

# Cold Brook Management

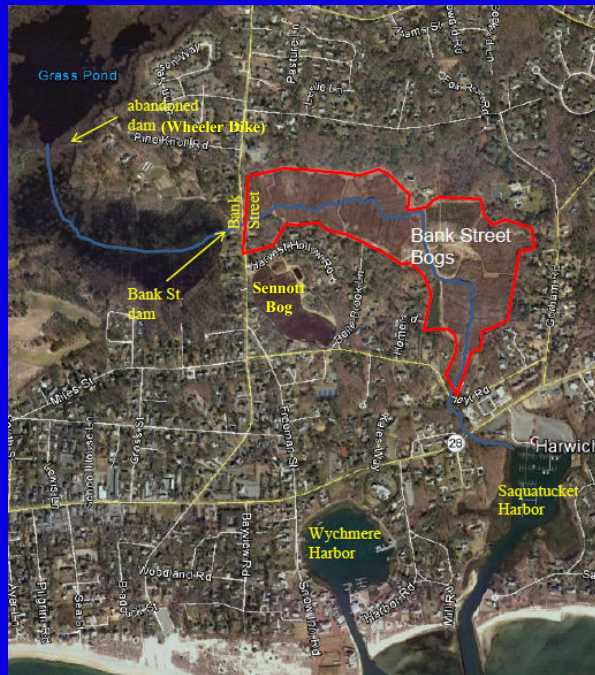
Bank Street Bogs Restoration, Natural  
Nitrogen Attenuation, Fisheries Restoration,  
and Grass Pond Management

Town of Harwich

March 30, 2018



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Coastal Systems Program  
School for Marine Science And Technology  
University of Massachusetts Dartmouth



## SYSTEM MANAGEMENT GOALS

- A. Saquatucket Estuary Nitrogen Remediation
- B. Bank Street Bogs Wetland Restoration
- C. Cold Brook Fisheries (Eel Habitat)
- D. Grass Pond Management

### Bank Street Bogs at Cold Brook Evaluation of Natural Nitrogen Attenuation/Baseline Assessment

FINAL REPORT  
September 2016

for the  
Town of Harwich



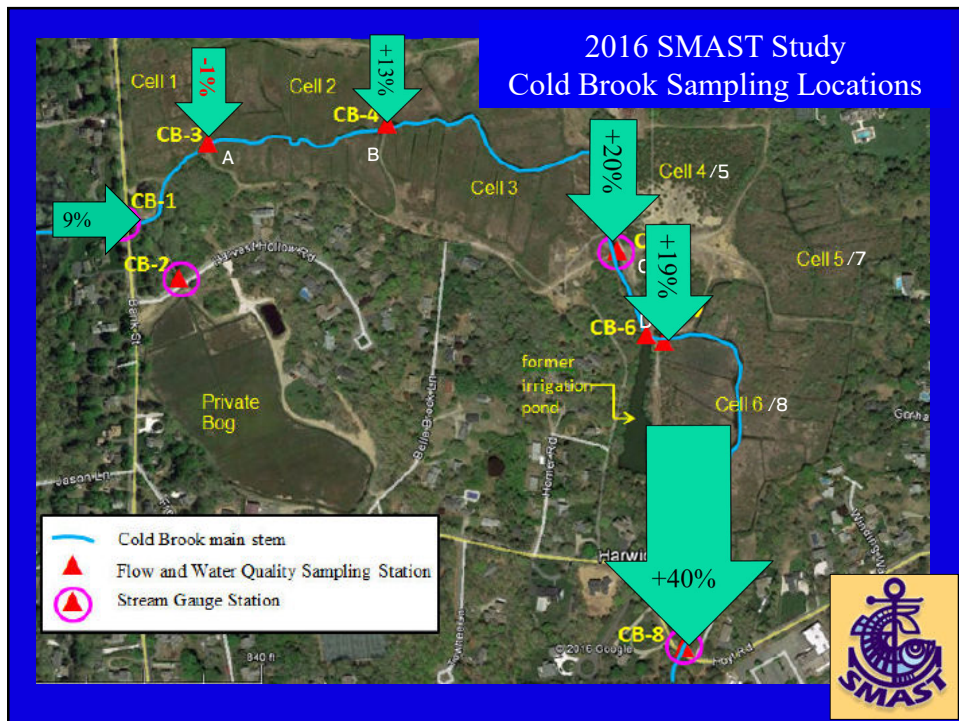
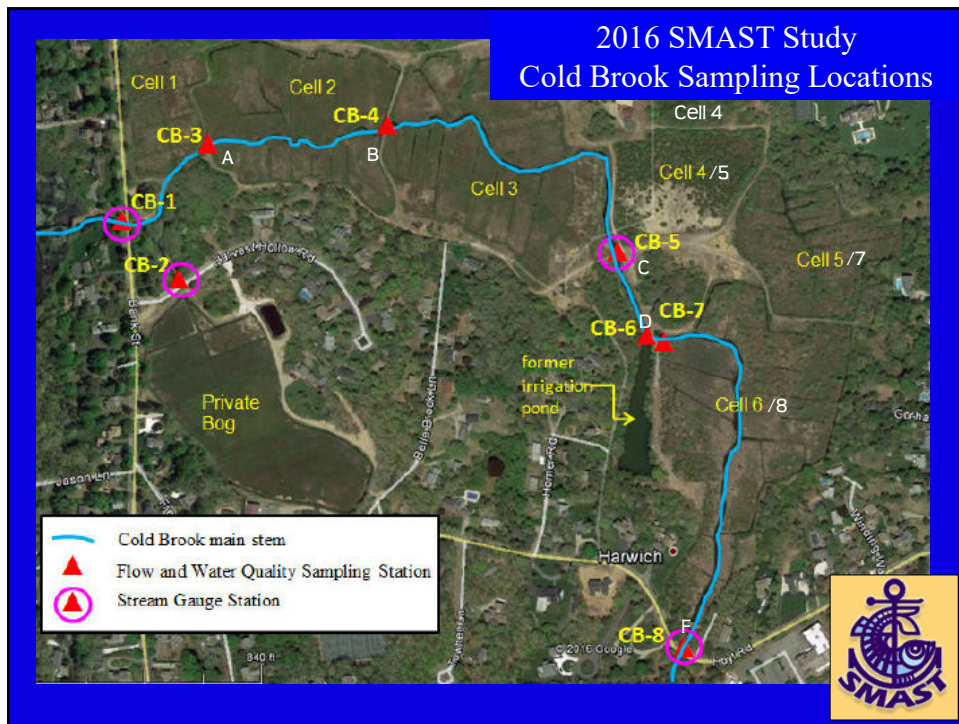
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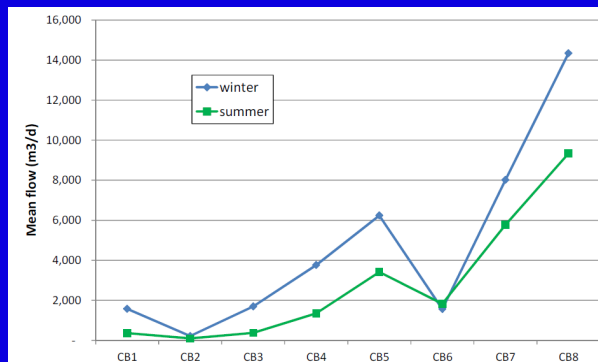
### 2016 Baseline of Bank Street Bogs

- Measurement of streamflow and water quality over complete hydrologic year into, within, and out of system
- Elevation survey
- Irrigation pond characterization
- Review of past data collection



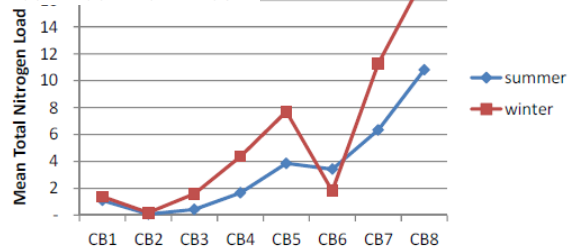


## Bank Street Bogs Flow and N Load

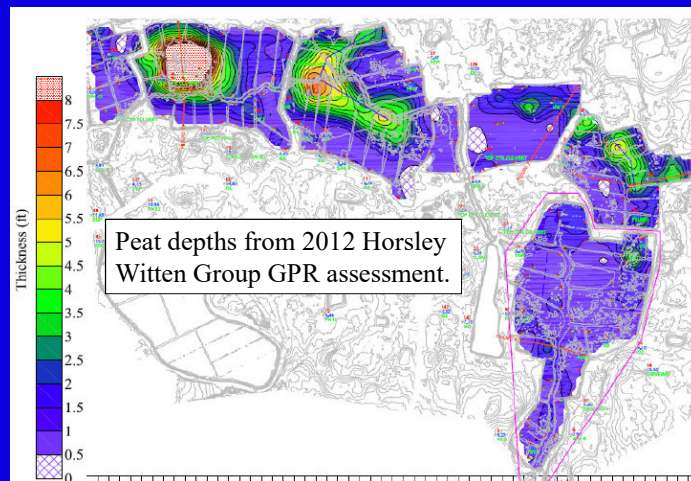


- Loads mostly parallel flow
- Significantly lower load in summer, also closely tied to reduced flow

Most of system flow occurs in eastern portion



## Past Data Collection



Cell 2: Area of peat at 2 ft contour = 3.6 acres (max depth = 2.44 m /GPR limit)

Cell 3: Area of peat at 3 ft contour = 2.7 acres (max depth = 1.98 m)

Cell 5: Area of peat at 1.5 ft contour = 1.0 acre (max depth = 1 m)

Cell 7: Area of peat at 3 ft contour = 0.6 acres (max depth = 1.5 m)

**TOTAL Pond Area = 7.9 acres** (conservative est; ~12% of total area)

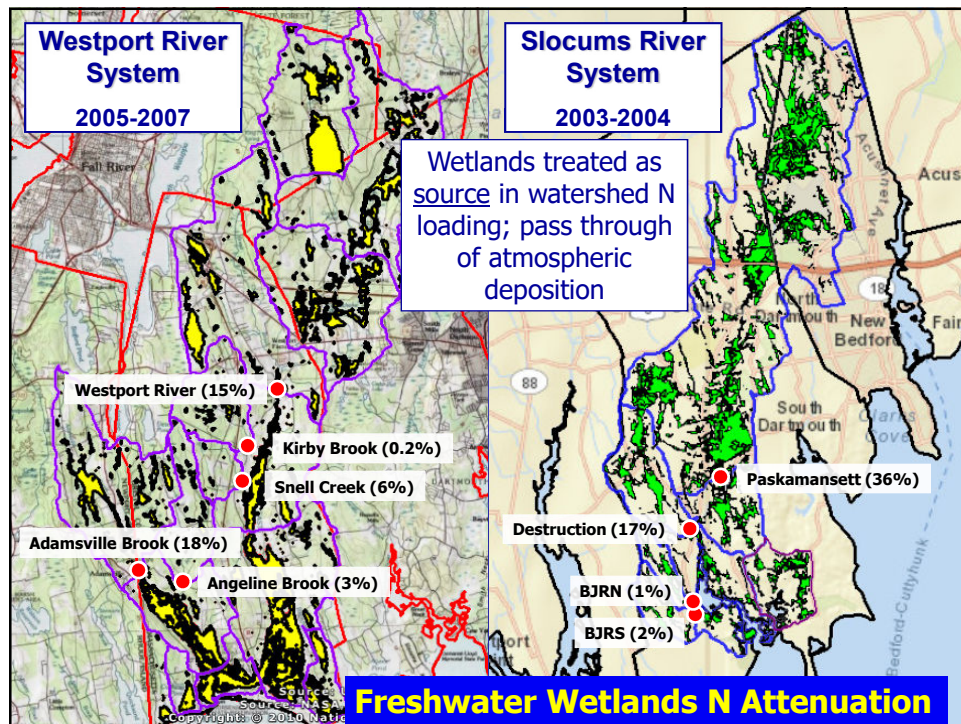
## MANAGEMENT GOALS

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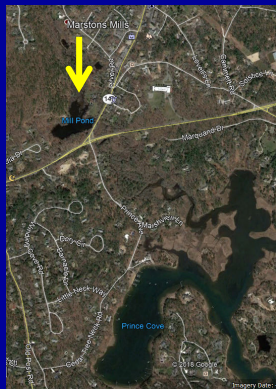
## N Attenuation: Surface Water Systems

- Nitrogen attenuation is variable within and among system types. Composite restorations (fresh wetland, pond, salt marsh) increase probability of N attenuation
- Freshwater wetlands can be a sink for watershed nitrogen or a source to down-gradient waters (-9% to 74% attenuation).
- N attenuation by ponds tends to increase with residence time, particulate N tends to be retained by ponds (rule of thumb 50%; large ponds >80%).
- SMAST Nitrogen Transport Studies found that salt marsh creekbottoms remove 40% of the watershed N load in highly enriched systems, compared to 38% and 72% for "typical Cape Cod salt marshes.

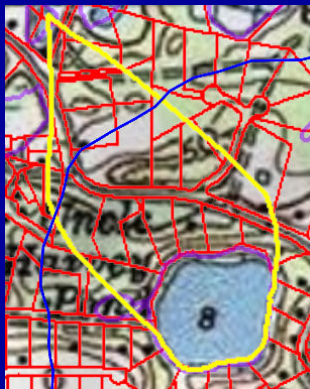
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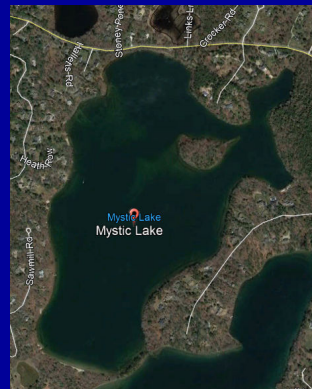
## Freshwater Pond N Attenuation



Mill Pond  
1 day res. time  
22% attenuation

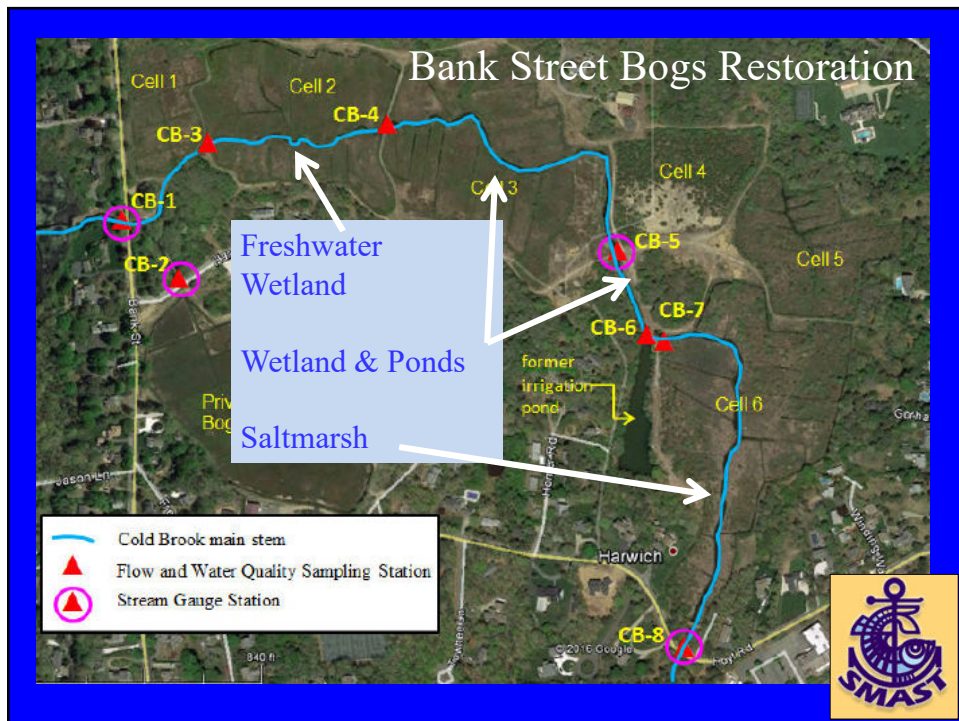
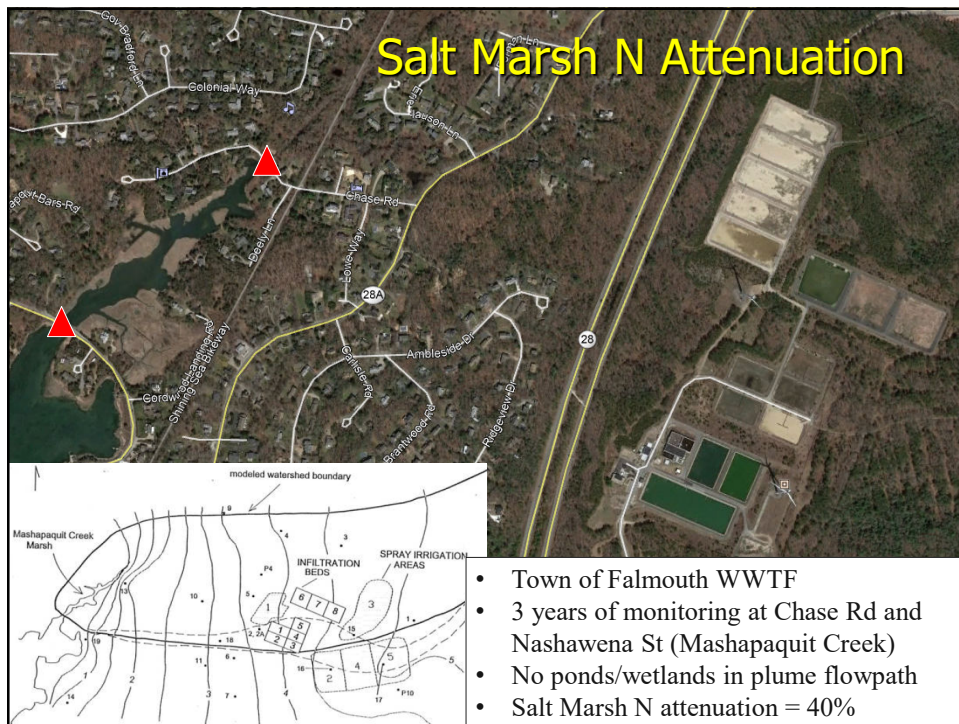


Uncle Harvey's Pond  
0.86 year res. time  
58% attenuation



Mystic Lake  
1.1 year res. time  
87% attenuation

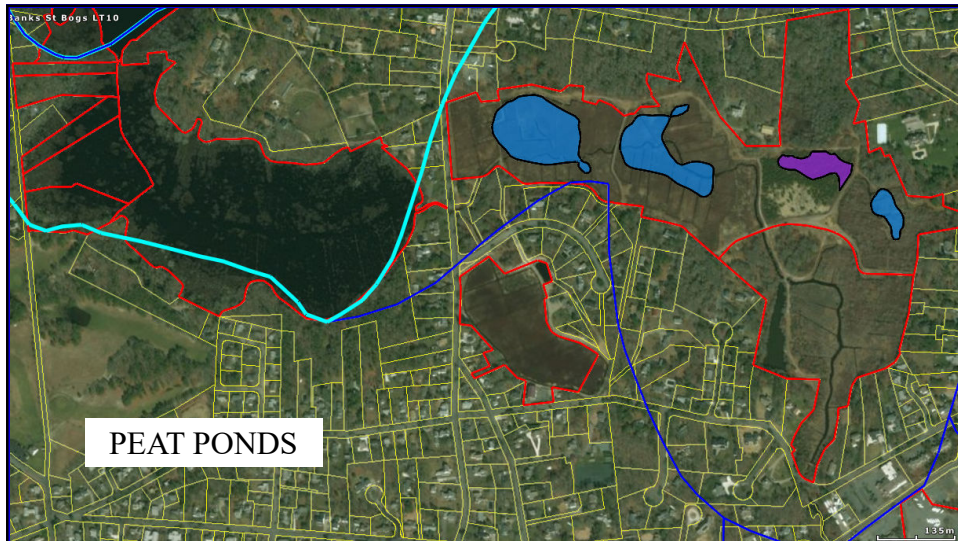










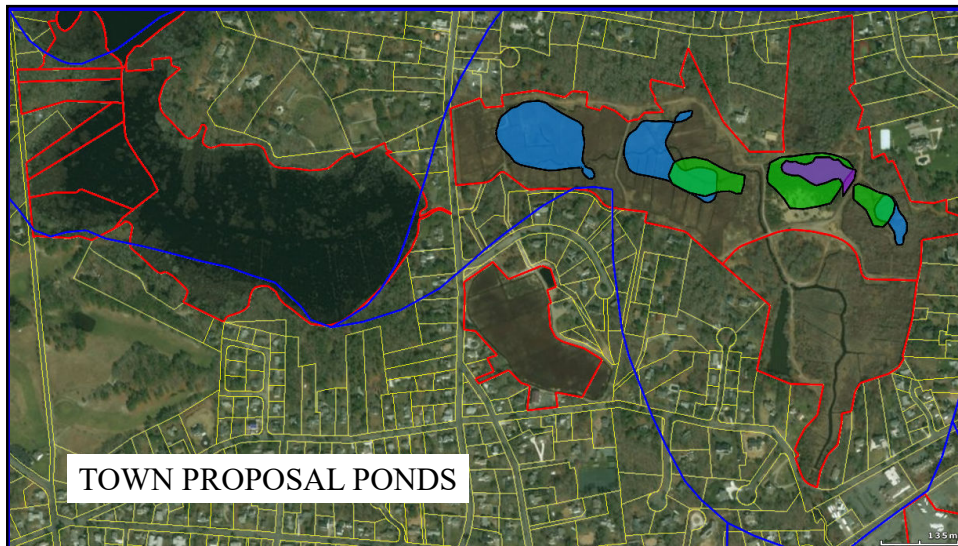


### BANK STREET BOGS PONDS

Peat ponds = 7.9 acres (blue & purple areas; 12% of property)

Town ponds (proposed) = 4.9 acres (green areas /original Consensus)

DER ponds (current) = 2.6 acres (orange areas)



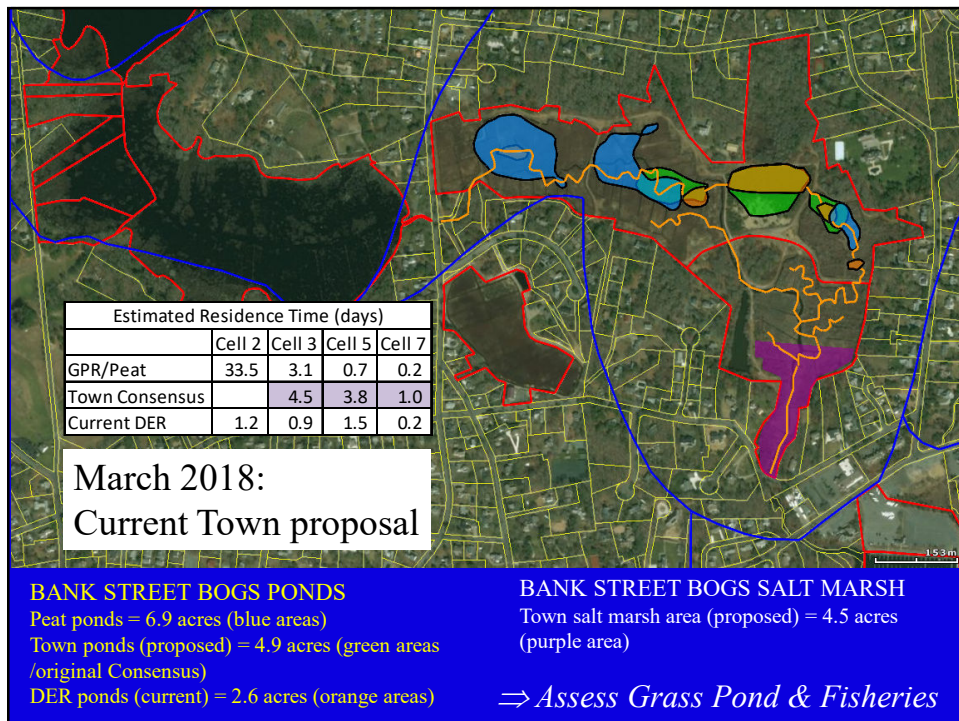
### BANK STREET BOGS PONDS

Peat ponds = 7.9 acres (blue & purple areas)

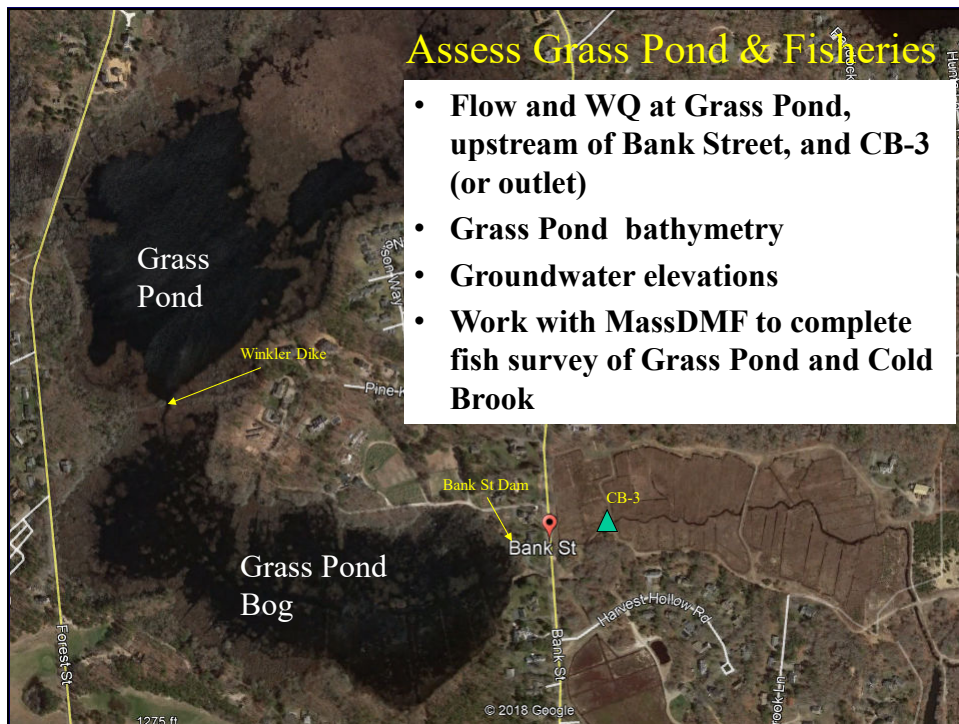
Town ponds (proposed) = 4.9 acres (green areas /orig. Consensus; 7%)


DER ponds (current) = 2.6 acres (orange areas)












## Coastal Systems Program

## University of Massachusetts

## Dartmouth

*Science for Management*



# Questions & Discussion

<p><u>Coastal Systems Program:</u></p> <table style="width: 100%;"> <tr> <td>Brian Howes</td> <td>Sara Sampieri</td> </tr> <tr> <td>Ed Eichner</td> <td>Jen Antosca</td> </tr> <tr> <td>Roland Samimy</td> <td>Mike Bartlett</td> </tr> <tr> <td>David Schlezinger</td> <td></td> </tr> <tr> <td>David White</td> <td></td> </tr> <tr> <td>Dale Toner</td> <td></td> </tr> </table>	Brian Howes	Sara Sampieri	Ed Eichner	Jen Antosca	Roland Samimy	Mike Bartlett	David Schlezinger		David White		Dale Toner		<p><u>Contact:</u></p> <p><b>Ed Eichner</b>          Coastal Systems Program          SMASST, UMASS Dartmouth  <a href="mailto:eichner@comcast.net">eichner@comcast.net</a>          home office: 508-775-9080          Cell: 508-737-5991</p>
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