

River Herring Status: Research Holds the Key

By: Matthew Heyl, *Marine Fisheries Specialist*
Courtney Laws, *Hourly Fisheries Biologist*

River herring aren't as well-known recreationally as striped bass or fluke. In the past, anglers used them for bait, not realizing the importance of this species. Read on to learn more about these fish including their value, population decline and current research.

Importance of River Herring

From the same family as American shad, river herring (a collective term for alewife and blue-back herring) are anadromous fish that spend most of their adult lives at sea, returning to freshwater in the spring to spawn. Most abundant in the mid-Atlantic and Northeast, river herring spawn in rivers, lakes and tributaries from northeastern Newfoundland to South Carolina.

River herring were once an important commercial fishery in New Jersey. Looking at landings dating back to 1950, commercial landings peaked around 42,000 pounds in 1990 and were the lowest in 2003 at around 200 pounds. Population declines and lack of data have contributed to the current regulations which prohibit the harvest or possession of river herring in all New Jersey waters.

Courtney Laws sets a 100-foot seine net on the Great Egg Harbor River. Common fish caught here include Atlantic silver-sides, bay anchovies, spottail shiners, blue crabs and mummichogs.



Chris Bartlett/Maine Sea Grant

The Decline of River Herring

The 2007 coast-wide stock assessment determined that river herring stocks were low and in need of recovery. Dams and other impediments that block spawning rivers, overfishing and habitat degradation have contributed to the river herring population decline. In response to the stock assessment, the Atlantic States Marine Fisheries Commission (ASMFC) passed an amendment prohibiting all recreational and commercial river herring harvest beginning January 1, 2013, unless a state had developed a sustainable fishery management plan approved by ASMFC. Since data was not available for New Jersey to develop a plan, the New Jersey Division of Fish and Wildlife began studying river herring in our waters.

Survey History

The key to finding ways to increase river herring populations is research. When funding was received in 2012, Fish and Wildlife's Bureau of Marine Fisheries (Marine Fisheries) began a three-year research project to collect biological data and determine indices for adult and juvenile river herring abundance on the Rancocas Creek and Maurice River watersheds.

During the first year of the program, staff performed test-sampling at numerous sites on both river systems with various sampling methods including gill netting, seining, fish ladder monitoring and electrofishing.

After three years, the project was evaluated and revised accordingly. The first change discontinued sampling at the Union Lake Dam since it was determined that few river herring were utilizing the fish ladder. The second change replaced the Rancocas Creek with the Great Egg Harbor River system. The decision to eliminate the Rancocas Creek was made due to the duplication of similar sampling during the Marine Fisheries' Striped Bass Recruitment Survey on the Delaware River. Both the Great Egg Harbor and Maurice Rivers contain a Denil-style fish ladder that allows biologists to view and study what species of fish pass into either Lake Lenape (Great Egg Harbor River) or Union Lake (Maurice River). In addition, the Great Egg Harbor River allows staff to survey and compare an Atlantic coastal drainage with a Delaware estuary drainage (Maurice River).

River Systems

The Rancocas Creek, a tributary of the Delaware River, has two branches that run through the Pine-lands National Reserve. The main stem of the river is 8.3 miles long; the north branch is 28.3 miles long and the south branch is 21.7 miles. Since 1975, spawning migrations of adult alewife and blueback herring have been confirmed in the mainstem as well as the north and south branches.

The Maurice River is the second longest and largest tributary to the Delaware Bay. It is 50 miles long and drains 386 square miles. Its mouth to the Delaware Bay is surrounded by salt marshes and serves as spawning and feeding grounds, nursery areas, and migratory routes for important recreational and commercial fish and invertebrates including alewife and blueback herring. Since 1977, Fish and Wildlife has confirmed

spawning migrations of adult alewife and blueback herring below the Union Lake Dam.

The Great Egg Harbor River is one of the major rivers traversing the Pinelands. It is 55 miles long and drains 308 square miles of wetlands into the Great Egg Harbor Bay and Atlantic Ocean. It serves as spawning and feeding grounds, nursery areas and migratory routes for important recreational and commercial fish and invertebrates including alewife.

Types of Sampling



A gill net is set by Hugh Carberry, Bill Maxwell and Courtney Laws below the Union Lake Dam on the Maurice River. Common catches include white perch, striped bass, channel and white catfish.

Gill Netting for adult river herring begins in March and runs through May. Alewife are the earliest to be netted as they are more tolerant of spawning in cooler water temperatures. A few weeks later blueback herring arrive. Gill nets are set weekly on each river system and are left in the water for one and a half hours on average. When pulling gill nets, biologists immediately put collected fish into a circular live well with a touch of salt. This minimizes the stress on the fish and greatly improves the chance of survival. River herring biological data collected includes fork and total length, sex and spawning stage. All other fish collected are measured and released. Common catches besides river herring are white perch, catfish and striped bass.



Marine fisheries staff retrieves a 100-foot seine net on the Great Egg Harbor River. Southern species caught during the survey have included gag grouper, mangrove snapper and Florida pompano.

Seine Netting for juvenile river herring begins in July and runs through October. Each river system has predetermined sites that range in

salinity from freshwater to saltwater and are sampled twice a month. The seine net is set and retrieved with a boat, creating a horseshoe loop in the net. All fish are identified to species and counted. A subsample of the catch is measured by fork length. Common catches besides river herring are Atlantic silversides, bay anchovies, spottail shiners, blue crabs and mummichogs.



An electrofishing survey of the Millstone River, conducted here by Fish and Wildlife seasonal staff Scott Catton (L) and Steve Tourto of the Stony Brook-Millstone Watershed Association, revealed the presence of blueback herring for the first time in spring of 2016.

Electrofishing by boat for juvenile river herring occurred on the Rancocas Creek during 2013 and 2014. Electrofishing is when electrical currents pass through positive and negative electrodes hung partially submerged in the water. As the boat moves, the electrical field travels through the water, temporarily stunning the fish. The lack of hard bottom made seine netting difficult on the northern and southern branches of the creek. Electrofishing is an extremely effective way of capturing and releasing juvenile river herring alive. Although electrofishing techniques were used on the Rancocas Creek until biologists ended sampling there, electrofishing equipment could not be used on other river systems due to the presence of salt water.

Data collected from all sampling methods listed above are similar. All fish caught are identified and counted; a sub-sample is measured. Other important data collected include water quality levels and atmospheric conditions which are recorded at each sampling site. Types of water quality information recorded are salinity, water temperature, dissolved oxygen and pH. Atmospheric conditions include air temperature, tide, weather conditions and moon phase.

River Herring Survey Results

Through 2017, Fish and Wildlife has completed five years of the River Herring Survey. For the gill net season, a total of 687 adult alewife and 13 adult blueback herring have been caught along with other species. For the seine season, a total of 4,305 juvenile alewife and 10,161 juvenile blueback herring have been caught. Percent frequencies and geometric means are calculated for both species.



Ladyfish

NJ Div. Fish and Wildlife



Crevalle Jack

Joe Reynolds/NY Harbor Nature.com

These species caught during sampling are uncommon along New Jersey. Ladyfish are found in tropical or subtropical regions. The crevalle jack can grow quite large and frequents tropical to temperate waters.

A geometric mean is the average of a set of products. This calculation provides the catch-per-unit-effort which allows biologists to measure the abundance of a target species. When comparing geometric means from different years, changes in the values signify changes to the species' true abundance.


For both rivers, the 2016 gill netting produced the highest geometric means of river herring for the time series. The 2017 seining season, juvenile alewife index was above average on the Great Egg, while juvenile blueback herring index was above average for the Maurice River. The numbers of both the juvenile alewife seine-netted on the Great Egg and juvenile blueback herring seine-netted on the Maurice River were the highest recorded in both river systems since bi-weekly sampling began in 2016. More years of sampling will help provide a better estimate of population trends.

Common and Rare Catches

Marine biologists record data on all fish caught, just not river herring. Common catches include many types of bait and game fish common to New Jersey such as Atlantic silverside (22,204 sampled), striped bass (192) and winter flounder (28.) On occasion, some uncommon or tropical species not typically seen in New Jersey's marine waters are caught, primarily in late-August through September when water temperatures are at their highest. These species are native to the warmer waters of the southeast U.S. coast.

Sustainability and Restoration of River Herring

Over the past 20 years, there has been a severe decline in river herring populations. The River Herring Survey was designed to enhance current understanding of overall stock levels and to gain information specific to the New Jersey populations. Fishery surveys like these are the groundwork for the overall stock assessment process where data collected is used to better understand coast-wide population trends and harvest potential.

New Jersey Division of Fish and Wildlife plans to continue the survey with the goal of expanding sampling to all Delaware River tributaries and Atlantic Coast rivers, obtaining sufficient data to develop a sustainability plan and restoration targets for alewife and blueback herring. 

TACKLEDIRECT
World's Premier Fishing Outfitter.™



REQUEST OUR CURRENT CATALOG
AT TACKLEDIRECT.COM/CATALOG

FISH, SNAP 📱 & TAG #HookedOnTD

SHIMANO



LUCANUS JIGS

★★★★★ Read Reviews + Product Q & A

Starting at SHM-1218 **\$14⁹⁹**

- Aerodynamic head design
- Trailers wobble and vibrate



BUTTERFLY FLAT FALL JIGS

★★★★★ Read Reviews + Product Q & A

Starting at SHM-2709 **\$12⁹⁹**

- Hydrodynamic flat keel design
- Two Owner dancing stinger hooks



BUTTERFLY FLAT SIDE JIGS

★★★★★ Read Reviews + Product Q & A

Starting at SHM-3097 **\$14⁹⁹**

- Innovative design that gives them the best performance when angle-vertical jigging

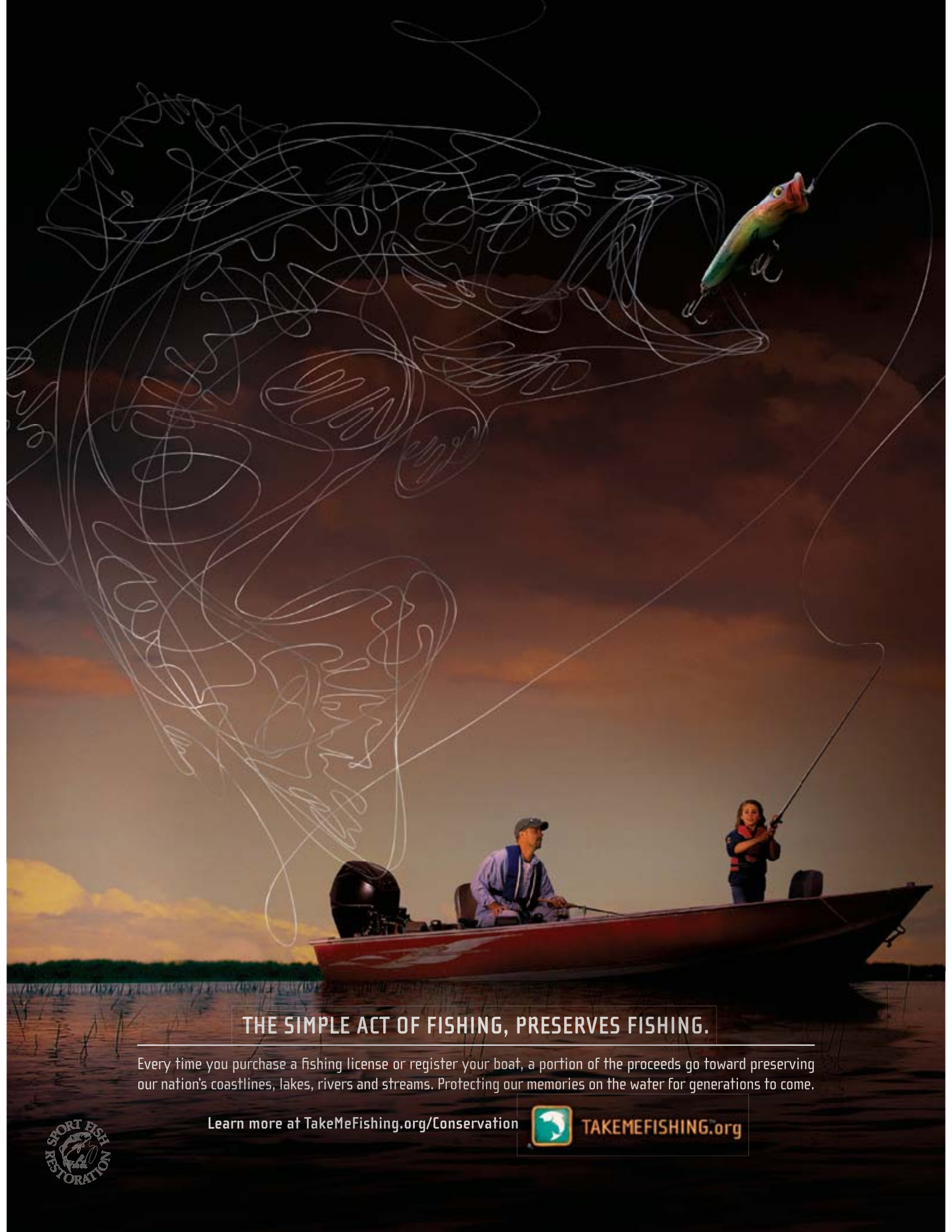
KEEP AMERICA FISHING



IGFA Corporate Member



Shop Online: TackleDirect.com Order Toll-Free: 888.354.7335 Retail Location: 6825 Tilton Road, Bldg C, Egg Harbor Twp, NJ 08234-4426



THE SIMPLE ACT OF FISHING, PRESERVES FISHING.

Every time you purchase a fishing license or register your boat, a portion of the proceeds go toward preserving our nation's coastlines, lakes, rivers and streams. Protecting our memories on the water for generations to come.

Learn more at [TakeMeFishing.org/Conservation](https://www.TakeMeFishing.org/Conservation)



TAKEMEFISHING.org



Governor's Surf Fishing Tournament

GET OUTSIDE & ENJOY A DAY OF FISHING WITH FAMILY AND FRIENDS

Join us for the 27th Annual Governor's Surf Fishing Tournament!

May 20, 2018

Island Beach State Park, Seaside Park, NJ

New Jersey Division of Fish and Wildlife, along with our co-sponsors—New Jersey Division of Parks and Forestry, New Jersey State Federation of Sportsmen's Clubs, Jersey Coast Anglers Association, and New Jersey Beach Buggy Association—congratulate Kyle Brendel of Nutley who took the grand prize and NJ Governor's Cup by catching a 34-inch bluefish. Mr. Brendel received two-rod and reel combinations, a Berkley Power Bait tackle bag, a pair of Costa Del Mar sunglasses, a plaque and will have his name engraved on the Governor's Cup.



Lacey High School winners: 1st Place High School Team category

Also, congratulations to Lacey High School for winning first place in the High School Team Category with a 21 7/8-inch bluefish. Lacey High School had their name engraved on the new High School Team Cup and received a 1st place plaque.

All participants who **mailed** their registration were entered into an **early entry raffle** for a Coastline Surf System.

Prizes are awarded in different species and age categories. For more information and to register, visit NJFishandWildlife.com/gsft.htm

A special thanks to our 2017 donors:

- American Angler
- Chestnut Neck Boat Yard
- Friends of Island Beach State Park
- Grumpy's Bait and Tackle
- NJ Div. of Fish and Wildlife's Hooked on Fishing—Not on Drugs Program
- Legal Limits Company
- Mann's Bait Company
- O. Mustad and Son
- Silver Horde
- Stanley Jigs
- World Jeep

A special thanks to our 2017 High School Team Category donors:

- The Fisherman
- The Reel Seat
- Fish Hawks Saltwater Anglers Club
- Shark River Surf Anglers

Capt. Bruce's

OTTER
Lure & Tackle LLC

Stronger and will outlast pork or plastic baits!

OTTERTAILS

Used on bucktails, jigs, spinner baits, tubes and more!

*Nearly Indestructible,
Totally Irresistible!*

**Strike Stimulating
Scented Action!**



Long Tail



Short Tail



Tiny Tail



**Great In
Freshwater
& Saltwater!**

COMING TO A TACKLE SHOP NEAR YOU!!

Call Today! (860) 912-4894

You can find these and other Capt. Bruce Products at
www.OtterLures.com

American Airboat Corp.

HOME OF THE AIRRANGER



GSA Advantage!

18'x8' AirRanger Law Enforcement Edition



20'x8'
AirRanger
Bowfishing
Edition



Over 54 Years of Airboat Experience!

American Airboat Corp. builds the highest quality Fire and Rescue airboats in the world. These airboats save lives.

Actual headlines taken from news sites:

“Ice Boats Help Rescuers Save Lives” - “Airboat To The Rescue”
“Water Rescue Thursday On Delaware River” - “Douglas County Helps Boat Crash Victims” - “Coast Guard Assists Two In Lake Erie”

We also have boats for:

Hunting • Bow Fishing • Law Enforcement • Fishing Boats • Pleasure
Duck Hunting • Extreme Terrain

Call for a Quote Today. You DREAM it - we BUILD it.

WORLD'S FINEST AND SAFEST AIRBOATS

www.americanairboats.com

800.241.6390 fax:409.883.0100 108 E. Lutchter Drive Orange, TX

Eastern Oysters of the Delaware Bay

By Russ Babb, Chief, Bureau of Shellfisheries



Fishing vessel Peter R. Paynter harvesting oysters in Delaware Bay as part of a resource enhancement program.

NJDFW/Marine Fisheries Admin.

Introduction

The Eastern oyster, *Crassostrea virginica*, has a long history as a commercially and ecologically important species in the Delaware Bay. Dating back as far as the early 1800s, the Delaware Bay oyster has been known for its unique flavor and high-quality meat, making it extremely popular in the seafood market. Oyster commerce contributed significantly to the bayshore communities of New Jersey and Delaware.

Throughout the early 1900s, oyster landings ranged from one to two million bushels annually. Today, oyster production is severely inhibited by a serious disease: a water-borne protozoan parasite called *Perkinsus marinus*, commonly known as Dermo. Oyster lovers have no fear—the Dermo parasite poses no health concern to human consumers. Dermo was originally detected in the Delaware Bay during the mid-1950s and was associated with imports of the seed oysters from southern states. The disease was essentially undetectable shortly after the cessation of the importing practice.

Unfortunately, this disease—associated with abnormally high winter temperatures—resurfaced in 1990, spreading throughout the oyster population in most of the bay. Although oyster stocks have been significantly impacted by disease, habitat loss and in some cases over-harvesting, the Eastern oyster still remains an integral part of the ecosystem of the Delaware Estuary and the basis of a viable industry.

Where Can We Find the Eastern Oyster?

The filter-feeding Eastern oyster is an estuarine animal with a tolerance for a wide salinity range. The Delaware Bay oyster typically exists in salinities as low as four or five parts per thousand (ppt) and as high as 28 ppt. (Sea water is normally 35 ppt.) However, the optimal salinity range is believed to be about 14–28 ppt.

In the New Jersey portion of the Delaware Bay, oysters are established in areas of suitable habitat

extending along the axis of the estuary from Cape May Point to Artificial Island, and in the brackish or lower portions of many tributaries leading into the Bay. The most productive beds in the Delaware Bay (i.e., currently providing the best recruitment and survival) range from the Cohansey River south to Nantuxent Cove.

Oysters will grow on almost any type of stable bottom available such as hard or sandy mud, clay, gravel and preferably—other oysters. Oysters do not survive well on sandy bottoms that are inclined to be unstable. Likewise, areas adjacent to shifting mud, sand or organic debris are also generally unsuitable as the oysters may become smothered during storm events.

Oysters grow from the intertidal zone to a depth of 30 or more feet. The most productive areas on New Jersey's natural oyster seedbeds and leased grounds range in depth from 6 to 25 feet.

The Mating Ritual

The Eastern oyster is a protandric alternate species as explained by following its path to sexual maturity. When oysters first develop gonads (a reproductive organ that produces sex cells and hormones), the majority are functionally male. As individuals grow larger, many will sexually morph into females. Oysters develop mature gametes and spawn in response to temperature. The first spawning typically occurs in Delaware Bay waters when the temperature reaches 77°F (25°C). Subsequent spawns commonly occur throughout the summer until early-September.

Survival of the Fittest

There is a two-week phase for the free-swimming larvae. During most of this period the larvae are passively transported by tidal and wind driven currents. In a stroke of evolutionary brilliance, during their last few days of larval life, they exhibit a tendency to descend in the water column on slack water, remain on the bottom during ebb tide and return to the water column on flood tides.



Water cannons deposit clean oyster shell on oyster seed bed in Delaware Bay as part of the annual shell planting program.

NJDFW/Marine Fisheries Admin.

In this manner, while late-stage larvae do experience a net movement toward the headwaters of the estuary, they remain in the estuary—not in the ocean where they cannot survive. When they are ready to set, larvae seek a hard, clean surface upon which to attach. Many oyster experts speculate that approximately 95 percent of larvae are lost to predation and other causes of mortality prior to final settlement and attachment. Once a larval oyster finds a substrate upon which to attach, it cements itself to that surface. It will remain there for life unless removed by some external force.

The availability of clean substrate or cultch—preferably oyster shell—is critical for the successful setting of juvenile oysters, at which point they become sessile (permanently attached to the cultch) and are referred to as “spat.”

The NJ Marine Fisheries Administration has a significant shell planting and reef enhancement program. Each July, hundreds of thousands of bushels are planted strategically across the oyster seed beds in an effort to increase recruitment.

If an oyster were lucky to be in the five percent that managed to set, the battle to survive is far from over. Following final settlement and attachment, the newly set oyster has other hazards to face. It is now vulnerable to many new predator threats. A gastropod known as the oyster drill, mud crabs, blue crabs, a flatworm called *Stylochus*, black drum, starfish, skates and rays all take a toll on oysters.

The principal predator in Delaware Bay is the oyster drill, *Urosalpinx cinerea* and *Eupleura caudata*. The abundance of these drills on the downbay market beds can have a significant effect on whether juvenile oysters survive to reproductive maturity. Drills are normally present on the lower beds below Ben Davis Point (higher salinity) and often have a major impact on the productivity of those beds, particularly during periods of drought. Drills have migrated to the upper seed beds of the Bay during prolonged periods of higher-than-normal salinity.


Oyster drills earn their name. These small snails prey on oysters by secreting sulfuric acid that slowly softens the shell. Next, using an organ called a radula, they drill a small hole in the shell, feasting on the soft oyster parts inside. High numbers of drills can decimate healthy oyster beds quickly.

At the peak of the droughts during the 1960s, oyster drills were quite common on the Cohansey and Ship John seed beds which are typically free of these pests due to lower salinities during the egg laying season for drills. The point: it is hard to live the life of an oyster.

Keystone Species

Many marine organisms—bryozoans, hydroids, sponges, barnacles, ascidians, tube-building worms and other bivalves—attach to oysters and the associated structure of their reefs. These fouling organisms, in turn, attract various crustaceans and small fish. This furnishes, as many anglers know, a concentrated food source for a variety of recreationally sought fish such as the weakfish, striped bass, croaker and black drum. Beyond that, numerous animals seek food and shelter in the interstices of oyster reefs, utilizing the oyster community for refuge, foraging and spawning habitat.

In short, oysters and oyster reefs play a critical ecological role in our estuaries and are the basis of a vast community of organisms. Management efforts by coastal states to bolster the oyster resource not only provide major economic benefits for harvesters and local communities, but add to the overall ecology of our estuaries. Healthy oyster reefs increase habitat and faunal diversity and in some cases, at the required scale and location, can even potentially improve water quality by reducing particulates and shifting nutrient dynamics.

A reference list of article resources is available from the Division of Fish and Wildlife by calling (609) 748-2040. 

CHESTNUT NECK BOAT YARD

**2018 FORKLIFT SERVICE 7 DAYS A WEEK
APRIL 15 TO NOVEMBER 15**

**Gas • Diesel • Ice • Bait • Tackle
Docks • 4 Launching Ramps
Used Boats for Sale**

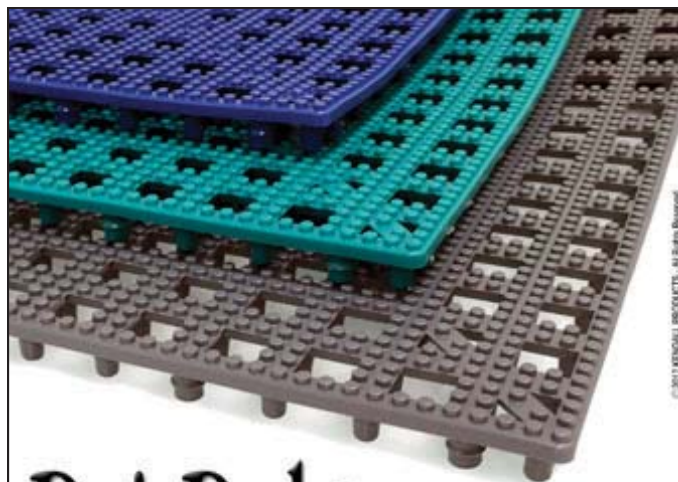
**Please come visit us at our new LARGE bait,
tackle and marine store!**



**758 Old New York Rd.
Port Republic, NJ
609-652-1119**

*We are a Suzuki Cutting Edge Award dealership
Suzuki's highest honor for service & customer satisfaction!*

www.chestnutneckboatyard.com



Dri-Dek® Protects Your Boat.
Keeps Equipment Dry.



Tough, flexible Dri-Dek 1' x 1' tiles just snap together and trim to fit any area. Line your lockers, under cushions or on the deck. The self-draining surface shields from impact and moisture.

Visit dri-dek.com today or Call 800-348-2398

Kendall Products - Since 1977
PO Box 8656 Naples, FL 34101

Free Samples!

