

FY2016

Annual Report

July 1, 2015—June 30, 2016



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State of New Jersey
Department of Environmental Protection
Division of Fish and Wildlife

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Message from DEP Commissioner Bob Martin

I am pleased to present the Department of Environmental Protection's (DEP's) Division of Fish and Wildlife's Annual Report for Fiscal Year 2016. The report covers the period of July 1, 2015 to June 30, 2016.

The Division is a professional, environmental organization dedicated to the protection, management and wise use of the State's fish and wildlife resources. Its mission is to protect and manage the State's fish and wildlife to maximize their long-term biological, recreational and economic values for all New Jerseyans.

It pursues this mission guided by three overarching goals:

- To maintain New Jersey's rich variety of fish and wildlife species at stable, healthy levels and to protect and enhance the many habitats on which they depend.
- To educate New Jerseyans on the values and needs of our fish and wildlife and to foster a positive human/wildlife co-existence.
- To maximize the recreational use and economic potential of New Jersey's fish and wildlife for both present and future generations.

As in previous years, each section of this report begins with an overview of a Division bureau or office along with several highlights from the year. Each page features the important work our professionals are involved in every day to protect and manage fish and wildlife, the habitats they depend upon and the variety of recreational opportunities associated with New Jersey's wild outdoors.

Fostering positive relationships between people and wildlife is a challenge in a State as densely populated and as diverse as our own. Success depends on our biologists and conservation officers educating those who live, work and spend time here on both the advantages and special considerations needed to successfully co-exist with wildlife. It also requires a sense of understanding, tolerance and cooperation between everyone who enjoys our natural resources.

Learning how best to share our space with wildlife will always be a work in progress. The solutions are rarely simple and often take time to develop. As you read through the year's accomplishments, I hope you will find, as I have, that the hard work, commitment and expertise of the staff of DEP's Division of Fish and Wildlife is achieving impressive results.

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Bureau of Freshwater Fisheries

Lisa Barno, Chief



The Bureau of Freshwater Fisheries is responsible for the protection and management of the State's freshwater fisheries resource as well as promoting its recreational use. The Bureau conducts research and management surveys, classifies the State's waterways, provides technical input on a variety of watershed and habitat-based issues, facilitates habitat restoration projects, serves as a liaison to a variety of conservation groups, and provides information to the general public in a variety of forums concerning New Jersey's freshwater fisheries. The Bureau also administers more than 600 permits annually to help effectively manage and protect this important resource.

The excitement of hooking a live one!

Highlights

As part of an effort to revise the State's Wildlife Action Plan, the first ever Delphi Status Review for freshwater fish in New Jersey was conducted. The Delphi technique is a scientifically accepted, objective approach to assessing the stability of a population. Based on the information gathered, several species were recommended for inclusion on New Jersey's endangered, threatened, or special concern lists. Three species were recommended for *endangered* status: shortnose sturgeon, ironcolor shiner and bridle shiner. One species, slimy sculpin, was proposed *threatened* and seven were suggested to be of *special concern*: brook trout, comely shiner, American brook lamprey, mud sunfish, black-banded sunfish, shield darter and Northern hogsucker. Since revisions to the Wildlife Action Plan are still in progress, formal listing of these species is currently pending.

During this time period, freshwater fisheries biologists conducted 243 surveys throughout the state to address a variety of recreational and species management needs as well as acquire public input regarding emerging fisheries issues. A majority of the surveys focused on collecting, identifying and enumerating the fish species in 127 streams, rivers, ponds and lakes. More than 59,000 fish representing 73 species were recorded. Other survey efforts ranged from electrofishing more than 25 lakes to evaluate largemouth bass populations to assessing nearly 50 streams as candidates for Wild Trout Stream regulations.

The network of streams designated for temperature monitoring studies was expanded from 25 to 39 sites to include several smaller trout production streams. Many of the waters are recreationally important, trout-stocked streams. In fact, five sites are located on small streams containing populations of *wild* brook trout. These waters are being specially monitored as part of the regional Eastern Brook Trout Joint Venture initiative to assess climate change. In these studies, biologists utilize water and air thermographs (infrared cameras) to record temperatures at

30-minute intervals year round. The data collected will be used to assess current temperature conditions, evaluate long-term trends, determine if water quality is consistent with DEP's Surface Water Quality Standards, and assist in managing coldwater (trout) fisheries.

Bureau of Fisheries Production

Ed Conley and Craig Lemon, Superintendents

The Bureau of Fisheries Production is responsible for the propagation and management of two State fish hatcheries in Warren County: the Pequest Trout Hatchery in Oxford and the Charles O. Hayford State Fish Hatchery in Hackettstown (Hackettstown Hatchery). Together these facilities raise 16 species of cold, cool and warm water fish for annual distribution statewide.



An early 20th century stocking truck.

Highlights

During FY 2016 the Pequest Hatchery produced 638,820 rainbow trout (364,704 pounds). A total of 611,455 were allocated for spring stocking, most of which averaged 11.3 inches in length, along with 6,425 two- and three-year-old brood stock. The allocation for fall stocking consisted of 21,730 rainbow trout: 20,985 14.6-inch two-year-old and 745 three-year-old breeders. For winter release, staff raised 5,635 two-year-old rainbows averaging 14.6 inches in length. The Pequest Hatchery continues to raise rainbow trout exclusively, and staff continues to employ several precautionary measures to prevent the spread of any harmful bacteria.

During this same period, the Hackettstown Hatchery raised more than three million cool and warm water fish of 14 species for release in more than 150 waterbodies statewide. Species included: Northern pike, tiger muskellunge, muskellunge, walleye, landlocked salmon, smallmouth bass, largemouth bass, hybrid striped bass, channel catfish, bluegill and pumpkinseed sunfish, black crappie, golden shiners, mosquitofish and fathead minnows.

Mosquitofish production was the highest on record, eclipsing the 2002 total by more than 9,400 fish. Production efforts were increased to help combat the human health threat posed by the West Nile and Zika viruses, which are spread by mosquitoes. As a result, mosquito-eating fish were distributed to mosquito control commissions in 15 counties.

Hackettstown staff also stocked 4,605 landlocked salmon, averaging 12-15 inches, in Tilcon Lake and Lakes Aeroflex and Wawayanda. This was the largest stocking to date and has helped create an excellent fishery in all three waters. Salmon are obtained through a fish trade with the Commonwealth of Massachusetts in exchange for surplus young Northern pike.

To increase survival rates, biologists at the Hackettstown hatchery grew holdover Northern pike, tiger muskellunge, and muskellunge to a larger size by holding them over for one full year. These larger yearlings (16-26 inches) were then stocked. The same method was applied to 13,000 channel catfish averaging 13.6 inches in length at the time of stocking.

Bureau of Land Management

Dave Golden, Chief

The Bureau of Land Management (BLM) is responsible for administering the Division's Wildlife Management Area System (WMA) comprising more than 349,000 acres on 121 separate areas. These areas are managed for a diversity of fish and wildlife species through a variety of habitat improvement programs. Public access for wildlife-associated recreation is encouraged through the development of visitor facilities, maintenance of roads and bridges, and the construction of parking areas and boat ramps. The Bureau is also responsible for the maintenance of Division facilities including buildings, shooting ranges, dams and water control structures. In addition, the BLM offers technical assistance to the DEP's Green Acres Program in the acquisition of open space and critical habitat.

Highlights

Northern region staff completed a project to expand the parking lot surrounding the boat ramp at Round Valley Reservoir in Hunterdon County. Extremely popular on summer weekends, the



Creating a slope for erosion control at the RVR boat ramp site.

area was beginning to pose difficulties for anglers, boaters, kayakers and paddle boarders vying for the limited launch space. As a result, crews moved an existing fence to allow for additional room along the shoreline, and the lower gravel lot was doubled in size to provide extra parking and ample room to maneuver boat trailers. To assist with erosion control, the shoulder of the lot was sloped and planted with a native grass seed mixture. Plans are in place to install a new ramp once

the reservoir is lowered by the Water Supply Authority for routine dam maintenance. Funds for this stage of the project are being provided through a grant administered by the New Jersey Department of Transportation's Maritime Industry Fund.

Central region staff resolved a beaver dam dilemma that had been beleaguering the town of Roosevelt. A colony of beavers had built a large dam at the east end of Assunpink Lake that was causing extensive flood damage to the town's trail network and water treatment plant. Through a cooperative effort between the Division's Bureaus of Land Management and Wildlife Management, along with assistance from licensed trappers, 18 beavers were removed from the site to help control the water level. This, in combination with the installation of a special device to control water flow, helped resolve the problem.

Southern region staff made improvements to the Glassboro, Peaslee, Dix, Nantuxent, Buckshutem and Heislerville WMAs. These areas are annually stocked with pheasant and quail, but over time had grown into habitat unsuitable for game bird hunting. In an effort to restore open fields and hedgerows, staff hydro-axed the impenetrable areas to eliminate the overgrown cover. Once cleared, the fields were plowed and sown with a seed mixture suitable for wildlife.

Bureau of Law Enforcement

Matt Brown, Acting Chief

The Bureau of Law Enforcement is responsible for enforcing regulations that protect wildlife and its habitat. Highly trained conservation officers patrol the state and its waters using the latest in law enforcement technology. These officers investigate all types of cases, including hunting and freshwater fishing violations, illegal marine and shellfish harvesting, the collection and sale of endangered species, and even water pollution.

Conservation officers are among the Division's most visible representatives, interacting with thousands of individuals each year. In the field, they educate and redirect the actions of recreationists to ensure compliance with Division policies, the Fish and Game codes, marine conservation measures and other land use regulations to protect the environment as well as ensure that people enjoy our natural resources in safe and ethical ways.

As the oldest organized law enforcement agency in the State of New Jersey (created in 1871), conservation officers have a storied history. Originally tasked strictly with fish protection in the Delaware River, officers now delve into every area of fish, wildlife and natural resource protection. Today, they enforce pollution laws involving New Jersey's woods and waterways, impose bans on the harvest of crabs from polluted waters, enforce clamming and oystering regulations designed to safeguard public health, assist with efforts to control nuisance bears, enforce commercial and recreational saltwater fishing regulations, protect State lands from illegal timber sales and off-road vehicle usage, and ensure the lawful handling of exotic wildlife and the sale of legally procured marine resources.

Conservation officers are also the primary law enforcement personnel in the State of New Jersey authorized to investigate hunting accidents or fatalities. They are uniformed officers with full law enforcement authority.

Each year, conservation officers provide countless hours of public outreach at educational facilities, outdoors shows and through the course of their daily patrols. Educating hunters, anglers and the general public about the environment and all that makes it beneficial is a valuable assignment that conservation officers proudly perform.

Highlights

Acting on an intelligence report received by the Northern Region Special Investigations Unit, an investigation was opened into the owner/operator of a deer processing shop in Washington Borough, Warren County. In September 2015 a search warrant was issued to examine the shop and residence. Thirteen conservation officers from all four regions spent more than seven hours searching, logging, photographing and removing hundreds of pieces of evidence from the scene. During the investigation, officers recovered and seized more than \$20,000 from illegal wildlife sales. Hundreds of pounds of processed venison products labeled for sale were documented and seized as well. The individual was arrested, charged and ultimately indicted on ten criminal counts in the Superior Court of Warren County, including five for the sale of white-tailed deer and five for the possession of drugs. The individual agreed to enter into the Pre-trial Intervention Program for first-time criminal offenders. To successfully complete the program, the owner agreed to a host of conditions, including 150 hours of community service, a 3-month loss of driving privileges, forfeiture of the money seized during the search, payment of penalties/restitution and donation of the deer meat taken as evidence to a non-profit food pantry.



A CO inspects the harvest to ensure that quantity and size are within legal limits.

Several fishermen in the Maurice River Cove Tonging Area of Delaware Bay have resorted to harvesting from adjacent waters classified as condemned. Because the condemned shellfish area of Maurice River Cove borders approved waters, it is not difficult for these fishermen to slip between the two zones without being detected by conservation officers (COs). In addition to the enforcement challenge this poses, the condemned water boundary line runs parallel to the shoreline making it impossible for COs to visually observe tonger vessel positions in relation to that borderline from land. Buoys placed to serve as reference points are useful, but only as effective as the chains that anchor them and over the years, vandalism has become a problem. To combat these difficulties, COs have used marked and unmarked patrol vessels to approach and apprehend outlaws. This has proven to be challenging since officers must safely maneuver alongside the offending vessel (often in shallow water and unpredictable weather conditions) to obtain accurate coordinates for effective criminal prosecution. Nevertheless, in February 2016, marine COs using new cutting-edge electronic equipment were able to determine that six fishermen in three

separate vessels were harvesting oysters in condemned waters. Three of the individuals were charged with the illegal harvest of oysters from restricted waters and the other three for possession of the contaminated shellfish. COs also filed for forfeiture of the vessels, motors and equipment involved in the case. As it turned out, two of the fishermen apprehended had prior convictions for the *same* crime committed in the *same* area (one's harvesting privileges were revoked since 2014 and the other also had outstanding warrants for the possession of controlled substances). All pled guilty and were fined with the maximum penalties. In addition, the court ordered suspension of their commercial shellfish licenses for a period of 3-5 years and forfeiture of their oyster tongs, worth several thousand dollars.

Southern Region conservation officers investigated a large illegal dumping case on the Winslow Wildlife Management Area (WMA) in Camden County. The case involved a contractor who had recently completed renovations on a house and disposed of the construction debris on State property. Contents in the trash led the officers to two Voorhees Township (Camden County) individuals who were business partners. One of the individuals was charged with dumping refuse on a WMA, damage to property on a WMA and given a criminal solid waste violation for dumping refuse at an unauthorized site. The other was charged with the same violations, as well as interference with the duties of a conservation officer. In court, both men pleaded guilty and paid \$3,500 in fines between them. They were also required to clean up the area.

Marine Fisheries Administration

Brandon Muffley, Administrator

The Marine Fisheries Administration (MFA) includes the Bureaus of Marine Fisheries and Shellfisheries. The MFA supervises and coordinates the planning, organization, operation and management of the marine and estuarine finfish and shellfish resources of New Jersey, which are valued at more than \$2 billion. The MFA also coordinates New Jersey's fishery management activities on a coastwide basis with the Atlantic States Marine Fisheries Commission and the Mid-Atlantic Fishery Management Council.

Bureau of Marine Fisheries Russ Allen, Chief

The Bureau of Marine Fisheries is responsible for developing and implementing management programs that protect, conserve and enhance New Jersey's marine fisheries resources.

To formulate sound state management plans, the Bureau gathers information about New Jersey's marine species, as well as the user groups that rely on them. This research is combined with information from other Atlantic states and federal management agencies to support coastwide management plans.



Striped bass fishing in Sandy Hook Bay.

Since many marine fisheries species are migratory in nature, they are managed on a coastwide basis by the Atlantic States Marine Fisheries Commission (ASMFC) and/or the Mid-Atlantic Fishery Management Council. The Bureau plays a vital role in representing New Jersey's fisheries and fishermen (both commercial and recreational) through these organizations.

Federal legislation mandates that states implement all of the fishery management plans approved by the ASMFC. Each plan requires that states employ the required management measures, enforce those rules and monitor the status of the fishery population. States failing to comply with the requirements of the plan risk a federally imposed moratorium in their state for those species covered.

Highlights

In 2015, the Great Egg Harbor River was added as a sampling location to the River Herring Survey. Inclusion of this river will allow biologists a unique opportunity to compare a coastal drainage system with the currently sampled Maurice River (part of the Delaware River drainage system). Data on adult population status was collected weekly in the spring from both rivers using a gill net; information on juveniles was obtained weekly from July through October using a seine net. Sampling of adult fish collected from the Maurice River yielded 36 alewife and four blueback herring, compared to 82 alewife and zero blueback herring from the Great Egg Harbor River. For juveniles, the nets collected 156 alewife and 872 blueback herring from the Maurice River and for the first year of sampling, the Great Egg Harbor River yielded 987 alewife and 153 blueback herring. Biologists will need several more years of data however, to make a thorough analysis.

From April through October 2015, staff conducted the annual Delaware Bay Juvenile Finfish Trawl Survey. Delaware Bay serves as an important spawning and nursery ground for a variety of ecologically and economically important fish species, so surveys like this help biologists monitor the overall health of a marine ecosystem. The research also helps biologists understand reproductive success and juvenile recruitment rates of commercially and recreationally important fish species. Staff sampled 11 sites monthly (77 trawl hauls) from Villas in Cape May County north to the Cohansey River on the eastern shore of Delaware Bay. The five most abundant species caught were: bay anchovy, weakfish, blue crabs, Atlantic croaker, and hogchoker (a small flatfish similar to a flounder). The survey's 25-year timeline provides a wealth of data that is used to develop coastwide stock assessments for numerous species that are federally managed by the Atlantic States Marine Fisheries Commission and the Mid-Atlantic Fisheries Management Council. The study was supported in part by Federal Aid to Sport Fish Restoration Act funding.



A juvenile weakfish is measured from tip of jaw to tail.

In March, the Bureau assumed responsibility for conducting the federal Access Point Angler Intercept Survey (APAIS) in New Jersey. Our state's information is part of a national endeavor to collect saltwater recreational fishing data to help determine future conservation measures for many marine species. Staff prepared budgets and purchased specialized equipment, as well as hired and trained part-time technicians to meet our obligation as a participant in the survey. As part of the new program, recreational anglers are interviewed at pre-determined fishing sites and on specific guide boats during assigned time periods. These efforts will vastly improve the quality and quantity of recreational fisheries information collected in our waters. It will also help to *accurately* represent New Jersey's recreational anglers, their participation efforts and the species they target to the federal entities responsible for managing marine resources on a regional level.

Bureau of Shellfisheries
Russ Babb, Acting Chief

The Bureau of Shellfisheries directs shellfish harvest and production programs on the Atlantic Coast and in Delaware Bay. Biologists work with other Division bureaus as well as various state and federal agencies on marine habitat conservation and shellfish management. Staff works closely with the New Jersey Shellfisheries Council, an advisory board to the DEP Commissioner, on issues related to the protection and enhancement of New Jersey's shellfisheries. Staff members are actively engaged in fostering aquaculture development and reviewing coastal development activities to protect critical habitat. They are also managing surf clams in the Atlantic Ocean and oysters in Delaware Bay, as well as examining the effects of offshore sand mining. In addition, the Bureau is responsible for administering a licensing program for recreational and commercial shellfishermen as well as the State's Shellfish Aquaculture Program.

Highlights

Bureau staff completed sampling for the 2015 New Jersey Surf Clam Inventory Project. A total of 194 stations were sampled from Cape May to Shark River Inlet. The estimated stock was calculated at 439,725 bushels. For the first time in a number of years, small "seed" surf clams were documented at a number of stations in harvest zones located between the Little Egg Harbor and Shark River inlets. While the total estimated volume of surf clams did not increase significantly from the all-time low in 2014, the estimated number of *individual* surf clams did – and by almost four times the number assessed in 2014 (because these individual clams were tiny, the overall biomass was barely affected). Currently, the harvest in New Jersey cannot exceed 10-percent of the estimated stock.



Staff sort and measure surf clams during the annual assessment survey.

Bureau staff have been working with the leasing committees of both sections of the New Jersey Shellfisheries Council (Atlantic Coast and Delaware Bay) to develop a comprehensive policy to

establish shellfish aquaculture leasing guidelines and harvest regulations. In March 2015, the Atlantic Coast council adopted a leasing policy that now serves as a critical planning document for managing shellfish aquaculture leases in New Jersey's Atlantic Coast tidal waters. The policy will be revised regularly to reflect the industry's changing needs as well as the Bureau's staffing capacity.

Staff conducted a hard clam stock assessment survey in northern Monmouth County, working in the Raritan and Sandy Hook bays as well as the Navesink and Shrewsbury rivers. The most recent previous assessment for the Raritan/Sandy Hook bay locations occurred in 2000; the last time the Navesink and Shrewsbury rivers were sampled was 1983. The data collected in 2014-15 is being compared with the results from the older surveys. Preliminary findings for Raritan and Sandy Hook bays indicate a collective standing stock of approximately 1.2 billion clams. In fact, in Raritan Bay the stock increased by approximately 39 percent compared, to figures in the 2000 study. Currently, biologists are finishing the comparison of data from the recent Navesink and Shrewsbury rivers survey to the 1983 figures. Once completed, the new data will then be confirmed through a dredge calibration survey, since the research vessel and the sampling dredge were significantly upgraded from those used to collect specimens in the earlier studies. A final report is expected for release in early 2017.

Bureau of Wildlife Management

Carole Stanko, Chief

The Bureau of Wildlife Management provides the scientific information and recommendations necessary to develop conservation plans for New Jersey's game species. It also manages breeding operations for the Division's Pheasant Stocking Program and assists the public in reducing damage caused by wildlife. Biologists work with other agencies and local governments to develop cooperative management programs throughout the State. These professionals also monitor wildlife population numbers and health conditions. The information collected is of critical importance to the Fish and Game Council, which relies on it to determine New Jersey's annual hunting and trapping regulations.



Thousands of chicks are raised annually at the Rockport Pheasant Farm in Warren County.

Highlights

On January 15, 2016, a trapper reported catching a fisher near the Pequest Wildlife Management Area in Warren County. Staff responded to the call in order to collect information on sex (male) and weight (11.5 pounds), as well as collect a DNA sample. The fisher was immobilized, removed from the trap, tagged and released on site. It was the first time a live fisher was ever handled by staff.



Fishers are slowly making a comeback in New Jersey.

Fishers are native to northwestern New Jersey, but logging and unregulated hunting nearly wiped out the population in the early 20th century. Thanks to restocking efforts by Pennsylvania and New York, fishers have now returned to their native range. They are currently considered a game species with a closed season.

The Comprehensive Black Bear Management Policy was updated to include the latest population estimates, as well as harvest and incident reporting data. Revisions include a Fish and Game Council-approved amendment to the bear hunting season structure with the addition of a six-day October segment and measures to revitalize hunter participation by incorporating archery.

Staff contributed to the following articles published during this report period:

- ◆ Survival and harvest of Atlantic Flyway Resident Population Canada geese, *Wildlife Society Bulletin*.
- ◆ Population trends of breeding waterfowl in New Jersey, 1993-2012, *Bulletin of the New Jersey Academy of Science*.
- ◆ Habitat Use by Black Bears (*Ursus americanus*) in the Urban-Wildland Interface of the Mid-Atlantic USA, *Ursus*.
- ◆ A Population Model for Management of Atlantic Flyway Resident Population Canada Geese, *Wildlife Society Bulletin*.
- ◆ Cooperative Hunting of Canada Geese (*Branta canadensis*) by Gray Wolves (*Canis lupus*) in Northern Quebec, *Canadian Field-Naturalist*.
- ◆ Factors Influencing Nest Survival of Atlantic Flyway Resident Population Canada Geese in New Jersey, *Journal of Wildlife Management*.
- ◆ Babesia spp. in *Ursus americanus* (Black Bear) in New Jersey, *Northeastern Naturalist*.



Deer herds can cause significant damage to private acreage. To help farmers and other landowners protect their properties from deer-imposed devastation, the Division issues special depredation permits. A total of 2,064 deer were harvested through these permits during the first half of FY16 (based on the data collected to date).

Endangered and Nongame Species Program

Dave Jenkins, Chief

The Endangered and Nongame Species Program (ENSP) was created following the enactment of the New Jersey Endangered Species Act of 1973. More than 80 endangered and threatened species inhabit the Garden State, and many more stop here to rest and refuel during their migrations. To protect these species, the ENSP is committed to conserving New Jersey's biological diversity by working to maintain and foster endangered and threatened populations as well as protect the unique habitats on which they depend. The ENSP is also responsible for administering the State Tax Check-Off for Wildlife, which benefits these species.

Highlights

Over the last several decades, the nation's American kestrel population has undergone a sharp decline. The smallest and most widely distributed falcon in North America, the loss of suitable habitat and nesting locations, competition from non-native species, use of pesticides and increased predator abundance, have all taken a toll on this grassland raptor.

To discover the status of these birds in New Jersey, ENSP biologists surveyed the population during the 2004 breeding season and uncovered some disturbing information. Of the 100 historically used fly routes surveyed, only nine were active. So to obtain data critical to the recovery of American kestrels in our State, biologists developed a Nest Box Program. In 2015, The Nature Conservancy (TNC) joined the recovery effort by installing and monitoring boxes throughout South Jersey. By targeting large landowners and those who had existing agreements with the federal Natural Resource Conservation Service, TNC was able to persuade these individuals to not only put up boxes, but also to take some of their acres out of production and convert that land to grassland habitat.



A nest box full of kestrel chicks.

Through the combined efforts of ENSP and TNC, the 2016 season was the most productive ever; 62 nesting attempts and 162 fledglings. In addition, ENSP biologists concluded the fourth year of a geo-locator study begun in 2013. During that first year, 15 kestrels were fitted with special geo-location devices. A year later, five of them were recovered and in 2015, another five were deployed. In 2016, two more were recovered. As a result, six of the seven locators were retrieved from live birds and from the data obtained, biologists discovered that three had wintered in Florida and three remained in the Northeast. Biologists will continue to monitor the birds for more valuable information.

One of the State's most imperiled birds, piping plovers nest on barrier island beaches along New Jersey's Atlantic coast from Sandy Hook to Cape May. Federally listed as threatened under the Endangered Species Act, plovers are considered endangered in New Jersey and experienced the

lowest nesting pair count ever (92 birds) in 2014. However, 2015 showed promise as numbers improved and building on that success, 2016 pair numbers have continued to rise (estimated at 115). More important and critical to New Jersey's population, productivity has increased. Biologists think the growth may be linked to a combination of excellent post-Sandy nesting conditions, good weather and a concerted effort between state agencies, NGOs and academic institutions to focus on and foster species recovery.

Staff is partnering with the Division of Parks and Forestry's Forest Nursery in Jackson, Ocean County, on an initiative to create gardens and meadows for butterflies and other pollinators on State land. A majority of the project has focused on rearing milkweed plants for Monarch butterflies. ENSP staff and volunteers collect seeds from three types of milkweed each year (common, swamp and orange butterfly) and deliver them to the nursery. Throughout May and June, nursery staff members tend the plants until they are 6-12 inch seedlings. This year, ENSP staff distributed approximately 300 seedlings to various state parks and one wildlife management area. The project will continue in 2017 with hopes of growing even more seedlings for distribution throughout the State.

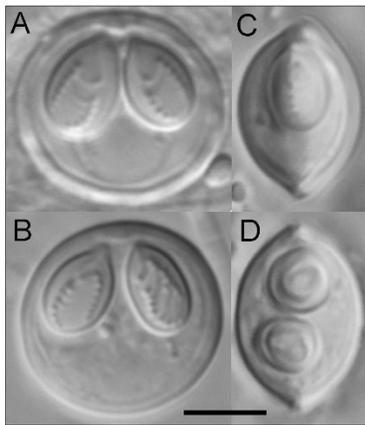
The ENSP, in cooperation with the Conserve Wildlife Foundation, New Jersey Audubon Society, U.S. Fish and Wildlife Service, Natural Resource Conservation Service and numerous private landowners, is leading an effort to monitor bog turtle populations and manage their habitat across the Garden State. Using funds from a federal Competitive State Wildlife Grant, New Jersey is also partnering with six other northeastern states to implement standardized bog turtle population and habitat monitoring protocols. By employing the same research practices, biologists can improve their understanding of population status on a regional level, as well as collectively plan recovery efforts. Staff is also modeling local population needs through radio-telemetry results.

In 2016 a parcel of public land entered its second year of habitat restoration for bog turtles. This particular project, a partnership between the ENSP and NJ Audubon, focused on the removal of invasive *Phragmites* (common reed) in two sections of wetlands. Prior to these efforts, the site had all but been written off with the last turtle fitted with a monitor in 2001 and only four known individuals left in the area. Then in 2013, a new turtle was discovered and a year later one of the previously marked turtles was recaptured! The site now has a recorded population of 10 bog turtles. Because habitat restoration efforts were so successful here, ENSP staff is working with the Division's Bureau of Land Management to design and install a modern bog turtle passageway underneath one of the roads at another suitable wildlife management area.

Office of Fish and Wildlife Health and Forensics Jan Lovy, Research Scientist

The Office of Fish and Wildlife Health and Forensics (OFWHF) conducts surveillance and research on diseases and chemical contaminants that affect New Jersey's fish and wildlife. Scientists in this office also recommend measures to combat diseases in the Division's fish hatcheries and in free-ranging fish and wildlife populations. These scientists are the only available experts in New Jersey State Government to specialize in wildlife pathology, fish pathology, and fish and wildlife toxicology. As a result, when fish and wildlife are dying in the Garden State, the public and other government agencies turn to the OFWHF to determine the cause and develop a response strategy.

Highlights



The parasite Myxobolus mauriensis as viewed under a microscope.

Throughout the Northeast, river herring populations, including blueback herring and alewife, have been declining. As a result, research was conducted to evaluate the health of these populations in New Jersey with particular interest on how the parasite (*Myxobolus mauriensis*), recently discovered in both species of herring, is affecting those populations. The parasite prevalence seems particularly high in the Maurice River in Cumberland County and biologists are currently trying to learn why. Curiously, *M. mauriensis* develops within the rib bones of young-of-the-year fish, producing large cysts that eventually break the bones causing bone growth deformities. Further research should help to uncover possible factors leading to infection and may explain the high occurrence of this parasite in the river system.

In collaboration with the New Jersey Department of Agriculture's Animal Health Diagnostic Laboratory, biologists conducted research to identify the bacterium responsible for several major fish kills in the spring. Currently, biologists are using molecular biology to determine the species of bacterium. Applying microbiology, genetic sequences were analyzed with all data leading to *Pseudomonas mandelii* (a strain previously thought not to be a fish pathogen). Found throughout the aquatic environment, it is not considered to be a human health threat. Biologists think the infection strikes populations in the spring when fish are already stressed from overwintering and water temperatures start to increase. Final analysis of the results is ongoing. Further investigation of fish kills and fisheries health surveillance will determine if this bacterial species will continue to affect fish populations in New Jersey's waters.

For the last several years Atlantic Menhaden, more commonly known as bunker, have been abundant along the Jersey Shore. Along with their plentiful numbers have been many large-scale fish kills in coastal habitats, rivers and estuaries. Many of these kills occurred in the Navesink River and Raritan Bay region in the spring and summer. The huge summer mortalities are likely related to massive numbers of fish crowded together in poorly circulated areas, leading to hypoxia from lack of oxygen. The spring kills affected several hundred to a thousand fish with an ongoing mortality rate characteristically unrelated to poor dissolved oxygen levels.

Subsequent investigation suggested a viral infection known as “spinning disease.” Clinical signs include disoriented swimming and spinning along the surface of the water. Biologists are currently working with the Cornell Veterinary Medicine Aquatic Diagnostic Lab in New York and the National Fish Health Lab in West Virginia to learn more about the virus.

Office of Environmental Review

Kelly Davis, Biologist

The Office of Environmental Review (OER) coordinates wildlife, marine fisheries, shellfisheries, freshwater fisheries and endangered species concerns related to state and federal permitting programs. The information provided protects, maintains and enhances fish and wildlife species and their habitats through environmental review of any development projects that could potentially cause negative impacts to them. Prior to construction, OER offers guidelines to eliminate or minimize these impacts. Biologists also review and provide comments or recommendations for the DEP’s Land Use Regulation Program (Waterfront Development, Coastal Area Facility Review Act and Stream Encroachment sections) as well as the Bureau of Dam Safety & Flood Control, and the Solid & Hazardous Waste Program. In addition, the OER offers input to federal agencies, including the Army Corps of Engineers, Federal Energy Regulatory Commission, Bureau of Ocean Energy Management, Federal Aviation Administration and the Department of Defense.

Highlights

During FY 2016, staff conducted 313 environmental review assessments and participated in 84 meetings on various projects throughout the State. Among these activities was a discussion with Joint Base McGuire-Dix-Lakehurst representatives to review the complex’s Integrated Natural Resource Management Plan, which includes a section on managing grassland habitat within the runways of McGuire Air Force Base. This is an important nesting area for threatened and endangered upland sandpipers, as well as Savannah and grasshopper sparrows, whose habitat is being compromised by one of the base’s flight safety programs. Several alternatives are currently under review to reduce the risks and potential hazards of aircraft striking birds and other wildlife along the runways.

Staff also continues to meet with representatives from the American Littoral Society and the United States Fish and Wildlife Service to discuss several projects to restore horseshoe crab spawning and red knot foraging habitat along Delaware Bay. Biologists are seeking ways to restore the critical areas lost during major storms, while minimizing any impacts to the area's shellfisheries resources.



Habitat restoration efforts along the Delaware Bay shore.

Office of Information and Education

Al Ivany, Chief

The Office of Information and Education educates thousands of New Jerseyans on the needs and values of fish and wildlife. As more and more families choose to reside in rural areas of the state, this education is critical to ensuring that residents and wildlife can successfully coexist together. Accordingly, staff interprets information on biology, ecology and conservation to help the public better understand and appreciate the unique needs of each species, as well as their economic, aesthetic, environmental and recreational values. Outreach efforts also promote the wise use of these resources and the need to safeguard them for future generations.

Highlights



Making use of a new trailer wrap to promote the HOFNOD Program.

New Jersey's Hooked On Fishing - Not On Drugs (HOFNOD) program has grown to 22 teams in 13 counties. "Hooked On Fishing - Not On Drugs" is a unique, nationally recognized program that encourages school-aged children to avoid tobacco, drug and alcohol use by providing alternative activities that involve learning to fish, appreciating the aquatic and outdoor environment, and developing positive life skills. Partnering with schools, community and faith-based youth organizations, the Division trains team leaders to create a constructive after-school atmosphere. Staff engaged in a variety of promotional efforts and activities to recruit new group leaders, including podcasts, public service announcements, school presentations and a statewide *Youth Fishing Challenge*. Free Fishing Day (June 11) was used as a platform to initiate the *Challenge* and encourage fishing

among youngsters and their family members as a way to form lasting, supportive bonds. The successful event hosted more than a thousand youngsters at 18 locations in 14 counties.

Staff assisted with the promotion of a new “Fishing Buddy” License in 2016. The special freshwater license rewards anglers for introducing a friend to the sport by offering licenses at a reduced cost. Any resident aged 16 to 65 or any non-resident over age 16 who purchases an annual New Jersey Freshwater Fishing License with a “Buddy” can take advantage of this new mentoring program. A variety of materials, including news releases, flyers, listserv messages and website/Facebook posts were designed to promote this new initiative.

The 25th Annual Governor's Surf Fishing Tournament was held Sunday, May 15 at Island Beach State Park in Ocean County. On that day, 600 participants were treated to a great bluefish run, but as luck would have it, a 43.5-inch striped bass caught by Dakota Hahn of Toms River took the grand prize and Governor's Cup. The tournament continues to be popular with anglers from New Jersey and neighboring states. Since its inception, the event has raised more than \$130,000 for a variety of conservation, education and beach access projects.

Office of Mosquito Control Coordination

Scott Crans, Administrator



Wetlands are prime mosquito habitat.

Created in 1974, the New Jersey State Mosquito Control Commission’s Office of Mosquito Control Coordination (OMCC) is based at the Division’s main office in Trenton. The OMCC coordinates programs funded by the State Mosquito Control Commission and serves as a public face on all State mosquito control matters. Actively collaborating with different bureaus in the Division and across DEP is a priority, as well as maintaining existing standards and developing new methods of mosquito control. These efforts ensure that county mosquito control agencies across the state are improving the public’s quality of life and protecting public health by reducing mosquito populations in an environmentally sound manner.

Highlights

As part of a DEP initiative, surveillance, control and public outreach efforts were expanded along with direct State aid to county mosquito control agencies to help prepare New Jersey for the inevitable arrival of *mosquito-transmitted* Zika virus (ZIKV). To date, the OMCC has distributed numerous tanks and traps designed to collect container-inhabiting mosquitoes (like *Aedes albopictus*) for use in public awareness and educational programs.



Aedes albopictus

In New Jersey, the ZIKV cases to date have all been associated with human travel; no local mosquito-driven transmission has occurred. Biologists are able to closely monitor the situation by collecting and testing samples. In FY16, more than 12,311 mosquito samples were collected statewide and submitted for virus testing. The number is a significant increase over previous years. This year's results showed that out of 202, 234 individual mosquito samples from eight different species, 426 tested positive for West Nile Virus (the second lowest year recorded since 2009). Eleven tested positive for Eastern Equine Encephalitis Virus (a typical number for New Jersey), and the samples submitted for Zika, Chikungunya and Dengue viruses all tested negative. This massive surveillance effort would not be possible without the dedicated work of county mosquito control agencies throughout the State along with invaluable assistance from the New Jersey Department of Health in providing access to state-of-the-art testing services.



The mosquito-eating Gambusia affinis.

As part of the State's Integrated Mosquito Management Plan, the OMCC continued working with the Division's Bureau of Fisheries Production to supply county mosquito control agencies with several species of mosquito-eating freshwater fish. The species chosen are voracious predators of mosquito larvae and provide a natural biological alternative to the use of larvicide. In FY 2016, more than 638,000 mosquito-eating fish were stocked statewide. To encourage more counties to participate, the OMCC created a southern distribution hub in

Camden County, added ten temporary holding tanks in five county mosquito control facilities, acquired four new transport tanks and two vehicles (for use at the Hackettstown Hatchery to assist in making deliveries).

The OMCC collaborated with several county mosquito control agencies and two aerial spraying companies to evaluate an innovative new product that combines the active ingredients of two State-approved biological insecticides (S-methoprene and *Bacillus thuringiensis* subspecies *israelensis*). By combining the two elements into one product, scientists hope the formulation will target immature mosquitoes before they can develop any resistance to the insecticide.

Office of Business Administration
Paulette Nelson, Assistant Director

The Office of Business Administration is responsible for the Division’s licensing, accounting, budgeting, purchasing and billing functions. This office has three primary elements: *Licenses and Revenue*, *Permits*, and *Budget and Procurement*. These three sections work together to provide fiscal services for the Division. The following chart illustrates revenue, appropriations and expenses for FY16.

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RESOURCES	
General State Fund Appropriation Hunters & Anglers	3,332,000
General State Fund Appropriation Shellfish and Marine Fisheries	1,130,000
General State Fund Appropriation Endangered Species	206,000
Subtotal GSF Appropriations	4,668,000
Hunters & Anglers Licenses/Permits	13,442,190
Lease Revenue	1,093,219
Endangered Species Revenue (License plates and Tax checkoff)	389,263
Waterfowl Stamp Revenue	67,663
Miscellaneous Dedicated Accounts (Exotics, Sedge Island, Hooked on Fishing, Pump Out)	453,857
Shellfish and Marine Licenses/Permits	722,051
Subtotal Revenues	16,168,243
Federal Salary & Fringe Reimbursements	4,334,466
Federal Operating Funds	3,964,334
Carryforward funds from prior years- Recurring Non-Federal accounts	2,796,546
Non-Federal reimbursements and transfers	1,311,119
Subtotal Federal & Other funding	12,406,465
TOTAL RESOURCES	33,242,708
EXPENDITURES	
Hunters & Anglers Salaries (Includes seasonals, overtime, clothing allowances)	11,463,091
Shellfish and Marine Fisheries Salaries (Includes seasonals, overtime, clothing allowances)	3,211,818
Endangered Species Salaries (Includes seasonals, overtime, clothing allowances)	1,000,870
Hunters & Anglers Fringe Benefit costs assessed by Treasury Office of Management & Budget	5,111,329
Miscellaneous Dedicated Expenditures (Exotics, Sedge Island, Hooked on Fishing, Pump Out)	683,968
Waterfowl Stamp Expenditures	173,819
Hunters & Anglers Operating (equipment, repairs, fuel, utilities, licensing vendor...)	2,902,485
Shellfish and Marine Operating (equipment, repairs, fuel, utilities...)	402,466
ENSP Operating (equipment, repairs, fuel, utilities...)	34,055
Federal Operating Expenditures	3,964,334
DEP Assessments (Deputy Attorney Generals, Office of Information Resources Management, Office of Administrative Law, Environmental Research Library, Office of Information Technology, Rent, Training Office)	615,264
TOTAL EXPENDITURES	29,563,499
*BALANCE	3,679,209

*Reflected balance includes funds in recurring nonfederal accounts dedicated for specific purposes. It is anticipated that a portion of the remaining balance will be needed for retroactive salary, fringe and clothing payments when employee contracts are settled. Information as of 8/25/16.