Dredging Windows Workshop
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Aquatic Biological Survey – Winter Flounder

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Introduction

- HDP Data Collection
- Biological Data Findings (Winter Flounder)
  - Egg Density vs. Depth
  - Egg Staging
  - Effects of Temperature
- Physical Data Findings (Total Suspended Solids)
- Summary of Data Applications
  - Local
  - Regional
HDP Data Collection

Background

- Harbor Deepening Project (HDP) is ongoing in NY/NJ to deepen selected channels to 50 feet
  - Aquatic Sampling Gear Comparison Study
  - Statistics Report
  - 1998 – 2010 data collected on winter flounder and other managed species as part of the ongoing Aquatic Biological Survey (ABS)
  - Harbor-Wide Water Quality/Total Suspended Solids (WQ/TSS) Monitoring
Aquatic Biological Survey (ABS)

- Tiger Team of Experts Convened in 1998
  - NAN Biologists
  - ERDC
  - Consultant Support

- Adaptive long-term monitoring program to study the spatial and temporal occurrence of adult spawning winter flounder and early life stage use in NY/NJ Harbor

- Targeted Winter Flounder early life stages, in response to NOAA-F concerns for impacts to EFH resources
ABS Station Locations

- **Deep Water (Channel) Stations**
- **Shallow (Non-Channel) Stations**
ABS Methodology

30-ft bottom trawls

epibenthic sled-mounted 0.5-m plankton nets (0.5-mm mesh)
Egg Density vs. Depth?

What depth is preferred by winter flounder for spawning?
Where in the Harbor were Eggs Collected?

![Bar chart showing mean egg density from 2002 to 2010 for AK/NB, LB, and UB. The chart indicates UB has the highest mean egg density, followed by LB, with AK/NB having the lowest.](chart.png)
Shallow Areas (<6m) Are Preferred Spawning Habitat
Early Life-History Stages

- An innovative sequential staging method based on developmental characteristics. Martin & Drewry (1978), Schultz et al. (2007)


- Staging enables us to distinguish between eggs that were recently deposited from those that are more developed, which may have moved from the site of their deposition.
Egg Stages

Stage 1
Early Cleavage (< 1 day)

Stage 2
Blastula (1-2 days)

Stage 3
Gastrula (2-3 days)
Stage 4
Early Embryo (4-15 days)

Stage 5
Late Embryo (>15 days)
Inter-annual Variation in Egg Densities in Channel versus Shallow Stations
Temperature Profiles for ABS Sampling Years

- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010

°C
ABS Data Summary (early life stages)

- Eggs are collected at highest densities in the non-channel habitat
- Eggs are uncommon at channel stations in most years
- Egg collections in channels coincide with years with severe cold temperatures, which delay egg development and allow more time for transport from the spawning site
- Nearly all (98%) newly spawned eggs (stages 1 and 2, less than 48 hours old) were collected at non-channel stations. Samples that contained multiple egg stages (presumably from multiple spawning events, which is indicative of spawning sites or sinks) were collected almost exclusively at non-channel stations.
Conclusion

The ABS data demonstrates that winter flounder spawning occurs in shallow water habitat (typically <6 meters)
NMFS Conservation Recommendations

• Habitat Removal
• Entrainment
• Essential Fish Habitat Function
• Sediment Resuspension

States Water Quality Certificates

• Best Management Practices (BMPs) related to Sediment Resuspension
  ► Bucket requirements
  ► Controlling rate of ascent
  ► Prohibition of overflow
  ► Seasonal Restrictions
Harborwide WQ/TSS Monitoring

- Mobile ADCP, fixed OBS arrays and WQ sampling.

- Determine spatial structure and temporal dynamics of sediment plume.

- 13 TSS studies
  - Different sediment types
  - Different equipment types
  - Different Hydrodynamic Conditions
WQ/TSS Surveys
ADCP Results Depicted in 3-D

Maximum TSS concentrations typically do not exceed 300 mg/l

Quickly dissipate within 500 meters down current

Plumes do not extend onto the flats – remain in channel

Bathymetry provided by: US Army Corps of Engineers, NY District

○ = Dredge Location
In General

The TSS studies we have done demonstrate that plumes quickly dissipate within a short distance down current of dredge and we don’t see large lateral diffusion (i.e., plumes do not extend onto the flats, remain in channel)
Application of ABS Data

- **Local:**
  - Based on ABS data analyses, shallow water is used as winter flounder spawning habitat.
  - Deep water (not designated as EFH for winter flounder) should be exempt from seasonal restrictions.

- **Regional:**
  - ABS data was used by NOAA and NEFMC to inform decision makers who voted to keep the EFH designation for Winter Flounder Eggs at 5m rather than redesignate to 20m
Applying ABS Data to EFH Redesignation

Fall 2007:
- NAN is informed of proposed Winter Flounder EFH redesignation from the current 5m (15 ft) down to 20m (60 ft).

Spring/Fall 2008:
- NAN & NAD coordinate with NOAA-F Regional Office
  - Proposed Fisheries Management Plan/ Omnibus EFH Amendment 2
    - New England Fishery Management Council (NEFMC)
    - Phase I – EFH designations & Phase II - minimize fishing impacts

Winter 2009 – Winter 2011
- NAN ABS technical team present ABS data to NOAA-F & NEFMC Habitat Plan Development Team (PDT) and attend NEFMC Habitat Committee meetings
Regional Coordination Success  
(10 March 2011)

- NEFMC Habitat Committee voted unanimously to keep EFH designation for Winter Flounder Eggs at 5m rather than move to 20m

- “Sub-tidal estuarine and coastal benthic habitats with substrates of mud, sand, muddy sand, gravel and/or submerged aquatic vegetation, from mean low water to 5 meters from Cape Cod to Delaware Bay, and to 70 meters in the gulf of Maine”
Questions?