



2015

**ANNUAL REPORT**  
NORTH ATLANTIC LANDSCAPE  
CONSERVATION COOPERATIVE



# North Atlantic Landscape Conservation Cooperative

## INTRODUCTION

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In 2015, the North Atlantic Landscape Conservation Cooperative (LCC) reached an exciting stage in its evolution, transitioning from an incubator for applied science motivated by landscape-level conservation challenges, to a partner network for delivering the resulting information and tools to the people who are addressing these challenges on the ground. The people who embody our work.

Although the North Atlantic LCC was established as part of an LCC Network to help conservation science keep pace with major regional threats, our work is driven by needs at the scales of states and other partners. Our priorities are defined by their priorities, and our success is defined by their success.

As 2015 drew to a close, we were reminded again of the importance of demonstrating success to remain accountable to these partners. At the request of Congress, the National Academy of Sciences conducted a review to evaluate the purpose, goals, and scientific merit of the Landscape Conservation Cooperatives program, and to determine whether progress has been made toward advancing conservation in the five years since the establishment of the network.

Released in December, the *Review of the Landscape Conservation Cooperatives* affirmed that in a time of uncertain, accelerated change, a landscape-scale approach is necessary for addressing the nation's conservation challenges, and that LCCs could provide an effective framework for carrying out that approach.

However, the review also identified areas where further improvement is needed. Chief among them is coordinating more closely with Joint Ventures, Fish Habitat Partnerships, and others, to complement rather than duplicate efforts, and figuring out how to measure results and associated benefits to demonstrate relevance to diverse partners.

Like the other LCCs in the network, the North Atlantic LCC has work to do on this front. But reflecting on 2015, we see indications that we are moving in the right direction coming from the most important source: our partners.

With more and more of the foundational science projects supported by the LCC partnership coming to fruition in the form of tangible conservation products, we redoubled our efforts in 2015 to put these tools in the hands of the people they were designed for, and to make sure they serve their intended purposes.

Do they provide the right information at the right scale? Do they translate to real-world scenarios? Do they help in making better conservation choices? Most importantly, are they being put to use?

Increasingly, the answer to this question is: "Yes." In this year's Annual Report, we have highlighted examples in key areas such as aquatic connectivity, coastal resilience, and support for objectives outlined in State Wildlife Action Plans, as well as examples of how diverse partners across the region are using the results of work we are supporting, and driving progress in conservation at a critical point in time.

Better, more informed, conservation on the ground is the most meaningful way to demonstrate the success of the LCC and to empower greater momentum in a new conservation movement. We hope in the coming years that we continue to see evidence from states and other partners that we are collectively moving in the right direction to achieve the long-term conservation outcomes we are all working toward as a community.

Ken Elowe  
*U.S. Fish and Wildlife Service*  
*Steering Committee Chair*

Bill Hyatt  
*Connecticut Department of Environmental Protection*  
*Chief of Natural Resources*  
*Steering Committee Vice Chair*

# Who We Are

## Our Partners

### STATES/DISTRICTS

Connecticut Department of Energy and Environmental Protection  
 Delaware Division of Fish and Wildlife  
 District of Columbia Department of Environment  
 Maine Department of Inland Fisheries and Wildlife  
 Maryland Department of Natural Resources  
 Massachusetts Division of Fisheries and Wildlife  
 New Hampshire Fish and Game Department  
 New Jersey Division of Fish and Wildlife  
 New York Department of Environmental Conservation  
 Pennsylvania Game Commission  
 Pennsylvania Fish and Boat Commission  
 Rhode Island Department of Environmental Management  
 Vermont Department of Fish and Wildlife  
 Virginia Department of Game and Inland Fisheries

### NATIVE AMERICAN TRIBES

United South and Eastern Tribes  
 Houlton Band of Maliseets

### FEDERAL AGENCIES

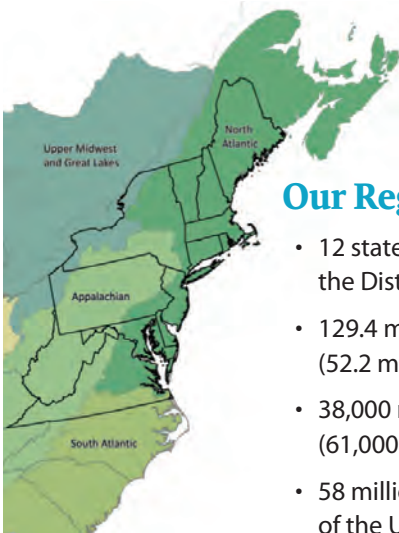
U.S. Fish and Wildlife Service  
 U.S. Geological Survey  
 Department of the Interior  
 Northeast Climate Science Center  
 National Park Service  
 Bureau of Ocean Energy Management, Regulation and Enforcement  
 Bureau of Indian Affairs  
 Bureau of Land Management  
 National Oceanic and Atmospheric Administration  
 U.S. Environmental Protection Agency  
 U.S. Forest Service

### CANADIAN PARTNERS

Environment Canada,  
 Canadian Wildlife Service

### NON-GOVERNMENTAL ORGANIZATIONS

Ducks Unlimited  
 Manomet Center for Conservation Sciences  
 National Wildlife Federation  
 The Nature Conservancy  
 National Fish and Wildlife Foundation  
 New England Wild Flower Society  
 Trust for Public Land  
 Wildlife Management Institute  
 Wildlife Conservation Society



## Our Region

- 12 states, 4 provinces, and the District of Columbia
- 129.4 million acres of land (52.2 million hectares)
- 38,000 miles of shoreline (61,000 kilometers)
- 58 million people, 17.8 percent of the U.S. population

## Our Staff

**Andrew Milliken**  
 North Atlantic LCC  
 Coordinator

**Scott Schwenk**  
 Science Coordinator

**Steve Fuller**  
 Science Delivery  
 Coordinator

**BJ Richardson**  
 Regional GIS Coordinator

**David Eisenhauer**  
 Science Applications  
 Communications  
 Coordinator

**Renee Farnsworth**  
 GIS Analyst

**Megan Tyrrell**  
 Coastal Resiliency  
 Coordinator

**Maritza Mallek**  
 Assistant to Science  
 Coordinator

**Bridget Macdonald**  
 Communications Specialist

**Stephanie Cuenoud**  
 Science Delivery Assistant

**Emily Powell**  
 Coastal Resiliency  
 Research Associate



# Our Approach

## Vision:

Landscapes that sustain our natural resources and cultural heritage maintained in a healthy state through active collaboration of conservation partners and partnerships in the North Atlantic region.

## Mission:

The North Atlantic Landscape Conservation Cooperative provides a partnership in which the private, state, tribal and federal conservation communities work together to address increasing land use pressures and widespread resource threats and uncertainties amplified by a rapidly changing climate. The partners and partnerships in the cooperative address these regional threats and uncertainties by agreeing on common goals for land, water, fish, wildlife, plant and cultural resources and jointly developing and delivering the scientific information and tools needed to prioritize and guide more effective conservation actions by partners toward those goals.

## Strategy:

Research, planning, evaluation, monitoring, and science delivery - each aspect of the conservation work supported by the North Atlantic LCC contributes to a regional vision for adaptive management.

This vision is captured in the Northeast Regional Conservation Framework, developed in collaboration with states and other partners during a formative workshop held in Albany, N.Y., in 2011. Although this framework shares a number of elements with other adaptive management approaches, it is unique in its emphasis on the delivery of science for practical applications by:

- **Managing information** to ensure information is easily available in necessary scales and formats
- **Translating science** into relevant and usable tools and products
- **Helping networks of partners** adopt and use these products for specific applications

The North Atlantic LCC Annual Report highlights examples of how we have made progress in five priority areas by supporting the development and delivery of science in response to regional needs:

## 2015 Accomplishments in Priority Areas



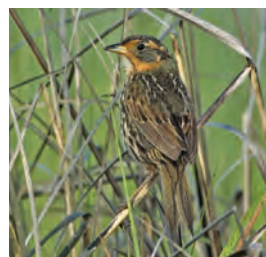
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# Aquatic Connectivity

## OVERVIEW

**Why it matters:** Tens of thousands of outdated, damaged, and poorly designed road-stream crossings fragment rivers and streams across the North Atlantic region, preventing aquatic species from moving up and downstream, and creating flooding threats to communities.



Participants in a North Atlantic LCC training held near Albany, N.Y., in May.  
Credit: Bridget Macdonald/NALCC



A collapsed bridge in Vermont after Hurricane Irene. Credit: Lars Gange and Mansfield Heliflight

**In 2015, more than 100 U.S. Fish and Wildlife Service, state and partner organization staff were trained in NAACC protocols, and more than 6,200 road-stream crossing assessments were completed in accordance with their standards.**



Flooding near Taunton, Mass., after a major storm hit the area in 2010.  
Credit: Mass Audubon

## PROGRESS IN 2015:

During the past year, major barriers have been coming down across the region for aquatic organisms and the people who care about them. Since its establishment in 2014, the LCC-supported and facilitated North Atlantic Aquatic Connectivity Collaborative (NAACC) has grown to include more than 50 partners across 14 states collaborating on aquatic connectivity and road-stream crossing resiliency.

With a central database of regional road-stream crossing infrastructure, standard protocols and trainings for assessments, and web-based tools for prioritizing upgrades, the NAACC provides a collaborative framework for partners to take on the enormous task of upgrading culverts and bridges that represent barriers to aquatic connectivity, and threats to human infrastructure and safety. In light of changing precipitation patterns and more intense storms predicted as a result of climate change, it's an increasingly urgent issue for both people and wildlife.

With support from North Atlantic LCC and Department of the Interior Hurricane Sandy Resiliency funds, more than 100 U.S. Fish and Wildlife Service, state and partner organization staff helped develop and were trained in NAACC protocols and more than 6,200 road-stream crossing assessments were completed in accordance with those standards in 2015.

## LOOKING AHEAD:

In the new year, project cooperators at the University of Massachusetts Amherst will be developing and testing protocols for assessing connectivity of tidally-influenced culverts, based on input provided by representatives from Northeast states and Canadian provinces in a September 2015 workshop in Portsmouth, N.H.

The North Atlantic and Upper Midwest Great Lakes LCCs will continue to collaborate on a new initiative to increase coordination and information sharing across the two regions to improve and increase the efficiency of aquatic connectivity assessments, databases, prioritization, and implementation. These LCCs are facilitating planning between partners focused on aquatic connectivity and those focused on increasing resilience of infrastructure to future floods, such as transportation and emergency management agencies.

## The North Atlantic Aquatic Connectivity Collaborative (NAACC)

A network of partners who are collaborating to take on the work of assessing and upgrading road-stream crossings to improve passage for wildlife and increase community resiliency to future floods. The NAACC offers:

- Consistent regional assessment protocols
- Field trainings on conducting assessments
- Regional database of road-stream crossings
- Prioritization of sub-watersheds for road-stream crossing surveys

### DEVELOPED BY:

The University of Massachusetts Amherst, The Nature Conservancy, Vermont Agency of Natural Resources, USDA Forest Service, and U.S. Fish and Wildlife Service

### WHO IS USING IT?

Heidi Ricci, Senior Policy Analyst, Mass Audubon, and other members of the Resilient Taunton Watershed Network

### HOW IS IT BEING APPLIED?

Using North Atlantic Aquatic Connectivity Collaborative data and protocols, Ricci led the development of a report in partnership with the Taunton River Watershed Alliance and other partners that identifies priority road-stream crossings in the watershed based on the potential ecological benefits associated with upgrades, repairs, and replacements.

The report is designed to help municipal officials in the 43 towns within the Taunton River watershed in southeastern Massachusetts direct limited resources toward projects that can offer multiple benefits, both by reducing flood risks and increasing aquatic connectivity for wildlife.

But Ricci hopes the report will also help raise awareness among residents. “There are all kinds of reasons to look at road-stream crossings,” she said. “We want to convey that functioning natural systems provide quality of



A culvert in Raynham, Mass, before and after replacement.  
Credit: Bill Napolitano, Southeastern Regional Planning and Economic Development District

life, economic value, protect infrastructure, and protect property.”

### WHAT CONSERVATION NEED DOES IT ADDRESS?

“More than just documenting road-stream crossings, we wanted to be able to move toward setting priorities and getting work done,” explained Ricci.

Addressing crossings that represent the weakest links in the aquatic chain is increasingly important in the context of climate change. “Especially in a low-lying watershed like the Taunton, when there’s a big rain event, drainage can be a major issue,” said Ricci, pointing to the fallout from an infamous storm in March 2010. “There was massive flooding. The Whittendon Dam failed, and they had to evacuate downtown Taunton for several days.”

### LEARN MORE:

- **North Atlantic Aquatic Connectivity Collaborative:** [www.streamcontinuity.org](http://www.streamcontinuity.org)
- **Mass Audubon’s Shaping the Future of Your Community program:** <http://www.massaudubon.org/our-conservation-work/advocacy/news-events/reconnecting-streams>
- **Southeastern Regional Planning and Economic Development District:** <http://www.srpedd.org>



# Coastal Resilience

## OVERVIEW

**Why it matters:** The rate of sea-level rise for the North Atlantic region is greater than the global average, and the consequences are already manifesting along the coast, threatening tidal marshes, beaches and other coastal systems with inundation and erosion. More intense coastal storms are predicted for the Atlantic with major potential impacts to coastal systems and communities.

## PROGRESS IN 2015:

To help guide decisions and investments intended to increase coastal resilience into the future, the North Atlantic LCC is facilitating a suite of three-year projects funded by Department of Interior Hurricane Sandy Funding to investigate threats to coastal systems and species. Two years in, the projects are starting to produce tools and information that are helping to connect the dots between the threats and the ways in which systems, species, and habitats will respond.

In December, the cohort of researchers leading projects focused on tidal-marsh systems and species met to share information and updates during a second annual workshop. Partners who presented initial results during the workshop included:

- Marsh equilibrium and hydrodynamic circulation models from the University of South Carolina and Louisiana State University

**With support from the North Atlantic LCC, the Saltmarsh Habitat and Avian Response Program (SHARP) was able to expand monitoring and evaluation for vegetation and wildlife impacts to marsh restoration sites that would not otherwise have been surveyed for pre- and post-restoration monitoring data of this type. SHARP technicians used standard vegetation monitoring and bird callback survey methods to collect data at approximately 119 restoration or control points.**



Partners share updates from studies investigating urgent threats posed by sea-level rise to coastal marshes during the second annual Tidal Marsh Resilience Workshop.  
*Credit: Bridget Macdonald/North Atlantic LCC*

- Marsh sediment dynamic models from U.S. Geological Survey
- Impacts to tidal marsh dependent bird species from the Saltmarsh Habitat and Avian Response Program (SHARP)
- Approaches to assess the relative resilience and integrity from The Nature Conservancy and University of Massachusetts; and
- Resilience science focusing on National Wildlife Refuges and National Parks

Building on these Hurricane Sandy resiliency efforts and the Gulf Coast Restoration efforts, the North Atlantic LCC brought on climate scientist Emily Powell to serve as the new Coastal Resilience Research Associate to foster greater collaboration among Atlantic and Gulf coast LCCs toward delivering information and tools that can increase the resilience of communities and coastal resources.

By the end of the year, Powell had established coastal resilience core and advisory teams with representatives from six coastal LCCs and three Climate Science Centers across the project's geography; identified 44 focal coastal species and four coastal habitats vulnerable to the impacts of sea-level rise and coastal storms and of interest to the LCCs and partners; and began building a database to compile and synthesize qualitative and quantitative information on thresholds and tipping points related to sea level rise and storm impacts for all focal species and habitats.

## LOOKING AHEAD:

With the Hurricane Sandy-funded projects entering their final year, research partners are beginning to align efforts to deliver information and tools to coastal decision makers throughout the region. Partners from the Northeast Regional Ocean Council (NROC) and the Mid-Atlantic Regional Ocean Council (MARCO) will be helping to disseminate resources through established networks and systems to make sure information from these projects is accessible, and gets in the hands of stakeholders who can use it to make better decisions for coastal communities and systems.



## Synthesis of Tidal Inlet and Sandy Beach Habitat Inventories

An inventory of the location, status, and condition of beach habitats including potential piping plover breeding grounds before Hurricane Sandy, immediately after Hurricane Sandy, and three years after post-storm recovery efforts, based on imagery from Google Earth, Google Maps, state agencies, municipalities, and private organizations. Products include:



- Google Earth files and metadata of Pre-Sandy Tidal Inlets, Beach Fill, and Beach Armoring (Maine to Va.); Excel spreadsheet of Pre-Sandy Beach Development, Armoring, and Fill by Community
- Report providing Inventory of Habitat Modifications to Sandy Beaches, Maine to Va.
- Report providing Inventory of Habitat Modifications to Tidal Inlets, Maine to Va.
- Inventory of Habitat Modifications to Sandy Beaches for Coastal Migration and Wintering Range in Continental U.S.

### DEVELOPED BY:

Tracy Monegan Rice, Terwilliger Consulting, Inc.

### WHO IS USING IT?

Peter Slovinsky, Marine Geologist, Maine Geological Survey (MGS) Member of the Northeast Regional Ocean Council (NROC) Coastal Hazards Resilience Subcommittee and Living Shorelines Group

### HOW IS IT BEING APPLIED?

Slovinsky used the inventory of shoreline structures to help fill in gaps in Maine's existing database of shoreline armoring on larger sandy

beach habitats in the state. This helped in the completion of an assessment of shoreline types for the Maine Coastal Program's 5 year report to the National Oceanic and Atmospheric Administration's (NOAA) Coastal Zone Management Program.

"For the assessment, we needed to be able to distill what extent of the coastline is sandy, highly erodible, stabilized, etc., in miles," explained Slovinsky. "Some of those numbers were built into Tracy's report and accompanying GIS layers, and that helped us supplement our datasets."

Applying the products of this effort brought things full circle for Slovinsky, who originally shared data compiled by Maine Geological Survey with Rice in 2015. "So often datasets like these are created, and you never hear about them, but Tracy made the effort to find out what data already existed in states, and importantly, to follow up with outreach when the project was complete," said Slovinsky. "The report helped us update our own database because it built on what we had, but added the sandy beaches in other parts of the state, and captured larger shoreline protections structures for the coastline."

### WHAT CONSERVATION NEED DOES IT ADDRESS?

In order to help both human and natural communities adapt to sea level rise, coastal decision makers need to understand what helps, and what makes matter worse, in terms of shoreline protection and stabilization.

"We want to get a handle on the cumulative impact of these structures," said Slovinsky. Moving forward, it will be valuable for his agency to know which sections of Maine's shoreline are currently armored as the state considers living shoreline approaches that can increase the resiliency of coastal systems in the face of future storms.

### LEARN MORE:

- **Products from Beach and Tidal Habitat Inventories:**  
<http://northatlanticlcc.org/groups/coastal-resiliency/projects/beach-and-tidal-inlet-habitat-inventories/beach-and-tidal-inlet-habitat-inventories>
- **Maine Geological Survey:**  
<http://www.maine.gov/dacf/mgs/>
- **NROC's Living Shorelines Group:**  
<http://northeastoceanouncil.org/committees/coastal-hazards-resilience/living-shorelines-group/>

# Landscape Conservation Design

## OVERVIEW

**Why it matters:** To ensure a sustainable future for our communities and natural resources, we need to identify and protect resilient, intact, connected landscapes that are capable of supporting people, wildlife, and ecological processes in the face of increasing threats from climate change and development.

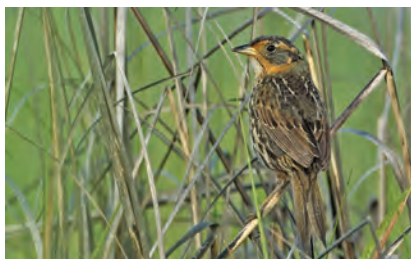


Credit: Al Braden Photography

## PROGRESS IN 2015:

The North Atlantic LCC marked a milestone for conservation in the Northeast and beyond with the completion of *Connect the Connecticut*, a conservation design and supporting information and tools for the Connecticut River watershed. Developed by a diverse team of partners from state and federal agencies, private organizations, and academic institutions, the design outlines a network of priority lands and waters that represent the best starting places for conservation in the watershed. The priorities are based on shared goals for sustaining key species, habitats, ecological processes, and associated benefits in the face of development and climate change.

This effort has earned national attention for its application of sophisticated new approaches to planning for change by uniting partners around shared goals and equipping them with the best available information to support decisions.



As the *Connect the Connecticut* project neared completion, the joint effort by states, U.S. Fish and Wildlife Service, and the LCC to create Northeast Regional Conservation Opportunity Areas (RCOAs) reached consensus on key components. The project unites experts from states, the Service, conservation organizations, and universities to identify areas based on shared priorities to benefit fish and wildlife across the 13 states in the Northeast region. Building on products such as regional habitat maps developed through the Northeast States' Regional Conservation Needs Program, the team is focusing on actions to restore priority ecosystems, conserve core landscapes, promote connectivity between them, and support Regional Species of Greatest Conservation Need identified in State Wildlife Action Plans.

## LOOKING AHEAD:

An expanded RCOA team is bringing in additional expertise as it works to complete the first version of the design in summer 2016. The final product will comprise a mapped network of priority areas and accompanying regionally consistent datasets that can be used by the Northeast Fish and Wildlife Diversity Technical Committee, state fish and wildlife agencies, and conservation partners. Partners will use the products to inform decisions about protecting land and restoring habitat and justify those decisions among their stakeholders and funders.

Empowered with LCC data and lessons learned from *Connect the Connecticut* and RCOAs, partners in other geographies are determining next steps for applying this approach to other landscapes, including the Patuxent National Wildlife Refuge, Chesapeake Bay, and the Gulf of Maine. North Atlantic LCC-Science Delivery grantee Chesapeake Conservancy will continue facilitating a landscape planning effort that began in the Susquehanna River watershed last year. The Envision the Susquehanna project focuses on using both community values and regional science to identify priorities and strategies for protecting the natural and cultural heritage of the watershed. The Chesapeake Conservancy will be holding a series of community engagement workshops in 2016 to cultivate interest and participation in the project.

## Connect the Connecticut

A set of data and tools that individuals and communities can use to make informed decisions about conservation, planning, and development in the Connecticut River watershed with an understanding of broader regional context and long-term implications. Products include:

- Partners' collective prioritization of high priority core areas and the connections between them, and supporting assessments and data that were used to create this network of core areas
- Tools that provide context for making more strategic decisions in anticipation of future changes associated with land use and climate change
- Tools that can inform efforts to reconnect and enhance connectivity in streams and rivers, as well as between blocks of terrestrial habitat that are separated by roads
- Additional GIS layers that can be used as base layers or overlays to facilitate viewing and interpreting the landscape design products

### DEVELOPED BY:

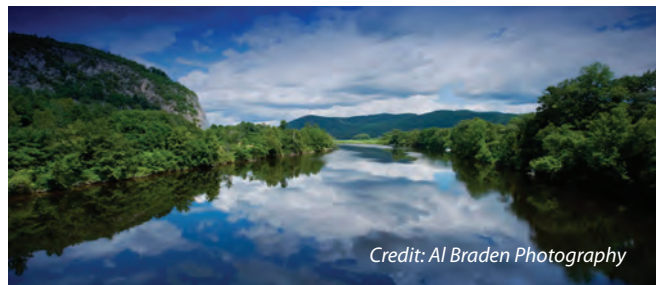
University of Massachusetts Designing Sustainable Landscapes Project, based on direction from a Core Team of partners representing 20 different organizations, including state and federal agencies, nongovernmental organizations, and academic institutions

### WHO IS USING IT?

Bill Labich, Senior Conservationist, Highstead Foundation, and Coordinator, Regional Conservation Partnership (RCP) Network Member of *Connect the Connecticut* Core Team

### HOW IS IT BEING APPLIED?

Highstead is one of seven partners that have received funding from a \$10 million federal grant from the USDA Regional Conservation Partners Program (RCPP) to reduce agricultural runoff into Long Island Sound in part by protecting key riparian and headwater areas. "For the Long Island Sound RCPP, we are figuring out what parcels



will be eligible, what proves that a piece of land contains habitat that can support rare, threatened, and endangered species," explained Labich.

Although many of the conservation partnerships that Highstead works with have their own strategic plans that address these kinds of questions, not all of them do. "In areas of the Long Island Sound watershed that overlap with the Connecticut River watershed, where there is no overarching conservation strategy, we want to lean on *Connect the Connecticut* as the plan that diverse partners are promoting and using," he said. "In those areas, the data from the design can help us identify the best prospective parcels for the RCPP."

### WHAT NEED DOES IT ADDRESS?

For Labich, the design provides a catalyst for conservation. "Everybody has their own priorities and activities, so the only way you can engage people in something new is to attach opportunity to it," he said, pointing out that a plan that aligns federal agencies, states, and NGOs behind shared goals represents an opportunity to contribute to larger outcomes.

"If you are working locally, you should know what is going on regionally - where there is going to be energy for conservation. This design offers that bigger picture, and the data allows both conservation partnerships and individuals to figure out where they can link into it," said Labich.

### LEARN MORE:

- **Connect the Connecticut:**  
<http://connecttheconnecticut.org/>
- **Highstead Foundation:**  
<http://www.highstead.net/>
- **Regional Conservation Partnership Program:**  
<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farmbill/rcpp/>



# Regionally Consistent Maps and Information Management

## OVERVIEW

**Why it matters:** Ecological processes don't stop at borders, and neither will threats from climate change and development. To ensure that individual efforts to conserve wildlife and habitat have the greatest collective impact for conservation, partners working at local, state, and regional levels all need access to resources and information that provide big-picture context for decisions at multiple scales.

### PROGRESS IN 2015:

Last October marked the deadline for the 10-year updates of State Wildlife Action Plans (SWAPs) - comprehensive strategies that identify priority species, habitats, and actions for conservation that are required for states to qualify for federal wildlife grants - as well as an important landmark for regionally consistent mapping. The first round of SWAPs in 2005 provided the motivation and momentum to develop Northeast regional maps and datasets through the Regional Conservation Needs (RCN) program to enable landscape-scale planning and actions to support Regional Species of Greatest Conservation Need (RSGCN). The North Atlantic LCC built tools and assessments on the foundation of

these RCN maps that were used to inform 2015 updates to their SWAPs.

Among the resources that came online in 2015 are two mapping and classification schemes developed by The Nature Conservancy (TNC) with support from the North Atlantic LCC. The Northeast Terrestrial Habitat Map was extended into Atlantic Canada and southern Quebec based on field-collected data and national and provincial datasets. A new data viewer provides a comprehensive habitat picture of this entire area offering a portal to information on ecology, associated species, securement, regional abundance, and predicted loss to development for 140 common and unique terrestrial habitats in the Northeast.

TNC also completed a consistent classification and mapping scheme for lakes and ponds in the Northeast based upon four key variables that are used to organize aquatic natural communities: water temperature, trophic state, alkalinity class, and light penetration. The Lakes and Ponds Classification System synthesizes regional and national lake survey information from states, and the Environmental Protection Agency's (EPA) National Lake Assessment and New England Lake and Pond Survey to provide a comprehensive database of sampled bodies of water in the region.

All of these resources, and many others (more than 230 regional data layers), are available on the North Atlantic LCC's Conservation Planning Atlas (*see box below*) and through the new North Atlantic LCC Products database.

### LOOKING AHEAD:

With the terrestrial habitat picture now complete for the North Atlantic region, partners in Canada are working with TNC to extend the aquatic map in U.S. portion of the LCC and develop a comprehensive classification and map of aquatic habitat across the Canadian portion of the North Atlantic LCC region.

The University of Massachusetts Amherst will also be completing the remaining habitat maps for the set of 30 species of wildlife selected to represent the habitat needs of a wide variety of wildlife across the Northeast. The wildlife habitat maps use the TNC habitat classifications along with other regionally consistent datasets.

The North Atlantic LCC's Conservation Planning Atlas provides access to 232 datasets and counting. It serves as a hub for accessing additional conservation resources from relevant efforts and geographies.

Learn more: <http://nalcc.databasin.org>

RESOURCE CATEGORY	NUMBER of DATASETS
Climate Change	65
Terrestrial	53 <i>(21 species)</i>
Aquatic	19
Coastal and Marine	36 <i>(24 species)</i>
Connect the Connecticut	59
<b>TOTAL</b>	<b>232</b>

## The Index of Ecological Integrity

Combining a set of key metrics for intactness and resiliency to measure the potential for individual sites to support biodiversity in the long term, the Index provides a tool to prioritize actions intended to conserve high quality habitat by enabling users to compare the integrity of different sites of the same ecosystem type.

### PRODUCTS:

- Maps that show the relative integrity of more than 140 different ecological systems at regional, state, and watershed scales

### DEVELOPED BY:

The University of Massachusetts Amherst Designing Sustainable Landscapes Project

### WHO IS USING IT?

Katie Callahan, GIS Specialist,  
New Hampshire Fish and Game Department

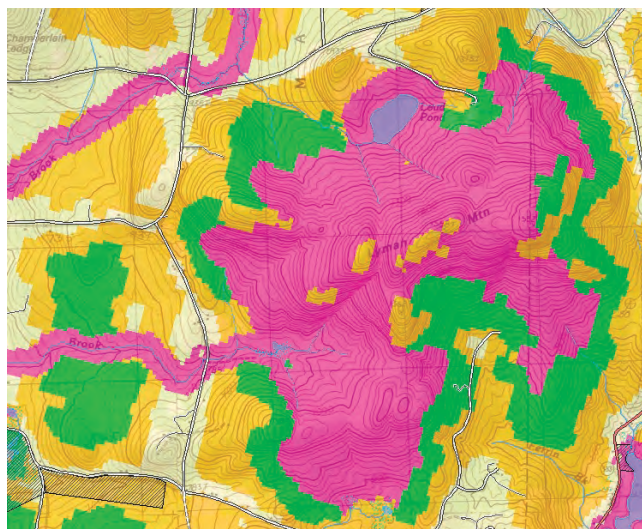
### HOW IS IT BEING APPLIED?

Callahan used the Index of Ecological Integrity (IEI) to refine New Hampshire’s approach for identifying resilient wildlife habitat as part of the mandatory ten-year update of its State Wildlife Action Plan.

To provide clear guidance that can help resource managers, conservation professionals, and planners identify areas that offer the best prospects for long-term conservation, New Hampshire ran an in-depth analysis to assess the condition of all habitat types in the state.

“This is the third time we’ve done a condition analysis for New Hampshire, and we found that even though IEI is weighted evenly with other datasets, it really helped to refine what we delineated as the areas in the state in the best relative ecological condition,” said Callahan.

IEI adds value because it captures the potential for a site to support biodiversity over time by assessing how vulnerable it is to disturbances, and how likely it is to withstand environmental change over time.



**HIGHEST RANKED WILDLIFE HABITAT BY ECOLOGICAL CONDITION 2015**

- Highest Rank Habitat in New Hampshire
  - Highest Rank Habitat in Biological Region
  - Supporting Landscapes
  - Conservation or public land
- Biological region = TNC ecoregional subsection for terrestrial habitats or Aquatic Resource Management region for wetlands and floodplain forest.

New Hampshire Fish and Game used the Index of Ecological Integrity as part of the process of identifying and ranking important wildlife habitats for the state’s Wildlife Action Plan. Credit: New Hampshire Fish and Game

### WHAT NEED DOES IT ADDRESS?

By focusing New Hampshire’s conservation lens, IEI will inform more effective decisions in the state, and beyond. Callahan explained that the results will directly inform her agency’s work on the ground in land acquisition and outreach to private landowners, but pointed out that it’s also a valuable tool to help land trusts and conservation commissions make local decisions that reflect state and regional priorities. Since the state began promoting the new maps last fall, a handful of organizations have contacted the agency to request access to the IEI datasets.

But one of the clearest indications that the data has helped fill a scientific gap comes from the field itself. “The ecologists who are out there in the field have been telling us that the places identified using the new habitat condition assessment, which includes IEI, are much more in line with what they see on the ground in terms of the natural communities that are in the best condition,” said Callahan.

### LEARN MORE:

- **The Index of Ecological Integrity:** <http://nalcc.databasin.org/datasets/af3a93f96d3040ac8c57ce61f47fc864>
- **New Hampshire Fish and Game Department:** <http://www.wildlife.state.nh.us>

# Science Delivery

## OVERVIEW

**Why it matters:** Scientific information is only as valuable as it is applicable. To benefit from the best available science, conservation practitioners need to be aware of the range of datasets and tools at their disposal, and need guidance and assistance to understand how they can apply these resources to advance their own work. Likewise, scientists developing information that can help address today's conservation challenges need to be attuned to the needs of people in the field.

## PROGRESS IN 2015:

With more and more projects designed to address regional science needs coming to fruition in the form of products such as assessments, reports, model results, and maps, the North Atlantic LCC redoubled efforts in 2015 to deliver scientific resources to partners who can use them to address a range of conservation priorities across the region.

In addition to the efforts being carried out by the LCC's Demonstration and Delivery Projects, North Atlantic LCC staff and partners presented information and tools designed to help practitioners achieve real conservation objectives at nearly 30 trainings, workshops, and meetings held across the region.

### EXAMPLES:

- **Where:** U.S. Fish and Wildlife Service Chesapeake Bay Field Office, Annapolis, Md.
- **What:** Presentation on landscape conservation design projects, tutorial on using the North Atlantic LCC Conservation Planning Atlas, and orientation to the Fish Habitat Decision Support Tool
- **For whom:** 30 staff members from several FWS programs, including Fisheries, Environmental Contaminants, Habitat Restoration, and Endangered Species



- **Where:** Marsh-Billings Rockefeller Historic Site, Woodstock, Vt.
- **What:** Hands-on workshop on interpreting and applying climate data available in the North Atlantic LCC Conservation Planning Atlas
- **For whom:** Members of Regional Conservation Partnerships, including members of land trusts and representatives from nonprofit organizations
- **Where:** Virginia Department of Game & Inland Fisheries Headquarters, Richmond, Va.
- **What:** Introduction to resources developed by the North Atlantic LCC-supported Designing Sustainable Landscapes project, including the Index of Ecological Integrity and Habitat Models for Representative Species
- **For whom:** More than 40 staff members from programs throughout the state agency

### LOOKING AHEAD:

In the coming year, the North Atlantic LCC will continue to increase targeted science delivery efforts through webinars, meetings, presentations, and trainings online and in person, including a workshop at the annual Northeast Fish and Wildlife Conference for biological and GIS staff at state agencies and NGOs about applying tools from LCCs to guide conservation decisions.



## Demonstration and Delivery Projects

The North Atlantic LCC provides Science Delivery grants to partners who have the vision and the knowledge to deliver science at relevant scales for practitioners, landowners, and communities.



PROJECT	GRANTEE	STATUS
<b>Envision the Susquehanna: Incorporating Landscape Science into Large Landscape Conservation</b>	Chesapeake Conservancy	Workshops are underway to share tools from the LCC and engage community members and organizations in the project
<b>Enhanced Stewardship of Priority Habitats and Species on Private Lands</b>	Wildlife Conservation Society	Report and database on wildlife-friendly land-use planning tools are in development, in collaboration with experts from state agencies and NGOs
<b>Science to Practice: A Science Delivery Program for Regional Conservation Partnerships in New England</b>	Highstead Foundation	Outreach is ongoing through conservation networks to deliver LCC products that can advance knowledge base and inform strategic planning
<b>Catalyzing Land Trust Capacity for Data and Science Integration</b>	Open Space Institute	Guide to using climate data for land trust audiences is slated for completion in spring 2016
<b>Local Adaptation for Marsh Migration</b>	Maine Department of Inland Fisheries and Wildlife	Outreach is ongoing in coastal towns in Maine that served as case studies for the project, and are incorporating sea-level rise data into planning
<b>White Mountains to Moosehead Lake Initiative</b>	Trust for Public Land	Customized online portal, in use, enables stakeholders in the 2.7 million-acre region to view data, develop maps, and access datasets for download



North Atlantic LCC Spatial Data Manager Renee Farnsworth provides technical support during a workshop introducing partners to datasets that can help them plan for climate change.

*Credit: Bridget Macdonald/North Atlantic LCC*

## Workshop on Improving Land Use Planning Tools to Enhance Wildlife Conservation on Private Lands

Science Delivery grantee Wildlife Conservation Society brought together practitioners in the field of land-use planning in the Northeast for a two-day workshop in 2015, focused on improving municipal land-use planning tools to better support wildlife conservation on private land.

By helping bridge the gap between regional conservation needs and local planning realities, the workshop attendees are contributing to the development of a set of resources that will help communities and landowners invest in actions that offer the greatest long-term benefits for wildlife. Products in progress:

- Report on wildlife friendly land-use planning tools (in conjunction with workshop participants)
- Database of communities with regulatory framework in place to support meaningful conservation actions
- Custom online portal for New York state where communities can view conservation datasets and other relevant resources

### Behind the scenes with workshop attendees:

**Karen Strong**, *Biodiversity Program Coordinator, Hudson River Estuary Program, Cornell University*

**Michael Klemens**, *Herpetologist, former Senior Conservationist for the Wildlife Conservation Society and Director of the Metropolitan Conservation Alliance*

**Kate McCarthy**, *Sustainable Communities Program Director, Vermont Natural Resource Council*

#### WHY DOES CONSERVATION ON PRIVATE LAND MATTER?

**STRONG:** This is where the rubber meets the road in conservation. If you don't talk about local land use planning, you're missing so much of what's happening on the ground, both in terms of impacts for biodiversity, and opportunities to educate people about the impacts they are having.

**KLEMENS:** There is no way we can sustain wildlife and habitats

solely through traditional conservation mechanisms, like land purchases, particularly in this time of habitat realignment from climate change. The only way we can ensure intact, vibrant, functioning ecosystems is to address private lands that are interspersed between protected areas.

**MCCARTHY:** The reality is that most land-use decisions are regulated at the local level, and made at the parcel level. That means when it comes to regionally important resources, you have the potential for a patchwork. So we have to start at the grassroots level to help landowners make good decisions, and to help towns lead good decisions, in a healthy landscape context.

#### HOW DOES THIS PROJECT HELP ADDRESS THE CHALLENGE?

**STRONG:** It's a matter of understanding what is really important for people to know. If we expect citizen planners to understand biodiversity before they

can make a decision that supports biodiversity, we're never going to get anything done. We need to find a common language - not just with words, but with values - that will allow communities to integrate biodiversity into land use planning in terms that are meaningful to them.

**KLEMENS:** Often there are missed opportunities in communities because of a lack of awareness, or a lack of having appropriate regulations in place. It's not enough to have a tool, you have to have enabling legislation, ordinances that point people in the right direction to use the tools. We need to have the implementation to make them work, and then we need to be able to explain to local officials why these tools are good, and how they can benefit communities.

**MCCARTHY:** Every day local officials, whether paid or volunteer, are being asked to address a whole range of



Experts in land-use planning from across the region gathered for a two-day workshop led by the Wildlife Conservation Society in Fairlee, V.T. Credit: Bridget Macdonald/NALCC

issues. Wildlife, habitat, forest connectivity, and working lands, are just a small slice of what they are dealing with, so we need to make it as easy as possible for local officials to take steps that are going to help sustain those resources. If we can come up with good models that are relatively easy to adopt and to implement, we are going to have much greater success.

#### WHAT DID YOU TAKE AWAY FROM PARTICIPATING IN THIS WORKSHOP?

**STRONG:** To be able to connect with others who not only understand the importance of biodiversity for conservation, but also understand what is and is not possible at the local level, is exciting and invigorating. We are all working towards the same goal of improving biodiversity conservation at the local level, and working with others only makes your work better. Who doesn't want that?

**KLEMENS:** I've learned a lot about different types of conservation planning challenges that my colleagues are dealing with. I think the relationships that are being developed here will transcend this meeting and become working relationships.

**MCCARTHY:** It's helpful to talk to people outside my own state because they are working on this issue in contexts that are different enough to teach me something new, but similar enough for me to come away with ideas that I can actually replicate in Vermont.

#### LEARN MORE:

- **Wildlife Conservation Society, Adirondacks Program:** <http://www.wcsnorthamerica.org/Wild-Places/Adirondacks.aspx>
- **Hudson River Estuary Conservation and Land Use Program:** <http://hudson.dnr.cals.cornell.edu/extension>
- **Vermont Natural Resources Council:** <http://vnrc.org>
- **Michael Klemens:** <http://www.michaelwklemens.com>



## 2015 at a glance: A selection of highlights and accomplishments for the North Atlantic Landscape Conservation Cooperative and its partners.

### JANUARY

Megan Tyrrell joins the LCC staff as Coastal Resilience Coordinator to oversee LCC-facilitated Hurricane Sandy Resiliency projects and coastal resilience program.

### FEBRUARY

Partners in the Long Island Sound watershed receive a grant through the Regional Conservation Partnership Program (RCPP) to reduce agricultural runoff into the sound, in part by protecting priority headwater areas identified using LCC datasets.

### MARCH

The first Regional Conservation Opportunity Areas (RCOAs) workshop unites experts from states, universities, and nongovernmental organizations to begin laying the groundwork for a regional landscape conservation design.

North Atlantic LCC Technical and Science Delivery Teams meet to prioritize science development and delivery for the LCC.

### APRIL

U.S. Fish and Wildlife Service Chesapeake Bay Field Office biologist Fred Pinkney publishes a study funded by the LCC on how climate change impacts excess nutrients and contaminants in the environment.

### MAY

USGS releases the iPlover smart-phone application developed as part of the LCC-facilitated beach resilience projects, providing shore-bird biologists a tool to contribute data to regional models forecasting outlook for sandy beach habitat across the Atlantic breeding range.

### JUNE

The North Atlantic Aquatic Connectivity Collaborative (NAACC) officially launches, establishing a network of partners using standard protocols to assess road-stream crossings in the region.

The Northeast Climate Science Center releases a report offering guidance for state natural resource managers to integrate climate science into updates of State Wildlife Action Plans.

### JULY

Climate scientist Emily Powell joins the LCC staff in the new role of Coastal Resilience Research Associate.

### AUGUST

Dr. Beth Gardner of North Carolina University completes the LCC-supported Marine Bird Mapping and Assessment modeling project to advance understanding of how marine birds use offshore waters.

### SEPTEMBER

The Nature Conservancy (TNC) completes the extension of the Northeast Terrestrial Habitat Map to Atlantic Canada.

### OCTOBER

Partners leading the *Connect the Connecticut* project complete the first version of a landscape conservation design for the Connecticut River watershed.

LCC staff meet with Northeast Fish and Wildlife Diversity Technical Committee to agree on methodology for RCOAs.

### NOVEMBER

The UMass Designing Sustainable Landscapes Project releases Version 3.0 of the Index of Ecological Integrity.

### DECEMBER

The National Academy of Sciences releases its Review of Landscape Conservation Cooperatives.

Partners investigating impacts to tidal marsh systems in the wake of Hurricane Sandy meet to share findings during the second annual LCC Tidal Marsh Resilience workshop.

TNC completes the Northeast Lake and Pond Classification system.

**Ken Elowe**

U.S. Fish and Wildlife Service  
Steering Committee Chair  
ken\_elowe@fws.gov

**Bill Hyatt**

Connecticut Department of Environmental Protection  
Chief of Natural Resources  
Steering Committee Vice Chair  
william.hyatt@ct.gov

**Andrew Milliken**

North Atlantic LCC Coordinator  
andrew\_milliken@fws.gov



CHINCOTEAGUE NATIONAL WILDLIFE REFUGE

PHOTO: STEVE HILLEBRAND/USFWS

For more information, please visit the North Atlantic LCC website: [www.northatlanticlcc.org](http://www.northatlanticlcc.org)  
For information on the national network of LCCs, please visit: [www.doi.gov/lcc/index.cfm](http://www.doi.gov/lcc/index.cfm)

