NIAGARA POWER PROJECT

RELICENSING IMPLEMENTATION

Ecological Standing Committee Meeting

September 17, 2008

Agenda

- Opening Remarks
- Review Action Items from May 28, 2008 Meeting
- Review Progress on HIPS
- Meeting Wrap Up / Review Action Items

Action Items – May 28,2008

1. NYPA will consult with City of North Tonawanda about Gratwick Park fish habitat/attraction structures.
2. NYPA will check on water level data for shallow fish habitat/attraction structure design.
3. NYPA will reach out to the boating community about shallow fish habitat/attraction structures.
4. NREC will look into interest for a program for college students to observe construction of fish attraction structures.
5. NYPA will look at permit schedule for fish habitat attraction structures and coordinate with local communities.
6. NYPA will do internal Greenway Consistency Review for HIPs
7. NREC will consult with ornithological groups about common tern and osprey HIPs.
8. NYPA will consult Grand Island about osprey pole at East River Marsh.
9. ESC will consider information kiosk for osprey nesting poles.

Action Items – May 28,2008 cont.

10. NREC to organize meeting about critical bird area and bird HIPs
11. NREC will work with Greenway Commission to conduct informational meetings about the Gorge.
12. NYPA will meet with municipalities that will be hosting HIPs. Can use Erie and Niagara Environmental Commissions.
13. At next meeting, NREC will report on its grant application for the Great Lakes Initiative.
14. Timing and process for future HIPs and potential leverage opportunities be on next meeting's agenda
15. At next meeting, NYPA and NYSDEC will report on status of $1M allocation to the NYSDEC and $200,000 for Cayuga Creek Restoration.
16. NYPA will circulate STL protocols about how to spend funds and how projects are selected for funding.
17. Next meeting will be in September.

2008 Third Quarter Progress on HIP Implementation

- Fish Attraction Structures
- Wetland Plant Characterization Study
- Invasive Species
- Motor Island Shoreline Protection
- Osprey Nesting Platforms
- Common Tern Nesting Habitat Enhancement

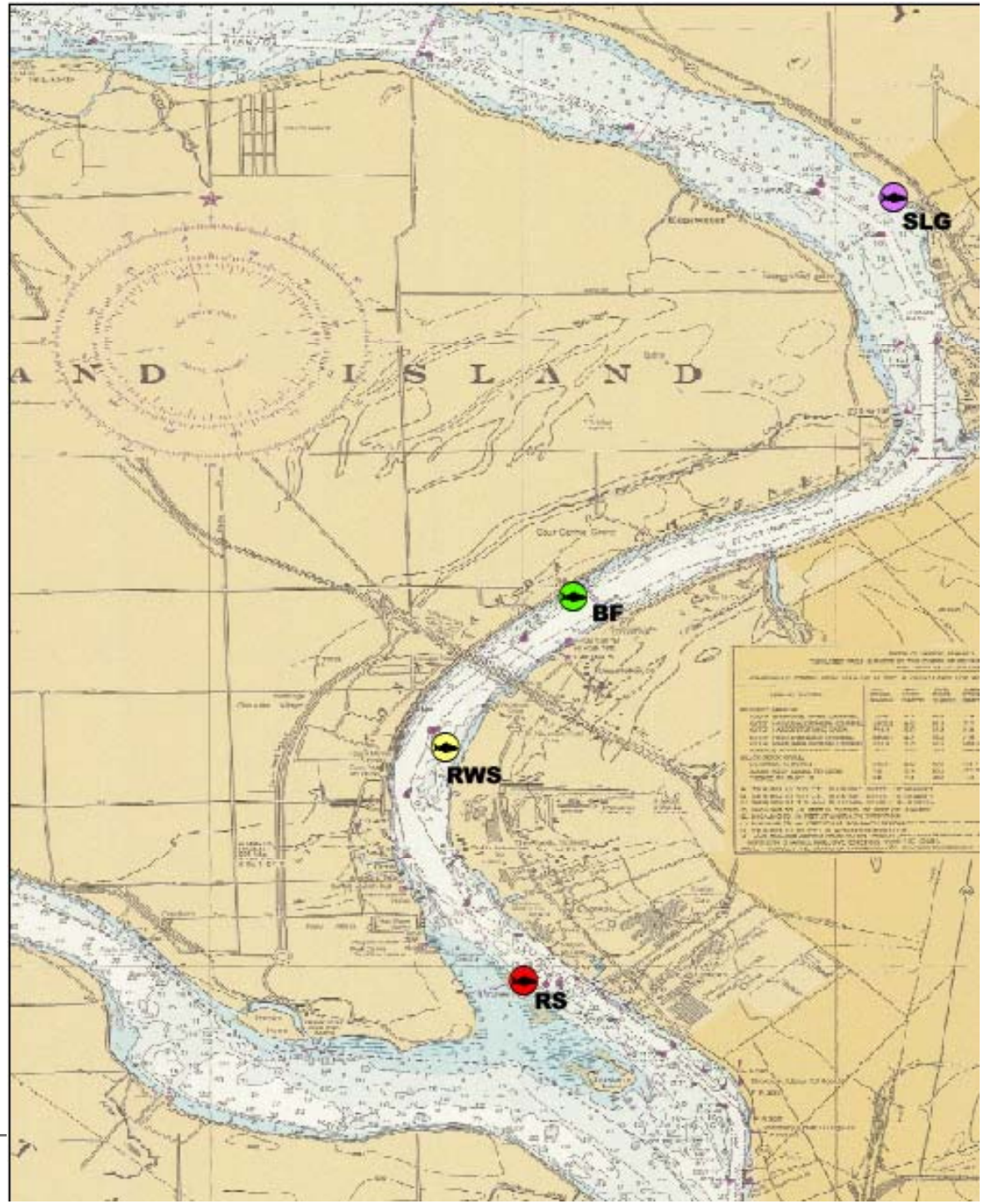
Fish Attraction Structures
2008 3rd Quarter Activities

- **Finalized Design of Prototype Structures**
- **Issued Request for Proposals for Construction and Hired Contractor**
- **Submitted Pre-construction Notification to USACOE (Review in progress)**
- **Solicited Coast Guard Approval and Conditions (Received)**
- **Evaluated Habitat at Each Location**
- **Award Construction Contract (In progress)**

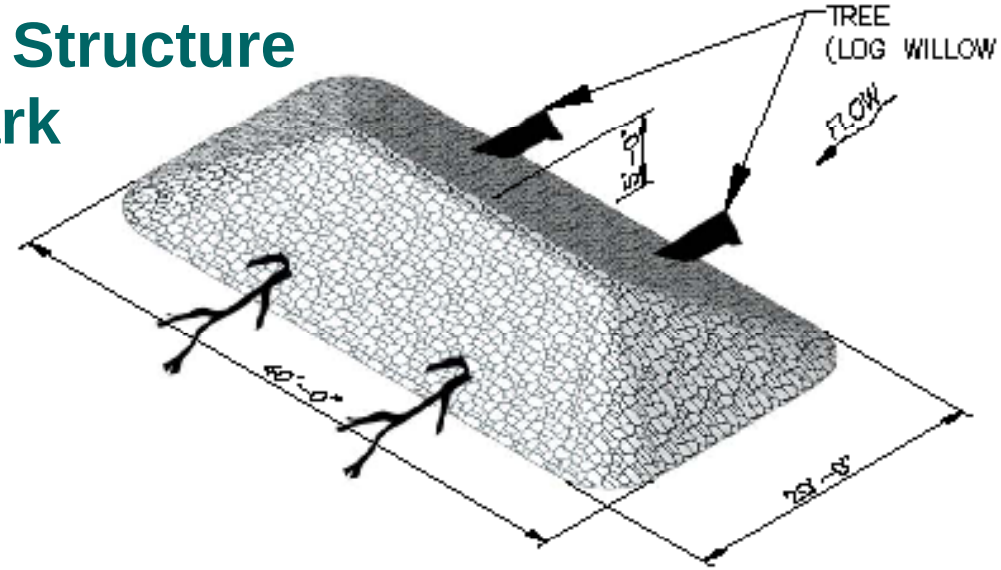
Fish Attraction Structures

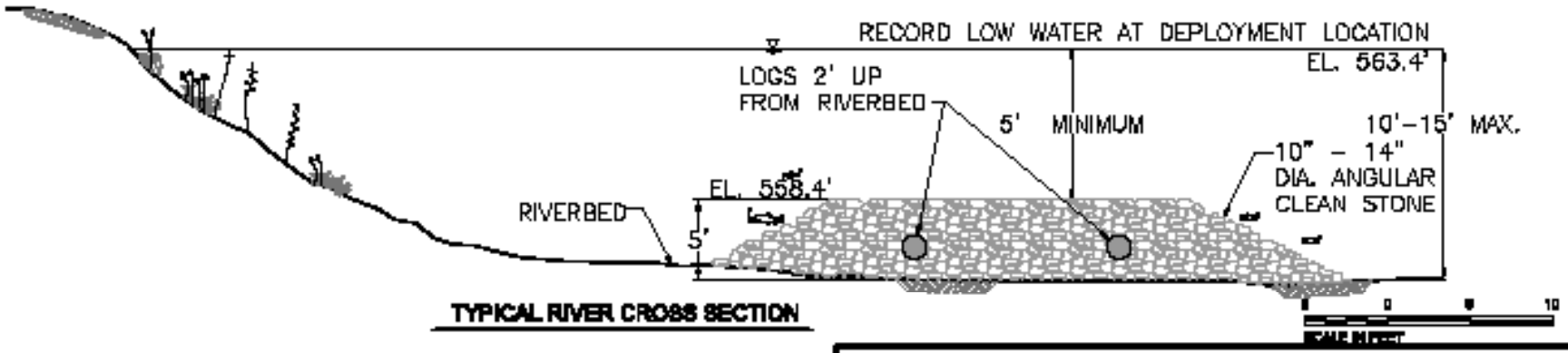
Four Locations
Four Prototypes

- Gratwick Park – Shallow Water Stone and Log Groin
- Downstream of the South Grand Is Bridge near Cherry Farms - Boulder Field
- Upstream of the South Grand Is Bridge – Rock Wing
- Motor Is – Rock Slope



Shallow Water Structure at Gratwick Park





TYPICAL RIVER CROSS SECTION

MATERIAL WORKSHEET	
STONE	10"–14" DIA. ANGULAR
LOG WILLOW OR HARDWOOD	2
VOLUME (FT^3)	1730±
FOOT PRINT (FT^2)	800±

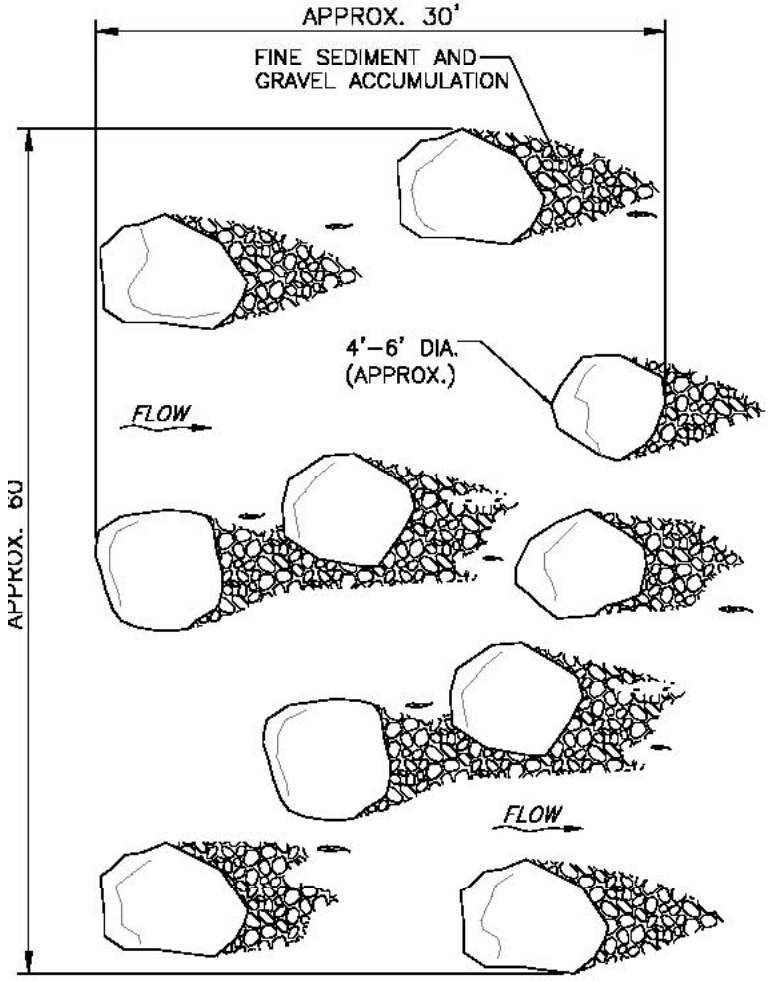
New York Power Authority

SHEET 1

NEW YORK POWER AUTHORITY
NIAGARA POWER PROJECT (FERC NO. 2216)
HABITAT IMPROVEMENT PROJECT
SHALLOW WATER
FISH ATTRACTION STRUCTURES
PROTOTYPE 1

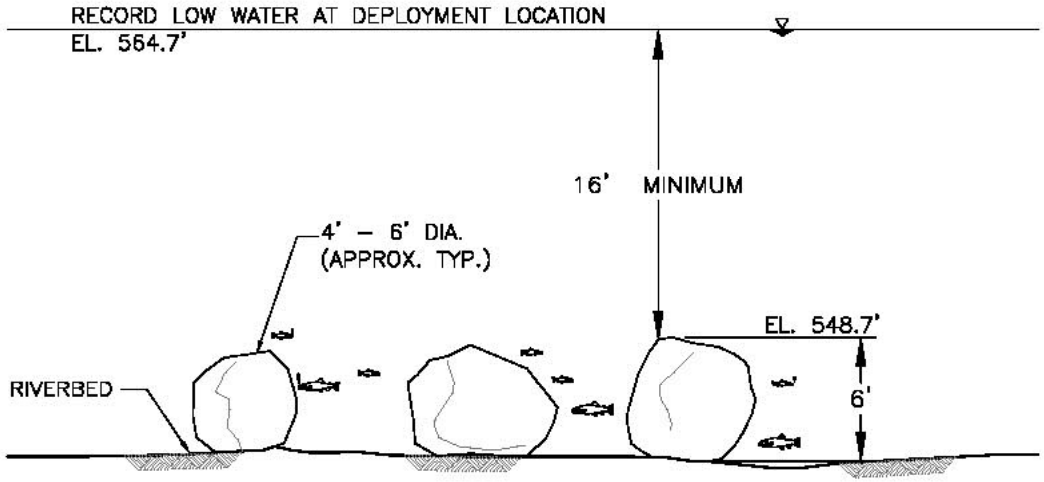
Shallow Water Structure at Gratwick Park

- 190’ from shore
- 11’ depth – provides 6’ of clearance
- flow 1 – 1.5 ft/s
- gravel with some cobble and small rocks
- sparse SAV (5 – 10%) wild celery



TYPICAL PLAN OF BOULDER FIELD

NOTES: 10 BOULDERS PER FIELD



TYPICAL RIVER CROSS SECTION

5 0 5 1

SCALE IN FEET

MATERIAL WORKSHEET	
	BOULDER FIELD
BOULDERS	4'–6' DIA. (QTY. OF 10)
VOLUME(FT^3)	1130±

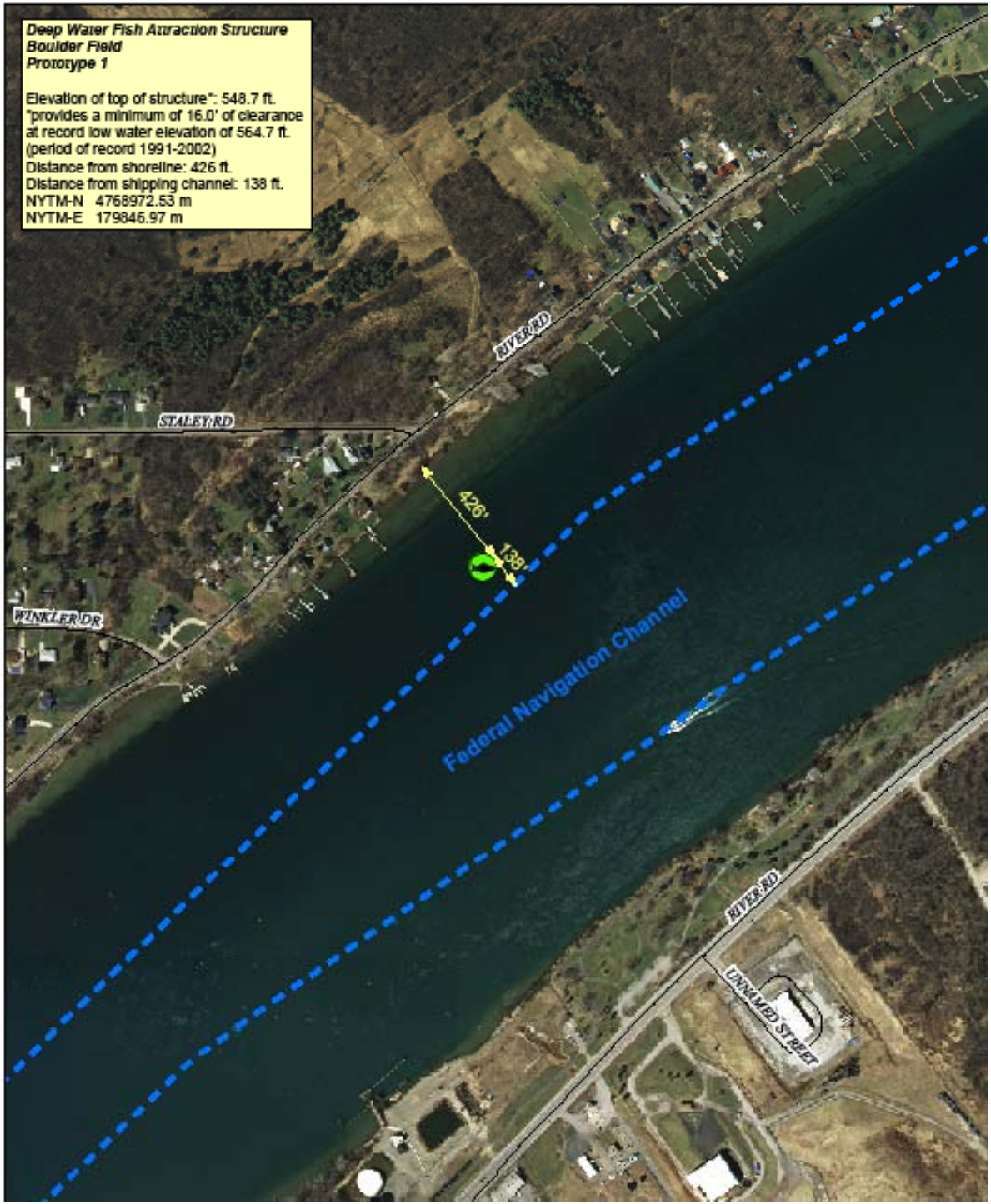
New York Power Authority

SHEET 2A

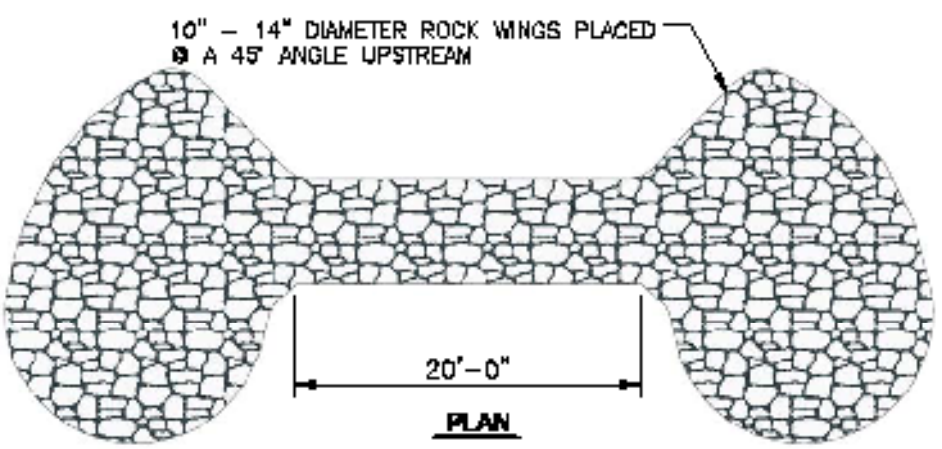
NEW YORK POWER AUTHORITY
NIAGARA POWER PROJECT (FERC NO. 2216)
HABITAT IMPROVEMENT PROJECT
DEEP WATER
FISH ATTRACTION STRUCTURES

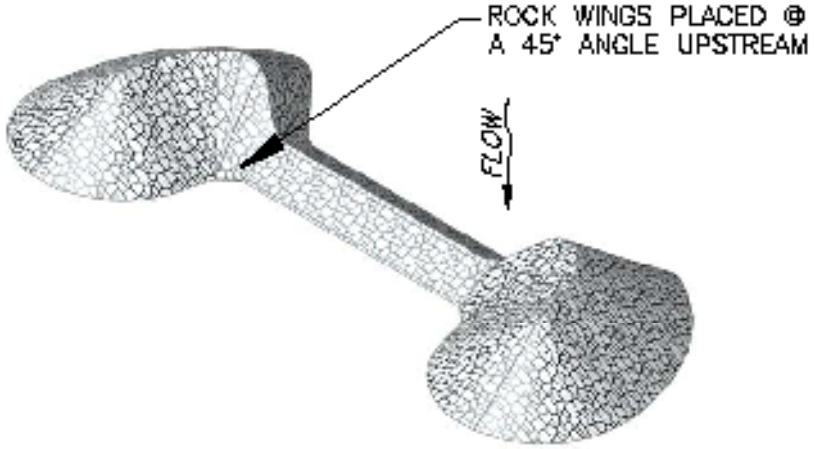
Boulder Field Downstream of South Grand Is Bridge

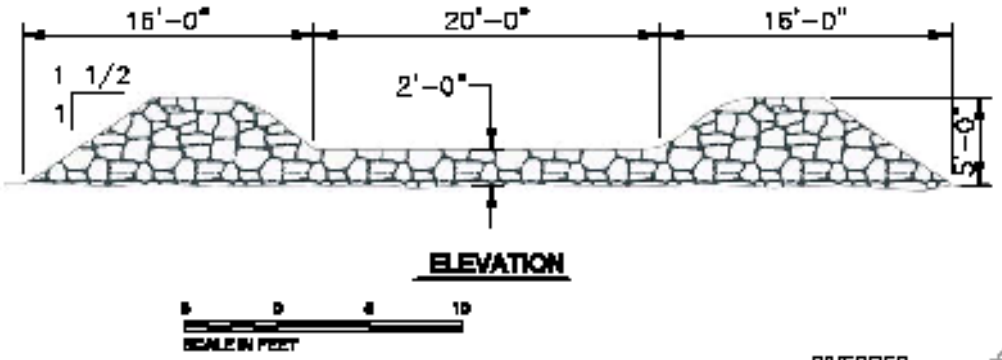
- 426’ from shore
- 22’ depth – 16’ of clearance
- flow 2 - 2.5 ft/s
- gravel and cobble
- sparse SAV but at the edge of a dense bed of wild celery

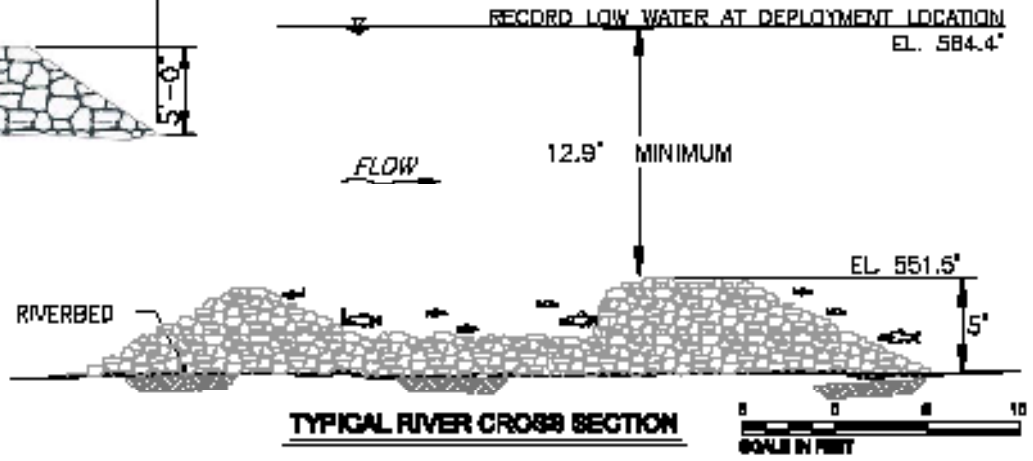


Rock Wing – Upstream of South Grand Is Bridge









MATERIAL WORKSHEET	
	ROCK WING
STONE	10"–14" DIA.
VOLUME(FT³)	1255±
FOOT PRINT(FT²)	653±

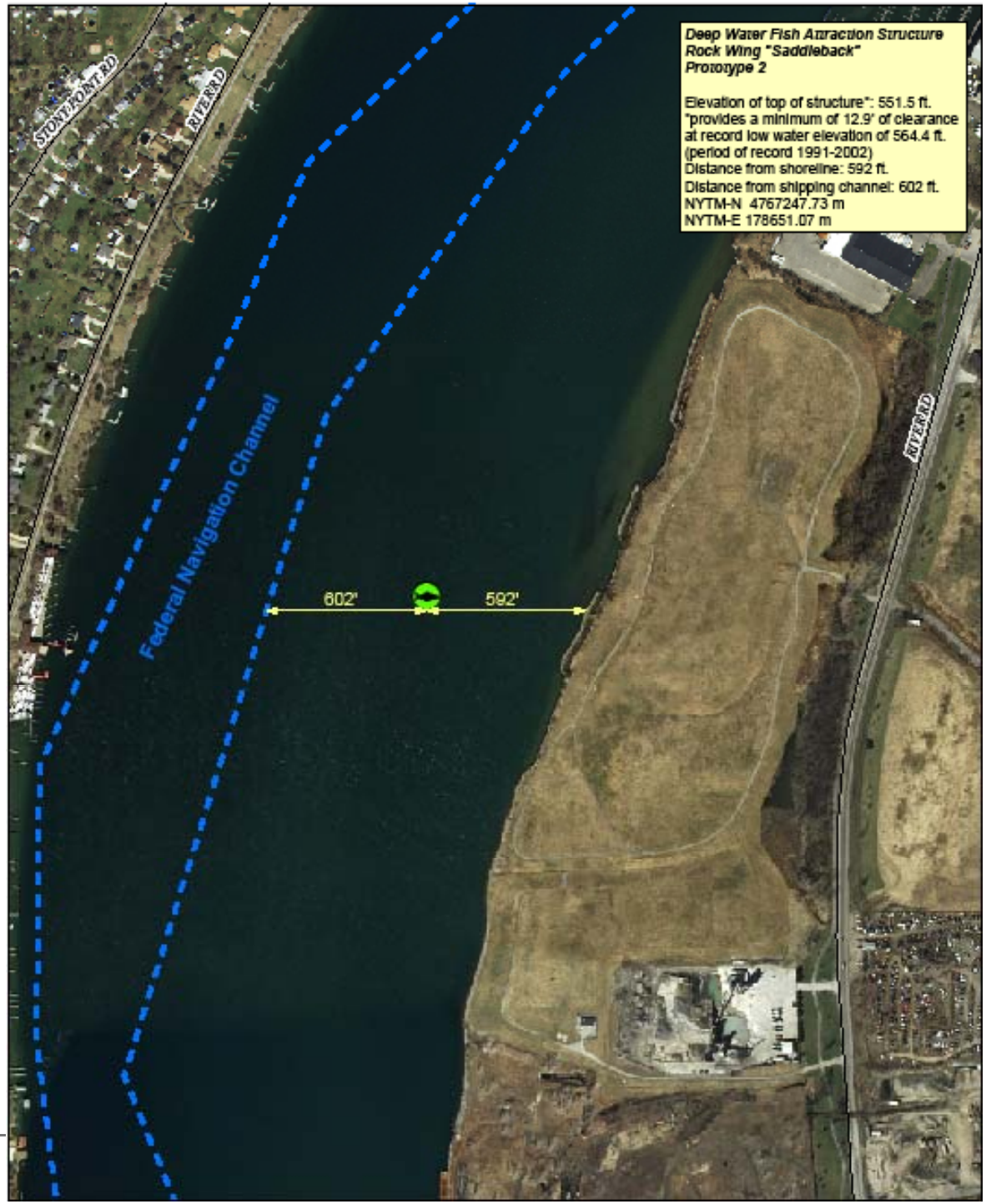
New York Power Authority

SHEET 29

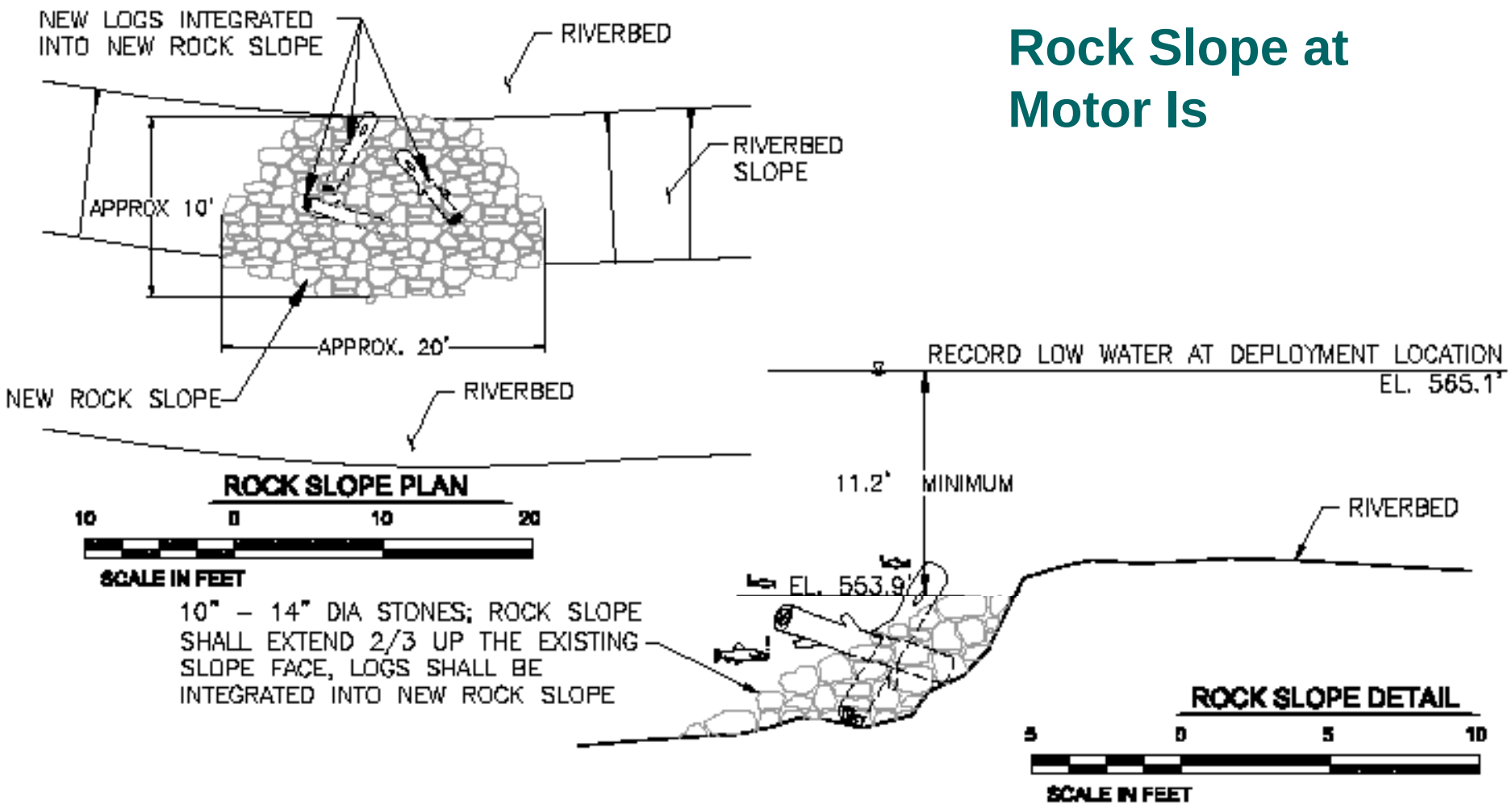
NEW YORK POWER AUTHORITY
NIAGARA POWER PROJECT (FERC NO. 2216)
HABITAT IMPROVEMENT PROJECT
DEEP WATER
FISH ATTRACTION STRUCTURES
PROTOTYPE 2

Rock Wing – Upstream of South Grand Is Bridge

- 592’ from shore
- 18’ depth – 13’ of clearance
- flow 2.5 – 3 ft/s
- gravel with scattered small rocks
- 30% SAV coverage by short wild celery



Rock Slope at Motor Is



MATERIAL WORKSHEET	
	ROCK SLOPE
STONE	10"–14" DIA.
WILLOW	3
VOLUME(FT³)	360±
FOOT PRINT(FT²)	183±

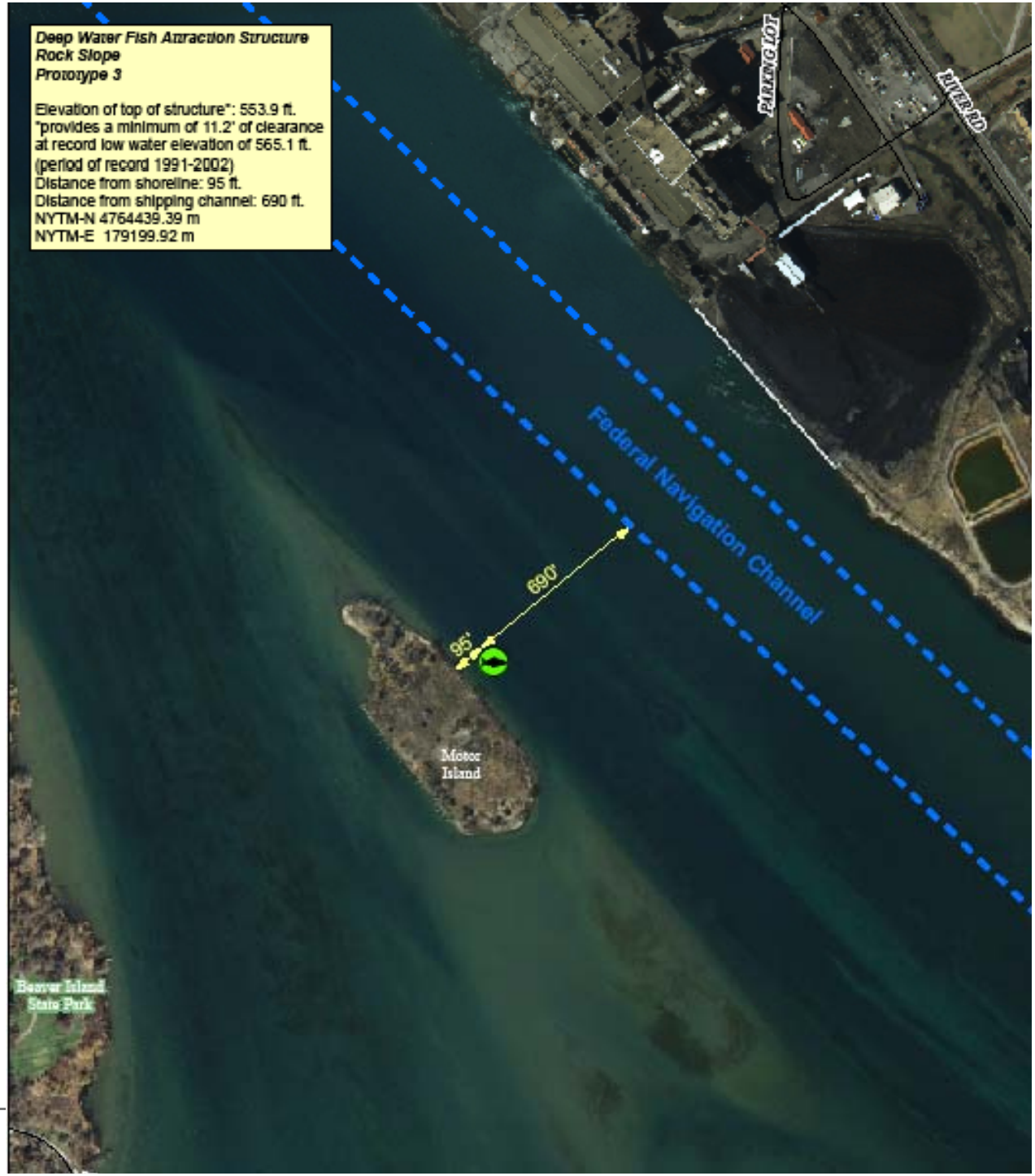
New York Power Authority

SHEET 2C

NEW YORK POWER AUTHORITY
NIAGARA POWER PROJECT (FERC NO. 2216)
HABITAT IMPROVEMENT PROJECT
DEEP WATER
FISH ATTRACTION STRUCTURES
PROTOTYPE 3

Rock Slope at Motor Is

- 95’ from shore
- slopes from 13’ to 17’ depth
- < than 1 ft/s current velocity
- silt and soft sediment
- edge of SAV bed at 13’ depth



Video Clips of Habitat Evaluation

Fish Attraction Structures
Next Steps

- Installation October 2008
- Develop Monitoring Plan
  - Underwater Investigations
    - Structural Integrity
    - Qualitative use by fish
  - Opportunity for involvement by groups such as fishing clubs and university researchers

2008 Third Quarter Progress on HIP Implementation

- Fish Attraction Structures
- **Wetland Plant Characterization Study**
- Invasive Species
- Motor Island Shoreline Protection
- Osprey Nesting Platforms
- Common Tern Nesting Habitat Enhancement

Assessment and Design Recommendations

Study Components

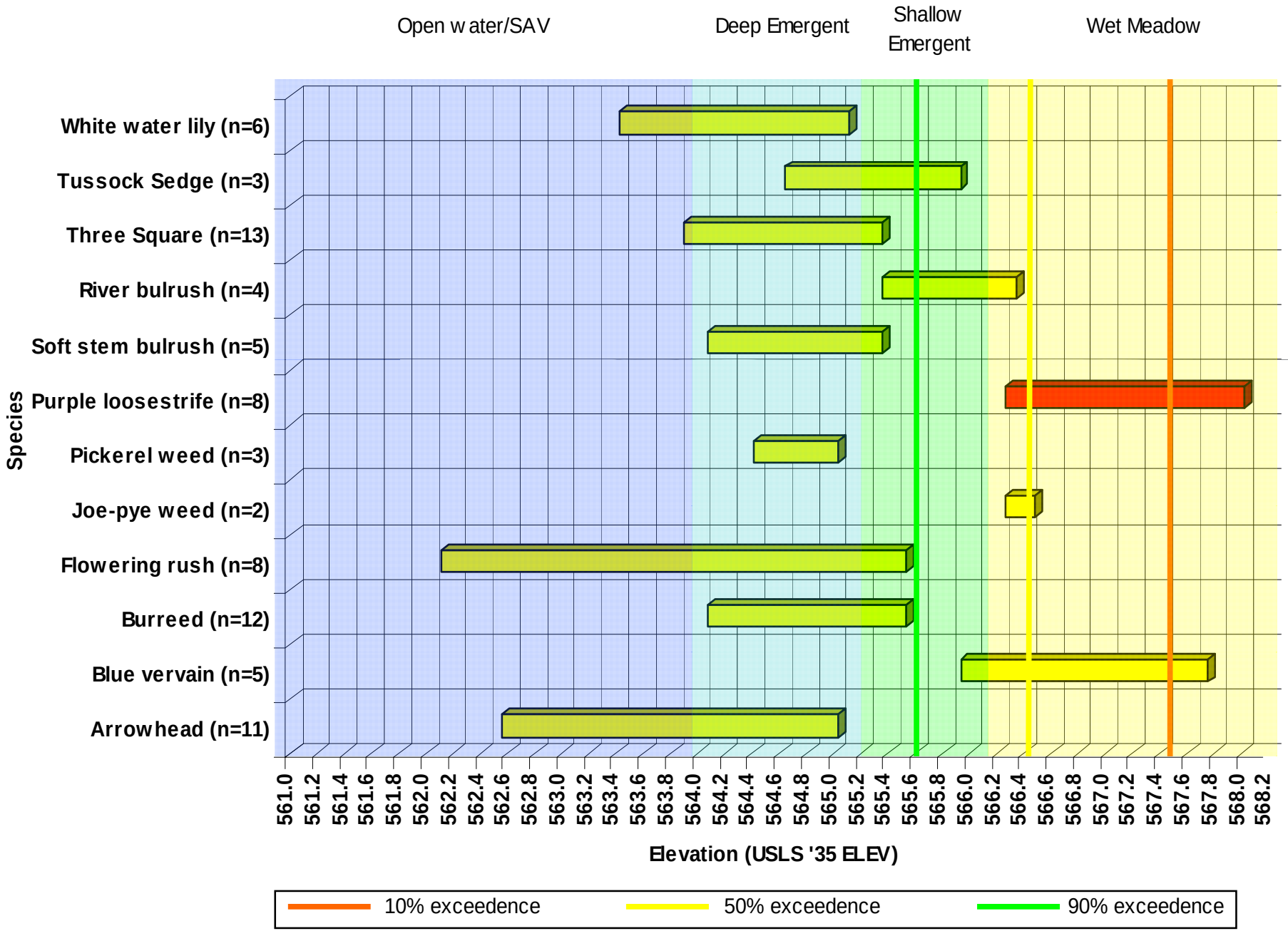
- ✓ Map Existing Conditions
  - ✓ SAV boundaries
  - ✓ invasive stands
  - ✓ marsh boundary
- ✓ Determine Plant and Habitat Elevations
- ✓ Characterize Wetland Plants
- ✓ Motor Island Transects Perpendicular to Shoreline

Results Used As Input for Wetland Designs

- Beaver Island
- Motor Island
- Frog Island
- Strawberry Island

Importance of Elevations

Beaver Island Wetland Plant Distribution



Elevation Ranges for Wetland Cover Types

Beaver Island & East River Marsh		
Elevation Range	**Habitat Type**	**Planting Zone**
566.1- Higher Elevations	Wet meadow*	A
562-566	Hemi-marsh**	(includes B-D)
565.2-566.1	Shallow Emergent	B
564.0-565.2	Deep Emergent	C
Lower Elevations-564.0	Submerged Aquatic Vegetation (SAV)	D

Wetland Design Zones

- Biologists developed list of native wetland plants and their targeted zone
- HIP-specific elevation ranges established for each zone
  - For example, wetland designs for Zone B - Shallow Emergent
    - Will have elevations:
      - Frog Island: 565.2-566.2 ft
      - Beaver Island 565.2-566.1 ft
    - Can select from list of more than 15 plants suitable for this zone, including:
      - American Water Plantain
      - River Bulrush
      - Giant Burreed
      - Tussock Sedge

2008 Third Quarter Progress on HIP Implementation

- Fish Attraction Structures
- Wetland Plant Characterization Study
- **Invasive Species**
- Motor Island Shoreline Protection
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Invasive Species Control Buckhorn and Tifft

Objective

"Control invasive wetland species in targeted areas in order to promote the growth of functionally valuable wetlands characterized by a diverse community of native wetland vegetation."

Project Constraints and Feasibility

- Exotic species control will require constant monitoring and follow-up treatment for a period of at least 10 years
- Control of exotic species at the landscape level is never over (these species will persist) so goals must be established to define what constitutes success

- Reducing further spread and dominance in targeted areas is a realistic goal; eradication is not

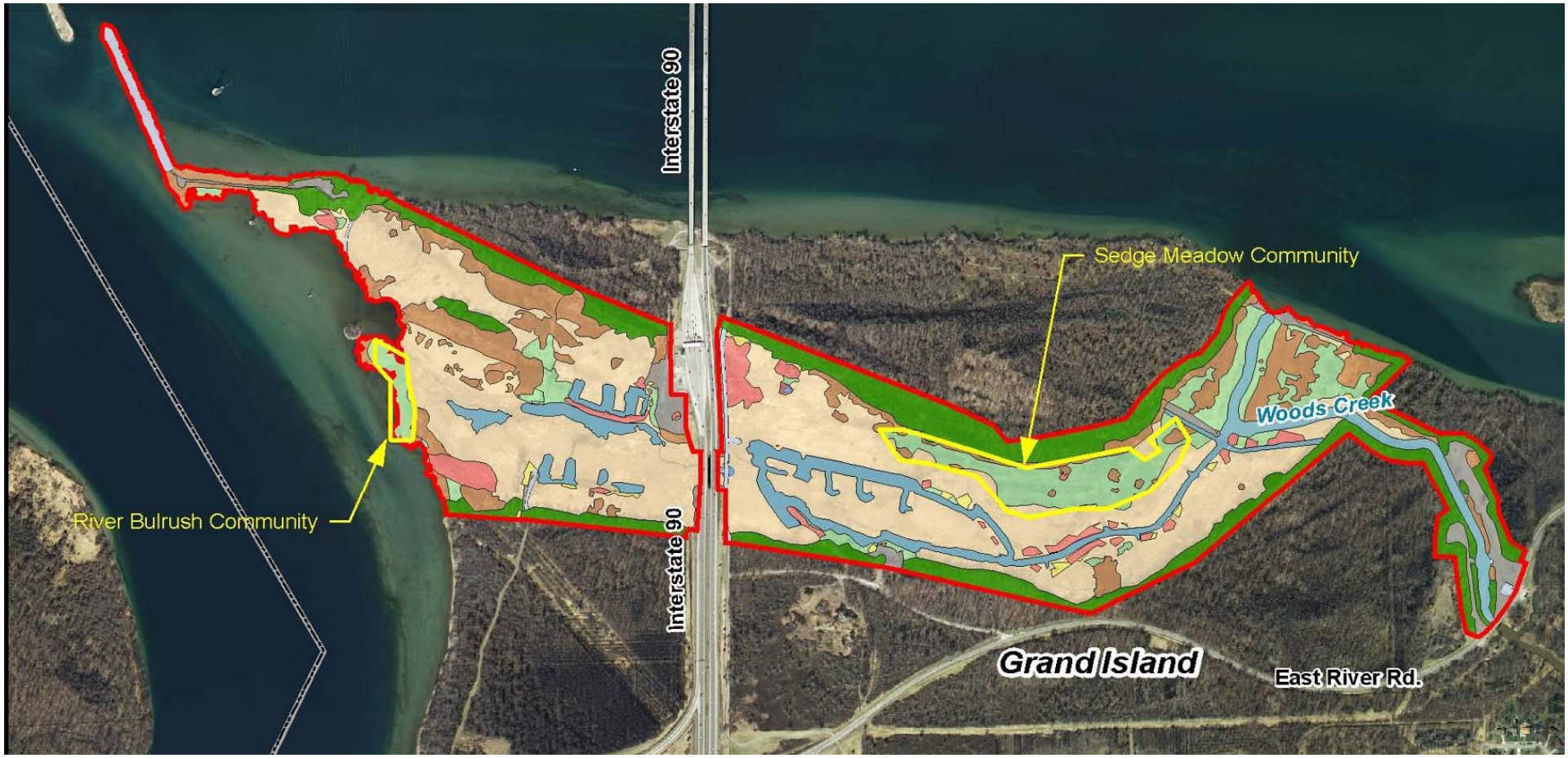
Progress & Schedule

- Winter (February) 2008 Field Survey
- Summer (July) 2008 Field Survey
- Fall 2008 Action Plan Development
- 2009: Permitting, Finalize Action Plan, RFP
- 2010: Begin implementation

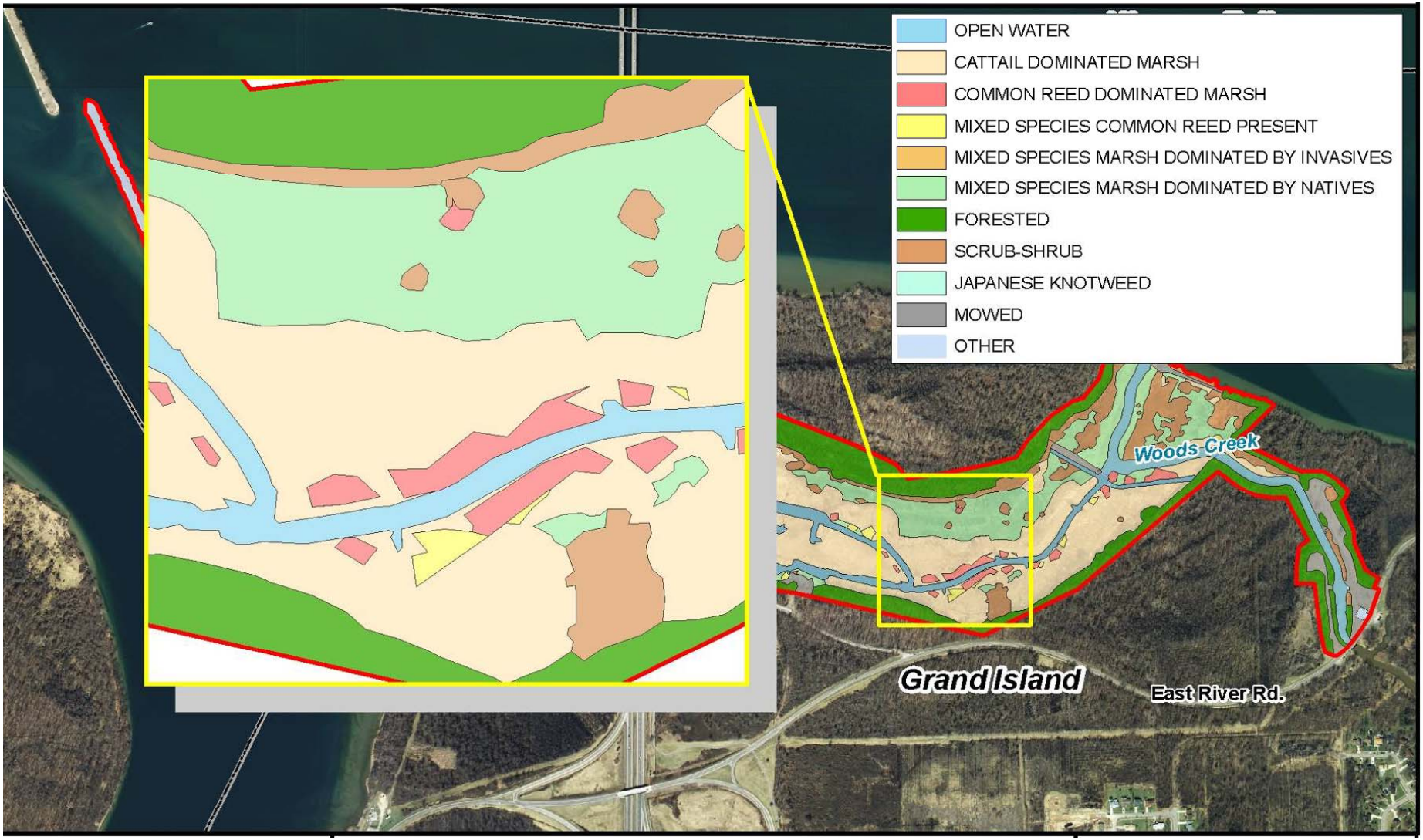
Existing Conditions

- Cattail is the dominant cover type at both Tifft and Buckhorn
- Phragmites stands mapped as two types: Phrag-dominated and mixed
- Some remnant, mixed native marsh at Buckhorn: sedge meadow on E side, river bulrush/cattail on W side
- Tifft: mostly cattail and Phrag but some small area of burreed and buttonbush

Cover Type Mapping - Buckhorn

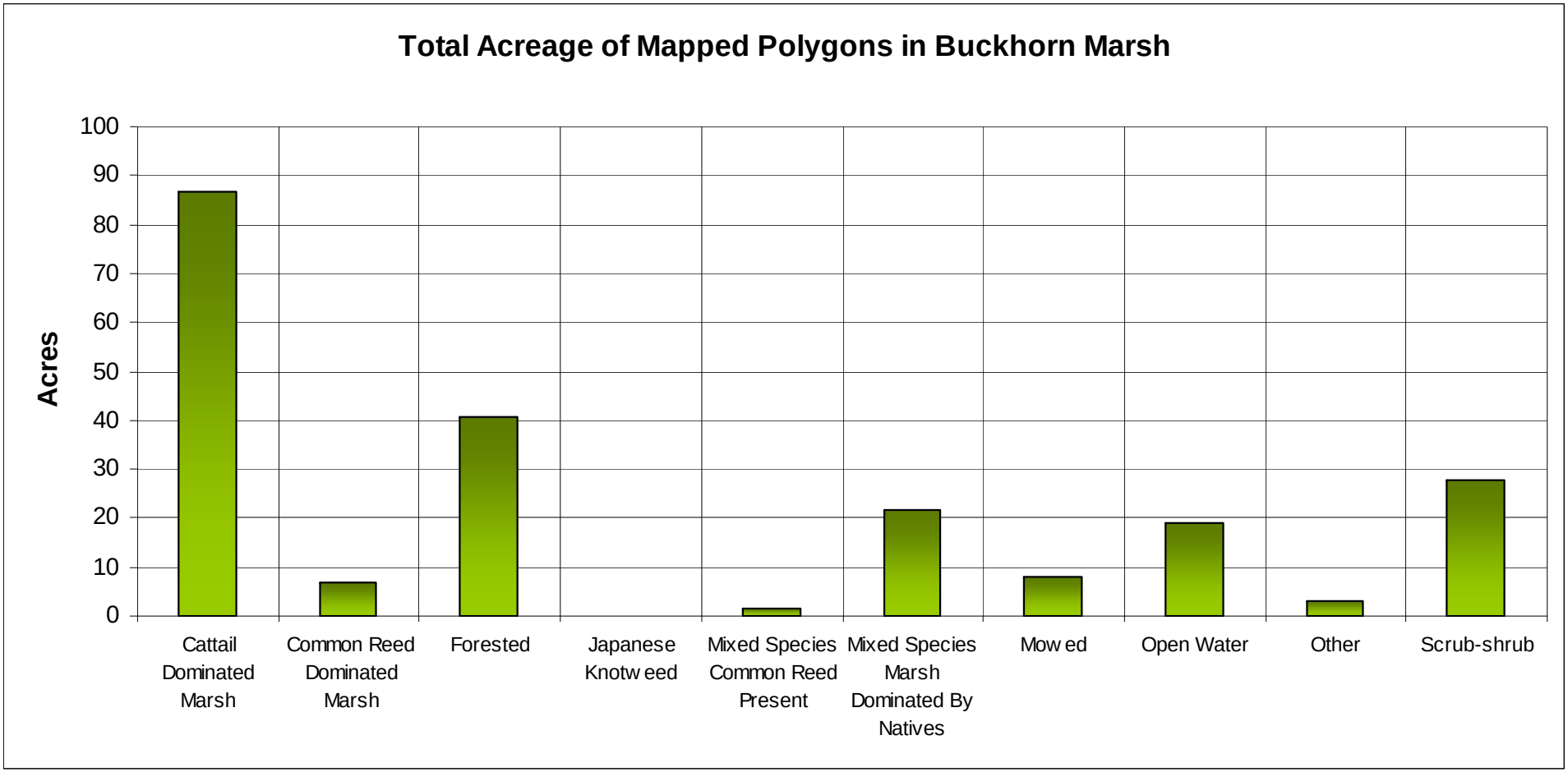


Cover Type Mapping - Buckhorn

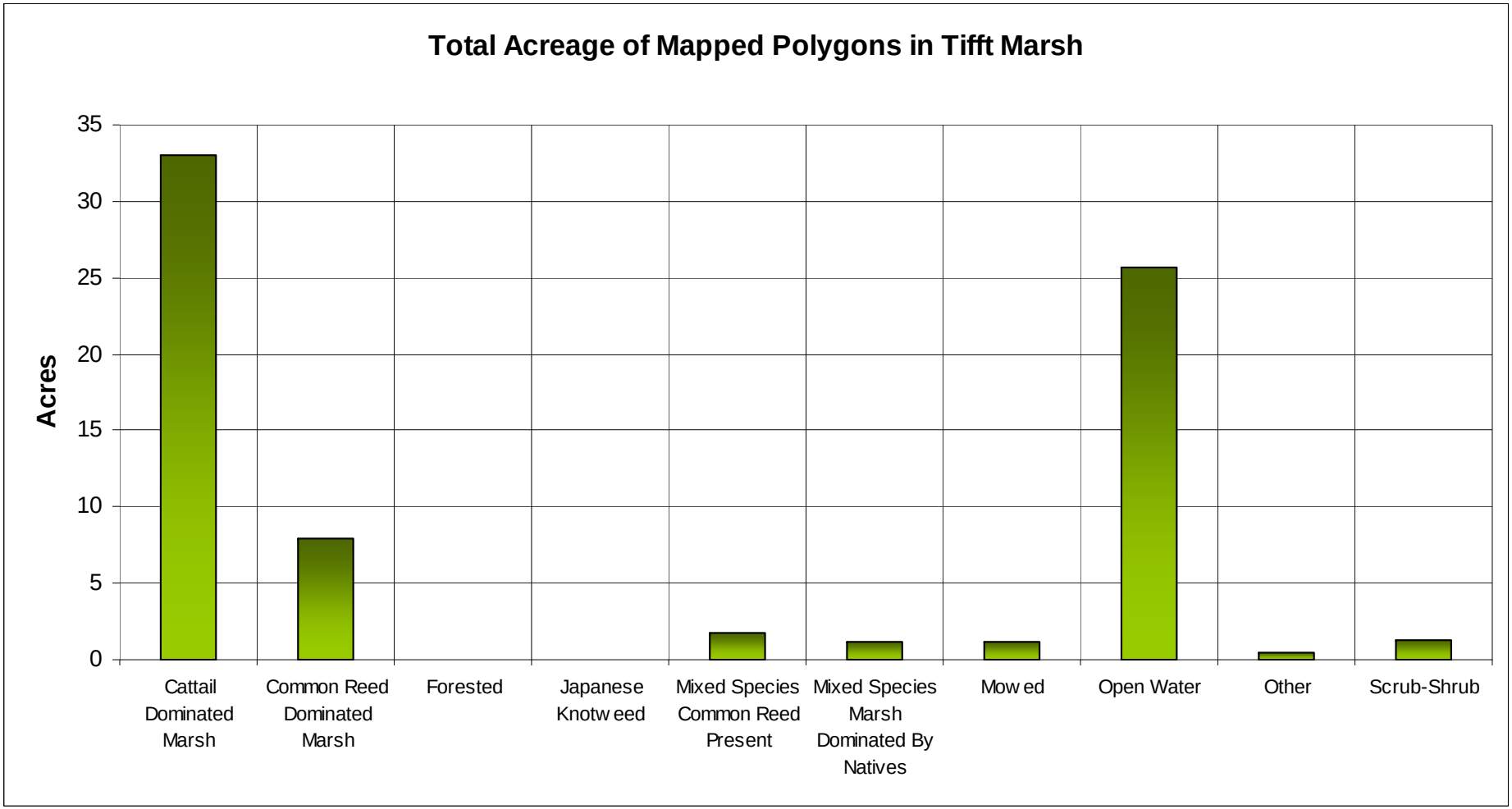


Cover Type Mapping – Tifft Marsh

Buckhorn Marsh Invasives Mapping



Tifft Marsh Invasives Mapping



Action Plan: Priority Species

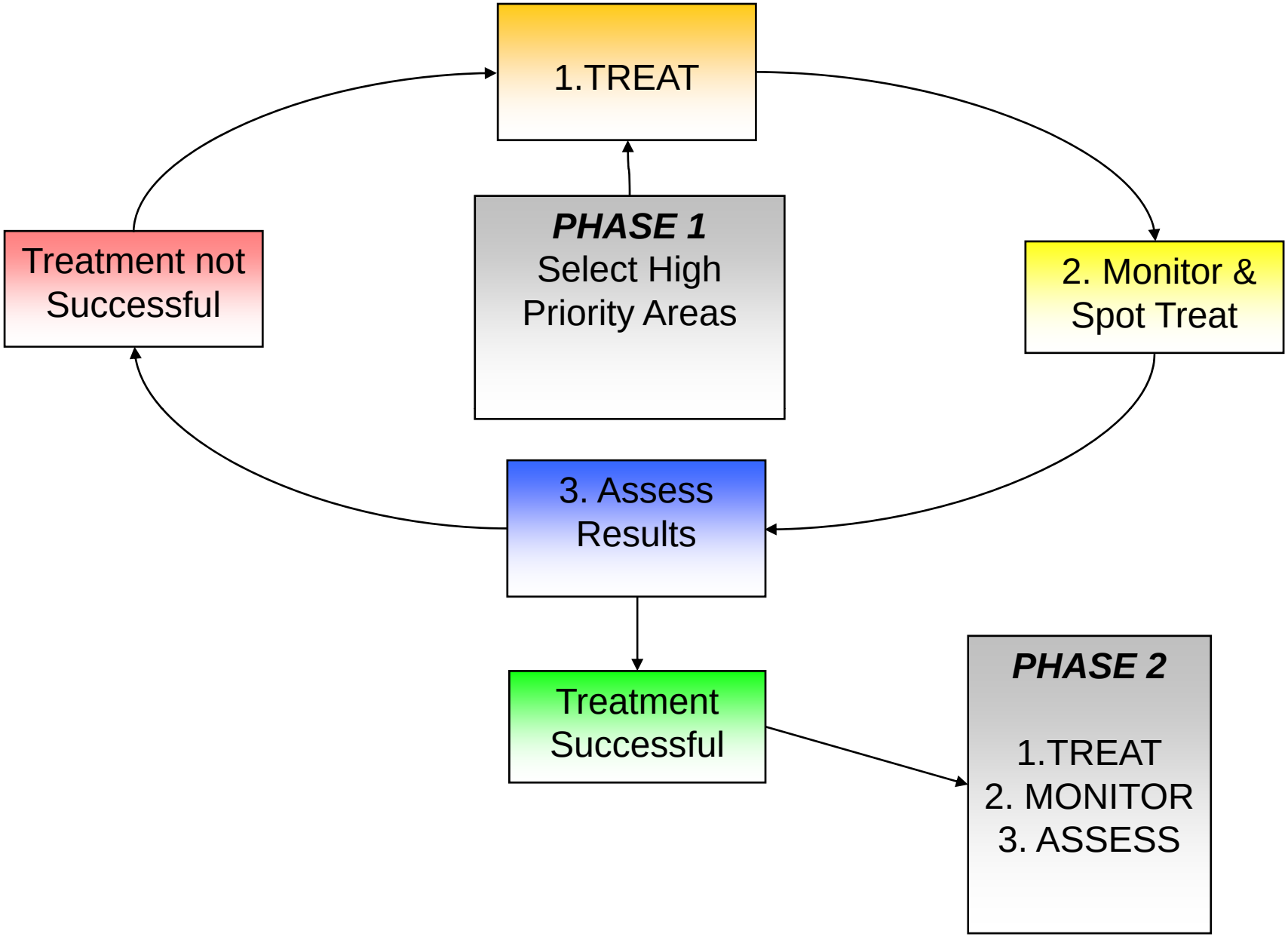
Phragmites
(primary)

Japanese Knotweed
(secondary)

Sedge Meadow and Other Mixed Native Cover Types

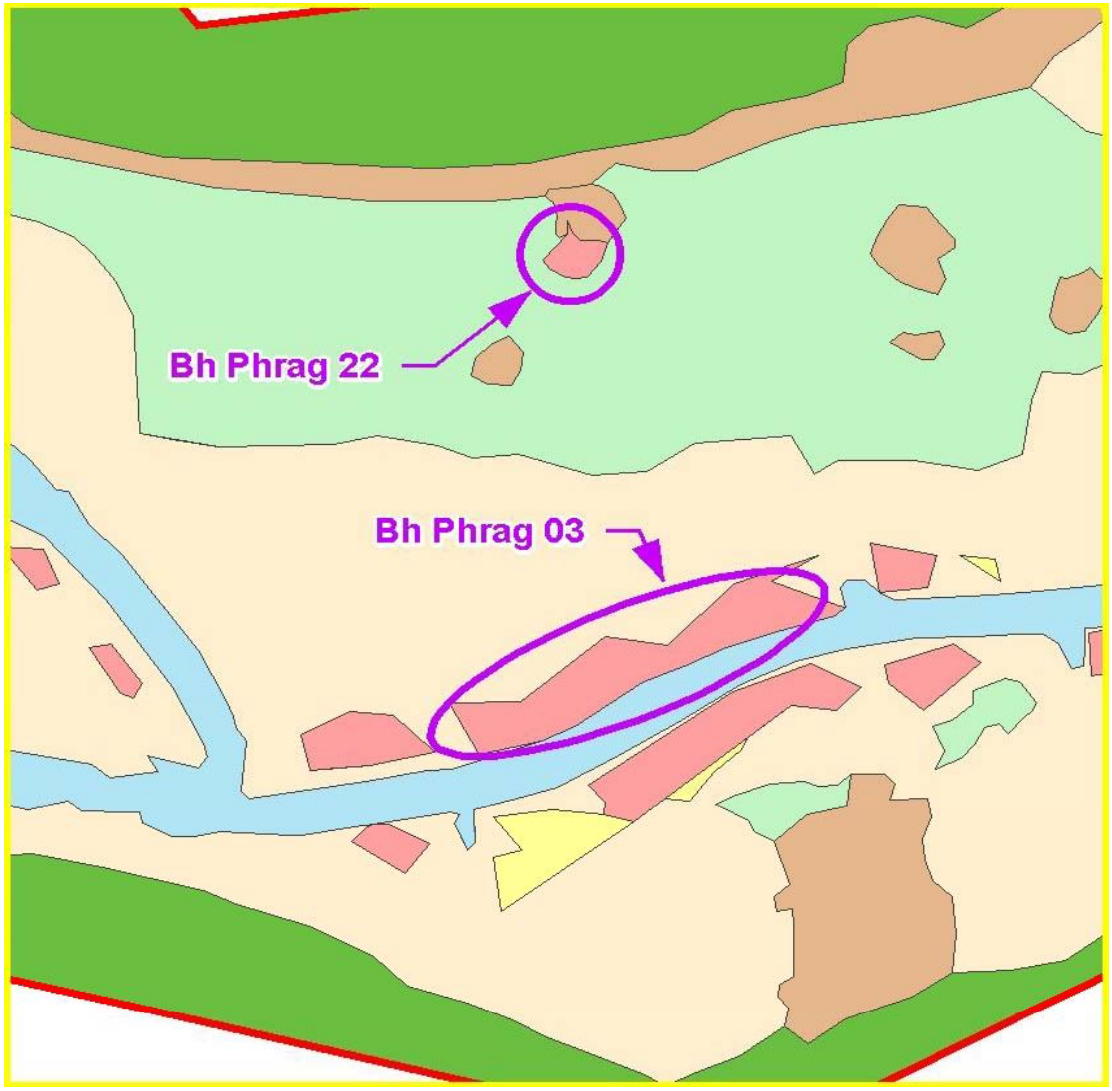
Action Plan Components

- Intro/Background Sections
- Control Methods (Tool Box)
- Recommended Control Methods
  - Phased implementation
  - Method to prioritize specific control areas
  - Treat priority areas with herbicide
- Monitoring


1.TREAT
PHASE 1
Select High Priority Areas
2. Monitor & Spot Treat
Treatment not Successful
3. Assess Results
Treatment Successful
PHASE 2
1.TREAT
2. MONITOR
3. ASSESS

Why and How to Prioritize

- Why Prioritize
  - Realistic/achievable long term goals (pick your battles)
  - Can't just spray large area and be done
  - Need to save resources for follow-up spot applications and monitoring
- How to prioritize
  - Size and density of stand
  - Proximity to sensitive habitats
  - Accessibility
  - Barriers to expansion



Size	Rank
Large (Greater than .50 acres)	2
Medium (.1-.499 acres)	1
Small (less than .1 acres)	0
Accessibility	**Rank**
Not easily accessible	2
Moderately accessible	1
Easily Accessible	0
Aerial Cover	**Rank**
>/=75%	2
>30%<75%	1
</=30%	0
Potential to Expand	**Rank**
0 sides	3
1 side	2
2 sides	1
3 sides	0
Adjacent to Sensitive Habitat	**Rank**
> 100'	3
within 100'	2
Yes	0

Stand ID	Acres	Cover %	Size	Access	Aerial Cover	Expansion	Adjacency	Prioritization
Bh Phrag 22	0.04	95	0	2	2	0	0	4
Bh Phrag 03	0.4	95	1	1	2	3	3	10

Proposed Control Technique(s)

- **Herbicide application primary technique**

- Not realistic to remove thatch, hand-pull or conduct controlled burn
- Biological techniques not applicable
  - Mechanical or water level control may be used depending on equipment availability and other constraints

Monitoring

- 16 permanent fixed-location plots
- Monitor treated areas pre- and post- treatment
- Update Phragmites stand mapping

Purpose:

- adaptive management
- effectiveness monitoring

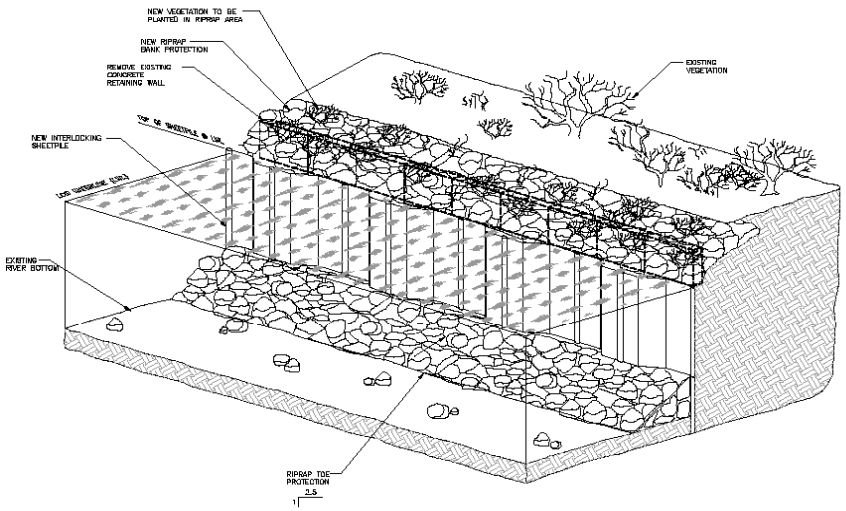
In summary, we may not eradicate Phragmites from marshes, but we can keep it in check, significantly reduce its extent, and protect important remnant marsh habitat

2008 Third Quarter Progress on HIP Implementation

- Fish Attraction Structures
- Wetland Plant Characterization Study
- Invasive Species
- **Motor Island Shoreline Protection**
- Osprey Nesting Platforms
- Common Tern Nesting Habitat Enhancement

Motor Island Shoreline Protection

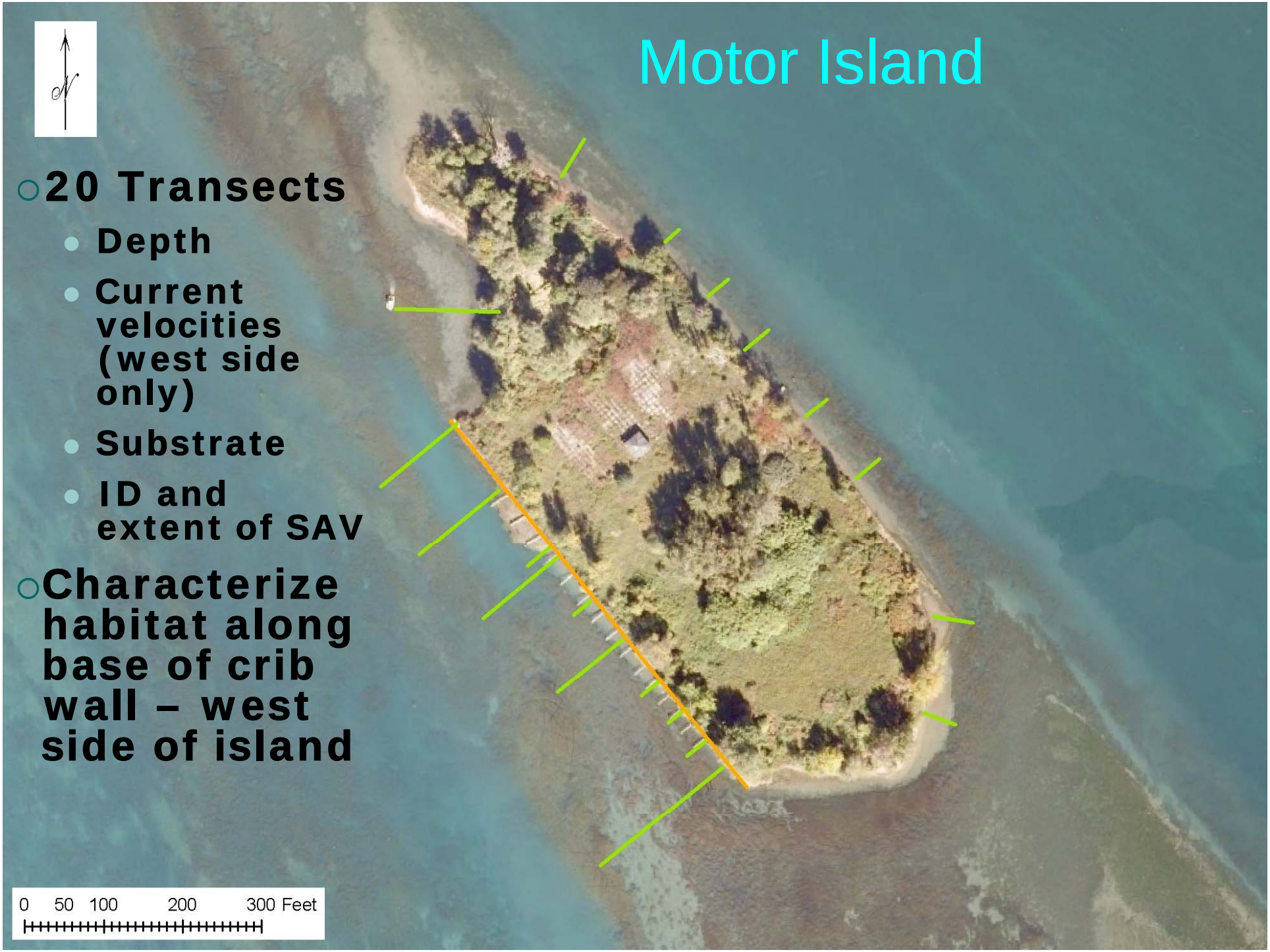
Provide for shoreline protection measures incorporating bioengineering methods wherever possible and practical – preserve vertical nature of western shoreline



Motor Island HIP

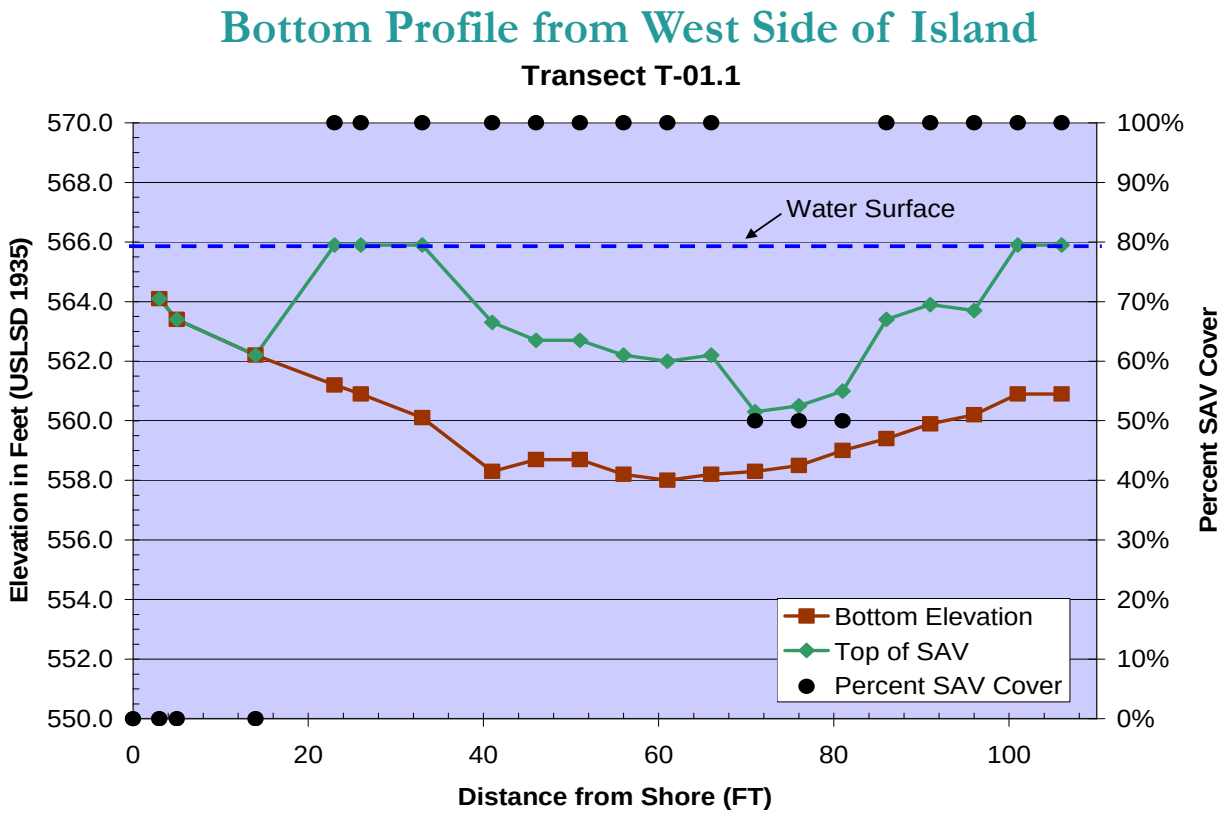
Field Survey

- August 18 and 19, 2008
- Baseline data on nearshore habitats to assist in developing a shoreline protection / enhancement strategy
- Supplement information gathered from 2007 SAV survey around island


Motor Island
20 Transects
Depth
Current velocities (west side only)
Substrate
ID and extent of SAV
Characterize habitat along base of crib wall – west side of island
0 50 100 200 300 Feet

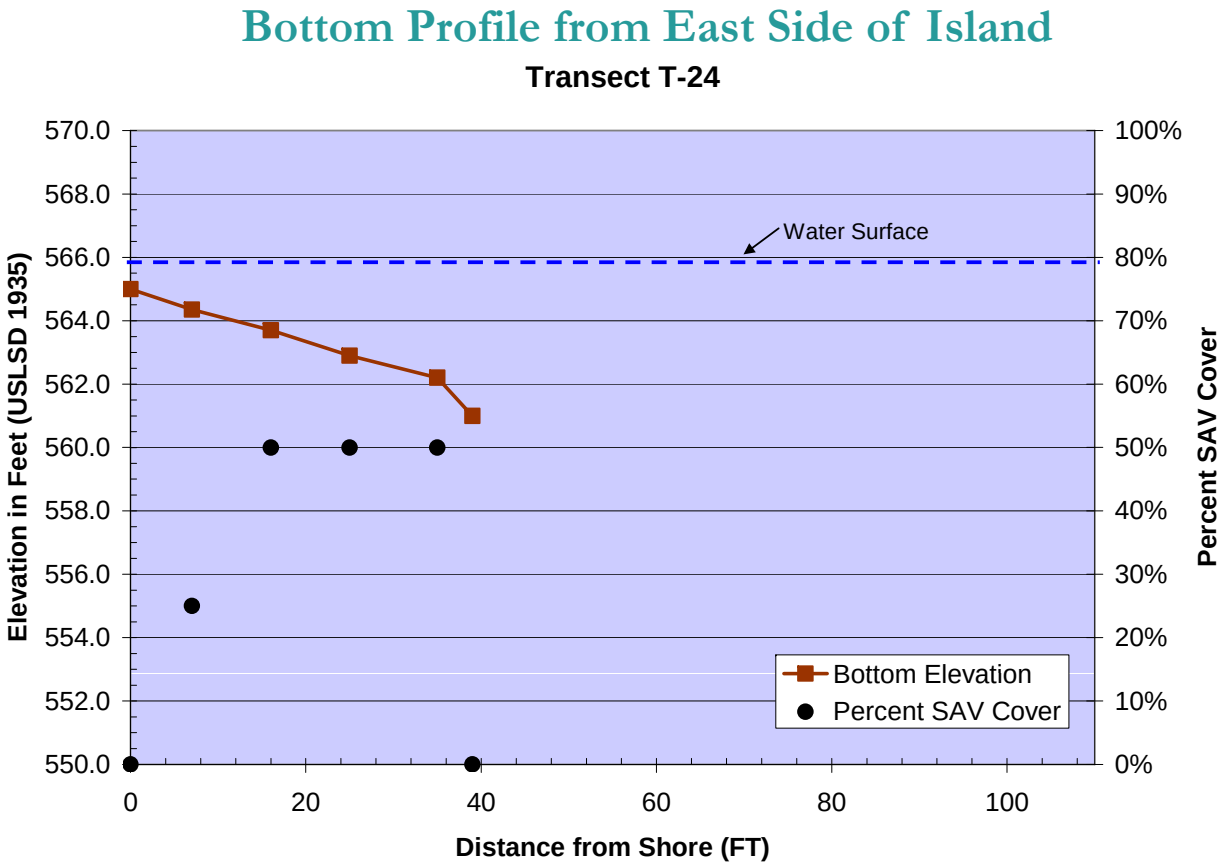
Motor Island HIP

- Preliminary findings
  - Narrow band around island with no SAV – possibly from ice scour/wind-driven waves and boat wakes
  - Wild Celery dominant form of SAV; Muskgrass also present
  - SAV is sparse in previously dredged areas along western shore



Motor Island HIP

- Preliminary findings (cont.)
  - Overall, there were low current velocities (< 1 ft/s) and extensive edge habitat within the SAV beds that provide good cover and feeding areas for juvenile and adult fish



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- **Osprey Nesting Platforms**
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Osprey Platform – update

- East River Marsh selected as location for 2008 installation
- Potential locations were identified in the marsh
- NYSDEC selected location
- Collected tree heights and geotechnical data
- Design pole installation
- Issued RFP for platform construction

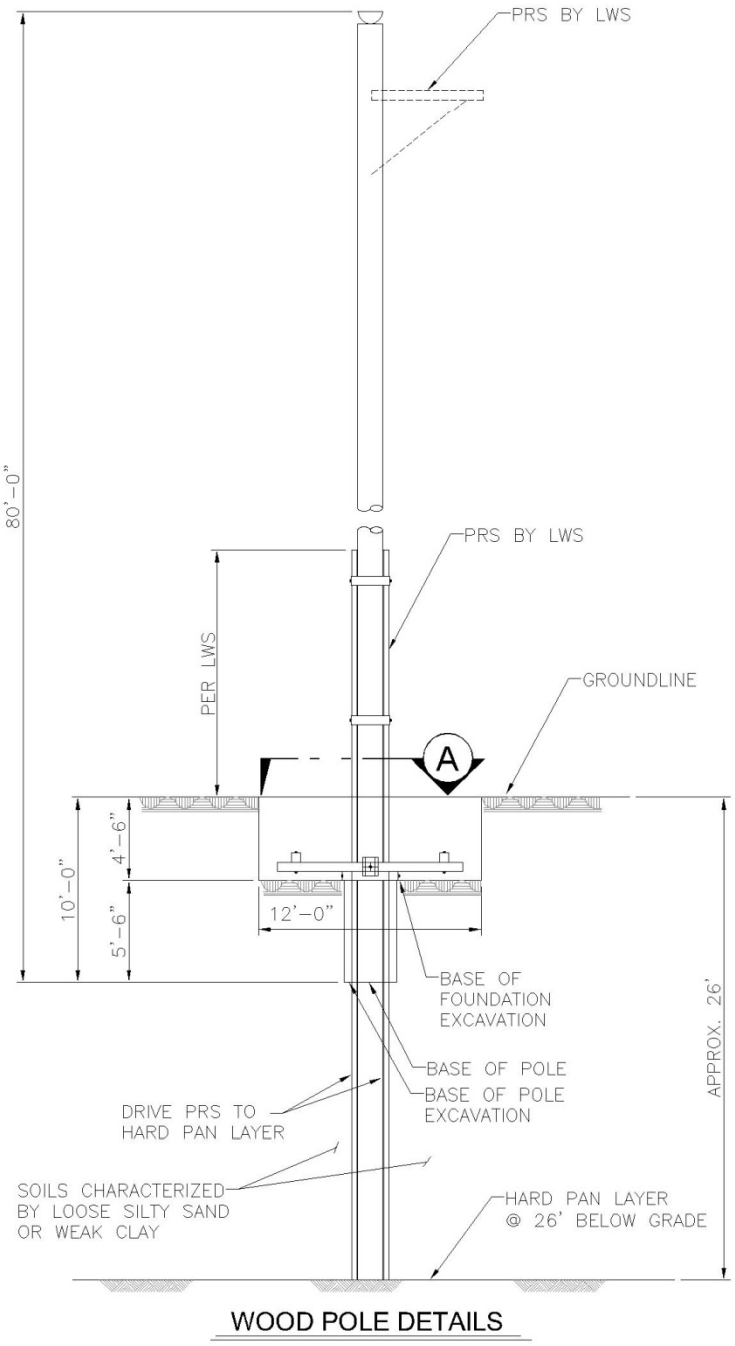
Osprey pole at Buckhorn Marsh

Potential Osprey Platform Locations in East River Marsh

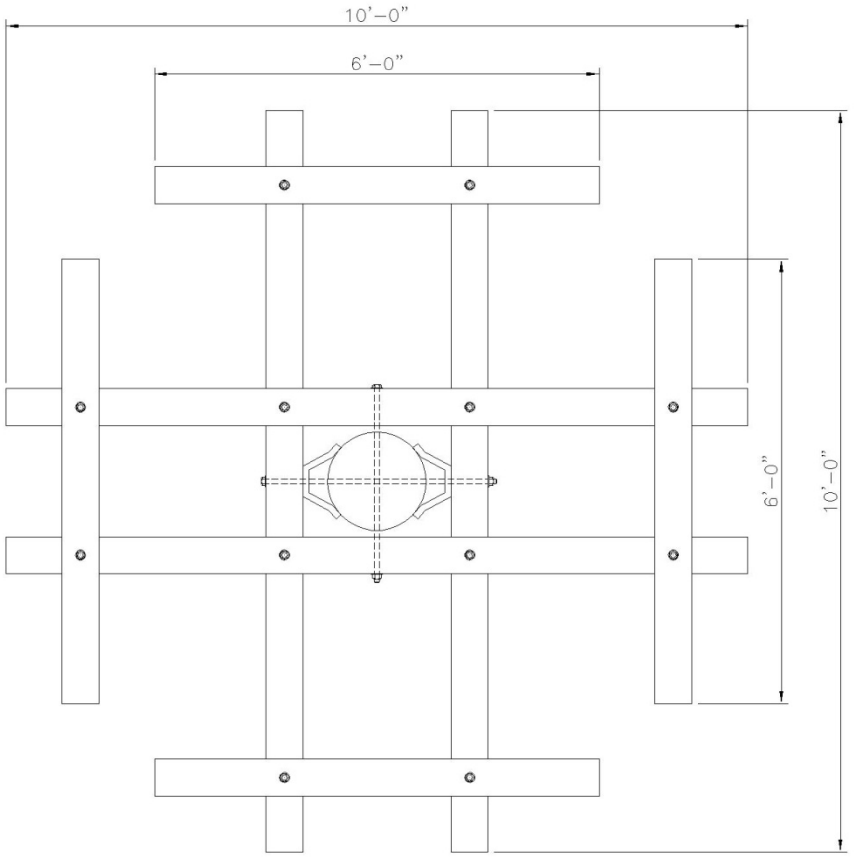
Installation Obstacles

- Tall pole required – 70’
- 26’ of soft soils will not stabilize a 70’ pole in high winds – particularly after many years of nest building
- Difficult access for equipment and long pole

Conceptual Design: Pole Foundation for Marsh Installation



WOOD POLE DETAILS



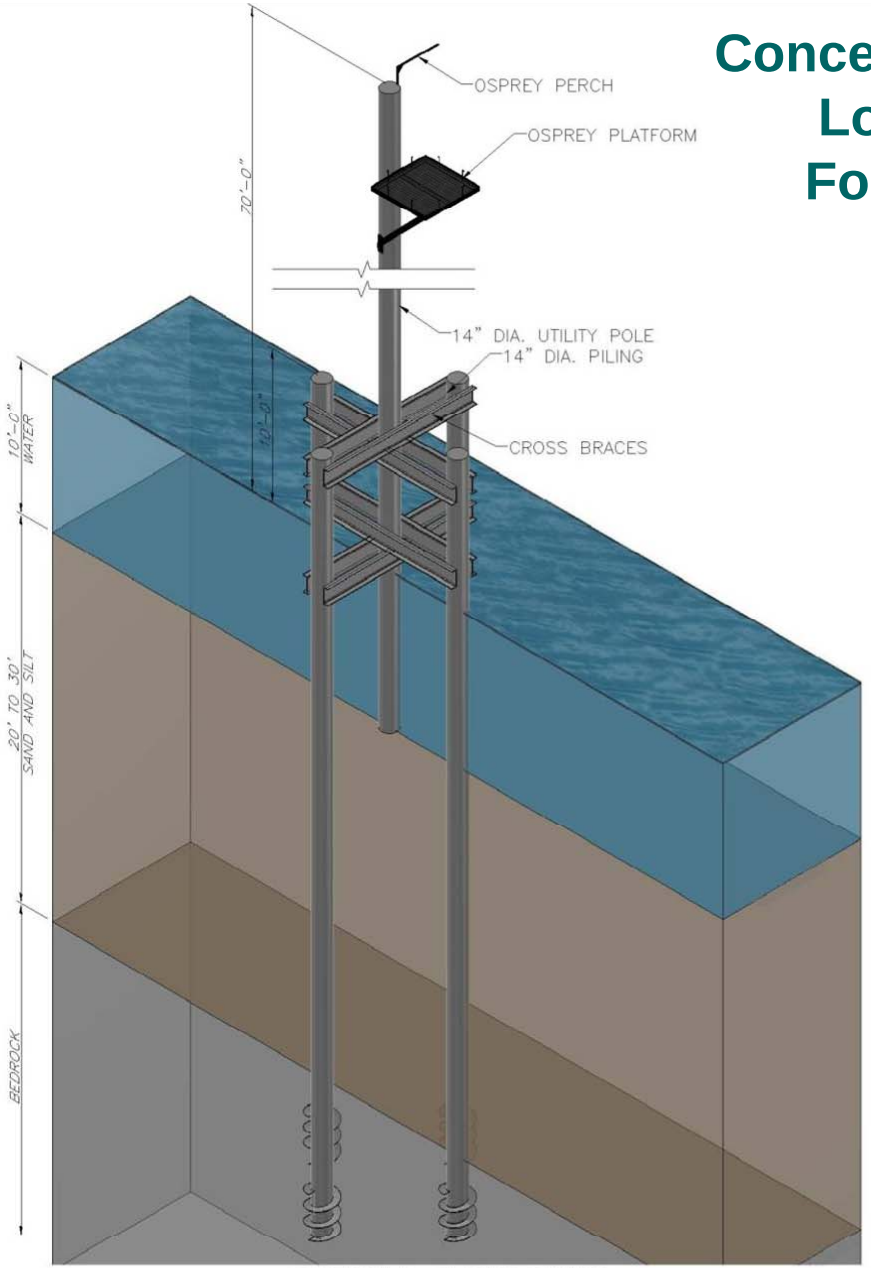
SECTION A

Four Potential Options for the East River Osprey Platform Installation

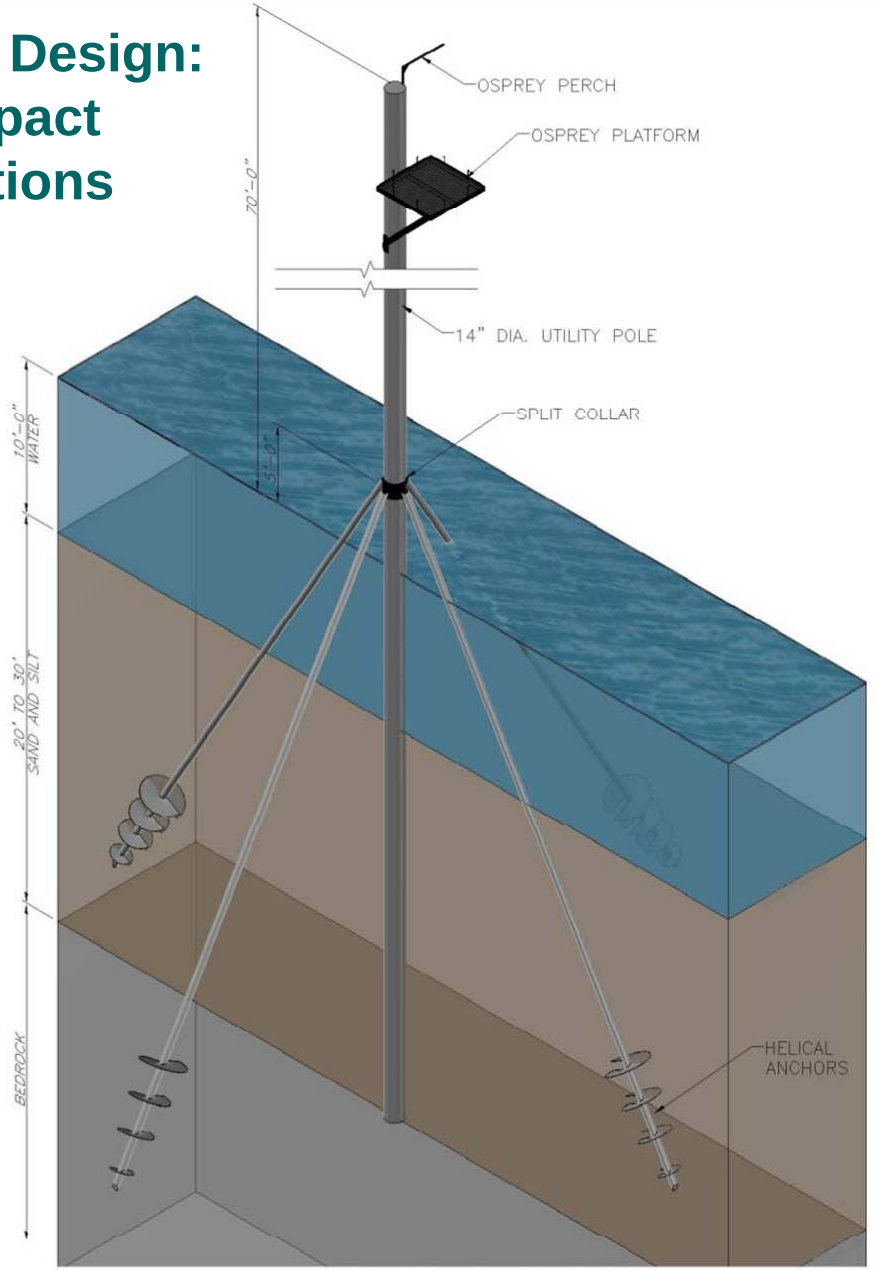
- Different installation design for in the marsh
- In the water behind a breakwall
- On upland ground at the south end of the marsh
- A different location altogether

East River Marsh Geotechnical Data Locations

Conceptual Design: Low Impact Foundations

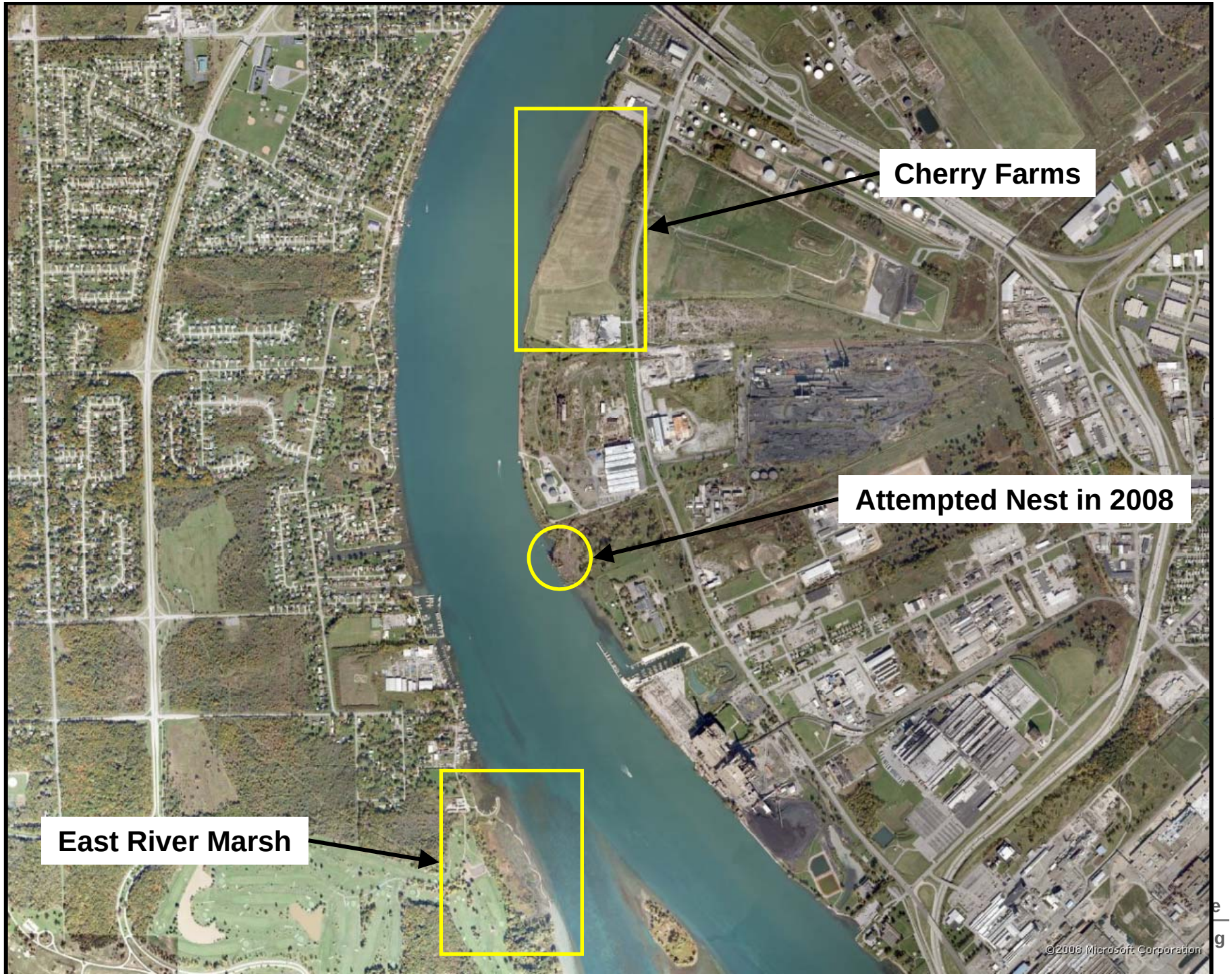


OPTION 1 - AUGER PILING



OPTION 2 - HELICAL ANCHORS

Potential Location at South End of Marsh


Cherry Farms
Attempted Nest in 2008
East River Marsh
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2008 Third Quarter Progress on HIP Implementation

- Fish Attraction Structures
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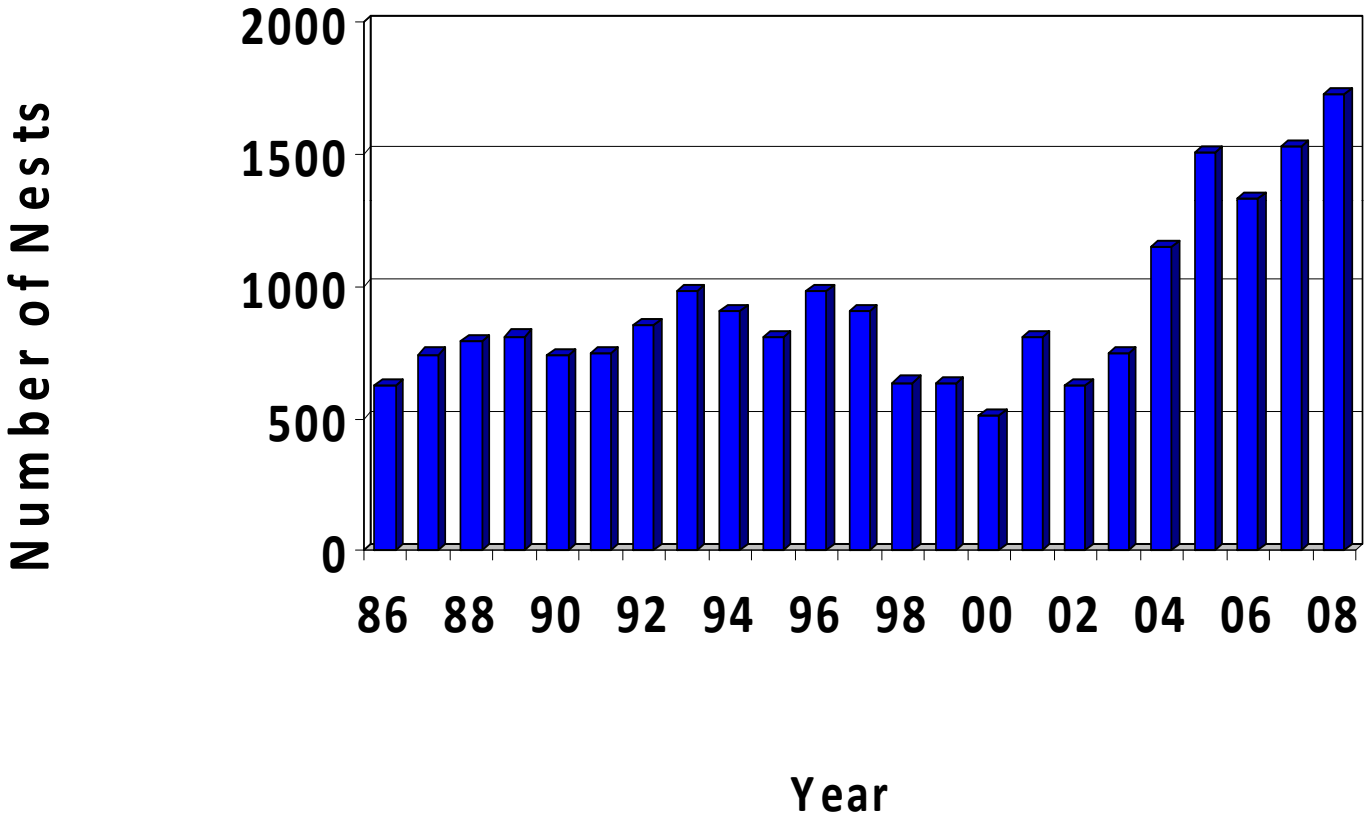
- Motor Island Shoreline Protection
- Osprey Nesting Platforms
- **Common Tern Nesting Habitat Enhancement**

Terns Nest on Buffalo Harbor breakwaters, and on Niagara River water intakes & cribs

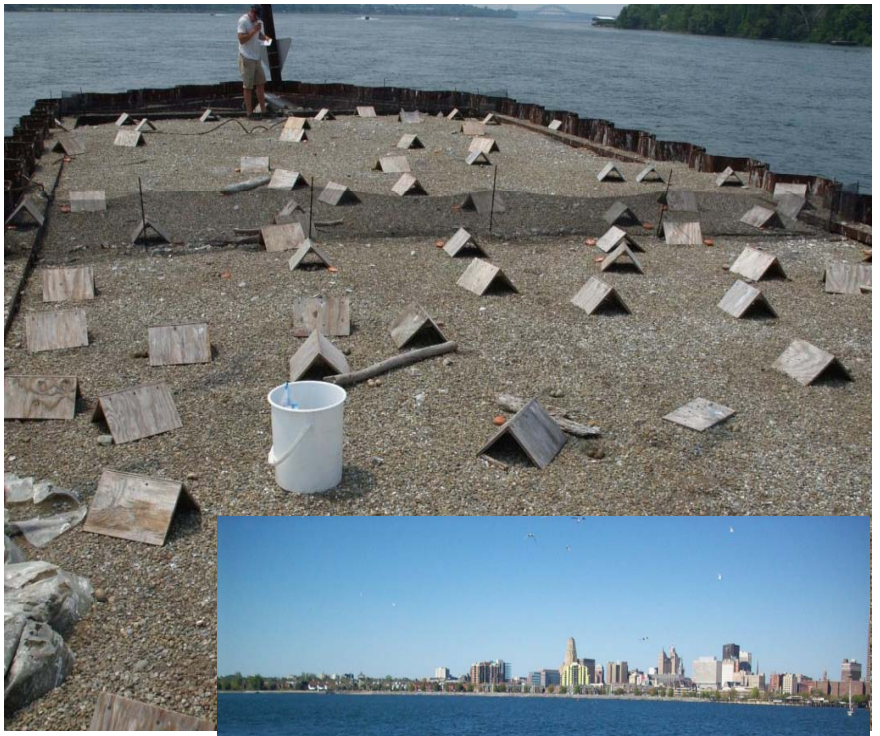
Niagara Frontier Common Terns 2008

- **METHODS**
  - Bigger boxes
  - New perimeter fence design
  - New enclosure design
  - More chick shelters
  - Gravel added as in previous years, but over broader area
- **RESULTS**
  - Approx. 1725 Nests
  - Up 13% from 2007
  - Number of nests at TWI almost doubled
  - Productivity at some sites reduced by weather and predation
  - Productivity within new fences high

Number of Tern Nests on the Niagara Frontier (1986-2008)



Niagara Frontier Common Terns 2008

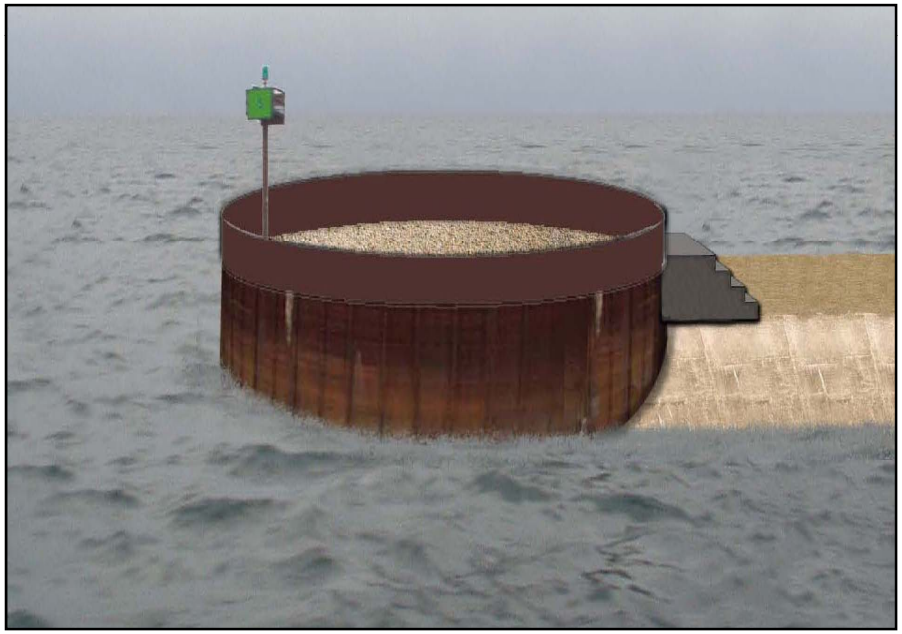


2008: new enclosure & perimeter fence designs, more chick shelters,

Common Tern Nesting Habitat Enhancement Next Steps

- Complete conceptual design for habitat enhancement in Buffalo harbor

Breakwall end cell improvement



Barge moored behind breakwall

Common Tern Nesting Habitat Enhancement Next Steps (cont.)

- Coordinate design efforts with Army Corps and Coast Guard
- Schedule permitting, install one prototype for 2009 nesting season – early season nesting may make this problematic

HIPS Capital Cost Expenditure Report

HIPs	Estimated Capital Cost	Spent To Date (6/27/2008)
Beaver Island Wetland Restoration	$2,700,000	$134,949
Strawberry Island Wetland Restoration	$2,300,000	$37,772
Area Upstream of Motor Island	$4,200,000	$194,561
Motor Island Shoreline Protection	$1,900,000	$107,440
Invasive Species-Buckhorn and Tifft Marsh	$350,000	$38,439
Osprey Nesting Platforms	$70,000	$25,126
Common Tern Nesting	$560,000	$30,430
Fish Attraction Structures	$310,000	$39,645
Total HIPs	$12,390,000	$608,400