New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
John Pappalardo, *Chairman* | Paul J. Howard, *Executive Director*

MEMORANDUM

DATE: September 20, 2010
TO: Habitat Committee
FROM: Michelle Bachman, Habitat PDT
SUBJECT: Review of winter flounder egg EFH designation

Introduction

During Phase 1 of the EFH Omnibus Amendment, the Council voted to increase the maximum depth for winter flounder egg EFH from 5 meters to 20 meters. Since the Phase 1 EFH designations were developed, additional years of sampling data for New York Harbor have been collected. This memorandum provides background information related to the issue and concludes with the Habitat PDT's recommended course of action. There are two primary options before the committee, although other intermediate options could be considered as well.

1. Maintain maximum depth for winter flounder egg EFH as 5m (status quo alternative)
2. Increase maximum depth for winter flounder egg EFH to 20m (Phase I preferred alternative)

Background

Winter flounder are unique among the federally-managed fish species in the NE region because 1) they produce demersal eggs that adhere to the bottom, 2) they spawn in late winter – early spring, and 3) they spawn in very shallow coastal water where the majority of human impacts occur. Protection of EFH for winter flounder is a primary concern for the NERO Habitat Conservation Division in reviewing permit applications for projects like harbor dredging. The status quo EFH designation for winter flounder eggs defines the maximum depth for EFH as 5 meters. This depth range has been in force since 1998 when EFH designations in the NE region were first implemented.

A change in the maximum depth for winter flounder egg EFH from 5 to 20 meters poses two new issues. 1) Projects that propose to dredge shallow water habitat (less than 5 m) to deeper depths to accommodate large ships would no longer be considered as having a significant adverse effect to winter flounder egg EFH if the final depths do not exceed 20 m. Since many such proposals currently exist, this will lead to significant and unmitigated losses of shallow water habitats. 2) Routine maintenance dredging of navigation channels (5-20 m deep) may be subject to additional conservation measures to avoid and minimize adverse effects to winter flounder egg EFH, such as restrictions on the time of year in which dredging operations could occur. Such time of year restrictions may not be warranted if deep channel

bottoms are not truly important habitat for winter flounder eggs. Unnecessary time-of-year restrictions are costly, and complicate project planning and logistics. The repercussions of designating winter flounder egg EFH to a depth of 20 m would be significant, particularly for coastal dredging projects and protection of shallow water habitats. The Council needs to have a good justification for either changing the status quo designation, or for not changing it. The new information needs to be carefully evaluated.

The status quo maximum depth limit was based on information in the 1999 EFH Source Document for winter flounder (Pereira et al. 1999) that summarizes the results of a limited number of shallow-water surveys conducted in Connecticut (Mystic River), Rhode Island (coastal salt ponds), and New Jersey (Manasquan, Navesink, and Shrewsbury Rivers). Sampling in all cases was limited to depths <5 meters. Since the publication of the original source document, new information has become available. One source (Schultz et al. 2007) reports on the results of winter egg survey work done in Milford and New Haven (CT) harbors. Eggs were collected at depths up to 7-8 meters, the maximum sampling depth.

The most important new source of information is a series of annual reports produced for the U.S. Army Corps of Engineers (ACOE) in the New York Harbor area. Eggs were collected at depths between 5 and 60 feet (1.5-18 m), the maximum sampling depth. Based on this information, the Council approved a new maximum depth of 20 meters for winter flounder egg EFH in the DEIS for Phase 1 of the Omnibus EFH Amendment 2. Since that time (June 2007), the ACOE has requested that this decision be re-considered, using data from their surveys, including data not available to the PDT that were collected during 2008-2010. A preliminary presentation was made to the PDT in March 2009 and a follow up presentation was made on September 16, 2010.

ACOE Surveys

The ACOE, using contracted services, has been sampling winter flounder eggs in the New York Harbor every year from 1999- present as part of a much broader biological survey effort. Eggs are collected using an epibenthic sled with attached plankton net that is towed along the bottom at pre-selected stations during February-April. Sampling is conducted in the upper and lower Bay in deeper shipping channels (30-60 feet, 9-18 m) that have been dredged into the natural shallow-water environment, and also in shallower non-channel areas (5-30 ft, 1.5-9 m). Egg densities per 1000 cubic meters of water are calculated for each tow using a flow-meter that is mounted in the mouth of the net.

Egg density by depth

In developing its recommendation during Phase 1, the PDT relied on ACOE data collected during 2002 and 2003 which showed that egg densities were not statistically different between channel (deep) and non-channel (shallow) stations (ACOE 2004). A longer time series of data (1999-2005) also failed to show any relationship between egg densities and depth.[1] However, during each year between 2007 and

[1] Another source of information that supported the >5 meter maximum depth was a verbal communication from the CT DEP that winter flounder eggs were collected at depths of about 40 feet at three stations on the north shore of Long Island as part of a biological monitoring survey for the Shoreham Nuclear Power Plant. This report has not been verified.

2010, more eggs were collected in non-channel (shallow) stations.[2] Also, early stage eggs (less than 2 days old) were more often collected at non-channel stations. This is assumed to indicate that non-channel stations provide preferred spawning habitat. Bottom temperature appears to influence inter-annual variability in egg distribution by depth: the data suggest that higher collections in channel areas occur during colder years.

In March 2009 and again on September 16, the PDT discussed that a major difficulty with interpreting this data set is that the human impacts differ between channel and non-channel stations, as the channels are used routinely by many vessels for navigational purposes. Thus, it is difficult to assess whether differences in egg density between channel and non-channel stations is due to depth, magnitude of disturbance, or a combination of factors. In response to this concern, in 2010 the ACOE added three new deep, non-channel stations (i.e. naturally deep stations) in the Lower Bay survey area where most of the eggs are found. Although data for these stations only was not included formally in the presentation to the PDT, when asked, the ACOE staff responded that few if any eggs were caught at the naturally deep stations.

Factors contributing to egg viability

For the first time in 2009 and 2010, non-viable as well as viable eggs were counted in order to determine if eggs in the shipping channels were being dislodged from more suitable shallow-water areas, re-suspended in the water column, and being re-deposited in the deeper channels where bottom current velocities are probably lower. Schultz et al (2007) speculated that eggs laid in high current areas (velocities >1 knot) are removed from the bottom and re-deposited in low current areas. The adhesive properties of winter flounder eggs are not very strong and degrade as they approach hatching (Doug Clarke, ACOE, pers. comm.). However, it isn't known whether an egg that has been removed from its original location and re-settles to the bottom is less likely to hatch than an un-disturbed egg, although it is known that once dislodged from the bottom, they don't stick to the substrate. The 2009 and 2010 ACOE data indicates that the percentage of non-viable eggs was similar in channel and non-channel stations.

The PDT asked whether substrate type influenced egg density, and noted that the critical shear stress required to move different types of substrate could influence egg adhesion. Apparently, winter flounder are generalist spawners with regards to substrate, and while the substrate in the study area ranges from clay to silty sand, there is no evidence of differences in egg density between substrate types.

The other factor that could reduce the quality of benthic habitat as EFH for winter flounder eggs is sedimentation. It has been estimated that if an egg is buried to half its diameter (1 mm) by fine sediment settling out of the water column before it hatches (incubation time 2-3 weeks), hatching success will be impaired (Walter Berry, USEPA, pers comm.). However, the PDT is not aware of any sedimentation rate data for the New York Harbor area, or anywhere else, that could shed any light on this topic, nor do we know if bottom current velocities and sedimentation rates (which would be related) are, in fact, lower in the shipping channels than in the adjacent shallow-water areas.

[2] Statistical tests for differences in mean densities between habitats are complicated by the fact that the tow by tow data are very noisy with a large number of low catches and a few large ones.

PDT recommendation

The PDT recommends reverting to the status quo (5 m) option as the preferred alternative for winter flounder egg EFH designation, for two reasons.

1. Although it is perhaps counterintuitive that a more restricted EFH designation would better protect the stock, the 5 m maximum depth designation would be expected to benefit winter flounder as compared to the 20 m designation, because any projects that dredge shallow water habitats to depths deeper than 5 m would constitute a removal of EFH and would be more likely to be disapproved or modified for conservation purposes. The PDT discussed that in general, broader EFH designations may be more appropriate for overfished stocks, but that in this instance, a narrow EFH designation is more appropriate from a conservation perspective.

2. Although the NY Harbor data indicate presence of winter flounder eggs in deeper habitat (to approximately 18 m), during 7 of 9 years from 2002 through 2010, mean egg density is higher at the non-channel stations as compared to the channel stations (however, note that significance testing of these relationships are ongoing). However, the data are complicated to interpret because disturbance and depth are confounded in the shallow/non-channel vs. deep/channel sampling design, with only a single year of data for the deep/non-channel stations. Unfortunately, evidence for the presence of winter flounder eggs in deeper waters other than in NY Harbor is not available.

References

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