

**Framework Adjustment 52**

**To the**

**Northeast Multispecies FMP**

**Appendix I**

**Analytic Techniques: Biomass criteria analysis for scaling back the  
windowpane flounder accountability measure**

## ***Overview***

The following analysis describes the development of the biomass criteria for scaling back the windowpane flounder accountability measure (see Option 2/Sub-Option A in Section 4.1.1.2).

## ***Survey Considerations***

Both the northern (GOM-GB) and southern (SNE-MA) windowpane stocks are assessed using the AIM model which is based on the relationship between the total catch and the NEFSC fall trawl survey. The SSC concluded that projections based on the AIM model are too unreliable for ABC determination.

Therefore, three year ABC and ACL specifications were instead estimated from the most recent three year average of the NEFSC fall biomass survey index multiplied by 75% of  $F_{MSY}$  (i.e., relative 75%  $F_{MSY}$  proxy). A three year average used for ABC determination is consistent with the average used for biomass within the AIM model. ABCs are usually set for three years which often also require bridge year assumptions for stocks which have projections. The third year of the constant windowpane ABC catch can be four to five years old when bridge years are considered.

The windowpane flounder ABCs and ACLs assume no increase in stock size over time since projections are not used. Increases in the windowpane stock could likely result in higher catches relative to the ACLs since windowpane flounder are widely spatially distributed (see Figures 11-16 in Section 6.5.10) and are not a targeted species in any fishery (i.e., no possession). Evidence of higher stock biomass that is reflected in the NEFSC fall biomass survey index would suggest the stocks are increasing with the present overages in the catch (see Figures 11 and 13 in Section 6.5.10).

## ***Development of the biomass criteria***

Figure 1 and Figure 2 (top plots) show the NEFSC fall biomass survey index with the centered three year moving average for the northern and southern windowpane flounder stocks. An assumption of the AIM model is that the moving average is an appropriate reflection of stock biomass. The strength of the relationship can be seen in the regression of relative F with the replacement ratio in the 2012 assessment update (see for the northern stock Figure I5d on page 582 and for the southern stock Figure J8d on page 613 of <http://nefsc.noaa.gov/publications/crd/crd1206/>).

The bottom plots in Figure 1 and Figure 2 show the ACLs (red series) used since the beginning of sector based management in 2010. The blue series is the monitoring windowpane catch estimate. With the current AM (see Option 1: No Action in section 4.1.1.1), if the catch (blue series) is above the ACLs (red series) and the small trigger (dashed black line) then the AM would be triggered based on the percentage above the ACL (> 5% dashed black line; > 20% solid black line).

However in this approach, updated fall survey indices could then be used to determine if the large AM area could be scaled back to the small AM area. The green series is the  $75\%F_{MSY}$  proxy (from the 2012 groundfish update assessment) multiplied by the updated centered three year average of the fall NEFSC survey biomass index. A centered three year average was used due to the assumption that the fall survey will be available to make this determination. For example, the average of 2011-2013 fall surveys are used for the 2012 AM trigger determination.

Survey information might only be needed when the catch is greater than 20% above the ACLs to determine if the triggered large AM area might be scaled back, although the survey should probably be monitored for signs of possible stock declines. Continued declines in the survey index would indicate that the specified ABCs were set too high using the current AIM model framework. If the catch is above ACL by greater than 20% and if the most recent 3-year average of the biomass per tow from the Fall NEFSC survey multiplied by  $75\%F_{MSY}$  (green series) is greater than the catch then the AM area could possibly be scaled back from the large area to the small area since this result indicates that exploitation is below  $75\%F_{MSY}$  as defined in the assessment.

Considering the survey information is an attempt to incorporate the stock assessments' estimates of biomass and exploitation directly to determine if a triggered AM can be scaled back by accounting for changes in stock size over time. However, possible changes in the  $F_{MSY}$  reference points will not be incorporated into the ACLs or the updated survey AM trigger method until the next updated assessment is completed.

In addition to the above criteria, the stock must also be rebuilt. The northern stock did not meet either requirement.

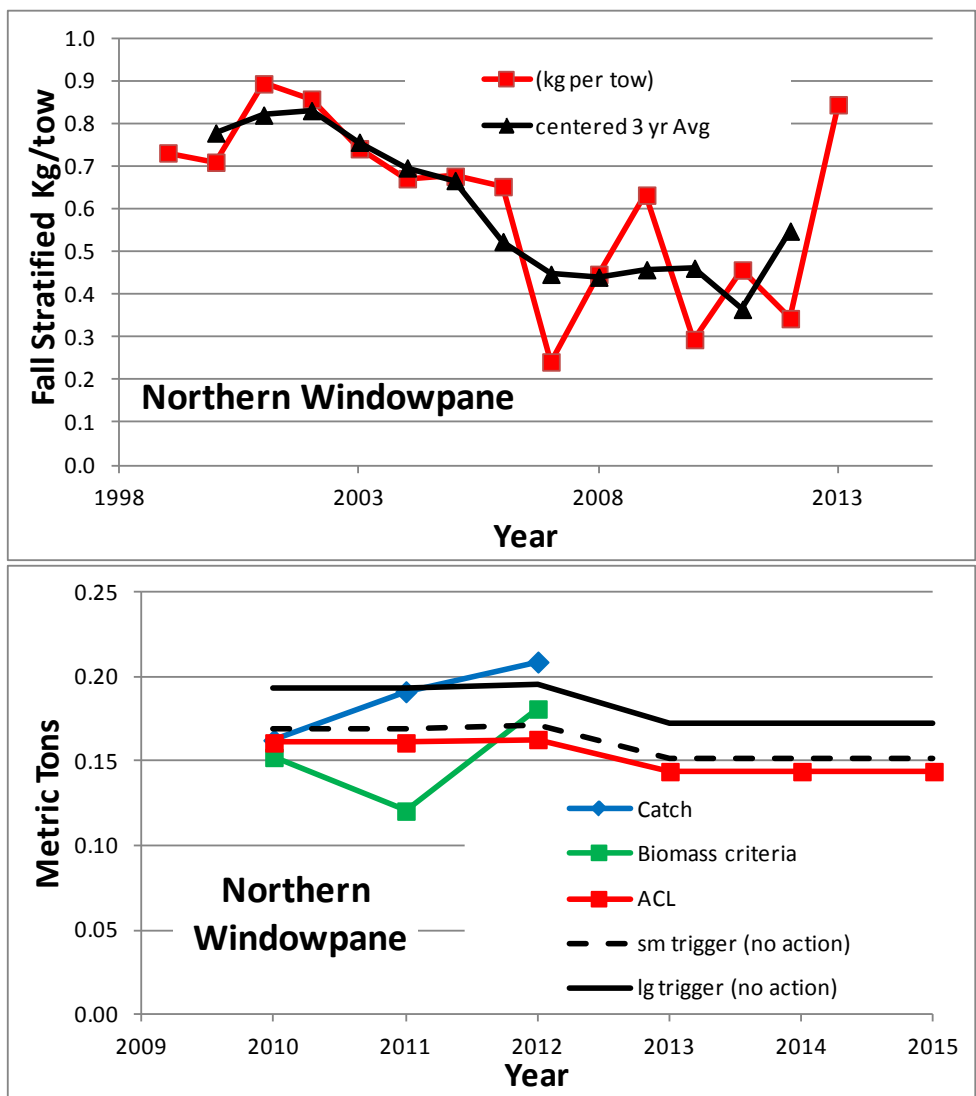
The southern windowpane stock has been declared rebuilt. The southern stock also exceeded the ACL by more the 20% but the biomass criteria (the 3-year average of the biomass per tow from the Fall NEFSC survey multiplied by  $75\%F_{MSY}$  estimate) (green series) was much higher than the catch which implies that the exploitation rate was lower than  $75\%F_{MSY}$  based on the last assessment's  $F_{MSY}$  estimate. The large AM could be considered for scaling back to the smaller AM area for the southern windowpane stock.

### ***Additional analysis to examine patterns in the surveys and catches***

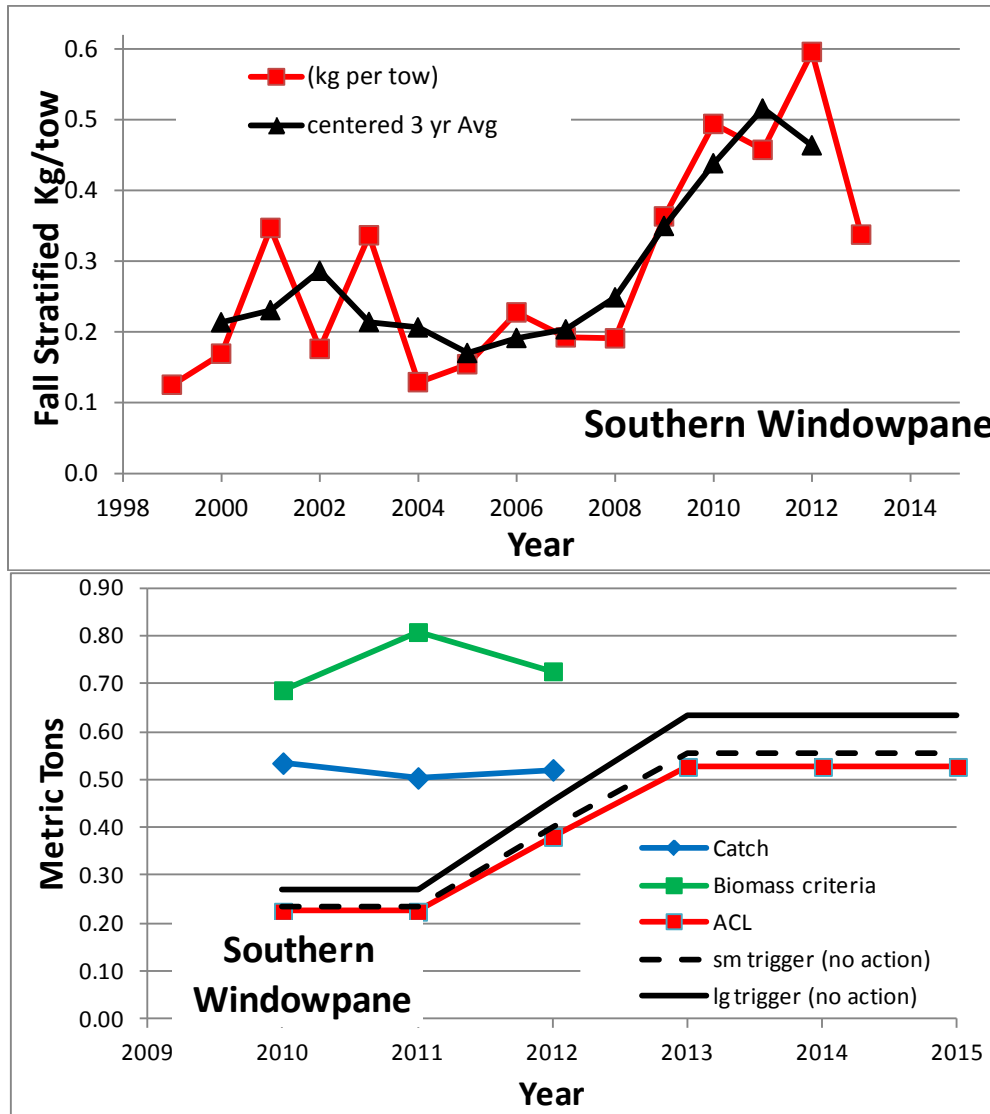
Figure 3 plots the 2011-2013 average / 2008-2010 average ratios comparing the surveys to the catch for the northern and southern windowpane flounder stocks. The distribution of the ratios is calculated from bootstrapping the annual values using the estimated variation for the biomass survey index and catch discard estimates. Estimated ratios greater than one indicate an increase and below one indicate a decrease. Catch was estimated on a calendar year basis because the AA (Area Allocation) tables were used to obtain the longer time series needed for this analysis. The northern (GOM-GB) stock ratios indicate a decrease in the catch (0.54 median) and an increase in the fall biomass index (1.21 median or a 21% increase). The southern (SNE) stock ratios show an increase in the catch (1.43 median) and a similar increase in the biomass as measured by

the fall index (1.36 median). This analysis provides additional information that suggests that AMs could be scaled back.

**Figure 1- NEFSC fall biomass survey index with the centered three year moving average for the northern windowpane flounder stock (top). The bottom figure shows ACLs (red series), windowpane flounder catch estimate (blue), and biomass criteria (update catch at 75%F<sub>MSY</sub> proxy multiplied by the updated centered three year average of the fall NEFSC survey biomass index) (green). Small and large trigger lines are based on the No Action alternative. If the catch (blue series) is above the ACL 20% trigger line (solid black line) and the biomass criteria (green series) is greater than the catch, then the AM area can be scaled down from the large area to the small area. The northern stock does not meet this requirement based on FY 2012 catches.**



**Figure 2- NEFSC fall biomass survey index with the centered three year moving average for the southern windowpane flounder stock (top). The bottom figure shows ACLs (red series), windowpane flounder catch estimate (blue), and biomass criteria (update catch at 75%F<sub>MSY</sub> proxy multiplied by the updated centered three year average of the fall NEFSC survey biomass index) (green). Small and large trigger lines are based on the No Action alternative. If the catch (blue series) is above the ACL 20% trigger line (solid black line) and the biomass criteria (green series) is greater than the catch then the AM area can be scaled down from the large area to the small area. The southern stock does meet this requirement based on FY 2012 catches.**



**Figure 3- Boxplots of the 2011-2013 average / 2008-2010 average ratios comparing the surveys to the catch for the northern and southern windowpane flounder stocks.**

