**Full Title:** *Collaboratively Increasing Resiliency and Improving Standards for Culverts and Road Stream Crossings to Future Floods While Restoring Aquatic Connectivity* (DOI Project # 63)

**Short Title:** *Increasing Aquatic Resiliency and Connectivity*

**Summary and Outcomes:** Partner-driven, science-based approach through the North Atlantic Landscape Conservation Cooperative (LCC) for identifying and prioritizing road stream crossings in the Hurricane Sandy area for increasing resilience to future floods while improving aquatic connectivity. The resulting information and tools will be used to inform and improve decision making by towns, states and other key decision makers.

**Funding:** $1,270,000

**LCC, Fish and Wildlife Service Leads:** Andrew Milliken, Phil Herzig and Martha Naley

**Products & Users:**

* **Standing Northeast regional aquatic connectivity project advisory team** including all state fish and wildlife agencies in region that can guide future collaborative efforts.
* **Consistent road-stream crossing assessment protocols and** comprehensive Stream Continuity road-stream crossings **database** for the Northeast Region to be used by federal, state and local partners involved in collaboratively assessing and restoring aquatic connectivity and resiliency of crossings.
* **Road stream crossing survey/assessment results** using consistent Northeast protocols and database for prioritized watersheds and crossings to improve data for prioritizing restoration of aquatic connectivity and resiliency of crossings to be used by federal, state and local partners.
* **Hydraulic response and risk assessment to climate change** (including future flood events) for pilot watersheds extrapolated for region allowing estimates of relative risk of failure of road-stream crossings and culverts under current and predicted future stream flows to be used by state and town transportation and emergency management agencies.
* **Recommendations for crossing/culvert replacement standards** and robust designs to withstand future flood events and provide guidance to be used by state and town transportation and emergency management agencies.
* **Web User Interface (WUI) where users can rank and select crossings based on aquatic organism passage, hydrologic vulnerability, and ecological metrics** **and optimize** stream crossings for removal/replacement according to single and multiple criteria at a range of spatial scales to be used by federal, state and local partners involved in assessing and restoring aquatic connectivity and resiliency of crossings.
* **Training including webinar training** for users targeting policy-makers on the local and state level as well as those constituencies that may be responding to post-flooding events; **and on-the-ground workshops** targeting local road commissions, heavy equipment operators, flood responders, and similar constituencies ; soliciting feedback from partners and exploring the option of a participant certification program.

**Activity Categories and Contractors**

|  |  |
| --- | --- |
| **Activity Category** | **Contractors/Staff** |
| Coordination and Oversight of surveys and data | USFWS Fisheries, LCC, UMass Amherst |
| Surveys and Data Collection | USFWS Fisheries, E.S., NWRs, State F&W agencies, Wildlife Management Institute, UMass |
| Model Development, Decision Support | UMass, TNC, Northeast Climate Science Center, U.S. Forest Service |
| Information Management and Training | USFWS Fisheries, Trout Unlimited, LCC, CBI (portal), FL (web)  |
| Total |

**Project Team**

* Andrew Milliken (USFWS Science Applications, North Atlantic LCC)
* Jan Rowan, Phil Herzig, Martha Naley, Joe McKeon (USFWS R5 Fisheries)
* Susan Wells (USFWS FR HQ)
* Jed Wright (USFWS ES Gulf of Maine Program)
* Colin Apse & Erik Martin (The Nature Conservancy)
* Scott Jackson (University of Massachusetts Amherst)
* Rick Palmer and Casey Brown (UMass/Northeast Climate Center)
* Keith Nislow (U.S. Forest Service/ Northeast Climate Center)
* Keith Curley (Trout Unlimited)

**Coordination and relationship to other projects**

Builds on an existing North Atlantic LCC project to develop regional protocols and database and conduct surveys in northeast states outside Hurricane Sandy affected area. Not aware of any redundant efforts but checking with USGS.

**Status as of 9/30/14**

* All agreements in place
* Protocols and database being developed
* Team including all states being developed
* Intensive survey efforts to commence spring 2015

**Full Title:** *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* (DOI Project # 67)

**Short Title:** *Increasing Resiliency of Beach Habitats and Species*

**Summary and Outcomes:** Coordinated effort through the North Atlantic LCC working with DOI Bureaus, Northeast Climate Science Center (CSC), coastal states, NGOs and university partners to integrate monitoring, models and tools to guide decisions about where and how to conduct beach restoration, conservation and management to sustain ecological values, ecosystem services and habitat suitability of beaches in the face of storm impacts and sea level rise in the Hurricane Sandy region.

**Funding:** $1,750,000

**LCC, Fish and Wildlife Service Leads:** Andrew Milliken, Anne Hecht

**Products & Users:**

* **Beach and tidal inlet inventories**, analyses, databases, and reports assessing changes to the baseline of tidal inlet and sandy beach habitats before, immediately following Hurricane Sandy and after beach management to be used by state and federal managers and biologists to understand changes, impacts from management and plan future species and habitat management.
* **Beach-nesting bird location and habitat data collected on and adjacent to key coastal National Wildlife Refuges and National Parks** from Maine to Virginia to provide finer-scale projections of habitat changes including the development of smart phone app for efficient collection of data to be used by federal, state, local and NGO beach managers to prioritize habitat and species management actions and efficiently collect future data.
* **Site-specific and regional models and decision support tools** that relate sea level rise, storms and management to beach habitat suitability for piping plover and other beach dependent species for guiding regional, state and local decisions on how and where to manage beaches and beach-dependent species in the face of change.
* **North Atlantic LCC modeling framework integrating beach resiliency** and habitat information along with predicted effects of climate change, urban growth and conservation to be used by LCC and other federal, state and local conservation partners as part of overall conservation design efforts.
* **Assessments of the impacts of beach nourishment and other stabilization activities** completed in response to Hurricane Sandy on the resiliency of beaches, beach habitats and beach-dependent species and recommendations for beach management to be used by state and federal managers to plan and implement long-term and storm response management.
* **Science delivery program to make coastal resiliency information and tools easily available** decision makers at scales and formats needed delivery network through NROC and MARCO to coastal states and communities as well as beach restoration, protection and management decision-makers.

**Activity Categories and Contractors**

|  |  |
| --- | --- |
| **Activity Category** | **Contractors/Staff** |
| Expand geographic scope of existing geomorphology and piping plover models, inventory beach modifications | USGS, Virginia Tech., TCI |
| Assess effects of beach stabilization projects in NY & NJ on beach habitats and beach nesting birds | Rutgers, Conserve Wildlife NJ, Virginia Tech., USFWS ES |
| Collect beach-nesting bird location and habitat data on and adjacent to National Wildlife Refuges and incorporate into finer-scale projections | USFWS NWRs , USGS |
| Delivery of results to partners and communities via information management, workshops, training and capacity building | NROC, MARCO, FWS LCC, Rutgers, Conserve Wildlife NJ, CBI (portal), FL (web)  |
| Overall coordination and facilitation | USFWS LCC, ES |

**Project Team**

* Andrew Milliken, Coastal Resiliency Coordinator TBD (USFWS Science Applications, North Atlantic LCC)
* Anne Hecht, Steven Papa, (USFWS Endangered Species Program),
* Jan Taylor, (USFWS NWRS)
* Rob Thieler, Matthew Anderson, (U.S. Geological Survey)
* Amanda Babson ( National Park Service)
* James Fraser, Sarah Karpanty (Virginia Tech)
* Brooke Maslo (Rutgers University)
* Todd Pover (Conserve Wildlife NJ)
* Tracey Rice (TCI)
* Kevin McGarigal (UMass Amherst)
* Mary Ratnaswamy, Radley Horton, (Northeast Climate Science Center)
* Darlene Finch and Adrianne Harrison (NOAA Coastal Services Center)
* Dani Carter, NROC; Kris Ohleth, MARCO

**Coordination and relationship to other projects**

USGS is an integral part of this project and ensures strong linkage with USGS “theme 2” projects and data team to link to ongoing “theme 2” and “theme 5” projects related to beaches and beach species and to regional sea level rise model. Complements Corps funded work on breach contingency planning by focusing on sea level rise modeling.

**Status as of 9/30/14**

* All agreements in place
* Coastal Resiliency Coordinator advertised
* First phase on beach and inlet inventory work complete
* First season of field work at detailed sites completed
* Rollout and testing of iPlover completed
* Survey/monitoring efforts being organized for 2015-2016

**Full Title:** *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* (DOI Project # 24)

**Short Title:** *Increasing Resiliency of Tidal Marsh Habitats and Species*

**Summary and Outcomes:** Coordinated effort by North Atlantic Landscape Conservation Cooperative (LCC) partners to integrate data, models and tools to guide decisions about where to conduct tidal marsh restoration, conservation and management to sustain ecological values, ecosystem services, habitat suitability and resiliency of tidal marshes and marsh species in the face of storm impacts, sea level rise and other stressors.

**Funding:** $2,200,000

**LCC, Fish and Wildlife Service Lead:** Andrew Milliken

**Products & Users:**

* **Regionally-consistent tidal marsh data and maps** including elevation and tidal marsh habitat mapping to be used by federal, state and NGO land managers and as well as conservation planners, researchers and modelers.
* **Integrated physical/biological marsh response models and decision support tools** for projecting future impacts of sea level rise and storms on tidal marshes and marsh species at specific sites and across the region for guiding marsh protection, management and restoration decisions to be used by range of partners involved in tidal wetland protection, restoration and management at regional, state and local scales.
* **Assessment and mapping of marsh resiliency and integrity** based on regionally consistent data and metrics to identify areas of highest integrity/resiliency for marsh protection and management to be used by range of conservation partners at regional, state and local scales.
* **North Atlantic LCC modeling framework integrating tidal marsh resiliency** and habitat information along with predicted effects of climate change, urban growth and conservation to be used by LCC and other federal, state and local conservation partners as part of overall conservation design efforts.
* **Monitoring and assessments of the effectiveness of DOI and partner tidal wetland restoration approaches** completed in response to Hurricane Sandy for increasing resiliency of marshes and marsh-obligate species to future storms and sea level rise and recommendations for future restoration efforts. Will be used range of partners involved in tidal wetland restoration and management at regional, state and local scales and by DOI to assess success of projects and recommend future approaches.
* **Science delivery program to make marsh resiliency information and tools easily available** to decision makers at scales and formats needed delivery network through NROC and MARCO to coastal states and communities as well as marsh restoration, protection and management decision-makers.

**Activity Categories and Contractors**

|  |  |
| --- | --- |
| **Activity Category** | **Contractors/Staff** |
| Compile consistent regional spatial data | SHARP (UConn, UDel, UMaine), FWS NWRs, USGS |
| Decision support models and incorporation into decision model framework | USC, UCF, UMass, TNC, SHARP, USGS |
| Monitoring and assessment of effectiveness of restoration for marsh resiliency | SHARP, USFWS MB and NWRs,  |
| Delivery of results to partners and communities via info. management, workshops, training and capacity building | NROC, MARCO, FWS LCC, CBI (portal), FL (web)  |
| Overall coordination and facilitation | USFWS LCC |

**Project Team**

* Andrew Milliken, Coastal Resiliency Coordinator TBD (USFWS Science Applications, North Atlantic LCC)
* Susan Adamowicz, Chuck Frost (USFWS NWRS)
* Georgia Basso, USFWS ES Coastal Program
* Mary Ratnaswamy, Richard Palmer, Radley Horton, Linda Deegan (Northeast Climate Science Center
* Kevin McGarigal (UMass Amherst)
* Rob Thieler, Neil Ganju, Matthew Anderson, Pete Murdoch (U.S. Geological Survey)
* Amanda Babson ( National Park Service)
* Adam Whelchel and Mark Anderson (The Nature Conservancy)
* James Morris (University of South Carolina)
* Scott Hagen (University of Central Florida)
* Darlene Finch and Adrianne Harrison (NOAA Coastal Services Center)
* Dani Carter, NROC
* Kris Ohleth, MARCO

**Coordination and relationship to other projects**

Significant ongoing coordination with USGS to link to ongoing “theme 2” and “theme 5” projects related to tidal marshes and to regional sea level rise model. Close coordination with USFWS MB and NWRs on metrics, protocols, and locations. Coordination among entities working on marsh resiliency indices (TNC, UMass, SHARP, USGS, USFWS).

**Status as of 9/30/14**

* All agreements in place
* Coastal Resiliency Coordinator advertised
* Internal common metrics team and white paper
* Coordination workshop planned for December
* Survey/monitoring efforts being organized for 2015-2016