AMENDMENT 5

to the

Fishery Management Plan (FMP)

for

Atlantic Herring

Including a

Final Environmental Impact Statement (FEIS)

Prepared by the

New England Fishery Management Council

SLIPPAGE INFORMATION (BACKGROUND)

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AMENDMENT 5 SLIPPAGE INFORMATION
SECTION 6.3.2.1, p. 438 AM 5 FEIS

2010 Slippage Information

The NEFOP recently updated its observer training program to address new requirements for herring vessel access to Closed Area I as well as general training for observing high volume fisheries. In 2010, the NEFOP conducted three high-volume fishery training classes to recertify 70 observers. The program was 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 was developed to improve 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.

The NEFOP also implemented a discard log in 2010 to obtain more detailed information regarding discards in high-volume fisheries. The new discard log is being completed for every haul, and it includes fields to provide information on what kind of discard event may have occurred, whether or not the observer could see the contents of the codend when pumping stopped, why catch may have been discarded, information about the composition of discarded catch, and any challenges the observer may have experienced when observing the haul. Observers are also documenting released catch (including operational discards and slippage events) with photographs whenever possible, and bringing in samples of fish from every trip to confirm species identification.

Between increased observer coverage levels, an increase in information being provided by the fishermen and crew, and the new observer discard log implemented in 2010, data collected by observers regarding released catch events on limited access herring vessels during the 2010 fishing year provides much more detail about catch not brought on board herring vessels, and overall, the information collected about slippage has improved considerably. Operational discards have been confirmed by observers to be relatively small amounts of fish that may remain in the net following a successful haul/pump; these fish are usually caught in the net and/or cannot be pumped on board. Information collected by observers about operational discards has improved, and hauls with operational discards are considered to be "observed" hauls; the operational discards are estimated by the observers and represent "small" amounts of fish. Any partial or full released catch ("slippage" as defined in Amendment 5) is considered unobserved, but observers still collect as much information as possible about these discards.

In 2010, observer coverage for the midwater trawl fleet was close to 30% fishery-wide and was even higher on Georges Bank (85% coverage by weight of fish landed). Overall, observers provided data for 929 hauls on limited access herring vessels during the 2010 fishing year. The new discard log allows observers to provide more information about reasons for not bringing fish on board, including who estimated the released catch, additional details regarding why the catch was released, and whether the discards were observed on the deck or in the water.

Table 1 provides data for the 332 observer records (287 unique hauls) in 2010 that included fish not brought on board. About 290 of these hauls were documented with "not enough fish to pump," i.e., operational discards. Observers document operational discards as *Herring NK* if they are able to see the fish that are not pumped and confirm that the discards are all herring-bodied fish. Otherwise, the discards are documented as *Fish NK* (see below for more information about the evolution of the Herring NK and Fish NK categories). The total weight of fish not brought on board estimated by observers in 2010 was about 460,000 pounds; this includes operational discards, which, although more frequent, generally represent very small amounts of fish. Total herring landings for this fleet in 2010 were about 58 million pounds.

A preliminary review of the observer data indicate that in 2010, only 35 records (approximately 30 unique hauls) of 929 hauls (3.2%) that were observed on limited access herring vessels were documented to have experienced full or partial slippage events. The total estimated catch not brought on board compared to the total observed catch on these vessels in 2010 was about 0.7% (this does not include fish that were brought on board and then discarded). In addition, there were 99 hauls observed in Closed Area I during 2010, under the new provisions for sampling catch, implemented in November 2009. There were no slippage events observed in these 99 hauls, and consequently no Released Catch Affidavits were submitted from the Closed Area I fishery in 2010. There appears to have been one released catch event (estimated 1,500 pounds) on a haul that ended (but did not begin) in Closed Area I. However, the recently-implemented revisions to the Closed Area I rules (January 2011) require that all operational discards be brought on board; potential logistical and sampling issues associated with this new requirement are unclear because fishing effort has not yet moved into Closed Area I this year.

Table 1 Summary of 2010 Observed Events on Limited Access Herring Vessels (by Number and Estimated Weight of Fish in Lbs.) with Fish Not Brought on Board

	species	"reason not specified"	"gear damage"	"fell out of gear"	"no market value"	"vessel capacity filled"	"not enough fish to pump"
Number of hauls with occurrence	butterfish	1					1
	haddock						6
	herring nk			3		1	105
	atl herring	1				1	18
	mackerel	1				1	4
	redfish						7
	spiny dogfish						1
	striped bass			1			1
	whiting	1					4
	fish nk	10	5	3	2	3	138
	hake nk						6
	lobster						1
	Loligo	1					1
	Illex						2
	eel nk						2
Estimated weight (lbs)	butterfish	5					1
	haddock						72
	herring nk			410		3,000	20,622
	atl herring	100				175	6,425
	mackerel	50				175	155
	redfish						38
	spiny dogfish						25
	striped bass			12			10
	whiting	10					372
	fish nk	169,450	108,000	4,700	44,000	20,050	72,766
	hake nk						215
	lobster						10
	Loligo	3					10
	Illex						13
	eel nk						8,150

Figure 1 Observed Events on Limited Access Herring Vessels (by Number of Hauls) with Fish Not Brought on Board in 2010

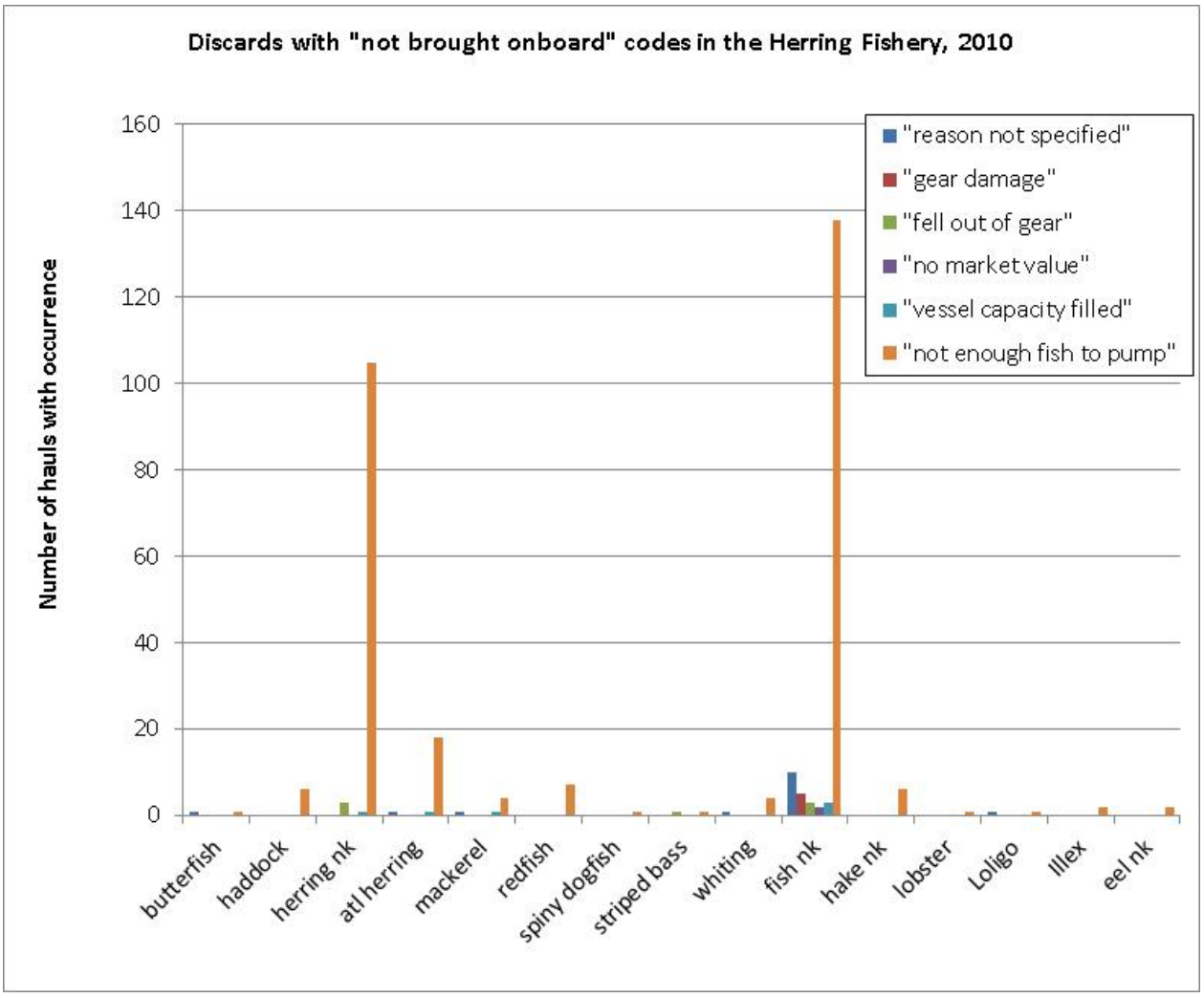


Figure 2 Observed Events on Limited Access Herring Vessels (by Estimated Weight of Fish in Pounds) with Fish Not Brought on Board in 2010

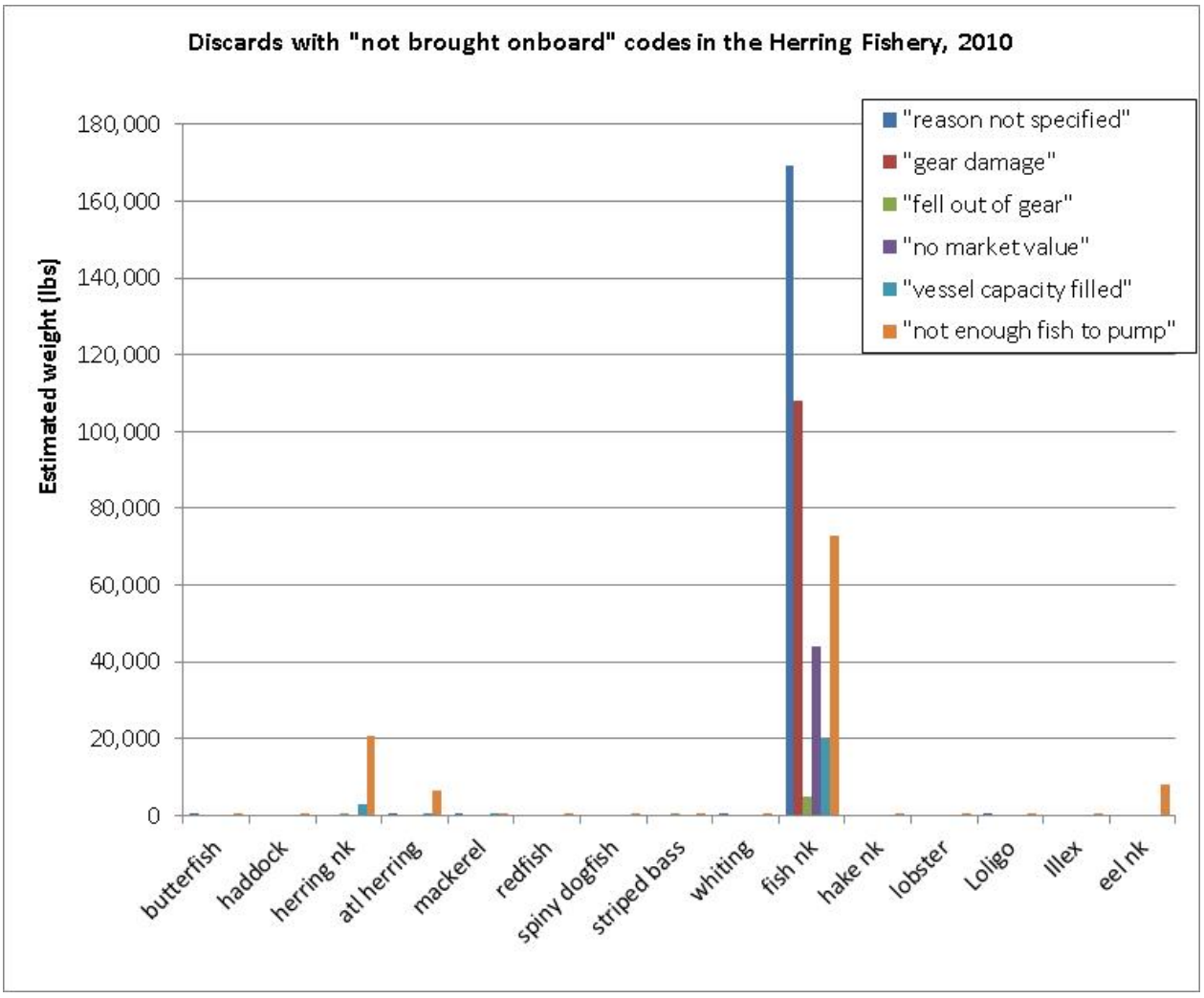


Figure 3 Use of Fish NK and Herring NK Codes on Observed Limited Access Herring Trips (by Number of Hauls) in 2010

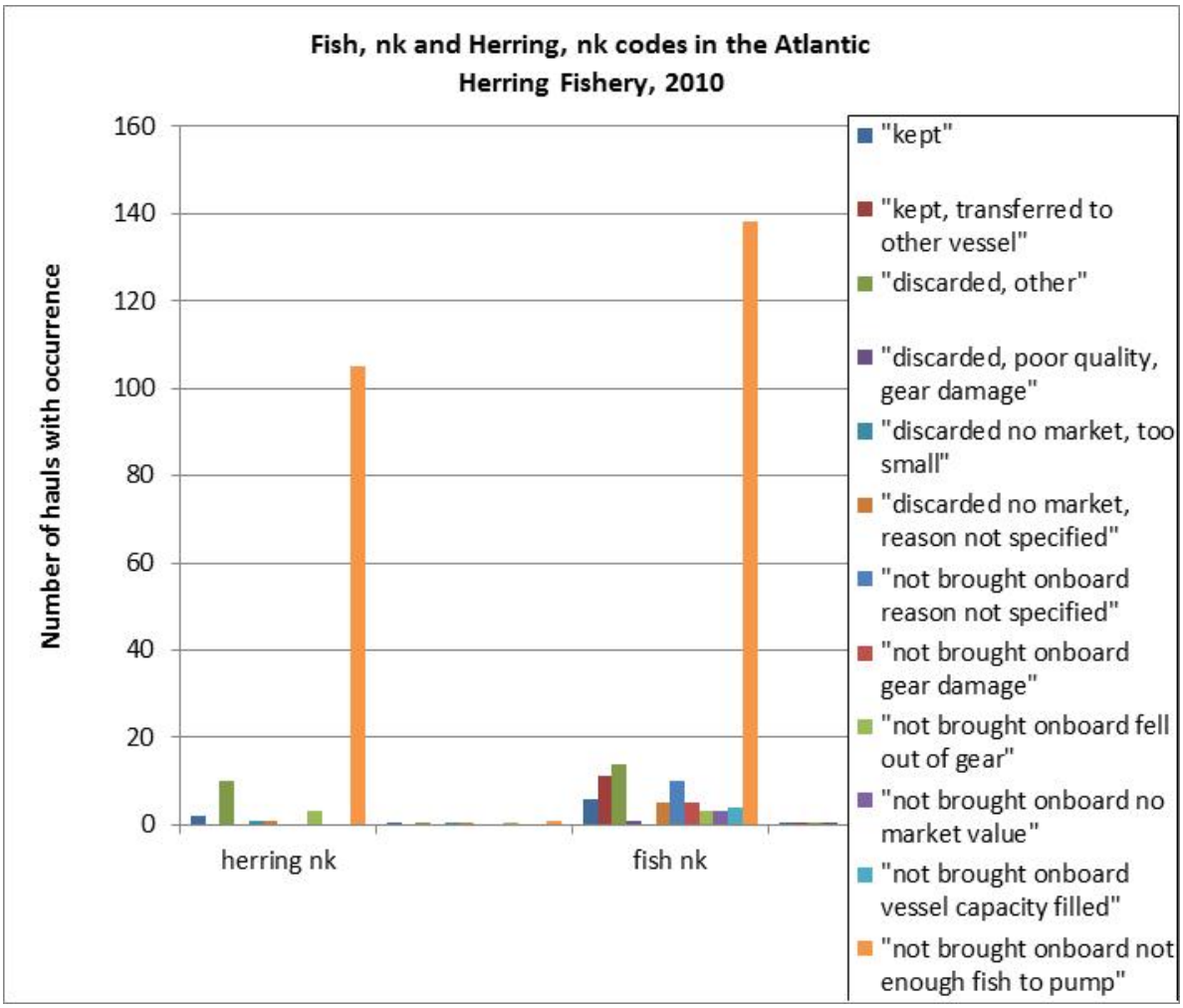
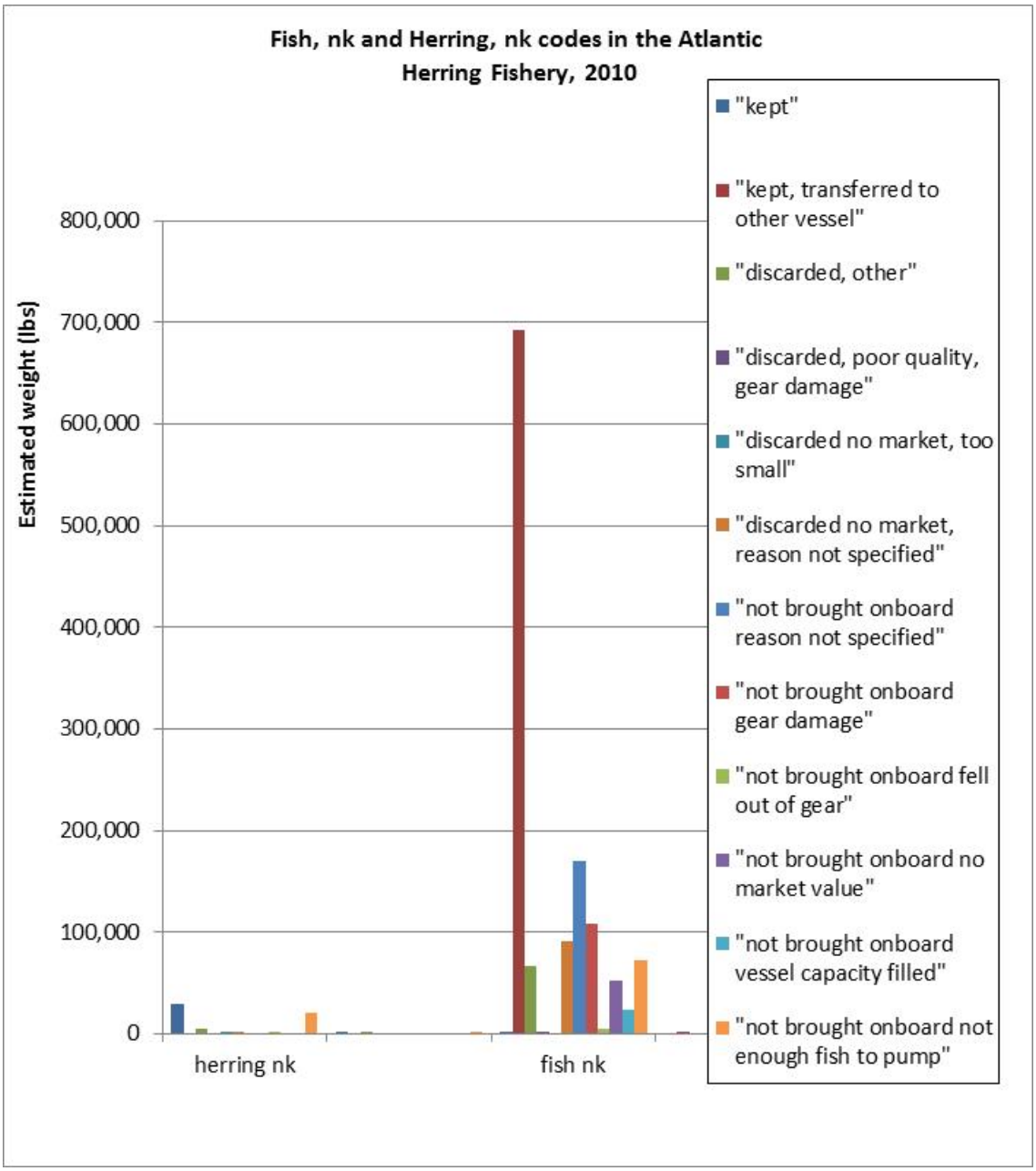
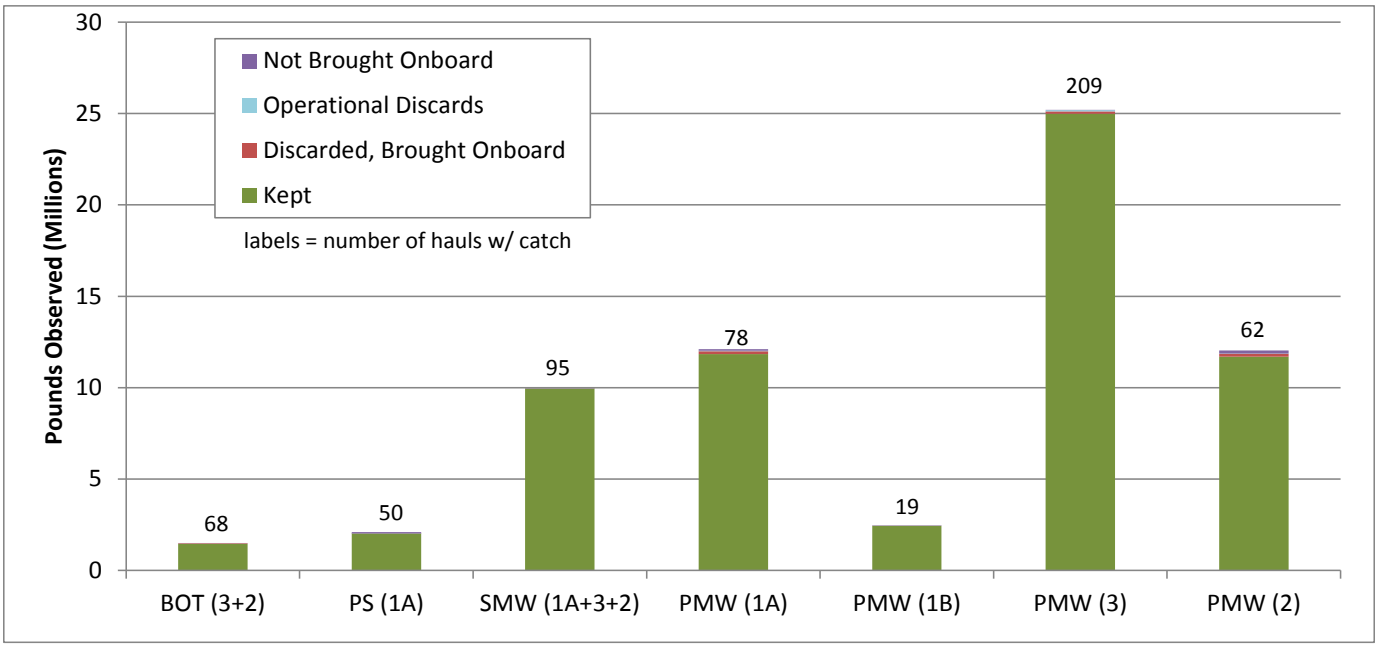


Figure 4 Use of Fish NK and Herring NK Codes on Observed Limited Access Herring Trips (by Estimated Weight) in 2010



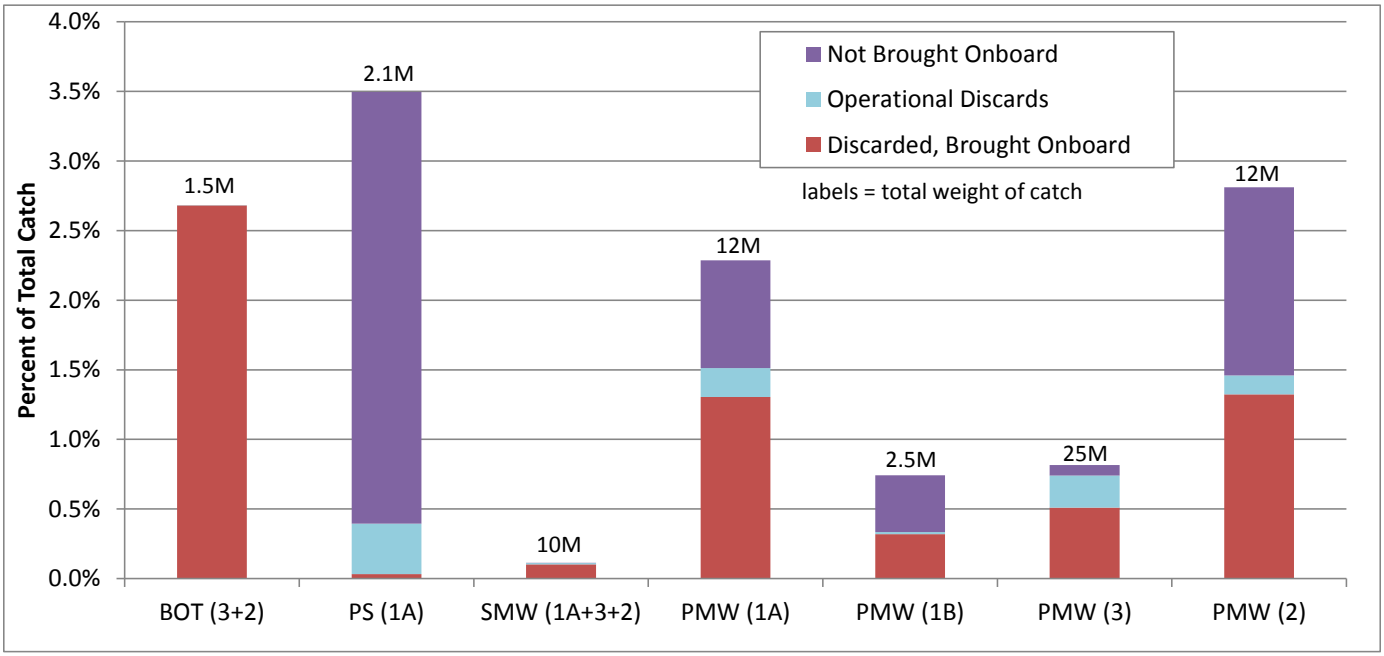
Available information suggests that the amount of fish estimated to be slipped in full/partial slippage events is less than 100,000 pounds. Information provided by vessel captains in 2008/2009, although incomplete, indicates that the estimated weight of partial slippage events (events for which captains provided an estimate) in averaged 45,175 pounds, and the estimated weight of full slippage events (when comments were provided) averaged 27,581 pounds. Information about slippage events and details about the released catch improved considerably in 2010 with the establishment of the new discard log. In addition, the observed number of slippage events declined in 2010. Figure 5 and Figure 6 characterize discards observed in 2010 and provide some perspective on slippage events by gear type and management area. Because few slippage events were observed in 2010 (with a relatively high level of observer coverage across the fishery), disaggregating the data is more difficult due to confidentiality restrictions. However the information in Figure 5 and Figure 6 show that discards at-sea, in total, represent a very small fraction of catch on herring vessels; catch not brought on board represented the highest fractions of total catch for purse seine and pair trawl vessels fishing in Areas 1 and 2 (purse seine vessels only fish in Area 1).

Figure 5 Summary of 2010 Observed Catch (Pounds) on A/B/C Herring Vessels on Declared Herring Trips by Gear Type, Management Area, and Disposition



BOT – Bottom Otter Trawl; PS – Purse Seine; SMW – Single Midwater Trawl; PMW – Paired Midwater Trawl

Figure 6 Summary of 2010 Observed Discards (as Percent of Total Observed Catch) on A/B/C Herring Vessels on Declared Herring Trips by Gear Type, Management Area, and Disposition



BOT – Bottom Otter Trawl; PS – Purse Seine; SMW – Single Midwater Trawl; PMW – Paired Midwater Trawl

2011 Slippage Information

Table 2, Figure 7, and Figure 8 summarize data for the observer records (1140 unique hauls) in 2011 on limited access declared herring trips that included fish "Not Brought On Board." About 198 of these hauls (17.4%) were documented with "not enough fish to pump," i.e., *operational discards*. Observers document operational discards as *Herring NK* if they are able to see the fish that are not pumped and confirm that the discards are all herring-bodied fish. Otherwise, the discards are documented as *Fish NK*. Data were pulled similar to the 2010 released catch/slippage data provided in this section (see previous tables/figures).

The total weight of fish not brought on board estimated by observers in 2011 was 1,041,211 pounds; this includes operational discards, which, although more frequent, generally represent very small amounts of fish.

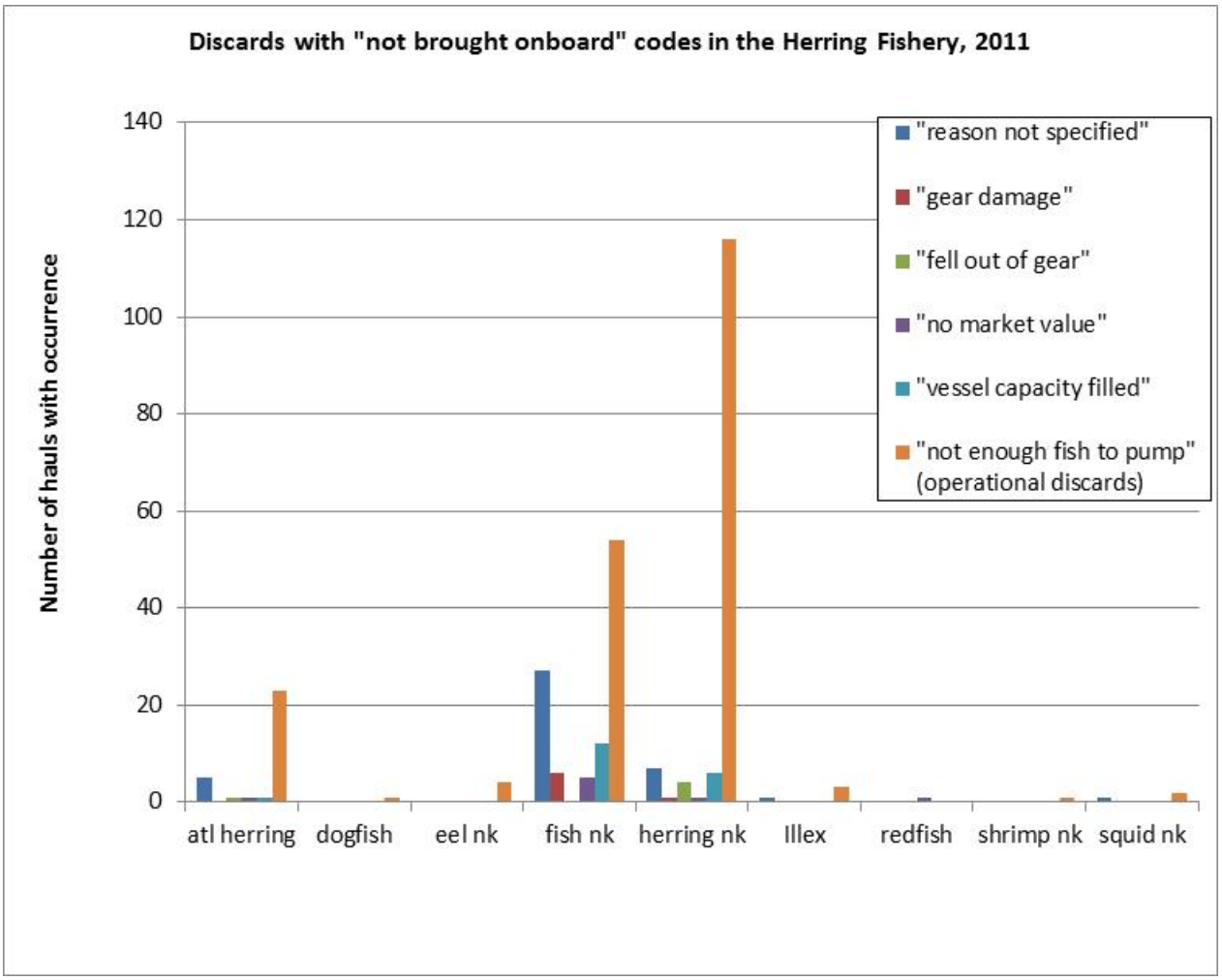
A review of the observer data indicate that in 2011, 78 out of 1,140 hauls (6.8%) observed on limited access declared herring trips experienced full or partial slippage events (catch not brought on board, not including operational discards). The ratio of total estimated catch not brought on board compared to the total observed catch on these vessels in 2011 was about 1.4% (this does not include fish that were brought on board and then discarded). By gear type, this ratio translates to 0.16% for bottom otter trawl (all areas), 5.31% for purse seine (Area 1A), 2.19% single midwater trawl (all areas), 0.11% pair trawl (Area 1A), 0.53% pair trawl (Area 3), and 0.48% pair trawl (Area 2). Additional information about slippage by gear type and management area is provided in this analysis to support the Council's ***Preferred Alternative*** for Management Measures to Address Net Slippage in Amendment 5.

Table 2 Summary of 2011 Observed Events on Limited Access Herring Vessels – Declared Herring Trips (by Number and Estimated Weight of Fish in lbs.) with "*Fish Not Brought on Board*" Codes

	species	"reason not specified"	"gear damage"	"fell out of gear"	"no market value"	"vessel capacity filled"	"not enough fish to pump" (operational discards)
Number of hauls with occurrence	atl herring	5	0	1	1	1	23
	dogfish	0	0	0	0	0	1
	eel nk	0	0	0	0	0	4
	fish nk	27	6	0	5	12	54
	herring nk	7	1	4	1	6	116
	Illex	1	0	0	0	0	3
	redfish	0	0	0	1	0	0
	shrimp nk	0	0	0	0	0	1
	squid nk	1	0	0	0	0	2
Estimated weight (lbs)	atl herring	2,754	0	10	10,000	500	1,947
	dogfish	0	0	0	0	0	80
	eel nk	0	0	0	0	0	860
	fish nk	339,170	394,000	0	68,400	108,500	11,398
	herring nk	43,700	300	170	10,000	32,700	16,248
	Illex	3	0	0	0	0	30
	redfish	0	0	0	400	0	0
	shrimp nk	0	0	0	0	0	1
	squid nk	10	0	0	0	0	30

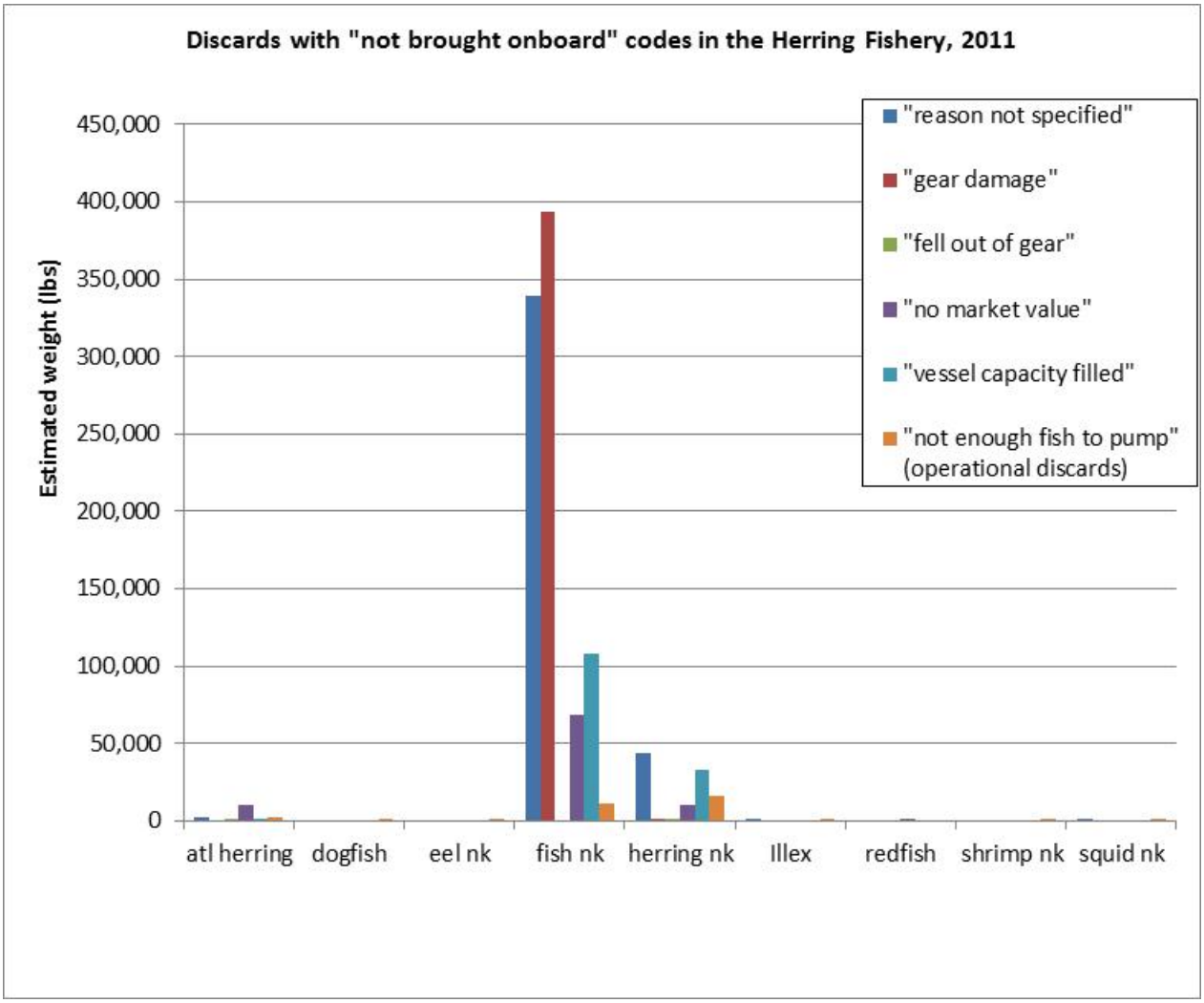
Note: Information in all columns except for the far right ("not enough fish to pump" (operational discards)) represents partial/full slippage events.

Figure 7 Observed Events on Limited Access Herring Vessels – Declared Herring Trips in 2011 with "*Fish Not Brought on Board*" Codes (by Species and Number of Hauls)



Note: All columns except for "'not enough fish to pump' (operational discards)" represent partial/full slippage events.

Figure 8 Observed Events on Limited Access Herring Vessels – Declared Herring Trips in 2011 with "*Fish Not Brought on Board*" Codes (By Species and Estimated Weight of Fish in Pounds)



Note: All columns except for "'not enough fish to pump' (operational discards)" represent partial/full slippage events.

There was almost no mackerel fishery in 2011, but in 2010 there were eight (8) observed mackerel trips (50% mackerel or over 100,000 pounds mackerel) that caught about 5.5 million pounds of fish (about 2 million pounds of mackerel and 3.3 million pound of herring) and had about 12,000 pounds of unobserved fish ("not brought on board"), some of which was specified by species but mostly consisted of "*Fish, NK*."

Table 3, Table 4, Figure 9, and Figure 10 provide 2011 observer data by gear type and management area, including observed hauls with catch "Not Brought on Board," i.e., full or partial slippage events (shaded rows in the following tables). Based on the ratio of slipped catch to total catch, purse seine vessels fishing in Area 1A had the highest observed slippage rates in the fishery during the 2011 fishing year. Observers documented full or partial slippage events on almost 30% of observed purse seine hauls in Area 1A during 2011. Coverage was low on purse

seine vessels relative to other gear types in the fishery; the proposed trip termination threshold of ten slippage events per gear type and management area, therefore, may constrain purse seine activity in Area 1A and may impact purse seine operations, especially if observer coverage is increased to 100% for Category A and B vessels.

Single midwater trawl vessels were not observed to have many slippage events in 2011; only four slippage events were observed on single midwater trawl vessels across all management areas. However, when grouped with pair trawls as proposed in the measures to address slippage, the single midwater trawl sector may be likely to encounter trip terminations in Areas 2 and 3, particularly with 100% observer coverage on Category A and B herring vessels. Pair trawl vessels were observed to have 8 slippage events in Area 2 and 19 in Area 3 during 2011, with about 30% observer coverage across the fishery (although closer to 80% in Area 3). Single midwater trawl vessels, however, accounted for the largest slippage events, averaging about 50,000 pounds per observed event. Purse seine vessels averaged 15,190 pounds per observed slippage event, and pair trawl vessels in Area 3 averaged about 9,000 pounds per event.

Table 3 Summary of NEFOP 2011 Released Catch Data from Limited Access Vessels on Declared Herring Trips (Number of Hauls by Gear and Area)

	Bottom Trawl (All Areas)	**Purse Seine (Area 1A)**	**Single MWT (All Areas)**	**Paired MWT (Area 1A)**	**Paired MWT (Area 3)**	**Paired MWT (Area 2)**
# of Hauls (# w/catch)	**366 (349)**	**133 (127)**	**51 (51)**	**65 (34)**	**313 (172)**	**122 (64)**
Hauls w/ Kept	346	104	51	31	158	57
Hauls w/ Discards, after brought onboard	319	107	34	30	141	62
Hauls w/ Operational Discards	0	71	0	9	75	43
Hauls w/ "Not Brought Onboard"	6	37	4	4	19	8
	Bottom Trawl (All Areas)	**Purse Seine (Area 1A)**	**Single MWT (All Areas)**	**Paired MWT (Area 1A)**	**Paired MWT (Area 3)**	**Paired MWT (Area 2)**
# of Hauls (# w/ catch)	**366 (349)**	**133 (127)**	**51 (51)**	**65 (34)**	**313 (172)**	**122 (64)**
Hauls w/ Kept	95%	78%	100%	48%	50%	100
Hauls w/ Discards, after brought onboard	87%	80%	67%	46%	45%	109
Hauls w/ Operational Discards	0%	53%	0%	14%	24%	75%
Hauls w/ "Not Brought Onboard"	2%	28%	8%	6%	6%	14%

Table 4 Summary of NEFOP 2011 Released Catch Data from Limited Access Vessels on Declared Herring Trips (Number of Pounds by Gear and Area)

	Bottom Trawl (All Areas)	Purse Seine (Area 1A)	Single MWT (All Areas)	Paired MWT (Area 1A)	Paired MWT (Area 3)	Paired MWT (Area 2)
Pounds Kept	**2,413,052**	**9,443,700**	**8,809,458**	**7,608,577**	**32,329,166**	**12,717,103**
Pounds Discarded, On-Board	136,668	575,877	212,143	23,093	258,726	78,354
Pounds Operational Discards	0	8,549	0	1,460	15,973	4,612
Pounds "Not Brought On-Board"	4,140	562,037	202,000	8,200	172,740	61,500
	Bottom Trawl (All Areas)	**Purse Seine (Area 1A)**	**Single MWT (All Areas)**	**Paired MWT (Area 1A)**	**Paired MWT (Area 3)**	**Paired MWT (Area 2)**
Total Pounds Observed	**2.55M**	**10.59M**	**9.22M**	**7.64M**	**32.78M**	**12.86M**
% Discarded, On-Board	5.35%	5.44%	2.30%	0.30%	0.79%	0.61%
% Operational Discards	0	0.08%	0	0.02%	0.05%	0.04%
% "Not Brought On-Board"	0.16%	5.31%	2.19%	0.11%	0.53%	0.48%

Figure 9 Summary of 2011 Observed Catch (Pounds) on Limited Access Herring Vessels on Declared Herring Trips by Gear Type, Management Area, and Disposition

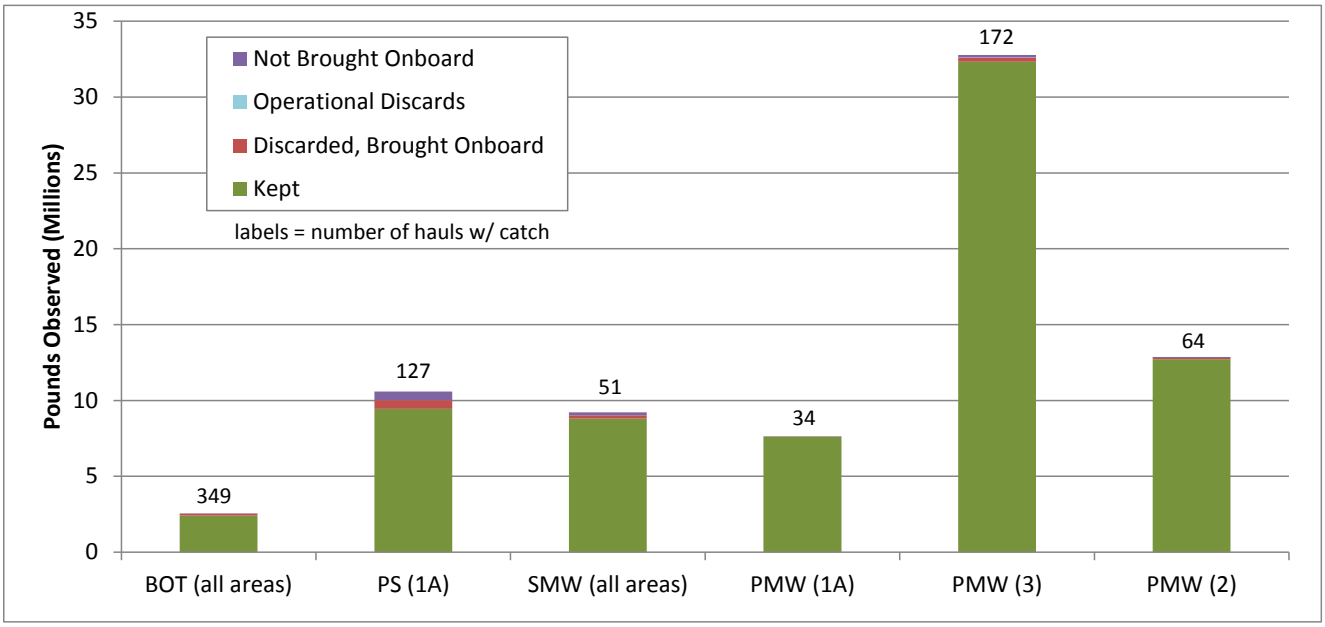
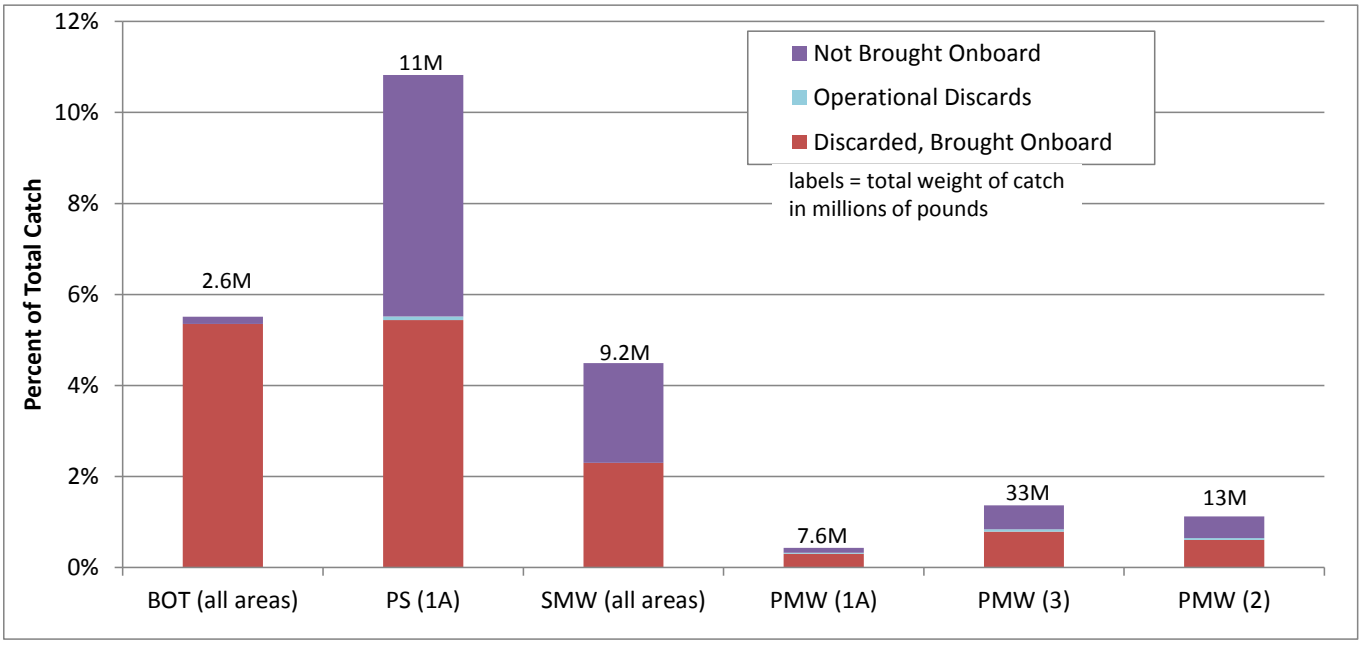


Figure 10 Summary of 2011 Observed Discards (as Percent of Total Observed Catch) on Limited Access Herring Vessels on Declared Herring Trips by Gear Type, Management Area, and Disposition



Use of "Herring NK" and "Fish NK"

It is important to understand the use of the Fish NK and Herring NK categories in the observer data and the ongoing effort by the NEFOP to reduce these categories and better document all fish either kept, discarded, transferred, or not brought on board in the limited access herring fishery. In 2009, the NEFOP transitioned to the use of Fish NK to represent the component of the catch for which observers could not verify identification. This includes partial and fully released tows and operational discards. Prior to 2009, Fish NK, or Herring NK, or Atlantic herring were used to describe this component of the catch, depending upon observer determinations based on their own visual inspection and/or captain and crew input.

In 2009, the NEFOP also transitioned to the use of Fish NK to *represent the composition of the catch pumped to the paired vessel when an observer is not present on the boat taking on the fish*. Prior to 2009, Atlantic herring, or Herring NK, or Fish NK were used to represent this component of the catch, based on the observers assumption that partial catches being pumped to the vessel they were deployed on, were made up of the similar species composition of that being pumped to the alternate vessel. Now, all fish that are retained but not observed in a multi-vessel operation are documented as Fish NK. This component represents the majority of Fish NK records. Using the most recent data as an example (Table 5 and Table 6), the majority of Fish NK records in 2010 (54% by weight) and 2011 (67% by weight) are associated with fish that were pumped to the paired vessel without an observer present to subsample. These fish were landed, sold, and documented through the dealer and VTR data (along with IVR at the time), and the landings may have been sampled through a State portside sampling program.

In 2010, the NEFOP conducted three high-volume fishery training classes to recertify 70 observers. The program was 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 was developed to improve 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. The NEFOP also implemented a discard log to obtain more detailed information regarding discards in high-volume fisheries. The discard log is completed for every haul during which fish are pumped, and it includes fields to provide information on what kind of discard event may have occurred, whether or not the observer could see the contents of the codend when pumping stopped, why catch may have been discarded, information about the composition of discarded catch, and any challenges the observer may have experienced when observing the haul. Observers are also bringing in samples of fish from every trip to confirm species identification. These efforts have improved sea sampling in the herring fishery and increased the amount and quality of information available to characterize and better document bycatch on vessels that pump fish.

Table 5 and Table 6 provide detailed information regarding all observed Herring NK and Fish NK events (hauls) on limited access herring vessels in 2010 and 2011 respectively, including catch disposition and reasons provided for discarding. "Kept" fish are retained; "discarded" fish represent bycatch (discards) after the catch is brought on board; "not brought on board" represents full/partial slippage events and observations of operational discards; the far right column in each of the tables "not brought on board, not enough fish to pump" represents operational discards.

Herring NK was documented on 122 hauls and Fish NK was documented on 200 hauls in 2010; Herring NK was documented on 191 hauls and Fish NK was documented on 161 hauls in 2011. The majority of Herring NK observations (86%) was due to "not enough fish to pump" (operational discards). Sixty nine percent (69%) of Fish NK observations was associated with operational discards. In general, the amounts of fish classified in these categories per haul are relatively small. There was one sampling event in 2010 that documented 30,000 pounds of Herring NK "kept," which represents almost half of all Herring NK observed in 2010 (Table 5, Figure 3, Figure 4). In this one event, the observer was able to see the fish as they came on board, and during the pumping process, the observer could confirm that the fish were all herring-bodied fish but could not obtain basket samples for safety reasons. As noted above, about ½ of observed Fish NK and Herring NK in 2010 was landed, and even more was landed in 2011; in these cases, portside sampling is beneficial to confirm the species composition of the landings.

The remaining Fish NK records are mostly associated with fish that were discarded and the reason was not specified, fish that were discarded due to gear damage and operational discards. Operational discards that the observer is able to visually inspect and therefore term Herring NK instead of Fish NK, represent 36% of the herring NK records by weight in 2010 and 14% by weight in 2011. Nine percent (9%) of the Herring NK records in 2010 are associated with fish that mainly fell from the chute, were seen by the observer and therefore identified as herring, then washed overboard.

Species identification issues also result in the use of Fish NK or Herring NK. In these cases, an observer has sent in a whole fish sample, which is identified by experienced staff at the NEFOP. If the observer has mis-identified the species the use of Fish NK or Herring NK may be used. In 2010, there was one record changed to Herring NK due to mis-identification of the species.

Table 5 Quantification of Fish NK and Herring NK (in Lbs) on Observed Hauls by Limited Access Herring Vessels in 2010

	species group	"kept"	"kept, transferred to other vessel"	"discarded, other"	"discarded, poor quality, gear damage"	"discarded no market, too small"	"discarded no market, reason not specified"	"not brought onboard reason not specified"	"not brought onboard gear damage"	"not brought onboard fell out of gear"	"not brought onboard no market value"	"not brought onboard vessel capacity filled"	"not brought onboard not enough fish to pump"	TOTALS
Number of hauls with occurrence	herring nk	2	0	10	0	1	1	0	0	3	0	0	105	**122**
		1.6%	0 %	8.2%	0%	0.8%	0.8%	0 %	0 %	2.5%	0 %	0 %	86.1%	
	fish nk	6	11	14	1	0	5	10	5	3	3	4	138	**200**
		3%	5.5%	7%	0.5%	0%	2.5%	5%	2.5%	1.5%	1.5%	2 %	69 %	
														322
Observed Pounds	herring nk	30,004	0	5,620	0	100	150	0	0	410	0	0	20,622	**56,906**
		52.73%	0 %	9.9%	0 %	0.2%	0.3%	0 %	0 %	0.7%	0 %	0 %	36.2%	
	fish nk	110	692,240	67,065	20	0	90,430	169,450	108,000	4,700	52,000	23,050	72,766	**1,279,831**
		0.01%	54.1%	5.2%	0 %	0 %	7.1%	13.2%	8.4%	0.4%	4.1%	1.8%	5.7%	
														1,336,737

Table 6 Quantification of Fish NK and Herring NK (in Lbs) on Observed Hauls by Limited Access Herring Vessels in 2011

	species group	"kept"	"kept, transferred to other vessel"	"discarded, other"	"discarded, poor quality, gear damage"	"discarded, poor quality, reason not specified"	"discarded no market, retained by observer"	"discarded no market, too small"	"discarded no market, reason not specified"	"not brought onboard reason not specified"	"not brought onboard gear damage"	"not brought onboard fell out of gear"	"not brought onboard no market value"	"not brought onboard vessel capacity filled"	"not brought onboard not enough fish to pump"	TOTALS
Number of hauls with occurrence	herring nk	15	0	32	0	2	6	0	2	7	1	4	0	6	116	**191**
		7.9%	0%	16.8%	0%	1.1%	3.1%	0%	1.1%	3.7%	0.5%	2.1%	0%	3.1%	60.7%	
	fish nk	5	28	5	0	0	0	0	18	27	6	0	6	12	54	**161**
		3.1%	17.4%	3.1%	0%	0%	0%	0%	11.2%	16.8%	3.7%	0%	3.7%	7.5%	33.5%	
																352
Observed Pounds	herring nk	3,947	0	19,353	0	226	3.7	0	30	43,700	300	170	0	32,700	16,248	**116,678**
		3.4%	0%	16.6%	0%	0.2%	0%	0%	0.03%	37.5%	0.3%	0.2%	0%	28%	13.9%	
	fish nk	177,600	2,320,000	14,500	0	0	0	0	389	339,170	394,000	0	78,400	108,500	11,398	**3,443,957**
		5.2%	67.4%	0.4%	0%	0%	0%	0%	0.01%	9.9%	11.4%	0%	2.3%	3.2%	0.3%	
																3,560,635