

Handout 13 North Atlantic Landscape Conservation Cooperative Common Science Needs by Rank

| Common Science Need | System | Taxonomic Group | Component | Specific Needs/Projects | Overall Rank | System Rank |
|--|-------------|-------------------------|--|--|--------------|---------------|
| Vulnerability of coastal wetlands and beaches to sea level rise and other anthropogenic stressors | Coastal | All | Conservation Design | Assessment of the current state and greatest needs for sea level rise models related to coastal wetlands and beaches; comprehensive assessment of tidal wetlands that unifies existing work. | 1 | Highest |
| General vulnerability assessments to northeastern fish and wildlife habitats and species | All | All | Ecological Planning, Conservation Design | Assessment of the impacts of climate change on northeastern fish & wildlife habitats and species through expert-driven model; complement expert-driven approach with data, models and maps. | 2 | High |
| Specific vulnerability assessments of northeastern amphibians and reptiles | All | Amphibians and Reptiles | Ecological Planning | Identification of highest priorities and gaps in distribution data for amphibians; vulnerability assessments including vernal pools, migratory barriers, sea level rise. | 3 | Moderate |
| Specific vulnerability assessments of cold water stream habitats and species including brook trout | Aquatic | Fish, Invertebrates | Ecological Planning | Bring together multiple approaches to assessing habitat and population factors for brook trout and other cold water species including: habitat modeling to predict distribution; vulnerability assessments to altered stream temperature and hydrology; identification of resilient habitat; barrier identification in headwater streams; population genomics. | 4 | High/Moderate |
| Habitat mapping and modeling of marine bird distributions and coastal migration of birds and bats | Coastal | Birds | Ecological Planning | 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. | 5 | Moderate |
| Species-habitat modeling and mapping of aquatic species | Aquatic | Fish, Invertebrates | Ecological Planning | Refine tools to classify and map aquatic habitat including hydrology, temperature and connectivity; develop habitat occupancy models; identify priority areas for conservation. | 6 | High |
| Species habitat modeling and mapping of terrestrial and wetland species | Terrestrial | All | Ecological Planning, Conservation Design | Model and map the current and predicted future distributions and extents of representative habitats and species. | 7 | High |
| Assessment of forest condition and management | Terrestrial | All | Conservation Design | Assessment of the influence of forest condition and forest management on regional habitat capability and connectivity. | 8 | Moderate |
| Climate model downscaling | Aquatic | All species | NA | Climate model downscaling at scales useful for stream flow and temperatures | 9 | Moderate |
| Assessments of landscape connectivity | Terrestrial | All | Conservation Design | Assess the current and future status of connectivity and regional and local scales. | 10 | Moderate |

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| Analysis of recent landscape change | Terrestrial | All | Monitoring | Contemporary land-cover change in the North Atlantic LCC for guiding management decisions. | 11 | Moderate |
| Identifying focal areas for conservation | Terrestrial | Amphibians and Reptiles | Conservation Design | Advancing landscape-scale conservation for Northeastern herpetofauna through support of the Priority Amphibian and Reptile Conservation Area (PARCA) system. | 12 | Moderate |
| Best management practices | Terrestrial | Amphibians and Reptiles | Conservation Design and Delivery | Developing conservation and management strategies for vernal pool dependent herpetofauna of the northeast including best management practices and model regulations. | 13 | Moderate |
| Detecting changes in species distribution | Coastal | Invasive spp. | Monitoring | Rapid assessment and response to coastal marine invasive species. | 14 | Moderate |
| Adaptation planning pilot projects | Terrestrial & Coastal | All | Demonstration Projects | Project the impacts of climate change and identify adaptation options at specific pilot sites; e.g., Chincoteague National Wildlife Refuge/Assateague National Seashore Complex. | 15 | Moderate |
| Habitat mapping and modeling at NALCC scale | All | All | Conservation Design | A characterization and "GAP" analysis of the LCC. | 16 | Moderate |
| Adaptive Management Frameworks for Representative Species | Coastal | American Black Duck | All | Developing an adaptive management framework for American black duck habitat conservation in the LCC. | 17 | Moderate |

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Information Management Needs

| Information Management Need | Specific Needs/Projects | Overall Rank |
|--|---|--------------|
| Long-term data management system | Overall project; Phase 1: Data needs assessment; Phase 2: Technical alternatives assessment; Phase 3: Pilot database | 1 |
| Managed Lands Database Development | Consistent/updated habitat management database for Northeast Region. | 2 |
| Consistent/updated secured lands database | Consistent, annually updated secured lands data for the Northeast Region. | 3 |
| Online tool for accessing the most recent conservation designs | Spatial database of conservation designs; RCN and LCC projects have a rapidly growing need for dissemination of spatial data products; would be part of overall data management needs but is highly feasible as a separate component to be integrated into future comprehensive database. | 4 |

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Detailed Projects and Recommendations

| Common Science Need | System | Taxonomic Group | Component | Specific Needs/Projects | Overall Rank | System Rank |
|---|---------|-----------------|--|--|--------------|-------------|
| Vulnerability of coastal wetlands and beaches to sea level rise and other anthropogenic stressors | Coastal | All | Conservation Design | Assessment of the current state and greatest needs for sea level rise models related to coastal wetlands and beaches; comprehensive assessment of tidal wetlands that unifies existing work. | 1 | Highest |
| <p>Ongoing projects: LCC - <i>Forecast effects of accelerating sea-level rise on the habitat of Atlantic Coast piping plovers and identify responsive conservation strategies</i> (208); FWS/USGS Science Support – <i>Dynamic models of sea level rise impacts on tidal marshes</i>.</p> <p>Proposed needs and projects: Evaluate existing physical conditions that influence Atlantic salt marshes (13); comprehensive assessment of our tidal wetlands so that we can evaluate system strengths and weaknesses and take appropriate actions (217); improved tools to assess coastal wetland loss to help states and partners develop adaptation strategies (105); geomorphological assessment of sea-level rise and storm impacts on coastal habitats (14); vulnerability of nesting islands, marsh migration (174); analysis of protected/managed lands for marsh migration (226); improved sea level rise models for shorebirds (225).</p> <p>Recommended steps: Contract to conduct an assessment of the existing state of sea level rise models along the Atlantic Coast, the resolution of data available and the geographic areas that should be focused on for additional efforts due to combination of high risk and uncertainty. A complementary assessment of the state of tidal marsh assessments and monitoring would also be beneficial. Based on the outcome of these assessments, determine where to focus efforts on data collection and model development. Specific data needs include: elevation data, shoreline status, shoreline ownership, nesting islands, tidal marsh condition, species use, sea level rise models related to tidal marshes and beaches.</p> | | | | | | |
| General vulnerability assessments to northeastern fish and wildlife habitats and species | All | All | Ecological Planning, Conservation Design | Assessment of the impacts of climate change on northeastern fish & wildlife habitats and species through expert-driven model; complement expert-driven approach with data, models and maps. | 2 | High |
| <p>Ongoing projects: RCN (2009) - <i>Assessing the likely impacts of climate change on northeastern fish and wildlife habitats and species of greatest conservation need</i> (199). LCC through RCN (2010) - <i>Evaluating the vulnerabilities of ecological resources to climate change in the Northeast</i> (204).</p> <p>Proposed needs and projects: Evaluating the vulnerabilities of ecological resources to climate change in the Northeast - project not yet selected (204);</p> <p>Recommended steps: Complete initial RCN regional habitat vulnerability assessment and select LCC project using a species and data driven vulnerability assessment approach. LCC could facilitate the combination of these approaches. Additional steps would include specific vulnerability assessments for the most vulnerable habitats and species and the modeling and mapping of predicted future distributions of habitats and species to show vulnerability spatially.</p> | | | | | | |

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| Specific vulnerability assessments of northeastern amphibians and reptiles | All | Amphibians and Reptiles | Ecological Planning | Identification of highest priorities and gaps in distribution data for amphibians; vulnerability assessments including vernal pools, migratory barriers, sea level rise. | 3 | Moderate |
| <p>Ongoing projects: RCN (2010) - <i>Regional Analysis of Frog Monitoring</i> (203). LCC (2010) - <i>Designing Sustainable Landscapes for Wildlife</i> (205) – will likely include some representative amphibian species.</p> <p>Proposed needs and projects: Establish monitoring protocols for vernal pool ecosystems (44); map amphibian road-crossing areas (45); utilize GIS and spatially explicit population data to identify potential Priority Amphibian and Reptile Conservation Area (PARCA) site nominations for those states located within the North Atlantic LCC (110); identify climate-vulnerable high value habitats for herpetofauna, develop climate adaptation conservation recommendations specific to vulnerable herpetofauna and habitats for the North Atlantic LCC and distribute to stakeholders and partners (111); document current condition or expected trends in distribution or occurrence of reptiles and amphibians (177); regional analysis of frog monitoring (203).</p> <p>Recommended steps: Work with Northeast Partners in Amphibian and Reptile Conservation (NEPARC) to determine best initial project(s) to develop vulnerability assessments and adaptation recommendations for amphibians; coordinate with overall regional vulnerability assessments</p> | | | | | | |
| Specific vulnerability assessments of cold water stream habitats and species including brook trout | Aquatic | Fish, Invertebrates | Ecological Planning | Bring together multiple approaches to assessing habitat and population factors for brook trout and other cold water species including: habitat modeling to predict distribution; vulnerability assessments to altered stream temperature and hydrology; identification of resilient habitat; barrier identification in headwater streams; population genomics. | 4 | High/Moderate |
| <p>Ongoing projects: RCN (2007) - <i>An interactive, GIS-based application to estimate daily streamflow at ungaged locations in the Connecticut River Basin</i> (209); RCN (2008) - <i>an interactive, GIS-based Application to Estimate Target Fish Communities in Northeastern Streams</i>; (192); RCN (2007) - <i>Northeast Regional Connectivity Assessment Project</i> (187); RCN (2010) - <i>Instream Flow for Great Lakes Basin of NY and PA</i> (201). LCC (2010) - <i>Forecasting changes in aquatic systems and resilience of aquatic populations</i> (207).</p> <p>Proposed needs and projects: Assess unassessed waters (39); catchment level assessment for brook trout (47); ranking brook trout habitats for resiliency to climate change, (48); vulnerability assessment of brook trout across its range (77); effects of altered hydrology on freshwater aquatic systems, habitats & species (91); population genomics approaches for distinguishing between migration and adaptation in response to environmental change (104); forecasting the impact of climate and land use change on brook trout and their habitat (106); modeling cold water stream refugia (85); citizen science effort that examines the impacts of climate change on the phenology of cold water riparian areas (129); Aquatic Resource Management Strategy: an approach to strategically conserving and restoring aquatic habitats (117).</p> <p>Recommended steps: Need to support population-habitat models and regional tools for understanding vulnerable and resilient cold water stream habitats for brook trout and other species based on current and predicted future conditions related to temperature, hydrology, land use and connectivity. First step is to convene a workshop of principal investigators, partners and partnerships (EBTJV) working on brook trout and cold water streams to facilitate working together and identify highest priority next steps.</p> | | | | | | |

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| Habitat mapping and modeling of marine bird distributions and coastal migration of birds and bats | Coastal | Birds | Ecological Planning | 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. | 5 | Moderate |
| <p>Ongoing projects: RCN (2007) - <i>Development of avian indicators and measures for monitoring threats and effectiveness of conservation actions in the Northeast</i> (185); <i>Identification of Tidal Marsh Bird Focal Areas BCR 30</i> (185). LCC 2010 – none yet</p> <p>Proposed needs and projects: Spatial mapping of nearshore and offshore marine bird hotspots in the Atlantic Flyway (132); risk assessment of near & offshore habitats (137); migration routes and distributions of birds and bats along the Atlantic Coast to inform decisions on wind turbine placement (181); understanding the habitat needs and migration patterns of migratory land animals in the Gulf of Maine (12); evaluating eelgrass population resilience to disturbance and climate change in northeastern U.S. (51).</p> <p>Recommended steps: Marine bird database supported through USFWS, BOEM and others. Consult with these agencies and partners and the North Atlantic Birds at Sea Collaborative and FWS and NPS I&M programs to determine if there are unmet needs for monitoring and database.</p> | | | | | | |
| Species-habitat modeling and mapping of aquatic species | Aquatic | Fish, Invertebrates | Ecological Planning | Refine tools to classify and map aquatic habitat including hydrology, temperature and connectivity; develop habitat occupancy models; identify priority areas for conservation. | 6 | High |
| <p>Ongoing projects: RCN/Doris Duke (2006) – <i>Northeast Aquatic Habitat Classification and Map</i> (189); RCN (2007) - <i>An interactive, GIS-based application to estimate continuous, unimpacted daily streamflow at ungaged locations in the Connecticut River Basin</i> (209); RCN (2008) - <i>An interactive, GIS-based Application to Estimate Target Fish Communities in Northeastern Streams</i>; (192); RCN (2007) - <i>Northeast Regional Connectivity Assessment Project</i> (187); RCN (2010) - <i>Instream Flow for Great Lakes Basin of NY and PA</i> (201); RCN (2009) - <i>Geospatial Condition Analysis of Northeast Habitats Based on the Northeast SGCN Habitat Maps</i> (196).</p> <p>Proposed needs and projects: Develop a network for recording stream temperatures stratified by the regional stream habitat classification project (39); integrated ecohydrological approach (103); information on how coastal rivers will "act" under climate change (164); development of fish habitat occupancy models and the information needed to support them (171); synthesis and applications of the Assessment of Existing Habitat Information (Atlantic Coastal Fish Habitat Partnership) (168); identifying the most resilient examples of all aquatic system types (78).</p> <p>Recommended steps: Develop consistent, comparable approaches to hydrology and temperature that can complement the NEAFA aquatic habitat classification and map and connectivity analysis; through representative species workshops, select set of representative aquatic species for different aquatic habitats and develop species-habitat models including occupancy models if data allows.</p> | | | | | | |

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| Species habitat modeling and mapping of terrestrial and wetland species | Terrestrial | All | Ecological Planning, Conservation Design | Model and map the current and predicted future distributions and extents of representative habitats and species. | 7 | High |
| <p>Ongoing projects: RCN/Doris Duke (2006) – <i>Northeast Aquatic Habitat Classification and Map</i> (189); RCN (2007) - <i>Creation of Regional Habitat Cover Maps: Application of the NE Terrestrial Habitat Classification System</i> (188); LCC (2010) – <i>Designing Sustainable Landscapes for Wildlife</i> (205); <i>Wildlife Habitat Models for Terrestrial Vertebrates</i> (206).</p> <p>Proposed needs and projects: Map the future distributions and extents of habitats and species (101); quantitative assessment of species-habitat relationships (80); adaptive capacity of species and habitats (159); species-habitat modeling that allows for assessments of current habitat capacity (139);</p> <p>Recommended steps: Develop species habitat models for all representative species; need to expand initial set of models developed for <i>Designing Sustainable Landscapes</i> to include additional species and geographic areas and explore options for occupancy models for a subset of these representative species.</p> | | | | | | |
| Assessment of forest condition and management | Terrestrial | All | Conservation Design | Assessment of the influence of forest condition and forest management on regional habitat capability and connectivity. | 8 | Moderate |
| <p>Ongoing projects: RCN (2007) – <i>The Conservation Status of Key Habitats and Species of Greatest Conservation Need in the Eastern Region</i> (184); RCN (2008) - <i>Regional Indicators and Measures: Beyond Conservation Land</i> (194); RCN (2009) - <i>Geospatial Condition Analysis of Northeast Habitats Based on the Northeast SGCN Habitat Maps</i> (196). LCC (2010) – <i>Designing Sustainable Landscapes for Wildlife</i> (205); <i>North Atlantic Landscape Conservation Cooperative: Wildlife Habitat Models for Terrestrial Vertebrates</i> (206).</p> <p>Proposed needs and projects: The influence of forest condition on regional habitat connectivity (84); data needs to help support conservation planning in the northern forest (86); providing deer management guidelines for industrial forest managers (116); effects of existing combined stressors on native forest structure & function (93); effects of climate change on structure & function of native forests stands (94); specific approaches to address age and structure in forests and early successional habitats (158); A spatial distribution analysis species that allows us to better prioritize forested landscapes and determine focal areas (173); Lynx, pine marten and forest biodiversity management plans for northern Maine forest (220); landscape change detection via remote sensing image classification (26); a profile of forest management in the LCC (82).</p> <p>Recommended steps: Work with existing Northern Forest groups to refine priorities and investigate options for regional assessments of forest age and structure that could support species-habitat models and connectivity analyses.</p> | | | | | | |
| Climate model downscaling | Aquatic | All species | NA | Climate model downscaling at scales useful for stream flow and temperatures | 9 | Moderate |
| <p>Ongoing projects: RCN (2010) and LCC (2010) – <i>Evaluating the Vulnerabilities of Ecological Resources to Climate Change in the Northeast (continuation of RCN)</i> (204). LCC (2010) - <i>Designing Sustainable Landscapes for Wildlife</i> (205); LCC (2010) - <i>Forecasting changes in aquatic systems and resilience of aquatic populations</i> (207).</p> <p>Proposed needs and projects: Effects of altered hydrology on freshwater aquatic systems, communities, species (91); integrated ecohydrological approach (103).</p> <p>Recommended steps: No immediate action needed; continue to incorporate climate downscaling into brook trout/coldwater and species habitat-modeling for aquatic species; identify future downscaling needs to be addressed through Climate Science Center</p> | | | | | | |

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| Assessments of landscape connectivity | Terrestrial | All | Conservation Design | Assess the current and future status of connectivity and regional and local scales. | 10 | Moderate |
| <p>Ongoing projects: RCN (2008) <i>Regional Focal Areas for Species of Great Conservation Need based on Site Adaptive Capacity, Network Resilience and Connectivity</i> (2008). LCC (2010) - <i>Designing Sustainable Landscapes for Wildlife</i> (205)</p> <p>Proposed needs and projects: Measure the current and future status of connectivity (83); landscape connectivity of ephemeral ponds for amphibian habitat (72); influence of forest condition on regional habitat connectivity (84); roads data for the northern forest (89); transportation and habitat connectivity planning for maintaining/restoring landscape in the Northeast (114); mapping and classification of industry roads and transmission lines across the Northern Appalachians (115).</p> <p>Recommended steps: Assess existing local and regional connectivity analyses by TNC and UMass and additional needs; evaluate need for road and transmission data for Northern Forest Region; investigate opportunities for working with transportation planners in pilot areas.</p> | | | | | | |
| Analysis of recent landscape change | Terrestrial | All | Monitoring | Contemporary land-cover change in the North Atlantic LCC for guiding management decisions. | 11 | Moderate |
| <p>Ongoing projects: no RCN or LCC projects addressing this need</p> <p>Proposed needs and projects: Contemporary land-cover change in the North Atlantic LCC (122); current estimates of landscape change over short periods (e.g., 5 years) to evaluate changes in carrying capacity, update adaptive management frameworks and decision support tools, and to prioritize habitat management activities (124); accurate, rapid and systematic assessments of wetlands and associated habitats (109).</p> <p>Recommended steps: Need additional detail of assessment approach and link to decision support; assess how recent landscape change is being developed in other LCCs.</p> | | | | | | |
| Identifying focal areas for conservation | Terrestrial | Amphibians and Reptiles | Conservation Design | Advancing landscape-scale conservation for Northeastern herpetofauna through support of the Priority Amphibian and Reptile Conservation Area (PARCA) system. | 12 | Moderate |
| <p>Ongoing projects: RCN 2010 <i>Regional Analysis of Frog Monitoring</i></p> <p>Proposed needs and projects: Advancing landscape-scale conservation for Northeastern herpetofauna through support of the Priority Amphibian and Reptile Conservation Area (PARCA) system (110)</p> <p>Recommended steps: Include in larger needs discussion with NEPARC; determine appropriate short-term LCC investment to leverage longer term benefits and resources.</p> | | | | | | |

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| Best management practices | Terrestrial | Amphibians and Reptiles | Conservation Design and Delivery | Developing conservation and management strategies for vernal pool dependent herpetofauna of the northeast including best management practices and model regulations. | 13 | Moderate |
| <p>Ongoing projects: RCN (2008) - <i>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</i> (193)</p> <p>Proposed needs and projects: Developing Conservation and Management Strategies for Vernal Pool Dependent Herpetofauna of the Northeast (113); vernal pool mapping project (43); vernal pool monitoring project (44); mapping amphibian road-crossing areas (46).</p> <p>Recommended steps: Discuss role of LCC in developing model regulations with Steering Committee; review model guidelines developed in RCN project.</p> | | | | | | |
| Detecting changes in species distribution | Coastal | Invasive spp. | Monitoring | Rapid assessment and response to coastal marine invasive species. | 14 | Moderate |
| <p>Ongoing projects: RCN 2007 - <i>Identifying relationships between invasive species and Species of Greatest Conservation Need in the Northeast Region</i> (186).</p> <p>Proposed needs and projects: Rapid assessment and response to coastal marine invasive species from Maine to Maryland (21); vulnerability of forage base (shorebird & seabird) to climate change, invasive spp. (156)</p> <p>Recommended steps: Assess general approach to documenting threats from invasive species.</p> | | | | | | |
| Adaptation planning pilot projects | Terrestrial & Coastal | All | Demonstration Projects | Project the impacts of climate change and identify adaptation options at specific pilot sites; e.g., Chincoteague National Wildlife Refuge/Assateague National Seashore Complex. | 15 | Moderate |
| <p>Ongoing projects: no RCN or LCC projects addressing this need</p> <p>Proposed needs and projects: Projecting the impacts of climate change and identifying adaptation options at Chincoteague National Wildlife Refuge Complex (218); climate change adaptation demonstration projects (102).</p> <p>Recommended steps: Summarize ongoing demonstration projects through Manomet, NWF and others; explore ongoing work at Chincoteague and Assateague and ability to apply models and scenario planning in that area; consider other types of demonstration projects related to forest connectivity and other adaptation factors; select projects that can demonstrate success and engage partners.</p> | | | | | | |
| Habitat mapping and modeling at NALCC scale | All | All | Conservation Design | A characterization and "GAP" analysis of the LCC. | 16 | Moderate |
| <p>Ongoing projects: RCN 2007 - <i>The Conservation Status of Key Habitats and Species of Greatest Conservation Need in the Eastern Region</i>: (184).</p> <p>Proposed needs and projects: A characterization and "GAP" analysis of the LCC (79); an LCC wide assessment of floodplain systems (81).</p> <p>Recommended steps: Need to clarify what added value would be of a general GAP analysis; consider GAP analysis focused on key habitat types such as floodplains.</p> | | | | | | |

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| Adaptive Management Frameworks for Representative Species | Coastal | American Black Duck | All | Developing an adaptive management framework for American black duck habitat conservation in the LCC. | 17 | Moderate |
| <p>Ongoing projects: RCN (2007) - <i>Development of avian indicators and measures for monitoring threats and effectiveness of conservation actions in the Northeast</i> (185)</p> <p>Proposed needs and projects: Developing an adaptive management framework for American black duck habitat conservation in the LCC (23); coastal wetland energetic carrying capacity for black ducks (107); Flyway integrated waterbird management and monitoring project (141)</p> <p>Recommended steps: Consider pilot adaptive management project for this representative species in cooperation with the Chesapeake Bay Program.</p> | | | | | | |

Information Management Needs

| Information Management Need | Specific Needs/Projects | Overall Rank |
|--|---|--------------|
| Long-term data management system | Overall project; Phase 1: Data needs assessment; Phase 2: Technical alternatives assessment; Phase 3: Pilot database | 1 |
| <p>Ongoing projects: RCN 2009 - <i>Development of an Online Database to Enhance the Conservation of SGCN Invertebrates in the Northeastern Region</i> (197)</p> <p>Proposed needs and projects: Land conservation targeting system (108); long-term data management system (146);</p> <p>Recommended steps: Develop phased approach beginning with needs assessment described above; could begin process at Albany workshop; consult with adjacent LCCs; Southeast "Conservation Atlas" and national LCC and CSC efforts. Engage agencies with existing databases.</p> | | |
| Managed Lands Database Development | Consistent/updated habitat management database for Northeast Region. | 2 |
| Consistent/updated secured lands database | Consistent, annually updated secured lands data for the Northeast Region. | 3 |
| Online tool for accessing the most recent conservation designs | Spatial database of conservation designs; RCN and LCC projects have a rapidly growing need for dissemination of spatial data products; would be part of overall data management needs but is highly feasible as a separate component to be integrated into future comprehensive database. | 4 |