

Modeling Tidal Wetland Migration Potential in Delaware

Division of Watershed Stewardship

Wetland Monitoring and
Assessment Program

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DELAWARE DEPARTMENT OF
NATURAL RESOURCES AND
ENVIRONMENTAL CONTROL

Project Partners



Wetland Monitoring & Assessment Program

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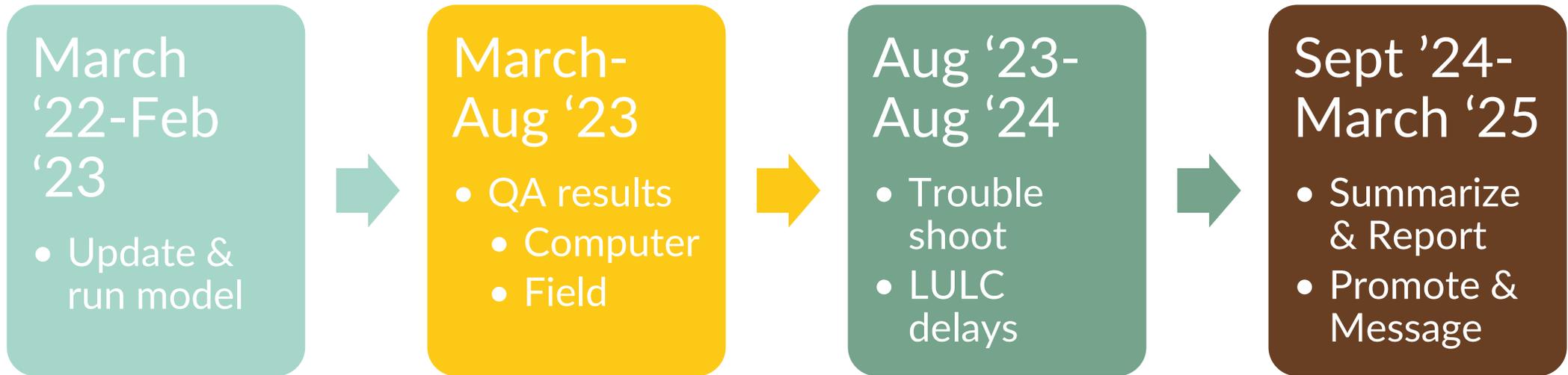


Delaware Coastal Management Program

Drew Faulhaber

Ashley Norton

Project Timeline



Project Goals

Inform state land management by conducting a suitability analysis on land in Delaware that may have the potential for future marsh migration under sea level rise.

- Simplistic model in ArcGIS combining many layers, 4ft SLR scenario and distance to tidal wetlands
- Results predict most suitable tidal wetland migration areas
 - Identify and evaluate areas to protect and prepare statewide
 - Coordinate with land holding partners regarding management
 - Message to private landowners about MM

Model Inputs

Using most recent layers:

1. Statewide aerial imagery 2017*
2. Statewide wetland maps 2017
3. Soils 2021
4. Impervious Surface 2017
5. Land Use Land Cover 2022
6. Slope 2017
7. DEM (LiDAR) 2017
8. Delaware SLR Scenarios 4ft 2016

* Aerial imagery used in background, not in model



Game Rules



Excluded open water



Excluded areas of impervious surface



Excluded current extent of tidal wetlands



Focused only on 4ft SLR scenario

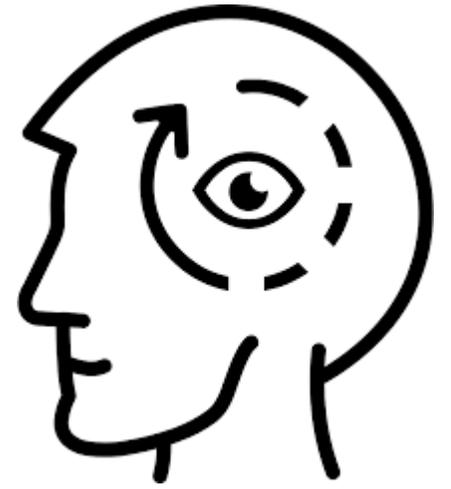


Some types of land use were incompatible with wetland migration

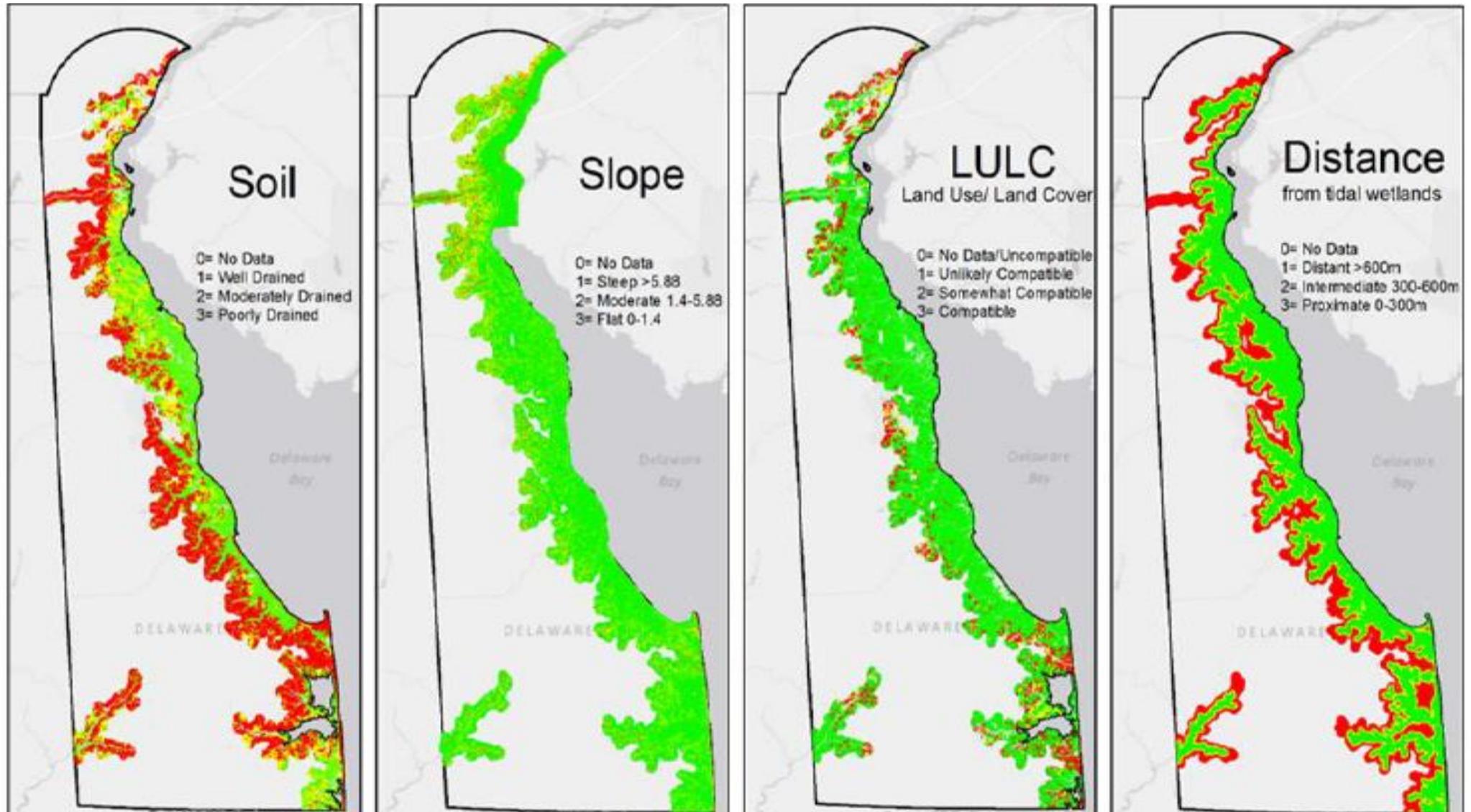


Assumptions

- Is meant to be a screening tool
- Does not predict extent of tidal wetlands for any time period
- Sediment accretion was not incorporated
- Uses a bathtub SLR model and hydrologic flow not an input
- SLR scenario used to estimate future MHHW; tidal wetlands may extend further



Major Inputs



Scoring

Polygon scores 0-12

Focused only on 10-12

Raster Value	0	1	2	3
Tidal Wetlands	Tidal wetlands, open water	Not classified as tidal wetlands or open water		
Impervious Surface	No Data, Impervious surfaces	Pervious surfaces		
Sea Level Rise (SLR)	Not inundated under SLR	Inundated under SLR		
Soil	No Data	Well drained (see Appendix A)	Moderately well drained (see Appendix A)	Poorly drained (see Appendix A)
Slope	No Data	Steep = 5.8861-76.24	Moderate=1.4381-5.886	Flat=0-1.438
Land use/Land cover (LULC)	No Data, and classifications incompatible with marsh migration (see Appendix B)	Unlikely compatible (see Appendix B)	Somewhat compatible (see Appendix B)	Likely compatible (see Appendix B)
Distance to nearest tidal wetland	No Data	Distant= 600.01-10,636.98m	Moderate distance= 300.01-600m	Proximate=0-300m





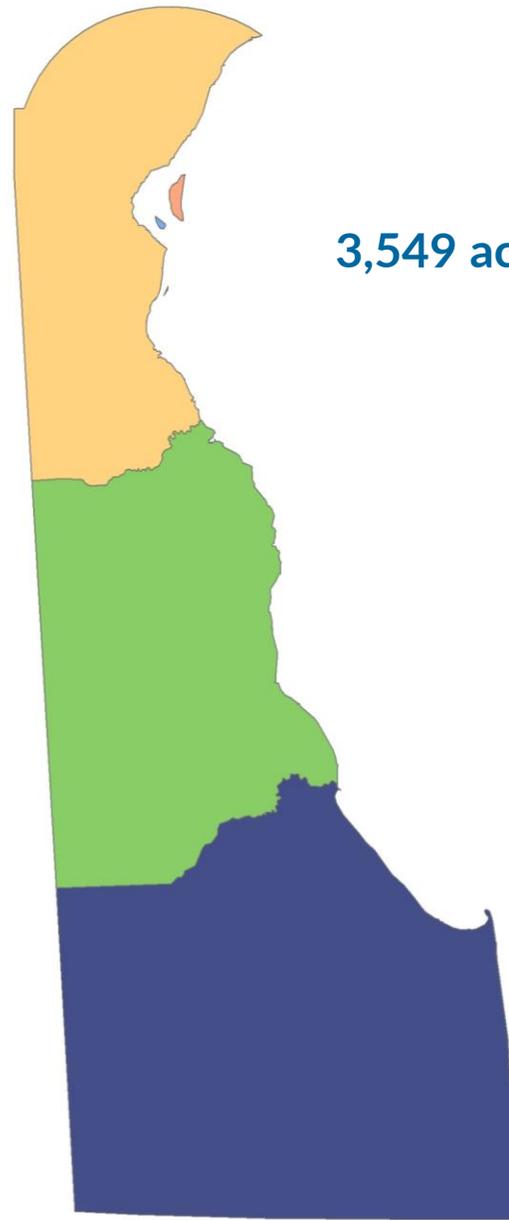
RESULTS



Totals

**21,449 acres
statewide
scoring 10-12**

*(21% of current
tidal vegetated
extent)*



3,549 acres New Castle Co

8,482 acres Kent Co

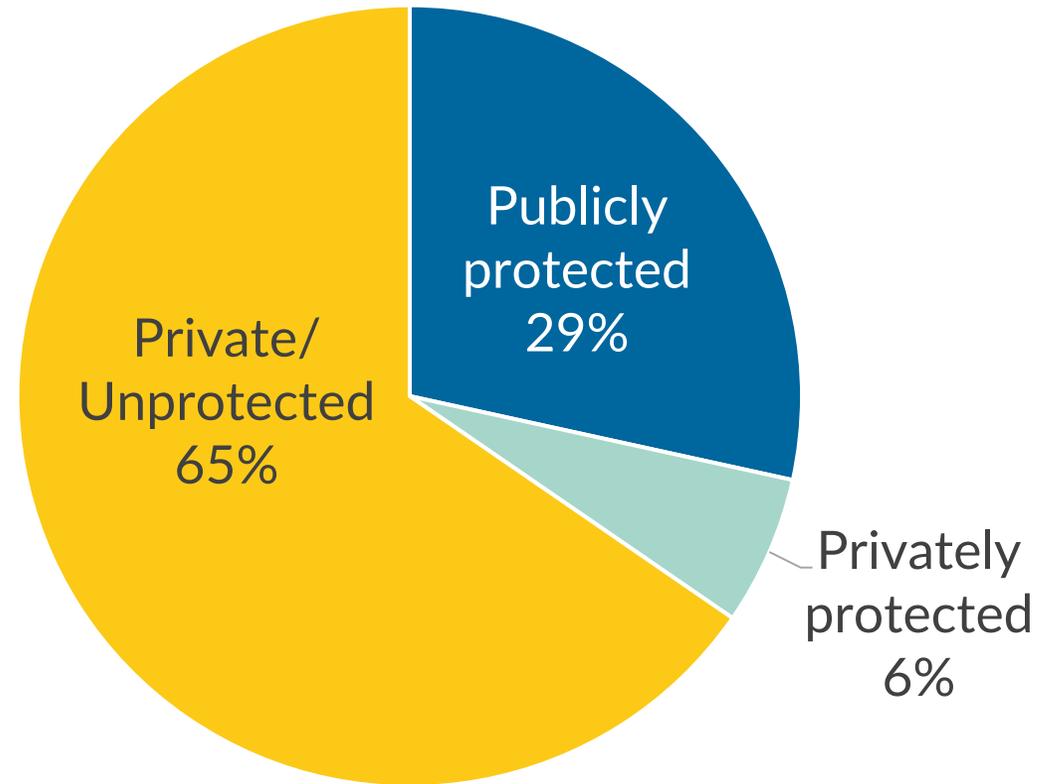
9,418 acres Sussex Co



Suitability + Protection

Only 35% of highly suitable land is protected publicly or privately.

Land Protection



2017 wetland mapping noted tidal migration happening already

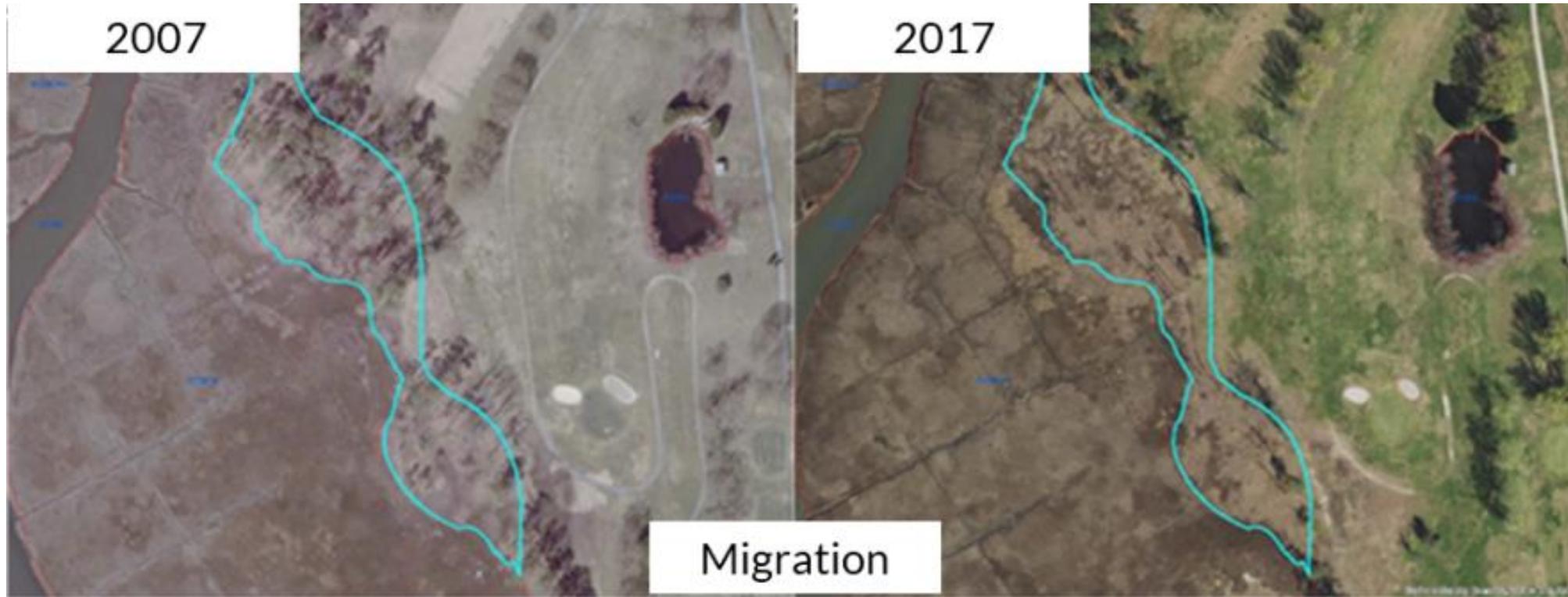


Coastal forested wetland

Dead trees and emergent vegetation

Prime Hook NWR → Continued migration potential is high

Migration in Motion



Fringing forest

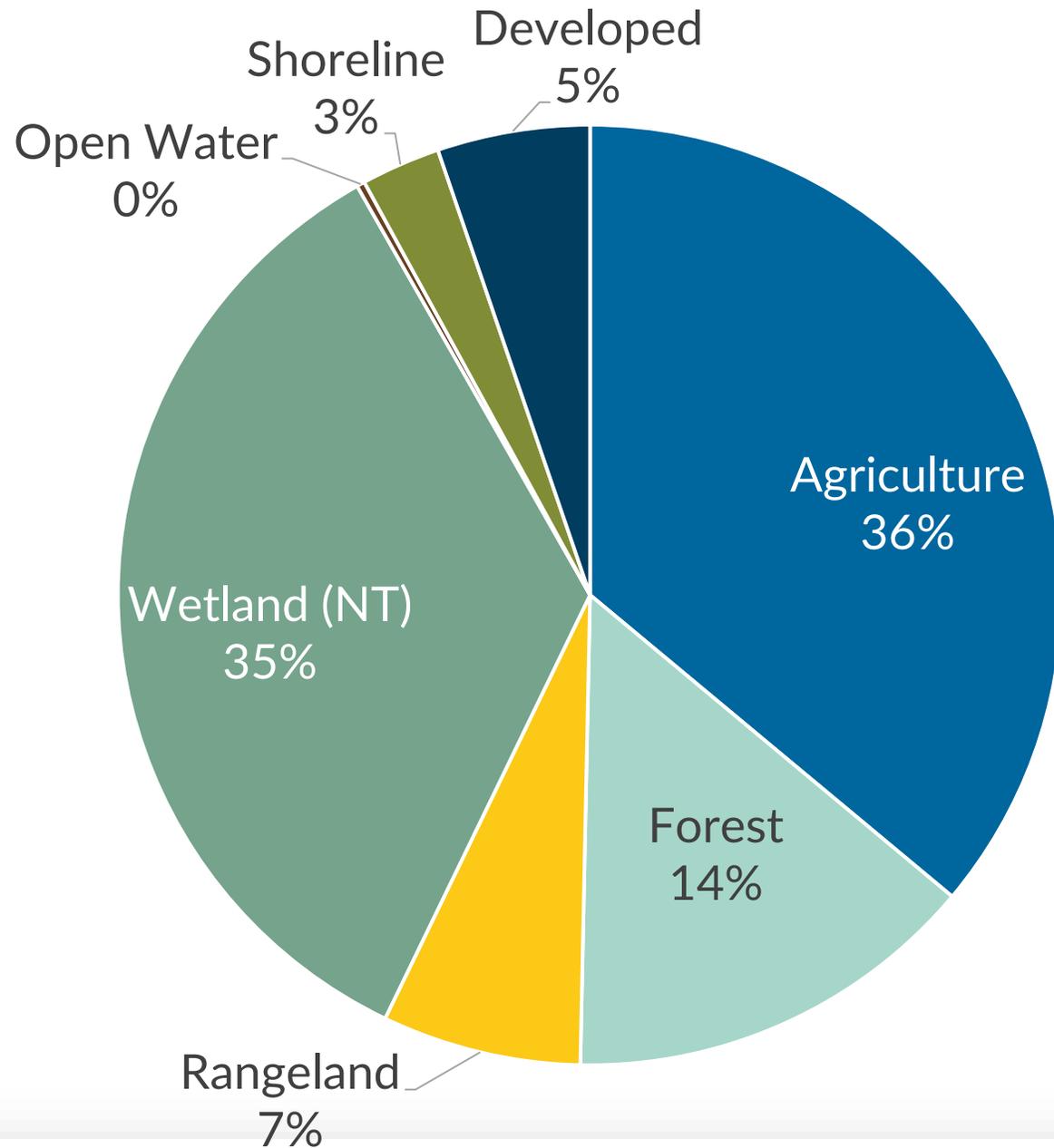
Dead trees and emergent vegetation

Private golf course → Continued migration potential is low

Suitability + Land Use

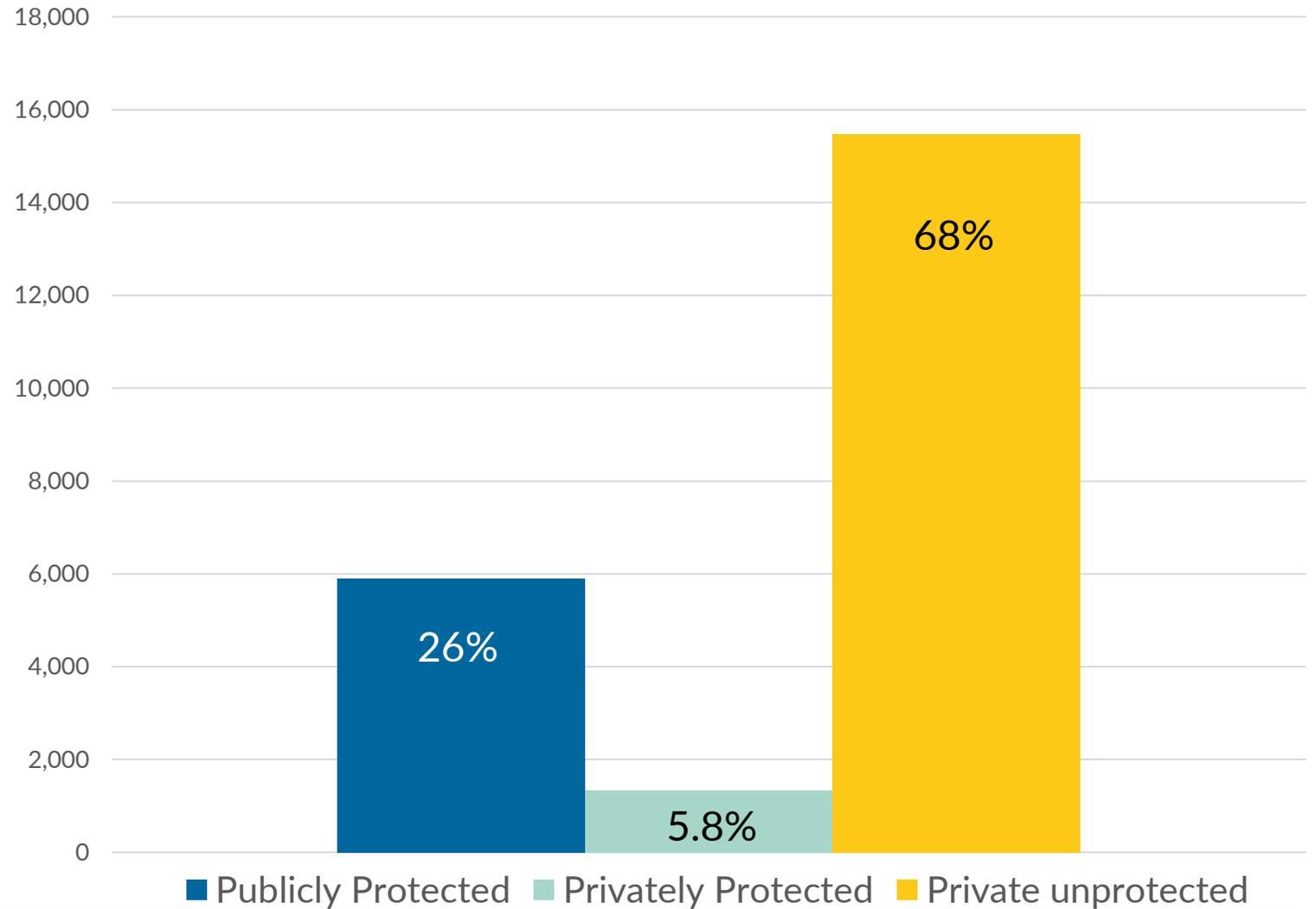
Current (2017)
Landuse

Freshwater wetlands and
Ag lands make up 70% of
highly suitable areas.



Suitability + Ownership Status

The majority of highly suitable land is privately owned.



Next Steps



Communication

Reporting
Prioritization
Messaging



Coordination

Connect with
target audiences
Education
Present options



Action

Land Management
Adjustments
Purchasing
Easements
??



Thank You!

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