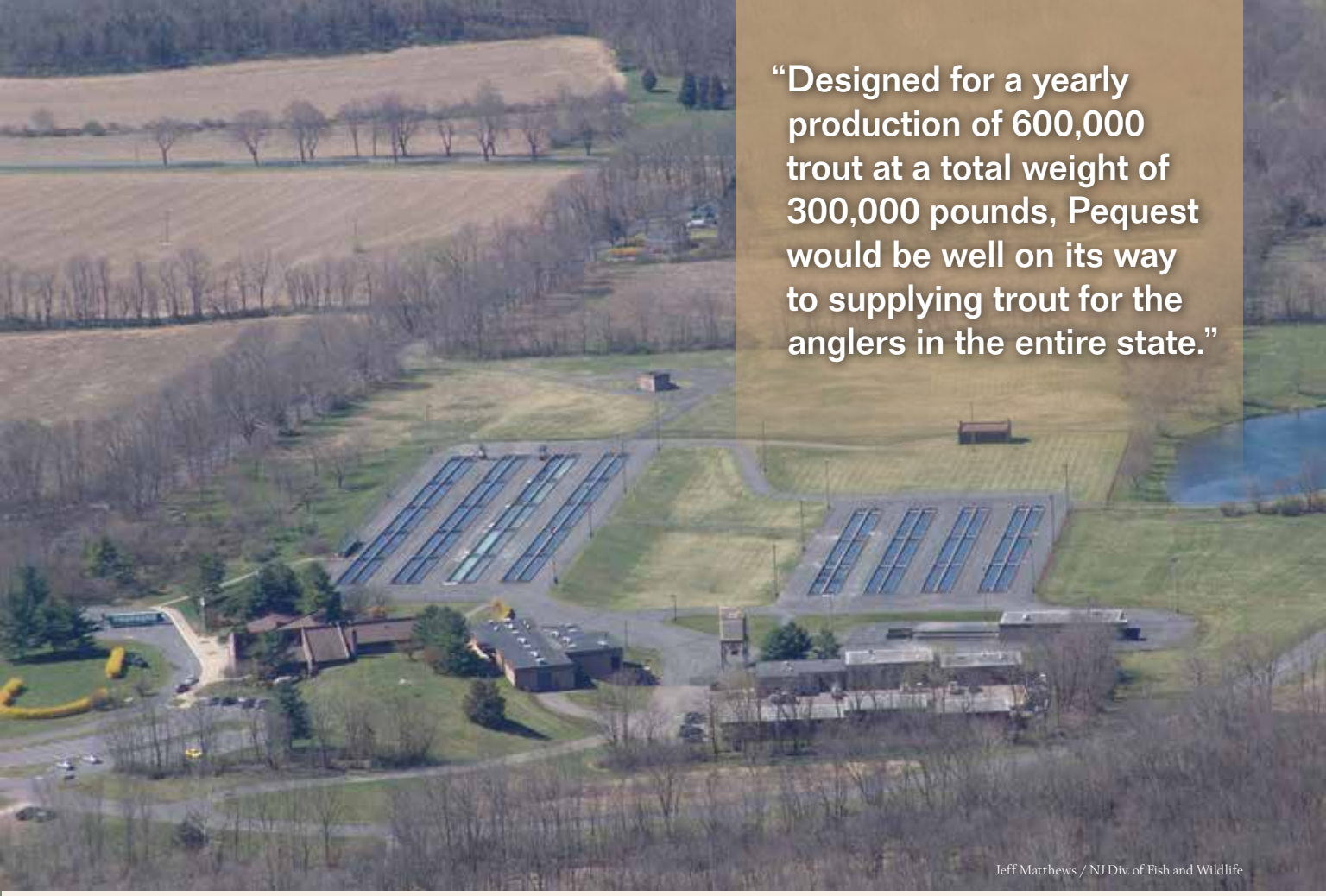
Thirty Years of TROUT PRODUCTION at Pequest Trout Hatchery

By Jeff Matthews | Hatchery Superintendent

Clint Deckey/ NJ Div. of Fish and Wildlife



"Designed for a yearly production of 600,000 trout at a total weight of 300,000 pounds, Pequest would be well on its way to supplying trout for the anglers in the entire state."

Jeff Matthews / NJ Div. of Fish and Wildlife

It was 1980 – a turning point for New Jersey Division of Fish and Wildlife's Bureau of Freshwater Fisheries – when construction began for the new Pequest Trout Hatchery and Natural Resource Education Center in the Pequest Valley, Warren County. Here, a huge aquifer was discovered in the early 1950s by the state geologist.

This pristine, high-volume underground water source would make the valley an ideal location for a much-needed new trout-rearing facility. Over time, conditions had become less favorable for trout production at the Hackettstown State Fish Hatchery. Now, the Pequest Valley was destined to become the new center for raising Garden State trout. In the 1950s over four thousand acres were purchased surrounding the aquifer to protect the water quality. The new Pequest hatchery was completed in 1982.

Designed for a yearly production of 600,000 trout with a total weight of three hundred thousand pounds, Pequest would be strongly positioned to supply trout for anglers statewide. Fish and Wildlife secured more than one million trout eggs of three different species from pathogen-free hatcheries. Rainbow trout eggs were brought in from West Virginia; brook and brown trout eggs came from Massachusetts.

From the first hatch, fish were hand-selected to serve as broodstock. To this day, a quality broodstock population is maintained at the hatchery serving as an "in house" egg source. A critical feature to note is that since day one, *no other outside fish or eggs have been introduced into the trout production cycle at Pequest.* This has been an important aspect in maintaining a pathogen-free trout rearing facility.

Many precautions and procedures have been undertaken to protect against any infection threat to our trout population. Strict access to the culture area is limited to staff only, the nursery building is cleaned and sterilized yearly, along with culture equipment and vehicles. The over-the-road stocking trucks are loaded outside the culture area to prevent any transfer of fish pathogens that may have been encountered while stocking the lakes and rivers in the state. Public viewing areas were built so that hatchery guests can experience and learn about how trout are raised and see them in the raceways without risk of introducing pathogens.

Over the past thirty years Pequest has earned a reputation as one of the finest pathogen-free trout hatcheries in the nation.

A specialized hatchery feed truck distributes pelleted feed four times daily along the hatchery's 1.5 miles of raceways.

Jeff Matthews / NJ Div. of Fish and Wildlife

Having a reliable water supply, dedicated employees, using the latest in trout culture technology and following stringent disease-prevention guidelines enables the staff at Pequest to reach production objectives every year.

The production cycle begins early in the fall when hatchery staff will manually strip and fertilize the eggs from adult trout.

The eggs are then placed in incubators for approximately twenty eight to thirty five days. Upon hatching, the young trout are called "sac-fry," so named because the yolk sac remains attached to the abdomen and nourishes the young fish for about two weeks. The sac-fry are moved from the incubators to special tanks located in the nursery building. Once the yolk is absorbed, the young fish swim up from the bottom of the tanks. They are then started on a high protein diet and fed eight times per day.

Following a three-month growing period inside, the fry—now called fingerlings—are sorted for size and moved outside in the summer to a series of pools known as raceways. The hatchery has 1.5 miles of raceway. Here, a specialized feeding truck distributes pelleted feed four times a day in each one hundred foot section of raceway. After the summer growing period the fish are again sorted for size and left in the raceways where they attain a 10.5-inch average length by early spring.

By mid-March the hatchery trucks are loaded and rolling, stocking quality trout in over two hundred lakes, streams and rivers for the enjoyment of anglers statewide. During the process of spring stocking, excess and older broodstock are liberated along with the regular production stock. These fish range from 15 to 25 inches and average 3 to 8 pounds.

Fish and Wildlife has consistently produced quality brook, brown and rainbow trout as a result of modern technology and a high quality water supply.

There are seven artesian production wells in the Pequest Valley that supply up to seven thousand gallons of water per minute. The continuously flowing waters of Pequest remain at a constant 52 degrees Fahrenheit year round. Clean, moving, cold water is a key factor that is essential to success in a trout-rearing facility.

Along with the hatchery's complex systems maintaining water flow is the demand of electricity to keep the pumps running. The Pequest Valley experiences many power outages a year. During the original construction, one diesel-driven generator and four direct-drive diesels were installed to drive the wells and to keep the water flowing always. A state-of-the art radio telemetry system was installed to monitor and control the operation of each individual well. Water flow, diesel motor operations and well status are all now monitored and operated with smartphones by the supervisory staff, along with desktop computer controls. Variable-speed motors have recently been installed in each of the wells. The old-style pumps ran at a constant speed and valves were used to adjust water flow. The new motors enable staff to control the amount of water being pumped from each well while reducing electrical usage and cost.

Jeff Matthews / NJ DFW

Clint Decker, engineer in charge of maintenance, keeps the complex systems running smoothly at both the Pequest and Hackettstown hatcheries.

In another approach to increase the resourcefulness of Pequest's fish culture activities is the recent incorporation of an additional large fish pump. This pump has the capability of moving and loading fish up to 18 inches long. In conjunction with the older pump still functioning since the early 1980s, staff now utilizes both pumps for sorting operations and loading trucks, making the operation more efficient and less labor intensive.

The Pequest hatchery added additional stocking programs in the early eighties. Fish and Wildlife's fall stocking program began as a way to stock surplus fish from the annual sorting procedures of the production stock. These yearling fish had grown up to eight inches long. After a survey of anglers in the state it was found that they prefer larger, yet fewer, fish. As a result, the fall, winter and sea-run trout stocking programs were woven into the production cycle as an added incentive to anglers.

The fall trout production cycle was changed to raise less fish but to retain them for an additional year of growth. Since 2005, the fall and winter stocking programs boast trout averaging up to sixteen inches in length and weighing 1.5 pounds each. And as an added angler incentive, up to one thousand rainbow trout breeders—measuring up to 25 inches—are liberated during the fall program. Fish and Wildlife offers sportsmen and sportswomen quality, catchable-sized trout throughout the fall and winter months.

After three decades of successful trout production and always exceeding our goals, both our achievements and our funding base are attributed to each of the freshwater anglers who purchase a New Jersey fishing license and trout stamp. The Division of Fish and Wildlife is looking forward to providing you with quality trout for years to come.


Jeff Matthews / NJ DFW

Hatchery technician Frank Jalosky carefully transfers newly fertilized eggs into hatching jars. The eggs will hatch in 28–35 days.

TROUT STOCKING

Raised with pride at New Jersey Division of Fish and Wildlife's Pequest Trout Hatchery

SPRING

- Over 570,000 brook, brown and rainbow trout
- Average size: 10.5 inches and ½ pound
- An additional 6,000 breeders 15–21 inches (3–6 pounds)
- Most waterbodies stocked at least three times
- 100 streams and 80 lakes stocked statewide
- All 21 counties stocked
- 180,000 trout released for Opening Day—April 6, 2013
- Stocking continues for seven weeks following Opening Day

FALL

- Second and third weeks in October (fall stocking begins October 8, 2013.)
- All large, two year old trout, measuring 14–16 inches
- 20,000 trout stocked
- 30 streams, lakes & ponds
- 1,000 rainbow trout breeders, averaging 20 inches
- Best chance to catch big trout

WINTER

- All large two year olds, measuring 15–16 inches
- Over 5,000 trout
- 24 lakes and ponds
- Great fishing all winter long!

SEA RUN BROWN TROUT

- Lower Manasquan River
- 15,000 7–8-inch brown trout
- Try this elusive fishery!


Jeff Matthews / NJ Div. of Fish and Wildlife

Shad of the Raritan River

By Jaime Darrow and Brian Neilan, Seasonal Fisheries Technicians

An important resource

The American Shad, *Alosa sapidissima*, was once one of the most plentiful, anadromous fishes to swim up the Raritan River. Like other anadromous fishes such as the smaller river herring, and the popular striped bass, American shad spend the majority of their lives living and growing in the ocean. They return to their natal rivers to spawn when water temperatures warm and the shadbush begins to bloom.

The Raritan River is the largest watershed completely within New Jersey that supports migratory fish species. The shad run in the Raritan had previously served as an extremely important commercial fishery in the region, contributing greatly to the local economy until their numbers began to plummet by the end of World War I. The increased industrialization of the region resulted in severe pollution and the construction of dams which left the Raritan unsuitable and not navigable for shad, cutting them off from their spawning grounds. These problems, combined with commercial overharvesting, reduced shad numbers to almost zero, robbing the Raritan of one of its most vital environmental and commercial resources.

Damn the dams

The Clean Water Act plus a renewed commitment to the state's environmental resources in the 1950's brought new life to the river as water quality greatly improved. These improvements resulted in shad once again returning to the banks of the "ol' Raritan." Unfortunately for American Shad, their journey up the Raritan River was still nothing short of challenging. Dams, mostly stone remnants of eras gone by, continued to impede their movements upstream. In the realm of dams, the dams of the Raritan are considered low head. However considering the relative shallowness of the Raritan River these dams pose significant blockages, not only to anadromous species but to resident species as well . Critical stream connectivity is severed resulting in sedimentation, elevated temperatures and destruction of fluvial habitats. In 1983, the Division of Fish and Wildlife began addressing the issues of the dams by breaching (partially removing) the lowermost dam on the Raritan, the Fieldsville dam, as part of a federally funded restoration project for the river. That was a start.

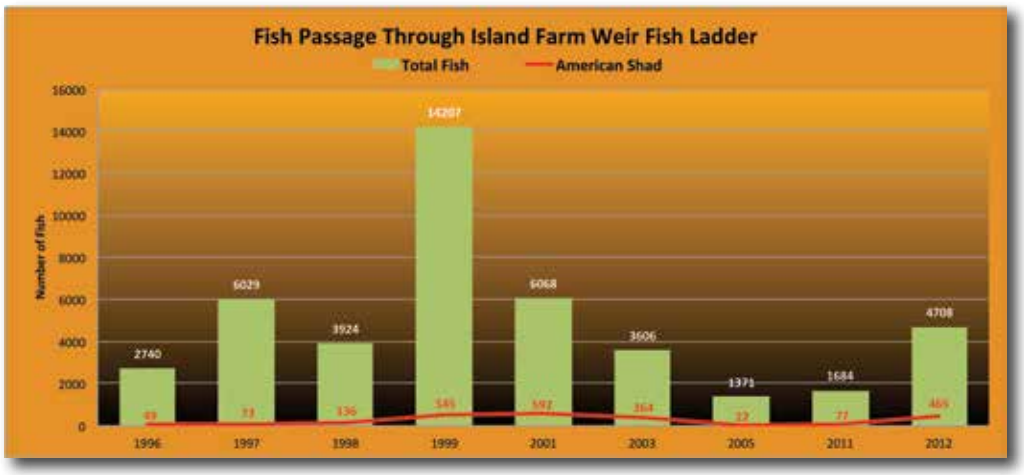
One shad, two shad, three....

The removal of the Fieldsville dam opened three more miles of river to returning shad. Improvements to water quality continued. New Jersey's growing population, however, resulted in increased demands for water resulting in the replacement of a small dam located near the Millstone confluence, with a much larger one, the Island Farm Weir was constructed in 1995. Current regulations require dams constructed on known migratory fish pathways to provide for fish passage. So the Island Farm Weir, constructed by the New Jersey Water Supply Authority, working in cooperation with Fish and Wildlife, included a large vertical slot fish ladder, complete with a 3-foot wide, 5-foot high viewing window. For a four foot high dam, the Island Farm Weir ladder is quite large, comprised of eight rooms measuring 12 x 35 feet, each separated from the room before by an eleven inch wide slot. There is only a 6-inch differential of water height from one room to the next.

In an effort to better understand the number of American shad still using the Raritan River as spawning grounds, the Division of Fish and Wildlife began an ambitious project at the Island Farm Weir fish ladder in 1996, monitoring the passage of fish utilizing the ladder. American shad, and the river are not conducive to traditional sampling methods such as electrofishing, and gill nets. From the beginning of April through the end of June, from 1996 to 2003, remote access video equipment recorded the passage of fish through the ladder as they passed by the viewing window. It was the job of Division employees to maintain the ladder, keeping it

The Island Farm Weir Fish Ladder on the Raritan River is located just below the river's confluence with the Millstone River.

Jamie Darrow / NJ Div. of Fish and Wildlife



Note: Total number of monitoring days varied annually due to changing river conditions.

obstruction free and retrieving the videos for viewing at the Lebanon Fisheries Laboratory. As there is no electricity to the viewing room, that is located below the river's flood stage, batteries that power the system have to be changed three times each week. These videos were then reviewed at the Lebanon Fisheries Laboratory for the purposes of fish enumeration and identification, with American shad being the targeted fish species. In the first year Fish and Wildlife was able to record the movement of American Shad up the Raritan River, they were surprised to find that 49 American Shad made the journey upstream of the Island Farm weir. "We were only anticipating one or two shad, and to see there were 49 really gave us hope for the future," remarked Lisa Barno the Chief of State's Bureau of Freshwater Fisheries. 2,740 fish were documented using the ladder that first year, representing 20 different species. The years immediately following, provided some initial optimism with numbers slowly increasing each year, with the height of passage occurring in 2001 with 592 shad, and over 6,000 fish documented using the ladder. Fish passage monitoring in 2003, and 2005 noted a disturbing decline, with 364 and 22 shad, respectively.

The declining numbers are consistent with the decline of American shad seen up and down the east coast. The lack of data to demonstrate a sustainable fishery in the Raritan will no doubt result in a closure of the fishery in 2013 in accordance with the Atlantic States Marine Fisheries Commission Shad and River Herring Plan.

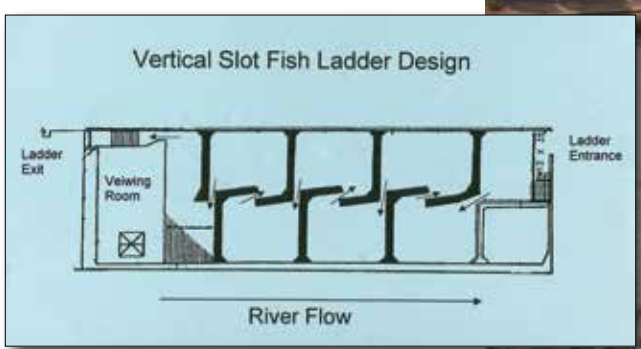
Fish passage at the Island Farm Weir is affected not only by the number of shad in the river but also by the ability of fish to navigate the Calco dam, located a mile downstream. After the breaching of the Fieldsville dam, the Calco dam became the lowermost impediment to fish passage on the Raritan. Through the efforts of the Delaware River Shad Fishermen's Association, the Calco Dam, a notch was cut in the concrete dam face to permit for passage of fish through the dam. Fish passage through the Calco notch, however, is only effective during higher flows of 800 cfs or more. Consistent low spring time flows no doubt prevented shad from getting above the dam.

Efforts Continue

Over the past few years NJDEP has worked diligently to remove three dams on the Raritan River, including the Calco dam, the Nevius Street dam, and the Robert Street dam. The removal of these barriers would open up a 10 mile stretch of the Raritan River for American Shad and other fish species to utilize. NJDEP's Natural Resource Damages Program negotiated removal of the three dams as part of a settlement agreement with the El Paso Corporation.

On July 19, 2011 the removal of the Calco dam began. Today, the Raritan River flows freely from the Island Farm weir and fish ladder, all the way to the Raritan Bay. A total of 6.1 miles of unobstructed river is now available for fish to move through. The Island Farm fish ladder is their next challenge. After they navigate the fish ladder, they are then headed for the Nevius Street dam. During higher water flows, the Nevius Street dam is passable by fish, allowing them to travel upstream to the Robert Street dam. In July of 2012 the removal of the Roberts Street dam was completed. This elimination cleared the way for fish to access another two miles of waterway for possible breeding grounds on the Raritan River. The removal of Nevius Street dam is anticipated sometime in 2013.

Shad of the Raritan River, *continued on page 15.*



Jamie Darrow / NJ Div. of Fish and Wildlife

Public Service Announcement

TEST

From the office of takemefishing.org.

Do you need a fishing license and boat registration?

Please take a few moments to consider each of the questions below. Take your time. Let it come naturally.

DO NOT SHARPEN

DIRECTIONS

1. Use No. 2 pencil.
2. Do NOT use a No. 1 pencil.
3. We don't know why. Just don't.

QUESTION

1 Is this your idea of fishing with friends?

(A) Yes. I am a 1,200-pound brown bear, and these are my friends.
(B) Yes. I stand at the edge of the falls and catch fish with my mouth.
(C) No.

QUESTION

2 Are you your own boat?

(A) Yes, and please stop staring at my stern.
(B) No. I'm my own airplane.
(C) No.

QUESTION

3 Do you want this in your favorite lake?

(A) Yes. Landfills are soooo cliché.
(B) Sure, who doesn't love dipping their toes into a pool of swirling sewage?
(C) No.

ANSWERS:

CONGRATULATIONS! You definitely need to be licensed and registered. Because funds generated from your fishing license and boat registration go toward conserving our waterways and providing better fishing and boating for generations to come.

Find out how to do your part at:

TAKEMEFISHING.org

Lisa Barno / NJ Div. of Fish and Wildlife

One of the first American Shad to pass by the viewing window of the Raritan River fish ladder.

As a result of these removals monitoring of shad passage at the Island Farm Weir was resumed for 2011, and 2012 to collect current information on the status of the shad.

The removed and breached dams will increase the quality of the water and surrounding habitat. Water quality will become more favorable for native species and will facilitate the eradication of undesirable species that were once favored by the pooling effects of dams. Native species will be able to disperse throughout the water body and aid in increasing the biodiversity upstream and downstream of the previous obstructions. Fish and other species will also be able to re-establish their gene flow between individuals that were once isolated. Sediment will be able to travel downstream in the currents, preventing geomorphic impacts, like the widening of streams. The removal of these dams, in the Raritan River, will help New Jersey restore the ecological functions of a free-flowing river and will show the beneficial effects over time.

The future of the shad in the Raritan

Unfortunately, the Raritan River American shad still face an uphill battle as their stocks are extremely low due to many decades of pollution, river impounding dams and commercial overfishing. There may be a light at the end of the tunnel for shad though, as conditions on the Raritan River have greatly improved over the years with the passing of State and Federal Acts aimed at reducing industrial pollution. Also in the shad's favor, is the push for the removal of dams and other impoundments on the upper stretches of the Raritan. The removals of the Calco and Robert Street dams as well as the planned removal of the Nevius Street dam are excellent steps toward rebuilding the American shad run of the Raritan River. Such measures have been shown to restore anadromous fish runs in other rivers throughout the country.