

Northeast Regional Conservation Framework Workshop RCN, LCC and other Relevant Project Summaries

Note: Many of these projects fit under multiple categories. These groupings represent an initial attempt to collect similar projects together to help identify synergies and potential gaps.

1. Habitat mapping

Successful implementation of State Wildlife Action Plans (SWAPs) and regional conservation strategies depend on consistent, current digital habitat maps. The projects in this group helped to create a system for uniform habitat mapping across the region and generated geographic information systems (GIS) datasets and tools to evaluate specific aspects of habitat quality. By assessing current conditions and creating tools to analyze potential management actions these projects can enable more effective design of conservation strategies.

Aquatic projects:

- Northeast Aquatic Classification and Mapping/ Northeast Aquatic Habitat Classification System (NAHCS) (Doris Duke)

PI: Arlene Olivero and Mark Anderson, The Nature Conservancy

<http://rcngrants.org/sites/default/files/AqHabreport101508.zip>

This project developed a standard classification system and GIS dataset to describe and map stream systems across thirteen northeastern states (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, West Virginia, and District of Columbia.). The system unified state classifications and enhanced understanding of aquatic biodiversity patterns across the region. The product was developed with input from a workgroup that included more than thirty agency biologists representing every state.

- Forecasting Stream Flow (NALCC)

PI: Dr. Ben Letcher, Silvio O. Conte Anadromous Fish Research Center, U.S. Geological Survey (USGS)

<http://www.northatlanticlcc.org/projects.html>

This project will develop a set of tools for managers to evaluate how to manage streams for fish in the face of a changing climate, stream flow and temperature. These tools, such as maps of stream fish habitat and models for Eastern brook trout, will form a user-friendly decision-support system (DSS) for stream fish that will identify which conservation actions are going to be the most effective. Managers will be able to use the DSS and associated products to incorporate information from climate change models into existing conservation models and develop comprehensive landscape-scale conservation plans.

- An interactive, GIS-Based application to Estimate continuous, Unimpacted Daily Streamflow at Ungaged Locations in the Connecticut River Basin

PI: Stacey A. Archfield, U.S. Geological Survey

<http://rcngrants.org/node/4>

The objective of this study is to expand underlying multi-variate regression equations and spatial data to provide an interactive point-and-click GIS application to estimate continuous, daily unimpacted streamflow at any ungaged location in the Connecticut River basin. This proposal is intended to address Priority RCN Topic 3: Development of Instream Flow Standards, Guidelines, and Policies through the development of a seamless, multi-state GIS-based point-and-click application that will allow users to identify a stream reach of interest in the Connecticut River basin and obtain estimated continuous daily, unimpacted or “natural” streamflow at the selected location. Streamflow estimates are intended for use to obtain environmental-flow statistics from software such as the Indicators of Hydrologic Alteration (Richter and others, 1996). The application will span the entire Connecticut River basin, including the states of Connecticut, Massachusetts, New Hampshire and Vermont. The proposed project will integrate current work being completed in cooperation with the Massachusetts Department of Environmental Protection and the Connecticut Department of Environmental Protection.

Terrestrial projects:

- Northeast Terrestrial Habitat Classification System (NETHCS) (Doris Duke)

PI: Sue Gawler, NatureServe

<http://www.rcngrants.org/sites/default/files/NETHCS%20Dec08.zip>

This project is the terrestrial counterpart to the Northeast Aquatic Habitat Classification System (NAHCS) described above. The system was designed for maximum compatibility with existing habitat classification efforts in the Northeast (LANDFIRE and the Gap Analysis Program). The structure is based on NatureServe's Ecological Systems and was expanded to include semi-natural and cultural land types and other wildlife habitat not currently covered by, or under-represented in, the Ecological Systems classification. The habitat classification is hierarchical so it can be scaled to different applications.

- Creation of Regional Habitat Cover Maps: Application of the NE Terrestrial Habitat Classification System (RCN 2007-1)

PI: Mark Anderson, The Nature Conservancy

<http://rcngrants.org/node/9>

This project is creating a comprehensive wildlife habitat map of the eastern region, including all states from Maine to Virginia, west to New York, Pennsylvania and West Virginia. The map will consist of a spatially comprehensive GIS grid of 30 meter pixels with a legend portraying the Northeastern Terrestrial Habitat Classification System (NETHCS). The map will include a series of map legends that range from coarser-scale with higher accuracy (habitats or groups of habitats) to finer-scale with lower accuracy (NVC/ National Vegetation Classification associations or alliances).

- Secured Lands of the Northeast 2007 (Doris Duke)

PI: Melissa Clark and Mark Anderson, The Nature Conservancy

<http://rcngrants.org/sites/default/files/securedareas.zip>

The Secured Lands dataset is a cooperative project led by The Nature Conservancy's (TNC) Regional office, relying on data from 14 state agencies and many private organizations. TNC began building this dataset in 2005; the 2007 version is the third revision. Its scope includes all public and private lands that are permanently secured against conversion to development, either land owned in fee or held with an easement as long as the protection is permanent. The geographic area includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, West Virginia, District of Columbia and Ohio. The dataset contains a spatial database (ESRI shapefile) with a record for each tract of land along with a set of standardized attributes describing the conservation management status, ownership, ownership type, designation, acreage and many other characteristics of the tract.

- Designing Sustainable Landscapes in the North Atlantic Landscape Conservation Cooperative (NALCC)

PI: Dr. Kevin McGarigal, University of Massachusetts

<http://www.northatlanticlcc.org/projects.html>

This pilot project is developing a set of decision-support tools (DSTs) that will allow managers to evaluate the effects of conservation and management actions on our ability to sustain wildlife populations into the future. DSTs will include maps and models of how habitats and species will be affected by the changing environment, including climate change and urban growth. The expected outcomes of the project include an estimate of the current condition, distribution and capacity of species' habitats, as well as a projection of future landscape conditions under a range of management scenarios incorporating the potential effects of climate change such as sea-level rise and changes in vegetation. Another project outcome is a set of species/habitat models that will allow managers to link population management strategies to current habitat conditions and future changes.

Coastal and marine projects:

- Develop Regional Coastal and Marine Base Maps for Analyses of NE SGCN Data (RCN 2011 topic 1)

<http://rcngrants.org/priority-rcn-topics>

The 2011 RCN grant cycle included coastal and marine habitat mapping as a priority topic area. Marine, estuarine, and deepwater Great Lakes habitats are a critical component of the analysis of NE SGCN that has yet to be developed. Proposals were requested to utilize the Coastal and Marine Ecological Classification Standard (CMECS) as a basis to integrate marine, estuarine and Great Lakes deepwater habitats into the previously developed Northeast Regional Habitat Classification System. Projects are expected to develop meaningful habitat information for the northeast that can be used by state agency staff, and would build on extant marine, estuarine and offshore freshwater habitat data and classification systems within the states.

- Coastal and Marine Spatial Planning (NOAA, regional ocean partnerships)

<http://www.cmsp.noaa.gov/>

Coastal and marine spatial planning (CMSP) is a comprehensive, ecosystem-based, spatial planning process for analyzing current and anticipated uses of ocean, coastal, and Great Lakes areas. CMSP identifies areas most suitable for various types or classes of activities in order to reduce conflicts among uses, reduce environmental impacts, facilitate compatible uses, and preserve critical ecosystem services to meet economic, environmental, security, and social objectives. The National Ocean Policy identifies CMSP as one of nine priority implementation objectives and outlines a flexible framework for effective CMSP. Under the framework, CMSP will be regional in scope, developed cooperatively among federal, state, tribal, and local authorities, and include substantial stakeholder, scientific, and public input.

- Coastal Change Analysis Program (C-CAP) Land Cover Atlas (NOAA)

<http://www.csc.noaa.gov/digitalcoast/data/ccapregional/index.html>

The Coastal Change Analysis Program (C-CAP) produces a nationally standardized database of land cover and land change information for the coastal regions of the U.S. C-CAP products provide inventories of coastal intertidal areas, wetlands, and adjacent uplands with the goal of monitoring these habitats by updating the land cover maps every five years. C-CAP products are developed using multiple dates of remotely sensed imagery and consist of raster-based land cover maps for each date of analysis, as well as a file that highlights what changes have occurred between these dates and where the changes were located.

LCC Needs:

- Spatial mapping of nearshore and offshore marine bird hotspots in the Atlantic Flyway and migration routes and distributions of birds and bats along the Atlantic Coast (NALCC)
- Model and map the current and predicted future distributions and extents of representative terrestrial and wetland habitats and species (NALCC)
- Habitat mapping and modeling at the NALCC scale through a characterization and GAP analysis (NALCC)
- Refine tools to classify and map aquatic habitat including hydrology, temperature and connectivity; develop aquatic habitat occupancy models; identify priority areas for aquatic conservation (NALCC)

2. Biological Assessments and Goal-Setting

The projects in this group assess the condition (status, trend, distribution, threats, limiting factors) of key species and habitats in the Northeast, particularly with respect to human-induced stressors and climate change. Efforts are also focused on prioritizing and setting goals for species, habitats and systems. Many of these projects build upon habitat mapping efforts and lead to the development of models and tools to guide conservation priorities.

Projects:

- Assessing the Impacts of Climate Change on SGCN (RCN 2009-1)

PI: Hector Galbraith, Manomet Center for Conservation Sciences, and Curtis Fisher, National Wildlife Federation

<http://rcngrants.org/node/50>

This project will provide vulnerability and adaptation information to help the northeastern states to plan their conservation of fish and wildlife under a changing climate. This project includes: (1) predicting at a regional scale how the climate (temperature and precipitation) will change over the next decades and century in order to map the distribution of “risk hotspots” within the region; (2) developing and applying a model to categorize the vulnerabilities of habitats and their associated vertebrate SGCNs to climate change; (3) based on the results of 1 and 2, identifying appropriate indicator species and recommendations for “climate-smart” monitoring so that the success of adaptive management programs may be evaluated and, if necessary, modified; (4) identifying adaptation actions to enhance the resilience of habitats and their resistance to change; and (5) partnering with state agencies to build their capacity to address climate change issues and facilitate the exchange of information across state boundaries.

- Northeast Regional Connectivity Assessment Project (RCN 2007-2)

PI: Erik Martin and Colin Apse, The Nature Conservancy

<http://rcngrants.org/node/8>

Work under this grant is focusing on developing region-wide spatial data, tools, and protocols to prioritize fish barrier mitigation projects to more efficiently conserve and restore diadromous fish, coldwater species, and other species of greatest conservation need. The project is organized around a Northeast Connectivity Workgroup which includes state resource agency personnel from throughout the Northeast NEAFWA states. The final product will be a region-wide barrier assessment product (a unified, error-checked dataset on dams, major waterfalls, and key anadromous fish habitat for all the NEAFWA states), as well as an ArcGIS Barrier Assessment Tool, and a “regional landscape scale management strategy” report.

- Instream Flow Recommendations for the Great Lakes Basin of New York and Pennsylvania (RCN 2010-2)

PI: David Klein, The Nature Conservancy

<http://rcngrants.org/node/52>

This project is employing the Ecological Limits of Hydrologic Alteration (ELOHA) framework in the Great Lakes drainage of New York and Pennsylvania to develop an objective, spatially explicit process for evaluating the ecological impacts of new withdrawals of water from the tributaries of Lakes Erie, Ontario, and the upper St. Lawrence River. The project will provide the information necessary to develop and implement instream flow standards for managing the Great Lakes surface and ground-waters of New York and Pennsylvania under the terms of the Great Lakes Compact.

- Designing Sustainable Landscapes in the North Atlantic Landscape Conservation Cooperative (NA LCC)—*discussed above under Habitat Mapping (terrestrial)*
- Forecasting Stream Flow (NA LCC)—*discussed above under Habitat Mapping (aquatic)*

- Geospatial Condition Analysis of Northeast Habitats Based on the Northeast SGCN Habitat Maps (RCN 2009-2)

PI: Mark Anderson, The Nature Conservancy

<http://rcngrants.org/node/47>

This project is evaluating and summarizing the current condition of terrestrial and aquatic habitats across the Northeast region. Using newly available region-wide habitat maps of streams (Olivero and Anderson 2008) and terrestrial ecosystems (Ferree et al. in prep) this project will overlay compatible datasets relative to factors that elucidate the condition and quality of each habitat. The selection of metrics will follow Tomajer et al (2008) and their calculation and application will be guided by a thirteen-state steering committee. The committee will also review results and help design the format for the final report. The metrics will be calculated relative to each habitat type, for example, dams, impervious surfaces and toxic release points for stream systems, or road density, patch size, canopy closure and projected housing density for terrestrial forests.

- Representative Species (FWS)

PI: Curt Griffin, University of Massachusetts

Representative species are species whose habitat needs, ecosystem function, or management responses are similar to a logical grouping of other species. The assumption is that conservation planning and actions based on representative species will also address the needs of other species in that grouping. The goal of the representative species process is to develop and apply protocols and tools for determining the optimum suite of species that can represent federal trust species and state Species of Greatest Conservation Need based upon habitat use, ecosystem function or management needs and response for the Northeast Region, initially in the North Atlantic LCC. The selected representative species will be used for detailed conservation planning as part of an overall approach to biological planning and conservation design. A cluster analysis of nearly 400 species that have been related to the Northeast Terrestrial and Aquatic Habitat Classifications was completed by the University of Massachusetts working with the U.S. Fish and Wildlife Service and partners.

- Identifying Relationships between Invasive Species and Species of Greatest Conservation Need in the Northeast Region (RCN 2007-3)

PI: Glen N. Stevens, Conservation Management Institute

<http://rcngrants.org/node/7>

The purpose of this project is to produce a concise set of documents that identifies the most critical potential interactions between invasive species (including terrestrial and aquatic species) and Species of Greatest Conservation Need in the Northeast Region. A state level and regional list of both invasive species and GCN species were developed which were then re-formatted in a fashion that is importable into a database form. The habitat assignments for 302 invasive species and 734 SGCNs were completed, and 4 major ways in which invasive species impact SGCNs were identified. Additionally, the initial pairwise comparison of individual GCN species and invasive species will be completed allowing for the development of an interactive spreadsheet which will allow users to generate their own analyses, a final report based on our regional and state analyses, and a website to facilitate delivery of project information and products.

- Full Life Cycle Vulnerability Assessments for the Birds of the Upper Midwest Great Lakes Region (UMGL LCC)

PI: Peter P. Marra, Conservation Ecologist, Smithsonian Conservation Biology Institute

Full life-cycle vulnerability assessments will be carried out of the effects of climate change on nongame migratory birds that are of conservation concern that breed in the UMGL region. Full life-cycle analyses are critical, as current efforts likely underestimate the vulnerability of migratory land birds due to a focus on assessing only one component of the annual cycle. Our approach will provide a framework for integrating exposure to climate changes, sensitivity to these changes, and the potential for adaptation in both winter and summer seasons, and accounts for “carry-over” effects from one season to another. The results of this work will inform regional management by highlighting both local and distant drivers of vulnerability, and provide a model for accounting for the complexities of migration within multi-taxa assessments that can also be applied to other species, such as waterfowl and fish. Bird Banding data and life history information will provide the primary source data for the project.

- Distribution and Abundance of Breeding Birds in the Upper Midwest and Great Lakes Region as Influenced by Climate and Land Cover Change (UMGL LCC)

PI: Dr. Gary J. Roloff, Michigan State University

The study will provide a retrospective analysis of the relationships among bird abundance and distribution and changes in land cover and climate in the Upper Midwest and Great Lakes region. The resultant models can subsequently be used to provide spatially explicit forecasts of future avian responses and thereby become an important planning tool. This project provides a cost effective means of incorporating climate change into bird conservation decisions.

- Identify High Priority NE Species of Greatest Conservation Need (RCN 2011 topic 2)
<http://rcngrants.org/priority-ren-topics>

Previous work by the Northeast Partners in Reptile Conservation (NEPARC) has developed methodology useful for the identification of high priority reptile Species of Greatest Conservation Need within the Northeast. A matrix that compares and contrasts measures of regional vulnerability with measures of regional responsibility for each reptile species in the Northeast provides states with an important tool to identify highest priority Species of Greatest Conservation Need. Using the NEPARC matrix, state agencies are advancing identification of highest priority fish, mammals and birds. Desired proposals within this RCN will similarly identify highest priority invertebrate groups. Previous work within a similar RCN topic resulted in the development of an online invertebrate database and proposals under this topic shall coordinate wherever possible with work conducted to date.

- Identify and Assess Threats to NE Species of Greatest Conservation Need (RCN 2011 topic 7)

<http://rcngrants.org/priority-ren-topics>

Some SCGN have experienced sudden and dramatic declines at the regional level. This topic seeks proposals that would address these declines by either identifying factors yet unknown and/or developing or implementing methodologies to address these factors once identified. Two examples of such recent sudden declines would be: 1) river herring (alewife and blueback herring) where several Northeast states have instituted complete harvest moratoria and restored passage at barriers to migration, yet river herring populations in those states still remain at

historically low levels due to unknown factors; 2) White Nose Syndrome in bats is causing precipitous and spreading declines in multiple species of bats. In addition, as of yet unidentified or unquantified threats may cause future declines in Species of Greatest Conservation Need and this RCN topic additionally seeks proposals that would assess potential future threats. Examples of projects suitable for the RCN include wind power, Marcellus shale development, biomass harvesting, and hydropower.

LCC Needs:

- General climate change vulnerability assessments for northeastern fish and wildlife habitats and species through an expert-driven model, data and maps (NALCC)
- Specific climate change vulnerability assessments for northeastern amphibians and reptiles identifying highest priorities and gaps in distribution data (NALCC)
- Specific climate change vulnerability assessments for cold water stream habitats and species, including brook trout (NALCC)
- Refine tools to classify and map aquatic habitat including hydrology, temperature and connectivity; develop aquatic habitat occupancy models; identify priority areas for aquatic conservation (NALCC)
- Great Lakes fisheries trophic response to climate change (UMGLLCC)
- Climate change impacts on lotic aquatic communities (UMGLLCC)
- Avian response to climate change (UMGLLCC)
- Impact of climate change and human population growth on future stream and river flows within the South Atlantic LCC (SALCC)
- Evaluating high-risk pathways for aquatic invasive species invasions (SALCC)

3. From Conservation Design to Delivery

These projects apply biological information to management decisions and planning. They develop and provide tools and information to guide decision makers and inform conservation actions to more effectively address threats, limiting factors and uncertainties and efficiently achieve objectives and ensure functional systems under current and predicted future conditions and link site-scale actions to landscape and regional scale goals. They also support regional-scale conservation delivery initiatives.

- Regional Focal Areas for Species of Great Conservation Need Based on Site Adaptive Capacity, Network Resilience and Connectivity (RCN 2008-3)

PI: Mark Anderson, The Nature Conservancy

<http://rcngrants.org/node/45>

This project is identifying focal areas for 500 species of great conservation concern with respect to their resilience and adaptive capacity. The analysis will utilize a previously compiled regional database of over 40,000 known species locations, contributed by the Natural Heritage programs and ranked for current viability through the TNC ecoregional planning assessments. A regional team of scientists representing public and private agencies will develop criteria to assess each site/occurrence relative to three factors: 1) site adaptive capacity, 2) network resilience and 3) connectivity. A report, database and maps identifying the focal areas comprise the products.

- Forecast effects of accelerating sea-level rise on the habitat of Atlantic Coast piping plovers and identify responsive conservation strategies (NALCC)

PI: Sarah Karpanty, Virginia Tech

This project will provide biologists and managers along the Atlantic coast with tools to predict effects of accelerating sea-level rise on the distribution of piping plover breeding habitat, test those predictions, and feed results back into the modeling framework to improve predictive capabilities. Immediate model results will be used to inform a coast-wide assessment of threats from sea-level rise and related habitat conservation recommendations that can be implemented by land managers and inform recommendations to regulators. Case studies incorporating explicit measures to preserve resilience of piping plover habitat to sea level rise into management plans for specific locations will demonstrate potential applications.

- Designing Sustainable Landscapes in the North Atlantic Landscape Conservation Cooperative (NA LCC)—*discussed above under Habitat Mapping (terrestrial)*
- Forecasting Stream Flow (NA LCC)—*discussed above under Habitat Mapping (aquatic)*
- Staying Connected in the Northern Appalachians: Mitigating Fragmentation & Climate Change Impacts on Wildlife through Functional Habitat Linkages (Comp. SWG)

PI: Mark Zankel, The Nature Conservancy

"Staying Connected" will implement top priority actions from the Maine, New Hampshire, New York and Vermont Wildlife Action Plans to restore, maintain and enhance the six most important habitat linkages in the Northern Appalachian Ecoregion. This work will benefit at least 41 wide-ranging and forest-dwelling Species of Greatest Conservation Need (SGCN). SGCN will benefit through protecting the ability of wildlife to move regionally in response to changing climate and by protecting and/or restoring the opportunity for regional genetic interchange. "Staying Connected" will integrate conservation planning at the ecoregional, state and local scales with land protection (at least 18,250 acres) and technical assistance activities targeted to the places where most land use decisions in the Northeast are made—at least municipalities in the four states. The work of the eight state agency partners and thirteen non-profit organizations will be complimented by similar conservation activities in the neighboring four Canadian provinces.

- Development of Model Guidelines for Assisting Local Planning Boards with Conservation of Species of Greatest Conservation Need and their Key Habitats through Local Land Use Planning (RCN 2008-2)

PI: Lesley Sneddon, NatureServe

<http://rcngrants.org/node/42>

This project will provide a survey and synthesis of conservation programs, policies and innovations from throughout the 13 Northeastern states (from Maine to Virginia). The products will integrate conservation information on species of greatest conservation need (SGCN) and their habitats with land use planning decisions. The study will produce an inventory of existing conservation delivery mechanisms, legal requirements, Best Management Practices, and funding sources, as well as key networking and dissemination opportunities available in the Northeast region. The study will also identify gaps in the existing delivery system that may be filled through an expanded toolkit. The end products will include a regional profile of how wildlife conservation is addressed, complete with individual state profiles, case studies on innovative

programs or projects, and guidelines for building robust programs for integration in the region. An initial web-based toolkit will be made available through LandScope.org.

- Proposal to Establish a Regional initiative for Biomass energy Development for Early Successional SGCN in the Northeast (RCN 2007-7)

PI: Jefferson L. Waldon, Conservation Management Institute

<http://rcngrants.org/node/3>

The goal of this project is to establish a recognizable, proactive, multi-agency group focused on developing a cooperative relationship with the biomass energy industry with the intention to minimize the negative impacts on, and maximize the benefits for, Species of Greatest Conservation Need as described in accepted state wildlife action plans of Northeastern States. The project compiled the SGCN for each of the 13 states in the Northeast Region and extracted all the birds, mammals, reptiles, and amphibians for analysis in this study. The complete regional list of SGCN consists of 470 species, 69 mammals, and 142 reptiles. Each of these species was categorized according to their primary habitat affinity. It was found that biomass focused lands in either forests or agriculture have the potential to immediately impact approximately 62% of the SGCN in the region. The Northeastern region will be further impacted if biomass energy activities are focused on forest lands cleared for some sort of non-woody biomass system. While some benefits could be realized with mature stand thinning and the subsequent increase in understory vegetation, the most obvious benefits would come from the conversion of intensively managed agriculture to some sort of early successional biomass system.

- Implementing Bird Action Plans for Shrubland Dependents in the Northeast (RCN 2007-8)

PI: Robert McDowell, Northeast Association of Fish and Wildlife Agencies

<http://rcngrants.org/node/1>

State Wildlife Action Plans for states in the Northeast Association of Fish and Wildlife agencies collectively identify greater than 80 species of Greatest Conservation Need that are dependent upon shrubland habitats. Work under this grant will improve the conservation status of shrubland habitat-dependant Species of Greatest Conservation Need within Bird Conservation Region (BCR) 28- Appalachian Mountains and BCR 14- Atlantic Northern Forest by extending the implementation of an existing shrubland restoration and management initiative. Grant funds will be used to create Best Management practices, develop demonstration areas, increase landowner interest and awareness, and provide technical and financial assistance to private landowners.

- An interactive, GIS-based application to estimate target fish communities in Northeastern streams (RCN 2008-1)

PI: Piotr Parasiewicz

<http://rcngrants.org/node/41>

The overall goal of this project is the development, testing and application of a regional tool for assessing the need for management actions in a watershed to protect the health of aquatic fauna and estimating the amount of water needed to sustain healthy aquatic ecosystems. To achieve this goal, the project will build on several ongoing projects. The specific objectives are to:

- Develop target fish communities as an evaluation baseline for every river segment in the study area and evaluate the robustness of a variety of alternative objective procedures for doing so.
- Create a set of habitat rating curves for the target fish community for every river segment.

- Develop a seasonal Uniform Continuous Under-Threshold Habitat-Duration curves (UCUT curves) for every river segment and procedures for creation of Assessment of Continuous Thresholds nomograms (ACTograms).
 - Develop an index of hydroecological alteration and prioritize river segments for future data collection and ecological restoration
 - Validate the models and evaluate the transferability of developed models into different geographical settings.
- White Nose Syndrome Projects
 - Exploring the Connection Between Arousal Patterns in Hibernating Bats and White Nose Syndrome: Immediate Funding Needs for the Northeast Region (RCN 2007-9)
<http://rcngrants.org/node/46>
 This project investigated whether hibernating patterns of bats were disrupted (which could lead to starvation) by monitoring little brown bats at affected sites, suspected sites, and control sites during 2008-2009. Bat and hibernacula monitoring activities included collecting temperature and arousal data associated with the hibernating patterns of little brown bats, temperature and humidity data at various sites within each selected research site, and morphological data on bats as they entered and exited the hibernacula.
 - Lab and Field Testing of Treatments for White Nose Syndrome (RCN 2010-1)
<http://rcngrants.org/node/51>
 This proposal seeks to address the sudden decline of hibernating bats due to White Nose Syndrome (WNS) by developing and optimizing treatments. An estimated one million bats have died thus far, with the most likely pathogen being the newly described cold-loving fungus *Geomyces destructans* (Gd). Tasks include: (1) testing potential treatments for efficacy against cultured Gd under laboratory conditions; (2) testing potential treatments for safety in healthy bats, and (3) testing potential treatments for efficacy against Gd in hibernating bats. If a successful treatment is identified, the investigators will lay out a specific set of recommendations for reversing the population decline associated with WNS by selective application of treatment protocols.
 - White Nose Syndrome: Multi-state Coordination, Investigation and Rapid Response to an Emerging Wildlife Health Threat (Comp. SWG)
 White Nose Syndrome is causing unprecedented mortality among cave bats in the Northeast, and its rapid expansion threatens adjoining regions. This project will support a region-wide coordinated response to White Nose Syndrome (WNS), a rapidly-emerging threat to bats. This project will: 1) investigate the causative agent(s), transmission, and control; 2) detect new occurrences; 3) detect and manage the threat to adjoining regions, and; 4) implement response and control strategies. This project joins CT, DE, MD, NH, NJ, NY, PA, VA, VT, WI, WV; Cornell University, Bat Conservation International, Metro Parks Ohio, Western Pa Conservancy, Quebec Ministry of Natural Resources and Wildlife together in a coordinated response to address WNS in fifteen bat Species of Greatest Conservation Need (SGCN).

- Rangewide New England Cottontail Initiative (Comp. SWG)

PI: Steve Fuller, WMI, and James Oehler, NH Fish and Game

This project's goal is to restore 1200 acres of New England cottontail rabbit (NEC) habitat creating 50 new habitat patches across the species range, with an expected long-term population increase of 720 animals. The long-term goal is to avert federal listing by increasing the rate of colonization of habitat patches, thereby stabilizing metapopulation viability. The objectives of the initiative are to: 1) convene a range-wide recovery steering committee comprised of partnering state wildlife agencies, NRCS, and USFWS; 2) evaluate target properties for habitat restoration and draft a spatially explicit habitat restoration plan; 3) disseminate restoration plans to local stakeholders and partnering agencies; 4) prescribe and implement habitat restoration activities in an adaptive management framework; 5) monitor performance to determine the relative efficacy of implemented actions; and 6) provide technical and administrative support to the states and partnering entities.

- Planning for Sea Level Rise in the Northeast: Considerations for the Implementation of Tidal Wetland Habitat Restoration Projects (NOAA)

PI: Helen McMillan, NOAA Fisheries Service

Tidal wetlands provide many ecological and human benefits, including serving as a habitat for fish and shellfish. The NOAA Restoration Center has been active for many years in restoring tidal wetlands from historic degradation such as filling, diking and restriction of tidal exchange, but climate change, and sea level rise in particular, poses new threats that need to be incorporated into restoration planning. This project will provide technical guidance for NOAA staff and partners on how to assess and incorporate sea level rise impacts into site-specific tidal wetland restoration planning and design.

- Habitat Priority Planner (NOAA)

<http://www.csc.noaa.gov/digitalcoast/tools/hpp/index.html>

This is a nationwide GIS-based tool that aids in making decisions about habitat conservation, restoration, and land use planning. The Habitat Priority Planner takes away much of the subjective nature of the process by providing a means of obtaining critical habitat analyses that are consistent, repeatable, and transparent. The program allows users to easily test various ideas and "what if" scenarios on the fly, making it the perfect tool to use in a group setting. It can also incorporate climate change considerations such as sea level rise.

- A Regional Decision Support Tool for Identifying Vulnerabilities of Riverine Habitat and Fishes to Climate Change (UMGL LCC)

Project Coordinator: Jana Stewart, USGS

This project will be executed by a multi-state consortium. By collaborating with and integrating results from five existing projects, the team will: 1) predict potential changes in thermal and flow regimes and keystone fish species/groups under modeled downscaled climate change scenarios to identify vulnerabilities of systems of the Upper Midwest and Great Lakes Landscape Conservation Cooperative (UMGL LCC), 2) organize two workshops of stakeholders to demonstrate a decision support tools and to develop management strategies for key species/habitats with the potential to adapt to altered climate, and 3) develop a web-based decision support system to integrate information generated in objectives 1 and 2 and provide

river segment-scale data that characterize the river network/catchment, connectivity, vulnerability to climate change, and potential management scenarios and adaptation strategies for use by stakeholders.

- On a Wing and a (GIS) Layer: Prioritizing Migratory Bird Stopover Habitat along Great Lakes Shoreline (UMGL LCC)

PI: Dr. Dave Ewert, The Nature Conservancy–Great Lakes Project

The overarching goal of this project is to develop a scalable (Great Lakes wide, individual lake basin, to coastal reach within a lake basin) rule-based spatial model for ranking the relative importance of coastal lands (< 15 miles from shoreline) and waters as habitat for migrating birds. Results will be used to guide conservation actions including land acquisition, land and water management and restoration, and development of wind energy facilities. Specifically, the team will: 1) Refine, create and integrate migratory bird stopover habitat models which depict the distribution of potential stopover sites along or near the shorelines of Lakes Michigan, Huron, Erie, and Ontario; and, 2) develop an online portal that will deliver results, models, data and information to conservation decision makers and implementers. This work will maximize application of sound science when making recommendations and decisions regarding land acquisition, management, restoration, and wind energy development.

- Reestablishing ecological connectivity between the Great Lakes and their tributaries: prioritization in a complex system (UMGL LCC)

PI: Dr. Peter McIntyre, University of Wisconsin, Center for Limnology

Ecological connectivity between the Great Lakes and their tributaries is widely impaired, and many agencies and organizations are currently investing in restoring these connections to enhance target fish and wildlife populations. To assist in targeting these investments spatial data on the location and attributes of barriers (dams and road-stream crossings) and fish breeding habitat (lake sturgeon and coaster brook trout) throughout the Great Lakes basin will be synthesized and used to analyze the optimum strategy for enhancing connectivity and restoring fish migrations. The project will provide specific guidance for restoration at scales from individual watersheds to the entire basin, refine methodologies for spatial analysis of barriers, and provide a systematic framework for comparing costs (direct economic costs, species invasions) and benefits (connectivity, focal fish species) of barrier removal.

- Design and Implement Conservation Strategies for NE Species of Greatest Conservation Need (RCN 2011 topic 5)

<http://rcngrants.org/priority-rcn-topics>

Many Northeastern states share priorities for habitat conservation to benefit Species of Greatest Conservation Need with multiple-state distributions. The states recognize that habitat protection, restoration, and management are necessary to mitigate habitat loss and degradation and to reverse negative population trends for Species of Greatest Conservation Need identified in SWAPs. We also recognize that the collective habitat requirements of many Species of Greatest Conservation Need are overlapping and subject to similar patterns of loss and degradation on the regional landscape.

- Identification of Regional Focal Areas and Corridors for the Conservation of Species of Greatest Conservation Need in the Northeast (RCN 2011 topic 4)

<http://rengnants.org/priority-ren-topics>

Conservation of Species of Greatest Conservation Need as outlined by the states' Wildlife Action Plans needs to be targeted to locations and specific habitat features. To be strategic and efficient, a regional context is needed that prioritizes species, identifies important population centers, and identifies conservation opportunities for regional collaboration. Building on completed RCN projects (including habitat classification and mapping, protected lands, potential impact of climate change), work proposed under this RCN will build region-wide models and maps and conduct analyses to support comprehensive fish and wildlife habitat conservation. Habitat conservation actions for Species of Greatest Conservation Need as outlined by the State Wildlife Action Plans in the Northeast need to be targeted to specific locations and habitat features that will optimize the benefit of implemented conservation actions. Products will enable state and local conservation organizations to identify focal areas based on multiple species and habitats. Products will also allow end users to identify component data layers comprising the focal areas and corridors. Products may include data and maps of current and potential landscape conditions relevant to the health and conservation of fish and wildlife habitats, models that relate potential landscape and habitat changes to fish and wildlife species distribution and abundance, and maps and tools to target conservation programs to effectively and efficiently achieve objectives in State Wildlife Action Plans and regional plans.

Conservation Design and Delivery LCC Needs:

- Vulnerability of coastal wetlands and beaches to sea level rise and other anthropogenic stressors (NALCC)
- Assessment of the influence of forest condition and management on regional habitat capability and connectivity (NALCC)
- Assessments of current and future status of landscape connectivity (NALCC)
- Identifying focal areas for amphibian and reptile conservation (NALCC)
- Best management practices for vernal pool dependent herpetofauna (NALCC)
- Adaptive management framework for representative species (NALCC)
- Landscape and climate change impacts on cultural or tribal resources (UMGLLCC)
- Strategies for reestablishing ecological connectivity in fragmented landscapes (UMGLLCC)
- Projects which explore the social and human dimensions of natural resource management decision-making (UMGLLCC)
- Need for an agreed upon model to predict future sea level rise (all coastal LCCs)

4. Monitoring, Evaluation and Research

Monitoring gathers valuable information about the status of key habitats and species to assess status and trends and the effectiveness of conservation actions. Research provides basic information and evaluates assumptions made in planning and design. Evaluation and performance metrics are developed and used to track progress towards goals. The projects in this group produced a unified framework for reporting on Species of Greatest Conservation Need

across the Northeast, used the framework to evaluate these habitats, and developed monitoring programs ranging from taxa-specific to agency-wide.

- Northeast Regional Monitoring and Performance Reporting Framework (NFWF/Doris Duke)
PI: Tracey Tomajer, New York Department of Environmental Conservation

<http://rcngrants.org/node/37>

NEAFWA members and collaborating agencies developed this Framework to offer an effective and cost-efficient mechanism for reporting on the status of Species of Greatest Conservation Need and their habitats within each state and across the Northeast region, and the effectiveness of actions taken to conserve those resources. The Framework provides details on what needs to be monitored, what data exist, and how that data should be collected, analyzed, and reported. NEAFWA members and regional stakeholders identified eight conservation targets (species, habitats, and/or ecosystems) that collectively represented or encompassed the Species of Greatest Conservation Need that members are working to conserve. They then developed a limited suite of monitoring indicators to create a dashboard that could indicate the general health of fish and wildlife and their habitats in the Northeast. NEAFWA members and stakeholders also worked to identify a process for determining the effectiveness of their actions to conserve Species of Greatest Conservation Need.

- Regional Indicators and Measures: Beyond Conservation Land (RCN 2008-5)

PI: Mark Anderson and Arlene Olivero Sheldon, The Nature Conservancy

<http://rcngrants.org/node/44> ; <http://conserveonline.org/workspaces/ecs/documents/northeast-conservation-status-report-april-2011/view.html>

This project summarized the status of approximately 30 key indicators and measures specific to eight habitats and two regional species groups. The report effectively implemented 75% of the NEAFWA's Northeast Monitoring and Performance Reporting Framework. This report will help NEAFWA states broadly assess the status of key habitats and Species of Greatest Conservation Need. Additionally, this work enables The Nature Conservancy (TNC) to meet its own standards for measuring progress on conserving its portfolio of critical conservation sites and meet congressional expectations for monitoring and performance reporting for Wildlife Action Plans and State Wildlife Grants Program.

- Conservation Status of Key Habitats and SGCN in the Eastern Region (RCN 2007-5)

PI: Mark Anderson and Arlene Olivero Sheldon, The Nature Conservancy

<http://rcngrants.org/node/5> ; <http://conserveonline.org/workspaces/ecs/documents/northeast-conservation-status-report-april-2011/view.html>

This project implemented the remaining pieces of the Northeast Regional Monitoring and Performance Reporting Framework. It summarized the regional conservation status of each key habitat and species target by overlaying information on the location and condition of the target with information on conservation land ownership and management. Through compiling region-wide data, analyzing the underlying patterns, and assessing the many indicators suggested by the frameworks, the report presents a comprehensive and multidimensional picture of the state of the natural world in the Northeast.

- Development of Avian Indicators and Measures for Monitoring Threats and Effectiveness of Conservation Actions in the Northeast (RCN 2007-4)

PI: Dan Lambert, American Bird Conservancy

<http://rcngrants.org/node/6>

This project developed regionally coordinated bird monitoring programs that measure both threats and management effects. Work focused on marshes, grasslands, and mountain forests - habitats that span the northeastern landscape, contain a high percentage of vulnerable species, and encompass the region's major management issues. Final results include a peer-reviewed survey design, monitoring protocol, and regional database for each indicator group. This project also produced the "Northeast Bird Monitoring Handbook".

- Tidal Marsh Bird Projects

- Identification of Tidal Marsh Bird Focal Areas in BCR 30 (RCN 2010-3)

PI: Greg Shriver, University of Delaware

<http://rcngrants.org/node/53>

This project will determine state-level responsibility for the conservation of tidal marsh bird species and provide the baseline for long-term monitoring of the entire tidal marsh bird community along the Atlantic coastline from Virginia to Maine (Bird Conservation Region 30). This unique biological community is important on a global scale, is under imminent threat of loss or severe degradation, and its unique characteristics present management challenges necessitating large-scale, collaborative conservation action. The primary objectives of this project are to identify regional population centers for tidal marsh birds within BCR 30 and provide all states in BCR 30 with a detailed description of their regional responsibility for tidal marsh bird species. This will require new tidal marsh bird surveys in areas that lack extensive survey work (NJ – VA) which will be combined with existing data from NY – ME to provide region-wide products that can be used to identify the relative importance of each state for the conservation of tidal marsh breeding birds.

- The Conservation of Marsh Tidal Birds: Guiding Action at the Intersection of Our Changing Landscape (Comp. SWG)

PI: Tom Hodgman, Maine Department of Inland Fisheries and Wildlife, Brian Olsen, University of Maine, Chris Elphick, University of Connecticut, Greg Shriver, University of Delaware

This project will provide information for the New England and Mid-Atlantic Coast States to protect regionally important habitats for tidal marsh birds (including 26 SGCN, such as the American black ducks, Nelson's sparrows and saltmarsh sparrows) and to provide a regionally consistent platform for tidal marsh monitoring in anticipation of sea-level rise and upland/watershed development. Primary state partners include Connecticut, Delaware and Maryland with work also occurring in Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Virginia.

- Northeast State of the Frogs: Development of Regional Analysis for Frog Call Survey Data from the North American Amphibian Monitoring Program (NAAMP) (RCN 2010-4)

PI: Linda Weir, USGS Patuxent Wildlife Research Center

<http://rcngrants.org/node/54>

This project will provide a Northeast regional trend assessment for amphibians and develop associated analytical methods, using 11 years (2001-2011) of survey data from the North American Amphibian Monitoring Program. NAAMP is a collaborative effort among USGS,

State Agencies, and other partners, to monitor calling amphibians using a standard, peer-reviewed protocol. This project will develop the modeling and trend assessment framework for regional reporting, resulting in the first regional level analysis using NAAMP data. In addition, this framework will become the methodology for future reporting on NAAMP results.

- Development of Noninvasive Monitoring Tools for New England Cottontail Populations: Implications for Tracking Early Successional Ecosystem Health (RCN 2009-4)

PI: Adrienne Kovach, University of New Hampshire

<http://rcngrants.org/node/49>

The goal of this project is to develop new monitoring tools for measuring the effectiveness of conservation actions for the New England cottontail (NEC), a Species of Greatest Conservation Need in the Northeast. The project will conduct a systematic study of detection and develop a standardized protocol dictating the number and circumstances of site visits needed to accurately determine patch occupancy. In order to yield information about population health and persistence, the project will also develop two new tools for population monitoring: 1) a genetic mark-recapture based method for estimating the number of individuals occupying a site; and 2) a population index based on pellet counts, for assessing relative abundance without reliance on genetic analysis. Once optimized and validated, guidelines will be developed for implementing these monitoring tools into an adaptive management framework.

- DOI Inventory and Monitoring (I&M) Programs

- FWS

The purpose of the National Wildlife Refuge System's I&M program is to collect and synthesize information which supports management at multiple geographic scales and informs decisions at all organizational levels. The program is nationally coordinated and collects information critical to the Nation's fish, wildlife and plant resources conservation in the face of climate change and other environmental stressors. It also documents status, assesses condition, and detects changes in the NWRS's diverse fish, wildlife and plant communities, and physical resources including water, air and soils, and ecological processes. This enables science-based conservation planning and management at multiple spatial scales.

- NPS

<http://science.nature.nps.gov/im/index.cfm>

The role of the National Parks Service I&M program is to collect, organize, and make available natural resource data and to contribute to the Service's institutional knowledge by facilitating the transformation of data into information through analysis, synthesis, and modeling. The primary goals of the I&M Program are to:

- Inventory the natural resources under National Park Service stewardship to determine their nature and status.
- Monitor park ecosystems to better understand their dynamic nature and condition and to provide reference points for comparisons with other, altered environments.
- Establish natural resource inventory and monitoring as a standard practice throughout the National Park system that transcends traditional program, activity, and funding boundaries.

- Integrate natural resource inventory and monitoring information into National Park Service planning, management, and decision making.
- Share National Park Service accomplishments and information with other natural resource organizations and form partnerships for attaining common goals and objectives.

- Identify NE Species of Greatest Conservation Need Data Gaps, Design Data Collection Protocols, and Collect Data (RCN 2011 topic 3)

<http://rcngrants.org/priority-rcn-topics>

State Wildlife Action Plans have identified gaps in the state's knowledge of Species of Greatest Conservation Need or guilds of Species of Greatest Conservation Need. Data gaps include documentation of current condition or trends in distribution and occurrence of Species of Greatest Conservation Need within the Northeast. In addition, data gaps may include documentation of current condition or trends in environmental factors, including distribution, occurrence, chemical properties or physical condition of terrestrial and aquatic habitat, weather, air or water.

- Design and Implement Monitoring Protocols, Measures, and Indicators for NE Species of Greatest Conservation Need (RCN 2011 topic 6)

<http://rcngrants.org/priority-rcn-topics>

To inform adaptive management and revision of SWAPs, states need collaborative mechanisms for implementing monitoring programs, tracking progress, and reporting performance, particularly for those Species of Greatest Conservation Need, habitats, and actions that are better served and more cost-effective to address at the regional scale. With the recent completion of the *Monitoring and Performance Reporting Framework for the Northeast*, states have a collective approach to documenting the status of Species of Greatest Conservation Need and their habitats. Previous work funded under this RCN includes determining the conservation status of key habitats and Species of Greatest Conservation Need in the Northeast, and developing avian indicators and measures for monitoring threats and effectiveness of conservation actions in the Northeast. New proposals under this RCN should address coordinated monitoring protocols for aquatic, estuarine, and marine Species of Greatest Conservation Need and their habitats.

Monitoring LCC Needs:

- Analysis of recent landscape change in the North Atlantic LCC for guiding management decisions (NALCC)
- Detecting changes in species distribution due to coastal and marine invasive species (NALCC)

5. Information Management

The projects in this session offer systems for organizing, managing and sharing information to enable natural resource managers and other users to put this information to use in their conservation planning efforts.

- Unified Platform for Tracking Progress (TRACS)

Wildlife TRACS is the new tracking and reporting tool of the Wildlife and Sport Fish Restoration Program (WSFR). The tool will offer critical geo-spatial viewing and mapping capabilities as well as performance outcome and strategic support tools. Wildlife TRACS will map and display projects and actions in a geospatial environment with multiple GIS layers; track and report project outputs, effectiveness, and species and habitat outcomes; and facilitate strategic conservation by open standards, shared data, and networking.

- Development of an Online Database to Enhance the Conservation of SGCN Invertebrates in the Northeastern Region (RCN 2009-3)

PI: James W. Fetzner, Carnegie Museum of Natural History

<http://rcngrants.org/node/48>

This project proposes to develop a suite of online-accessible tools that will allow operation of a database of occurrence records (spatial and temporal) to enhance conservation management of invertebrate species of greatest conservation need (SGCN) in the Northeast Region. The data to be exploited are derived from authoritatively determined specimens in institutional collections, and a wide range of other information not documented directly by specimens (literature, notes, reports, etc.). The tools will allow the scientific community to add, edit and download species-specific data records in a secure manner for the purpose of generating distribution maps, phenological plots, and conservation management plans, directly improving efforts for invertebrate conservation. Carnegie Museum of Natural History, perhaps the largest depository of SGCN relevant records in the NE Region, will capture data from an estimated 10,000 SGCN specimens.

- Southeast Conservation Planning Atlas (Southeast LCCs)

This data management system is currently being developed by the Gulf Coastal Plains and Ozarks LCC. The goal is to create platform that serves data in a consistent manner and allows end-users to easily discover, access, and integrate existing data and tools. The format will be a web-based dynamic platform that relies on both web services to expose data/tools that are maintained by remote providers and local storage for serving data/tools maintained “on-site”. The target audience is the casual GIS user, best represented by the manager or biologist on an area or in a regional office who has basic GIS skills and has a need for geospatial data but may or may not have desktop GIS software. Power users and individuals from outside the conservation community are also expected to be potential users, though they are not the targeted audience. The key functionalities include providing data storage, map viewing/ data preview ability, and basic geoprocessing ability (e.g., clip, buffer, intersect).

- Designing a shared Great Lakes Information Management and Delivery System (IMDS) to Support Landscape Conservation (UMGL LCC)

The Nature Conservancy and the US Geological Survey, working with a broad network of scientists, natural resource professionals, agency staff, and non-profit colleagues are in the process of designing and developing a shared Great lakes Information Management and Delivery System (GL IMDS) to help support coordinated conservation decision-making through efforts

like the Upper Midwest and Great Lakes LCC, Joint Ventures, and the Great Lakes Basin Fish Habitat Partnership. The project goal is to provide data and knowledge support to several regional demonstration projects, thereby building the backbone for the eventual development of a shared, web-based, GL IMDS to generally support landscape scale Strategic Habitat Conservation in the Great Lakes Basin. The system should be capable of providing comprehensive background information on the challenges facing the basin, provide models and decision tools related to decisions commonly facing managers, and facilitate tracking the outcomes resulting from collective management decisions, in other words, provide data and knowledge support for the adaptive management cycle at the landscape scale.

Information Management LCC Needs:

- Development of a long-term data management system (NALCC)
- Managed lands database development (NALCC)
- Consistent/updated secured lands database (NALCC)
- Online tool for accessing the most recent conservation designs (NALCC)