140	L	24 28	190	L	26 30	290	L	25 29	230	L	
Common Carp	1	(1)	65 69	6160	L													
White Perch		(15)	19 20	120	L	24 25	250	L	36 38	900	L	36 38	870	L	33 35	650	L	
↓			35 36	790	L	33 35	7100	L	26 27	320	L	25 26	290	L	20 21	150	L	
			20 21	130	L	17 18	70	L	17 18	100	L	19 20	120	L	17 18	70	L	
W. Sucker		(4)	38 41	710	L	41 44	790	L	37 40	560	L	44 45	900	L				
B. Shad		(2) +6 juv	41 46	1470	L	44 50	1470	L										
B. Bullhead		(1)	26	250	L													
Mummichog		(1)	10	20	L													
Silverside		(3)	13		D	13		D	12		D							40s weight all 3
B. Crab	male	(1)	4	10	L													
Eel		(3)	50	190	L	40	140	L	101	140	L							

1 OS: (6) (all same size) Grass Shad

WATER QUALITY: Time: 1208 **Location/Depth:** 55 cm (Secchi 44 cm) **Recorders:** JK, MM **Equipment:** YSI Pro Plus

Air Temp. (°C): 16.6 **Water Temp. (°C):** 17.1 **Dissolved Oxygen (mg/L):** 6.53 / 108.2% **Salinity (ppt):** .75 **pH:** 7.40 **Cond. (µS/cm):** 1544

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

HERRING PROJECT DATA SHEET

entered ✓ (JK) | Event #2 Net set

Page 1 of 1

Location: WP RR Fyke Net | Field Crew: JK, TL | Date: 5/15/15 (PM)

Sample Number: [redacted] | Weather: overcast, wind 3 W | Water Quality Taken (circle): (Y) N

Net Deployment Time: 1845 | Net Retrieval Time: — | Time Net Collecting: —

Tides (time/ft) – Low: 1133 / -0.3' | High (time/ft): 1754 / 5.6' | Precipitation in Last 24 hrs (circle): Y (N)

Total Number of Species: — | Total Number of Individuals: — | T&E Species Collected (circle): ~~Y~~ N

Data Recorder: TL | Signature (team lead): [signature]

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
																		Secchi 4/8cm salinity - 3.3@25cm 1.35 surface 9.2 Bottom

WATER QUALITY: Time: 1823 | Location/Depth: 50cm | Recorders: TL, JK | Equipment: YSI Proplus cal. 5/13/15

Air Temp. (°C): 64 | Water Temp. (°C): 12.7 | Dissolved Oxygen (mg/L): 7.95/93.8 | Salinity (ppt): 1.35 surface | pH: 7.10 | Cond. (µS/cm): 47.20

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

9.2 Bottom

HERRING PROJECT DATA SHEET

entered ✓ JK

Page 1 of 1

Location: WP RR Fyke **Field Crew:** JK, PVH, RC (Ruby Colman) **Date:** 5/16/15 AM

Sample Number: WP150201 **Weather:** Pt'ly cloudy / no wind **Water Quality Taken (circle):** (Y) N

Net Deployment Time: 5/15-1845 / 5/16-0740 **Net Retrieval Time:** 0630 **Time Net Collecting:** 11:45

Tides (time/ft) – Low: 0109 / 0.5 **High (time/ft):** 0713 / 5.2 **Precipitation in Last 24 hrs (circle):** Y (N)

Total Number of Species: (8) **Total Number of Individuals:** (20) **T&E Species Collected (circle):** Y N

Data Recorder: RC **Signature (team lead):**

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
Alewife		4	24 28	160	L	26 29	220	L	27 30	240	L	25 28	190	L			
White sucker		4	36 39	610	L	41 45	930	L	38 42	680	L	27 29	240	L			
White perch		1	32 34	680	L	19 20	90	L									
Common carp		1	46 53	1726	L												
Pumpkinseed		2	12 13	40	L	13 14	50	L									
Golden shiner		2	9 10	10	L	10 11	11	L									
Banded killifish + Minnet		1	9	9	L												
Banded killifish + Minnet		3	10	11	L	8	6	L	10	11	L						
American Eel		2	60	590	L	54	340	L									

NOTES

secchi (cm) – 50

salinity surface – 1.81
bottom – 7.24

3rd & 4th Alewife + 2nd white perch caught while measuring others

Set net: 7:40 AM

WATER QUALITY: Time: 6:09 **Location/Depth:** 50 CM **Recorders:** JK + PVH **Equipment:** YSI Pro Plus

Air Temp. (°C): 15.5 **Water Temp. (°C):** 19.0 **Dissolved Oxygen (mg/L):** 5.34 / 58.5% **Salinity (ppt):** 2.89 **pH:** 7.42 **Cond. (µS/cm):** 5,356

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

HERRING PROJECT DATA SHEET

✓ entered JK

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Location: WP RR Fylke
Sample Number: WP150202
Net Deployment Time: 5/16 0740 / 1845
Tides (time/ft) – Low: 13:14 / 0.5
Total Number of Species: (4) +1 crabs
Data Recorder: SS

Field Crew: JK, SS, EB + Fam
Weather: overcast, BS (1) E
Net Retrieval Time: 18:20
High (time/ft): 19:34 / 6.0
Total Number of Individuals: (5) +1 crabs
Signature (team lead):

Date: 5/16/15 (PM)
Water Quality Taken (circle): (Y) N
Time Net Collecting: 10:40
Precipitation in Last 24 hrs (circle): (Y) N 0.05"
T&E Species Collected (circle): Y (N)

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
Blue Crab			8	40	L/M													secchi – 48cm
Yellow perch			21 / 22	130	L													
Banded killifish			9	5	D													salinity – surface – 1.42 Bottom – 7.65
Pumpkin seed sunfish			11	16.5	40	L												
American eel			~50	—	L	~30	—	L										(2) Am. eels lost through net, est. length

WATER QUALITY: Time: 18:11 Location/Depth: 50 cm Recorders: JK, SS Equipment: YSI Pro Plus

Air Temp. (°C): 69°F Water Temp. (°C): 23.1 Dissolved Oxygen (mg/L): 6.91 / 87% Salinity (ppt): 2.48 pH: 7.58 Cond. (µS/cm): 3806

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

HERRING PROJECT DATA SHEET

✓ + entered (JK)

Location: WP Rd Rn Fyke (mr Rd)
Field Crew: Jenna, Meg, Tom, Charlie
Date: 5/17/15 (AM)

Sample Number: WP150203
Weather: cloudy, 8C
Water Quality Taken (circle): (Y) N

Net Deployment Time: 5/16/15-1845 / 5/17-0745
Net Retrieval Time: 5/17/15 06:40
Time Net Collecting: 11:55

Tides (time/ft) – Low: 0109/-0.6
High (time/ft): 07:13/5.1
Precipitation in Last 24 hrs (circle): (Y) N 0.29"

Total Number of Species: 6
Total Number of Individuals: 33
T&E Species Collected (circle): Y (N)

Data Recorder: Charlie
Signature (team lead):

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
Alewife	110	(1)	22/25	110	L													
White Perch		(8)	35/37	850	L	33/35	700	L	31/33	560	M/L	29/31	430	M/L	24/26	210	L	Surf: Sal → 0.57
White Perch			23/25	250	L	22/23	210	L	19/20	130	L							Bot: sal → 0.79
Golden Shiner		(13) 17	15/17	55	L	9/10	13	L	10/11	12	L	10/11	15	L	10/11	13	L	
Golden Shiner			9/10	40	L	9/10	11	L	9/10	11	L	10/11	15	L	9/10	10	L	
Golden Shiner			9/10	8	L	9/10	10	L	8/9	8	L							
American Eel		(4)	50TL	Bled	L	60TL	N/A	L	40TL	N/A	L	~50TL	L	L				
White Sucker		(4)	38/41	760	L	32/36	430	L	30/32	310	L	29/32	350	L				
Pumpkinseed		(3)	14/15	60	L	9/9	13	L	7/7	6	L							

Secchi: 43 cm

WATER QUALITY: Time: 06:28 **Location/Depth:** SD **Recorders:** JK, MM **Equipment:** YSI Pro Plus

Air Temp. (°C): 68°F **Water Temp. (°C):** 19.5 **Dissolved Oxygen (mg/L):** 6.07 / 66.4 **Salinity (ppt):** 0.65 **pH:** 7.29 **Cond. (µS/cm):** 1289

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

HERRING PROJECT DATA SHEET

√ entered (JT)

Page 1 of 1

Location: WP RR Fyke
Sample Number: WP150204
Net Deployment Time: 5/17 - 0745 / 5/17 - 1845
Tides (time/ft) – Low: 12:24 / -0.5
Total Number of Species: 3
Data Recorder: TY

Field Crew: JK, TL, KC, TY, LO
Weather: Sunny, slight breeze (1)
Net Retrieval Time: 1835
High (time/ft): 18:46 / 5.9
Total Number of Individuals: 4
Signature (team lead):

Date: 5/17/15 (PM) - New moon
Water Quality Taken (circle): (Y) N
Time Net Collecting: 10:55
Precipitation in Last 24 hrs (circle): (Y) N 0.29"
T&E Species Collected (circle): Y N

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
glimpse shad		1	40 46	1020	L
yellow perch		2	18 19	60	L
yellow perch			19 20	90	L
banded killifish		1	8.5	7	L

NOTES

Secchi disk: 56 cm

Salinity (ppt): Surface 0.56 Bottom 1.87

WATER QUALITY: Time: 1828 Location/Depth: 50 cm Recorders: LO, JK, TL Equipment: YSI Pro plus

Air Temp. (°C): 73°F Water Temp. (°C): 26.7 Dissolved Oxygen (mg/L): 6.41 / 81.5% Salinity (ppt): 0.91 pH: 7.10 Cond. (µS/cm): 1715

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

HERRING PROJECT DATA SHEET

Jt entered (JK)

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Location: WP RR Fyke **Field Crew:** JK, TL, KC **Date:** 5/18/15 (AM)

Sample Number: WP150205 **Weather:** cloudy, windy **Water Quality Taken (circle):** (Y) N

Net Deployment Time: 5/17-18:35 / 5/19-0725 **Net Retrieval Time:** 0615 **Time Net Collecting:** 11:40

Tides (time/ft) – Low: 08:00 / -0.7 **High (time/ft):** 0903 / 5.1 **Precipitation in Last 24 hrs (circle):** (Y) N

Total Number of Species: 8 **Total Number of Individuals:** 41 **T&E Species Collected (circle):** Y (N)

Data Recorder: Katie Conrad **Signature (team lead):**

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
alewife		(4)	37 41	940	L	35 39	790	L	34 37	770	L	32 35	710	L				Secchi 1.56m
white perch		(29)	34 36	580	L/ML	29 31	420	L	33 35	590	L/ML	31 33	510	L	27 29	360	L	Bi Salinity 0.99
"			23 25	250	L	31 33	520	L	33 35	620	L/ML	33 35	670	L/ML	23 25	590	L	Surf. 0.69
"			16 19	100	L	19 20	100	L	29 30	480	L	23 25	230	L	25 27	300	L	
white sucker		(1)	33 33	380	L										16 17	60	L	eel barf bowfin killifish
brown bullhead		(1)	29	310	L													
pumpkinseed sunfish		(2)	14 14.5	60	L	14 14	40	L										
Common carp		(1)	41 46	1070	L													
gizzard shad		(7)	38 44	970	L/ML	39 45	1200	L	33 40	830	L	36 41	740	L	31 35	470	FD/M	
"			33 38	540	L	37 42	840	L										
eel-American		(5)	49	250	L	62	550	L	55	330	L	64	550	L	65	470	D	

WATER QUALITY: Time: 06:05 **Location/Depth:** 5' **Recorders:** JK, TL, KC **Equipment:** YSI Pro Plus

Air Temp. (°C): 68°F **Water Temp. (°C):** 22.6 **Dissolved Oxygen (mg/L):** 6.6 / 5.5 **Salinity (ppt):** .18 **pH:** 7.07 **Cond. (µS/cm):** 18.63

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

HERRING PROJECT DATA SHEET

Stuntered (JK)

Page 1 **of** 1

Location: WP RR A/KE
Field Crew: JK, AM, TL
Date: 5/18/15 (PM)
Sample Number: WP150206
Weather: drizzle, 45°
Water Quality Taken (circle): (Y) N
Net Deployment Time: 5/18 07:25 /5/18 - 1830
Net Retrieval Time: 19:15
Time Net Collecting: 10:55
Tides (time/ft) – Low: 14:03/-0.5
High (time/ft): 20:21/5.9
Precipitation in Last 24 hrs (circle): (Y) N
Total Number of Species: (2)
Total Number of Individuals: (5)
T&E Species Collected (circle): Y (N)
Data Recorder: JK
Signature (team lead): [illegible]

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
Pumpkinseed		(4)	— 15	67	L	— 11	34	L	— 7	9	L	— 7	10	L			
banded killifish		(1)	— 11	12	L												

NOTES

secchi - 39 cm

B Sal 1.01
S Sal / 0.94

WATER QUALITY: Time: 1804 **Location/Depth:** 50 **Recorders:** JK, TL **Equipment:** YSI Pro Plus
Air Temp. (°C): 57°F **Water Temp. (°C):** 19.8 **Dissolved Oxygen (mg/L):** 6.77 74.3 **Salinity (ppt):** .95 **pH:** 7.05 **Cond. (µS/cm):** 1851

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK

HERRING PROJECT DATA SHEET

Event #2 PULL

reinforced

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Location: WP RR Fyke **Field Crew:** JK, AM, SS **Date:** 5/19/15 (AM)

Sample Number: WP150219 **Weather:** overcast, no wind **Water Quality Taken (circle):** (Y) N

Net Deployment Time: 5/18-1830 **Net Retrieval Time:** 06:15 **Time Net Collecting:** 11:45

Tides (time/ft) – Low: 0245/-0.6 **High (time/ft):** 0853/5.0 **Precipitation in Last 24 hrs (circle):** (Y) N 6.05"

Total Number of Species: 5+1 crab **Total Number of Individuals:** 73+ zeroes **T&E Species Collected (circle):** Y (N)

Data Recorder: SS **Signature (team lead):**

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
Alewife		(43)	22/25	175	L	25/28	199	L	24/28	155	L	24/27	190	L	23/27	160	L	salinity surface - 0.45
Alewife			25/28	190	L	24/28	190	L	24/28	230	L	24/28	170	L	24/27	190	L	bottom - 1.40
Alewife			24/28	210	L	24/28	190	L	25/29	190	L	22/26	170	L	26/30	250	L	
White perch		(18)	37/39	980	L	25/27	300	L	18/19	100	L	18/19	90	L	17/18	70	L	
White perch			19/19	100	L	18/19	90	L	17/18	90	L	19/20	130	L				secchi - 50cm
White sucker		(6)	29/31	320	L	39/43	770	L	37/41	630	L	38/41	720	L	35/38	620	L	
Pumpkin seed		(4)	13/14	70	L	14/15	80	L	12/13	40	L	12/13	50	L				
Alewife			23/27	170	L	25/29	240	L	22/25	170	L	23/27	160	L	23/27	160	L	
Alewife			24/28	180	L	23/27	180	L	24/28	180	L	25/29	230	L	25/29	200	L	
Alewife			25/29	250	L	24/28	180	L	25/29	180	L	23/27	130	L	23/27	200	L	
Alewife			25/28	200	L	24/28	200	L	24/28	210	L	23/27	170	L	24/28	140	L	
Alewife			26/29	230	L	23/27	160	L	24/28	190	L	24/28	190	L	24/27	150	L	
White perch			26/27	310	L	29/31	400	L	18/19	100	L	18/19	190	L	17/18	80	L	
White sucker			35/39	540	L													
Alewife			23/26	150	L	23/26	150	L	25/28	190	L							

WATER QUALITY: Time: 0603 **Location/Depth:** 50cm **Recorders:** JK, SS **Equipment:** YSI ProPlus

Air Temp. (°C): 68°F **Water Temp. (°C):** 17.8 **Dissolved Oxygen (mg/L):** 5.67/60.2 **Salinity (ppt):** 1.25 **pH:** 7.04 **Cond. (µS/cm):** 2515

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

Event # 2 pull

J+ entered

HERRING PROJECT DATA SHEET

Location: WP RR Fyke **Field Crew:** JK, AM, SS **Date:** 5/19/15

Sample Number: WP150207 **Weather:** overcast, no wind **Water Quality Taken (circle):** (Y) N

Net Deployment Time: — **Net Retrieval Time:** 06:15 **Time Net Collecting:** —

Tides (time/ft) – Low: — **High (time/ft):** — **Precipitation in Last 24 hrs (circle):** (Y) N

Total Number of Species: — **Total Number of Individuals:** — **T&E Species Collected (circle):** (Y) N

Data Recorder: SS **Signature (team lead):** [signature]

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
white perch			33 35	580	L	22 23	170	L	17 18	90	L	17 18	90	L				salinity surface – 0.45 bottom – 1.40
american eel		(2)	55	weight	L	60	weight	L										secchi – 50cm
blue crab		(2)	11	70	L/M	12	90	L/M										

WATER QUALITY: Time: 0603 **Location/Depth:** 50cm **Recorders:** JK, SS **Equipment:** YSI ProPlus

Air Temp. (°C): — **Water Temp. (°C):** 17.8 **Dissolved Oxygen (mg/L):** 5.67/602 **Salinity (ppt):** 1.25 **pH:** 7.04 **Cond. (µS/cm):** 2515

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

HERRING PROJECT DATA SHEET

Event # 3
Net Set

Jt entered (JK)

Location: WP AR Fyke
Field Crew: JK, KC, JW, KL, RL
Date: 5/31/15 (PM)
Sample Number: —— Netset
Weather: sunny, BS-1
Water Quality Taken (circle): (Y) N
Net Deployment Time: 1900
Net Retrieval Time: ——
Time Net Collecting: ——
Tides (time/ft) – Low: 12:17 / 0.3'
High (time/ft): 18:41 / 5.2'
Precipitation in Last 24 hrs (circle): Y (N)
Total Number of Species: ——
Total Number of Individuals: ——
T&E Species Collected (circle): Y (N)
Data Recorder: JK/RL
Signature (team lead): [signature]

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
																		Secchi – 32 cm
																		Salinity
																		Surface .03
																		Bottom .04
																		CAL 5/29/15

WATER QUALITY: Time: 1830 Location/Depth: 50 CM Recorders: JK - RL Equipment: YSI Pro+
Air Temp. (°C): 21.4 Water Temp. (°C): 28.6 Dissolved Oxygen (mg/L): 7.91 / 103.8 % Salinity (ppt): .03 pH: 7.49 Cond. (µS/cm): 77.4

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

HERRING PROJECT DATA SHEET

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√ tentered (JR)

Location: WP RR Fyke Net **Field Crew:** JK, AM, JW, KC **Date:** 6/1/15 (AM)

Sample Number: WP150301 **Weather:** overcast, drizzle (BS #1) **Water Quality Taken (circle):** (Y) N

Net Deployment Time: 5/31-1900 / 6/1-0700 **Net Retrieval Time:** 6/1 - 6:15 **Time Net Collecting:** 11:15

Tides (time/ft) – Low: 12:59 / 0.2 **High (time/ft):** 7:01 / 4.4 **Precipitation in Last 24 hrs (circle):** (Y) N

Total Number of Species: (6) + 1 crab **Total Number of Individuals:** [illegible] + 4 crabs **T&E Species Collected (circle):** Y (N)

Data Recorder: Katie Conrad **Signature (team lead):** [signature]

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
alewife	[illegible]	(2)	24 / 28	190	L	23 / 26	140	L										1 eel lost same size
white perch		(2)	33 / 35	630	L	29 / 30	400	L										
gizzard shad		(5)	37 / 42	720	L	42 / 48	1440	L	33 / 36	530	L	44 / 50	1440	L	39 / 42	1270	L	cataracts
american eel		(1)	— / 61	530	L	— / —	—	L → escaped										injured tail
brown bullhead		(4)	— / 26	210	L	— / 29	390	L	— / 28	380	L	— / 31	610	L				
pumpkinseed sunfish		(10) (5)	— / 14	60	L	— / 13	37	L	— / 9	19	L	— / 9	10	L	— / 9	10	L	
blue crab		(4)	Male / 11	110	L	M / 12	90	L	M / 12	110	L	M / 7	35	L				weight est. - scale not working
pumpkinseed sunfish		(5)	— / 9	10	L	— / 8	8	L	— / 8	8	L	— / 9	10	L	— / 8	8	L	

Notes: secchi - 40cm; surface salinity - 0.04; bottom salinity - 0.04

WATER QUALITY: Time: 6:15 **Location/Depth:** 55 cm **Recorders:** GW / JK **Equipment:** YSI ProPlus

Air Temp. (°C): 19.1 **Water Temp. (°C):** 21.4 **Dissolved Oxygen (mg/L):** 6.19 / 68.9% **Salinity (ppt):** 0.04 **pH:** 6.95 **Cond. (µS/cm):** 85.0

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

√ entered (JK)

HERRING PROJECT DATA SHEET

Location: WP BR Fyke **Field Crew:** JK, Toriann, TD, JW, Kathy + Rich **Date:** 6/1/15 (PM)

Sample Number: WP150302 **Weather:** drizzle, cloudy, norwind **Water Quality Taken (circle):** (Y) N

Net Deployment Time: 07:00(AM) / 1855(PM) **Net Retrieval Time:** 1815 **Time Net Collecting:** 11:15

Tides (time/ft) – Low: 13:00/0.3 **High (time/ft):** 19:20/5.3 **Precipitation in Last 24 hrs (circle):** (Y) N

Total Number of Species: (5) **Total Number of Individuals:** (27) **T&E Species Collected (circle):** Y (N)

Data Recorder: Rich Lucas **Signature (team lead):** [signature]

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
white sucker		(4)	34 / 36	530	L	35 / 38	550	L	25 / 27	200	L	25 / 27	200	L			
white PERCH		(2)	20 / 21	120	L	18 / 19	100	L									
BROWN BULLHD		(3)	— / 30	400	L	— / 29	350	L	— / 29	350	L						
PUMKIN SEED			~~13~~ / 14	50	L	— / 8	11	L	— / 9	13	L	— / 8	12	L	— / 8	12	L
PUMKIN SEED			— / 8	12	L	— / 9	13	L	— / 8	12	L	— / 7	8	L	— / 7	8	L
PUMKIN SEED		(13)	— / 6	5	L	— / 6	5	L	— / 7	6	L	—					
~~Blue~~ photo	sunfish	(5)	— / 8	9	L	— / 7	5	L	— / 6	5	L	— / 6	5	L	— / 6	4	L

NOTES

Secchi 39 CM

Surface 0.04

Bottom 0.04

Wood post broke rotted in half - rigged to metal sign for night

WATER QUALITY: Time: 807 PM **Location/Depth:** 50 CM **Recorders:** YPRo + RLJK **Equipment:** #6 YSI Pro Plus

Air Temp. (°C): 16.7 **Water Temp. (°C):** 20.5 **Dissolved Oxygen (mg/L):** 5.67 / 61.8 **Salinity (ppt):** 0.04 **pH:** 6.11 **Cond. (µS/cm):** 90.8

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

Stentered (JK)

HERRING PROJECT DATA SHEET

Location: WP RR Fyke **Field Crew:** JK, AS, JW **Date:** 6/2/15 (AM)

Sample Number: WP150303 **Weather:** overcast, cloudy drizzle **Water Quality Taken (circle):** (Y) N

Net Deployment Time: 1855 (PM) / 0740 (AM) **Net Retrieval Time:** 06:15 **Time Net Collecting:** 11:20

Tides (time/ft) – Low: 01:49 / 0.0 **High (time/ft):** 07:43 / 4.5 **Precipitation in Last 24 hrs (circle):** (Y) N

Total Number of Species: 9 + 1 crab sp. **Total Number of Individuals:** 44 + 9 crabs **T&E Species Collected (circle):** Y (N)

Data Recorder: Jen Worringer **Signature (team lead):** [signature]

SPECIES	Total w/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
alewife		5	24/27	200	L	22/25	120	L	26/29	220	L	22/25	130	L (I1)	23/26	150	L	secchi – 52 cm
alewife		3	26/29	290	L	24/28	180	L	24/28	170	D							I1 = injured – chunk taken out of back.
white perch		5	32/34	640	L	33/35	670	L	29/30	440	L	33/35	650	L	27/28	310	L	
white perch		5	24/25	230	L	23/24	230	L	23/24	180	L	20/21	130	L	20/21	140	L	salinity – .04
white perch		5	18/19	90	L	20/21	130	L	32/34	620	L	26/27	340	L	24/25	180	L	bottom – .04
yellow perch		2	25/26	210	L	27/28	310	L										surface – .04
white perch		5	22/23	210	L	23/24	170	L	23/24	190	L	19/20	70	L	18/19	70	L	
white perch		2	18/19	50	L	15/16	60	L										
common carp		2	46/52	1760	L	46/53	2100	L										
brown bullhead		2	≈30 lost	lost	L	28	280	L										
white sucker		2	41/45	920	L	38/41	scales lost	L										scales not working – wet?
pumpkin seed		1	13	?	L													
golden shiner		1	9/10	?	L													
american eel		4	54	?	L	61	?	L	≈50 [illegible]	[illegible]	L	41	?	L				
blue crab		9	8	?	L/M	10	?	L/M	5	?	L/M	4	[illegible]	L/M	6	—	L/M	

L/M-7, L/M-4, L/M-6, L/M-6

WATER QUALITY: Time: 6:04 **Location/Depth:** 50 **Recorders:** JK, AS, JW **Equipment:** YSI Pro plus

Air Temp. (°C): 12.6 **Water Temp. (°C):** 16.7 **Dissolved Oxygen (mg/L):** 6.70 / 68.8% **Salinity (ppt):** .04 **pH:** 6.74 **Cond. (µS/cm):** 80.5

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

HERRING PROJECT DATA SHEET

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Intertidal (JK)

Location: WP RR Fyke **Field Crew:** JK, TK, JW, LO **Date:** 6/2/15 (PM)
Sample Number: WP150304 **Weather:** overcast, drizzle, no wind **Water Quality Taken (circle):** (Y) N
Net Deployment Time: 07:40 / 18:20 **Net Retrieval Time:** 18:15 **Time Net Collecting:** 10:35
Tides (time/ft) – Low: 13:44 / 0.2 **High (time/ft):** 19:59 / 5.04 **Precipitation in Last 24 hrs (circle):** (Y) N
Total Number of Species: (3) **Total Number of Individuals:** (22) **T&E Species Collected (circle):** Y (N)
Data Recorder: JW **Signature (team lead):**

SPECIES	Total w/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
white perch		(1)	22 / 24	190	L													
pumpkinseed		(19)	~~7~~ head only		D	~~12~~ 12.5	60	L	~~—~~ 14	64	L	~~—~~ 12.5	45	mangled tail L	~~—~~ 12	39	L	
pumpkinseed			~~13~~	46	L	~~—~~ 10	20	L	~~—~~ 10	19	L	~~—~~ 9	14	L	~~—~~ 8	11	L	
pumpkinseed			~~—~~ 85	11	L	~~—~~ 8	11	L	~~—~~ 8	9	L	~~—~~ 8.9 escapee	—	L	~~—~~ 10	21	L	
blue gill		(2)	~~—~~ 7	6	L	~~—~~ 9	14	L	~~—~~ 8	9	L	~~—~~ 8 escapee		L	~~—~~ 8	10	L	
			~~—~~ 7	6	L	↑	pumpkinseed ↑											secchi - 38.5 cm
																		surface: 0.04
																		bottom: 0.04

WATER QUALITY: Time: 18:07 **Location/Depth:** 55cm **Recorders:** JW / JK **Equipment:** YSI ProPlus
Air Temp. (°C): 14.2 **Water Temp. (°C):** 16.9 **Dissolved Oxygen (mg/L):** 6.67 / 68.7% **Salinity (ppt):** 0.04 **pH:** 6.78 **Cond. (µS/cm):** 77.5

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

Herring Data Collection Form – American Littoral Society; 18 Hartshorne Dr. Highlands, NJ 07732 (732)-291-0055

V+ entered (JK)

HERRING PROJECT DATA SHEET

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Location: WP BA Fyke **Field Crew:** JK, AM, KD **Date:** 6/3/15 (Am)
Sample Number: WP150305 **Weather:** overcast, DS-2 **Water Quality Taken (circle):** (Y) N
Net Deployment Time: 06:45 (10:30) **Net Retrieval Time:** 6:15AM **Time Net Collecting:** 11:55
Tides (time/ft) – Low: 02:29/0.2' **High (time/ft):** 08:25/4.5' **Precipitation in Last 24 hrs (circle):** (Y) N
Total Number of Species: 9+1 crab **Total Number of Individuals:** 19+1 crab **T&E Species Collected (circle):** Y (N)
Data Recorder: K. Devine **Signature (team lead):**

SPECIES	Total w/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
Alewife		1	24/28	120	L												
BC Crab		1	6	20	Male												
W Perch		5	27/28	328	L	30/32	315	L/M	26/27	285	L	25/26	245	L	15/16	50	D
Am. Eel		4	60	-	L	45	-	L	57	-	L	50	-	L			
common CARP		1	45 (257)	6930	L	2											
GIZZARD		1	41/47	1160	L												
Brown Bullhead		2	29	450	L	26	410	L									
W Sucker		1	27/29	380	L												
Pumpkin seed		3	13	53	L	12	37	L	9	16	L						
BLUE Gill		1	8	8	L												

NOTES

secchi - @60cm

salinity -
surface - 0.03
bottom - 0.03
15.1 temp A2

Eel Barf:
Banded Killi (5)
Golden Shiner (2)

WATER QUALITY: Time: 05:59 **Location/Depth:** 55 cm **Recorders:** AM/JK **Equipment:** YSI Pro Plus
Air Temp. (°C): 12.6 (64°F) **Water Temp. (°C):** 15.0 **Dissolved Oxygen (mg/L):** 7.03/69.8 **Salinity (ppt):** .03 **pH:** 6.67 **Cond. (µS/cm):** 72.5

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

HERRING PROJECT DATA SHEET

V+ entered (JC)

Location: WP RR Fyke **Field Crew:** JK, KC, TK, LO **Date:** 6/3/15 (PM)

Sample Number: WP150306 **Weather:** overcast, Ø wind **Water Quality Taken (circle):** (Y) N

Net Deployment Time: 18:25 / 06:45 **Net Retrieval Time:** 18:15 **Time Net Collecting:** 11:30

Tides (time/ft) – Low: 14:28 / 0.2' **High (time/ft):** 20:39 / 5.5' **Precipitation in Last 24 hrs (circle):** (Y) N

Total Number of Species: 6 + 1 crab **Total Number of Individuals:** 17 + 2 crabs **T&E Species Collected (circle):** Y (N)

Data Recorder: TK **Signature (team lead):**

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
White perch		2	18 / 18.5	50	D
White sucker		5	39.5 / 42	810	L
Blue crab		2	13 J	110	L/M
Gizzard shad		1	45 / 51.5	1,800	L
yellow perch		1	17.5 / 18.5	80	L
Pumpkin seed sunfish		7	15.5 / 16	80	L
Pumpkin seed sunfish			8 / 8.5	10	L
American eel		1	56 J	360	L

SPECIES	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
White perch	23.5 / 24	160	L
White sucker	38.5 / 41.5	700	L
Blue crab	7 J	?	L/M
Gizzard shad			
yellow perch			
Pumpkin seed sunfish	11.5 / 12	40	L
Pumpkin seed sunfish	8 / 8	10	L
American eel			

SPECIES	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
White perch			
White sucker	20.5 / 31	280	L
Blue crab			
Gizzard shad			
yellow perch			
Pumpkin seed sunfish	11.5 / 12	52	L
Pumpkin seed sunfish			
American eel			

SPECIES	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
White perch			
White sucker	40 / 41.5	720	L
Blue crab			
Gizzard shad			
yellow perch			
Pumpkin seed sunfish	11.5 / 12	50	L
Pumpkin seed sunfish			
American eel			

SPECIES	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
White perch			
White sucker	40 / 43	810	L
Blue crab			
Gizzard shad			
yellow perch			
Pumpkin seed sunfish	9 / 9.5	20	L
Pumpkin seed sunfish			
American eel			

NOTES

Bottom salinity: 0.2
Surface salinity: 0.19
Secchi: 52 cm

WATER QUALITY: Time: 18:06 **Location/Depth:** 55cm **Recorders:** TK, LO **Equipment:** YSI Pro Plus

Air Temp. (°C): 16.1 **Water Temp. (°C):** 19.4 **Dissolved Oxygen (mg/L):** 7.93 / 85.3% **Salinity (ppt):** 0.2 **pH:** 6.5 **Cond. (µS/cm):** 407.3

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

HERRING PROJECT DATA SHEET

Event #3 Net pull / Vt entered (JK)

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Location: WP RR Fyke
Sample Number: WP150307
Net Deployment Time: 18:25 / —
Tides (time/ft) – Low: 03:12 / -0.2'
Total Number of Species: 8 + 1 crab
Data Recorder: KC

Field Crew: JK, KC, JW, KD
Weather: Overcast, breezy (2)
Net Retrieval Time: 06:20
High (time/ft): 09:09 / 4.5'
Total Number of Individuals: 24 + 7 crabs
Signature (team lead):

Date: 6/4/15 (AM)
Water Quality Taken (circle): (Y) N
Time Net Collecting: 11:55
Precipitation in Last 24 hrs (circle): (Y) N
T&E Species Collected (circle): Y (N)

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
alewife		(7)	27 / 24	200	L	23 / 22	130	L	21 / 24	130	L	24 / 22	130	L	25 / 29	140	L	Secchi - 80cm
alewife			24 / 22	180	L	23 / 26	180	L										Salinity surface - 0.15 bottom - 0.15
black crappie		(1)	30 / 31	410	L													
pumpkinseed		(3)	— / 7.5	10	L	— / 9	16	L	— / 9	23	L							
bluegill		(2)	— / 11	25	L	21 / 22	250	L										
white perch		(3)	17 / 14	70	L	29 / 30	420	L										
gizzard shad		(2)	33 / 34	590	L	33 / 39	510	L										
bullhead brown		(5)	— / 24	340	L	— / 26	180	L	— / 25	180	L	— / 24	180	L	— / 20	330	L	
American eel		(2)	— / 55	440	L	60 / —		L										
blue crab		(7)	+ / 9	34	male L	— / 7	33	female L	— / 6.5	35	female L	— / 6	36	female L	— / 5	13	male L	
			— / 4.5	14	male L	— / 7	male L	50		1								

WATER QUALITY: Time: 6:15 Location/Depth: 55 cm Recorders: KC JK Equipment: YSI ProPlus

Air Temp. (°C): 14.0 Water Temp. (°C): 16.0 Dissolved Oxygen (mg/L): 7.27 (7.3, 7.2) Salinity (ppt): 0.15 pH: 7.03 Cond. (µS/cm): 316.8

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

HERRING PROJECT DATA SHEET

Event #4 Net Set | Transects (JK)

Location: WP RR Fyke | Field Crew: JK, JW, AS | Date: 6/14/15 (PM)

Sample Number: — | Weather: partly sunny, BS-① | Water Quality Taken (circle): (Y) N

Net Deployment Time: 19:10 | Net Retrieval Time: — | Time Net Collecting: —

Tides (time/ft) – Low: 12:01 / -0.3' | High (time/ft): 18:26 / 5.6' | Precipitation in Last 24 hrs (circle): Y (N)

Total Number of Species: — | Total Number of Individuals: — | T&E Species Collected (circle): Y N

Data Recorder: AS | Signature (team lead): [signature]

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm)	FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm)	FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm)	FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm)	FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm)	FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
																							Salinity Bottom: 14.91 Surface: 2.17 Secchi: 48cm

WATER QUALITY: Time: 19:17 | Location/Depth: 60 cm | Recorders: AS, JK | Equipment: YSI Pro Plus cal. 6/12

Air Temp. (°C): 23 | Water Temp. (°C): 30.8 | Dissolved Oxygen (mg/L): 10.51 / 147.4 | Salinity (ppt): 9.02 | pH: 8.53 | Cond. (µS/cm): 15723

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

HERRING PROJECT DATA SHEET

Jentered (JK)

Location: WP RR Fyke
Field Crew: JK, JW, SS
Date: 6/15/15 (AM)

Sample Number: WP150401
Weather: overcast, drizzle/rain; W: 59

Net Deployment Time: 19:10 / 06:30
Net Retrieval Time: 06:20
Water Quality Taken (circle): (Y) N

Tides (time/ft) – Low: 00:52/-0.3
High (time/ft): 06:55/4.8
Time Net Collecting: 11:10

Total Number of Species: (5)
Total Number of Individuals: (22)
Precipitation in Last 24 hrs (circle): (Y) N

Data Recorder: SS
Signature (team lead): [signature]
T&E Species Collected (circle): Y (N)

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
Gizzard Shad		5	33.5/39	640	L	34/40	640	L	44/51	1410	L	44/51	1180	L	38/44	880	L
white perch		5	23/27	240	L	21/22.5	160	L	24/25	215	L	19.5/20.5	125	L	17/18	90	L
white sucker		1	30/33	350	L												
white perch		5	21/22	40	L	20/21	125	L	19.5/20.5	125	L	19.5/20.5	130	L	20/21	135	L
white perch		2	18/19	100	L	17.5/18.5	95	L									
striped bass ★		1	9.5/10	10	D												
pumpkin seed		3	–/13	50	L	–/8	7	L	–/8	7	L						

NOTES

salinity:
bottom: 0.78
surface: 0.46

secchi: 56cm

★ striped bass was stuck in the net by his gills – didn't make it.

WATER QUALITY: Time: 06:08 **Location/Depth:** 55cm **Recorders:** JW, JK **Equipment:** YSI Pro Plus

Air Temp. (°C): 22.4 **Water Temp. (°C):** 23.5 **Dissolved Oxygen (mg/L):** 5.65/66.5 **Salinity (ppt):** 0.49 **pH:** 7.47 **Cond. (µS/cm):** 976

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

HERRING PROJECT DATA SHEET

Page 1 of 1

Location: WI RR Fyke **Field Crew:** JK, JW, TL, JK **Date:** 6/15/15 (PM)

Sample Number: WI15DH02 **Weather:** cloudy/hot, ESE 4 mi/hr **Water Quality Taken (circle):** (Y) N

Net Deployment Time: 06:30 / 07:15 **Net Retrieval Time:** 18:30 **Time Net Collecting:** 12:00

Tides (time/ft) – Low: 12:52 / 0.1 **High (time/ft):** 19:15 / 5.8 **Precipitation in Last 24 hrs (circle):** (Y) N

Total Number of Species: (6) + 1 crab sp. **Total Number of Individuals:** (28) + 3 crabs **T&E Species Collected (circle):** Y (N)

Data Recorder: TK **Signature (team lead):**

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
white perch		1	29 26	205	L													Salinity bottom: .05 surface: .05
yellow perch		2	19 20	90	L	15 16	50	L										
blue crab		3	11 1/2 ✓	90	LF	6 ✓	15	LM	—	—	L*							
pumpkin seed		5	—	9 10	L	14 ✓	50	L	14 ✓	55	L	9 ✓	10	L	10 ✓	15	L	
pumpkin seed		5	9 ✓	15	L	7 ✓	5	L	9 ✓	10	L	7 ✓	5	L	7 ✓	5	L	Secchi: 43 cm
pumpkin seed		5	9 ✓	5	L	9 ✓	15	L	9 ✓	10	L	9 ✓	15	L	8 ✓	5	L	* escaped
blue gill		3	8 ✓	5	L	6 ✓	5	L										
pumpkin seed		2	7.5 ✓	15	L	8 ✓	5	L										
golden shiner		4	10.5 11.5	—	L	—	—	L	—	—	L	—	—	L	—	—	L	→ rain couldn't record too wet
Banded killifish		2	—	11	10	L	—	[illegible]	L									

WATER QUALITY: Time: 18:12 **Location/Depth:** 60 cm **Recorders:** JK, TL **Equipment:** YSI Pro Plus

Air Temp. (°C): 27.9 **Water Temp. (°C):** 27.1 **Dissolved Oxygen (mg/L):** 5.96 / 4.7 **Salinity (ppt):** .05 **pH:** 6.82 **Cond. (µS/cm):** 74.0

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ON BACK)

HERRING PROJECT DATA SHEET

Entered JK

Location: WP RR Fyke **Field Crew:** JK, TK, SS, JW **Date:** 6/16/15 (AM)

Sample Number: WP150403 **Weather:** overcast, wind 1 **Water Quality Taken (circle):** (Y) N

Net Deployment Time: 19:15 / 07:10 **Net Retrieval Time:** 06:30 **Time Net Collecting:** 11:15

Tides (time/ft) – Low: 01:42/-0.4 **High (time/ft):** 07:45/4.8 **Precipitation in Last 24 hrs (circle):** (Y) N

Total Number of Species: (6) +1 crab **Total Number of Individuals:** (27) +1 crab **T&E Species Collected (circle):** Y (N)

Data Recorder: Sheri Shifren **Signature (team lead):**

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
common carp		1	73 78	4950	L												
white perch		4	38 40	1020	L	23 24	190	L	23 33	150	L	19 20	110	L			
pumpkin seed sunfish		5	Escaped	L	– 12	31	L	– 9	10	L	– 10	15	L	– 9	17	L	
white sucker		5	36 39	600	L	38 41	650	L	30 32	350	L	37 40	630	L	38 41	660	L
white sucker		1	29 31	360	L												
pumpkin seed sunfish		5	– 8	12	L	– 8	12	L	– 9	15	L	– 8	15	L	– 8	15	L
blue gill		1	– 9	10	L												
pumpkin seed		3	– 8	10	L	– 7	10	L	– 6	7	L						
Atlantic croaker		2	– 9	12	D	– 9	12	D									
blue crab		1	– 6	27	L/M												

NOTES

Salinity bottom: 0.04
surface: 0.03

Secchi: 65cm

Net set: 7:10

WATER QUALITY: Time: 06:19 **Location/Depth:** 60cm **Recorders:** JW/JK **Equipment:** YSI Pro plus

Air Temp. (°C): 20.9 **Water Temp. (°C):** 23.0 **Dissolved Oxygen (mg/L):** 5.66/65.9% **Salinity (ppt):** 0.04 **pH:** 6.80 **Cond. (µS/cm):** 77.1

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

HERRING PROJECT DATA SHEET

Ventened

Location: WP RR Fyke **Field Crew:** JK, JD, KC, LO, TK **Date:** 6/16/15 (PM)

Sample Number: W150404 **Weather:** overcast, drizzle (rain) (wind: NW 2 mph) **Water Quality Taken (circle):** (Y) N

Net Deployment Time: 07:10 / 18:55 **Net Retrieval Time:** 18:30 **Time Net Collecting:** 11:20

Tides (time/ft) – Low: 13:41 / -0.1 **High (time/ft):** 20:07 / 5.7 **Precipitation in Last 24 hrs (circle):** (Y) N

Total Number of Species: (12) + 1 crab **Total Number of Individuals:** (42) + 2 crabs **T&E Species Collected (circle):** Y (N)

Data Recorder: JK, LO **Signature (team lead):** Jen M. Kay

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
white sucker		(6)	30 32	400	L	37 39	590	L	36 38	600	L	26 28	260	L	40 44	880	L	salinity bottom: 0.04 psu surface: 0.04 psu
"			29 31	360	L													
yellow perch		(2)	22 23	160	L	20 21	130	L										secchi: 66 cm
Bluegill		(2)	– 14	60	L	– 6	5	L										
pumpkinseed		(29)	– 14	65	L	– 13	50	L	– 14	65	L	– 13	52	L	– 13	50	L	
"			– 12	45	L	– 13	50	L	– 9	18	L	– 9	15	L	– 8	15	L	
"			– 9	10	L	– 9	10	L	– 9	10	L	– 9	15	L	– 9	18	L	
"			– 10	20	L	– 10	20	L	– 9	18	L	– 10	22	L	– 8.5	12	L	
"			– 9	18	L	– 9	15	L	– 8	12	L	– 7.5	10	L	– 9	12	L	
Banded killifish		(2)	– 8	5	L	– 9.5	12	L										
Atlantic croaker		(1)	– 9.5	10	L													
Blue crab		(2)	– 7	22	L/M	– 7.5	32	L/M										

WATER QUALITY: Time: 18:16 hrs **Location/Depth:** 60 cm **Recorders:** LO/TK **Equipment:** YSI Pro plus

Air Temp. (°C): 25.1 **Water Temp. (°C):** 25.8 **Dissolved Oxygen (mg/L):** 6.93 / 97.7 % **Salinity (ppt):** 0.04 **pH:** 6.50 **Cond. (µS/cm):** 79.2

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

HERRING PROJECT DATA SHEET

Entered (JK)

Page 1 of 1

Location: WP RR Fyke
Sample Number: WP150405
Net Deployment Time: 18:55 / 07:15
Tides (time/ft) – Low: 02:30 / -0.4
Total Number of Species: 6 + 1 crab
Data Recorder: K.D

Field Crew: JK, KC, TL, KD
Weather: clear, sunny, 4mph NW
Net Retrieval Time: 06:30
High (time/ft): 08:33 / 4.8
Total Number of Individuals: 56 +5 crabs
Signature (team lead):

Date: 6/17/15 (AM)
Water Quality Taken (circle): (Y) N
Time Net Collecting: 11:35
Precipitation in Last 24 hrs (circle): (Y) N
T&E Species Collected (circle): Y (N)

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
Gizzard shad		2	46 / 51	1330	L
Pumpkinseed		4	— / 7	10	L
White perch		3	31 / 32	660	L
Bluegill		2	— / 7	5	L
Black Crappie		1	27 / 29	360	L
Blue crab		5	— / 6	25	L/M
White sucker		24	38 / 41	—	L
			40 / 44	850	L
			30 / 32	350	L
			30 / 33	330	L
			29 / 32	340	L
Pumpkin seed		20	8	9	L
Pumpkin seed			12	55	L
			10	20	L
			9	15	L

SPECIES	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
Gizzard shad	36 / 41	730	L
Pumpkinseed	— / 8	10	L
White perch	25 / 26	280	L
Bluegill	— / 8	10	L
Black Crappie			
Blue crab	— / 6	25	L/M
White sucker	40 / 44	850	L
	40 / 43	690	L
	37 / 40	610	L
	31 / 33	330	L
	28 / 30	300	L
Pumpkin seed	9	15	L
Pumpkin seed	14	70	L
	8	15	L
	9	20	L

SPECIES	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
Gizzard shad			
Pumpkinseed	— / 8	15	L
White perch	24 / 24	260	
Bluegill			
Black Crappie			
Blue crab	— / 5	15	L/F
White sucker	36 / 40	600	L
	36 / 39	600	L
	39 / 43	690	L
	30 / 32	350	L
	35 / 38	520	L
Pumpkin seed	8	10	L
Pumpkin seed	14	70	L
	10	25	L
	8	15	L

SPECIES	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
Gizzard shad			
Pumpkinseed	— / 7	10	L
White perch			
Bluegill			
Black Crappie			
Blue crab	— / 5	20	L/F
White sucker	39 / 43	770	L
	40 / 43	810	L
	29 / 32	340	L
	35 / 38	540	L
	29 / 32	350	L
Pumpkin seed	8	15	L
Pumpkin seed	12	40	L
	8	15	L
	9	20	L

SPECIES	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)
Gizzard shad			
Pumpkinseed			
White perch			
Bluegill			
Black Crappie			
Blue crab	— / 5	20	L/M
White sucker	37 / 41	600	L
	28 / 30	280	L
	35 / 38	550	L
	23 / 32	360	L
Pumpkin seed			
Pumpkin seed	8	15	L
	11	25	L
	9	15	L
	9	15	L

NOTES

salinity:
bottom: 0.04
surface: 0.04

secchi: 67cm

WATER QUALITY: Time: 06:22 **Location/Depth:** 60 cm **Recorders:** KC, JK **Equipment:** YSI Pro Plus

Air Temp. (°C): 19.3 **Water Temp. (°C):** 22.3 **Dissolved Oxygen (mg/L):** 5.59 / 65.3% **Salinity (ppt):** 0.04 (surface: 0.04, bottom: 0.03) **pH:** 6.7+ **Cond. (µS/cm):** 80.+

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES

HERRING PROJECT DATA SHEET

Ventered

Location: WP RR Fyke **Field Crew:** Jenna, Jeff, Toni Ann, Jenny, Shea **Date:** 06-17-15 (PM)

Sample Number: WP150406 **Weather:** overcast, 2

Net Deployment Time: 07:15 / 18:30 **Net Retrieval Time:** 18:25 **Water Quality Taken (circle):** (Y) N

Tides (time/ft) – Low: 14:28 / 0.0 **High (time/ft):** 20:46 / 5.5 **Time Net Collecting:** 11:10

Total Number of Species: 3 + 1 crab **Total Number of Individuals:** 8 + 1 crab **Precipitation in Last 24 hrs (circle):** (Y) N

Data Recorder: JW **Signature (team lead):** [signature] **T&E Species Collected (circle):** Y (N)

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
blue crab		(1)	– / 9	70	L/M clawless													
pumpkinseed		(5)	– / 9.5	15	L	– / 8.5	14	L	– / 8.5	15	L	– / 8	10	L	– / 6	4	L	Secchi - 64 cm
bluegill		(2)	– / 7	10	L	– / 8	15	L										sal surface: 0.04
banded killifish		(1)	– / 9	10	L													sal bottom: 0.04

WATER QUALITY: Time: 18:17 **Location/Depth:** 55cm **Recorders:** AW, JK **Equipment:** YSI Pro Plus

Air Temp. (°C): 24.1 **Water Temp. (°C):** 27.2 **Dissolved Oxygen (mg/L):** 104.8%/8.41 **Salinity (ppt):** 0.04 **pH:** 6.56 **Cond. (µS/cm):** 79.0

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES (ADDITIONAL NOTES ...

HERRING PROJECT DATA SHEET

Event #4 Net pull / entered

Location: WP RR Fyke
Field Crew: JK, TL, JW, KD
Date: 6/18/15 (Am Pull)
Sample Number: WP150407
Weather: raining, 1
Water Quality Taken (circle): (Y) N
Net Deployment Time: 18:30 / —
Net Retrieval Time: 06:20
Time Net Collecting: 11:50
Tides (time/ft) – Low: 03:15 / -0.3
High (time/ft): 09:21 / 4.7
Precipitation in Last 24 hrs (circle): (Y) N
Total Number of Species: (9) + 1 crab
Total Number of Individuals: (33) + 2 crabs
T&E Species Collected (circle): Y (N)
Data Recorder: JW
Signature (team lead): [signature]

SPECIES	Total wt/sub	Total Count/sub ct.	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	Length (cm) FL/TL	Weight (g)	Live (L) Fresh Dead (FD) Dead (D)	NOTES
white sucker		(5)	36/41	780	L	39/44	850	L	37/40	640	L	37/40	640	L	28/30	290	L	
white perch		(3)	31/32	510	L	23/25	220	L	20/21	130	L							salinity: 0.04 bottom: 0.04 surface: 0.04
gizzard shad		(4)	40/50	1250	L	37/42	780	L	43/46	1310	L	38/43	940	L				
black crappie		(1)	26/31	480	L													
blue gill		(1)	–/7	10	L													
pumpkinseed		(16)	–/7	10	L	–/7	10	L	–/8	15	L	–/7	10	L	–/9.5	20	L	secchi: 89cm
PS			–/9	20	L	–/8	15	L	–/8	10	L	–/7.5	10	L	–/8.5	10	L	
PS			–/7.5	16	L	–/8.5	10	L	–/7.5	10	L	–/8	15	L	–/7.5	10	L	
PS ↓			–/6	5	L													
banded killifish		(1)	–/8.5	10	L													
golden shiner		(1)	10/11	20	L													
blue crab		(2)	–/6.5	25	Female L	–/10.5	Male 75											
American eel		(1)	–/57	450	L													

WATER QUALITY: Time: 06:10 **Location/Depth:** 60 cm **Recorders:** JW/KD **Equipment:** YSI Pro Plus

Air Temp. (°C): 19.1 **Water Temp. (°C):** 22.3 **Dissolved Oxygen (mg/L):** 6.29 / 73% **Salinity (ppt):** 0.04 **pH:** 6.85 **Cond. (µS/cm):** 85.6

NOTES – CIRCLE NAMES/INITIALS OF VOLUNTEERS/VETERANS; CIRCLE LENGTH(S) OF SPECIES WITH ABNORMALITIES AND DESCRIBE IN SPACE TO RIGHT; NOTE T&E SPECIES