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## MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

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### M E M O R A N D U M

**TO:** Science and Statistical Committee, Spiny Dogfish Monitoring Committee

**FROM:** Jim Armstrong, Spiny Dogfish Monitoring Committee Chairman

**DATE:** October 27, 2008

**SUBJECT:** Staff Recommendation - Spiny Dogfish Management Measures for the 2009 Fishing Year

A meeting of the ASMFC's Spiny Dogfish Technical Committee (TC) meeting was held October 16, 2008. At that meeting, the latest NEFSC survey catches, landings and discard estimates, fishing mortality estimates, and other indicators of spiny dogfish stock status were presented by Dr. Paul Rago of the Northeast Fisheries Science Center (Center). Following Paul's presentation, the TC discussed the management implications of the updated information, and developed recommendations for a commercial quota and trip-limits for the 2009 fishing year (May 1, 2009 – Apr 30, 2010). The purpose of this memo is to provide the Mid-Atlantic Council's Science and Statistical Committee (SSC) and the Spiny Dogfish Monitoring Committee (MC) with a staff recommendation prior to the October 31 MC meeting on the subject. The staff recommendation contained herein is based on the updated stock status and associated discussion from the TC meeting. In the interest of minimizing duplication, information made available to the TC is referenced in this document and is also forwarded with this memo.

#### **Current Stock and Management Conditions**

##### Stock Biomass

The updated stochastic estimate of mature female biomass (SSB) for 2007 is about 16% above  $SSB_{max}$ , the proxy for  $B_{msy}$  target based on data from 1968 to 1996. Specific estimates of SSB are 194,616 mt under the Commission's plan ( $SSB_{max} = 167,800$  mt) and about 232,000 mt under the Federal plan ( $SSB_{max} = 200,000$  mt). The different SSB and  $SSB_{max}$  values reflect different assumptions in the plans about the average size of the survey trawl "footprint" used to estimate total swept area biomass. This is a scaling factor, however, meaning that the values are functionally equivalent. Technically speaking, no official biomass target exists in the Federal FMP since a biomass target of 90%  $SSB_{max}$  was proposed by the Councils and subsequently rejected by the NMFS in the development/implementation of the Federal FMP. This technicality is expected to be resolved through Framework Adjustment 2 to the FMP, which will permit automatic incorporation of biological reference points into the FMP as they are recommended through peer-reviewed benchmark assessments (such an assessment is expected to occur in

2009). The current 2007 estimate of SSB appears to have a 75% probability of exceeding  $SSB_{max}$ . In comparison to the FMP's biomass threshold ( $1/2 SSB_{max}$ ), within the context of model uncertainty,  $SSB_{2007}$  appears to be associated with a nearly 100% probability that *the stock is not overfished*. (See the attached report)

Other information should be considered with respect to determining the current condition of the stock. Low pup production from 1997 through 2003 has been implicated by survey catches of pups and is further supported by subsequent low survey catches of the size categories these age classes have grown into. Several explanations have been offered to rationalize low pup production. A primary cause is suspected to be low maternal size. In other words, although the estimate of absolute reproductive biomass has increased markedly in recent years, overall fecundity may be lower than fecundity at  $SSB_{max}$  represented in the 1968-1996 time series (the period used in the Ricker model to establish the  $SSB_{max}$  reference point) where maternal size was generally larger. In terms of long-term future trends in stock condition, a decline in SSB is expected as the small 1997-2003 year-classes recruit into the SSB. Another potentially important factor in the survival of pups under current conditions is that the overall male to female sex ratio is skewed strongly toward males (4:1) compared to the 2:1 ratio expected under more natural conditions. The exact cause for this is not understood, however. Finally, as with all fish species, environmental variables are likely to be contributing to recruitment success, but no specific factor has been identified. The important point is that a simplistic comparison of current SSB against the  $SSB_{max}$  reference point may result in overly optimistic conclusions about the condition of the stock.

#### Fishing Mortality

Several sources of removals contribute to the estimate of F for 2007. These include U.S. commercial landings (3,524 mt), Canadian commercial landings (2,328 mt), U.S. discards (6,247 mt), and U.S. recreational landings (37 mt). Total removals in 2007 were approximately 12,136 mt corresponding to an F estimate of 0.1104, well below the overfishing threshold of  $F = 0.39$  and essentially equivalent to  $F_{rebuild} = 0.11$ . The probability that *overfishing is not occurring* ( $F_{2007} < F_{threshold}$ ) is approximately 100%.

#### Projections

Six projections scenarios of stock biomass, landings, and fishing mortality rate were presented at the TC meeting. These included: F-status quo, F-rebuild, F-target (for a rebuilt stock), F-threshold, status quo (2007) landings, and status quo landings plus 5,000 mt. The projection time frame for each scenario was 2008-2027. As the attached report indicates, all of these long-term projections are characterized by oscillations. A sustained decline in projected SSB after about 2011 is, as noted above an expected outcome of the small 1997-2003 year classes. After projected SSB reaches a low level in about 2017, a subsequent increase is expected, however this increase is dependent on the assumption that pup survival rates will increase. (See attached report)

For the purposes of establishing a recommendation, the TC was reluctant to officially declare the stock to be rebuilt. Accordingly, the TC recommended using the rebuilding F value of 0.11 as a target in the 2009 fishing year rather than the  $F = 0.28$  as a 'rebuilt' status would allow. The TC also agreed that the quota should be set for one fishing year since a benchmark Transboundary Resource Assessment Committee (TRAC) assessment is expected to take place in 2009. That assessment is likely to review the current biological reference points, and may endorse an alternative assessment methodology.

## Staff Recommendation

The Monitoring Committee, Joint Committee, and Councils are charged with recommending a commercial quota and other management measures that will "*assure that target F is not exceeded*" in a given year. Given the technical advice that has been developed thus far through the TC, the fact that the Federal FMP does not currently have a biomass target, and the anticipation of a benchmark assessment in 2009, Council staff recommends that target F in 2009 be set at  $F_{\text{rebuild}}$  (0.11). Indeed, it is the opinion of staff that no other option is currently available within the Federal FMP. A summary of specific staff recommendations and the underlying rationale follows:

### Commercial Quota Recommendation

Set quota to achieve  $F = 0.11$  ( $F_{\text{rebuild}}$ ) for 2009. This is roughly equivalent to maintaining status quo F. The quota is projected to be 12,348,156 lbs, or roughly 12 M lbs of combined male and female dogfish. The quota accounts for 5.5 M lbs of Canadian landings and 88,000 lbs of recreational landings (see the highlighted cell in Table 3 in attached report).

### Rationale

This is the first year since rebuilding began in which an assessment update suggests that the stock may be rebuilt. However, there is significant uncertainty as to whether it would be appropriate to officially declare the stock to be "rebuilt" in response to the update. Some of this uncertainty is based on the metric used as proxy for  $B_{\text{msy}}$  (i.e., SSBmax) given the current size distribution of mature females compared to the size structure used to develop the  $B_{\text{msy}}$  proxy. Therefore, a precautionary management response to the 2008 update is more appropriate for 2009 than a major relaxation of regulatory constraints. Nevertheless, constraining harvest to achieve  $F_{\text{rebuild}}$  in 2009 equates to a 50% increase in the ASMFC quota (currently 8 M lbs) and a 200% increase in the federal quota (currently 4 M lbs).

Long term projections suggest that sustained harvest at the F target for a rebuilt stock (0.28) would result in the stock *returning to an overfished status* in approximately ten years. Although SSB is projected to increase afterward, the increase is a function of *assumed* increases in pup production, while the decrease is a function of *observed* low pup numbers.

Continued low pup production when mature female biomass is estimated to have returned to historic levels suggests the presence of some other constraining factor on stock productivity, perhaps the size structure issue mentioned above and/or the skewed ratio of mature males to females (4:1), or other environmental causes.

A benchmark assessment is anticipated for 2009 with the strong possibility that biological reference points (BRPs) will be addressed. Stock status relative to those BRPs may change compared to what is suggested in this year's stock status update. The new assessment may address current and projected stock status in a way that takes into account the relationship between maternal size and pup size and related natural mortality issues for pups.

Although increased removals of male dogfish would not in itself threaten the health of the stock, the Committee expressed concern about how such a fishery (the perennially proposed male-only fishery) would operate: If regulations are adjusted to allow for either a directed or an unrestricted bycatch fishery for males, how will that affect discard F on females? It is expected that the discard F would increase and thus violate assumed discards used to project total catch.

On October 22, 2008, the ASMFC adopted a 12 million lb commercial quota for the 2009 fishing year. An equivalent Federal quota is likely to decrease fishing pressure on the nearshore (mostly female) component of the stock.

#### Trip limits

No specific recommendation, however Federal trip limits could be increased from 600 lbs to 3,000 lbs.

#### Rationale

A 3,000 lb federal trip limit (equivalent to the trip limit recently adopted by the ASMFC) would allow for increased retention of dogfish incidentally captured in Federal (offshore) waters. Based on NEFSC trawl data, dogfish captured 40nm or more offshore are likely to be males as compared to dogfish caught nearshore.

A very large increase in the trip limits (e.g., above 3,000 lbs) runs the risk of exceeding the quota, while a small (e.g., 600 lb) trip limit is likely to result in protracted closures in the EEZ. The exact threshold level for either of these outcomes is unknown; however, the 3,000 lb trip limit in place in state jurisdictional waters in 2007 coincided with a realized  $F$  equivalent to  $F_{\text{rebuild}}$  (0.11).

#### Duration for recommended management measures:

One year

#### Rationale:

Anticipation of benchmark assessment next year, and uncertainties noted above.