



The Northeast Area Monitoring and Assessment Program (NEAMAP) Principles

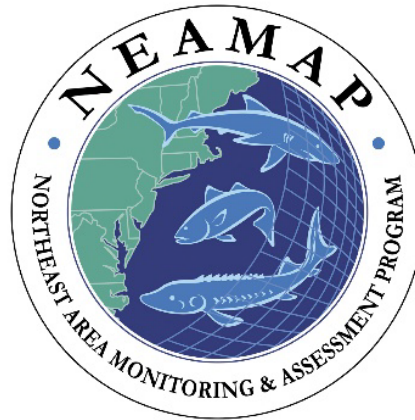


The Northeast Area Monitoring and Assessment Program (NEAMAP) Principles

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What is a NEAMAP Survey?

NEAMAP surveys are conducted by NEAMAP partners; they include both partner and Operations Committee designed surveys, and operate on local and regional spatial scales. NEAMAP surveys are designed to collect long-term fishery-independent data on species abundance, distributions, and life history, as well as related ecosystem and environmental information. NEAMAP surveys are reviewed and approved by the NEAMAP Operations Committee. NEAMAP data are collected to support fisheries management, as well as to enhance knowledge of marine fish and invertebrate stocks and the ecosystem.

Objectives of NEAMAP:

- Collection and analysis of fishery-independent data to support assessments and management
- Enhancing coordination among fishery-independent surveys
- Promoting use and dissemination of fishery independent data
- Identifying and prioritizing short- and long-term needs
- Securing funding to support NEAMAP activities

Existing NEAMAP surveys include:

- Maine-New Hampshire Inshore Trawl Survey
- Massachusetts Division of Marine Fisheries Bottom Trawl Survey
- Southern New England/Mid-Atlantic Nearshore Trawl Survey (VIMS)

Other NEAMAP partner coastal surveys:

- Rhode Island Coastal Trawl Survey
- New York Nearshore Trawl Survey
- The New Jersey Ocean Stock Assessment Program
- Delaware Coastal Trawl Survey
- Maryland Coastal Trawl Survey
- North Carolina Pamlico Sound Survey

Data & Sample Management: Biological Data
Nicole Lengyel Costa

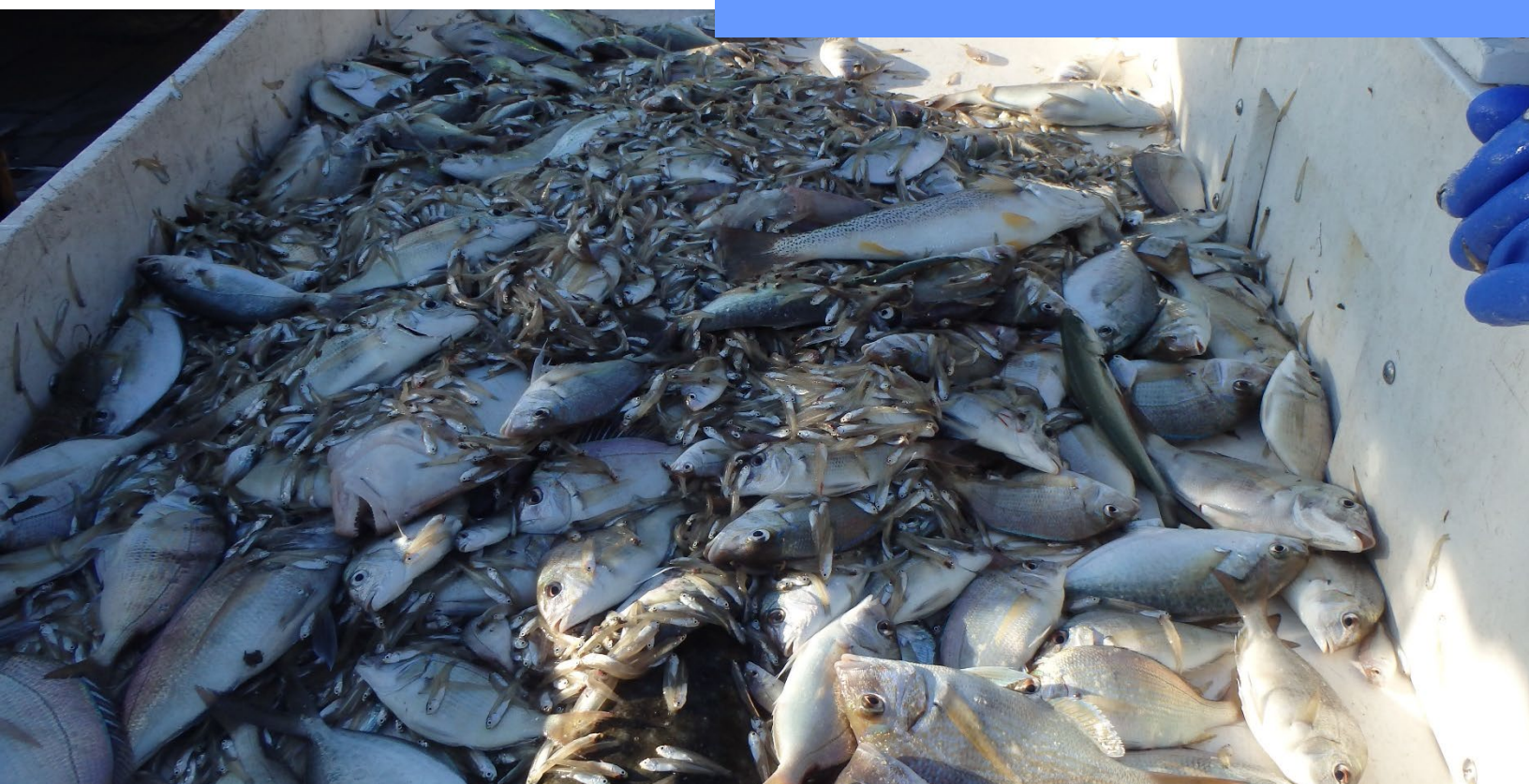
Biological data are collected from target species including finfish, shellfish, and crustaceans. These data may be collected to answer a specific research question or to provide data for stock assessments. Tracking of these data are important to ensure that the data from each specimen can be traced back to the trip on which it was collected to characterize the data appropriately, provide information on gear selectivity, time of year, etc. Tracking of samples once they have been returned to the laboratory is imperative to ensure sample integrity throughout the processing and data entry phases. This helps prevent contamination, sample mislabeling, data entry errors, and loss of samples.

Minimum Criteria/Basic Protocol:

Specific data on each specimen should include the unique trip or haul ID, date, survey program, gear type, area, source, aggregate weights and lengths, as well as subsample of individual length, weight, hard part collected, age, sex, and maturity. Length and weight units should be recorded to the nearest decimal for each specimen. For finfish length measurements, it should be noted whether total length or fork length is recorded. For other species such as crustaceans, it should be noted what lengths correspond to (e.g., carapace width). Some biological data may be collected onboard the survey vessel while others may be collected back in the laboratory. These data may be collected on a subsample of the overall catch with the goal of covering a broad range of specimen lengths. Subsample methods should be clearly detailed for each survey.

Additional Recommended Criteria/Protocols:

Additional biological data collected may include a stomach content analysis for each specimen (or a subsample) with weight and enumeration of each prey taxa. The use of digital barcodes and unique specimen ID's for hard parts and stomach analysis can be used to ensure sample validity. Recording the name of each person conducting the aging, and performing QA/QC tests for aging bias between readers or for each reader between years can be conducted and data recorded should there ever be a question regarding ages submitted for stock assessments.



Data & Sample Management: Publicly Available Data
Steve Wilcox

NEAMAP surveys collect a variety of information and data as described in “Biological Data”. These surveys are designed to monitor long term trends of marine populations, environmental conditions, and gear performance. Data collected from these surveys are often used to inform stock assessments, monitor population health, and inform management decisions. Data collected should be publicly available upon request. Requesting the data should be a straightforward and easy process. Data requests should be filled in a reasonable timeframe. The timeframe can vary based on the complexity of the request, when the request is made, and in some cases adhering to any Freedom of Information Act (FOIA) guidelines for the entity that is overseeing the data.

Minimum Criteria/Basic Protocol:

There should be a listed contact (name and email) to request data for each survey. Follow up discussions may be necessary prior to filling the request allowing for refined/modified request in some cases. The data provided and any supporting information should be documented, and any supporting information or caveats to the data should be clearly outlined for each request.

Additional Recommended Criteria/Protocols: Exact protocols for all surveys may not be possible as some agencies/organizations may have overriding data request protocols.



Data & Sample Management: Environmental Data
Angel Willey

Environmental data can be helpful in determining why fishes, invertebrates, and plants are present or absent and help understand how environmental conditions may be changing over time. It includes variables that describe the physical and chemical makeup of a sample site at the time of collection.

Minimum Criteria/Basic Protocol:

If possible, surveys should gather depth, tide stage, weather, wind direction, wind speed (knots, kts), dissolved oxygen (milligrams per liter, mg/L), salinity (parts per thousand, ppt), and water temperature define (bottom / surface / etc.) (Celsius, C).

Additional Recommended Criteria/Protocols:

If resources and funding are available then the following data could also be collected: Bottom type, wave height, moon phase, turbidity, air temperature, barometric pressure, relative humidity, pH, and chlorophyll. Collection of chlorophyll, dissolved oxygen, salinity, and water temperature should occur at multiple depths.



Vessels & Fishing Gear
Jameson Gregg

Prior to initiating a survey, options should be discussed for the gear and vessel sizes that will be used for sampling. It is understood that all surveys were not created equal and options may be limited to existing vessels, equipment and moreover funding. The best place to start is to engage in discussions with other agencies to see what options and specifications are currently being used for survey work. Additionally, industry stakeholders can provide great insight to both vessel and gear specifications. Several agencies engaged in cooperative collaborative arrangements may be great resources.

Funding is often the biggest driving factor in implementing changes or improvements to an existing survey. The time series of a survey's data is critical to its objective of providing long-term sustainable monitoring of resources. As technology continues to evolve new options develop and older ones may become obsolete. This often creates unexpected hurdles for surveys to navigate, which inevitably require action.

Minimum Criteria/Basic Protocol:

- Considerations for new surveys:
 - Review existing surveys to discuss vessel and gear packages. Before acquiring new equipment, explore options currently being used to create more continuity across surveys for easier standardization.
- Considerations for existing surveys:
 - *Gear certification*- Maintain logs for age of gear, wear to gear, repairs to gear and establish “acceptable” ranges for the gear. Certification logs will at a minimum allow best maintenance practices for monitoring wear over time.
 - *Net mensuration*- Many options exist for the implementation of a net mensuration package to a survey. Many of these options are portable and lighter than historical options. Net mensuration can help a survey achieve optimal fishing dimensions for the vessel and the gear. Parameters that can be observed or recorded are head rope height, wing spread, door spread, bottom contact, catch size, temperature, pitch and roll of the doors and more.
 - *Understanding the gear*- optimal fishing dimensions/geometry, warp/scope ratio, know the pieces of the net, doors, and bridles. Know the length or sizes of various parts. If there are problems, things need to be properly communicated among the vessel crew and scientists (if gear is handled by scientific staff).
 - *Spare parts*- Net mesh/webbing, bridle wires, shackles, twine, floats, etc.

Additional Recommended Criteria/Protocols:

- *Collaboration*: Network and communicate with state and federal agencies, commercial fishers, net/gear manufacturers. Discussions and communications of the initial results of changes to gear design can lead to other agencies adopting the same gear package, and or starting the discussion for the possibility of adopting this new gear. Further, collaborations resulting in a more standardized gear package across multiple surveys can create more congruences across broader ecological communities.
- *Flume tank*: Obtain net geometry from scale modeling for optimal fishing configurations under different conditions. The costs of scale modeling and usage of the flume tank can pay for itself in what would have been blind troubleshooting in the field. Additionally, optimal geometry can continue to be obtained through various net mensuration packages.

- *Simultaneous changes:* Conduct one calibration and not two if you are thinking of changing vessels. Be sure you are not also going to switch fishing gear as well, or you will need to conduct two calibrations, one for the vessel and one for the gear. Whereas, if both were changed at the same time, only one calibration would be necessary.
- *Costs:* New vessels are expensive, modifying old vessels is expensive, new gear is expensive. Know your gear before you commit to it (see flume tank). Calibrations are expensive, operating two vessels and two survey crews at the same time will take a lot of resources. There may be trade-offs, compromises, modifications or cuts that have to be made to effectively continue the survey. There may be delays in submitting or sharing survey data until calibration coefficients can be calculated and applied to the data.



Permits & Reporting
Jameson Gregg

Before the start of field sampling for any project, ample forethought should be dedicated to researching the necessary permits required for field sampling. Permits or sampling permission may range from paid applications for scientific research, to already being covered by individual state laws. Surveys crossing state boundaries should plan on obtaining permits from associated states and recognize their reporting requirements may be different than those in your home state. Surveys that plan on sampling in federal waters should allow several months (or possibly longer) to apply for proper permitting (NEPA permits such as Incidental Take of Endangered Species). Regardless of the sampling permit, survey leads should be aware of reporting requirements and notifications to state or federal enforcement before sampling occurs. Academically related surveys should also be aware of IACUC protocols for their specific University or Institute.

Minimum Criteria/Basic Protocol:

- Allow for lead time to apply and process necessary permits well in advance of survey activity.
- Be conscious of all reporting requirements for various permits.
 - These may include more frequent updates or specific usage notifications.
- Funding agents may require quarterly, biannual, or annual survey updates to continue justification.

Additional Recommended Criteria/Protocols:

NEPA permits can sometimes take upwards of a year to be developed, written, and approved. Depending on the survey activity, permitting should start here due to the lead time.

NEAMAP survey area state permit applications:

- [Maine](#)
- [New Hampshire](#)
- [Massachusetts](#)
- [Rhode Island](#)
- [Connecticut](#)
- [New York](#)
- [New Jersey](#)
- [Delaware](#)
- [Maryland](#)
- [Virginia](#)
- [North Carolina](#)
- [NOAA](#)
 - [NEPA](#)
 - [Scientific Research Permitting](#)

Safety & Training
Jameson Gregg

It is imperative that all participants in field going survey activities are briefed for safety protocols and properly trained in the usage of individual/specific survey protocols. Vessel owners, operators, and crew should all be able to instruct and debrief scientific crew on the location of all safety equipment and muster stations. Safety equipment is often provided by the vessel, so it is important to know where these items are located each time you arrive on the vessel. The leaders of the scientific crew are responsible for training participants in the proper usage of scientific equipment and protocols. This may include troubleshooting, maintenance and cleaning, data entry, and most of all proper species identification if special handling is required.

Properly handling survey fishing gear requires adherence to a combination of safety related protocols as well as survey specific protocols to ensure the safe and proper deployment of fishing gear. Many surveys utilize chartered fishing vessels in cooperative research-based applications. In almost all of these cases, the chartered crew will handle the fishing gear. There may also be a designated crew that specifically handles the fishing gear on state agency vessels. However, sometimes there is a combination of a vessel crew and scientific crew that will handle the fishing gear. Regardless of who is handling the gear directly, safety standards should be discussed prior to embarking on the survey. Additionally, items like net mensuration equipment should be discussed between the vessel crew and scientific crew for proper implementation.

Minimum Criteria/Basic Protocol:

- Safety:
 - **PFD locations-** stowage of Type I PFDs and usage/locations of Type III work-vest or inflatable PFDs).
 - **Locations of:** Radios, Personal Locating Beacon (PLB), Emergency Position-indicating Radio Beacon (EPIRB), life rafts, life rings, life slings, fire extinguishers, fire hoses, first aid, signaling devices (visual and audible), immersion suits, and muster stations.
 - **Rehearsal of safety drills**, including man overboard, fire, and abandon ship.
 - **Known allergies** of scientific crew (vessel crew if possible) in case of emergency reaction and location of medicine if required (epi-pen, etc).
- Fishing gear:
 - **Danger zones-** pinch points, out of sight of equipment operators, moving parts on winches and net reels.
 - **Personal protective equipment-** hardhats, PFDs, gloves, boots, eye protection
 - **Safety tools-** accessible knives, bolt cutters, cable cutters, life rings.
 - **Net mensuration-** proper sensor placement, proper mounting or deployment of the hydrophone.
 - **Gear inspection-** in-situ inspection of the net and doors for wear, tears or issues. Tighten and secure shackles (anti-seize on threads, properly tightened and secured or locked with wire or cable ties through the pin eye to prevent backing-out).
- Survey protocols:
 - Importance of collected data or missed/unusable data.
 - Posted placards.
 - Species identification.
 - Species size, length bins or quantities.
 - Operation of measuring boards (both manual and electronic).

- Operation of motion compensated balances (scales), including proper units and taring.
- Species subsampling:
 - Single species discards- aggregate weights and individual lengths, and species weights and counts.
 - Mixed species/size subsampling.

Additional Recommended Criteria/Protocols:

Much of the training involved in the individual surveys can be learned with hands-on experience in the field. Many of the protocols are memorized by repetition. However, when field participants are often volunteers, survey leaders or experienced personnel will spend a lot of time training or retraining field participants. Training requires clear and precise articulation of instructions and a lot of patience.

Pre-research cruise training sessions with electronic equipment - even quick crash courses for field participants to see the equipment in a stationary room prior to the survey can help participants understand specific uses and functions of various pieces of equipment. This is especially helpful if participants will be using data entry software in the field. (User friendly software such as FEED also assists in training new participants or refreshing the memory of experienced personnel).



Public Communications
Rebecca Peters

NEAMAP surveys collect a variety of important data that are used to inform regional management of living marine resources. Commercial and recreational fishers who are impacted by such management actions, as well as scientists and interested members of the public, have a desire to access these data to view long-term trends in each survey region. Transparency through public communication of NEAMAP survey design, timing, data use, and results keeps stakeholders informed of trends and maintains public trust in these surveys. In turn, this maintains public support for the long-term funding and need for NEAMAP surveys across the Atlantic coast.

In some regions where NEAMAP surveys occur there is a large presence of fixed-gear that may make it difficult to complete random locations identified to survey. It is important to work with and communicate on survey protocols, importance, and timing to commercial fixed-gear fishermen to collaborate with the fishery to move their gear when the survey occurs. Communication and collaboration with the fixed-gear fishery is imperative for success of NEAMAP surveys in regions where there is a large fixed-gear presence.

Minimum Criteria/Basic Protocol:

A listed contact (name and email) on the website for the public to reach out to ask questions or get information about the survey. Reports on yearly survey results should be easily accessible to the public or able to be provided if asked.

Surveys in regions with a large fixed-gear fishery should communicate to that fishery on survey timing and location of the survey. This communication should be done through mailings or web communication to work with the fixed-gear fishery to move their gear so the survey can occur and lessen any potential interactions with the fixed-gear fishery in the region. In the communication there should be multiple ways to contact the chief scientist and boat so that fishers can communicate with the scientists and vessel when the survey is underway. The radio that the vessel can be hailed on should be listed as well as the cell phone number that is monitored on the boat throughout the survey.

Additional Recommended Criteria/Protocols:

- If allowable by funding or agency: an online, publicly accessible data portal to show survey trends in abundance, biomass, length frequency, and species distributions in the surveys.
- A website with access to each NEAMAP survey protocol and description of each survey for the public to access.

