Protecting Wetland Migration Pathways in New Jersey

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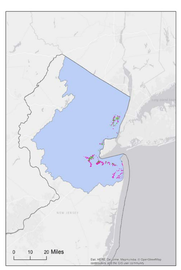
Introduction

For thousands of years prior to human existence, tidal wetlands have moved laterally with rising and falling sea levels. Today, these vulnerable ecosystems encounter the "coastal squeeze," where coastal development and other urban land uses do not allow for this migration. Wetland migration pathways are the exception; places where existing wetlands are predicted to be able to move with sea level rise. This project uses spatial data to capture preliminary information about the migration pathways in the New Jersey part of the Hudson-Raritan Estuary. The objective is to highlight opportunities to protect the pathways for coastal land managers, resiliency planners and conservationists.

Materials and Methods

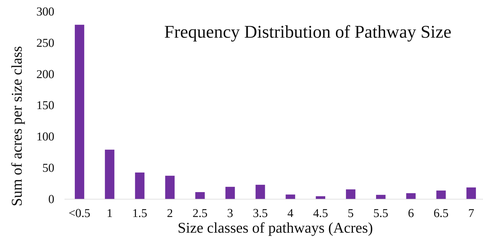
- The marsh migration pathways used in this this study were developed by the Lathrop Lab at Rutgers University, partially based on the Sea Level Affecting Marshes Model (SLAMM) provided by the NOAA Coastal Services Center. The projection for these pathways is for the year 2050 assuming a moderate level of sediment accretion (4mm/year). Data available at NJFloodMapper.org.
- Pathways as used in this analysis account for 3 feet of sea level rise by 2050; 3 feet is in the 90th percentile of likelihood (NPCC, 2015) so pathways here can be considered inclusive of almost all migration potential.
- All other spatial data is publically available from NJDEP or NJ Geographic Information Network including tax maps, land use/land cover, known contaminated sites, and critical habitat areas.
- The spatial extent (right)



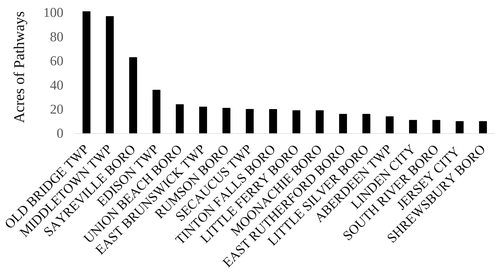
Results

Area

- Area of wetland migration pathways: 570 Acres
- Area of existing marsh that will likely be converted to open water (without intervention): 590 Acres
- Only 1/3 of pathways are greater than one acre



Location



Other municipalities account for 24 additional acres.

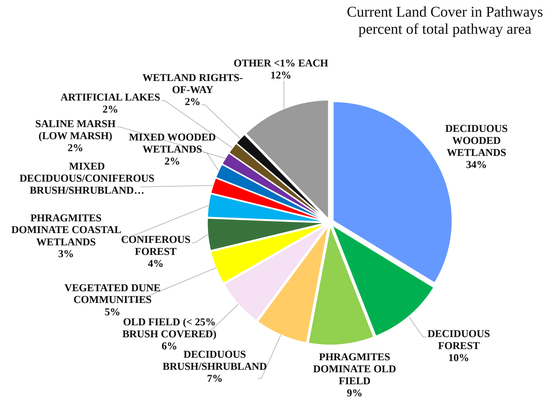
Habitat

249 acres of pathways (43%) are located in priority habitat areas for New Jersey's native species, including many endangered and threatened species, as outlined by the recent Connecting Habitats across New Jersey (CHANJ) report (NJDFW, 2019).

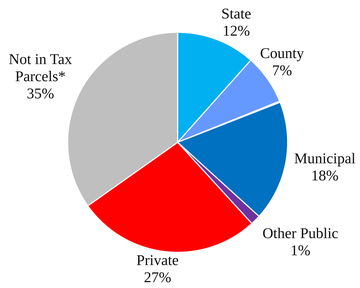
Flooding

100% of pathways were flooded during Hurricane Sandy

Land Cover



Ownership



Of the privately owned parcels, 42% are described as vacant (no structures).
*Not in Tax Parcels – these lands may be owned by the State, County or Municipalities but are likely not privately owned.

Contamination

121 acres of the pathways (21%) are within 100 meters of a known contaminated site or groundwater well restriction area due to excess levels of one or more contaminants.

Discussion

While the data presented here is only a preliminary analysis, it helps indicate appropriate next steps for coastal land managers and planners.

- The small size of the wetland migration pathways indicate that protection must consist of multiple strategies, as opposed to just targeting larger pathways for acquisition.
- Most of the pathways are already publically owned but that does not mean that they are protected from development. Education of, and partnership with public agencies is critical.
- Almost half of the pathways (49%) are wetlands. These parcels are more likely to be protected from development by federal and state regulations. Many may also be protected through the NJDEP's Blue Acres flood mitigation buyout program. However, more research is needed to determine the protection status of pathways.
- The majority of the current land use in the pathways is forested. This conversion from forest to tidal wetlands may have implications including: loss of carbon storage from trees lost that cannot tolerate the increasing salinity, loss of biodiversity along the salinity gradient (Odum, 1988), what salt marsh plant species the migration involves and what wetland functionalities migrate first (Anisfeld et al., 2017). It is still an open question of how the invasive phragmites reed, absent from the migrations of centuries past, will help or hinder migration.
- The predicted area of drowned wetlands on top of the regular loss of ~30 acres/year to development and other land uses (Stinnette et al. 2018) make protecting these pathways a critical opportunity.

Literature Cited

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Odum, W. E. (1988). Comparative ecology of tidal freshwater and salt marshes. *Annual review of ecology and systematics*, *19*(1), 147-176.

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Acknowledgments

This research builds off of efforts by partner organizations including Rutgers University, Scenic Hudson and Regional Plan Association.

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