# Upper Midwest and Great Lakes LCC Projects

# Funded in FY 2010

## Designing a Great Lakes Information Management and Delivery System to Support Landscape Scale Conservation

**Project Duration:**  10/2010 – 09/2013

**Project Coordinator:** Scott Sowa, The Nature Conservancy, ssowa@tnc.org

**Objectives**

The project objectives are to:

1. Illustrate the ability to develop a Great Lakes IMDS (i.e., Proof of Concept).
2. Illustrate the benefits of intuitive information management and delivery and generate support for expanding the IMDS across the Great Lakes.
3. Identify technical, logistical, and administrative obstacles and solutions for the incremental
development and long term maintenance of the IMDS.

## Climate Adaptation Recommendations for Site Managers

**Project Duration:**  10/2010 – 10/2012

**Project Coordinator:**  Olivia E. LeDee, Ph.D., University of Wisconsin-Madison, ledee@wisc.edu

**Objectives**

In year 1, we will identify adaptation and mitigation options that are feasible to implement at a local level (e.g. park, refuge). In Year 2, we determine what strategies are viable and what limits the implementation of others.

## Identification of the Most Climate Vulnerable Terrestrial Species and Natural Communities in the UMGL LCC

**Project Duration:**  10/2010 – 10/2012

**Project Coordinator:**  Olivia E. LeDee, Ph.D., University of Wisconsin-Madison, ledee@wisc.edu

**Objectives**

In year 1, the goals of the project, are to: 1) to exchange information, share priorities, and foster collaborations among scientists and managers on climate change and natural resource management and 2) identify ~15-30 terrestrial species that are priorities for a climate impact assessment. The workshops focus on impacts of climate change on wildlife, vulnerability assessments, coalition-building, regional changes in climate, and conservation priorities. In Year 2, we will collaborate with partners to develop an ecological model of the impacts of climate change and other stressors on the future distribution and abundance of the target species.

## Project Title: Downscaling climate in the Great Lakes region for regional climate impact assessment

**Project Duration:**  9/1/2010 – 7/31/2012

**Project Coordinator:** Daniel J. Vimont; Atmospheric and Oceanic Sciences Department, University of Wisconsin – Madison; dvimont@wisc.edu

**Project PI(s):**

**Objectives:**

The project objectives are to:

1. Produce debiased and downscaled estimates of relevant climate variables as simulated by the suite of global climate models that contribute to the IPCC 4th Assessment Report.
2. Produce a product that is at the same time reliable, and flexible enough to be used in a wide variety of potential applications by researchers from other fields.
3. Improve the existing downscaling methodology to incorporate more realistic effects of lakes and other geographical features, to better represent the covariance between different climatic parameters, and to better simulate the spatially coherent variations in daily weather events.
4. Develop a web-based client to host and distribute the downscaled data.

## Great Lakes Restoration Initiative – Geospatial Habitat Assessment

**Project Duration:**  10/2010 – 10/2011

**Project Coordinator:** Brian Huberty, U.S. Fish and Wildlife Service, brian\_huberty@fws.gov

**Deliverables (See website for further information):**

MTRI – a Great Lakes Coastal Zone Phragmites and Wetland Extent Map

<http://mtri.org/phragmites.html>

UMN – Create the new geospatial methodologies to incorporate radar and lidar imagery so forested wetlands and habitats can be mapped more quickly, accurately, and at a reduced cost.

<http://www.nrsm.umn.edu/People/graduate_students/jennifer_corcoran/index.htm>

<http://knightlab.org/projects.htm>

 DU- Implement the work by MTRI and UMN to improve the wetland maps for the Great Lakes States

<http://www.ducks.org/conservation/glaro/gis-nwi-update>

SharedGeo – Serve 10 Tbytes of high resolution stereo aerial images of the Great Lakes Shoreline as well as other geospatial habitat layers such as NWI.

<http://www.sharedgeo.org/jump-to/great-lakes-restoration-initiative-project/>

SMU- Finish the Wisconsin Wetland Inventory ortho and NWI conversion for the Great Lakes Basin adjacent counties in Wisconsin.

<http://geospatialservices.org/basic/GSS/GIS%20Products/wetlands.html>

# Funded in FY 2011

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

**Project Duration:**  07/2011 – 06/2013

**Project Coordinator**: Robert Scheller, PhD, Portland State University, rmschell@pdx.edu

**Objectives:**

Using a modeling framework, the project objectives are to:

1. Assess the efficacy of assisted migration as an adaptive management technique to overcome spatial and temporal barriers under different climate change scenarios.
2. Assess the efficacy of tree species refugia by increasing forest reserves – areas that exempt from traditional commercial harvesting - under different climate change scenarios.
3. Compare alternative management techniques across forest landscapes in Minnesota (less fragmented) and Michigan (more fragmented).
4. Measure the modeled forest resilience to disturbance under two different climate change scenarios, two different landscapes, two different additional reserve densities, and two different levels of assisted migration.

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

**Project Duration:**  07/2011 – 06/2012 (year 1).

**Project Coordinator:** David Ewert, The Nature Conservancy, dewert@tnc.org

**Objectives**

1. Expand, refine and integrate stopover models for landbirds, waterfowl and shorebirds within 15 miles of Lakes Michigan, Huron, Erie, and Ontario.
2. Develop an online portal that will deliver results, models, data and information to conservation practitioners, agencies, wind energy companies/developers and others interested in Great Lakes natural resources.

## Avian Response to Climate Change

**Project Duration:** 09/2011 – 09/2012

**Project Coordinator:** Dr. Gary J. Roloff, Department of Fisheries and Wildlife, Michigan State University, roloff@msu.edu

**Objectives**

1. Estimate changes in the distribution and abundance of select breeding birds across the Upper Midwest and Great Lakes Region for the last 50 years and examine relationships with land use and climate change.
2. Use multi-species occupancy models to produce spatially explicit estimates of avian species richness for multiple time-steps and examine relationships with land use and climate change.
3. Use model-estimated relationships between species’ distributions and abiotic factors (e.g., landscape composition, climate variables) to predict future distributions under climate change scenarios. Identify areas where conservation efforts have and will be most effective at maintaining diversity.

## Full Life Cycle Vulnerability Assessments for the Birds of the Upper Midwest Great Lakes Region.

**Project Duration:**  09/2011 – 7/2013

**Project Coordinator:** Peter Marra, Smithsonian Conservation Biology Institute, marrap@si.edu

**Objectives**

1. To determine which avian species in the Upper Midwest Great Lakes Region are the most vulnerable to climate change.
2. To determine which stages of the annual cycle contribute to climate change vulnerability.
3. To determine what contributes to a species’ vulnerability in terms of life history traits, habitat needs and exposure to climate change, and potential for intrinsic or management-based adaptation.

## Manajiwin: Respecting Tribes, First Nations and Cultural Resources in Cooperative Landscape and Climate Change Decision Making

**Project Duration:**  07/2011 – 09/2012

**Project Coordinator:** Dr. Nicholas J. Reo, University of Michigan, reon@umich.edu

**Objectives**

1. Improve conservation-related networking, information sharing and cooperation among Tribes, First Nations and other relevant partners in the Upper Midwest – Great Lakes region.
2. Provide guidance for the authentic, robust inclusion of Tribes and First Nations in regional resource conservation cooperative frameworks.
3. Improve the efforts of the emerging UMGL LCC for involving Tribes and First Nations in regional conservation efforts.

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

**Project Duration:**  09/2011 – 04/2013

**Project Coordinator:** Dr. Peter McIntyre, Center for Limnology, University of Wisconsin, Madison, pmcintyre@wisc.edu

**Objectives**

The project objectives are to:

1. **Map dams and road-stream crossings.** We consider these the two most important classes of barriers to fish migration. To achieve this objective we will merge maps of dams and road-stream crossings to yield a new, state-of-the-art map of barrier locations and their associated passability ratings across the entire Great Lakes basin. Passability ratings and validation of road-stream crossings maps will be derived from direct field assessments from high-resolution case studies.
2. **Determine fish habitat and passability requirements.** We will develop models specific to lake sturgeon and coaster brook trout, both of which are of special conservation concern in the Great Lakes. The limited range and known habitat needs of these focal species make it possible to construct connectivity models for only tributaries that have potential for successful spawning. Based on field surveys and published data we are determining the passability of culverts and dams for fish species with varying swimming speeds. We will establish low, medium, or high passability threshold classes, following Coffman (2005).
3. **Optimize restoration of connectivity between the Great Lakes and their tributaries.** We will use our maps of barrier locations and needs for habitat and barrier passability to establish a series of analyses to optimize restoration of ecological connectivity for migratory fish in the Great Lakes Basin.

## A Regional Decision Support Tool for Identifying Vulnerabilities of Riverine Habitat and Fishes to Climate Change

**Project Duration:**  10/2011 – 09/2013

**Project Coordinator:** Jana Stewart, USGS, jsstewar@usgs.gov

**Objectives**

The project objectives are to:

1. predict potential changes in thermal and flow regimes and keystone fish species under downscaled climate change scenarios to identify vulnerabilities of river systems of the UMGL LCC,
2. organize two workshops of stakeholders to develop management scenarios and adaptation strategies for protecting vulnerable keystone habitat and fish species and minimizing changes to riverine systems,
3. develop a web-based decision support mapping tool to integrate results from objectives 1 and 2 for use by natural resource managers for planning, management, and decision-making.

## Predicting Climate Change Effects on Riverine Aquatic Insects Using Museum Data and Niche Modeling

**Project Duration:**  07/2011 – 06/2013

**Project Coordinator:** Dr. R. Edward DeWalt, University of Illinois, Illinois Natural History Survey, dewatl@illinois.edu

**Objectives**

The project objectives are to:

1. Predict changes in the ranges of stonefly species and species richness across much of the UMGL LCC region under low, medium, and high emission scenarios for the years 2050-2059 and 2090-2099.
2. Predict changes in the ranges of mayfly species and species richness across much of the UMGL LCC region under low, medium, and high emission scenarios for the years 2050-2059 and 2090-2099.
3. Predict changes in the ranges of caddisfly species and species richness across much of the UMGL LCC region under low, medium, and high emission scenarios for the years 2050-2059 and 2090-2099.