

US EPA ARCHIVE DOCUMENT

Restoration of Tidally Restricted Salt Marshes Rumney Marsh in Massachusetts:

Balancing Flood Protection with Marsh
Restoration by use of Self-Regulating Tidegates

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New England Association of
Environmental Biologists
March 17, 2010
Newport, RI

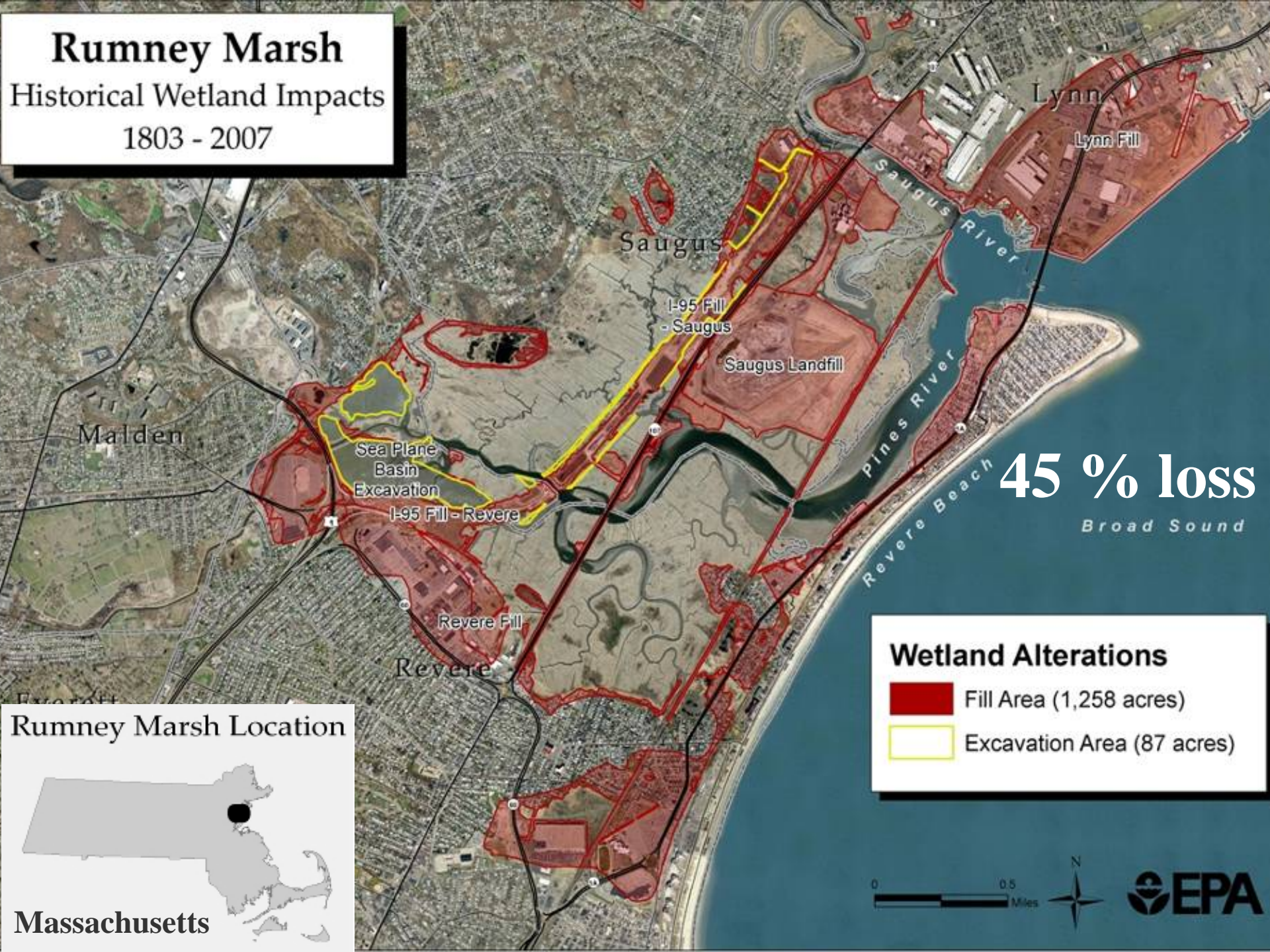
Disclaimer

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Rumney Marsh

Historical Wetland Impacts



1803 - 2007



45 % loss

Broad Sound

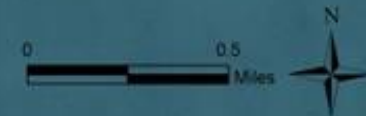
Wetland Alterations

-  Fill Area (1,258 acres)
-  Excavation Area (87 acres)

Rumney Marsh Location



Massachusetts



I-95 Abandoned Embankment

**2.4 Miles, 120 Acres
6 Million Cubic Yards**

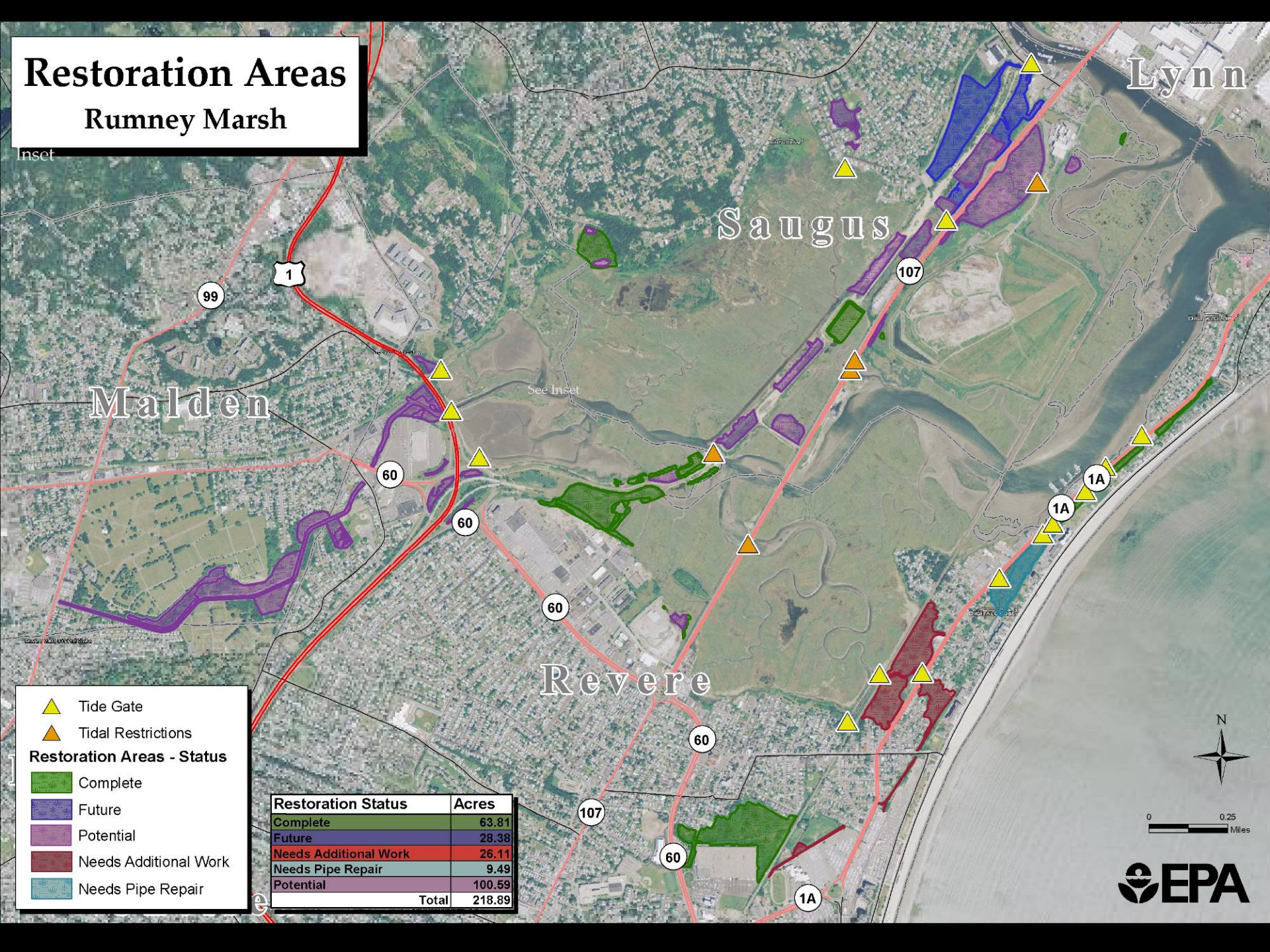
**444 Acres Tidally
Restricted**



Restoration Areas

Rumney Marsh

Inset

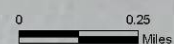


- ▲ Tide Gate
- ▲ Tidal Restrictions

Restoration Areas - Status

- Complete
- Future
- 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



Hydrology



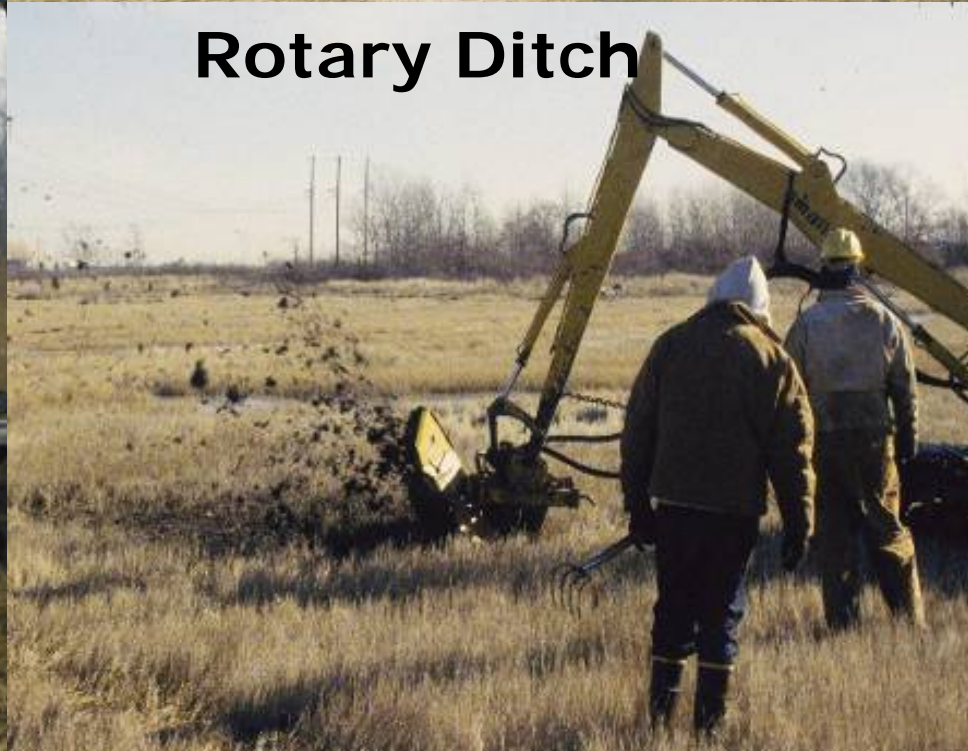
Creek Excavation



Panne
Creation



Flail Mower



Rotary Ditch

Grading Below MHW Helps Control Phragmites

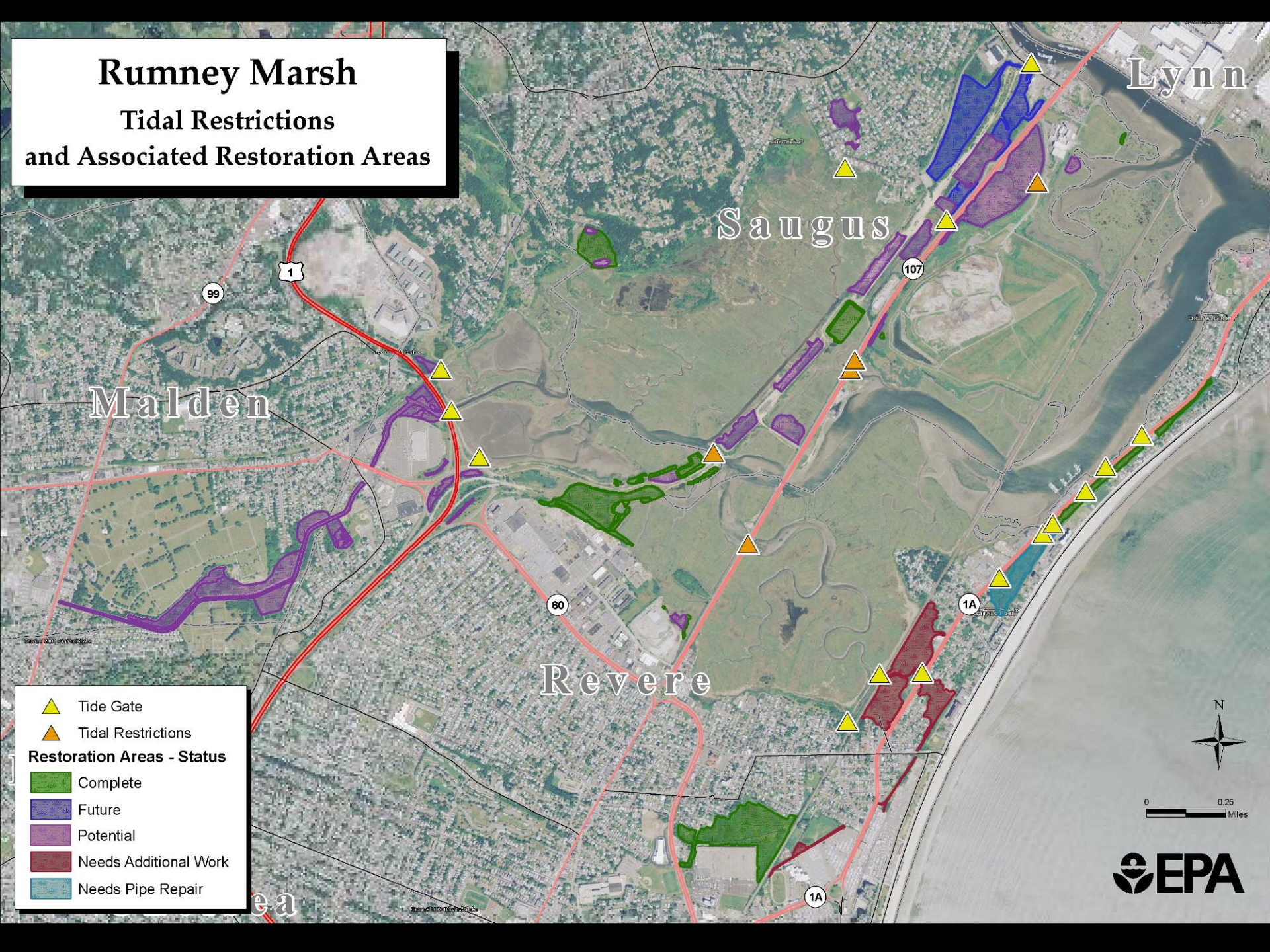




Natural Colonization Usually Works

Rumney Marsh

Tidal Restrictions and Associated Restoration Areas



Lynn

Saugus

Malden

Revere

- ▲ Tide Gate
- ▲ Tidal Restrictions
- Restoration Areas - Status**
- Complete
- Future
- Potential
- Needs Additional Work
- Needs Pipe Repair



0 0.25 Miles



Tide Gates





Salt Marshes
Need Salt
Water

Phragmites





Standard Flap Gates Kill Salt Marshes Unless They Leak

Dense
Stands of
Phragmites
Cause



Fire and Flood
Problems

Self-Regulating Tidegates Provide Adjustable Tidal Flow



Restoration of Tidal Flows

- Central County Ditch - 1997
- Route 1A - 2000
- Town Line Brook - 2001
- Oak Island Marsh - 2003

Rumney Marsh has 11 SRT's in Revere

- Ballard Street, Saugus – 2011 ?

Rumney Marsh

Tidal Restrictions and Associated Restoration Areas

▲ Tide Gate

▲ Tidal Restrictions

Restoration Areas - Status

■ Complete

■ Future

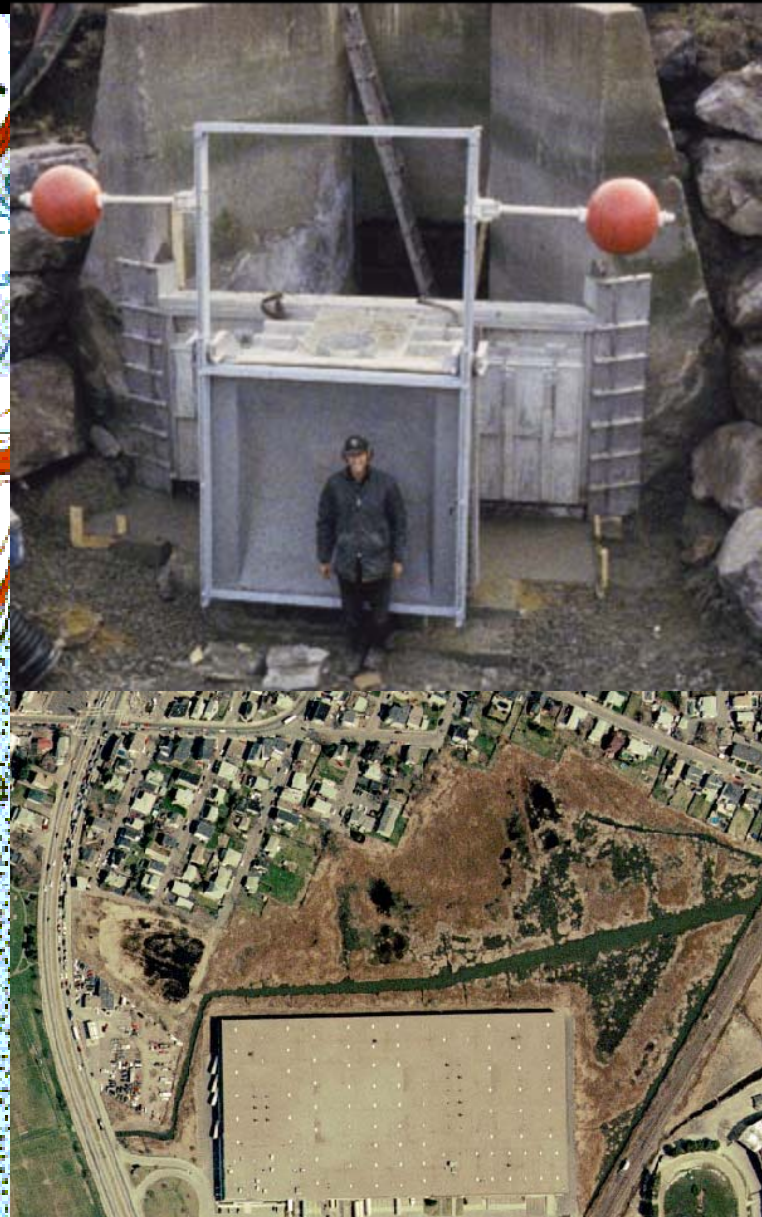
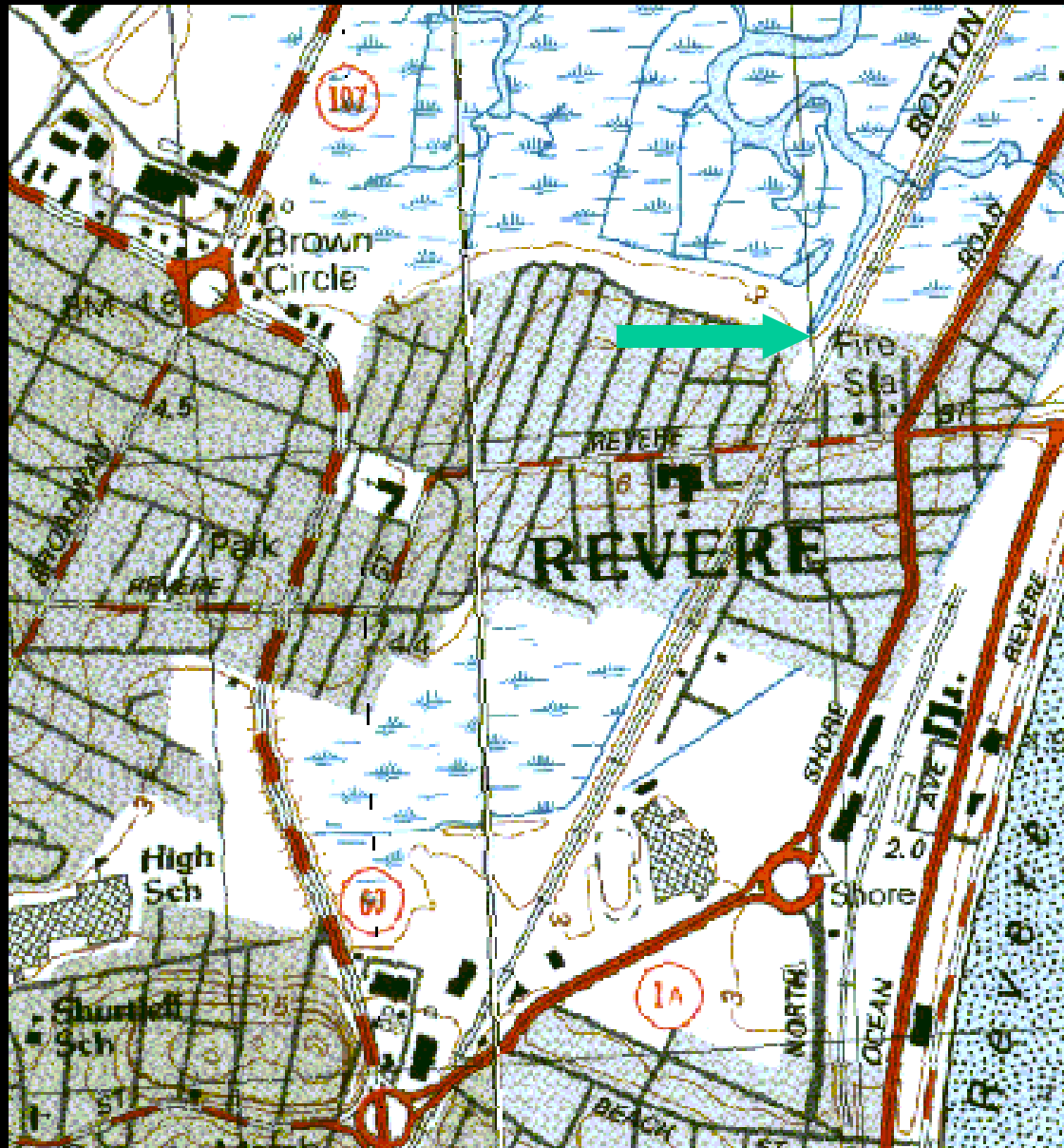
■ Potential

■ Needs Additional Work

■ Needs Pipe Repair



Central County Ditch SRT



1988 - Phragmites



1998 - Mud



1999 - Salicornia



2001 - Spartina



Rumney Marsh

Tidal Restrictions

and Associated Restoration Areas

-  Tide Gate
-  Tidal Restrictions
- Restoration Areas - Status**
-  Complete
-  Future
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-  Needs Pipe Repair

Saugus
Landfill

Pines River

Saugus

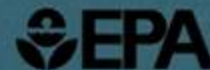
Route 1A
Tide Gates
#1-6

Route 1A
Tide Gates
#1-4 Marsh

Revere

Revere Beach

Route 1A
Tide Gates
#5-6 Marsh



Exterior Mounted SRTs



Interior Mounted



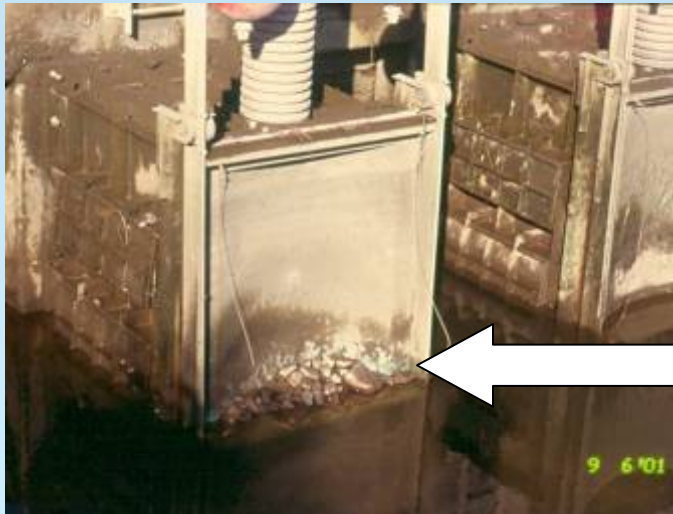
Vandalism



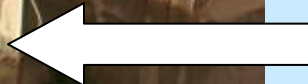
Rocks Block Pipe



Aluminum Grates
and Parts Stolen



Rocks Thrown at SRT



Culvert Problems



Riprap Blocking Culvert
Inlet



Culvert Outlet
Blocked

Sediment Problems



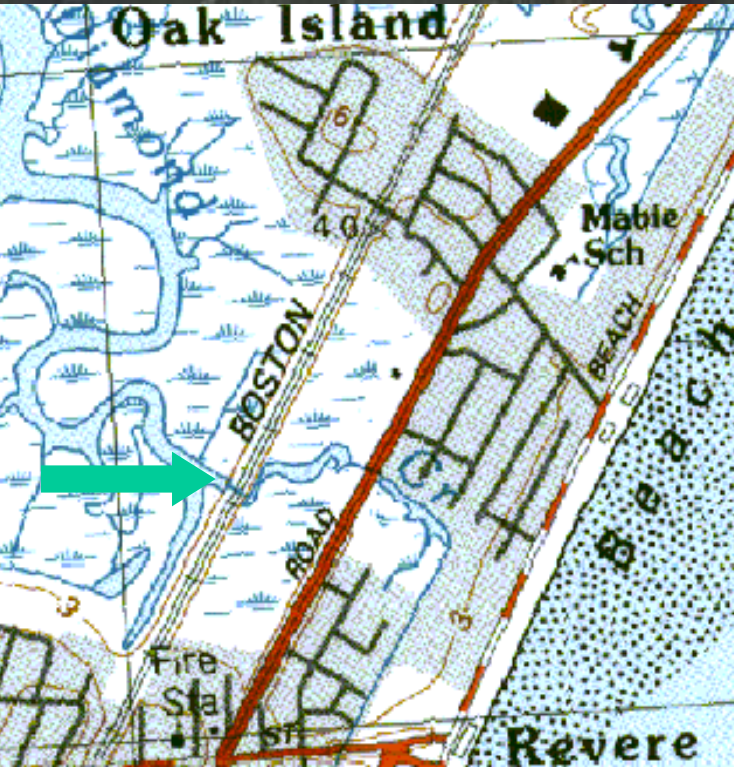
SRT 3 Inlet



SRT 6 Outlet

Sediment Removal
and Pipe Repairs are Needed

Oak Island Salt Marsh





**72-Inch
Culvert
Jacked
Under
Railroad**

**Concrete
Vault
Construction**

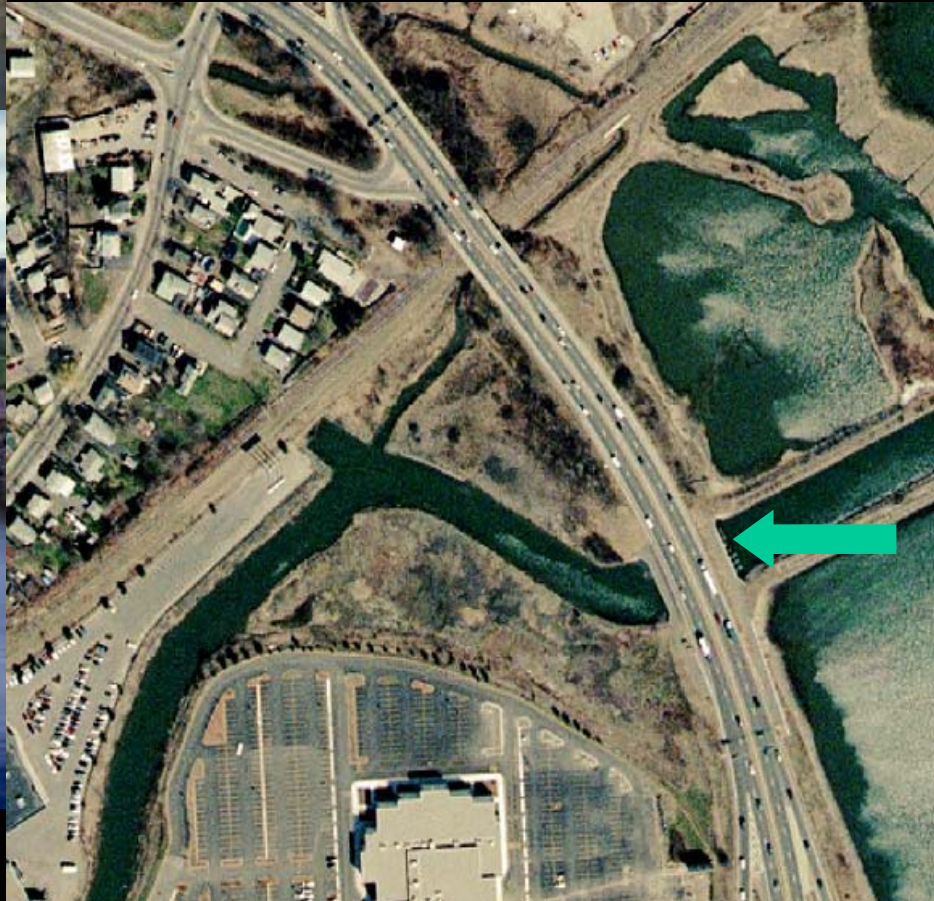


Engineering Error

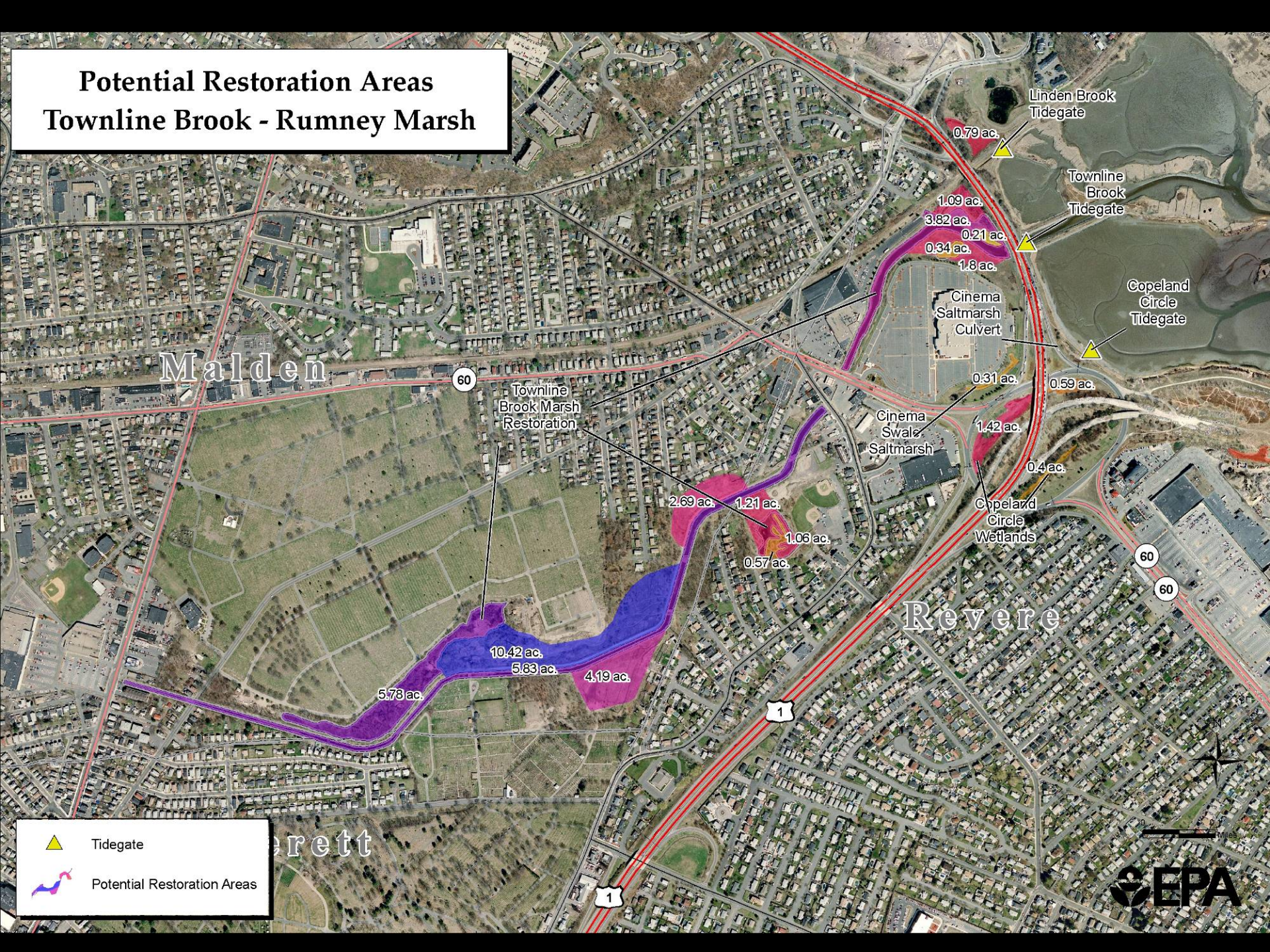


The concrete vault was too narrow to allow correct SRT adjustment

Town Line Brook



Potential Restoration Areas Townline Brook - Rumney Marsh



 Tidegate
 Potential Restoration Areas



Manufacturing Design Error





Replacement Gates








Installed in 2009

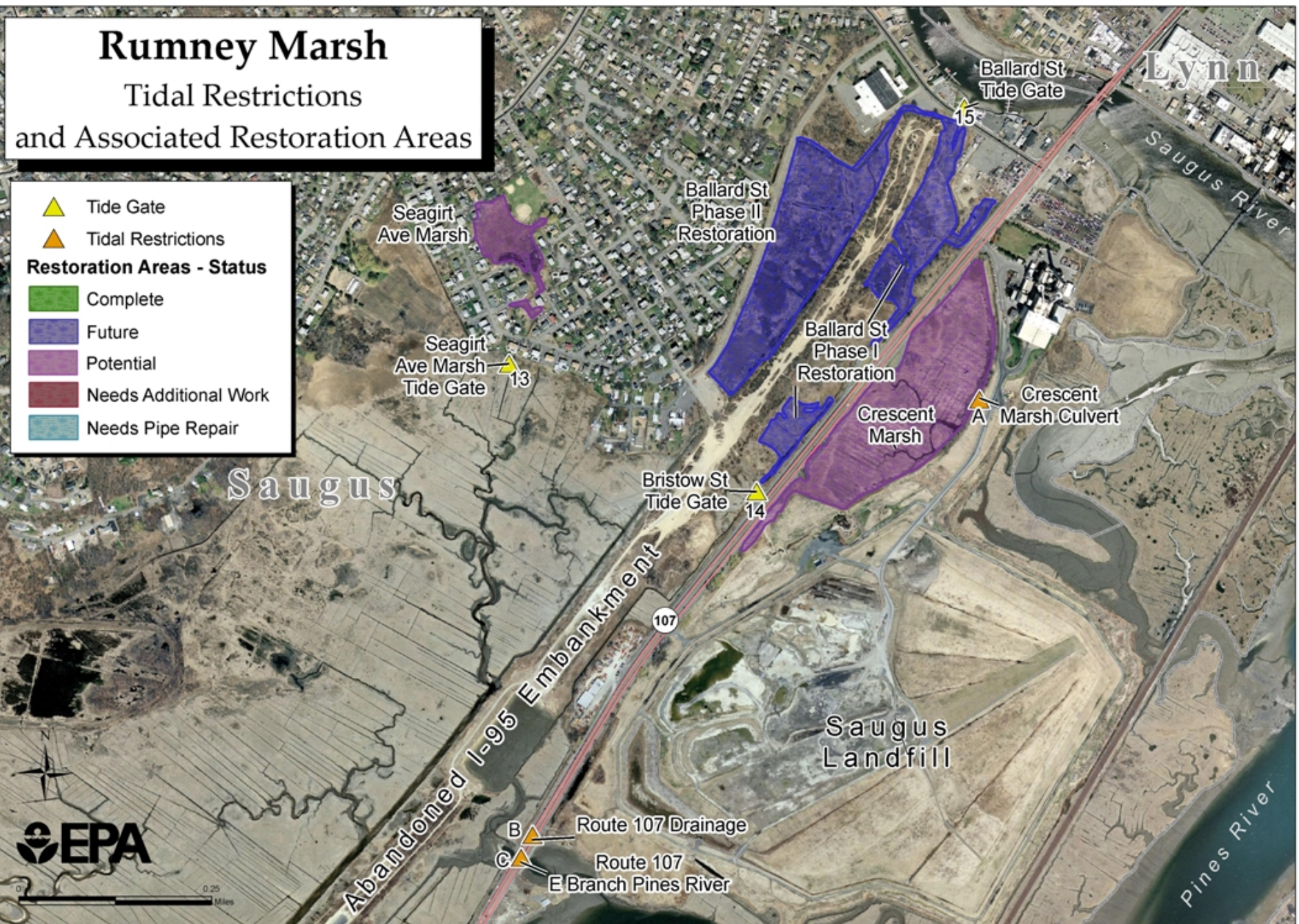
Rumney Marsh

Tidal Restrictions and Associated Restoration Areas

-  Tide Gate
-  Tidal Restrictions

Restoration Areas - Status

-  Complete
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0 0.25 Miles

Lynn

Saugus

Saugus Landfill

Pines River

Abandoned I-95 Embankment

Route 107 Drainage
Route 107
E Branch Pines River

Ballard St
Tide Gate

Seagirt
Ave Marsh

Ballard St
Phase II
Restoration

Seagirt
Ave Marsh
Tide Gate

Ballard St
Phase I
Restoration

Crescent
Marsh

Crescent
Marsh Culvert

Bristow St
Tide Gate

B
C

Ballard Street Marsh

82,800 c.y.
Excavation,
51-acre feet

SRT

An aerial photograph of a large, brown, marshy area. A cyan arrow points downwards from the text 'SRT' to a specific location in the marsh. A white outline on the right side of the image encloses a large section of the marsh, with text indicating excavation volume and acreage. The background shows some urban structures and roads.

Ballard Street Salt Marsh



23 Acres Damaged



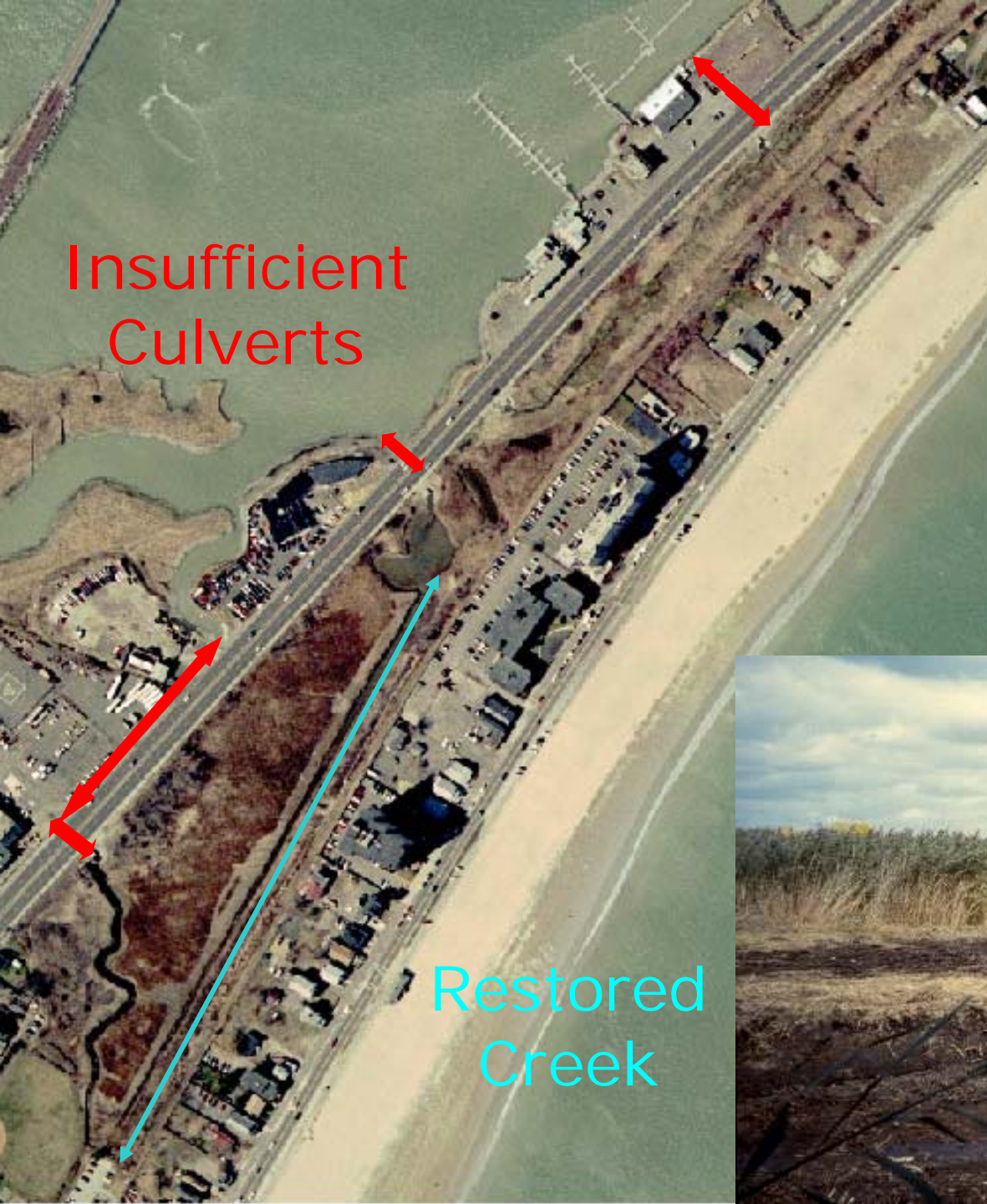
Culverts



24" Round Culvert
(inadequate flow)



New Twin Box Culvert
(adequate flow)



Insufficient
Culverts

Restored
Creek

Route 1A
Culverts 3, 5 & 6
Need
Replacement



10:19:00

Trash Racks Require Cleaning



Results

- ✓ Tidal flow restored to marsh
- ✓ Flood protection improved



Recommendations

- Check engineering design
- Clear permit conditions & plans
- Operation and Maintenance plans
 - Monitor and make adjustments
 - Periodic inspection/maintenance
- Repair or replace culverts
- Avoid small size riprap

Questions



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