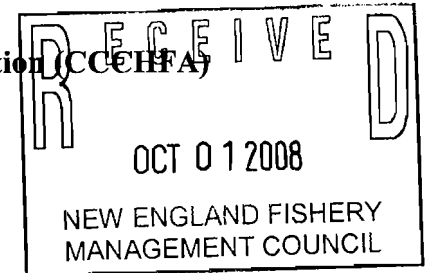


**Shore Based Monitoring in the Atlantic Herring Fishery:
Translation of Successful U.S. Models to New England including Context of
Shore-Based Tools within Comprehensive Catch Monitoring Programs**

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Introduction:

The Cape Cod Commercial Hook Fishermen's Association (CCCHFA) has conducted research into shore-based monitoring for high-volume fisheries. The purpose of this paper is to share some of the lessons learned with Federal decision-makers. It will describe the proven tools and technologies for shore-based monitoring that should be imported to New England from other U.S. fisheries, and also place shore-based monitoring in the larger context of a robust catch monitoring plan for the New England herring fishery as a whole. Specifically, this paper discusses shore-based monitoring as it should be developed by the New England Fishery Management Council (NEFMC) through Amendment 4 to the Atlantic Herring Fishery Management Plan (FMP).

Shore-based monitoring is a powerful tool that should form a cornerstone of Amendment 4, but only as part of a larger system that delivers accurate and precise accounting of all catch by also addressing at-sea discards in a robust fashion. The assumption, based on fishermen's reports, that landings can be equated with catch in this fishery is troublesome and unfounded because at-sea discards are not sufficiently sampled by observers at this time. While additional sampling of any discards actually brought on board is needed, even more important are measures to quantify and qualify at-sea dumping of unsampled catch that is not currently brought on board (slippage).

A potential alternative to measuring discards at sea is to eliminate them, by mandating that all possible catch must be brought to shore for sampling. Under such a scenario, shore-based monitoring would be combined with a maximized retention program that has a verification system to ensure all catch (with the exception of prohibited species and such discards due to vessel safety concerns) is brought to shore, weighed and sampled by shore-based monitors. Video-based Electronic Monitoring (EM) is the preferred verification system. It should be noted that CCCHFA has conducted successful feasibility testing of EM for this purpose in the New England herring fishery (report previously submitted to NEFMC and available in the Am. 4 Scoping Comments).

Shore-based monitoring alone cannot deliver the information on herring fishery impacts sought by the Council, the industry, the government, or the public.

Problem Statement:

The management infrastructure in the New England herring fishery has not kept pace with the fishing infrastructure, and is currently characterized by a lack of cohesion, chronic under-sampling, and long delays prior to the release of catch estimates which often lack certainty. The largest and most efficient fleet in New England is currently monitored by self-reporting, Federal at-sea observers, dockside inspections by enforcement personnel, and voluntary port sampling programs. The existing monitoring programs have inconsistent protocols and coverage rates, which lead to data extrapolation challenges. For instance, extrapolations are usually not available in a timely fashion and are often characterized by severe uncertainty. In addition, there are no regulations which mandate that landed fish are actually weighed, and as such they rarely are; instead managers rely on good-faith, volumetric estimates from captains and dealers, which do not accurately or completely account for the presence of bycatch.

While the large volumes of fish and the use of fish pumps do present unique monitoring challenges, the tools and techniques to solve these problems are widely available, and all parties acknowledge that there is a pressing need for more and better information on total catch of all target and bycatch species in this fishery. Bycatch is essentially anything caught except the target species (Atlantic herring), and is known to include Atlantic mackerel, bluefin tuna, cod, haddock, striped bass, scup, river herring, and protected species like marine mammals. Some bycatch, if landed, may also be described by the term “incidental catch.”

River herring and haddock are non-target catch species in the herring fishery of particular concern and relevance to this program: both require intensive basket sampling to derive good catch data and the management system has a pressing need for accurate, precise sea herring fishery impact estimates on these species. River herring are in severe decline in the waters of New England, and a recently released report indicates that bycatch and incidental catch in the herring fishery is significant and catch data is in need of improvement. Haddock is a primary New England groundfish stock with which the herring fishery has encountered bycatch incidents in recent years and for which the fishery operates under a bycatch cap that is inadequately monitored.

There is widespread agreement that in general the monitoring systems in this fishery are inadequate and in recognition of this fact the NEFMC has begun work on Amendment 4 to the Herring FMP. The status quo, in which landed fish are infrequently sampled for bycatch and are never actually weighed, and are often used as a proxy for total catch, is yielding a great deal of uncertainty. This in turn leads to politicization of the scant data that trickles up to managers and out to the public.

Shore based monitoring represents the most efficient and cost-effective option for quantifying and qualifying landings, and as long as it is paired with at-sea measures to quantify, qualify or eliminate discards, including slipped discards, it should form a cornerstone of the new monitoring system in New England.

The 5 Part West-Coast Model for Shore Based Monitoring:

Other U.S. fisheries have encountered, and solved, all the unique monitoring challenges of a high-volume, high-throughput, and fish-pump dependent fishery like the New England herring fishery. By copying the best rules, regulations, and tools from these programs, managers in New England will quickly be able to build a program that independently quantifies and qualifies all herring fishery landings (including incidental catch and bycatch) instead of relying on estimates provided by vessels and dealers. The plan is modeled on demonstrated success in similar fisheries in Alaska and Oregon, in which government and industry cooperate and pool resources to preserve flexibility, yet also meet performance standards. (*See Appendix A: Monitoring Models*)

The program will require modest investments in technology, personnel and infrastructure, coupled with Council and NMFS mandated standards for landings monitoring and reporting. The program has five parts: actual weights, 100% coverage by shore-based observers, industry-designed monitoring plans, analysis summaries, and at-sea companion measures. *Appendix A (Monitoring Models)* outlines two examples of high-volume U.S. fisheries that achieve robust monitoring of landed catch, and also directs the reader towards the regulatory language that codifies these successful programs. These examples are suggested as models which illustrate the availability of technology, expertise, and technical and legal language. This knowledge can in turn help create monitoring systems that meet scientific criteria yet maintain industry flexibility.

- 1) **Actual Weights:** It is more accurate to rely on independently verified actual weights from certified scales (or an approved volumetric proxy) instead of good-faith estimates made by captains and dealers. Proven technology is readily available that can deliver these data without great interference to vessel offloading operations. The preferred tools, called flow scales or hopper scales, are specially designed to deliver an accurate weight for total landings in a fishery which pumps the fish from place to place. These scales do not slow down or otherwise layer inefficiency into the offload process for the vessels or processors. The scales eliminate uncertainty inherent in the reliance on industry-generated estimates of landings and will provide scientists with accurate data. Regulations mandating the installation, maintenance and use of approved scales or other weighing techniques for all pelagic fishery offloads forms the first key component of this program. Other methods which may also provide certified actual weights include truck scales or certified volumetric estimates based on vessel fish-hold surveys and calibrated measuring techniques. The NEFMC should use Amendment 4 to convert herring landings monitoring to 100% certified actual weights.
- 2) **100% Coverage:** Rigorous sampling of the landed fish and certification of the offload weigh-out by certified shore-based fishery observers forms the second critical component of the program. Previous efforts at shore-based sampling undertaken by state agencies, Federal agencies, and enforcement personnel have been hampered by inconsistent funding, coverage, and protocols, lack of species-level sampling, a reliance on industry-generated weight estimates, and voluntary participation. As a result, some data is not statistically viable for extrapolation of total impacts. This

data is in turn used as political fodder by both proponents and opponents of the current management and monitoring regime. 100% coverage of offloads by certified shore-based fishery observers who execute a robust protocol to derive total species-level landings composition is necessary in this fishery due to the episodic but significant nature of the bycatch events. The NEFMC should use Amendment 4 to require compliance with the 100% coverage provision, and mandate that shore-based observers are granted the same access, assistance and cooperation as at-sea observers.

- 3) **Catch Monitoring and Control Plan (CMCP):** The third component will assure that the industry retains critical control and flexibility over landing and processing operations while still ensuring that the shore-based observers can deliver a robust data collection program. Pelagic fishery vessels and dealers would design and submit for approval a Catch Monitoring and Control Plan (CMCP) that would outline in detail how they will meet the catch monitoring and control standards set by the NEFMC. CMCP's are currently required for the following fisheries in Alaska: American Fisheries Act Pollock, Aleutian Islands directed Pollock and certain Rockfish programs. The Council mandated standards, in turn, would outline requirements for each CMCP to include the following: sorting and weighing all landings under the oversight of the shore-based observer, notification requirements in advance of a landing, use of approved scales or weighing techniques, provision of safe and convenient access points and sampling locations for shore-based observers, and most important, procedures to ensure that no unobserved pre-sorting occurs.
- 4) **Analysis and Reporting:** Finally, the fourth component will ensure that the information generated through the program enters into the management system quickly and accurately. Shore-based observers will certify and report the weight and species composition of each landing within 24 hours of its conclusion, providing real time data. Analysts will compile, audit, and summarize the data produced under this program, quickly generating hard numbers on landed catch and bycatch of all species. This will support overall efforts to better understand the impacts of the pelagic fisheries, as high-quality, real-time information will be available to scientists and managers at all levels.
- 5) **At-Sea Companion Measures:** A shore-based monitoring system such as the one described herein is a powerful tool but cannot meet the goals and objectives of Amendment 4 in and of itself. Amendment 4 will fail without a strong companion system to quantify and qualify all at-sea discards in the herring fishery, or verify that all catch is brought to shore where it can be measured and sampled by the shore-based infrastructure. Both approaches are successfully used in the west-coast models contemplated here: The Alaska fisheries employ a robust at-sea observer program to address at-sea discards and the Oregon hake fishery uses EM to verify maximized retention such that landings may be assumed to equal catch. Amendment 4 will fail if it is based on the fishermen's word that landings equals catch. Recent examinations of at-sea observer data, especially new insights into at-sea dumping of catch (slippage) in the herring fishery confirm this conclusion and clearly debunk the assertion that landings equal catch.

Brief Description of Potential Cost:

Estimates of purchase and installation costs for flow scales or hopper scales were generated through discussions with a company that provides flow scales to pelagic fisheries on the west coast. Exact final costs will vary somewhat depending on the location of the scale and the installation specifications of the industry-developed Catch Monitoring and Control Plan (CMCP). Scales typically range from \$39,000 - \$55,000. Additions of items such as conveyor belts would increase the total cost. 18 wheeler truck scales cost between \$5,000 and \$9,000 and would be an alternative option for some operators instead of flow and hopper scales. Also, certified volumetric estimates can be obtained if a vessel's holds are surveyed and measured and a calibrated measuring stick is created for each hold, and discussions with certified Canadian vendors who provide this service indicate that surveying a vessel will cost approximately \$3,000 including surveyor travel.

It should be noted that procedures can be developed to have the weighing method certified and to allow a shore-based observer to effectively monitor the offloads using any of the options above: flow, hopper, truck scale, or volumetric.

Discussions with observer provider companies indicate that NMFS-certified, shore-based third-party observers would likely cost approximately \$3300 per month. It is estimated that maintenance for flow scales will average \$5,000 for the year.

Conclusion:

The Cape Cod Commercial Hook Fishermen's Association (CCCHFA) has recently assisted Massachusetts' fishery managers and state lawmakers in the development of progressive legislation that will enable the Division of Marine Fisheries (DMF) to build and implement a groundbreaking shore-based monitoring system for the pelagic fishing industry. CCCHFA and state officials anticipate that this program will form a critical piece of a revamped regional monitoring infrastructure for these unique fisheries.

Massachusetts' fishery managers have expressed support for implementing the unanimously expressed will of the state legislature and as such it is expected that Massachusetts herring vessels will benefit from a shore-based monitoring program of the type described above by fall 2009. The Massachusetts program currently lacks at-sea companion measures because it was largely designed by the legislature to assist in enforcement of state landings regulations; furthermore the state has the authority to address landings, while it cannot control discards in Federal waters.

The NEFMC is presented with a unique opportunity to build upon the infrastructure Massachusetts will create by developing a preferred alternative based on shore-based monitoring and verified maximized retention. Tremendous potential exists for the Amendment 4 process to encourage the development and assimilation of programs like the one in Massachusetts in the other New England states where herring is landed. The resulting collaboration and pooling of resources between state and Federal governments will create the monitoring infrastructure needed for this important fishery and the public resource on which it depends.

Appendix A (Monitoring Models)

The following two case studies are presented as examples of successful monitoring programs in other U.S. fisheries which use pelagic trawl gear including fish pumps, and in which landings are both weighed and sampled for species composition at statistically significant levels. They are suggested as mix-and-match models of technology, personnel and regulatory language that can be used to design a program in New England that will deliver robust monitoring of landings in the midwater trawl fishery without undue burden on the industry. Brief summaries of the fisheries and their monitoring programs are provided, as well as clickable links that lead to more in-depth information including actual regulations.

Case Study #1: Pacific Whiting Shore Based Mid-water Trawl Fishery

Pacific Whiting are fished using midwater trawl nets between the months of May and November. The fishery is managed by the Pacific Fishery Management Council (PFMC) in cooperation with the National Marine Fisheries Service (NMFS). Vessels are required to have a limited entry permit, which means that the fishery isn't open to everyone. There are three ways which a vessel can catch and process whiting: catcher-processor, shore-based and mothership.

Regulations have been developed in all three sectors to monitor what is caught, discarded, and landed. The shore-based sector most closely resembles the New England midwater trawl fisheries. In the shore-based sector, landings are monitored through an ambitious program that is a cooperative effort between the PFMC, NMFS, the Pacific States Marine Fisheries Commission (PSMFC) and the states of Washington, Oregon and California. Though this plan is still evolving, there are elements of interest which the NEFMC may wish to consider. Under the current Pacific whiting regulations, first receivers (defined as people or processors who receive, buy or accept whiting deliveries directly from whiting mid-water trawl vessels in quantities greater than 4,000 pounds) are required to follow strict regulations to ensure that all fish delivered (i.e. landed) are weighed and reported. Fish must be sorted by species prior to being weighed and after being offloaded from the vessel. Reported weights must be recorded from scales with appropriate weighing capacity ensuring that the fish are accurately weighed. First receivers are required to e-mail the weights within 24 hours of the catch being landed using special computer software provided by the National Marine Fisheries Service. First receivers are also required to sign processor agreements with the states in which they operate. These agreements generally require them to retain, at their expense, state-certified observers who sample and certify a designated minimum percentage of offloads.

Pacific Whiting Definitions:

- *Catcher-processor Sector:* A ship that catches the fish and processes it on board
- *Mothership Sector:* Vessels that process whiting, but do not catch it, working in conjunction with catcher vessels catch the fish and deliver it to the mothership
- *Shore based Sector:* vessels that harvest whiting for delivery to shore-based processors or receivers.

- *Pacific whiting shoreside first receivers*: persons who receive, purchase, or take custody, control, or possession of Pacific whiting onshore directly from a Pacific whiting shoreside vessel.

Pacific Whiting Further Reading:

- Link to whiting management homepage maintained by the NMFS Northwest Regional Office: <http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Whiting-Management/index.cfm>
- Link to complete Pacific Groundfish regulations, including Federal whiting monitoring regulations found largely in section 660.373: http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Regulations/upload/2008%20Pink%20Pages_May08_2.pdf
- Link to the recent Federal Register Final Rule implementing new electronic reporting and scale requirements for whiting first receivers: <http://www.nwr.noaa.gov/Publications/FR-Notices/2007/upload/72FR50906.pdf>
- Link to an Environmental Assessment which contemplates new requirements for first receivers of whiting, in the context of a maximized retention program: <http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/upload/Processor-Rule-Draft-EA.pdf>
- Link to an Environmental Assessment which contemplates new monitoring requirements for whiting vessels, in the context of a maximized retention program: <http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/upload/Amend-10-EA.pdf>
- Link to the Shoreside Hake Observation Program website (this is the joint effort by the 3 pacific states to implement monitoring requirements for first receivers, including observer requirements: <http://www.dfw.state.or.us/MRP/hake/>
- Link to a typical Processor Agreement between a state and a whiting processor: <http://www.dfw.state.or.us/MRP/hake/Main%20Pages/Permits%20and%20Agreements/p-s/2007%20OR-Proc-state%20agreement%20FINAL.pdf>

Case Study #2: Alaska Pollock Fishery

Alaska Pollock is managed under the North Pacific Fishery Management Council and the Alaska NMFS. Pollock are caught using mid-water trawl nets. They catch approximately 2.5 billion pounds a year. Most Pollock is caught and processed at sea, but some of it is brought in whole to shore based processors. The mid-water trawl fleet is similar to the shore based processing system. Processors which receive or buy Pollock are required to submit a catch monitoring and control plan (CMCP) to NMFS that provides the following:

- How the processing plant will sort and weigh all the species caught including the number of staff, the amount and location of space for sorting and the maximum rate that catch will flow through the sorting area,
- Serial number of every scale and why that scale was chosen
- Procedures for how the scale will be tested and by whom,

- Ensure that each scale is capable of producing a printed record of the weight of each species in a delivery,
- The location where fish are removed from the vessel and where it can be initially sorted,
- Identify a location where observers can monitor the flow of fish and ensure that the area meets the observation standards
- Communication equipment that is used by plant staff and ensure that the plant will provide one to the observer,
- A scale drawing of the plant,
- Who is the designated plant liaison that orients new observers to the plant

Scales must be inspected every 12 months. Under the current regulations NMFS is able to request that a scale be tested just as long as they notify plant personnel 20 minutes prior. All fish species brought to the plant must be sorted prior to being weighed in the processing plant. Every scale is required to produce a printed report of the weight of each species in the delivery unless exempted by NMFS. The reports must be printed every 24 hours ensuring that all the delivered fish have been accurately recorded

These agreements generally require them to retain, at their expense, state-certified observers who sample and certify a designated minimum percentage of offloads.

Alaskan Pollock Fishery Further Reading

- Link to Alaska Region National Marine Fisheries Service Homepage:
<http://www.fakr.noaa.gov/>
- Link to complete set of Alaska NMFS Regulations of the Economic Exclusive Zone (EEZ). <http://www.fakr.noaa.gov/regs/>
- Link to specific Alaska NMFS Pollock fishery regulations dealing with equipment and operations, monitoring and observers
679.28-Equipment & Operational Requirements:
<http://www.fakr.noaa.gov/regs/679b28.pdf>
679.32- Groundfish and halibut CDQ catch monitoring:
<http://www.fakr.noaa.gov/regs/679c32.pdf>
679.50- Groundfish Observer Program:
<http://www.fakr.noaa.gov/regs/679e50.pdf>
679.63- Catch weighing requirements for vessels and processors:
<http://www.fakr.noaa.gov/regs/679f63.pdf>
679-Appendix Performance and Technical Requirements for Scales Used to Weigh Catch At Sea in the Groundfish Fisheries off Alaska:
<http://www.fakr.noaa.gov/regs/679app.pdf>
- Link to summary written by NMFS regarding catch weighing and monitoring for the groundfish and crab fisheries: <http://www.fakr.noaa.gov/scales/default.htm>
- Link to Alaska Observer Manual, see section 9, shoreside plants and floating processors:
http://www.afsc.noaa.gov/FMA/Manual_pages/MANUAL_pdfs/manual2008.pdf