

5TH ANNUAL CAPE COASTAL CONFERENCE

Case Study: Muddy Creek Restoration Project

Robert A. Duncanson, Ph.D.
Director of Health & Natural Resources
Town of Chatham

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Muddy Creek Restoration Project

A Joint Project of:



With Support From:



Funding:

USDOI/FWS Hurricane Sandy 2013 Grant
FWS National Coastal Wetlands Conservation Grant
NOAA Coastal Ecosystem Resiliency Grant
Town Funds

Harwich

Chatham

500 feet

Existing Conditions

- ❖ Restricted tidal flushing
- ❖ Poor water quality
 - Total Nitrogen TMDL
 - Bacterial TMDL
- ❖ Wetlands impacts
 - Loss of marine wetlands
 - Introduction of invasive species
- ❖ Shellfish Closures
- ❖ Limitations on fish passage
- ❖ Limited public water access



Restoration Assessment

- ❖ Alternatives - Chatham MEP (2003)
- ❖ Priority Project – MassDER Wetland Restoration Program (2008)
- ❖ Hydrodynamic Model → optimal opening (2009)
- ❖ Water Quality & Resource Assessments - Confirmed Benefits (2010-2012)
- ❖ Design alternatives → single span bridge (2012)
- ❖ Design and permitting (2013-2015)
- ❖ Construction 2016 (January – May)

Restoration Benefits – Wetlands

❖ 56 acres of wetlands restored

❖ Long-Term Restoration Benefits

- Increased Salinity and Tidal Range
- Reduction of Invasive Stands - Improved Biodiversity
- Expansion of Tidal Mud Flats and Low Marsh Communities
- New and Expanded Brackish & High Marsh Communities
- Improved Habitat for several High Priority Species/Populations of migratory waterfowl & other migratory species.



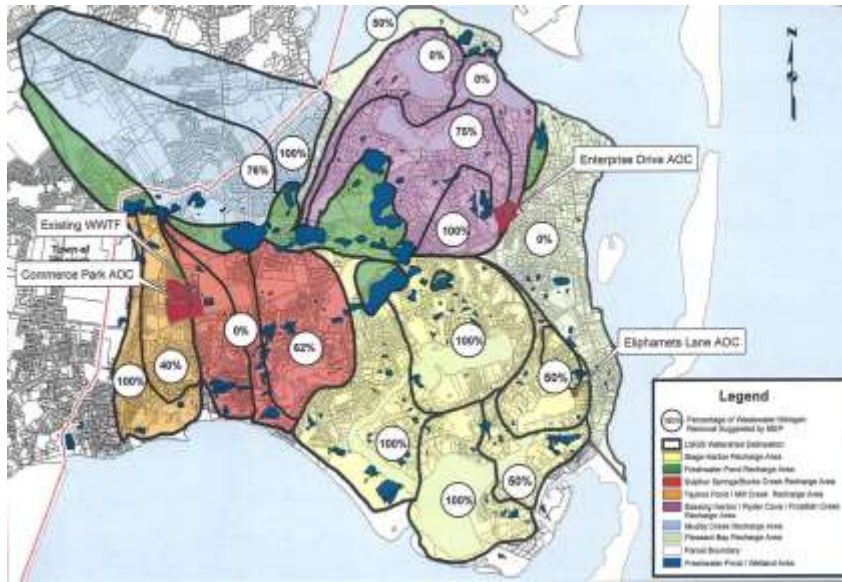
Pre- and Post Wetlands



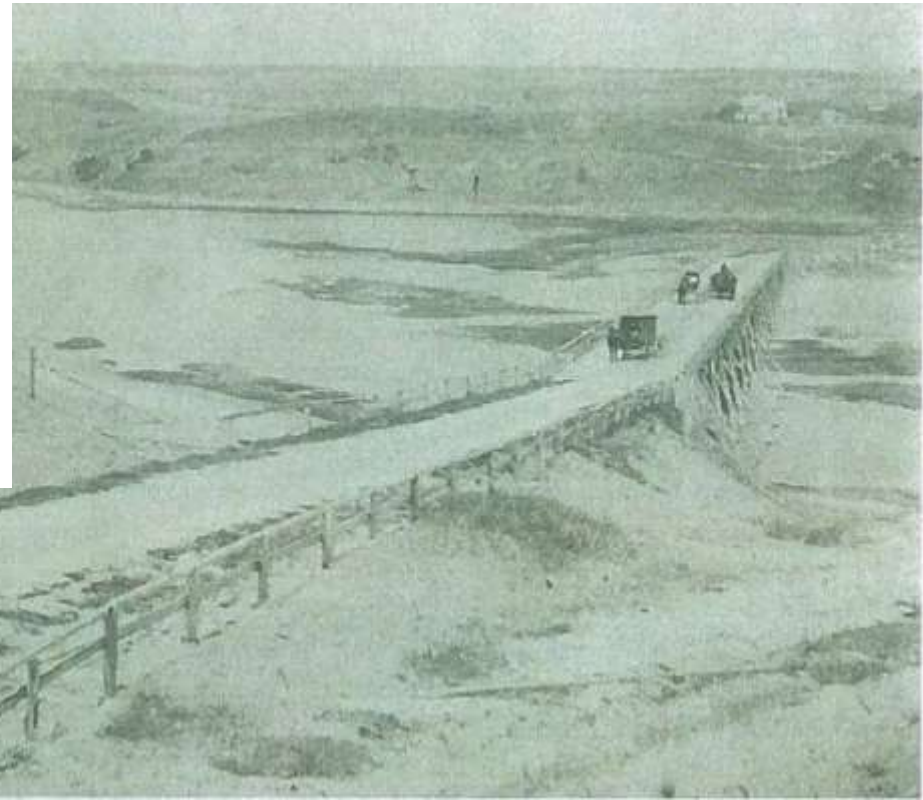
Restoration Benefits - Fish/Shellfish

◆ Long-Term Restoration Benefits

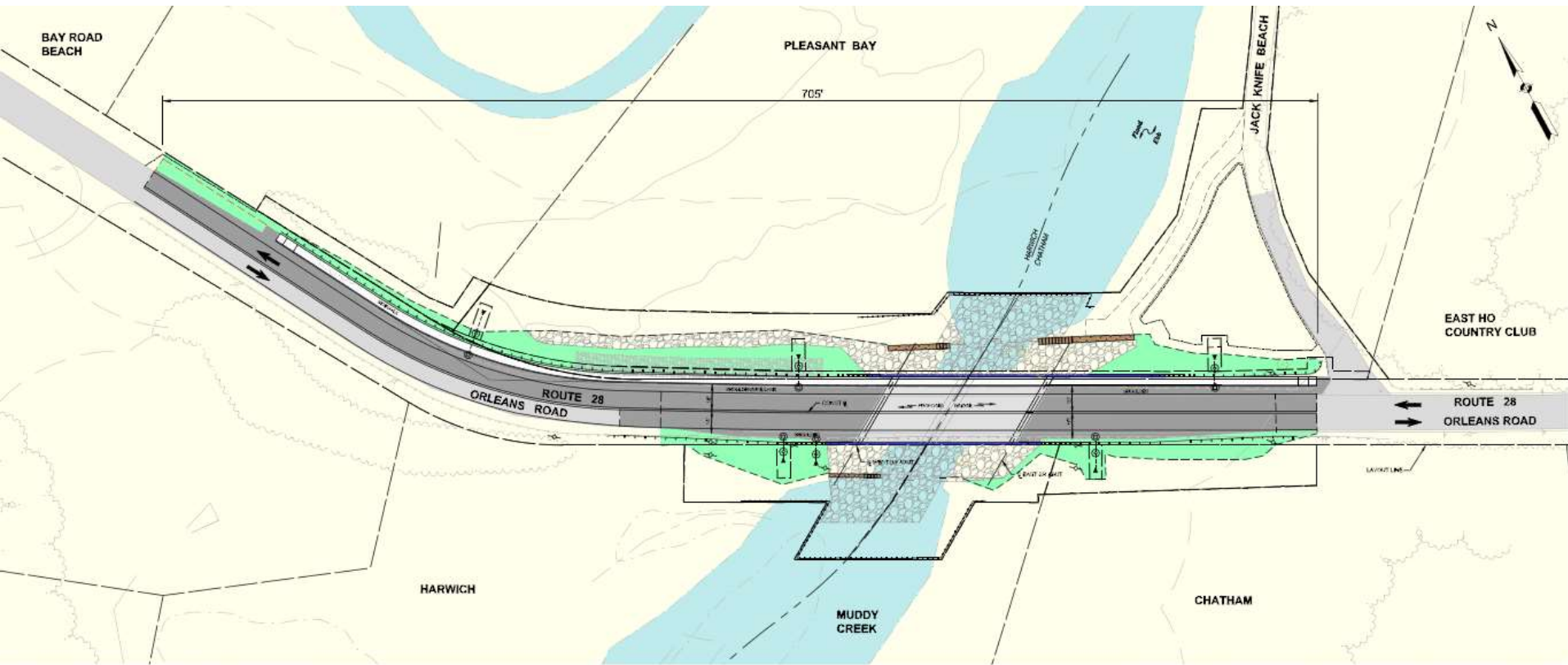
- Larger Channel Opening Will Improve Fish Passage Opportunities for American eel, Alewife, White Perch, Frost Fish and Blue Crab
- Increased Tidal Exchange Will Improve Water and Habitat Quality
- Improved Shellfish habitat (formerly a robust habitat for quahog (*Mercenaria mercenaria*))



Project Design

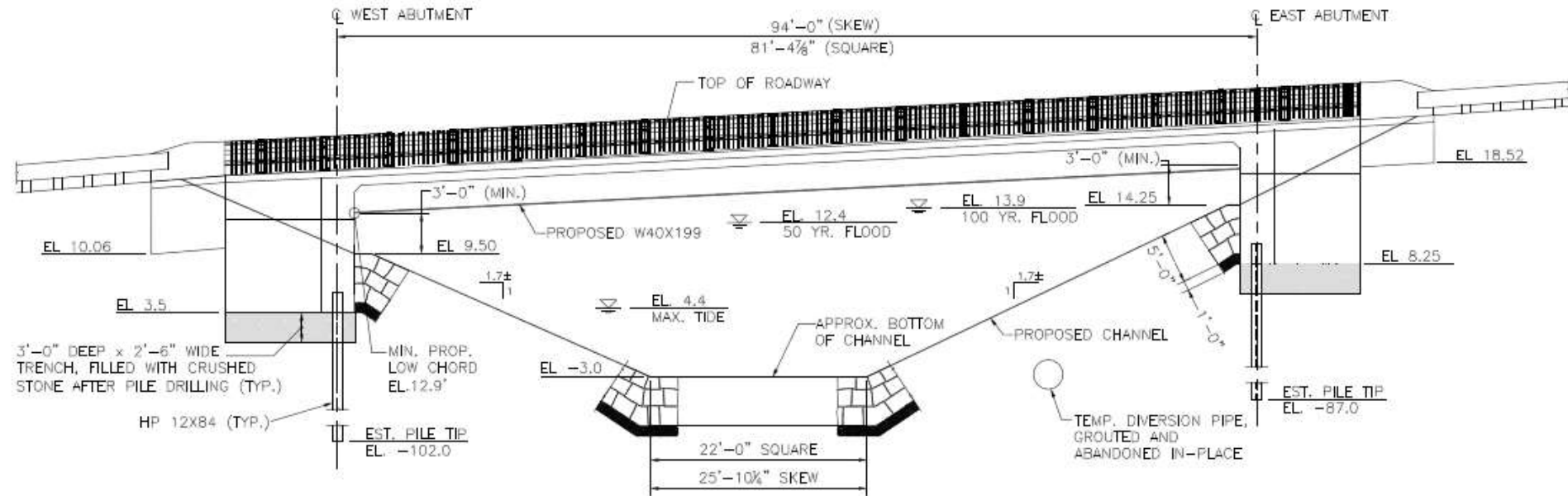


PROPOSED PROJECT



**MUDDY CREEK RESTORATION BRIDGE PROJECT
ROUTE 28 OVER MUDDY CREEK**

PROPOSED BRIDGE STRUCTURE



SOUTH ELEVATION VIEW – CREEK SIDE

Natural Resource Impacts within the Limit of Work

IMPACTS WITHIN LIMIT OF WORK			
RESOURCE AREA	TOTAL AREA	TEMPORARY IMPACTS	PERMANENT IMPACTS
Coastal Beach	4,500 sf	4,500 sf	NA
Coastal Dune	4,600 sf	1,600 sf	3,000 sf loss
Salt Marsh	5,400 sf	3,500 sf	1,900 sf loss
Coastal Bank	800 lf	700 lf	100 lf loss
Land Subject to Coastal Storm Flowage	60,000 sf	60,000 sf	NA
Notes: 1. Permanent impacts do not include the temporary impacts incurred during construction identified in the previous columns. 2. sf = square feet. 3. lf = linear feet. 4. NA = not applicable.			

Source: Supplemental NOI Dated 3-25-2015 – Table 2: Current Natural Resource Area Impacts

















September 11, 2014



June 11, 2017

Photos Courtesy of
Spencer Kennard

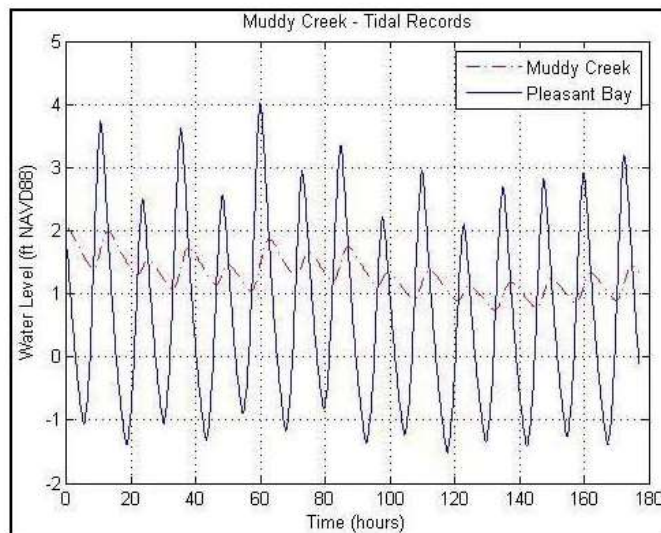


Figure 4. Tide gage records from November 2009 for instruments deployed both upstream and downstream of the Route 28 culvert along Muddy Creek. In 2009, Pleasant Bay was connected to Muddy Creek through a pair of stone box culverts. The stone box culverts were approximately 2.5-feet wide, 3.75-feet in height, and 100-feet in length.

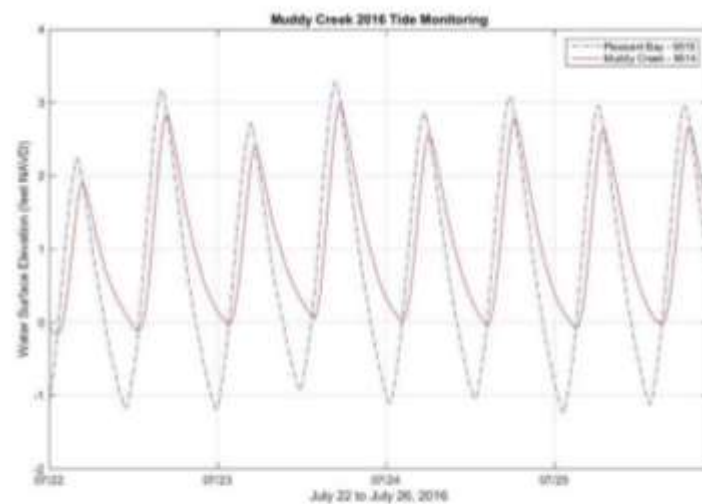


Figure 3. Plot showing three tide cycles offshore in Pleasant Bay and within Muddy Creek upstream of the new Route 28 Bridge.

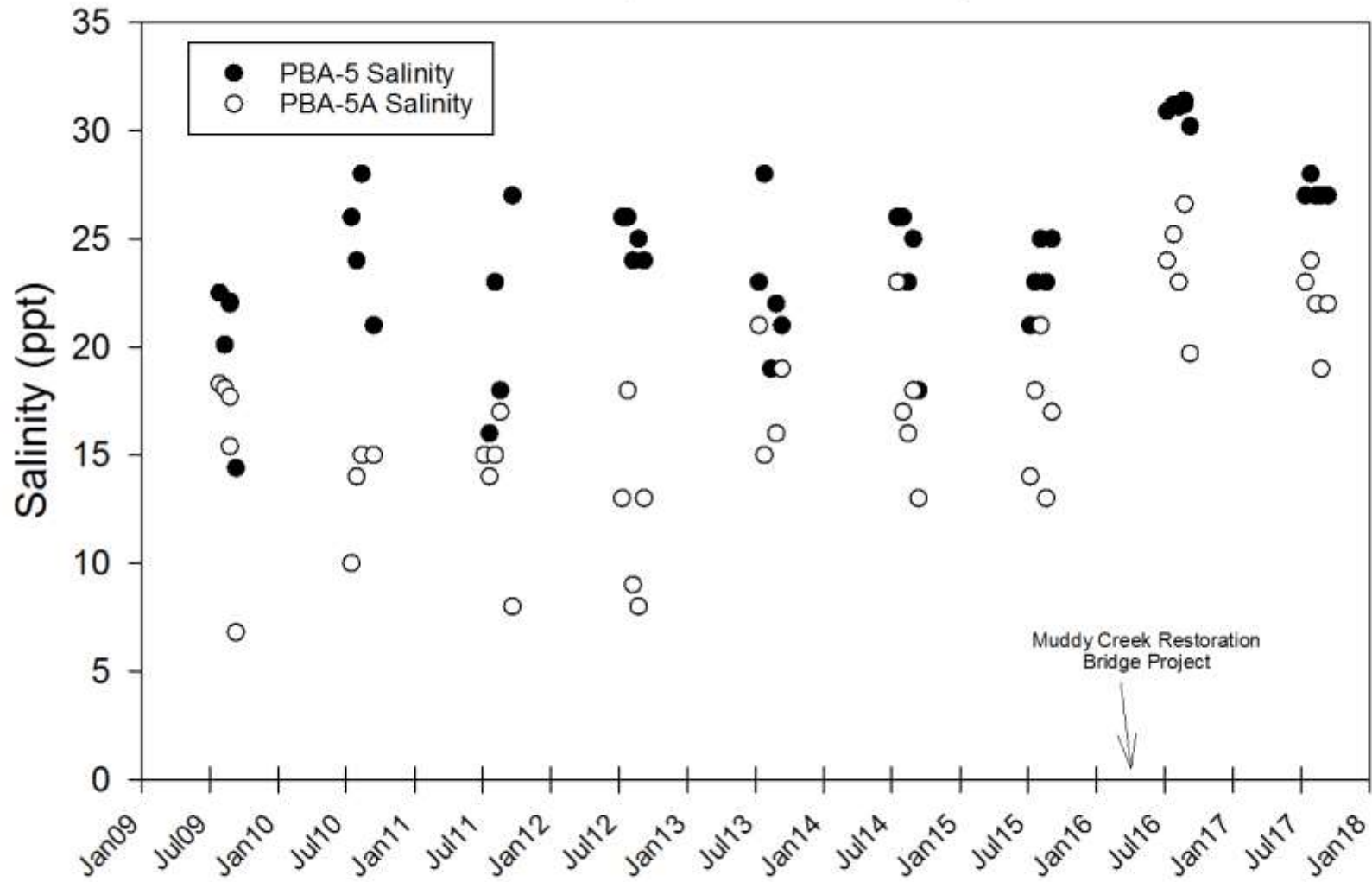


PBA-5

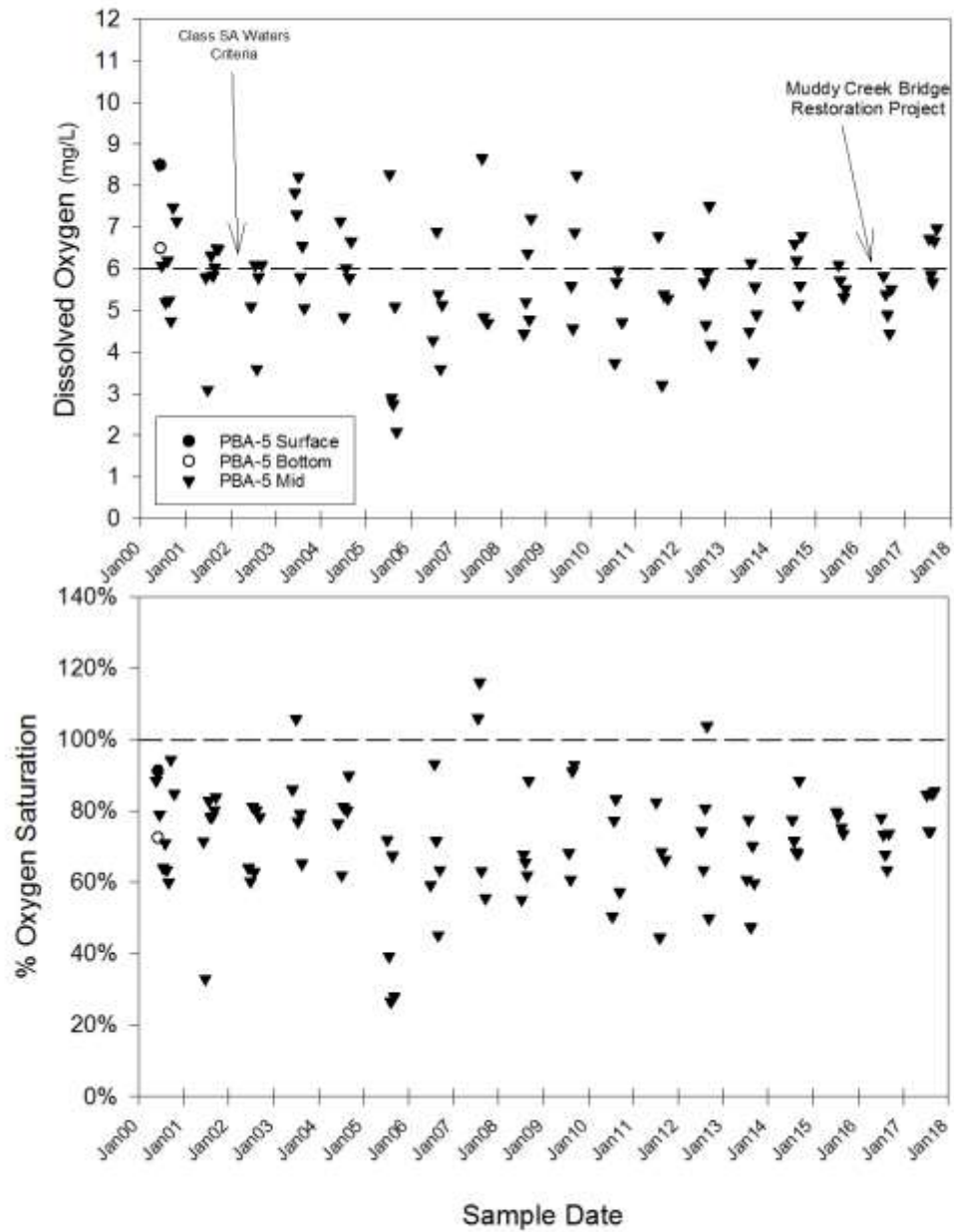
PBA-5A

500 feet

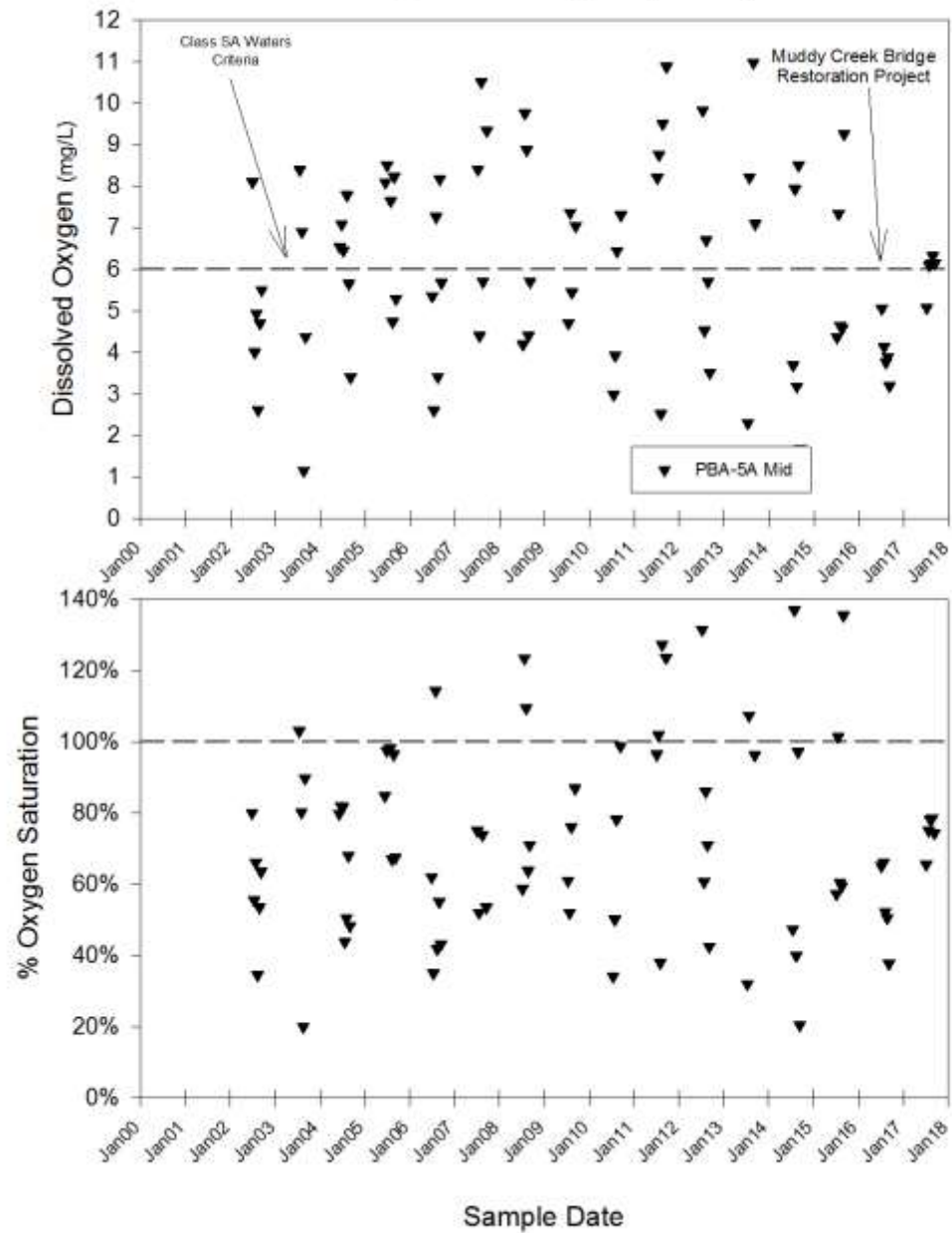
Muddy Creek Salinity



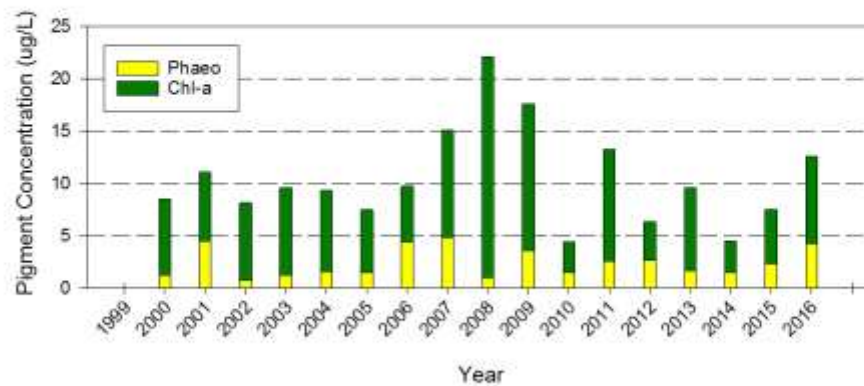
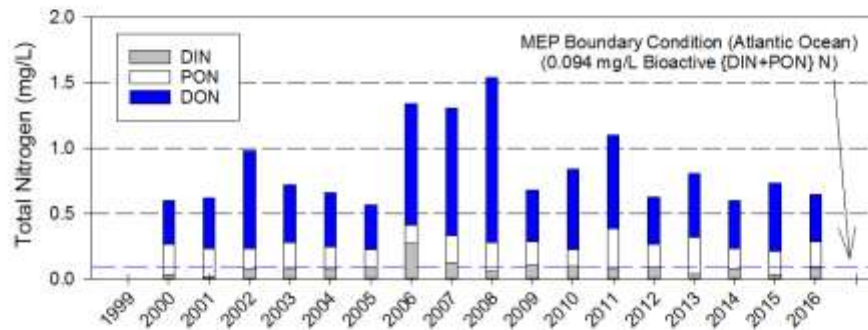
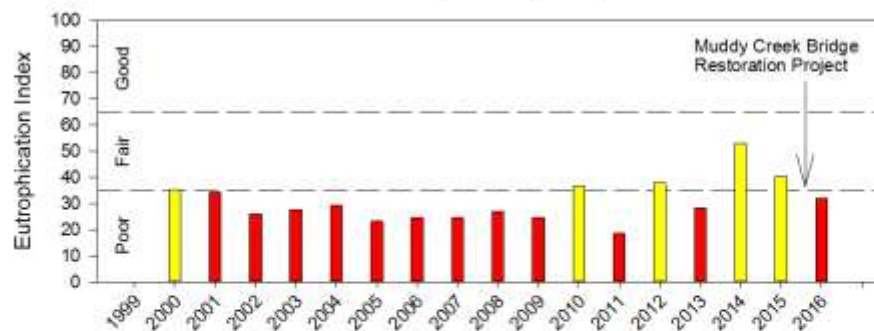
Muddy Creek (PBA-5)



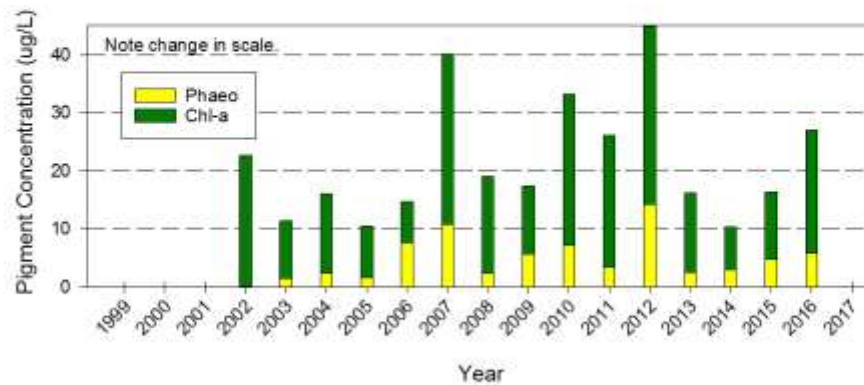
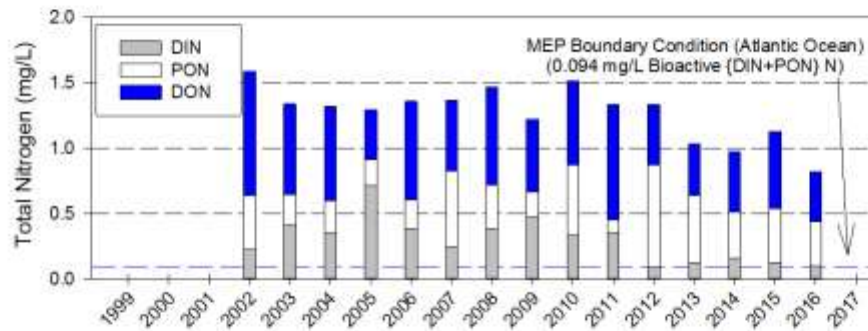
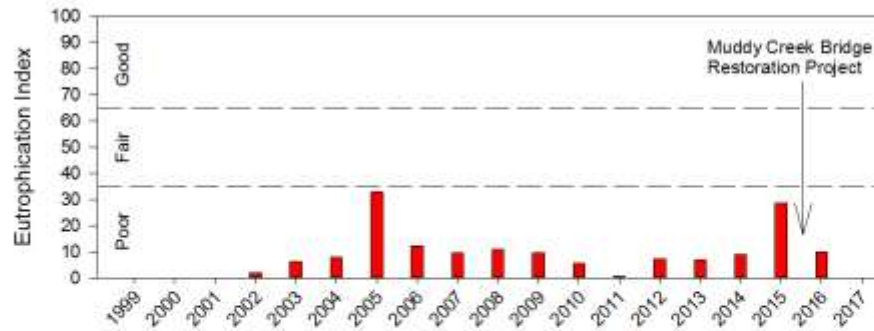
Muddy Creek - Upper (PBA-5A)



Muddy Creek (PBA-5)



Muddy Creek - Upper (PBA-5A)



An aerial photograph showing a multi-lane bridge crossing a river. A large, light-colored sandbar is prominent in the foreground, partially blocking the river's flow. The riverbanks are lined with dense green trees and some residential houses are visible in the upper left. The text "Questions ?" is overlaid in red in the center of the image.

Questions ?

Courtesy of
Spencer Kennard