Opportunities and Constraints for Mitigating the Environmental Effects of an Abandoned Highway Embankment Fill at Rumney Marsh in Revere and Saugus, Massachusetts

Edward Reiner - EPA New England

New England Association of Environmental Biologists
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Disclaimer

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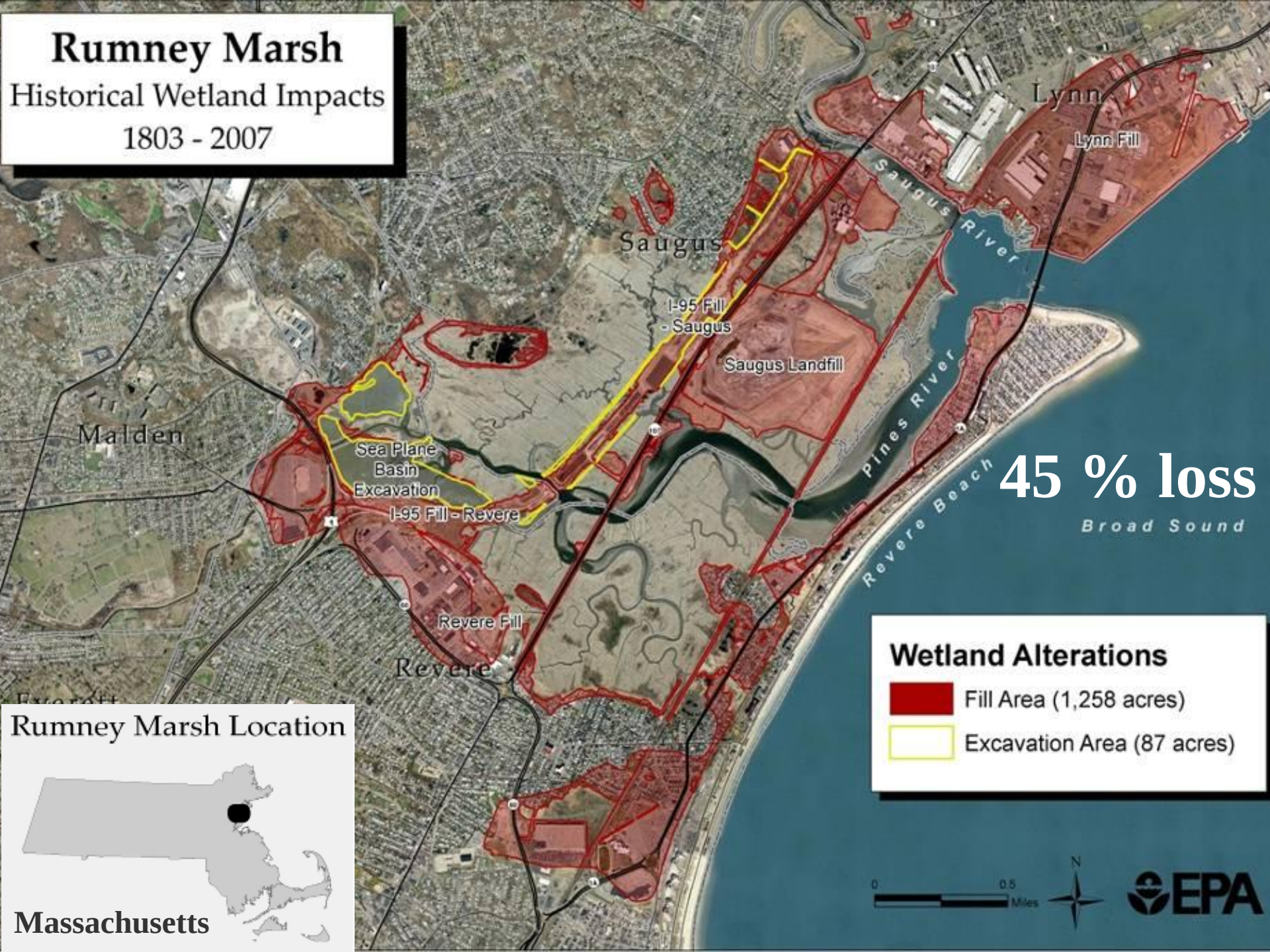
Presentation Outline

- Historical Wetland Losses
- I-95 Impacts
- Fill Removal
  - Opportunities
  - Constraints on Restoration of Tidal Flow
- Future Research Needs


Rumney Marsh
Historical Wetland Impacts
1803 - 2007
Lynn
Lynn Fill
Saugus River
Saugus
I-95 Fill - Saugus
Saugus Landfill
Pines River
Malden
Sea Plane Basin Excavation
I-95 Fill - Revere
Revere Beach
45 % loss
Broad Sound
Revere Fill
Revere
Wetland Alterations
Fill Area (1,258 acres)
Excavation Area (87 acres)
Rumney Marsh Location
Massachusetts
0
0.5
Miles
N
EPA

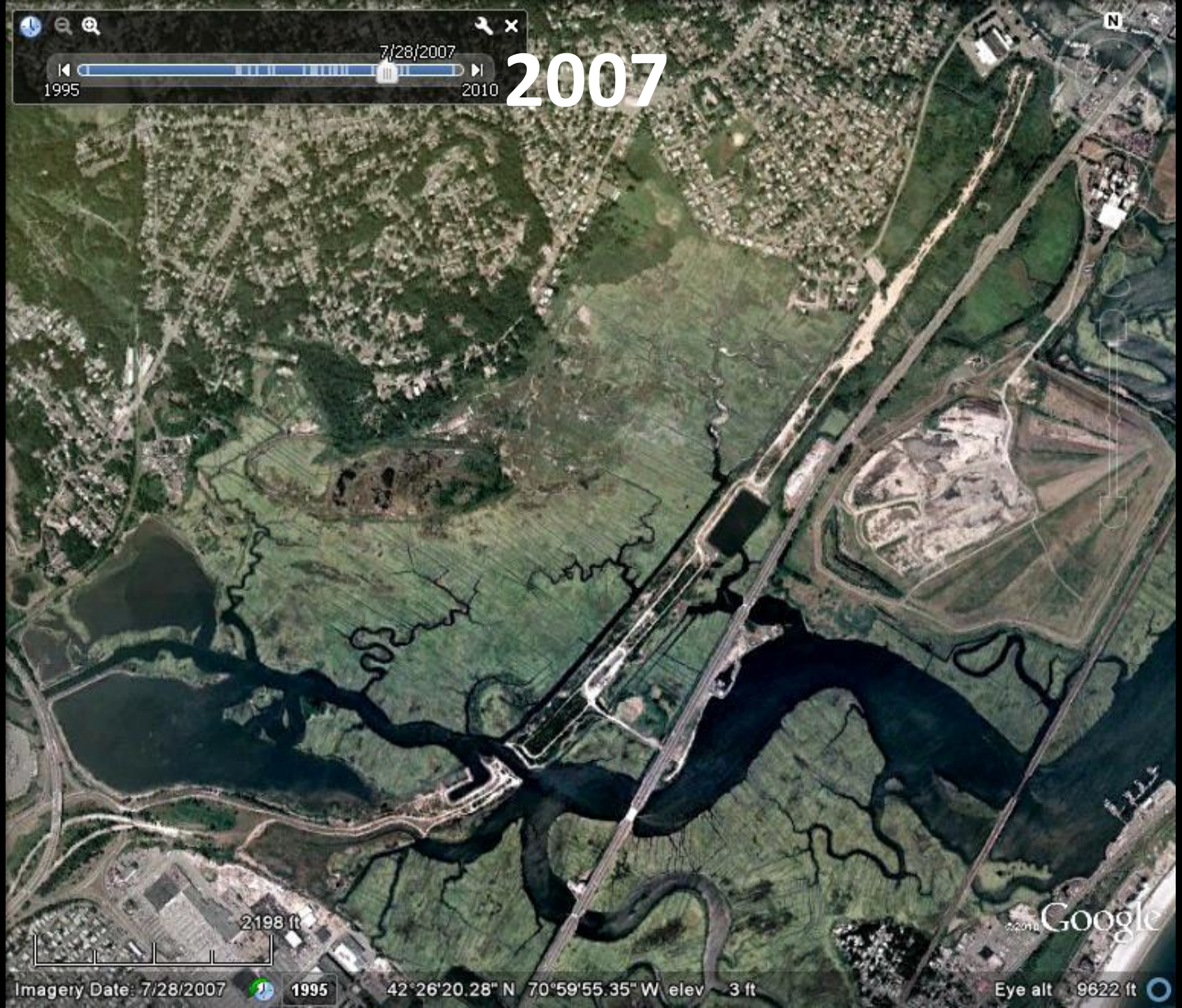
I-95 Abandoned Embankment


1967


1972


1980
SAUGUS RIVER
BROAD
ANE BASIN
PINES RIVER
CARUSO
CONSTRUCTION SITE


4/13/2002
2002
N
Image © 2011 DigitalGlobe
2198 ft
©2010 Google
Imagery Date: 4/13/2002
1995
42°26'20.42" N 70°59'55.35" W elev 2 ft
Eye alt 9622 ft


7/28/2007
1995
2010
2007
N
2198 ft
Google
Imagery Date: 7/28/2007
1995
42°26'20.28" N 70°59'55.35" W elev -3 ft
Eye alt 9622 ft

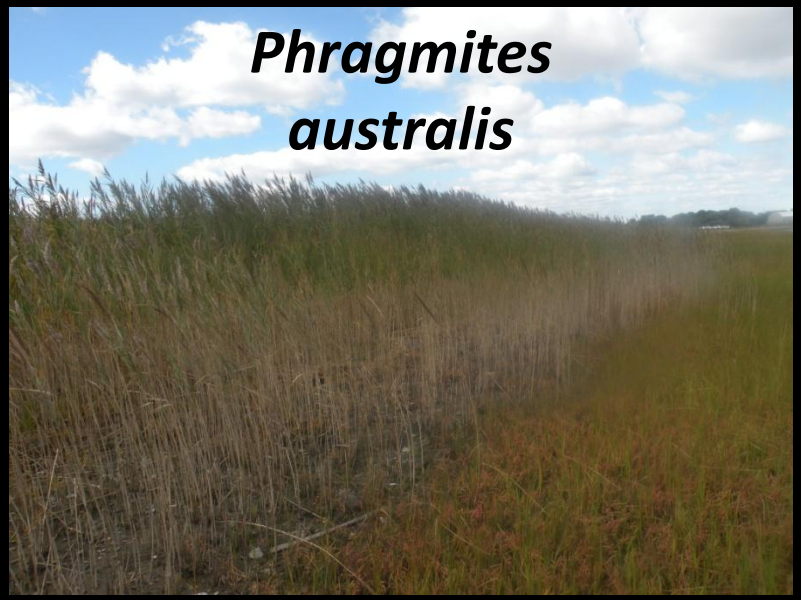
Dumping

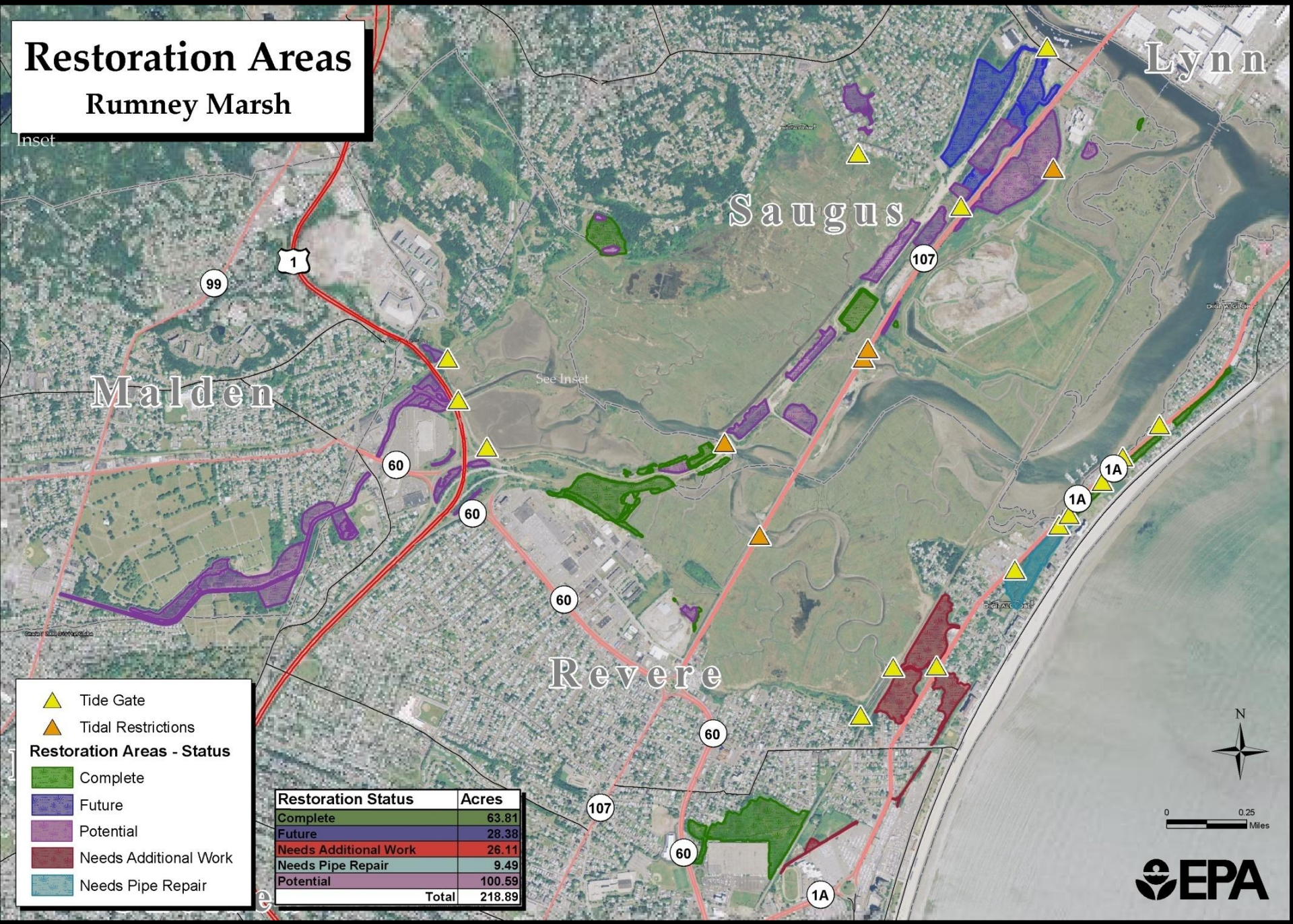
Refuse Dump

Abandoned Vehicle

Erosion Effects

Invasive Species




Restoration Areas
Rumney Marsh
Inset
Lynn
Saugus
Malden
Revere
See Inset
99
1
107
60
1A
Tide Gate
Tidal Restrictions
Restoration Areas - Status
Complete
Future
Potential
Needs Additional Work
Needs Pipe Repair
Restoration Status | Acres
Complete | 63.81
Future | 28.38
Needs Additional Work | 26.11
Needs Pipe Repair | 9.49
Potential | 100.59
Total | 218.89
N
0
0.25
Miles
EPA

Fill Removal Projects

Grading Below MHW Helps Control *Phragmites*



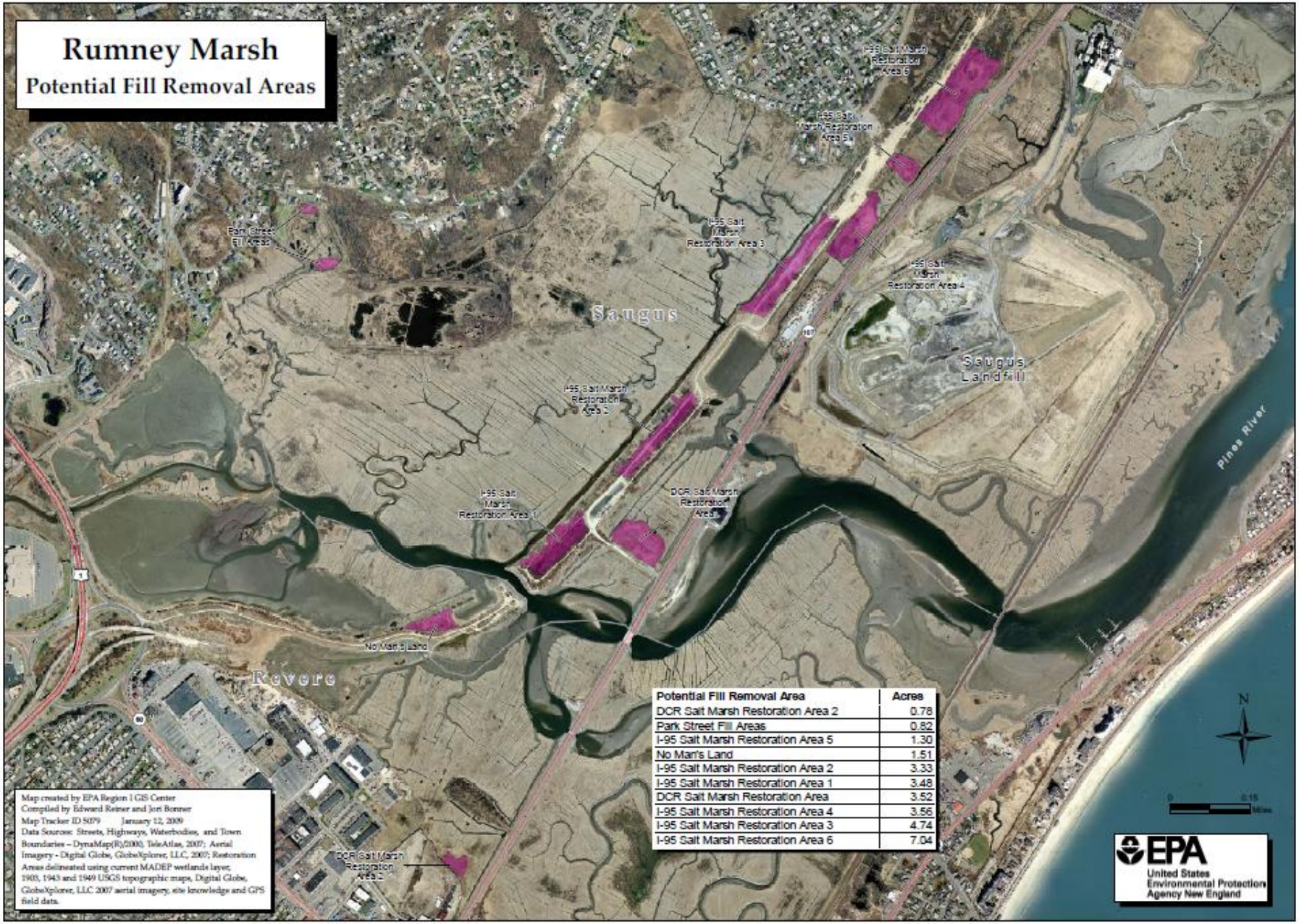

Natural Colonization Usually Works

Roughans Point Clam Flat Mitigation


Successful Clam Flat
Spartina Plantings Failed
Little Natural Colonization after 12 years
92 ft
Google
Imagery Date: 6/18/2010
1995
42°25'54.94" N 71°00'11.48" W elev 4 ft
Eye alt 430 ft

Saugus Mud Flat Mitigation

Natural Design ?


Rumney Marsh
Potential Fill Removal Areas
I-95 Salt Marsh Restoration Area 6
I-95 Salt Marsh Restoration Area 5
Park Street Fill Areas
I-95 Salt Marsh Restoration Area 3
I-95 Salt Marsh Restoration Area 4
Saugus
Saugus Landfill
I-95 Salt Marsh Restoration Area 2
I-95 Salt Marsh Restoration Area 1
DCR Salt Marsh Restoration Area
Pines River
No Man's Land
Revere
DCR Salt Marsh Restoration Area 2
Potential Fill Removal Area | Acres
DCR Salt Marsh Restoration Area 2 | 0.78
Park Street Fill Areas | 0.82
I-95 Salt Marsh Restoration Area 5 | 1.30
No Man's Land | 1.51
I-95 Salt Marsh Restoration Area 2 | 3.33
I-95 Salt Marsh Restoration Area 1 | 3.48
DCR Salt Marsh Restoration Area | 3.52
I-95 Salt Marsh Restoration Area 4 | 3.56
I-95 Salt Marsh Restoration Area 3 | 4.74
I-95 Salt Marsh Restoration Area 6 | 7.04
N
0 0.15 Miles
Map created by EPA Region 1 GIS Center
Compiled by Edward Reiner and Jori Bonner
Map Tracker ID 5079 January 12, 2009
Data Sources: Streets, Highways, Waterbodies, and Town Boundaries – DynaMap(R)/2000, TeleAtlas, 2007; Aerial Imagery - Digital Globe, GlobeXplorer, LLC, 2007; Restoration Areas delineated using current MADEP wetlands layer, 1903, 1943 and 1949 USGS topographic maps, Digital Globe, GlobeXplorer, LLC 2007 aerial imagery, site knowledge and GPS field data.
EPA
United States Environmental Protection Agency New England

Competing Interests

RC Airplane Runway

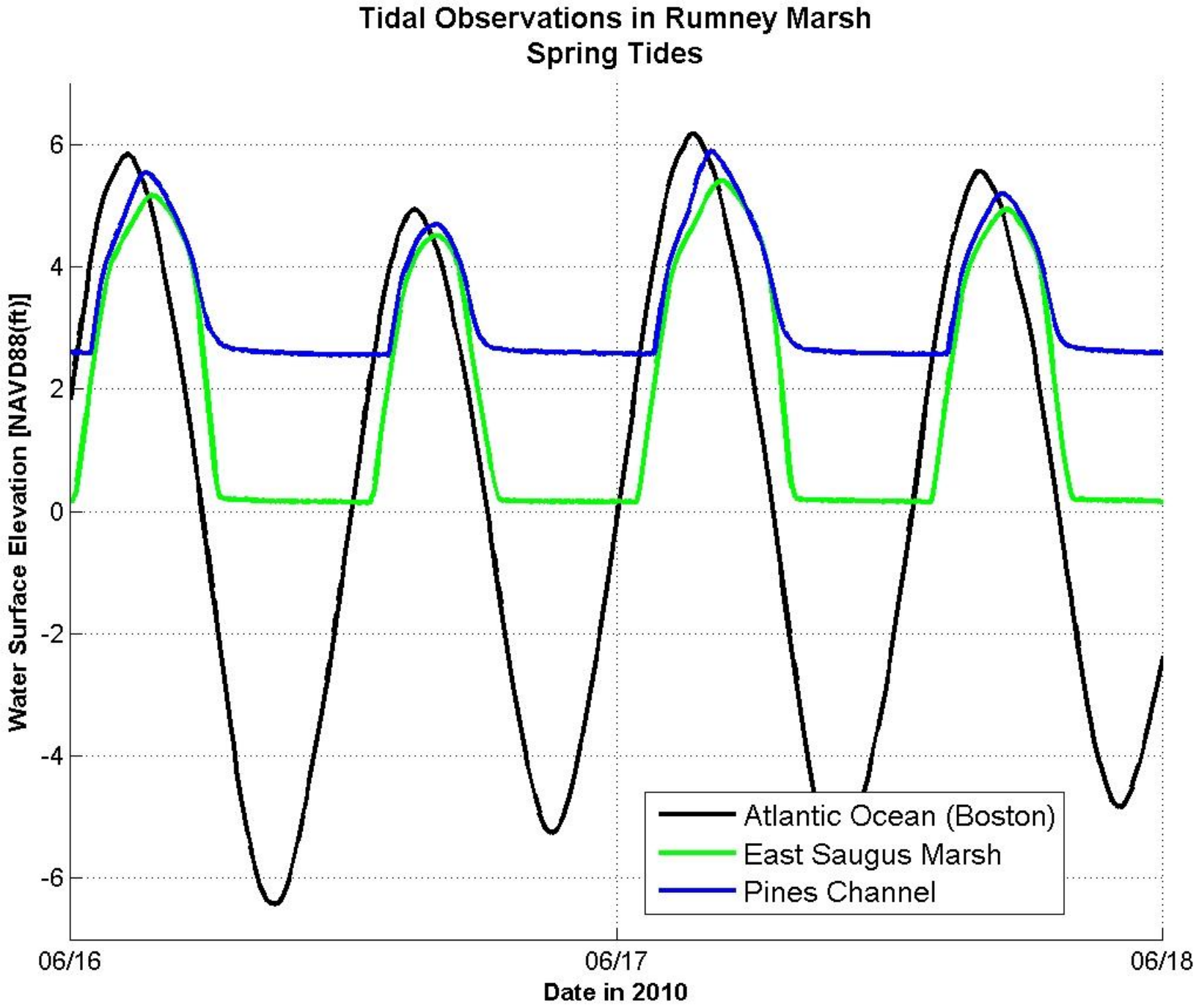
Additional Issues or Constraints

- Buried Refuse on Revere Parcel
- Illegal ORV Use
- Vista from East Saugus
  - Fill blocks view of Waste Energy Plant


N
No-Mans Land
Capped Refuse Dump
840 ft
©2010 Google
Imagery Date: 6/18/2010
1995
42°25'48.76" N 71°00'30.43" W elev 5 ft
Eye alt 3728 ft

Additional Restoration Possible

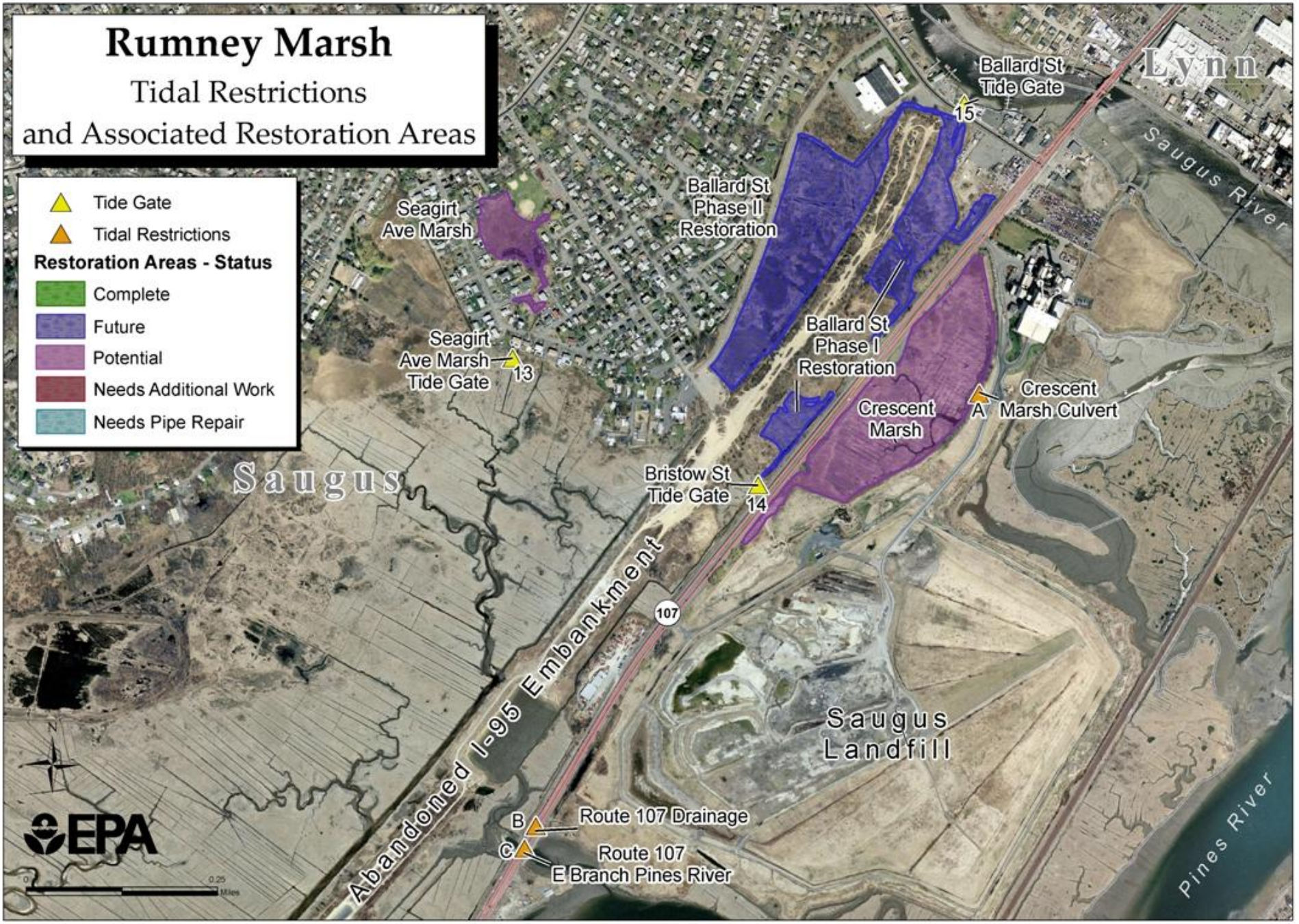

Future Restoration Areas Saugus
Ballard St Tidegate
Seagirt Ave Marsh Tidegate
Crescent Marsh Pipe
Bristow St Tidegate
Route 107 E Branch Pines River
Route 107 Drainage
Route 1A Tidegate
1806 ft
Google
Imagery Date: 6/18/2010
1995
42°26'32.14" N 70°59'23.14" W elev 11 ft
Eye alt 7811 ft



Source: Woods Hole Group

Spring Tide Water Surface Elevation

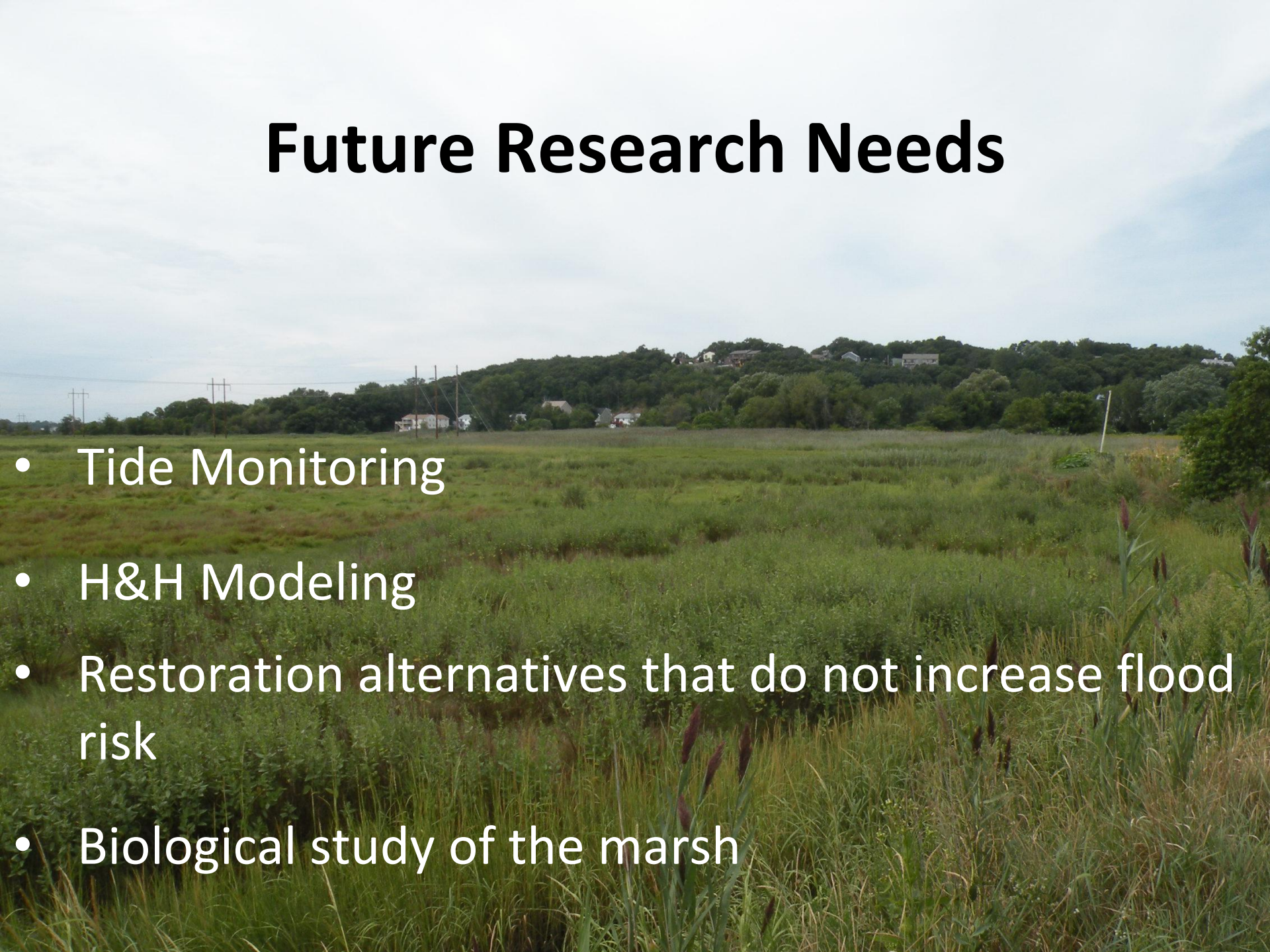
Tide Gauge Station	Maximum (NAVD88-ft)	Mean High Water (NAVD88-ft)
Pines Channel	6.52	4.66
East Saugus Marsh	5.65	4.4


Rumney Marsh
Tidal Restrictions
and Associated Restoration Areas
Tide Gate
Tidal Restrictions
Restoration Areas - Status
Complete
Future
Potential
Needs Additional Work
Needs Pipe Repair
Ballard St
Tide Gate
15
Lynn
Saugus River
Seagirt
Ave Marsh
Ballard St
Phase II
Restoration
Ballard St
Phase I
Restoration
Seagirt
Ave Marsh
Tide Gate
13
Crescent
Marsh
A
Crescent
Marsh Culvert
Saugus
Bristow St
Tide Gate
14
107
Abandoned I-95 Embankment
Saugus
Landfill
B
Route 107 Drainage
C
Route 107
E Branch Pines River
Pines River
EPA
0.25
Miles

Ballard Street Salt Marsh

Ballard Street Marsh

Future Research Needs



- Tide Monitoring
- H&H Modeling
- Restoration alternatives that do not increase flood risk
- Biological study of the marsh

Conclusions

- Loss of 120 acres of marsh
- 444 acres hydrologically altered
- 25 acres restored
- 25 additional acres can be restored while maintaining a flood barrier

Is Complete Restoration Possible?

Ed Reiner 617.918.1692
reiner.ed@epa.gov