Designing Sustainable Landscapes: Landscape Capability for marsh species

Hurricane Sandy Tidal Marsh Resiliency Workshop

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North Atlantic Landscape Conservation Cooperative



Designing Sustainable Landscapes

– Landscape

- <u>Change</u>: predict potential changes
- <u>Assessment</u>: assess impact on species distributions and ecosystem integrity
- <u>Design</u>: use results to provide guidance for strategic habitat conservation





LCAD Model

Designing Sustainable Landscapes



- 30 surrogate species
- •LC to assess current landscape and impacts of future landscape/climate change
- •Ultimately informs landscape conservation design

Marsh species



ESM+















Climate suitability model



- •Statistically downscaled climate models (RCP4.5 & RCP 8.5) for 2010, 2030, 2080
- •2 precipitation variables
- 4 temperature variables
- Logistic regression
- •Minimize errors of commission, 95% sensitivity

Climate suitability model



Climate suitability model



Prevalence



- •Coarse smoothing of occurrence data
- •Account for factors other than habitat or climate (e.g., competition, disease, etc.)



2010 Landscape Capability (LC)



2080 Landscape Capability: Climate



LC clim

2010 Habitat Capability

X

2080 Climate Suitability

2080 Climate Persistence



<u>Climate persistence</u>

2010 Landscape Capability

 \mathcal{X}

2080 LC clim

Climate Vulnerability



2080 climate niche envelope

Zone of contraction (2080)

Climate Vulnerability





Zone of contraction (2080) 2010 & 2080 climate envelope

High



Low

Directions & challenges

- Incorporate SLR vulnerability (Thieler lab) for assessments of future landscapes
- Acquire regional marsh bird occurrence data to use in climate suitability models (SHARP)
- Incorporate updated high/low marsh mapping when available (Olsen lab / SHARP)





http://www.umass.edu/landeco/research/dsl/dsl.html





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Climate Vulnerability



2010 climate niche envelope