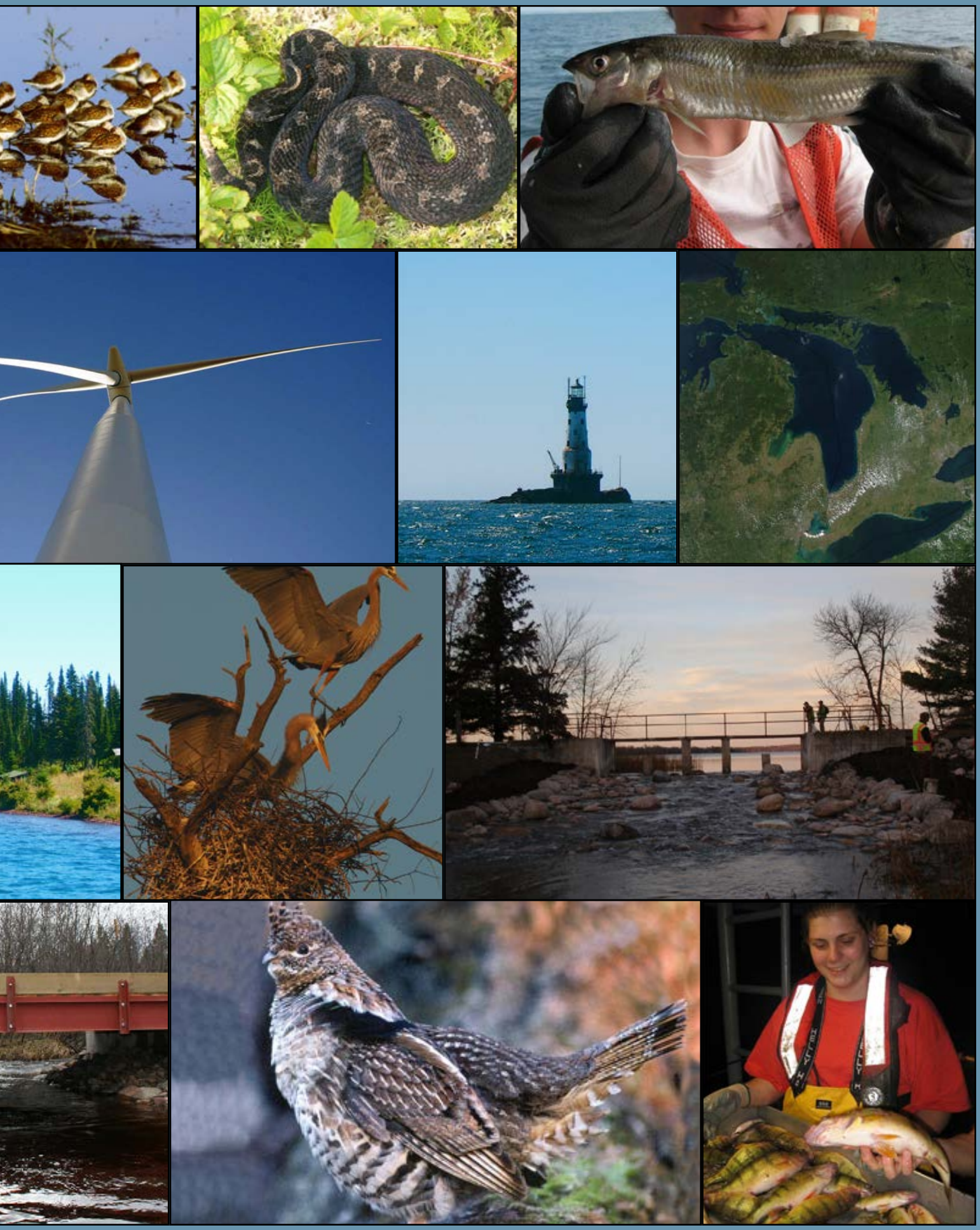
LANDSCAPE
CONSERVATION
COOPERATIVES

Upper Midwest & Great Lakes Landscape Conservation Cooperative

2012

Creating efficient conservation actions through **collaboration** *and* **sound science**



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U.S. Geological Survey.

Clough Island, Lake Superior. Cover photo by Richard Hamilton Smith.

LANDSCAPE CONSERVATION COOPERATIVES

From our steering committee co-chairs

Three years in the making, the Upper Midwest and Great Lakes Landscape Conservation Cooperative celebrates its successes, invests in the future.

The Upper Midwest and Great Lakes LCC has made great strides during 2012 to build bench-strength and increase our capacity by expanding our reach, engaging stakeholders, and identifying shared priorities among our partners that will guide future investments.

Through the guidance of our steering and technical committee members, we have formed a stronger and more definitive identity within the conservation community. We are developing practical and pragmatic tools that can be used by on-the-ground conservation practitioners and decision-makers, from national wildlife refuge managers to county commissioners and private landowners.

Left: Tom Melius, Regional Director
U.S. Fish and Wildlife Service Midwest Region

Right: Becky Humphries, Director
Ducks Unlimited Great Lakes/Atlantic Region

From May-September this year we employed a rigorous assessment to narrow down shared priorities for science and collaboration. Working across jurisdictional lines we identified climate change, terrestrial and aquatic connectivity, and energy development among our priority resource challenges.

We look forward to our steering committee meeting in January 2013 to review these priorities and forge ahead with technical working groups to address science needs and collaboration efforts. As we work strategically to guide our future investments, we also take pause to acknowledge and celebrate our success over the past year.

Climate change remains at the forefront of our shared conservation challenges. This year, our LCC supported the development of highly anticipated down-scaled climate data which projects future changes in precipitation and air temperature using a number of different global circulation models. These data, in turn, are being used to estimate potential impacts of climate change on fish, wildlife and habitat. In partnership with state and academic institutions, we are examining

the Eastern massassauga rattlesnake, ruffed grouse and snowshoe hare among species that may be highly vulnerable to climate change impacts.

We also made headway with our aquatic connectivity initiative to help fisheries managers and conservationists strategically restore connectivity across watersheds in the upper Midwest and Great Lakes. We look forward to the completion of our Great Lakes Information Management and Delivery System which will allow users to integrate relevant ecological and socioeconomic data and assemble decision support tools that currently exist or are under development for use in upper Midwest and Great Lakes conservation.

We look forward to a year of progress through partnership. We simply could not seek our shared vision without the commitment, input and support of our dedicated conservation professionals.

Becky Humphries
Co-Chair, Upper Midwest and Great Lakes LCC

Tom Melius
Co-Chair, Upper Midwest and Great Lakes LCC

U.S. Fish and Wildlife Service.

Our Community

Upper Midwest and Great Lakes LCC

Our Vision

The Upper Midwest and Great Lakes LCC envisions a conservation community, that while governed by their unique purposes and missions, collaborates on sustaining lands and waters that support natural and cultural resources and the services they provide.

Our Mission

Our mission is to support and sustain a conservation community through information development and dissemination designed to inform coordinated conservation action.

Landscape Conservation Cooperatives

Landscape Conservation Cooperatives (LCCs) address natural resource challenges that transcend political and jurisdictional boundaries and require a networked approach to conservation—holistic, collaborative, and grounded in science – to ensure the sustainability of America's land, water, wildlife and cultural resources.

The Upper Midwest and Great Lakes Landscape Conservation Cooperative (LCC), established in 2010, is focused on a diverse range of fish, wildlife and other natural resources that transcend state and international borders. This includes the Great Lakes, North America's largest freshwater resource, coastal wetlands, boreal forests, major river systems and prairie-hardwood ecosystems. Many of these ecosystems surround heavily populated urban centers creating both resource challenges and opportunities.

The Upper Midwest and Great Lakes LCC is among 22 similar partnerships that collectively form a national network of land, water, wildlife and cultural resource managers, scientists, and interested public and private organizations—within the U.S. and across our international borders—that share a common need for scientific information in conservation.

LCC Network Vision

Landscape Conservation Cooperatives are the forum for the conservation community to define, design, and deliver landscapes that can sustain natural and cultural resources at levels desired by society.

> A landscape is a specific geographic area that includes the pattern and structure of the geography, the biological components, its physical environment, as well as the social and cultural setting.

Our steering committee

- Serves as the executive body for decision making.
- Provides guidance on policy and develops operational and strategic plans.
- Promotes cooperation, coordination, consolidation of information, and collaboration among partner organizations to support the LCC's goals and objectives.
- Reviews prioritized projects and related activities recommended by the Technical Committee for development and dissemination.
- Identifies funding opportunities and other available resources (e.g., staff, in-kind services) for supporting priority projects and activities.

Our technical committee

- Formulates and facilitates a transparent process for the identification and prioritization of shared landscape conservation science needs and recommends priority projects and activities to the steering committee to meet those needs.
- Provides recommendations to the steering committee on coordination, planning, staffing and science activities for the LCC.
- Develops appropriate mechanisms for communicating with and receiving input from organizations not represented on the steering committee regarding science needs and capacity for science delivery.
- Establishes ad-hoc subcommittees to carry out the purpose and function of the LCC.
- Maintains regular, clear and transparent communication with and among existing conservation partnerships, other interested or contributory organizations, and the LCC network.

Our People

We are leaders in the conservation community. But we are not just conservationists. We are also economists, social scientists, and communicators. We come from federal and state governments, not-for-profit and private organizations, tribal groups, and pre-existing partnerships. We see beyond agency lines and authorities, to identify what is in the best interest of our collective community, both within the LCC and outside of the LCC, to benefit fish, wildlife, habitat and people.

LANDSCAPE CONSERVATION COOPERATIVES

Since 2010, our steering and technical committee membership has grown to represent more than 30 agencies and organizations across state and international boundaries, committed to healthy ecosystems for current and future generations.

U.S. DEPARTMENT OF THE INTERIOR · MARCH 3, 1849

U.S. FISH & WILDLIFE SERVICE

NECSC Northeast Climate Science Center

NATIONAL PARK SERVICE

FOREST SERVICE · U.S. · DEPARTMENT OF AGRICULTURE

USGS science for a changing world

DNR

NOAA · NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION · U.S. DEPARTMENT OF COMMERCE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

The Nature Conservancy

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

DNR

Chicago Wilderness

CANADIAN WILDLIFE SERVICE · SERVICE CANADIEN DE LA FAUNE

DEPARTMENT OF NATURAL RESOURCES · DNR · MICHIGAN

ILLINOIS NATURAL HISTORY SURVEY

OHIO DEPARTMENT OF NATURAL RESOURCES

WISCONSIN DEPT. OF NATURAL RESOURCES

Minnesota DEPARTMENT OF NATURAL RESOURCES

NATIONAL FISH HABITAT PARTNERSHIP

PENNSYLVANIA GAME COMMISSION 1895

DEPARTMENT OF ENVIRONMENTAL CONSERVATION · NEW YORK STATE

NRCS Natural Resources Conservation Service

DUCKS UNLIMITED

Ontario Ministry of Natural Resources

PENNSYLVANIA FISH & BOAT COMMISSION

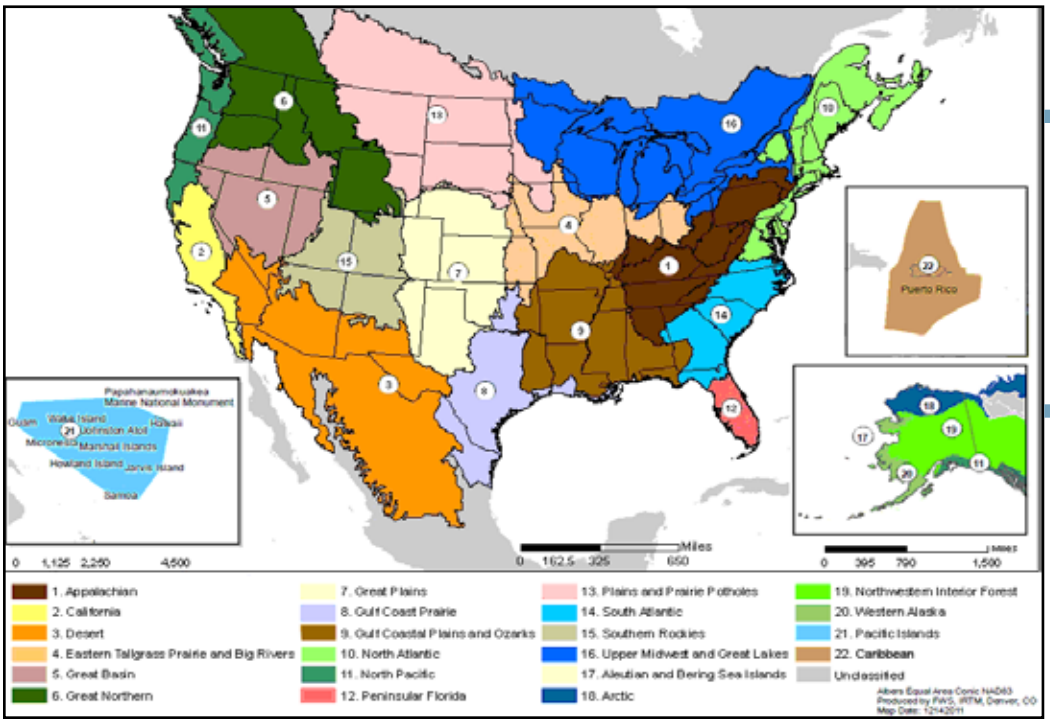
DCNR

Protecting Our Fishery · Great Lakes Fishery Commission · SCIENCE · SEA LAMPREY CONTROL · PARTNERSHIPS

UPPER MISSISSIPPI RIVER & GREAT LAKES REGION JOINT VENTURE

Ressources naturelles Québec

Our History



From 2010 - 2012, the LCC has funded 16 research projects ranging from $35,000 to $560,000. LCC partners continue to zero-in on key research and collaboration needs within the upper Midwest and Great Lakes natural resources community.

2009

In 2009, the U.S. Department of Interior demonstrated its commitment to serving the public's interest in our nation's treasured landscapes by issuing Secretarial Order 3289 titled: Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources. Among the actions in that order, the Department of Interior committed to helping the conservation community develop a collaborative response to climate change.

2010

In 2010, Congress appropriated funds to support DOI's vision of establishing a national network of Landscape Conservation Cooperatives (LCCs). The Upper Midwest and Great Lakes LCC was not initially targeted for fiscal year 2010 U.S. Fish and Wildlife Service funding. However, the Environmental Protection Agency (EPA) provided an initial allocation of $1 million via the Great Lakes Restoration Initiative (GLRI).

Great Lakes RESTORATION

LANDSCAPE CONSERVATION COOPERATIVES

2011

In addition to continued GLRI funding, the LCC also received funding from U.S. Fish and Wildlife Service in 2011 and 2012. This funding supported the LCC's mission to build science and collaboration priorities, and provide additional funding for research projects initiated in 2010 and new research to meet the needs of the conservation community.

LCC coordinator and science coordinator positions were hired in 2010 and 2011 respectively to lead and develop the mission, vision and operational structure of the LCC. Steering and technical committees were initiated in 2010 and continue to evolve and ensure broad representation of the conservation community, including federal, state, non-governmental, and tribal resource agencies and organizations.

2012

In 2012, technical committee members developed a proposed list of science and collaboration priorities using a rigorous scientific assessment across agencies and organizations. These priorities will be presented to the steering committee for approval in January 2013 and will guide future research and the development of issue-specific work groups to tackle our highest priority natural resource challenges.

Our Successes

Waterfowl. U.S. Fish and Wildlife Service.

Identifying science and collaboration priorities

In 2012, technical committee members reviewed and proposed priorities for science and collaboration to guide conservation research and future investments by the LCC and its partners. Climate change, terrestrial and aquatic connectivity, and energy development were identified among priority resource challenges.

The proposed priorities were established through a qualitative and quantitative research process engaging more than 30 representatives from across non-governmental, federal (U.S. and Canadian), state and provincial agencies and organizations vested in the conservation, restoration and protection of upper Midwest and Great Lakes natural resources.

The shared conservation priorities assessment began in March 2012 and was conducted by researchers at the University of Illinois. Upper Midwest and Great Lakes LCC technical committee members reviewed the assessment and selected priorities to propose to the LCC steering committee in October 2012. The LCC steering committee will review the proposed priorities in early 2013.

"We simply cannot expend our resources everywhere. With tightening budgets, increasing demands on our natural resources, and impacts to these resources by stressors like climate change, we must work together to prioritize where we can do the most good, not just for fish, wildlife and natural resources, but for people as well," said Bradly Potter, Science Coordinator for the Upper Midwest and Great Lakes LCC.

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The shared priorities assessment included comprehensive one-on-one interviews with more than 30 natural resources experts who serve as staff, technical or steering committee members of the Upper Midwest and Great Lakes LCC. Researchers also conducted a background documentation analysis on existing conservation priorities articulated by LCC partners. Following this information gathering process, descriptive statistics were used to rank priorities for further discussion among LCC leadership and the LCC technical committee. Technical committee members proposed the following science and collaboration priorities to guide LCC investments and activities.

Upper Mississippi River National Fish and Wildlife Refuge. U.S. Fish and Wildlife Service.

Research on energy development and landscape change was identified by the LCC as a resource priority. U.S. Fish and Wildlife Service.

Science Priorities

Assessing terrestrial and aquatic connectivity

Connected landscapes facilitate movement for wildlife, including individuals, populations and communities and support more resilient ecosystems. The LCC conservation community desires to maintain connected habitats and restore severed habitats.

Conservation of species at a landscape scale

Conservation activities benefiting fish, plants and wildlife often occur at local scales, however, regional coordination is necessary to increase the efficacy of conservation actions when working toward species population objectives.

Climate change adaptation for fish, wildlife and natural resources

Natural resource managers will be required to adapt conservation and management efforts to account for rapidly accelerated climate changes that are impacting fish, wildlife and other natural resources. The LCC aims to support the development of strategies for climate change adaptation, including assessing vulnerability of species and development of decision-support and communication tools.

Quantifying and communicating ecosystem services

Ecosystem services acknowledges the benefits of conservation actions beyond direct impacts to natural resources. These include social and economic impacts of conservation and management activities. The LCC conservation community supports quantifying and communicating these indirect impacts of conservation to garner greater public support for landscape conservation.

Energy development and landscape change

Increased demand for energy production and the growth of non-traditional energy sources have direct impacts on natural resources across broad regions and landscapes. Understanding these impacts is critical to allow natural resources managers and the energy development community to work together to minimize those effects while meeting energy demands.

Collaboration Priorities

Information management, delivery and communication

The LCC aims to ensure the conservation community receives maximum value from LCC science investment by facilitating the transfer of information in formats that are quickly accessed, easily understood, transparent, and trustworthy.

Using regional assets for relating science, management and policy

The LCC is strategically situated to identify key conservation assets and make those assets available to the broader conservation community.

Emerging conservation issues

Natural resources in the upper Midwest and Great Lakes region continually face new and unfamiliar threats. The LCC aims to bring awareness to these issues to the broader conservation community with potential to quickly mobilize actions and response.

Regional conservation efforts

No single agency or organization can achieve conservation objectives individually. Bringing the conservation community together around shared goals develops a greater capacity to leverage resources for action and communication. The LCC aims to serve as a venue to develop shared conservation goals and coordinate regional conservation efforts.

Great Lakes lighthouse. U.S. Fish and Wildlife Service.

Accountability

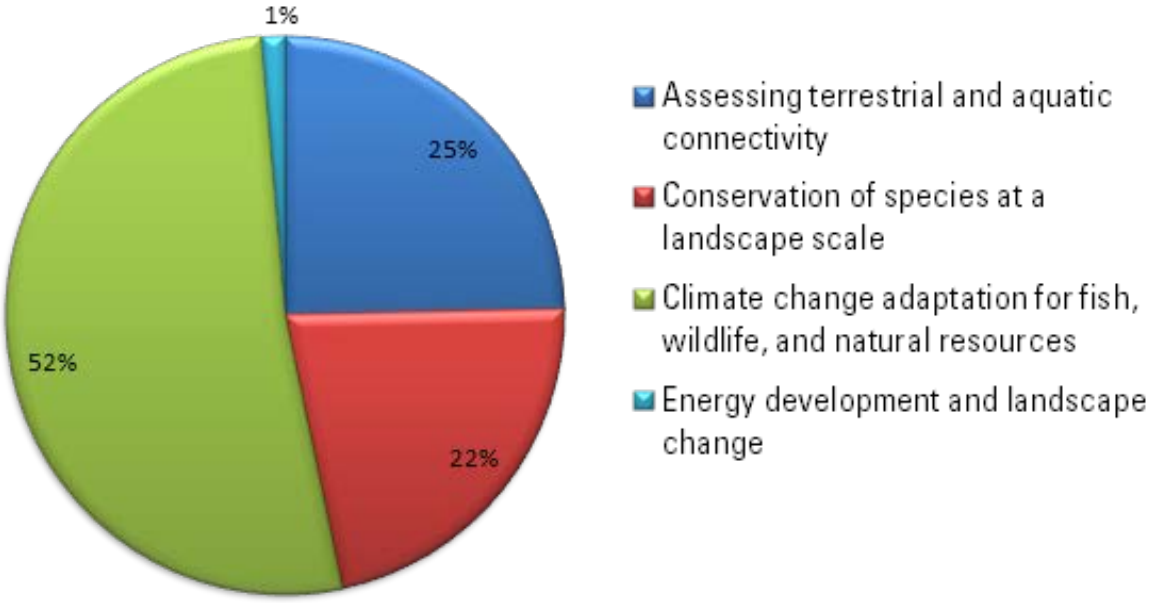
From initiation in the summer of 2010 until fall 2012, the LCC provided nearly $3 million to research institutions working on increasing the scientific foundation for management of natural resources and the development of tools and frameworks to improve our ability to work as a conservation community.

For this annual report, the charts represent only the financial resources provided by the U.S. Fish and Wildlife Service and the Environmental Protection Agency via the Great Lakes Restoration Initiative. Future reports will include the additional resources provided by other participating LCC organizations.

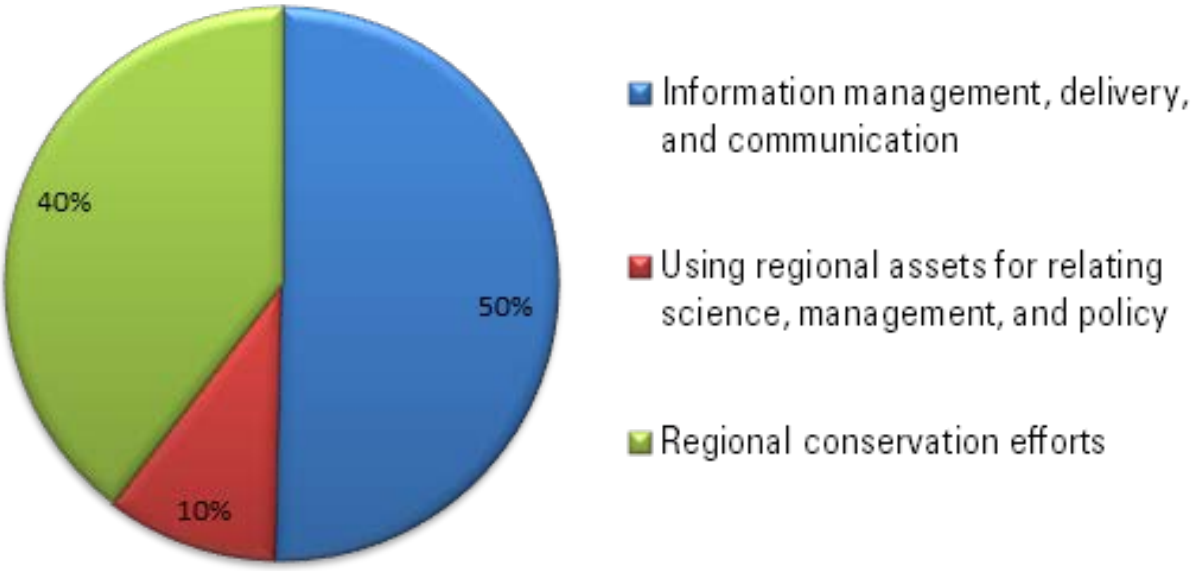
To date, approximately 80 percent of the LCC's financial investments in research focused on science for the management of natural resources. The LCC has also invested 20 percent of total funding in projects that assist the conservation community with maximizing communication and collaboration goals.

Satellite image of Great Lakes. NASA/Goddard Space Flight Center.

Percent LCC funding (2010-2012) by proposed SCIENCE priority



Percent LCC funding (2010-2012) by proposed COLLABORATION priority



Projects were categorized by general conservation priority to demonstrate emphasis of LCC science and collaboration activities. Several projects cross multiple priorities and their funding amount was divided into the appropriate categories based on the expected benefit to the priorities. For example, the project titled, "Distribution of breeding birds in response to climate and land use change" was separated 70 percent of the total funding to the climate change adaptation for fish, wildlife, and natural resource priority; the rest (30 percent), conservation of species at a landscape scale.

Ongoing Research

The following scientific research projects have received funding from the Upper Midwest and Great Lakes LCC. These and other LCC-funded projects continue to transcend boundary lines to generate the most advanced and scientifically-solid data to guide natural resources management across the upper Midwest and Great Lakes.

The partnerships and data produced are critical to informing the protection and conservation of these unique and valuable natural resources.

Piping plovers. U.S. Fish and Wildlife Service.

National Wetland Inventory Mapper. U.S. Fish and Wildlife Service.

National Wetlands Inventory (NWI) mapping

Scheduled completion date: September 2014
LCC funding: $260,000

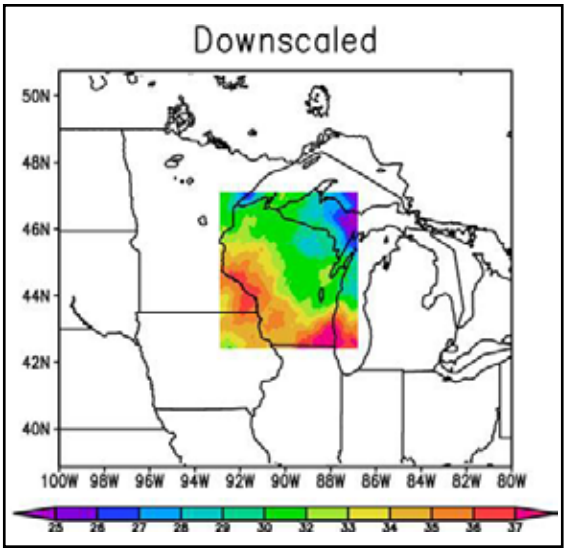
Funding for this project has been leveraged with several other larger projects to improve digital wetland mapping infrastructure for Michigan, Minnesota and Wisconsin. For Wisconsin, the portion of this project is targeting the digital conversion and updating of Wisconsin Wetland Inventory maps for at least six Wisconsin counties. With additional contributions from the Wisconsin Department of Natural Resources, Ducks Unlimited and U.S. Fish and Wildlife Service, this LCC supported project will complete an updated wetland mapping dataset for the Midwest.

Isle Royale, Wright Island, Lake Superior. U.S. Fish and Wildlife Service.

Climate adaptation recommendations for site managers

Scheduled completion date: June 2013
LCC funding: $179,950

Researchers are assessing the trade-offs between mitigation and adaptation strategies within forest, grassland, and wetland ecosystems in the Upper Midwest and Great Lakes region. A literature review identified climate mitigation and adaptation options available to natural resource managers. State, federal, NGO and tribal agencies are being interviewed for additional detail on management options and management tools they employ. Cost, feasibility, and additional factors will be considered in an analysis of the trade-off between multiple scenarios of mitigation and/or adaptation strategies. In collaboration with regional managers, mitigation and adaptation options will be classified by their compatibility with each other and existing management priorities.



Downscaling probability distribution. Wisconsin Climate Change Initiative.

Down-scaled climate data

Scheduled completion date: July 2013
LCC funding: $126,416

Researchers downscaled projections of maximum and minimum temperature and precipitation across a large extent east of the Rocky Mountains to the Atlantic Coast. The data is probabilistic in nature, providing flexibility in incorporating climate information into impact assessments. Statistical techniques were used for the downscaling and it retains a reasonable representation of daily extreme events, such as intense precipitation or extreme temperatures. A web-based client is in creation to host and distribute the data. This project was featured during the Ohio State University Climate Change Webinar Series. Research featured on page 22.

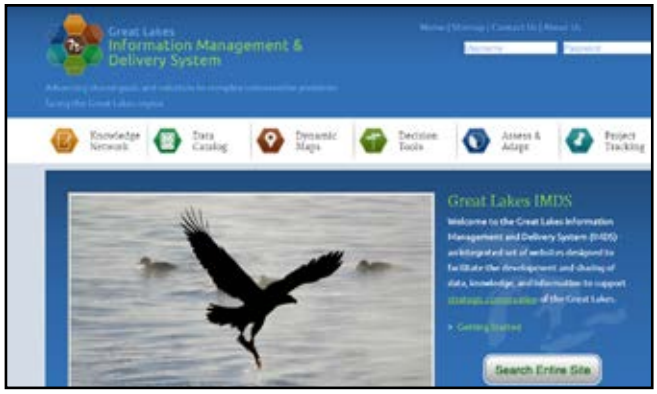
Regional wildlife vulnerability assessment
Scheduled completion date: July 2013
LCC funding: $220,050

Researchers from the University of Wisconsin and Wisconsin Department of Natural Resources led an effort among scientists and natural resource managers to identify priority terrestrial wildlife species that may be especially vulnerable to impacts of climate change. A series of workshops identified common management objectives and identify terrestrial species for priority evaluation of the potential direct and indirect impacts of climate change. Species identified included the Eastern massasauga rattlesnake, white-tailed deer, Blanding's turtle, ruffed grouse and snowshoe hare. Researchers are now forging ahead with quantitative vulnerability assessments for a subset of these identified species to determine how climate change may impact future distribution and abundance. Research featured on page 26.

Eastern massassauga rattlesnake. Ohio Biodiversity Conservation Partnership.

Great Lakes Information Management and Delivery System
Scheduled completion date: July 2013
LCC funding: $560,616

Researchers developed an integrated web-based Great Lakes Information Management and Delivery System (IMDS). The IMDS facilitates the process of adaptive management and aids the development of shared conservation objectives by efficiently managing information and knowledge through six web-based modules. The first version of the IMDS is complete and is being user tested. The system will be prototyped for a couple key conservation issues during 2013. Research featured on page 24.



Screenshot of Great Lakes IMDS homepage.

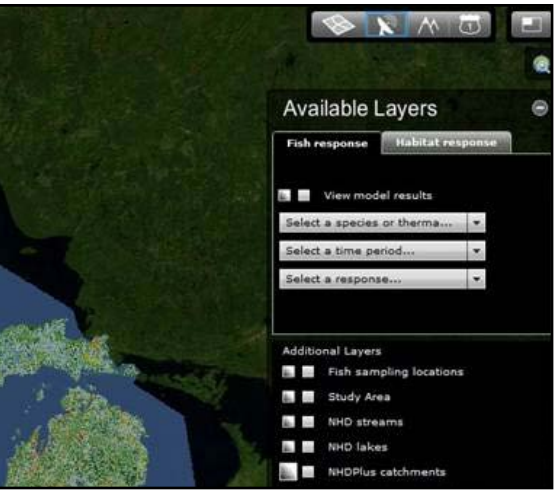
Regional decision-support tool for identifying vulnerabilities of riverine habitat and fishes to climate change
Scheduled completion date: September 2013
LCC funding: $400,000

Researchers are identifying vulnerabilities of fish species and river segments to climate change in the U.S. portion of the Upper Midwest and Great Lakes LCC region. By collaborating with and integrating results from six existing projects, the team will predict potential changes in thermal and flow regimes and keystone fish species/groups under modeled downscaled climate change scenarios to identify vulnerabilities. The team organized two stakeholder workshops to demonstrate decision support tools and develop management strategies for key species/habitats with the potential to adapt to altered climate. Additionally, the team is developing web-based decision support system to provide river segment-scale data that characterize the river network/catchment, connectivity, vulnerability to climate change, and potential management scenarios and adaptation strategies. The state of Wisconsin is already using information from this project to plan land management strategies in the Driftless region.

Web-based decision support system that provides river segment scale data to characterize connectivity, vulnerability to climate change and potential management scenarios. U.S. Geological Survey.

Great blue herons. U.S. Fish and WIldlife Service.

Piping plovers. U.S. Fish and WIldlife Service.



Distribution and abundance of breeding birds in the upper Midwest and Great Lakes region as influenced by climate and land cover change

Scheduled completion date: June 2013
LCC funding: $179,575

The study seeks to 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 will be used to provide spatially explicit forecasts of future avian responses. Using data from the North American Breeding Bird Survey (BBS) and a hierarchical modeling framework that accounts for imperfect detection during surveys, species distribution and abundance is estimated. Historic aerial photos are being digitized and classified to measure landscape covariates. Once species-specific relationships between distribution parameters (i.e., occupancy, colonization, extinction) and landscape covariates have been established, climate change projections will allow prediction of future species' distributions.

Full life cycle vulnerability assessments for the birds of the upper Midwest and Great Lakes

Scheduled completion date: August 2013
Approved fiscal year 2011 funding: $123,431

Full life-cycle vulnerability assessments are identifying the effects of climate change on nongame migratory birds that are of conservation concern and breed in the upper Midwest and Great Lakes 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. The approach provides 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, life history information, and down-scaled climate data are the primary source data for the project.

Manajiwin: Respecting tribes, First nations and cultural resources in cooperative landscape and climate change decision-making

Scheduled completion date: June 2013
LCC funding: $128,496

This project will improve tribal and First Nation engagement in cooperative natural resource conservation efforts. Researchers are fostering networking among tribes, First Nations and other relevant partners in the upper Midwest – Great Lakes region, and engaging tribal and First Nation representatives in the development of a set of principles and strategies for their authentic, robust inclusion in regional resource conservation cooperative frameworks. The project is conducting an environmental scan of current climate and landscape change planning initiatives as well as mitigation and resilience-building projects being implemented by tribes and First Nations in the region. The results will lead to broader inclusion of tribal values, traditional knowledge and cultural resource protection in regional conservation initiatives such as the LCC.

On-a-wing and a (GIS) Layer: Prioritizing migratory bird habitat along Great Lakes shoreline

Scheduled completion date: June 2013
Approved fiscal year 2011 funding: $222,286

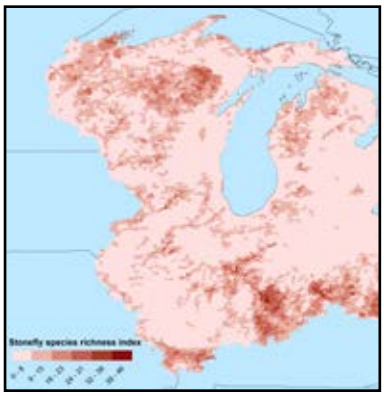
The Nature Conservancy - Great Lakes Program is leading the development of a scalable (Great Lakes wide, individual lake basin, to coastal reach within a lake basin) rule-based spatial model for ranking the relative importance of coastal lands and waters as habitat for migrating birds. Results will guide 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.

Mallards. U.S. Fish and Wildlife Service.

Predicting climate change effects on riverine aquatic insects using museum data and niche modeling

Scheduled completion date: June 2013
LCC funding: $145,505

Aquatic insect museum data, environmental data from the Great Lakes Aquatic Gap Program, the National Hydrography Dataset, and climate change projections from University of Wisconsin are being used to model the occurrence aquatic insects and assess how climate change will affect their distributions and connectivity between populations. The study area includes the U.S. portion of the Upper Midwest and Great Lakes LCC excluding New York, Pennsylvania and Vermont. Models will predict the natural and climate modified occurrence for up to 400 species occurring in the region. Maps, color coded by probability of occurrence for each modeled species, will project an expected distribution under different emission scenarios. Species richness maps will be produced by summing the probabilities of individual modeled species and illustrate how diversity hotspots shift under different emission scenarios by the end of the century.



Stonefly richness.
University of Illinois.

Reestablishing ecological connectivity between the Great Lakes and their tributaries: Prioritization in a complex system

Scheduled completion date: February 2014
LCC funding: $167,115

Ecological connectivity between the Great Lakes and their tributaries is widely impaired, and many agencies and organizations are investing in restoring these connections to enhance fish and wildlife populations. To assist in targeting these investments, spatial data on the location and attributes of barriers (dams and road-stream crossings) throughout the Great Lakes basin is being synthesized and used to analyze the optimal strategy for enhancing connectivity to restore fish migrations. To provide specific insights for a priority species, additional analyses will focus on barriers within the current and historical range of lake sturgeon. The project will provide the basis for a decision-support tool to guide restoration at scales from individual watersheds to the entire basin, and provide a systematic framework for comparing costs (direct economic costs, species invasions) and benefits (connectivity, focal fish species) of barrier removal. To date, we have produced the first comprehensive spatial analysis of potential barriers through the Great Lakes basin (~270,000 sites), and are in the final stages of predicting passability for each of these barriers. The optimization model has been coded, and will soon be applied to the barrier database to test how recommendations change based on spatial scale of analysis and the complexity of the cost and benefit functions.

Great Lakes fish passage project.
U.S. Fish and Wildlife Service.

Kadence Creek Mouth. U.S. Fish and Wildlife Service.

Scenarios for forest reserve expansion and adaptive management under alternative climate change scenarios in the northern Great Lakes

Scheduled completion date: June 2013
LCC funding: $104,868

Researchers are assessing how an expansion of forest reserves and climate-adaptive management may improve ecological connectivity and resilience under different climate scenarios. Resilience is being measured as the capacity for these systems to maintain extant forest communities and aboveground live biomass. Forest landscape change is being simulated via a spatially explicit forest ecosystem model, LANDIS-II. Simulations will cover areas in northern Minnesota and northern lower Michigan that represent northern Great Lakes forest types. Restoring and maintaining ecological connectivity is one of the primary climate change adaptation strategies available to land managers, in addition to silvicultural practices. This study is integrated in an ongoing regional Climate Change Response Framework linking the results to land management throughout the northwoods.

Examining focal predator species in Lake Erie food web. U.S. Geological Survey.

Developing fish trophic interaction indicators of climate change for the Great Lakes

Scheduled completion date: April 2014
LCC funding: $70,666

The project addresses regional climate change effects on aquatic food webs in the Great Lakes, and will develop fishery management tools that characterize food web changes to support efficient monitoring and adaptive management. Researchers are developing a comparative analysis of trophic interactions in fisheries from three ecotones of Lake Erie representing scenarios that may occur in other Great Lakes if current climate trends continue. Cool water fish guilds in Lake Erie's central basin are seasonally squeezed vertically in the water column and horizontally towards the eastern basin, and into shallower waters by hypoxia. This seasonal change forces cool and cold water fish guilds to overlap with consequences to food web dynamics. Researchers will use standard dietary and biochemical techniques to identify critical food web pathways and analytical metrics that can serve as synoptic measures of the effect of these physical forces on food web structure and fishery resources.

Great Lakes ice cover. Wisconsin Climate Change Initiative.

Future changes in weather extremes derived from statistically downscaled climate projections for the Great Lakes region

Scheduled completion date: December 2013
LCC funding: $59,750

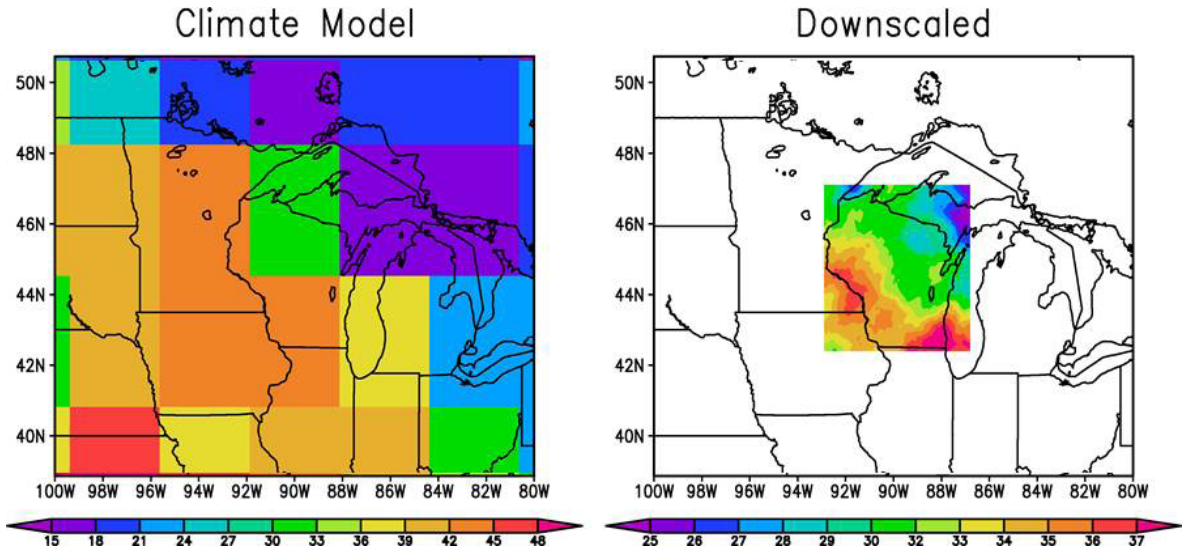
Researchers are analyzing projected changes in the frequency and intensity of extreme weather events across the Great Lakes region, namely heat waves, cold spells, heavy precipitation events, and droughts, using a new statistically downscaled climate product produced by the Climate Working Group of the Wisconsin Initiative on Climate Change Impacts (WICCI). Researchers will perform a probabilistic exploration of weather extremes, ideally tailored toward decision-makers who are developing impact assessments at a regional scale across the Great Lakes region. The project will conclude and present results during a workshop with natural resource managers.

Making climate change data relevant to land managers

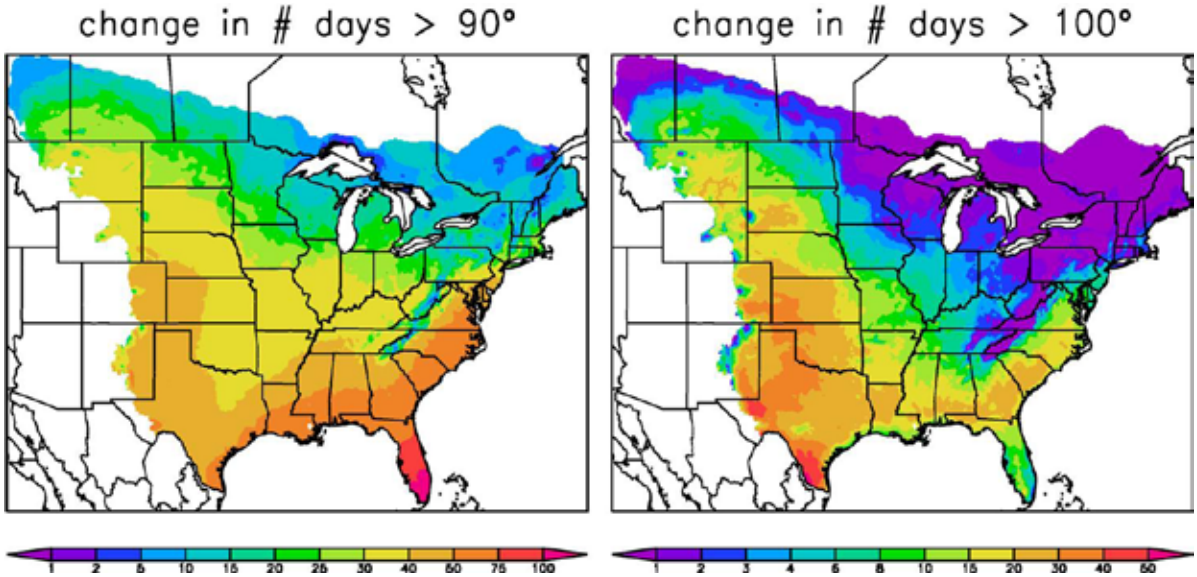
Global climate models project that Earth's temperature will warm by about 2°-4°C (about 3°-7°F) in the coming century. But what does that mean for communities, natural resource managers, and other local interests? And how can climate scientists ensure that climate data is useful to a wide range of individuals with different data needs?

In cooperation with the Upper Midwest and Great Lakes LCC, Dan Vimont, associate professor at the University of Wisconsin-Madison and his team of climate scientists are releasing a newly developed set of downscaled climate data developed specifically to address climate change challenges at a local level. The data set will be housed and available to conservation and land managers through a U.S. Geological Survey web portal in early 2013.

"The data can be used in a number of different ways, by groups with very different needs," Vimont said.



Extreme Heat



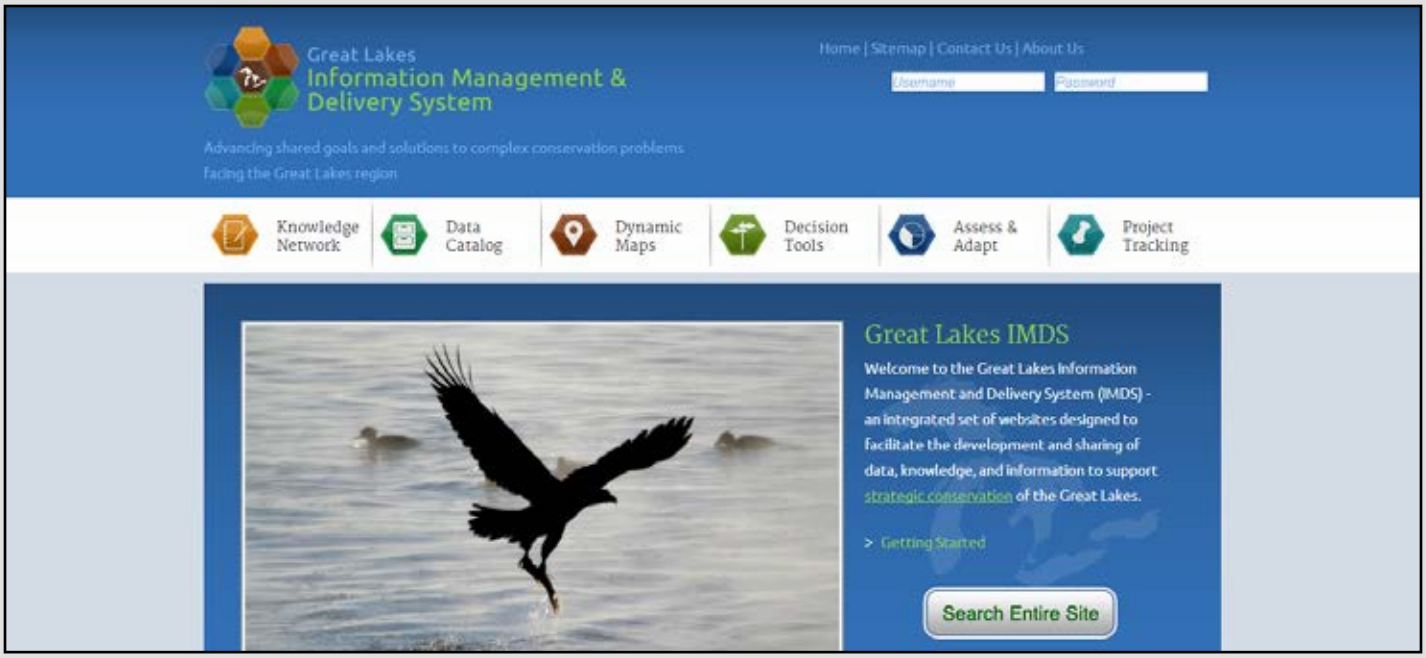
"The data can be used in a number of different ways, by groups with very different needs," Vimont said.

For example, the data could be used to assess and anticipate climate change impacts on specific natural resources, ecosystems and regions, but it is also valuable for evaluating potential effects on industry, agriculture, tourism, and other human activities. Ultimately, the data will be used to develop and recommend climate adaptation strategies. The data is extremely flexible due to its probabilistic nature. It also applies high spatial (eight kilometer) and temporal (daily) resolutions across the study region, critical components for adaptation planning.

Based on this newly developed data, the LCC is supporting additional work to project the changes in the frequency and intensity of extreme weather events across the Great Lakes region, namely heat waves, cold spells, heavy precipitation events, and droughts.

Preliminary analysis shows an increase in the number of "very hot" days, a decrease in the number of "very cold" days, wet areas getting wetter and dry areas getting drier. For example, in the Chicago area, data shows the area will warm by 3 to 8°F by mid-century, have more frequent very hot days (four weeks per year), and less frequent freezing days (five to six weeks per year). Winter precipitation could increase by 0-25 percent, and very wet days will become more frequent. In fact, the number of two inch rainfall events could double. These characterizations of the potential weather extremes and the downscaled data will allow upper Midwest and Great Lakes natural resources managers prepare for anticipated climate impacts.

U.S. Fish and Wildlife Service.



Combining science and technology to build a Great Lakes Information Management and Delivery System

Strategic conservation seeks to get the right conservation practices to the right place in the right amount at the right time, as efficiently as possible, to achieve a desired set of conditions. Over the past century, the complexity of conservation in the Great Lakes has increased significantly. We are now building a management and delivery system designed to handle the ever growing supply of conservation data, knowledge and information in an integrated way to support adaptive management of the Great Lakes.

The Nature Conservancy, U.S. Geologic Survey, and Upper Midwest and Great Lakes LCC have collaborated to build a prototype Great Lakes Information Management and Delivery System (IMDS).

The IMDS brings to life strategic conservation by providing a dynamic platform to access and share all the necessary components of adaptive management.

Researchers have developed a highly efficient, first stop shop to find and contribute data, knowledge, online mapping services, decision tools, shared goals and project demonstrating solutions associated with featured Great Lakes issues.

By using and contributing to the IMDS, the conservation community will break down silos and push strategic conservation of the Great Lakes beyond development and into action.

The six IMDS modules represent the core elements of adaptive management. The content is layered so that users can retrieve information and knowledge appropriate to their level of expertise and to provide a comparative look at conservation across Great Lakes ecosystems and geographies.

Knowledge Network—sharing knowledge to increase understanding
Learn about the condition of Great Lakes ecosystems and what ecological values are at stake, build partnerships, or contribute content and advance our understanding of Great Lakes terrestrial, inland aquatic, and Great Lake habitats.

Data Catalog—sharing data to advance knowledge
The Data Catalog is a virtual repository of Great Lakes data layers and databases. Find or share data for any media (land, air, water), ecosystem, or ecological pattern or process in the Great Lakes region.

Dynamic Maps—sharing interactive maps to provide a sense of place
The Dynamic Maps module catalogs interactive mapping applications. Use these online mapping tools to assess the scope of conservation issues, or share dynamic mapping applications and support our knowledge Great Lakes ecosystems.

Decision Tools—sharing models and decision tools to address complex problems
The Decision Tools module indexes tools ranging from vegetation calculators, to watershed assessment procedures, to climate change modeling tools, to help you find the tools most relevant to your natural resource management decisions.

Assess & Adapt—sharing goals to foster solutions
The Assess & Adapt module delivers conservation performance indicators for important landscape-scale conservation issues in the Great Lakes region.

Project Tracking—sharing ideas to facilitate and coordinate conservation actions
Project Tracking is a collection of project information searchable by geography or terms. Export project information for your own analysis. Identify opportunities to work collaboratively where project goals and objectives align.

This project will improve and enhance communications and facilitate an effective and efficient flow of information across the conservation community.

Linking information to promote breakthroughs in landscape-scale conservation

The IMDS serves two key purposes, providing an information supply chain that supports collaborative strategic conservation and empowering users to tell a complete story through the deliberate, interlinking of each module's content. Easy access to related content will help conservation practitioners do their work better and encourage breakthroughs in landscape-scale conservation in the Great Lakes region.

Identifying species highly vulnerable to climate change impacts

Left: Ruffed grouse. U.S. Fish and Wildlife Service. Right: Eastern massassauga rattlesnake. Ohio Biodiversity Conservation Partnership.

Researchers from the University of Wisconsin and Wisconsin Department of Natural Resources led an effort among scientists and natural resource managers to identify priority terrestrial wildlife species that may be especially vulnerable to impacts of climate change. Species identified from the research include Eastern massasauga rattlesnake, white-tailed deer, Blanding's turtle, ruffed grouse and snowshoe hare. Researchers are now forging ahead with quantitative vulnerability assessments for a subset of these identified species to determine how climate change may impact future distribution and abundance.

Researchers conducted workshops with more than 200 participants representing 62 agencies and organizations across the region. As a result of these workshops, 30 terrestrial species were identified and considered to be priorities for climate impact assessment. Now, researchers are completing a quantitative vulnerability assessment on two partner-identified priority species, eastern massasauga rattlesnake and ruffed grouse. This project will identify potential changes in the distribution and abundance of these priority species.

"Resources for wildlife conservation and management are limited, so this information could help inform the allocation of resources and effort for the conservation and management of the species across their range," said project investigator Olivia LeDee.

Climate change is a key threat identified by LCCs, Joint Ventures, National Bird Conservation Initiative, and other leading conservation partnerships, and state natural resources agencies are beginning to incorporate climate change impacts into State Wildlife Action Plans.

Researchers are currently developing simulation models and sensitivity analyses for Eastern massasauga and ruffed grouse under multiple future climate change scenarios. Using relationships based on past demographic and climatic changes, researchers are simulating future demographic and distributional projections over the next 50 and 100 years. These models will be used to produce geographic maps identifying areas of strong future population survival; representing refugia for existing populations and priorities for management. The approach can ultimately simulate the likely population trajectories under future scenarios of climate change and further understand which aspects of a shifting climate (e.g., drought, flooding, temperature increases) might be more influential.

LeDee explains,"The results are spatially-explicit, informing on the ground management opportunities, and we will identify the most influential parameters, determining where management efforts may be most beneficial."

Aquatic connectivity initiative

Fish passage project, Iron River, Wisconsin. U.S. Fish and Wildlife Service.

Barrier modification for lake sturgeon. U.S. Fish and Wildlife Service.

In the Great Lakes ecosystem, anthropogenic barriers such as dams fragment riverine habitat and block seasonal migrations of fishes and other aquatic organisms.

Conversely, some barriers provide ecological benefits by assisting with the control of invasive species like sea lamprey, and can protect threatened, endangered or vulnerable native species by preventing the spread of pathogens and contaminants.

The Upper Midwest and Great Lakes LCC serves as a venue to coordinate vested stakeholder efforts to improve aquatic connectivity for the Great Lakes and their tributaries. Federal, state, provincial and municipal governments, as well as non-governmental organizations and private interests need a strategic approach to barrier removal and modification to ensure maximum return on investments.

Many organizations and partnerships including the Council of Lake Committees, Council of Great Lakes Fishery Agencies, American Fisheries Society and Association of Fish and Wildlife Agencies are involved in providing guidance for site-specific actions related to aquatic connectivity. The Upper Midwest and Great Lakes LCC is working toward development of a coordinated, system wide approach to ensure the cumulative effects of all such actions are adequately considered.

To kick of this initiative, LCC partners hosted a symposium at the 142nd American Fisheries Society conference in St. Paul, Minnesota in August 2012 to gather information from aquatic connectivity stakeholders to identify shared challenges and existing scientific research, and, gaps in science, information and policy. Included in the two-day discussion were threatened and endangered species protection, invasive species, fish passage and pathogen and contaminant containment.

For each of these topics, subject matter experts outlined regulatory, administrative and ecological requirements and facilitated discussion to identify knowledge gaps, data needs, and decision-support tool needs, and developed a synthesis underlining how local decision-making can be integrated with an evaluation of bigger picture impacts.

LCC partners plan to share recommendations from this discussion with the Council of Lakes Committees and Council of Great Lakes Fishery Agencies for review, validation, and potential voluntary adoption by participating Great Lakes authorities.

Our Reach

The Upper Midwest and Great Lakes LCC has capitalized on pre-existing conservation communities and networks to share our messages and establish our identity. LCC staff have made it a priority to engage with federal, state, non-governmental and tribal groups to ensure an open, two-way dialogue exists surrounding LCC activities.

Traveling display and print materials.

In 2012, the Upper Midwest and Great Lakes LCC welcomed the addition of a communications specialist to assist with strategic communications for the partnership. As a result, the LCC developed a comprehensive strategic communications plan, initiated communications requirements for research proposals funded by the LCC, and developed an external partnership Web site. Standardized templates for outreach products including banners, news releases, posters and fact sheets were developed.

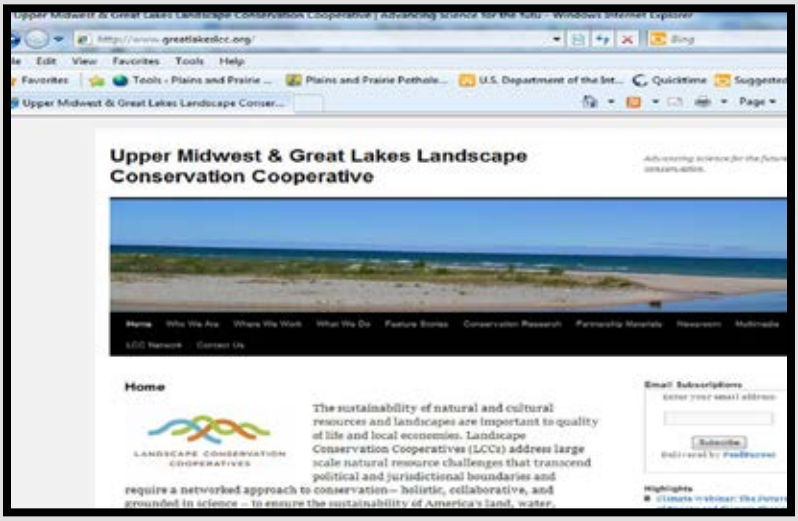
Ohio Sea Grant and The Ohio State University have worked in collaboration with the Upper Midwest and Great Lakes LCC to present a series of webinars highlighting LCC-funded projects, through the OSU Climate Change webinar series. These webinars cover the impacts of climate change on coastal, tribal, aquatic, and avian communities in addition to forest resiliency projects. 'General public-friendly' summaries and researcher profiles of each research project act as primers for the webinars. Webinars are recorded, transcribed, and archived on the OSU Changing Climate regional Web site. The OSU Changing Climate webinars each average more than 250 attendees, representing 150+ regional and national organizations from (US and Canadian) governmental agencies, academia, non-profit groups, private industry, and the legislature. More than 9,000 have viewed the archived webinars and its climate resources.

Effective communications will continue to be a high priority for the LCC and its partners, as the LCC builds its outreach capacity and strategizes ways to share research results with decision makers, land managers, policy-makers and other on-the-ground conservation interests.

Branding guide.

Effective communication is a critical function of the Upper Midwest and Great Lakes LCC

Sign up to stay in the know at www.GreatLakesLCC.org



Upper Midwest and Great Lakes LCC partnership Web site. Email subscription to receive updates, activities and announcements available through the Web site.

"The state of Wisconsin is already using information from the LCC to plan land management strategies in the Driftless region."
- Jana Stewart, U.S. Geological Survey.

A strategic communications plan was developed in October 2012 to outline internal and external communications with key stakeholders. Online, print and broadcast outreach materials and guidance have been developed for the LCC and partners. LCC staff and partners engaged with members of the conversation community this year, providing presentations, symposiums and hosting and facilitating gatherings to discuss LCC activities. Below is an abbreviated sample of LCC engagements in 2012.

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2012 Engagements

January 9 – LCC steering committee convenes
January 10 – Engage with Northeast Climate Science Center leadership
January 23 – 24 - LCC project coordinators convene
March 13 – 15 - Northwoods conference
March 22nd – Technical core team convenes
March 26 – 29th – LCC national network convenes
April – Meeting with U.S. Fish and Wildlife Service Madison field office
May 16 - Steering committee convenes
June 24 – LCC Steering committee convenes with Midwest Association of Fish and Wildlife Agencies
July 31 – August 2 - LCC keystone address at Midwest Coordinated Bird Monitoring conference
August 21 – 23 - American Fisheries Society annual meeting – Aquatic habitat symposium and Climate change symposium
September 18– Technical core team convenes for science and collaboration priorities
October 22 – Steering committee teleconference
November 13 – 16th – LCC national network convenes
December 7 – LCC convenes meeting on State Wildlife Action Plan revisions
December 10 – LCC co-hosts Midwest Association of Fish and Wildlife Agencies symposium

Our Future

Over the past three years, the Upper Midwest and Great Lakes Landscape Conservation Cooperative has come together as a conservation community to face 21st century conservation challenges and increase conservation efficacy through collaboration. Steering and technical committees were established, nearly $3 million was expended on projects improving our scientific foundation and how we do business, and shared conservation priorities were identified. We have a solid foundation of dedication conservation professionals and are poised to move to the next level.

Sunrise over Siskiwit Bay, Lake Superior. U.S. Fish and Wildlife Service.

In 2013, we will be more strategic with our collective assets. Early in the year, we will conclude our shared priority identification process by selecting priorities for focus and articulating the outcomes we expect to achieve. Following these key decisions, frameworks will be developed to pursue expected outcomes and an organizational structure for the technical community will be implemented. Watch for announcements on technical community workshops. These workshops will be the venue for these actions to take place. This framework will allow us to direct our assets to the most demanding conservation needs.

Many of our projects are also coming to conclusion this year. Considerable effort will be made to ensure the results of these projects reach conservation practitioners and decision-makers. Our LCC communications specialist will lead the charge, but it will take the collective efforts of the researchers, their affiliation's communications specialists, and communication personnel of participating LCC agencies and organizations. In addition, we will share our successes by highlighting feature stories of landscape conservation from around the region. What we do as a community and the importance of landscape conservation must be obviously relevant to our stakeholders and the public.

There is much to be done in the coming year as we continue to pursue our vision. I encourage our member organizations and the broader conservation community to remain thoughtfully and actively engaged with the LCC this year as we carry out our daily work to protect and conserve our nation's natural resources.

Bradly A. Potter

Bradly Potter, Science Coordinator
Upper Midwest and Great Lakes LCC

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