

North Atlantic Landscape Conservation Cooperative Conservation Science Strategic Plan

I. Background, Goals, Objectives and Strategies

A. Purpose

The purpose of this strategic plan is to articulate a vision, common conservation framework, process and initial priorities for developing shared science capacity for the North Atlantic Landscape Conservation Cooperative (LCC) as part of the larger mission of the LCC. The intent is to show how the LCC shared science capacity will build upon and link together ongoing and completed science by partners in the northeast with additional priority science needs and identify next steps.

B. North Atlantic LCC Background, Vision and Mission

The North Atlantic LCC was formed in 2010 as a conservation science-management partnership, consisting of federal agencies, states, tribes, universities and private organizations focused on collaboratively developing science and tools to guide effective conservation. The LCC is working to address major environmental and human-related factors affecting species, habitats and systems at broad scales, including developing adaptation strategies in response to climate change. LCCs can serve as the forum for the conservation community to define, design, and deliver landscapes that can sustain natural and cultural resources at levels desired by society.

The vision, mission statement, components and goals stated below are excerpted from the approved LCC Mission Statement. These statements articulate the broader vision of the LCC. This strategic plan is specific to the science components.

Vision: (*LCC vision for the future, future desired condition*)

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 Statement: (*purpose of LCC*)

The North Atlantic Landscape Conservation Cooperative provides a partnership in which the private, state, tribal and federal conservation community works 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 the scientific information and tools needed to prioritize and guide more effective conservation actions by partners toward those goals.

Components and Goals (*what the LCC does*)

In order to achieve this mission, the North Atlantic LCC focuses on eight key components for action:

- Ecological Planning
- Conservation Design
- Conservation Adoption and Delivery

- Monitoring and Evaluation
- Research
- Information Management
- Communication and Outreach
- Coordination and Organization

These components (with the exception of coordination and organization, and communication and outreach) correspond to categories of projects and needs outlined in this science strategy. The coordination and organization component is addressed in the LCC governance document and the communication and outreach component is addressed in the LCC Communications Plan.

This strategic plan defines the strategies, actions and next steps for the LCC towards defining, designing and delivering sustainable landscapes in the face of major regional conservation threats and issues, especially habitat loss, fragmentation and degradation associated with land use changes and multiple predicted impacts of climate change. Land use changes that are having major impacts include commercial and residential development, transportation corridors, energy development, forest management practices, agriculture, and management of water resources. Expected climate change impacts include increasing temperature, changing spatial and temporal precipitation patterns, sea level rise, increased storm frequency and severity and ocean acidification. Many of these impacts will interact with and amplify each other such as changing development patterns in response to sea level rise.

In order to accomplish its work, the North Atlantic LCC draws on strong relationships with many partners as well as the long history of cooperative work on regional conservation issues among the 13 states, District of Columbia and non-governmental partners, federal agencies and tribes in the Northeast. The LCC builds upon existing partnerships such as Joint Ventures, Fish Habitat Partnerships and the Northeast Association of Fish and Wildlife Agencies.

The North Atlantic LCC functions as part of a national network of 22 Landscape Conservation Cooperatives across the United States and adjoining portions of Canada and Mexico. By functioning as a network of interdependent units, LCC partnerships can accomplish more together than any single partnership can alone. The North Atlantic LCC works closely with its neighboring LCCs: Appalachian, Upper Midwest and Great Lakes, and South Atlantic (Figure 1).

Landscape Conservation Cooperatives in the Northeast Region

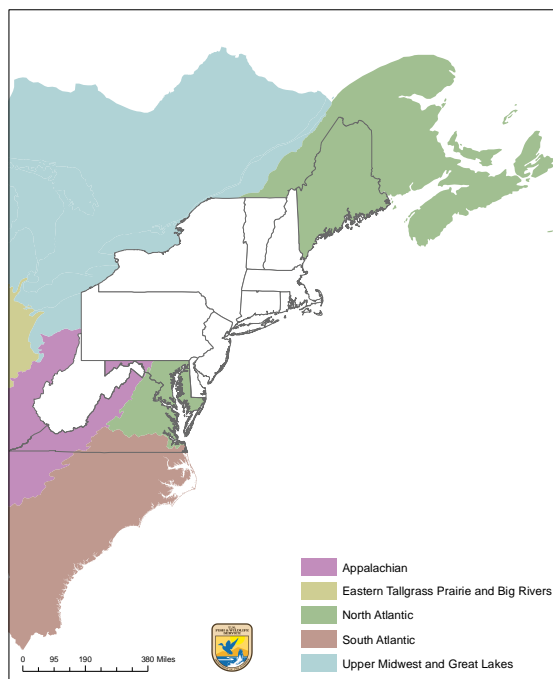


Figure 1. Map of Northeast Landscape Conservation Cooperatives

Additional information about the LCC can be found on the LCC website and in the North Atlantic LCC Development and Operations Plan (<http://www.northatlanticlcc.org>). Additional information on other LCCs is available through the national website (<http://www.fws.gov/science/SHC/lcc.html>).

C. The Northeast Regional Conservation Framework

As a means to help organize its conservation efforts and goals along with those of its partners, the North Atlantic LCC helped to develop a Northeast Regional Conservation Framework (Framework) in the summer of 2011. The Framework was created by the Northeast Regional Conservation Framework Workshop planning team to organize categories of conservation activities and help assess their current status and key needs for the future. While the Framework will evolve over time, participants at the Framework Workshop in June 2011 came to a consensus that most of the key components were represented in the diagram below (Figure 2).

Many of the components of the Framework correspond with elements of Strategic Habitat Conservation developed by the U.S. Fish and Wildlife Service and U.S. Geological Survey and other similar adaptive resource management frameworks, but with a greater emphasis on translating science into usable tools and products for managers and the need for information management and consideration of human dimensions of conservation. This LCC Conservation Science Strategic Plan is organized in part around the components of the Framework. The Framework is intended to provide an organizational framework and context for individual conservation science needs and projects. By linking projects together, the Framework can ensure

that each project draws on and feeds effectively into the next. It also helps identify the appropriate roles for the LCC relative to other partners and partnerships in the northeast.

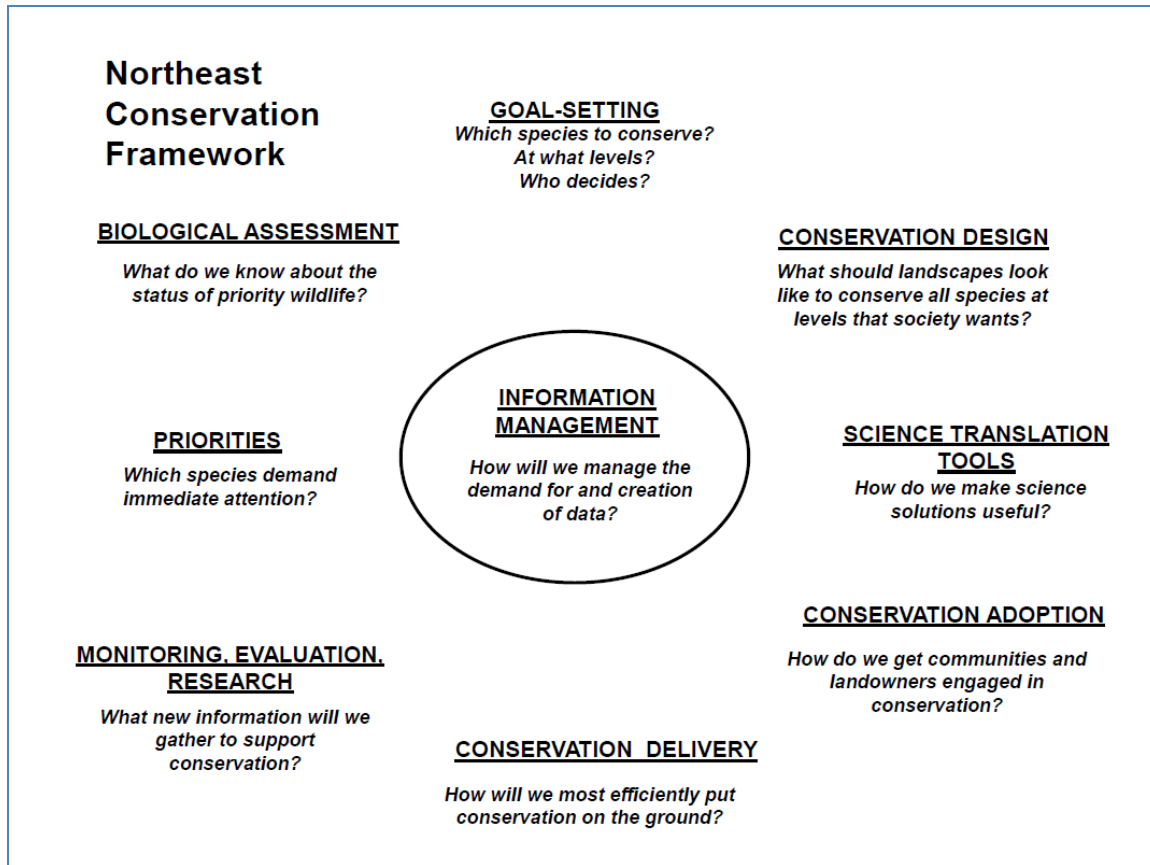
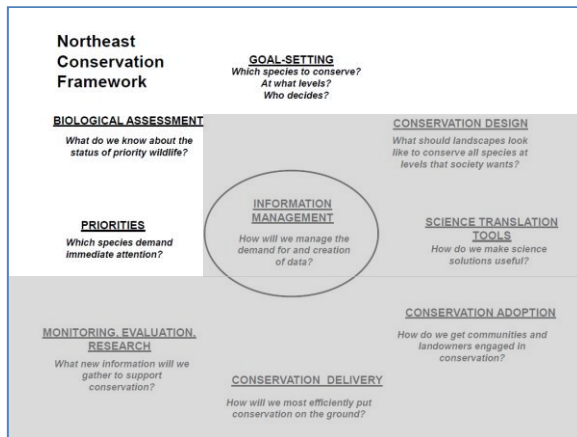


Figure 2. The Northeast Conservation Framework as presented at the Albany II workshop with LCC Mission Components

D. Objectives, Strategies and Actions

The overall goal of this science strategy is to provide the science and products needed to achieve the mission of the North Atlantic LCC. The following components, objectives and strategies fit into the Northeast Regional Conservation Framework and support the LCC mission. The underlined components are the ones listed in the LCC mission statement, *the component(s) in parentheses and italic are the equivalent Framework component(s)*. Specific strategies are listed under each objective generally in the order in which they need to be accomplished.

Ecological Planning (Priorities, Biological Assessment and Goal Setting):

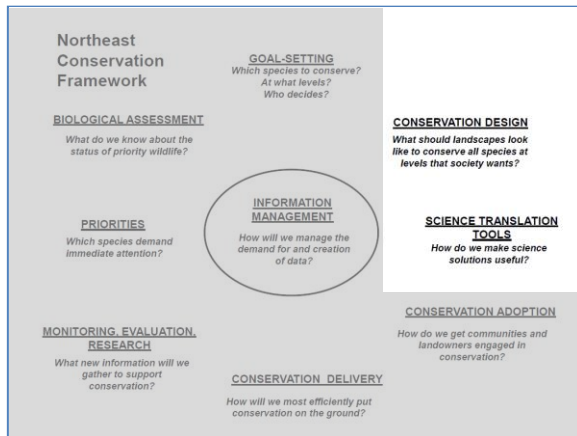


Through the process of ecological planning, the LCC systematically assesses needs for sustaining fish, wildlife, plants and cultural resources. In order to determine these needs, partners assess existing status and distribution of populations and resources; articulate measurable objectives for sustaining priority species; consider what may be limiting populations or resources to less than objective levels; and determine if there are immediate priorities for action.

Objective: Compile, organize and provide information from existing partners and partnerships on status, trends, current and emerging threats and limiting factors for priority fish, wildlife and plant species and cultural resources; agree on regional objectives for these species and resources; and assess their relationship to limiting factors, ecological processes, habitats and landscapes to provide a scientific basis for conservation actions.

- **Ecological Planning Strategy:** Conduct ecological planning steps at landscape and regional scales to provide a scientific basis for conservation actions
 - **Action 1:** Develop and maintain lists and associated information on priority fish, wildlife and plant species and natural communities for the North Atlantic LCC
 - **Action 2:** Identify representative subsets of priority species (representative species) representing guilds, habitat types and response to management;
 - **Action 3:** Compile and step down population objectives where available from existing plans and partnerships; work with partners to develop additional or refine existing population objectives and other conservation targets;
 - **Action 4:** Compile best available information on threats and limiting factors constraining population size and distribution and management options to address these factors;
 - **Action 5:** Conduct regional climate change vulnerability assessments for species, habitats and cultural resources;
 - **Action 6:** Develop and apply models that relate populations to habitat, ecological processes and other limiting factors; and
 - **Action 7:** Determine any immediate priorities based on emerging threats (triage).

Conservation Design (Conservation Design and Science Translation):



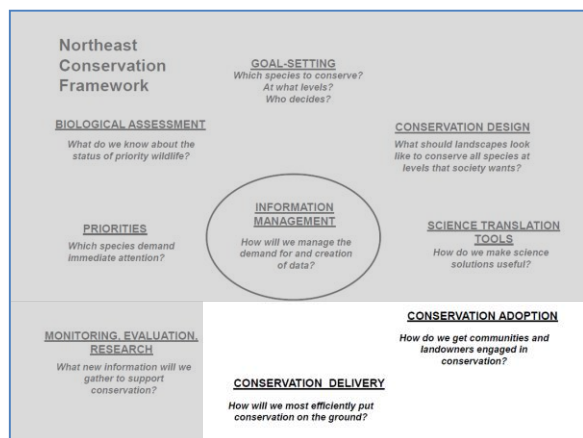
Conservation design encompasses a series of steps that builds on the results of ecological planning to develop maps and tools that guide decisions about where to deliver how much of what habitat as well as other conservation actions in order to efficiently restore and sustain populations, ecological processes and resilient systems. The LCC makes that information available to partners in formats and at scales that are useful. The development of these tools must be done with managers and decision-makers to ensure that the tools address their needs.

Objective: Develop provide and translate maps, tools and information to guide decision makers and inform conservation actions to more effectively address threats, limiting factors and uncertainties and efficiently achieve objectives; ensure functional natural systems under current and predicted future conditions; and link site-scale actions to landscape and regional scale goals.

- **Conservation Design Strategy:** Develop conservation design tools building on existing ecological planning efforts.
 - **Action 1:** Work with managers and conservation decision makers to assess what information and tools are needed to support their decision-making;
 - **Action 2:** Develop regional, consistent, spatial databases and maps to support conservation design at multiple spatial scales including consistent spatial data layers on habitat types and other key landscape attributes;
 - **Action 3:** Use population-habitat models to assess the existing capacity of habitats to support populations using consistent habitat data layers;
 - **Action 4:** Estimate the amount of habitat needed to achieve population objectives;
 - **Action 5:** Use predicted impacts of climate change, urban growth, and other stressors with population-habitat models to assess impacts to ecological processes, future capacity of habitats to support populations under different scenarios and adjust population objectives if needed based on current and likely future habitat capacity;
 - **Action 6:** Develop tools (e.g., population-habitat models, decision support models) to guide on-the-ground habitat conservation to efficiently achieve objectives including the identification of priority areas;
 - **Action 7:** Assess existing areas and habitat types under protection and management in the LCC and identify gaps in protection;

- Action 8: Develop landscape designs that assess greatest contribution of each part of the landscape to achieve objectives for multiple species and accommodate human uses; and complementary landscape designs that utilize coarse-filter approaches including ecological integrity, connectivity and geophysical attributes (e.g., geology, landforms, elevation, latitude);
- Action 9: Test conservation design approaches in pilot areas in the LCC and revise approaches; and
- Action 10: Work with developers of science and tools to ensure that they are effectively explained and translated for use by a variety of audiences.

Conservation Adoption and Delivery (Conservation Adoption and Conservation Delivery):

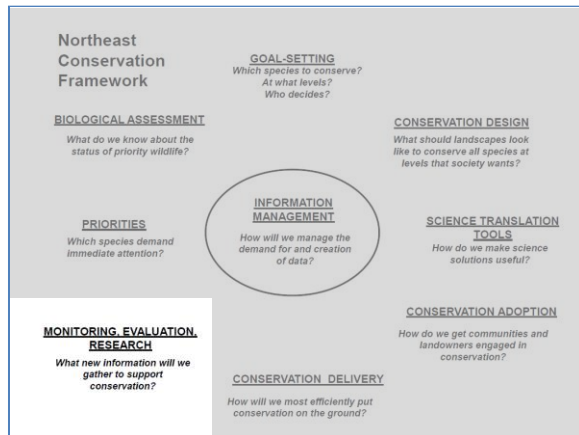


In order for the science and tools developed through the LCC to be useful to partners, there is a need to provide support to those partners to help them understand, adopt and use the science and tools. There is also a need to support demonstration projects that provide examples of how science and tools link to delivery at local scales and test the validity and effectiveness of the tools.

Objective: Assist partners with use of science and tools and work with partners to implement actions designed to test, validate and improve scientific information and tools developed by the LCC to enhance the ability of our lands and waters to sustain fish, wildlife, plant and cultural resources.

- Conservation Adoption Strategy: Assist partners with use of science and tools
 - Action 1: Provide products of biological planning and conservation design including maps and decision support tools that inform the delivery of conservation programs;
 - Action 2: Host workshops, webinars and other forums for conservation delivery partners to educate state and local partners on availability and uses of science and tools; and
- Demonstration Projects Strategy: Support demonstration projects that link science and tools to delivery
 - Action 3: Work with partners to implement demonstration projects that test, validate and improve scientific information and tools developed by the LCC at a variety of sites including climate change adaptation.

Monitoring and Evaluation (Monitoring, Evaluation and Research):



Monitoring programs are needed not only to track the status and trends of priority populations and habitats to support ecological planning and conservation design but also to evaluate the effectiveness of conservation actions in sustaining these populations. To the extent possible, monitoring programs should move beyond just surveillance type monitoring to programs that are also designed to evaluate management actions. In addition to population and habitat monitoring, a process is needed to develop metrics and track habitat conservation and management projects in a

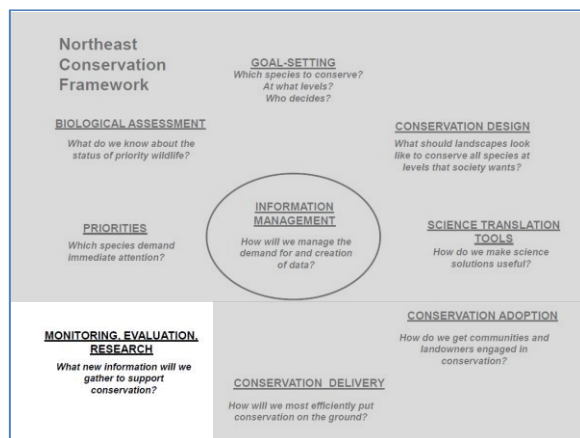
way that can be used to evaluate the contributions towards objectives and assess the greatest needs for additional conservation.

Objective: Facilitate monitoring of populations, resources, habitats and landscapes and tracking of conservation actions designed to assess the effectiveness of conservation actions, assess progress towards common goals and inform future planning and actions based on the results.

- **Population Monitoring Strategy:** Utilize and build on existing programs and partnerships to monitor populations to evaluate and support conservation planning and delivery
 - **Action 1:** Work with existing partnerships to analyze and improve consistency, validity, applicability and coordination of existing population surveys for supporting ecological planning, evaluating effects of conservation actions on priority populations and testing model assumptions;
 - **Action 2:** Identify priority monitoring needs currently not met by existing programs and partnerships for evaluating effectiveness of conservation actions, and work with partners to design scale-appropriate surveys to meet those needs;
 - **Action 3:** Coordinate closely National Park Service, National Wildlife Refuge System and other Inventory and Monitoring Programs to integrate monitoring needs identified through the LCC with their monitoring networks;
- **Habitat Inventory and Monitoring Strategy:** Develop and implement habitat and landscape monitoring to assess net change
 - **Action 4:** Develop habitat and landscape monitoring parameters that will be inventoried and monitored over time and the expected process (e.g., remote sensing) and time interval for data collection; assess net change in LCC landscape conditions and habitat types (e.g. land cover, wetlands, urban growth) at regular intervals at multiple scales to support conservation design efforts;

- **Effectiveness Monitoring Strategy** : Develop and implement metrics and tracking programs building on existing efforts
 - **Action 5**: Develop metrics for measuring success of conservation actions;
 - **Action 6**: Utilize, compile results from and coordinate among existing accomplishment tracking databases (e.g. TRACS, habITS); and
- **Inform Planning Strategy** : Use results of monitoring to adapt future planning
 - **Action 7**: Regularly assess the results of monitoring to inform Ecological Planning and Conservation Design steps.

Research (Monitoring, Evaluation and Research):



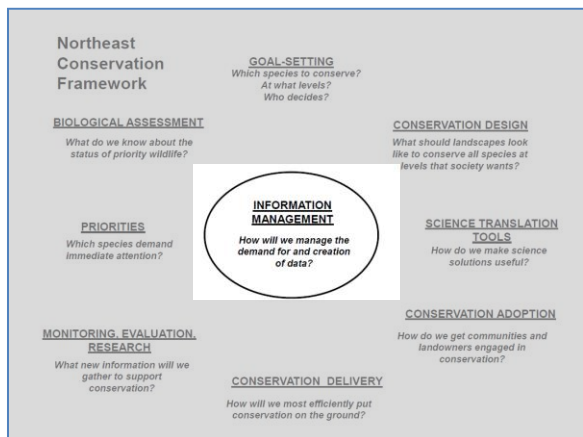
Research is needed to evaluate assumptions made in planning including determining limiting factors, developing population-habitat models and decision-support tools, and assessing and predicting effects of management on ecological processes, habitat and species.

Objective: Facilitate the pursuit and support of priority research activities based on needs identified and prioritized by partners and partnerships that test key assumptions in planning and inform future planning and delivery; provide guidance to Climate Science Centers on climate science needed by the LCC; and work with partners to coordinate ongoing research initiatives on priority conservation issues.

- **Overall Research Coordination and Funding Strategy:** Work with partners and partnerships to identify and support priority applied research
 - **Action 1:** Work cooperatively with partners, partnerships, universities, Cooperative Ecosystems Studies Units, Cooperative Fish and Wildlife Research Units, and other research consortiums the northeast to identify and prioritize applied research needs for conservation within the LCC area and maintain list on website;
 - **Action 2:** Leverage and coordinate LCC funding for priority applied research projects with partner contributions and competitive grant programs such as USGS Science Support Partnership and Quick Response Funding, National Fish and Wildlife Foundation, Multistate Conservation Grant Program, and Northeast Regional Conservation Needs Program;

- Action 3: Work with the Northeast Climate Science Center (CSC) to identify annual research priorities of the LCC that are appropriate for CSC support.

Information Management (Information Management):



Information management supports the flow of data about the status of resources and conservation activities from implementers to planners and analysts and vice versa, at every stage of conservation.

Objective: Compile, synthesize, organize and make available information, data and tools developed by partners and partnerships and the LCC in scales and formats needed by partners.

- Assessment and Development of Information Management Needs Strategy: Assess information needs and work collaboratively to develop tools to address those needs
 - Action 1: Conduct an information management needs assessment with partners to determine needs, audiences and opportunities for collaboration with existing partnerships and programs;
 - Action 2: Based on needs assessment, work with team and database developer to design database(s) and/or portal(s) or refine existing databases; develop pilot database/portal to test and refine the structure; develop full database/portal; regularly assess effectiveness of database(s) and refine as needed;
- Database Development Strategy: Compile or link to existing databases; assess need for, develop and maintain new specific databases to address priority unmet database needs
 - Action 3: Make conservation design databases and tools (e.g., decision support models) available on the web, catalogued, easily accessible and in appropriate scales and formats to assist partners in assessing conservation priorities at various scales; and
 - Action 4: Assess unmet database development needs, prioritize needs and work with partners to develop priority databases;
 - Action 5: Develop approach for shared database technical support.

II. Process for Prioritizing and Selecting Science Needs and Projects

The framework, components, objectives and strategies identified in this document provide the context for determining science priorities in the LCC. The North Atlantic LCC also needs a process for working with partners and partnerships to regularly assess and determine priority science needs and select priority projects and collaborators within this context that is understandable, transparent and inclusive. This section reviews the process and criteria. The annual schedule for this process is shown in Table 1 along with the parallel process and schedule for the Regional Conservation Needs process.

A. Science Needs Assessment

The North Atlantic LCC needs to periodically solicit information from partners on priority science needs consistent with the LCC mission, goals and objectives. These requests for science needs should be closely coordinated with partner agencies and organizations and partnerships (e.g. Atlantic Coast Joint Venture) in the North Atlantic LCC area. The needs requests should clearly link to the mission, objectives and strategies of the LCC and be as specific as possible. Needs requests should be issued annually unless the LCC Technical Committee determines that the existing information on needs is sufficient and current for that given year.

The LCC should also support periodic partner workshops to review the needs in the context of the Framework, assess progress on previous needs and adjust components, strategies, and process.

B. Prioritization of Needs

The North Atlantic LCC Technical Committee is charged with reviewing and prioritizing science needs and making recommendations to the North Atlantic LCC Steering Committee. The Steering Committee decides whether to approve the recommendations. They may delegate the authority to select specific projects and contractors to the LCC Technical Committee and staff. The Technical Committee developed the following criteria to prioritize needs, modified to reflect this strategic plan and the 2011 Northeast Conservation Framework Workshop results.

Criteria for Prioritizing Needs

- 1) Needs that address strategies listed in the North Atlantic LCC Science Strategic Plan in a logical order.
- 2) Needs that fit into the Northeast Conservation Framework and were identified as a priority at the Northeast Conservation Framework Workshop.
- 3) Foundational needs for organizing landscape conservation including:
 - building blocks for future science and tools (e.g., consistent classification, mapping);
 - organizational frameworks for science and tools to guide conservation decision-making based on current and future conditions (e.g., modeling frameworks that link predictions of future conditions to conservation decisions);
 - information management tools to ensure that information is organized in a way that it is available in scales and formats needed to guide conservation decisions;

- pilot/demonstration projects of approaches that can be applied at landscape and regional scales.
- 4) Needs that address major threats and uncertainties to sustaining natural or cultural resources in the North Atlantic LCC including:
 - human impacts include land use change (e.g. urban growth, roads, sprawl, transmission corridors), changes in hydrology, invasive species, contaminants;
 - climate impacts include sea level rise, impacts from changing temperature and precipitation including changing hydrology (floods, droughts, change in timing or duration);
 - shifts/changes/loss of natural communities, changing phenology and changes in invasive species distribution;
 - energy impacts including hydropower and wind development, biomass, transmission corridors;
 - co-occurrence of these impacts.
 - 5) Needs that address threats and uncertainties to multiple species or habitats.
 - 6) Needs that will inform applied conservation decisions and actions by agencies, organizations and partnerships working in the North Atlantic LCC to sustain natural and cultural resources.
 - 7) Needs that are priorities for existing partnerships in the North Atlantic LCC.

C. Development and Selection of Projects and Collaborators

Direct Selection of Projects and Collaborators

There are many partner agencies, organizations and universities active in conservation in the Northeast region and nationally with expertise and resources related to identified LCC science needs. Through discussions with the LCC Technical and Steering Committees, partnerships in the Northeast, adjacent LCCs and others, key collaborators to address a prioritized need may be identified. In many cases, this collaborator has already been addressing a particular science need in the northeast and is uniquely qualified to continue that work. If a collaborator is identified that is determined to be uniquely qualified by the Technical Committee or partnerships working with the Technical Committee, that collaborator may be selected.

Request for Proposals

When there is not a clear collaborator or ongoing project identified to address a science need, the Technical Committee and staff may issue a Request for Proposals (RFP). This RFP should be targeted to a specific science need or set of science needs. The Technical Committee will work with LCC Staff and Contractors to develop the RFP language and criteria for selecting projects and on the final selection of collaborators.

Contracts

For those proposals that are selected to receive funding through appropriated LCC funds, a subcontract will be developed through the existing administrative agreement between the LCC and the Wildlife Management Institute. This subcontract will include provisions for reporting and dissemination of projects.

Advisory/Oversight Committees

In most cases, selected projects will have advisory committees that include LCC partners to provide input and oversight on the project and ensure that it is achieving its intended need.

Projects that are intended to result in decision-support tools may also have management or user committees made up of decision-makers that will use the tools once developed.

Table 1. LCC Annual Process for Assessing Science Needs and Selecting Projects

Date(s)	LCC Event	LCC Decision or Process
October	October LCC Technical Committee Meeting/Call	Recommendations on Projects for LCC Funding
		Recommendations on CSC Needs
November	November LCC Steering Committee meeting	Funding Decisions on LCC Projects (including RCN projects for LCC support)
		Approve Recommendations on Climate Science Center Needs
December		Notify Applicants/Announce Funding Decisions
January-February		Request Input on Science Needs to Partners
	LCC Steering Committee Conf. Call	Additional Decisions on Projects (as needed)
March	Technical Committee Call/Meeting	Develop Recommendations on Science Needs
April	Steering Committee meeting at Northeast F&W Conference	Approval of Science Needs (including RCN topics that LCC could support); Additional decisions on projects (as needed)
	Northeast F&W Conference	Presentations on completed LCC Projects
May-June		Assess need for RFP or direct contracts
		Issue targeted RFP if needed
July	Technical Committee Call/Meeting	Review of Proposals, recommendations on initial science projects, identification of need for further work on proposals
August	LCC Steering Committee Conf. Call	Decisions on initial projects (as needed)
September		Revision of proposals (as needed); input from Northeast Fish and Wildlife Diversity Technical Committee

NEAFWA RCN Annual Process

NEAFWA Event	NEAFWA Decision or Process
NEWA/NE FA Meeting	Approve RCN Recommendations
NEAFWA Directors Meeting	Final Decisions on RCN Projects
	Approve Modification to Priority Topics for RFP
	RCN Request for Proposals
	RCN Proposals due
Directors Meeting at Northeast F&W Conference	Select Priority RCN Topics for Following Year
Northeast F&W Conference	Presentations on completed RCN Projects
	Provide RCN proposals to tech. review teams
	Technical review scores due
	Proposals reviewed and scored by states
NE F&W Diversity Tech. Com.	Recommendations on RCN projects

D. Information Management and Communications

This conservation science strategic plan, the description of the needs process and criteria, the results of annual science needs assessments, lists of selected projects, and project reports, products and results will all be made available to partners via the North Atlantic LCC Website. Specific tools will include:

- An online database that organizes the information associated with strategies, science needs and projects;
- Presentations of initial and final results of ongoing projects via webinars and presentations;
- An online database with products resulting from LCC projects that allows access to descriptions, data and visualizations.

E. Evaluation

An evaluation of which science needs have been addressed and identification of new needs will be completed on an annual basis through consultation with LCC partners and reflected in the matrix. This updating process will enable continued focus on the science and delivery needs of greatest importance, and will allow the LCC to measure progress towards fulfilling information gaps. A yearly appraisal of how completed projects align with the Framework and this strategic plan will also be completed, which will provide a higher-level view of how the LCC and its partners are contributing towards achieving the fundamental goal of sustainable landscapes in the Northeast.

III. Current Science Needs Related to the Objectives and Strategies

The components and strategies in this strategic plan are related to projects that the LCC has funded, as well as Regional Conservation Need (RCN) and other relevant regional partner projects in the matrix table below. This table also includes priority science needs identified by the North Atlantic LCC and partners through a formal needs assessment and the Northeast Conservation Framework workshop in 2011. Potential next steps and roles are identified for each strategy. This matrix should be updated annually or more frequently as needed. This version of the matrix is limited to the results of the science needs assessment and conservation framework workshop. In the future, the matrix will include completed and ongoing projects from a broader set of partners as well as a broader set of partners listed as responsible for accomplishing next steps.

Table 2 Legend - Description of Columns

- LCC Component: described in Section I above
- Action: described in Section I above
- Regional Projects Completed or Underway: describes regional conservation science projects that are recently completed or underway through the LCC (NALCC); regional projects developed by the states and funded through the Regional Conservation Needs (RCN) program, Doris Duke Foundation (DD) and Competitive State Wildlife Grants (Comp. SWG); and other relevant regional projects developed by the U.S. Fish and Wildlife Service (USFWS), states and other partners.
- Northeast Workshop Overall High Priorities: lists priorities identified in the Northeast Conservation Framework Workshop.
- RCN Topics/LCC Science Need Priorities: lists active priority RCN topics and Priority North Atlantic LCC Science Needs identified by partners and prioritized by the LCC Technical Committee.
- Potential Next Steps: lists potential next steps to be taken to address the priorities and needs associated with the strategy
- Responsibility: indicates whether the LCC or another partner or partnership should have a lead role in implementing that step. This table is incomplete but will be the starting point for a more extensive and updated matrix of priorities, needs and next steps.

Acronyms in Table 2	Meaning
ACJV	Atlantic Coast Joint Venture
BCR	Bird Conservation Region
BMP	Best Management Practice/Plan
BDJV	Black Duck Joint Venture
CZM	Coastal Zone Management
CSC	Climate Science Center
DD	Doris Duke
EBTJV	Eastern Brook trout Joint Venture
EPA	Environmental Protection Agency
GIS	Geographic Information Systems
I&M	Inventory and Monitoring
LCC	Landscape Conservation Cooperative
NALCC	North Atlantic Landscape Conservation Cooperative
NE	Northeast
NEAFWA	Northeast Association of Fish and Wildlife Agencies
NEPARC	Northeast Partners in Amphibian and Reptile Conservation
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NWRS	National Wildlife Refuge System
PARC	Partners in Amphibian and Reptile Conservation Areas
RCN	Regional Conservation Needs
RFP	Request for Proposals
SGCN	Species of Greatest Conservation Need
SWAP	State Wildlife Action Plan
SWG	State Wildlife Grants
TNC	The Nature Conservancy
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UVM	University of Vermont
UMass	University of Massachusetts Amherst

WNS	White Nose Syndrome
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Table 2. Matrix of Actions, Projects, Priority Needs, Next Steps and Responsibility

LCC Component	Action	Regional Projects Completed or Underway	Northeast Workshop Overall High Priorities	RCN Topics/LCC Science Need Priorities	Potential Next Steps	Responsibility	
Ecological Planning	Action 1: Develop and maintain lists of priority species and natural communities	USFWS: Federal Trust Species lists; States: Individual State SGCN lists; NEAFWA Terrestrial and Aquatic Habitat Classifications; NEAFWA high concern, high responsibility species	•Support development of SWAP database to promote consistency in next generation of SWAPs	RCN Topic 2: Identify High Priority NE Species of Greatest Conservation Need (invertebrates)	•Make compiled lists and tables available online	LCC staff can post on website	
	Action 2: Identify representative species	USFWS: Representative Species Process			•Additional work on selecting aquatic species	USFWS with partners	
	Action 3: Compile and develop population objectives	USFWS: Compiled lists from existing migratory bird, fisheries and endangered species recovery plans; States: State Wildlife Action Plans (SWAPS)	• In new SWAPs recommend adopting consistent format to allow region-wide roll up (including population targets) for establishing goals; • Develop a process to develop regional representative species goals. •Support development of SWAP database to promote consistency in next generation of SWAPs		•Support compilation of SWAP objectives as part of SWAP database; •Develop process for developing or refining goals	Joint effort of LCC and NEAFWA?	
	Action 4: Compile info. on threats and limiting factors	RCN: Identifying relationships between invasive species and Species of Greatest Conservation Need in the Northeast region (RCN 2007-3)			RCN Topic 3: Identify NE Species of Greatest Conservation Need Data Gaps, Design Data Collection Protocols, and Collect Data NALCC: Adaptive Management Frameworks for Representative Species	•Continue initial efforts on representative species modeling; •RCN support for addressing SGCN data gaps	Initial modeling efforts through UMass and UVM; SGCN work through NEAFWA RCN
	Action 5: Conduct climate change vulnerability assessments	RCN: Assessing the Likely Impacts of Climate Change on Northeastern Fish and Wildlife Habitats and Species of Greatest Conservation Need (RCN 2009-1); NALCC: Evaluating the Vulnerabilities of Ecological Resources to Climate Change in	• Better information/tools on assessing sea level rise impacts on species and marsh management		NALCC: General vulnerability assessments to northeastern fish and wildlife habitats and species	•Continue joint RCN/LCC vulnerability assessment project of Manomet and NatureServe	LCC, NEAFWA, Manomet, NatureServe

LCC Component	Action	Regional Projects Completed or Underway	Northeast Workshop Overall High Priorities	RCN Topics/LCC Science Need Priorities	Potential Next Steps	Responsibility	
Conservation Design		the Northeast (NALCC 2010).		Specific vulnerability assessments of northeastern amphibians and reptiles	•Support NEPARC PARCA and vulnerability assessment project	LCC, NEPARC	
				NALCC: Specific vulnerability assessments of cold water stream habitats and species including brook trout	•Additional support for brook trout and other cold water vulnerability assessments incorporating EBTJV needs	USGS Science Center support, Coordination with ongoing projects and EBTJV	
				NALCC: Vulnerability of coastal wetlands and beaches to sea level rise and other anthropogenic stressors	•Assess current state of sea level rise data and tools for predicting impacts to coastal habitats; determine gaps and needs.	LCC working with NOAA, NPS, USGS, EPA, and state CZMs	
	Action 6: Develop and apply models	NALCC: Designing Sustainable Landscapes for Wildlife: forecasting changes to landscapes, habitats and species & development of decision support tools (NALCC 2010); NALCC: Forecast effects of sea level rise on habitat of piping plovers & identify responsive conservation strategies (NALCC 2010); NALCC: Forecasting changes in aquatic systems and resilience of aquatic populations (NALCC 2010)			NALCC: Species-habitat modeling and mapping of aquatic species; NALCC: Species-habitat modeling and mapping of terrestrial and wetland species	•Complete ongoing terrestrial, aquatic and coastal projects	LCC
					NALCC: Adaptive Management Frameworks for Representative Species	•Support Adaptive Management Framework for American Black Duck	LCC, BDIJ
	Action 7: Determine immediate priorities (triage)				RCN Topic 7: Identify and Assess Threats to NE Species of Greatest Conservation Need	•Assess LCC and RCN role on as needed basis	LCC, NEAFWA
	Strategy 1: Assess decision support					•Ensure that all projects have links to	LCC

LCC Component	Action	Regional Projects Completed or Underway	Northeast Workshop Overall High Priorities	RCN Topics/LCC Science Need Priorities	Potential Next Steps	Responsibility
	needs				and input from conservation decision-makers.	
	Action 2: Develop regional, consistent, spatial databases	RCN: Creation of Regional Habitat Cover Maps: Application of the NE Terrestrial Habitat Classification System (RCN 2007-1) RCN: An interactive, GIS-based application to estimate continuous, unimpacted daily streamflow at ungaged locations in the Connecticut River Basin (RCN 2007-6) RCN: Instream Flow for Great Lakes Basin of NY and PA (RCN 2010-2) DD: Northeast Aquatic Classification and Mapping/Northeast Aquatic Habitat Classification System (Doris Duke) DD: Northeast Terrestrial Habitat Classification System (Doris Duke) DD: Secured Lands of the Northeast (Doris Duke 2007)	<ul style="list-style-type: none"> • Finish mapping all systems (Canada, lakes); • Usable product (expectations, limits); • Mapping accuracy and validation; • Layers (land use, threats, refugia, invasives); • Create distribution maps for regional responsibility/high concern species • Better aquatic temperature data/classification 	RCN Topic 1: Develop Regional Base Maps for Analyses of NE SGCN Data (marine);	•RCN or LCC support for marine mapping	NEAFWA, LCC
NALCC: Habitat mapping and modeling at NALCC scale				•Consider expansions of consistent data layers into Canada	LCC with Canadian partners	
NALCC: Habitat mapping and modeling of marine bird distributions and coastal migration of birds and bats				•Work with North Atlantic Marine Bird Cooperative to assess priorities	LCC, USFWS, ACJV	
NALCC: Managed Lands Database Development				•Work with ACJV on proposal for database	LCC, ACJV	
NALCC: Consistent/updated secured lands database				•Ensure incorporation of information from National Conservation Easement Database into Northeast Secure Lands Database (TNC)	LCC, TNC	
				Assess needs for consistent data layers on stream temperature and hydrology	LCC, USGS	
	Action 3: Assess the existing habitat capacity	RCN: Geospatial Condition Analysis of Northeast Habitats Based on the Northeast SGCN Habitat Maps (RCN 2009-2) RCN: The Conservation Status of Key Habitats and Species of Greatest Conservation Need in the Eastern Region	<ul style="list-style-type: none"> • Create distribution maps for regional responsibility/high concern species. 	NALCC: Assessment of forest condition and management	<ul style="list-style-type: none"> •Complete first phase of representative species-habitat modeling including distribution maps; •Consider more 	LCC, NEAFWA

LCC Component	Action	Regional Projects Completed or Underway	Northeast Workshop Overall High Priorities	RCN Topics/LCC Science Need Priorities	Potential Next Steps	Responsibility
		(RCN 2007-5)			detailed status assessments of habitats based on results of RCN Conservation Status Report	
	Action 4: Determine habitat objectives	NALCC: Designing Sustainable Landscapes for Wildlife: forecasting changes to landscapes, habitats and species & development of decision support tools (NALCC 2010);			•Complete first phase of representative species-habitat modeling	LCC
	Action 5: Predict landscape change and future capacity	NALCC: Designing Sustainable Landscapes for Wildlife: forecasting changes to landscapes, habitats and species & development of decision support tools (NALCC 2010); NALCC: Forecast effects of sea level rise on habitat of piping plovers & identify responsive conservation strategies (NALCC 2010); NALCC: Forecasting changes in aquatic systems and resilience of aquatic populations (NALCC 2010)	• Better information/tools on assessing sea level rise impacts on species and marsh management	NALCC: Climate model downscaling	•Complete first phase of three LCC landscape change projects; •Identify additional needs for Climate Science Center	LCC, CSC
	Action 6: Develop decision-support tools	RCN: Northeast Regional Connectivity Assessment Project (RCN 2007-2) RCN: Proposal to Establish a Regional Initiative for Biomass Energy Development For Early-Succession SGCN in the Northeast (RCN 2007-7) RCN: An Interactive, GIS-based Application to Estimate Target Fish Communities in Northeastern Streams (RCN 2008-1) NALCC: Forecasting changes in aquatic systems and resilience of aquatic populations (NALCC 2010) NALCC: Forecast effects of sea level rise on habitat of piping plovers & identify	•Working with implementers/users, translate the information into usable tools		•Complete first phase of three LCC landscape change projects; •Involve user groups in ongoing or completed projects	LCC, NEAFWA

LCC Component	Action	Regional Projects Completed or Underway	Northeast Workshop Overall High Priorities	RCN Topics/LCC Science Need Priorities	Potential Next Steps	Responsibility
		responsive conservation strategies (NALCC 2010); NALCC: Designing Sustainable Landscapes for Wildlife: forecasting changes to landscapes, habitats and species & development of decision support tools (NALCC 2010);				
	Action 7: Assess protected and managed lands	DD: Northeast Secured Lands(Doris Duke) RCN: Geospatial Condition Analysis of Northeast Habitats Based on the Northeast SGCN Habitat Maps (RCN 2009-2) RCN: The Conservation Status of Key Habitats and Species of Greatest Conservation Need in the Eastern Region (RCN 2007-5)		NALCC: Assessment of forest condition and management NALCC: Consistent/updated secured lands database	•Consider additional forest condition analysis	LCC
	Action 8: Develop landscape designs	RCN: Regional Focal Areas Site Adaptive Capacity, Network Resilience and Connectivity (RCN 2008-3) RCN: Identification of Tidal Marsh Bird Focal Areas BCR 30 (RCN 2010-3) NALCC: Designing Sustainable Landscapes for Wildlife: forecasting changes to landscapes, habitats and species & development of decision support tools (NALCC 2010);	<ul style="list-style-type: none"> • Identification of habitat focus areas with a step up step down (regional to local) process to implement on-the-ground habitat conservation, restoration, and management; • Development of habitat focus areas and corridors • Overlay and integrate datasets to delineate landscapes of regional significance (focal areas and connectivity) • Provide information on landscapes of regional significance to conservation partners to implement specific conservation actions •Develop conservation designs for multiple representative species • Create distribution maps for regional responsibility/high concern species. 	RCN Topic 4: Identification of Regional Focal Areas and Corridors for the Conservation of Species of Great Conservation Need in the Northeast	•Consider submitted RCN projects (grassland birds, black rail, permeable landscapes)	NEAFWA RCN for grassland birds and rail; possibly LCC for permeable landscapes
NALCC: Assessments of landscape connectivity				•Consider supporting RCN project on permeable landscapes	LCC, TNC	
NALCC: Identifying focal areas for conservation (for herps)				•Support for PARCA project NE-PARC	LCC, NE-PARC	
				•Consider focus area, green infrastructure synthesis of existing projects	LCC	
				•Complete Phase I of LCC Sustainable Landscapes Project to develop landscape designs in three pilot watersheds	LCC, UMass	

LCC Component	Action	Regional Projects Completed or Underway	Northeast Workshop Overall High Priorities	RCN Topics/LCC Science Need Priorities	Potential Next Steps	Responsibility
	Action 9: Test conservation design approaches	NALCC: Forecasting changes in aquatic systems and resilience of aquatic populations (NALCC 2010) NALCC: Forecast effects of sea level rise on habitat of piping plovers & identify responsive conservation strategies (NALCC 2010); NALCC: Designing Sustainable Landscapes for Wildlife: forecasting changes to landscapes, habitats and species & development of decision support tools (NALCC 2010);			•Complete Phase I of three LCC projects in pilot areas and consider expansion to rest of LCC	LCC, UMass
	Action 10: Science translation				•Work with PIs on completed RCN projects on user guides and other tools to explain and translate	NEAFWA
Conservation Adoption and Delivery	Action 1: Provide products of biological planning and conservation design	RCN: 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)	<ul style="list-style-type: none"> • An information delivery mechanism should be a requirement of every future RCN product •Provide cookbook or catalog of on-the-ground implementation details that translate conservation design results into practical actions or projects •Communications, tool kit, users guide 	NALCC: Best management practices (for vernal pool dependent herpetofauna)	•Consider project to support BMPs for herpetofauna	LCC or NEAFWA
					•Support better distribution and translation of RCN products	NEAFWA RCN
	Action 2: Host forums for conservation delivery partners		<ul style="list-style-type: none"> • Take existing RCN products and fund a communications specialist to repackage and deliver information • Deliver the results (synthesis) of the projects (products) in a meaningful way 		•Work with states to develop a strategy for delivering results to partners.	NEAFWA
	Action 3: Implement	• Implementing Bird Action Plans for Shrubland-Dependent Species of Greatest		RCN Topic 5: Design and Implement Conservation	•RCN support for SGCN	NEAFWA

LCC Component	Action	Regional Projects Completed or Underway	Northeast Workshop Overall High Priorities	RCN Topics/LCC Science Need Priorities	Potential Next Steps	Responsibility
	demonstration projects	Conservation Need in the Northeast (RCN 2007-8) <ul style="list-style-type: none"> • Staying Connected in the Northern Appalachian: Mitigating Fragmentation & Climate Change Impacts on Wildlife through Functional Habitat Linkages (Comp SWG) • White Nose Syndrome: Multi-state Coordination, Investigation and Rapid response to an Emerging Wildlife Health Threat (Comp SWG) • Rangewide New England Cottontail Initiative (Comp SWG) 		Strategies for NE Species of Greatest Conservation Need (Bicknell's Thrush, Wood Turtle)	implementation strategies	RCN
				NALCC: Adaptation planning pilot projects	•Articulate LCC role in supporting demonstration projects	LCC
				NALCC: Adaptive Management Frameworks for Representative Species	•Support Adaptive Management Framework for American Black Duck	LCC, BDJV
Monitoring	Action 1: Coordinate existing population surveys	RCN: Development of avian indicators and measures for monitoring threats and effectiveness of conservation actions in the Northeast (RCN 2007-4) <ul style="list-style-type: none"> • The Conservation of Marsh Tidal Birds: Guiding Action at the Intersection of Our Changing Landscape (Comp SWG) 	<ul style="list-style-type: none"> •Identify and leverage existing federal monitoring programs and develop state/tribal/ngo surveys to complement the federal surveys to provide regional status •Establish Uniform Monitoring Practices that can be applied across large geographic areas for multi-jurisdictional resources 		•Host coordination meeting with LCC, NWRS and NPS I&M programs	LCC
	Action 2: Identify and support unmet priority monitoring needs	RCN: Regional Analysis of Frog Monitoring (RCN 2010-4) RCN: Development of Non-invasive Monitoring Tools for New England Cottontail Populations: Implications for Tracking Early Successional Ecosystem Health (RCN 2009-4)	<ul style="list-style-type: none"> • Ensure accurate monitoring of representative species to support biological assessment and conservation design •Identify and increase ways to include citizen scientists in monitoring 	RCN Topic 6: Design and Implement Monitoring Protocols, Measures, and Indicators for NE Species of Greatest Conservation Need (aquatic, estuarine, marine)	•Further define this RCN (no projects were identified through RFP)	NEAFWA RCN
				NALCC: Detecting changes in species distribution (for invasives)	•Explore role in invasive species monitoring through detail by invasive species expert	LCC
					•Identify monitoring	USFWS, LCC

LCC Component	Action	Regional Projects Completed or Underway	Northeast Workshop Overall High Priorities	RCN Topics/LCC Science Need Priorities	Potential Next Steps	Responsibility
					needs for selected representative species	
	Action 3: Coordinate closely with NPS and NWRs I&M Programs	USFWS: Flyway Integrated Waterbird Monitoring and Management	<ul style="list-style-type: none"> Identify and leverage existing federal monitoring programs and develop state/tribal/ngo surveys to complement the federal surveys to provide regional status 		<ul style="list-style-type: none"> Host coordination meeting with LCC, NWRs and NPS I&M programs 	LCC
	Action 4: Develop habitat monitoring objectives and assess net change			NALCC: Analysis of recent landscape change	<ul style="list-style-type: none"> Explore options for assessing contemporary land-cover change 	LCC, USGS, EPA
	Action 5: Develop metrics for measuring success of conservation actions	DD: Northeast Regional Monitoring and Performance Reporting Framework (Doris Duke) RCN: Regional Indicators and Measures: Beyond Conservation Land (RCN 2008-5)	<ul style="list-style-type: none"> Specific performance criteria and reporting must be a required part of all RCN projects--best if they are standardized Long-term monitoring and performance evaluation to feed into the conservation framework, Fund implementation of the NE Regional Monitoring and Performance Reporting Framework 		<ul style="list-style-type: none"> NEAFWA RCN Support for implementation of the NE Regional Monitoring and Performance Reporting Framework 	NEAFWA
	Action 6: Compile results from existing accomplishment tracking databases		<ul style="list-style-type: none"> SWG Success Stories: Immediate need for reporting on success of SWG grant-funded work. 		<ul style="list-style-type: none"> Compile recent SWG results 	NEAFWA, USFWS
	Action 7: Use results of monitoring to adapt future planning				<ul style="list-style-type: none"> Develop protocols for regular updating of planning 	
Research	Action 1: Identify and prioritize	USFWS: FWINS database			<ul style="list-style-type: none"> Modify existing or develop new online 	LCC, USFWS

LCC Component	Action	Regional Projects Completed or Underway	Northeast Workshop Overall High Priorities	RCN Topics/LCC Science Need Priorities	Potential Next Steps	Responsibility
	applied research needs				research needs tracking database	
	Action 2: Coordinate funding for priority applied research projects	RCN: Exploring the Connection Between Arousal Patterns in Hibernating Bats and White Nose Syndrome: Immediate Funding Needs for the Northeast Region (RCN 2007-9); RCN: Lab and Field Testing of Treatments for WNS (RCN 2010-1)			•Establish process for exchange of information on emerging research needs among federal and state agency research funding programs	
	Action 3: Work with the Northeast Climate Science Center (CSC) to identify annual research priorities				•Establish close working relationship with new Northeast CSC; build CSC needs assessment into annual LCC needs assessment process	LCC, USGS
Information Management	Action 1: Conduct an information needs assessment		•Support and engage in the forthcoming regional information needs assessment	Long-term data management system	•Develop a technical team and work with contractor to conduct a Northeast information needs assessment	LCC, NEAFWA, USFWS
	Action 2: Design and develop database/portal		•Develop a way for states, LCCs and other partners to immediately access the habitat mapping and geospatial condition analysis products coming out of the RCN process •Create regional geospatial database that can be shared and used among all partners • An information delivery mechanism should be a requirement of every future RCN product •Support and engage in the forthcoming regional	Long-term data management system	•Based on results of Northeast information needs assessment, design and pilot a northeast database/portal system	LCC, NEAFWA, USFWS

LCC Component	Action	Regional Projects Completed or Underway	Northeast Workshop Overall High Priorities	RCN Topics/LCC Science Need Priorities	Potential Next Steps	Responsibility
			information needs assessment • Institutionalize long term datasets on a Regional cooperative basis • Create data sharing agreements between all members of NE conservation community			
	Action 3: Compile and link to existing databases		Develop a way for states, LCCs and other partners to immediately access the habitat mapping and geospatial condition analysis products	NALCC: Online tool for accessing the most recent conservation designs	•Work with partners to compile existing maps and conservation designs	LCC
	Action 4: Develop and maintain new specific databases	RCN: Development of an Online Database to Enhance the Conservation of SGCN Invertebrates in the Northeastern Region (RCN 2009-3)	•Regional habitat management database •Support development of SWAP database to promote consistency in next generation of SWAPs	NALCC: Managed Lands Database Development NALCC: Consistent, updated secured lands database	•Work with ACJV on proposal for managed lands database; •Support development of SWAP database pilot	LCC, ACJV NEAFWA, LCC
	Action 5: Develop capacity to provide database support				•Include technical support needs in Needs Assessment process	LCC