

Tracking Catch Against Herring Fishery Catch Caps

Herring Alternatives 2.1-2.4 were evaluated with regard to their impact on monitoring catch caps (haddock and river herring and shad) in the herring fishery. The intent of this analysis is to provide a general characterization of how different alternatives would affect the precision of catch estimates tracked against catch caps. Fishing year (FY) 2015 data were used because haddock and river herring/shad catch caps were in effect for the herring fishery in 2015 and 2015 is the most recent available data. River herring/ shad catch data were from January 1 to December 31, 2015, while haddock data were from May 1, 2015 to March 2, 2016. Due to restrictions placed on the Georges Bank Haddock Accountability Measure Area in October 2015 and the low probability of midwater trawl fishing in the Gulf of Maine, catch tracked against the catch caps is unlikely to change between March 2, 2016, and April 30, 2016. The FY2015 catch data are not finalized and should be considered preliminary.

Estimates of catch tracked against herring fishery catch caps are comprised of both retained and discarded components. In FY2015, incidental retained catch accounted for greater than 99% of the total catch tracked against all catch caps, except for river herring/shad small mesh bottom trawl cap in Southern New England where retained catch accounted for 87% of total catch (Table 1).

TABLE 5. SUMMARY OF PRELIMINARY FY2015 CATCH TRACKED AGAINST CATCH CAPS

Catch Cap Fishery	Catch Cap (mt)	Discard (mt)	Incidental Kept (mt)	Catch (mt)
Haddock: Gulf of Maine Midwater Trawl	14	0.0	0.0	0.0
Haddock: Georges Bank Midwater Trawl	227	0.6	235.0	235.5
Herring-River Herring/Shad: Gulf of Maine Midwater Trawl	86	0.0	11.1	11.1
Herring-River Herring/Shad: Cape Cod Midwater Trawl	13	0.0	0.7	0.7
Herring-River Herring/Shad: Southern New England Bottom Trawl	89	13.1	87.6	100.7
Herring-River Herring/Shad: Southern New England Midwater Trawl	124	0.1	63.9	64.0

Source: GARFO Quota Monitoring Database Archives

Because of the relatively minor influence discards have on total catch tracked against catch caps, catch estimate precision will be sensitive to the type of coverage (NEFOP-level observer, at-sea monitor, or EM and portside) specified in each alternative. Alternatives that increase at-sea monitoring coverage are likely to produce minimal precision improvements, compared to those focusing on NEFOP-level observer coverage or EM/portside sampling coverage. This is because at-sea monitors will only quantify discard catch composition, not retained catch composition, which would be collected by NEFOP-level observers and portside samplers.

The coefficient of variation (CV) is defined for this analysis as the ratio of the standard error of total catch (incidental retained and discards) to estimated total catch is commonly used to quantify the precision of the estimated catch. The CV is sensitive to sample size. In a finite population the CV will converge to zero as the sample size approaches the population size. The total fishing trips within a stratum is considered finite, therefore as sampling coverage approaches 100%, the CV will converge to zero for that stratum. However, it is important to understand that this dynamic only holds for sampling regimes that capture both retained and discarded catch composition. Sampling regimes that only capture one of these components (retained or discarded) will only improve that component's precision, while leaving the precision of the other component unchanged.

For the purpose of this discussion, it was assumed that at-sea monitors would collect data on discarded catch similar to NEFOP-level observers and the vessel estimate would be used for retained catch information for each haul. An EM and portside sampling program does not currently exist for the herring fishery, therefore, its performance is unknown. For the purpose of this discussion, it was assumed that EM and portside sampling would collect data on retained and discarded catch similar to NEFOP-level observers. Thus, for Alternatives 2.3 and 2.4, 100% NEFOP-level observer coverage is used as a proxy for 100% EM and portside sampling coverage.

Herring Alternative 2.1: 100% NEFOP-Level Coverage on Category A and B Vessels

Herring Alternative 2.1 would likely produce CVs of zero for FY2015 haddock and midwater trawl river herring/shad catch caps. All of the FY2015 trips subject to these catch caps were by Category A and B vessels, therefore, under 100% NEFOP-level observer coverage, the CV will converge to zero. The river herring/shad bottom trawl cap for Southern New England was the only catch cap with catch by vessels other than Category A and B vessels, therefore, not all trips that would count against catch caps would be covered by Herring Alternative 2.1. This causes the CV for bottom trawl catch cap estimates to decline, but not converge to zero.

Catch caps apply to trips landing more than 6,600 lb of herring or, in general, to trips by vessels with limited access herring permits (Category A- C). One hundred percent sampling of Category A and B vessels may bias the catch estimate tracked against catch caps by over sampling Category A and B vessels (100% coverage) relative to Category C vessels (SBRM coverage).

Herring Alternative 2.2: 25%-100% ASM Coverage on Category A and B Vessels

Herring Alternative 2.2 will likely have a negligible impact on CVs for catch estimates tracked against catch caps for all proposed coverage targets (25%-100) because FY2015 discards

comprise less than 1% of total catch for most catch caps. The river herring/shad bottom trawl cap in Southern New England is the only catch cap with a substantial discard component; therefore, the impact on the CV for the catch estimate tracked against this cap may be low positive. Furthermore, the sampling bias (described above) towards Category A and B vessels may have more impact on catch estimation than any improvement in CV from increased sampling of the discarded portion of the catch.

Herring Alternative 2.3: Combination Coverage on Category A and B Vessels and Midwater Trawl Fleet

Assuming EM and portside sampling is analogous to NEFOP-level observer coverage, Herring Alternative 2.3 would likely produce CVs of zero for haddock and midwater trawl river herring/shad catch caps covered by 100% EM and portside sampling. The river herring/shad bottom trawl cap in Southern New England is the only catch cap that would not be covered by 100% EM and portside sampling. The impact on the CV for the catch estimate tracked against the river herring/shad bottom trawl cap in Southern New England will be similar to Herring Alternative 2.2 at low positive.

Herring Alternative 2.4: EM and Portside Coverage on Midwater Trawl Fleet

Assuming EM and portside sampling is analogous to NEFOP-level observer coverage, Herring Alternative 2.4 would likely produce CVs of zero for haddock and midwater trawl river herring/shad catch caps covered by 100% EM and portside sampling. The CV for catch estimates tracked against the river herring/shad bottom trawl cap in Southern New England would not be affected by this alternative because EM and portside sampling would not apply to bottom trawl gear.