NORTHEAST SEAFOOD COALITION

DATE: January 17, 2013

TO: New England Fishery Management Council

CC: Scientific and Statistical Committee

RE: Estimation of Fmsy for Groundfish Stocks

Implementation of the Magnuson-Stevens Act requirements to end or prevent overfishing according to the National Standard 1 guidelines requires the determination of Fmsy or, if a direct estimate cannot be determined, a proxy thereof.

Efforts to estimate Fmsy in groundfish assessments have typically applied methodologies that rely in part on an adequate understanding of the stock – recruitment relationship for each stock. In practice, stock-recruitment relationships are difficult to determine for many fish stocks. Accordingly, a range of approaches have been developed to estimate Fmsy, including biomass-based production models, theoretical stock-recruitment models, more generalized stock-recruitment models, and empirical stock-recruitment models.

Nevertheless, instead of presenting the results from different methods to the Council, the 2002 *Final Report of the Working Group on Re-Evaluation of Biological Reference Points for New England Groundfish* chose to simply establish a proxy for Fmsy for groundfish stocks. This choice has had a substantially limiting influence on all future groundfish stock assessments and the advice provided to the Council.
http://www.nefsc.noaa.gov/publications/crd/crd0204/crd0204.pdf

The default proxy chosen by the 2002 Working Group for Fmsy was the Shepherd model (a combination of stock-and-recruitment theory and yield-per-recruitment theory). The Shepherd model is based on a specification of the 'maximum spawning potential' (MSP). Although a range of MSP values are possible, the Working Group chose only 40% MSP.[1] So, in other words, although a large range of alternatives is possible, the Working Group presented the Council with only one method and only one of the many possible versions of the method.

[1] The fishing mortality rate associated with 40% of the MSP of the stock. MSP is defined as the 'spawning stock biomass per recruit in the absence of any fishing' —i.e., when F=0. Thus, the F40%msp proxy means the fishing mortality rate that would reduce spawning stock biomass per recruit to 40% of the unfished level (maximum).

It should be noted that MSP-based proxies for Fmsy assume the stock is in equilibrium. These stocks are not in equilibrium and several more realistic alternatives exist for estimating Fmsy using non-equilibrium methods. Indeed, the scientist who performed the simulations in 1992-3 on which the 2002 Working Group based its advice for using F40%msp as a proxy has since raised his own questions about this methodology in the scientific literature. Although those simulations were for west coast fish stocks, managers of those fisheries have since adopted F35%msp as their proxy for Fmsy.

The GARM III Working Group was unable to define stock-recruitment relationships for most groundfish stocks. Instead of using production models or other available methods that do not require any understanding of the stock-recruitment relationship to directly estimate Fmsy, the Working Group chose to apply the F40%msp proxy for Fmsy for all stocks (ignoring F30%, F20%, etc.), except redfish, for which F50%msp was applied. The GARM III report specifically cites the 2002 Working Group report as justification for their choice. *http://www.nefsc.noaa.gov/saw/garm/Garm%20III_BRPs_report_6june2008_finalCorrected.pdf*

Further, the choice to adopt the F40%msp proxy for Fmsy by the GARM III Working Group has subsequently been cited as the "best scientific information available" in Amendment 16 and subsequent framework actions adopted by the Council including proposed Framework 48. It is clear that the Council was not fully advised of the implications of this approach or the potentially more desirable and scientifically sound alternatives available when making these decisions. As can be seen, the limited advice provided in the 2002 Working Group Report cited above has been perpetuated throughout the groundfish stock assessment and management process.

Two serious questions emerge for the Council's consideration—

1) **Was the specific choice of F40%msp as the proxy for Fmsy appropriate for most groundfish stocks and does it represent the best scientific information available?**

   - The choice of 40% of MSP as opposed to some other percentage of MSP in setting a proxy for Fmsy (overfishing) is inherently arbitrary. It also often generates much greater rebuilding targets that may exceed Bmsy, which may be very difficult if not impossible to achieve within arbitrary MSA rebuilding timeframes. Managers need to understand the important implications this choice has for the specific management goals for each stock.

2) **Is *<u>any</u>* MSP-based proxy for estimating Fmsy appropriate for groundfish stocks and does that represent the best scientific information available? (ie. should we use direct estimates of Fmsy instead)?**

- Overfishing is legally defined according to Fmsy, and technical guidance from NOAA is that Fmsy proxies should only be used when Fmsy is not estimable.
- Since 2002 considerable additional data has been obtained that may support an understanding of the stock-recruitment relationship for some groundfish stocks (including Georges Bank yellowtail flounder) that is adequate to support the direct estimation of Fmsy for specific stocks (but a production model approach does not require assumptions about the stock-recruitment relationship).
- Even when stock-recruitment relationships cannot be determined as is often the case for groundfish stocks, valid production models based on age-aggregated biomass dynamics can be used to provide direct estimates of Fmsy for these stocks.
- MSP-based proxies for Fmsy are not appropriate for groundfish stocks that are not at equilibrium, and alternative non-equilibrium methods are more appropriate.

With these questions in mind, NSC respectfully recommends that the Council submit the following requests to the SSC to be addressed as soon as possible:

1) **Where possible, provide direct estimates of Fmsy for all groundfish stocks.**

2) **Where not possible to provide direct estimates of Fmsy, reevaluate the current Fx%msp proxy taking into consideration what percentage of MSP is most likely to achieve the specific management goals for each applicable stock. This should include an evaluation of the consequences of this choice on the rebuilding target for each stock, and a comparison to available data.**