

Comparison of At-Sea Catch Monitoring Programs with Full Observer Coverage to the Directed Atlantic Herring Fishery – New England

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A report prepared

by



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1 Executive Summary

The Atlantic herring fishery is currently undergoing scrutiny concerning bycatch of haddock, bycatch of alewife and blueback herring (collectively referred to as ‘river herring’) and dumping complete or partial hauls (slippage) without having these discards accounted for. River herring are depleted and candidates for listing under the Endangered Species Act (ESA). Observer coverage is currently in the range of 30% on midwater trawls, sufficiently low to question the robustness of river herring bycatch and of slippage estimates. The possibility of introducing higher observer coverage levels to the herring fishery suggests that information for observer programs that require 100% or higher observer coverage in other regions could provide valuable information for discussions on increasing the herring coverage. This report summarizes fishery characteristics, observer program characteristics, and observer cost components for four fisheries that require 100% or higher observer coverage for comparison with characteristics of the Atlantic herring fishery to inform discussions on potential coverage levels of the Atlantic herring fishery. The four 100% fisheries are the Hawaii (HI) longline swordfish, the Alaska (AK) pollock midwater trawl, the west coast (WC) at-sea whiting (hake) midwater trawl, and the west coast (WC) non-whiting trawl Individual Fishing Quota (IFQ). Both the at-sea hake and AK pollock fisheries are certified as sustainable according to the principles and criteria of the Marine Stewardship Council (MSC). The MSC certification criteria require sufficient data to account for impacts of the fishery on the target stock and on the components of the ecosystem. MSC certified fisheries tend to have more robust monitoring systems than uncertified fisheries, but the at-sea monitoring for certified fisheries can range from quite modest to 100% or higher coverage levels, depending on the needs.

In the Atlantic herring fishery, midwater trawl vessels possess either category A (access to fish in all management areas) or B permits (access to fish in two of four management areas), and take over 60% of the landings. Presently there are less than 20 active vessels with A/B permits, 12 of which are paired midwater trawls that catch the majority of the quota; the remaining are single midwater trawls, purse seines and bottom trawls. In 2010, paired midwater trawls landed 70.54% of the total herring landings from all areas, single midwater trawls landed 12.97%, purse seine gear landed 11.47% and bottom trawls landed 5.02%.

The four fisheries with 100% observers span a range of gears, catch volume, revenue, and vessel characteristics that bracket the NE herring fishery. The herring fishery is comparable in weight and revenue to the WC hake fishery; far exceeds the weight of the HI longline fishery but only doubles its revenue; substantially exceeds the weight of the WC trawl IFQ fishery but moderately exceeds the revenue; and falls far below the weight and value of the AK pollock fishery as do all the other fisheries. NE herring and WC trawl IFQ both run short trips compared to HI longline and the mothership operations of AK pollock and WC hake, resulting in higher logistics requirements to deploy the observers.

The Atlantic herring fishery shares some important characteristics with the four 100% observer coverage fisheries discussed here (Table 2 and Table 3). All four 100% fisheries and the Atlantic herring fishery have some sort of limited access. All four 100% fisheries and the Atlantic herring fishery have interactions with endangered, threatened and protected (ETP) species and/or depleted species that can limit the target fishery. Like the pollock and whiting fisheries, the Atlantic herring fishery is high volume, which can make detection of the limiting species difficult. Like the whiting at-sea fishery, midwater trawl gear makes up the total (whiting) or a very high

proportion of the total (herring) catch, although the herring fishery has three other legal gears, similar to the IFQ whiting fishery.

Bycatch and discards drive the observer programs as primary objectives for the 100% fisheries and for the Atlantic herring fishery (Table 3), reflecting the need to obtain observer information for activities that occur at sea and cannot be effectively monitored from ports. Prohibited species monitoring uniformly rises to the top one or two priorities. Discard weights (herring, WC Trawl IQ) and species composition sampling (pollock, at-sea hake) appear as high priorities for some but not other fisheries. Biological samples and length frequencies tend to occur as mid priorities for most programs, but HI swordfish shows biological samples as a high priority. The 100% coverage required of the comparison fisheries represent a variable proportion of the revenues for these fisheries, ranging from around 2% for AK pollock and the at-sea whiting to 7-8% for Hawaii swordfish longline and WC trawl IFQ. Applying the characteristics of the Atlantic herring fishery, we estimate that the cost of 100% observer coverage would run in the 10-11% range. The substantially higher cost for herring results from a sea day rate that is about twice as expensive as for the other fisheries. Where the sea day rates for the 100% comparison fisheries runs on the order of \$350, the estimated sea day rate for herring is about \$740. The \$740 rate incorporates observer salary, travel, provider fees and logistics, federal Service Contract Act (SCA) and Fair Labor Standards Act (FLSA) requirements and an observer pay bonus structure required under NEFOP. This rate does not include NMFS expenses (estimated at an additional \$400 approximately), which includes training and debriefing, NMFS salaries, and database development and maintenance; these additional costs assumed by NMFS would remain in place as long as the program is operated as a federal observer program. The higher rate for herring, which is comparable to the current rates for the Northeast Fishery Observer Program (NEFOP) and the Northeast At-sea Monitoring (ASM) Program, results from a combination of short trips and a substantial infrastructure needed for efficient deployment of observers; the NEFOP bonus; and SCA and FLSA requirements.

2 Introduction

Four fisheries in the U.S. employ 100% or more at-sea monitoring. Currently, and in large part due to concerns over significant and unreported river herring bycatch, Draft Amendment 5 to the Atlantic Herring Fishery Management Plan is considering alternatives to increase observer coverage to 100% on all herring vessels. MRAG Americas developed information concerning the fishery characteristics, reasons for choosing 100% coverage, the observer program structure, and requirements and costs of these 100% (comparison) fisheries to provide background for the discussions of potential changes to the herring observer program. This report compares and contrasts the comparison fisheries with the current directed Atlantic herring fishery (permit category A/B). The report further speculates on the potential costs of 100% at-sea coverage for the A/B herring fishery, by applying a number of relevant factors known to affect observer program costs.

3 Characteristics of the Atlantic Herring Fishery

The Atlantic herring fishery operates year round in the Gulf of Maine. In 2010, the fleet landed 144 million lbs of herring worth over \$18.7M.¹ Four gears types are employed in fishing operations (weir, purse seine, single midwater trawl and paired midwater trawl). The Atlantic Herring fishery is managed by the New England Fishery Management Council's (NEFMC) Atlantic Herring Fishery Management Plan as a limited access permit fishery. Permits regulate possession limits and grant access to four management areas: Area 1A (Gulf of Maine), Area 1B (Gulf of Maine), Area 2 (Southern New England), and Area 3 (Georges Bank) (). Category A permitted vessels are authorized to fish in all limited access managed areas and have unlimited possession limits in all areas; Category B permits have access to Areas 2 and 3 only and unlimited possession limits within Areas 2/3; Category C are incidental catch permits limiting vessels to 55,000 lb per trip/day in all areas; and Category D permits are open access permits with a more restricted possession limit of 6,600 lb per trip/day in all areas.²

The majority of commercially-caught Atlantic Herring is harvested by midwater trawl boats ranging up to 165' in length with Category A and B permits; over 80% of Atlantic herring landings³ in all management areas resulted from midwater trawls in 2010 (paired midwater trawls landed 70.54% of the landings, single midwater trawls landed 12.97%, purse seine gear landed 11.47% and bottom trawls landed 5.02%).⁴ Within each herring management area, in 2010, over 70% of herring landings by Category A permitted vessels were caught by paired midwater trawls whereas single midwater trawls caught only about 10% of the total for Category A permits (Figure 2). In 2010, 101 vessels were granted limited access permits in the Atlantic Herring fishery, 46 had Category A and B permits, and 55 were Category C permits. An additional 2,258 boats held Category D open access herring permits; a number of these were herring/multispecies combination permits (Table 1). Presently there are less than 20 active vessels with A/B permits, 12 of which are paired midwater trawls that catch the majority of the quota; the remaining are single midwater trawls and bottom trawls.⁵ Additional vessels are permitted to possess herring without a federal herring permit if herring is only used for bait and commercial fishing gear (purse seine, midwater trawl, pelagic gillnet, sink gillnet, or bottom trawl gear) is not on board the vessel, and herring is not transferred, sold, traded, or bartered; or the vessel is a skiff or other similar vessel that is used exclusively to set the net in a purse seine operation with a vessel that has a herring permit. The fishery is assigned an annual catch limit (ACL) that is allocated among the four management areas.

¹ NEFMC. 2012. Draft Amendment 5 to the Atlantic Herring FMP. Public comments. February 16, 2012. Available at: http://nefmc.org/herring/planamen/draft_a5/public%20hearings/Draft%20AM%205%20FOR%20PUBLIC%20HEARINGS%20OFFICIAL%20FEB%2016%202012%20NO%20INDEX.pdf

² Northeast Regional Office (NERO). 2012. Atlantic Herring Information Sheet. January 1, 2012. <http://www.nero.noaa.gov/nero/regs/infodocs/AtlHerringInfoSheet.pdf>

³ These values breakdown gear composition by catch for categories A and B permit types only; this is slightly different than the values provided in Table 1, which considers gear composition of catch by all permit types.

⁴ NEFMC. 2012. NMFS VTR data.

⁵ NEFSC staff, personal communications. February 2012.

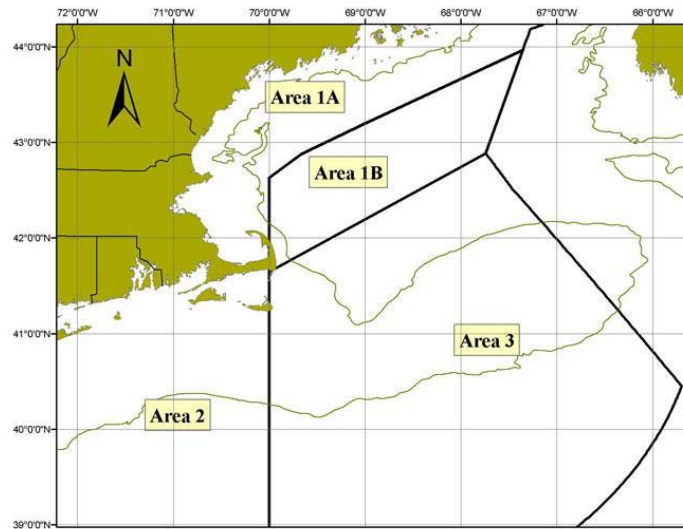


Figure 1: Herring Management Areas: Area 1A – Inshore Gulf of Maine, Area 1B – Offshore Gulf of Maine, Area 2 – South Coastal Area, Area 3 – Georges Bank (NERO 2012).

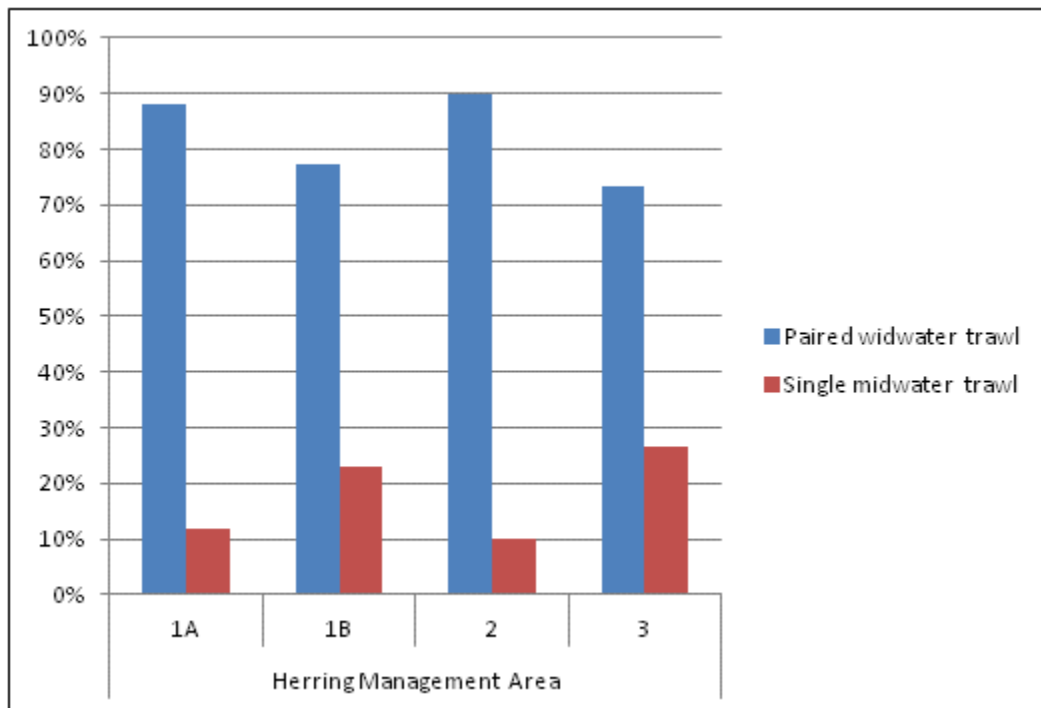


Figure 2: Atlantic herring landings by federally permitted single and paired midwater trawl vessels (Category A) as a percentage of the total for this category, by management area fished in 2010 (NEFMC 2012).

Table 1: 2010 Herring permits by category and herring/multispecies combination permits (NEFMC 2011).

Herring Permit Category	Herring Only	Herring with Multispecies Limited Access		Herring with Multispecies Open Access**	Total	Percentage of Total Landings in 2010
		A, D, E, F	C, HA	HB, I, J, K		
A	8	14	1	19	42	97.12%***
B*	0	4	0	0	4	1.11%
C**	0	39	0	12	51	1.13%
D	144	887	71	1144	2246	0.63%
Total	152	944	72	1175	2343	100.00%
* All B permitted vessels also have a C permit.						
** Does not include C permits that are associated with B permits.						
*** Break down by gear for 97% of total herring landings: 67% paired midwater trawls, 14 % midwater otter trawls, 12% purse seine, and 4% bottom trawl.						

The range of the herring fleet overlaps with that of river herring, designated species of concern range (i.e. alewife and blueback herring).⁶ Both species of river herring are presently depleted and proposed for listing under the Endangered Species Act.⁷ River herring populations have drastically declined over the last twenty years due to overfishing, bycatch, dam construction, habitat degradation and striped bass predation. Due to these continual declines, the bycatch of river herring in the Atlantic herring fishery is a significant concern. Public comments in response to the scoping for draft Amendment 5 included many interested parties that believe present levels of observer coverage on midwater trawl vessels do not adequately identify the amount of river herring bycatch.⁸ Higher observer coverage on these vessels would provide the data necessary to understand the magnitude of the problem and allow management to appropriately address it. In addition, other fish (e.g. haddock, mackerel), birds, marine mammals and tuna that feed on herring schools are also vulnerable to midwater trawlers in the herring fishery.⁹ According to observer data for 2009-2010, where it is estimated that over 30% of the midwater trawl A/B vessel trips were observed (387 observed of 1005 total trips), six species (alewife, blueback herring, dogfish, haddock, Atlantic herring, Atlantic mackerel) made up 22% of the discarded species between January and June 2009: these same species comprised over 97% of the landed catch. The majority of discarded fish was categorized as fish NK and totaled 945,922 lb. Fish NK and herring NK, where the observer can see and confirm herring-bodied fish, are categories used by observers to represent the component of the catch for which observers could not verify identification. This includes partial and fully released tows (net

⁶ NOAA Fisheries. 2009. Species of Concern: River Herring. Available at: http://www.nmfs.noaa.gov/pr/pdfs/species/riverherring_detailed.pdf

⁷ Alewife: <http://www.nmfs.noaa.gov/pr/species/fish/alewife.htm>; Blueback herring: <http://www.nmfs.noaa.gov/pr/species/fish/bluebackherring.htm>

⁸ NEFMC. 2012. Draft Amendment 5 to the Atlantic Herring FMP. Public comments. February 16, 2012. Available at: http://nefmc.org/herring/planamen/draft_a5/public%20hearings/Draft%20AM%205%20FOR%20PUBLIC%20HEARINGS%20OFFICIAL%20FEB%2016%202012%20NO%20INDEX.pdf

⁹ NEFMC. 2012.

slippage¹⁰) and operational discards (“not enough fish to pump”).¹¹ These data reflect information available for only a portion of the midwater trawl fleet (paired and single trawls), where the highest portion of observed trips occurred on Category A/B vessels fishing in Groundfish Closed Area 1.¹²

4 Characteristics of US Fisheries that employ 100% At-Sea monitoring

The impetus for mandating 100% at sea monitoring in U.S. fisheries varies by example and in some cases the requirement pertains only to a sector of vessels within the fishery. High levels of monitoring are typically used when needed information on activities that occur at sea cannot be obtained in port, e.g., discards and monitoring of rare events (endangered, threatened, and protected (ETP) and limiting species). Below we provide a general summary outlining the characteristics of four US fisheries with 100% monitoring (west coast limited entry groundfish trawl IFQ, west coast (WC) at-sea hake processors, Alaska (AK, subdivided into Gulf of Alaska and Bering Sea/Aleutian Islands) pollock midwater trawl, and Hawaii (HI) swordfish longliners (LL)) for comparison with the herring fishery (Table 2). The four fisheries with 100% observers span a range of gears, catch volume, revenue, and vessel characteristics that bracket the NE herring fishery. The herring fishery is comparable in weight and revenue to the WC hake fishery; far exceeds the weight of the HI longline fishery but only doubles its revenue; substantially exceeds the weight of the WC trawl IQF fishery but moderately exceeds the revenue; and falls far below the weight and value of the AK pollock fishery – as do all the other fisheries. NE herring and WC trawl IFQ both run short trips compared to HI longline and the mothership operations of AK pollock and WC hake, resulting in higher logistics requirements to deploy the observers.

¹⁰ Draft Amendment 5 (NEFMC 2012) defines slippage as “Unobserved catch, i.e., catch that is discarded prior to being observed, sorted, sampled, and/or brought on board the fishing vessel. Slippage can include the release of fish from a codend or seine prior to completion of pumping or the release of an entire catch or bag while the catch is still in the water”.

¹¹ NEFMC. 2012.

¹² NEFMC. 2010.

Table 2: Comparison of fishery characteristics.

	NE Herring	HI Swordfish Longline	AK Pollock	WC At-Sea Hake	WC Trawl IFQ
Current level of observer coverage	30%+	100%	100-200%	100%	100%
Fishery Characteristics (data through 2010)					
Target Species	Atlantic Herring	Swordfish, Marlin	Pollock	Hake	Various species
Primary gear	Midwater trawl	Shallow LL	Midwater trawl	Midwater trawl	shallow/deep Trawl/pots/LL
Catch Volume range	63,000 - 95,000 mt	1,800 - 2,300 mt	813,000 - 1,390,000 mt	114,784 - 240,985 mt	19,400 - 27,700 mt
Fishery Revenue range (2007 - 2010)	\$19.3M - \$18.77M	\$10.8M - \$9.5M	\$297.4M - \$323.2M	\$32.6M - \$27.3M	\$26.7M - \$27.0M
Season	all year	Jan-Dec slower in Summer	late Jan to Oct	May-Dec	Jan-Dec
Number of Permits	46	32 active in shallow set fishery (124 active LL vessels)	82	15	114
Landing Ports	4+	2	3	7+	13+
Trip length range	1-5 days	21-50 days	2-90 days	2-90 days	2-5 days

Bycatch and discards drive the observer programs as primary objectives for the 100% fisheries and for the Atlantic herring fishery (Table 3), reflecting the need to obtain observer information for activities that occur at sea and cannot be effectively monitored from ports. Prohibited species monitoring uniformly rises to the top one or two priorities. Discard weights (herring, WC trawl IFQ) and species composition sampling (pollock, at-sea hake) appear as high priorities for some but not other fisheries. Biological samples and length frequencies tend to occur as mid priorities for most programs, but HI swordfish longline shows biological samples as a high priority. Monitoring compliance, marine mammal and seabird collections, fishing effort data, gear measurements, and processor recovery rates fall to low priorities, and observers collect data for these categories on an opportunity basis.

Table 3: Summary of observer program priorities.

	NE Herring	HI Swordfish Longline	AK Pollock	WC At-Sea Hake	WC Trawl IFQ
Issues and Priority of Data collection (if applicable) <i>Data collection priority ranked in order of importance (1 is top priority); where lesser priority data would not be collected if time and conditions would not permit.</i>					
Federal Obs	No	No	No	No	No
Obs Primary Concern	Bycatch - River Herring, Tuna, MMs, seabirds	Bycatch - Turtles, MM, sharks	Bycatch - salmon	Bycatch - rebuilding stocks	Discard analysis
Obs Secondary Concern	Discard Analysis	Biological Sampling	Species Composition	Species Composition	Bycatch - critical stocks
Compliance Monitoring	4	4	6	6	5
MM Collection	5	4	4	5	6
Seabird Collection	5	4	4	5	6
Biological Samples	5	2	3	3	4
Length Frequencies	5	3	3	3	4
Observer Training Center Determination	6	3	5	4	3
Discard Weights	2	No	5	4	1
Species Composition Sampling	3	5	2	2	3
Prohibited Species Monitoring	1	1	1	1	2
Fishing Effort Data	4	5	6	6	5
Gear Measurements	4	No	No	6	No
Processor Recovery Rates	7	No	No	No	No
Shore Side Sampling	No	No	100%	100%	100%

4.1 The West Coast Groundfish Trawl Individual Fishing Quota (IFQ)

The west coast groundfish fishery is a multispecies fishery managed by the Pacific Fishery Management Council's (PFMC) Groundfish Fishery Management Plan (FMP), which manages over ninety species, eight of which are presently under rebuilding plans. In January 2011, The PFMC implemented the West Coast Groundfish Trawl Rationalization Program , a limited access privilege program under the Magnuson-Stevens Act. The program consists of the individual fishing quota (IFQ) program for the shoreside limited entry bottom trawl fleet and two

distinct cooperative programs for the at-sea hake mothership and catcher/processor trawl fleets (described in more detail below). A quota share permit authorizes a person or group to own quota share (expressed as a percentage); quota share (QS) accounts allocate individual fishing quota (IFQ) and individual bycatch quota (IBQ) species¹³. Only vessels with quota shares are allowed to fish in the trawl IFQ fishery; however, quota can be bought, sold, leased or traded. In the first year of the program (2011) numerous fixed gear vessels, using pot and longline gear entered the fishery. These vessels were able to target specific species with lower bycatch of limiting stocks. The bottom trawl fleets traditionally operates from the U.S./Canadian border to Morro Bay, California. The fishing season operates year round.

In 2011, there were 138¹⁴ permitted shore-based trawl vessels in the groundfish IFQ fishery. The fishery landed 242,386,298 pounds of a 375,004,872 quota¹⁵ (64.6%) worth \$26,066,500. While the landed weight did not change substantially from previous years, the 2011 value per non-whiting vessel increased by 34% from the previous 5-yr average, from an average of \$216,000 to slightly more than \$289,000¹⁶. The value of the whiting fleet increased even more, from about \$273,000 per vessel on average over the last few years to \$775,000 in 2011.

Within the IFQ program, vessels will be allowed to use a variety of directed groundfish commercial gear (including non-trawl gear) to take the shoreside trawl sector allocation, which will thus allow for “gear switching.” IFQs were created for most species of groundfish under the Groundfish FMP. Allocation of annual harvest is shared between sectors. In the non-whiting sector, 90% of the quota share is granted to limited entry permit holders, 0% to processors, and 10% for adaptive management.¹⁷ In 2010, catch of groundfish by the limited entry bottom trawl sector was approximately 24,250 mt, and with 114 active permits. In 2011, the limited entry bottom trawl sector catch was approximately 19,400 mt with ~80 active permits.¹⁸ Shoreside vessels receive an individual bycatch quota (IBQ) for Pacific halibut.

Groundfish bottom trawl vessels range in from 35 - 95 feet, with an average length of 65 feet. Vessels fish a wide range of depths throughout the year and deliver catch to shoreside processors. Bottom trawlers often target species assemblages, resulting in a mixed catch. A single groundfish tow often includes 15-20 species. Groundfish trawl vessels retain the portion of their catch that is marketable and permitted to be landed. The portion of the catch which is prohibited by regulations or not marketable is discarded at-sea.¹⁹

¹³ <http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Trawl-Program/upload/2012-interim.pdf>

¹⁴ <http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Trawl-Program/quota-shares.cfm>

¹⁵ <https://www.webapps.nwfsc.noaa.gov/ifq/>

¹⁶ <http://www.nwr.noaa.gov/Newsroom/Current/loader.cfm?csModule=security/getfile&pageid=53063>

¹⁷ PFMC. 2011. Groundfish FMP Appendix E: Trawl Rationalization. http://www.pcouncil.org/wp-content/uploads/GF_FMP_ApdxE_TRat.pdf

¹⁸ Pacific Fisheries Information Network: <http://pacfin.psmfc.org/>

¹⁹ NWFSC. 2012. Limited Entry Bottom Trawl Webpage. Accessed February 2012. Available at: http://www.nwfsc.noaa.gov/research/divisions/fram/observer/bottom_trawl.cfm

4.1.1 West Coast Trawl IFQ Observer Program

One hundred percent observer coverage is provided by the West Coast Groundfish Observer Program (WCGOP) in both the west coast (WC) groundfish shore-based trawl fleets managed under IFQ (for whiting and non-whiting groundfish) and the offshore fisheries (motherships and catcher/processors) targeting Pacific whiting. Observers collect information on fishing activity, catch, individual fish, bycatch, and species interactions. The program is designed to enhance accountability by fishermen through the use of 100% at-sea observer coverage and 100% monitoring of shoreside landings. All vessels are required to carry at-sea observers for full total catch verification (100 percent of the groundfish IFQ species in each haul); observers are required to monitor the sorting, weighing, and discarding of catch.^{20,21} The data collected are used to account for any IFQ discarded catch, including the mandatory discarding of and the tracking of individual bycatch quota (IBQ)²² for Pacific halibut. Fishery observers monitor all offloads and confirm the accuracy of reported landings; these data enable fishermen to track their IFQs and managers to monitor progress of the fishery. The observer coverage is a core element of the accountability of the program.²³

The catch shares program led to development of the Catch Shares Observer Program (CSOP) under the WCGOP, which provides 100% observer coverage on all catch shares program fishing trips. All vessels participating in the shorebased IFQ program must carry a NMFS-certified observer on each trip until all fish from that trip have been offloaded; vessels greater than 125' participating in the Mothership Coop Program or Catcher/Processor Coop Program must carry two NMFS-certified observers.

Prior to the 2011 implementation of the catch shares program, observer coverage monitored less than 25% of non-whiting trawl trips; there was considerable delay in data delivery resulting in catch by species information not being available for more than a year after the fishing ended.²⁴ Additionally, observers were employed by observer providers, though the Pacific States Marine Fisheries Commission (PSMFC) selects and funds the provider for observer services through a federal contract and the WCGOP was completely funded by the federal government. This program differs from other federally-funded programs in that a separate entity, the PSMFC, rather than NMFS administered the funds.

²⁰ PFMFC. 2011. Pacific Groundfish Fishery Management Plan. <http://www.pcouncil.org/groundfish/fishery-management-plan/fmp-amendment-20/>

²¹ PFMFC. 2010. Rationalization of the Pacific Coast Groundfish Limited Entry Trawl Fishery; Final Environmental Impact Statement Including Regulatory Impact Review and Initial Regulatory Flexibility Analysis.

²² Individual bycatch quota (IBQ) means the amount of bycatch quota for an individual species/species group and area expressed as a percentage of the annual allocation of allowable bycatch mortality to the Shorebased IFQ Program. (50CFR660.111; http://edocket.access.gpo.gov/cfr_2010/octqtr/50cfr660.111.htm)

²³ NOAA Fisheries. 2010. West Coast Groundfish Trawl Catch Share Program - New Catch Share Regulations. Final: August 16, 2010.

²⁴ PFMFC. 2010. Rationalization of the Pacific Coast Groundfish Limited Entry Trawl Fishery; Final Environmental Impact Statement Including Regulatory Impact Review and Initial Regulatory Flexibility Analysis.

4.2 West Coast At-Sea Hake Fishery

The Pacific whiting (or 'hake', *Merluccius productus*) fishery is one of the largest by volume in the US with an annual catch in 2010 of 161,000 mt (106,000 mt caught by the at-sea fishery and 55,000 mt by the shoreside fishery).²⁵ Pacific hake is managed by the PFMC under the Pacific Coast Groundfish FMP.²⁶ Of the 90+ species managed under the Groundfish FMP, whiting landings are the largest single-species landings by volume. Presently, the entire U.S. west coast groundfish trawl fishery is managed under a catch share program (Trawl Rationalization Program, implemented January 2011).²⁷ Since the 1990s, the US share is divided among distinct sectors: Catcher/Processors (CP) are large vessels that harvest and process their own catch at-sea; Motherships (MS) that take deliveries from catcher vessels and process at-sea; Shoreside (SS) where shore-based processing plants take deliveries from catcher vessel; and Coastal treaty Tribes in Washington State (namely the Makah and Quileute tribes) that receive a reserved fraction of the coast-wide hake harvest set aside for native tribes. Motherships and catcher/processers belong to fishery cooperatives that help optimize use of allowable harvest and aid in management and research of the resource.^{28,29} In 2006, a Pacific whiting retention maximization program went into place for the shoreside fishery³⁰ with objectives of accounting for Chinook salmon catch; meeting standardized bycatch reporting requirements specified by the Magnuson-Stevens Fishery Conservation and Management Act; and collecting biological data on catch that would otherwise not be available; these objectives require a high level of at-sea monitoring. Chinook salmon is a protected species listed as endangered or threatened for nine of 17 recognized evolutionary significant units (ESU), where each ESU is treated as a separate species under the ESA.³¹ Chinook salmon are anadromous species, similar to river herring that are susceptible to fishing during their adult lives at sea.

Each sector's catch is also restricted by limits on bycatch of Chinook salmon and depleted rockfish species. The management system uses observer data to determine if the whiting fishery reaches or exceeds an aggregate limit of 11,000 Chinook salmon, which automatically triggers a salmon conservation area closure for the entire whiting fleet. The at-sea mothership and catcher-processor co-ops and vessels in the shorebased IFQ programs receive limits on the amount of depleted rockfish available for catch. Attaining the co-op or individual vessel

²⁵ Stewart, I.J., R.E. Forrest, C. Grandin, O.S. Hamel, A.C. Hicks, S.J.D. Martell, and I.G. Taylor. 2011. Status of the Pacific Hake (Whiting) stock in U.S. and Canadian Waters in 2011. Joint U.S. and Canadian Hake Technical Working Group. Final SAFE document. March 17, 2011. http://www.pcouncil.org/wp-content/uploads/Pacific_Whiting_2011_Assessment.pdf

²⁶ PFMC. 2011. Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery. Through Amendment 19. December 2011. http://www.pcouncil.org/wp-content/uploads/GF_FMP_FINAL_Dec2011.pdf

²⁷ DOC 2010. 50CFR Part 660. Fisheries Off West Coast States; Pacific Coast Groundfish Fishery Management Plan; Amendments 20 and 21; Trawl Rationalization Program. <http://www.nwr.noaa.gov/Publications/FR-Notices/2010/upload/75FR78344.pdf>

²⁸ Stewart et al. 2011.

²⁹ Pacific Whiting Conservation Cooperative (PWCC). 2012. Website. <http://www.pacificwhiting.org/>

³⁰ Northwest Regional Office. 2007. A maximized Retention and Monitoring Program for the Pacific Whiting Shoreside Fishery, Implementing Amendment 10. <http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/upload/Amend-10-EA.pdf>

³¹ NMFS Office of Protected Resources Chinook Salmon designation, Accessed March 2012: <http://www.nmfs.noaa.gov/pr/species/fish/chinooksalmon.htm>; Northwest Regional Office Chinook Salmon Populations, Accessed March 2012: <http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Chinook/>

limits leads to restrictions in fishing activities for the co-op or vessel; attaining the aggregate limit for the depleted species could close an entire sector.

These vessels target Pacific hake using midwater trawl nets and fish mid-May through November. Hake is targeted and is the predominant catch, though catch can include rockfish (*Sebastes spp.*) and salmon bycatch. Whiting form huge schools and midwater trawls target the schools; bycatch can be upwards of 2% of the catch (by weight). Fishermen may discard unwanted catch, but all catch is accounted for and applied to individual or co-op quotas. Midwater trawls must have a codend mesh of at least 3 inches to prevent bycatch of small fish. Regulations restrict where fishermen may harvest Pacific whiting to reduce the bycatch of Chinook salmon. Bycatch allocations are used to limit the catch of depleted rockfish species in the catcher/processor and mothership sectors. Quota shares are used in the shore-based fishery. The at-sea hake processing sector (motherships and catcher/processor vessels) is subject to mandatory 100% observer coverage and catch monitors monitor landings. This was precipitated by the need to account for bycatch of rockfish (*Sebastes spp.*) and salmon. Full accounting of the catch leads to reduced bycatch. In 2010, fleet size was comprised of 15 processing vessels (9 catcher/processors and 5 motherships with 14 catcher vessels), processing vessels range in size from 250-600'. In 2009, the Pacific hake midwater trawl fishery received certification as a sustainable and well managed fishery under the Marine Stewardship Council (MSC) standards.³²

4.2.1 West Coast At-Sea Hake Fishery Observer Program

The At-Sea Hake Observer Program (A-SHOP) monitors the at-sea hake processing vessels and all vessels carry two observers at all times. A-SHOP dates back to 1975 when observers were deployed to monitor foreign and joint venture fishing; there has been 100% coverage on the domestic fleet since 1991. Observer data collection focuses primarily on total catch and bycatch (especially salmon and rockfish) and protected species interactions data.³³ Observer coverage in the directed hake (Pacific whiting fishery) is required for all offshore fisheries (motherships and catcher/processors). Processing vessels less than 125' are required to carry one observer on all fishing trips; vessels 125' or over must carry two observers on all trips directed at hake. Since 2002, all catcher-processors and motherships have carried two observers due to declines in populations of certain rockfish species along the west coast; this has resulted in the hake fishery being held to lower bycatch quotas. In 2004, the at-sea hake fishery came close to catching the entire canary rockfish allocation in one haul; therefore, some rockfish species have specific bycatch limits (or "hard caps").³⁴ The west coast at-sea limiting species situation has similarities to haddock in the herring fishery, in which a haddock incidental catch cap is in place in the Atlantic herring fishery allocates 1% of the haddock acceptable biological catch for each the Gulf of Maine and Georges Bank stocks in each multispecies fishing year. The Chinook conservation zone has additional similarities with a management option proposed in Atlantic herring draft Amendment 5 that includes monitoring and

³² MSC Certification of Hake: <http://www.msc.org/newsroom/news/pacific-hake-mid-water-trawl-fishery-is-msc/>

³³ Northwest Fisheries Science Center. 2011.1 At-Sea Hake Observer Program, Observer Sampling Manual. Fishery Resource Analysis and Monitoring, At-Sea Hake Observer Program. NWFSC, 2725 Montlake Blvd. East, Seattle, Washington 98112. Available at: http://www.nwfsc.noaa.gov/research/divisions/fram/observer/pdf/hake_manual_2011.pdf

³⁴ NWFSC. 2011.

avoidance measures in certain geographic regions that would be implemented in the event that river herring catch caps in the directed herring fishery (in specified geographic regions) were triggered.

Data collection occurs 24 hours/day in order to sample nearly all tows for species composition, though due the large volume (>60mt/tow) observers sample about 50% of each haul.³⁵ The primary concerns that require observer coverage are catch of rebuilding stocks and interaction with marine mammals and seabirds. Any bycatch of marine mammals and seabirds found in a species composition sample requires expanded sampling. These sampling protocols differ from those used by the West Coast Groundfish Observer Program (for the WC IFQ fishery), since the shore-based non-hake groundfish fisheries do not process at sea and deliver retained catch to shoreside processors. Observers on the at-sea hake vessels subsample total catch (both retained and discarded fish); this is similar to the protocols employed in the Northeast Observer Program aboard midwater trawl herring vessels.³⁶

Observers are trained and certified by NMFS and employed by independent observer providers. Observers are primarily responsible for collecting bycatch data, on rebuilding stocks in particular. Observer providers hire, deploy, and support the observers in the field. Deployments are typically for a month or more and motherships and C/Vs and are often limited by the 90 day limit for a given individual observer on a vessel in a calendar year. Catcher vessels typically fish everyday as weather allows. Offloads are usually short, less than 3 hours, allowing rapid catcher vessels redeployment. Considerably less logistical time is required in the at-sea hake program, versus in the CSOP.

4.3 Alaska Pollock Trawl Fleet

Alaska, or walleye, pollock (*Theragra chalcogramma*) is a key species in the Alaska groundfish complex and a target species for the largest fishery in the U.S. and one of the world's largest fisheries. Pollock is a semipelagic schooling fish widely distributed in the North Pacific Ocean with largest concentrations found in the eastern Bering Sea. Pollock is a member of the cod family, managed within the multi-species groundfish complex by the North Pacific Fishery Management Council (NPFMC) under the Groundfish FMPs for the Gulf of Alaska (GoA) and Bering Sea and Aleutian Islands (BSAI). The BSAI and GoA stocks are considered to be two separate stocks. In 2010, there were 82 permitted catcher vessels in the Alaska pollock fishery, and pollock catch was 888,520 mt worth over \$320 million, which comprised 55.8% of the total groundfish catch off Alaska. The fishing season operates between January 20 to mid-April and June 10 to November 1 annually.

The BSAI and GoA pollock fishery is currently a midwater trawl fishery. Originally, the vessels used both demersal and midwater trawls, but the bycatch of various crab species, Pacific halibut, and other species led to a prohibition on the use of non-pelagic trawl gear in the directed fishery for pollock. Catcher vessels range in size from 90' to 150' in length making short trips and then offloading catches at shoreside plants. Some catcher vessels deliver to floating processors. Catcher-processor vessels comprise the balance of the fleet, ranging from 125 to 320 feet in length; these vessels remain on the grounds for extended periods. In the Gulf of Alaska, the

³⁵ NOAA Fisheries. 2008. Report on the Bycatch of Marine Mammals and Seabirds by the US West Coast Groundfish Fleet. Northwest Fisheries Science Center, At-sea Hake Observer Program, West Coast Groundfish Observer Program. Available at: http://www.nwfsc.noaa.gov/research/divisions/fram/observer/datareport/otherreports/full_mmsb_report072308.pdf

pollock fishery uses predominantly pelagic trawls, and is entirely shore-based. In 1998, the American Fisheries Act (AFA) implemented a cooperative program for the pollock fishery to limit access, including a buyout of 9 catcher-processor vessels. Vessels that meet the statutory requirements established under the AFA that specify minimum landings of pollock and U.S. vessel ownership requirements, and shore-based processors eligible to receive pollock from catcher vessels. The mothership and catcher-processor sectors have formed voluntary cooperatives to manage their allocations and do not receive an exclusive harvest privilege from NMFS. The pollock TAC is adjusted for the community development quota and incidental catch of pollock in other fisheries; the remaining TAC is allocated 50% to catcher vessels using shoreside processing, 40% to catcher/processor vessels and 10% to motherships. Seventeen catcher-processor vessels greater than 125' and eleven motherships require two observers at all times, the catcher vessels and processing plants require 100% coverage for full catch accounting including incidental catch of Pacific salmon, crab, Pacific halibut, and Pacific herring. In 2005, the Gulf of Alaska and Bering Sea pollock fisheries became MSC certified.³⁷

American Fisheries Act (AFA) cooperatives in the Gulf of Alaska are managed through catch shares, requiring full catch accounting. The catch accounting system in the fishery includes real-time electronic reporting and observer reporting components to monitor allocations. The North Pacific Groundfish Observer Program (NPGOP) has deployed observers on domestic groundfish vessels since 1990. Observer coverage for vessels is based on length overall (LOA), gear type and the amount of groundfish delivered each month for fish processing plants.

4.3.1 Alaska Pollock Trawl Fleet Observer Program

The current Alaska observer program evolved from a need to understand and control foreign fishing in Alaskan waters. Foreign fishing began in the 1930s and over time led to depletion of fish stocks, such as Pacific Ocean perch and yellowfin sole. Foreign vessels directed high levels of harvest on snow and king crab. The foreign vessels caused high levels of mortality on Pacific halibut, one of the few domestic Alaskan fisheries at the time. In 1973, NMFS began placing observers on foreign vessels on a voluntary basis to determine the amount of discarded and retained Pacific halibut and to monitor the catch of various crab species by the Japanese.^{38, 39} The observer program subsequently started monitoring bycatch of snow and king crab and the salmon species, and began to collect biological data on the retained and discarded catch. In 1976, as a result of the Magnuson Fishery Conservation and Management Act (now the Magnuson-Stevens Fishery Management and Conservation Act), NMFS placed observers on all foreign vessels. As fishing transitioned from foreign to joint venture (American catcher vessels delivering to foreign processing vessels) to fully domestic, the observer coverage declined as domestic vessels did not carry observers. In 1986, the domestic observer program began on a small scale with industry funded coverage for a fishery with bycatch of red king crab, followed by other small scale observer programs. In 1989, amendments to the groundfish management plans for the Gulf of Alaska and the

³⁷ MSC Certification of BSAI and GoA Pollock: <http://www.msc.org/track-a-fishery/certified/pacific/bsai-pollock>; <http://www.msc.org/track-a-fishery/certified/pacific/gulf-of-alaska-pollock>

³⁸ <http://www.afsc.noaa.gov/FMA/history.htm>

³⁹ NPFMC. 2010. Restructuring the Program for Observer Procurement and Deployment in the North Pacific – Public Review Draft. October 2010. Available at: http://www.fakr.noaa.gov/npfmc/PDFdocuments/conservation_issues/Observer/Observer_restructuring910.pdf

Bering Sea-Aleutian Islands required vessels 125 feet or longer to carry a NMFS-certified observer 100 percent of the time while fishing for groundfish; vessels 60-124 feet long to carry a NMFS-certified observer during 30 percent of their fishing days in each calendar quarter of the year in which they fish more than 10 days; plants processing 1,000 or more metric tons in a month to have an observer in the plant each day they process groundfish; and those processing 500-1,000 metric tons to have observers 30 percent of the days. The catcher processor vessels (greater than 125') that are required to carry observers 100% of their time at sea are allocated 40% of the directed fishing allowance (after 10% of the total is allocated to the community development quota program) in the Bering Sea/Aleutian Islands; motherships receive 10% and catcher vessels the remaining 50%.⁴⁰ These requirements were put into place in 1990 with the implementation of the North Pacific Groundfish Observer Program (NPGOP). Fishing vessels paid for observers and NMFS paid for the costs of managing the program. The management system understood the value of data collected by observers for obtaining data available only at sea. The loss of observer data as foreign fishing phased out of Alaska before the beginning of the NPGOP threatened the data-intensive assessment and management system in Alaska.

The AFA recognized the value of observer data by requiring two observers on catcher-processor and mothership vessels participating in the pollock fishery to monitor and better understand actual harvest.⁴¹ Vessels in the AK pollock fishery are subject to 100 to 200% observer coverage, depending on vessel size. More recently, salmon bycatch taken incidentally in the GOA and BSAI pollock fisheries is a major concern, similar to the concerns of river herring catch in the directed Atlantic herring fishery where catch caps are under consideration, leading to improvements in the efforts to minimize this bycatch.^{42, 43} Because the pollock fisheries tend to have low bycatch rates, the amounts of salmon bycatch could have passed with little notice in the absence of observers; the fairly rare events of salmon on a haul by haul basis lead to substantial total salmon mortality because of the magnitude of the total pollock catch. The North Pacific Council and NMFS noted that "coverage requirements have increased for vessels and processors participating in (rationalized) limited access privilege programs and individual quota based fisheries. In fisheries where individual entities or cooperatives receive an allocation of the TAC, observer coverage has been increased to ensure harvesters maintain catches within the annual allocations and do not exceed prohibited species catch or other harvest limits. The amount of observer coverage in these fisheries is typically higher than in the open access groundfish fisheries and observers may be required to have additional training and experience beyond an entry level groundfish observer."⁴⁴

In 2010, Amendment 86 to the FMP for Groundfish in the Bering Sea / Aleutian Islands and Amendment 76 for the FMP for Gulf of Alaska Groundfish restructured the observer program by expanding coverage to include smaller groundfish vessels (< 60'), extended coverage to 100% for all catcher/processor (CP) vessels from 60' - 125', changed the way observers are funded and deployed on catcher vessels observer at less than 100%, and extended the reach of the NPGOP into the directed Pacific Halibut fishery (previously vessels in the halibut IFQ were not regularly observed). These changes apply to vessels not previously required to carry observers on

40 Final 2011 and 2012 Allocations of Pollock TACS.

http://www.alaskafisheries.noaa.gov/sustainablefisheries/specs11_12/bsaitable3.pdf

41 <http://www.fakr.noaa.gov/sustainablefisheries/afa/congress202.pdf>

42 http://www.alaskafisheries.noaa.gov/sustainablefisheries/bycatch/salmon/non_chinook/default.htm

43 <http://www.alaskafisheries.noaa.gov/sustainablefisheries/bycatch/default.htm>

44 http://www.fakr.noaa.gov/npfmc/PDFdocuments/conservation_issues/Observer/Observer_restructuring910.pdf

100% of their trips. Vessels that remain unaffected along with the smaller CPs that gained extended coverage will pay for observers through contracted observer providers. For other vessels, the added costs due to the expansion of the program will be covered by a fixed percentage (currently set at 1.25%, split by harvesters and processor) of their total fishery revenues from landings of groundfish and halibut.⁴⁵ Restructuring of the program will significantly increase the number of vessels and plants that are observed, and change the funding structure.

4.4 Hawaii Longline Swordfish Fishery

Longline fishing began in Hawaii in 1917 targeting large yellowfin tuna, *Thunnus albacares*, and bigeye tuna, *T. obesus*. The Hawaii-based longline fishery is the largest domestic commercial fishery in Hawaii. Many current Hawaii-based longliners continue to target tunas in addition to broadbill swordfish, *Xiphius gladius*. The fishery is managed under the Western Pacific Fishery Management Council's (WPFMC) Pelagic FMP. In April 1991, a moratorium prohibiting new entrants into the fishery went in effect, and was later replaced in 1994 by a limited entry program. Federal limited entry permits are capped at 164 Hawaii-based longline vessels. Also beginning in 1994, a satellite vessel monitoring system (VMS) program was implemented to track longline vessels fishing within and beyond the EEZ off Hawaii. Currently, all Hawaii-based longline vessels carry VMS on board. The longline fishery is one sector of the Pacific pelagic fishery, along with the purse seine and troll fisheries. The Hawaii-based longline fishery accounts for the majority of Hawaii's commercial pelagic landings. Commercial longline vessels are small, generally 40 to 100 feet in length and are typically operated by the captain and four or five deck hands. Fishing activity occurs throughout the year, although fishing effort is concentrated between October 1 and June 30. In 2010, the shallow set longline fishery landed over 1,400 mt of swordfish worth over \$7.3 million⁴⁶; inter-annually catch typically ranges from 1,800 to 2,300 with a total fishery revenue ranging \$9 to 11 million. The combined tuna and swordfish fleet consists of about 100 vessels, though only 32 vessels target swordfish with shallow sets landing their catch at two ports, Honolulu and San Francisco. Approximately 1/3 of the tuna/swordfish fleet is owned and operated by Korean interests and 1/3 is operated by Vietnamese interests. A large percentage of the shallow set trips are conducted by the Vietnamese vessels.

Since 1990, a federal logbook system for domestic longline vessels in the Western Pacific region has been used to record interactions with endangered and threatened species. These data coupled with data from voluntary observer trips before 1994 indicated that estimated sea turtle interactions or "take" had exceeded the level allowed by a Biological Opinion⁴⁷; additionally, NMFS suspected under-reporting by fishermen of interactions with protected species. This need for accurate data on interactions led the NMFS Southwest Region (SWR) to institute an observer program in February 1994, and operators of Hawaii-based longline fleet vessels were required to carry a federal observer if requested by NMFS. The priority of the program was to document

⁴⁵ NPFMC. 2010. Restructuring the Program for Observer Procurement and Deployment in the North Pacific – Public Review Draft. October 2010. Available at:

http://www.fakr.noaa.gov/npfmc/PDFdocuments/conservation_issues/Observer/Observer_restructuring910.pdf

⁴⁶ NMFS Commercial Landings database (2012): http://www.st.nmfs.noaa.gov/pls/webpls/MF_GEAR_LANDINGS.RESULTS

⁴⁷ NMFS and Pacific Islands Region. 2011. Endangered Species Act – Section 7 Consultation Biological opinion. January 30, 2012. http://www.fpir.noaa.gov/Library/PUBDOCs/biological_opinions/SSLL%202012%20BiOp%201-30-2012-final%20FOR%20POSTING%20ON%20WEBSITE.pdf

interactions of longline gear with five species of protected sea turtles; among these leatherback, loggerhead and hawksbill sea turtles are ESA-listed as endangered where green and olive ridley are ESA-listed as threatened.⁴⁸

In 2002, regulations were imposed that severely limited the allowable catch of swordfish, with closed seasons and strict possession limits, closed certain sectors (the longline “shallow set” fishery for swordfish) of the fishery, and required mandatory observer coverage on longline vessels. In 2004, management measures allowed for reopening of the longline “shallow set” swordfish fishery with new management measures and a requirement for 100% observer coverage on vessels engaged in the shallow set fishery.

4.4.1 Hawaii Longline Swordfish Fishery Observer Program

The Hawaiian Longline Swordfish fishery (or shallow-set longline fishery) operates out of Honolulu, Hawaii, but some trips occasionally originate or terminate in San Francisco, CA. Trip lengths average around 33 days, but may extend up to 50 days. Longline vessels fish in deep ocean waters, more than 50 miles beyond the Northwestern Hawaiian Islands. These fisheries encounter sharks, sea turtles, sea birds, marine mammals, and other fish species. Because of the incidental take of sea turtles, including leatherback, loggerhead, green, olive ridley, and hawksbill, and other protected species, NMFS has the obligation to monitor the fishery and obtain estimates of take. The NMFS Office of Protected Resources List of Fisheries places the Hawaii longline/setline fishery for swordfish, tuna, billfish, mahi mahi, wahoo, and oceanic sharks in Category I, a serious level of concern that requires observers. Observers collect the required information to assess the involvement of sea turtles, sea birds, and marine mammals, other protected species, and other by-catch species in the pelagic longline fisheries along with acquired biological information for population and life history studies.

There is 100% observer coverage on vessels engaged in the shallow set fishery and the program is managed by the Pacific Islands Regional Office (PIRO). While at sea, observers may work an average of 77 hours per week aboard commercial fishing vessels, with a daily range between 8 and 16 hours. The mandatory observer program is operated under the authority of the Pelagic Fishery FMP established under the Magnuson Fishery Conservation and Management Act (MSFCMA) in response to concerns regarding interactions with listed threatened and endangered sea turtle species.

Observers aboard Hawaii longliners collect data specific to interactions with protected species and fishing effort data. They sample marine mammal, sea turtle, and sea bird specimen parts as well as the entire animal carcass of species that haven taken. Data are required to assess the potential impact of the fisheries on sea turtles and other protected species, specifically: loggerhead, olive ridley, leatherback, and green turtles, seabirds, and marine mammals. The collected data are analyzed by PIRO scientists in conjunction with logbook data to estimate total sea turtle and seabird interactions. Data are used to prepare for the annual reports of biological opinions (as required by the current biological opinion) for the Western Pacific Fishery Management Council, and estimates of bird mortality to the U.S. Fish and Wildlife Service. The current biological opinion for the pelagic fisheries has concluded that the shallow set longline fishery adversely affects sea turtles, but that they are not likely to jeopardize the continued existence of the species.

⁴⁸ NMFS OPR. 2012. Sea Turtles ESA status. Accessed March 2012. <http://www.nmfs.noaa.gov/pr/species/turtles/>

Observers collect required information to assess the involvement of sea turtles, sea birds, and marine mammals, other protected species, and other by-catch species in the pelagic longline fisheries along with acquired biological information for population and life history studies.

The federal government is responsible for training, debriefings, and data management. NMFS contracts with certified independent contractors that recruit and deploy observers, handle logistics provide insurance and deliver data to NMFS. Vessel owners and operators are responsible for contacting the program manager to make arrangements for placement of observers.

5 Observer Program Requirements, Costs and Fishery Revenues

The four 100% fisheries and the Atlantic herring observer programs have similar requirements for individuals to qualify as observers (Table 4). In general, the programs require observers to have a Bachelors degree with classes in biology, math, and sometimes a statistics course (AK pollock, WC at-sea hake, and WC trawl IQ). The HI swordfish longline allows individuals without a degree to qualify as an observer by passing a unique course (Alu Like⁴⁹) designed to recruit and train candidates; those who pass the Alu Like program may enter NMFS training and may become observers upon passing the NMFS course. The programs all require information on prior criminal history, through a criminal background check (Atlantic herring and HI longline) or through self-reporting.

Table 4: Summary of observer program position requirements.

	NE Herring	HI Swordfish Longline	AK Pollock	WC At-Sea Hake	WC Trawl IFQ
Observer Position Requirements					
Primary Data Users	NMFS	NMFS	NMFS/COOP - bycatch	NMFS	NMFS/COOP - bycatch
Bachelors Required	Yes	No	Yes	Yes	Yes
30+ Hours Collegiate Biology	Yes	No	Yes	Yes	NMFS/COOP - bycatch
Statistics Course	No	No	Yes	Yes	Yes
Math Course	Yes	Yes	Yes	Yes	Yes
CPR/1st Aid	Yes	Yes	No	No	Yes
Criminal Background Check	Yes	Yes	No-Self Report	No-Self Report	No-Self Report

⁴⁹ http://www.alulike.org/services/kaipu_maritime.html

In no cases do the 100% or Atlantic herring observer programs use federal observers, but the federal government assumes the indirect costs of training and debriefing, managing the program, and providing data processing and quality control (Table 5). Independent third-party observer providers hire and deploy observers, but variability occurs in the use of single (Atlantic herring and HI longline) and multiple (AK pollock, WC at-sea hake, and WC trawl IQ) observer providers. In two cases (Atlantic herring and HI longline), the federal government contracts and pays for observers, in two cases (AK pollock and WC at-sea hake) industry contracts and pays for observers; and the WC trawl splits the costs between industry and the government. The federally funded programs require compliance with the Service Contract Act (SCA)⁵⁰ and the Fair Labor Standards Act (FLSA)⁵¹, which increases costs relative to programs not required to minimum wage and overtime. Northern Economics (2011) estimated that these requires are likely to add approximately \$100 to the sea day cost. Specific components of observer daily costs vary among programs. All programs have observer salary and benefits, debriefing pay, and observer support costs included in daily costs for observers. Briefing/training, room and board while deployed or on land, dockside monitoring, and travel may appear within the observer daily cost or as a separate cost item.

The sea day rate for the Northeast consists of observer salary, travel, provider fees and logistics, federal Service Contract Act (SCA) and Fair Labor Standards Act (FLSA) requirements and an observer pay bonus structure required under NEFOP. This rate does not include NMFS expenses (estimated at an additional \$400 approximately), which includes training and debriefing, NMFS salaries, and database development and maintenance; these additional costs assumed by NMFS would remain in place as long as the program is operated as a federal observer program. The higher rate for herring, which is comparable to the current rates for the Northeast Fishery Observer Program and the Northeast At-sea Monitoring Program, results from a combination of short trips and a substantial infrastructure needed for efficient deployment of observers; the NEFOP bonus; and SCA and FLSA requirements.

⁵⁰ The McNamara-O'Hara Service Contract Act (SCA) applies to every contract entered into by the U.S., requires contractors and subcontractors performing services to pay service employees in various classes no less than the monetary wage rates and to furnish fringe benefits: <http://www.dol.gov/compliance/laws/comp-sca.htm>.

⁵¹ The Fair Labor Standards Act (FLSA) prescribes standards for the basic minimum wage and overtime pay: <http://www.dol.gov/compliance/laws/comp-flsa.htm>.

Table 5: Summary of observer program cost components.

	NE Herring	HI Swordfish Longline	AK Pollock	WC At-Sea Hake	WC Trawl IFQ
Observer Costs					
Direct Observer Costs	Federal Gov currently	Federal Gov	Industry	Industry	Industry/Gov split 10%/90%
Indirect Observer Costs	Federal Gov	Federal Gov	Federal Gov	Federal Gov	Federal Gov
Provider	Federal Contracted Independent Provider (currently)	Federal Contracted Independent Provider	Multiple Independent Providers	Multiple Independent Providers	Multiple Independent Providers
Federal Observer	No	No	No	No	No
Federal Cost Requirements <i>estimated to add \$100/sea-day - removed when industry funded</i>					
Service Contract Act requirement	Yes	Yes	No	No	No
Fair Labor and Standards Act Requirement	Yes	Yes	No	No	No
Sea -Day Cost <i>'Yes/No' indicates whether the expense is/is not included in the sea day rate, and who pays (whether included in the sea day rate or not)</i>					
Observer Salary & Benefits, Insurance, Taxes	Yes - NMFS	Yes – NMFS	Yes - Industry	Yes - Industry	Yes - Industry/NMFS
Brief/Training Pay	No - separate line item	No - separate line item	Yes - Industry	Yes - Industry	Yes - Industry/NMFS
Debrief Pay	Yes - NMFS	Contractor Line Item after Oct 2008	Yes - Industry	Yes - Industry	Yes - Industry/NMFS
Room/Board Deployed	Yes - NMFS	Yes – NMFS	No - Industry	No - Industry	No - Industry
Room/Board Land	No - N/A	No - N/A	Yes - Industry	Yes - Industry	Partial - Industry/NMFS
Logistical and Support Costs	Yes - NMFS	Yes – NMFS	Yes - Industry	Yes - Industry	Yes - Industry/NMFS
Dockside Monitoring	No - N/A	No - N/A	Yes - Industry	Yes - Industry	Yes - Industry/NMFS
Travel & Lodging	No - separate line item	No - separate line item	No - Industry	Yes - Industry	Yes - Industry/NMFS
Briefing & Training Indirect Costs	NMFS budget	NMFS budget	NMFS budget	NMFS budget	NMFS budget

	NE Herring	HI Swordfish Longline	AK Pollock	WC At-Sea Hake	WC Trawl IFQ
Debriefing & Data Management	NMFS budget	NMFS budget	NMFS budget	NMFS budget	NMFS budget

Over the past four years, revenue within each of the comparison fisheries has remained relatively stable (Figure 3), though by comparison the AK pollock fisheries is worth considerably more than the other fisheries. Sea day costs in each of the observer programs compared with fishery revenue in 2010, and 2011 for the WC at-sea hake and trawl IFQ are provided in Figure 4. The following sections provide overview of the costs associated with the various 100% fishery observer programs. Section 5.3 further compares the costs associated with the various programs.

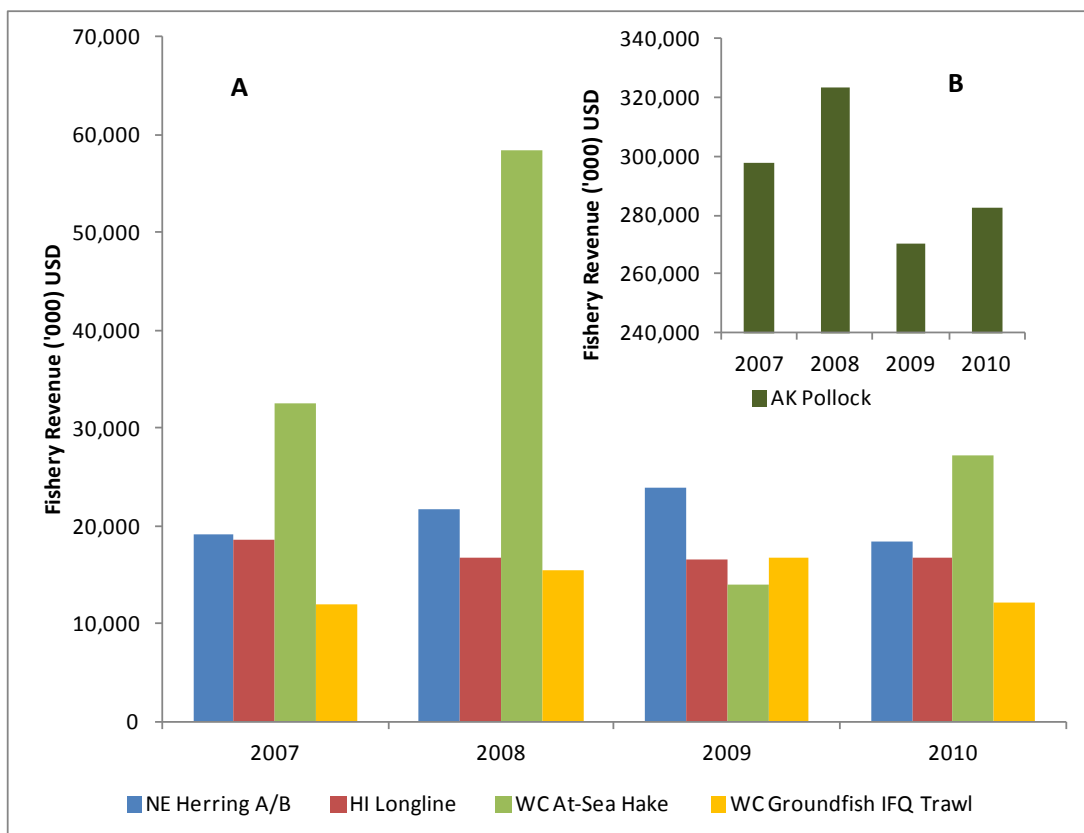


Figure 3: Recent revenues compared across 100% fisheries and Atlantic herring; pollock revenue is plotted separately (B), note scales on x-axes in figures A and B.⁵²

⁵² Revenue data for pollock, swordfish, hake and pacific groundfish limited entry from NOAA Fisheries Annual Commercial Landings by Gear Type Database (accessed February 2012, available at: http://www.st.nmfs.noaa.gov/st1/commercial/landings/gear_landings.html), herring landings from Draft Amendment 5 (NEFMC 2012).

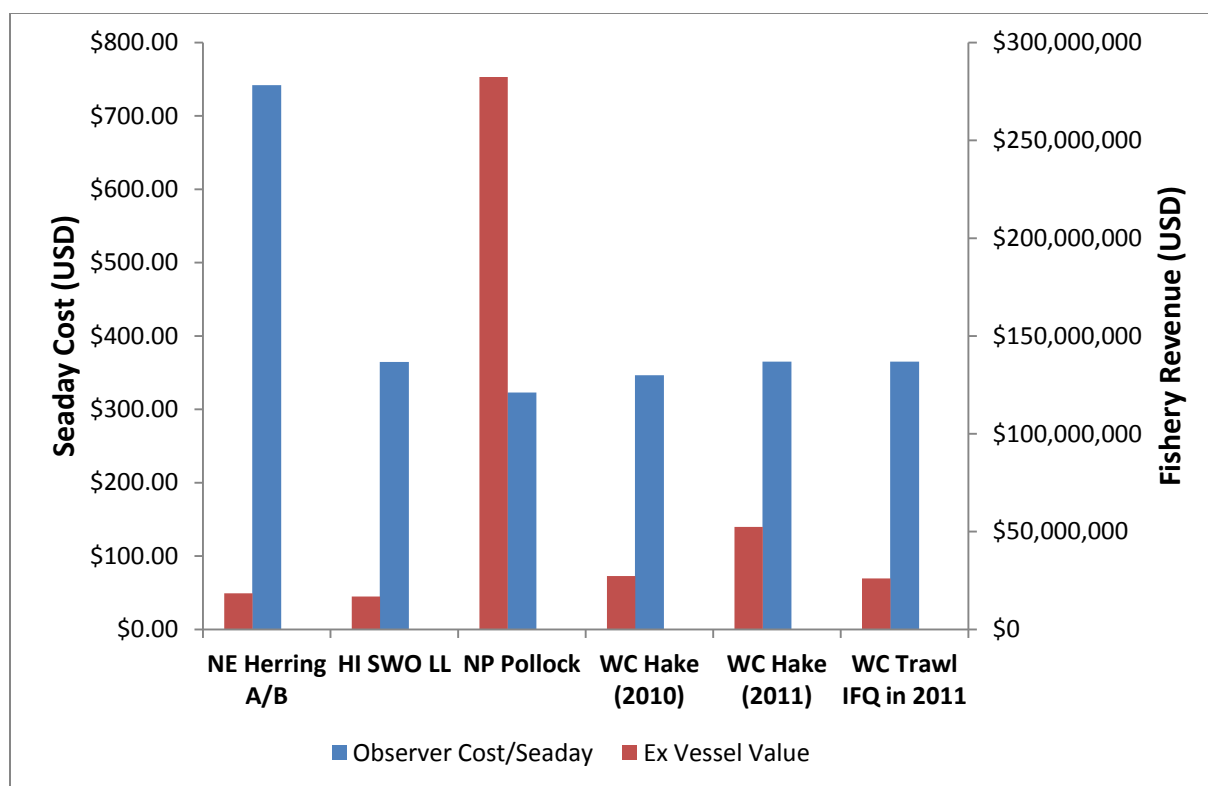


Figure 4: 2010 sea day costs and revenue for Herring, Hawaii longline, pollock and at-sea hake and 2011 for at-sea hake and west coast trawl.⁵³

5.1 WC Trawl Fishery Observer Program Costs

The Northwest Fisheries Science Center provides observer training, handles logistical assignments, develops sampling design, contacts vessels, debriefs observers, conducts data editing, analysis and storage, quality assurance and control, database maintenance and security. Observer services (including employment and travel arrangements) are provided through contracted third party providers. Observer providers contract directly with vessels and processors and the PSMFC currently reimburses these providers for observer services with funds provided by NMFS.

The third-party funding approach used by the CSOP is federally regulated, but fishery participants are responsible for making arrangements with a NMFS permitted observer provider to have an observer onboard their vessel. Participants pay the providers directly for the observer costs that are not reimbursed under the government subsidy plan. The providers collect the fees from the vessels and PSMFC to cover the sea day and

⁵³ Revenue data for pollock, swordfish, hake and pacific groundfish limited entry from NOAA Fisheries Annual Commercial Landings by Gear Type Database (accessed February 2012, available at: http://www.st.nmfs.noaa.gov/st1/commercial/landings/gear_landings.html), herring landings from Draft Amendment 5 (NEFMC 2012). Sea day costs from NEI 2011, National Observer Program Report for 2010 (http://www.st.nmfs.noaa.gov/st4/nop/Outreach/FY_2010_NOP_Annual_Report_FINAL.pdf) and personal communications B. Belay (MRAG Americas Observer Programs Manager).

dockside observer costs. These costs fund the recruitment and training of observers, provide salary, insurance and benefits for deployed and shore days, cover the logistical costs to deploy observers and dockside monitors, and ensure debriefed data are delivered to NMFS in a timely manner. Vessels may be charged additional travel and lodging costs by providers. The industry provides room and board for the observers while deployed and does not get reimbursed by the government. Federal funds are used for the training and debriefing of observers, data management and maintaining observer equipment. NMFS uses the data to account for catches against participant's individual quotas and to develop stock assessments for the annual allocation of catch.

In 2011, NMFS reimbursed observer providers for approximately 90% of the cost of observers. The industry portion of the costs of observers will increase each year. The original plan called for 50% reimbursement in 2012, 25% reimbursement in 2013 and in 2014 industry will be responsible for all of the cost of hiring and deploying observers. The 2011 cost per sea day for observers in the CSOP as provided by NMFS is \$365/day. Rates for the 2012 season range from \$380 to \$420 per day.⁵⁴ There is an additional hourly cost for a catch monitor to monitor offloads that is incurred by the processing plant.

5.2 WC At-Sea Hake Fishery Observer Program Costs

In this program NMFS is responsible for funding and overall administration of the program including providing observer trainings, in-season data support, and sampling gear. NMFS is responsible for debriefing observers and maintaining information systems for scientific and operational data, and administrative support. Observer contractors are certified by NMFS against the North Pacific Observer Program NMFS-certification requirements and are responsible for observer recruiting, deployment, logistics, and salary, insurance, and benefits. The fishing industry must make arrangements with observer providers for placement of NMFS-trained observers aboard their vessels. Motherships and C/Ps are responsible for paying for their costs directly to the contractors. In 2011, catcher vessels were required to carry 100% observers and were subject to the subsidies provided under the catch shares program, thus 90% of their observer costs were covered in 2011. The observer costs on catcher vessels will continue to be subsidized at the 75% to 90% level in 2012.

The at-sea hake fishery has been using the industry-funded third-party provider approach for 10 years. The program is federally regulated, but fishery participants are responsible for making arrangements with a NMFS permitted observer provider to have an observer(s) onboard their vessel. Participants pay the providers directly for the observer costs on motherships and C/Vs. The government began to require 100% observer coverage on catcher vessels in 2011. In 2011, 90% of the observer cost for catcher vessels was covered by the government. The providers collect the fees from the vessels and PSMFC to cover the sea day and dockside observer costs. These costs fund the recruitment and training of observers, provide salary, insurance and benefits for deployed and shore days, cover the logistical costs to deploy observers and dockside monitors, and ensure debriefed data is delivered to NMFS in a timely manner. Vessels may be charged additional travel and lodging costs by providers. The industry provides room and board for the observers while deployed and does not get reimbursed by the government. Federal funds are used for the training and debriefing of observers, data management and

⁵⁴ NEI, Inc. 2011.

maintaining observer equipment. NMFS uses the data to account for catches against participant's individual quotas and to develop stock assessments for the annual allocation of catch.

Several factors reduce the overall cost of the Hake observer program. Motherships and catcher processors carry one or two observers for an extended time, up to 90 days. Catcher vessels typically deliver daily and carry observers for multiple trips. The logistics for the catcher vessels required more effort by the contractors in 2011 under the catch shares program. However, the logistics are still far simpler than those in the multi-species trawl fishery. Observer duties are not extensive in comparison to many other fisheries. The primary costs for the observer providers are in the training and initial deployment of observers. Once observers are deployed, observer provider responsibilities are minimal. Debriefing costs may also become a factor as seasons extend later into the year. Some observer providers offer housing or other support for observers during non-deployed time.⁵⁵

5.3 AK Pollock Fishery Observer Program Costs

When the North Pacific Observer Program was designed in 1989, there was no authority by the MSFCMA to charge domestic industry fees to pay for the cost of observers, and Congress provided no funds to cover the cost of observers. This provided limited options for the NMFS and NPFMC. The need for observers was deemed urgent enough that the Council and NMFS established observer program requirements under Amendments 13 and 18 to the groundfish FMPs for the BSAI and GOA, respectively. These "interim" regulations established observer coverage requirements for vessels and processors participating in the BSAI and GOA groundfish fisheries, and required those vessels and processors to arrange for observer services from an observer provider certified by NMFS. Under this program, NMFS provides operational oversight, certification training, definition of observer sampling duties and methods, debriefing of observers, and management of the data. Although the costs associated with managing the program are paid for by the Federal government, vessels and processing plant owners pay for the direct cost of the observers.⁵⁶

NMFS, the Observer Training Center of the University of Alaska Anchorage (OTC), industry and independent observer providers share the responsibilities for the observer program. NMFS and OTC train and debrief observers. NMFS also provides support services, including observer gear, training documents, enforcement support, maintains field offices in Kodiak and Dutch Harbor, and is responsible for storage and analysis of data collected by the observers.

The Federal Government covers the costs associated with the administration of the program, observer certification training and briefing, observer debriefing, and management of the observer data. The fishing industry must make arrangements with NMFS-permitted observer providers for placement of NMFS-certified observers aboard their vessels or at their processing facilities. Industry pays observer providers for direct observer costs. The observer providers are responsible for recruiting, deployment, logistics, insurance/benefits for observers and delivery of observer data to NMFS.

⁵⁵ B. Belay, personal communications, MRAG Americas Observer Program Manager. February 2012.

⁵⁶ NPFMC. 2010.

The daily sea day rate for deploying observers in 2010 averaged \$366 (\$323 per sea day with an additional \$43 per day for travel expenses); estimates varied slightly by provider (NEI 2011). The sea day rate covers the observer salary, benefits, insurance, and taxes for the deployed day. The SCA and the FLSA do not apply in the Pollock fishery due to direct contracts between the vessel and the provider. In addition the sea day rate includes the training and debriefing costs as well as any standby or travel time for each observer. The sea day rate includes communication and logistical costs observer support costs while on land and observer provider field office costs. The primary costs to the observer provider are the training and debriefing costs as well as housing observers while not deployed. Despite these additional training and debriefing expenses, the volume of deployed days created by two observers per catcher processor allows the providers to maintain a low sea day rates. The travel costs in the Pollock fishery are much higher than other fisheries. Observers are flown from Seattle through Anchorage to Dutch Harbor. In 2011 the round-trip airfare averaged \$2,300.00 per observer. The industry provides room and board for the observers while deployed and does not get reimbursed by the government.

In 2008, the groundfish industry-funded costs of the NPGOP were estimated at \$14.4million, about 1.4% of the fishery revenue generated in the groundfish fishery. Though this does not take into account that the majority of observer days occur on CPs and at onshore plants; by comparing cost of the program to the estimated first wholesale value of groundfish products, the cost of observers is 0.6% of total product value generated in the fishery (NEI 2011).

5.4 Hawaii Swordfish Longline Fishery Observer Program Costs

The National Marine Fisheries Service contracts directly with an independent observer provider via an indefinite-delivery indefinite-quantity (IDIQ) contract. The current contract held by Saltwater, Inc., was awarded in October of 2008 for five years. The contractor invoices the government for line items which include sea days, vessel meal reimbursements, travel and gear reimbursements, and debriefing costs. The contractor's sea day rate includes the recruitment of observers, the observers salary, benefits, insurance and taxes, daily effort estimation, gear management, and logistical and support costs. Vessels are reimbursed \$20 for each deployed day for observer room and board while deployed. Contractors pay vessels directly and are reimbursed by the government. Costs in addition to the sea day rate include; debriefing pay which is based on a trip basis, three days are allocated for each trip. The government reimburses direct travel costs for observers embarking or disembarking outside of Honolulu. Reimbursed travel is typically flights to/from San Francisco or Hilo, HI. The government reimburses the contractor for up to five pre-deployment status days (PDS); these are paid at a lower rate while the observer is waiting for the vessel to deploy. The government provides reimbursement for training salary and per diem. NMFS is responsible for training, debriefing and data management at the PIRO offices in Honolulu.

Since providers are under a federal contract, the SCA and FLSA apply to the observer salary. The swordfish fishery revenue also does not compare to the highly profitable AK pollock and EC hake fisheries. Observers are paid based on hourly wage determination issued by the Department of Labor. All hours worked over 40/week must be paid overtime (time and a half). The observer workforce is also unionized which affects the hourly rate. Due to the long trips and limited number of ports, the logistical and support costs are relatively low per sea day. The primary costs to the contractor are gear maintenance and observer placement. Contractor staff conducts a placement meeting for every trip. The observers sampling responsibilities during fishing activity are extensive.

Observers may work more than the average of 11 hours per day. If observers work additional overtime during their deployment that cost is covered under the sea day rate. The additional overtime costs can be a significant factor during slow fishing periods. The observer contractor does not support observers during land days in Hawaii.

6 Prospects for 100% monitoring in the New England Atlantic herring fishery

6.1 Current At-sea monitoring on herring vessels

The Northeast Fisheries Observer Program (NEFOP) collects data on catch and protected species interactions for fisheries in the Northeast region of the U.S. In New England, scientists calculated the level of coverage needed to achieve estimates of bycatch with a 30% coefficient of variation (CV) for fishing gears and species groups in the Northeast region.⁵⁷ The attainment of no more than 30%CV is for individual fleet/species combinations. Thus, for each fleet, a CV of 30% or less is to be attained for target species within that fleet. The cost of observer coverage needs to be considered in the context of setting, and attaining a performance standard. This is often expressed in terms of a target level of precision (usually the Coefficient of Variation – CV) of one or more quantities to be estimated from the observer data. An increase in the number of samples (i.e. from higher observer coverage) will reduce the CV, indicating higher precision in the estimate. But there are diminishing returns in terms of CV reduction for each additional sample. NMFS (2004) identified the relative tradeoff between increased sample size, reduction in uncertainty, and cost assuming the relationship between sample size and cost can be considered fixed and linear (Figure 3). Observer coverage rates that would result in a CV within the prescribed range for primary species may result in CVs far larger than desired for rare species – such as river herring.

⁵⁷ NEFSC. 2011. Standardized Bycatch Reporting Methodology Sea Day Analysis and Prioritization. January 25, 2011.

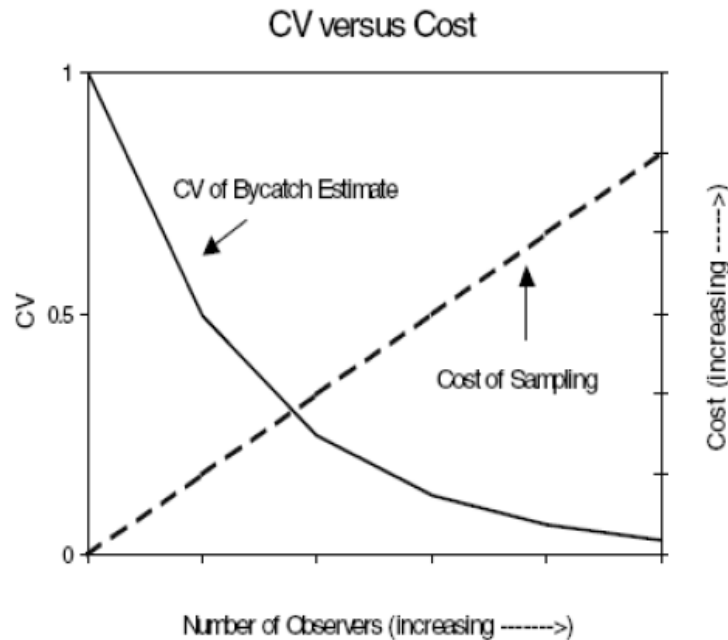


Figure 5: Example of the tradeoffs between precision (CV) and cost.⁵⁸

NEFOP does currently deploy a small portion of at-sea observers on permitted herring vessels. Herring days are presently based on the SBRM (30% CV on overall bycatch rate). Recently, the prioritization part of the methodology was challenged and the courts declared that it was flawed; however, it is presently unclear how the ruling will change the methodology in time for the start of the fishing season (April 1st).⁵⁹ NMFS began placing observers on herring vessel in 1994, though there was only 1 observed trip that year. There was no established protocol for data collection in place until 2003.⁶⁰ Prior to 2005, NMFS placed observers on herring vessels in response to concerns around interactions with marine mammals. Subsequently, with the allowance of herring fishing in groundfish closed areas, the focus of the observer program shifted over concerns of substantial amounts of haddock bycatch being caught by herring vessels; it has been estimated that in 2006 herring midwater trawl vessels caught 277 mt of haddock on Georges Bank, five times that of the previous year.⁶¹ Initially, the focus was on accounting for haddock bycatch in the midwater trawl herring fishery. Haddock bycatch had remained the top priority of observers, followed by concerns over river herring and tuna bycatch. More recently substantial bycatch of river herring has resulted in area closures. Priorities for placing observers on herring vessels has and continues to evolve around the growing concerns of bycatch of haddock and depleted

⁵⁸ NMFS 2004. Evaluating bycatch: a national approach to standardized bycatch monitoring programs. U.S. Dep. Commer., NOAA Tech. Memo. NMFSF/ SPO-66, 108 p. http://www.nmfs.noaa.gov/by_catch/SPO_final_rev_12204.pdf

⁵⁹ Federal Register Volume 76, Number 250 (Thursday, December 29, 2011). Fisheries of the Northeastern United States; Removal of Standardized Bycatch Reporting Methodology Regulations. Available at: <http://www.gpo.gov/fdsys/pkg/FR-2011-12-29/html/2011-33302.htm>

⁶⁰ NEFOP personal communications.

⁶¹ NEFMC. 2011. Framework Adjustment 46 to the Northeast Multispecies FMP. June 17, 2011.

river herring stocks.⁶² Data suggests that the majority of the haddock bycatch is taken in Herring Management Area 3 by midwater trawlers.⁶³

The current herring sea day rate under NEFOP is estimated at about \$740. The \$740 rate incorporates observer salary, travel, provider fees and logistics, federal Service Contract Act (SCA) and Fair Labor Standards Act (FLSA) requirements and an observer pay bonus structure required under NEFOP. This rate does not include NMFS expenses (estimated at an additional \$400 approximately), which includes training and debriefing, NMFS salaries, and database development and maintenance; these additional costs assumed by NMFS would remain in place as long as the program is operated as a federal observer program. The higher rate for herring, which is comparable to the current rates for the Northeast Fishery Observer Program (NEFOP) and the Northeast At-sea Monitoring (ASM) Program, results from a combination of short trips and a substantial infrastructure needed for efficient deployment of observers, the NEFOP bonus, and SCA and FLSA requirements.

Funding for the NEFOP program is used primarily to ensure that program-specific and negotiated TACs are not exceeded, and to monitor bycatch of groundfish in the Atlantic herring fishery. This later objective allowed for the allocation of 547 sea days to cover midwater trawl and purse seine components of the fishery, with statistical performance standards for that specific objective (420 sea days and 127 sea days associated with Herring Closed Area I) in 2011.⁶⁴

Present estimates of observer coverage on the herring fleet have been around 40% on all paired midwater trawls. NEFOP deploys 100% coverage to herring vessels that fish in Groundfish Closed Area 1 within Herring Management Area 3 (Figure 4); Herring Management Area 3 represents about 55.9% of the area fished by the Atlantic herring fleet and have averaged 17.6% of the Atlantic herring taken each year. In 2001, Area 3 reached its maximum percentage of the overall catch at 30.5%. In 2006 only 4.5% of the overall catch came from Area 3. In 2010, herring catch from Area 3 accounted for 22.9% of the overall catch from all areas and permits types; and 25.8% of the catch from 'A' vessels. NEFOP aims for, but has rarely achieved, 20% coverage to all other areas.⁶⁵ In 2009 – 2010, coverage rates on directed herring vessels were substantially increased, ranging between 7-44%, with 37% coverage of trips on Category A midwater pair trawl vessels.⁶⁶

⁶² NEFOP personal communications. February 2012.

⁶³ Groundfish Oversight Committee. 2011. Framework Adjustment 46 Haddock Catch Cap Issues. January 19, 2011. Available at:

http://www.nefmc.org/nemulti/council_mtg_docs/Jan%202011/Haddock%20Catch%20Cap%20Issues_COuncil.pdf

⁶⁴ NEFSC. 2011.

⁶⁵ NEFSC Sampling Branch, personal communications, January 2012

⁶⁶ NEFMC 2012.

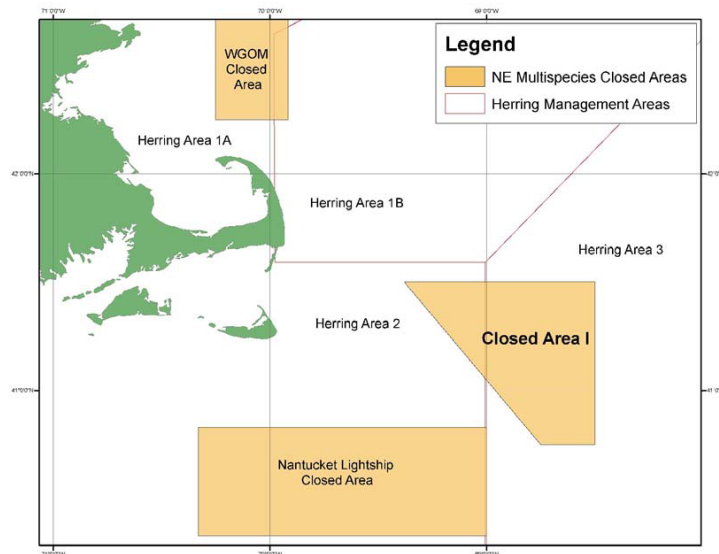


Figure 6: Northeast Multispecies closed areas and herring management areas.⁶⁷

Midwater trawl herring vessels fishing in Closed Area 1 are subject to a specific set of observer sampling protocols for high volume fisheries, in addition to general sampling protocols. These additional requirements are designed to improve sampling in fisheries that pump fish on board and ensure that only experienced observers who have proven high data quality will be assigned to these fisheries. The program focuses on improved fishery-specific training and focuses on defining gear, understanding bycatch issues, knowing and identifying species of concern, subsampling methodology, common scenarios, safety, and the process of pumping fish on board.⁶⁸ Training observers for high volume fisheries adds an additional day to a 15 day NEFOP training.⁶⁹ In 2010, the NEFOP conducted three fishery training classes to recertify 70 observers for work in high-volume fisheries. In 2010, NEFOP also implemented a discard log to obtain more detailed information regarding discards in high-volume fisheries.⁷⁰

6.2 Design considerations

The Atlantic herring fishery shares some important characteristics with the four comparison fisheries discussed earlier (Table 2 and Table 3). All four 100% fisheries and the Atlantic herring fishery have some sort of limited access. All four 100% fisheries and the Atlantic herring fishery have interactions with endangered, threatened and protected (ETP) species and/or depleted species that can limit the target fishery. Like the pollock and whiting fisheries, the Atlantic herring fishery is high volume, which can make detection of the limiting species difficult. Like the whiting at-sea fishery, midwater trawl gear makes up the total (whiting) or a very high

⁶⁷ NERO. 2009. Changes for Midwater Trawl Vessels Fishing in Groundfish Closed Area I: Small Entity Compliance Guide. October 28, 2009. <http://www.nero.noaa.gov/nero/nr/nrdoc/09/09MultiCAIHerringMidwaterTrawl.pdf>

⁶⁸ NEFMC. 2012.

⁶⁹ NEFOP personal communications. February 2012.

⁷⁰ NEFMC. 2012.

proportion of the total (herring) catch. Although the herring fishery has three other legal gears, the majority of the fish is caught with midwater trawls. However, one major feature of the herring fishery contrasts with the four 100% fisheries: the herring fishery can slip the catch (discard the entire or a portion of the catch without bringing it on board); in the cases of slippage, the species composition, amount of limiting species, and biological data are not available for the slipped or pumped fish. The 100% fisheries meet the primary observer objectives by fully accounting for the entire catch and making the fishery (in some cases the vessels) responsible for catches, discards, or takes of ETP of depleted species: reaching specified limits results in closure to fishing of vessels, co-ops, or sectors. By having 100% coverage, the fisheries nearly eliminate the issue of rare events since even infrequent occurrences will be observed. The current herring fishery observer coverage cannot fully meet the top priorities (prohibited species monitoring, discard weight, and sampling catch composition) because a substantial portion of the catch is not accessible to the observers and because coverage levels limit the ability to detect rare events even if the observers had full access.

Accountability for catch is particularly important in the Atlantic herring fishery; annual catch limits and accountability measures require accurate reporting of herring catch and strict limits on haddock bycatch (1% of the herring ABC for each of the Gulf of Maine and Georges Bank stocks), which when met will prohibit midwater trawlers from fishing for, possessing or landing more than 2,000 lb of herring in either the Gulf of Maine or Georges Bank.⁷¹

In comparing aspects of the 100% observer programs and considering the feasibility of employing a similar program in the Atlantic herring fishery, there are a number of factors that would require further analysis for understanding the impact these factors would have on data collection, observer sampling protocols, cost and other aspects of the observer program, some of which has been undertaken by the Herring Plan Development Team (PDT) and are discussed in Amendment 5. These include the issues of net slippage and maximized retention and test tows⁷²; these impacts are not discussed further in the present analysis.

6.3 Cost and Revenue Considerations

There are some similarities that can be drawn in comparing the revenues of the four comparison fisheries with each other and the Atlantic herring fishery. In Table 6, all values are for 2010, with the exception of the WC trawl IFQ fishery, which wasn't in operation as a catch share until 2011. The 2011 WC hake fishery numbers are also included for comparison on the new IFQ regulations. The total cost estimates for the Atlantic herring fishery assumes 100% observer coverage in all areas for the fleet (either Category A, B, C or Category A, B only). The observer sea day cost can be compared as a percentage of fishery revenue or using the observer cost index. When comparing observer sea day costs as a percentage of fishery revenue it becomes obvious that high-volume fisheries such as the AK pollock and WC hake fisheries have significantly lower ratios to the fishery

⁷¹ NOAA Fisheries. 2012. Atlantic Herring Information Sheet. Last updated January 1, 2012. <http://www.nero.noaa.gov/nero/regs/infodocs/AtlHerringInfoSheet.pdf>

⁷² Fishermen may make a short tow to determine the composition and/or quality of fish they are catching before fully loading the bag. If the fish in the test tow are not desirable, the vessel can release the bag and move elsewhere. This is addressed in the Closed Area I provisions by requiring that the fish from the test tow remain in the net until the subsequent pump-out (p.404, Draft Amendment 5, NEFMC 2011).

revenue. Lower volume fisheries, such as the Hawaiian swordfish longline and west coast trawl IFQ fisheries, have a higher ratio of observer costs to fishery revenue, but still less than that for Atlantic herring. The Atlantic herring fishery is a high volume fishery; however, the percentage of total fishery revenue that a 100% coverage observer program would require is higher than any of the other comparison fisheries - by a significant margin. This is due, in large part, to the relatively high sea day costs for this fishery compared to others, with a NEFOP sea day costing nearly twice as much. The government pays for all monitoring for the Hawaiian swordfish longline fishery and, at present, 90% of the WC trawl IFQ fishery. The Atlantic herring observer days are currently provided by the Northeast Fisheries Observer Program (NEFOP) which is a government funded program.

The observer cost index provides a comparison between programs based on the daily sea day rate as opposed to the total program cost. The observer cost index is determined by adding the observer sea day rate plus any travel and additional costs on a daily basis together and dividing this total 'daily observer cost' by the total fishery revenue. The quotient is then multiplied by \$1,000 to provide an index that can be compared between programs. This number serves as a conversion factor to derive a cost index that represents the cost of a day of observer coverage for every \$1000 of revenue. The four fisheries with 100% coverage have observer cost indexes ranging from 0.13 to 2.39, where lower indices correspond to higher economic feasibility. The upper limit of industry funded programs may actually be closer to 1.4, since the Hawaiian swordfish longline fishery observer program is fully federally funded and has a higher rate as results of SCA and FLSA requirements. The Atlantic herring fishery is substantially higher in comparison to the 100% comparison fisheries. This is primarily due to the large daily rate currently being charged under NEFOP, as described in Section 6.1.

Table 6: Comparison of 2010 observer program rates and fishery revenues.

	2010 Rates and Revenues					2011	
	NE Herring A, B, C ^A	NE Herring A/B	HI Swordfish Longline ^B	AK Pollock ^C	WC At-Sea Hake ^D	WC At-Sea Hake ^E	WC Trawl IFQ in 2011 ^E
Total Fishery Revenue	\$18,771,000	\$18,449,000	\$16,807,991	\$282,398,860	\$27,315,866	\$52,368,500	\$26,066,500
Observer Cost/Sea day	\$741.88 ^F	\$741.88	\$364.70	\$323.00	\$346.50	\$365.00	\$365.00
Observer Travel Cost/Sea day	\$59.38	\$59.38	\$15.71	\$43.00	\$3.39	\$4.50	\$4.05
Other Reimbursable Cost (e.g. debriefing)	\$55.18	\$55.18	\$20.68	n/a	n/a	n/a	n/a
Total Sea days	2,479	2,122	3,446	11,742	1,772	2,666	5,236
Total Observer Sea day Cost	\$1,839,121	\$1,574,269	\$1,256,756	\$3,792,666	\$613,998	\$973,090	\$1,911,140
Total Travel Cost	\$147,203	\$126,004	\$54,138	\$504,906	\$6,000	\$12,000	\$21,205
Additional Total Reimbursable Costs	\$136,791	\$117,092	\$71,263	n/a	n/a	n/a	n/a
Obs Cost % of Fishery Revenue	11.31%	9.85%	8.22%	1.52%	2.27%	1.88%	7.33%
Observer cost index	4.56	4.64	2.39	0.13	1.28	0.71	1.40

^A Herring revenue data and Sea days (VTR data) from Draft Amendment 5 (NEFMC 2012), sea day, travel and debriefing costs from NEI (2011)

^B Hawaii Swordfish LL revenue data from NMFS Annual Landings database for Hawaii and Pacific, sea days from National Observer Program Annual Report for 2010 (NMFS 2011), travel and other costs estimated based on total cost from 2007 (B. Belay, MRAG Americas) and 2010 sea days, sea day cost in Hawaii varies, with one rate (\$342.01) applying 3/4 of the year and another rate (\$355.01) applying to the remaining quarter, plus \$20/sea day vessel reimbursement. This factors to an average sea day cost of \$364.70.

^C AK Pollock revenue data from NMFS Annual Landings database, number of sea days, sea day and travel costs from NEI 2011. Note that the restructured program will adjust these costs some.

^D WC at-sea hake for 2010, revenue from NMFS Annual Landings database, travel cost estimate averaged from total cost of travel and number of sea days (B.Belay MRAG Americas), number of sea days from National Observer Program Report for 2010 (NMFS 2011).

^E WC at-sea hake and WC trawl IFQ for 2011, revenue, sea day cost, estimated travel cost per sea day based on total travel costs and number of sea days observed, and total number of sea days provided from NWFSC (J. Majewski, personal communications).

^F This estimated rate of approximately \$740 are the provider's costs for a sea day, including observer salary, travel, provider fees and logistics, federal contract requirements (Service Contract Act and Fair Labor Standards Act) and an observer pay bonus structure. This rate is independent of NMFS expenses (estimated at an additional \$400 approximately), which includes training and debriefing, NMFS salaries, and database development and maintenance; these additional costs assumed by NMFS would remain in place as long as the program is operated as a federal observer program.

6.4 Contributing Factors

There are a number of factors that affect the complexity and cost of observer programs. These factors: observer wage (including insurance, benefits, bonuses), federal requirements, deployment logistics (e.g. trip length, number of ports, number of vessels, travel), NMFS certification requirements (contractor responsibilities, training length, debriefing requirements), and sampling strategy/data collection, storage and analysis vary among the comparison fisheries. Evaluation of these factors and their affect on the Atlantic herring fishery and observer program cost structure could be considered to mitigate the cost and increase the feasibility of implementing 100% observer coverage in the directed herring fishery (Category A, B, C).

Sea Day Costs

- The AK pollock fishery is significantly higher volume and revenue compared with the other fisheries (Figure 3, above). The sea day rate for deploying observers includes training costs, debriefing time, and deployment costs and is less than (in 2010) that in all other fisheries (Figure 4, above). This low daily rate in the AK pollock fishery is a direct result of competition between observer providers in the North Pacific. Competition between providers lowers the costs to the vessels and constricts observer wages.
- In the North Pacific Groundfish Observer Program, observer wages start at \$140/day and maximize at \$210/day; observers receive little to no benefits or bonus. In the Northeast, observer wages begin around \$240/day and exceed \$300/day; there are significant bonus pay and benefits available.
- Other costs that factor into payroll, such as insurance and federal and state tax requirements are directly proportional to salary. Structuring observer benefits and performance bonuses in an equitable manner can provide additional savings. Observer providers with efficient payroll systems, direct deposit and automated billing can reduce overhead costs and minimize days paid to the observers that are not billed to vessels, where industry assumes the cost.

Logistics

- The deployment logistics of placing an observer on a vessel vary between fisheries and affect the sea day rate considerably. Longer deployments reduce the administrative burden of scheduling, coordinating and placing observers on vessels, along with reduced post-trip debriefing. The number of field offices, coordinators, bunk houses, and other observer support costs required to coordinate the observer program is determined by size, seasonality, and fishing strategy of the subject fishery.
- In Hawaii trips range from 3 to 5 weeks, in the North Pacific deployments typically are 10 to 12 weeks for the at-sea fleet, and in the WC at-sea hake trips range from day trips for shoreside catcher vessels and 6 to 12 week for the catcher processors and mother ships. In these cases, logistical overhead and training/debriefing costs can be spread over a larger number of sea days.
- Trip length in the Atlantic herring fishery is similar to the WC trawl IFQ fishery, where trip lengths generally last from 1 to 5 days. Due to these shorter trip lengths, observer program coordinators spend considerably more time arranging the same numbers of sea days compared to fisheries with long trips. On the west coast, observer program offices are located near the primary landing ports used in the hake and trawl IFQ fisheries; this keeps travel costs low, even where trip lengths are shorter.

- In addition to trip length, the number of vessels and primary landing ports reduce logistics involved and travel costs. The cost for observer travel to/from departure/landing port for trip deployment is lower with fewer trips (of greater trip length). Further, when the travel costs can be spread over a greater number of days per trip, the contribution of travel expense to sea day rate is lower.
- For example, in the AK pollock fishery, trips are long and the high cost of deployment airfare (of approximately \$2,300 on average) spread over a large number of days adds a small travel expense to the sea day rate.
- In the Atlantic herring fishery, the fishery is authorized to fish a relatively small area (approximately 63,750 mi²) in comparison with the regions fished by the west coast fisheries. Given this smaller area, observers could be based in a number of northeast states and reach the majority of deployment ports with little travel (several hours drive, and low cost).
- While short trip lengths increase logistics, in the Atlantic herring fishery there is estimated to be less than 20 active vessels in permit Category A/B. This lower number of vessels using relative few ports (4 primary ports are responsible for > 90% of the landings) could further simplify the required logistics. In addition, the current requirement for vessels to provide a pre-trip notification to determine if they have been assigned for observer coverage requires a substantial effort on the part of observer coordinators to arrange for a vessel to take an observer. In 100% coverage, the vessel could not leave without an observer, simplifying the duties of the observer coordinators.
- A limited number of ports, small number of permitted vessels, and relatively steady fishing will lend itself to a more efficient logistical structure.

Federal Requirements

- The Hawaii longline and Atlantic herring observer providers are both under federal contracts, which requires compliance with SCA and FLSA; these requirements are removed from third-party funding approaches, as seen in the AK pollock, at-sea hake and WC trawl IFQ. The third-party funding structure maintains federal regulation of the program, but fishery participants coordinate with and directly pay the providers.
- The requirements on observer salary due to the SCA and the FLSA can increase observer rates 50 to 100% due to overtime and wage determinations, NEI (2011) estimated this to add on average \$100/sea day.

Fishery Characteristics

- Undoubtedly the value of a fishery's landed catch factors considerably into whether they can support the cost of an observer program at a given rate. The Hawaii swordfish longline fishery, the WC at-sea hake and groundfish trawl IFQ and the Atlantic herring fishery are relatively similar in the volume of landings over the last four years (2007-2010) (Figure 7). The WC at-sea hake, WC trawl IFQ and Atlantic herring have also been relatively similar in annual revenue from landed catch (Figure 3). In comparing price per pound, the swordfish fishery is worth considerably more than the others (Figure 8).
- Seasonality of a fishery affects observer costs. The WC hake program begins in May annually and slows down in October and the fishery typically closes by December. With the limited season, the fishery requires a large number of observers to be trained and prepared to deploy for a limited period of time.

The AK pollock fishery season is longer than the at-sea hake season, but observer providers must accommodate remote deployments in the Bering Sea. In contrast, the Hawaiian swordfish longline fishery operates year round, though slows during summer months, reducing the number of deployments.

- Seasonality is one of the factors in the difference in (2010) sea day rate for observers in the WC at-sea hake (\$346.50) and AK Pollock (\$323), with additional costs required in ramping up for a shorter season.
- The Atlantic herring fishery operates year round, though exhibits seasonality in which fish are caught as herring populations migrate from inshore to offshore and from north to south in winter months.⁷³ Given that this fishery does operate year round, there is unlikely to be significant additional costs, as seen in the hake fishery; additionally, with some months requiring additional sea days compared to others, but no months having significantly fewer or greater days, the observer program would maintain a steady workforce, increase employment opportunities and reduce days paid in between deployments.

NMFS-Regulated Requirements

- NMFS decisions on what components of an observer program to pay for directly affect the sea day rate for observer programs. Length of observer training, NMFS certification requirements, trip debriefing requirements, and other reporting criteria can add substantial costs. In some fisheries - AK pollock, WC at-sea hake and trawl IFQ⁷⁴ – these costs are paid by the observer provider, whereas in the Hawaii longline and Atlantic herring fisheries the government reimburses these costs directly. In the case of a hypothetical 100% coverage for herring, these government costs are included in the additional \$400/day that adds to the estimated \$740/sea day rate in the northeast to bring the total sea day rate to around \$1200 in the Northeast Fishery Observer Program.
- In most industry funded programs (e.g., AK pollock, WC at-sea hake and trawl IFQ) the training and debriefing costs are incorporated in the sea day rate. Currently the Atlantic herring fishery trains its observers under the NEFOP protocols. Observers in the herring fishery require additional training for high-volume fisheries, which adds an additional day to an already 15-day training program. Under an industry funded program the training costs would most likely be incorporated into the sea day rate; however, there could be flexibility in the training protocols dependant on the desired sampling strategy and data collection.
- In some programs (e.g., Hawaii swordfish longline), NMFS reimburses observer providers for debriefing pay. In other programs (AK pollock) vessels are responsible for debriefing costs through the sea day rate.
- Developing an efficient and reliable debriefing system decreases observer costs. Allowing quicker observer turn-around onto subsequent trips results in fewer observers needed for a program.

Sampling Strategy, Data Collection, Storage and Analysis

- The amount of work and time spent collecting data required of the observer in a given sea day relates to the priority data collection needs and the required training for that program. The actual sampling

⁷³ Gulf of Maine Research Institute: Atlantic Herring Life Cycle. http://www.gma.org/herring/biology/life_cycle/default.asp

⁷⁴ Note that this program will not phase into being completely industry-funded until 2014.

strategy/data collection and data storage and analysis can often be streamlined to improve inefficiencies and reduce costs.

- Observer programs must have clear primary and secondary goals for data collection and these goals should be fishery specific. It is important to consider a program that allows observers to accomplish these goals and collect additional information in a reasonable and realistic manner. The present sampling strategy of NEFOP requires the collection of important data, although the strategy may not sufficiently address the issues bycatch, slippage, and discarding in the Atlantic herring fishery.
- In the West Coast Catch Share Observer Program, the program is designed to account for small numbers of critical rebuilding stocks. A specific sampling strategy was designed for that purpose; this includes observers recording all at-sea discards and complete monitoring of retained catch at processing plants or other offload points to ensure recording of every fish.
- The requirements and protocols of the program will change with increased observer coverage, e.g. from 30%+ to 100%. The level of confidence in the numbers and the ability to identify unusual tows will increase, and the margin for error will decrease, with the enhanced at-sea monitoring.
- Presently in the Atlantic herring fishery, a vessel may spend a large portion of sea time searching for fish and conducting test tows, during which time an observer is idle waiting for a haul in order to conduct sampling. In this fishery, actual work load conducted by an observer is disproportionately low relative to the amount of time deployed. A modified program design could consider other uses for time spent at sea, or ways to pay reduced rates for sea-time that does not produce collected data.
- A well-designed program will increase observer morale. This point should not be underestimated; employee well-being has significant impacts on performance and job retention. Low retention affects data quality, increases training costs, and recruitment costs. The observer's quality of life is an important aspect that should always be considered when making decisions about program design.
- The feasibility of a sampling protocol is an important design consideration. Programs in which observers are unable to complete tasks or collect quality data because of an overly complicated or physically taxing sampling protocol would likely experience lower retention than in more efficient programs. In recent years, the North Pacific Groundfish Observer Program has added additional duties and specific sampling protocols to an already complex program. The resulting 600+ page manual combined with a lengthy debriefing process are contributing factors to the reduced retention rates experienced by that program.
- In U.S. observer programs, observers collect and provide the data to NMFS, who typically conducts the data debriefing⁷⁵, and handles data storage, maintenance and analysis. However, most observer providers do have experience with observer debriefing and storage, including database development. The role (and cost) of data debriefing and storage may be assumed by the provider in single provider systems, or by a third party in multiple provider systems; this is another factor for consideration that could reduce costs compared to the costs for the government to conduct these activities.

⁷⁵ In order to ensure that data are consistently collected according to program guidelines observers are required to go through a debriefing process that consists of data review, submission, correction and evaluation. (WCGOP Manual, Chapter 11: http://www.nwfsc.noaa.gov/research/divisions/fram/observer/observermanual/wcgop_manual_chapter_11.pdf.sav)

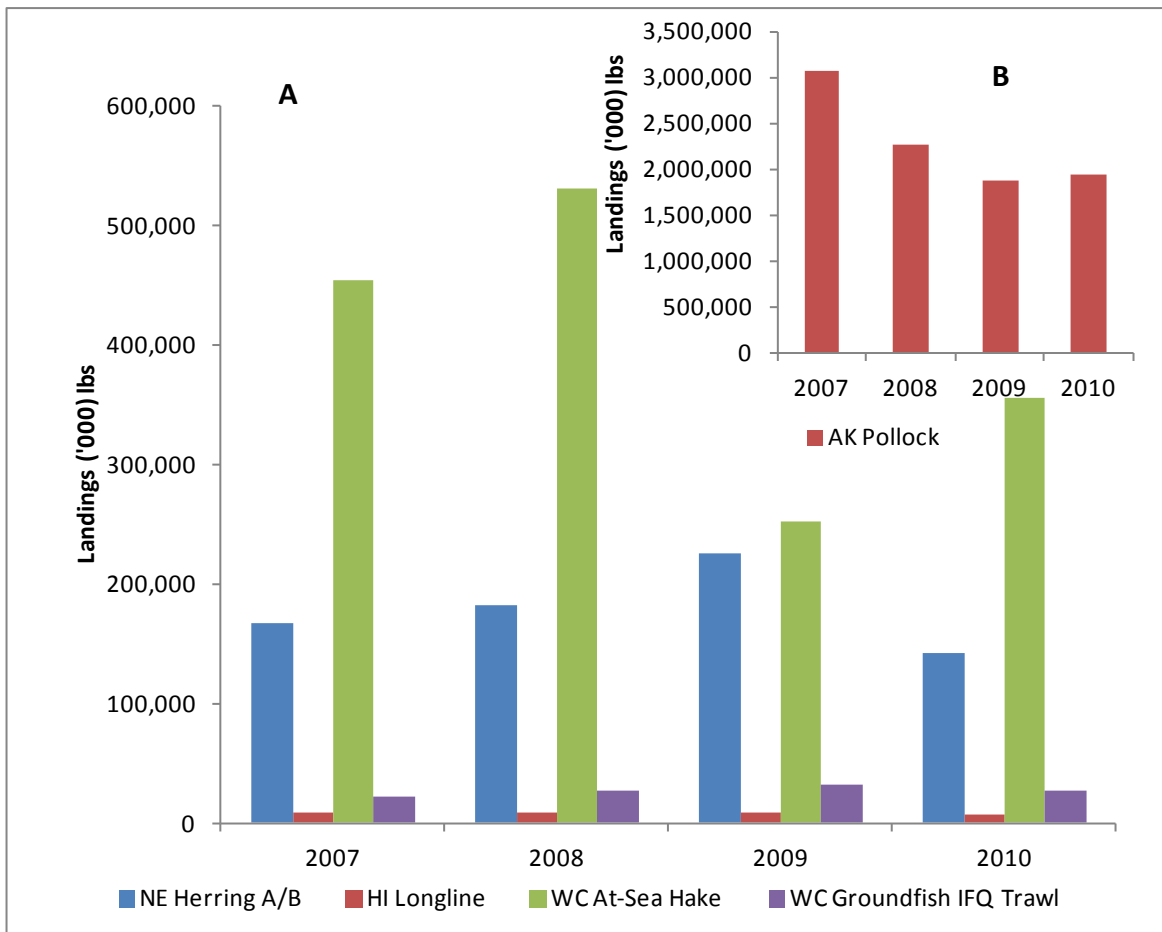


Figure 7: Recent landings compared across the four 100% observer fisheries and Atlantic herring; note the scale for landings in figures A and B.⁷⁶

⁷⁶ Landings data for pollock, swordfish, hake and pacific groundfish limited entry from NOAA Fisheries Annual Commercial Landings by Gear Type Database (accessed February 2012, available at: http://www.st.nmfs.noaa.gov/st1/commercial/landings/gear_landings.html), herring landings from Draft Amendment 5 (NEFMC 2012).

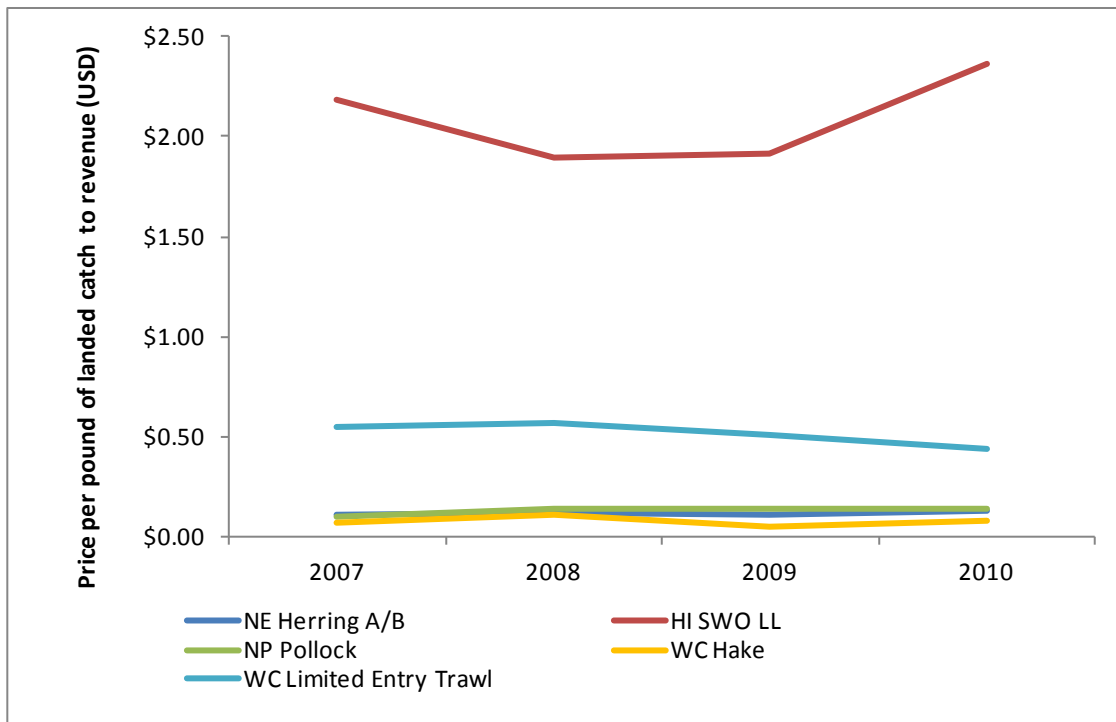


Figure 8: Recent changes in price per pound for landed catch compared across the four 100% fisheries and Atlantic herring.⁷⁷

7 Summary

Implementing industry-funded 100% observer coverage in the Atlantic herring fishery, given the current program structure, would put a higher economic burden on the industry compared with other 100% observer coverage fisheries. There are a number of factors that affect observer costs, some of which could be evaluated for their potential in reducing program costs. The Atlantic herring fishery shares many characteristics with the comparison fisheries, most importantly in the context of where 100% observer coverage has been adopted to solve catch monitoring and protected species problems that enhanced the need for at-sea monitoring. Total fishery revenue in the Atlantic herring fishery falls in line with both the at-sea hake and WC trawl IFQ fisheries; however, characteristics of the NEFOP program results in a sea day cost nearly double that of the other four comparison fisheries.

In the Atlantic herring fishery in 2010, NMFS estimated 139 vessels in herring Categories A, B, C and D (though likely an overestimate according to NEFSC); Categories A/B accounted for approximately 30 active vessels (also likely overestimated according to NEFSC), and paired midwater trawls accounted for 12 of these 30 active

⁷⁷ Price per pound calculated from revenue and landings data for pollock, swordfish, hake and pacific groundfish limited entry from NOAA Fisheries Annual Commercial Landings by Gear Type Database (accessed February 2012, available at: http://www.st.nmfs.noaa.gov/st1/commercial/landings/gear_landings.html), herring landings from Draft Amendment 5 (NEFMC 2012).

vessels. Category A/B vessels landed just over 70% of the herring landings worth \$18.4M; whereas Category C vessel landings were worth \$322,000.⁷⁸ Therefore, a small subset of the Atlantic herring fleet lands the great majority of the catch and the revenue. Options for herring observer coverage could include all vessels or a subset of vessels, and options for payment could include government funding, industry funding on a sea day rate, and industry funding based on payment proportional to landings (value or pounds). Funding could include shared government and industry contributions.

Separating herring observers from NEFOP could lead to some savings by specifying requirements that minimize the current high costs of NEFOP. For example, shifting the structure of the program to a third-party funding structure would remove the SCA and FLSA requirements and the requirement for overtime. NMFS could evaluate whether elements of a herring observer program, such as training, are more economically run by the government or shifted to third party providers. Regardless, NMFS should retain control over the data once delivered.

Logistics required to operate NEFOP remain complex. Vessels currently have an incentive to avoid carrying observers so they may not maintain good communication with observer providers, which requires observer providers to expend time seeking out vessels selected for coverage; a 100% requirement would require the vessel to arrange for an observer before departure, reducing observer provider administrative time. Short trips, diverse landing sites, NEFOP observer performance bonuses, and SCA/FLSA requirements all lead to a complex infrastructure that increases cost. Shifting to a small number of authorized landing ports, coordination of vessels to maximize observer efficiency, privatizing the workforce to remove SCA/FLSA requirements, and structuring pay to be commensurate with observer work effort could simplify the logistics and result in lower costs. The NEFOP program, in consultation with observer providers and stakeholders, could evaluate a new design specifically for herring that achieves coverage requirements with increased efficiency that reduces costs.

8 Acknowledgements

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⁷⁸ NEFMC. 2012.