2013

SUMMARY
STREAM SURVEY DATA

This section of the report includes stream survey data completed by the Bureau of Freshwater Fisheries in 2013. All surveys, unless specifically noted otherwise, are sampled in accordance to the Bureau's established stream sampling protocol which is consistent with EPA's Rapid Bioassement Protocol for Wadeable Streams. The Bureau's wadeable stream survey protocol can be found in Appendix A. The Bureau also assesses in-stream and riparian conditions by performing a Habitat Assessment at the time of each survey. This assessment is consistent with the EPA Rapid Bioassessment sampling habitat assessment protocol with regional modifications (Appendix B). Basic water quality parameters are also measured.

Surveys are listed alphabetically by stream name within identified watershed areas. Each survey is identified by the specific Activity by which it was funded. It is important to note, however, the use of established stream sampling protocols permits data to be used beyond the specific Activity for which they were collected. Data provided for the purposes of this report is only a summary of the individual stream survey data collected by the DFW's Bureau of Freshwater Fisheries. All stream data collected under the Bureau's standardized sampling protocol is entered into the Division's FishTrack database.

Surveys in the Northwest Region
(Upper Delaware River, Central Delaware River, and Wallkill)

BARKERS MILL BROOK

Activity: Evaluate Cessation of Stocking	**Drainage:** Pequest River
Location: Cemetery Road bridge, downstream	**County:** Warren
Date: August 9, 2013	**Municipality:** Independence Twp.

Summary

This small stream has been surveyed (electrofished) four times prior to 2012 (in 1981, 1987, 1991, and 2007). Very low numbers of trout (< 9 individuals) were found each time. On one occasion, in 1991, Brook Trout reproduction was confirmed. On several occasions stocked Brown and Rainbow Trout were present. Trout stocking was discontinued in 2008 to give wild Brook Trout a chance to regain a foothold. The survey conducted in 2013 found two Brook Trout but, unfortunately, fin wear indicated they were of hatchery origin. The stocked trout likely migrate upstream from the Pequest River which is trout-stocked and approximately 1/3 mile downstream from the survey site.

Water Chemistry & Habitat	
Water temperature	18.5°C
Dissolved oxygen	8.76 mg/L
pH	7.98
Alkalinity	168.0 mg/L as $CaCO_3$
Specific conductance	433.8 µS/cm
Sample length	150 m
Habitat assessment score	155 (suboptimal)

Fish species	Number
American Eel	20
Redfin Pickerel	1
Blacknose Dace	102
Longnose Dace	29
Creek Chub	5
Pumpkinseed	1
Tessellated Darter	16
Brook Trout (older than y-o-y)	2 (250 -305 mm)

Recommendation: Additional surveys should be conducted to determine if a wild trout population is present. This stream may be a good candidate for a more active brook trout restoration effort since the passive effort to restore this native fish (by not stocking hatchery trout) appears to have failed. However, it may be difficult to find a suitable pathogen-free source (i.e. wild) population that would not jeopardize the integrity of Pequest Trout Hatchery located downstream.

BEERSKILL CREEK

Activity: Evaluate Cessation of Stocking	**Drainage:** Flat Brook River
Location: Shaytown Road, end of cul-de-sac	**County:** Sussex
Date: August 14, 2013	**Municipality:** Montague Twp.

Summary

Prior to 2013 this stream was surveyed twice, in 1968 and 2004. The first electrofishing survey (conducted in 1969, a 183 m long stretch) documented 20 young-of-the-year (y-o-y) Brook Trout, along with Slimy Sculpin and Blacknose Dace. In 2004, over a 150 m stretch, 11 y-o-y and 7 older Brook Trout were captured, along with 1 Rainbow Trout (presumed stocked), 15 American Eel, and the same sculpin and dace species. To protect and enhance this stream's wild Brook Trout, trout stocking was discontinued in 2006.

The 2013 survey documented the four previously found species in addition to a Golden Shiner. Only one y-o-y and six older Brook Trout were collected. None of the trout collected in 2013 exceeded the minimum harvestable size of 229 mm (9 in). The low abundance of trout found in 2013 was similar to results from surveys conducted in previous years when trout were stocked. It was hoped that the Brook Trout population would increase following cessation of stocking but that was not the case. Water quality is not likely an issue, given the presence of slimy sculpin (an indicator of cold and clean water) and the undeveloped forested watershed of Stokes State Forest. There may be a shortage of desirable in-stream habitat features (such as woody debris) as indicated by a habitat assessment score of 13 (suboptimal) for epifaunal substrate/available cover. Downstream of the section surveyed in 2004 and 2013, severe bank erosion was noted in 2003 (picture at right) which may negatively impact the wild trout population.

Water Chemistry & Habitat	
Water temperature	16.8°C
Dissolved oxygen	8.57 mg/L
pH	7.1
Alkalinity	2 mg/L as $CaCO_3$
Specific conductance	36.0 µS/cm
Sample length	150 m
Habitat assessment score	173 (optimal)

Fish species	Number
American Eel	12
Golden Shiner	1
Blacknose Dace	54
Slimy Sculpin	29
Brook Trout (y-o-y)	1 (89 mm)
Brook Trout (older than y-o-y)	6 (144 – 206 mm)

Recommendation: To conserve and enhance wild Brook Trout it is recommended that trout stocking not be resumed on this stream. It is not clear if more stringent fishing regulations (such as the *Wild Trout Stream* regulation) would enhance the trout fishery by preventing the harvest of adults, as the stream in its current condition may not be capable of producing many trout of harvestable size. Habitat restoration/enhancement may increase the abundance of wild trout, improve the size structure of the population, and thereby provide a better sport fishery. Monitoring of this trout production stream should continue in accordance with the established schedule (every 20 years) unless additional management actions are undertaken.

BIG FLAT BROOK

Activity: Regulation Change	**Drainage:** Flat Brook
Location: Between Rt. 206 & Rt. 560 bridges, off un-named road on western side of brook	**County:** Sussex
Date: August 7, 2013	**Municipality:** Sandyston Twp.

Summary

This survey is one of four conducted within 2013 on the 4.1 mile special regulation fishing area on the Big Flat Brook/Flat Brook (fly fishing only for all or most of the year). The survey station is located in the upper end of this special regulation area, in the section where bait fishing is permitted for nine days, starting with the "Opening Day" of the trout season in April. Two backpacks and a two-electrode stream rig were used to electrofish this stream reach. Trout and other fish species commonly found with trout were present (15 species total). Eight trout were captured and of these, 2 were wild Brook Trout and the remaining six trout (5 rainbows and 1 brown) were stocked fish of hatchery origin (wild vs. hatchery based upon fin erosion and wear). In addition to the ubiquitous White Sucker, the uncommon Northern Hog Sucker was also present. Although classified as *Trout Production*, this stream section yielded no young-of-the-year trout. Slightly more trout were found in this survey compared to the previous year (3 trout in 2012), perhaps due in part to the presence of a new-fallen hemlock that created a nice pool. In 2014 the fishing regulations on this 4.1 mile stretch will change to *Catch & Release - Artificials Only*.

Water Chemistry & Habitat	
Water temperature	17.1°C
Dissolved oxygen	9.01 mg/L
pH	7.08
Alkalinity	28.0 mg/L as $CaCO_3$
Specific conductance	102.6 µS/cm
Sample length	150 m
Habitat assessment score	167 (optimal)

Fish species	**Number**
Sea Lamprey	1
American Eel	43
Cutlip Minnow	23
Blacknose Dace	71
Longnose Dace	51
White Sucker	17
Northern Hog Sucker	1
Margined Madtom	1
Rock Bass	1 (158 mm)
Largemouth Bass	3 (46 – 66 mm)
Tessellated Darter	13
Slimy Sculpin	15
Brook Trout (older than y-o-y)	2 (211-225 mm)
Brown Trout (older than y-o-y)	1 (278 mm)
Rainbow Trout (older than y-o-y)	5 (285–309 mm)

Recommendation: The data from the four electrofishing surveys, along with continuous water temperature and angler survey/catch data, will be used to evaluation the 2014 fishing regulation change on the trout fishery.

BIG FLAT BROOK

Activity: Regulation Change	**Drainage:** Flat Brook River
Location: Upstream from Blewett Tract (Sta #2)	**County:** Sussex
Date: August 29, 2013	**Municipality:** Sandyston Twp.

Summary

This survey is one of four conducted within 2013 on the 4.1 mile special regulation area on the Big Flat Brook/Flat Brook (fly fishing only for all or most of the year). The survey station is located upstream of the Blewitt Tract and Station #1. Two backpacks were used to electrofish this stream reach. Trout and other fish species commonly found with trout were present (19 species total). The five brook trout encountered were all wild, naturally reproduced fish (based upon fin erosion and wear). Two species not widely found in New Jersey (northern hog sucker and shield darter) were also present. Although this stream section is classified as *Trout Production*, no young-of-the-year trout were found and limited numbers of older trout were present. In 2014 the fishing regulations on this 4.1 mile stretch will change to *Catch & Release - Artificials Only*.

Water Chemistry & Habitat	
Water temperature	18.6°C
Dissolved oxygen	8.58 mg/L
pH	7.58
Alkalinity	26.0 mg/L as $CaCO_3$
Specific conductance	95.9 µS/cm
Sample length	150 m
Habitat assessment score	-

Fish species	**Number**
Sea Lamprey	3
American Eel	6
Redfin Pickerel	1
Cutlip Minnow	13
Common Shiner	46
Blacknose Dace	52
Longnose Dace	16
Creek Chub	3
Fallfish	9
White Sucker	20
Northern Hog Sucker	6
Margined Madtom	1
Bluegill	1
Tessellated Darter	17
Shield Darter	3
Slimy Sculpin	6
Brook Trout (older than y-o-y)	5 (175 – 240mm)
Brown Trout (older than y-o-y)	1 (293mm)
Rainbow Trout (older than y-o-y)	1 (277mm)

Recommendation: The data from the four electrofishing surveys, along with continuous water temperature and angler survey/catch data, will be used to evaluation the 2014 fishing regulation change on the trout fishery.

BIG FLAT BROOK

Activity: Regulation Change	**Drainage:** Flat Brook River
Location: Upstream of Blewett Tract - (Sta #1)	**County:** Sussex
Date: August 29, 2013	**Municipality:** Sandyston Twp.

Summary

This survey is one of four conducted in 2013 within the 4.1 mile special regulation area on the Big Flat Brook/Flat Brook (fly fishing only for all or most of the year). The survey station is located upstream of the Blewett Tract and downstream of Station #2. Two backpacks were used to electrofish this stream reach. Fifteen fish species were encountered and although this stream section is classified as *trout production* no trout were present. In the 2012 survey 8 trout were encountered (7 wild Brook Trout and 1 stocked Rainbow Trout). Water quality parameters were not measured due to equipment malfunction. In 2014 the fishing regulations on this 4.1 mile stretch will change to *Catch & Release - Artificials Only*.

Water Chemistry & Habitat	
Water temperature	-
Dissolved oxygen	-
pH	-
Alkalinity	-
Specific conductance	-
Sample length	150m
Habitat assessment score	-

Fish species	Number
American Eel	14
Redfin Pickerel	3
Cutlip Minnow	11
Common Shiner	14
Blacknose Dace	23
Longnose Dace	11
Creek Chub	9
Fallfish	1
White Sucker	28
Northern Hog Sucker	6
Brown Bullhead	2
Tessellated Darter	17
Shield Darter	4
Slimy Sculpin	6
Lamprey sp.	present

Recommendation: The data from the four electrofishing surveys, along with continuous water temperature and angler survey/catch data, will be used to evaluation the 2014 fishing regulation change on the trout fishery.

BRASS CASTLE CREEK (AKA ROARING ROCK BROOK)

Activity: Evaluate Cessation of Stocking	**Drainage:** Pohatcong Creek
Location: Brass Castle Rd. bridge (lower most bridge), immediately upstream	**County:** Warren
Date: August 9, 2013	**Municipality:** Washington Twp.

Summary

This location has been surveyed three times (1970, 2001, and 2013). The electrofishing survey conducted in 1970 (183 m long stretch) documented a small number of presumed wild (not hatchery origin) trout (4 Brook Trout and 19 Brown Trout). The 2001 survey found considerably more wild trout (33 Brook Trout, of which 12 were y-o-y, and 58 Brown Trout, of which 38 were y-o-y) over a shorter distance (150 m long stretch), and also 5 Rainbow Trout (presumed hatchery origin). This stream was stocked with hatchery trout for many decades prior to 2010 under the name "Roaring Rock Brook". Rainbow Trout was the primarily species stocked to minimize impacting (interbreeding with) the resident wild Brook and Brown Trout population. Stocking was discontinued in 2010 to allow the wild trout to provide a recreational trout fishery.

In 2013 significantly fewer wild trout (46) were documented (1 Brook Trout and 44 Brown Trout) over 150 m. Five harvestable-sized wild Brown Trout (minimum size 228 mm/9 in) were present in the 2013 survey, compared to 5 wild trout and 3 hatchery rainbows that exceeded this minimum size in 2001. Reduced fishing pressure following cessation of stocking was expected (but not quantified) yet decreased numbers of wild trout were observed in the third year following discontinuation of stocking. The number of wild trout in the survey stretch likely fluctuates from year to year so to fully assess the cessation of stocking annual monitoring would be necessary.

Water Chemistry & Habitat	
Water temperature	19.2°C
Dissolved oxygen	8.66 mg/L
pH	7.21
Alkalinity	31.0 mg/L as $CaCO_3$
Specific conductance	192.4 µS/cm
Sample length	150 m
Habitat assessment score	179 (optimal)

Fish species	Number
American Eel	9
Cutlip Minnow	5
Blacknose Dace	30
Longnose Dace	38
Green Sunfish	1
Pumpkinseed	1
Brown Trout (y-o-y)	10 (66 – 88 mm)
Brown Trout (older than y-o-y)	34 (143 – 277 mm)
Brook Trout (older than y-o-y)	1 (160 mm)

Recommendation: The wild trout population is capable of providing a trout fishery for anglers who enjoy catching wild trout that are noticeably smaller than the spring-stocked hatchery trout (10.5 in average size). Therefore, resumption of trout stocking is not recommended. Although wild Brook and Brown Trout are still present in the stream, the scarcity of Brook Trout is cause for concern. Brass Castle Creek is comprised of five catchments. The three catchments upstream and one catchment is downstream from the location/catchment surveyed in 2013 should be surveyed to assess the status of the wild Brook Trout population throughout the stream's watershed. The stream at the Brass Castle Road survey site should continue to be monitored in accordance with the established schedule (every 20 years).

FLAT BROOK

Activity: Regulation Change	**Drainage:** Flat Brook River
Location: NPS Rt 615, pull off across from NJDFW rifle range, downstream of pool	**County:** Sussex
Date: August 7, 2013	**Municipality:** Sandyston Twp.

Summary

This survey is one of four conducted within 2013 on the 4.1 mile special regulation fishing area on the Big Flat Brook/Flat Brook (fly fishing only for all or most of the year). The survey station is located in the lower end of this special regulation area, in the section where bait fishing is permitted for nine days, starting with the "Opening Day" of the trout season in April. Two backpacks and a two-electrode stream rig were used to electrofish the stream reach. Trout and other fish species commonly found with trout were present (13 species total). Four trout representing three species were present and two of the fish (the brook and brown trout) appeared to be of wild origin (based upon fin erosion and wear). A limited number of trout were present, despite the presence of optimal physical habitat. The 2012 survey at this location produced similar results (six trout present).

Water Chemistry & Habitat	
Water temperature	16.3°C
Dissolved oxygen	8.52 mg/L
pH	7.39
Alkalinity	94.0 mg/L as $CaCO_3$
Specific conductance	243.5 µS/cm
Sample length	150 m
Habitat assessment score	174 (optimal)

Fish species	Number
Sea Lamprey	2
American Eel	43
Redfin Pickerel	1
Cutlip Minnow	5
Blacknose Dace	13
Longnose Dace	33
Creek Chub	2
Tessellated Darter	23
Shield Darter	4
Slimy Sculpin	9
Brook Trout (older than y-o-y)	1 (282 mm)
Brown Trout (older than y-o-y)	1 (211 mm)
Rainbow Trout (older than y-o-y)	2 (299 – 302 mm)

Recommendation: The data from the four electrofishing surveys, along with continuous water temperature and angler survey/catch data, will be used to evaluation the 2014 fishing regulation change on the trout fishery.

LIVINGSTON PONDS BROOK

Activity: TP Stream Inventory	**Drainage:** Pochuck Creek
Location: Barrett Rd./Waywayanda Ct. Intersection, adjacent to	**County:** Sussex
Date: July 26, 2013	**Municipality:** Vernon Twp.

Summary

Located in Sussex County and adjacent to Wawayanda State Park, this small stream flows in a northerly direction into New York before entering Pochuck Creek. Previously a small number of wild Brook and Brown Trout were documented in this stream in 1990. This time 71 Brook Trout were encountered over a 150 m stream reach and of these, 18 were young-of-the-year (y-o-y) fish. Although the largest trout was only 201 mm (7.9 in), the prevalence of trout over 100 mm (4 in) compared to y-o-y was somewhat unusual. This phenomenon was attributed to several deep pools created by large trees that fell or slid down the steeply sloped stream bank, causing larger fish to be concentrated this favorable habitat. No wild Brown Trout were found in the stream section surveyed. This bodes well for the brook trout, which is native to New Jersey, because the non-native brown trout tends to suppress Brook Trout when both species co-exist. Two other species, Blacknose Dace (92 individuals) and Pumpkinseed (3 individuals <100 mm), were also present.

Water Chemistry & Habitat	
Water temperature	18.5°C
Dissolved oxygen	7.77 mg/L
pH	8.03
Alkalinity	89.0 mg/L as $CaCO_3$
Specific conductance	292.5 µS/cm
Sample length	150 m
Habitat assessment score	176 (optimal)

Fish species	Number
Blacknose Dace	92
Pumpkinseed	3
Brook Trout (y-o-y)	18 (62 – 87 mm)
Brook Trout (older than y-o-y)	53 (111 – 201 mm)

Recommendation: Continue to monitor this stream in accordance with the established schedule (every 20 years).

PAULINSKILL RIVER (trib.) (Stillwater Station) (AKA ROY SPRING BROOK)

Activity: Evaluate Cessation of Stocking	**Drainage:** Paulinskill River
Location: Rt. 610 bridge, downstream endpoint ~10m below deep hole at bridge	**County:** Sussex
Date: August 16, 2013	**Municipality:** Fredon Twp.

Summary

This stream was stocked with hatchery trout for many decades prior to 2006 under the name "Roy Spring Brook". This stream was surveyed twice prior to 2013, in 1970 and 2004. The first electrofishing survey (conducted in 1970, a 183 m long stretch) documented only three young-of-the-year (y-o-y) Brown Trout. A subsequent electrofishing survey in 2004 documented 25 Brook Trout (105 – 255 mm) and the smallest of these trout were considered y-o-y due to high productivity (lush aquatic vegetation, an abundance of *Gammarus* (amphipods), and high alkalinity indicative of limestone inputs). To protect and enhance this wild Brook Trout population trout stocking was discontinued in 2006.

When surveyed in 2013, significantly more wild brook trout (152 fish) were present, ranging in size from 79 -223 mm (3.1 - 8.8 in) and not all the trout encountered were captured because of the phragmites. It is difficult to determine the size range for the y-o-y trout. In a small stream such as this one there is usually an obvious break in the size distribution which clearly separates y-o-y from older age classes brook trout (at or below 100 mm mark, in the summer). In this survey a substantial number brook trout 103 ranged in size from 101 – 141 mm so the first obvious break in size was between two individuals measuring 141 and 162 mm. The y-o-y trout may grow to a larger size in this stream compared to other, less productive, streams of a similar size. Although none of the trout collected met the minimum size of 9 in (229 mm), larger adults are likely present in deeper (non-wadable) pools that were outside the stream reach surveyed.

Water Chemistry & Habitat	
Water temperature	13.9°C
Dissolved oxygen	7.85 mg/L
pH	7.66
Alkalinity	167.0 mg/L as $CaCO_3$
Specific conductance	417.7 µS/cm
Sample length	150 m
Habitat assessment score	150 (suboptimal)

Fish species	Number
American Eel	5
Eastern Mudminnow	1
Blacknose Dace	1
Longnose Dace	3
Creek Chub	1
White Sucker	15
Margined Madtom	1
Banded Killifish	2
Pumpkinseed	1
Bluegill	2
Largemouth Bass	7
Tessellated Darter	2
Brook Trout (y-o-y; <100 mm)	44 (79 – 100 mm)
Brook Trout 100 – 141 mm	103 (101 – 141 mm)
Brook Trout 100 – 136 mm	5 (162 - 223mm)

Recommendation: This stream has an excellent wild Brook Trout fishery and resumption of trout stocking is not warranted. Consideration should be given to regulating the fishery under special regulations such as the *Wild Trout Stream* regulations. Continue to monitor this stream in accordance with the established schedule (every 20 years).

PEQUEST RIVER

Activity: Wild Fish Population Health Assessment	**Drainage:** Pequest River
Location: Alphano Road, dirt state park access road (upstream of Alphano Road bridge).	**County:** Warren
Date: September 24, 2013	**Municipality:** Independence Twp.

Summary

Due to the recent discovery of furunculosis in a portion of the trout residing in the Pequest Trout Hatchery, electrofishing was conducted on September 24 and 25 at five locations along the Pequest River to obtain trout to be tested for pathogens by Fish Pathologist Jan Lovy. A total of 11 trout were collected upstream of the hatchery (1 rainbow, 2 brook, and 8 brown) and 23 below the hatchery (23 brown and an estimated 100 rainbow). The fish were determined to be free of furunculosis, however additional tests are being conducted to assess for other pathogens. In addition, a list of species encountered was compiled for each site. Great species diversity was documented, totaling 31 species in all. This data will contribute to the statewide mapping of our freshwater fishes. Of particular interest, the ironcolor shiner was found.

Water Chemistry & Habitat	
Water temperature	-
Dissolved oxygen	-
pH	-
Alkalinity	-
Specific conductance	-
Sample length	-
Habitat assessment score	-

Fish species	Number
Sea Lamprey	present
American Eel	present
Redfin Pickerel	present
Golden Shiner	present
Common Shiner	present
Spottail Shiner	present
Swallowtail Shiner	present
Blacknose Dace	present
Creek Chub	present
White Sucker	present
Yellow Bullhead	present
Brown Bullhead	present
Margined Madtom	present
Banded Killifish	present
Rock Bass	present
Green Sunfish	present
Pumpkinseed	present
Bluegill	present
Redbreast Sunfish	present
Largemouth Bass	present
Black Crappie	present
Tessellated Darter	present
Brook Trout	1
Brown Trout	4
Rainbow Trout	1

Recommendation: Future monitoring for fish health may be warranted.

NON- STANDARDIZED SURVEY

PEQUEST RIVER

Activity: Wild Fish Population Health Assessment	**Drainage:** Pequest River
Location: Johnsonburg Road bridge, 500m downstream	**County:** Warren
Date: September 24, 2013	**Municipality:** Allamuchy Twp.

Summary

Due to the recent discovery of furunculosis in a portion of the trout residing in the Pequest Trout Hatchery, electrofishing was conducted on September 24 and 25 at five locations along the Pequest River to obtain trout to be tested for pathogens by Fish Pathologist Jan Lovy. A total of 11 trout were collected upstream of the hatchery (1 rainbow, 2 brook, and 8 brown) and 23 below the hatchery (23 brown and an estimated 100 rainbow). The fish were determined to be free of furunculosis, however additional tests are being conducted to assess for other pathogens. In addition, a list of species encountered was compiled for each site. Great species diversity was documented, totaling 31 species in all. This data will contribute to the statewide mapping of our freshwater fishes. Of particular interest, the ironcolor shiner was found.

Water Chemistry & Habitat	
Water temperature	-
Dissolved oxygen	-
pH	-
Alkalinity	-
Specific conductance	-
Sample length	500m
Habitat assessment score	-

Fish species	Number
American Eel	present
Redfin Pickerel	present
Chain Pickerel	present
Cutlip Minnow	present
Ironcolor Shiner	present
Common Shiner	present
Spottail Shiner	present
Swallowtail Shiner	present
Creek Chub	present
White Sucker	present
Creek Chub Sucker	present
Yellow Bullhead	present
Margined Madtom	present
Banded Killifish	present
Rock Bass	present
Green Sunfish	present
Bluegill	present
Redbreast Sunfish	present
Largemouth Bass	present
Tessellated Darter	present

Recommendation: Future monitoring for fish health may be warranted.

NON- STANDARDIZED SURVEY

PEQUEST RIVER

Activity: Wild Fish Population Health Assessment	**Drainage:** Pequest River
Location: Long Bridge Road bridge, 550m downstream.	**County:** Warren
Date: September 24, 2013	**Municipality:** Allamuchy Twp.

Summary

Due to the recent discovery of furunculosis in a portion of the trout residing in the Pequest Trout Hatchery, electrofishing was conducted on September 24 and 25 at five locations along the Pequest River to obtain trout to be tested for pathogens by Fish Pathologist Jan Lovy. A total of 11 trout were collected upstream of the hatchery (1 rainbow, 2 brook, and 8 brown) and 23 below the hatchery (23 brown and an estimated 100 rainbow). The fish were determined to be free of furunculosis, however additional tests are being conducted to assess for other pathogens. In addition, a list of species encountered was compiled for each site. Great species diversity was documented, totaling 31 species in all. This data will contribute to the statewide mapping of our freshwater fishes. Of particular interest, the ironcolor shiner was found.

Water Chemistry & Habitat	
Water temperature	-
Dissolved oxygen	-
pH	-
Alkalinity	-
Specific conductance	-
Sample length	880m
Habitat assessment score	-

Fish species	Number
American Eel	present
Redfin Pickerel	present
Cutlip Minnow	present
Common Shiner	present
Spottail Shiner	present
Swallowtail Shiner	present
Blacknose Dace	present
Longnose Dace	present
Creek Chub	present
Yellow Bullhead	present
Margined Madtom	present
Rock Bass	present
Bluegill	present
Redbreast Sunfish	present
Black Crappie	present
Tessellated Darter	present
Brook Trout	1
Brown Trout	1

Recommendation: Future monitoring for fish health may be warranted.

NON- STANDARDIZED SURVEY

PEQUEST RIVER

Activity: Wild Fish Population Health Assessment	**Drainage:** Pequest River
Location: Pequest Hatchery access road bridge, approx. 440m downstream, up to hatchery sluiceway.	**County:** Warren
Date: September 25, 2013	**Municipality:** White Twp.

Summary

Due to the recent discovery of furunculosis in a portion of the trout residing in the Pequest Trout Hatchery, electrofishing was conducted on September 24 and 25 at five locations along the Pequest River to obtain trout to be tested for pathogens by Fish Pathologist Jan Lovy. A total of 11 trout were collected upstream of the hatchery (1 rainbow, 2 brook, and 8 brown) and 23 below the hatchery (23 brown and an estimated 100 rainbow). The fish were determined to be free of furunculosis, however additional tests are being conducted to assess for other pathogens. In addition, a list of species encountered was compiled for each site. Great species diversity was documented, totaling 31 species in all. This data will contribute to the statewide mapping of our freshwater fishes. Of particular interest, the ironcolor shiner was found.

Water Chemistry & Habitat	
Water temperature	-
Dissolved oxygen	-
pH	-
Alkalinity	-
Specific conductance	-
Sample length	610m
Habitat assessment score	-

Fish species	Number
Sea Lamprey	present
American Eel	present
Blacknose Dace	present
Longnose Dace	present
White Sucker	present
Margined Madtom	present
Redbreast Sunfish	present
Tessellated Darter	present
Rainbow Trout	~100
Brown Trout	21

Recommendation: Future monitoring for fish health may be warranted.

NON- STANDARDIZED SURVEY

PEQUEST RIVER

Activity: Wild Fish Population Health Assessment	**Drainage:** Pequest River
Location: Pequest Furnace Road, USGS gauge station upstream to halfway to bridge	**County:** Warren
Date: September 25, 2013	**Municipality:** White Twp.

Summary

Due to the recent discovery of furunculosis in a portion of the trout residing in the Pequest Trout Hatchery, electrofishing was conducted on September 24 and 25 at five locations along the Pequest River to obtain trout to be tested for pathogens by Fish Pathologist Jan Lovy. A total of 11 trout were collected upstream of the hatchery (1 rainbow, 2 brook, and 8 brown) and 23 below the hatchery (23 brown and an estimated 100 rainbow). The fish were determined to be free of furunculosis, however additional tests are being conducted to assess for other pathogens. In addition, a list of species encountered was compiled for each site. Great species diversity was documented, totaling 31 species in all. This data will contribute to the statewide mapping of our freshwater fishes. Of particular interest, the ironcolor shiner was found.

Water Chemistry & Habitat	
Water temperature	-
Dissolved oxygen	-
pH	-
Alkalinity	-
Specific conductance	-
Sample length	600m
Habitat assessment score	-

Fish species	Number
American Eel	present
Redfin Pickerel	present
Golden Shiner	present
Swallowtail Shiner	present
White Sucker	present
Yellow Bullhead	present
Margined Madtom	present
Banded Killifish	present
Pumpkinseed	present
Redbreast Sunfish	present
Tessellated Darter	present
Rainbow Trout	5
Brown Trout	2

Recommendation: Future monitoring for fish health may be warranted.

NON- STANDARDIZED SURVEY

PEQUEST RIVER (trib.)(Petersburg)

Activity: TP Stream Inventory	**Drainage:** Pequest River
Location: Ryan Road bridge, 4m upstream.	**County:** Warren
Date: September 12, 2013	**Municipality:** Independence Twp.

Summary

When this small Warren County stream was previously sampled in 1991, a small number of wild Brook Trout were found (8 young-of the year and 3 adults) over 600 ft. This time more Brook Trout were encountered (31 individuals). Six Brook Trout, ranging in size from 154 – 193 mm (6.1 – 7.6 in), were one year or older. The size range for the remaining 25 trout spanned 64 – 116 mm (2.5 – 4.6 in), and the smaller fish are undoubtedly young-of-the year, however, some of the largest fish in this size range may be one year old. Other fish species present in small numbers included Blacknose Dace (61), Creek Chub (18), American Eel (4), Longnose Dace (1), White Sucker (1), Bluegill (3), and Green Sunfish (4).

Water Chemistry & Habitat	
Water temperature	19.0°C
Dissolved oxygen	8.48 mg/L
pH	8.14
Alkalinity	230.0 mg/L as $CaCO_3$
Specific conductance	520.4 µS/cm
Sample length	150 m
Habitat assessment score	165 (optimal)

Fish species	Number
American Eel	4
Blacknose Dace	61
Creek Chub	18
White Sucker	1
Green Sunfish	4
Bluegill	3
Brook Trout (y-o-y)	25 (64 – 116 mm)
Brook Trout (older than y-o-y)	11 (154 – 193mm)

Recommendation: Continue to monitor this stream in accordance with the established schedule (every 20 years).

SHIMERS BROOK

Activity: Evaluate Cessation of Stocking	**Drainage:** Delaware River – Sussex Co.
Location: Rt. 521 bridge, upstream	**County:** Sussex
Date: August 19, 2013	**Municipality:** Montague Twp.

Summary

Prior to 2013 this stream reach was surveyed three times (1970, 1996, and 2005). The 1970 electrofishing survey documented wild Brown Trout (and possible wild Brook Trout), and four other species often found in association with trout (Blacknose Dace, Longnose Dace, White Sucker, and Shield Darter). Surveys conducted in 1996 and 2005 documented very few trout (four or less each time, and no y-o-y) and a greater diversity of fish species (Rainbow trout, American Eel, Cutlip Minnow, Largemouth Bass, Bluegill Margined Madtom, and Spottail Shiner). Trout stocking was discontinued on this stream in 2006 to eliminate competition between stocked and wild trout for the benefit of the wild trout fishery.

In the 2013 survey only one adult Brown Trout and four other fish species, including Fallfish, were detected. it appears that the wild trout fishery has not rebounded in the absence of trout stocking. Fish surveys conducted further upstream in this watershed in 2008, to assess the distribution of wild Brook Trout, documented a naturally reproduction of this species upstream of Holiday Lake. The dam of this manmade lake (constructed in 1964) has resulted in a loss of stream habitat (inundated by lake), fragmented the stream, and isolated the wild Brook Trout population. In addition, warm surface waters exiting Holiday Lake during the summer could cause elevated stream temperatures that are stressful or lethal to trout downstream. An optimal habitat assessment score suggests that physical habitat is not a limiting factor for trout.

Water Chemistry & Habitat	
Water temperature	19.7°C
Dissolved oxygen	8.72 mg/L
pH	8.09
Alkalinity	97.0 mg/L as $CaCO_3$
Specific conductance	258.3 µS/cm
Sample length	150 m
Habitat assessment score	182 (optimal)

Fish species	Number
American Eel	21
Cutlip Minnow	4
Longnose Dace	16
Fallfish	1
Brown Trout (older than y-o-y)	1 (280 mm)

Recommendation: It is not clear why so few wild trout are present in the stream reach sampled in 2013, and this situation warrants further investigation. As a first step, it is recommended that water temperature be monitored continuously to determine if high water temperatures during the summer are problematic for trout. If determined that water temperature is not a limiting factor for trout, then consideration should be given to restoring wild Brook Trout to this reach. Holiday Lake is a barrier to upstream fish movement, and greatly hampers the downstream movement of a sufficient number of wild brook trout that could potentially re-colonize the stream reach downstream of the lake. Restoration of wild brook trout in the downstream reach would require translocation of wild fish and the wild fish population upstream of Holiday Lake would probably be a suitable source population for this activity. If restoration is not an option, then resumption of trout stocking should be considered. This trout production stream should continue to ne monitored in accordance with the established schedule (every 20 years) unless additional management actions are undertaken that warrant additional sampling.

SPRING MILLS BROOK

Activity: Evaluate Cessation of Stocking	**Drainage:** Delaware River – Hunterdon Co.
Location: Rt. 519 bridge, downstream - NJ Natural Lands Trust property	**County:** Hunterdon
Date: August 2, 2013	**Municipality:** Holland Twp.

Summary

Spring Mills Brook is a tributary to Hakihokake Creek, which flows directly into the Delaware River in Milford (NJ). Four electrofishing surveys were conducted prior to 2013 at three different locations in this stream. Two sites were surveyed in 1970 and the lowermost site (near the stream's confluence with Hakihokake Creek) did not document trout, whereas the upper site (off Spring Gardens Rd) documented brown trout reproduction. As a result the upper stream reach was classified Trout Production and the lower reach was classified Trout Maintenance. Later on, in 1998, a survey conducted in the Trout Maintenance reach confirmed the presence of wild Brown Trout (12 y-o-y and 12 older fish) as well as several stocked trout (1 brook and 2 rainbows). The upstream site initially surveyed in 1970 was re-surveyed in 2001 and 68 wild Brown Trout, and no stocked trout were documented. Trout stocking was discontinued on this stream in 2010 to allow wild brown trout to provide a recreational trout fishery.

In 2013 the site originally surveyed in 1998 was re-surveyed and a small number of wild Brown Trout (10), in addition to other fish species that commonly co-occur with wild trout, were present. None of the trout exceed the minimum harvestable size of 229 mm (9 in). In comparison, the upstream site surveyed in 2001 (2 km/1.3 mi upstream) detected more trout (68), including 5 harvestable trout, 233 – 286 mm (9.2 – 11.3 in). Although angling activity and harvest were not assessed as part of this study, typically when the stocking of catchable trout is discontinued the intense angling pressure in the spring subsides. The low trout abundance found in 2013 may simply be due to inherent variability in year class strength and habitat variation between survey sites rather than reflect harvest by anglers.

Water Chemistry & Habitat	
Water temperature	18.1°C
Dissolved oxygen	9.52 mg/L
pH	8.04
Alkalinity	87.0 mg/L as $CaCO_3$
Specific conductance	287.6 µS/cm
Sample length	150 m
Habitat assessment score	136 (suboptimal)

Fish species	Number
American Eel	8
Blacknose Dace	140
Longnose Dace	22
Creek Chub	1
White Sucker	11
Tessellated Darter	28
Brown Trout (y-o-y)	5 (74 – 92 mm)
Brown Trout (older than y-o-y)	5 (151 – 195 mm)

Recommendation: The wild trout population is capable of providing a trout fishery for anglers who enjoy catching wild trout that are noticeably smaller than the spring-stocked hatchery trout (10.5 in average size). Therefore, resumption of trout stocking is not recommended. This stream should continue to be monitored in accordance with the established schedule (every 20 years). Note: There are two surveys sites on this stream (the site surveyed in 2013 and the other site last surveyed in 2001).

TUTTLES CORNER BROOK

Activity: Evaluate Cessation of Stocking	**Drainage:** Flat Brook River
Location: Shotwell Road, Stokes State Forest by maintenance building	**County:** Sussex
Date: August 16, 2013	**Municipality:** Sandyston Twp.

Summary
Most of this Trout Production stream flows through Stokes State Forest before entering the Big Flat Brook (just upstream of the Rt. 206 bridge) and it has been surveyed three times prior to 2013 (in 2000, 1970, and 2005). Although wild Brook Trout have been found during each survey, the most found in any one survey was seven, and on one occasion (2001) several young-of-the-year Brown Trout were also encountered. This stream was also stocked with trout for many years and occasionally a hatchery trout was also encountered in these surveys. In 2006 this stream was dropped from the trout stocking program to conserve and enhance the wild Brook Trout population.

The survey conducted in 2013 continued to document very low numbers of Brook Trout (only 3 collected). Although the absence of other competing trout species (wild or stocked) benefits Brook Trout, the continued scarcity of brook trout is cause for concern. It is possible that in-stream habitat in the section surveyed is less than ideal despite the optimal habitat assessment score and Brook Trout may be more abundant in other stream reaches having better habitat. There could also be issues with water temperature during the summer given there are several impoundments upstream, including a 36 h (90 ac) lake (Kittatinny Lake). The residential lake community at Kittatinny Lake occasionally stocks trout (under permit issued by NJDFW) and in recent years they been successfully dissuaded from stocking either Brook and Brown Trout to better protect wild Brook Trout downstream.

Water Chemistry & Habitat	
Water temperature	18.9°C
Dissolved oxygen	8.32 mg/L
pH	7.23
Alkalinity	13.0 mg/L as $CaCO_3$
Specific conductance	90.1 µS/cm
Sample length	150 m
Habitat assessment score	183 (optimal)

Fish species	**Number**
Common Shiner	1
Blacknose Dace	36
Creek Chub	17
Largemouth Bass	1
Slimy Sculpin	1
Brook Trout (y-o-y)	1 (66mm)
Brook Trout (older than y-o-y)	2 (162 – 184 mm)

Recommendation: It is not clear why so few wild trout are present in this stream reach, and this situation warrants further investigation. Other reaches should be surveyed to determine if Brook Trout are more abundant elsewhere in the stream. If low abundance is widespread in this stream then water temperature monitoring may be warranted to determine if summer water temperature is limiting. Habitat enhancement, such as the introduction of woody material to create more habitat diversity would likely benefit the wild trout population. At a minimum this stream should monitored in accordance with the established schedule (every 20 years).

WALLKILL RIVER (trib.) (Ogdensburg)

Activity: TP Stream Inventory	**Drainage:** Wallkill River
Location: Route 517 bridge, upstream.	**County:** Sussex
Date: September 5, 2013	**Municipality:** Ogdensburg Boro

Summary

When this small stream was sampled for the first time in 1991, small numbers of brook trout (9 young-of-the year and 1 older fish), and one 12 in brown trout were documented in a 200 ft stretch. Sadly, no trout were found in 2013 despite sampling a stretch over twice as long (150 m or 492 ft) at the same location. Creek chubs were quite abundant (123 collected) and many were unusually large (100 – 125 mm, 4 – 5 in) for such a small stream. Blacknose dace, a fish species frequently found in small trout production streams were present (131 individuals) and 1 eastern mudminnow was also present. Warmwater centrarchid species were also present, including largemouth bass (4 young-of-the year and 1 older), 4 pumpkinseed, 7 redbreast sunfish, 2 bluegill, and 1 yellow bullhead. These warmwater fishes likely originated from Heaters Pond, a 19 acre lake located about a ½ mile upstream from the survey site. Their presence suggests that warm surface water exits the pond during the summer which could be the reason trout are absent despite the cool water temperature on the day of the survey.

Water Chemistry & Habitat	
Water temperature	19.0°C
Dissolved oxygen	7.83 mg/L
pH	7.86
Alkalinity	60.0 mg/L as $CaCO_3$
Specific conductance	156.9 µS/cm
Sample length	150 m
Habitat assessment score	159 (suboptimal)

Fish species	Number
Eastern Mudminnow	1
Blacknose Dace	131
Creek Chub	123
Yellow Bullhead	1
Pumpkinseed	5
Bluegill	2
Redbreast Sunfish	7
Largemouth Bass	5

Recommendation: The stream should be sampled further to ascertain if brook trout have been extirpated.

WALLKILL RIVER (trib.) (Sparta)

Activity: TP Stream Inventory	**Drainage:** Wallkill River
Location: Route 517, behind Sparta police station	**County:** Sussex
Date: September 5, 2013	**Municipality:** Sparta Twp.

Summary

In 1992, when this stream was first surveyed, 13 Brook Trout were found over a 600 ft stretch and 7 of these were young-of-the-year. Brook Trout were present, in greater numbers, in 2013, with a total of 51 Brook Trout captured. Of these, 48 were young-of-the year (71 – 104 mm) and only 3, within a much narrower size range (187 – 206 mm, 7.4 – 8.1 in), were older than y-o-y. Other species captured included Blacknose Dace (48), Longnose Dace (77), Creek Chub (22), Pumpkinseed (7), White Sucker (5), and Bluegill (3). Similar to the Ogdensburg tributary (which is about 3 miles away), the Sparta tributary is also downstream of a small lake (Lake Saginaw, 16 acres), yet brook trout persist in the Sparta tributary. Lake Saginaw is about one mile upstream of the survey site (twice the distance between Heaters Pond and the survey site on the Ogdensburg trib.) and this added distance may allow ground water to infiltrate the stream and ameliorate the effects of warm water flowing out of Lake Saginaw during the summer.

Water Chemistry & Habitat	
Water temperature	16.4°C
Dissolved oxygen	8.14 mg/L
pH	8.34
Alkalinity	148.0 mg/L as $CaCO_3$
Specific conductance	550.1 µS/cm
Sample length	150 m
Habitat assessment score	184 (optimal)

Fish species	Number
Blacknose Dace	48
Longnose Dace	77
Creek Chub	22
White Sucker	5
Pumpkinseed	7
Bluegill	3
Brook Trout (y-o-y)	47 (71 – 104 mm)
Brook Trout (older than y-o-y)	4 (187 – 216 mm)

Recommendation: Continue to monitor this stream in accordance with the established schedule (every 20 years).

Surveys in the Northeast Region
(Passaic, Hackensack, and Hudson) and Upper Atlantic Region

BEAR SWAMP BROOK

Activity: Assessment of Wild Brook Trout	**Drainage:** Ramapo River
Location: Bear Swamp Lake, immediately downstream of outlet/dam	**County:** Bergen
Date: August 6, 2013	**Municipality:** Mahwah

Summary

Backpack electrofished this previously un-sampled Trout Production catchment just downstream of Bear Swamp Lake dam. Good flow through cobble and boulders. Stream banks were well stabilized with vegetation. Blacknose Dace, Brown Bullhead, Pumpkinseeds, Largemouth Bass, Yellow Perch and Mudminnows were collected. No trout were collected.

Water Chemistry & Habitat	
Water temperature	18.7°C
Dissolved oxygen	4.95 mg/L
pH	5.66
Alkalinity	10.0 mg/L as $CaCO_3$
Specific conductance	33.8 µS/cm
Sample length	150 m
Habitat assessment score	166 (optimal)

Fish species	Number
Eastern Mudminnow	6
Blacknose Dace	57
Brown Bullhead	1
Pumpkinseed	3
Largemouth Bass	8
Yellow Perch	1

Recommendation: No need to sample again.

BEAVER BROOK (MORRIS-ROCKAWAY)

Activity: Assessment of Wild Brook Trout	**Drainage:** Rockaway River
Location: Splitrock Reservoir spillway, immediately downstream	**County:** Morris
Date: August 6, 2013	**Municipality:** Rockaway

Summary

Backpack electrofished this previously un-sampled Trout Production catchment just downstream of Splitrock Reservoir dam. Good flow through riffles and runs. Vegetated banks were well stabilized. Blacknose Dace, White Suckers, Bluegills, Smallmouth Bass, and Creek Chubs were collected. No trout were collected.

Water Chemistry & Habitat	
Water temperature	23.3°C
Dissolved oxygen	5.06 mg/L
pH	6.54
Alkalinity	9.0 mg/L as $CaCO_3$
Specific conductance	48.1 µS/cm
Sample length	150 m
Habitat assessment score	159 (suboptimal)

Fish species	Number
Blacknose Dace	141
Creek Chub	68
White Sucker	5
Bluegill	20
Smallmouth Bass	1

Recommendation: No need to sample again.

BURNT MEADOW BROOK

Activity: Assessment of Wild Brook Trout	**Drainage:** Wanaque River
Location: Fire Road off Burnt Meadow Rd. (Hewitt), around house #409	**County:** Passaic
Date: August 5, 2013	**Municipality:** West Milford

Summary

Backpack electrofished this previously un-sampled Trout Production catchment. Very little water was present at this remote location along a fire road. Only 2 Creek Chubs were collected. No trout were collected. No need to sample again.

Water Chemistry & Habitat	
Water temperature	17.0°C
Dissolved oxygen	7.40 mg/L
pH	5.6
Alkalinity	6 mg/L as $CaCO_3$
Specific conductance	34.5 µS/cm
Sample length	150 m
Habitat assessment score	147 (suboptimal)

Fish species	Number
Creek Chub	2

Recommendation: No need to sample again.

BURNT MEADOW BROOK

Activity: Assessment of Wild Brook Trout	**Drainage:** Wanaque River
Location: Colfax Drive (cul-de-sac), upstream	**County:** Passaic
Date: July 30, 2013	**Municipality:** Ringwood Boro.

Summary

Backpack electrofished this previously un-sampled Trout Production catchment. Good flow through runs and riffles. Residential lawns along this stretch were mowed up to the stream bank's edge. Informed one of the home owners as to the stabilization advantages of allowing vegetation to flourish on the stream banks. Creek Chubs, White Suckers, Common Shiners, Blacknose Dace, Redfin Pickerel, Largemouth Bass, Bluegills, and 43 Brown Trout (37 YOY) were collected.

Water Chemistry & Habitat	
Water temperature	18.5°C
Dissolved oxygen	9.22 mg/L
pH	7.71
Alkalinity	38.5 mg/L as $CaCO_3$
Specific conductance	169.2 µS/cm
Sample length	150 m
Habitat assessment score	137 (suboptimal)

Fish species	Number
Redfin Pickerel	2
Common Shiner	16
Blacknose Dace	134
Creek Chub	87
White Sucker	7
Bluegill	3
Largemouth Bass	3
Brown Trout (y-o-y)	37 (61 – 97 mm)
Brown Trout (older than y-o-y)	6 (165 – 231 mm)

Recommendation: No need to sample again.

BURNT MEADOW BROOK

Activity: Assessment of Wild Brook Trout	**Drainage:** Wanaque River
Location: Magee Road bridge, approximately 200m upstream	**County:** Passaic
Date: July 30, 2013	**Municipality:** Ringwood Boro.

Summary

Backpack electrofished this previously un-sampled Trout Production catchment. Very little water present with very low flows. Stream banks were well stabilized with vegetation. Blacknose Dace, Creek Chubs, Redfin Pickerel, Largemouth Bass, Pumpkinseed and 3 Brown Trout (2 YOY) were collected.

Water Chemistry & Habitat	
Water temperature	18.0°C
Dissolved oxygen	8.96 mg/L
pH	7.6
Alkalinity	38.0 mg/L as $CaCO_3$
Specific conductance	167.8 µS/cm
Sample length	150 m
Habitat assessment score	129 (suboptimal)

Fish species	Number
Redfin Pickerel	7
Blacknose Dace	3
Creek Chub	27
Pumpkinseed	1
Bluegill	3
Largemouth Bass	1
Brown Trout (y-o-y)	3 (81 – 103 mm)

Recommendation: No need to sample again.

BURNT MEADOW BROOK (trib.) (Harrison Mtn. Lake Outlet)

Activity: Assessment of Wild Brook Trout	**Drainage:** Ramapo River
Location: Art Street Bridge, downstream	**County:** Passaic
Date: July 30, 2013	**Municipality:** Ringwood Boro.

Summary

Backpack electrofished this previously un-sampled Trout Production catchment just below the outlet of Harrison Mountain Lake. Very little water present. Portions of the stream bottom appeared to be covered in iron oxide flocculant. Creek Chubs, Bluegills, and Blacknose Dace were collected. No trout were collected.

Water Chemistry & Habitat	
Water temperature	22.2°C
Dissolved oxygen	6.97 mg/L
pH	7.34
Alkalinity	32.1 mg/L as $CaCO_3$
Specific conductance	112.7 µS/cm
Sample length	150 m
Habitat assessment score	125 (suboptimal)

Fish species	Number
Blacknose Dace	23
Creek Chub	3
Bluegill	2

Recommendation: No need to sample again.

BURNT MEADOW BROOK (trib.)(Lake Sonoma Outlet)

Activity: Assessment of Wild Brook Trout	**Drainage:** Wanaque
Location: Fire Road off Burnt Meadow Rd. (Hewitt) road around house #409	**County:** Passaic
Date: August 5, 2013	**Municipality:** West Milford

Summary

Backpack electrofished this previously un-sampled Trout Production catchment. Very little water present in this deep boulder lined gorge. Blacknose Dace and Longnose Dace were collected. No trout were collected.

Water Chemistry & Habitat	
Water temperature	18.4°C
Dissolved oxygen	7.09 mg/L
pH	6.15
Alkalinity	14.0 mg/L as $CaCO_3$
Specific conductance	37.6 µS/cm
Sample length	150 m
Habitat assessment score	145 (suboptimal)

Fish species	Number
Blacknose Dace	26
Longnose Dace	4

Recommendation: No need to sample again.

FOX BROOK

Activity: Assessment of Wild Brook Trout	**Drainage:** Ramapo River
Location: Camp Glen Grey (Bergen County Park)	**County:** Bergen
Date: July 25, 2013	**Municipality:** Mahwah

Summary

Backpack electrofished this previously un-sampled Trout Production catchment. Very little water present in this brook that is, no doubt, impacted by this high use day camp. A ½" diameter pipe, used for water withdrawal during higher flows, was present. No fish were collected. Frogs and salamanders were present.

Water Chemistry & Habitat	
Water temperature	18.7°C
Dissolved oxygen	6.29 mg/L
pH	6.03
Alkalinity	4.0 mg/L as $CaCO_3$
Specific conductance	34.9 µS/cm
Sample length	150 m
Habitat assessment score	106 (marginal)

Fish species	Number
No Fish Collected	

Recommendation: No need to sample again.

HEWITT BROOK

Activity: Assessment of Wild Brook Trout	**Drainage:** Wanaque River
Location: Burnt Meadow Road bridge	**County:** Passaic
Date: July 23, 2013	**Municipality:** West Milford

Summary

Backpack electrofished this previously un-sampled Trout Production catchment. Good flow, through cobbles with well stabilized stream banks. Blacknose Dace, Creek Chubs, and 11 Brook Trout (3 YOY) were collected.

Water Chemistry & Habitat	
Water temperature	21.3°C
Dissolved oxygen	7.58 mg/L
pH	7.31
Alkalinity	12.0 mg/L as $CaCO_3$
Specific conductance	54.8 μS/cm
Sample length	150 m
Habitat assessment score	182 (optimal)

Fish species	Number
Blacknose Dace	31
Creek Chub	9
Brook Trout (y-o-y)	3 (63 – 68 mm)
Brook Trout (older than y-o-y)	8 (111 – 160 mm)

Recommendation: Routine monitoring recommended.

HEWITT BROOK (trib.) (Outlet of Green Turtle Pond)

Activity: Assessment of Wild Brook Trout	**Drainage:** Wanaque River
Location: Awosting Road, immediately downstream Green Turtle Pond outlet	**County:** Passaic
Date: July 23, 2013	**Municipality:** West Milford

Summary

Backpack electrofished this previously un-sampled Trout Production catchment just downstream of the Green Turtle Pond outlet. Good flow with well stabilized stream banks. However, part of the sampling stretch was within a 5.5' diameter concrete culvert, which in combination with road run-off, undoubtedly impacts this brook. Creek Chubs, Blacknose Dace, Pumpkinseed, Yellow Bullhead, and Bluegills were collected. No trout were collected.

Water Chemistry & Habitat	
Water temperature	27.1°C
Dissolved oxygen	6.27 mg/L
pH	7.45
Alkalinity	17.0 mg/L as $CaCO_3$
Specific conductance	103.9 μS/cm
Sample length	150 m
Habitat assessment score	127 (suboptimal)

Fish species	Number
Blacknose Dace	30
Creek Chub	18
Yellow Bullhead	1
Pumpkinseed	1
Bluegill	4

Recommendation: No need to sample again.

MILL BROOK

Activity: Evaluate Cessation of Stocking	**Drainage:** Rockaway River
Location: Mill Brook Road bridge, downstream end 2m below Mill Brook Rd. bridge	**County:** Morris
Date: August 8, 2013	**Municipality:** Randolph Twp.

Summary

This location has been surveyed two times (1997 and 2013). The electrofishing survey conducted in 1997 over a 107 m (350 ft) long stretch documented 64 wild Brown Trout. Of these, 31 were young-of-the year (y-o-y), 69 – 99 mm; the remaining 29 were older fish, 136 – 268 mm. The minimum harvestable size in 1997 was 178 mm (7 in) and of the 64 trout encountered, 13 were harvestable trout, and 4 were larger than 229 mm (9 in). In 2005 trout stocking was discontinued to allow the wild trout to provide a recreational trout fishery. In 2008 the statewide minimum harvestable size for trout was increased to 229 mm (9 in).

This site was re-surveyed in 2013 over a longer, 150 m (492 ft) section and 138 Brown Trout were encountered (51 y-o-y and 87 older fish) and of these, four were harvestable-sized. Based upon this limited data, it appears that this self-sustaining Brown Trout population has remained relatively stable following the cessation of trout stocking and is capable of providing a trout fishery for anglers who enjoy catching trout that are generally smaller than a stocked trout (stocked at 10.5 in average size).

Water Chemistry & Habitat	
Water temperature	17.4°C
Dissolved oxygen	8.82 mg/L
pH	6.48
Alkalinity	39.0 mg/L as $CaCO_3$
Specific conductance	468.6 µS/cm
Sample length	150 m
Habitat assessment score	136 (suboptimal)

Fish species	**Number**
Blacknose Dace	16
White Sucker	1
Brown Trout (y-o-y)	51 (57 – 96 mm)
Brown Trout (older than y-o-y)	87 (118 – 266 mm)

Recommendation: The wild trout population is capable of providing a fishery for anglers who enjoy catching trout that are generally smaller than spring-stocked hatchery trout. Therefore, resumption of trout stocking is not recommended. This stream should continue to be monitored in accordance with the established schedule (every 20 years).

MILL BROOK

Activity: Evaluate Cessation of Stocking	**Drainage:** Rockaway River
Location: Palmer Road bridge, 5m upstream.	**County:** Morris
Date: August 8, 2013	**Municipality:** Denville Twp.

Summary

This location has been surveyed two times (1997 and 2013). The electrofishing survey conducted in 1997 over a 107 m (350 ft) long stretch documented 14 Brown Trout ranging in size from 165 – 285 mm (6.5 – 11.2 in); none of these were young-of-the year (y-o-y). The minimum harvestable size for trout in 1997 was 178 mm (7 in) and 10 of the trout encountered in 1997 were harvestable. One stocked rainbow trout measuring 295 mm (11.6 in) was also encountered. In 2005 trout stocking was discontinued to allow the wild trout to provide a recreational trout fishery. In 2008 the statewide minimum harvestable size for trout was increased to 229 mm (9 in).

When this site was re-surveyed in 2013, over a longer, 150 m (492 ft) section, 12 Brown Trout were encountered. Similar to the 1997 survey, no y-o-y were present. None of the trout were harvestable. Based upon this limited data, it appears that this self-sustaining Brown Trout population has remained relatively stable. The survey reach scored poorly for certain habitat parameters and indicated that sedimentation, riparian vegetation disruption and narrow riparian zones are problematic and likely negatively impact trout reproduction in this stream reach. The lack of y-o-y in the 1997 survey suggests that this has been an ongoing problem for this stream reach. Although the trout fishery in this reach is not likely to satisfy anglers accustomed to catching larger hatchery trout, those who enjoy catching smaller, wild trout would likely find this fishery satisfactory.

Water Chemistry & Habitat	
Water temperature	18.3°C
Dissolved oxygen	7.87 mg/L
pH	6.74
Alkalinity	35.0 mg/L as $CaCO_3$
Specific conductance	395.6 µS/cm
Sample length	150 m
Habitat assessment score	120 (suboptimal)

Fish species	**Number**
American Brook Lamprey	2
Eastern Mudminnow	46
Blacknose Dace	27
Longnose Dace	1
Creek Chub	7
Fallfish	9
White Sucker	21
Yellow Bullhead	1
Margined Madtom	1
Tessellated Darter	27
Brown Trout (older than y-o-y)	12 (151 – 212 mm)

Recommendation: The wild trout population is capable of providing a fishery for anglers who enjoy catching trout that are generally smaller than spring-stocked hatchery trout. Therefore, resumption of trout stocking is not recommended. This stream should continue to be monitored in accordance with the established schedule (every 20 years).

RAMAPO RIVER (trib.) (Lake Tamarack Outlet)

Activity: Assessment of Wild Brook Trout	**Drainage:** Ramapo River
Location: Overlook Drive (cul-de-sac), upstream	**County:** Bergen
Date: July 25, 2013	**Municipality:** Oakland

Summary

Backpack electrofished this previously un-sampled Trout Production catchment in the vicinity of a relatively new housing development. Very low flow and very little water present. A Pumpkinseed and Bluegills were collected. No trout were collected.

Water Chemistry & Habitat	
Water temperature	18.2°C
Dissolved oxygen	8.43 mg/L
pH	6.22
Alkalinity	15.0 mg/L as $CaCO_3$
Specific conductance	196.9 µS/cm
Sample length	150 m
Habitat assessment score	115 (suboptimal)

Fish species	Number
Pumpkinseed	1
Bluegill	44

Recommendation: No need to sample again.

RUSSIA BROOK (trib.)(S. Of Mt. Paul)

Activity: Assessment of Wild Brook Trout	**Drainage:** Rockaway River
Location: Mt. Paul Road, St. Paul's Monastery	**County:** Morris
Date: August 15, 2013	**Municipality:** Jefferson Twp.

Summary

Backpack electrofished this previously un-sampled Trout Production catchment on the grounds of a monastery that was recently acquired by the county. Minimal water and large cobbles / boulders made sampling difficult. Only 1 Largemouth Bass was collected. However, 3 trout were observed, but evaded capture.

Water Chemistry & Habitat	
Water temperature	19.0°C
Dissolved oxygen	6.95 mg/L
pH	7.74
Alkalinity	17.0 mg/L as $CaCO_3$
Specific conductance	69.4 µS/cm
Sample length	150 m
Habitat assessment score	158 (suboptimal)

Fish species	Number
Largemouth Bass	1

Recommendation: Resample to verify species of trout.

Surveys in the Raritan Region
(Raritan, Arthur Kill, Raritan Bay, Shrewsbury, and Navesink)

CAKEPOULIN CREEK

Activity: General Fisheries Survey	**Drainage:** Raritan River S/Br
Location: Hamden Road, 52.8m upstream of confluence with Raritan River S/Br.	**County:** Hunterdon
Date: August 30, 2013	**Municipality:** Franklin Twp.

Summary

An electrofishing survey was conducted along Cakepoulin (Capoolong) Creek following a stream habitat Activity funded by the US Department of Agriculture's Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQUIP). This grant program provides financial and technical assistance to agricultural producers to help plan and implement conservation practices that address natural resource concerns and for opportunities to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland. The Activity restored the original dry stream bed that was abandoned following a large log/debris jam that rerouted the stream. Fish habitat was improved by creating pool, riffle, run sequences. Six wild brown trout were found ranging from 3.7-8.9 inches (95-225 mm). Other species encountered were Blacknose Dace, Longnose Dace, Creek Chub, Common Shiner, Spottail Shiner, White Sucker, Tessellated Darter, Shield Darter, Margined Madtom, Green Sunfish, Redbreast Sunfish, and American Eel.

Water Chemistry & Habitat	
Water temperature	19.6°C
Dissolved oxygen	7.23 mg/L
pH	7.71
Alkalinity	54.0 mg/L as $CaCO_3$
Specific conductance	203.8 µS/cm
Sample length	150 m
Habitat assessment score	167 (optimal)

Fish species	Number
American Eel	29
Common Shiner	10
Spottail Shiner	1
Blacknose Dace	136
Longnose Dace	97
Creek Chub	8
White Sucker	54
Margined Madtom	4
Green Sunfish	3
Redbreast Sunfish	1
Tessellated Darter	55
Shield Darter	1
Brown Trout (y-o-y)	2 (95 – 103mm)
Brown Trout (older than y-o-y)	4 (118 – 225mm)

Recommendation: This stream should be monitored over time, due to the small trout population and to assess the outcome of the stream habitat Activity.

LAMINGTON (BLACK) RIVER

Activity: Native Fishes	**Drainage:** Raritan River N/Br
Location: Milnor Road, old dam upstream of confluence with Raritan River N/Br.	**County:** Somerset
Date: July 24, 2013	**Municipality:** Bedminster Twp.

Summary

The Lamington River was electrofished in Burnt Mills, upstream of its confluence with the Raritan River North Branch on July 24. The survey was conducted for two primary reasons; first to determine in any stocked trout were holding over from the spring stocking and second to look for native species such as the bridle shiner which was documented in this section in 1973. No trout were encountered and water temperatures were 73.4F (23.0C). Bridle shiners were not found, which is not surprising as they are disappearing throughout their native range. The only relatively rare species encountered is the shield darters, in which 16 were found. This information is important to the mapping and assessment of our native fishes.

Water Chemistry & Habitat	
Water temperature	23.0°C
Dissolved oxygen	7.78 mg/L
pH	7.66
Alkalinity	50.0 mg/L as $CaCO_3$
Specific conductance	247.6 µS/cm
Sample length	150 m
Habitat assessment score	163 (optimal)

Fish species	Number
American Brook Lamprey	1
American Eel	67
Redfin Pickerel	1
Spottail Shiner	3
Spotfin Shiner	6
White Sucker	26
Yellow Bullhead	4
Margined Madtom	17
Banded Killifish	12
Rock Bass	10
Green Sunfish	5
Bluegill	4
Redbreast Sunfish	50
Smallmouth Bass	1
Largemouth Bass	1
Tessellated Darter	38
Shield Darter	16

Recommendation: No further sampling warranted at this location, however additional surveys should be conducted up and downstream.

MILLSTONE RIVER

Activity: General Fisheries Survey	**Drainage:** Millstone River
Location: Griggstown causeway, survey ended at riffle under bridge	**County:** Somerset
Date: October 16, 2013	**Municipality:** Montgomery Twp.

Summary

The Millstone River was sampled above and below the dam at the Wilhousky Street Bridge (Manville / Weston Causeway) using the Smith-Root electrofishing boat to gather fisheries information above and below the dam prior to dam removal, which is planned in the near future. These surveys provided an excellent opportunity to gather general fisheries information to assist in the management of the lower Millstone and Raritan rivers. This system supports a diverse recreational fishery composed of over twenty species. These surveys produced largemouth and smallmouth bass, walleye, four catfish species (including the first documented flathead catfish in the watershed), striped bass, pickerel, an assortment of panfish including sunfish and yellow perch, common carp, and American eel in addition to a variety of non-sport fish. One species of interest was the comely shiner, a species relatively rare in New Jersey. Several species were collected only below the dam, indicating the Weston Causeway dam may prevent upstream movement. For example, 6 walleye were collected, ranging from 17 inches and 1.7 lbs. up to 27 inches and 6.7 lbs., all below the dam, and the probably source being the Raritan River, via the D & R Canal, via the Delaware River as no walleye are stocked within the watershed.

Water Chemistry & Habitat	
Water temperature	16.9°C
Dissolved oxygen	6.70 mg/L
pH	7.17
Alkalinity	53.0 mg/L as $CaCO_3$
Specific conductance	373.1 µS/cm
Sample length	150 m
Habitat assessment score	113 (suboptimal)

Recommendation: No further sampling warranted at this location.

Fish species	Number
American Eel	198
Comely Shiner	11
Satinfin Shiner	24
Common Shiner	6
Spottail Shiner	108
Swallowtail Shiner	5
Spotfin Shiner	9
Longnose Dace	8
Fallfish	3
White Sucker	10
Yellow Bullhead	5
Brown Bullhead	1
Channel Catfish	1
Margined Madtom	3
Banded Killifish	8
Rock Bass	1
Green Sunfish	8
Pumpkinseed	2
Bluegill	12
Redbreast Sunfish	58
Largemouth Bass	4
Black Crappie	2
Tessellated Darter	108
Shield Darter	18

MILLSTONE RIVER

Activity: General Fisheries Survey	**Drainage:** Millstone River
Location: Blackwells Mills Road bridge, 32m Downstream, ended at dam	**County:** Somerset
Date: October 16, 2013	**Municipality:** Franklin Twp.

Summary

The Millstone River was sampled above and below the dam at the Wilhousky Street Bridge (Manville / Weston Causeway) using the Smith-Root electrofishing boat to gather fisheries information above and below the dam prior to dam removal, which is planned in the near future. These surveys provided an excellent opportunity to gather general fisheries information to assist in the management of the lower Millstone and Raritan rivers. This system supports a diverse recreational fishery composed of over twenty species. These surveys produced largemouth and smallmouth bass, walleye, four catfish species (including the first documented flathead catfish in the watershed), striped bass, pickerel, an assortment of panfish including sunfish and yellow perch, common carp, and American eel in addition to a variety of non-sport fish. One species of interest was the comely shiner, a species relatively rare in New Jersey. Several species were collected only below the dam, indicating the Weston Causeway dam may prevent upstream movement. For example, 6 walleye were collected, ranging from 17 inches and 1.7 lbs. up to 27 inches and 6.7 lbs., all below the dam, and the probably source being the Raritan River, via the D & R Canal, via the Delaware River as no walleye are stocked within the watershed.

Water Chemistry & Habitat	
Water temperature	15.8°C
Dissolved oxygen	8.37 mg/L
pH	7.51
Alkalinity	54.0 mg/L as $CaCO_3$
Specific conductance	355.3 µS/cm
Sample length	150 m
Habitat assessment score	115 (suboptimal)

Recommendation: No further sampling warranted at this location.

Fish species	**Number**
Sea Lamprey	1
American Eel	161
Chain Pickerel	2
Satinfin Shiner	7
Common Shiner	1
Spottail Shiner	3
Spotfin Shiner	1
Longnose Dace	2
Fallfish	16
Creek Chubsucker	1
Yellow Bullhead	2
Channel Catfish	2
Margined Madtom	3
Banded Killifish	2
Rock Bass	3
Green Sunfish	4
Pumpkinseed	8
Bluegill	49
Redbreast Sunfish	86
Lepomis Hybrid	1
Tessellated Darter	38
Shield Darter	10

MILLSTONE RIVER

Activity: General Fisheries Survey	**Drainage:** Millstone River
Location: Wilhousky St. (Manville/ Weston Causeway) downstream of dam.	**County:** Somerset
Date: July 19, 2013	**Municipality:** Manville Boro.

Summary

The Millstone River was sampled above and below the dam at the Wilhousky Street Bridge (Manville / Weston Causeway) using the Smith-Root electrofishing boat to gather fisheries information above and below the dam prior to dam removal, which is planned in the near future. These surveys provided an excellent opportunity to gather general fisheries information to assist in the management of the lower Millstone and Raritan rivers. This system supports a diverse recreational fishery composed of over twenty species. These surveys produced Largemouth and Smallmouth Bass, Walleye, four catfish species (including the first documented Flathead Catfish in the watershed), Striped Bass, Chain Pickerel, an assortment of panfish including sunfish and Yellow Perch, Common Carp, and American Eel in addition to a variety of non-sport fish. One species of interest was the Comely Shiner, a species relatively rare in New Jersey. Several species were collected only below the dam, indicating the Weston Causeway dam may prevent upstream movement. For example, 6 Walleye were collected, ranging from 17 inches and 1.7 lbs. up to 27 inches and 6.7 lbs., all below the dam, and the probably source being the Raritan River, via the D & R Canal, via the Delaware River as no Walleye are stocked within the watershed.

Water Chemistry & Habitat	
Water temperature	-
Dissolved oxygen	-
pH	-
Alkalinity	-
Specific conductance	-
Sample length	800 m
Habitat assessment score	-

Fish species	Number
American Eel	~50
Gizzard Shad	1
Common Carp	~21
Comely Shiner	2
Satinfin Shiner	6
Spottail Shiner	1
White Sucker	4
Yellow Bullhead	2
Channel Catfish	3
Flathead Catfish	1
Gambusia sp.	20
Striped Bass	1
Bluegill	~20
Redbreast Sunfish	~100
Smallmouth Bass	4
Largemouth Bass	2
Yellow Perch	5
Walleye	6

Recommendation: May consider re-sampling if / when dam is removed in the future.

NON- STANDARDIZED SURVEY

MILLSTONE RIVER

Activity: General Fisheries Survey	**Drainage:** Millstone River
Location: Wilhousky St. (Manville/ Weston Causeway) immediately upstream of dam.	**County:** Somerset
Date: July 19, 2013	**Municipality:** Manville Boro.

Summary

The Millstone River was sampled above and below the dam at the Wilhousky Street Bridge (Manville / Weston Causeway) using the Smith-Root electrofishing boat to gather fisheries information above and below the dam prior to dam removal, which is planned in the near future. These surveys provided an excellent opportunity to gather general fisheries information to assist in the management of the lower Millstone and Raritan rivers. This system supports a diverse recreational fishery composed of over twenty species. These surveys produced Largemouth and Smallmouth Bass, Walleye, four catfish species (including the first documented Flathead Catfish in the watershed), Striped Bass, Chain Pickerel, an assortment of panfish including sunfish and Yellow Perch, Common Carp, and American Eel in addition to a variety of non-sport fish. One species of interest was the Comely Shiner, a species relatively rare in New Jersey. Several species were collected only below the dam, indicating the Weston Causeway dam may prevent upstream movement. For example, 6 Walleye were collected, ranging from 17 inches and 1.7 lbs. up to 27 inches and 6.7 lbs., all below the dam, and the probably source being the Raritan River, via the D & R Canal, via the Delaware River as no Walleye are stocked within the watershed.

Water Chemistry & Habitat	
Water temperature	-
Dissolved oxygen	-
pH	-
Alkalinity	-
Specific conductance	-
Sample length	700 m
Habitat assessment score	-

Fish species	Number
American Eel	~200
Gizzard Shad	~20
Redfin Pickerel	1
Chain Pickerel	1
Common Carp	~20
Golden Shiner	6
Satinfin Shiner	1
Spottail Shiner	8
Spotfin Shiner	1
White Catfish	1
Yellow Bullhead	1
Pumpkinseed	~20
Bluegill	~30
Redbreast Sunfish	~100
Smallmouth Bass	1
Largemouth Bass	5
Yellow Perch	~10

Recommendation: May consider re-sampling if / when dam is removed in the future.

NON- STANDARDIZED SURVEY

NOMAHEGAN BROOK

Activity: General Fisheries Survey	**Drainage:** Rahway River
Location: Park Drive, Echo Lake Co. Park, below Lower Echo Park Pond	**County:** Union
Date: June 15, 2013	**Municipality:** Mountainside Boro.

Summary

Participated in Union County's annual BioBlitz at Rahway River Park on June 15. With the help of Steve Jandoli (NJDEP Green Acres Program), wildlife worker Scott Collenburg, and seasonal workers Bill King, Luke Diglio, Tom Peck, Jamie Darrow, and Brian Neilan, the fish team sampled the Rahway River, Nomahegan Brook, Lower Echo Park Pond, Westfield Pond, and Lenape Park Pond. The team used a variety of sampling methods including electro-shocking (using mild electrical currents to temporarily stun the fish for easy capture and identification) and seining. The fish diversity is moderate, consisting of 14 species, with the Banded Killifish and various sunfish the most prevalent. All but 5 species are native to New Jersey waters. Non-native species include Green Sunfish, Bluegill, Largemouth Bass, Goldfish, and Western Mosquitofish. The warmwater fish assemblage encountered provides recreational opportunities for both the novice naturalist and the expert angler including Largemouth Bass and a variety of sunfish species. In addition, Lower Echo Park Pond is stocked with trout and Channel Catfish. Nomahegan Park Pond will be stocked annually with trout beginning for the 2014 fishing season. The fish team also conducted one waterfront public presentation, consisting of a fish collection demonstration by means of the use of a backpack electrofishing unit and a twenty-foot seine. The presentation also touched upon the job of a fisheries biologist, a summary of fishes encountered, and field identification.

Water Chemistry & Habitat	
Water temperature	-
Dissolved oxygen	-
pH	-
Alkalinity	-
Specific conductance	-
Sample length	-
Habitat assessment score	-

Fish species	Number
American Eel	present
Golden Shiner	present
Yellow Bullhead	present
Brown Bullhead	present
Banded Killifish	present
Green Sunfish	present
Pumpkinseed	present
Bluegill	present
Largemouth Bass	present

Recommendation: No further sampling warranted at this location.

NON- STANDARDIZED SURVEY

NOMAHEGAN BROOK

Activity: General Fisheries Survey	**Drainage:** Rahway River
Location: Nomahegan Drive, Lenape Park, access along walking path.	**County:** Union
Date: June 15, 2013	**Municipality:** Westfield Town

Summary

Participated in Union County's annual BioBlitz at Rahway River Park on June 15. With the help of Steve Jandoli (NJDEP Green Acres Program), wildlife worker Scott Collenburg, and seasonal workers Bill King, Luke Diglio, Tom Peck, Jamie Darrow, and Brian Neilan, the fish team sampled the Rahway River, Nomahegan Brook, Lower Echo Park Pond, Westfield Pond, and Lenape Park Pond. The team used a variety of sampling methods including electro-shocking (using mild electrical currents to temporarily stun the fish for easy capture and identification) and seining. The fish diversity is moderate, consisting of 14 species, with the Banded Killifish and various sunfish the most prevalent. All but 5 species are native to New Jersey waters. Non-native species include Green Sunfish, Bluegill, Largemouth Lass, Goldfish, and Western Mosquitofish. The warmwater fish assemblage encountered provides recreational opportunities for both the novice naturalist and the expert angler including largemouth bass and a variety of sunfish species. In addition, Lower Echo Park Pond is stocked with trout and channel catfish. Nomahegan Park Pond will be stocked annually with trout beginning for the 2014 fishing season. The fish team also conducted one waterfront public presentation, consisting of a fish collection demonstration by means of the use of a backpack electrofishing unit and a twenty-foot seine. The presentation also touched upon the job of a fisheries biologist, a summary of fishes encountered, and field identification.

Water Chemistry & Habitat	
Water temperature	-
Dissolved oxygen	-
pH	-
Alkalinity	-
Specific conductance	-
Sample length	-
Habitat assessment score	-

Fish species	Number
White Sucker	present
Brown Bullhead	present
Banded Killifish	present
Green Sunfish	present
Pumpkinseed	present
Bluegill	present
Largemouth Bass	present
Tessellated Darter	present

Recommendation: No further sampling warranted at this location.

NON- STANDARDIZED SURVEY

PIKE RUN

Activity: Native Species Inventory	**Drainage:** Millstone River
Location: Montgomery Park (Harlington Road), 118m downstream of pedestrian bridge	**County:** Somerset
Date: July 31, 2013	**Municipality:** Montgomery

Summary

An electrofishing survey was conducted at Pike Run at the request of the Stony Brook Millstone Watershed Association as a follow-up to a stream restoration Activity on a portion of Pike Run in Montgomery Park. The Division conducted a similar survey in 2007 prior to the stream restoration Activity. This stream is a hotbed for native species diversity with 16 native species, including rare native minnow species such as Bridle and Comely Shiners and 4 non-native species. The fish assemblage remained relatively unchanged over the six-year time frame.

Water Chemistry & Habitat	
Water temperature	22.8°C
Dissolved oxygen	11.21 mg/L
pH	8.76
Alkalinity	75.0 mg/L as $CaCO_3$
Specific conductance	347.3 µS/cm
Sample length	150 m
Habitat assessment score	136 (suboptimal)

Fish species	Number
American Eel	20
Redfin Pickerel	6
Golden Shiner	33
Comely Shiner	2
Satinfin Shiner	19
Bridle Shiner	29
Common Shiner	64
Spottail Shiner	35
Swallowtail Shiner	151
White Sucker	91
Creek Chubsucker	7
Yellow Bullhead	3
Banded Killifish	15
Rock Bass	6
Green Sunfish	21
Pumpkinseed	19
Bluegill	14
Redbreast Sunfish	8
Largemouth Bass	5
Tessellated Darter	373

Recommendation: Survey additional streams in the vicinity to search for native fishes.

RAHWAY RIVER

Activity: General Fisheries Survey	**Drainage:** Rahway River
Location: Springfield Ave., Nomahegan Co. Park, access via walking path behind Park Pond.	**County:** Union
Date: June 15, 2013	**Municipality:** Cranford Twp.

Summary

Participated in Union County's annual BioBlitz at Rahway River Park on June 15. The fish team sampled the Rahway River, Nomahegan Brook, Lower Echo Park Pond, Westfield Pond, and Lenape Park Pond. The team used a variety of sampling methods including electro-shocking and seining. The fish diversity is moderate, consisting of 14 species, with the Banded Killifish and various sunfish the most prevalent. All but 5 species are native to New Jersey waters. Non-native species include Green Sunfish, Bluegill, Largemouth bass, Goldfish, and Western Mosquitofish. The warmwater fish assemblage encountered provides recreational opportunities for both the novice naturalist and the expert angler including Largemouth Bass and a variety of sunfish species. Specific results for this location are found below.

Water Chemistry & Habitat	
Water temperature	-
Dissolved oxygen	-
pH	-
Alkalinity	-
Specific conductance	-
Sample length	-
Habitat assessment score	-

Fish species	Number
Mosquitofish sp.	present
Green Sunfish	present
Pumpkinseed	present
Bluegill	present
Largemouth Bass	present

Recommendation: No further sampling warranted

NON- STANDARDIZED SURVEY

RAHWAY RIVER

Activity: General Fisheries Survey	**Drainage:** Rahway River
Location: Kenilworth Blvd., Lenape Co. Park, upstream of dam near park entrance.	**County:** Union
Date: June 15, 2013	**Municipality:** Cranford Twp.

Summary

Participated in Union County's annual BioBlitz at Rahway River Park on June 15. The fish team sampled the Rahway River, Nomahegan Brook, Lower Echo Park Pond, Westfield Pond, and Lenape Park Pond. The team used a variety of sampling methods including electro-shocking and seining. The fish diversity is moderate, consisting of 14 species, with the Banded Killifish and various sunfish the most prevalent. All but 5 species are native to New Jersey waters. Non-native species include Green Sunfish, Bluegill, Largemouth Bass, Goldfish, and Western Mosquitofish. The warmwater fish assemblage encountered provides recreational opportunities for both the novice naturalist and the expert angler including Largemouth Bass and a variety of sunfish species. Specific results for this location are found below.

Water Chemistry & Habitat	
Water temperature	-
Dissolved oxygen	-
pH	-
Alkalinity	-
Specific conductance	-
Sample length	-
Habitat assessment score	-

Fish species	Number
American Eel	present
Banded Killifish	present
Mummichog	present
Mosquitofish sp.	present
Green Sunfish	present
Bluegill	present
Tessellated Darter	present

Recommendation: No further sampling warranted

NON- STANDARDIZED SURVEY

RARITAN RIVER N/ BR (trib) (Leone Pond)

Activity: General Fisheries Survey	**Drainage:** Raritan River N/Br
Location: Campbell Road, Leone property (site 1) 38m upstream of bridge upstream of pond.	**County:** Somerset
Date: August 23, 2013	**Municipality:** Bernardsville Boro.

Summary

Conducted two electrofishing surveys on an unnamed tributary to the North Branch of the Raritan River on August 23. Surveys were in response to a DEP watercourse restoration Activity in Bernardsville Borough, Somerset County. The restoration is a result of a violation in which the property owner re-aligned two meandering unnamed tributaries to form one straight channel for a distance of approximately 175 feet. Amy S. Greene Environmental Consultants were hired to conduct the restoration Activity, which was completed in 2009. Prior to the restoration effort, 5 wild Brown Trout were found, whereas four years later 18 wild Brown Trout were collected within the study area.

Water Chemistry & Habitat	
Water temperature	16.6°C
Dissolved oxygen	10.54 mg/L
pH	7.4
Alkalinity	27.0 mg/L as $CaCO_3$
Specific conductance	175.1 µS/cm
Sample length	150 m
Habitat assessment score	149 (suboptimal)

Fish species	Number
Blacknose Dace	136
Brown Trout (older than y-o-y)	18 (166 – 244mm)

Recommendation: No further sampling warranted.

RARITAN RIVER N/ BR (trib) (Leone Pond)

Activity: General Fisheries Survey	**Drainage:** Raritan River N/Br
Location: Campbell Road, Leone property (site 2) upstream of disturbed site on property.	**County:** Somerset
Date: August 23, 2013	**Municipality:** Bernardsville Boro.

Summary

Conducted two electrofishing surveys on an unnamed tributary to the North Branch of the Raritan River on August 23. Surveys were in response to a DEP watercourse restoration Activity in Bernardsville Borough, Somerset County. The restoration is a result of a violation in which the property owner re-aligned two meandering unnamed tributaries to form one straight channel for a distance of approximately 175 feet. Amy S. Greene Environmental Consultants were hired to conduct the restoration Activity, which was completed in 2009. Prior to the restoration effort, 5 wild Brown Trout were found, whereas four years later 18 wild Brown Trout were collected within the study area.

Water Chemistry & Habitat	
Water temperature	16.0°C
Dissolved oxygen	10.06 mg/L
pH	7.30
Alkalinity	25.0 mg/L as $CaCO_3$
Specific conductance	175.2 µS/cm
Sample length	150 m
Habitat assessment score	152 (suboptimal)

Fish species	Number
Blacknose Dace	51

Recommendation: No further sampling warranted.

RARITAN RIVER S/BR

Activity: Special Regulation Trout Area Inventory
Location: Claremont stretch, old stocking point.
Date: July 17, 2013

Drainage: Raritan River S/Br
County: Morris
Municipality: Washington Twp.

Summary

The Claremont Stretch, a 1.1 mile section of the Raritan River South Branch, was surveyed to assess the fish assemblage and the current Year Round Trout Conservation Area regulations. Two surveys were conducted at locations routinely monitored every few years, last of which was in 2007. Know for relatively abundant wild Brown and Brook Trout populations, only 24 Brook Trout were collected, which is a decline compared to the last survey in which 97 were collected. Slimy Sculpin experienced a similar trend dropping from 171 to 44. Brown Trout increased from 129 to 162. This section of stream will continue to be monitored.

Water Chemistry & Habitat	
Water temperature	22.9°C
Dissolved oxygen	8.90 mg/L
pH	8.10
Alkalinity	62 mg/L as $CaCO_3$
Specific conductance	364.1 µS/cm
Sample length	150 m
Habitat assessment score	163 (optimal)

Fish species	Number
American Brook Lamprey	10
Redfin Pickerel	3
Spottail Shiner	1
Blacknose Dace	169
Longnose Dace	27
Creek Chub	3
Fallfish	11
White Sucker	247
Redbreast Sunfish	1
Largemouth Bass	1
Tessellated Darter	135
Slimy Sculpin	23
Brook Trout (older than y-o-y)	6 (160 – 211mm)
Brown Trout (y-o-y)	17 (56 – 98mm)
Brown Trout (older than y-o-y)	101 (131 – 322mm)
Rainbow Trout (y-o-y)	1 (105mm)
Rainbow Trout (older than y-o-y)	1 (288mm)

Recommendation: Continue to monitor this Year Round Trout Conservation Area.

RARITAN RIVER S/BR

Activity: Special Regulation Trout Area Inventory	**Drainage:** Raritan River S/Br
Location: Claremont stretch, fiber optic crossing	**County:** Morris
Date: July 17, 2013	**Municipality:** Washington Twp.

Summary

The Claremont Stretch, a 1.1 mile section of the Raritan River South Branch, was surveyed to assess the fish assemblage and the current Year Round Trout Conservation Area regulations. Two surveys were conducted at locations routinely monitored every few years, last of which was in 2007. Know for relatively abundant wild Brown and Brook Trout populations, only 24 Brook Trout were collected, which is a decline compared to the last survey in which 97 were collected. Slimy sculpin experienced a similar trend dropping from 171 to 44. Brown Trout increased from 129 to 162. This section of stream will continue to be monitored.

Water Chemistry & Habitat	
Water temperature	21.2°C
Dissolved oxygen	8.44 mg/L
pH	8.09
Alkalinity	64 mg/L as $CaCO_3$
Specific conductance	364.8 µS/cm
Sample length	150 m
Habitat assessment score	159 (suboptimal)

Fish species	Number
American Brook Lamprey	21
American Eel	5
Golden Shiner	1
Blacknose Dace	19
Longnose Dace	34
Fallfish	5
White Sucker	92
White Perch	2
Green Sunfish	1
Pumpkinseed	1
Bluegill	2
Redbreast Sunfish	5
Largemouth Bass	2
Tessellated Darter	215
Yellow Perch	2
Slimy Sculpin	21
Brook Trout (older than y-o-y)	18 (155 – 192mm)
Brown Trout (y-o-y)	4 (61 – 95mm)
Brown Trout (older than y-o-y)	40 (133 – 500mm)

Recommendation: Continue to monitor this Year Round Trout Conservation Area.

RARITAN RIVER S/BR

Activity: Special Regulation Trout Area Inventory
Location: Ken Lockwood Gorge, boulder field.
Date: August 21, 2013

Drainage: Raritan River S/Br
County: Hunterdon
Municipality: Lebanon Twp.

Summary

The Ken Lockwood Gorge, a 2.5 mile section of the Raritan River South Branch, was surveyed to assess the fish assemblage and the current Year Round Trout Conservation Area regulations. Two surveys were conducted at locations routinely monitored every few years, last of which was in 2006 and 2007. Known for its great scenery and fish habitat, the Ken Lockwood Gorge is very popular among anglers and is primarily used by fly anglers. This section of the South Branch of the Raritan River is stocked by the Division during the spring and fall and has seen an increase in the amount of natural reproduction of trout in recent years. Recent data warrants the upgrade in NJ's Surface Water Quality Standards from *Trout Maintenance* to *Trout Production*, with the presence of young-of -the-year (YOY) Brown Trout. Wild Rainbow Trout and Brook Trout are also found in lesser abundance. Also, a wild Tiger Trout (brook and brown trout hybrid) measuring 6.7 inches was also encountered. Over the last three sampling events in 2006, 2007, and 2013, the total number of trout has increase from 96 to 126 to 212 respectively. When broken down by species, Brown Trout have increased in number from 84 and 73 to 150 in 2013, the Rainbow Trout have increased from 9 to 23 to 50, while Brook trout went from 30 to 2 to 11 respectively. The number of trout over 9 inches (general trout minimum size, although not applied on this Trout Conservation Area) has increased from 54 to 82 to 149 respectively. The number of trout over 15 inches (Trout Conservation area size limit) has increased from 0 to 2 to 6 respectively. Conditions during the summer of 2013 were particularly good for trout given the above average rainfall and subsequent stream flows. This section of stream will continue to be monitored as the Fish and Game Council has proposed to regulate the Ken Lockwood Gorge as a Catch and Release and artificial lures only for trout in 2013.

Water Chemistry & Habitat	
Water temperature	19.8°C
Dissolved oxygen	9.97 mg/L
pH	8.55
Alkalinity	92.0 mg/L as $CaCO_3$
Specific conductance	323.5 µS/cm
Sample length	150 m
Habitat assessment score	-

Recommendation: Continue to monitor this Catch and Release Area.

Fish species	Number
American Brook Lamprey	1
American Eel	2
Blacknose Dace	15
Longnose Dace	147
White Sucker	53
Margined Madtom	21
Redbreast Sunfish	1
Smallmouth Bass	29
Tessellated Darter	9
Brook Trout (older than y-o-y)	2 (235 – 278mm)
Brown Trout (y-o-y)	3 (99 – 109mm)
Brown Trout (older than y-o-y)	52 (132 – 380mm)
Rainbow Trout (older than y-o-y)	13 (144 – 337mm)

RARITAN RIVER S/BR

Activity: Special Regulation Trout Area Inventory	**Drainage:** Raritan River S/Br
Location: Ken Lockwood Gorge, 28m downstream of trestle.	**County:** Hunterdon
Date: August 21, 2013	**Municipality:** Lebanon Twp.

Summary

The Ken Lockwood Gorge, a 2.5 mile section of the Raritan River South Branch, was surveyed to assess the fish assemblage and the current Year Round Trout Conservation Area regulations. Two surveys were conducted at locations routinely monitored every few years, last of which was in 2006 and 2007. Known for its great scenery and fish habitat, the Ken Lockwood Gorge is very popular among anglers and is primarily used by fly anglers. This section of the South Branch of the Raritan River is stocked by the Division during the spring and fall and has seen an increase in the amount of natural reproduction of trout in recent years. Recent data warrants the upgrade in NJ's Surface Water Quality Standards from *Trout Maintenance* to *Trout Production*, with the presence of young-of -the-year (YOY) Brown Trout. Wild Rainbow Trout and Brook Trout are also found in lesser abundance. Also, a wild Tiger Trout (brook and brown trout hybrid) measuring 6.7 inches was also encountered. Over the last three sampling events in 2006, 2007, and 2013, the total number of trout has increase from 96 to 126 to 212 respectively. When broken down by species, Brown Trout have increased in number from 84 and 73 to 150 in 2013, the Rainbow Trout have increased from 9 to 23 to 50, while Brook trout went from 30 to 2 to 11 respectively. The number of trout over 9 inches (general trout minimum size, although not applied on this Trout Conservation Area) has increased from 54 to 82 to 149 respectively. The number of trout over 15 inches (Trout Conservation area size limit) has increased from 0 to 2 to 6 respectively. Conditions during the summer of 2013 were particularly good for trout given the above average rainfall and subsequent stream flows. This section of stream will continue to be monitored as the Fish and Game Council has proposed to regulate the Ken Lockwood Gorge as a Catch and Release and artificial lures only for trout in 2013.

Water Chemistry & Habitat	
Water temperature	18.4°C
Dissolved oxygen	9.14 mg/L
pH	8.21
Alkalinity	92.0 mg/L as $CaCO_3$
Specific conductance	324.9 µS/cm
Sample length	150 m
Habitat assessment score	-

Recommendation: Continue to monitor this Catch and Release Area.

Fish species	Number
American Brook Lamprey	1
American Eel	11
Blacknose Dace	52
Longnose Dace	34
White Sucker	144
Margined Madtom	3
Bluegill	1
Smallmouth Bass	17
Tessellated Darter	16
Brook Trout (older than y-o-y)	9
Brown Trout (y-o-y)	8 (87 – 112mm)
Brown Trout (older than y-o-y)	89 (121 – 405mm)
Rainbow Trout (older than y-o-y)	37 (251 – 540mm)
Tiger Trout	1 (171mm)

ROCKAWAY CK S/BR

Activity: Assessment and Classification	**Drainage:** Raritan River N/Br
Location: Knox Lane, 29.8m upstream of railroad trestle	**County:** Hunterdon
Date: July 9, 2013	**Municipality:** Clinton Twp.

Summary

An electrofishing survey was conducted to document the presence of young-of-the-year (YOY) trout in the headwaters of the South Branch of Rockaway Creek. Two Brown Trout were collected in the 150m survey ranging from 85mm (3.3 in) to 219mm (8.6 in). This YOY Brown Trout was the first documented in this section of the creek. Additional species collected include White Sucker, Creek Chub, Blacknose Dace, Longnose Dace, Tessellated Darter, Green Sunfish, Pumpkinseed, and Largemouth Bass. Additional stretches were conducted upstream and in an adjacent tributary to look for stocked trout or wild Brook Trout, however only wild Brown Trout were encountered.

Water Chemistry & Habitat	
Water temperature	21.8°C
Dissolved oxygen	6.52 mg/L
pH	7.19
Alkalinity	94.0 mg/L as $CaCO_3$
Specific conductance	306.2 µS/cm
Sample length	150 m
Habitat assessment score	159 (suboptimal)

Fish species	Number
Blacknose Dace	64
Longnose Dace	5
Creek Chub	64
White Sucker	15
Green Sunfish	1
Pumpkinseed	4
Largemouth Bass	1
Tessellated Darter	16
Brown Trout (y-o-y)	1 (85mm)
Brown Trout (older than y-o-y)	1 (219mm)

Recommendation: No further sampling warranted.

ROCKAWAY CK S/Br

Activity: General Fisheries Survey	**Drainage:** Raritan River N/Br
Location: Knox Lane, 66.7m downstream of railroad trestle	**County:** Hunterdon
Date: July 7, 2013	**Municipality:** Clinton Twp.

Summary

An electrofishing survey was conducted on the South Branch of Rockaway Creek to document the presence of trout in the headwaters. Six Brown Trout were collected in the survey ranging from 103mm (4.0 in) to 256mm (10.1 in). Additional stretches were conducted in the Rockaway Creek S/Br. an a nearby tributary to look for stocked trout or wild Brook Trout, however only wild Brown Trout were encountered.

Water Chemistry & Habitat	
Water temperature	21.2°C
Dissolved oxygen	-
pH	-
Alkalinity	-
Specific conductance	-
Sample length	154 m
Habitat assessment score	-

Fish species	Number
Brown Trout (y-o-y)	2 (103 – 104mm)
Brown Trout (older than y-o-y)	4 (194 – 256mm)

Recommendation: No further sampling warranted.

NON- STANDARDIZED SURVEY

ROCKAWAY CK S/BR (trib) (E. of Lebanon Field Office)

Activity: General Fisheries Survey	**Drainage:** Raritan River N/Br
Location: Knox Lane, tributary 26.5m upstream of railroad trestle	**County:** Hunterdon
Date: July 9, 2013	**Municipality:** Clinton Twp.

Summary

An electrofishing survey was conducted on this tributary of the South Branch of Rockaway Creek to document the presence of trout in the headwaters. Three adult Brown Trout were collected in the survey ranging from 209mm (8.2 in) to 225mm (8.9 in). Additional stretches were conducted in the Rockaway Creek S/Br. both upstream and downstream to look for stocked trout or wild Brook Trout, however only wild Brown Trout were encountered.

Water Chemistry & Habitat	
Water temperature	18.0°C
Dissolved oxygen	-
pH	-
Alkalinity	-
Specific conductance	-
Sample length	392 m
Habitat assessment score	-

Fish species	Number
Brown Trout (older than y-o-y)	3 (209 – 225mm)

Recommendation: No further sampling warranted.

NON- STANDARDIZED SURVEY

2013

DISSOLVED OXYGEN/ TEMPERATURE PROFILE DATA

Dissolved oxygen/temperature profiles are performed to determine a lakes ability to support trout throughout the harsh summer months. During the summer most New Jersey lakes deeper than 3 m (10 ft) thermally stratify. The epilimnion (surface waters) become too warm to support coldwater fishes (trout), and the metalimnion and hypolimnion (middle and bottom waters), while often cold enough for trout, often have dissolved oxygen levels too low to support trout (and other fish species). Only deep lakes (generally at least 15 m (50 ft) deep), that are not overly eutrophic, maintain sufficient levels of dissolved oxygen in some portion of the strata below the epilimnion during the summer and early fall. A water temperature-dissolved oxygen profile is conducted in the deepest part of a lake using a YSI meter with cable marked in one-foot increments. Measurements are generally taken at 5 to 10 foot intervals, but more frequently (1-ft increments) when marked changes are observed (typically in the metalimnion). A secchi disk (also marked in one-foot increments) is used to measure water transparency. The criteria used to determine trout-supporting water is water temperature $\leq$ 21ºC (69.8ºF) and dissolved oxygen $\geq$ 4 mg/L (Appendix A).

Surveys in the Northwest Region
(Upper Delaware River, Central Delaware River, and Wallkill)

Results of a temperature-dissolved oxygen profile conducted on Culvers Lake in 2013 to determine its trout supporting status. No trout supporting water (temperature ≤ 21ºC and dissolved oxygen ≥ 4 mg/L) was documented.

Waterbody	Culvers Lake
Region	Northwest
Drainage	Paulins Kill
County	Sussex
Survey date	8/5/13
Secchi Disk	4.5 ft

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
0	23.1	8.00
5	22.6	7.87
10	22.6	7.53
15	21.7	3.61
16	19.4	0.23
17	18.9	0.05
18	16.6	0.24
19	15.3	0.71
20	14.6	1.04
25	13.4	1.06
30	12.7	0.63
35	11.1	0.52
40	10.0	0.02
45	9.2	0.04

Results of three temperature-dissolved oxygen profiles conducted on Lake Hopatcong in 2013 to determine its trout supporting status. No trout supporting water (temperature ≤ 21ºC and dissolved oxygen ≥ 4 mg/L) was documented.

Waterbody	Lake Hopatcong (Chestnut Point)	**Waterbody**	Lake Hopatcong Raccoon Island
Region	Northwest	**Region**	Northwest
Drainage	Musconetcong River	**Drainage**	Musconetcong River
County	Morris/Sussex	**County**	Morris
Survey date	8/19/13	**Survey date**	8/19/13
Secchi Disk	9 ft	**Secchi Disk**	9 ft.

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)	Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
0	23.6	8.13	0	23.8	7.89
5	23.4	7.93	5	23.5	7.90
10	23.3	8.28	10	23.3	7.78
15	23.2	7.87	15	23.2	7.46
20	23.1	7.46	20	22.8	6.43
22	22.3	5.32	22	22.4	5.66
23	21.6	4.03	23	21.7	4.41
24	20.9	2.99	24	20.4	1.92
25	20.3	2.15	25	19.1	0.98
30	14.8	0.02	30	13.8	0.03
40	11.7	0.03	40	11.5	0.04
50	10.7	0.04	44	11.5	0.04

Waterbody	Lake Hopatcong Yacht Club
Region	Northwest
Drainage	Musconetcong River
County	Morris
Survey date	8/19/13
Secchi Disk	9 ft.

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
0	23.5	7.99
5	23.4	7.82
10	23.3	7.64
15	23.0	6.74
19	22.5	5.55
20	21.8	4.06
25	20.7	1.73
30	15.0	0.04

Results of a temperature-dissolved oxygen profile conducted on Merrill Creek Reservoir in 2013 to determine its trout supporting status. Boldfaced data indicate trout supporting water (temperature ≤ 21ºC and dissolved oxygen ≥ 4 mg/L). Data provided by the Merrill Creek Owners Group.

Waterbody	Merrill Creek Reservoir
Region	Northwest
Drainage	Pohatcong Creek
County	Warren
Survey date	8/16/14
Secchi Disk	-

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
0.0	23.7	7.9
6.6	23.2	7.9
13.1	23.1	8.0
19.7	22.9	7.9
26.2	**18.4**	**9.0**
32.8	**10.4**	**8.7**
39.4	**7.9**	**7.0**
45.9	**6.8**	**7.1**
52.5	**6.1**	**7.2**
59.1	**5.8**	**7.2**
65.6	**5.8**	**7.0**
72.2	**5.5**	**7.3**
78.7	**5.4**	**7.3**
85.3	**5.3**	**7.0**
91.9	**5.3**	**6.8**
98.4	**5.1**	**6.4**
105.0	**5.0**	**6.1**
111.5	**4.9**	**5.9**
118.1	**4.9**	**5.6**
124.7	**4.9**	**5.4**
131.2	**4.8**	**5.3**
137.8	**4.8**	**5.2**
144.4	**4.8**	**5.1**
150.9	**4.8**	**5.1**
157.5	**4.8**	**4.6**
164.0	**4.8**	**4.3**
170.6	**4.9**	**4.1**
177.2	**4.9**	**3.9**
183.7	**5.0**	**4.2**

Results of a temperature-dissolved oxygen profile conducted on Morris Lake in 2013 to determine its trout supporting status for the purpose of classification. Shading depicts depths having trout supporting water (temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L).

Waterbody	Morris Lake
Region	Northwest
Drainage	Wallkill River
County	Sussex
Survey date	8/27/13
Secchi Disk	15 ft

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
0	24.2	8.32
1	24.3	7.47
5	24.0	7.12
10	23.9	7.70
15	23.6	7.20
20	21.8	7.91
21	**20.6**	**8.20**
25	**15.6**	**10.04**
35	**7.9**	**10.62**
45	**5.5**	**8.49**
55	**4.9**	**7.02**
65	**4.7**	**7.35**
75	**4.6**	**6.89**
85	**4.6**	**4.85**
89	**4.6**	**4.12**
90	4.6	3.69
95	4.6	2.27
105	4.6	2.24
115	4.6	0.07
123	4.6	0.15

Results of a temperature-dissolved oxygen profile conducted on Silver Lake (Warren Co.) in 2013 to determine its trout supporting status. No trout supporting water (temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L) was documented.

Waterbody	Silver Lake (Warren Co.)
Region	Northwest
Drainage	Pequest River
County	Warren
Survey date	8/14/13
Secchi Disk	6 ft

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
0	24.2	10.62
3	24.3	10.53
5	24.2	10.03
10	22.1	4.35
11	21.5	2.87
12	20.8	1.92
13	19.6	0.64
15	16.5	0.30
20	9.6	0.04
22	8.4	0.04
25	7.5	0.05
30	7.1	0.07

Results of a temperature-dissolved oxygen profile conducted Tilcon Lake in 2013 to determine its trout supporting status for the purpose of classification. Boldfaced data indicate trout supporting water (temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L).

Waterbody	Tilcon Lake
Region	Northwest
Drainage	Musconetcong River
County	Morris
Survey date	7/30/13
Secchi Disk	16 ft

Depth from surface (ft)	**Water temp. (°C)**	**Dissolved oxygen (mg/L)**
0	26.5	7.12
5	26.5	7.08
10	26.3	6.85
15	25.9	6.40
18	22.8	8.04
19	21.4	8.48
20	**20.0**	**8.64**
21	**18.0**	**10.01**
23	**15.2**	**10.18**
25	**13.0**	**9.14**
27	**11.5**	**8.40**
29	**10.6**	**7.77**
31	**9.6**	**6.83**
33	**9.1**	**6.50**
35	**8.4**	**7.00**
37	**8.0**	**6.60**
39	**7.4**	**5.31**
41	**7.3**	**4.85**
43	**7.1**	**4.06**
44	7.0	3.50
4	7.0	1.73
50	6.7	0.16

Results of two temperature-dissolved oxygen profiles conducted on Wawayanda Lake in 2013 to determine its trout supporting status. Boldfaced data indicate trout supporting water (temperature ≤ 21ºC and dissolved oxygen ≥ 4 mg/L).

Waterbody	Wawayanda Lake
Region	Northwest
Drainage	Pochuck Creek
County	Sussex
Survey date	7/25/13
Secchi Disk	6 ft

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
1	25.3	6.53
3	25.3	6.51
5	25.3	6.35
7	25.3	6.20
10	25.2	5.70
12	21.5	5.97
13	**20.5**	**5.91**
14	**18.9**	**5.72**
16	**15.8**	**6.13**
18	**13.2**	**8.13**
20	**11.2**	**7.14**
22	**9.3**	**6.83**
24	**8.3**	**6.46**
26	**7.3**	**6.74**
28	**6.5**	**6.44**
30	**6.1**	**6.65**
32	**5.7**	**7.37**
34	**5.5**	**7.45**
36	**5.4**	**7.80**
38	**5.2**	**8.15**
40	**5.1**	**7.92**
42	**5.0**	**8.42**
44	**5.0**	**8.59**
46	**4.9**	**8.29**
48	**4.9**	**8.21**
50	**4.8**	**8.96**
52	**4.8**	**8.04**
54	**4.7**	**8.29**
56	**4.7**	**8.11**
58	**4.7**	**7.78**
60	**4.7**	**7.19**
62	**4.6**	**6.76**
64	**4.6**	**6.30**
66	**4.6**	**5.50**
68	**4.6**	**4.65**
70	**4.6**	**4.44**
71	4.6	3.10
72	4.6	2.65
73	4.6	2.03
75	4.6	1.16
80	4.6	0.25

Waterbody	Wawayanda Lake
Region	Northwest
Drainage	Pochuck Creek
County	Sussex
Survey date	7/25/13
Secchi Disk	6 ft

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
1	25.1	6.20
3	25.1	6.49
5	25.1	6.00
7	25.1	6.37
10	24.8	5.98
12	21.3	4.58
13	**19.7**	**4.71**
14	**18.0**	**4.52**
16	**16.0**	**4.13**
18	**13.4**	**4.19**
20	**12.3**	**4.48**
22	**11.0**	**4.74**
24	**9.5**	**4.63**
26	**8.6**	**5.37**
28	**7.7**	**5.64**
30	**6.9**	**6.27**
32	**6.4**	**6.97**
34	**6.1**	**7.57**
36	**5.8**	**7.65**
38	**5.7**	**8.42**
40	**5.6**	**8.37**
42	**5.5**	**8.32**
44	**5.4**	**7.36**
46	**5.3**	**6.49**
48	**5.3**	**5.40**
50	**5.3**	**4.14**
51	5.2	3.85
52	5.2	2.92
53	5.2	2.14
55	5.2	0.10
60	5.1	0.09

Results of a temperature-dissolved oxygen profile conducted on White Lake (Hardwick Twp.) in 2013. Boldfaced data indicate trout supporting water (temperature ≤ 21ºC and dissolved oxygen ≥ 4 mg/L).

Waterbody	White Lake (Hardwick Twp.)
Region	Northwest
Drainage	Paulins Kill
County	Warren
Survey date	7/26/13
Secchi Disk	10.5 ft

Depth from surface (ft)	**Water temp. (°C)**	**Dissolved oxygen (mg/L)**
0	28.2	8.86
5	27.4	9.14
10	26.9	9.18
17	22.3	15.75
18	**20.6**	**13.25**
20	**17.4**	**13.69**
25	**11.9**	**12.95**
30	**8.8**	**9.85**
36	**7.1**	**5.00**
37	7.0	3.83
38	7.0	1.75
40	6.8	0.40
44	6.6	0.80

Results of a temperature-dissolved oxygen profile conducted on White Lake (Sparta) in 2013 to determine its trout supporting status. Boldfaced data indicate trout supporting water (temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L).

Waterbody	White Lake (Sparta)
Region	Northwest
Drainage	Wallkill River
County	Sussex
Survey date	8/26/13
Secchi Disk	8 ft

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
0	24.5	9.30
5	24.5	8.51
10	24.5	8.34
15	23.6	8.66
17	22.6	8.60
18	**20.6**	**8.10**
20	**16.3**	**11.74**
23	**12.9**	**11.76**
25	**10.4**	**8.77**
27	**9.4**	**7.44**
28	**8.5**	**6.32**
29	**7.8**	**4.94**
30	7.3	3.45
35	6.1	0.03
40	5.4	0.02
50	5.1	0.03
60	5.3	0.03
70	5.3	0.03

Surveys in the Northeast Region
(Passaic, Hackensack, and Hudson) and Upper Atlantic Region

Results of a temperature-dissolved oxygen profile conducted on Jersey City Reservoir in 2013 to determine its trout supporting status. No trout supporting water (temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L) was documented.

Waterbody	Boonton Reservoir
Region	Northeast
Drainage	Passaic
County	Morris
Survey date	8/8/13
Secchi Disk	5.5 ft

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
0	25.2	8.79
5	24.7	8.60
10	24.6	7.62
15	24.1	6.2
20	23.4	4.55
25	22.2	3.12
26	21.4	1.55
27	21.3	1.34
28	20.6	.32
29	20.1	.07
30	19.4	.03
35	15.1	.03
40	12.2	.05
45	10.4	.05
50	9.3	.14
55	7.6	1.83
65	6.0	.04
75	5.3	.03

Results of a temperature-dissolved oxygen profile conducted on Charlotteburg Reservoir (Charlotteburg) in 2013 to determine its trout supporting status. Boldfaced data indicate trout supporting water (temperature ≤ 21ºC and dissolved oxygen ≥ 4 mg/L).

Waterbody	Charlotteburg Reservoir
Region	Northeast
Drainage	Pequannock River
County	Morris
Survey date	7/11/13
Secchi Disk	-

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
1	27.9	7.86
5	27.2	8.34
10	24.0	7.59
12	22.5	6.65
13	21.8	6.11
14	**20.8**	**5.44**
15	**19.4**	**4.42**
16	17.9	3.74
18	16.1	3.16
20	13.3	2.52
25	10.6	2.48
30	8.9	2.28
35	8.6	1.78
40	8.6	1.91
45	8.4	2.29
50	8.1	2.32
53	8.0	2.20
55	8.0	1.95
57	7.9	1.69
60	7.8	0.22
65	7.7	0.21
67	7.8	0.27

Waterbody	Charlotteburg Reservoir
Region	Northeast
Drainage	Pequannock River
County	Morris
Survey date	7/30/13
Secchi Disk	13 ft

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
0	25.3	7.58
5	24.7	6.9
10	22.8	5.8
11	22.6	5.8
12	21.6	4.82
13	**20.7**	**4.15**
14	20.0	3.4
15	18.5	2.7
20	13.6	.55
25	11.8	.55
30	9.1	.75
35	8.9	.05
40	8.8	.09
45	8.7	.11
50	8.6	.06
55	8.4	.04
60	8.1	.04
65	7.8	.05

Results of a temperature-dissolved oxygen profile conducted on Green Pond (Rockaway) in 2013 to determine its trout supporting status. No trout supporting water (temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L) was documented.

Waterbody	Green Pond
Region	Northeast
Drainage	Passaic
County	Morris
Survey date	8/8/13
Secchi Disk	12.5 ft

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
0	23.8	6.94
5	23.8	6.53
10	23.8	6.55
15	23.6	6.38
20	23.4	5.99
23	21.7	2.61
24	20.6	.77
25	18.2	.10
30	13.7	.03
35	12.6	.03
40	12.4	.03
45	12.3	.04

Results of four temperature-dissolved oxygen profiles conducted on Greenwood Lake (West Milford) in 2013 to determine its trout supporting status. No trout supporting water (temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L) was documented.

Waterbody	Greenwood Lake (Chapel Island)
Region	Northeast
Drainage	Wanaque River
County	Passaic
Survey date	7/29/13
Secchi Disk	5.5 ft

Depth from surface (ft)	**Water temp. (°C)**	**Dissolved oxygen (mg/L)**
0	26.5	7.56
5	25.6	7.01
10	25.5	6.42
15	25.4	6.38
20	24.7	4.15
21	22.2	0.06
22	20.6	0.02
23	20.0	0.02
24	19.8	0.02
25	18.1	0.02
26	16.9	0.02
27	15.9	0.02
28	15.3	0.02
29	14.6	0.03
30	13.9	0.03
35	11.8	0.03
40	11.1	0.03

Waterbody	Greenwood Lake (Sandbar)
Region	Northeast
Drainage	Wanaque River
County	Passaic
Survey date	7/29/13
Secchi Disk	5.5 ft

Depth from surface (ft)	**Water temp. (°C)**	**Dissolved oxygen (mg/L)**
0	27.0	7.62
5	26.4	7.74
10	25.5	6.94
15	25.5	6.77
20	25.2	5.62
21	24.5	3.31
22	21.9	0.02
23	19.5	0.02
24	18.9	0.02
25	17.1	0.02
26	16.0	0.02
27	15.2	0.02
28	14.2	0.02
29	13.6	0.03
30	13.3	0.03
35	11.9	0.03
40	10.8	0.03

Waterbody	Greenwood Lake (Forrest Knolls)

Depth from surface (ft)	**Water temp. (°C)**	**Dissolved oxygen (mg/L)**
0	26.80	7.19
5	25.60	7.16
10	25.40	6.70
15	25.20	5.78
17	25.10	5.88
19	24.50	2.55
20	24.00	1.73
21	23.20	0.50
22	22.60	0.02
23	21.60	0.02
24	20.00	0.02
25	17.20	0.02
26	16.30	0.02
27	15.80	0.02
28	14.80	0.02
29	14.20	0.02
30	13.30	0.02
35	11.70	0.02
40	11.00	0.02

Waterbody	Greenwood Lake (State Line)

Depth from surface (ft)	**Water temp. (°C)**	**Dissolved oxygen (mg/L)**
0	26.3	7.32
5	25.7	7.52
10	25.2	5.80
15	25.0	5.61
20	25.0	5.45
21	24.7	3.16
22	23.7	1.73
23	22.0	0.15
24	19.6	0.02
25	16.7	0.02
29	14.0	0.02
30	13.3	0.02

Results of a temperature-dissolved oxygen profile conducted on Lake Sonoma in 2013 to determine its trout supporting status for the purpose of classification. No trout supporting water (temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L) was documented.

Waterbody	Lake Sonoma
Region	Northeast
Drainage	Wanaque River
County	Passaic
Survey date	8/6/13
Secchi Disk	10 ft

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
0.	24.2	6.13
3	23.2	5.96
5	23.0	5.26
8	22.8	5.27
10	22.4	2.93
13	18.6	0.17
15	17.0	0.03

Results of a temperature-dissolved oxygen profile conducted on Monksville Reservoir in 2013 to determine its trout supporting status. Boldfaced data indicate trout supporting water (temperature ≤ 21ºC and dissolved oxygen ≥ 4 mg/L).

Waterbody	Monksville Reservoir					
Location	Near Dam	**Location**	Powerlines	**Location**	1200m West of Dam
Region	Northeast	**Region**	Northeast	**Region**	Northeast
Drainage	Passaic River	**Drainage**	Passaic River	**Drainage**	Passaic River
County	Passaic	**County**	Passaic	**County**	Passaic
Survey date	7/22/13	**Survey date**	7/22/13	**Survey date**	7/22/13
Secchi Disk	ft	**Secchi Disk**	ft	**Secchi Disk**	ft

Depth from surface (ft)	**Water temp. (°C)**	**Dissolved oxygen (mg/L)**
1	30.0	7.54
5	29.9	7.25
10	28.4	8.78
11	22.7	10.26
12	21.7	10.22
13	**20.9**	**10.15**
15	**19.1**	**10.11**
17	**16.9**	**6.53**
19	**15.5**	**4.28**
21	**13.3**	**4.21**
28	**12.1**	**4.93**
30	**11.0**	**4.41**
32	**10.1**	**5.21**
34	**9.4**	**5.42**
36	**8.3**	**5.22**
38	**7.7**	**5.75**
40	**7.3**	**5.65**
42	**6.9**	**6.09**
44	**6.7**	**6.04**
46	**6.4**	**5.84**
48	**6.3**	**5.54**
50	**6.2**	**6.06**
52	**6.1**	**6.21**
54	**6.0**	**6.24**
56	**6.0**	**6.19**
58	**5.9**	**6.29**
60	**5.8**	**6.30**
62	**5.7**	**6.20**
64	**5.7**	**5.86**
66	**5.7**	**5.81**
68	**5.7**	**5.79**
70	**5.6**	**5.26**
72	**5.6**	**4.49**
74	**5.5**	**4.05**
75	5.5	3.84
76	5.5	3.70
77	5.5	2.95
82	5.5	.57
87	5.5	.05

Depth from surface (ft)	**Water temp. (°C)**	**Dissolved oxygen (mg/L)**
1	30.6	7.10
10	27.8	8.05
13	23.5	7.98
14	22.0	7.09
15	19.8	2.56
16	18.1	1.54
17	16.4	1.81
18	15.0	0.51
20	12.7	0.54
25	10.5	0.89
30	8.3	1.28
35	7.0	1.20
40	6.5	2.33
45	6.5	2.04
50	6.4	2.15

Depth from surface (ft)	**Water temp. (°C)**	**Dissolved oxygen (mg/L)**
1	30.1	6.85
13	23.2	9.40
14	21.3	9.20
15	**19.3**	**9.38**
16	**18.0**	**5.34**
17	**16.5**	**4.55**
18	15.3	2.41
20	13.6	2.78
22	12.5	2.47
23	11.8	2.36
24	11.2	3.29
25	10.5	3.93
26	10.0	3.36
27	9.2	3.85
30	8.4	3.37
35	7.3	2.84
40	6.6	2.35
45	6.3	2.94
46	6.3	3.26
47	6.2	3.37
48	6.2	3.38
49	6.1	3.50
50	6.1	3.60
51	6.0	3.69
52	6.0	3.83
53	6.0	3.90
54	6.0	3.81
55	**5.9**	**4.04**
57	**5.8**	**4.04**
58	**5.8**	**4.03**
59	**5.8**	**4.00**
61	**5.8**	**4.13**
62	5.8	3.42
70	5.8	.39

Results of a temperature-dissolved oxygen profile conducted on Scarlet Oak Pond in 2013 to determine its trout supporting status. Boldfaced data indicate trout supporting water (temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L).

Waterbody	Scarlet Oak Pond
Region	Northeast
Drainage	Passaic
County	Bergen
Survey date	7/23/13
Secchi Disk	2.5 ft

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
0	30.8	8.76
2	29.4	8.35
4	28.8	8.02
6	27.8	8.24
8	24.0	2.35
9	22.6	1.60
10	19.9	2.72
11	18.7	2.95
12	17.0	3.82
13	**15.4**	**4.58**
14	**13.8**	**4.56**
15	**12.6**	**5.76**
16	**12.3**	**5.97**
17	**11.2**	**6.1**
18	**10.1**	**5.98**
19	**9.1**	**5.9**
20	**8.3**	**5.7**
21	**7.6**	**5.3**
22	**7.3**	**4.39**
24	6.7	3.9
25	6.4	2.19
26	6.2	1.24
27	6.0	0.53
30	5.9	0.03
35	5.7	0.03
40	5.6	0.04
45	5.5	0.04
47	5.6	0.04
49	5.6	0.04

Results of a temperature-dissolved oxygen profile conducted on Shepherd Lake in 2013 to determine its trout supporting status. Boldfaced data indicate trout supporting water (temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L).

Waterbody	Shepherd Lake
Region	Northeast
Drainage	Wanaque
County	Passaic
Survey date	7/23/13
Secchi Disk	10.5 ft

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
0	29.3	6.39
2	29.2	6.38
4	29.1	6.51
6	29.1	6.51
8	28.9	6.36
10	28.2	7.45
11	26.8	8.36
12	24.6	8.54
13	23.5	9.04
14	21.6	8.84
15	**19.3**	**8.58**
16	**17.9**	**8.06**
17	**16.6**	**7.66**
18	**15.6**	**7.63**
19	**14.2**	**7.37**
20	**12.8**	**7.27**
21	**11.8**	**5.40**
22	**11.1**	**5.13**
23	10.1	2.31
24	9.2	0.27
25	8.8	0.04
27	8.2	0.04
29	7.4	0.11

Results of a temperature-dissolved oxygen profile conducted on St. Pauls Monastery Lake in 2013 to determine its trout supporting status for the purpose of classification. No trout supporting water (temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L) was documented.

Waterbody	St. Pauls Monastery Lake
Region	Northeast
Drainage	Rockaway River
County	Morris
Survey date	8/20/13
Secchi Disk	10 ft

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
0	23.5	7.13
5	22.5	7.15
7	22.4	7.03
10	21.1	2.60
11	20.5	1.51
12	19.1	0.85
15	14.9	0.14
18	12.7	0.09

Results of a temperature-dissolved oxygen profile conducted on Wanaque Reservoir in 2013 to determine its trout supporting status. No trout supporting water (temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L) was documented. Data provided by the North Jersey District Water Supply Commission.

Waterbody	Wanaque Reservoir
Region	Northeast
Drainage	Wanaque River
County	Passaic
Survey date	8/15/13
Secchi Disk	-

Depth from surface (ft)	Water temp. (°C)	Dissolved oxygen (mg/L)
1.6	23.98	8.56
5.0	23.76	8.72
8.2	23.54	8.73
11.6	23.45	8.63
14.7	23.43	8.62
18.2	23.41	8.48
21.2	23.38	8.39
24.8	22.88	7.92
27.8	22.72	7.63
31.3	22.52	7.35
34.3	22.33	7.13
37.9	21.79	6.18
40.9	19.83	1.12
44.5	16.93	1.93
47.5	15.2	1.1
50.8	12.05	0.68
54.2	10.61	0.67
57.3	9.9	0.76
60.7	9.47	0.88
64.0	9	0.5

APPENDIX C

Field Sampling Protocols

Lakes – Dissolved Oxygen and Temperature Profiles

Most New Jersey lakes deeper than 3 m (10 ft) thermally stratify during the summer. The epilimnion (surface waters) becomes too warm to support coldwater fishes (trout), and the metalimnion and hypolimnion (middle and bottom waters), while often cold enough for trout, often have dissolved oxygen levels too low to support trout (and other fish species). Only deep lakes (generally at least 15 m (50 ft) deep), that are not overly eutrophic, maintain sufficient levels of dissolved oxygen in some portion of the strata below the epilimnion during the summer and early fall. New Jersey lakes are characteristically shallow and therefore most are too warm to support trout through the critical summer months. They are however quite suitable for a multitude of other cool and warmwater species. The criteria used to determine a lake's trout-supporting capabilities is water temperature $\leq$ 21ºC (69.8ºF) and dissolved oxygen $\geq$ 4 mg/L (Hamilton and Barno 2006).

Dissolved oxygen and temperature profiles are performed during mid–August at the deepest point of the impoundment using a YSI oxygen meter with cable marked in one-foot increments. Measurements are generally taken at 5 to 10 foot intervals, but more frequently (1-ft increments) when marked changes are observed (typically in the metalimnion). A secchi disk (also marked in one-foot increments) is used to measure water transparency.

For QA/QC purposes oxygen meters are re-verified on a monthly basis against a Winkler Titration of deionized water samples. The re-verification procedure is also repeated after any atypical field readings to verify the meter is functioning properly. Meters are field calibrated prior to each use according to the manufacturer specifications.

Wadeable Streams - Electrofishing

As with lakes the summer months are a critical time period for trout survival due to elevated temperatures, lower dissolved oxygen concentrations, and reduced flows. Streams are sampled from June through mid September of each year using electrofishing gear. Electrofishing provides for the safe, effective sampling of resident fishes with limited associated mortality. Prior to 1980, A.C. electrofishing equipment was used to sample stream fish populations. This sampling gear consisted of two or three paddle-type electrodes powered by a gas generator and operated by a four to six person crew (two or three electrode-bearers, one or two netters, and one generator operator). With technological advances in electrofishing gear, D.C. electrofishing equipment, powered

by battery or generator, has been used almost exclusively since 1980. A battery-powered D.C. backpack unit, having one paddle-type electrode and used by an operator and one or two netters, has been in used since 1980 to sample small streams. On larger streams a gas generator is used in conjunction with a conversion box (to convert A.C. to D.C.), two or three electrodes, and a five to seven person field crew.

The standard sampling distance, which has been used during and since the original stream surveys, is 182.9 meters (600 feet). This length was occasionally shortened when trout reproduction was found or when conditions such as an abundance of warmwater species or physical stream conditions indicated that trout would not be found. Occasionally a prospective stream or site would not be sampled based upon a visual, water temperature, or pH check that indicated conditions unsuitable for trout. Lack of water, excessive turbidity, temperatures in excess of 24°C, and extremely low pH values (4.0 or less) would result in sampling site rejection. Since 2001, in an effort to standardize data collection efforts across various research and field inventories a distance of 150 meters was established and is used on streams when young-of-the-year trout are encountered. Since the development of the Incidence of Occurrence was based on a sampling distance of 182 meters (600 feet) this distance is still used for classifying streams when young of the year trout are not encountered.

Sampling methods follow those outlined by Kurtenbach (Kurtenbach, 1994) and as defined in the EPA manual "Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers" (Barbour 1999) and are consistent, for comparative purposes, with data collection efforts for other Activitys. All sites are sampled under typical stream flows during the months of June through September. Electrofishing gear is used to provide pulsed direct current to collect fishes. Settings on each of the stream units vary depending on the conductivity and flow conditions at each site, output usually ranges from 3 to 4 amperes. A typical backpack field crew consists of three persons, one to wear the backpack and netters. Stream widths exceeding the capabilities of one backpack unit are either sampled with two backpack teams traveling in tandem or with a two-paddle streamside generator. The type of unit selected is based upon stream width, depth, and contour of the stream environment. One up-stream pass is made through the sample stretch. The sample stretch length is 150 meters for streams having naturally reproducing trout populations and 182 meters (600 feet) for trout maintenance or non trout waters. Sampling time averages approximately 2.5 hours per site.

All fish encountered are collected without bias to species or size. Fishes with lengths greater than 20 mm are identified to the species level, counted, and examined for disease or anomalies. Anomalies such as visible lesions, tumors, skeletal anomalies, and fin damage may be an indication of impaired conditions. Any obvious injuries due to electrofishing are noted, but not considered anomalies. Total length measurements are taken on all trout and other game species. Retained specimens are preserved in 10% formalin solution in the field. Specimens are then transferred to a 70% ethanol solution for long-

term preservation 2-3 weeks after initial collection.

In addition to fish collection, basic physical and chemical parameters of the stream environment are also measured and recorded on the Bureau's Stream Survey Data Sheet. All physical and chemical data are collected one-time-only, thus no long-term data is collected. Physical parameters included stream depth, stream width, substrate type, and shade index. YSI Model 85 and YSI Model 60 meters are used to determine chemical parameters such as dissolved oxygen, temperature, salinity, conductivity, and pH. For QA/QC purposes oxygen meters are re-verified on a monthly basis against a Winkler Titration of deionized water samples. The re-verification procedure is also repeated after any atypical field readings to verify the meter is functioning properly. Meters are field calibrated prior to each use according to the manufacturer specifications. Alkalinity and specific conductance data have been collected since 2002. In-house laboratory staff determine alkalinity via titration. The reference temperature and temperature coefficient for specific conductance are 25°C and 1.91% respectively.

A stream habitat assessment is also conducted at each site, in accordance with criteria established by the EPA (EPA 1999). The habitat assessment is intended to evaluate various aspects of the aquatic habitat, surrounding terrestrial environment, and potential anthropogenic factors that may impact the aquatic biota of the stream. Habitat Assessments have been designed for two stream types - high gradient (riffle/run prevalent) and low gradient (glide/pool prevalent) streams. High Gradient Habitat Assessments are conducted on most streams north of the Fall line, in the Piedmont, Highlands, and Appalachian Valley and Ridge physiographic provinces. Natural high-gradient streams have substrates composed primarily of coarse sediment particles (i.e. gravel or larger) or frequent coarse particulate aggregations along stream reaches. Low gradient habitat assessments are conducted on streams in the Coastal Plain and in other moderate to low gradient landscapes. Natural low gradient streams have substrates of fine sediment or infrequent aggregations of more coarse (gravel of larger) sediment particles along stream reaches. Data are recorded on the Bureau's High Gradient Habitat Assessment Data Sheet and Low Gradient Habitat Assessment Data Sheet (Appendix B).

For the habitat assessment, ten specific physical parameters are assessed. For a low gradient stream the parameters are: epifaunal substrate, pool substrate, pool variability, sediment deposition, channel flow status, channel alteration, channel sinuosity, bank stability, vegetative protection, and riparian vegetative zone width. The assessment for a high gradient stream substitutes pool substrate, pool variability, and channel sinuosity with embeddedness, velocity/depth regime, and frequency of riffles or bends. The first five parameters of each assessment are assessed within the stretch of the stream electrofished. Assessments of the five remaining variables are based upon a larger stream reach that extends 150 meters upstream and downstream of the electrofished stretch. Each assessment variable is divided into four condition categories: optimal, sub-optimal, marginal, and poor, each with established criteria. Twenty points are allotted for each of the ten variables resulting in a maximum score of 200. The left and right banks of a stream, determined by facing downstream, are assessed separately for bank stability, vegetative protection, and riparian vegetative zone width. Biologists from the Bureau of Freshwater Fisheries have received habitat assessment training from EPA staff.

APPENDIX D

NJ Division of Fish and Wildlife

Bureau of Freshwater Fisheries

Habitat Assessment - Datasheet

High Gradient Streams

Stream Name		Date
Location		
WMA	Drainage	
Assessment Completed By:	Weather	

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate **Available Cover**	Greater than 70 % of substrate favorable for epifaunal colcnization and fish cover;mix of snags submerged logs, undercut banks cobble and other stable habitat and at stage to allow full colonization potentia. (Logs/snag are not new fall and not transient.)	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale)	20-40 % mix of stable habitat;habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
2. Embeddedness Assessed in riffle area	Gravel, cobble and boulder particles are 0-25 % surrounded by fine sediment. Cobble layering provides habitat diversity.	Gravel, cobble and boulder particles are 25-50 % surrounded by fine sediment	Gravel, cobble and boulder particles are 50-75% surrounded by fine sediment	Gravel, cobble and boulder particles are more than 75 % surrounded by fine sediment
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
3. Velocity/Depth Regime	All four velocity/depth regimes are present: (slow-deep, slow-shallow, fast deep, fast shallow) Slow is < 0.3 m/s, deep is > 0.5 m	Only 3 of the 4 regimes are present. If fast-shallow is missing, score lower than if missing other regimes.	Only 2 of the 4 regimes are present. If fast-shallow or slow shallow are missing score low.	Dominated by 1 velocity/depth regime. Usually slow deep
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5 % of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5 -30% of the bottom affected; slight deposition in pools	Moderate depostion of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected;sediment deposits at obstructions, constrictons and bends;moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development;more than 50% of the bottom changing frequently;pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or < 25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present in standing pools
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

Above parameters are to be evaluated for the length of the sample reach only.

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6.Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern	Some channelization present;usually in areas of bridge abutments;evidence of past channelization, ie. dredging (greater than past 20 yr) may be present but recent channelization is not	Extensive channelization and/or embankments or shoring structures present on both banks; and 40-80% of the stream reach is channelized and disrupted.	Banks shored with gabion or cement;over 80% of the stream reach channelized and disupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent;ratio of distance between riffles divided by width of stream < 7:1 (generally 5 to 7);In streams where riffles are continuous, placement of boulders or other large natural obstructions is important. Variety of habitat is key.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 and 15.	Occassional rifle or bend, bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 and 25	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio > 25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
8. Bank Stability Left and right bank determined by facing downstream	Banks stable:evidence of erosion or bank failure absent or minimal;little or potential for future problems. < 5% of the bank affected	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion;high erosion potential during floods.	Unstable;many eroded areas:"raw" areas frequent along straight sections and bends;obvious bank sloughing;60-100% of bank has erosional scars.
SCORE	**Left Bank** 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or non woody plants; vegetative disruption through grazing or mowing minimal or not evident;almost all plants allowed to grow naturally	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented;disruption evident but not affecting full growth potential to any great extent;more than 1/2 potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation;disruption obvious;patches of bare soil or closely cropped vegetation common;less than one-half of the potential plant stubble height remaining..	Less than 50 % of the streambank surfaces covered by vegetation;disruption of streambank is very high;vegetation has been removed to 5 cm or less tin average stubble height.
SCORE	**Left Bank** 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width	Width of riparian zone > 18 meters;human activities (i.e. parking lots, roadbeds, clear cuts, lawns or crops) have not impacted zone.	Width of riparian zone 12-18 meterts;human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters;human activities have impacted zone agreat deal.	Width of riparian zone < 6 meters; little or no riparian vegetation due to human activities.
SCORE	**Left Bank** 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Above parameters are to be evaluated 1 sampling length broader upstream and 1 sampling length broader downstream

TOTAL SCORE ☐

NJ Division of Fish and Wildlife
Bureau of Freshwater Fisheries

Habitat Assessment - Datasheet
Low Gradient Streams

Fish and Wildlife

Stream Name		Date
Location		
WMA	Drainage	
Assessment Completed By:	Weather	

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1.Epifaunal Substrate Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags,submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale)	10-30% mix of stable habitat;habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
2. Pool Substrate	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present	All mud or clay or sand bottom; little or no root mat;no submerged vegetation	Hard-pan clay or bedrock;no root mat or vegetation
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
3. Pool Variability	Even mix of large-shallow (> half the stream cross section and < 1 m deep), large-deep(> half the stream cross section and > 1 m deep), small shallow (< half the stream cross section and < 1 m depth), small-deep (< half the stream cross section and > 1m depth) pools present.	Majority of pools large deep; very few shallow pools present (< 1 m in depth)	Shallowpools (< 1 m depth) much more prevalent than deep pools (> 1 m depth)	Majority of pools small and shallow (< half the stream cross section and < 1m in depth) or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20 % of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools	Moderate depostion of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected;sediment deposits at obstructions, constrictons and bends;moderate deposition of pools	Heavy deposits of fine material, increased bar development;more than 80% of the bottom changing frequently;pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or < 25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present in standing pools
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

Above parameters are to be evaluated for the length of the sample reach only.

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6.Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern	Some channelization present;usually in areas of bridge abutments;evidence of past channelization, ie. dredging (greater than past 20 yr) may be present but recent channelization is not	Extensive channelization and/or embankments or shoring structures present on both banks; and 40-80% of the stream reach is channelized and disrupted.	Banks shored with gabion or cement;over 80% of the stream reach channelized and disupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was a straight line. (Note-channel braiding is considered normal in coastal plains and other low lying areas. This parameter is not easily rated in these	The bends in the stream increase the stream length 1 to 2 times longer if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
8. Bank Stability Left and right bank determined by facing downstream	Banks stable:evidence of erosion or bank failure absent or minimal;little or potential for future problems. < 5% of the bank affected	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion;high erosion potential during floods.	Unstable;many eroded areas:"raw" areas frequent along straight sections and bends;obvious bank sloughing;60-100% of bank has erosional scars.
SCORE	**Left Bank** 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or non woody macrophytes;vegetative disruption through grazing or mowing minimal or not evident;almost all plants allowed to grow naturally	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented;disruption evident but not affecting full growth potential to any great extent;more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation;disruption obvious;patches of bare soil or closely cropped vegetation common;less than one-half of the potential plant stubble height remaining.	Less than 50 % of the streambank surfaces covered by vegetation;disruption of streambank is very high;vegetation has been removed to 5 cm or less in average stubble height.
SCORE	**Left Bank** 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width	Width of riparian zone > 18 meters;human activities (i.e. parking lots, roadbeds, clear cuts, lawns or crops) have not impacted zone.	Width of riparian zone 12-18 meterts;human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters;human activities have impacted zone agreat deal.	Width of riparian zone < 6 meters; little or no riparian vegetation due to human activities.
SCORE	**Left Bank** 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Above parameters are to be evaluated 1 sampling length broader upstream and 1 sampling length broader downstream

TOTAL SCORE ☐

APPENDIX E

New Jersey Division of Fish & Wildlife
List of New Jersey Freshwater Fishes
(Revised 2005)

Scientific Name	Common Name	Trophic Guild	Tolerance	**Historical Presence**
Petromyzontidae:				
Lampetra appendix	American brook lamprey	NF	IS	N
Petromyzon marinus	sea lamprey	PF	MT	N
Acipenseridae:				
Acipenser oxyrhynchus	Atlantic sturgeon	BI	IS	N
Acipenser brevirostrum	shortnose sturgeon	BI	IS	N
Lepisosteidae:				
Lepisosteus osseus	longnose gar	P	M	EX
Amiidae:				
Amia calva	bowfin	P	TS	US
Anguillidae:				
Anguilla rostrata	American eel	P	TS	N
Clupeidae:				
Alosa aestivalis	blueback herring	PL	MT	N
Alosa mediocris	hickory shad	I/P	US	N
Alosa pseudoharengus	alewife	PL	MT	N
Alosa sapidissima	American shad	PL	MT	N
Drosoma cepedianum	gizzard shad	G	TS	N
Salmonidae:				
Oncorhynchus mykiss	rainbow trout	I/P	IS	NN
Salmo trutta	brown trout	I/P	IS	E
Salvelinus fontinalis	brook trout	I/P	IS	N
Salvelinus namaycush	lake trout	P	IS	NN
Osmeridae:				
Osmerus mordax	rainbow smelt	I	IS	N
Umbridae:				
Umbra pygmaea	eastern mudminnow	I	TS	N
Esocidae:				
Esox americanus	redfin pickerel	P	MT	N
Esox lucius	northern pike	P	IS	NN
Esox niger	chain pickerel	P	MT	N
Esox masquinongy	muskellunge	P	IS	NN

Scientific Name	Common Name	Trophic Guild	Tolerance	Historical Presence
Cyprinidae:				
Carassius auratus	goldfish	G	TS	E
Cyprinus carpio	common carp	G	TS	E
Carpiodes cyprinus	quillback	BI	TS	N
Exoglossum maxillingua	cutlip minnow	BI	IS	N
Hybognathus regius	eastern silvery minnow	H	MT	N
Notemigonus crysoleucas	golden shiner	G	TS	N
Notropis amoenus	comely shiner	I	TS	N
Cyprinella analostana	satinfin shiner	I	TS	N
Cyprinella spiloptera	spotfin shiner	I	TS	N
Notropis bifrenatus	bridle shiner	I	IS	N
Notropis chalybaeus	ironcolor shiner	I	IS	N
Luxilis cornutus	common shiner	I	MT	N
Notropis husdonius	spottail shiner	I	MT	N
Notropis procne	swallowtail shiner	I	MT	N
Pimephales promelas	fathead minnow	G	TS	NN
Pimephales notatus	bluntnose minnow	G	TS	NN
Rhinichthys atratulus	blacknose dace	BI	TS	N
Rhinichthys cataractae	longnose dace	BI	MT	N
Semotilus atromaculatus	creek chub	I	TS	N
Semotilus corporalis	fallfish	I	MT	N
Ctenopharyngodon idella	grass carp	H	MT	E
Catostomidae:				
Catostomus commersoni	white sucker	BI	TS	N
Erimyzon oblongus	creek chubsucker	BI	MT	N
Hypentelium nigricans	northern hog sucker	BI	IS	N
Ictaluridae:				
Ameiurus catus	white catfish	I/P	MT	N
Ameiurus melas	black bullhead	BI	MT	NN
Ameiurus natalis	yellow bullhead	BI	MT	US
Ameiurus nebulosus	brown bullhead	BI	TS	N
Ictalurus punctatus	channel catfish	I/P	MT	NN
Noturus gyrinus	tadpole madtom	BI	MT	N
Noturus insignis	margined madtom	BI	IS	N
Aphredoderidae:				
Aphredoderus sayanus	pirate perch	I	MT	N
Cyprinodontidae:				
Fundulus diaphanus	banded killifish	I	TS	N
Fundulus heteroclitus	mummichog	I	TS	N
Poeciliidae:				
Gambusia holbrooki	eastern mosquitofish	I	TS	N
Gambusia affinis	mosquitofish	I	TS	NN

Scientific Name	Common Name	Trophic Guild	Tolerance	Historical Presence
Gasterosteidae:				
Apletes quadracus	fourspine stickleback	I	MT	N
Gasterosteus aculeatus	threespoine stickleback	I	MT	N
Pungitius pungitius	ninespine stickleback	I	MT	N
Moronidae:				
Morone americana	white perch	I/P	MT	N
Morone saxatilis	striped bass	P	MT	N
Centrarchidae:				
Acantharchus pomotis	mud sunfish	I	MT	N
Ambloplites rupestris	rock bass	I/P	MT	NN
Enneacanthus chaetodon	blackbanded sunfish	I	IS	N
Enneacanthus gloriosus	bluespotted sunfish	I	IS	N
Enneacanthus obesus	banded sunfish	I	IS	N
Lepomis cyanellus	green sunfish	I/P	TS	NN
Lepomis gibbosus	pumpkinseed	I	MT	N
Lepomis macrochirus	bluegill	I	TS	NN
Lepomis auritus	redbreast sunfish	I	MT	N
Lepomis gulosus	warmouth	I/P	TS	NN
Micropterus dolomieu	smallmouth bass	I/P	MT	NN
Micropterus salmoides	largemouth bass	P	MT	NN
Pomoxis annularis	white crappie	I/P	TS	NN
Pomoxis nigromaculatus	black crappie	I/P	MT	NN
Percidae:				
Etheostoma fusiforme	swamp darter	BI	IS	N
Etheostoma olmstedi	tessellated darter	BI	MT	N
Perca flavescens	yellow perch	I/P	MT	N
Percina peltata	shield darter	BI	IS	N
Sander vitreus	walleye	P	IS	NN
Cottidae:				
Cottus cognatus	slimy sculpin	BI	IS	N
Cobitidae:				
Misgurnus anguillicaudatus	oriental weatherfish	G	TS	E
Soleidae:				
Trinectes maculatus	hogchoker	G	IS	N

Key:

Abbreviation	Term	Definition
Trophic Guild		
BI	Benthic Insectivore	Specialist feeder that primarily consumes insects taken from the bottom substrate.
H	Herbivore	A species that consumes plant and algae materials.
I	Insectivore	A species that consumes primarily insects.
NF	Nonparasitic Filterer	A species that feeds by filtering algae and other microorganisms found in detritus.
G	Generalist	A species that consumes a wide variety of food types from a wide variety of habitats.
P	Piscivore	A species that primarily consumes fish.
PF	Parasitic Filterer	A species that feeds by attaching to and rasping a hole in the side of a large fish.
PL	Planktivore	A species that consumes small organisms (algae and animals) that float in the water column.
Historical Presence		
E	Exotic	A non-native species introduced from a foreign country.
EX	Extirpated	A native species no longer present, either as a result of natural causes or because of eradication by humans.
N	Native	In the U.S., a species historically occurring in a geographic range previous to the arrival of the first European settlers.
NN	Non-Native	A species found outside of their historical range. The occurrence of a non-native species may be a result of intentional stocking (sportfish or biological control), unintentional stocking (escape), or a response to habitat/climatic changes.
Tolerance		
IS	Intolerant Species	A species most sensitive to environmental degradation. These species have historical distributions significantly greater than presently occurring populations.
TS	Tolerant Species	A species least sensitive to environmental degradation. These species can withstand stressful environmental conditions and often become a dominant member in the fish assemblage.
Miscellaneous		
US	Uncertain Status	An assignment in which there is not enough data or no general consensus to mak a confident classification at this point in time.