North Atlantic LCC Hurricane Sandy Projects (funded with DOI funds through FWS)

- Aquatic Connectivity and Resiliency
- Beaches and Beach Species Resiliency
- Tidal Marshes and Marsh Species Resiliency





Collaboratively Increasing Resiliency and Improving Standards for Culverts and Road Stream Crossings to Future Floods While Restoring Aquatic Connectivity

Goals:

- Regional culvert survey, mapping and prioritization
 - Unified regional protocols, database, models and optimization
- Improved resiliency of culverts/roads to withstand future floods
- Improved fish passage in streams in the Sandy affected area; and
- Support for culvert replacement standards designed to withstand floods and improve fish passage.

Collaborators:

- USFWS (LCC & Fisheries), State F&W, UMass/CSC, USFS, TNC, TU, FHWA, USGS
- Links to previously funded LCC project

LCC SLR SDM Model

Optimize the allocation of conservation efforts in a spatially explicit manner in order to sustain ecological values of beaches/tidal marshes across the NALCC in the face of storm impacts and sea level rise

Sustainable Conservation of Ecosystem Services (Carbon + Protection of Infrastructure+ Rec Measure) Ensure Persistence of Native Habitats (Pr Persist Beach Complex + Pr Persist Marsh Complex) Ensure Persistence of Native Species (∆ Suitability Spp Beach + ∆ Suitability Spp Marsh)

USGS SLR Response Models

Predicted Habitat and Species Response Sea level rise + Storm impacts LCC/CSC spp. and habitat models, LCAD Model

Universe of Alternatives (Suites of Actions) Type of Action, State of Patch, Location of Patch, Time of Implementation

Acquire New Habitat – Future Buffering (Habitat that could buffer effects, but will need management to transition)

Manage New Habitat - Transition (Management to get newly acquired habitat to buffer effects)

Acquire Existing Habitat (Maintain high-quality habitat) Manage/Restore Existing Habitat - Resiliency (Management to habitat in conservation status to improve resiliency to effects) Decision support model uses regional datasets and their uncertainties to determine probabilities of adjusted land elevation and response type given a range of sea level scenarios:



Sydney Coastal Councils Group

LCC Landscape Change Assessment and Design Model



Decision Support for Hurricane Sandy Restoration and Future Conservation to Increase Resiliency of Beach Habitats and Beach-Dependent Species in the Face of Storms and Sea Level Rise

Goals

- Integrated decision support tools for understanding impacts of sea level rise and storms on coastal beaches and prioritizing actions
- Assess impact of post storm management on beach habitats and spp. (initial focus on PIPL)
- Collect & model beach-nesting bird location and habitat data on/adjacent to NWRs & NPS to provide finer-scale projections of habitat changes
- Incorporate models of beach habitat and species response to sealevel rise and storms into the LCC modeling framework
- Make decision support tools, maps and monitoring results easily available to decision makers at scales and formats needed

FWS Leads/Partners:

 USFWS (LCC, E.S.), USGS, NPS, State F&W, UMass/CSC, VA Tech, Rutgers, CWNJ, TCI

Decision Support for Hurricane Sandy Restoration and Future Conservation to Increase Resiliency of Tidal Wetland Habitats and Species in the Face of Storms and Sea Level Rise

Goals:

- Integrated decision support tools for understanding future impacts of sea level rise and storms on tidal marshes and prioritizing actions
- Summarize assessments of Hurricane impacts on tidal marshes & spp.
- Regionally-consistent spatial data on tidal marshes
 - High/low marsh, tidal, restrictions, ditches, and hardened structures (USGS?)
- Monitor and assess the effectiveness of tidal wetland restorations
- Improve and incorporate models of marsh response to sea-level rise and storms into the North Atlantic LCC modeling framework
- Make decision support tools, maps and monitoring results easily available to decision makers at scales and formats needed

Partners:

 USFWS, USGS, NPS, State F&W, UMass/CSC, UME, UConn, UDel, TNC, NROC, MARCO, NOAA, MBL

Integration among Science projects and with restoration projects

Resiliency monitoring

- Consistent Metrics and Protocols
- Study Design with restoration and reference sites
- Evaluation of effectiveness
- Informing models and decision support tools

Measurable Monitoring Metrics Vegetation **Elevation (marsh &** shore) Size (marsh & shore) Marsh transgression **Hydrology metric Bird** use Fish use

Database of Science Projects

- Searchable Access database
- Reports in Excel and Word
- 45 DOI and 93 NOAA projects
- Now using to articulate common approach to evaluating the effectiveness of projects for increasing resiliency
- <u>http://northatlanticlcc.org/resources/hurricane-sandy</u>