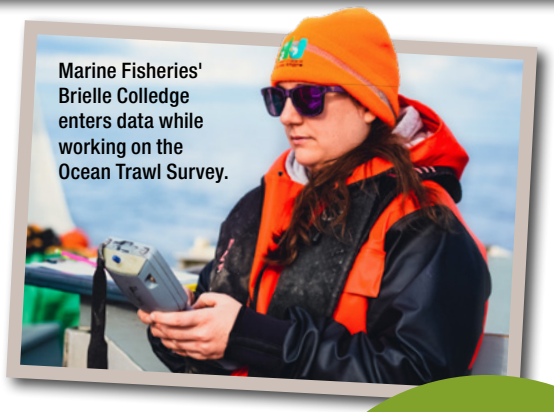
Fishery Management 101

Until the 1970s, there were no guiding federal fishery management plans, and fishing outside of state waters was often described as a free-for-all. Foreign fishing fleets regularly and aggressively exploited US fish stocks threatening to deplete them.

Marine Resources' Tim Daniels, Pat Barker and Ricky DiVaccaro show off striped bass caught during the Delaware Bay Tagging Survey.

Introduction to Marine Fisheries Management: Federal/Coastwide Level


Marine Fisheries' Brielle Colledge enters data while working on the Ocean Trawl Survey.

To stop overfishing, the Magnuson-Stevens Fishery Conservation and Management Act (**MSA**) was signed in 1976, where the US established an exclusive economic zone (**US EEZ**). The MSA limited foreign access to US fish stocks within the US EEZ which extended 200 nautical miles off the coast. The goal of the MSA was the prevention of overfishing and to enable the recovery of overfished stocks. The National Marine Fisheries Service (**NMFS**) implements these goals through conservation and management of fishery resources. Eight regional fishery management councils were also established to monitor and implement fishery management plans (**FMPs**) designed to restore depleted fish stocks. These councils would manage the fisheries within their respective region's federal waters, which extended from the 3 nautical mile boundary of state waters to the 200 nautical mile border of the US EEZ. Each of the FMPs were required to comply with 10 national standards:

1. Prevention of overfishing while still producing sustainable optimum yields
2. Basis on the best available scientific information
3. Management of stocks as distinctive units, when practicable
4. No discrimination between residents of different states or individual anglers
5. Efficient use of fishery resources
6. Consideration of variations in fisheries, resources and catches
7. Economic efficiency to minimize cost and duplication
8. Use of economic and social data to sustain participation in the fishing industry & minimize adverse effects on coastal communities
9. Minimization of bycatch
10. Measures that promote safety of human life at sea

Though the MSA eliminated foreign participation in the US EEZ, limiting access to only American fishing fleets still resulted in the overfishing of many fish stocks, so an amendment, the Sustainable Fisheries Act, was passed in 1996. It established 3 key requirements designed to stop overfishing and bring recovery to vulnerable stocks by 1) defining "overfishing" and "overfished" with species-specific criteria for their determination in stock status; 2) identifying essential fish habitat; and 3) assessing the amount of bycatch within the fishery. Additional safeguards against overfishing were established in 2006 with the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (**MSRA**) with the implementation of Annual Catch Limits (**ACL**) for stocks under each regional council which could not exceed scientific recommendations or allow overfishing; and accountability measures established by each regional council to enforce the ACLs such as fishery closures, electronic monitoring, and observer coverage.

Federally managed species commonly found off New Jersey's coast mainly fall under the auspices of two Regional Councils: the Mid-Atlantic Fishery Management Council (**MAFMC**) and the New England Fishery Management Council (**NEFMC**) (see graphic on right). Some of the species managed by these Councils also have state waters fishery components which are overseen by the Atlantic States Marine Fisheries Commission (**ASMFC**).

MAFMC regulates:

Atlantic Mackerel
Black Sea Bass
Bluefish
Butterfish
Chub Mackerel
Golden and Blueline Tilefish
Illex Squid
Longfin Squid
Ocean Quahog
Scup
Summer Flounder
Surf Clam

MAFMC & NEFMC jointly regulates:

Monkfish
Spiny Dogfish

NEFMC regulates:

Atlantic Cod
Haddock
Pollock
Yellowtail Flounder
Windowpane Flounder
Winter Flounder
Ocean Pout
Sea Scallop
Atlantic Herring
Winter Skate
Little Skate
Clearnose Skate
Silver Hake
Red Hake

Marine Fisheries Management: State and Local Level

While the federal fisheries management system handles species and fisheries that operate in federal waters (greater than 3 miles from shore–200 miles offshore), the state systems have jurisdiction within 3 miles from shore. New Jersey manages species that pass through our state waters with cooperation from other states — the ASMFC facilitates this cooperation among the states. A typical management scenario begins with staff reporting results after conducting coastwide stock assessments and analyzing data which is presented to a Management Board (Board). The Board determines, based on the peer reviewed stock assessments, whether any management action is necessary, and if so, will develop those proposed actions (for example, an "Amendment" or an "Addendum" to an FMP) that will then get reviewed through public hearings. After public hearings have taken place, the Board reviews all input on the various management options and votes to select the most appropriate option for all involved parties.

Once a management option is selected, it must be implemented by the state. This occurs through the New Jersey Marine Fisheries Council (**NJMFC**) which assists in final decision making and implementation. If NJ does not implement the action, that specific fishery could be closed by the National Oceanic and Atmospheric Administration (**NOAA**). For example, we might be instructed by ASMFC to ensure our harvest is reduced or increased by 10% in the coming year. NJ staff will develop specific alternative size, season, and possession limit options that are presented to NJMFC advisors; that input is then brought to the full NJMFC, and the NJMFC makes a final decision. As long as that decision is consistent with ASMFC mandates, NJDEP Fish & Wildlife will implement the Council's decision as a regulation.

Management authority for species that generally do not wander across state boundaries (non-migratory species such as blue crabs and hard clams) rests with NJ only. We work with our Marine and Shellfisheries Councils to establish priorities and develop management plans (see page 4 for a list of Council members).


Marine Fisheries' Samantha MacQuesten with an American Lobster caught on the Artificial Reef Survey.

State-Level Fishery Management Plans in New Jersey

NJDEP Fish & Wildlife's Bureau of Marine Fisheries (Bureau) has been involved in joint management, either on a coastwide or regional basis, of many important commercial and recreational fish species. Most of these species have wide ranging seasonal and spawning migrations crossing multiple state borders, being encountered in different fisheries at different times of the year. While this joint management system works for long ranging species, the Bureau decided to take a closer look at species that don't fall under the umbrella of any regional and/or coastwide management agencies. Our goal is to develop Fisheries Management Plans (FMPs) for local species to monitor the health of their populations and/or implement management strategies that allow for the sustainable harvest of these local favorites.

How does the Bureau plan on developing these FMPs? Staff use other interstate management agencies stock assessment and FMP development processes as a model for our own in-house procedures. The first step is choosing a species that the Bureau feels is popular and harvested in great enough quantities that population monitoring would benefit both the fish and the angler. Species will be chosen based on data from the Bureau's commercial and recreational fishery monitoring programs, Bureau surveys, and input from the public received at New Jersey Marine Fisheries Council (NJMFC) meetings.

Marine Fisheries Biologists Brendan Harrison and Greg Hinks collect data from the Yellow Eel Pot Survey.

Marine Resources' Matt Heyl and Lloyd Lomelino collect and record data on the River Herring Survey.

Once a species is selected for evaluation, staff biologists and stock assessment scientists hold a "data workshop" where the quantity and quality of data available from surveys that routinely encounter the selected species is evaluated. The data analyzed falls into two groups: fishery-dependent and fishery-independent. Fishery-dependent data is collected from recreational and commercial fisheries and includes commercial harvest reports, biological samples collected from the commercial fishery, recreational data from the Marine Recreational Information Program (**MRIP**), and volunteer angler surveys. Fishery-independent data comes from sources not directly associated with recreational or commercial fisheries and includes information collected from the multitude of in-house surveys including gill net, trawl, pot, fyke, and seine net surveys conducted throughout the state.

Bureau staff then analyze the data and look for trends in population size, distribution, biological characteristics, and commercial and recreational harvest characteristics. The analysis is then summarized and presented to the NJMFC for further guidance in the development of statewide management strategies that are protective of both the resources and the fisheries.

The first species chosen for the Bureau's statewide FMP program was blue crab. The lessons learned from developing a statewide FMP for this commercially, recreationally, and ecologically important species will serve as a template for future statewide FMPs. If there is a species you feel should be a candidate for a future FMP, please do not hesitate to contact the Bureau or attend a NJMFC meeting to voice your opinion!

A catch is sorted and fish are counted during the Delaware River Seine Survey.

Development of New Jersey's Blue Crab Management Plan

The Bureau of Marine Fisheries is currently developing a statewide FMP for blue crab. Data was gathered and analyzed from historical state collections, as well as reliable commercial, recreational, and fishery-independent data sources. Fishery-independent data came from long term ichthyoplankton and otter trawl surveys conducted by Rutgers University, a seine survey from the Barnegat Bay Partnership, in addition to New Jersey's long term Ocean Trawl Survey, Delaware Bay Trawl Survey, Delaware River Seine Survey and the River Herring Seine Survey. Commercial data was gathered from New Jersey's mandatory blue crab harvest reporting survey dating back to 1977. Recreational data was gathered from historical volunteer surveys conducted by New Jersey staff and Marine Academy of Technology and Environmental Science (**MATES**) students, in addition to New Jersey's Voluntary Recreational Crab Pot Report. Other information was also gathered, including economic impacts to stakeholders, current regulations, and life history. Once everything was consolidated, it was reviewed as a whole for a better understanding of the blue crab fishery in New Jersey.

Through this process, it was discovered that certain areas lacked specific information, offering opportunities for future surveys and studies. New Jersey has already developed and produced another volunteer survey to gather additional data about female blue crabs bearing eggs, called the New Jersey Sponge Crab Sighting Survey. This input will help staff better understand the spawning behavior of blue crabs and over time, monitor trends and track changes.

Development of the New Jersey Blue Crab Fishery Management Plan provided insight into species interactions that could be addressed in the process. For example, current regulations mandating terrapin excluders on all traps (within waters less than 150' wide or man-made lagoons) reduce the mortality of terrapins in the blue crab fishery. The fishery management process allows New Jersey to discover how our blue crab fisheries impacts other species and allows staff to develop ways to reduce those impacts.

Blue Crab: A Profile

Scientific Name: *Callinectes sapidus* — Meaning: "beautiful savory swimmer"

Color: olive-green and vivid blue (mature females have red tips on their claws)

Size: Up to 9 inches in length (point to point of the shell)

Age: 3 to 4 years

Diet: clams, oysters, mussels, smaller crustaceans, dead fish, and animal debris

Blue crabs mature by molting, where a crab's hard shell is shed, and a new soft shell is grown. They are known by an assortment of names which often classifies a stage in their life cycle and/or gender when caught.

Hard-shell crab = non-molting with a shell that is hard to the touch

Peelers = hard-shell crabs showing signs of molting with the new soft shell starting to show beneath the hard outer shell

Busters = crabs that have started to molt, and a transition can be seen where the soft and hard shell meet up

Soft shell crabs = recently molted and have a shell that is soft to the touch

Jimmies = adult males

Sooks = adult females

She-crabs or Sallies = immature females

Sponge crabs = females carrying eggs

Female blue crab bearing eggs, also called a sponge crab

Blue Crab

Have input? Be heard!

With almost everything available in a digital format in today's society, information is at your fingertips. However, fisheries management still requires a hands-on, boots on the ground approach; and being able to share information in a timely fashion has invaluable benefits. It is difficult for fisheries staff to be in enough places to assess what is happening across the state and this is where you can make the most impact! While there are many ways to get involved, we encourage anglers to participate in a variety of fishery surveys to help provide important information that can be used to manage our fisheries. Let your voice be heard. Submit comments/concerns when topics are open to public comment or attend a New Jersey Marine Fisheries Council (NJMFC) meeting to be involved in the conversation.

NJDEP Fish & Wildlife conducts several surveys, both fishery-dependent and -independent of our commercial and recreational fisheries. The fishery-dependent fishery surveys are where you can get involved. A few of these surveys include the following:

- The Access Point Angler Intercept Survey (**APAIS**) collects catch-per-trip data from shore, private boat, and for-hire anglers. Data are collected via survey interviews in the field and are used to estimate total recreational catch.
- The For-Hire Telephone Survey (**FHTS**) is conducted with a sample of state and federally permitted for-hire vessel representatives. Each phone interview requires state samplers to ask vessel operators to report vessel-fishing activity for one-week reference periods and to document details from each trip. Collected data are used to estimate for-hire fishing effort, which is the number of angler trips taken on charter vessels and headboats.
- The NJ Saltwater Recreational Registry Program (**NJSRRP**) is an active contact book of the state's recreational saltwater anglers, as well as for-hire vessels. Registrations must be renewed annually. While the registry itself is mandatory, the addresses are used to help compile a recipient list for the voluntary For-Hire Effort Survey (**FES**). The FES is sent to a sample of coastal residential households. Resulting data are used to estimate private angler effort from both shore and private boats.
- The Volunteer Angler Survey (**VAS**) is a voluntary survey focused on collecting information on catch and effort from recreational fishing trips in marine and estuarine waters of NJ and surrounding areas, supplementing MRIP survey data. Information collected provides data which may support alternative management strategies that increase fishing opportunities for the public.
- The Striped Bass Bonus Program's (**SBBP**) goal is to allow anglers to participate in the management process while enjoying their favorite recreational pastime. It provides valuable data for assessing stock status and fishing trends, making it an integral part of New Jersey's striped bass management. Participating in the program is voluntary for both individual recreational anglers and for-hire vessels; however, there are mandatory reporting components.

The NJMFC is one of several councils and committees involved in managing our fish and wildlife resources. They advise the New Jersey Commissioner of the Department of Environmental Protection on various issues and management programs related to marine fishery resources. NJMFC Advisory Committees were assembled to discuss issues for a particular species, group of species, gear type, or other fishery management topic. Each committee advises the NJMFC on matters pertaining to its area of expertise. There are many ways to be involved in the decision-making process: be present at meetings (in person or virtually), and make sure to comment before decisions are finalized, or by being an advisor to the NJMFC! You can always email the NJMFC at MarineFisheriesCouncil@dep.nj.gov.

Fishery Management 101 Contributors: Peter Clarke (Principal Biologist), Linda Barry (Research Scientist), Michael Celestino (Research Scientist), Brian Neilan (Principal Biologist), Jamie Darrow (Senior Biologist), Shana Fehring (Senior Wildlife Worker) and Maryellen Gordon (Principal Biologist).

Marine Fisheries' Jonathan Klotz conducts an APAIS interview.

Marine Fisheries Management 101
Common Terms & Acronyms

Managing marine fish that move freely in and out of political boundaries is no small task, which is why there are so many cooperative organizations that are involved in the management of this shared resource. Use the table below as a summary of the many different organizations that are involved with marine fisheries management. Below and on the next page are tables of common terms that are often used and abbreviated when discussing marine fisheries management.

Organizations

Acronym	What Does It Stand For?	Relationship to Fisheries Management
ACCSP	Atlantic Coastal Cooperative Statistics Program	Principal source of fisheries-dependent information on the Atlantic coast. Produces dependable and timely statistics for fisheries that are collected, processed and disseminated according to common standards agreed upon by all partners, including the ASMFC.
ASMFC	Atlantic States Marine Fisheries Commission	Consists of the 15 Atlantic coastal states plus 2 districts and 2 federal agencies. Coordinates conservation and management in state waters of 27 nearshore fish species from 0–3 nautical miles offshore. Each state is represented by three Commissioners. Receives species specific input for fisheries management from public comment, advisory panels, a technical committee, and a species management board.
MAFMC	Mid-Atlantic Fishery Management Council	One of 8 regional fishery management councils established by the Magnuson-Stevens Fishery Conservation and Management Act in 1976 to manage fisheries within US federal waters. Authority extends from three to 200 miles off the coasts of New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina. Receives species specific information from public comment, advisory panel, monitoring committee, and species committee. All decisions approved by the MAMFC must be approved by NMFS.
NJMFC	New Jersey Marine Fisheries Council	NJ specific management body consisting of 11 members including recreational, commercial, public, and shellfish representatives which establish rules and regulations for NJ fisheries. Recommends management actions and strategies requiring a vote for approval. Guidelines for management are provided through the ASMFC, MAFMC, and NMFS. NJMFC decisions are implemented by NJDEP as new regulations.
NMFS	National Marine Fisheries Service	Federal agency within the US Department of Commerce's NOAA. Responsible for the stewardship of US national marine resources in the Federal EEZ. Uses the Magnuson-Stevens Act as its guide while assessing and predicting the status of fish stocks, setting catch limits, ensuring compliance with fisheries regulations, and reducing bycatch.
NOAA	National Oceanic and Atmospheric Administration	Scientific and regulatory agency within the US Department of Commerce. Serves many functions including managing fishing and protection of marine mammals and endangered species in the US EEZ.
USFWS	United States Fish and Wildlife Service	Federal agency whose primary responsibility is to manage fish and wildlife resources in the public trust for current and future generations. Partners with NJ and other agencies to protect marine/estuarine species. Provides funding to State agencies for use in the management of marine species related to recreational fisheries.

Fishery Management Terms

Acronym	What Does It Stand For?	How Is It Involved in Fisheries Management?
CPUE	Catch Per Unit Effort	An index which measures the relative abundance of a species. Fluctuations signify changes to the species' true abundance.
EEZ	Exclusive Economic Zone	The Federal (US) EEZ extends from 3–200 nautical miles offshore.
eTRIPS	Electronic Trip Reporting	Computer system that allows fisheries harvesters to report their catch in a timely and accurate format. Data are used directly for fisheries management.
FMP	Fishery Management Plan	A plan developed by a state or regional fishery management council to manage a fishery resource.
GIS	Geographical Information System	Computer system that analyzes and displays geographically referenced information.
ISFMP	Interstate Fisheries Management Program	ASMFC and MAFMC fisheries decision-making occurs through Interstate Management Programs, where species management boards determine strategies that develop into plans. Multiple states implement the ISFMPs through fishing regulations.
MRIP	Marine Recreational Fisheries Information Program	The state-regional-federal partnership that develops and implements a national network of recreational fishing surveys to estimate total recreational catch.

Saltwater Fishing Regulations:
dep.nj.gov/njfw/fishing/marine/seasons-and-regulations/

Access Point Angler Intercept Survey (APAIS):
fisheries.noaa.gov/recreational-fishing-data/recreational-fishing-surveys#access-point-angler-intercept-survey

NOAA Fisheries' Marine Recreational Information Program Surveys:
fisheries.noaa.gov/recreational-fishing-data/recreational-fishing-surveys#for-hire-survey

NJ Sponge Crab Information:
dep.nj.gov/njfw/fishing/marine/assist-marine-fisheries-biologist-by-reporting-your-sponge-blue-crab-sightings/

NJ Saltwater Recreational Registry Program:
saltwaterregistry.nj.gov

NJ Recreational Saltwater Volunteer Angler Survey:
dep.nj.gov/njfw/fishing/marine/volunteer-angler-survey/

Striped Bass Bonus Program:
dep.nj.gov/njfw/fishing/marine/striped-bass-bonus-program/

Marine Fisheries Council:
dep.nj.gov/njfw/fishing/marine/marine-fisheries-council/

Atlantic States Marine Fisheries Commission:
asmfc.org/

ASMFC Public Input:
asmfc.org/about-us/public-input

Mid-Atlantic Fishery Management Council:
mafmc.org/

New England Fishery Management Council:
nefmc.org/

Magnuson-Stevens Act:
fisheries.noaa.gov/topic/laws-policies

Flipping the Switch on Ecosystem Management:
nj.gov/dep/fgw/artmarine_ebfm20.htm