

1.1 ECONOMIC IMPACTS

1.1.1 Georges Bank haddock accountability measures for the herring fishery

1.1.1.1 No Action (Alternative 1)

When the GB haddock sub-ACL has been caught, all herring vessels fishing with midwater trawl gear are prohibited from fishing for, possessing, or landing, more than 2,000 lb of herring in the GB Haddock AM area (**Error! Reference source not found.**) for the remainder of the multispecies fishing year (April 30). If NMFS determines that total catch exceeded any ACL or sub-ACL for a fishing year, then the amount of the overage shall be subtracted from that ACL or sub-ACL for the fishing year following total catch determination.

The no action alternative will have no additional economic impacts relative to the status quo. MWT vessels will continue to fish in Georges Bank; they will continue to face the risk of closure of the GB herring fishery if the haddock catch cap is reached. In some years the current AM has not imposed direct costs on the fishery, although fishing vessels may have incurred costs associated with trying to avoid haddock during all years. These modifications to normal fishing practices, such as fishing in less ideal places or less efficiently, can have negative economic consequences as well by reducing herring catch rates, increasing costs, or both. In one year the AM were triggered, reducing total catches from Area 3 in both FY2015 and FY2016 with associated negative economic impacts.

1.1.1.2 Alternative 2 – Implement a proactive AM closure and maintain the current reactive AM closure

The series of options developed under this option would implement a smaller, more explicit AM closure proactively that would overlap the areas and seasons with the highest expected bycatch rates of haddock in the herring midwater trawl fishery based on historical observer and survey data. If the herring fishery is estimated to harvest the full sub-ACL (before, during, or after the smaller AM is implemented), the existing AM closure would be implemented (**Error! Reference source not found.**) to help reduce the likelihood of the herring fishery exceeding the annual sub-ACL of GB haddock, and to help prevent overfishing of the GB haddock resource.

In order to assess the potential economic impacts of proactive closures on the MWT fishery the Herring PDT summarized monthly catches inside and outside of the alternative AM areas using data from 2007-2015. This analysis is based on VTR reported landings and fishing locations, prices constructed using dealer data, and the statistical model described in DePiper (2014). Because landings are constructed using VTR data, the reported figures will differ slightly from the official quota monitoring statistics produced by GARFO.

In general, midwater trawl vessels use Area 3 to catch herring and mackerel during the spring and summer months Figure 1. Area 3 is not particularly important in the late fall (Nov) and winter (Dec-Feb), but fishing does pick back up in the spring. Avoiding a summer closure due to high catch of haddock is likely to be important to the portion of industry that uses Area 3 during the winter.

During the June-September period, midwater trawl vessels derive a very large fraction of their revenue from Area 3 Figure 2. These vessels have few other choices about where to fish with that gear type. During the rest of the year (October-May), there are more places for these vessels to fish (Areas 1A, 1B, and 2). The share of landings from Area 3 is more variable from year to year during these months. There is fairly substantial variability from year to year: for example, revenues shares in January-May are typically under 40%; however, in 2-3 years (out of the 9 years), revenues from Area 3 make up over 75% of monthly revenue for the midwater trawl fleet.

This analysis is based on VTR reported landings and fishing locations, prices constructed using dealer data, and the statistical model described in DePiper (2014). Because landings are constructed using VTR data, the reported figures will differ slightly from the official quota monitoring statistics produced by GARFO.

Figure 1 – Total revenue estimated for MWT vessels by month and year from Area 3 only

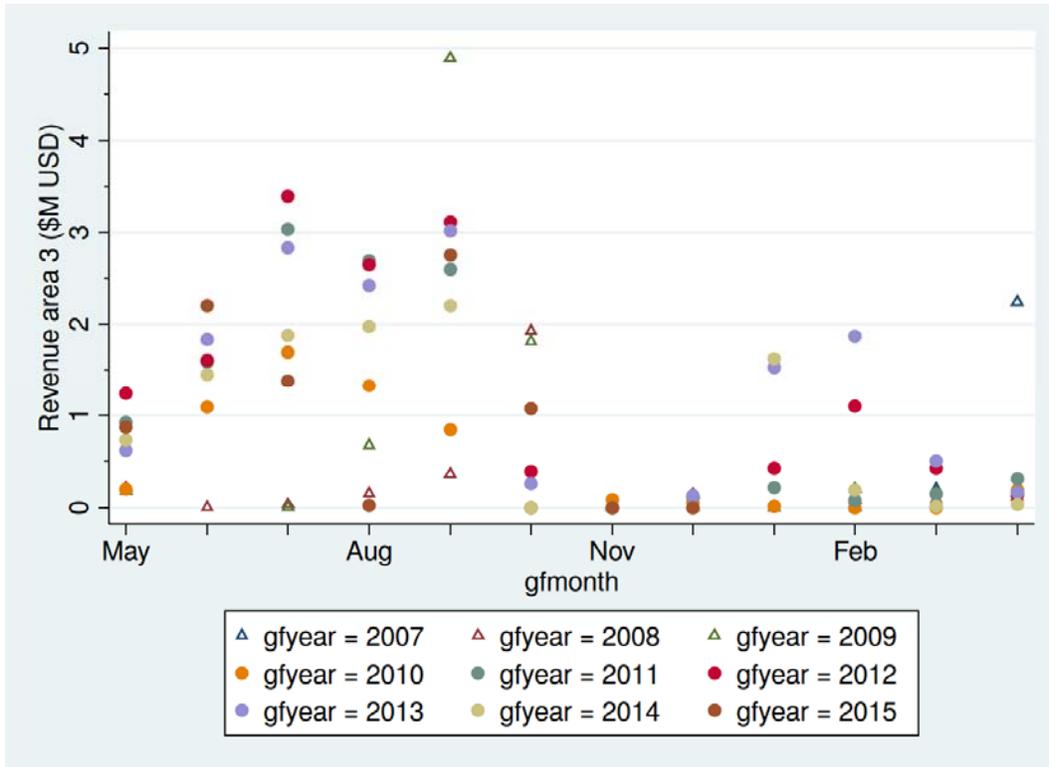
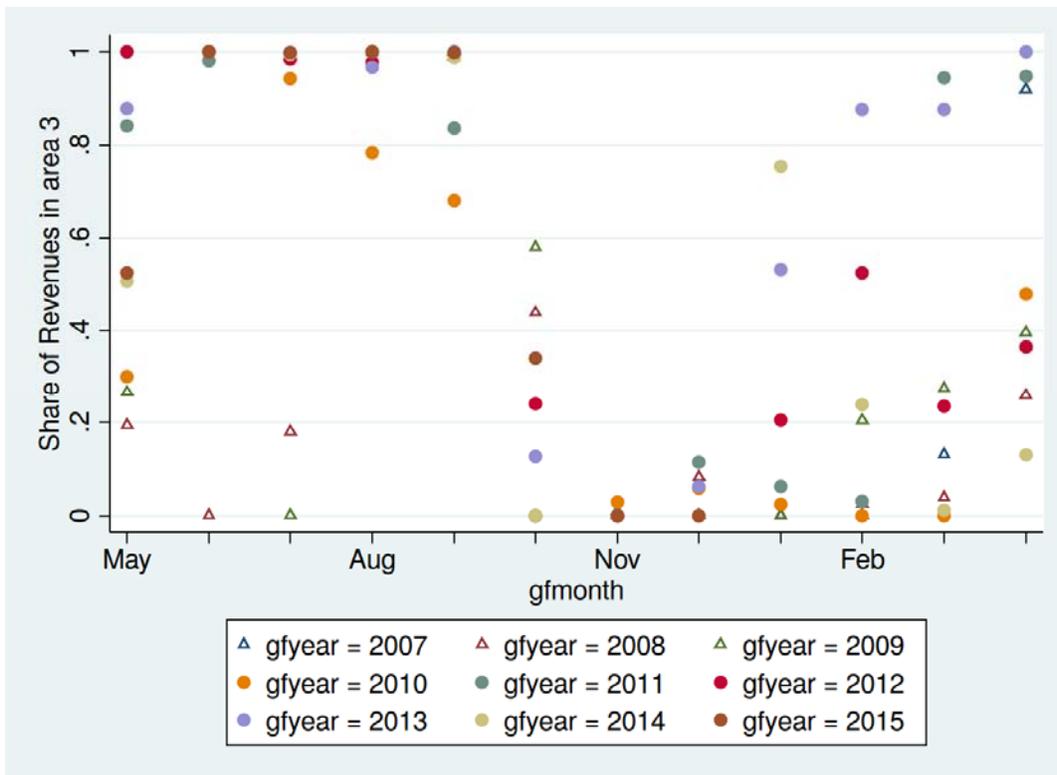


Figure 2 – Revenue share estimates for MWT vessels by month and year from Area 3 compared to all areas



1.1.1.2.1 Alternative 2 Option 1 – Proactive AM closure of GF mortality Closed Areas I and II

Either year-round, or seasonally the current GF closed areas I and II would be closed to the herring MWT fishery to minimize bycatch in-season and minimize the likelihood of implementing the larger reactive in-season closure (**Error! Reference source not found.**).

If CA1 and CA2 are closed, MWT vessels will either fish outside these areas (within Area 3), fish outside Area 3, or they will not fish at all. These alternatives and sub-options will have two impacts on the MWT herring fishery. First, they will have negative impacts by reducing the area available to fish. The magnitude of these impacts is likely to vary based on ocean conditions. These impacts could be relatively large: for example in 2012, the share of MWT landings in CA1 and CA2 was 33% of total MWT landings during June-August. On the other hand, these impacts could be relatively small: in 2013, the share of MWT landings was just 3% of total MWT landings during June-August.

The second impact is that these proactive closures would result in lower catch of haddock and therefore avoid the early closure of the Georges Bank herring fishery (that occurred in 2015). Avoidance of a closure would lead to (potentially) large increases in revenue, relative to the current reactive AM closure. The effectiveness of the proactive closures depends on whether the remaining areas are low haddock catch areas. That is, if herring vessels encounter haddock at the same (or higher) rate outside of the proactive closure areas, then these measures will be ineffective (or counterproductive) at reducing the probability that the Georges Bank herring fishery will be closed due to haddock bycatch.

The MWT fishery typically uses the proposed closure areas (CA1, CA2, CA1plus, and CA2plus) during the summer and fall; there is minimal use of these areas during the winter and spring. Therefore, the directly impacted fishing vessels and trips are very similar under suboptions 1 and 2.

1.1.1.2.1.1 Sub-option for proactive AM season

For this proactive AM closure, three sub-options have been developed for the length of time the proactive measures would be in place: a) year-round proactive closure; b) May-October proactive closure; and c) June-August proactive closure.

SUB 1.

Year-round proactive closures of CA1 and CA2 may have negative impacts on the midwater trawl fishery. These impacts are likely to be quite variable from year to year. If adopted, the PDT expects heavier use of the open portion of Area 3; this may cause crowding on fishing grounds. If the midwater trawl fleet moves to other HMAs as a result of the year-round proactive AM closures, particularly Area 2 during the late fall and early winter; this may increase gear conflict and concerns about harder fishing pressure in nearshore areas. See Table 1 for a summary of the percentage of herring landings (and

Table 4 for a summary of the percentage of mackerel landings) and associated revenues that could be impacted by year-round closures; for herring landings the range is 2% in 2015 and 20% in 2012 and 2009 in terms of annual landings potentially coming from these areas during these months. However, if the proactive closures help prevent the larger reactive AMs from triggering, then some of these potentially negative impacts could be countered by the positive

economic impacts associated with avoiding triggering the larger reactive AM that closes GB entirely for the remainder of the year.

SUB 2.

May-October proactive closures of CA1 and CA2 may have negative impacts on the midwater trawl fishery. The directly impacted MWT trips are likely to be quite similar to the impacted trips in sub-option 1 (year-round closures). These impacts are likely to be quite variable from year to year. If adopted, the PDT expects heavier use of the open portion of Area 3; this may cause crowding on fishing grounds. If the midwater trawl fleet moves to other HMAs as a result of the year-round proactive AM closures, particularly Area 2 during the late fall and early winter; this may increase gear conflict and concerns about harder fishing pressure in nearshore areas. See

Table 2 for a summary of the percentage of herring landings (and

Table 5 for a summary of the percentage of mackerel landings) and associated revenues that could be impacted by year-round closures; for herring landings the range is 4% in 2015 and 37% in 2009 in terms of annual landings potentially coming from these areas during these months. However, if the proactive closures help prevent the larger reactive AMs from triggering, then some of these potentially negative impacts could be countered by the positive economic impacts associated with avoiding triggering the larger reactive AM that closes GB entirely for the remainder of the year.

SUB 3.

June-August proactive closures of CA1 and CA2 may have negative impacts on the midwater trawl fishery. These impacts are likely to be quite variable from year to year, but are expected to be smaller in magnitude than the sub-option 2 and sub-option 1. If adopted, the PDT expects heavier use of the open portion of Area 3; this may cause crowding on fishing grounds. If the midwater trawl fleet moves to other HMAs as a result of the year-round proactive AM closures, particularly Area 2 during the late fall and early winter; this may increase gear conflict and concerns about harder fishing pressure in nearshore areas. See

Table 3 for a summary of the percentage of herring landings (and

Table 6 for a summary of the percentage of mackerel landings) and associated revenues that could be impacted by year-round closures; for herring landings the range is 3% in 2015 and 33% in 2012 in terms of annual landings potentially coming from these areas during these months. However, if the proactive closures help prevent the larger reactive AMs from triggering, then some of these potentially negative impacts could be countered by the positive economic impacts associated with avoiding triggering the larger reactive AM that closes GB entirely for the remainder of the year.

1.1.1.2.2 Alternative 2 Option 2 – Proactive AM closure of GF mortality Closed Areas I and II with 15 nm buffer north of Closed Area 1 and west of Closed Area II

Either year-round, or seasonally the current GF closed areas I and II, including extended areas to the north of Closed Area I and west of Closed Area II would be closed to the herring MWT fishery to minimize bycatch in-season and minimize the likelihood of implementing the larger reactive in-season closure (**Error! Reference source not found.**).

The impacts are similar to the effects described in the overview section. If CA1-plus and CA2-plus are closed, MWT vessels will either fish outside these areas (within Area 3), fish outside Area 3, or they will not fish at all. An additional negative impact of these alternatives is the increases in regulatory complexity associated with another spatial closure. The boundaries of the

groundfish closed areas are well known. Modifications to these areas for the purposes of reducing haddock catch will increase regulatory complexity; vessels and enforcement agencies are not used to these boundaries, so adjustments will need to be made to ensure compliance etc.

1.1.1.2.2.1 Sub-option for proactive AM season

For this proactive AM closure, three sub-options have been developed for the length of time the proactive measures would be in place: a) year-round proactive closure; b) May-October proactive closure; and c) June-August proactive closure.

SUB 1.

Year-round proactive closures of CA1plus and CA2plus may have negative impacts on the midwater trawl fishery. These impacts are likely to be quite variable from year to year. If adopted, the PDT expects heavier use of the open portion of Area 3; this may cause crowding on fishing grounds. If the midwater trawl fleet moves to other HMAs as a result of the year-round proactive AM closures, particularly Area 2 during the late fall and early winter; this may increase gear conflict and concerns about harder fishing pressure in nearshore areas. See Table 1 for a summary of the percentage of herring landings (and

Table 4 for a summary of the percentage of mackerel landings) and associated revenues that could be impacted by year-round closures; for herring landings the range is 11% in 2010 and 29% in 2009 in terms of annual landings potentially coming from these areas during these months. However, if the proactive closures help prevent the larger reactive AMs from triggering, then some of these potentially negative impacts could be countered by the positive economic impacts associated with avoiding triggering the larger reactive AM that closes GB entirely for the remainder of the year.

SUB 2.

May-October proactive closures of CA1plus and CA2plus may have negative impacts on the midwater trawl fishery. The directly impacted MWT trips are likely to be quite similar to the impacted trips in sub-option 1. These impacts are likely to be quite variable from year to year. If adopted, the PDT expects heavier use of the open portion of Area 3; this may cause crowding on fishing grounds. If the midwater trawl fleet moves to other HMAs as a result of the year-round proactive AM closures, particularly Area 2 during the late fall and early winter; this may increase gear conflict and concerns about harder fishing pressure in nearshore areas. See

Table 2 for a summary of the percentage of herring landings (and

Table 5 for a summary of the percentage of mackerel landings) and associated revenues that could be impacted by year-round closures; for herring landings the range is 19% in 2014 and 55% in 2009 in terms of annual landings potentially coming from these areas during these months. However, if the proactive closures help prevent the larger reactive AMs from triggering, then some of these potentially negative impacts could be countered by the positive economic impacts associated with avoiding triggering the larger reactive AM that closes GB entirely for the remainder of the year.

SUB 3.

June-August proactive closures of CA1plus and CA2plus may have negative impacts on the midwater trawl fishery. These impacts are likely to be quite variable from year to year, but are expected to be smaller in magnitude than the sub-option 2 and sub-option1. If adopted, the PDT expects heavier use of the open portion of Area 3; this may cause crowding on fishing grounds. If the midwater trawl fleet moves to other HMAs as a result of the year-round proactive AM closures, particularly Area 2 during the late fall and early winter; this may increase gear conflict and concerns about harder fishing pressure in nearshore areas. See

Table 3 for a summary of the percentage of herring landings (and

Table 6 for a summary of the percentage of mackerel landings) and associated revenues that could be impacted by year-round closures; for herring landings the range is 4% in 2008 and 43% in 2012 in terms of annual landings potentially coming from these areas during these months. However, if the proactive closures help prevent the larger reactive AMs from triggering, then some of these potentially negative impacts could be countered by the positive economic impacts associated with avoiding triggering the larger reactive AM that closes GB entirely for the remainder of the year.

Table 1 – All Herring Landings, MWT Herring Landings, and Share of MWT Herring Landings from the CA1 and CA2 areas in January-December (landings in mt).

Year	All landings	MWT landings	CA1 and CA2 landings	MWT Share from CA1 and CA2	CA1plus and CA2plus landings	MWT Share from CA1plus and CA2plus
2008	80,406	51,592	4,806	9%	6,469	13%
2009	96,750	70,452	13,832	20%	20,206	29%
2010	64,098	51,941	2,735	5%	5,894	11%
2011	79,549	58,669	2,568	4%	10,146	17%
2012	85,497	61,859	12,170	20%	16,650	27%
2013	93,665	62,039	3,596	6%	13,247	21%
2014	90,000	56,918	4,083	7%	6,512	11%
2015	77,582	51,281	1,234	2%	9,288	18%

Table 2 – All Herring Landings, MWT Herring Landings, and Share of MWT Herring Landings from the CA1 and CA2 areas in May-October (landings in mt).

Year	All landings	MWT landings	CA1 and CA2	MWT Share from CA1 and CA2	CA1plus and CA2plus	MWT Share from CA1plus and CA2plus
2008	47,668	20,859	4,692	22%	6,207	30%
2009	58,486	37,012	13,820	37%	20,173	55%
2010	34,690	26,348	2,727	10%	5,816	22%
2011	65,862	49,002	2,557	5%	10,052	21%
2012	60,155	40,606	12,151	30%	16,551	41%
2013	61,417	38,082	3,550	9%	12,973	34%
2014	60,175	33,240	4,043	12%	6,150	19%
2015	56,369	33,297	1,217	4%	9,156	27%

Table 3 – All Herring Landings, MWT Herring Landings, and Share of MWT Herring Landings from the CA1 and CA2 areas in June-August (landings in mt).

Year	All	MWT	CA1	MWT	CA1plus	MWT
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	landings	landings	and CA2 landings	Share from CA1 and CA2	and CA2plus landings	Share from CA1plus and CA2plus
2008	27,811	2,367			96	4%
2009	21,920	3,079	351	11%	864	28%
2010	15,604	12,480	2,133	17%	4,477	36%
2011	33,981	23,183	1,169	5%	4,564	20%
2012	37,785	23,218	7,554	33%	9,892	43%
2013	39,555	20,917	665	3%	4,583	22%
2014	31,444	16,456	525	3%	1,934	12%
2015	32,267	11,941	340	3%	2,349	20%

Table 4 – All Mackerel Landings, MWT Mackerel Landings, and Share of MWT Mackerel Landings from the CA1 and CA2 areas in January-December (landings in mt).

Year	All landings	MWT landings	CA1 and CA2 landings	MWT Share from CA1 and CA2	CA1plus and CA2plus landings	MWT Share from CA1plus and CA2plus
2008	20,734	20,734		0%		0%
2009	19,275	19,275		0%		0%
2010	9,037	9,037		0%		0%
2011	484	484		0%		1%
2012	5,005	5,005		0%		0%
2013	3,941	3,941	31	1%	399	10%
2014	5,922	5,922		0%	164	3%
2015	5,615	5,615		0%		0%

Table 5 – All Mackerel Landings, MWT Mackerel Landings, and Share of MWT Mackerel Landings from the CA1 and CA2 areas in May-October (landings in mt).

Year	All landings	MWT landings	CA1 and CA2	MWT Share from CA1 and CA2	CA1plus and CA2plus	MWT Share from CA1plus and CA2plus
2008	33	33		0%		0%
2009	67	67		0%		5%
2010	148	148		0%		0%
2011	39	39		0%		5%
2012	76	76		0%		8%
2013	112	112		1%		6%
2014	414	414		0%		1%
2015	462	462		0%		1%

Table 6 – All Mackerel Landings, MWT Mackerel Landings, and Share of MWT Mackerel Landings from the CA1 and CA2 areas in June-August (landings in mt).

Year	All landings	MWT landings	CA1 and CA2 landings	MWT Share from CA1 and CA2	CA1plus and CA2plus landings	MWT Share from CA1plus and CA2plus
2008				0%		0%
2009	17	17		0%		4%
2010	45	45		0%		0%
2011	13	13		0%		0%
2012				0%		1%
2013	66	66		2%		8%
2014	51	51		0%		1%
2015	184	184		0%		1%

1.1.2 Implementation of Georges Bank haddock accountability measures for the herring fishery

1.1.2.1 No Action (Alternative 1)

Under No Action, the AM is triggered in-season based on an extrapolation of observed catch to the entire fishery using the cumulative method. If there is an overage of the GB haddock sub-ACL in year one, herring MWT fishing may be further restricted in year 2 to account for the overage. This could have low negative economic impacts if harvest levels are reduced as a result of lower haddock sub-ACL. In some cases however, a reduction in haddock sub-ACL does not impact the fishery because bycatch remains under both the original, as well as the reduced sub-ACL. In most years the Area 3 TAC is not fully harvested when AMs or payback provisions are not triggered, so direct impacts from a potential payback in year 2 are likely very minimal.

1.1.2.2 Alternative 2 - Seasonal split of GB haddock sub-ACL (80%/20%)

Eighty percent of the haddock sub-ACL would be available to the herring fishery on May 1 and the remaining 20% would be added on November 1. If the herring fishery catches more than 80% before November 1, then the existing AM would close to direct midwater trawl herring fishing from that time through October 31. The remaining 20% would become available on November 1 to support a winter herring fishery. The Council clarified that this alternative would not be automatic percentages for splitting the sub-ACL; if adopted, the Council would have the ability to select the seasonal split of the haddock sub-ACL in each specification process.

This alternative may increase the ability for the fishery to harvest the full TAC by reserving some haddock sub-ACL for later in the season, to enable a winter herring/mackerel fishery. Those potential positive impacts may not be shared by all participants in the fishery. Some integrated (or partially integrated) firms have the ability to store herring after it is landed and

supply it at the appropriate time. Other firms do not have this ability or may not prefer to fish for herring and mackerel in the winter.

There may be negative economic impacts as well. If the GB AM is triggered earlier in the year under this alternative because the haddock sub-ACL is reduced from 100% to something lower (80%), there is a higher likelihood of triggering the AM earlier in the season is higher. This would have negative economic impacts on the MWT fishery. The proportion of MWT effort in Area 3 is highest in August and September, suggesting that access to Area 3 is most critical for this gear type during those months. There is a high demand for lobster bait during those months and the MWT fishery is prohibited from fishing in Area 1A during those months; therefore, the areas for MWT vessels to harvest herring during the season lobster bait is most critical is limited. Trawl vessels are not permitted to fish in Area 1A until November, so these vessels would have limited options for fishing areas if the larger AM is triggered earlier before Area 1A is open to MWT vessels. Some MWT vessels fish in Area 2 in the winter, but some do not.

1.1.2.2.1 Seasonal split of GB haddock sub-ACL for FY2017 and FY2018

If adopted, the seasonal split for the GB haddock sub-ACL for FY2017 and FY2018 shall be set at 80% for May 1, and the remaining 20% would be available on November 1, including any underage from the first season (May-October). This option would maintain the split for these two fishing years, and future specification packages would consider whether a split would be used in the future. For FY2017 the split would be 360 mt (or 640.8mt if sub-ACL increased to 1.5% in GF FW56), and for FY2018 the specific values would be revisited next year through the GF specifications process, but they are expected to be even higher than 2017 (**Error! Reference source not found.**). No additional impacts beyond what was assessed in Section 1.1.2.2 are expected.

1.1.2.3 Alternative 3 – Amend how estimated catch is calculated in the herring fishery – incorporate state portside data

This alternative would require that state portside data be incorporated in the monitoring of haddock catch in the midwater trawl herring fishery, if available.

This alternative was not analyzed to date; it will move to the considered and rejected section if GARFO analyses are not ready for final Council meeting (Jan).