

New York District – US Army Corps of Engineers

Dredging Windows Workshop

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Aquatic Biological Survey – Winter Flounder

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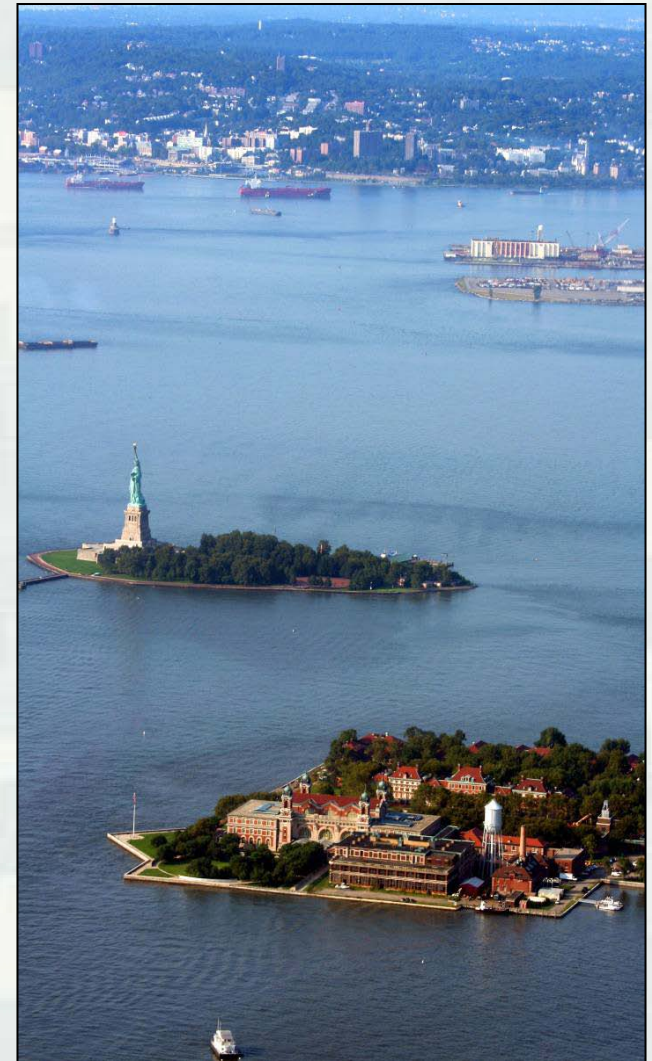
Introduction

- 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

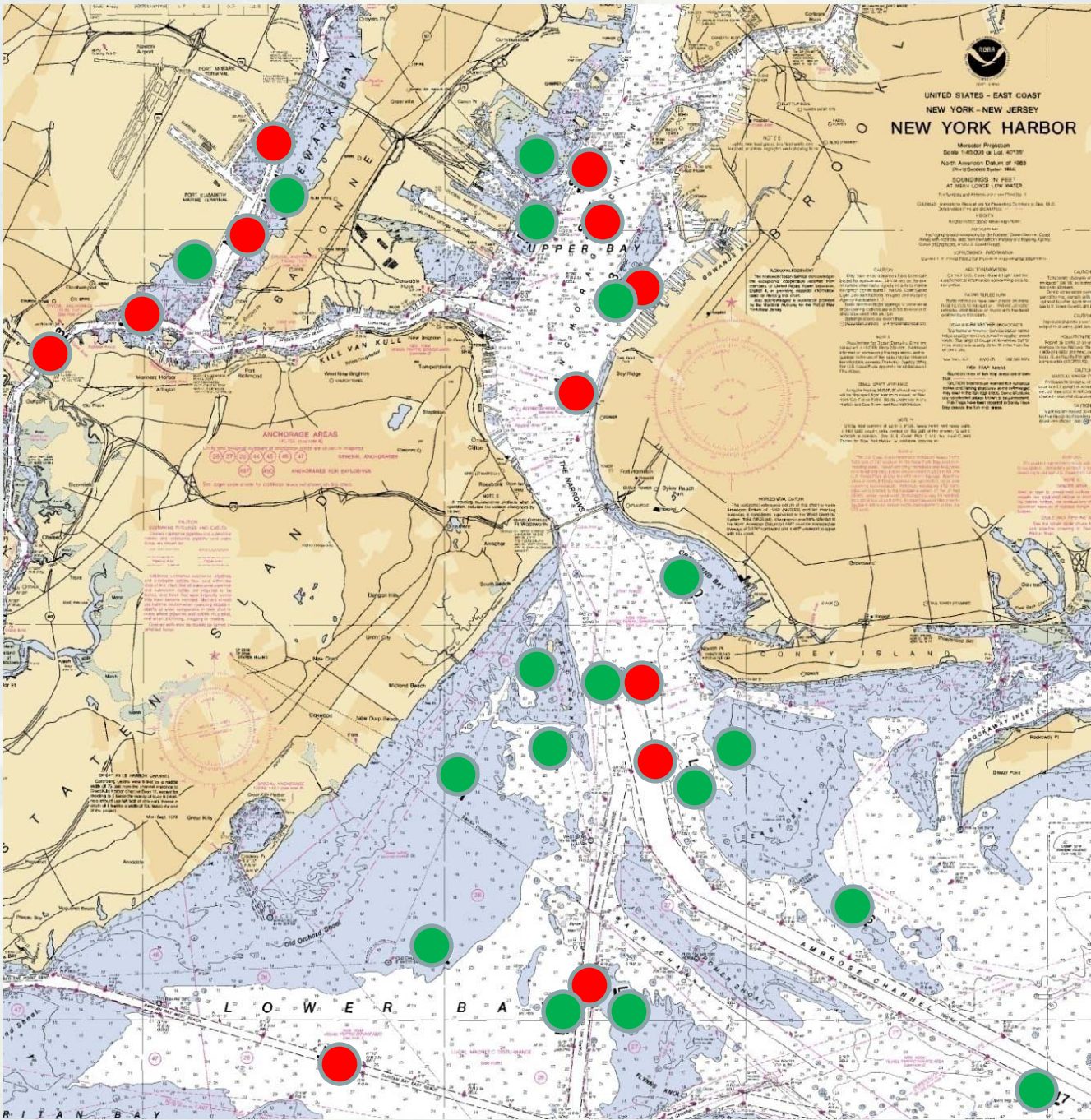
- Harbor Deepening Project (HDP) is ongoing in NY/NJ to deepen selected channels to 50 feet
 - ▶ Aquatic Sampling Gear Comparison Study
 - ▶ Statistics Report
 - ▶ 1998 – 2010 data collected on winter flounder and other managed species as part of the ongoing Aquatic Biological Survey (ABS)
 - ▶ Harbor-Wide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



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ABS Methodology



30-ft bottom trawls

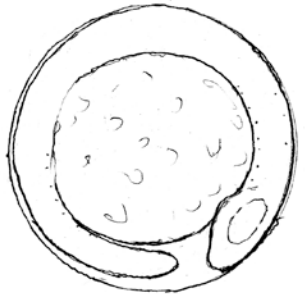
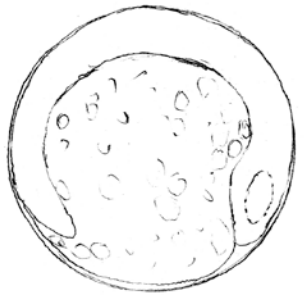


**epibenthic sled-mounted 0.5-m
plankton nets (0.5-mm mesh)**



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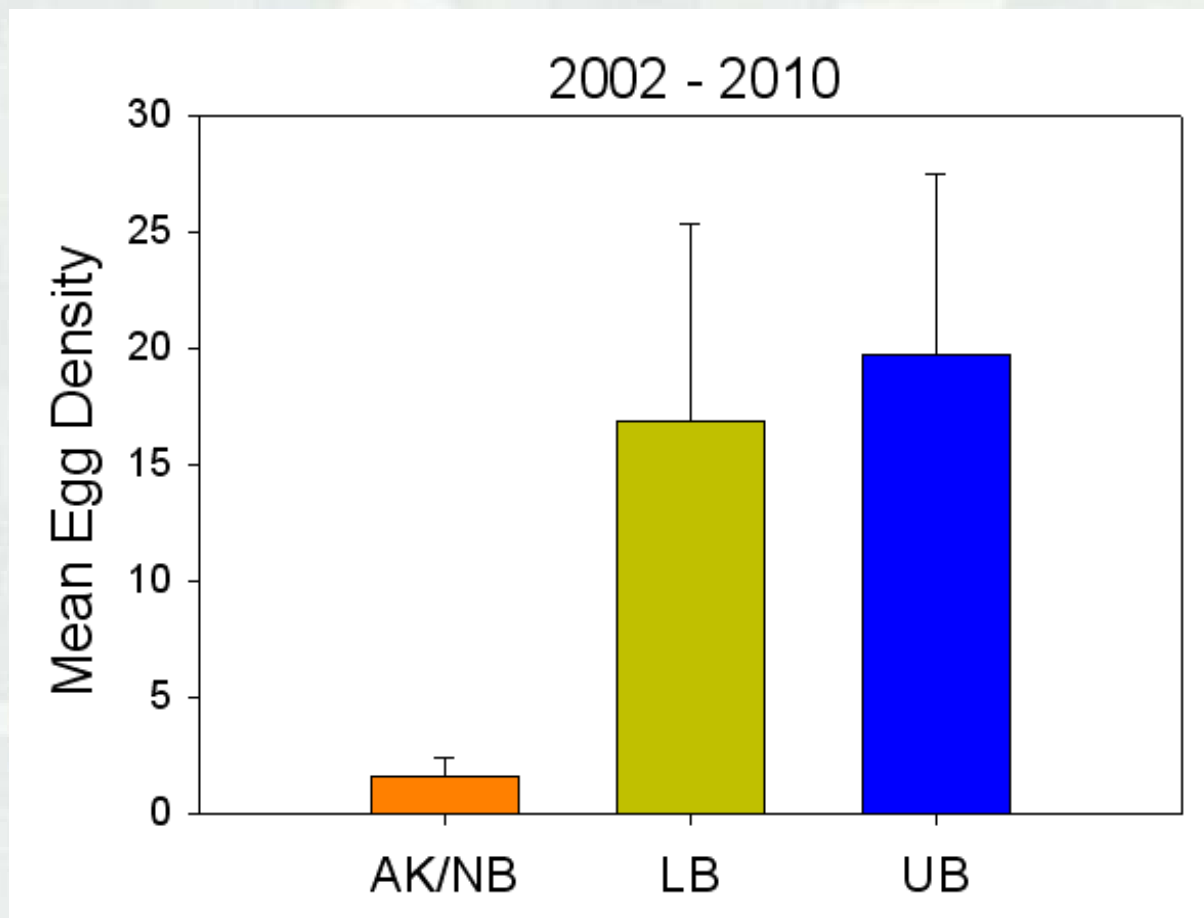
Egg Density vs. Depth?



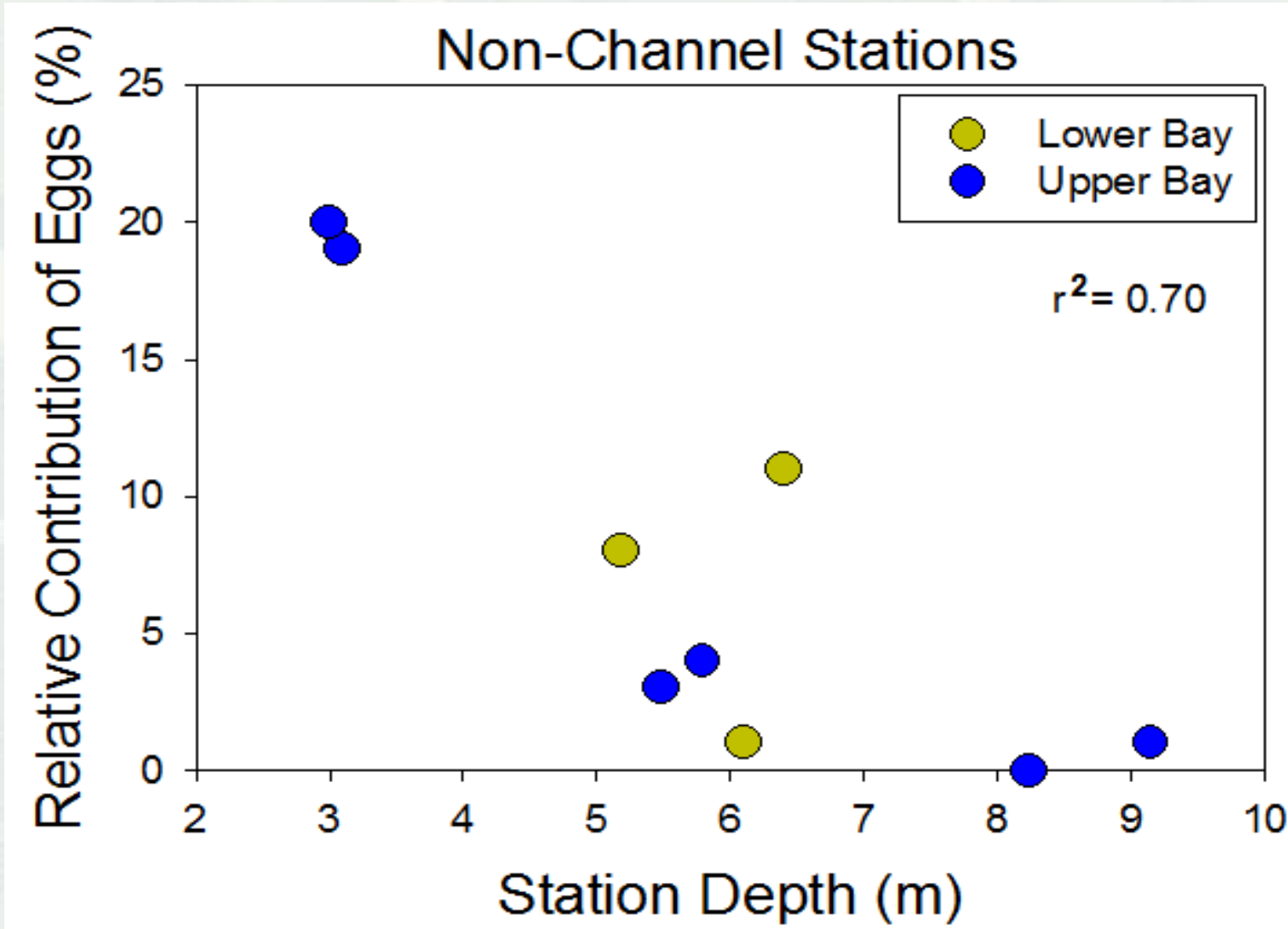
What depth is preferred by winter flounder for spawning?



Where in the Harbor were Eggs Collected?



Shallow Areas (<6m) Are Preferred Spawning Habitat



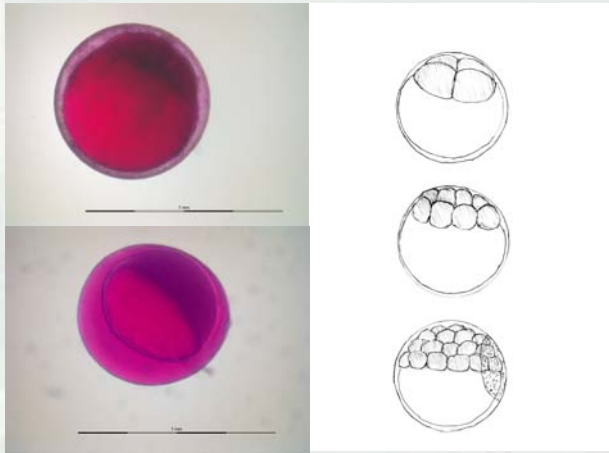
Early Life-History Stages

- An innovative sequential staging method based on developmental characteristics. Martin & Drewry (1978), Schultz *et al.* (2007)
- Staging of larvae began in 2007 & staging of eggs began in 2008.
- 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.

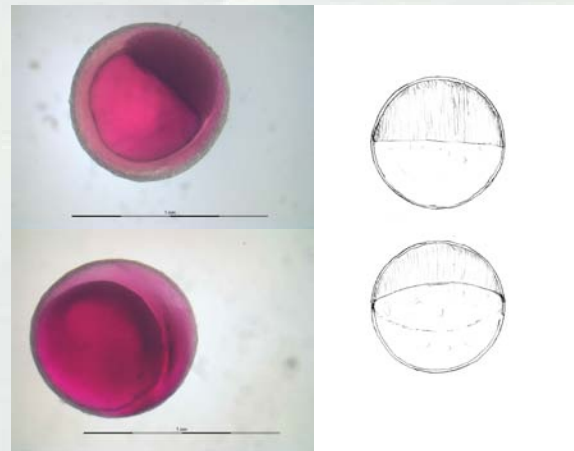


Egg Stages

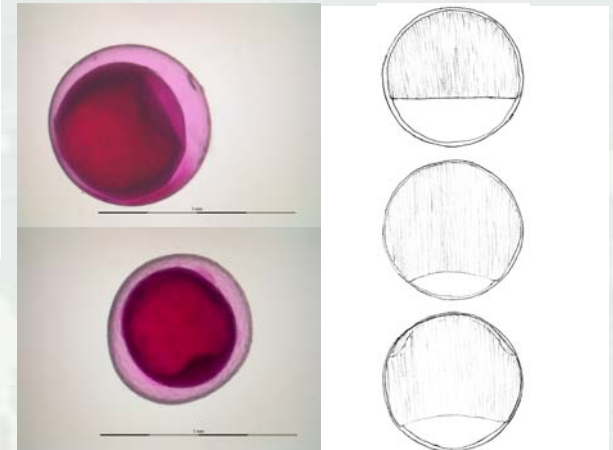
Stage 1 Early Cleavage (< 1 day)



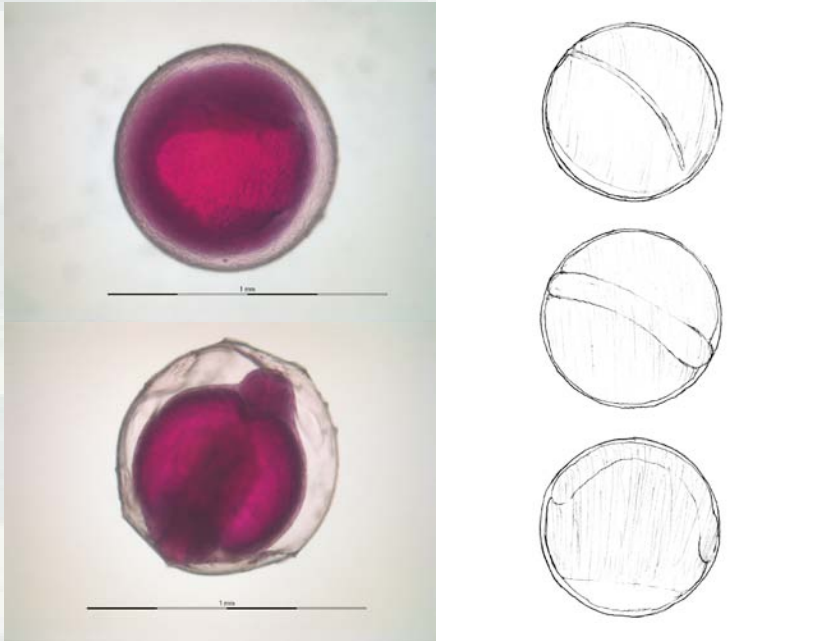
Stage 2 Blastula (1 -2 days)



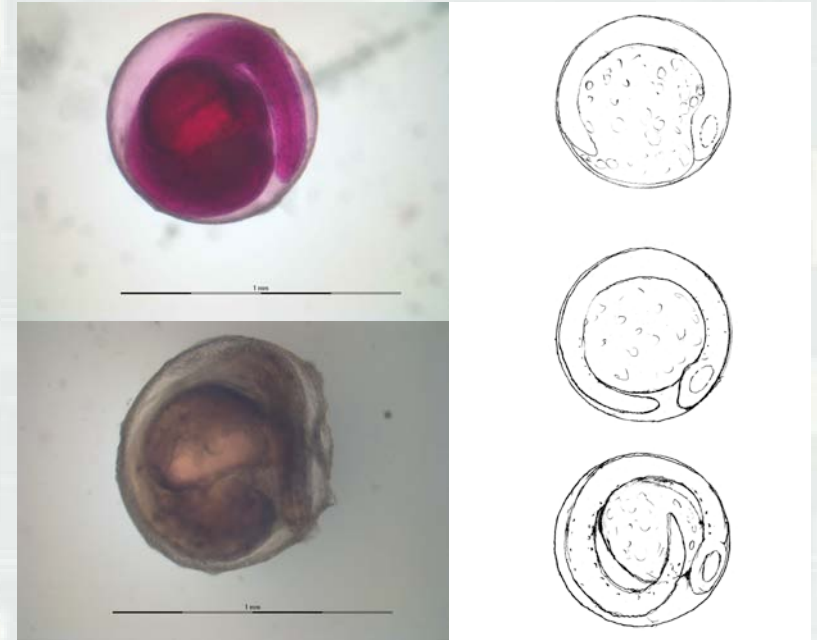
Stage 3 Gastrula (2-3 days)

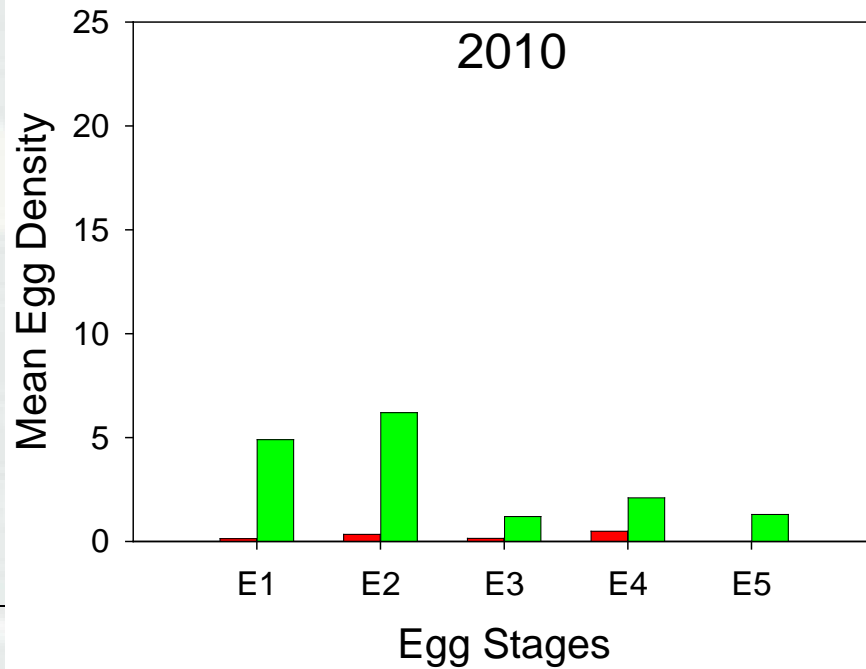
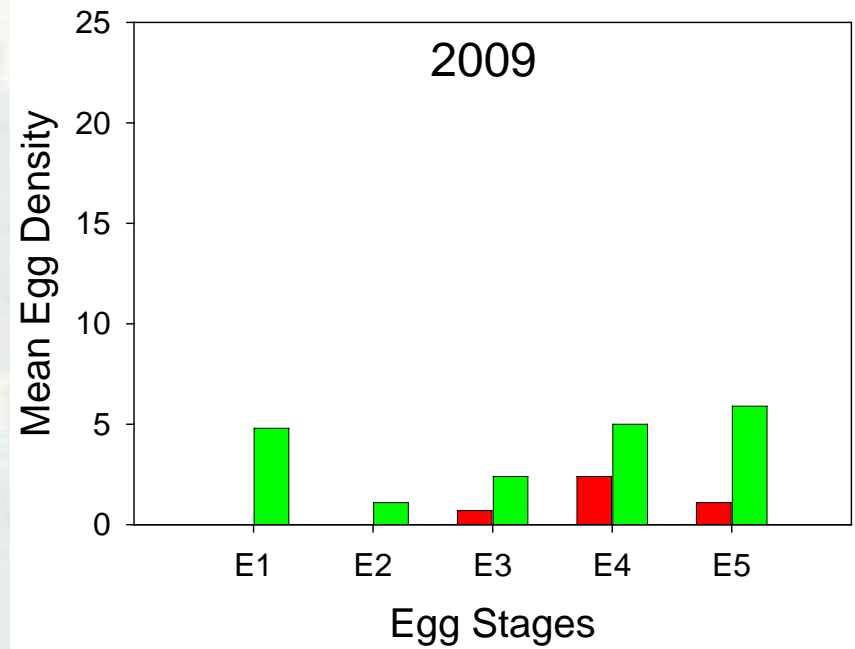
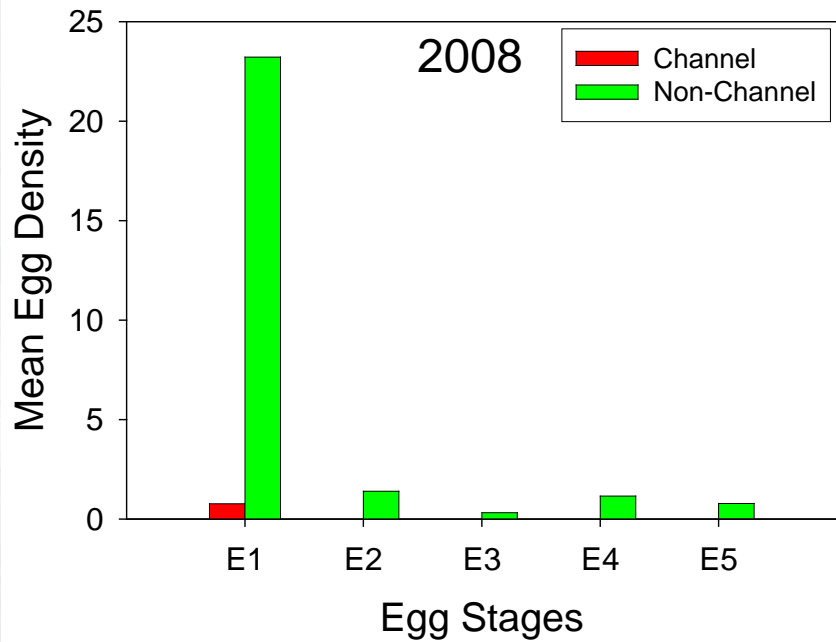


Stage 4 Early Embryo (4-15 days)

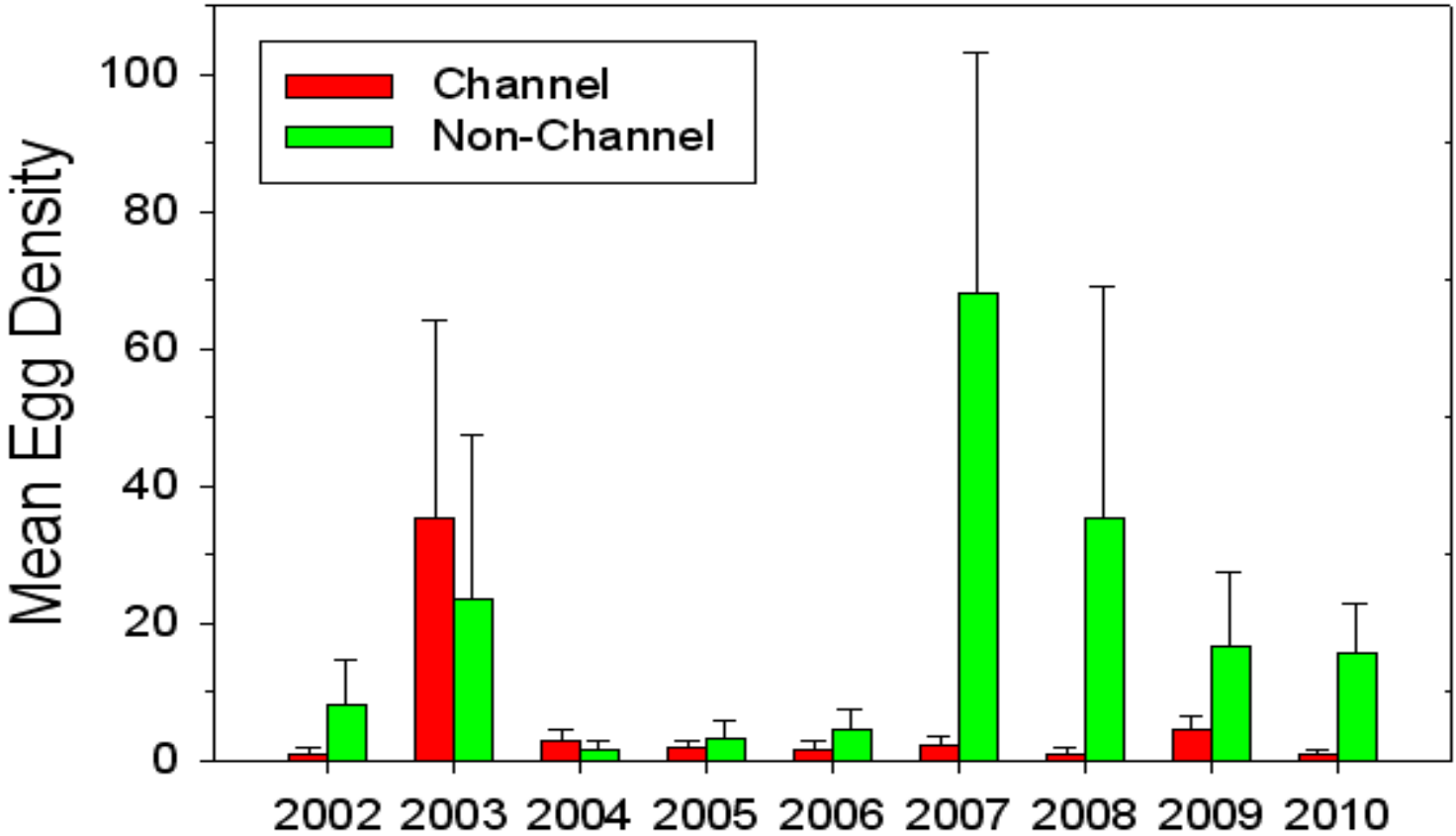


Stage 5 Late Embryo (>15 days)

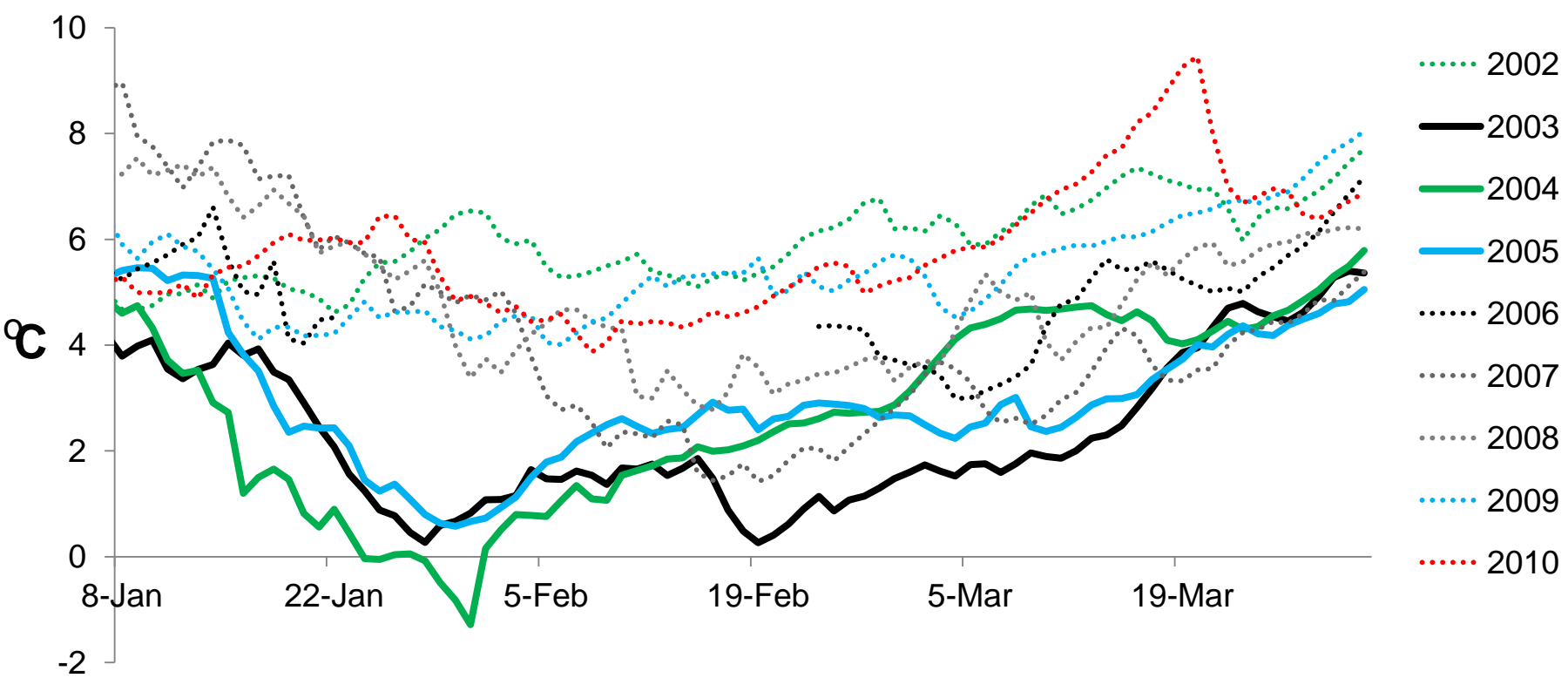


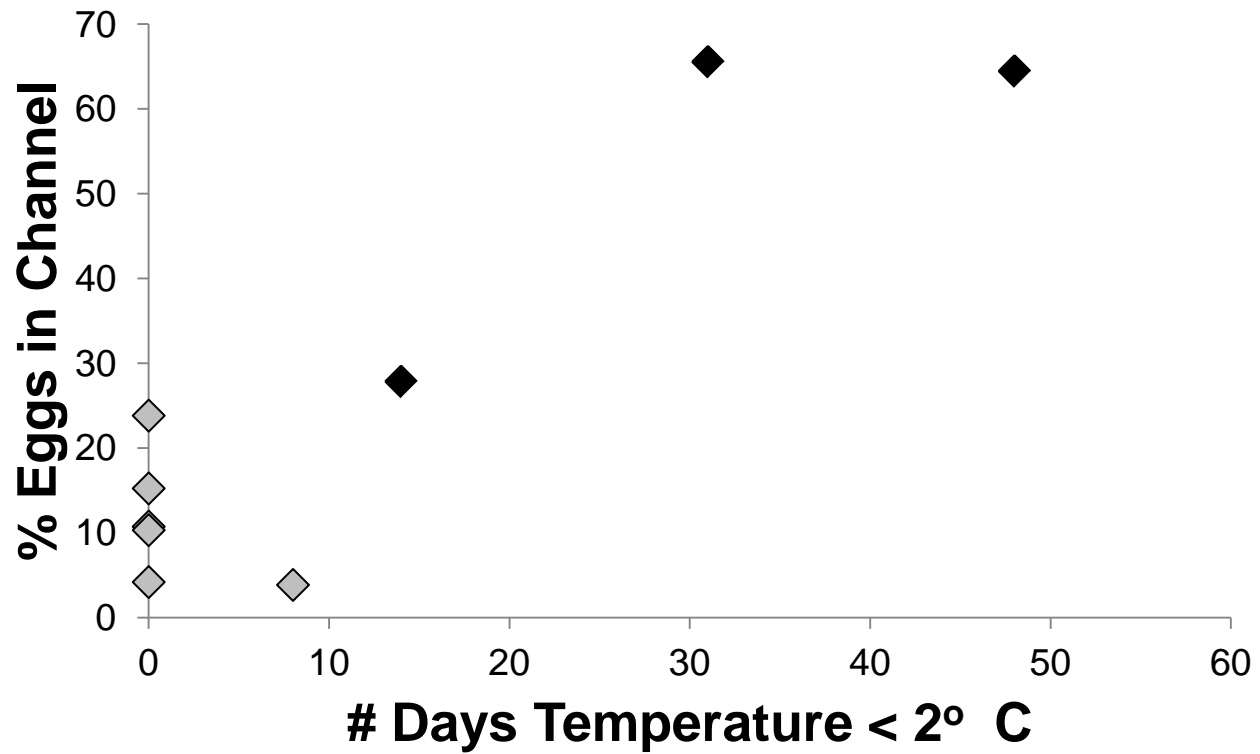


Inter-annual Variation in Egg Densities in Channel versus Shallow Stations



Temperature Profiles for ABS Sampling Years





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**



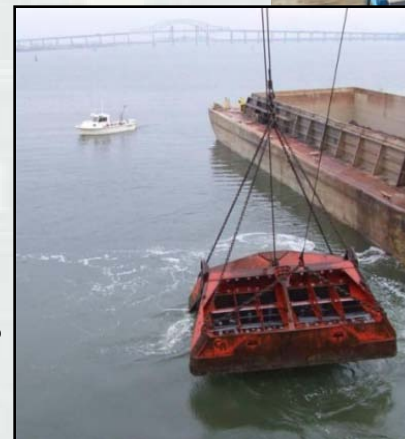
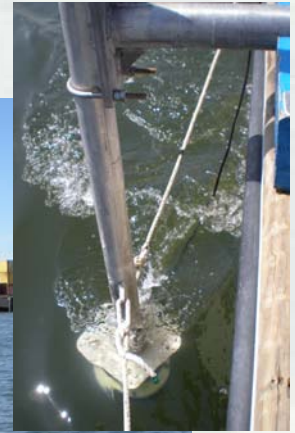
States Water Quality Certificates

- Best Management Practices (BMPs) related to **Sediment Resuspension**
 - ▶ Bucket requirements
 - ▶ Controlling rate of ascent
 - ▶ Prohibition of overflow
 - ▶ Seasonal Restrictions

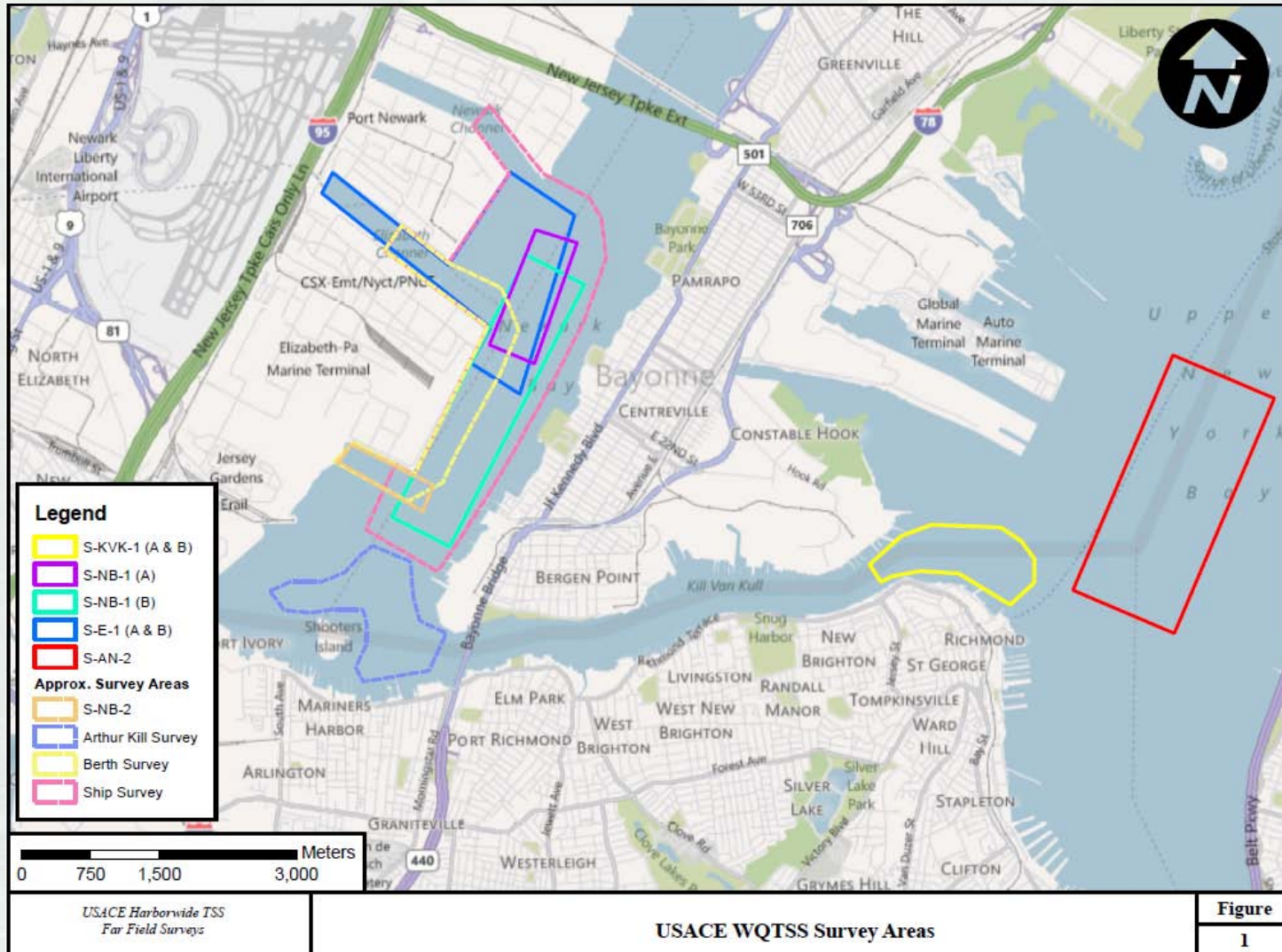


Harborwide WQ/TSS Monitoring

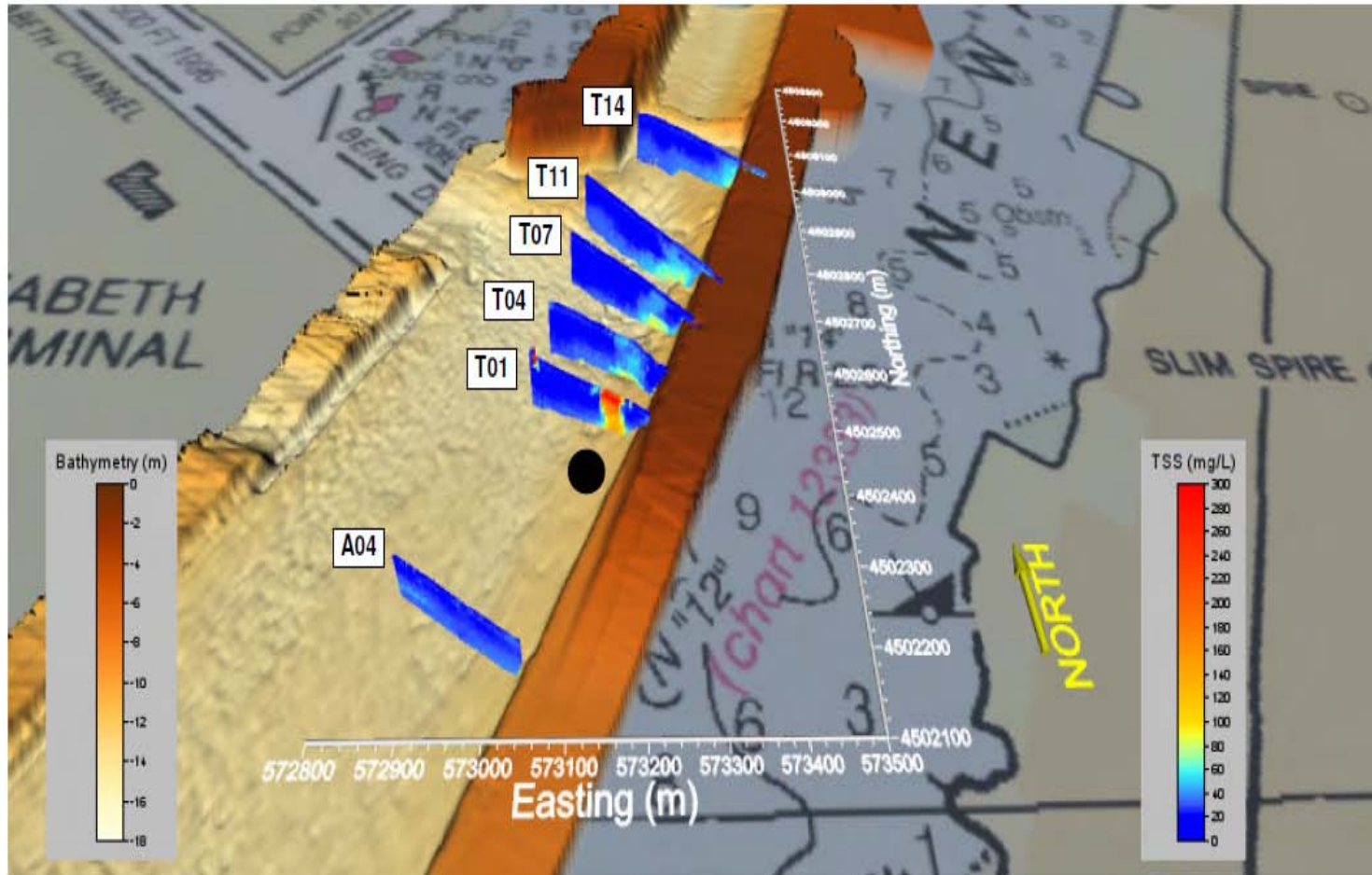
- Mobile ADCP, fixed OBS arrays and WQ sampling.
- Determine spatial structure and temporal dynamics of sediment plume.
- 13 TSS studies
 - Different sediment types
 - Different equipment types
 - Different Hydrodynamic Conditions



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

Z Scale Exaggerated 6x

● = Dredge Location



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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”





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Questions?

