



MASSWILDLIFE

Restoration of Tern Nesting Habitat at Bird Island, Massachusetts

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Common Tern



- State-listed: *Special Concern*
- Breeding range on Atlantic Coast: NL to SC
- 28,000 pairs in MA
- MA pop. increasing

Roseate Tern



- Federally listed: *Endangered*
- Breeding range: NS/QC to NY
- 3,600 pairs in MA / 5,300 US
- MA & US pops. increasing

Bird Island, Buzzards Bay, MA

- Distance from mainland: 0.8 km (0.5 mi)
- Max. elevation: 3 m (10 ft.)
- Ownership: Town of Marion
 - MA DFG conservation restriction



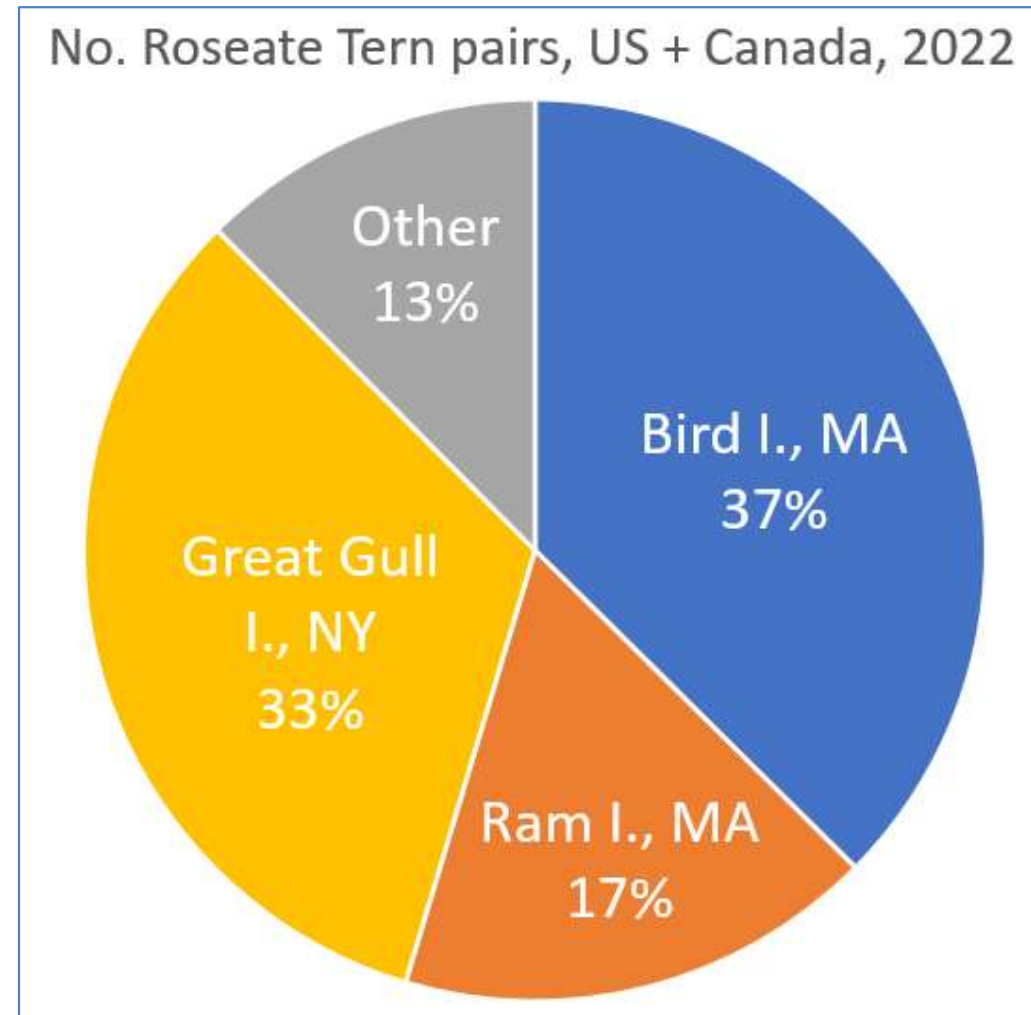
Bird Island

- Lighthouse, 1819
- Revetment, 1850s
 - Area inside = 0.8 ha (2 ac)

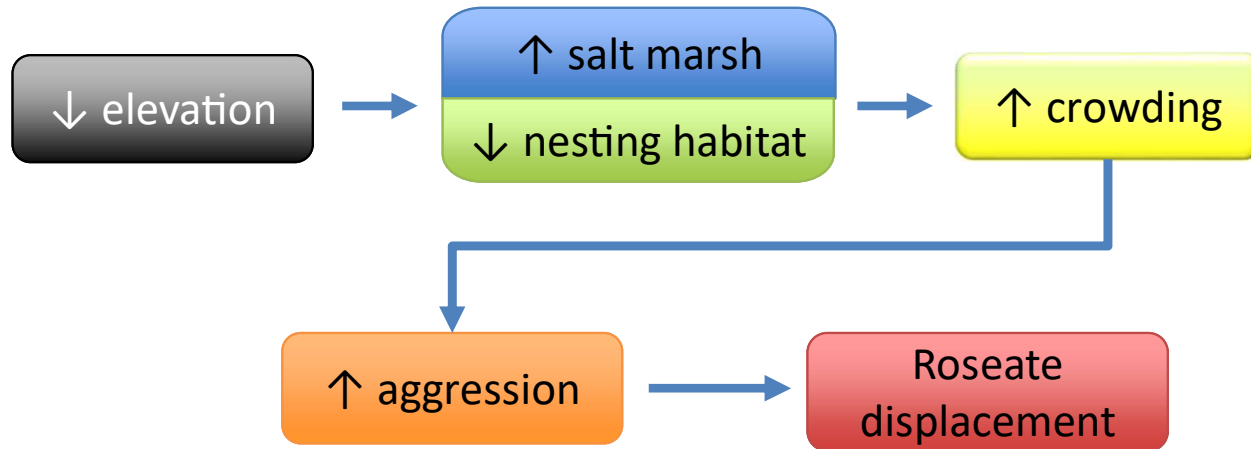


Conservation importance of Bird I.

- 1st or 2nd largest ROST colony in N. America
- 3rd largest COTE colony in MA




Revetment deterioration & erosion



Pressing need to remedy habitat degradation & respond to climate change

Restoration

- **Objectives:** Stabilize, nourish, revegetate
 - Informed by sea-level rise predictions
- **Partners**
 - MassWildlife
 - US Army Corps of Engineers
 - Town of Marion
- **Timeline**
 - Late 1990s: conceived
 - Late 2015: construction starts
 - 2018: completed
- **Cost:** \$6 million (65% federal)



Major Design Components



Photo: Peter Paton

Rebuilt revetment,
↓ energy

- wider
- higher (+2.5')
- sloping face
- voids

Nourished with
gravelly sand

- ↑ nesting habitat
- ↓ salt marsh

Planted tern-
friendly veg.

- Seaside goldenrod
- Am. beachgrass

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Additional tern customizations

Chick curb to prevent access to revetment



Chick bumpers to prevent "edge running"

- Unvegetated cobble ring = chick provisioning area (and French drain)

- Surplus armor stones placed in clusters to attract Roseates



Armor
stone
cluster

Chick
curb

Cobble
ring

Photo: Michael Moore






2017



- 1st construction season
(Dec. 2015 – Apr. 2016)
 - 50% of revetment built
 - Fixes
- 2nd construction season
(Sep. 2016 – Apr. 2017)
 - Revetment finished
 - Nourished
 - Planted
 - Fixes
- 3rd construction season
(Spring 2018)
 - Fixes



Problems

-  Lack of nest material & shelter
-  Entrapments
-  Habitat degradation
-  Overwash
-  Poor drainage

Lack of
nest
material &
shelter



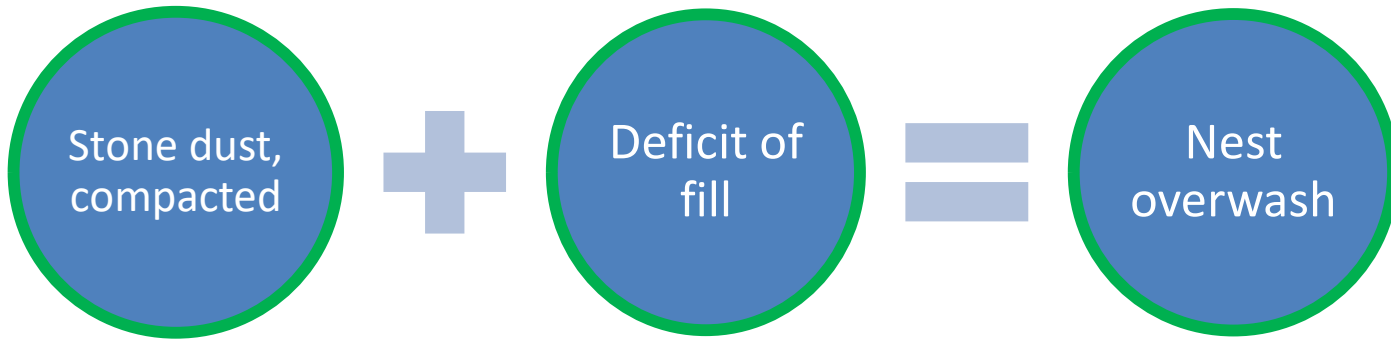
Common Tern entrapments

- COTE & ROST adults & fledglings explored crevices
- 3 stones deep, tightly spaced
 - Problem for COTE
- Voids chinked with 15-20 cm stone
- Surplus provided for future



Habitat degradation & overwash

- Staging area for materials – formerly major COTE area



- Added material

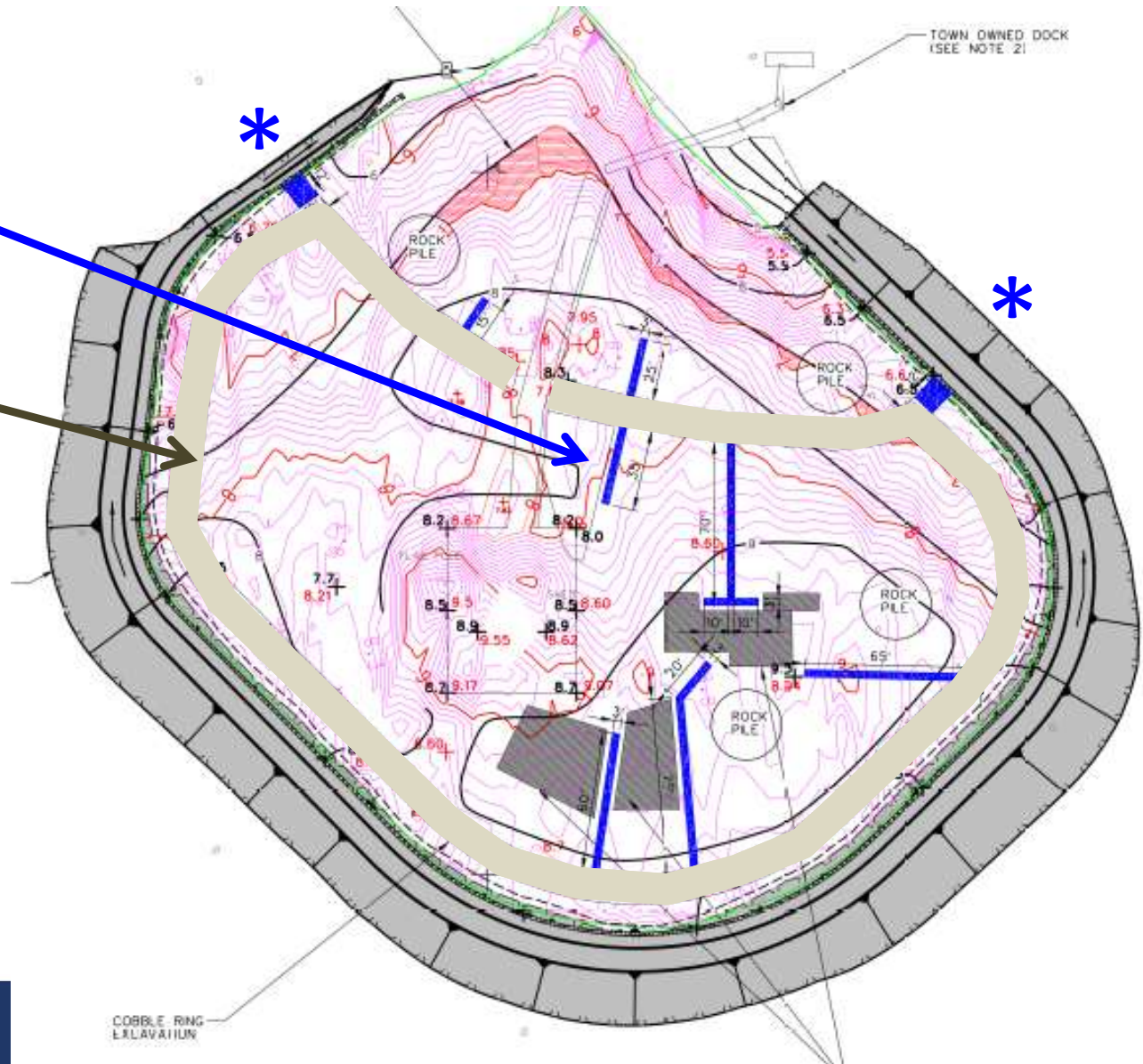


Poor drainage

- QC issue with nourishment (too fine)
- Pooling rainwater
- Sub-surface saturation








- Installed cobble drainage ditches, connected to cobble ring, which was connected to revetment at low points of island (*)
- Capped with highly permeable fill




Drainage ditches (Fall 2017)



Current status of issues

-  Plenty of nest material & shelter
-  No more entrapments noted
-  High-quality nesting substrate at surface
-  No more standing water
-  No more overwash

Lessons learned

- 🐧 Staged construction: 
 - ID problems during 1st season, correct before completion
- 🐧 Specifications need extremely close scrutiny
 - Impossible to write a perfect spec or control for odd interpretations
- 🐧 Regular site visits, communication: critical
 - Head-off problems

Pre-construction

Salt marsh



May 2017



July 2017

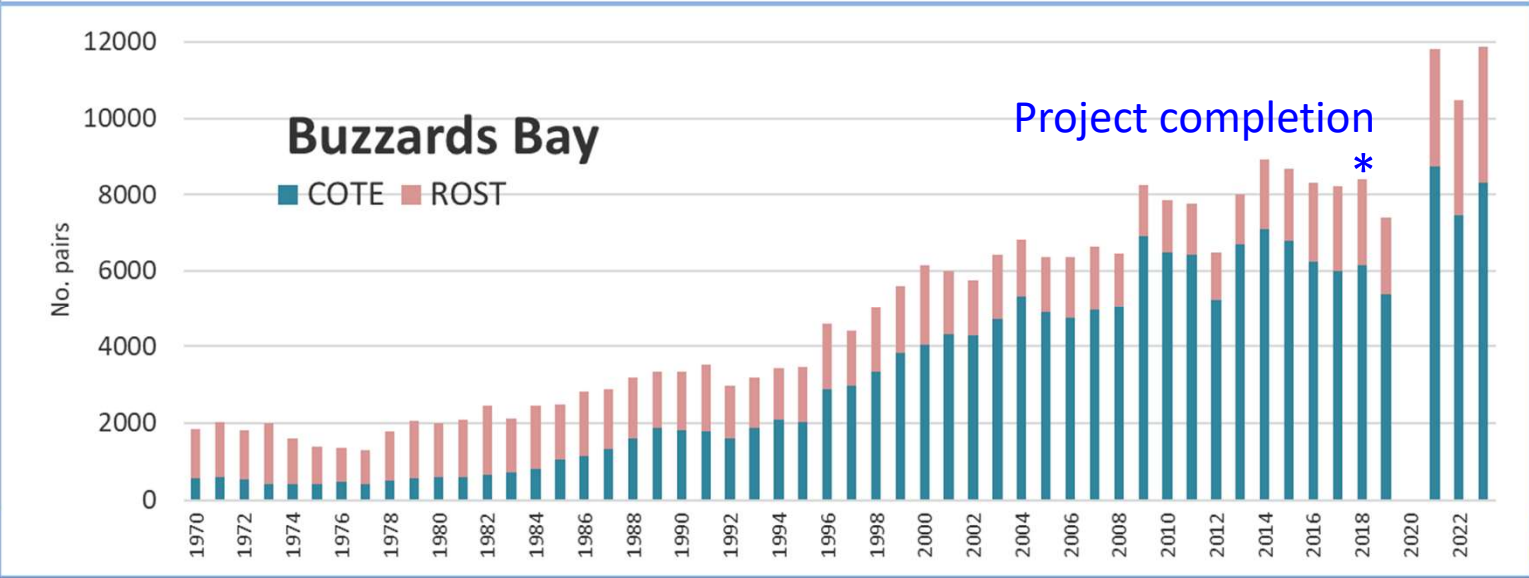
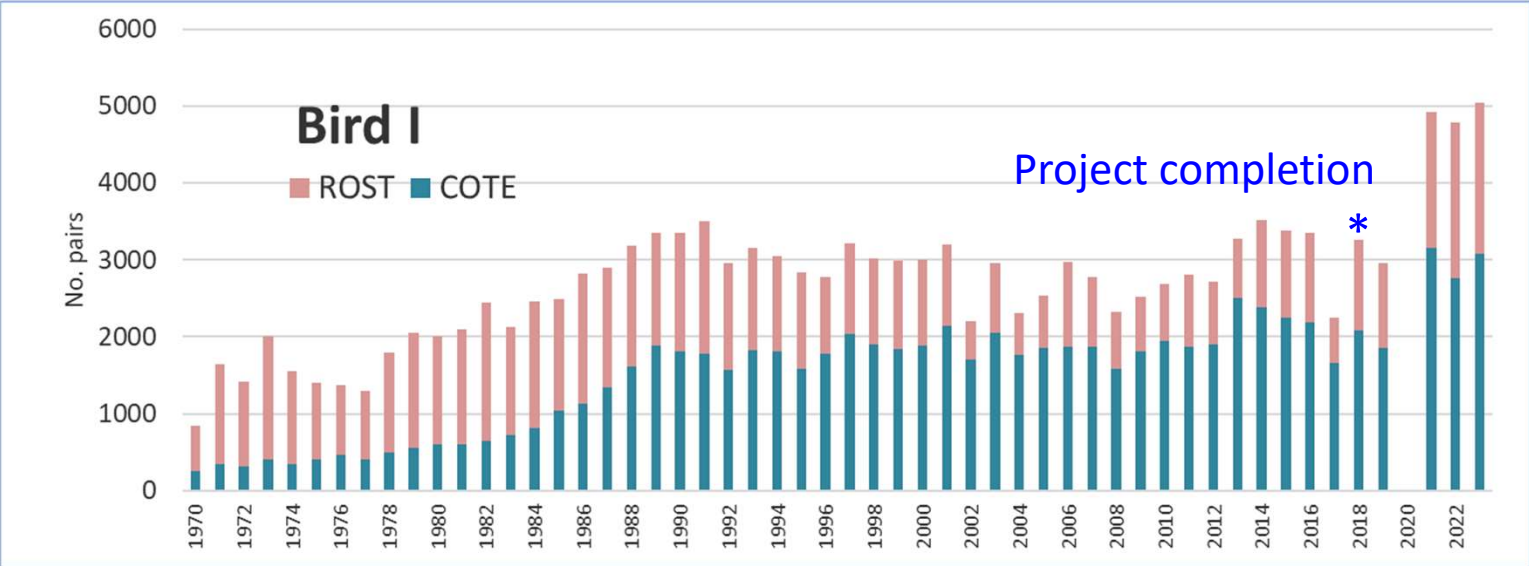


July 2019



Pre- and post-construction stats

	Pre (2008-2016)	Post (2021-2023)
Nesting habitat (ac)	1	2
ROST pairs	902	1,920 +100%
% of US ROST pop.	27%	36%*
COTE pairs	2,048	2,996 +50%
		<i>*based on 2021-2022 only</i>



Acknowledgements

- **New Bedford Harbor Trustee Council (EEA, NOAA, USFWS)**
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- ***Many others!***

