# APPENDIX A

## Stream Electrofishing Survey Data (2014)

This section of the report includes stream survey data completed by the Bureau of Freshwater Fisheries in 2014. 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 Upper Delaware Region
# (Upper Delaware & Wallkill)

## BEAR BROOK (AKA DARK MOON BROOK)

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Pequest River |
| **Location**: | Rt. 612 | **County:** | Warren |
| **Date:** | August 25, 2014 | **Municipality:** | Frelinghuysen Twp. |

**Summary:** Bear Brook (a.k.a. Dark Moon Brook) has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. This brook, a tributary to Bear Creek, has mucky substrate, high alkalinity (195 MG/L), and in-stream habitat similar to Bear Creek (also surveyed in 2014). A total of 24 wild Brook Trout were captured (16 young-of-the-year and 8 older fish). The largest of these was 294 mm (11.6 in). Other species present included Blacknose Dace, Tessellated Darter, White Sucker, Creek Chub, American Eel, Bluegill, Sea Lamprey, and the non-native Green Sunfish. Larger Brook Trout and suckers were observed in a large pool below the Rt.612 bridge, but unfortunately this pool could not be included in the 150 m section surveyed because it was un-wadeable (too wide and deep to effectively sample). When this stream was last sampled 10 years ago, just upstream from the 2014 survey site, significantly more large Brook Trout were present (71 individuals, 127 – 298 mm long, plus 1 young-of-the-year) due to the presence of deeper pools.

**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 16.7°C | 7.45 mg/L | 7.64 | 195 mg/L | 515.5 µS/cm | 150 m | 143 (suboptimal) |

| Fish Species | Number |
|---|---|
| Sea Lamprey | 4 |
| American Eel | 23 |
| Eastern Mudminnow | 15 |
| Redfin Pickerel | 34 |
| Creek Chub | 3 |
| Blacknose Dace | 13 |

| Fish Species | Number |
|---|---|
| White Sucker | 4 |
| Green Sunfish | 5 |
| Pumpkinseed | 4 |
| Tessellated Darter | 15 |
| Brook Trout (y-o-y) | 16 (67 – 125 mm) |
| Brook Trout (older than y-o-y) | 8 (187 – 294 mm) |

## BEAR CREEK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Pequest River |
| **Location**: | Bear Creek Road (2nd downstream bridge) | **County:** | Warren |
| **Date:** | August 29, 2014 | **Municipality:** | Frelinghuysen Twp. |

**Summary:** Bear Creek has been regulated as a *Wild Trout Stream* since the inception of this special regulation in 1990. In 2014 this stream was surveyed at two locations to assess the wild trout population. This low gradient stream flows through swamp land in a broad, rolling valley before entering the Pequest River upstream of Great Meadows. Although regulated as a *Wild Trout Stream*, trout reproduction (i.e. presence of young-of-the-year trout) has never been documented in this stream despite the presence of wild Brook Trout age 1 and older. The stream's mucky bottom substrate and high alkalinity (189 mg/L) is a natural condition and not the result of human activity, but rather a reflection of its geology (underlain with carbonate rock) and glacial origin. These stream characteristics are unusual compared to most wild trout/trout production streams in New Jersey, which are typically higher gradient, freestone streams having rocky substrate and low alkalinities (<50 mg/L). The following summarizes data collected at the downstream survey location:

Although the instantaneous water temperature was quite cold at 15.4°C (59.7°F) and conducive for trout survival, only one Brook Trout, measuring 210 mm (8.3 in), was encountered in this survey. Two native species commonly found in swampy north Jersey streams, Redfin Pickerel and Eastern Mudminnow, along with Tessellated Darter, were the most abundant species encountered in this survey. Other fish species present included Blacknose Dace, White Sucker, Creek Chub, Sea and Brook Lampreys, Pumpkinseed, and Green Sunfish, a non-native species.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 15.4°C | 9.33 mg/L | 7.84 | 189 mg/L | 609.8 µS/cm | 150 m | 139 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Brook Lamprey | 2 |
| Sea Lamprey | 3 |
| Eastern Mudminnow | 107 |
| Redfin Pickerel | 35 |
| Creek Chub | 1 |
| Blacknose Dace | 19 |

| Fish Species | Number |
|---|---|
| White Sucker | 8 |
| Green Sunfish | 1 |
| Pumpkinseed | 1 |
| Tessellated Darter | 46 |
| Brook Trout (older than y-o-y) | 1 (210 mm) |

## BEAR CREEK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Pequest River |
| **Location**: | Rt. 519 Bridge | **County:** | Warren |
| **Date:** | August 29, 2014 | **Municipality:** | Frelinghuysen Twp. |

**Summary:** Bear Creek has been regulated as a *Wild Trout Stream* since the inception of this special regulation in 1990. In 2014 this stream was surveyed at two locations to assess the wild trout population. This low gradient stream flows through swamp land in a broad, rolling valley before entering the Pequest River upstream of Great Meadows. Although regulated as a *Wild Trout Stream*, trout reproduction (i.e. presence of young-of-the-year trout) has never been documented in this stream despite the presence of wild Brook Trout age 1 and older. The stream's mucky bottom substrate and high alkalinity (189 mg/L) is a natural condition and not the result of human activity, but rather a reflection of its geology (underlain with carbonate rock) and glacial origin. These stream characteristics are unusual compared to most wild trout/trout production streams in New Jersey, which are typically higher gradient, freestone streams having rocky substrate and low alkalinities (<50 mg/L). The following summarizes data collected at the upstream survey location:
Although the instantaneous water temperature of 20.1°C (68.2°F) at this site was conducive for trout survival, no Brook Trout were encountered. Pumpkinseed was the most abundant species collected (94) and two native species that are commonly found in swampy north Jersey streams, Redfin Pickerel and Eastern Mudminnow, were also present. Also worth noting was the presence of three Bluespotted Sunfish (a native, but less common, sunfish). Other species present included Tessellated Darter, American Eel, Yellow Perch, Largemouth Bass, and lamprey (species undetermined).
**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 20.1°C | 7.77 mg/L | 7.67 | 165 mg/L | 520.5 µS/cm | 150 m | 134 (suboptimal) |

| Fish Species | Number |
|---|---|
| Unknown Lamprey Species | 2 |
| American Eel | 16 |
| Eastern Mudminnow | 2 |
| Redfin Pickerel | 9 |
| Green Sunfish | 1 |
| Bluespotted Sunfish | 3 |

| Fish Species | Number |
|---|---|
| Bluegill | 3 |
| Pumpkinseed | 94 |
| Largemouth Bass | 2 |
| Tessellated Darter | 2 |
| Yellow Perch | 1 |

## BIG FLATBROOK

| | | | |
|---|---|---|---|
| **Project:** | Trout Special Regulation Area Inventory | **Drainage:** | Flat Brook |
| **Location**: | Between Rt. 206 and Rt. 560 | **County:** | Sussex |
| **Date:** | August 5, 2014 | **Municipality:** | Sandyston Twp. |

**Summary:** Prior to 2014, special trout fishing regulations (fly fishing for most or all of the year, and harvest allowed) had been in place for over 50 years on a 4.1 mile stretch of the Big Flat Brook/Flat Brook. In 2014, year round *Catch & Release - Artificials Only* fishing regulations were implemented. Electrofishing surveys have been conducted annually at four stations within this special regulation area since 2012 to assess the trout fishery. Described below are the results from the station located the furthest upstream of the four survey stations.

Although this stream section is classified as Trout Production and is trout-stocked, relatively few trout have been encountered at this survey location over a three year period. In the 2014 survey only 3 wild Brook Trout were found along with 12 other fish species. In 2013, 8 trout were present (2 wild Brook Trout, 1 stocked Brown Trout and 5 stocked Rainbow Trout) and only 3 trout (2 stocked Brown Trout and 1 stocked Rainbow Trout) were found in 2012. It is not immediately apparent why so few trout are present at this location. Intense fishing pressure and better trout habitat (deep pools) upstream and downstream of the survey stretch may be a factor.

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

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 18.4°C | 9.58 mg/L | 7.95 | 30 mg/L | 136.4 µS/cm | 150 m | - |

| Fish Species | Number |
|---|---|
| American Eel | 47 |
| Blacknose Dace | 169 |
| Longnose Dace | 43 |
| Cutlip Minnow | 10 |
| Common Shiner | 16 |
| White Sucker | 20 |
| Northern Hog Sucker | 1 |

| Fish Species | Number |
|---|---|
| Largemouth Bass | 1 |
| Smallmouth Bass | 1 |
| Margined Madtom | 7 |
| Slimy Sculpin | 24 |
| Tessellated Darter | 21 |
| Brook Trout (y-o-y) | 2 (81 & 97 mm) |
| Brook Trout (older than y-o-y) | 1 (196 mm) |

## BIG FLAT BROOK

| | | | |
|---|---|---|---|
| **Project:** | Trout Special Regulation Area Inventory | **Drainage:** | Flat Brook |
| **Location**: | Upstream of Blewett Tract (Sta #1) | **County:** | Sussex |
| **Date:** | July 30, 2014 | **Municipality:** | Sandyston Twp. |

**Summary:** Prior to 2014, special trout fishing regulations (fly fishing for most or all of the year, and harvest allowed) had been in place for over 50 years on a 4.1 mile stretch of the Big Flat Brook/Flat Brook. In 2014, year round *Catch & Release - Artificials Only* fishing regulations were implemented. Electrofishing surveys have been conducted annually at four stations within this special regulation area since 2012 to assess the trout fishery. Described below are the results from one station of two stations located not far upstream from the area known as the Blewett Tract.

Although this stream section is classified as Trout Production, relatively few wild trout have been encountered at this survey location over a three year period. In the 2014 survey only 2 Brown Trout (wild fish, not hatchery origin) were found along with 12 other fish species. No trout were present in 2013 and only 8 trout (7 wild Brook Trout and 1 stocked Rainbow Trout) were found in 2012. It is not immediately apparent why so few trout are present at this location.

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

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.5°C | 9.16 mg/L | 7.35 | 28 mg/L | 131.5 µS/cm | 150 m | - |

| Fish Species | Number |
|---|---|
| Sea Lamprey | 2 |
| American Eel | 14 |
| Blacknose Dace | 8 |
| Longnose Dace | 12 |
| Cutlip Minnow | 4 |
| Common Shiner | 2 |
| White Sucker | 2 |

| Fish Species | Number |
|---|---|
| Northern Hog Sucker | 1 |
| Margined Madtom | 7 |
| Slimy Sculpin | 20 |
| Shield Darter | 3 |
| Tessellated Darter | 10 |
| Brown Trout (older than y-o-y) | 2 (170 – 298 mm) |

## BIG FLATBROOK

| | | | |
|---|---|---|---|
| **Project:** | Trout Special Regulation Area Inventory | **Drainage:** | Flat Brook |
| **Location**: | Upstream of Blewett Tract (Sta #2) | **County:** | Sussex |
| **Date:** | July 30, 2014 | **Municipality:** | Sandyston Twp. |

**Summary:** Prior to 2014, special trout fishing regulations (fly fishing for most or all of the year, and harvest allowed) had been in place for over 50 years on a 4.1 mile stretch of the Big Flat Brook/Flat Brook. In 2014, year round *Catch & Release - Artificials Only* fishing regulations were implemented. Electrofishing surveys have been conducted annually at four stations within this special regulation area since 2012 to assess the trout fishery. Described below are the results from one station of two stations located not far upstream from the area known as the Blewett Tract.

Although this stream section is classified as Trout Production, relatively few trout (wild or stocked) have been encountered at this survey location over a three year period. In the 2014 survey only 8 trout were found (5 Brook Trout and 3 Brown Trout, all wild) in addition to 13 other fish species. In 2013 only 7 trout were found (5 wild Brook Trout, 1 stocked Brown Trout, and 1 stocked Rainbow Trout). In 2012 only 3 wild Brook Trout were found. It is not immediately apparent why so few trout are present at this location.

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

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.6°C | 8.30 mg/L | 6.83 | 28 mg/L | 131.6 µS/cm | 150 m | - |

| Fish Species | Number |
|---|---|
| Sea Lamprey | 3 |
| American Eel | 14 |
| Redfin Pickerel | 78 |
| Creek Chub | 1 |
| Blacknose Dace | 36 |
| Longnose Dace | 24 |
| Cutlip Minnow | 14 |
| Common Shiner | 35 |

| Fish Species | Number |
|---|---|
| White Sucker | 7 |
| Northern Hog Sucker | 1 |
| Margined Madtom | 4 |
| Slimy Sculpin | 18 |
| Tessellated Darter | 6 |
| Brook Trout (older than y-o-y) | 5 (195 – 284 mm) |
| Brown Trout (older than y-o-y) | 3 (215 – 346 mm) |

## CLOVE BROOK (AKA MILL BROOK)

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Delaware River |
| **Location**: | Rt. 23 bridge | **County:** | Sussex |
| **Date:** | August 27, 2014 | **Municipality:** | Montague Twp. |

**Summary:** Clove Brook (a.k.a. Mill Brook) has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. Three surveys have been conducted at this location prior to 2014 (in 1968, 1998, and 2004). Although the number of Brown Trout in these surveys has fluctuated (a total of 10, 31, 16, and 14 Brown Trout were caught in 1968, 1998, 2004, and 2014 respectively), the Brown Trout population appears stable. Brook Trout were encountered at this location in the past (two Brook Trout in both the 1968 and 1998 surveys), however, in 2004 and 2014 Brook Trout were absent. Upstream of the sample location is an on-stream impoundment (Montague Lake) that is a likely source of warmwater input during the summer and may be the causative factor of the Brook Trout absence in recent years. In addition, interspecific competition with Brown Trout and additional predators that were introduced in the lake upstream (warmwater species such as, Largemouth Bass, Chain Pickerel, Redbreast Sunfish, and Pumpkinseed, were found present in all surveys conducted here since 1968) may have further fated Brook Trout absence. In 2006, during the Brook Trout Assessment, a survey was conducted upstream of Montague Lake and 98 wild Brook Trout were captured along with 36 wild Brown Trout. This provides further evidence to suggest the major impact Montague Lake is having on Clove Brook. Trout species encountered during this survey included 14 wild Brown Trout ranging from 58 mm to 281 mm, including one young-of-the-year. Largemouth Bass, Blacknose Dace, Longnose Dace, Tessellated Darter, American Eel, Chain Pickerel, and Redbreast Sunfish were also captured during this survey.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*). Future surveys should continue to monitor upstream reaches of Clove Brook and Mill Brook whose confluence is met upstream of Montague Lake.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 20.9°C | 20.8 mg/L | 7.72 | 92 mg/L | 363.2 µS/cm | 150 m | 158 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Eel | 9 |
| Chain Pickerel | 1 |
| Blacknose Dace | 82 |
| Longnose Dace | 9 |
| Redbreast Sunfish | 7 |

| Fish Species | Number |
|---|---|
| Largemouth Bass | 1 |
| Tessellated Darter | 2 |
| Brown Trout (y-o-y) | 1 (58 mm) |
| Brown Trout (older than y-o-y) | 13 (158 – 281 mm) |

## DUNNFIELD CREEK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Delaware River |
| **Location**: | Del. Water Gap (parking lot off I-80) | **County:** | Warren |
| **Date:** | August 1, 2014 | **Municipality:** | Hardwick Twp. |

**Summary:** Dunnfield Creek has been regulated as a *Wild Trout Stream* since 1997. In 2014 this stream was surveyed at two locations to assess the wild trout population. The creek flows through a crease in the mountain that forms the majestic Delaware Water Gap. This stream is inhabited by wild Brook and Brown Trout and is perhaps the most pristine of New Jersey's 36 regulated *Wild Trout Streams*. The watershed upstream of the Interstate 80 bridge lies mostly within Worthington State Forest and is entirely forested and undeveloped, except for trails, footbridges, and a seldom used unimproved road leading to Sunfish Pond. The source of the creek is not Sunfish Pond (which lies in another watershed) but rather a small, 4-acre natural pond just west of Upper Yards Creek Reservoir. Prior to 1997, Dunnfield Creek was annually stocked with catchable trout each spring. The following summarizes data collected at the downstream survey location:
Of the 120 trout collected at this site in 2014, Brown Trout were significantly more abundant (95%) than Brook Trout (4%) or Tiger Trout (1%). A few Tiger Trout (a hybrid trout – the offspring of a successful mating between a brown and Brook Trout) have been documented in the past in this stream reach but never figured prominently in the catch. Eighteen Brown Trout exceeded the 229 mm (9 in) minimum size and the largest of these was 376 mm (14.8 inches). Surveys conducted in prior years yielded similar results. In 2004, 108 Brown Trout, 7 Brook Trout, and 1 Tiger Trout were present. In 1995 there were 119 trout (118 Brown Trout and 1 Brook Trout). Exclusively trout were found in the 1970 survey (10 Brown Trout and 2 Brook Trout). The exact location of this survey is unknown, but the low number of trout could be due to a number of factors, including inefficiency of the electrofishing gear, the stocking of hatchery trout suppressing the wild population, and angler harvest (no minimum harvestable size back then). The high habitat assessment score (187) reflects the outstanding habitat qualities of this stream. Woody material, boulder/bedrock and steep gradient combine to create plunge pools of sufficient depth to support more and larger trout than other similar-sized streams.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.4°C | 9.14 mg/L | 7.58 | 7 mg/L | 36.0 µS/cm | 150 m | 187 (optimal) |

| Fish Species | Number |
|---|---|
| American Eel | 33 |
| Blacknose Dace | 4 |

| Fish Species | Number |
|---|---|
| Brook Trout (y-o-y) | 5 (60 – 79 mm) |
| Brown Trout (y-o-y) | 54 (52 – 81 mm) |
| Brown Trout (older than y-o-y) | 60 (121 – 376 mm) |
| Tiger Trout (y-o-y) | 1 (141 mm) |

## DUNNFIELD CREEK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Delaware River |
| **Location**: | Approx. 1.3 km upstream from I-80 | **County:** | Warren |
| **Date:** | August 1, 2014 | **Municipality:** | Hardwick Twp. |

**Summary:** Dunnfield Creek has been regulated as a *Wild Trout Stream* since 1997. In 2014 this stream was surveyed at two locations to assess the wild trout population. The creek flows through a crease in the mountain that forms the majestic Delaware Water Gap. This stream is inhabited by wild Brook and Brown Trout and is perhaps the most pristine of New Jersey's 36 regulated *Wild Trout Streams*. The watershed upstream of the Interstate 80 bridge lies mostly within Worthington State Forest and is entirely forested and undeveloped, except for trails, footbridges, and a seldom used unimproved road leading to Sunfish Pond. The source of the creek is not Sunfish Pond (which lies in another watershed) but rather a small, 4-acre natural pond just west of Upper Yards Creek Reservoir. Prior to 1997, Dunnfield Creek was annually stocked with catchable trout each spring. The following summarizes data collected at the upstream survey location:
Of the 67 trout collected at this site in 2014, Brown Trout were significantly more abundant (87%) than Brook Trout (13%) and none exceeded the 229 mm (9 in) minimum harvestable size. A survey conducted in 1995 in the same vicinity (exact location unknown) yielded different results. In this survey not only were more trout (143) caught (over 183 m section sampled), but Brook Trout dominated the catch (102 fish or 71%) and Brown Trout were significantly less numerous (40 fish or 28%). One stocked Rainbow Trout was also present. The current species shift to Brown Trout is cause for concern as this species is displacing Brook Trout, New Jersey's only native salmonid species. The high habitat assessment score (194) reflects the outstanding habitat qualities of this stream. The gradient is less steep in this reach compared to downstream and as a consequence woody material, boulders/bedrock, and less flow combine to create fewer plunge pools that favor larger trout.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. Consideration should be given to managing this stream for wild Brook Trout using fishing regulations and other restoration techniques geared toward suppressing the wild Brown Trout population. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 16.6°C | 9.30 mg/L | 6.98 | 9 mg/L | 33.0 µS/cm | 150 m | 194 (optimal) |

| Fish Species | Number | Fish Species | Number |
|---|---|---|---|
| Brook Trout (y-o-y) | 5 (65 – 88 mm) | Brown Trout (y-o-y) | 35 (45 – 94 mm) |
| Brook Trout (older than y-o-y) | 4 (179 – 216 mm) | Brown Trout (older than y-o-y) | 23 (148 – 224 mm) |

## FLAT BROOK

| | | | |
|---|---|---|---|
| **Project:** | Trout Special Regulation Area Inventory | **Drainage:** | Flat Brook |
| **Location**: | Off Rt. 615 (below rifle range pool) | **County:** | Sussex |
| **Date:** | August 5, 2014 | **Municipality:** | Sandyston Twp. |

**Summary:** Prior to 2014, special trout fishing regulations (fly fishing for most or all of the year, and harvest allowed) had been in place for over 50 years on a 4.1 mile stretch of the Big Flat Brook/Flat Brook. In 2014, year round *Catch & Release - Artificials Only* fishing regulations were implemented. Electrofishing surveys have been conducted annually at four stations within this special regulation area since 2012 to assess the trout fishery. Described below are the results from the station located the furthest downstream of the four survey stations.

Although this stream section is classified as Trout Production and is trout-stocked, relatively few trout have been encountered at this survey location over a three year period. In the 2014 survey only 2 trout (1 wild Brown Trout and 1 stocked Rainbow Trout) were found along with 12 other fish species. In 2013, 4 trout were present (1 wild Brook Trout, 1 stocked Brown Trout and 2 stocked Rainbow Trout) and in 2012 only 6 trout (1 wild Brook Trout, 1 wild and 2 stocked Brown Trout, and 2 stocked Rainbow Trout) were found. It is not immediately apparent why so few trout are present at this location. Intense fishing pressure and better trout habitat (deep pools) upstream and downstream of the survey stretch may be a factor.

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

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.3°C | 8.95 mg/L | 8.03 | 100 mg/L | 308.8 µS/cm | 150 m | - |

| Fish Species | Number |
|---|---|
| American Eel | 32 |
| Creek Chub | 5 |
| Common Shiner | 3 |
| Blacknose Dace | 44 |
| Longnose Dace | 33 |
| Cutlip Minnow | 3 |
| White Sucker | 1 |

| Fish Species | Number |
|---|---|
| Slimy Sculpin | 3 |
| Bluegill | 1 |
| Redbreast Sunfish | 1 |
| Shield Darter | 1 |
| Tessellated Darter | 13 |
| Brown Trout (older than y-o-y) | 1 (205 mm) |
| Rainbow Trout (older than y-o-y) | 1 (340 mm) |

## HAKIHOKAKE CREEK (AKA LITTLE YORK BROOK)

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Delaware River |
| **Location**: | Sweet Hollow Road | **County:** | Hunterdon |
| **Date:** | July 22, 2014 | **Municipality:** | Holland Twp. |

**Summary:** Little York Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. This brook, which is the headwater reach of Hakihokake Creek, flows along Sweet Hollow Road and through the town of Little York before joining with an un-named tributary just upstream of the Little York - Mount Pleasant Road bridge. When the *Wild Trout Stream* fishing regulation was adopted in 1990, trout stocking was discontinued on this brook. Past electrofishing surveys conducted in 1970, 1988, 1998, 2001, and 2008 documented a reproducing Brown Trout population. In 2014 Brown Trout were relatively abundant (40 young-of-the-year fish and 55 older fish captured). Seven trout exceeded the 229 mm (9-inch) minimum harvestable size and the largest was 340 mm (13.4 inches).

**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. If Little York Brook continues to have special fishing regulations then inconsistencies in the stream name must be resolved to prevent angler confusion and enforcement problems. Currently the upper section of Little York Brook is named Little York Creek in NJDEP's Surface Water Quality Standards GIS map layer. However, the lower section of Little York Brook overlaps with Hakihokake Creek (a trout-stocked water, having different fishing regulations). This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.4°C | 9.15 mg/L | 7.42 | 36 mg/L | 168.2 µS/cm | 150 m | 172 (optimal) |

| Fish Species | Number |
|---|---|
| American Eel | 22 |
| Creek Chub | 1 |
| Blacknose Dace | 43 |
| Longnose Dace | 6 |

| Fish Species | Number |
|---|---|
| Brown Trout (y-o-y) | 40 (59 – 86 mm) |
| Brown Trout (older than y-o-y) | 55 (132 – 340 mm) |

## HANCES BROOK (TRIB.) (ROCKPORT)

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Musconetcong River |
| **Location**: | Highland Avenue bridge | **County:** | Warren |
| **Date:** | July 24, 2014 | **Municipality:** | Mansfield Twp. |

**Summary:** Hances Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. This stream section has been surveyed two times prior to 2014. In the past, NJDFW considered this surveyed stream section to be the mainstem. However, the "tributary" to the east is officially designated as the mainstem of Hances Brook, both on the original USGS topographical map and in NJDEP's GIS layer. In the 2014 survey only 5 young-of-the-year (y-o-y) Brook Trout were found over the 150 m stretch sampled, despite suitable in-stream habitat and cool water temperature (17.8°C). The electrofishing surveys conducted in the past have documented more Brook Trout. In 2004, 19 Brook Trout were encountered (15 y-o-y and 4 older) and in 1970 19 Brook Trout (5 y-o-y and 14 older) were documented (183 m section surveyed in 1970). The reason for the low trout abundance in 2014 is not readily apparent. About 10 years ago a small sewage treatment plant that had chronic water quality issues with the wastewater it discharged into the brook was decommissioned. Water quality should have improved in this stream reach following this event. It is surprising that the trout population was not more robust, especially considering the relatively high habitat assessment score (176, optimal).

**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. Additional fish sampling (upstream/downstream/mainstem) should be conducted to better document the distribution and abundance of Brook Trout in this stream and to obtain data on the mainstem of this stream. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.8°C | 9.30 mg/L | 7.52 | 33.5 mg/L | 214.7 µS/cm | 150 m | 176 (optimal) |

| Fish Species | Number |
|---|---|
| American Eel | 31 |
| Creek Chub | 20 |
| Blacknose Dace | 113 |
| Longnose Dace | 13 |

| Fish Species | Number |
|---|---|
| Tessellated Darter | 12 |
| White Sucker | 7 |
| Brook Trout (y-o-y) | 5 (62 – 80 mm) |

## MERRILL CREEK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Pohatcong Creek |
| **Location**: | Prospect St. bridge | **County:** | Warren |
| **Date:** | August 21, 2014 | **Municipality:** | Greenwich Twp. |

**Summary:** Merrill Creek (downstream of Merrill Creek Reservoir) has been regulated as a *Wild Trout Stream* since 1996. In 2014 this stream was surveyed at two locations to assess the wild trout population. Prior to the 1980's the creek was fragmented by the Ingersol-Rand Reservoir. When the much larger Merrill Creek Reservoir was constructed on top of this existing reservoir in the mid-1980's, additional stream habitat was lost when 3 km (2 mi) of this 12 km (7.5 mi) long stream was inundated. The fish species composition and abundance above and below the Merrill Creek Reservoir are distinctly different. Trout stocking was discontinued below the reservoir in 1996, when this section was designated a *Wild Trout Stream*. The following summarizes data collected at the downstream survey location:
In the 2014 survey, although both Brook and Brown Trout were present (231 individuals) Brown Trout dominated the trout catch (85% of total. A total of 197 Brown Trout and 34 Brook Trout were collected. Of these, 61 (26% of total trout catch) were young-of the year (44 Brown Trout and 17 Brook Trout). The largest Brown Trout was 278 mm (11.4 in) and the largest Brook Trout was 217 mm (8.5 in). A total of 5 trout (brown) were harvestable (exceeded 229 mm (9 in)). Very few fish other than trout encountered in the survey (5 American Eel and 1 Green Sunfish). When this same section was last surveyed in 2007 considerably more trout were present (397) and Brown Trout dominated the trout catch (92% of total trout). In the 1995 survey (same location) far fewer trout were present (137 total) over a longer stretch (183 m), however, Brook Trout dominated the trout catch (77% Brook Trout, 22% Brown Trout, and 1 stocked Rainbow Trout). Finally, when this location was first surveyed in 1984 (when the much smaller Ingersol-Rand Reservoir was present), there were relatively few (4) trout present. The cold-water bottom release from Merrill Creek Reservoir (minimum conservation flow of 3 CFS mandated) has resulted in abnormally cold summer water temperatures (9.6°C (49.3°F) on the survey date) which not only enhance the ability of stream below the reservoir to support trout but also suppress other fish species that have warmer temperature preferences. The shift in trout species abundance to Brown Trout does not bode well for Brook Trout. But it should be noted that further upstream (closer to the base of the dam, and less flow) Brook Trout continue to more abundant than Brown Trout (according to electrofishing data collected by the reservoir owner).
**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 9.6°C | 11.58 mg/L | 7.19 | 27.5 mg/L | 117.8 µS/cm | 150 m | 159 (optimal) |

| Fish Species | Number |
|---|---|
| American Eel | 5 |
| Green Sunfish | 1 |
| Brook Trout (y-o-y) | 17 (67 – 92 mm) |
| Brook Trout (older than y-o-y) | 17 (125 – 217 mm) |

| Fish Species | Number |
|---|---|
| Brown Trout (y-o-y) | 41 (52 – 80 mm) |
| Brown Trout (older than y-o-y) | 156 (96 – 289 mm) |

## MERRILL CREEK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Pohatcong Creek |
| **Location**: | Richline Road bridge | **County:** | Warren |
| **Date:** | September 2, 2014 | **Municipality:** | Harmony Twp. |

**Summary:** Merrill Creek (upstream of Merrill Creek Reservoir) has been regulated as a *Wild Trout Stream* the adoption of this special regulation in 1990. In 2014 this stream was surveyed at two locations to assess the wild trout population. Prior to the 1980's the creek was fragmented by the Ingersol-Rand Reservoir. When the much larger Merrill Creek Reservoir was constructed on top of this existing reservoir in the mid-1980's, additional stream habitat was lost when 3 km (2 mi) of this 12 km (7.5 mi) long stream was inundated. The fish species composition and abundance above and below the Merrill Creek Reservoir are distinctly different. Trout stocking was discontinued below the reservoir in 1996, when this section was designated a *Wild Trout Stream*. The following summarizes data collected at the downstream survey location:
When surveyed in the summer of 2014, the instantaneous water temperature in this reach was quite high (22.8°C (73°F)) for a Trout Production stream. This warm water likely impacts trout abundance as no trout were encountered in this sluggish stream reach. The most abundant fish species was Creek Chub (200 individuals) and many of these were large individuals (12 – 15 cm). Other fishes present included Blacknose Dace, White Sucker, Pumpkinseed, Bluegill, and Rock Bass. Evidence of past beaver activity was noted and beavers likely utilize a swamp on the mainstem just upstream of the Richline Road bridge. These two factors contribute to trout habitat degradation by causing excessive water warming and silt accumulation (less flushing of sediment). The presence of centrarchids (sunfish) and large creek chubs is further evidence that the habitat in this reach is less than favorable for trout. The reservoir's owner has regularly sampled this reach, primarily at five check dams installed to mitigate the loss of riverine habitat when the reservoir was constructed. In the past they have encountered primarily wild Brook Trout and, more recently, an occasional wild Brown Trout. The reservoir is annually stocked with Brown and Rainbow Trout (and until recently, Lake Trout). It is surprising that Brown Trout have not gained a stronger foothold in the creek above the reservoir, especially following the removal of a poorly functioning fish barrier dam just upstream from the reservoir in 1991. In 2014 the check dams were jointly inspected with reservoir staff and it was recommended that some of these be removed or rehabilitated (by the reservoir's owner).
**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 22.8°C | 7.75 mg/L | 7.86 | 29.5 mg/L | 184.7 µS/cm | 150 m | 136 (suboptimal) |

| Fish Species | Number | Fish Species | Number |
|---|---|---|---|
| Creek Chub | 200 | Pumpkinseed | 10 |
| Blacknose Dace | 120 | Bluegill | 9 |
| White Sucker | 36 | Rock Bass | 7 |

## PARKER BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Flatbrook |
| **Location**: | Crigger Road, Stokes State Forest | **County:** | Sussex |
| **Date:** | July 29, 2014 | **Municipality:** | Montague Twp. |

**Summary:** Parker Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. This stream was previously surveyed in 2004, 2000 and 1968 in which 0, 1 and 38 Brook Trout were found respectively. In 2014, 3 wild Brook Trout (64mm – 140mm) were found and 2 were young-of-the-year. Water temperature in the 2014 survey was 17.9°C which is a little warm for optimal / preferred Brook Trout temperatures, but not out of the range of Brook Trout survival. The 2000 survey, which found only 1 Brook Trout, had a water temperature of 21.1°C which is above the range of good Brook Trout survival. In 1968, 5 species were found during the survey and all 5 species are what you would normally find in a Wild Brook Trout Stream. The surveys done since then all showed higher species diversity with species not typically associated with a *Wild Trout Stream* hinting that the stream quality maybe degrading. 2014 had the highest species diversity when 11 different fish species were found. Stream flow during the 2014 survey was extremely low as much of the stream was running under the rocks and cobble of the stream bottom making for poor trout habitat and also making it difficult to survey the stream.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the Wild Trout Stream regulation should be modified and/or if new regulations for wild trout are warranted. Further surveys need to be conducted in different locations to determine if the decreasing Brook Trout population found in past surveys is due to the likelihood of stream temperatures exceeding trout sustaining temperatures, if the low flows found in 2014 make the survey location a poor choice for finding wild trout, and/or if the influx of other species and their increase in competition for resources has displaced and relegated wild Brook Trout to other areas in Parker Brook. This stream should also be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.9°C | 7.44 mg/L | 7.17 | 16 mg/L | 85.6 µS/cm | 150 m | 178 (optimal) |

| Fish Species | Number |
|---|---|
| American Eel | 6 |
| Creek Chub | 21 |
| Blacknose Dace | 72 |
| Longnose Dace | 3 |
| Creek Chubsucker | 2 |
| Cutlip Minnow | 1 |

| Fish Species | Number |
|---|---|
| Common Shiner | 25 |
| Golden Shiner | 2 |
| White Sucker | 3 |
| Margined Madtom | 6 |
| Brook Trout (y-o-y) | 2 (64 – 65 mm) |
| Brook Trout (older than y-o-y) | 1 (140 mm) |

## POHATCONG CREEK

| | | | |
|---|---|---|---|
| **Project:** | Fish Health | **Drainage:** | Pohatcong Creek |
| **Location**: | Creek Road | **County:** | Warren |
| **Date:** | May 29, 2014 | **Municipality:** | Pohatcong Twp. |

**Summary:** The lower end of the Pohatcong Creek was electrofished on May 29 to screen for fish pathogens. Seven Brown Trout (6-15 in.) appeared to be of wild origin. Nine Rainbow Trout (12-16 in.) were of stocked origin based on extensive fin erosion. All trout appeared healthy and disease free based on visual observations. No trout were submitted for laboratory analysis.

**Recommendation:** No additional surveys necessary.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 13.3°C | 10.36 mg/L | 7.93 | - | 333.6 µS/cm | ~ 140 m | - |

| Fish Species | Number |
|---|---|
| Sea Lamprey | present |
| American Eel | present |
| Blacknose Dace | present |
| White Sucker | present |

| Fish Species | Number |
|---|---|
| Cutlip Minnow | present |
| Tessellated Darter | present |
| Brown Trout (older than y-o-y) | 7 (150 – 375 mm) |
| Rainbow Trout (older than y-o-y) | 9 (296 – 371 mm) |

**NON - STANDARDIZED SURVEY**

## STEPHENSBURG BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Musconetcong River |
| **Location**: | Stephensburg Road bridge | **County:** | Morris |
| **Date:** | July 23, 2014 | **Municipality:** | Washington Twp. |

**Summary:** Stephensburg Brook (a.k.a. Stephensburg Creek) has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. This stream has been surveyed twice previously (1970 and 2003) and both times the only trout species documented was Brook Trout. In 1970 a total of 26 Brook Trout (10 young-of-the-year and 16 older individuals) were documented over a 183 m survey stream reach. In 2003 a total of 84 Brook Trout (76 young-of-the-year and 9 older individuals) were documented over 150 m.
In the 2014 electrofishing survey, only 15 Brook Trout were documented over the 150 m sample stretch and of these, 13 were young-of-the-year. Other species encountered during this survey were American Eel, Blacknose Dace, Longnose Dace, and Brown Trout. This stream had previously been the exclusive domain of Brook Trout, New Jersey's only native trout species. However, the young-of-the-year Brown Trout documented in the 2014 survey indicates this non-native game fish is now also successfully reproducing in this stream. Stephensburg Brook is one of five streams inhabited by wild Brook Trout that are being monitored with paired water/air temperature data loggers by NJ Bureau of Freshwater Fisheries as part of the Eastern Brook Trout Joint Venture's initiative to assess the impact of climate change on this temperature sensitive fish species. Since Brown Trout can tolerate slightly warmer water than Brook Trout, concurrently monitoring the temperature and fish population in this stream will provide valuable baseline data that will help evaluate long term trends and aid in the management of this valuable coldwater fishery.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. Additional fish sampling (upstream and downstream of the reach surveyed in 2014) should be conducted to better document the distribution and abundance of Brook and Brown Trout in this stream. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 18.0°C | 8.77 mg/L | 7.53 | 27 mg/L as $CaCO_3$ | 244.9 µS/cm | 150 m | 167 (optimal) |

| Fish Species | Number |
|---|---|
| American Eel | 21 |
| Blacknose Dace | 42 |
| Longnose Dace | 1 |

| Fish Species | Number |
|---|---|
| Brook Trout (older than y-o-y) | 2 (185 & 189 mm) |
| Brook Trout (y-o-y) | 13 (52 – 75 mm) |
| Brown Trout (y-o-y) | 3 (58 – 72 mm) |

## STONY BROOK (SUSSEX)

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Flat Brook |
| **Location**: | Kittle Road | **County:** | Sussex |
| **Date:** | July 29, 2014 | **Municipality:** | Sandyston Twp. |

**Summary:** Stony Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. An electrofishing survey was conducted in 2014 at Stony Brook located in Sandyston Township, Sussex County to assess the resident trout population. This stream is managed as a *Wild Trout Stream* and was surveyed in 2004, 2000 and 1970, in which 31, 6 and 15 Brook Trout were found respectively. The 2014 survey also found a relatively small wild Brook Trout population of 12 total Brook Trout (74 mm – 244 mm) which included 3 young-of-the-year (74 mm – 82 mm). Water temperatures during each survey were variable ranging from 15.8°C to 20.0° C and this variation may be the reason behind the inconsistent and overall small population sizes found from one survey to the next. Although this variation is not unusual, it is possible that an on-stream impoundment located upstream (Stony Lake, 15.4 acres) negatively impacts stream temperature during the summer. A tributary that enters the brook downstream of the lake likely helps ameliorate the impact of warm water discharge from the lake during the summer.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the Wild Trout Stream regulation should be modified and/or if new regulations for wild trout are warranted. Additional surveys should be conducted to determine if a small Brook Trout Population is consistent throughout Stony Brook or if there are larger and more stable numbers of Brook Trout found elsewhere in the stream. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 15.8°C | 8.95 mg/L | 6.02 | 9 mg/L | 62.2 µS/cm | 150 m | 187 (optimal) |

| Fish Species | Number |
|---|---|
| American Eel | 14 |
| Blacknose Dace | 68 |
| Longnose Dace | 17 |
| Bluegill | 4 |

| Fish Species | Number |
|---|---|
| Slimy Sculpin | 4 |
| Brook Trout (y-o-y) | 3 (74 – 82 mm) |
| Brook Trout (older than y-o-y) | 9 (148 – 244 mm) |

## VAN CAMPENS BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Delaware |
| **Location**: | Brink Road bridge | **County:** | Warren |
| **Date:** | September 4, 2014 | **Municipality:** | Hardwick Twp. |

**Summary:** This stream is located within the Delaware Water Gap National Recreation Area (DEWA) and is considered one of NJ's best *Wild Trout Streams* due the abundance and occurrence of all three trout species (brook, brown, and rainbow). It was the first stream to have special fishing regulations for wild trout, beginning in the 1979 as a *Natural Trout Fishing Area*, and later designated as a *Wild Trout Stream* when this regulation was implemented in 1990 (and trout stocking completely ceased). This stream has been sampled numerous times since 1968. The trout species distribution pattern found in the 2014 surveys mimicked those observed in the past, where Brook Trout dominate the headwaters, then transitions to Rainbow Trout, and finally to Brown Trout. The following summarizes data collected at the "middle" station surveyed in 2014:
In 2014, at this site (located just downstream of the power lines that cross the stream below the Watergate ponds) a total of 54 trout were collected. The trout species breakdown was 50% Rainbow Trout, 41%, Brown Trout, and 9% Brook Trout. The largest trout was 385 mm (15.2 in) and this Brown Trout was one of only two trout encountered that exceeded its minimum harvestable size (305 mm (12 in) for Brown Trout on this stream). The other harvestable-sized trout was a rainbow that measured 263 mm (10.4 in) (229 mm (9 in) is the minimum harvestable size for Rainbow Trout on this stream). Seven other fish species were found, including four centrarchid species. A severely eroded bank (cliff-like) was observed on the easterly side of the stream where a trail parallels the stream and this is a constant source of undesirable sediment. Although the stream has been surveyed multiple times in the past, none of the surveys appear to have been conducted near the 2014 survey location.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 21.3°C | 6.92 mg/L | 7.53 | 32 mg/L | 94.6 µS/cm | 150 m | 168 (optimal) |

| Fish Species | Number | Fish Species | Number |
|---|---|---|---|
| Creek Chub | 9 | Largemouth Bass | 1 |
| Blacknose Dace | 143 | Brook Trout (y-o-y) | 5 (57 – 69 mm) |
| White Sucker | 20 | Brown Trout (y-o-y) | 6 (54 – 82 mm) |
| Pumpkinseed | 9 | Brown Trout (older than y-o-y) | 16 (130 – 385 mm) |
| Bluegill | 1 | Rainbow Trout (y-o-y) | 13 (61 – 84 mm) |
| Redbreast Sunfish | 2 | Rainbow Trout (older than y-o-y) | 14 (125 – 263 mm) |

## VAN CAMPENS BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Delaware River |
| **Location**: | Blairstown-Millbrook Road bridge | **County:** | Warren |
| **Date:** | September 4, 2014 | **Municipality:** | Hardwick Twp. |

**Summary:** This stream is located within the Delaware Water Gap National Recreation Area (DEWA) and is considered one of NJ's best *Wild Trout Streams* due the abundance and occurrence of all three trout species (brook, brown, and rainbow). It was the first stream to have special fishing regulations for wild trout, beginning in the 1979 as a *Natural Trout Fishing Area*, and later designated as a *Wild Trout Stream* when this regulation was implemented in 1990 (and trout stocking completely ceased). This stream has been sampled numerous times since 1968. The trout species distribution pattern found in the 2014 surveys mimicked those observed in the past, where Brook Trout dominate the headwaters, then transitions to Rainbow Trout, and finally to Brown Trout. The following summarizes data collected at the most upstream of the three locations surveyed in 2014:

In the 2014 survey, conducted a short distance upstream from Millbrook Village, 84 trout were collected. The majority was Brook Trout (60%) and the remainder was Rainbow Trout. None of the trout exceeded the minimum harvestable size (229 mm (9 in)). The largest was a Rainbow Trout measuring 182 mm (7.2 in). When last surveyed in this vicinity in 1994 (over a slightly longer, 183 m stretch), more trout were present (202), and 96% were Brook Trout. In a study conducted on this stream in the 1980's, reproductive success of Rainbow Trout (which typically spawn in the spring instead of the fall) was shown to be impacted by episodic depression of pH related to snow melt.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.2°C | 7.93 mg/L | 6.9 | 22.0 mg/L | 58.2 µS/cm | 150 m | 170 (optimal) |

| Fish Species | Number |
|---|---|
| Creek Chub | 11 |
| Longnose Dace | 128 |
| Bluegill | 2 |

| Fish Species | Number |
|---|---|
| Brook Trout (y-o-y) | 8 (62 – 84 mm) |
| Brook Trout (older than y-o-y) | 42 (93 – 180 mm) |
| Rainbow Trout (y-o-y) | 2 (58 & 68 mm) |
| Rainbow Trout (older than y-o-y) | 32 (89 – 182 mm) |

## VAN CAMPENS BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Delaware River |
| **Location**: | Depew Recreation Site Access Road | **County:** | Warren |
| **Date:** | August 22, 2014 | **Municipality:** | Hardwick Twp. |

**Summary:** This stream is located within the Delaware Water Gap National Recreation Area (DEWA) and is considered one of NJ's best *Wild Trout Streams* due the abundance and occurrence of all three trout species (brook, brown, and rainbow). It was the first stream to have special fishing regulations for wild trout, beginning in the 1979 as a *Natural Trout Fishing Area*, and later designated as a *Wild Trout Stream* when this regulation was implemented in 1990 (and trout stocking completely ceased). This stream has been sampled numerous times since 1968. The trout species distribution pattern found in the 2014 surveys mimicked those observed in the past, where Brook Trout dominate the headwaters, then transitions to Rainbow Trout, and finally to Brown Trout. The following summarizes data collected at the lowermost of the three locations surveyed in 2014:

In 2014 at the Depew location, a total of 64 trout (3 species) were collected along with 10 other fish species. The trout species breakdown was 92% Brown Trout, 6% Rainbow Trout, and 2% Brook Trout. A total of 6 trout (all browns) exceed the minimum harvestable size (305 mm (12 in) for browns and 229 mm (9 in) for brooks and rainbows on this stream). The largest trout encountered was a stunning 485 mm (19.1 in) long Brown Trout. Brown Trout have historically dominated in this lower reach of the brook. When last surveyed in this vicinity (in 1994, over 183 m) a total of 27 trout were encountered and most (89%) were Brown Trout. This stream reach has favored Brown Trout for some time, most likely because the flow is greater and pools are larger than those in reaches upstream of Van Campens Glen.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 18.4°C | 9.14 mg/L | 7.27 | 30.5 mg/L | 94.5 µS/cm | 150 m | 197 (optimal) |

| Fish Species | Number |
|---|---|
| American Eel | 45 |
| Eastern Mudminnow | 1 |
| Cutlip Minnow | 6 |
| Creek Chub | 4 |
| Blacknose Dace | 59 |
| Longnose Dace | 10 |
| Fallfish | 12 |

| Fish Species | Number |
|---|---|
| White Sucker | 4 |
| Margined Madtom | 4 |
| Yellow Bullhead | 2 |
| Brook Trout (y-o-y) | 1 (60 mm) |
| Brown Trout (y-o-y) | 17 (66 – 110 mm) |
| Brown Trout (older than y-o-y) | 42 (127 – 485 mm) |
| Rainbow Trout (older than y-o-y) | 4 (135 – 154 mm) |

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

## BEAR SWAMP BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Ramapo River |
| **Location**: | Bear Swamp Brook Road bridge | **County:** | Bergen |
| **Date:** | July 23, 2014 | **Municipality:** | Mahwah Twp. |

**Summary:** Bear Swamp Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. In this survey 24 Brook Trout, ranging in size from 79 – 208 mm (including 3 young-of-the-year), were encountered. In a previous survey conducted in 2003, at this exact location, only eight Brook Trout ranging in size from 76 – 282 mm (including 4 young-of-the-year) were collected. Although a higher number of trout was captured in 2014, the low number of young-of-the-year Brook Trout, and the presence of the invasive Green Sunfish are cause for concern. In 2013 this brook was surveyed upstream, just below the outflow at the base of Bear Swamp Lake Dam, as part of an effort to document the distribution of Brook Trout in small catchments within a larger watershed. This survey revealed the presence of a warm water fish population and no trout, suggesting the lake influences the fish assemblage in this stream. It appears that the wild trout population thrives in the lower section of this stretch, quite likely because cold water inputs favorably influence summer water temperatures. During the 2014 survey a fly fishing angler was observed fishing just upstream of the survey stretch.

**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 19.8°C | 8.46 mg/L | 7.15 | 5 mg/L | 35.9 µS/cm | 150 m | 151 (suboptimal) |

| Fish Species | Number |
|---|---|
| Creek Chub | 3 |
| Blacknose Dace | 27 |
| Green Sunfish | 1 |

| Fish Species | Number |
|---|---|
| Brook Trout (y-o-y) | 3 (79 – 89 mm) |
| Brook Trout (older than y-o-y) | 21 (112 – 208 mm) |

## INDIAN GROVE BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Upper Passaic River |
| **Location**: | Hardscrabble Road | **County:** | Somerset |
| **Date:** | August 28, 2014 | **Municipality:** | Bernardsville Boro |

**Summary:** Indian Grove Brook has been regulated as a *Wild Trout Stream* since 1992. In 2014 this stream was surveyed to assess the wild trout population. This stream was previously surveyed in 2007, 1996, 1990 and 1969, in which 150, 50, 50 and 5 Rainbow Trout were found, respectively. The 2014 survey found 24 wild Rainbow Trout (72 mm – 206 mm) and 2 of these were young-of-the-year. Water temperatures during each survey ranged from 19.7 C – 21.5 C. These temperatures even though consistent, are on the upper range of trout survival and may be the reason behind the inconsistent population sizes found from one year to the next as there is little room for temperatures to warm up before having a negative impact on population size.

**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the Wild Trout Stream regulation should be modified and/or if new regulations for wild trout are warranted. Further surveys need to be conducted to determine if the Rainbow Trout Population will continue this pattern or if stream temperatures will rise, as global temperatures are predicted to rise, possibly exterminating Rainbow Trout from this stream. Habitat improvement projects designed to aid in lowering stream temperature should be investigated as this location, as this location would greatly benefit from lower stream temperatures. This stream should also be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 19.7°C | 8.36 mg/L | 7.75 | 36.5 mg/L | 283.0 µS/cm | 150 m | 166 (optimal) |

| Fish Species | Number |
|---|---|
| Creek Chub | 50 |
| Blacknose Dace | 249 |
| White Sucker | 31 |

| Fish Species | Number |
|---|---|
| Rainbow Trout (y-o-y) | 2 (72 – 76 mm) |
| Rainbow Trout (older than y-o-y) | 22 (125 – 206 mm) |

## JACKSON BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Rockaway River |
| **Location**: | Hedden Park | **County:** | Morris |
| **Date:** | July 31, 2014 | **Municipality:** | Mine Hill Twp. |

**Summary:** This stream (from its source to Hedden Park Lake) has been regulated as a *Wild Trout Stream* since 2004. In 2014 this stream was surveyed to assess the wild trout population. A total of 72 Brown Trout (34 young-of-the-year) ranging in size from 64 – 388 mm indicated a very attractive trout fishery with a balanced population. When this location was previously surveyed in 2001 the same associated species were collected, and the proportion of young-of-the-year trout to older trout was similar to that found in the 2014 survey

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 16.5°C | 9.19 mg/L | 7.75 | 39 mg/L | 551.1 µS/cm | 150 m | 162 (optimal) |

| Fish Species | Number |
|---|---|
| Creek Chub | 7 |
| Blacknose Dace | 67 |
| White Sucker | 16 |

| Fish Species | Number |
|---|---|
| Brown Trout (y-o-y) | 35 (64 – 91 mm) |
| Brown Trout (older than y-o-y) | 37 (134 – 388 mm) |

## PASSAIC RIVER

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Upper Passaic River |
| **Location**: | Jockey Hollow Road | **County:** | Morris/Somerset |
| **Date:** | August 4, 2014 | **Municipality:** | Mendham Twp / Bernardsville Boro |

**Summary:** The Passaic River (source to Rt. 202, Bernardsville) has been regulated as a *Wild Trout Stream* since 1992. In 2014 this stream was surveyed to assess the wild trout population. In this survey 13 wild Brown Trout (including one young-of-the-year), and 8 wild Rainbow Trout (including 3 young-of-the-year) were encountered. Seven other species were also captured including Creek Chub, Blacknose Dace, Longnose Dace, Common Shiner, White Sucker, and Redbreast Sunfish. In 2007, a total of 59 trout were captured from the same sample reach and in 1990, a total of 52 trout were captured. Approximately ¾ mi upstream from the survey location is Ledell's Pond which may be introducing fine sediments and warmer water temperatures which may be causative factors of a trout population that has decreased.

**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. High temperatures may be influencing trout survival and consideration should be given to continuously monitor temperature at this site. Other parameters should be further investigated as well (i.e. fine sediments from Ledell's Pond). This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 20.6°C | 8.89 mg/L | 7.72 | 49 mg/L | 312.0 µS/cm | 150 m | 164 (optimal) |

| Fish Species | Number |
|---|---|
| Creek Chub | 39 |
| Blacknose Dace | 93 |
| Longnose Dace | 4 |
| Common Shiner | 12 |
| White Sucker | 18 |
| Redbreast Sunfish | 6 |

| Fish Species | Number |
|---|---|
| Largemouth Bass | 4 |
| Brown Trout (y-o-y) | 1 (105 mm) |
| Brown Trout (older than y-o-y) | 12 (138 – 174 mm) |
| Rainbow Trout (y-o-y) | 3 (51 – 64 mm) |
| Rainbow Trout (older than y-o-y) | 5 (125 – 204 mm) |

## PEQUANNOCK RIVER

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Pequannock |
| **Location**: | Cross Road bridge | **County:** | Passaic |
| **Date:** | August 20, 2014 | **Municipality:** | West Milford Twp. |

**Summary:** The Pequannock River (Oak Ridge Road bridge in Newark Watershed, downstream to railroad bridge immediately upstream of Charlotteburg Reservoir) has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream reach was surveyed to assess the wild trout population. A total of 126 Brown Trout (including 49 young-of-the-year), were collected. The majority of the Brown Trout were captured in a relatively small area along the right bank where a portion of a cement retaining wall had collapsed and created a pool. The 2008 survey, conducted as the same location as the 2014 survey, revealed fewer Brown Trout (78), suggesting that the retaining wall was intact at that time. Similar fish species were collected during both surveys. The water temperature was 4.2 degrees colder than the 2008 survey.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. In-stream habitat enhancement should be considered. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 14.1°C | 9.81 mg/L | 6.97 | 35.5 mg/L | 186.9 µS/cm | 150 m | 142 (suboptimal) |

| Fish Species | Number |
|---|---|
| Common Shiner | 12 |
| Chain Pickerel | 1 |
| Blacknose Dace | 4 |
| Fallfish | 6 |
| White Sucker | 12 |

| Fish Species | Number |
|---|---|
| Brown Bullhead | 2 |
| Smallmouth Bass | 1 |
| Tessellated Darter | 38 |
| Brown Trout (y-o-y) | 49 (51 – 98 mm) |
| Brown Trout (older than y-o-y) | 77 (103 – 384 mm) |

## PEQUANNOCK RIVER

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Pequannock River |
| **Location**: | Generant Valve Factory | **County:** | Passaic |
| **Date:** | August 20, 2014 | **Municipality:** | West Milford Twp. |

**Summary:** The Pequannock River (Rt.23 bridge at Smoke Rise, downstream to the Rt. 23 bridge at Smith Mills) has been regulated as a *Wild Trout Stream* since 2010. Prior to that (1992 – 2009) it was regulated as a *Seasonal Trout Conservation Area* and annually stocked with trout in the spring. In 2014 this stream reach was surveyed to assess the wild trout population. A total of 8 Brown Trout (including 1 young-of-the-year) were collected. The first attempt at sampling this stretch, earlier in the summer, was thwarted by the presence of an adult black bear and 3 cubs at a nearby dumpster. The upstream Charlottesburg Reservoir is supposed to maintain adequate downstream flow. At the time of this survey, the stream flow was low, which may have accounted for the low number of Brown Trout collected compared to 121 encountered in a survey conducted in 2008 at the same location. Consultation with the retired Fisheries Biologist who conducted the survey in 2008 revealed that the majority of the 121 Brown Trout were captured from "a deep pool". Though the same stretch was sampled this year, "a deep pool" was not present. Similar fish species were collected during both surveys.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 18.7°C | 9.48 mg/L | 7.16 | 32.5 mg/L | 221.5 µS/cm | 150 m | 149 (suboptimal) |

| Fish Species | Number |
|---|---|
| Common Shiner | 72 |
| Cutlip Minnow | 48 |
| Creek Chub | 13 |
| Blacknose Dace | 54 |
| Fallfish | 1 |
| White Sucker | 22 |

| Fish Species | Number |
|---|---|
| Pumpkinseed | 1 |
| Largemouth Bass | 1 |
| Smallmouth Bass | 5 |
| Tessellated Darter | 15 |
| Brown Trout (y-o-y) | 1 (77 mm) |
| Brown Trout (older than y-o-y) | 7 (190 – 286 mm) |

## SADDLE RIVER

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Assessment | **Drainage:** | Passaic River |
| **Location**: | Lake Street bridge | **County:** | Bergen |
| **Date:** | July 24, 2014 | **Municipality:** | Upper Saddle River |

**Summary:** The Saddle River (Stateline to Lake Street) has been regulated as a *Wild Trout Stream* since 2004. In 2014 this stream was surveyed at two locations to assess the wild trout population. The following summarizes data collected at the downstream survey location (Lake Street bridge):

In the survey 69 Brown Trout (including 21 young-of-the-year) were collected. Stream flow was low. In a previous survey conducted in 2002 at this exact location, similar fish species were collected and the proportion of young-of-the-year trout to older trout was also similar.

**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 19.7°C | 8.96 mg/L | 8.17 | 112.5 mg/L | 619 µS/cm | 150 m | 136 (suboptimal) |

| Fish Species | Number |
|---|---|
| Creek Chubsucker | 2 |
| Blacknose Dace | 16 |
| Longnose Dace | 14 |

| Fish Species | Number |
|---|---|
| White Sucker | 14 |
| Brown Trout (y-o-y) | 21 (68 – 95 mm) |
| Brown Trout (older than y-o-y) | 48 (150 – 330 mm) |

## SADDLE RIVER

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Passaic River |
| **Location**: | Stone Church Road bridge | **County:** | Bergen |
| **Date:** | July 24, 2014 | **Municipality:** | Upper Saddle River |

**Summary:** The Saddle River (Stateline to Lake Street) has been regulated as a *Wild Trout Stream* since 2004. In 2014 this stream was surveyed at two locations to assess the wild trout population. The following summarizes data collected at the upstream survey location (Stone Church Road bridge:

Thirty eight Brown Trout were collected and of these, 11 young-of-the-year. Just downstream of this stretch, from the vantage point of Stone Church Rd. Bridge, numerous trout were observed. The water there is impounded by an old dam, and was too deep to back pack electrofish. When last surveyed in 1995, larger numbers of trout associated species were present and no Brown Trout were collected.

**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. Sampling should be expanded to include the above-mentioned deep pool using the barge electrofishing gear. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 20.0°C | 7.82 mg/L | 7.75 | 105 mg/L | 588 µS/cm | 150 m | 145 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Eel | 4 |
| Blacknose Dace | 26 |
| Longnose Dace | 33 |
| Green Sunfish | 1 |

| Fish Species | Number |
|---|---|
| Largemouth Bass | 1 |
| Tessellated Darter | 8 |
| Brown Trout (y-o-y) | 11 (56 – 82 mm) |
| Brown Trout (older than y-o-y) | 27 (144 – 255 mm) |

## WANAQUE RIVER

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Wanaque River |
| **Location**: | Back Beach Park | **County:** | Passaic |
| **Date:** | August 19, 2014 | **Municipality:** | Wanaque Boro |

**Summary:** A four-mile stretch of the Wanaque River was added to the *Wild Trout Stream* program in 2008. Three electrofishing surveys were conducted on the main stem of the Wanaque River to assess the status of its' wild trout population. The same location (Back Beach Park in Wanaque Borough) was sampled in 2004 and subsequently in 2007 and data provided evidence of a wild Brown Trout population that was abundant and had many sizable individuals (74 and 81 Brown Trout were captured in each respective survey). The section of the Wanaque below the Wanaque Reservoir has been known to produce some of the biggest wild trout in the state and this survey continued to support its reputation. The minimum harvestable size for most *Wild Trout Streams* is 9 inches for all three trout species, however there is a 12 inch limit for Brown Trout in this section of the Wanaque River. Trout species encountered during this survey included eighty-two wild Brown Trout ranging from 86 mm to 510 mm, including 73 young-of-the-year. Three Brown Trout captured were in excess of 15 inches. The size structure of this population has shifted and the amount of adult Brown Trout has declined drastically (9 adult Brown Trout in 2014 compared to 37 adult Brown Trout in 2004).

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This section should be closely monitored to determine causative factors of decreasing adult Brown Trout in population. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 16.3°C | 8.72 mg/L | 6.81 | 39.5 mg/L | 312.0 µS/cm | 150 m | 150 (suboptimal) |

| Fish Species | Number |
|---|---|
| Eastern Mudminnow | 2 |
| Chain Pickerel | 5 |
| Creek Chub | 68 |
| Blacknose Dace | 9 |
| Creek Chubsucker | 1 |
| Fallfish | 6 |
| Cutlip Minnow | 2 |

| Fish Species | Number |
|---|---|
| White Sucker | 602 |
| Redbreast Sunfish | 17 |
| Green Sunfish | 3 |
| Largemouth Bass | 6 |
| Tessellated Darter | 439 |
| Brown Trout (y-o-y) | 73 (86 – 130 mm) |
| Brown Trout (older than y-o-y) | 9 (210 – 510 mm) |

## WANAQUE RIVER

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Wanaque River |
| **Location**: | Boulevard Avenue | **County:** | Passaic |
| **Date:** | August 19, 2014 | **Municipality:** | Wanaque Boro |

**Summary:** A four-mile stretch of the Wanaque River was added to the *Wild Trout Stream* program in 2008. In 2014, three electrofishing surveys were conducted on the main stem of the Wanaque River to assess the status of its wild trout population. A similar location (300 m downstream of Route 287 in Wanaque Borough) was sampled in 2004 and subsequently in 2007 and data provided evidence of a wild Brown Trout population that had many sizable individuals (20 and 16 Brown Trout captured in each respective survey). The section of the Wanaque below the Wanaque Reservoir has been known to produce some of the biggest wild trout in the state and this survey continued to support its reputation. The minimum harvestable size for most *Wild Trout Streams* is 9 inches for all three trout species, however there is a 12 inch limit for Brown Trout in this section of the Wanaque River. A section slightly upstream from the older site was selected due to an access issue but similar results were found. Trout species encountered during this survey included nine wild Brown Trout ranging from 92 mm to 600 mm, including 4 young-of-the-year. This stretch continues to produce large wild trout with three of the nine Brown Trout captured exceeding 18 inches. The Brown Trout population here appears to be stable.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This section would benefit from in-stream habitat restoration projects to create a variety of habitat and refuge for fish. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 18.9°C | 7.59 mg/L | 6.80 | 42.5 mg/L | 322.9 µS/cm | 150 m | 134 (suboptimal) |

| Fish Species | Number |
|---|---|
| Creek Chub | 3 |
| Blacknose Dace | 2 |
| White Sucker | 144 |
| Yellow Bullhead | 1 |
| Redbreast Sunfish | 2 |

| Fish Species | Number |
|---|---|
| Green Sunfish | 1 |
| Tessellated Darter | 726 |
| Brown Trout (y-o-y) | 4 (92 – 105 mm) |
| Brown Trout (older than y-o-y) | 5 (246 – 600 mm) |

## WANAQUE RIVER

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Wanaque River |
| **Location**: | Meadow Brook confluence | **County:** | Passaic |
| **Date:** | August 4, 2014 | **Municipality:** | Wanaque Boro |

**Summary:** A four-mile stretch of the Wanaque River was added to the *Wild Trout Stream* program in 2008. Three electrofishing surveys were conducted on the main stem of the Wanaque River to assess the status of its' wild trout population. The section below the Wanaque Reservoir was electrofished on August 4th and has been known to produce some of the biggest wild trout in the state, however, only one wild Brown Trout of 556 mm was encountered. The minimum harvestable size for most *Wild Trout Streams* is 9 inches for all three trout species, however there is a 12 inch limit for Brown Trout in this section of the Wanaque River. The Brown Trout population has declined considerably since the last time the sample reach was surveyed in 2004 and 2007. In 2004, 29 Brown Trout (mix of adult and young-of-year) were captured and even 1 Rainbow Trout and in 2007, 16 Brown Trout were captured. The water released from the Wanaque Reservoir maintains a cold water source for coldwater fish species but heavy siltation in this section may hinder trout spawning and establishment. In 2004, it was noted that Meadow Brook introduced fine sediments via construction that has been occurring in the area.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This section should be closely monitored and causative factors of Brown Trout population decline, such as heavy siltation, should be investigated. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 16.5°C | 10.82 mg/L | 7.60 | 28 mg/L | 234.3 µS/cm | 150 m | 143 (suboptimal) |

| Fish Species | Number |
|---|---|
| Chain Pickerel | 1 |
| White Sucker | 31 |
| Bluegill | 2 |

| Fish Species | Number |
|---|---|
| Tessellated Darter | 11 |
| Brown Trout (older than y-o-y) | 1 (556 mm) |

**WEST BROOK**

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Wanaque |
| **Location**: | West Brook Road | **County:** | Passaic |
| **Date:** | August 27, 2014 | **Municipality:** | West Milford Twp. |

**Summary** West Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. An electrofishing survey was conducted at West Brook located in West Milford Township, Passaic County to assess the resident trout population. This stream is managed as a *Wild Trout Stream* and was surveyed in 2010, 2002, 1985 and 1969, in which 163, 135, 9 and 43 Rainbow Trout were found respectively. The distances surveyed 1985 and 1969 were considerably shorter than surveys conducted after 2000 which is why the number of trout found is considerably less. The 2014 survey found 144 wild Rainbow Trout (53 mm – 268 mm) and of these 41 were young-of-the year.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the Wild Trout Stream regulation should be modified and/or if new regulations for wild trout are warranted. The wild Rainbow Trout population in this stream appears to be thriving and stable in West Brook. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 16.8°C | 8.13 mg/L | 7.23 | 35.5 mg/L | 255.8 µS/cm | 150 m | 165 (optimal) |

| Fish Species | Number |
|---|---|
| Creek Chub | 15 |
| Blacknose Dace | 46 |
| Yellow Perch | 50 |
| Unknown Sunfish Species | 1 |

| Fish Species | Number |
|---|---|
| Largemouth Bass | 5 |
| Rainbow Trout (y-o-y) | 41 (53 – 80 mm) |
| Rainbow Trout (older than y-o-y) | 103 (97 – 268 mm) |

## WHIPPANY RIVER

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Whippany River |
| **Location**: | Tingley Road | **County:** | Morris |
| **Date:** | September 3, 2014 | **Municipality:** | Mendham Twp. |

**Summary** The Whippany River has been regulated as a *Wild Trout Stream* since 2004. An electrofishing survey was conducted in 2014 on the Whippany River in Mendham Township, Morris County to assess the resident trout population. This stream is managed as a *Wild Trout Stream* and was surveyed in 2010, 2001, and 1969, in which 0, 0, and 1 Brook Trout, 7, 26, and 10 Rainbow Trout and 46, 64 and 26 Brown Trout were found respectively. The data from the 2014 survey resembles the 2010 survey as 0 Brook Trout, 2 Rainbow Trout (140 mm – 259 mm) (0 Y-O-Y) and 94 Brown Trout (72 mm – 438 mm) (71 Y-O-Y 72 mm – 107 mm) were found. Water temperatures are marginal for trout species ranging from 18.8 C to 20.9 C in the surveys. Brown Trout appear to be out-competing both Brook Trout and Rainbow Trout and have almost completely taken over at this survey location. Habitat Assessment Surveys have been done in 2001, 2010 and 2014 and show decreasing trout habitat suitability with scores of 174 (optimal) to 160 (optimal) to 154 (sub-optimal) respectively.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the Wild Trout Stream regulation should be modified and/or if new regulations for wild trout are warranted. This stream is unique in New Jersey as it is one of the few streams with reproducing Rainbow Trout in it. Habitat improvement projects designed to aid in lowering stream temperature and increase wild trout habitat should be investigated as this location would greatly benefit and possibly keep the relatively rare reproducing Rainbow Trout found here. The Brook Trout population may have been lost at this location, but would also benefit from habitat improvement projects if a few Brook Trout are still hanging on in the area. Future surveys upstream of this location should be conducted to see if Rainbow Trout or Brook Trout are found in other areas with possible better environmental conditions. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 19.6°C | 7.79 mg/L | 7.60 | 49.5 mg/L | 368.30 µS/cm | 150 m | 154 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Brook Lamprey | 1 |
| Creek Chub | 1 |
| Blacknose Dace | 101 |
| White Sucker | 14 |
| Brown Bullhead | 1 |
| Largemouth Bass | 7 |

| Fish Species | Number |
|---|---|
| Green Sunfish | 5 |
| Bluegill | 1 |
| Tessellated Darter | 13 |
| Brown Trout (y-o-y) | 71 (72 – 107 mm) |
| Brown Trout (older than y-o-y) | 23 (145 – 438 mm) |
| Rainbow Trout (older than y-o-y) | 2 (140 – 259 mm) |

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

## ASH BROOK

| | | | |
|---|---|---|---|
| **Project:** | General Fisheries Survey | **Drainage:** | Rahway River |
| **Location**: | Raritan Road Golf Course | **County:** | Union |
| **Date:** | June 14, 2014 | **Municipality:** | Scotch Plains Twp. |

**Summary:** Union County's 2014 BioBlitz was held at Ash Brook Reservation and Golf Course and Oak Ridge Golf Course on June 14th. The fish team, lead by New Jersey Department of Environmental Protection, Division of Fish and Wildlife, sampled multiple waters including Ash Brook. Fish species presence or absence was documented, with no records of quantity, also no biometric data were collected. The warmwater fish assemblage encountered provides neither substantial recreational opportunity for anglers, nor does it currently support any species considered to be of conservation concern.

**Recommendation:** No additional surveys necessary.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| - | - | - | - | - | ~550 m | - |

| Fish Species | Number |
|---|---|
| American Eel | Present |
| Redfin Pickerel | Present |
| Golden Shiner | Present |
| Common Shiner | Present |
| Creek Chub | Present |

| Fish Species | Number |
|---|---|
| Blacknose Dace | Present |
| Banded Killifish | Present |
| Pumpkinseed | Present |
| Bluegill | Present |
| Tessellated Darter | Present |

**NON - STANDARDIZED SURVEY**

## ASH BROOK

| | | | |
|---|---|---|---|
| **Project:** | General Fisheries Survey | **Drainage:** | Rahway River |
| **Location**: | Raritan Road Powerline | **County:** | Union |
| **Date:** | June 14, 2014 | **Municipality:** | Scotch Plains |

**Summary:** Union County's 2014 BioBlitz was held at Ash Brook Reservation and Golf Course and Oak Ridge Golf Course on June 14th. The fish team, lead by New Jersey Department of Environmental Protection, Division of Fish and Wildlife, sampled multiple waters including Ash Brook. Fish species presence or absence was documented, with no records of quantity, also no biometric data were collected. The warmwater fish assemblage encountered provides neither substantial recreational opportunity for anglers, nor does it currently support any species considered to be of conservation concern.

**Recommendation:** No additional surveys necessary.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| - | - | - | - | - | ~200 m | - |

| Fish Species | Number |
|---|---|
| American Eel | Present |
| Redfin Pickerel | Present |
| Eastern Mudminnow | Present |
| Common Shiner | Present |

| Fish Species | Number |
|---|---|
| Golden Shiner | Present |
| Banded Killifish | Present |
| White Sucker | Present |
| Pumpkinseed | Present |

**NON - STANDARDIZED SURVEY**

**BEE BROOK**

| | | | |
|---|---|---|---|
| **Project:** | Native Species Inventory | **Drainage:** | Millstone River |
| **Location**: | Scutter's Mill Road | **County:** | Middlesex |
| **Date:** | July 9, 2014 | **Municipality:** | Plainsboro Twp. |

**Summary:** This small tributary to Devils Brook, which flows into the Millstone River, was surveyed to assess the fish assemblage in a portion of the Piedmont, that is close to the boarder of the Inner Coastal Plain, which represents an overlap in ranges of species that occur both primarily to the north and primarily to the south. This information contributes greatly in the assessment of the status and distribution of our fish species. Only four species (Redfin Pickerel, Pumpkinseed, Eastern Mudminnow, and Tessellated Darter) were found, none of which are considered rare in NJ. An impoundment is located directly below the sample reach, therefore low species diversity may be due to habitat fragmentation. Habitat in this stretch was suboptimal, with features such as available cover, pool variability, sediment deposition, and channel sinuosity scoring low. The stream substrate had a relatively large amount of gravel and cobble for this far south in NJ, in fact yellow river stones were found, which are more commonly found in the coastal plain.

**Recommendation:** It is recommended to continue fisheries surveys along this transitional habitat to better understand the distribution of our freshwater fish species.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 23.6°C | 5.18 mg/L | 7.54 | 43 mg/L | 572 µS/cm | 150 m | 117 (suboptimal) |

| Fish Species | Number |
|---|---|
| Redfin Pickerel | 19 |
| Eastern Mudminnow | 154 |

| Fish Species | Number |
|---|---|
| Pumpkinseed | 2 |
| Tessellated Darter | 106 |

## BLACK BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River S/Br |
| **Location**: | Van Syckle's Road | **County:** | Hunterdon |
| **Date:** | August 8, 2014 | **Municipality:** | Union Twp. |

**Summary:** Black Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. This survey was conducted at the same location in this tributary of Spruce Run Reservoir, during the summer of 1969, in which 28 presumably wild Brook Trout and 4 presumably wild Rainbow Trout were found. Upon completion of Spruce Run Reservoir, the first stocking of trout was conducted, including fingerling Donaldson strain rainbows. In a 1976 survey the numbers were 10 and 14 respectively. By 2003, 5 Brook Trout and 2 Rainbow Trout were found. Notes did not indicate whether these fish were believed to be of wild or stocked origin, however Spruce Run Reservoir was being stocked at the time and these fish could have swam a short distance upstream Their size (10.3 – 12.4 in), and no young-of-the-year (y-o-y), suggests a stocked population only. In 2003, 3 wild Brown Trout were also encountered, consisting of only one y-o-y. Stocking of trout in the Reservoir was discontinued in 2006, however, several streams that flow into the reservoir are still stocked. In 2014, the Brown Trout population seems to have only slightly expanded in numbers as 13 were found from 7.0 to 12.2 in,, however, no y-o-y were present. Unfortunately, no wild Brook Trout appear to be left at this location, however instantaneous temperature and habitat do not seem to be a limiting factor.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. Unfortunately, no wild Brook Trout appear to be left at this survey location, therefore it is recommended to sample further upstream to determine if they persist in the headwaters of Black Brook. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 16.2°C | 8.68 mg/L | 7.66 | 22.0 mg/L | 166.2 µS/cm | 150 m | 167 (optimal) |

| Fish Species | Number |
|---|---|
| Creek Chub | 15 |
| Blacknose Dace | 146 |
| Longnose Dace | 19 |
| Pumpkinseed | 13 |

| Fish Species | Number |
|---|---|
| Largemouth Bass | 8 |
| Smallmouth Bass | 1 |
| Tessellated Darter | 29 |
| Brown Trout (older than y-o-y) | 13 (177 – 310 mm) |

**BURNETT BROOK**

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River N/Br |
| **Location**: | Rt. 24 bridge | **County:** | Morris |
| **Date:** | July 31, 2014 | **Municipality:** | Chester Twp. |

**Summary:** Burnett Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. This stream was first sampled in 1969 and 32 Brown Trout were collected. More recently, a 2002 survey produced 39 wild Brown Trout. In 2014 74 Brown Trout were found and the majority were adult/subadult (n=57) compared to 17 young-of-the-year (y-o-y). This may indicate limited reproduction, but relatively good recruitment. The largest trout was a 406 mm (16.0 in) wild Brown Trout which is quite large for a small stream. The relatively small number of y-o-y compared to older fish may be due to the elevated amount of sediment that was observed. In the 2002 survey, the number of y-o-y (n=20) was similar to that found in the 2014 survey, however, the number of adult/subadult trout increased substantially, from 19 to 57.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.7°C | 9.45 mg/L | 7.29 | 37.5 mg/L | 365.8 µS/cm | 150 m | 158 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Brook Lamprey | 1 |
| Fallfish | 2 |
| Blacknose Dace | 183 |
| Longnose Dace | 38 |
| White Sucker | 14 |
| Pumpkinseed | 2 |

| Fish Species | Number |
|---|---|
| Bluegill | 4 |
| Largemouth Bass | 6 |
| Tessellated Darter | 12 |
| Brown Trout (y-o-y) | 17 (63 – 89 mm) |
| Brown Trout (older than y-o-y) | 57 (125 – 406 mm) |

## CAKEPOULIN (CAPOOLONG) CREEK

| | | | |
|---|---|---|---|
| **Project:** | Fish Health | **Drainage:** | Raritan River S/Br |
| **Location**: | Lower Landsdown Road | **County:** | Hunterdon |
| **Date:** | June 26, 2014 | **Municipality:** | Franklin Twp. |

**Summary:** The Capoolong Creek was electrofished on June 26 to screen for fish pathogens. Four Brown Trout (2.8 – 13.0 in.) of wild origin were collected and appeared to be in good health with no symptoms of fish disease, therefore none were submitted to our fish pathologist. Wild Brown Trout were encountered, as expected, as this stream is classified as a *Trout Production* stream in NJ's Surface Water Quality Standards N.J.A.C. 7:9B.

**Recommendation:** No additional surveys necessary.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 20.7°C | 9.60 mg/L | 7.95 | - | 198.4 µS/cm | ~800 m | - |

| Fish Species | Number |
|---|---|
| American Eel | present |
| Blacknose Dace | present |
| Longnose Dace | present |
| Creek Chub | present |
| Spottail Shiner | present |
| White Sucker | present |
| Margined Madtom | present |
| Green Sunfish | present |

| Fish Species | Number |
|---|---|
| Pumpkinseed | present |
| Bluegill | present |
| Redbreast Sunfish | present |
| Largemouth Bass | present |
| Tessellated Darter | present |
| Brown Trout (y-o-y) | 3 (70 – 77 mm) |
| Brown Trout (older than y-o-y) | 1 (331 mm) |

**NON - STANDARDIZED SURVEY**

## CHAMBERS BROOK

| | | | |
|---|---|---|---|
| **Project:** | Native Species Inventory | **Drainage:** | Raritan River N/Br |
| **Location**: | Airport Road / Love Road | **County:** | Somerset |
| **Date:** | June 30, 2014 | **Municipality:** | Bridgewater Twp. |

**Summary:** This tributary to the North Branch of the Raritan River that is classified as *Non Trout*, was electrofished to search for rare native species, such as the Bridle Shiner, which was found in a nearby tributary in recent years. Although this stream looked promising, due to the presence of a submerged aquatic vegetation called Elodea, the Bridle Shiner was not found at this location. A variety of other minnow species were found, including the Swallowtail Shiner.

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

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 22.8°C | 10.12 mg/L | 8.15 | 78 mg/L | 821 µS/cm | 150 m | 129 (suboptimal) |

| Fish Species | Number |
|---|---|
| Spotfin Shiner | 2 |
| Spottail Shiner | 3 |
| Swallowtail Shiner | 1 |
| Common Shiner | 5 |
| Blacknose Dace | 1 |
| Longnose Dace | 6 |
| Creek Chub | 5 |

| Fish Species | Number |
|---|---|
| White Sucker | 38 |
| Yellow Bullhead | 4 |
| Banded Killifish | 8 |
| Bluegill | 3 |
| Redbreast Sunfish | 20 |
| Rock Bass | 7 |
| Tessellated Darter | 47 |

## COLD BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River N/Br |
| **Location**: | Vliettown Road | **County:** | Hunterdon |
| **Date:** | August 4, 2014 | **Municipality:** | Tewksbury Twp. |

**Summary:** Cold Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. This stream was last surveyed in 2002, in which 80 wild Brown Trout were encountered. When first surveyed in 1969, 10 Brown Trout were found. In 2014, 67 wild Brown Trout were found and most of these (61) were young-of-the-year (y-o-y) fish. The stream held adult Brown Trout up to 349 mm (13.7 in), which is quite large for wild trout in a small stream.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.0°C | 8.67 mg/L | 7.53 | 130.0 mg/L | 371.4 µS/cm | 150 m | 131 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Eel | 14 |
| Creek Chub | 8 |
| Blacknose Dace | 176 |
| Longnose Dace | 31 |
| White Sucker | 13 |

| Fish Species | Number |
|---|---|
| Green Sunfish | 13 |
| Bluegill | 3 |
| Tessellated Darter | 122 |
| Brown Trout (y-o-y) | 61 (65 – 114 mm) |
| Brown Trout (older than y-o-y) | 6 (206 – 349 mm) |

## FLANDERS BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River S/Br |
| **Location**: | Rt. 206 bridge | **County:** | Morris |
| **Date:** | July 22, 2014 | **Municipality:** | Mount Olive Twp. |

**Summary:** Flanders Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this tributary to the South Branch of the Raritan River was surveyed to assess the wild trout population. Surveys conducted in the past documented that a unique assemblage of trout inhabits this stream, as it supports naturally reproducing Brook Trout, Brown Trout, and Rainbow Trout. Trout species encountered in the 2014 survey included 1 wild Brook Trout (141 mm), 56 wild Brown Trout (including 19 young-of-the-year (y-o-y)), and 27 Rainbow Trout (including 9 y-o-y). American Eel, Blacknose Dace, and Longnose Dace were also captured during the survey. Above the Route 206 bridge the streambanks are very unstable and eroded. Past surveys were conducted in the same location in 1980, 1997, and 2004 and Brook Trout populations seem to be barely holding on as in each survey 9, 0, and 2 Brook Trout were captured, compared to 5, 31, and 26 Brown Trout, and 60, 31, and 61 Rainbow Trout, respectively.

**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This section would benefit from a bank stability project as the bank is eroding so badly that the road adjacent to the bank is becoming deteriorated as well (sections of pavement falling into stream). Due to the declining Brook Trout population here and the condition of the streambank, this stream should be monitored closely. Future surveys should investigate upstream reaches to determine the extent, if any, of Brook Trout presence. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 16.3°C | 9.14 mg/L | 8.14 | 27 mg/L | 463.7 µS/cm | 150 m | 163 (optimal) |

| Fish Species | Number |
|---|---|
| American Eel | 1 |
| Blacknose Dace | 5 |
| Longnose Dace | 3 |

| Fish Species | Number |
|---|---|
| Brook Trout (older than y-o-y) | 1 (141 mm) |
| Brown Trout (y-o-y) | 19 (60 – 90 mm) |
| Brown Trout (older than y-o-y) | 37 (134 – 365 mm) |
| Rainbow Trout (y-o-y) | 9 (45 – 62 mm) |
| Rainbow Trout (older than y-o-y) | 18 (110 – 219 mm) |

## HEATHCOTE BROOK

| | | | |
|---|---|---|---|
| **Project:** | Native Species Inventory | **Drainage:** | Millstone River |
| **Location**: | Ridge Road | **County:** | Middlesex |
| **Date:** | July 9, 2014 | **Municipality:** | South Brunswick Twp. |

**Summary:** This tributary to Carnegie Lake was surveyed because it represents an overlap in the ranges of species that occur both to the north in the Piedmont and to the south in the Inner Coastal Plain. This information contributes greatly in the assessment of the status and distribution of our fish species. This survey produced a highly diverse fish assemblage, consisting of 19 species, some of which are not found together often, such as Longnose Dace and Pirate Perch.

**Recommendation:** It is recommended to continue fisheries surveys along this transitional habitat to better understand the distribution of our freshwater fish species.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 21.5°C | 6.91 mg/L | 6.35 | 33.5 mg/L | 427.6 µS/cm | 150 m | 156 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Brook Lamprey | 2 |
| American Eel | 65 |
| Redfin Pickerel | 5 |
| Chain Pickerel | 7 |
| Eastern Mudminnow | 16 |
| Common Shiner | 5 |
| Blacknose Dace | 48 |
| Longnose Dace | 18 |
| Fallfish | 6 |
| White Sucker | 20 |

| Fish Species | Number |
|---|---|
| Creek Chubsucker | 4 |
| Yellow Bullhead | 1 |
| Pirate Perch | 13 |
| Green Sunfish | 4 |
| Pumpkinseed | 8 |
| Bluegill | 7 |
| Redbreast Sunfish | 5 |
| Largemouth Bass | 3 |
| Tessellated Darter | 56 |

## HERZOG BROOK (AKA LOMERSON BROOK)

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River N/Br |
| **Location**: | Longview Road | **County:** | Morris |
| **Date:** | August 27, 2014 | **Municipality:** | Chester Twp. |

**Summary:** Herzog Brook (a.k.a. Lomerson Brook) has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. This stream was surveyed previously in 2004, 1996 and 1969, in which 0, 4, and 20 Brook Trout were found along with 82, 36 and 16 Brown Trout, respectively. The 2014 survey found 1 wild Brook Trout (150 mm) and 93 wild Brown Trout, including 36 young-of-the-year (y-o-y). The 2014 survey is consistent with a commonly observed pattern of a decreasing or non-existing Brook Trout population being displaced by an increasing Brown Trout Population. This pattern is fairly common throughout New Jersey as habitat is degraded and temperatures rise in trout production streams statewide. In Herzog Brook, temperatures found in previous surveys have remained relatively consistent since 1969 at a range of 18.4°C - 20.5°C, which is above the preferred stream temperature for Brook Trout creating a stressful environment for Brook Trout. Brown Trout can handle slightly warmer temperatures than Brook Trout and are not as affected by these warmer temperatures. Habitat assessment surveys have also been done in 2004 and 2014 and show a decrease in habitat suitability for trout in 2014. Both surveys classified the habitat as "sub-optimal" for trout. This also may be attributing to the loss of Brook Trout, but it should be pointed out that the Brook Trout population was already low in 1996. Unfortunately, no habitat assessments were recorded in 1996 or 1969 to compare to and determine when the habitat began its decline.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the Wild Trout Stream regulation should be modified and/or if new regulations for wild trout are warranted. Further surveys need to be conducted to determine if the Brook Trout Population shifted to other locations such as upstream where there may be better habitat conditions allowing Brook Trout to remain. Habitat improvement projects designed to aid in lowering stream temperature and increase trout habitat should be investigated as this location would greatly benefit from lower stream temperatures and an increase in wild trout stream habitat suitability. This stream should also be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 18.4°C | 8.78 mg/L | 7.54 | 44.5 mg/L | 245.8 µS/cm | 150 m | 133 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Brook Lamprey | 9 |
| American Eel | 7 |
| Creek Chub | 20 |
| Blacknose Dace | 131 |
| Longnose Dace | 1 |

| Fish Species | Number |
|---|---|
| White Sucker | 88 |
| Tessellated Darter | 14 |
| Brook Trout (older than y-o-y) | 1 (150 mm) |
| Brown Trout (y-o-y) | 36 (60 – 96 mm) |
| Brown Trout (older than y-o-y) | 57 (122 – 286 mm) |

## HICKORY RUN

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River S/Br |
| **Location**: | Hickory Run Road | **County:** | Hunterdon |
| **Date:** | August 25, 2014 | **Municipality:** | Lebanon Twp. |

**Summary:** Hickory Run has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. This stream was last surveyed in 2002, in which 106 wild Brook Trout 3 wild Rainbow Trout were encountered. The original survey from 1969 revealed a reproducing Rainbow Trout population, which is relatively rare in New Jersey waters, consisting of 14 young-of-the-year (y-o-y) and 22 older individuals. Thought to be remnant of a private pond stocking that occurred many years ago, the reproducing Rainbow Trout population seems to have gradually declined over the years and as of the most recent survey, has disappeared. In 2014, 254 wild Brook Trout were found, which was the highest number of trout found in any of the 46 surveys conducted 36 streams regulated as a *Wild Trout Stream*. Interestingly, no Brook Trout were found in the 1969 survey, suggesting they may have been displaced by Rainbow Trout and relegated to the stream's headwaters. The largest Brook Trout encountered in the 2014 survey was only 191mm (7.5 in), which may not be very enticing to most anglers, however the 220 y-o-y demonstrates the importance of the Hickory Run population to the sustainability of the South Branch of the Raritan River system. Although dams are most frequently considered to have negative impacts on trout populations by fragmenting habitat and restricting movement, the small dam that creates an impoundment downstream of the survey location, may actually contribute to the success of Brook Trout in this stream as it prevents stocked trout and wild Brown and Rainbow Trout from moving from the South Branch into this small tributary.

**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. An effort should be made to compile other case studies in which habitat fragmentation, natural or man-made, may in-fact be beneficial to Brook Trout by preventing introduced species that serve as competitors or predators from entering the system. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 15.5°C | 8.99 mg/L | 7.63 | 27 mg/L | 162.8 µS/cm | 150 m | 179 (optimal) |

| Fish Species | Number |
|---|---|
| Creek Chub | 2 |
| Blacknose Dace | 48 |

| Fish Species | Number |
|---|---|
| Brook Trout (y-o-y) | 220 (44 – 90 mm) |
| Brook Trout (older than y-o-y) | 34 (122 – 191 mm) |

## INDIA BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River N/Br |
| **Location**: | Doby Road | **County:** | Morris |
| **Date:** | August 11, 2014 | **Municipality:** | Randolph Twp. |

**Summary:** India Brook (source to Mountainside Road) has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed at two locations to assess the wild trout population. This brook has maintained a prolific wild trout population over the years. Surveys conducted off Doby Road near the former Cedar Lane Bridge in 1969, and more recently in 2005 and 2014, suggest Brook Trout are being replaced by Brown Trout in the upper end of this stream. The surveys from 1969 and 2005 documented more Brook Trout than Brown Trout, however, the 2014 survey found 4.5 times more Brown Trout than Brook Trout. All trout appeared to be of wild origin, with the largest Brown Trout measuring 306 mm (12 in).

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. It is recommended to monitor the fish assemblage in this stream, because Brook Trout are being replaced by Brown Trout and it appears they may disappear with time. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 16.3°C | 9.51 mg/L | 7.59 | 50.5 mg/L | 447.4 µS/cm | 150 m | 152 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Brook Lamprey | 9 |
| Chain Pickerel | 1 |
| Creek Chub | 30 |
| Blacknose Dace | 58 |
| White Sucker | 27 |
| Bluegill | 1 |

| Fish Species | Number |
|---|---|
| Tessellated Darter | 35 |
| Brook Trout (y-o-y) | 3 (75 – 100 mm) |
| Brook Trout (older than y-o-y) | 9 (129 – 176 mm) |
| Brown Trout (y-o-y) | 14 (61 – 92 mm) |
| Brown Trout (older than y-o-y) | 40 (110 – 306 mm) |

## INDIA BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River N/Br |
| **Location**: | Mountainside Road | **County:** | Morris |
| **Date:** | August 11, 2014 | **Municipality:** | Mendham Twp. |

**Summary:** India Brook (source to Mountainside Road) has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed at two locations to assess the wild trout population. The lower survey point, near the Mountainside Road bridge, was previously surveyed in 1969 and 2005. When surveyed in 2005, this site had a robust wild Brown Trout population, consisting of 183 individuals across multiple year classes. Four Rainbow Trout were encountered at that time ranging from 8 to 11 inches. The wild Brown Trout appear to be doing very well in this section, as 155 were encountered in 2014. Interestingly, wild Rainbow Trout seemed to have become established in this reach as 34 young-of-the-year (y-o-y) were collected. No additional year classes of Rainbow Trout were encountered in 2014, therefore the stability of this species' population is in question. In addition, no stocked trout were encountered in the 2014 survey. This stream is traditional stocked annually in the spring with trout (below the Mountainside Road bridge). However, in 2014 it was not stocked with trout as a precaution (to protect the wild trout fishery) due to an outbreak of a fish disease (Furunculosis) in the Pequest Trout Hatchery.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.3°C | 9.07 mg/L | 7.50 | 42.0 mg/L | 336.5 µS/cm | 150 m | 166 (optimal) |

| Fish Species | Number |
|---|---|
| Blacknose Dace | 11 |
| Longnose Dace | 53 |
| Pumpkinseed | 1 |
| Bluegill | 1 |

| Fish Species | Number |
|---|---|
| Tessellated Darter | 1 |
| Brown Trout (y-o-y) | 61 (56 – 80) mm |
| Brown Trout (older than y-o-y) | 94 (95 – 239) mm |
| Rainbow Trout (y-o-y) | 34 (37 – 74) mm |

## LAMINGTON (BLACK) RIVER

| | | | |
|---|---|---|---|
| **Project:** | General Fisheries Survey | **Drainage:** | Raritan River N/Br |
| **Location**: | Fiddler's Elbow Country Club Reach 2 | **County:** | Somerset |
| **Date:** | July 2, 2014 | **Municipality:** | Readington Twp. |

**Summary:** Two electrofishing surveys were conducted along the Lamington River in Fiddler's Elbow Country Club to gather baseline fisheries and habitat data prior to a stream restoration and fish habitat project 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. Although this stream section is currently classified as *Non Trout* in NJ's Surface Water Quality Standards, five wild Brown Trout were found ranging from 164 mm to 184 mm (6.5 in – 7.2 in), none of which were young-of-the-year (y-o-y).

**Recommendation:** Additional surveys are recommended to solidify a possible recommendation to upgrade the Surface Water Classification and delineate the most appropriate boundaries. Plan to conduct additional electrofishing surveys at this location, following stream restoration project that is planned.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 22.2°C | 9.51 mg/L | 8.09 | 61 mg/L | 329.1 µS/cm | 150 m | 111 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Brook Lamprey | 2 |
| Sea Lamprey | 2 |
| American Eel | 83 |
| Yellow Bullhead | 1 |
| Longnose Dace | 3 |
| Common Carp | 3 |
| Swallowtail Shiner | 18 |
| Spotfin Shiner | 24 |
| Fallfish | 2 |
| Banded Killifish | 1 |
| White Sucker | 13 |
| Green Sunfish | 3 |

| Fish Species | Number |
|---|---|
| Bluegill | 31 |
| Pumpkinseed | 2 |
| Redbreast Sunfish | 27 |
| Hybrid Sunfish | 4 |
| Black Crappie | 6 |
| Largemouth Bass | 3 |
| Smallmouth Bass | 7 |
| Rock Bass | 7 |
| Tessellated Darter | 9 |
| Shield Darter | 6 |
| Brown Trout (older than y-o-y) | 5 (164 – 184 mm) |

## LAMINGTON (BLACK) RIVER

| | | | |
|---|---|---|---|
| **Project:** | Classification | **Drainage:** | Raritan River N/Br |
| **Location**: | Fiddler's Elbow Country Club Reach 1 | **County:** | Somerset |
| **Date:** | July 2, 2014 | **Municipality:** | Bedminster Twp. |

**Summary:** Two electrofishing surveys were conducted along the Lamington River in Fiddler's Elbow Country Club to gather baseline fisheries and habitat data prior to a stream restoration and fish habitat project 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. Although this stream section is currently classified as *Non Trout* in NJ's Surface Water Quality Standards, four wild Brown Trout were found ranging from 66 mm to 196 mm (2.6 – 7.7 in), including one young-of-the-year (y-o-y).

**Recommendation:** Additional surveys are recommended to solidify a possible recommendation to upgrade the Surface Water Classification and delineate the most appropriate boundaries. Plan to conduct additional electrofishing surveys at this location, following stream restoration project that is planned.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 25.1°C | 12.90 mg/L | 8.66 | 59.5 mg/L | 322.9 µS/cm | 150 m | 124 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Brook Lamprey | 2 |
| American Eel | 143 |
| Swallowtail Shiner | 1 |
| Spottail Shiner | 1 |
| Spotfin Shiner | 4 |
| Blacknose Dace | 6 |
| Longnose Dace | 25 |
| Fallfish | 7 |
| White Sucker | 64 |
| Margined Madtom | 15 |

| Fish Species | Number |
|---|---|
| Pumpkinseed | 4 |
| Bluegill | 8 |
| Redbreast Sunfish | 21 |
| Smallmouth Bass | 9 |
| Rock Bass | 3 |
| Tessellated Darter | 23 |
| Shield Darter | 22 |
| Brown Trout (y-o-y) | 1 (66 mm) |
| Brown Trout (older than y-o-y) | 3 (184 – 196 mm) |

## LAMINGTON (BLACK) RIVER

| | | | |
|---|---|---|---|
| **Project:** | Classification | **Drainage:** | Raritan River N/Br |
| **Location**: | Lamington Road Bridge | **County:** | Hunterdon |
| **Date:** | July 11, 2014 | **Municipality:** | Tewksbury Twp. |

**Summary:** In response to two surveys conducted within the Fiddler's Elbow Country Club, the Lamington River was sampled at Lamington Road in Tewksbury Township to assess the current Surface Water Classification which is currently listed as *Trout Maintenance* or FW2-TM(C1) in NJ's Surface Water Quality Standards. Eight wild Brown Trout were collected, ranging from 72 mm to 302 mm (2.8 in – 11.9 in), including two young-of-the-year (y-o-y). At least 21 species were encountered (laboratory identification pending), making this stream home to one of the State's most diverse fisheries assemblages.

**Recommendation:** This data may be used to recommend upgrading this section of the Lamington River from *Trout Maintenance* to *Trout Production*, however data acquired from additional surveys will be considered before any recommendations are compiled.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 20.2°C | 8.09 mg/L | 7.54 | 54.5 mg/L | 308.3 µS/cm | 150 m | 162 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Brook Lamprey | 2 |
| American Eel | 77 |
| Chain Pickerel | 1 |
| Common Shiner | 37 |
| Satinfin Shiner | 1 |
| Swallowtail Shiner | 6 |
| Spottail Shiner | 6 |
| Creek Chub | 1 |
| Blacknose Dace | 28 |
| Longnose Dace | 92 |
| Fallfish | 14 |
| White Sucker | 12 |

| Fish Species | Number |
|---|---|
| Margined Madtom | 26 |
| Banded Killifish | 3 |
| Green Sunfish | 3 |
| Rock Bass | 1 |
| Hybrid Sunfish | 1 |
| Redbreast Sunfish | 19 |
| Smallmouth Bass | 3 |
| Tessellated Darter | 39 |
| Shield Darter | 34 |
| Brown Trout (y-o-y) | 2 (72 – 96 mm) |
| Brown Trout (older than y-o-y) | 6 (174 – 302 mm) |

## LAMINGTON (BLACK) RIVER

| | | | |
|---|---|---|---|
| **Project:** | Classification | **Drainage:** | Raritan River N/Br |
| **Location**: | McCan Mill Rd | **County:** | Hunterdon |
| **Date:** | July 11, 2014 | **Municipality:** | Tewksbury Twp. |

**Summary:** In response to two surveys conducted within the Fiddler's Elbow Country Club, the Lamington River was sampled at McCan Mill Road in Tewksbury Township to assess the current Surface Water Classification which is currently listed as *Trout Production* or FW2-TP(C1) in NJ's Surface Water Quality Standards. Eight wild Brown Trout were collected, ranging from 63 mm to 264 mm (2.5 in – 10.4 in), including one young-of-the-year (y-o-y). This data is confirms the existing classification and will be considered when assessing the most appropriate boundaries downstream, as recent data indicate the *Trout Mainten*ance and possibly *Non Trout* sections downstream may warrant an upgrade to *Trout Production*, however data acquired from additional surveys will be considered before any recommendations are compiled.

**Recommendation:** No additional surveys necessary.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 22.3°C | 9.59 mg/L | 7.79 | 52 mg/L | 343 µS/cm | 150 m | 176 (optimal) |

| Fish Species | Number |
|---|---|
| American Brook Lamprey | 4 |
| American Eel | 51 |
| Chain Pickerel | 1 |
| Eastern Mudminnow | 2 |
| Common Shiner | 70 |
| Spottail Shiner | 5 |
| Spotfin Shiner | 3 |
| Satinfin Shiner | 11 |
| Blacknose Dace | 151 |
| Longnose Dace | 43 |

| Fish Species | Number |
|---|---|
| Creek Chub | 5 |
| Fallfish | 41 |
| White Sucker | 63 |
| Margined Madtom | 17 |
| Redbreast Sunfish | 23 |
| Largemouth Bass | 7 |
| Tessellated Darter | 22 |
| Brown Trout (y-o-y) | 1 (63 mm) |
| Brown Trout (older than y-o-y) | 7 (148 – 264 mm) |

## LAMINGTON (BLACK) RIVER

| | | | |
|---|---|---|---|
| **Project:** | Classification | **Drainage:** | Raritan River N/Br |
| **Location**: | Hacklebarney State Park | **County:** | Morris |
| **Date:** | August 26, 2014 | **Municipality:** | Washington Twp. |

**Summary:** Electrofishing surveys were conducted in the Lamington (Black) River within Hacklebarney State Park and within Black River County Park near the Kay Environmental Center, to assess the current Trout Maintenance classification in NJ's Surface Water Quality Standards N.J.A.C. 7:9B. Previous surveys have indicated the trout supporting capabilities of both stocked and wild trout, however no reproduction has been found in this section of the river. The surveys conducted in 2014 yielded similar results. The survey within Hacklebarney State Park unveiled one stocked Rainbow Trout (likely stocked by the Division during the spring of 2014) and one stocked Brook Trout (either stocked by the Division during the spring or fall of 2013 or stocked by a private fishing club during spring of 2014). Six wild Brown Trout were also collected from 171 mm to 222 mm (6.7 in – 8.7 in). No young-of-the-year (y-o-y) trout were encountered, therefore the Incidence of Occurrence value was calculated to be 31.0, confirming the Trout Maintenance classification.

**Recommendation:** No additional surveys are necessary at this time. It will be interesting to assess the continuous water temperature data collected with the temperature logger that is installed in this section of river, as one would expect more trout to be found, given the excellent habitat in this section of river and proximity of two reproducing trout streams (Trout Brook and Rinehart Brook).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 18.3°C | 9.18 mg/L | 7.37 | 53.0 mg/L | 423.8 µS/cm | 150 m | 178 (optimal) |

| Fish Species | Number |
|---|---|
| American Brook Lamprey | 6 |
| American Eel | 12 |
| Golden Shiner | 3 |
| Creek Chub | 5 |
| Blacknose Dace | 49 |
| Longnose Dace | 67 |
| Fallfish | 2 |
| White Sucker | 14 |

| Fish Species | Number |
|---|---|
| Brown Bullhead | 2 |
| Pumpkinseed | 5 |
| Bluegill | 2 |
| Redbreast Sunfish | 1 |
| Tessellated Darter | 15 |
| Brook Trout (older than y-o-y) | 1 (372 mm) |
| Rainbow Trout (older than y-o-y) | 1 (330 mm) |
| Brown Trout (older than y-o-y) | 6 (171 – 222 mm) |

## LAMINGTON (BLACK) RIVER

| | | | |
|---|---|---|---|
| **Project:** | Classification | **Drainage:** | Raritan River N/Br |
| **Location**: | Kay Environmental Center | **County:** | Morris |
| **Date:** | August 26, 2014 | **Municipality:** | Chester Twp. |

**Summary:** Electrofishing surveys were conducted in the Lamington (Black) River within Hacklebarney State Park and within Black River County Park near the Kay Environmental Center, to assess the current Trout Maintenance classification in NJ's Surface Water Quality Standards N.J.A.C. 7:9B. Previous surveys have indicated the trout supporting capabilities of both stocked and wild trout, however no reproduction has been found in this section of the river. The surveys conducted in 2014 yielded similar results. The survey within Black River County Park unveiled three wild Brook Trout, 162 mm to 218 mm (6.4 – 8.6 in). No young-of-the-year (y-o-y) trout were encountered, therefore, the Incidence of Occurrence value was calculated to be 31.8, confirming the Trout Maintenance classification.

**Recommendation:** No additional surveys are necessary at this time. It will be interesting to assess the continuous water temperature data collected with the temperature logger that is installed downstream of this section of river, as one would expect more trout to be found, given the excellent habitat in this section of river and proximity of several reproducing trout streams, including Hacklebarney Brook.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 20.4°C | 8.03 mg/L | 7.67 | 61.0 mg/L | 457.0 µS/cm | 150 m | 173 (optimal) |

| Fish Species | Number |
|---|---|
| American Eel | 19 |
| Blacknose Dace | 51 |
| Longnose Dace | 89 |
| White Sucker | 4 |

| Fish Species | Number |
|---|---|
| Redbreast Sunfish | 3 |
| Tessellated Darter | 6 |
| Brook Trout (older than y-o-y) | 3 (162 – 218 mm) |

## LAMINGTON RIVER (TRIB) (N. OF READINGTON)

| | | | |
|---|---|---|---|
| **Project:** | Native Species Inventory | **Drainage:** | Raritan River N/Br |
| **Location**: | Cedar Road | **County:** | Hunterdon |
| **Date:** | June 27, 2014 | **Municipality:** | Readington Twp. |

**Summary:** An electrofishing survey was conducted in this tributary to the Lamington River, currently classified as *Non Trout*, that has not been surveyed previously. It was selected primarily because Bridle Shiners were encountered nearby in 1973. Unfortunately, no Bridle Shiners were found during the 2014 survey; only 10 common species none of which were of size to provide significant angling value or considered rare.

**Recommendation:** Continue to survey local waters to determine extent of the range of the Bridle Shiner in NJ.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 20.9°C | - | 7.06 | 89 mg/L | 460.6 µS/cm | 150 m | 122 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Eel | 3 |
| Blacknose Dace | 305 |
| Fathead Minnow | 2 |
| Creek Chub | 67 |
| White Sucker | 33 |

| Fish Species | Number |
|---|---|
| Brown Bullhead | 2 |
| Green Sunfish | 6 |
| Pumpkinseed | 30 |
| Bluegill | 28 |
| Tessellated Darter | 58 |

## LEDGEWOOD BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River S/Br |
| **Location**: | Emmans Road | **County:** | Morris |
| **Date:** | August 1, 2014 | **Municipality:** | Roxbury Twp. |

**Summary:** Ledgewood Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this tributary to the South Branch of the Raritan River was surveyed to assess the wild trout population. Ninety-five wild Brown Trout ranging from 58 mm to 395 mm, including 65 young-of-the-year, were encountered during the 2014 survey. Additionally, four other species were also documented including Blacknose Dace, Eastern Mudminnow, Slimy Sculpin, and White Sucker. Accessing this stream reach was difficult due to the prevalence of private homes along the stream. The stream reach was also sampled in 1969, 1980, 1997, and 2002 and 38, 34, 29, and 85 Brown Trout were captured, respectively. The Brown Trout population has been increased dramatically since 1969. One Brook Trout was captured in each survey in 1997 and 2002.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. Tributaries of Ledgewood Brook should be investigated to determine Brook Trout presence/absence as well. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 16.9°C | 9.24 mg/L | 7.62 | 122 mg/L | 951 µS/cm | 150 m | 147 (suboptimal) |

| Fish Species | Number |
|---|---|
| Eastern Mudminnow | 1 |
| Blacknose Dace | 5 |
| White Sucker | 2 |

| Fish Species | Number |
|---|---|
| Slimy Sculpin | 79 |
| Brown Trout (y-o-y) | 65 (58 – 100 mm) |
| Brown Trout (older than y-o-y) | 30 (130 – 395 mm) |

**MUDDY RUN**

| | | | |
|---|---|---|---|
| **Project:** | Native Species Inventory | **Drainage:** | Raritan River N/Br |
| **Location**: | Burnt Mills Road | **County:** | Somerset |
| **Date:** | June 30, 2014 | **Municipality:** | Bedminster Twp. |

**Summary:** An electrofishing survey was conducted at Muddy Run, a previously unsurveyed tributary to the Lamington River that is classified as *Non Trout*. It was selected primarily because Bridle Shiners were encountered nearby in 1973. Unfortunately, no Bridle Shiners were found during the 2014 survey; only eight common species none of which were of size to provide significant angling value. The habitat in this small stream is degraded and erosion is evident.

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

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 19.7°C | 6.81 mg/L | 7.59 | 100 mg/L | 779 µS/cm | 150 m | 105 (marginal) |

| Fish Species | Number |
|---|---|
| American Eel | 1 |
| Creek Chub | 34 |
| White Sucker | 43 |
| Banded Killifish | 11 |

| Fish Species | Number |
|---|---|
| Green Sunfish | 5 |
| Bluegill | 2 |
| Largemouth Bass | 12 |
| Tessellated Darter | 28 |

## RARITAN RIVER (TRIB) (W. OF BEDMINSTER)

| | | | |
|---|---|---|---|
| **Project:** | Native Species Inventory | **Drainage:** | Raritan River N/Br |
| **Location**: | Matthews Drive | **County:** | Somerset |
| **Date:** | June 27, 2014 | **Municipality:** | Bedminster Twp. |

**Summary:** This unnamed tributary to the North Branch of the Raritan River (sometimes referred to as Clucas Brook) was electrofished to determine if Bridle Shiners and Comely Shiners were present, as they were found in a nearby tributary in 2003. This stream, classified as *Non Trout,* has limited fish habitat and appears to be impacted by rain events that erode the banks and flush woody debris out of the stream. Twelve fish species were encountered, including the Swallowtail Shiner and the rare Bridle Shiner.

**Recommendation:** Additional surveys in the area are recommended to better understand the current distribution of Bridle Shiners.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 22.8°C | - | 7.24 | 73.5 mg/L | 413.8 µS/cm | 150 m | 133 (suboptimal) |

| Fish Species | Number |
|---|---|
| Blacknose Dace | 10 |
| Creek Chub | 42 |
| Common Shiner | 17 |
| Bridle Shiner | 3 |
| Swallowtail Shiner | 12 |
| White Sucker | 26 |

| Fish Species | Number |
|---|---|
| Yellow Bullhead | 1 |
| Banded Killifish | 7 |
| Green Sunfish | 7 |
| Redbreast Sunfish | 13 |
| Largemouth Bass | 1 |
| Tessellated Darter | 11 |

## RARITAN RIVER S/BR

| | | | |
|---|---|---|---|
| **Project:** | General Fisheries Survey | **Drainage:** | Raritan River S/Br |
| **Location**: | Washington Street | **County:** | Hunterdon |
| **Date:** | August 15, 2014 | **Municipality:** | High Bridge Boro |

**Summary:** The first of six electrofishing surveys in the South Branch of the Raritan River was conducted below the Lake Solitude Dam in High Bridge. This section of river is classified as *Trout Maintenance* in NJ's Surface Water Quality Standards N.J.A.C. 7:9B and is routinely stocked with trout by the Division, including the spring of 2014, when the river section above the Lake Solitude dam upstream to Mt. Olive was not stocked due to implications related to the Furunculosis outbreak at the Pequest Trout Hatchery. One stocked Rainbow Trout was captured and eleven wild Brown Trout including the largest at 336 mm (13.2 in) and one young-of-the-year (y-o-y). Although one y-o-y trout was found, the Division is not ready to recommend upgrading the classification to *Trout Production* without additional data. The Incidence of Occurrence value was calculated to be 25.6, confirming the *Trout Maintenance* classification. The wild trout fishery at this location would be considered marginal. All fish appeared healthy. The relatively rare Shield Darter was found at this location, which is the highest it has been found within the watershed.

**Recommendation:** No additional surveys necessary at this time.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.8°C | 8.64 mg/L | 8.02 | 99.5 mg/L | 397.0 µS/cm | 150 m | 131 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Eel | 216 |
| Cutlip Minnow | 12 |
| Common Shiner | 1 |
| Blacknose Dace | 2 |
| Longnose Dace | 32 |
| Fallfish | 5 |
| White Sucker | 120 |
| Margined Madtom | 3 |

| Fish Species | Number |
|---|---|
| Rock Bass | 3 |
| Redbreast Sunfish | 18 |
| Smallmouth Bass | 15 |
| Tessellated Darter | 14 |
| Shield Darter | 1 |
| Brown Trout (y-o-y) | 1 (98 mm) |
| Brown Trout (older than y-o-y) | 10 (224 – 336 mm) |
| Rainbow Trout (older than y-o-y) | 1 (308 mm) |

## RARITAN RIVER S/BR

| | | | |
|---|---|---|---|
| **Project:** | General Fisheries Survey | **Drainage:** | Raritan River S/Br |
| **Location**: | Raritan River Road | **County:** | Hunterdon |
| **Date:** | August 15, 2014 | **Municipality:** | Lebanon Twp. |

**Summary:** The South Branch of the Raritan River was surveyed along Raritan River Road in Lebanon Township upstream of the Ken Lockwood Gorge WMA and across from the mouths two tributaries that have reproducing trout, Hickory Run and Little Brook. This is the second of six locations surveyed in 2014. This section was last stocked by the Division during the Fall of 2013, but was stocked by a private hatchery this year. The young-of-the-year (y-o-y) trout present confirms a recent recommendation to upgrade the classification from *Trout Maintenance* to *Trout Production*. Trout collected include six wild Brook Trout up to 249 mm (9.8 in), 16 wild Brown Trout up to 253 mm (10.0 in) including two y-o-y, 1 stocked Rainbow Trout at 546 mm (21.5 in), and 1 wild Rainbow Trout at 111 mm (4.4 in). [This is one of seven wild Rainbow Trout collected in this river in since 2012 (lengths sorted by length: 105, 108, 111, 144, 162, 162, and 177 mm). Its status as a y-o-y is not certain, due to its relatively large size (statewide typically less than 100 mm) and small sample size, however it is believed that it was a y-o-y as the more numerous Brook and Brown Trout in this river often appear in relatively high numbers and attain lengths of 105 and 125 mm respectively.]
**Recommendation:** Subsequent surveys should be conducted to monitor the fishery in regards to the trout that tested positive for furunculosis in 2014. Surveys would also be beneficial to assess the current stocking program and management of the river. In regards to habitat, this location is fairly straight, flat, and sandy and would benefit from a stream habitat project in which a meandering thalwag was created, engineered riffles created, and boulder placement, thus allowing the river to transport sediment and creating better fish habitat.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 18.3°C | 8.95mg/L | 8.23 | 86 mg/L | 402.7µS/cm | 150 m | 150 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Brook Lamprey | 2 |
| American Eel | 9 |
| Blacknose Dace | 3 |
| Longnose Dace | 59 |
| White Sucker | ~160 |
| Green Sunfish | 1 |
| Margined Madtom | 14 |
| Smallmouth Bass | 21 |

| Fish Species | Number |
|---|---|
| Tessellated Darter | 27 |
| Slimy Sculpin | 1 |
| Brook Trout (older than y-o-y) | 6 (186 – 249 mm) |
| Brown Trout (y-o-y) | 2 (88 – 99 mm) |
| Brown Trout (older than y-o-y) | 14 (135 – 253 mm) |
| Rainbow Trout (y-o-y) | 1 (111 mm) |
| Rainbow Trout (older than y-o-y) | 1 (546 mm) |

## RARITAN RIVER S/BR

| | | | |
|---|---|---|---|
| **Project:** | General Fisheries Survey | **Drainage:** | Raritan River S/Br |
| **Location**: | Vernoy Road | **County:** | Hunterdon |
| **Date:** | August 14, 2014 | **Municipality:** | Tewksbury Twp. |

**Summary:** The third of six electrofishing surveys along the South Branch of the Raritan River was conducted just downstream of the Vernoy Road bridge. Trout collected include seven wild Brook Trout including five young-of-the-year (y-o-y) and two larger individuals, up to 210 mm (8.3 in). Forty-nine Wild Brown Trout were encountered, with 39 Y-O-Y and 10 from 200 to 270 mm (7.9 to 10.6 in). When last surveyed in 1995, 14 Brook Trout and 7 Brown Trout were found, which is in line with other statewide observations that indicate a shift towards increasing Brown Trout abundance, in lieu of Brook Trout. The presence of y-o-y trout confirms the existing *Trout Production* classification in NJ's Surface Water Quality Standards N.J.A.C. 7:9B.

**Recommendation:** Subsequent surveys should be conducted to monitor the fishery in regards to the trout that tested positive for furunculosis in 2014. Surveys would also be beneficial to assess the current stocking program and management of the river.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.0°C | 8.48 mg/L | 7.93 | 87.5 mg/L | 412.9 µS/cm | 150 m | 161 (optimal) |

| Fish Species | Number |
|---|---|
| American Brook Lamprey | 9 |
| American Eel | 9 |
| Eastern Mudminnow | 1 |
| Common Shiner | 1 |
| Blacknose Dace | 204 |
| Longnose Dace | 149 |
| White Sucker | 21 |
| Yellow Bullhead | 1 |
| Margined Madtom | 33 |

| Fish Species | Number |
|---|---|
| Rock Bass | 1 |
| Redbreast Sunfish | 15 |
| Largemouth Bass | 3 |
| Tessellated Darter | 287 |
| Brook Trout (y-o-y) | 5 (83 – 101 mm) |
| Brook Trout (older than y-o-y) | 2 (176 – 210 mm) |
| Brown Trout (y-o-y) | 39 (66 – 125 mm) |
| Brown Trout (older than y-o-y) | 10 (200 – 270 mm) |

## RARITAN RIVER S/BR

| | | | |
|---|---|---|---|
| **Project:** | General Fisheries Survey | **Drainage:** | Raritan River S/Br |
| **Location**: | Schooley's Mountain Rd | **County:** | Morris |
| **Date:** | August 14, 2014 | **Municipality:** | Washington Twp. |

**Summary:** The South Branch of the Raritan River was surveyed in Long Valley near the Schooley's Mountain Road bridge. This location is downstream of the Claremont Stretch, a 1.1 mile section which is regulated as a Year Round Trout Conservation Area, which has a daily limit of one trout over 15 inches, is catch and release during the preseason closure, use of artificial lures only, and is not stocked. The Claremont is known to produce the highest number of wild trout of any of NJ's major streams or rivers and the survey conducted just downstream in Long Valley did not disappoint. This electrofishing survey yielded 128 wild trout, which was more than twice as many as the other five surveys on this river during 2014. The presence of y-o-y trout confirms the existing *Trout Production* classification in NJ's Surface Water Quality Standards N.J.A.C. 7:9B. Staff continues to be impressed by the abundance and size of wild trout in this river, as was Field and Stream editor Joe Cermele, who recently wrote an article based on this survey, titled "If you ever get the chance to electrofish your home waters, don't miss out." Brown Trout were most abundant, consisting of 79 individuals with 41 young-of-the-year (y-o-y) and the largest being a very impressive 475 mm (18.7 in). Two wild Rainbow Trout (108 and 162 mm) were captured, which were two of seven wild Rainbow Trout collected in this river in since 2012 (lengths sorted by length: 105, 108, 111, 144, 162, 162, and 177 mm). The 108 mm individual is considered a y-o-y (although not certain, due to its relatively large size (statewide typically less than 100 mm) and small sample size (2)), however it is believed that it was a y-o-y as the more numerous Brook and Brown Trout in this river often appear in relatively high numbers and attain lengths of 105 and 125 mm respectively. This survey also produced 121 Slimy Sculpins, a species that can not tolerate degraded habitat and requires very cold water, therefore it often indicates pristine habitat and excellent water quality.

**Recommendation:** Subsequent surveys should be conducted to monitor the fishery in regards to the trout that tested positive for furunculosis in 2014. Surveys would also be beneficial to assess the current stocking program and management of the river.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.8°C | 9.74 mg/L | 7.95 | 76.0 mg/L | 444.9 µS/cm | 150 m | 135 (suboptimal) |

| Fish Species | Number |
|---|---|
| American Brook Lamprey | 1 |
| American Eel | 7 |
| Redfin Pickerel | 2 |
| Blacknose Dace | 150 |
| Longnose Dace | 130 |
| White Sucker | 97 |
| Margined Madtom | 4 |
| Green Sunfish | 7 |
| Redbreast Sunfish | 2 |
| Hybrid Sunfish | 1 |

| Fish Species | Number |
|---|---|
| Tessellated Darter | 142 |
| Yellow Perch | 2 |
| Slimy Sculpin | 121 |
| Brook Trout (y-o-y) | 37 (62 – 105 mm) |
| Brook Trout (older than y-o-y) | 10 (165 – 245 mm) |
| Brown Trout (y-o-y) | 41 (74 – 123 mm) |
| Brown Trout (older than y-o-y) | 38 (163 – 475 mm) |
| Rainbow Trout (y-o-y) | 1 (108 mm) |
| Rainbow Trout (older than y-o-y) | 1 (162 mm) |

**RARITAN RIVER S/BR**

| | | | |
|---|---|---|---|
| **Project:** | General Fisheries Survey | **Drainage:** | Raritan River S/Br |
| **Location**: | Bartley WMA | **County:** | Morris |
| **Date:** | August 18, 2014 | **Municipality:** | Washington Twp. |

**Summary:** The fifth of six surveys on the South Branch of the Raritan River was electrofished through the Bartley WMA. This section of river is significantly narrower than the 4 surveys located downstream, therefore two backpack electrofishing units were used, as opposed to the electrofishing barge that was used elsewhere downstream. Thirty-eight trout were found, comprised of 35 Brown Trout, 24 of which were young-of-the-year (y-o-y) and 3 Brook Trout, all of which were y-o-y. The largest Brown Trout was 251 mm (9.9 mm). The presence of y-o-y trout confirms the existing *Trout Production* classification in NJ's Surface Water Quality Standards N.J.A.C. 7:9B. This location is very straight and flat, as it parallels an old railroad bed that has been converted to a walking path, and may have been historically straightened.

**Recommendation:** Subsequent surveys should be conducted to monitor the fishery in regards to the trout that tested positive for furunculosis in 2014. Surveys would also be beneficial to assess the current stocking program and management of the river. This section of public land would greatly benefit from a stream habitat project in which a meandering thalwag was created, in addition to boulder placement, thus creating better fish habitat. A project such as this would likely hold more trout and be more appealing to fish for anglers.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 15.7°C | 7.45 mg/L | 7.84 | 30.5 mg/L | 376.4 µS/cm | 150 m | 157 (suboptimal) |

| Fish Species | Number |
|---|---|
| Eastern Mudminnow | 1 |
| Creek Chub | 5 |
| Blacknose Dace | 87 |
| Longnose Dace | 63 |
| Fallfish | 35 |
| White Sucker | 57 |
| Margined Madtom | 2 |

| Fish Species | Number |
|---|---|
| Yellow Bullhead | 2 |
| Redbreast Sunfish | 1 |
| Tessellated Darter | 123 |
| Slimy Sculpin | 1 |
| Brook Trout (y-o-y) | 3 (63 – 79 mm) |
| Brown Trout (y-o-y) | 24 (60 – 86 mm) |
| Brown Trout (older than y-o-y) | 11 (147– 251 mm) |

**RARITAN RIVER S/BR**

| | | | |
|---|---|---|---|
| **Project:** | Fish Health | **Drainage:** | Raritan River S/Br |
| **Location**: | Bartley WMA | **County:** | Morris |
| **Date:** | May 28, 2014 | **Municipality:** | Washington Twp. |

**Summary:** Several state and /or privately stocked waters were sampled to screen for fish pathogens. The South Branch of the Raritan River was electrofished through the Bartley WMA on May 28. Eighteen Brown Trout (6-11 in.) and five Brook Trout (6 – 8 in.) were collected, all presumably of wild origin. All trout appeared healthy and disease free based on visual observations. No trout were submitted for laboratory analysis.

**Recommendation:** Subsequent surveys should be conducted to monitor the fishery in regards to the trout that tested positive for furunculosis in 2014. Surveys would also be beneficial to assess the current stocking program and management of the river.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| - | - | - | - | - | ~500 m | - |

| Fish Species | Number | Fish Species | Number |
|---|---|---|---|
| American Eel | present | White Sucker | present |
| Redfin Pickerel | present | Green Sunfish | present |
| Margined Madtom | present | Pumpkinseed | present |
| Yellow Bullhead | present | Bluegill | present |
| Brown Bullhead | present | Black Crappie | present |
| Common Shiner | present | Tessellated Darter | present |
| Blacknose Dace | present | Slimy Sculpin | present |
| Longnose Dace | present | Brook Trout (older than y-o-y) | 5 (139 – 202 mm) |
| Fallfish | present | Brown Trout (older than y-o-y) | 18 (152 – 285 mm) |

**NON- STANDARDIZED SURVEY**

## RARITAN RIVER S/BR

| | | | |
|---|---|---|---|
| **Project:** | General Fisheries Survey | **Drainage:** | Raritan River S/Br |
| **Location**: | Stephens Mill Road | **County:** | Morris |
| **Date:** | August 18, 2014 | **Municipality:** | Mount Olive Twp. |

**Summary:** The final of six electrofishing surveys on the South Branch of the Raritan River was located upstream of Stephen's Mill Road in Mount Olive, which is downstream of the newly renovated YMCA/Mount Olive Complex dam at Flanders Drakestown Road. The unique geological features consisting of large boulders, bedrock, and steep gradient provide optimal trout habitat, however the influence of warm water originating from Budd Lake and then the impoundment above the YMCA dam likely limit the fishery potential. The South Branch recovers as it picks up additional coldwater tributaries and forested canopy. Brown Trout were the only trout species found at this location, consisting of 34 individuals, 10 of which were young-of-the-year (y-o-y). The four largest wild Brown Trout were sizable from 330 to 420 mm (13.0 to 16.5 in) were captured. The y-o-y trout present confirms a recent recommendation to upgrade the classification from *Trout Maintenance* to *Trout Production*. Brook Trout were found during previous surveys in the vicinity, however none were found in 2014.

**Recommendation:** Subsequent surveys should be conducted to monitor the fishery in regards to the trout that tested positive for furunculosis in 2014. Surveys would also be beneficial to assess the current stocking program and management of the river.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.7°C | 9.47 mg/L | 7.62 | 33.0 mg/L | 424.7 µS/cm | 150 m | 177 (optimal) |

| Fish Species | Number |
|---|---|
| American Eel | 9 |
| Eastern Mudminnow | 1 |
| Creek Chub | 8 |
| Blacknose Dace | 87 |
| Longnose Dace | 46 |
| Fallfish | 2 |
| White Sucker | 22 |
| Margined Madtom | 1 |

| Fish Species | Number |
|---|---|
| Brown Bullhead | 1 |
| Yellow Bullhead | 1 |
| Pumpkinseed | 12 |
| Bluegill | 8 |
| Tessellated Darter | 14 |
| Yellow Perch | 2 |
| Brown Trout (y-o-y) | 10 (61 – 78 mm) |
| Brown Trout (older than y-o-y) | 24 (134 – 420 mm) |

**RARITAN RIVER S/BR (Trib.)(NE of Lake Solitude)**

| | | | |
|---|---|---|---|
| **Project:** | Classification | **Drainage:** | Raritan River S/Br |
| **Location**: | River Road | **County:** | Hunterdon |
| **Date:** | August 25, 2014 | **Municipality:** | Clinton Twp. |

**Summary:** This unnamed tributary to the South Branch of the Raritan River has never been surveyed for fish by the Division of Fish and Wildlife. This stream was selected to be surveyed in 2014 because it has features, such as topography, forested landuse, instream habitat, and proximity to other trout waters, to suggest it may too be suitable for trout reproduction. Currently, this stream is classified as Trout Maintenance by default, because it was not previously surveyed and it flows into Trout Maintenance water. Six young-of-the-year (y-o-y) Brook Trout and six wild Brown Trout, all older than y-o-y, were found.

**Recommendation:** Data suggest the Division will recommend this tributary be reclassified as at Trout Production stream in NJ's Surface Water Quality Standards N.J.A.C. 7:9B.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.1°C | 7.68 mg/L | 7.75 | 49 mg/L | 322.9 µS/cm | 150 m | 163 (optimal) |

| Fish Species | Number |
|---|---|
| Blacknose Dace | 44 |
| Bluegill | 4 |

| Fish Species | Number |
|---|---|
| Brook Trout (y-o-y) | 6 (77 – 106 mm) |
| Brown Trout (older than y-o-y) | 6 (156 – 206 mm) |

## RINEHART BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River N/Br |
| **Location**: | Hacklebarney State Park | **County:** | Morris |
| **Date:** | July 25, 2014 | **Municipality:** | Washington Twp. |

**Summary:** Rinehart Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. This stream was previously surveyed in 2004, 1996, and 1969, in which 143, 19, and 25 Brown Trout and 0, 1, and 12 Brook Trout were found, respectively. The data from these surveys is similar to the 2004 survey data. In the 2014 survey 95 wild Brown Trout, including 66 young-of-the-year, were found. Even though water temperatures are cool enough for both Brook and Brown Trout survival, the Brown Trout appear to have out competed Brook Trout at this survey location, as Brook Trout were not found. The wild Brown Trout population appears to be stable.

**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. Further surveys should be conducted at different locations within the brook to determine if the Brook Trout population has been extirpated from Rinehart Brook or has it been relegated to other reaches where Brown Trout are less abundant or absent. This stream should also be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 18.2°C | 9.03 mg/L | 7.83 | 37.0 mg/L | 271.8 µS/cm | 150 m | 171 (optimal) |

| Fish Species | Number |
|---|---|
| Blacknose Dace | 5 |

| Fish Species | Number |
|---|---|
| Brown Trout (y-o-y) | 66 (56 – 90 mm) |
| Brown Trout (older than y-o-y) | 29 (115 – 236 mm) |

**Rockaway Creek, North Branch**

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River N/Br |
| **Location**: | Rockaway Road | **County:** | Hunterdon |
| **Date:** | August 22, 2014 | **Municipality:** | Tewksbury Twp. |

**Summary:** The North Branch Rockaway Creek has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. This stream was surveyed previously in 2004, 1981, and 1969, in which 0, 0 and 1 Brook Trout and 54, 40 and 27 Brown Trout were found, respectively. In the 2014 survey, 58 wild Brown Trout (66 – 248 mm) were found and of these, 20 were young-of-the-year. Brown Trout appear to have out-competed Brook Trout and have completely taken over at this survey location, as no Brook Trout were found. It is possible that the lone Brook Trout previously documented at this site, in 1969, could have been stocked since stocking occurred at a location not too far from this survey site. The Brown Trout population appears stable.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 18.6°C | 9.21 mg/L | 7.75 | 30 mg/L | 145.5 µS/cm | 150 m | 160 (optimal) |

| Fish Species | Number |
|---|---|
| American Eel | 15 |
| Blacknose Dace | 20 |
| Longnose Dace | 24 |
| Fallfish | 1 |

| Fish Species | Number |
|---|---|
| White Sucker | 3 |
| Tessellated Darter | 3 |
| Brown Trout (y-o-y) | 20 (66 – 106 mm) |
| Brown Trout (older than y-o-y) | 38 (144 – 248 mm) |

**ROCKY RUN**

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River S/Br |
| **Location**: | Rocky Run Road | **County:** | Hunterdon |
| **Date:** | August 6, 2014 | **Municipality:** | Lebanon |

**Summary:** Rocky Run has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. This stream is a tributary to Spruce Run Creek and was previously surveyed in 2009, 1995, and 1988 in which 22, 96 and 84 Brook Trout were found, respectively. The 2014 survey found a comparable number of Brook Trout, 69 individuals (53 mm – 216 mm) and most of these (61) were young-of-the-year (y-o-y). The high number of Brook Trout found could be attributed to just a highly successful reproductive year and is not necessarily a good representative of a healthy / stable population. In fact, the ratio between adults to Young of the Year has been on a steady decline in each successive survey since the original survey done in 1988. Stream temperatures recorded in past surveys range from 16.8 C – 22.2 C. This shows fairly high stream variability from one year to the next; with 3 out of 4 years found to be above 19 C. These temperatures are above optimal / preferred temperature levels for Brook Trout and maybe a cause of the decreasing adult to y-o-y ratio.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the Wild Trout Stream regulation should be modified and/or if new regulations for wild trout are warranted. Further surveys need to be conducted to determine if the Brook Trout Population will continue to hold on or if stream temperatures will rise, as global temperatures are predicted to rise, possibly exterminating Brook Trout entirely from Rocky Run. Habitat improvement projects designed to aid in lowering stream temperature should be investigated, as this location would greatly benefit from lower stream temperatures. Future surveys upstream of this location should be conducted to see if Brook Trout are thriving in other areas with potentially better environmental conditions.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 19.5°C | 7.13 mg/L | 7.53 | 31 mg/L | 189.8 µS/cm | 150 m | 159 (suboptimal) |

| Fish Species | Number |
|---|---|
| Blacknose Dace | 128 |

| Fish Species | Number |
|---|---|
| Brook Trout (y-o-y) | 61 (53 – 96 mm) |
| Brook Trout (older than y-o-y) | 8 (166 – 216 mm) |

**SIDNEY BROOK**

| | | | |
|---|---|---|---|
| **Project:** | Fish Health | **Drainage:** | Raritan River S/Br |
| **Location**: | Pittstown Road Bridge | **County:** | Hunterdon |
| **Date:** | May 29, 2014 | **Municipality:** | Union Twp. |

**Summary:** Sydney Brook was electrofished in 2014 to screen for fish pathogens. Three Brown Trout (8-11 in.) appeared to be of wild origin. Seven Rainbow Trout (10-14 in.) were of stocked origin based on extensive fin erosion. Two Rainbow Trout were submitted for fish health testing due to patches of discoloration on their skin. Pathology results were negative for Furunculosis. Five Margined Madtoms were submitted for pathology that exhibited superficial parasites, which were determined to be a common undescribed nematode that causes a benign infection. Two of the madtoms had cranial lesions that were screened for Edwardsiella ictaluri, but were negative for the bacteria.

**Recommendation:** No additional surveys necessary.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.7°C | 9.14 mg/L | 7.78 | - | 208.7 µS/cm | ~ 650 m | - |

| Fish Species | Number |
|---|---|
| American Eel | present |
| Common Shiner | present |
| Blacknose Dace | present |
| Longnose Dace | present |
| White Sucker | present |
| Margined Madtom | present |

| Fish Species | Number |
|---|---|
| Yellow Bullhead | present |
| Green Sunfish | present |
| Bluegill | present |
| Redbreast Sunfish | present |
| Rainbow Trout (older than y-o-y) | 7 (203 – 279 mm) |
| Brown Trout (older than y-o-y) | 3 (254 – 356 mm) |

**NON - STANDARDIZED SURVEY**

## STONY BROOK (MORRIS)

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River S/Br |
| **Location**: | Naughtright Road | **County:** | Morris |
| **Date:** | August 4, 2014 | **Municipality:** | Washington Twp. |

**Summary:** Stony Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. Stony Brook, aptly named due to its relatively silt-free substrate composed of cobble and boulder layering, provides excellent habitat for both fish and aquatic invertebrates. This brook was previously surveyed in 1969 and 2005. The section surveyed in 2005 was replicated in 2014. Numbers of trout were similar for both wild Brook Trout (6 in 1969, 7 in 2005, and 2 in 2014) and wild Brown Trout (44 in 1969, 79 in 2005, and 102 in 2014). There was an even mix of young-of-the-year (y-o-y) (n=48) and adults/subadults (n=54), providing many catchable Brown Trout, although the largest was only 8.9 inches. This survey also produced 263 Slimy Sculpins, which may be the highest number encountered in any 150 m stretch surveyed in New Jersey. This species can not tolerate degraded habitat and requires very cold water, therefore it often indicates pristine habitat and excellent water quality.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted.

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.7°C | 7.81 mg/L | 7.27 | 34.0 mg/L | 233.3 µS/cm | 150 m | 181 (optimal) |

| Fish Species | Number |
|---|---|
| Blacknose Dace | 24 |
| Longnose Dace | 5 |
| Slimy Sculpin | 263 |

| Fish Species | Number |
|---|---|
| Brook Trout (y-o-y) | 2 (72 – 77 mm) |
| Brown Trout (y-o-y) | 48 (49 – 90 mm) |
| Brown Trout (older than y-o-y) | 54 (105 – 227 mm) |

## TEETERTOWN BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River S/Br |
| **Location**: | Trimmer Road bridge | **County:** | Hunterdon |
| **Date:** | August 6, 2014 | **Municipality:** | Lebanon Twp. |

**Summary:** Teetertown Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. When this stream was last surveyed in 2007, 28 Brown Trout and 25 Brook Trout were encountered. The electrofishing survey conducted in 2014 yielded a similar proportion of the two species with 44 Brown Trout and 49 Brook Trout. Additional netters were used during the 2014 survey, therefore it can not be concluded that the trout are increasing in number, only that they are apparently doing well and staying approximately at the same proportion to one another. Several Brown Trout measured 10 inches, and one large trout measured 14.4 inches. Nine adult Brook Trout ranged from 6 – 8 in and the remaining 40 Brook Trout were young-of-the-year (y-o-y), all less than 94 mm (3.7 in). This stream may be an important nursery area for trout, contributing to the excellent wild trout fishery downstream, in the South Branch of the Raritan River.

**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 19.5°C | 8.48 mg/L | 7.59 | 36.5 mg/L | 196.7 µS/cm | 150 m | 157 (suboptimal) |

| Fish Species | Number |
|---|---|
| Redfin Pickerel | 1 |
| Common Shiner | 37 |
| Creek Chub | 43 |
| Blacknose Dace | 119 |
| Longnose Dace | 51 |
| White Sucker | 21 |
| Margined Madtom | 22 |
| Redbreast Sunfish | 6 |
| Green Sunfish | 6 |

| Fish Species | Number |
|---|---|
| Bluegill | 2 |
| Pumpkinseed | 5 |
| Largemouth Bass | 6 |
| Tessellated Darter | 28 |
| Brook Trout (y-o-y) | 40 (56 – 94 mm) |
| Brook Trout (older than y-o-y) | 9 (157 – 204 mm) |
| Brown Trout (y-o-y) | 31 (61 – 102 mm) |
| Brown Trout (older than y-o-y) | 13 (155 – 365 mm) |

## TROUT BROOK (HACKLEBARNEY)

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River N/Br |
| **Location**: | Hacklebarney State Park | **County:** | Morris |
| **Date:** | July 25, 2014 | **Municipality:** | Chester Twp. |

**Summary:** Trout Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this stream was surveyed to assess the wild trout population. It was last surveyed in 2002 at the exact location as in 2014. In 2002, 181 Brook Trout (81 young-of-the-year) were found. The 2014 survey found comparable amounts of Brook Trout to the 2002 survey where 118 wild Brook Trout, including 70 young-of-the-year were found. Other surveys conducted upstream of this location in 1996, 1993, and 1969 also found Brook Trout but with smaller numbers, possibly due to lesser quality habitat. It is interesting to note that just downstream of the 2014 survey location is a natural barrier (waterfall) and the main stem Black River (trout-stocked) is located a short distance downstream. A nearby tributary to the Black River, Rinehart Brook (also in Hacklebarney State Park) was also surveyed in 2014, and only Brown Trout were collected at that location. The natural barrier in Trout Brook likely prevents Brown Trout from establishing a population upstream of the waterfall, thereby benefitting the existing wild Brook Trout population, which appears to be healthy and stable. Although barriers (both natural and man-made) are generally considered to be detrimental to fish populations by fragmenting and isolating them, it is important to recognized that barriers may also protect native fish populations by preventing the establishment of non-native fishes that occur downstream.

**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. Trout Brook should be surveyed downstream of the natural barrier to determine if Brown Trout are present and if the waterfall prevent their intrusion upstream. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.2°C | 9.03 mg/L | 7.45 | 51.5 mg/L | 278.6 µS/cm | 150 m | 179 (optimal) |

| Fish Species | Number |
|---|---|
| American Eel | 4 |
| Blacknose Dace | 151 |
| Longnose Dace | 10 |
| Bluegill | 3 |

| Fish Species | Number |
|---|---|
| Largemouth Bass | 3 |
| Brook Trout (y-o-y) | 70 (53 – 89 mm) |
| Brook Trout (older than y-o-y) | 48 (126 – 237 mm) |

## TURKEY BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River S/Br |
| **Location**: | Flanders - Drakestown Road | **County:** | Morris |
| **Date:** | July 22, 2014 | **Municipality:** | Mount Olive Twp. |

**Summary:** Turkey Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. In 2014 this tributary to the South Branch of the Raritan River was surveyed to assess the wild trout population. This sample reach was originally surveyed in 1969 when 62 wild Brook Trout were found. A survey conducted in 2001 documented 75 wild Brook Trout and 6 Brown Trout. During the survey conducted in 2014, 23 wild Brook Trout, including 4 young-of-the-year, and 5 wild Brown Trout were encountered. The Brook Trout population appears to be declining perhaps due in part to competition with Brown Trout. One causative factor of Brook Trout decline may be the small rock dams built in the sample reach which has resulted in silted pools. Other anthropogenic factors have impacted this stream as well (i.e. channelization, removal of riparian vegetation up to streambank, and Maier's Pond (~ ½ mile upstream from survey location). Other surveys have been conducted in recent years downstream from this location (near the brook's confluence with the South Branch of the Raritan River) and these surveys indicate a drastic decline in the number of Brook Trout. In 2012, 91 Brown Trout and 3 Brook Trout were captured in the downstream location. Species composition changes drastically in the 1.5 mile stretch and may further indicate that the habitat due to temperature and anthropogenic factors may be less suitable for Brook Trout colonization.

**Recommendations:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the *Wild Trout Stream* regulation should be modified and/or if new regulations for wild trout are warranted. Due to the potential declining Brook Trout population stream temperature data should be analyzed (presently a stream temperature monitoring site located near the confluence with the Raritan River South Branch) along with habitat changes. Landowner may be directly impacting the section directly adjacent to this property and downstream sections look to have fine sediments accumulated from a man-made dam. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 19.3°C | 7.62 mg/L | 7.40 | 22 mg/L | 314.4 µS/cm | 150 m | 140 (suboptimal) |

| Fish Species | Number |
|---|---|
| Creek Chub | 83 |
| Blacknose Dace | 253 |
| White Sucker | 4 |
| Bluegill | 1 |
| Tessellated Darter | 7 |

| Fish Species | Number |
|---|---|
| Slimy Sculpin | 36 |
| Brook Trout (y-o-y) | 4 (50 – 66 mm) |
| Brook Trout (older than y-o-y) | 19 (122 – 230 mm) |
| Brown Trout (older than y-o-y) | 5 (135 – 205 mm) |

## WILLHOUGHBY BROOK

| | | | |
|---|---|---|---|
| **Project:** | Wild Trout Stream Reg. Assessment | **Drainage:** | Raritan River S/Br |
| **Location**: | Buffalo Hollow Road | **County:** | Hunterdon |
| **Date:** | August 6, 2014 | **Municipality:** | Lebanon Twp. |

**Summary** Willhoughby Brook has been regulated as a *Wild Trout Stream* since the adoption of this special regulation in 1990. An electrofishing survey was conducted at Willhoughby Brook located in Lebanon Township, Hunterdon County to assess the resident trout population. This stream is managed as a *Wild Trout Stream* and was surveyed in 2001, 1995 and 1969, in which 1, 0 and 18 Brook Trout were found along with 51, 46 and 1 Brown Trout were found respectively. The 2014 survey found 70 wild Brook Trout (55 mm – 177 mm, of which 69 were young-of the year) and 52 wild Brown Trout (66 mm – 217 mm, of which 44 were young-of the year). Although the 2014 survey found a good number of Brook Trout, all but one Brook Trout was born this year. The high number of Brook Trout found could possibly be attributed to a good reproductive year and is not necessarily a representative of a healthy / stable population. The Brown Trout population, almost non-existent in 1969 has been increasing through time while the Brook Trout population, which was weak at this survey site in 1969, has almost entirely disappeared. It is appears that Brown Trout are out competing Brook Trout at this site and may contribute to the loss of Brook Trout from this location. Water temperatures may also be contributing to the decline of Brook Trout as all surveys are a little higher than preferred Brook Trout temperatures, but especially in 2001 when temperatures where recorded at 20.3 C. Higher water temperatures have a more deleterious effect on Brook Trout population than Brown Trout populations.

**Recommendation:** This data (and data from surveys previously conducted on trout production streams statewide) will be used to determine if the Wild Trout Stream regulation should be modified and/or if new regulations for wild trout are warranted. Further surveys need to be conducted to determine if Brook Trout Populations will continue to hold on or if stream temperatures will rise, as global temperatures are predicted to rise, possibly exterminating Brook Trout entirely from Willhoughby Brook. Habitat improvement projects designed to aid in lowering stream temperature should be investigated, as this location would greatly benefit from lower stream temperatures. Future surveys upstream of this location should be conducted to see if Brook Trout are thriving in other areas with possible better environmental conditions. This stream should be periodically monitored in accordance with the established schedule (every five years for a *Wild Trout Stream*).

| Water Chemistry & Habitat | | | | | | |
|---|---|---|---|---|---|---|
| **Water Temperature** | **Dissolved Oxygen** | **pH** | **Alkalinity (as $CaCO_3$)** | **Specific Conductance** | **Sample Length** | **Habitat Assessment Score** |
| 17.2°C | 8.85 mg/L | 7.14 | 45 mg/L | 198.4 µS/cm | 150 m | 173 (optimal) |

| Fish Species | Number |
|---|---|
| Blacknose Dace | 119 |
| Pumpkinseed | 1 |

| Fish Species | Number |
|---|---|
| Brook Trout (y-o-y) | 69 (55 – 99 mm) |
| Brook Trout (older than y-o-y) | 1 (177 mm) |
| Brown Trout (y-o-y) | 44 (66 – 99 mm) |
| Brown Trout (older than y-o-y) | 8 (168 – 217 mm) |

# APPENDIX B

# 2014 LAKE 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 < 21ºC (69.8ºF) and dissolved oxygen > 4 mg/L (Appendix A).

# Surveys in the Upper Delaware Region
# (Upper Delaware & Wallkill)

Results of a temperature-dissolved oxygen profile conducted on Lake Aeroflex in 2014 to determine its trout supporting status. Boldfaced data indicate trout supporting water (temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L).

| | |
|---|---|
| **Waterbody** | Lake Aeroflex |
| **Region** | Northwest |
| **Drainage** | Pequest |
| **County** | Sussex |
| **Survey date** | 9/22/2014 |
| **Secchi Disk** | 13 ft |

| Depth from surface (ft) | Water temp. (°C) | Dissolved oxygen (mg/L) |
|---|---|---|
| 1 | 20.7 | 8.80 |
| 5 | 20.7 | 8.74 |
| 10 | 20.7 | 8.60 |
| 15 | 20.6 | 8.55 |
| 16 | 20.6 | 8.82 |
| 17 | 20.6 | 8.93 |
| 18 | 20.5 | 9.32 |
| 19 | 19.7 | 10.12 |
| 20 | 19.8 | 9.84 |
| 21 | 18.8 | 11.80 |
| 22 | 15.1 | 19.17 |
| 23 | 14.5 | 20.64 |
| 24 | 13.5 | 22.43 |
| 25 | 11.8 | 20.32 |
| 26 | 11.0 | 15.30 |
| 27 | 9.6 | 7.36 |
| 28 | 8.1 | 0.73 |
| 29 | 7.5 | 1.20 |
| 30 | 6.9 | 0.60 |
| 35 | 4.9 | 0.62 |
| 40 | 4.7 | 0.65 |
| 45 | 4.5 | 0.71 |
| 50 | 4.4 | 0.69 |
| 55 | 4.4 | 0.71 |
| 60 | 4.4 | 0.73 |
| 65 | 4.4 | 0.72 |
| 70 | 4.4 | 0.73 |
| 75 | 4.4 | 0.68 |
| 80 | 4.4 | 0.71 |
| 85 | 4.4 | 0.74 |
| 90 | 4.5 | 0.71 |
| 95 | 4.5 | 0.72 |
| 99 | 4.6 | 0.75 |

Results of two temperature-dissolved oxygen profiles conducted on Tilcon Lake in 2014 to determine its trout supporting status. 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** | 7/24/2014 |
| **Secchi Disk** | 15 ft |

| Depth from surface (ft) | Water temp. (°C) | Dissolved oxygen (mg/L) |
|---|---|---|
| 0 | 27.2 | 7.07 |
| 5 | 27.2 | 7.86 |
| 10 | 26.9 | 7.93 |
| 15 | 25.1 | 8.09 |
| 17 | 24.6 | 8.34 |
| 18 | 21.1 | 8.72 |
| **19** | **19.1** | **9.30** |
| **20** | **16.8** | **10.14** |
| **25** | **12.3** | **11.51** |
| **30** | **9.9** | **9.61** |
| **35** | **8.4** | **9.32** |
| **40** | **7.3** | **7.49** |
| **43** | **7.1** | **6.27** |
| 44 | 6.8 | 3.38 |
| 45 | 6.7 | 2.41 |
| 50 | 6.7 | 0.27 |

| | |
|---|---|
| **Waterbody** | Tilcon Lake |
| **Region** | Northwest |
| **Drainage** | Musconetcong River |
| **County** | Morris |
| **Survey Date** | 9/23/2014 |
| **Secchi Disk** | 20 ft |

| Depth from surface (ft) | Water temp. (°C) | Dissolved oxygen (mg/L) |
|---|---|---|
| **1** | **20.8** | **7.84** |
| **5** | **20.6** | **7.70** |
| **10** | **20.5** | **7.01** |
| **15** | **20.5** | **7.41** |
| **16** | **20.6** | **7.65** |
| **18** | **20.5** | **7.28** |
| **20** | **20.4** | **7.05** |
| **22** | **20.2** | **7.42** |
| **24** | **16.4** | **9.74** |
| **25** | **15.1** | **9.01** |
| **26** | **14.5** | **9.36** |
| **28** | **13.4** | **8.80** |
| **30** | **11.8** | **6.26** |
| **33** | **10.4** | **7.47** |
| **35** | **9.4** | **6.56** |
| **36** | **9.0** | **6.21** |
| **37** | **8.7** | **5.97** |
| **38** | **8.3** | **5.62** |
| **39** | **8.2** | **5.32** |
| **40** | **8.1** | **4.99** |
| **41** | **7.8** | **4.02** |
| 42 | 7.6 | 2.10 |
| 43 | 7.5 | 1.36 |
| 44 | 7.4 | 1.43 |
| 45 | 7.2 | 1.51 |
| 50 | 6.4 | 1.69 |

Results of two temperature-dissolved oxygen profiles conducted on Wawayanda Lake in 2014 to determine its trout supporting status. Boldfaced data indicate trout supporting water (temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L).

| **Waterbody** | Wawayanda Lake 80' Basin |
|---|---|
| **Region** | Northwest |
| **Drainage** | Pochuck Creek |
| **County** | Sussex |
| **Survey Date** | 9/22/2014 |
| **Secchi Disk** | 10.1 ft |

| **Depth from surface (ft)** | **Water temp. (°C)** | **Dissolved oxygen (mg/L)** |
|---|---|---|
| 1 | 19.3 | 8.83 |
| 5 | 19.3 | 8.22 |
| 10 | 19.2 | 8.60 |
| 12 | 19.3 | 8.75 |
| 14 | 19.2 | 8.15 |
| 16 | 19.2 | 8.68 |
| 18 | 16.7 | 5.76 |
| 20 | 15.1 | 5.55 |
| 22 | 13.5 | 5.74 |
| 24 | 10.8 | 5.28 |
| 26 | 9.5 | 4.78 |
| 28 | 8.5 | 4.66 |
| 30 | 7.9 | 4.35 |
| 32 | 7.2 | 4.43 |
| 34 | 6.4 | 5.27 |
| 36 | 6.0 | 5.48 |
| 38 | 5.6 | 5.74 |
| 40 | 5.4 | 5.66 |
| 41 | 5.3 | 5.68 |
| 42 | 5.2 | 5.60 |
| 43 | 5.1 | 5.48 |
| 44 | 5.0 | 5.62 |
| 45 | 5.0 | 5.84 |
| 46 | 4.9 | 6.22 |
| 47 | 4.9 | 6.20 |
| 48 | 4.8 | 6.10 |
| 49 | 4.8 | 6.21 |
| 50 | 4.8 | 5.98 |
| 51 | 4.7 | 5.45 |
| 52 | 4.5 | 5.43 |
| 53 | 4.6 | 5.35 |
| 54 | 4.5 | 5.31 |
| 55 | 4.5 | 5.28 |
| 56 | 4.5 | 6.65 |
| 57 | 4.4 | 5.43 |
| 58 | 4.3 | 5.10 |
| 59 | 4.3 | 4.65 |
| 60 | 4.3 | 4.58 |
| 61 | 4.3 | 4.22 |
| 62 | 4.3 | 4.09 |
| 63 | 4.3 | 3.26 |
| 64 | 4.3 | 2.84 |
| 65 | 4.3 | 2.80 |
| 70 | 4.3 | 1.32 |
| 80 | 4.5 | 0.48 |

| **Waterbody** | Wawayanda Lake 60' Basin |
|---|---|
| **Region** | Northwest |
| **Drainage** | Pochuck Creek |
| **County** | Sussex |
| **Survey Date** | 9/22/2014 |
| **Secchi Disk** | 10.1 ft |

| **Depth from surface (ft)** | **Water temp. (°C)** | **Dissolved oxygen (mg/L)** |
|---|---|---|
| 1 | 19.1 | 8.26 |
| 5 | 19.1 | 7.96 |
| 10 | 19.1 | 8.00 |
| 11 | 19.1 | 8.09 |
| 12 | 19.1 | 8.00 |
| 13 | 19.1 | 7.94 |
| 14 | 19.1 | 7.87 |
| 15 | 19.0 | 7.89 |
| 16 | 19.0 | 7.83 |
| 17 | 18.9 | 7.34 |
| 18 | 18.7 | 6.98 |
| 19 | 18.5 | 6.64 |
| 20 | 18.7 | 7.43 |
| 21 | 18.5 | 6.84 |
| 22 | 15.5 | 4.83 |
| 23 | 15.0 | 5.01 |
| 24 | 13.6 | 4.42 |
| 25 | 12.4 | 4.23 |
| 26 | 10.4 | 3.04 |
| 27 | 10.1 | 2.85 |
| 28 | 9.6 | 2.46 |
| 29 | 9.3 | 2.72 |
| 30 | 9.1 | 2.15 |
| 31 | 8.7 | 2.15 |
| 32 | 8.9 | 2.15 |
| 33 | 7.6 | 2.52 |
| 34 | 7.4 | 2.55 |
| 35 | 7.1 | 2.67 |
| 36 | 7.0 | 2.99 |
| 37 | 6.8 | 3.03 |
| 38 | 6.5 | 2.80 |
| 39 | 6.4 | 3.38 |
| 40 | 6.3 | 3.46 |
| 45 | 5.5 | 2.01 |
| 50 | 5.1 | 1.70 |
| 55 | 4.9 | 0.42 |
| 60 | 5.1 | 0.31 |

# APPENDIX C

# Field Sampling Protocols
# Lake Profiles and Wadeable Streams

## Lakes – Dissolved Oxygen / 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 Activities. 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

# Habitat Assessment Data Sheets

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**<br>**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**<br>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 |
| SCORE **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

## List of New Jersey Freshwater Fishes
**(Revised 2015)**

| 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 brevirostrum | Shortnose Sturgeon | BI | IS | N |
| Acipenser oxyrhynchus | Atlantic 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 |
| Monopterus albus | Asian Swamp Eel | G | TS | E |
| | | | | |
| **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 |
| | | | | |
| **Channidae** | | | | |
| Channa Argus | Northern Snakehead | P | TS | E |

| Scientific Name | Common Name | Trophic Guild | Tolerance | Historical Presence |
|---|---|---|---|---|
| **Esocidae:** | | | | |
| Esox americanus | Redfin Pickerel | P | MT | N |
| Esox lucius | Northern Pike | P | IS | NN |
| Esox masquinongy | Muskellunge | P | IS | NN |
| Esox niger | Chain Pickerel | P | MT | N |
| | | | | |
| **Cyprinidae:** | | | | |
| Carassius auratus | Goldfish | G | TS | E |
| Carpiodes cyprinus | Quillback | BI | TS | N |
| Cyprinus carpio | Common Carp | G | TS | E |
| 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 |
| Margariscus margarita | Pearl Dace | G | MT | US |
| 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 notatus | Bluntnose Minnow | G | TS | NN |
| Pimephales promelas | Fathead 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 |
| Pylodictis olivaris | Flathead Catfish | P | TS | NN |
| | | | | |
| **Aphredoderidae:** | | | | |
| Aphredoderus sayanus | Pirate Perch | I | MT | N |

| Scientific Name | Common Name | Trophic Guild | Tolerance | Historical Presence |
|---|---|---|---|---|
| **Cyprinodontidae:** | | | | |
| Fundulus diaphanus | Banded Killifish | I | TS | N |
| Fundulus heteroclitus | Mummichog | I | TS | N |
| | | | | |
| **Poeciliidae:** | | | | |
| Gambusia affinis | Mosquitofish | I | TS | NN |
| Gambusia holbrooki | Eastern Mosquitofish | I | TS | N |
| | | | | |
| **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 auritus | Redbreast Sunfish | I | MT | N |
| Lepomis cyanellus | Green Sunfish | I/P | TS | NN |
| Lepomis gibbosus | Pumpkinseed | I | MT | N |
| Lepomis gulosus | Warmouth | I/P | TS | NN |
| Lepomis macrochirus | Bluegill | I | 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 make a confident classification at this point in time. |

# APPENDIX F

## Trout Stocking Modifications for 2014

The NJ DEP Division of Fish and Wildlife's 2014 spring trout stocking program has been modified due to the outbreak of a fish disease (furunculosis) at the Pequest Trout Hatchery. The Division has implemented a plan to control the disease at the hatchery, but it is necessary to modify the trout stocking program this spring in order to conserve and protect our wild trout resources and other year-round trout fisheries. In order to protect priority trout resources, no trout will be stocked in Trophy Trout Lakes, Holdover Trout Lakes, and certain Trout Production streams, or waters directly connected to them. These year-round fisheries will continue to provide anglers excellent trout fishing opportunities this spring.

**The following waters will not be stocked in Spring 2014**:

**Trophy Trout Lakes:**

Merrill Creek Reservoir, Round Valley Reservoir

**Holdover Trout Lakes:**

Clinton Reservoir, Lake Aeroflex, Lake Wawayanda, Sheppard Lake, White Lake

**Trout Production Streams:**

Beaver Brook (Hunterdon), Buckhorn Creek, Capoolong Creek, Franklin Pond Creek, Furnace Brook, Hakihohake Creek, India Brook, Little Flat Brook, Lopatcong Creek, Mulhockaway Creek, Peapack Brook, Pequannock River, Rockaway Creek S/Br, S/Br Raritan River – upstream Lake Solitude Dam, Spruce Run Creek, Trout Brook (Middleville), Wanaque River – Lower, Whippany River

**Directly connected to Trout Production Streams:**

Blue Mtn. Lake, Beaver Brook (Morris), Drakes Brook, Green Turtle Pond, Furnace Lake, Hibernia Brook, Manny's Pond, Mountain Farm Pond, Passaic River – White Bridge Rd to Rt 24 Bridge, Chatham Borough, Pond Brook, Pophandusing Creek, Russia Brook, Saddle River (Upper/Lower), Silver Lake (Sussex), Speedwell Lake, Stony Lake, Trout Brook (Connected to Hackettstown Hatchery)

**Waters that will be stocked in Spring 2014**

Certain trout waters still scheduled to be stocked will be allocated the hatchery's supply of negative trout (never documented to have the bacterium). As there is a limited number of negative trout the traditional seven-week in-season stocking season has been shortened to four in-season weeks.

**The following waters will be stocked in Spring 2014 with trout that have always tested negative for Aeromonas salmonicida:**

Big Flat Brook, Black River, Musconetcong River, Paulins Kill, Pequest River (above hatchery), Pequest River Lwr & TCA, Pohatcong Creek, Ramapo River, Raritan River N/br, Raritan River S/Br – Downstream, Rockaway River, Wallkill River – Lower, Wallkill River – Upper, Wanaque River – Upper, Andover Jct. Brook, Beaver Brook (Warren), Brookaloo Swamp, Honey Run, Lake Hopatcong, Lake Musconetcong, Lubbers Run, Mountain Lake, Blair Creek, Clove Brook, Culvers Lake Brook, Glenwood Brook, Jacksonburg Creek, Neldon Brook, Papakating Creek, Ringwood Brook, Sydney Brook, Wawayanda Creek, Alms House Pond, Blair Lake, Dry Brook, Columbia Lake, Hohokus Brook, Lamington River, Little Swartswood Lake, Mt. Hope Pond, Neshanic River, Papakating Creek W/B, Pompton River, Potash Lake, Rockaway Creek, Saw Mill Pond, Swartswood Lake, Whites Pond, & Lake Ocquittunk

The hatchery also has fish categorized as negative but exposed fish. These fish are a population of fish which have been tested and the bacterium has never been detected but, these fish have been held in downstream water of a raceway that has undergone an outbreak of furunculosis. It is believed that these fish could be potential low level carriers of the bacterium. These fish will not be stocked into trout production waters. They may be stocked into trout maintenance or non-trout waters and these waters will receive an additional allocation of trout prior to opening day and an additional stocking the week following opening day. **The following waters will be stocked in Spring 2014 with trout that are categorized as negative, but exposed to Aeromonas salmonicida**:

Manasquan River, Metedeconk N/br, Metedeconk S/br, Tom's River, Alexauken Creek, Hockhockson Brook, Lockatong Creek, Mingamahone Brook, Shark River, Wichecheoke Creek, Echo Lake, Hamilton Fire Pond, Lake Shenandoah, Nishisakawick Creek, Grenloch Lake, Rowands Pond, Westville Pond, Giampietro Park Pond, Iona Lake, Hammonton Lake, Maurice River, Oak Pond, Rancocas Creek SW/Br, Pemberton Lake, Shaws Mill Pond, South Vineland Park Pond, Shadler's Sand Wash

The hatchery also has fish categorized as treated fish. These treated fish are a population of fish in which the pathogen has been previously detected, treated with antibiotics, gone through a mitigation period, and subsequently test negative for the bacterium. These fish will be considered as carriers of the bacterium and will only be stocked in waters that do not support trout (non-trout waters such as warmwater lakes and rivers primarily found in the eastern, central, and southern areas of the state). These waters have been allocated more trout than usual this spring as trout treated for furunculosis cannot be utilized in waters with

existing trout populations. **The following waters will be stocked in Spring 2014 with trout that are categorized as Treated**:

Amwell Lake, Barbour's Pond, Birch Grove Park Pond, Branch Brook Park Lake, Burnham Park Pond, Colonial Lake, Crystal Lake, Dahnert's Lake, Diamond Mill Pond, Englishtown Mill Pond, Franklin Lake, Garvey's Pond, Gloucester City Pond, Greenwich Lake, Haddon Lake, Harrisonville Lake, Heritage Park Pond, Holmdel Park Pond, Indian Lake, Lake Papaianni, Laurel Pond, Lower Echo Park Pond, Mac's Pond, Manalapan Lake, Mary Elmer Lake, Middle Brook, Mill Pond, Milton Lake, Mohawk Pond, Nomahegan Park Pond, Oldham Pond, Pohatcong Lake, Ponderlodge Pond, Prospertown Lake, Roosevelt Park Pond, Rosedale Lake, Seeley's Pond, Spooky Brook Park Pond, Spring Lake, Swedesboro Lake, Sylvan Lake, Topenemus Lake, Tuckahoe Lake, Verona Park Lake, Warinanco Park Pond, West Hudson Co Park Pond, Woodcliff Lake, Assunpink Creek, Cohansey River, D&R Canal, D&R Feeder Canal, Green Brook, Hackensack River, Ireland Brook, Lawrence Brook, Pascack Creek, Rahway River, Rahway River W/br, Raritan River, Rock Brook, Stony Brook, Tienekill Creek, Yellow Brook

In addition, several other waters not typically stocked with trout will be stocked with trout this spring which provide additional trout fishing opportunities. **The following waters, which are not typically stocked or scheduled to be stocked with trout, will be stocked Spring of 2014 only:**

DOD Lake (Salem)
Hackensack River (below Oradel Reservoir Dam)
Hockhockson Brook (below Tinton Falls)
Passaic River – (below Great Falls to Dundee Dam)
Raritan River (below Duke Island Park)
Rahway River (St George to Lawrence)
Farrington Lake (Middlesex) *
Shadow Lake (Monmouth) *

* Farrington Lake & Shadow Lake were dropped from the trout stocking program beginning in 2014, however, due to the furunculosis situation at the hatchery, both lakes were re-instated for this year only.

# Stream Temperature Monitoring Report (2014)

## Investigations and Management of New Jersey's Freshwater Fisheries Resources (APPENDIX G)

By
Scott Collenburg, Assistant Fisheries Biologist

New Jersey Department of Environmental Protection
Division of Fish and Wildlife
Bureau of Freshwater Fisheries

Sportfish Restoration Grant F-48-R

*This grant was paid for by fishing license sales and matching Dingell-Johnson/Wallop-Breaux funds available through the Federal Sportfish Restoration Act.*

## Introduction

Studies have shown that stream temperature is the main determinant of fish species distribution and slight fluctuations in water temperature can severely influence fish species absence\occurrence. Temperature is especially important to cold-water species of fish such as trout, as elevated stream temperatures can be lethal, and chronic exposure to sublethal temperatures can affect their growth, reproduction, and tolerance to pollutants or disease. Continuous temperature monitoring provides Bureau of Freshwater Fisheries staff with reliable data that can be used to guide management decisions related to fish stocking, fish and habitat restoration, and fishing regulations

In 2013 the Bureau established an ambient stream temperature monitoring network on streams having trout fisheries that are recreationally important or of conservation interest. The temperature data is used to assess current temperature conditions, evaluate long term trends, determine if ambient water quality is consistent with NJDEP's Surface Water Quality Standards, and aid in the management of coldwater (trout) fisheries in these streams. Integral to the establishment of this monitoring network was the development of a quality assurance plan that complied with NJDEP's regulations concerning the certification of laboratories and environmental measurements under N.J.A.C. 7:18-1 et seq. A Quality Assurance Project Plan (QAPP) for Ambient Stream Water and Air Temperature Monitoring was prepared and subsequently approved by NJDEP's Office of Quality Assurance in July 2013. This certification is renewed annually.

In 2014 water temperature was monitored at 26 sites(Figure 1 and Table 1), including 2 new sites on the South Branch of the Raritan River (Claremont section and below Lake Solitude) to learn more about this stream's temperature gradient. Twenty-one of the sites were located on 17 recreationally important, major trout-stocked streams. Of these, 8 were located on stream sections classified as FW2-Trout Production (TP), 16 were on stream sections classified as FW2-Trout Maintenance (TM), and 2 were on stream sections classified FW2-NT (NT). The remaining five sites were located on small streams having populations of wild Brook Trout, as part of the Eastern Brook Trout Joint Venture initiative to assess climate change (using paired water/air thermographs). A total of 31 thermographs (Onset Hobo Pro v2) were deployed to record temperature at 30 minute intervals year round. The thermographs were calibrated and regularly checked to maintain the validity of the stream temperature data. The results of the 2014 water temperature data are presented below.

**Figure 1.** Locations of continuous stream temperature logger sites maintained by NJDFW in 2014.

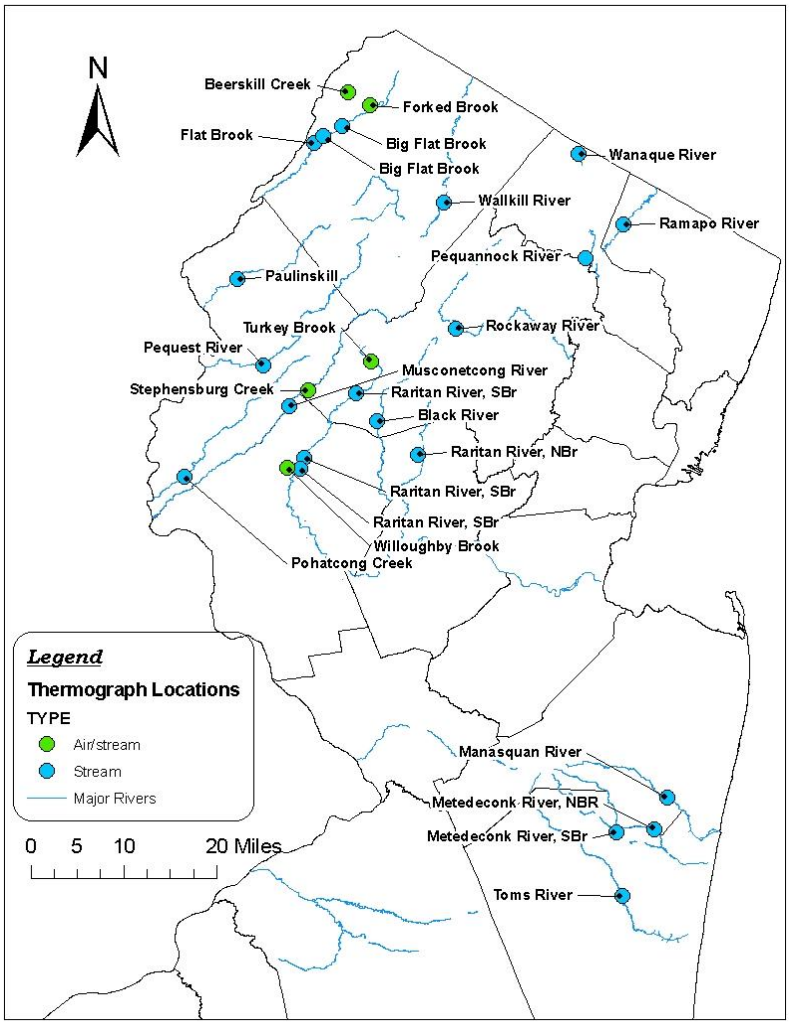


**Table 1:** 2014 NJDFW stream temperature monitoring network..

| Stream | Site ID | Surface Water Classification | Monitoring Type |
|---|---|---|---|
| Black River | BLACK1 | Trout Maintenance | water |
| Big Flat Brook | FLATBROOK206 | Trout Production | water |
| Big Flat Brook | FLATBROOKBLW | Trout Production | water |
| Flat Brook | FLATBROOKROY | Trout Maintenance | water |
| Manasquan River* | MANASQUAN1 | Trout Maintenance | water |
| Metedeconk River, N/Br | METNBR1 | Trout Maintenance | water |
| Metedeconk River, S/Br. | METSBR1 | Non-Trout | water |
| Musconetcong River | MUSKY1 | Trout Maintenance | water |
| Paulinskill | PAUL1 | Trout Maintenance | water |
| Pequannock River | PEQUAN1 | Trout Maintenance | water |
| Pequest River | PEQUEST1 | Trout Maintenance | water |
| Pohatcong Creek | POHAT1 | Trout Maintenance | water |
| Ramapo River | RAM1 | Non-Trout | water |
| Raritan River, N/Br. | RARNBR1 | Trout Maintenance | water |
| Raritan River, S/Br. | RARSBRKLG | Trout Maintenance | water |
| Raritan River, S/Br. | RARSBRCLMT | Trout Production | water |
| Raritan River, S/Br. | RARSBRSLTD | Trout Maintenance | water |
| Rockaway River | ROCK1 | Trout Maintenance | water |
| Toms River | TOMS1 | Trout Maintenance | water |
| Wallkill River | WALL1 | Trout Maintenance | water |
| Wanaque River | WAN1 | Trout Maintenance | water |
| Beerskill | BEERS1 | Trout Production | water & air |
| Forked Brook | FORKED1 | Trout Production | water & air |
| Stephensburg Brook | STEPHEN1 | Trout Production | water & air |
| Turkey Brook | TURK1 | Trout Production | water & air |
| Willoughby Brook | WILLO1 | Trout Production | water & air |

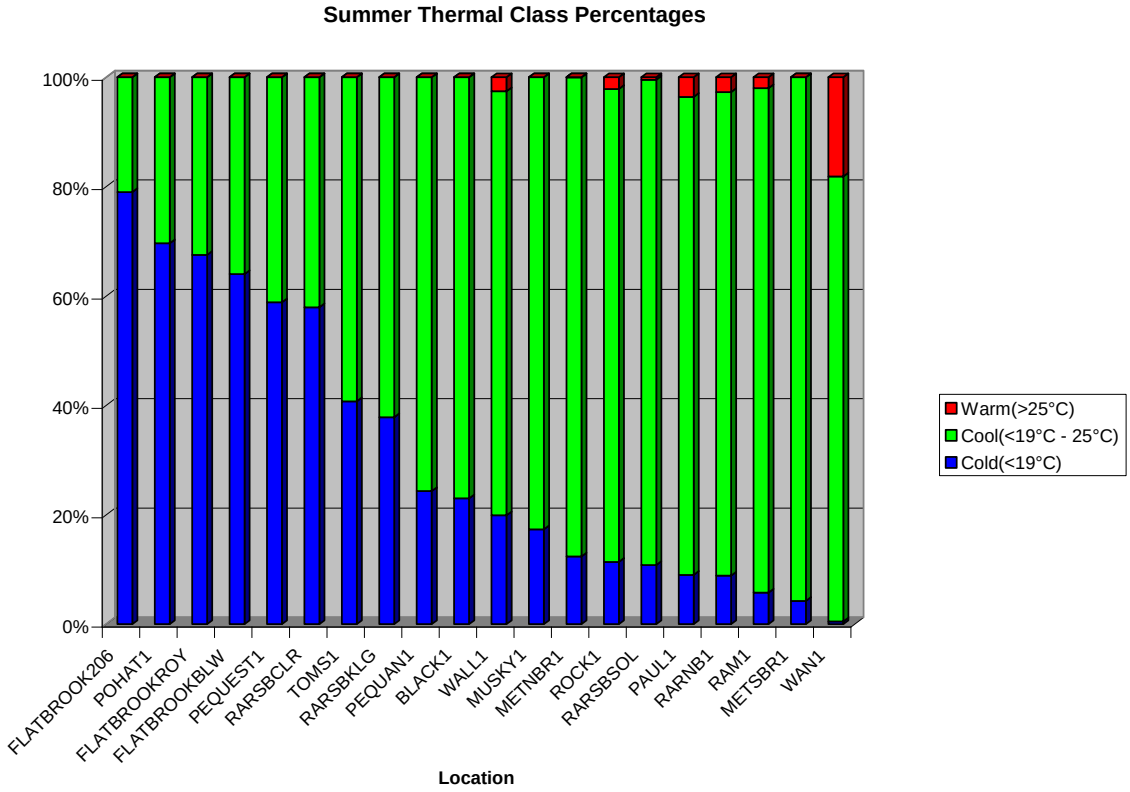
* Thermograph deployed in the following stream experienced problems in 2014: Manasquan River – Data screening revealed errors due to exposure to air. Thermograph was relocated to a more suitable location.

## Thermal Classification

Identifying the thermal classification of a stream is a useful tool in giving a basic understanding of the thermal regime of a stream. Figure 2 show the proportion of all summer (June 1 to August 31) stream temperature records above 25°C (warm-water), between 19-25°C (cool-water), and below 19°C (cold-water).

Sites on the Flat Brook/Big Flat Brook along with the Pohatcong had the highest percentages (64 – 79%) of cold temperatures (<19°C) throughout summer while the sites on the Wanaque River, South Branch Metedeconk, Ramapo River, and the North Branch of the Raritan River had the lowest percentage of cold temperatures (0.5 – 8.9%). Sites that had the highest percentage of warm temperatures (>25°C) throughout summer were located on the Wanaque River, Paulins Kill, and North Branch of the Raritan River (2.7 – 18.2%).

**Figure 2:** Proportion of 2014 summer stream temperatures that fit into each thermal regime: warm, cool, and cold.



## Trout Production Streams

New Jersey's Surface Water Quality, Standards New Jersey Administrative Code (N.J.A.C.) 7:9B states that for waters classified as FW-TP "temperatures shall not exceed a daily maximum of 22 degrees Celsius or rolling seven-day average of the daily maximum of 19 degrees Celsius, unless due to natural conditions." In Figure 3, the seven-day rolling average of the daily maximum temperature for three sites classified as FW-TP (sites with paired thermographs excluded) was compared against the FW-TP criteria for each week of summer. The results indicate that weekly average maximum temperatures at the TP sites exceeded the FW-TP standard for a seven-day rolling average of stream temperature 89% of the time (32 of the 36 readings exceeded the TP standard (Table 2)).

**Figure 3:** Weekly average of the daily average maximum temperature for each FW2-TP site during summer weeks encompassing June 1 to August 31, 204. The red horizontal line indicates the "FW-TP" criteria that Trout Production streams should not exceed when observing their seven-day rolling average of daily average max temperature.

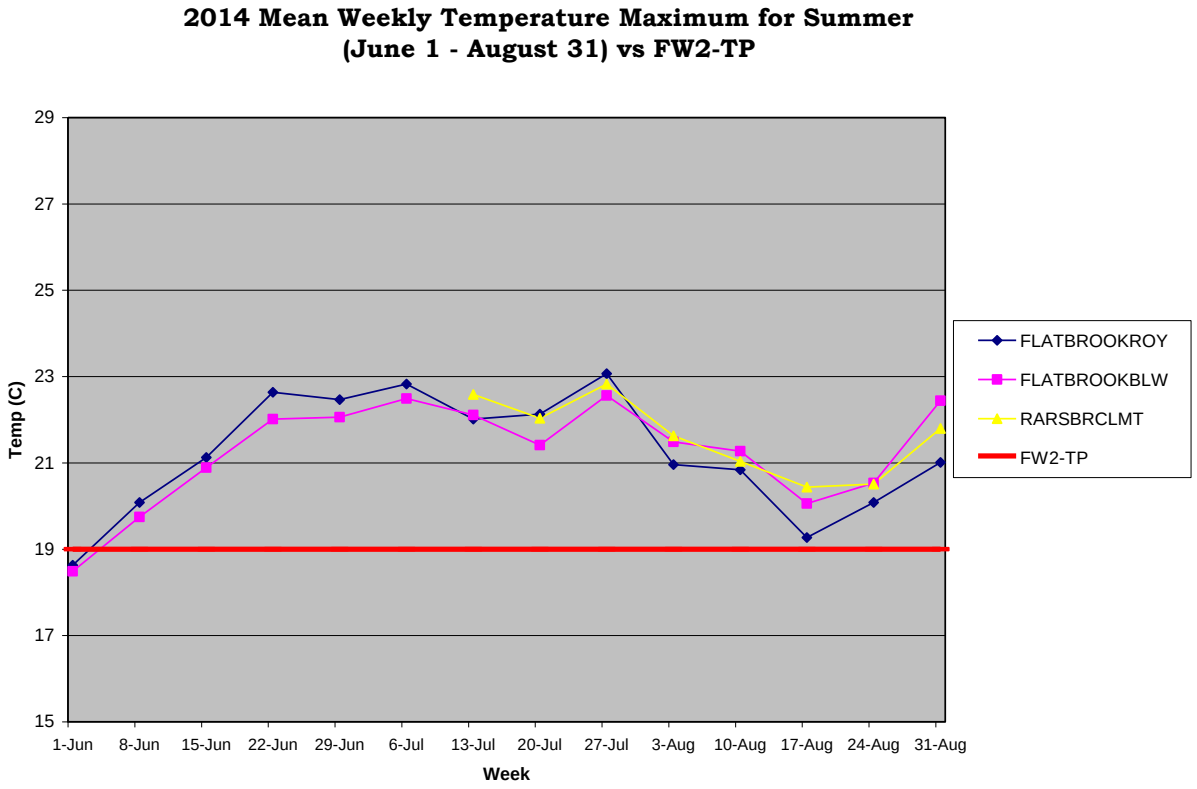



**Table 2:** Weekly average of the daily average maximum temperature for each FW2-TP site during summer weeks encompassing June 1 to August 31. Temperatures in red exceed the Surface Water Quality Standard criteria (FW2-TP) for a seven-day rolling average of stream temperature.

| Week ---> | 1-Jun | 8-Jun | 15-Jun | 22-Jun | 29-Jun | 6-Jul | 13-Jul | 20-Jul | 27-Jul | 3-Aug | 10-Aug | 17-Aug | 24-Aug |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site Name | Maximum Weekly Mean Temperature (C°) | | | | | | | | | | | | |
| FLATBROOK206 | 17.058 | 18.818 | 20.007 | 21.318 | 20.96 | 22.226 | 21.843 | 21.103 | 21.963 | 20.055 | 20.317 | 18.771 | 19.484 |
| FLATBROOKBLW | 18.485 | 19.746 | 20.889 | 22.011 | 22.058 | 22.489 | 22.106 | 21.413 | 22.561 | 21.485 | 21.27 | 20.055 | 20.531 |
| RARSBRCLMT | | | | | | | 22.585 | 22.034 | 22.824 | 21.628 | 21.032 | 20.436 | 20.507 |
| FW2-TP | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |

## T**rout Maintenance Streams**

New Jersey's Surface Water Quality, Standards New Jersey Administrative Code (N.J.A.C.) 7:9B states that for waters classified as FW-TM "temperatures shall not exceed a daily maximum of 25 degrees Celsius or rolling seven-day average of the daily maximum of 23 degrees Celsius, unless due to natural conditions." In Figure 4, the seven-day rolling average of the daily maximum temperature for each site classified as FW-TM was compared against the FW-TM standard each week of summer. The results indicate that weekly average maximum temperatures at the TM sites exceeded the FW-TM standard for a seven-day rolling average of stream temperature 48% of the time (91 of the 190 readings exceeded the TM standard (Table 3)).

**Figure 4:** Seven-day rolling average of the daily average maximum temperature for each FW2-TM site during summer weeks encompassing June 1 to August 31, 2014. The red horizontal line indicates the "FW-TM" criteria that Trout Maintenance streams should not exceed when observing their seven-day rolling average of daily average max
temperature.

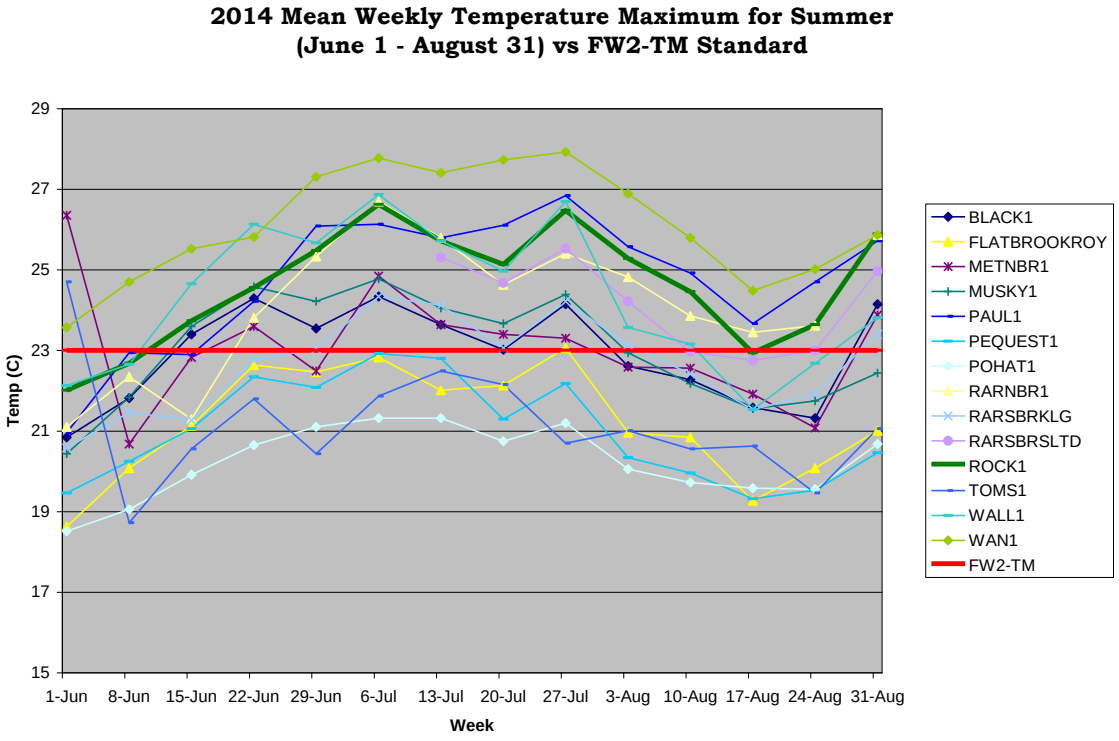


**Table 3:** Weekly average of the daily average maximum temperature for each FW2-TM site during summer weeks encompassing June 1 to August 31, 2014. Temperatures in red exceed the Surface Water Quality Standard criteria (FW2-TM) for the seven-day rolling average of stream temperature (not to exceed 23°C).

| Week ---> | 1-Jun | 8-Jun | 15-Jun | 22-Jun | 29-Jun | 6-Jul | 13-Jul | 20-Jul | 27-Jul | 3-Aug | 10-Aug | 17-Aug | 24-Aug |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site Name | Maximum Weekly Mean Temperature (C°) | | | | | | | | | | | | |
| BLACK1 | 20.841 | 21.819 | 23.4 | 24.291 | 23.545 | 24.339 | 23.641 | 23.016 | 24.146 | 22.609 | 22.274 | 21.581 | 21.318 |
| FLATBROOKROY | 18.628 | 20.079 | 21.127 | 22.633 | 22.465 | 22.824 | 22.011 | 22.13 | 23.064 | 20.96 | 20.841 | 19.27 | 20.079 |
| METNBR1 | 26.353 | 20.674 | 22.824 | 23.593 | 22.489 | 24.847 | 23.641 | 23.4 | 23.304 | 22.585 | 22.561 | 21.915 | 21.079 |
| MUSKY1 | 20.436 | 21.843 | 23.593 | 24.581 | 24.219 | 24.774 | 24.05 | 23.665 | 24.388 | 22.944 | 22.178 | 21.557 | 21.748 |
| PAUL1 | 20.96 | 22.944 | 22.896 | 24.219 | 26.085 | 26.134 | 25.793 | 26.109 | 26.842 | 25.574 | 24.919 | 23.665 | 24.702 |
| PEQUEST1 | 19.46 | 20.246 | 21.056 | 22.345 | 22.082 | 22.92 | 22.8 | 21.294 | 22.178 | 20.341 | 19.96 | 19.318 | 19.532 |
| POHAT1 | 18.509 | 19.056 | 19.912 | 20.65 | 21.103 | 21.318 | 21.318 | 20.746 | 21.199 | 20.055 | 19.722 | 19.579 | 19.555 |
| RARNBR1 | 21.103 | 22.345 | 21.294 | 23.809 | 25.331 | 26.695 | 25.793 | 24.629 | 25.404 | 24.823 | 23.857 | 23.448 | 23.617 |
| RARSBRKLG | 20.579 | 21.461 | 21.27 | 22.753 | 23.04 | 24.339 | 24.122 | 23.064 | 24.219 | 23.136 | 22.417 | 21.533 | 21.915 |
| RARSBRSLTD | - | - | - | - | - | | 25.307 | 24.677 | 25.525 | 24.219 | 22.968 | 22.753 | 22.992 |
| ROCK1 | 22.011 | 22.681 | 23.737 | 24.557 | 25.477 | 26.622 | 25.72 | 25.137 | 26.475 | 25.283 | 24.46 | 22.944 | 23.641 |
| TOMS1 | 24.702 | 18.723 | 20.555 | 21.795 | 20.436 | 21.867 | 22.489 | 22.154 | 20.698 | 21.008 | 20.555 | 20.627 | 19.46 |
| WALL1 | 22.13 | 22.657 | 24.653 | 26.134 | 25.671 | 26.867 | 25.72 | 24.968 | 26.695 | 23.569 | 23.16 | 21.533 | 22.681 |
| WAN1 | 23.569 | 24.702 | 25.525 | 25.817 | 27.308 | 27.776 | 27.407 | 27.727 | 27.924 | 26.891 | 25.793 | 24.484 | 25.016 |
| FW2-TM | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |

## NonTrout Streams

New Jersey's Surface Water Quality, Standards New Jersey Administrative Code (N.J.A.C.) 7:9B states that for waters classified as FW-NT "temperatures shall not exceed a daily maximum of 31 degrees Celsius or rolling seven-day average of the daily maximum of 28 degrees Celsius, unless due to natural conditions." In Figure 5, the seven-day rolling average of the daily maximum temperature for each site classified as FW-NT was compared against the FW-NT standard each week of summer. The results showed that temperatures at the NT sites did not exceed FW-NT standards (Table 4).

**Figure 5:** Weekly average of the daily average maximum temperature for each FW2-NT site during summer weeks encompassing June 1 to August 31, 2014. The red horizontal line indicates the "FW-NT" criteria that Non-Trout streams should not exceed when observing their seven-day rolling average of daily average max temperature.

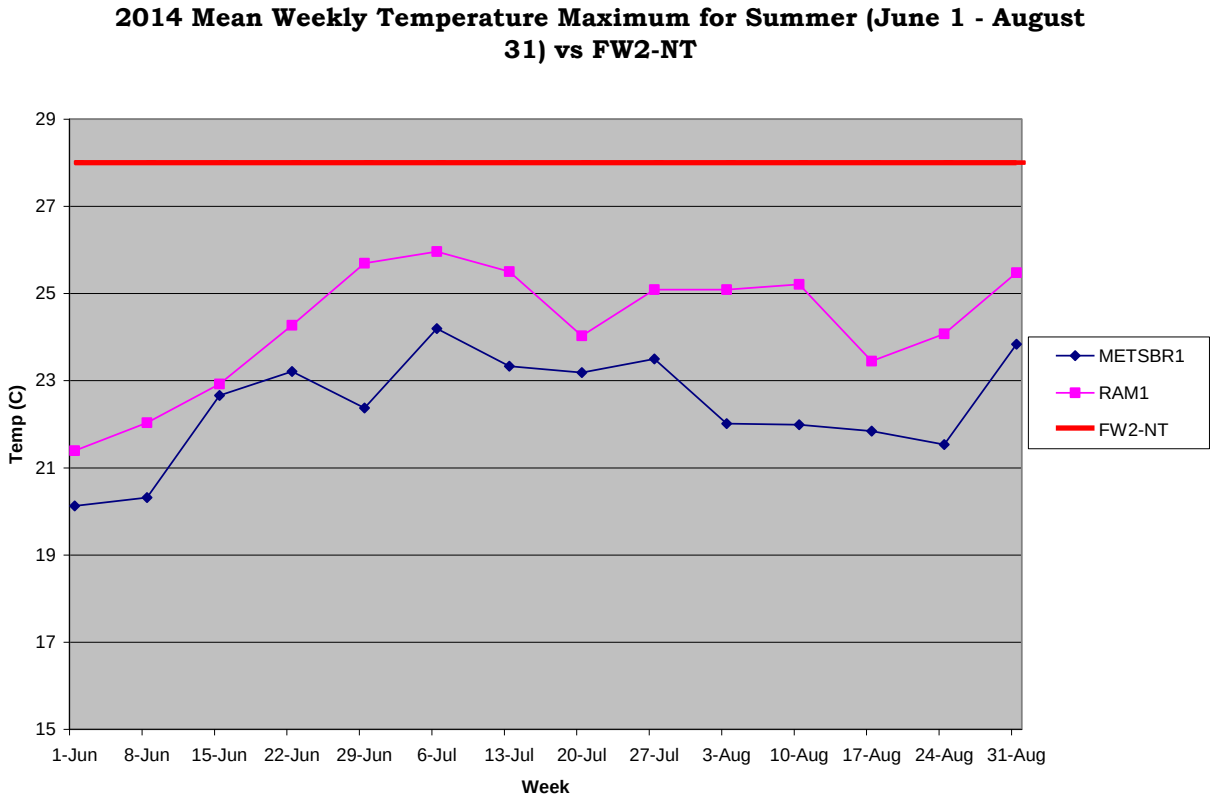



**Table 4:** Weekly average of the daily average maximum temperature for each FW2-NT site during summer weeks encompassing June 1 to August 31. Temperatures in red exceed the Surface Water Quality Standard criteria (FW2-NT) for a seven-day rolling average of stream temperature.

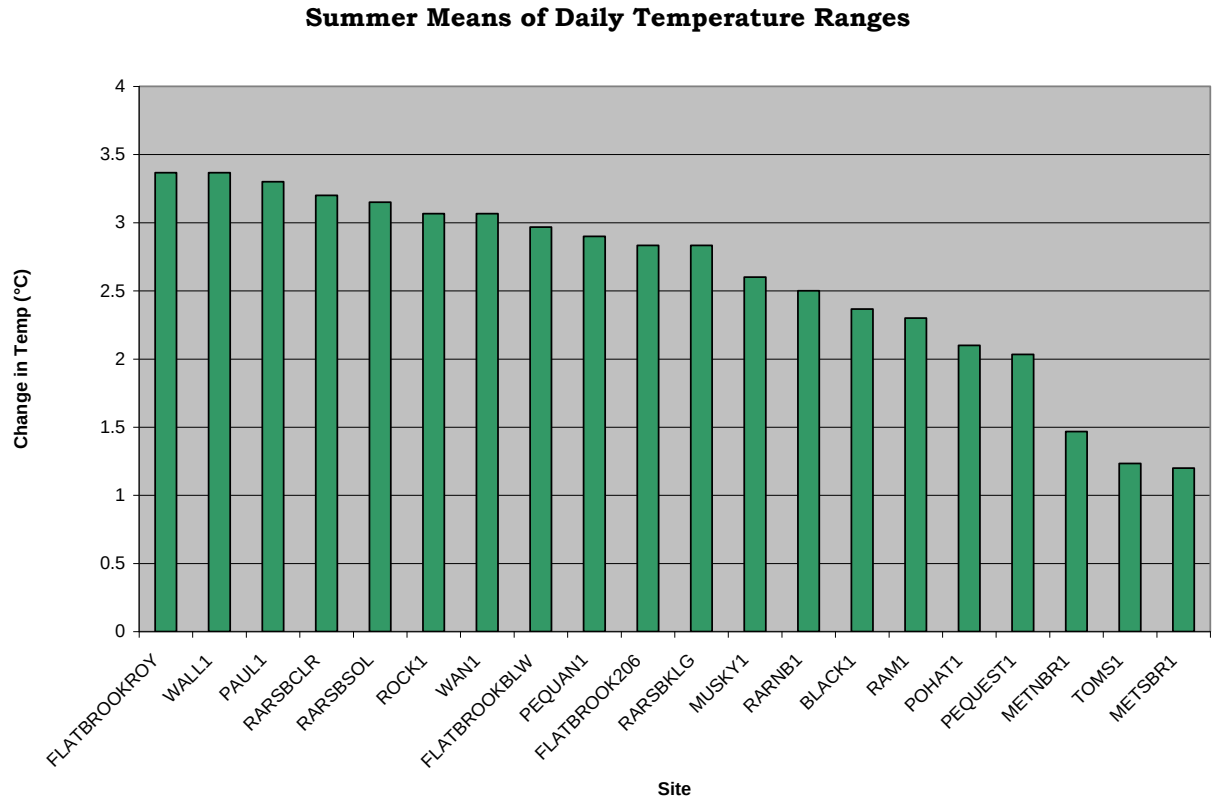
| Week ---> | 1-Jun | 8-Jun | 15-Jun | 22-Jun | 29-Jun | 6-Jul | 13-Jul | 20-Jul | 27-Jul | 3-Aug | 10-Aug | 17-Aug | 24-Aug |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site Name | Maximum Weekly Mean Temperature (C°) | | | | | | | | | | | | |
| METSBR1 | 20.126 | 20.317 | 22.657 | 23.208 | 22.369 | 24.195 | 23.328 | 23.184 | 23.497 | 22.011 | 21.987 | 21.843 | 21.533 |
| RAM1 | 21.39 | 22.034 | 22.92 | 24.267 | 25.695 | 25.963 | 25.501 | 24.026 | 25.089 | 25.089 | 25.21 | 23.448 | 24.074 |
| FW2-NT | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |

## Daily and Seasonal Temperature Variability

Amplitude between daily and seasonal extreme values are useful in assessing the shape of daily and seasonal temperature change. Temperature variations at a given point in a stream may be related to two major sets of factors; (1) conditions at the sample location (velocity and discharge, season and hour, and the daily range of fluctuations of air temperatures) and (2) conditions upstream from the sample location (upstream environment, substrates, atmospheric conditions, temperatures, distance and time of flow from critical upstream situations).

Results of variability were calculated by determining the monthly mean of daily temperature maxima and minima. To determine summer daily temperature ranges, the monthly minima is subtracted from the monthly maxima for June, July, and August, and then the average is taken (Figure 6).

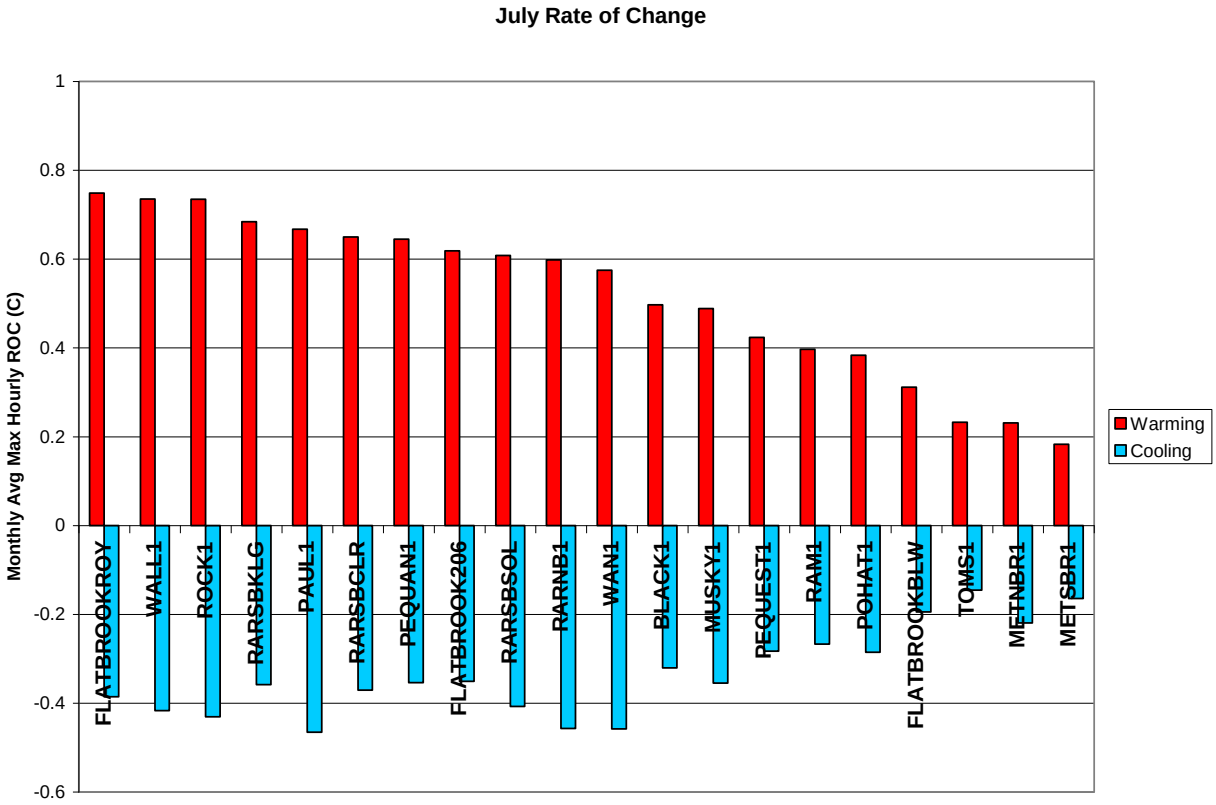
**Figure 6:** Average summer variability for each site in 2014.



## Rate of Temperature Change

Large and sudden changes in temperature can lead to thermal shock in aquatic biota. Sub-lethal effects have been noted for smaller rates of change such as physiological stress leading to metabolic dysfunction, growth inhibition, and disease initiation. For the 20 sites monitored in 2014, July rates of change were calculated (Figure 7) by determining the maximum warming and cooling hourly rates of change for each day. These daily extreme hourly rates of change are then averaged for each month.

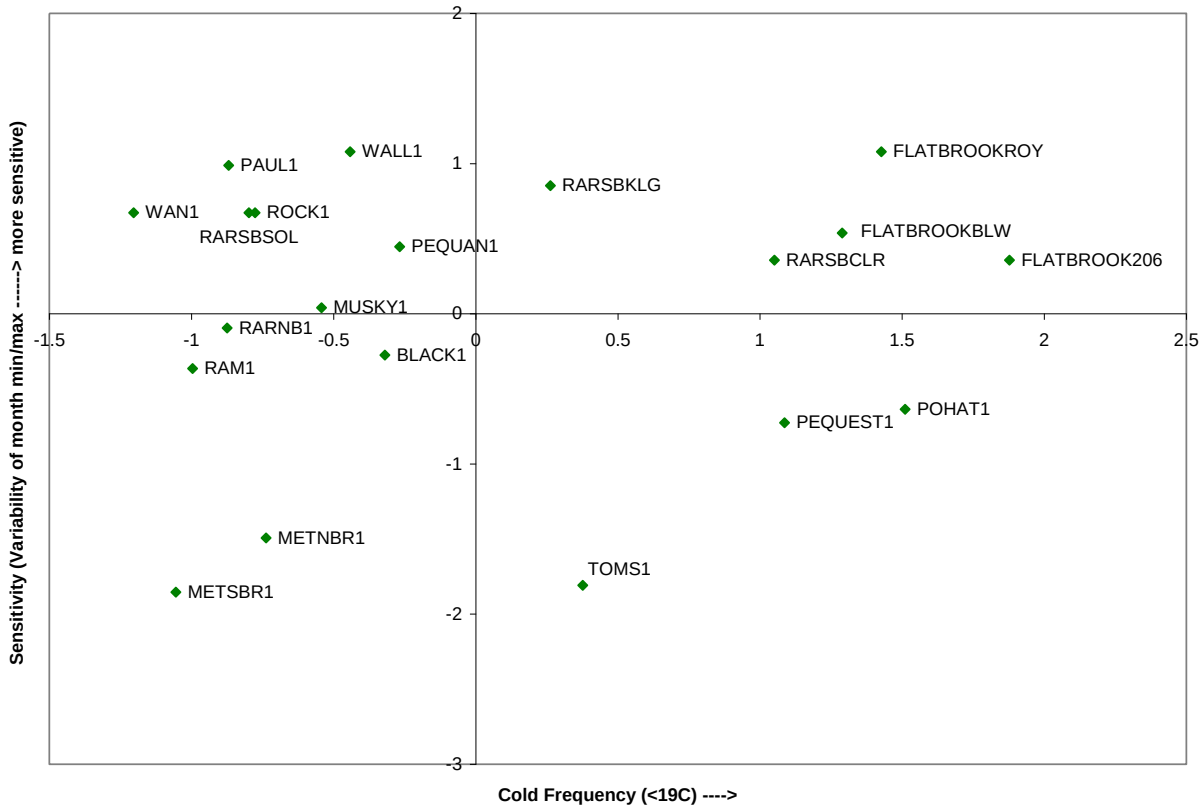
**Figure 7:** The warming and cooling rate of change for the month of July 2014 for each site.



## Study Site Rankings

Based on proportion of time that the study sites were cold (<19°C) and the variability parameter, the sites were plotted to help classify which sites are most sensitive to stream temperature fluctuations and which sites are colder in general (Figure 8). Both parameters were standardized to enable an easier comparison ((x-mean)/SD). Ranking our sites based on sensitivity and cold frequency enables us to determine the best sites for trout habitat in general. With this information, we can alter trout stocking schedules and locations, prioritize habitat restoration projects, or compliment a variety of other projects that helps the Bureau of Freshwater Fisheries create better opportunities for our anglers.

**Figure 8:** Ranking system based on sensitivity and proportion of time streams are cold (<19°C). Sites that are coldest and least sensitive will tend gravitate to the bottom right of the graph and sites that are warmer and most sensitive will gravitate to the top left.



## Summary

The stream temperature data collected in 2014 indicates that many of the streams stocked with trout experienced summer water temperatures that were stressful for trout, despite a below average statewide air temperature (0.44°C below the 1981-2010 average) and above average precipitation (0.26 inches above the 1981-2010 average) (McCarty 2014). Many of the stream sections monitored and classified as Trout Production or Trout Maintenance exceeded their respective rolling seven-day average of the daily maximum temperature criteria (Figures 3 and 4). Pohatcong Creek (POHAT1) and the Pequest River (PEQUEST1) were the only sites where stream temperatures did not exceed the criteria. At some of the trout maintenance sites stream temperature criteria was exceeded over long periods of time causing chronic exposure of stocked trout to warm water (unless the trout are able to find areas of thermal refuge). The nontrout streams that are stocked with trout (South Branch of the Metedeconk River and Ramapo River) appeared to have temperature regimes comparable to many of the TM stream sites monitored (that exceeded the temperature criteria) .

One interesting site seems to be the Big Flat Brook /Flat Brook where summer stream temperatures were coldest compared to all other sites besides the Pohatcong. Despite favorable summer water temperatures, Bureau of Freshwater Fisheries (BFF) data from electrofishing surveys conducted annually from 2012-2014 indicates few wild trout are present. The Bureau found considerably more wild trout in the South Branch of the Raritan River (Ken Lockwood Gorge and Claremont section) despite having comparable, or higher, temperature regimes. The temperature metrics that measure sensitivity (variability and rate of change) failed to shed light on this situation.

## Recommendations

1. Continue to monitor temperature in 2015 at the 26 established sites, including the paired air and stream temperature loggers on the five streams having wild Brook Trout (data to be provided and analyzed by the Eastern Brook Trout Joint Venture).

2. Additional sites will be added on the Black River and potentially on the Flat Brook/Big Flat Brook to further investigate temperature gradients/influences and find causative factors that limit trout reproduction at these places.

3. Investigate why production of wild trout is low in the Flat Brook/ Big Flat Brook despite cold temperatures and good habitat.

## Acknowledgements

Funding for this ongoing study is provided through the Federal Aid in Sport Fish Restoration Program (Grant F-48-R) administered through the New Jersey Division of Fish and Wildlife and through the sale of New Jersey freshwater fishing licenses and trout stamps.

## References

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# New Jersey Coolwater Assessment Program Report (2014)

## Investigations and Management of New Jersey's Freshwater Fisheries Resources (APPENDIX H)

By
Scott Collenburg, Assistant Fisheries Biologist

New Jersey Department of Environmental Protection
Division of Fish and Wildlife
Bureau of Freshwater Fisheries

Sportfish Restoration Grant F-48-R

*This grant was paid for by fishing license sales and matching Dingell-Johnson/Wallop-Breaux funds available through the Federal Sportfish Restoration Act.*

**NEW JERSEY COOLWATER ASSESSMENT PROGRAM - 2014**

A Coolwater Assessment Program began in 2013 to develop methods to sample coolwater fish species (Walleye, Muskellunge, and Northern Pike) to help better manage lakes that are currently managed as warm/cool water fisheries. In 2013, Mountain Lake, Furnace Lake, and Carnegie Lake were sampled for Muskellunge. A total of five Musky were captured during 2013 sampling, three at Mountain Lake (rate of 0.5 fish/net), 1 at Furnace Lake (rate of 0.125 fish/net), and 1 at Carnegie Lake (rate of 0.09 fish/net). Just as important as the fish that were captured and data that was collected in 2013, was the development and beginning of our Coolwater Assessment Program which will continue to be refined (if necessary) to provide information that will aid in the management of these fisheries. In 2014, the second year of the Coolwater Assessment, Farrington Lake, Pompton Lake, Lake Hopatcong, and Monksville Reservoir were selected as waterbodies to conduct spring trap netting surveys.

# FARRINGTON LAKE

**Location:** Middlesex County, New Brunswick, NJ
**Drainage:** Impounded section of Lawrence Brook
**Target Species:** Northern Pike

**Acres:** 290
**Avg Depth:** 6 ft
**Max Depth:** 12 ft

## Methods

A total of sixteen South Dakota trap nets were set on Farrington Lake between March 25th and April 2nd. Between two and three trap nets were set daily in water depths ranging from 3.5 to 8 ft deep and allowed to fish for 24 hours. Sample sites were selected using a UTM grid system which partitioned the waterbody into 47 possible sample areas. Sample areas were then randomly selected using a random number generator and only if suitable habitat was present. For example, if a sample area does not have the gradual sloping banks that are necessary to set an effective trap net, that sample area would not be selected. Once set, the nets were tended the following day and relocated to different random sites to ensure all suitable habitats were sampled. Captured Northern Pike were measured for total length and weight, and scales were collected for growth analysis and age. Other fish species were measured for total length and weight, and/or counted for presence.

## Biological Data

A total of 4,105 fish were captured in trap nets. Bluegill, Black Crappie, Yellow Perch, Golden Shiner, and Brown Bullhead were the five most abundant species sampled in the trap nets respectively (Table 1). A total of seventeen species of fish were collected during the 2014 trap net survey at Farrington Lake. Catch of Northern Pike was low to moderate. A total of seven Northern Pike were captured and they ranged in size from 397 – 945 mm long and 0.4 – 5.32 kg. Of the Northern Pike captured, the majority were larger individuals, with only one smaller than 27 inches. The overall mean $W_r$ for Northern Pike collected was 101 ± 7.43 and ranged from 84 – 108 which indicates fish are in very good condition (Table 4). Furthermore, a number of anglers commented on a section of the lake located north of Church Lane nicknamed "Pike Cove" as a hot spot for Northern Pike activity. On the days that the trap net survey was being conducted, anglers would stop and make comments to Freshwater Fishery crews and, in general,

they were happy with the Northern Pike fishery at Farrington Lake, but a majority of the anglers were targeting Largemouth Bass. In addition, compared to catch per unit effort (CPUE) of Hackettstown Hatchery's Broodstock collection of Northern Pike on Farrington Lake between 1998 and 2005 (0.39 – 0.82 Northern Pike/net) to trap netting results this year, CPUE has remained relatively consistent and is further indication that the population here is stable (Table 2). However, as Farrington Lake is the first lake with "ice-out" conditions stocked with Northern Pike, trap nets will be set here again in early spring 2015 to obtain more data on the Northern Pike fishery.

**Table 1.** Total number and percent of total number of each species caught on Farrington Lake in 2014.

| | Total | |
|---|---|---|
| **Species** | **No.** | **% of Pop. By No.** |
| Bluegill | 1517 | 36.95 |
| Black Crappie | 1178 | 28.70 |
| Yellow Perch | 459 | 11.18 |
| Golden Shiner | 306 | 7.45 |
| Brown Bullhead | 221 | 5.38 |
| White Perch | 90 | 2.19 |
| Pumpkinseed | 72 | 1.75 |
| Yellow Bullhead | 60 | 1.46 |
| Chain Pickerel | 54 | 1.32 |
| Alewife | 47 | 1.14 |
| Brown Trout | 44 | 1.07 |
| Largemouth Bass | 27 | 0.66 |
| White Sucker | 11 | 0.27 |
| Creek Chubsucker | 9 | 0.22 |
| Northern Pike | 7 | 0.17 |
| Rainbow Trout | 1 | 0.02 |
| Hybrid Sunfish | 1 | 0.02 |
| American Eel | 1 | 0.02 |
| **Total** | **4105** | **100** |

**Table 2.** Comparison of this years trap net survey (2014) on Farrington Lake to Broodstock Collection trap net surveys between 1998-2005 conducted by Hackettstown Hatchery. CPUE has remained consistent.

| Year | Species | Total caught | Nets deployed/ day | Days | Hours | CPUE (catch per hour) | CPUE (catch per net) |
|---|---|---|---|---|---|---|---|
| 2014 | Northern Pike | 7 | 2 to 3 | 6 | 384 | 0.02 | 0.44 |
| 2005 | Northern Pike | 7 | 3 | 6 | 432 | 0.02 | 0.39 |
| 2001 | Northern Pike | 7 | 4 | 4 | 384 | 0.02 | 0.44 |
| 1999 | Northern Pike | 23 | 4 | 7 | 672 | 0.03 | 0.82 |
| 1998 | Northern Pike | 16 | 5 | 4 | 480 | 0.03 | 0.80 |

Farrington Lake has been stocked with Northern Pike since 1987 at about a rate of 10 fingerlings (6 inches) per acre (Figure 1). New Jersey's stocking rate has been 10/acre for Northern Pike and as sampling continues in Farrington Lake and other waterbodies containing Northern Pike, the data collected will be used to assess these rates.

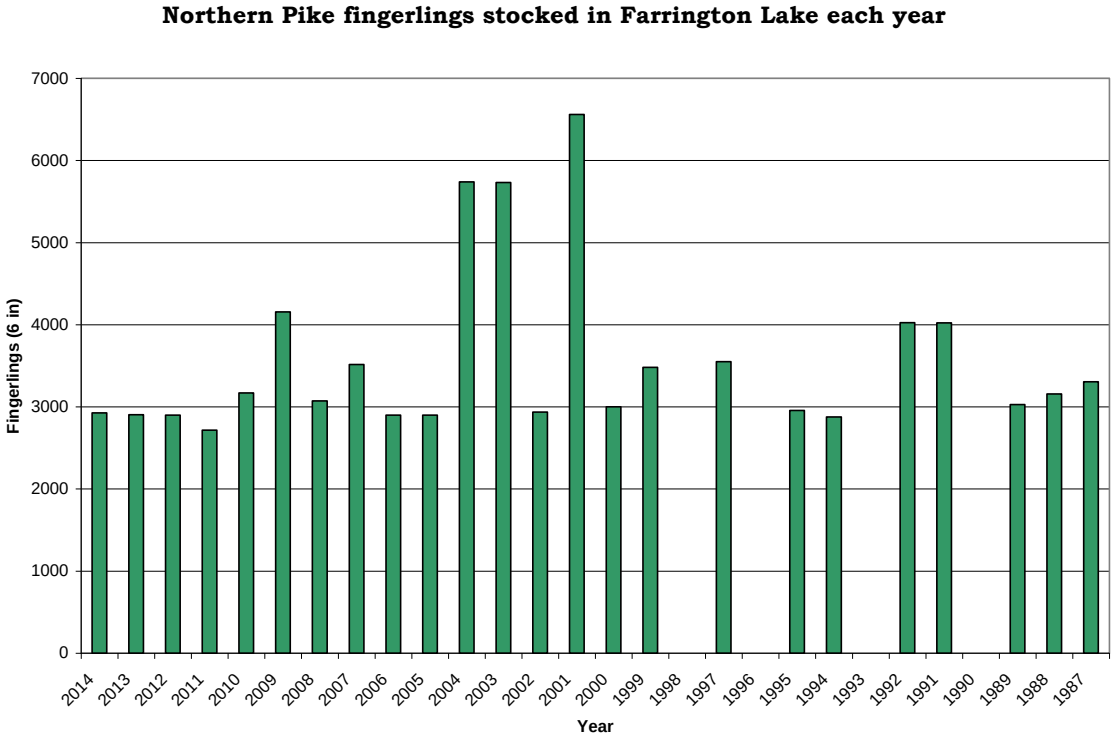


**Figure 1.** Total Northern Pike fingerlings stocked in Farrington Lake by year.

Trap netting is typically not a successful practice in terms of sampling Largemouth Bass populations (Largemouth Bass have "net fear"). Relating this knowledge to our actual CPUE (1.69/net), and angler reports of good bass fishing, the Largemouth Bass population here seems to be providing adequate angler opportunities. In addition, not included in this data are hatchery broodstock results which included 15 Largemouth Bass above catchable size caught in just one trap net upstream of Church Lane (Hackettstown Hatchery staff, personal communication).

Trap netting revealed an abundant population of Chain Pickerel (CPUE of 3.38/net). Many large individuals composed the population (PSD value of 90 and $RSD_p$ of 34), and even a few were large enough to be claimed for a Skillful Angler Award. While this size structure may make for good fishing (many large individuals), our length-frequency data may suggest poor recruitment in recent years (Figure 2). Yellow Perch were abundant (CPUE of 28.69/net), condition is below average ($W_r$ of 87), and the population is poorly distributed (Figure 3). Largemouth Bass and Chain Pickerel may heavily prey upon the Yellow Perch.

There were two species of sunfish, Bluegill and Pumpkinseed, captured during the survey. Bluegill were abundant, well balanced, were well distributed, but were slightly below average condition. Bluegill condition may suffer due to increased abundance and competition. Pumpkinseeds were less abundant, well balanced, well distributed, and showed overall good condition.

Black Crappies were the second most abundant species found in trap nets. Black Crappies are well balanced (PSD of 67), condition is great ($W_r$ of 100), and length-frequency graph shows a bimodal distribution (Figure 4). Black Crappies should provide excellent angling opportunities.

A species to note that was not collected in our sampling was the Channel Catfish. Channel Catfish are routinely stocked in Farrington Lake to provide additional opportunities for anglers but further sampling should be done to determine their status in this waterbody and evaluate our stocking of them. Channel Catfish are notoriously elusive in a variety of sample gear.

Proportional Stock Density (PSD) of all species captured was on the higher end of their accepted ranges (Table 4) and part of this may be due to trap net bias. For instance, Laarman and Ryckman (1982) showed that trap nets were selective for larger sizes of Rock Bass, Walleye, Black Crappie, Bluegill, Yellow Perch, and Pumpkinseed. Being aware of these biases and interpreting them based upon the knowledge of these biases is appropriate. All gear used in collection of fisheries data can have their own bias. Even the method of collection can create a bias to alter what we perceive is the current condition of a fishery, verses what's actually present.

## Management Recommendations

1. Manage Northern Pike under the current regulations and sample in 2015.
2. Continue to manage panfish, Largemouth Bass, and Chain Pickerel under current regulations.
3. Further evaluation of Channel Catfish may be necessary and should be done using other sample gear.

**Table 3.** Catch per unit effort (CPUE) and stock density indices for Spring Trap Netting on Farrington Lake in 2014.

| Species | Number | % of Pop by Number | Nets Set | CPUE | PSD | 95% CI (+/-) | $RSD_p$ | $RSD_m$ |
|---|---|---|---|---|---|---|---|---|
| Largemouth Bass | 27 | 0.7 | 16 | 1.69 | 80 | 21 | 24 | 0 |
| Chain Pickerel | 54 | 1.3 | 16 | 3.38 | 91 | 10 | 34 | 4 |
| Bluegill | 1517 | 37.0 | 16 | 94.81 | 66 | 8 | 1 | 0 |
| Pumpkinseed | 72 | 1.8 | 16 | 4.50 | 58 | 9 | 1 | 0 |
| Yellow Perch | 459 | 11.2 | 16 | 28.69 | 54 | 14 | 15 | 0 |
| Black Crappie | 1178 | 28.7 | 16 | 73.63 | 67 | 14 | 2 | 0 |
| White Perch | 90 | 2.2 | 16 | 5.63 | 95 | 14 | 73 | 14 |
| Northern Pike | 7 | 0.2 | 16 | 0.44 | 86 | 44 | 71 | 14 |
| Yellow Bullhead | 60 | 1.5 | 16 | 3.75 | 73 | 13 | - | - |
| Brown Bullhead | 221 | 5.4 | 16 | 13.81 | 96 | 8 | - | - |
| Golden Shiner | 306 | 7.5 | 16 | 19.13 | - | - | - | - |
| Alewife | 47 | 1.1 | 16 | 2.94 | - | - | - | - |
| Brown Trout | 44 | 1.1 | 16 | 2.75 | - | - | - | - |
| White Sucker | 11 | 0.3 | 16 | 0.69 | - | - | - | - |
| Creek Chubsucker | 9 | 0.2 | 16 | 0.56 | - | - | - | - |
| Rainbow Trout | 1 | 0.0 | 16 | 0.06 | - | - | - | - |
| Hybrid Sunfish | 1 | 0.0 | 16 | 0.06 | - | - | - | - |
| American Eel | 1 | 0.0 | 16 | 0.06 | - | - | - | - |
| **Total** | **4105** | | | | | | | |

**Note:** A total of 16 nets were set for a 24 hour period each, a total of 384 hours of sampling.

**Table 4.** Size structure/composition of fish species captured described using Proportional Stock Density (PSD) indices with 95% Confidence Intervals (CI), Preferred-Relative Stock Density indices ($RSD_p$), and Memorable-Relative Stock Density ($RSD_m$)indices from Spring Trap Netting on Farrington Lake in 2014.

| Species (w/ accepted PSD ranges) | Size (mm) | Number | PSD | 95% CI | $RSD_p$ | $RSD_m$ |
|---|---|---|---|---|---|---|
| Largemouth bass (40-70) | ≥ 200 | 25 | **80** | **21** | **24** | **0** |
| | ≥ 300 | 20 | | | | |
| | ≥ 380 | 6 | | | | |
| | ≥ 510 | 0 | | | | |
| Chain pickerel | ≥ 250 | 56 | **91** | **10** | **34** | **4** |
| | ≥ 380 | 51 | | | | |
| | ≥ 510 | 19 | | | | |
| | ≥ 630 | 2 | | | | |
| Bluegill (20 - 60) | ≥ 80 | 191 | **66** | **8** | **1** | **0** |
| | ≥ 150 | 127 | | | | |
| | ≥ 200 | 1 | | | | |
| | ≥ 250 | 0 | | | | |
| Pumpkinseed | ≥ 80 | 147 | **58** | **9** | **1** | **0** |
| | ≥ 150 | 85 | | | | |
| | ≥ 200 | 1 | | | | |
| | ≥ 250 | 0 | | | | |
| Yellow perch (30 - 50) | ≥ 130 | 65 | **54** | **14** | **15** | **0** |
| | ≥ 200 | 35 | | | | |
| | ≥ 250 | 10 | | | | |
| | ≥ 300 | 0 | | | | |
| Black crappie (30 - 60) | ≥ 130 | 63 | **67** | **14** | **2** | **0** |
| | ≥ 200 | 42 | | | | |
| | ≥ 250 | 1 | | | | |
| | ≥ 300 | 0 | | | | |
| White Perch | ≥ 130 | 22 | **95** | **14** | **73** | **14** |
| | ≥ 200 | 21 | | | | |
| | ≥ 250 | 16 | | | | |
| | ≥ 300 | 3 | | | | |
| Northern Pike (30 - 60) | ≥ 350 | 7 | **86** | **44** | **71** | **14** |
| | ≥ 530 | 6 | | | | |
| | ≥ 710 | 5 | | | | |
| | ≥ 860 | 1 | | | | |
| Yellow Bullhead | ≥ 150 | 67 | **73** | **13** | **-** | **-** |
| | ≥ 230 | 49 | | | | |
| Brown Bullhead | ≥ 150 | 51 | **96** | **8** | **-** | **-** |
| | ≥ 230 | 49 | | | | |

**Table 5.** Condition of fish species captured indicated by Relative Weight ($W_r$) index from trap netting survey on Farrington Lake in 2014. Relative Weight quantifies fish condition based on how much a fish weighs for its length. A $W_r$ of 95-105 is a typical objective for most species. Values well below 100 for a size group may be indicative of a problem in food and feeding relationships, and values well above 100 for a size group may be indicative of fish not making the best use of available prey.

| Species | Number | Avg $W_r$ | 95 % CI (+/-) | SE | Range $W_r$ |
|---|---|---|---|---|---|
| Largemouth Bass | 18 | 99 | 2.88 | 1.36 | 90 - 109 |
| Chain Pickerel | 48 | 93 | 3.15 | 1.57 | 64-132 |
| Bluegill | 186 | 93 | 1.88 | 0.95 | 50-142 |
| Pumpkinseed | 37 | 103 | 7.89 | 3.89 | 62-147 |
| Yellow Perch | 67 | 87 | 3.38 | 1.69 | 56-138 |
| Black Crappie | 80 | 100 | 3.55 | 1.78 | 50-142 |
| White Perch | 20 | 101 | 4.44 | 2.12 | 73-117 |
| Northern Pike | 7 | 101 | 7.43 | 3.04 | 84-108 |
| Yellow Bullhead | 67 | 92 | 2.36 | 1.18 | 66-122 |
| Brown Bullhead | 49 | 89 | 2.01 | 1.00 | 70-108 |

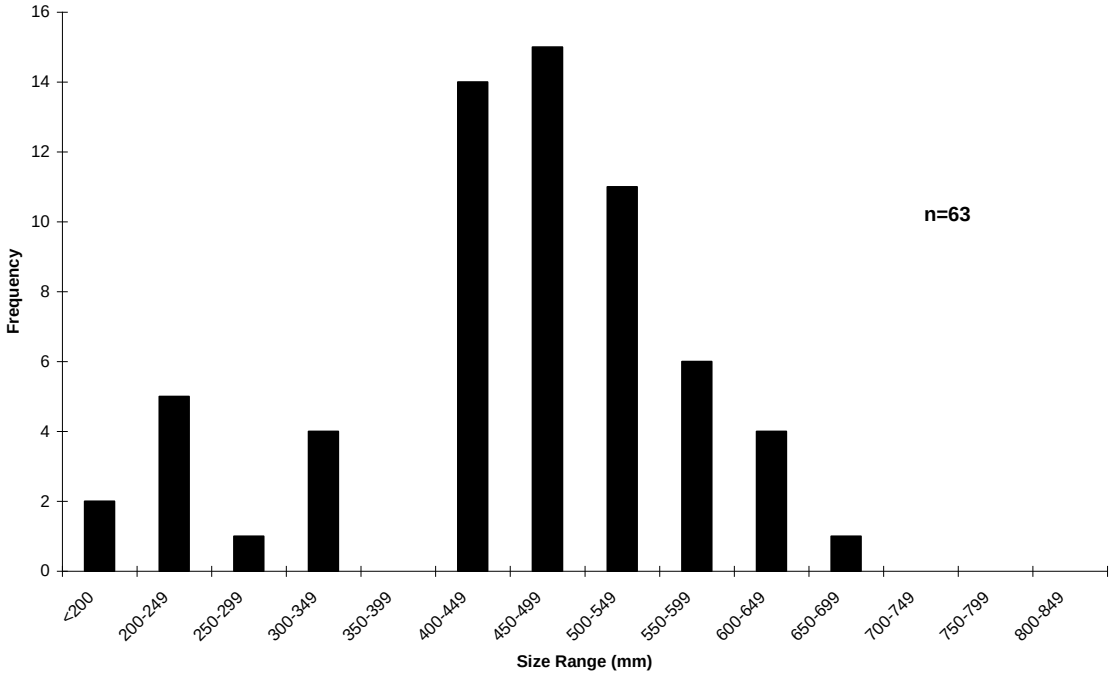


**Figure 2.** Length-Frequency Histogram of Chain Pickerel from Spring Trap Netting Farrington Lake (2014).

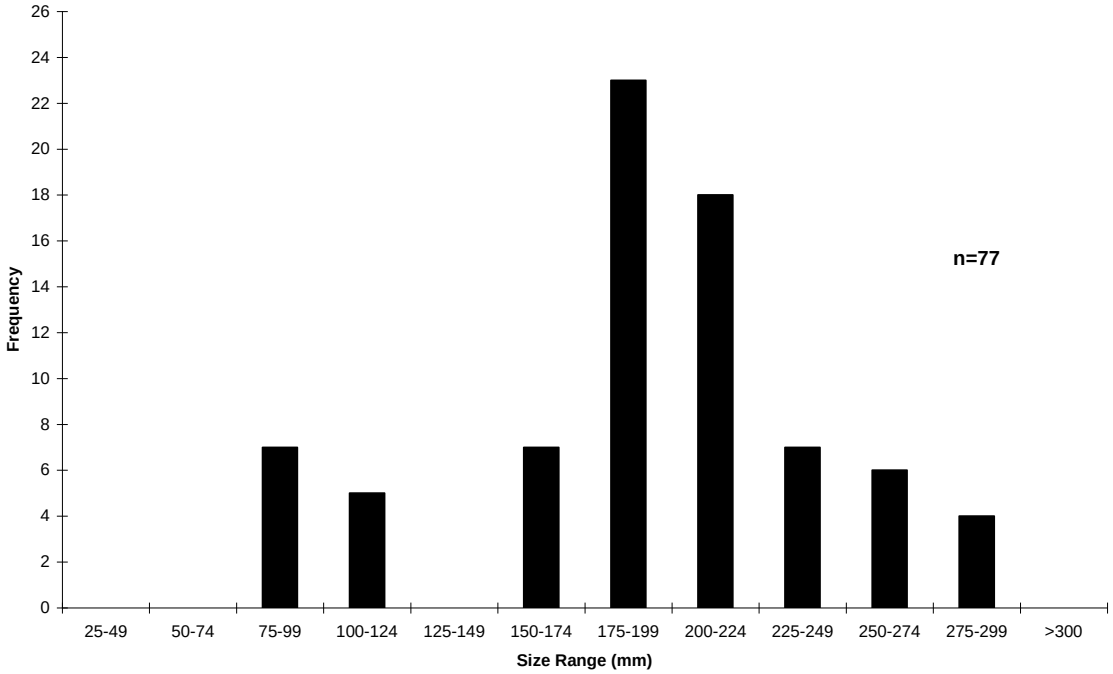


**Figure 3.** Length-Frequency Histogram of Yellow Perch from Spring Trap Netting Farrington Lake (2014).

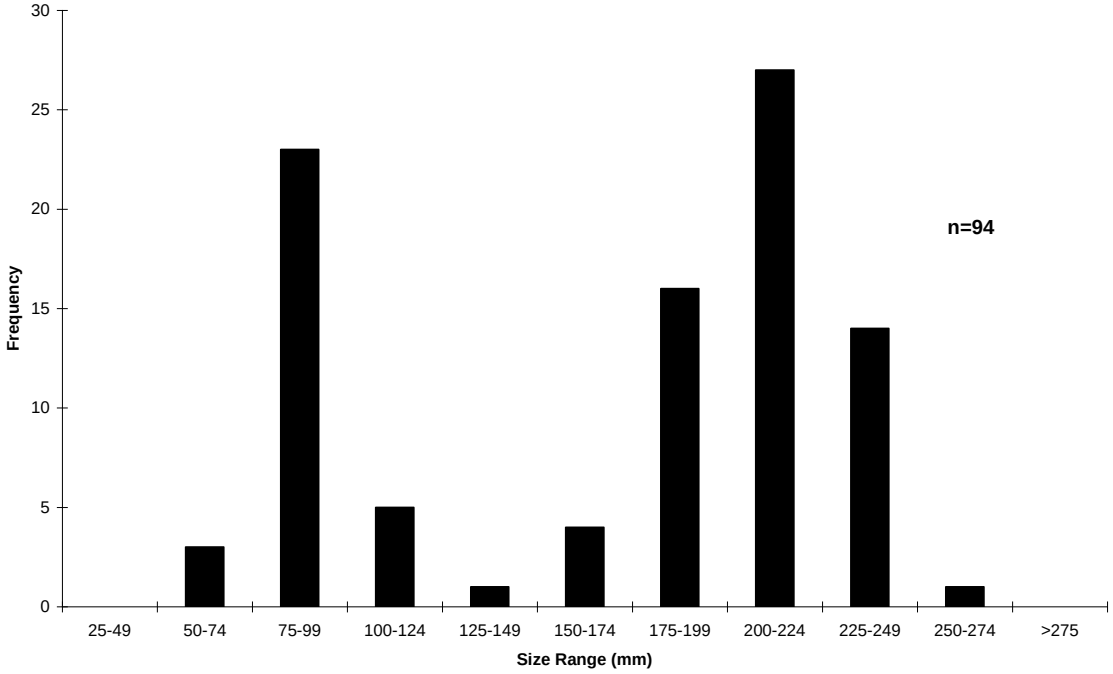


**Figure 4.** Length-Frequency Histogram of Black Crappie from Spring Trap Netting Farrington Lake (2014).

# POMPTON LAKE

**Location:** Passaic County, Pompton Lakes, NJ
**Drainage:** Impounded section of the Ramapo River
**Target Species:** Northern Pike
**Acres:** 204
**Avg Depth:** 6 ft
**Max Depth:** 10 ft

## Methods

A total of eight South Dakota trap nets were set on Pompton Lake between April 8th and April 11th. Between two and three trap nets were set daily in water depths ranging from 4.5 to 8 ft deep and allowed to fish for 24 hours. Sample areas were randomly selected between areas that had potential to be spawning migration routes for Northern Pike. But if a sample area does not have the gradual sloping banks that are necessary to set an effective trap net, that sample area would not be selected. Once set, the nets were tended the following day and relocated to different random sites to ensure all suitable habitats were sampled. Captured Northern Pike were measured for total length and weight, and scales were collected for growth analysis and age. Other fish species were measured for total length and weight, and/or counted for presence.

## Biological Data

Bluegill, Black Crappie, and Yellow Perch were the three most abundant species sampled in the trap nets respectively (Table 6, Table 7). A total of seventeen species of fish were collected during the 2014 trap net survey at Pompton Lake. A total of five Northern Pike were captured and they ranged in size from 540 – 790 mm long and 0.895 – 2.29 kg (Table 8).

Catch of Northern Pike was good this Spring (0.63 Northern Pike/net) considering we placed only 8 trap nets before focusing our attention on sampling Lake Hopatcong. Since our sample size was not as large as we would have wanted we will be sampling Pompton Lake in the spring of 2016. In addition to the data we collected, reports from anglers indicated that Northern Pike were readily caught and provided more evidence of a good fishery for Northern Pike. However, the Northern Pike population will be sampled at Pompton Lake again soon to more accurately determine their population structure.

Three of the five Northern Pike captured were harvestable size (> 24 inches), with the largest exceeding 31 inches. The Northern Pike were in below average condition, with a mean $W_r$ of 90 (Table 8). The below average condition was most likely do to catching the Northern Pike soon after spawn. Anglers that interacted with Freshwater Fishery crews indicated that they did very well for Northern Pike and have seen others do well for Northern Pike on Pompton Lake. One angler's report indicated catching four Northern Pike on the southern end of the lake the night before we checked our nets. Currently, a larger sample size of our target species is desirable but the data collected thus far and angler reports indicate that Northern Pike are providing a lot of action for anglers.

**Table 6.** Total number and percent of total number of each species caught on Pompton Lake in 2014.

| Species | No. | % of Pop. By No. |
|---|---|---|
| Bluegill | 1329 | 44.60 |
| Black Crappie | 617 | 20.70 |
| Yellow Perch | 440 | 14.77 |
| Golden Shiner | 374 | 12.55 |
| White Perch | 86 | 2.89 |
| Pumpkinseed | 62 | 2.08 |
| Brown Bullhead | 19 | 0.64 |
| Yellow Bullhead | 15 | 0.50 |
| Largemouth Bass | 12 | 0.40 |
| Rock Bass | 8 | 0.27 |
| Chain Pickerel | 5 | 0.17 |
| Northern Pike | 5 | 0.17 |
| White Sucker | 4 | 0.13 |
| Fallfish | 1 | 0.03 |
| Rainbow Trout | 1 | 0.03 |
| Common Carp | 1 | 0.03 |
| Smallmouth Bass | 1 | 0.03 |
| **Total** | **2980** | **100** |

**Table 7.** Catch per unit effort and stock density indices for Spring Trap Netting on Pompton Lake in 2014.

| Species | Number | % of Pop by Number | Nets Set | CPUE | PSD | 95% CI (+/-) | RSDp | RSDm |
|---|---|---|---|---|---|---|---|---|
| Bluegill | 1329 | 44.60 | 8 | 166.13 | 97 | 3 | 12 | 0 |
| Black Crappie | 617 | 20.70 | 8 | 77.13 | 58 | 7 | 1 | 0 |
| Yellow Perch | 440 | 14.77 | 8 | 55.00 | 69 | 6 | 13 | 1 |
| Golden Shiner | 374 | 12.55 | 8 | 46.75 | - | - | - | - |
| White Perch | 86 | 2.89 | 8 | 10.75 | - | - | - | - |
| Pumpkinseed | 62 | 2.08 | 8 | 7.75 | - | - | - | - |
| Brown Bullhead | 19 | 0.64 | 8 | 2.38 | - | - | - | - |
| Yellow Bullhead | 15 | 0.50 | 8 | 1.88 | - | - | - | - |
| Largemouth Bass | 12 | 0.40 | 8 | 1.50 | - | - | - | - |
| Rock Bass | 8 | 0.27 | 8 | 1.00 | - | - | - | - |
| Chain Pickerel | 5 | 0.17 | 8 | 0.63 | - | - | - | - |
| Northern Pike | 5 | 0.17 | 8 | 0.63 | - | - | - | - |
| White Sucker | 4 | 0.13 | 8 | 0.50 | - | - | - | - |
| Smallmouth Bass | 1 | 0.03 | 8 | 0.13 | - | - | - | - |
| Rainbow Trout | 1 | 0.03 | 8 | 0.13 | - | - | - | - |
| Fallfish | 1 | 0.03 | 8 | 0.13 | - | - | - | - |
| Common Carp | 1 | 0.03 | 8 | 0.13 | - | - | - | - |
| **Total** | **2980** | | | | | | | |

**Table 8.** Condition of fish species captured indicated by Relative Weight ($W_r$) index on Pompton Lake in 2014. Relative Weight quantifies fish condition based on how much a fish weighs for its length. A $W_r$ of 95-105 is a typical objective for most species. Values well below 100 for a size group may be indicative of a problem in food and feeding relationships, and values well above 100 for a size group may be indicative of fish not making the best use of available prey.

| Species | Number | Avg $W_r$ | 95 % CI (+/-) | SE | Range $W_r$ |
|---|---|---|---|---|---|
| Largemouth Bass | 6 | 108 | 12.13 | 4.72 | 93 - 123 |
| Bluegill | 293 | 91 | 1.22 | 0.62 | 52 - 131 |
| Pumpkinseed | 20 | 106 | 10.00 | 4.78 | 77 - 147 |
| Yellow Perch | 258 | 86 | 2.36 | 1.20 | 50 - 142 |
| Black Crappie | 226 | 97 | 1.39 | 0.71 | 50 - 142 |
| White Perch | 18 | 90 | 6.84 | 3.24 | 62 - 113 |
| Northern Pike | 5 | 90 | 17.41 | 6.27 | 73 - 109 |
| Yellow Bullhead | 12 | 92 | 12.69 | 5.76 | 65 - 131 |
| Brown Bullhead | 7 | 96 | 8.56 | 3.50 | 78 - 107 |

Pompton Lake has been stocked with Northern Pike since 1989 at about a rate of 10 fingerlings (6 inches) per acre (Figure 5). New Jersey's stocking rate has been 10/acre for Northern Pike and as sampling continues in Pompton Lake and other waterbodies containing Northern Pike, the data collected will be used to assess these rates.

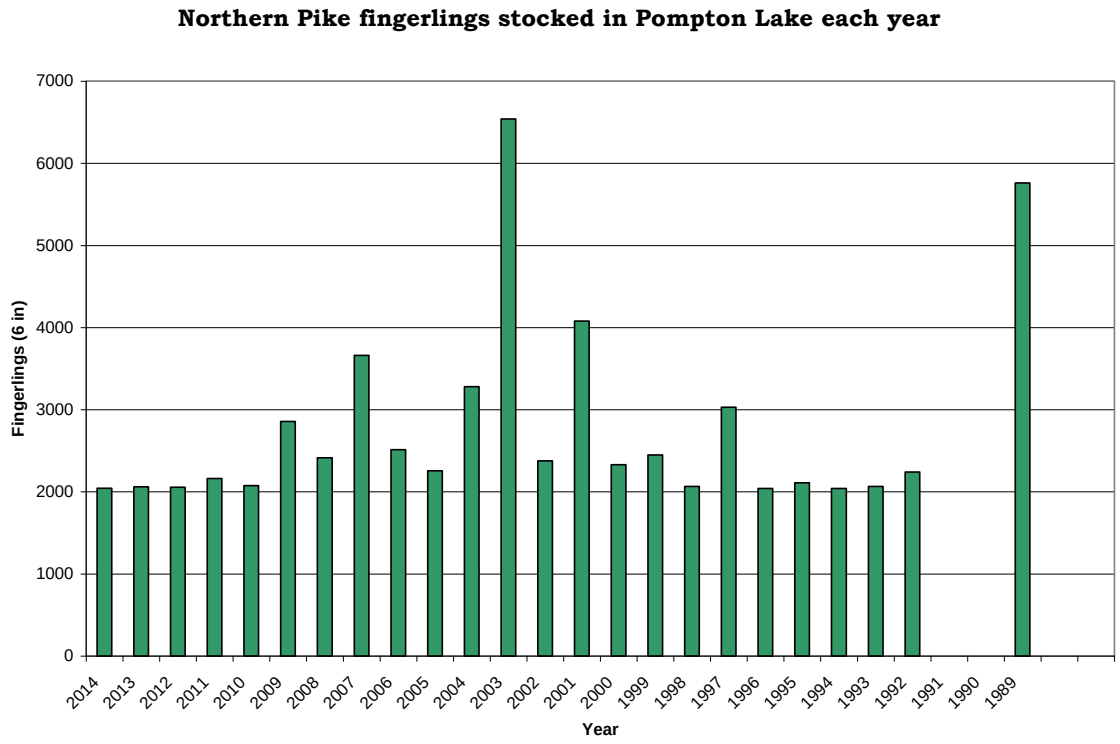


**Figure 5.** Total Northern Pike fingerlings that are stocked in Farrington Lake by year.

Trap netting is typically not a successful practice in terms of sampling Largemouth Bass populations (Largemouth Bass have "net fear"), but our CPUE (1.50/net) was good, all Largemouth Bass caught were larger than the legal size harvest limit (12 inches), conditions were above average with a $W_r$ of 108 (Table 8), and two individuals exceeded 4.5 pounds.

Catch of Chain Pickerel was very low (CPUE of 0.63/net) and may be driven by competition with Largemouth Bass which prey on the same forage or possibly angler harvest. The majority of our catch was comprised of Bluegill with a CPUE of 166.13/net (Table 7). The majority of Bluegill caught were larger individuals with a PSD of 97 and $RSD_p$ of 12 (Table 9), but $W_r$ of 91 is slightly below average condition. The Bluegill population is currently providing good angler opportunities but the population is unbalanced with too many large individuals. Looking at both the Bluegill's high PSD value and length-frequency graph (Figure 6), this data suggests poor recruitment in recent years.

Black Crappie comprised the second most abundant catch with a CPUE of 77.13/net (Table 7). The majority of Black Crappie were larger, with a PSD of 58 (Table 9), and the length-frequency graph shows a balance with larger individuals (>150 mm). McInerny

and Cross (2006) provided evidence that indicated smaller Black Crappies (<150 mm) avoid trap nets or shoreline habitats or are better able to escape trap nets than larger individuals based on a study of 8 Minnesota lakes between 1996-2001. Yellow Perch CPUE was 55.00/net (Table 7), majority was larger, with a PSD of 69, $RSD_p$ of 13, but $W_r$ of 86 was low. Largemouth Bass and Chain Pickerel may heavily prey upon the Yellow Perch, and their below average condition indicates significant competition.

Proportional Stock Density (PSD) of all species captured was on the higher end of their accepted ranges (Table 9) and part of this may be due to trap net size selectivity for certain species. For instance, Laarman and Ryckman (1982) showed that trap nets were selective for larger sizes of Rock Bass, Walleye, Black Crappie, Bluegill, Yellow Perch, and Pumpkinseed. Being aware of these biases and interpreting them based upon the knowledge of these biases is appropriate. All gear used in collection of fisheries data can have their own bias. Even the method of collection can create a bias to alter what we perceive is the current condition of a fishery, verses what's actually present.

**Management Recommendations**

1. Northern Pike will be continued to be closely monitored (plan trap netting survey in the next few years), but no alteration to stocking or regulations seem necessary as angler activity and reports suggest that they are providing good action.
2. Consider electrofishing for Largemouth Bass to obtain a larger sample size to determine status of this species.
3. Bluegill, Pumpkinseed, Black Crappie, and Yellow Perch populations are stable. Continue managing with existing regulations.

**Table 9.** Size structure/composition of fish species captured described using Proportional Stock Density (PSD) indices with 95% Confidence Intervals (CI), Preferred-Relative Stock Density indices ($RSD_p$), and Memorable-Relative Stock Density ($RSD_m$)indices from Spring Trap Netting on Pompton Lake in 2014.

| **Species (w/ accepted PSD ranges)** | **Size (mm)** | **Number** | **PSD** | **95% CI** | **$RSD_p$** | **$RSD_m$** |
|---|---|---|---|---|---|---|
| Largemouth bass (40-70) | ≥ 200 | 6 | - | - | - | - |
| | ≥ 300 | 6 | | | | |
| | ≥ 380 | 4 | | | | |
| | ≥ 510 | 1 | | | | |
| Chain pickerel | ≥ 250 | 1 | - | - | - | - |
| | ≥ 380 | 1 | | | | |
| | ≥ 510 | 1 | | | | |
| | ≥ 630 | 1 | | | | |
| Bluegill (20 - 60) | ≥ 80 | 296 | **97** | **3** | **12** | **0** |
| | ≥ 150 | 286 | | | | |
| | ≥ 200 | 36 | | | | |
| | ≥ 250 | 0 | | | | |
| Pumpkinseed | ≥ 80 | 20 | - | - | - | - |
| | ≥ 150 | 20 | | | | |
| | ≥ 200 | 1 | | | | |
| | ≥ 250 | 0 | | | | |
| Yellow perch (30 - 50) | ≥ 130 | 267 | **69** | **6** | **13** | **1** |
| | ≥ 200 | 184 | | | | |
| | ≥ 250 | 35 | | | | |
| | ≥ 300 | 3 | | | | |
| Black crappie (30 - 60) | ≥ 130 | 219 | **58** | **7** | **1** | **0** |
| | ≥ 200 | 126 | | | | |
| | ≥ 250 | 2 | | | | |
| | ≥ 300 | 0 | | | | |
| White Perch | ≥ 130 | 18 | - | - | - | - |
| | ≥ 200 | 18 | | | | |
| | ≥ 250 | 13 | | | | |
| | ≥ 300 | 2 | | | | |
| Northern Pike (30 - 60) | ≥ 350 | 3 | - | - | - | - |
| | ≥ 530 | 2 | | | | |
| | ≥ 710 | 0 | | | | |
| | ≥ 860 | 0 | | | | |
| Yellow Bullhead | ≥ 150 | 13 | - | - | - | - |
| | ≥ 230 | 8 | | | | |
| Brown Bullhead | ≥ 150 | 7 | - | - | - | - |
| | ≥ 230 | 7 | | | | |
| Smallmouth bass | ≥ 180 | 1 | - | - | - | - |
| | ≥ 280 | 1 | | | | |
| | ≥ 350 | 1 | | | | |
| | ≥ 430 | 0 | | | | |
| Rock Bass | ≥ 100 | 5 | - | - | - | - |
| | ≥ 180 | 1 | | | | |
| | ≥ 230 | 0 | | | | |
| | ≥ 280 | 0 | | | | |

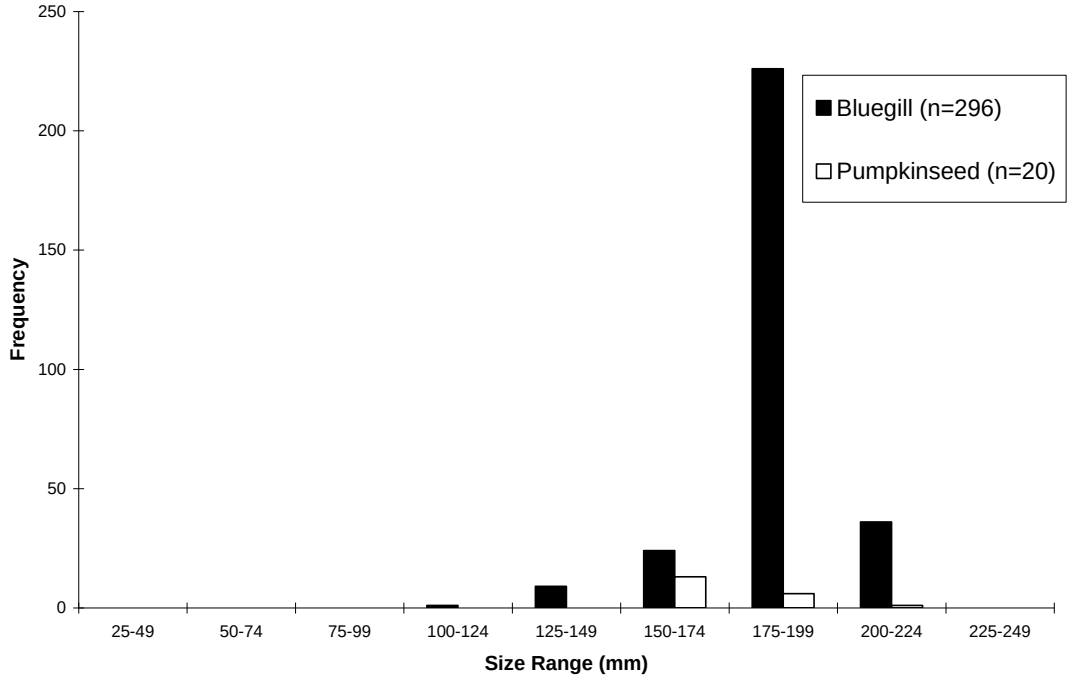


**Figure 6.** Length-Frequency Histogram of Bluegill Sunfish and Pumpkinseed Sunfish from Spring Trap Netting Pompton Lake in 2014.

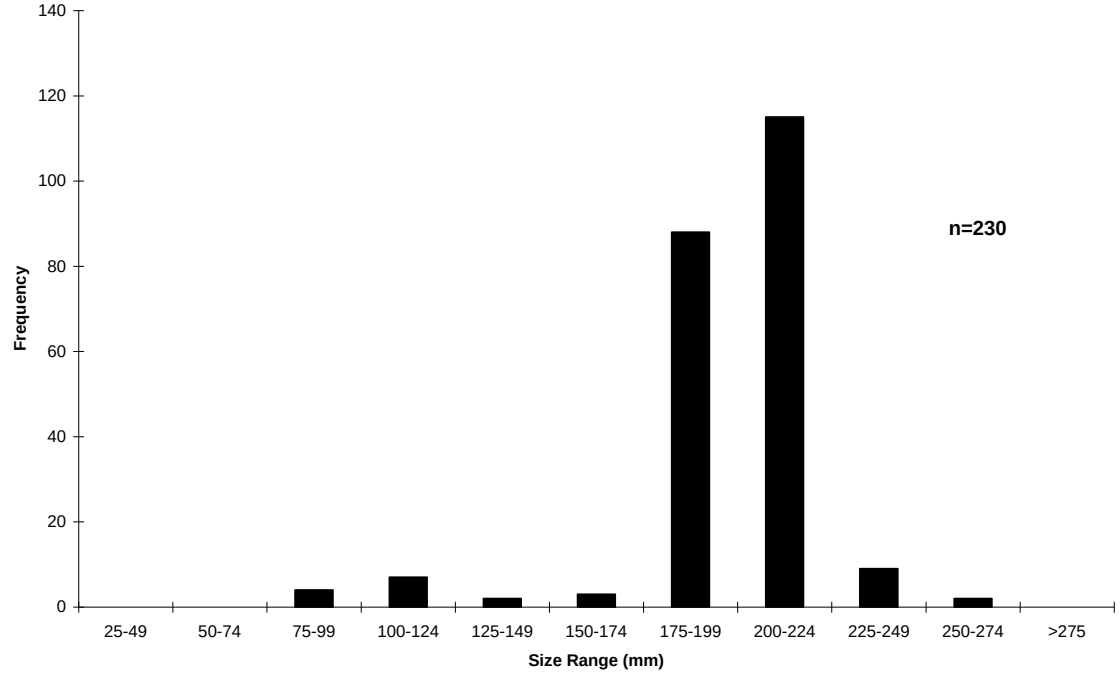


**Figure 7.** Length-Frequency Histogram of Black Crappie from Spring Trap Netting Pompton Lake in 2014.

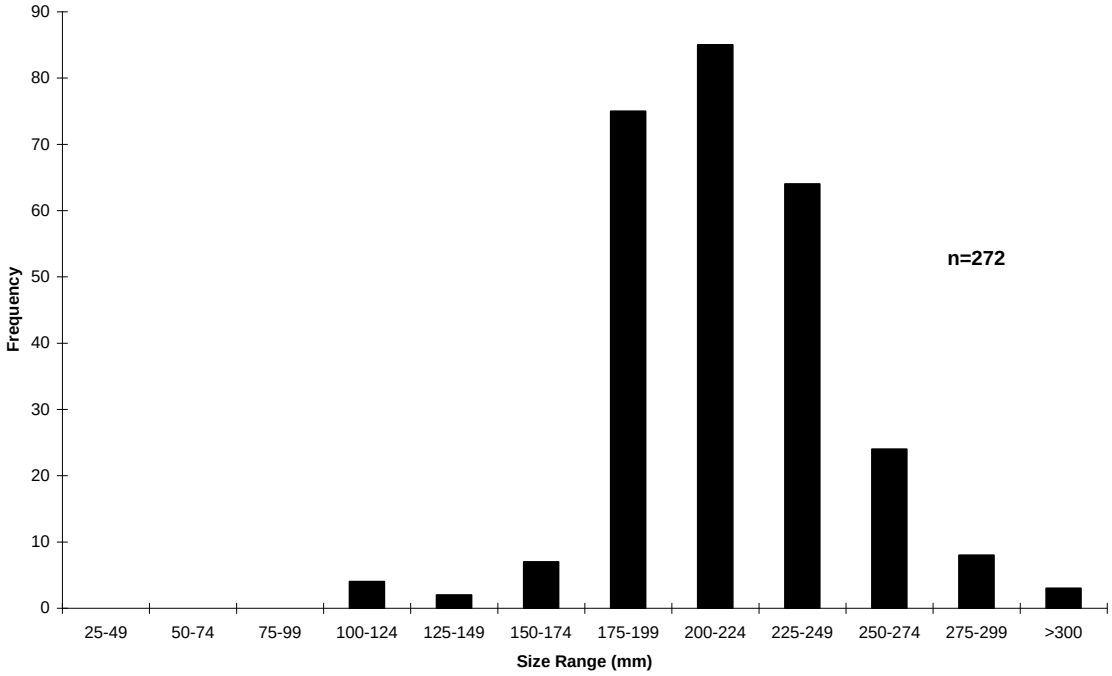


**Figure 8.** Length-Frequency Histogram of Yellow Perch from Spring Trap Netting Pompton Lake in 2014.

# MONKSVILLE RESERVOIR

**Location:** Passaic County, Ringwood Twp, NJ
**Drainage:** Impounded section of the Wanaque River
**Target Species:** Muskellunge and Walleye

**Acres:** 505
**Avg Depth:** 43 ft
**Max Depth:** 90 ft

## Methods

A total of five South Dakota trap nets were set on Monksville Reservoir between May 20th and May 22nd. Aquatic vegetation at this point in the season inhibited the effectiveness of our trap net sampling so it was suspended until the Fall. Between November 3rd and November 7th sixteen South Dakota trap nets were set on Monksville Reservoir. Four trap nets were set daily in water depths ranging from 4 to 8 ft deep and allowed to fish for 24 hours. Sample areas were randomly selected between areas that had potential to effectively capture Walleye or Muskellunge. If a sample area does not have the gradual sloping banks that are necessary to set an effective trap net, that sample area would not be selected. Once set, the nets were tended the following day and relocated to different random sites if available to ensure all suitable habitats were sampled. Captured Muskellunge and Walleye were measured for total length and weight, and scales were collected for growth analysis and age. Other fish species were measured for total length and weight, and/or counted for presence.

## Biological Data

Bluegill comprised the majority of the sample in the trap nets (89.49% of population by total number caught) and Pumpkinseed followed comprising 5.06% of the population by total number caught (Table 10). A total of eleven species of fish were collected during the 2014 trap net survey in the Fall but a few additional species were captured in the Spring that were not captured in the Fall (Alewife, Brown Bullhead, Yellow Bullhead captured in Spring). Composition of number of each species caught was very similar in the Spring and Fall. A total of two Walleye were captured and ranged from 588 - 660 mm long and 2.066 – 3.04 kg (two additional Walleye were captured in the Spring). All were larger than 23 inches and one was in excess of 27 inches and 7.5 lbs.

Two Muskellunge were captured and ranged from 1005 – 1009 mm long and 8.62 – 9.3 kg in weight. Both were in good condition with a $W_r$ of 104 and 111 respectively (Table 12). Anglers that interacted with Freshwater Fishery crews indicated that the Muskellunge fishing was great here and that they regularly caught them. On one day tending the nets, an angler held up a freshly caught Muskellunge in excess of 40 inches and then released it back into the water.

**Table 10.** Total number and percent of total number of each species caught on Monksville Reservoir in the Fall of 2014.

| Species | No. | % of Pop. By No. |
|---|---|---|
| Bluegill | 1396 | 89.49 |
| Pumpkinseed | 79 | 5.06 |
| Black Crappie | 30 | 1.92 |
| Chain Pickerel | 24 | 1.54 |
| Largemouth Bass | 10 | 0.64 |
| Yellow Perch | 7 | 0.45 |
| Rock Bass | 5 | 0.32 |
| White Perch | 3 | 0.19 |
| Golden Shiner | 2 | 0.13 |
| Walleye | 2 | 0.13 |
| Muskellunge | 2 | 0.13 |
| **Total** | **1560** | **100** |

**Table 11.** Catch per unit effort (CPUE) and stock density indices for trap netting on Monksville Reservoir in the Fall of 2014.

| Species | Number | % of Pop by Number | Nets Set | CPUE | PSD | 95% CI (+/-) | $RSD_p$ | $RSD_m$ |
|---|---|---|---|---|---|---|---|---|
| Bluegill | 1396 | 89.5 | 16 | 87.25 | 39 | 12 | 0 | 0 |
| Pumpkinseed | 79 | 5.1 | 16 | 4.94 | 65 | 14 | 0 | 0 |
| Black Crappie | 30 | 1.9 | 16 | 1.88 | 97 | 10 | 40 | 13 |
| Chain Pickerel | 24 | 1.5 | 16 | 1.50 | - | - | - | - |
| Largemouth Bass | 10 | 0.6 | 16 | 0.63 | - | - | - | - |
| Yellow Perch | 7 | 0.4 | 16 | 0.44 | - | - | - | - |
| Rock Bass | 5 | 0.3 | 16 | 0.31 | - | - | - | - |
| White Perch | 3 | 0.2 | 16 | 0.19 | - | - | - | - |
| Walleye | 2 | 0.1 | 16 | 0.13 | - | - | - | - |
| Muskellunge | 2 | 0.1 | 16 | 0.13 | - | - | - | - |
| Golden Shiner | 2 | 0.1 | 16 | 0.13 | - | - | - | - |
| **Total** | **1560** | | | **98** | | | | |

**Note:** A total of 16 nets were set for a 24 hour period each, a total of 384 hours of sampling.

**Table 12.** Condition of fish species captured from Monksville Reservoir in 2014 indicated by Relative Weight ($W_r$) index. Relative Weight quantifies fish condition based on how much a fish weighs for its length. A $W_r$ of 95-105 is a typical objective for most species. Values well below 100 for a size group may be indicative of a problem in food and feeding relationships, and values well above 100 for a size group may be indicative of fish not making the best use of available prey.

| Species | Number | Avg $W_r$ | 95 % CI (+/-) | SE | Range $W_r$ |
|---|---|---|---|---|---|
| Largemouth Bass | 9 | 101 | 5.89 | 2.55 | 90-114 |
| Chain Pickerel | 24 | 91 | 3.63 | 1.76 | 74-107 |
| Bluegill | 94 | 84 | 1.91 | 0.96 | 66-120 |
| Pumpkinseed | 62 | 93 | 2.41 | 1.20 | 65-114 |
| Yellow Perch | 7 | 76 | 6.01 | 2.46 | 71-85 |
| Black Crappie | 30 | 98 | 2.23 | 1.09 | 87-109 |
| White Perch | 3 | 86 | 13.68 | 3.18 | 80-90 |
| Muskellunge | 2 | 108 | 44.47 | 3.50 | 104-111 |
| Walleye | 2 | 92 | 12.71 | 1.00 | 91-93 |

Besides Bluegill, other panfish were present but in low to moderate densities. The population size structure is dominated by larger individuals. PSD values for Pumpkinseed and Black

Crappie are 65 and 97 respectively. Few Yellow Perch and White Perch were caught but those that were captured were large (all Yellow Perch exceeded 10 inches and all White Perch exceeded 8.5 inches). Chain Pickerel were abundant and should be providing a lot of action for anglers. Largemouth Bass were also present but in low densities.

A desirable fishery has developed for Muskellunge on top of the present desirable fishery for Walleye. However, abundance of Walleye seems to have declined since the last survey was completed in 2003 but our sampling time (late May or Fall) makes it difficult to make a direct comparison between different sampling efforts that have been conducted at Monksville. There is an increasing large predator base and this may have subsequently increased competition amongst the top level predators here impacting Walleye abundance. The Walleye that were captured were of impressive size and should still be providing action for anglers on top of what seems to be a popular spot for Musky anglers. Panfish of impressive sizes and abundant Chain Pickerel only add to the desirable sportfishery here.

**Management Recommendations**

1. Walleye population may have decreased but to assess further, plan spring or fall night time electrofishing for 2015.
2. To obtain more data on Muskellunge population set trap nets in the Spring of 2015.
3. Chain Pickerel, Bluegill, Pumpkinseed, Black Crappie, and Yellow Perch populations are stable. Continue managing with existing regulations.

**Table 13.** Size structure/composition of fish species captured described using Proportional Stock Density (PSD) indices with 95% Confidence Intervals (CI), Preferred-Relative Stock Density indices ($RSD_p$), and Memorable-Relative Stock Density ($RSD_m$)indices from Fall Trap Netting on Monksville Reservoir in 2014.

| **Species** (w/ accepted PSD ranges) | **Size (mm)** | **Number** | **PSD** | **95% CI** | **$RSD_p$** | **$RSD_m$** |
|---|---|---|---|---|---|---|
| Bluegill (20 - 60) | ≥ 80 | 94 | **39** | **12** | **0** | **0** |
| | ≥ 150 | 37 | | | | |
| | ≥ 200 | 0 | | | | |
| | ≥ 250 | 0 | | | | |
| Pumpkinseed | ≥ 80 | 62 | **65** | **14** | **0** | **0** |
| | ≥ 150 | 40 | | | | |
| | ≥ 200 | 0 | | | | |
| | ≥ 250 | 0 | | | | |
| Black crappie (30 - 60) | ≥ 130 | 30 | **97** | **10** | **40** | **13** |
| | ≥ 200 | 29 | | | | |
| | ≥ 250 | 12 | | | | |
| | ≥ 300 | 4 | | | | |

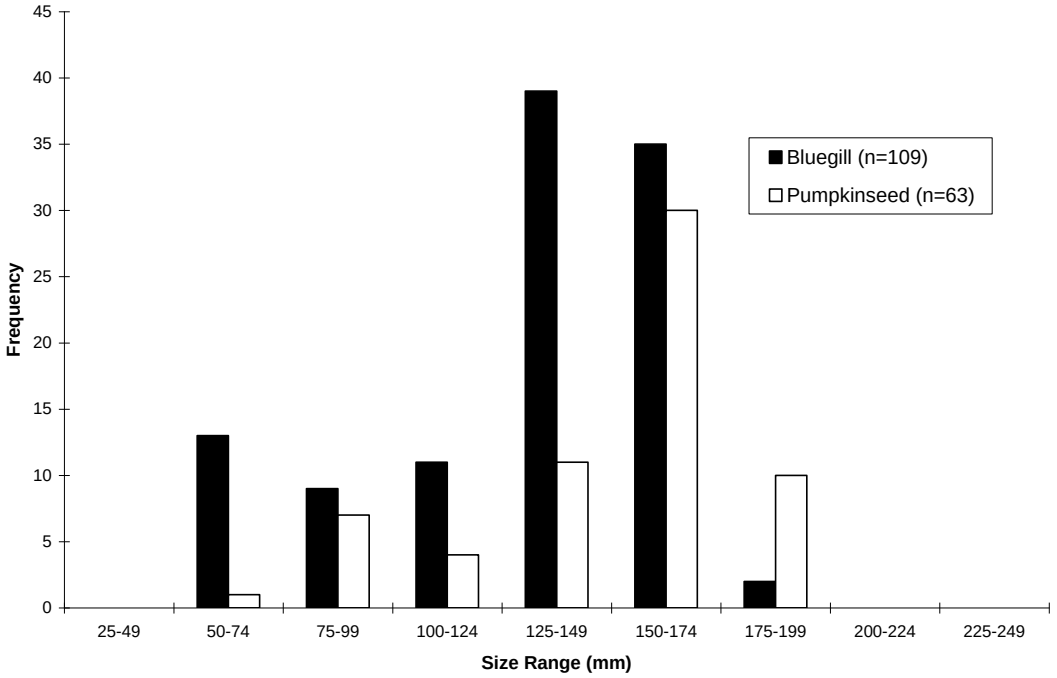


**Figure 9.** Length-Frequency Histogram of Bluegill Sunfish and Pumpkinseed Sunfish from fall trap netting Monksville Reservoir (2014).

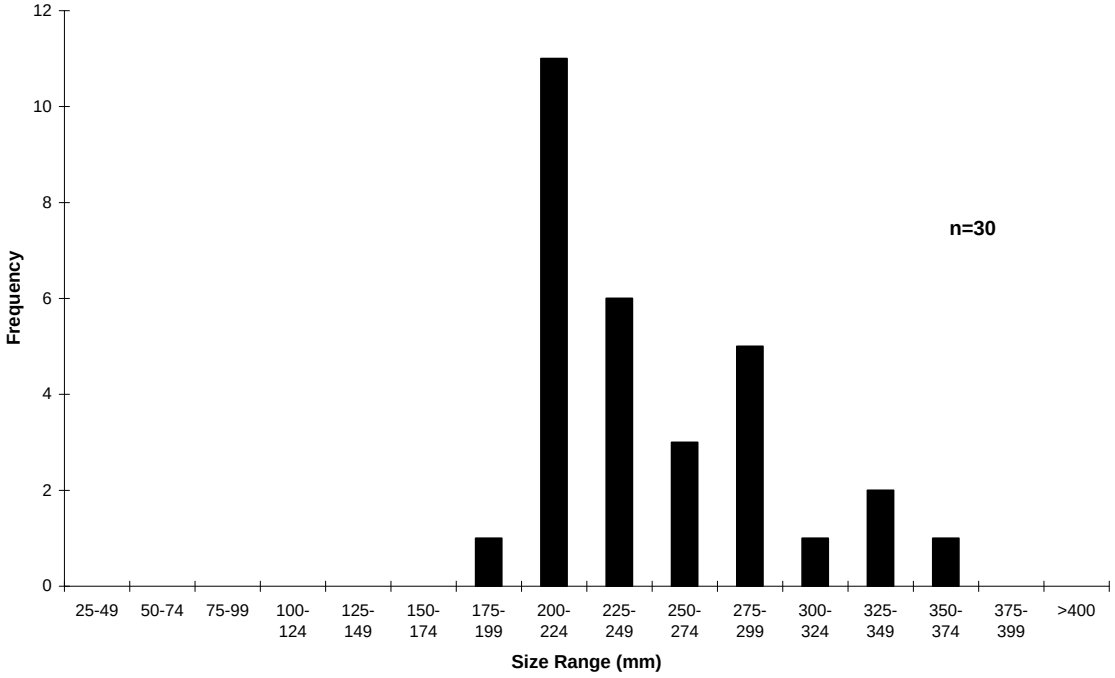


**Figure 10.** Length-Frequency Histogram of Black Crappie from fall trap netting Monksville Reservoir (2014).

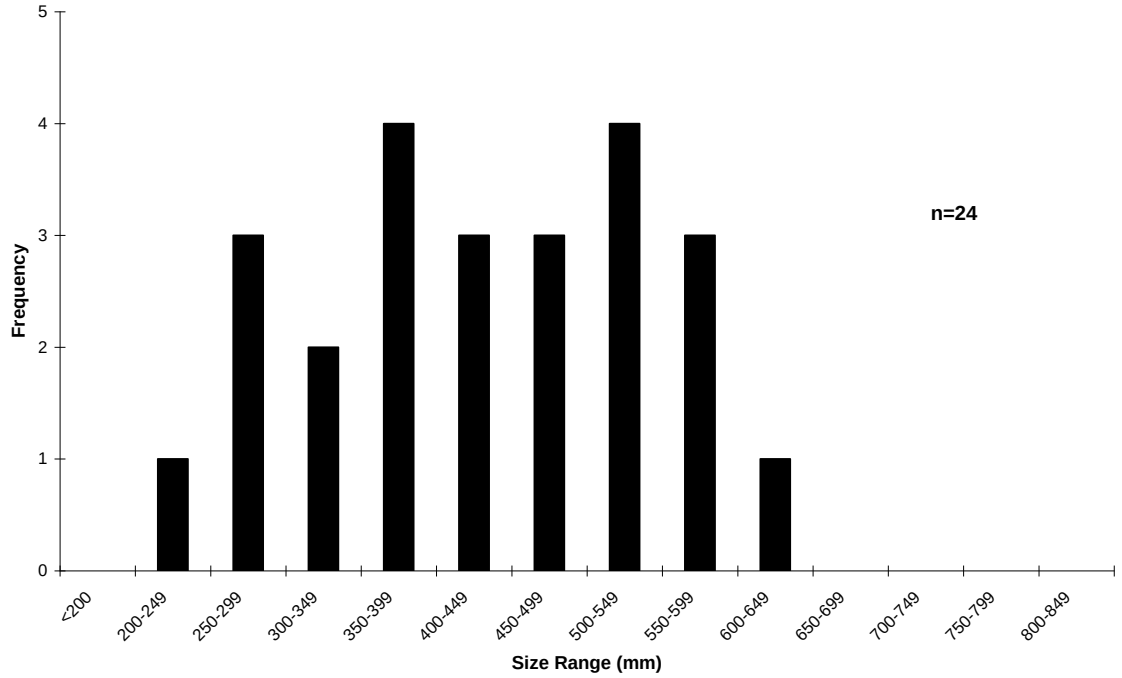


**Figure 11.** Length-Frequency Histogram of Chain Pickerel from fall trap netting Monksville Reservoir (2014).

# LAKE HOPATCONG

**Location:** Morris County, Mt. Arlington, NJ
**Drainage:** Musconetcong
**Target Species:** Muskellunge, Walleye

**Acres:** 2,685
**Avg Depth:** 18 ft
**Max Depth:** 51 ft

## Methods

A total of twenty-nine South Dakota trap nets were set on Lake Hopatcong between April 16th and May 8th. Between three and four trap nets were set daily in water depths ranging from 3.5 to 8 ft deep and allowed to fish for 24 hours. Sample sites were selected based on historical sites and diversity of habitat. Once nets are set, the following day the nets were tended and relocated to different random sites to ensure all suitable habitats were sampled. Captured Muskellunge or Walleye were measured for total length and weight, and scales were collected for growth analysis and age. Other fish species were measured for total length and weight, and/or counted for presence.

## Biological Data

A total of 5,828 fish were captured in trap nets. Bluegill, Black Crappie, Yellow Perch, and Pumpkinseed were the four most abundant species sampled in the trap nets respectively (Table 14). A total of twenty species of fish were collected during the 2014 trap net survey at Lake Hopatcong. Catch of both Muskellunge and Walleye were moderate to good. A total of ten Muskellunge were captured and they ranged in size from 991 – 1210 mm long and 6.6 – 16 kg. Of the Muskellunge captured, the majority were larger individuals, with all 10 exceeding the keeper size of 36 inches and 7 exceeding trophy size of 40 inches! The overall mean $W_r$ for Muskellunge collected was 102 ± 9.34 and ranged from 78 – 120 which indicates very good conditions (Table 17). A total of 71 Walleye were captured and they ranged in size from 419 – 720 mm long and 0.64 – 3.755 kg. Of the Walleye captured, the majority were larger individuals (PSD of 100, $RSD_P$ of 86, and $RSD_m$ of 23), with all but 2 of the 71 exceeding the keeper size of 18 inches. The overall mean $W_r$ for Walleye collected was 90 ± 2.06 and ranged from 71 – 132 which indicates below average conditions (Table 17).

Coolwater trap netting this year on Lake Hopatcong was done in conjunction with the Lake Hopatcong Inventory which entailed a variety of other sample gear, additional sampling of the same species, and spanned two years worth of data collection. Additional data was collected on Walleye during boat electrofishing in 2013 and 2014 and a comprehensive look at all the data as a whole can be found in the Lake Hopatcong Inventory Report. The data within this report is a review of the trap netting data only and primarily coolwater species.

**Table 14.** Total number and percent of total number of each species caught on Lake Hopatcong in 2014.

| | Total | |
|---|---|---|
| **Species** | **No.** | **% of Pop. By No.** |
| Bluegill | 1787 | 30.65 |
| Black Crappie | 1306 | 22.40 |
| Yellow Perch | 985 | 16.90 |
| Pumpkinseed | 606 | 10.39 |
| White Perch | 350 | 6.00 |
| Alewife | 203 | 3.48 |
| Brown Bullhead | 191 | 3.28 |
| Golden Shiner | 105 | 1.80 |
| Rock Bass | 74 | 1.27 |
| Chain Pickerel | 72 | 1.23 |
| Walleye | 71 | 1.22 |
| Yellow Bullhead | 45 | 0.77 |
| Muskellunge | 10 | 0.17 |
| Smallmouth Bass | 6 | 0.10 |
| Largemouth Bass | 5 | 0.09 |
| Redbreast Sunfish | 5 | 0.09 |
| Common Carp | 4 | 0.07 |
| Creek Chubsucker | 1 | 0.02 |
| Rainbow Trout | 1 | 0.02 |
| Channel Catfish | 1 | 0.02 |
| Redfin Pickerel | 1 | 0.02 |
| Hybrid Striped Bass | 1 | 0.02 |
| **Total** | **5830** | **100** |

Trap netting is typically not a successful practice in terms of sampling Largemouth Bass populations (Largemouth Bass have "net fear"). However, in relating this knowledge to our actual CPUE (0.17/net), and past sampling yields between 1-2/net, the Largemouth Bass population here appears to be below average (Table 15).

Trap netting revealed a good population of Chain Pickerel (CPUE of 2.48/net). Many large individuals composed the population (PSD value of 96 and $RSD_p$ of 60), all but two Chain Pickerel exceeded the 15 inch keeper limit. In Lake Hopatcong many Bluegill, Black Crappie, Yellow Perch, and Pumpkinseed compose a large portion of the forage base. Each population is composed primarily of larger individuals, especially Black Crappie and Yellow Perch whose $RSD_p$ values are 18 and 14 respectively (Table 16). Black Crappie and Yellow Perch populations at Lake Hopatcong appears to be providing excellent angler opportunities.

Proportional Stock Density (PSD) of all species captured was on the higher end of their accepted ranges (Table 16) and part of this may be due to trap net bias. For instance, Laarman and Ryckman (1982) showed that trap nets were selective for larger sizes of Rock Bass, Walleye, Black Crappie, Bluegill, Yellow Perch, and Pumpkinseed. Being aware of these biases and interpreting them based upon the knowledge of these biases is appropriate. All gear used in collection of fisheries data can have their own bias. Even the method of collection can create a bias to alter what we perceive is the current condition of a fishery, verses what's actually present.

## Management Recommendations

1. Continue to manage Muskellunge and Walleye under the current regulations.
2. Refer to Lake Hopatcong Inventory for additional management recommendations.

**Table 15.** Catch per unit effort (CPUE) and stock density indices for Spring Trap Netting on Lake Hopatcong in 2014.

| Species | Number | % of Pop by Number | Nets Set | CPUE | PSD | 95% CI (+/-) | $RSD_p$ | $RSD_m$ |
|---|---|---|---|---|---|---|---|---|
| Bluegill | 1787 | 30.7 | 29 | 61.62 | 81 | 8 | 1 | 0 |
| Black Crappie | 1306 | 22.4 | 29 | 45.03 | 79 | 7 | 18 | 5 |
| Yellow Perch | 985 | 16.9 | 29 | 33.97 | 86 | 7 | 14 | 0 |
| Pumpkinseed | 606 | 10.4 | 29 | 20.90 | 90 | 9 | 3 | 0 |
| White Perch | 350 | 6.0 | 29 | 12.07 | - | - | - | - |
| Alewife | 203 | 3.5 | 29 | 7.00 | - | - | - | - |
| Brown Bullhead | 191 | 3.3 | 29 | 6.59 | - | - | - | - |
| Golden Shiner | 105 | 1.8 | 29 | 3.62 | - | - | - | - |
| Rock Bass | 74 | 1.3 | 29 | 2.55 | - | - | - | - |
| Chain Pickerel | 72 | 1.2 | 29 | 2.48 | 96 | 8 | 60 | 2 |
| Walleye | 71 | 1.2 | 29 | 2.45 | 100 | 1 | 86 | 23 |
| Yellow Bullhead | 45 | 0.8 | 29 | 1.55 | - | - | - | - |
| Muskellunge | 10 | 0.2 | 29 | 0.34 | 100 | 10 | 100 | 40 |
| Smallmouth Bass | 6 | 0.1 | 29 | 0.21 | - | - | - | - |
| Largemouth Bass | 5 | 0.1 | 29 | 0.17 | - | - | - | - |
| Redbreast Sunfish | 5 | 0.1 | 29 | 0.17 | - | - | - | - |
| Common Carp | 4 | 0.1 | 29 | 0.14 | - | - | - | - |
| Creek Chubsucker | 1 | 0.0 | 29 | 0.03 | - | - | - | - |
| Redfin Pickerel | 1 | 0.0 | 29 | 0.03 | - | - | - | - |
| Rainbow Trout | 1 | 0.0 | 29 | 0.03 | - | - | - | - |
| **Total** | **5828** | | | | | | | |

**Note:** A total of 29 nets were set for a 24 hour period each, a total of 696 hours of sampling.

**Table 16.** Size structure/composition of fish species captured described using Proportional Stock Density (PSD) indices with 95% Confidence Intervals (CI), Preferred-Relative Stock Density indices ($RSD_p$), and Memorable-Relative Stock Density ($RSD_m$)indices from Spring Trap Netting on Lake Hopatcong in 2014.

| Species (w/ accepted PSD ranges) | Size (mm) | Number | PSD | 95% CI | $RSD_p$ | $RSD_m$ |
|---|---|---|---|---|---|---|
| Chain pickerel | ≥ 250 | 47 | 96 | 8 | 60 | 2 |
| | ≥ 380 | 45 | | | | |
| | ≥ 510 | 28 | | | | |
| | ≥ 630 | 1 | | | | |
| Bluegill (20 - 60) | ≥ 80 | 117 | 81 | 8 | 1 | 0 |
| | ≥ 150 | 95 | | | | |
| | ≥ 200 | 1 | | | | |
| | ≥ 250 | 0 | | | | |
| Pumpkinseed | ≥ 80 | 72 | 90 | 9 | 3 | 0 |
| | ≥ 150 | 65 | | | | |
| | ≥ 200 | 2 | | | | |
| | > 250 | 0 | | | | |
| Yellow perch (30 - 50) | ≥ 130 | 145 | 86 | 7 | 14 | 0 |
| | ≥ 200 | 125 | | | | |
| | ≥ 250 | 21 | | | | |
| | ≥ 300 | 0 | | | | |
| Black crappie (30 - 60) | ≥ 130 | 165 | 79 | 7 | 18 | 5 |
| | ≥ 200 | 130 | | | | |
| | ≥ 250 | 30 | | | | |
| | ≥ 300 | 8 | | | | |
| Muskellunge | ≥ 510 | 10 | 100 | 10 | 100 | 40 |
| | ≥ 760 | 10 | | | | |
| | ≥ 970 | 10 | | | | |
| | ≥ 1070 | 4 | | | | |
| Walleye | ≥ 250 | 70 | 100 | 1 | 86 | 23 |
| | ≥ 380 | 70 | | | | |
| | ≥ 510 | 60 | | | | |
| | ≥ 630 | 16 | | | | |

**Table 17.** Condition of fish species captured on Lake Hopatcong in 2014 indicated by Relative Weight ($W_r$) index. Relative Weight quantifies fish condition based on how much a fish weighs for its length. A $W_r$ of 95-105 is a typical objective for most species. Values well below 100 for a size group may be indicative of a problem in food and feeding relationships, and values well above 100 for a size group may be indicative of fish not making the best use of available prey.

| Species | Number | Avg $W_r$ | 95 % CI (+/-) | SE | Range $W_r$ | |
|---|---|---|---|---|---|---|
| | | | | | Min | Max |
| Chain Pickerel | 47 | 85 | 3.27 | 1.24 | 68 | 139 |
| Bluegill | 117 | 90 | 2.90 | 1.69 | 45 | 175 |
| Pumpkinseed | 72 | 98 | 2.66 | 1.17 | 61 | 144 |
| Yellow Perch | 145 | 79 | 2.03 | 1.40 | 48 | 191 |
| Black Crappie | 165 | 94 | 1.43 | 0.97 | 54 | 143 |
| Muskellunge | 10 | 102 | 9.34 | 1.49 | 78 | 120 |
| Walleye | 70 | 90 | 2.06 | 0.93 | 71 | 132 |

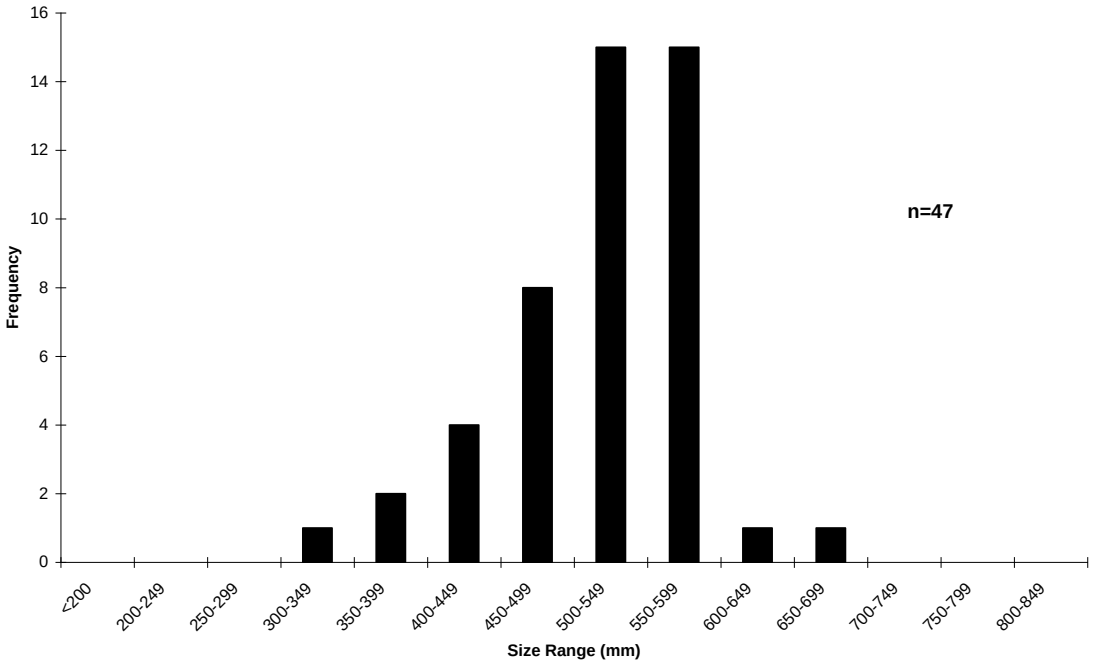


**Figure 12.** Length-Frequency Histogram of Chain Pickerel from Spring Trap Netting Lake Hopatcong (2014).

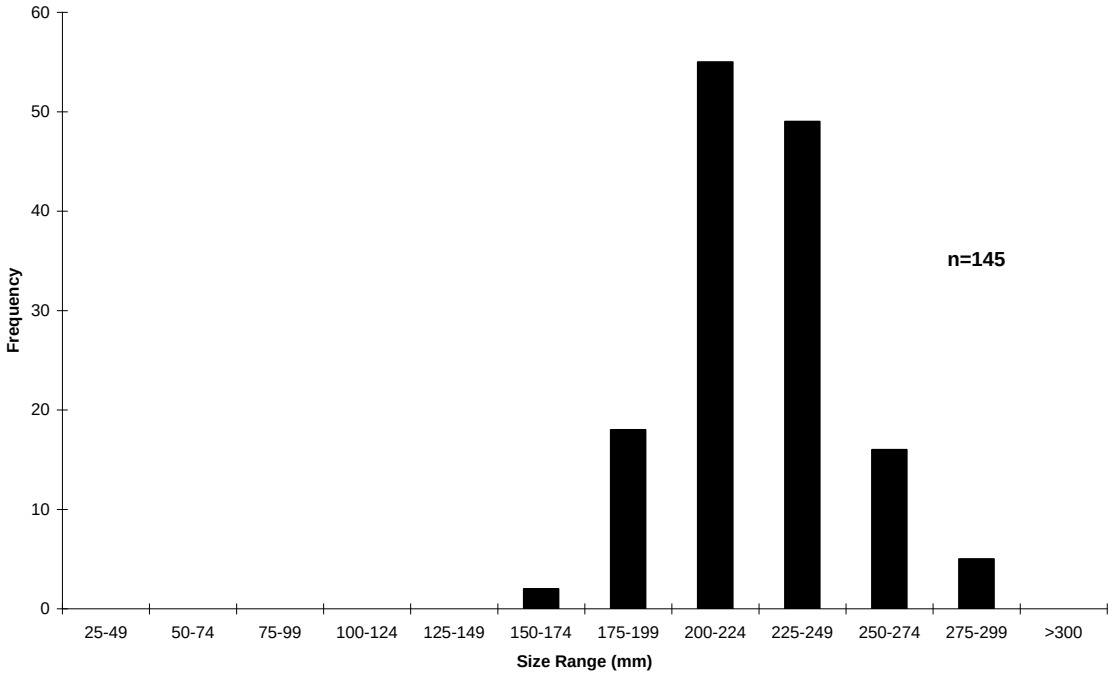


**Figure 13.** Length-Frequency Histogram of Yellow Perch from Spring Trap Netting Lake Hopatcong (2014).

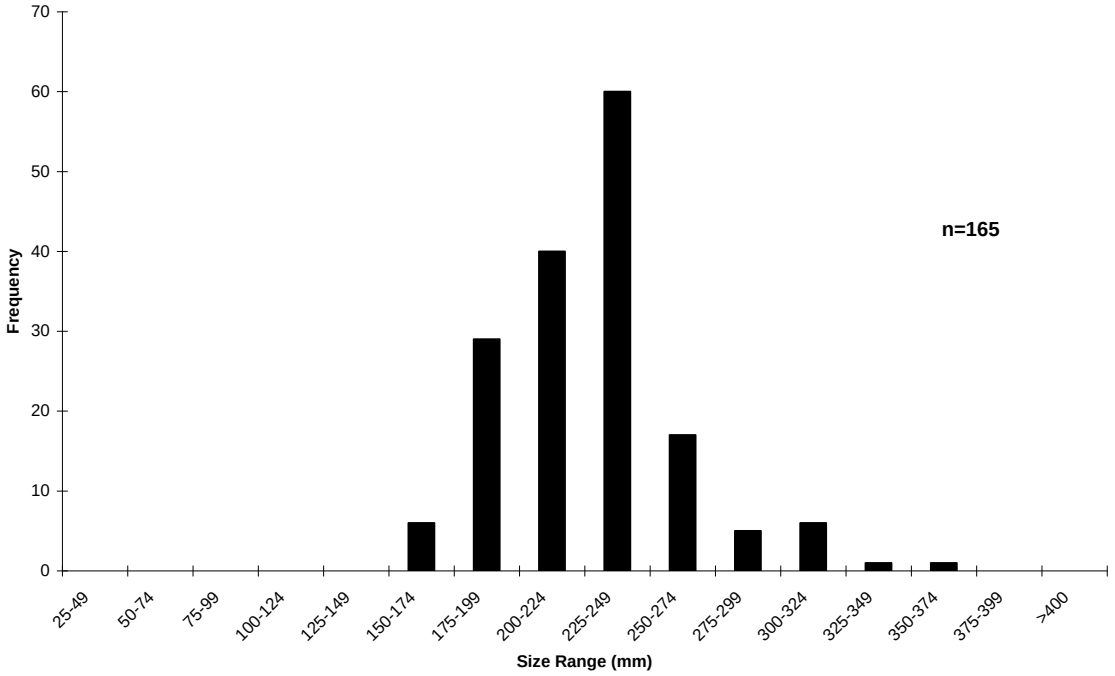


**Figure 14.** Length-Frequency Histogram of Black Crappie from Spring Trap Netting Lake Hopatcong (2014).

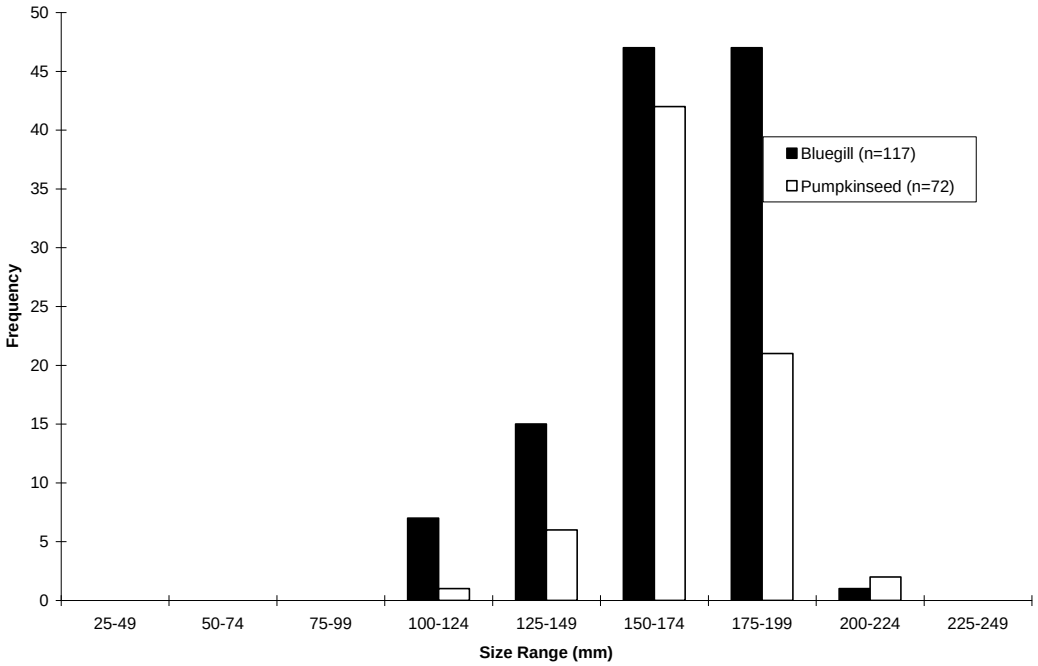


**Figure 15.** Length-Frequency Histogram of sunfish species from Spring Trap Netting Lake Hopatcong (2014).

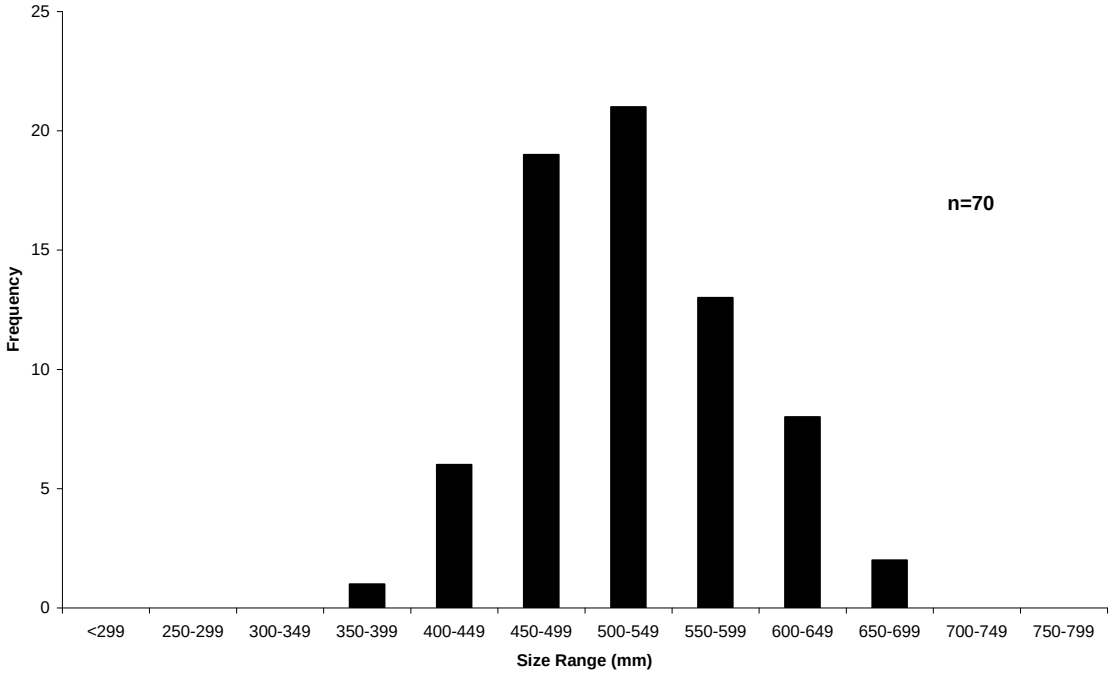


**Figure 16.** Length-Frequency Histogram of Walleye from Spring Trap Netting Lake Hopatcong (2014).

## References

Laarman, P.W., and J.R. Ryckman. 1982. Relative size selectivity of trap nets for eight species of fish. North American Journal of Fisheries Management 2: 33-37.

McInerny, M.C. and T.K. Cross. 2006. Trap-net catchability of Black Crappies. North American Journal of Fisheries Management 26(3): 652-654.

# Opening Day Trout Angler Survey Report (2014)

## Investigations and Management of New Jersey's Freshwater Fisheries Resources (APPENDIX I)

By
Scott Collenburg, Assistant Fisheries Biologist

New Jersey Department of Environmental Protection
Division of Fish and Wildlife
Bureau of Freshwater Fisheries

Sportfish Restoration Grant F-48-R

*This grant was paid for by fishing license sales and matching Dingell-Johnson/Wallop-Breaux funds available through the Federal Sportfish Restoration Act.*

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**What are Angler Surveys?**

Angler (or sometimes referred to as "creel") surveys are one device utilized by Fisheries Managers to help protect and enhance freshwater fishing opportunities. An angler survey is a widely applied and broad term that simply refers to methods of sampling that are used to collect recreational fishing information.

Many anglers who fish on Opening Day of trout season may already be familiar with the Bureau of Freshwater Fisheries use of angler surveys given that this tool has been utilized since 2004 on about 120 trout stocked locations throughout the Garden State. So, if you fish on Opening Day, you may have a good chance of having your voice heard and taking part in the management of New Jersey's freshwater fisheries. Just another, of many good reasons, to get out there and fish!

The Bureau of Freshwater Fisheries (BFF) relies on anglers to gather information about angler success, fishing preferences, interests, and attitudes, not only about trout stocking, but also about the Division's Freshwater Fishery program. The BFF collects angler information through multiple formats: phone, online, angler logbooks, or on-site surveys. The type of angler survey that is used on Opening Day is referred to as an "On-Site Creel Survey" because surveys or interviews are conducted at the time the angler is fishing. Traditionally, anglers kept their catch in a wicker basket, also known as a creel. Even though anglers commonly opt to store their catch on a stringer or in a cooler, the term creel still refers to what an angler has caught. The intent of this type of data is to provide the Division with information to better understand anglers, provide better service, and ultimately improve fishing throughout New Jersey.

The Opening Day Angler Survey has two main objectives: (1) to record angler presence or turnout on specific waterbodies and (2) to determine angler success. This data is gleaned from casual interviews with anglers. Data about species specific catch, waterbody conditions, cormorant activity, and other pertinent information is also collected to enable the Bureau of Freshwater Fisheries to better manage the waterbodies that are being stocked with trout. The emphasis of the opening day survey is on lakes and ponds because of the difficulty in obtaining and assessing accurate angler turnout and success on streams. In 2014, on selected waterbodies, specific questions were asked to gauge angler reaction to possible regulation changes. This year, specific questions were asked of all anglers about how often they fish and what species that they fish for.

Above: Dahnert's Lake on 4/5/2014
Photo Credit: Art Lemise, WCC

**How are surveys conducted?**

Wildlife Conservation Corps (WCC) volunteers assist Fish and Wildlife in conducting surveys on various waterbodies on Opening Day of trout season. Each volunteer, or angler survey clerk, is assigned a waterbody and given written instructions to be reviewed before Opening Day so questions or concerns about the survey can be addressed.

All individuals who are fishing are counted by angler survey clerks to help determine angler turn-out. Total counts of anglers fishing are made at 8 a.m., 9 a.m., 10 a.m., 11 a.m., and 12 p.m. From the five counts made, the highest count is used as an indicator of total turnout on that specific waterbody. A limitation to making angler counts hourly is that turnover is not taken into account. For example, if 10 anglers leave the waterbody, and 10 new anglers arrive, the count would still be 10. However, survey clerks would have a difficult time keeping track of all anglers coming and going, especially on large waterbodies, as they rove between different locations interacting with anglers.

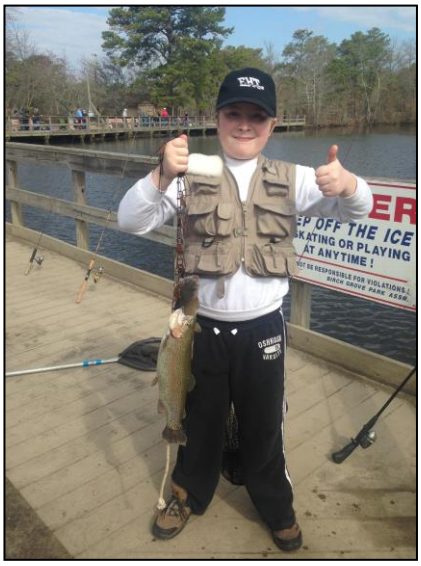
Above: Manalapan Lake, Noah Templeton on 4/5/2014

Between angler counts, survey clerks begin wandering around and having casual conversations with anglers. Survey clerks record angler catches, what successful anglers are using to catch trout, observations about the fishing action in general, and any other pertinent information supplied by the anglers or observed by the survey clerk.

Survey clerks record their gathered data on supplemental data forms and then send them back to the Division of Fish and Wildlife so it can be compiled and analyzed. Lakes and streams are analyzed separately because of the difficulty in counting total anglers fishing on a given stream stretch at one particular point in time. Angler counts on streams are not as reliable and can skew actual angler turnout.

**Results of the 2014 Opening Day Angler Survey**

The Opening Day of the 2014 trout season was Saturday, April 5th and the angler survey was conducted on this day from 8 a.m. - 12 p.m. The weather was sunny, but windy in many locations. Of the 37 surveys conducted and completed, 33 were on lakes and ponds. On the 33 lakes and ponds surveyed, 1830 anglers (Figure 1) were observed fishing (an average of ~55 anglers per waterbody). Note that angler counts do not take into account turnover; we do not keep track of the number of anglers coming and going. For example, a volunteer survey clerk at a waterbody may record 100 anglers on any given hour, then, they count 100 anglers the next hour; this second count does not take into account anglers that may have left or arrived in that time interval. By making counts using our methods (number of anglers counted every hour and using the highest number to indicate count) we run the risk of underestimating the amount of anglers that actually fished on Opening Day on any given waterbody. Bear in mind the difficulty in tracking turnover as survey clerks are constantly interviewing anglers and roving between different locations on a waterbody.




Above: Birch Grove Park Pond, Addison Bard on 4/5/2014
Photo credit: Sean Carey, WCC

There were reports of great trout fishing, but in many places fishing was "slow." Some creel clerks counted over 100 anglers at their respective waterbodies, they included Birch Grove Park Pond, Verona Park Pond, Burnham Park Pond, and Musconetcong River (Stephens State Park). However, some waterbodies, such as Mary Elmer Lake (18), Heritage Park Pond (14), DOD Lake (8), and Mountain Lake (8), were noted as having low angler turnouts.

A complete list of Opening Day angler turnouts can be found in Table 1 along with trout catch information. At Shaws Mill Pond, Verona Park Pond, Schadler's Sand Wash Pond, and Rowands Pond, anglers were very successful catching 125, 105, 102 and 81 trout, respectively. Waterbodies that reported no trout caught or less than 5 trout caught between all anglers included:

- Greenwich Lake
- Swedesboro Lake
- Colonial Lake
- DOD Lake
- Heritage Park Pond
- Mary Elmer Lake
- Lake Shenandoah
- Mountain Lake
- Rosedale Lake
- Roosevelt Park Pond
- Crystal Lake

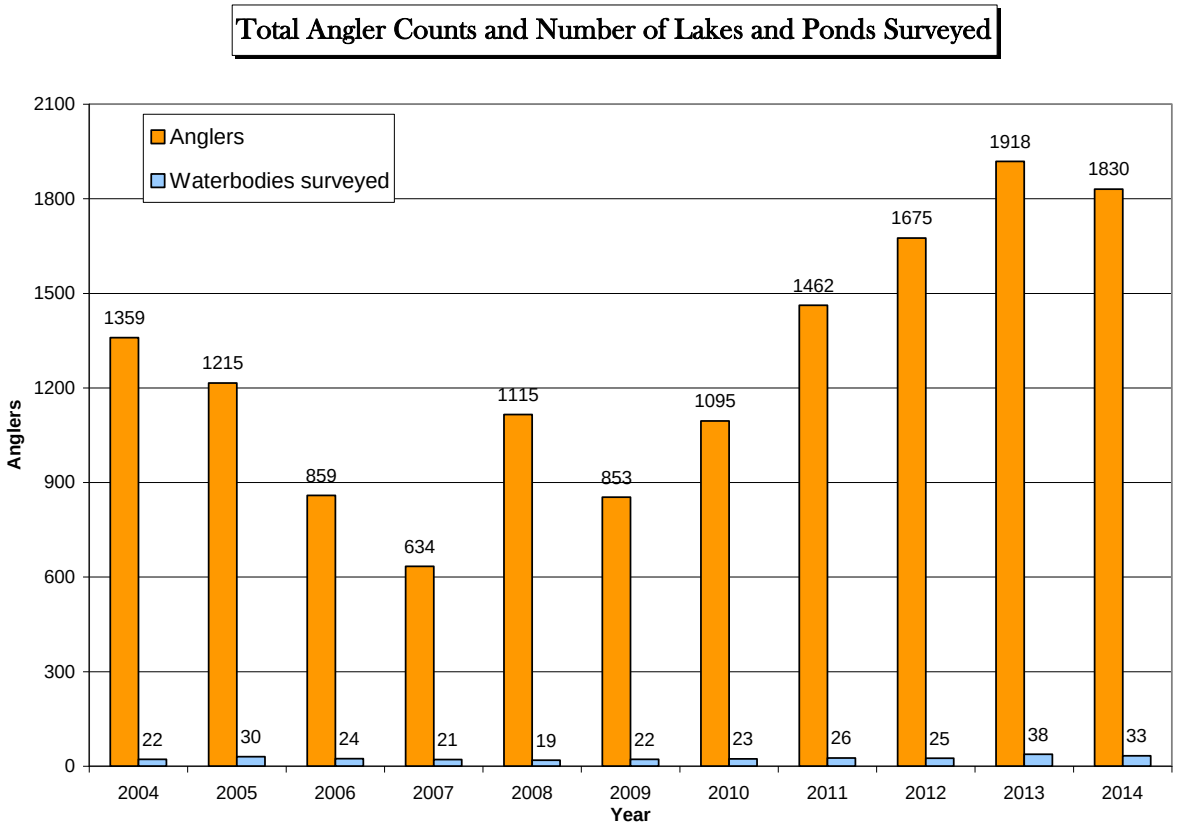



**Figure 1:** Opening Day trout angler counts over the past 10 years (official angler turnout is estimated from taking the highest of five hourly counts between 8a.m. and 12p.m.). Angler counts completed before 2012 were conducted from 8a.m. – 11a.m.

## Trout-stocked Lakes and Ponds

On 33 lakes and ponds that had surveys conducted, 13 reported 50 or more anglers. Birch Grove Park Pond had the largest angler turnout with 201 anglers counted at one point. Verona Park Pond continues to be a popular spot for anglers (after having the highest turnout in 2012 (182) and 2013 (125)), 161 anglers were counted at one point. Some key highlights from Opening Day are as follows:

- Great fishing and high numbers of trout caught (an average of over 1 trout per angler) were reported at Grenloch Lake, Blair Lake, Englishtown Mill Pond, Rowands Pond, Shaws Mill Pond, Schadler's Sand Wash Pond, and Holmdel Park Pond.
- Low catch rates (1 fish or less for every 5 anglers) were reported at Roosevelt Park Pond, Rosedale Lake, Heritage Park Pond, Amwell Lake, Mary Elmer Lake, Crystal Lake, Birch Grove Park Pond, Lake Shenandoah, Greenwich Lake, Swedesboro Lake, Colonial Lake, and DOD Lake (Table 1).
- Seven out of eight waterbodies that received the highest angler turnout were stocked with Bonus Broodstock (table 1).

**Table 1:** Lakes and ponds included in the 2014 trout angler survey, showing largest to smallest angler turnout.

| County | Waterbody | BB[1] | Total # of Anglers | Total # of Trout Caught |
|---|---|---|---|---|
| Atlantic | Birch Grove Park Pond | **X** | 201 | 9 |
| Essex | Verona Park Pond | **X** | 161 | 105 |
| Morris | Burnham Park Pond | **X** | 138 | 55 |
| Camden | Oak Pond | | 97 | - |
| Bergen | Dahnert's Lake | **X** | 93 | 71 |
| Hunterdon | Amwell Lake | **X** | 89 | 6 |
| Cumberland | Shaws Mill Pond | **X** | 88 | 125 |
| Burlington | Crystal Lake[2] | **X** | 82 | 4 |
| Gloucester | Greenwich Lake | | 69 | 0 |
| Sussex | Lake Ocquittunk | | 67 | 31 |
| Gloucester | Iona Lake | | 64 | 30 |
| Camden | Rowands Pond | | 62 | 102 |
| Salem | Schadler's Sand Wash Pond[2] | | 58 | 81 |
| Atlantic | Hammonton Lake | | 49 | 30 |
| Middlesex | Manalapan Lake | | 47 | 16 |
| Mercer | Rosedale Lake[2] | | 41 | 3 |
| Gloucester | Swedesboro Lake | | 41 | 0 |
| Monmouth | Holmdel Park Pond | | 38 | 47 |
| Monmouth | Englishtown Mill Pond | | 35 | 59 |
| Middlesex | Roosevelt Park Pond | | 35 | 4 |
| Gloucester | Harrisonville Lake | | 31 | 13 |
| Cumberland | South Vineland Park Pond | | 30 | 25 |
| Passaic | Barbours Pond | | 30 | 18 |
| Ocean | Prospertown Lake | | 29 | 8 |
| Gloucester | Grenloch Lake | | 27 | 69 |
| Ocean | Lake Shenandoah[2] | | 26 | 1 |
| Warren | Blair Lake | | 22 | 43 |
| Mercer | Colonial Lake | | 22 | 0 |
| Cumberland | Mary Elmer Lake | | 18 | 1 |
| Atlantic | Heritage Park Pond[2] | | 14 | 1 |
| Warren | Mountain Lake | | 8 | 2 |
| Salem | DOD Lake | | 8 | 0 |

[1]Bonus Broodstock Waterbodies

[2]Angler counts were not conducted from 8a.m. - 12p.m.(refer to appendix for details)

**Trout-stocked Streams and Rivers**

Angler counts and success on streams and rivers is difficult to assess because the distance that has to be covered and the movement in and out of fishing spots by anglers. However, getting angler input and having casual conversations with as many anglers as possible gives us a general idea of how successful and happy anglers are with fishing on Opening Day. Angler surveys and counts were conducted on the following 4 streams: Musconetcong River (Stephens State Park), Glenwood Brook, Big Flat Brook (fly stretch), and the South Branch Raritan River (Ken Lockwood Gorge).

- The Musconetcong River at Stephens State Park had a large turnout with both upper and lower parking lots of the State Park filled to capacity at 8 AM. Fishing on the Musconetcong River was great too with 81 total trout seen caught by the volunteer survey clerk.
- Glenwood Brook had a small turnout with an angler count of 5. The survey clerk noted that with few good spots along the stream to fish, anglers that would potentially fish there pass by and go somewhere else. Despite the low angler count, anglers that fished at Glenwood Brook did well and caught a total of 24 trout.
- The Big Flat Brook / Flat Brook Catch and Release area was surveyed and 36 anglers were counted and a total of 77 trout were seen caught. A few anglers did a lot better than others on this stretch.
- The South Branch of the Raritan River (Ken Lockwood Gorge) Catch and Release area was surveyed and 26 anglers were counted and a total of 2 trout were seen caught.

**Update: Are Rainbow Trout Easier to Catch?**

In 2012 and 2013, for our Spring Trout Program, eight waterbodies were stocked pre-season with a mix of Brook and Rainbow Trout (50% each species) rather than the traditional 100% Brook Trout, to see if anglers were more successful catching one species (Table 2).

**Table 2:** Waterbodies stocked pre-season with a mix of Brook and Rainbow Trout (50% each species).

| County | Waterbody |
|---|---|
| Bergen | Dahnert's Lake |
| Middlesex | Roosevelt Park Pond |
| Essex | Verona Park Pond |
| Hunterdon | Amwell Lake |
| Morris | Burnham Park Pond |
| Passaic | Barbours Pond |
| Sussex | Lake Ocquittunk |
| Union | Seeley's Pond |

Between 2012 and 2013, Rainbow Trout were caught more often than Brook Trout overall (430 Rainbow Trout compared to 206 Brook Trout). With the exception of Amwell Lake in 2012, on every waterbody Rainbow Trout gave anglers a better return to creel compared to Brook Trout (Table 3). Figure 3 shows return to creel from 2012-2013 (collectively) of each species, on each waterbody.

**Table 3:** Results of trout caught on lakes that were stocked with 50% Rainbow Trout and 50% Brook Trout in 2012 and 2013. Overall, Rainbow Trout were caught 1.7 times more than Brook Trout in 2013 and 2.6 times more than Brook Trout in 2012. Trout that were greater than 14" in length were not included as they had the potential to be holdovers from a previous seasons stocking.

| County | Waterbody | Brook trout caught | | Total Brook Trout Caught | Rainbow trout caught | | Total Rainbow Trout | Rainbow trout to Brook trout Ratio |
|---|---|---|---|---|---|---|---|---|
| | | kept | rel | | kept | rel | | |
| **2013 Results** | | | | | | | | |
| Bergen | Dahnert's Lake | 8 | 0 | 8 | 11 | 3 | 14 | 1.8 |
| Bergen | Dahnert's Lake (4/7) | 1 | 0 | 1 | 5 | 0 | 5 | 5.0 |
| Middlesex | Roosevelt Park Pond | 0 | 0 | 0 | 3 | 0 | 3 | 3 to 0 |
| Essex | Verona Park Pond | 46 | 17 | 63 | 52 | 19 | 71 | 1.1 |
| Hunterdon | Amwell Lake | 1 | 0 | 1 | 14 | 1 | 15 | 15.0 |
| Morris | Burnham Park Pond | 0 | 0 | 0 | 1 | 1 | 2 | 2 to 0 |
| Passaic | Barbours Pond | 11 | 0 | 11 | 51 | 2 | 53 | 4.8 |
| Passaic | Barbours Pond (4/7) | 10 | 2 | 12 | 5 | 0 | 5 | 0.4 |
| Sussex | Lake Ocquittunk | 4 | 0 | 4 | 9 | 0 | 9 | 2.3 |
| Union | Seeley's Pond | 13 | 1 | 14 | 15 | 1 | 16 | 1.1 |
| | **Total (2013)** | 94 | 20 | **114** | 166 | 27 | **198** | 1.7 |
| **2012 Results** | | | | | | | | |
| Bergen | Dahnert's Lake | 6 | 0 | 6 | 32 | 7 | 39 | 6.5 |
| Middlesex | Roosevelt Park Pond | 0 | 4 | 4 | 9 | 2 | 11 | 2.8 |
| Essex | Verona Park Pond | 16 | 0 | 16 | 31 | 0 | 31 | 1.9 |
| Hunterdon | Amwell Lake | 23 | 0 | 23 | 15 | 0 | 15 | 0.7 |
| Morris | Burnham Park Pond | 1 | 0 | 1 | 13 | 0 | 13 | 13.0 |
| Passaic | Barbours Pond | 0 | 0 | 0 | 52 | 0 | 52 | 52 to 0 |
| Sussex | Lake Ocquittunk | 19 | 1 | 20 | 31 | 0 | 31 | 1.6 |
| Union | Seeley's Pond | 22 | 0 | 22 | 44 | 1 | 45 | 2.0 |
| | **Total (2012)** | 87 | 5 | **92** | 227 | 10 | **237** | 2.6 |
| **Total** | **2012-2013** | **181** | **25** | **206** | **393** | **37** | **430** | **2.1** |

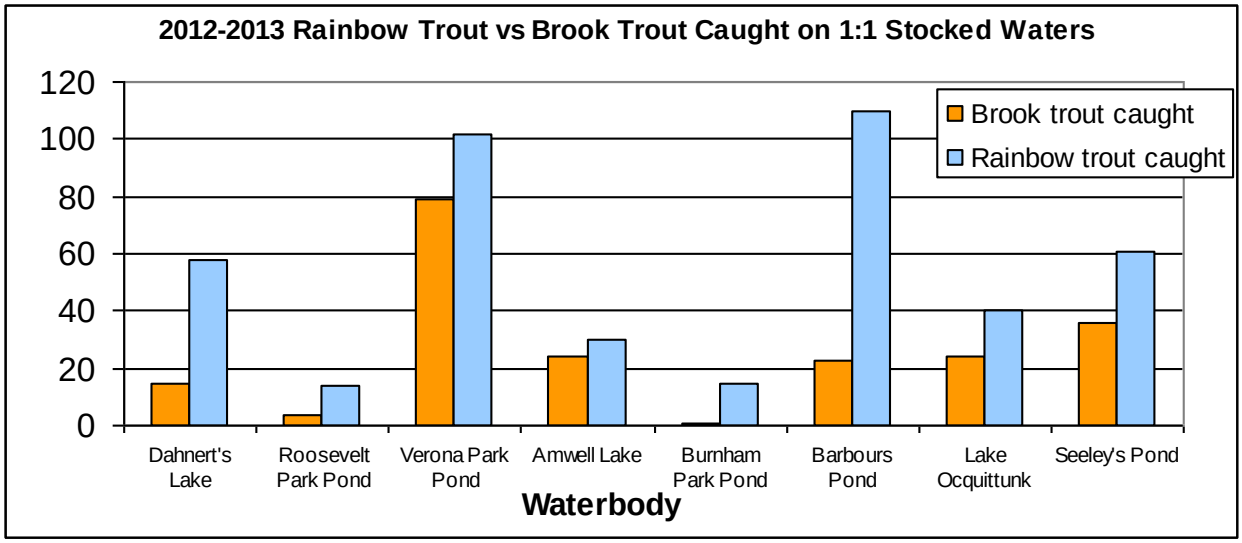



**Figure 3:** 2012-2013 cumulative return to creel of Rainbow Trout and Brook Trout on waterbodies that received 1:1 stocking.

In 2014, the 33 waterbodies that were surveyed on Opening Day received either full allocations of Rainbow Trout or full allocations of Brown Trout. Twelve waterbodies received Rainbow Trout and twenty received Brown Trout. Rainbow Trout continued to give anglers a better return

to creel on lakes and ponds surveyed. Of the 10,020 Rainbow Trout stocked in 12 waterbodies surveyed, 813 Rainbow Trout were caught (8.11% of the Rainbow Trout allocated were caught during the Opening Day survey), and of the 27,070 Brown Trout stocked in 20 waterbodies surveyed, 295 Brown Trout were caught (1.09% of the Brown Trout allocated were caught during the Opening Day survey) (Figure 4). In addition, considering fishing pressure on lakes stocked with just Brown Trout were more than double (1,260 anglers counted on Brown Trout waterbodies compared to 501 anglers counted on waterbodies stocked with Rainbow Trout), it polarizes the comparison between Rainbow Trout and Brown Trout fishing success even further (Figure 4).

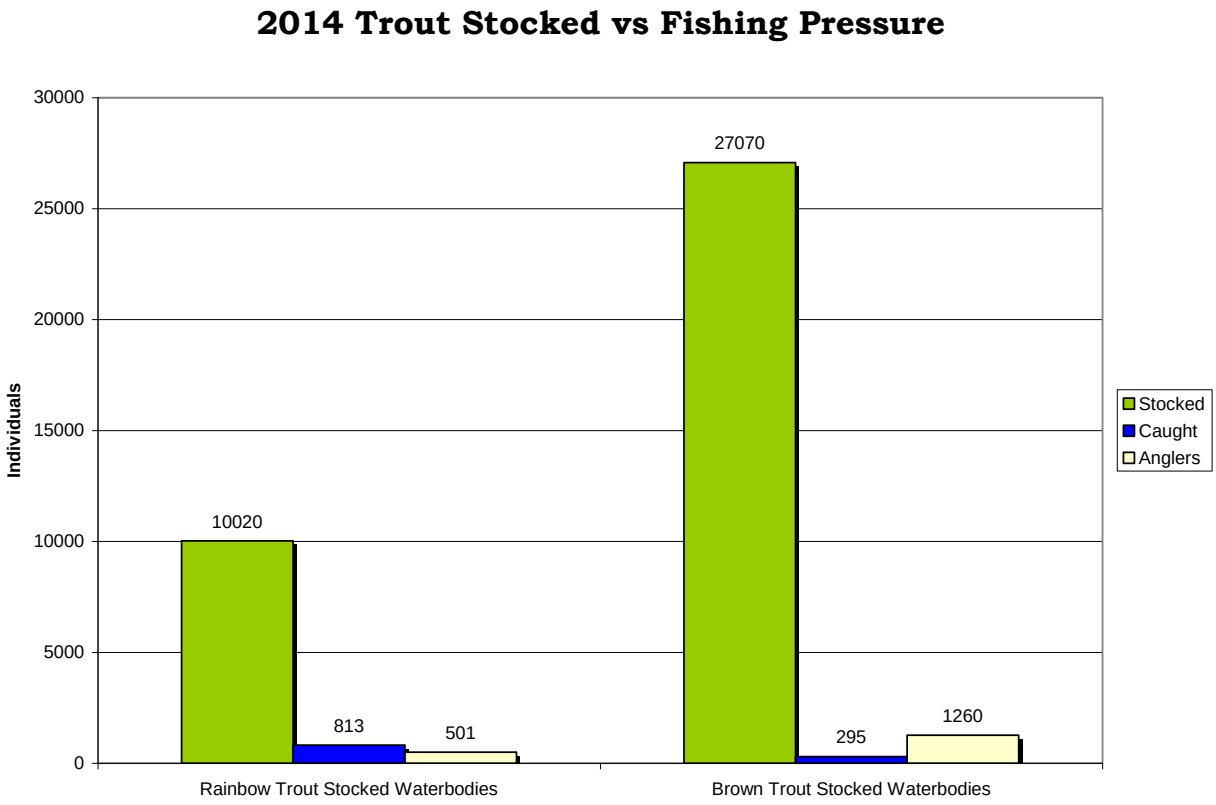



**Figure 4:** 2014 trout species allocations compared to fishing effort. With less fishing pressure (501 anglers utilizing angler counts) and less Rainbow Trout stocked, Rainbow Trout still gave anglers a much higher return to creel than Brown Trout. 8.11% of the Rainbow Trout allocated were caught compared to only 1.09% of the Brown Trout allocated during the Opening Day Angler Survey.

Furthermore, survey clerks reported on 14 waterbodies where less than 10 trout were caught, 12 of those waterbodies were stocked with Brown Trout (Table 4). In general, waterbodies stocked with Rainbow Trout had higher rates of "Trout Caught/Angler" and "Percent of Allocation Caught" (percent of allocated trout caught) (Table 4). Seventy-two Brook Trout were caught and may have been trout that were holdovers from the fall or winter stocking program or potentially misidentified.

**Table 4:** Waterbodies surveyed in 2014, ordered by "Trout Caught/Angler." Of the 32 lakes and ponds surveyed, 12 were stocked with Rainbow Trout (highlighted in pink) and 20 were stocked with Brown Trout.

| County | Waterbody | BB[1] | Total # of Anglers | Total # of Trout Caught | Trout Caught/ Angler | Allocated Trout Species | Allocated # of Trout | Percent of Allocation Caught |
|---|---|---|---|---|---|---|---|---|
| Gloucester | Grenloch Lake | | 27 | 69 | 2.56 | RBT | 950 | 7.26 |
| Warren | Blair Lake | | 22 | 43 | 1.95 | RBT | 240 | 17.92 |
| Monmouth | Englishtown Mill Pond | | 35 | 59 | 1.69 | BNT | 1150 | 5.13 |
| Camden | Rowands Pond | | 62 | 102 | 1.65 | RBT | 600 | 17.00 |
| Cumberland | Shaws Mill Pond | X | 88 | 125 | 1.42 | RBT | 1340 | 9.33 |
| Salem | Schadler's Sand Wash Pond[2] | | 58 | 81 | 1.40 | RBT | 1000 | 8.10 |
| Monmouth | Holmdel Park Pond | | 38 | 47 | 1.24 | BNT | 570 | 8.25 |
| Union | Seeley's Pond | | 38 | 37 | 0.97 | BNT | 630 | 5.87 |
| Cumberland | South Vineland Park Pond | | 30 | 25 | 0.83 | RBT | 1160 | 2.16 |
| Bergen | Dahnert's Lake | X | 93 | 71 | 0.76 | BNT | 690 | 10.29 |
| Essex | Verona Park Pond | X | 161 | 105 | 0.65 | BNT | 1260 | 8.33 |
| Atlantic | Hammonton Lake | | 49 | 30 | 0.61 | RBT | 1450 | 2.07 |
| Passaic | Barbours Pond | | 30 | 18 | 0.60 | BNT | 1130 | 1.59 |
| Gloucester | Iona Lake | | 64 | 30 | 0.47 | RBT | 1100 | 2.73 |
| Sussex | Lake Ocquittunk | | 67 | 31 | 0.46 | RBT | 310 | 10.00 |
| Gloucester | Harrisonville Lake | | 31 | 13 | 0.42 | BNT | 1400 | 0.93 |
| Morris | Burnham Park Pond | X | 138 | 55 | 0.40 | BNT | 910 | 6.04 |
| Middlesex | Manalapan Lake | | 47 | 16 | 0.34 | BNT | 1570 | 1.02 |
| Ocean | Prospertown Lake | | 29 | 8 | 0.28 | BNT | 2350 | 0.34 |
| Warren | Mountain Lake | | 8 | 2 | 0.25 | RBT | 500 | 0.40 |
| Middlesex | Roosevelt Park Pond | | 35 | 4 | 0.11 | BNT | 1100 | 0.36 |
| Mercer | Rosedale Lake[2] | | 41 | 3 | 0.07 | BNT | 1260 | 0.24 |
| Atlantic | Heritage Park Pond[2] | | 14 | 1 | 0.07 | BNT | 1150 | 0.09 |
| Hunterdon | Amwell Lake | X | 89 | 6 | 0.07 | BNT | 1030 | 0.58 |
| Cumberland | Mary Elmer Lake | | 18 | 1 | 0.06 | BNT | 1350 | 0.07 |
| Burlington | Crystal Lake[2] | X | 82 | 4 | 0.05 | BNT | 1470 | 0.27 |
| Atlantic | Birch Grove Park Pond | X | 201 | 9 | 0.04 | BNT | 1050 | 0.86 |
| Ocean | Lake Shenandoah[2] | | 26 | 1 | 0.04 | RBT | 1370 | 0.07 |
| Mercer | Colonial Lake | | 22 | 0 | 0.00 | BNT | 1030 | 0.00 |
| Salem | DOD Lake | | 8 | 0 | 0.00 | BNT | 3350 | 0.00 |
| Gloucester | Greenwich Lake | | 69 | 0 | 0.00 | BNT | 1250 | 0.00 |
| Gloucester | Swedesboro Lake | | 41 | 0 | 0.00 | BNT | 1370 | 0.00 |

[1]Bonus Broodstock Waterbodies

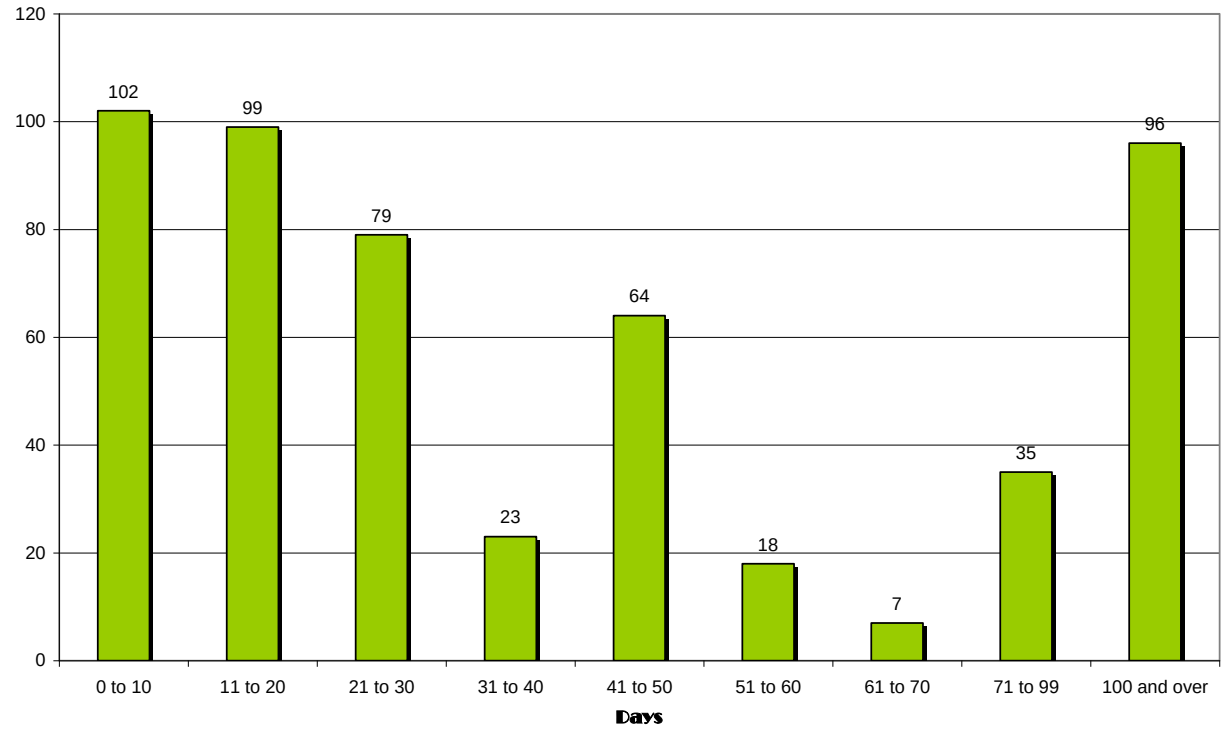
[2]Angler counts were not conducted from 8a.m. - 12p.m.(refer to appendix for details)

## Angler Interview Questions

Specific questions were asked this year on select waterbodies to garner input from anglers who fish Opening Day. Questions pertained to possible regulation changes that were put into effect on the Big Flat Brook and South Branch of the Raritan River (Ken Lockwood Gorge). The following questions were posed to anglers:

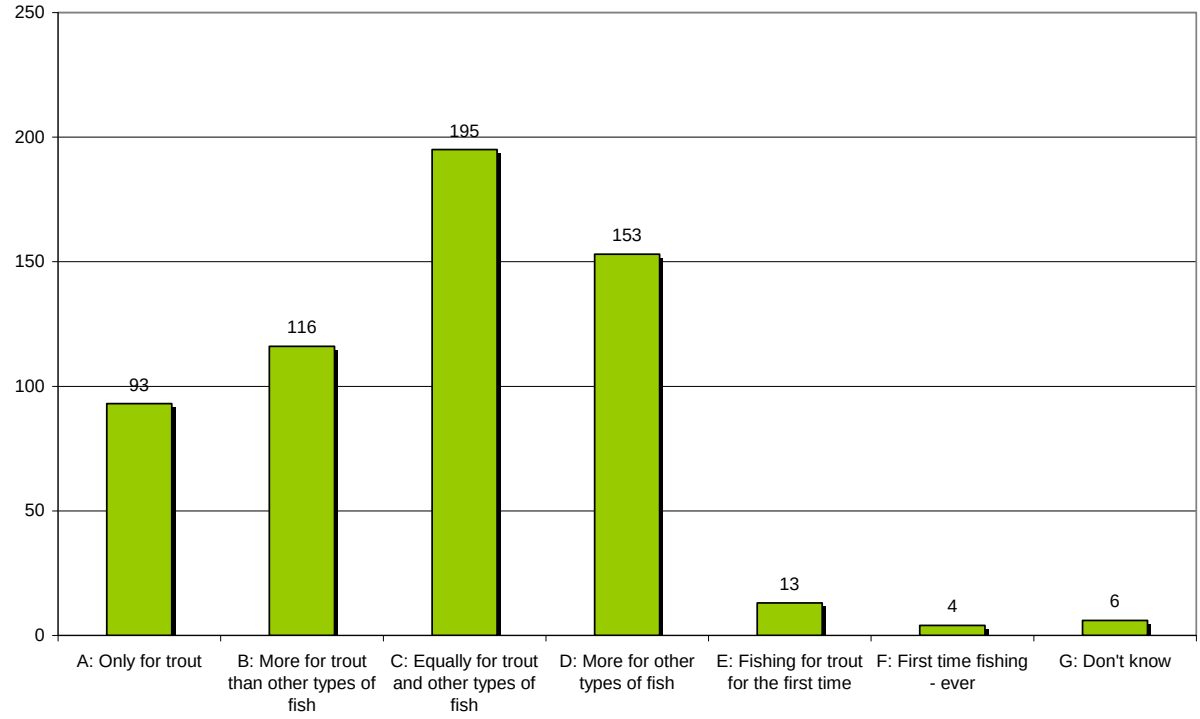
***Trout Angler Interview Questions posed to anglers on April 4, 2014:***

**1. How many days do you freshwater fish in NJ?**




- Most anglers fish between 0-20 days a year
- However, many dedicated and highly recreationally invested anglers fish on Opening Day as well. A large number of anglers, that fish over 100 days a year, are fishing on Opening Day as well.

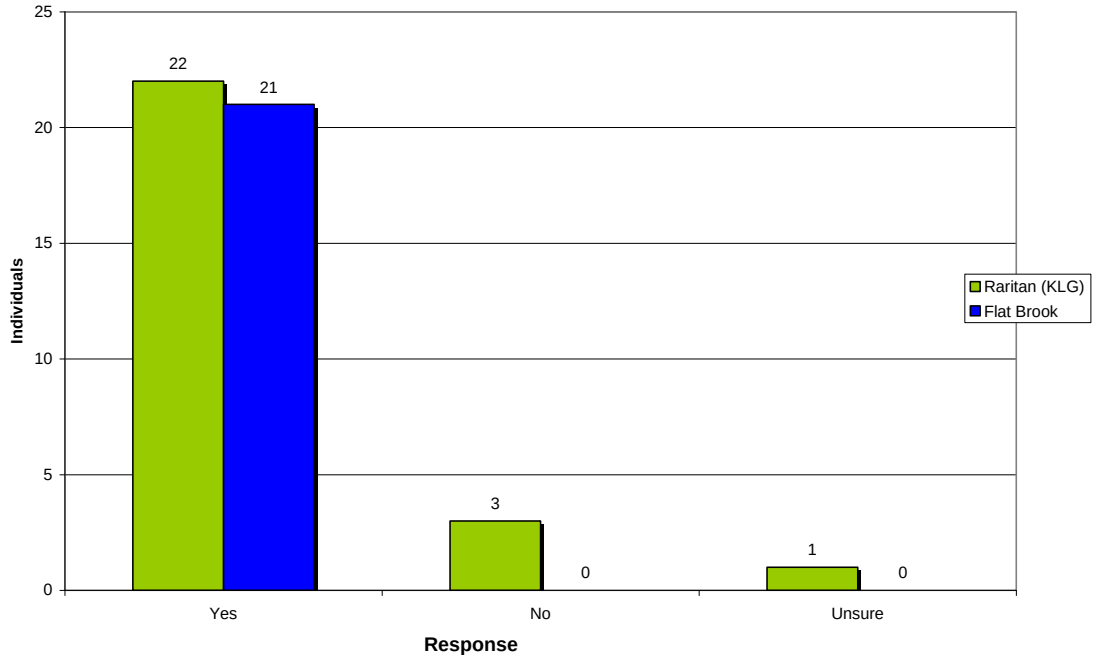
**2. When freshwater fishing in New Jersey do you fish.....**

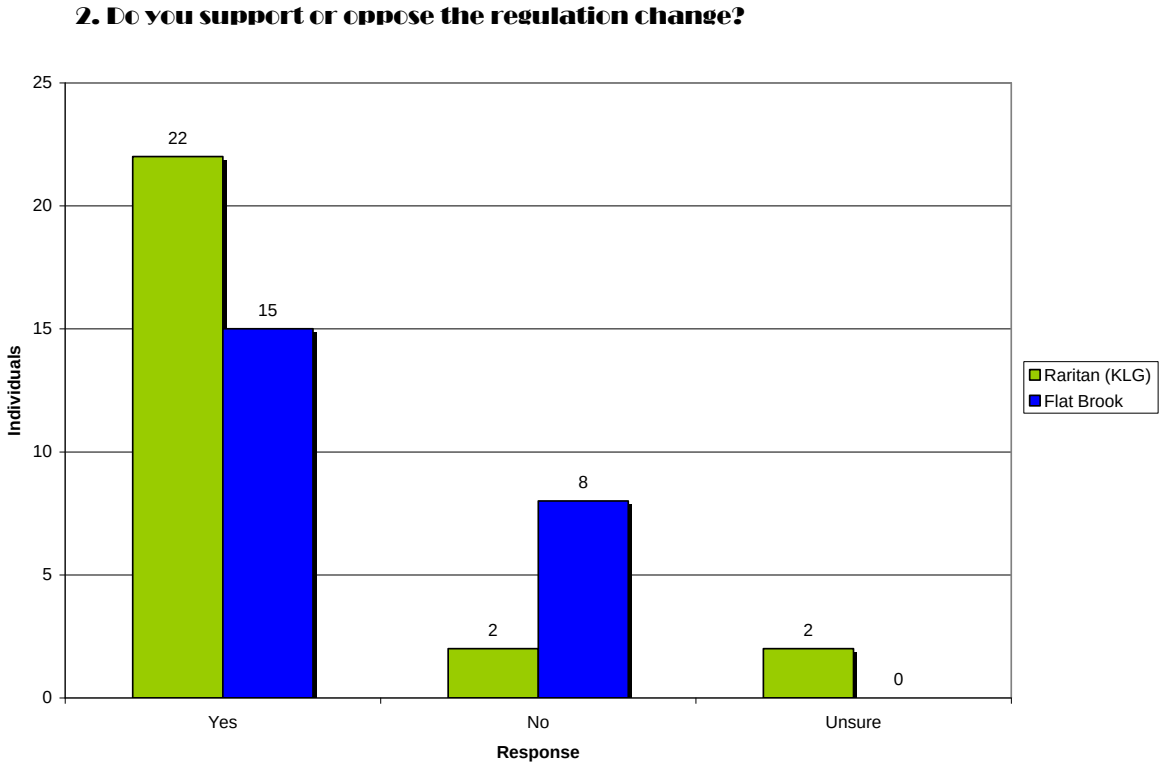



- Most anglers fish for trout as much as they fish for other types of fish.
- A large portion of anglers also spend most of their time fishing for other fish.

***Trout Angler Interview Questions posed to anglers on the Big Flat Brook and South Branch of the Raritan Ken Lockwood Gorge on April 4, 2014 :***

**1. Were you aware of the regulation change prior to today?**






## Summary

The opening day angler counts in 2014 reflected a good angler turnout. Birch Grove Park Pond had the largest showing with 201 anglers wetting their lines.

Overall, and despite a chilly and windy morning, angler turnout was high. Fishing was reportedly "slow" on many waters across the state. Cold waters could have been the reasons curtailing trout activity, especially if we consider that for this year, Brown Trout were primarily stocked preseason, not Brook Trout (as Brook Trout prefer slightly colder water temperatures). Many anglers were discouraged but reports of trout fishing action increased in the following weeks.

Fishing was great in some locations, such as, Grenloch Lake, where over 2 trout were caught per angler on the waterbody. The most successful anglers were lining the banks of trout stocked rivers or streams like the Musconetcong River, Big Flat Brook, or Glenwood Brook. Rowands Ponds, Shaws Mill Pond, and Schadler's Sand Wash Pond were popular and it was uncommon to see stringers empty.

In 2013 when historical trends of angler turnout were investigated, Dahnert's Lake and Roosevelt Park Pond angler turnouts seemed to have noticeably decreased in recent years. In 2014, Roosevelt Park Pond angler turnout decreased again but Dahnert's Lake angler turnout increased (Table 4). In looking at trends for spring trout stocked waterbodies, one factor that seems to influence turnout is Bonus Broodstock waterbodies (Table 4). For Dahnert's Lake, Verona Park Pond, Roosevelt Park Pond, Burnham Park Pond, Barbour's Pond, and Seeley's Pond angler turnout noticeably increased during years when Bonus Broodstock were stocked

(Table 4). However, consistently poor angler success may influence angler turnout, in such cases as Roosevelt Park Pond and Mary Elmer Lake where records of poor angler success have been noted in recent years (Table 4). The Bureau of Freshwater Fisheries has been conscious of the changes to Roosevelt Park Pond's fishery and will be attentive to finding solutions.

**Table 4:** Angler turnout numbers on a variety of trout stocked lakes and ponds since 2004. Years highlighted in yellow indicate bonus broodstock trout were stocked. Data was not collected every year (blank boxes indicate years where angler survey was not conducted).

| County | Waterbody | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bergen | Dahnert's Lake | | | | | 90 | | | 116 | 74 | 60 | 93 |
| Camden | Rowands Pond | | | 56 | | 65 | 49 | | | | 59 | 62 |
| Cumberland | Mary Elmer Lake | | 14 | | 29 | | | 26 | | 32 | 42 | 18 |
| Essex | Verona Park Lake | 156 | | | | | 140 | | 107 | 182 | 125 | 161 |
| Middlesex | Roosevelt Park Pond | 120 | | 26 | | 126 | | | 130 | 64 | 73 | 35 |
| Morris | Burnham Park Pond | 82 | | | | | | | 89 | 37 | 78 | 138 |
| Passaic | Barbour's Pond | | 84 | | | | 84 | | | 107 | 73 | 30 |
| Salem | Schadler's Sand Wash Pond | | | 48 | | | | | | | 53 | 58 |
| Union | Seeley's Pond | | | 29 | | | | | 28 | 67 | 29 | 38 |

Despite the slow start to the spring trout fishing season, anglers will hopefully be more successful as the season progresses. Reports and detailed results noted by volunteer survey clerks for each waterbody surveyed can be found in the appendix of this report.

**Acknowledgements**

This angler survey was made possible by the efforts of New Jersey Fish and Wildlife staff and Wildlife Conservation Corp (WCC) volunteers. Collectively the WCC volunteers spent a total of 139.5 hours on this activity. Special thanks to the following 30 dedicated WCC volunteers who conducted the surveys: Anthony Acceta, Heather Aupperle, Jerry Benfer, Chris Booras, Jeff Bower, Daniel Capparoni, Sean Carey, Marie Ciaffa, Ashley Collier, Gene Cottrell, Mark Delendra, Rich Fernandez, Casey Florek, Juanita Hummel, Ken & Jake Janson, Robert Johnston, Meghan Kolk, Steve Krumm, Hung Le, Art Lemise, James Lesnefsky, Steve Luell, Kendall Metelow, Brad Miller, Jim Newquist, Dennis Ripka, Tim Segada, Keith Strockbine, Pat Walker, and Jason Witts. Thanks also to the following employees who participated in the survey: Lisa Barno, Shawn Crouse, Pat Hamilton, Keith Fox, Chris Smith, and Paul Toppin.

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**Appendix 1-1:** Complete information and details included from opening day trout angler surveys conducted on April 5, 2014.

| County | Waterbody | Lake/ River Conditions | # of Cormorants Present | Time | # of Shoreline anglers | | # of Boat anglers | | Total # of anglers | Brook Trout caught | | | | Brown Trout caught | | | | Rainbow Trout caught | | | | Total trout caught | Angler comments / Interviewer observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | <14 in | | >14 in | | <14 in | | >14 in | | <14 inches | | >14 in | | | |
| | | | | | adult | child | adult | child | | kept | rel | kept | rel | kept | rel | kept | rel | kept | rel | kept | rel | | |
| Atlantic | Birch Grove Park Pond | Clear | 2 | 8:00 | 83 | 109 | 0 | 0 | 192 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 1 | 0 | 2 | 1 | 9 | Fishing was slow, not many bites on variety of baits. |
| | | | | 9:00 | 84 | 113 | 0 | 0 | 197 | | | | | | | | | | | | | | |
| | | | | 10:00 | 85 | 116 | 0 | 0 | 201 | | | | | | | | | | | | | | |
| | | | | 11:00 | 21 | 15 | 0 | 0 | 36 | | | | | | | | | | | | | | |
| | | | | 12:00 | 16 | 7 | 0 | 0 | 23 | | | | | | | | | | | | | | |
| Atlantic | Hammonton Lake | Clear / high water | 0 | 8:00 | 16 | 1 | 25 | 0 | 42 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 2 | 11 | 0 | 30 | Anglers caught mostly rainbow trout. Several anglers mentioned Opening Day was more successful last year. Wind progressed to get heavier later into the morning. |
| | | | | 9:00 | 18 | 14 | 27 | 0 | 49 | | | | | | | | | | | | | | |
| | | | | 10:00 | 14 | 7 | 19 | 0 | 40 | | | | | | | | | | | | | | |
| | | | | 11:00 | 15 | 2 | 17 | 0 | 34 | | | | | | | | | | | | | | |
| | | | | 12:00 | 21 | 2 | 3 | 0 | 26 | | | | | | | | | | | | | | |
| Atlantic | Heritage Park Pond | Clear | 12 | 8:00 | 14 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | Not available. |
| | | | | 9:00 | 12 | 0 | 0 | 0 | 12 | | | | | | | | | | | | | | |
| | | | | 10:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| | | | | 11:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| | | | | 12:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| Bergen | Dahnert's Lake | Muddy | 2 | 8:00 | 75 | 5 | 0 | 0 | 80 | 0 | 0 | 0 | 0 | 25 | 22 | 5 | 14 | 3 | 1 | 1 | 0 | 71 | Many questions about water quality and how many fish were stocked. |
| | | | | 9:00 | 85 | 8 | 0 | 0 | 93 | | | | | | | | | | | | | | |
| | | | | 10:00 | 54 | 5 | 0 | 0 | 59 | | | | | | | | | | | | | | |
| | | | | 11:00 | 48 | 5 | 0 | 0 | 53 | | | | | | | | | | | | | | |
| | | | | 12:00 | 32 | 3 | 0 | 0 | 35 | | | | | | | | | | | | | | |
| Burlington | Crystal Lake | Clear | 0 | 8:00 | 74 | 2 | 6 | 0 | 82 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 4 | Mixed comments about stocking. Fishing very slow. All individuals were aware of the Furunculosis issue. |
| | | | | 9:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| | | | | 10:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| | | | | 11:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| | | | | 12:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| Camden | Oak Pond | Sunny / Clear | 0 | 8:00 | 32 | 7 | 30 | 6 | 73 | - | - | - | - | - | - | - | - | - | - | - | - | - | Not available. |
| | | | | 9:00 | 37 | 11 | 39 | 10 | 97 | | | | | | | | | | | | | | |
| | | | | 10:00 | 21 | 2 | 27 | 3 | 53 | | | | | | | | | | | | | | |
| | | | | 11:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| | | | | 12:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| Camden | Rowands Pond | Muddy | 0 | 8:00 | 51 | 11 | 0 | 0 | 62 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 68 | 32 | 0 | 0 | 102 | Fish are biting! Mostly along parking area. People are friendly and doing well. |
| | | | | 9:00 | 45 | 7 | 0 | 0 | 52 | | | | | | | | | | | | | | |
| | | | | 10:00 | 37 | 4 | 0 | 0 | 43 | | | | | | | | | | | | | | |
| | | | | 11:00 | 23 | 5 | 0 | 0 | 27 | | | | | | | | | | | | | | |
| | | | | 12:00 | 16 | 3 | 0 | 0 | 19 | | | | | | | | | | | | | | |
| Cumberland | Mary Elmer Lake | Muddy | 1 | 8:00 | 14 | 2 | 2 | 0 | 18 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | It was slow all morning. Anglers commented that more fish needed to be stocked at Mary Elmer and other south Jersey lakes. |
| | | | | 9:00 | 10 | 2 | 2 | 0 | 16 | | | | | | | | | | | | | | |
| | | | | 10:00 | 8 | 2 | 4 | 0 | 14 | | | | | | | | | | | | | | |
| | | | | 11:00 | 10 | 1 | 6 | 0 | 14 | | | | | | | | | | | | | | |
| | | | | 12:00 | 6 | 0 | 0 | 0 | 6 | | | | | | | | | | | | | | |

**Appendix 1-2:** Complete information and details included from opening day trout angler surveys conducted on April 5, 2014.

| County | Waterbody | Lake/ River Conditions | # of Cormorants Present | Time | # of Shoreline anglers | | # of Boat anglers | | Total # of anglers | Brook Trout caught | | | | Brown Trout caught | | | | Rainbow Trout caught | | | | Total trout caught | Angler comments / Interviewer observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | <14 in | | >14 in | | <14 in | | >14 in | | <14 inches | | >14 in | | | |
| | | | | | adult | child | adult | child | | kept | rel | kept | rel | kept | rel | kept | rel | kept | rel | kept | rel | | |
| Cumberland | Shaws Mill Pond | Clear | 0 | 8:00 | 40 | 8 | 24 | 7 | 79 | 0 | 0 | 0 | 0 | 19 | 0 | 1 | 0 | 92 | 10 | 3 | 0 | 125 | Not available. |
| | | | | 9:00 | 42 | 9 | 26 | 7 | 84 | | | | | | | | | | | | | | |
| | | | | 10:00 | 38 | 12 | 30 | 8 | 88 | | | | | | | | | | | | | | |
| | | | | 11:00 | 20 | 10 | 29 | 7 | 66 | | | | | | | | | | | | | | |
| | | | | 12:00 | 15 | 5 | 10 | 1 | 31 | | | | | | | | | | | | | | |
| Cumberland | South Vineland Park Pond | Muddy | 0 | 8:00 | 23 | 2 | 5 | 0 | 30 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 8 | 0 | 12 | 3 | 25 | Slow start, catches few and far between. Many left for other locations. |
| | | | | 9:00 | 25 | 0 | 5 | 0 | 30 | | | | | | | | | | | | | | |
| | | | | 10:00 | 13 | 0 | 13 | 0 | 26 | | | | | | | | | | | | | | |
| | | | | 11:00 | 17 | 1 | 7 | 0 | 25 | | | | | | | | | | | | | | |
| | | | | 12:00 | 12 | 0 | 5 | 0 | 17 | | | | | | | | | | | | | | |
| Essex | Verona Park Pond | Muddy | 2 | 8:00 | 138 | 23 | 0 | 0 | 161 | 0 | 0 | 0 | 0 | 55 | 0 | 0 | 0 | 31 | 0 | 19 | 0 | 105 | Fishing pressure was high. Anglers with lures seemed more successful. Mixture of gear used. |
| | | | | 9:00 | 142 | 12 | 0 | 0 | 154 | | | | | | | | | | | | | | |
| | | | | 10:00 | 142 | 12 | 0 | 0 | 154 | | | | | | | | | | | | | | |
| | | | | 11:00 | 68 | 4 | 0 | 0 | 72 | | | | | | | | | | | | | | |
| | | | | 12:00 | 68 | 4 | 0 | 0 | 72 | | | | | | | | | | | | | | |
| Gloucester | Greenwich Lake | Clear / choppy | 3 | 8:00 | 25 | 7 | 12 | 3 | 47 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Most anglers asked, "was this lake even stocked?" No trout were seen caught. One catfish was caught. |
| | | | | 9:00 | 45 | 8 | 13 | 3 | 69 | | | | | | | | | | | | | | |
| | | | | 10:00 | 15 | 3 | 3 | 3 | 24 | | | | | | | | | | | | | | |
| | | | | 11:00 | 15 | 3 | 3 | 3 | 24 | | | | | | | | | | | | | | |
| | | | | 12:00 | 12 | 1 | 2 | 0 | 15 | | | | | | | | | | | | | | |
| Gloucester | Grenloch Lake | Clear | 0 | 8:00 | 13 | 3 | - | - | 16 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 54 | 12 | 0 | 0 | 69 | Not available. |
| | | | | 9:00 | - | - | 9 | 2 | 11 | | | | | | | | | | | | | | |
| | | | | 10:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| | | | | 11:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| | | | | 12:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| Gloucester | Harrisonville Lake | Clear / calm | 0 | 8:00 | 11 | 2 | 17 | 0 | 30 | 1 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 13 | Not a very big turnout compared to previous years, a lot of anglers did not catch fish. |
| | | | | 9:00 | 12 | 2 | 17 | 0 | 31 | | | | | | | | | | | | | | |
| | | | | 10:00 | 16 | 1 | 10 | 0 | 27 | | | | | | | | | | | | | | |
| | | | | 11:00 | 10 | 2 | 17 | 0 | 29 | | | | | | | | | | | | | | |
| | | | | 12:00 | 17 | 2 | 10 | 0 | 29 | | | | | | | | | | | | | | |
| Gloucester | Iona Lake | Clear / choppy / high water | 0 | 8:00 | 37 | 5 | 21 | 1 | 64 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 23 | 0 | 4 | 0 | 30 | Anglers were not catching trout from spillway as in previous years. Anglers felt fishing has been getting worse the past 6 years. |
| | | | | 9:00 | 31 | 5 | 23 | 3 | 62 | | | | | | | | | | | | | | |
| | | | | 10:00 | 28 | 6 | 21 | 1 | 56 | | | | | | | | | | | | | | |
| | | | | 11:00 | 19 | 4 | 14 | 2 | 39 | | | | | | | | | | | | | | |
| | | | | 12:00 | 11 | 1 | 3 | 0 | 15 | | | | | | | | | | | | | | |
| Gloucester | Swedesboro Lake | Muddy | 16 | 8:00 | 26 | 4 | 4 | 2 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Everyone was extremely disappointed with no catches. Cormorants were very active. Anglers were wondering why nothing was biting. |
| | | | | 9:00 | 31 | 4 | 4 | 2 | 41 | | | | | | | | | | | | | | |
| | | | | 10:00 | 32 | 6 | 0 | 0 | 38 | | | | | | | | | | | | | | |
| | | | | 11:00 | 21 | 6 | 0 | 0 | 27 | | | | | | | | | | | | | | |
| | | | | 12:00 | 23 | 5 | 0 | 0 | 28 | | | | | | | | | | | | | | |

**Appendix 1-3:** Complete information and details included from opening day trout angler surveys conducted on April 5, 2014.

| County | Waterbody | Lake/ River Conditions | # of Cormorants Present | Time | # of Shoreline anglers | | # of Boat anglers | | Total # of anglers | Brook Trout caught | | | | Brown Trout caught | | | | Rainbow Trout caught | | | | Total trout caught | Angler comments / Interviewer observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | <14 in | | >14 in | | <14 in | | >14 in | | <14 inches | | >14 in | | | |
| | | | | | adult | child | adult | child | | kept | rel | kept | rel | kept | rel | kept | rel | kept | rel | kept | rel | | |
| Hunterdon | Amwell Lake | Muddy / choppy | 2 | 8:00 | 58 | 7 | 11 | 0 | 76 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 6 | 3 anglers left before 9 a.m. All thought the cooler water temperature kept fish inactive. Muddy water and wind thought to be problems. |
| | | | | 9:00 | 72 | 5 | 12 | 0 | 89 | | | | | | | | | | | | | | |
| | | | | 10:00 | 27 | 2 | 8 | 1 | 38 | | | | | | | | | | | | | | |
| | | | | 11:00 | 19 | 4 | 8 | 0 | 31 | | | | | | | | | | | | | | |
| | | | | 12:00 | 13 | 6 | 2 | 0 | 21 | | | | | | | | | | | | | | |
| Hunterdon | Raritan River S/Br. (KLG) | Slightly turbid/ slightly elevated | 0 | 8:00 | 15 | 3 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | KLG was selected because it was the first year with new C&R/artificials only regulations. In addition, the South Branch in this section was not stocked by DFW due to furunculosis outbreak. |
| | | | | 9:00 | 15 | 3 | 0 | 0 | 18 | | | | | | | | | | | | | | |
| | | | | 10:00 | 23 | 3 | 0 | 0 | 26 | | | | | | | | | | | | | | |
| | | | | 11:00 | 23 | 3 | 0 | 0 | 26 | | | | | | | | | | | | | | |
| | | | | 12:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| Mercer | Colonial Lake | Clear | 25 | 8:00 | 14 | 1 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Day started calm with winds stedaily picking up through the morning. The more time passed without a fish caught, the more anglers blamed cormorants. |
| | | | | 9:00 | 19 | 1 | 0 | 0 | 20 | | | | | | | | | | | | | | |
| | | | | 10:00 | 21 | 1 | 0 | 0 | 22 | | | | | | | | | | | | | | |
| | | | | 11:00 | 11 | 0 | 0 | 0 | 11 | | | | | | | | | | | | | | |
| | | | | 12:00 | 18 | 1 | 0 | 0 | 19 | | | | | | | | | | | | | | |
| Mercer | Rosedale Lake | Clear / choppy | 10 | 8:00 | - | - | - | - | - | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 3 | Slow fishing the entire morning. Many anglers came and left within an hour of arriving. All anglers were aware of the furunculosis issue. |
| | | | | 9:00 | 38 | 3 | 0 | 0 | 41 | | | | | | | | | | | | | | |
| | | | | 10:00 | 30 | 6 | 0 | 0 | 36 | | | | | | | | | | | | | | |
| | | | | 11:00 | 25 | 4 | 0 | 0 | 29 | | | | | | | | | | | | | | |
| | | | | 12:00 | 17 | 6 | 0 | 0 | 23 | | | | | | | | | | | | | | |
| Middlesex | Manalapan Lake | Clear / choppy | 1 | 8:00 | 18 | 12 | 5 | 1 | 36 | 0 | 0 | 0 | 0 | 10 | 0 | 2 | 0 | 4 | 0 | 0 | 0 | 16 | Fishing was slow and most fish were caught on spinners amd spoons. |
| | | | | 9:00 | 27 | 15 | 5 | 0 | 47 | | | | | | | | | | | | | | |
| | | | | 10:00 | 27 | 15 | 5 | 0 | 47 | | | | | | | | | | | | | | |
| | | | | 11:00 | 34 | 18 | 3 | 0 | 55 | | | | | | | | | | | | | | |
| | | | | 12:00 | 13 | 2 | 0 | 0 | 15 | | | | | | | | | | | | | | |
| Middlesex | Roosevelt Park Pond | Muddy | 5 | 8:00 | 32 | 3 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | Very little angling action, total of 4 trout caught. Lake turbid from rain. Very windy, water temps low 40's. |
| | | | | 9:00 | 28 | 2 | 0 | 0 | 30 | | | | | | | | | | | | | | |
| | | | | 10:00 | 18 | 3 | 0 | 0 | 21 | | | | | | | | | | | | | | |
| | | | | 11:00 | 13 | 2 | 0 | 0 | 15 | | | | | | | | | | | | | | |
| | | | | 12:00 | 6 | 0 | 0 | 0 | 6 | | | | | | | | | | | | | | |
| Monmouth | Englishtown Mill Pond | Muddy / high water | 1 | 8:00 | 17 | 12 | 0 | 0 | 29 | 4 | 0 | 24 | 1 | 8 | 0 | 5 | 12 | 1 | 1 | 3 | 0 | 59 | Not available. |
| | | | | 9:00 | 17 | 13 | 3 | 2 | 35 | | | | | | | | | | | | | | |
| | | | | 10:00 | 12 | 8 | 3 | 2 | 25 | | | | | | | | | | | | | | |
| | | | | 11:00 | 11 | 6 | 2 | 0 | 19 | | | | | | | | | | | | | | |
| | | | | 12:00 | 9 | 3 | 4 | 0 | 16 | | | | | | | | | | | | | | |
| Monmouth | Holmdel Park Pond | Choppy | 5 | 8:00 | - | - | - | - | 30 | 0 | 0 | 0 | 0 | 39 | 7 | 0 | 0 | 0 | 0 | 0 | 1 | 47 | Everyone seemed to be very happy and in good spirits. Multiple anglers limited out. |
| | | | | 9:00 | - | - | - | - | 32 | | | | | | | | | | | | | | |
| | | | | 10:00 | - | - | - | - | 38 | | | | | | | | | | | | | | |
| | | | | 11:00 | - | - | - | - | 33 | | | | | | | | | | | | | | |
| | | | | 12:00 | - | - | - | - | 23 | | | | | | | | | | | | | | |

**Appendix 1-4:** Complete information and details included from opening day trout angler surveys conducted on April 5, 2014.

| County | Waterbody | Lake/ River Conditions | # of Cormorants Present | Time | # of Shoreline anglers | | # of Boat anglers | | Total # of anglers | Brook Trout caught | | | | Brown Trout caught | | | | Rainbow Trout caught | | | | Total trout caught | Angler comments / Interviewer observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | <14 in | | >14 in | | <14 in | | >14 in | | <14 inches | | >14 in | | | |
| | | | | | adult | child | adult | child | | kept | rel | kept | rel | kept | rel | kept | rel | kept | rel | kept | rel | | |
| Morris | Burnham Park Pond | Choppy | 3 | 8:00 | 88 | 40 | 0 | 0 | 138 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 37 | 13 | 55 | It was a slow morning, fish were not feeding. Cormorants were very active and feeding on fish. |
| | | | | 9:00 | 52 | 22 | 0 | 0 | 74 | | | | | | | | | | | | | | |
| | | | | 10:00 | 45 | 13 | 0 | 0 | 58 | | | | | | | | | | | | | | |
| | | | | 11:00 | 30 | 5 | 0 | 0 | 35 | | | | | | | | | | | | | | |
| | | | | 12:00 | 37 | 3 | 0 | 0 | 40 | | | | | | | | | | | | | | |
| Morris | Musconetcong River (Stephen State Park) | Clear | 0 | 8:00 | 88 | 20 | 0 | 0 | 108 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 72 | 0 | 8 | 0 | 81 | Not available. |
| | | | | 9:00 | 58 | 12 | 0 | 0 | 70 | | | | | | | | | | | | | | |
| | | | | 10:00 | 42 | 3 | 0 | 0 | 45 | | | | | | | | | | | | | | |
| | | | | 11:00 | 40 | 6 | 0 | 0 | 46 | | | | | | | | | | | | | | |
| | | | | 12:00 | 32 | 2 | 0 | 0 | 34 | | | | | | | | | | | | | | |
| Ocean | Lake Shenandoah | Clear / choppy | 17 | 8:00 | 14 | 3 | 7 | 2 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | Most anglers said they don't catch much every year. Many cormorants and blue heron. |
| | | | | 9:00 | 11 | 3 | 6 | 0 | 20 | | | | | | | | | | | | | | |
| | | | | 10:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| | | | | 11:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| | | | | 12:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| Ocean | Prospertown Lake | Clear | 3 | 8:00 | 22 | 2 | 3 | 0 | 27 | 0 | 0 | 0 | 0 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | Interest in several anglers in furunculosis. Surprise at so many browns but no rainbows caught. 4 pickerel were caught and released. Questions about if it was stocked and how many. |
| | | | | 9:00 | 16 | 8 | 4 | 1 | 29 | | | | | | | | | | | | | | |
| | | | | 10:00 | 20 | 2 | 3 | 1 | 26 | | | | | | | | | | | | | | |
| | | | | 11:00 | 14 | 0 | 6 | 0 | 20 | | | | | | | | | | | | | | |
| | | | | 12:00 | 7 | 2 | 3 | 0 | 12 | | | | | | | | | | | | | | |
| Passaic | Barbours Pond | Clear / choppy | 0 | 8:00 | - | - | - | - | - | 5 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 9 | 1 | 2 | 0 | 18 | Not available. |
| | | | | 9:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| | | | | 10:00 | 25 | 5 | 0 | 0 | 30 | | | | | | | | | | | | | | |
| | | | | 11:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| | | | | 12:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| Salem | DOD Lake | Clear / choppy | 4 | 8:00 | 4 | 0 | 2 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Anglers were only staying for a short period of time due to windy conditions. Would drop boats in the water and return after 10-15 minutes. Some anglers were unaware that the lake was stocked with trout. |
| | | | | 9:00 | 1 | 0 | 4 | 0 | 5 | | | | | | | | | | | | | | |
| | | | | 10:00 | 1 | 0 | 2 | 0 | 3 | | | | | | | | | | | | | | |
| | | | | 11:00 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | |
| | | | | 12:00 | 4 | 0 | 4 | 0 | 8 | | | | | | | | | | | | | | |
| Salem | Schadler's Sand Wash Pond | Clear | 0 | 8:00 | 45 | 5 | 8 | 0 | 58 | 13 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 61 | 3 | 1 | 0 | 81 | Not available. |
| | | | | 9:00 | 35 | 2 | 0 | 0 | 37 | | | | | | | | | | | | | | |
| | | | | 10:00 | 27 | 2 | 0 | 0 | 29 | | | | | | | | | | | | | | |
| | | | | 11:00 | 17 | 1 | 0 | 0 | 18 | | | | | | | | | | | | | | |
| | | | | 12:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| Sussex | Big Flat Brook | Clear / slightly high water | 0 | 8:00 | 13 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 71 | 0 | 0 | 77 | Not available. |
| | | | | 9:00 | 10 | 0 | 0 | 0 | 10 | | | | | | | | | | | | | | |
| | | | | 10:00 | 12 | 1 | 0 | 0 | 13 | | | | | | | | | | | | | | |
| | | | | 11:00 | - | - | - | - | - | | | | | | | | | | | | | | |
| | | | | 12:00 | - | - | - | - | - | | | | | | | | | | | | | | |

**Appendix 1-5:** Complete information and details included from opening day trout angler surveys conducted on April 5, 2014.

| County | Waterbody | Lake/ River Conditions | # of Cormorants Present | Time | # of Shoreline anglers | | # of Boat anglers | | Total # of anglers | Brook Trout caught | | | | Brown Trout caught | | | | Rainbow Trout caught | | | | Total trout caught | Angler comments / Interviewer observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | <14 in | | >14 in | | <14 in | | >14 in | | <14 inches | | >14 in | | | |
| | | | | | adult | child | adult | child | | kept | rel | kept | rel | kept | rel | kept | rel | kept | rel | kept | rel | | |
| Sussex | Glenwood Brook | Clear / high water | 0 | 8:00 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 20 | 2 | 0 | 0 | 24 | Anglers come here because it's not crowded. New Yorkers come here because the trout stocked in NY are much smaller. Not a lot of good spots along the stream to fish. |
| | | | | 9:00 | 4 | 0 | 0 | 0 | 4 | | | | | | | | | | | | | | |
| | | | | 10:00 | 4 | 1 | 0 | 0 | 5 | | | | | | | | | | | | | | |
| | | | | 11:00 | 3 | 2 | 0 | 0 | 5 | | | | | | | | | | | | | | |
| | | | | 12:00 | 1 | 2 | 0 | 0 | 3 | | | | | | | | | | | | | | |
| Sussex | Lake Ocquittunk | Clear | 0 | 8:00 | 52 | 8 | 7 | 0 | 67 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 2 | 22 | 0 | 31 | Fishing was slow was slow and fish were small in the smaller section. Ice covered half the shoreline. |
| | | | | 9:00 | 29 | 2 | 0 | 0 | 31 | | | | | | | | | | | | | | |
| | | | | 10:00 | 28 | 5 | 0 | 0 | 33 | | | | | | | | | | | | | | |
| | | | | 11:00 | 21 | 8 | 5 | 0 | 34 | | | | | | | | | | | | | | |
| | | | | 12:00 | 25 | 6 | 0 | 0 | 31 | | | | | | | | | | | | | | |
| Union | Seeley's Pond | Muddy | 0 | 8:00 | 32 | 6 | 0 | 0 | 38 | 6 | 0 | 0 | 0 | 24 | 3 | 0 | 0 | 2 | 0 | 2 | 0 | 37 | Anglers mentioned it was a slow day for fishing. Anglers report there's a good turnout every year at Seeley's. A few anglers were there because their usual spot was not stocked. |
| | | | | 9:00 | 32 | 5 | 0 | 0 | 37 | | | | | | | | | | | | | | |
| | | | | 10:00 | 30 | 4 | 0 | 0 | 34 | | | | | | | | | | | | | | |
| | | | | 11:00 | 25 | 6 | 0 | 0 | 31 | | | | | | | | | | | | | | |
| | | | | 12:00 | 10 | 4 | 0 | 0 | 14 | | | | | | | | | | | | | | |
| Warren | Blair Lake | Clear / high water | 4 | 8:00 | 12 | 3 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 39 | 3 | 1 | 0 | 43 | Only a few anglers caught most of the fish. |
| | | | | 9:00 | 17 | 5 | 0 | 0 | 22 | | | | | | | | | | | | | | |
| | | | | 10:00 | 14 | 7 | 0 | 0 | 21 | | | | | | | | | | | | | | |
| | | | | 11:00 | 9 | 2 | 0 | 0 | 11 | | | | | | | | | | | | | | |
| | | | | 12:00 | 9 | 0 | 0 | 0 | 9 | | | | | | | | | | | | | | |
| Warren | Mountain Lake | Clear / choppy | 1 | 8:00 | 2 | 3 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | Very low participation rate. Slow fishing. |
| | | | | 9:00 | 2 | 4 | 2 | 0 | 8 | | | | | | | | | | | | | | |
| | | | | 10:00 | 0 | 0 | 3 | 0 | 3 | | | | | | | | | | | | | | |
| | | | | 11:00 | 1 | 2 | 3 | 0 | 6 | | | | | | | | | | | | | | |
| | | | | 12:00 | 0 | 0 | 2 | 0 | 2 | | | | | | | | | | | | | | |

# Lake Hopatcong Fisheries Management Plan

## Investigations and Management of New Jersey's Freshwater Fisheries Resources (APPENDIX J)

By
Chris Smith, Principal Fisheries Biologist

New Jersey Department of Environmental Protection
Division of Fish and Wildlife
Bureau of Freshwater Fisheries

Sportfish Restoration Grant F-48-R

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