Michigan's
Wildlife Action Plan

State Wildlife Grants Funding in Action

Project Summaries 2011-2012

DEPARTMENT OF NATURAL RESOURCES
DNR
MICHIGAN

Table of Contents

Introduction

The goal of Michigan's Wildlife Action Plan is to provide a common strategic framework that will enable Michigan's conservation partners to jointly implement a long-term holistic approach for the conservation of all wildlife species.

Michigan's Wildlife Action Plan is part of a national conservation strategy for safeguarding wildlife (aquatic and terrestrial) and their habitats for current and future generations. Michigan's action plan is uniquely designed to serve Michigan's needs. The current version of the Wildlife Action Plan provides a status assessment of 404 species thought to be declining in Michigan. The Wildlife Action Plan describes threats to and conservation actions needed to help these species of greatest conservation need and their habitats. Conservation of endangered species is complicated and expensive. Proactive conservation and management of species before they become endangered is more straightforward, cost-efficient, and effective.

State Wildlife Grants
State Wildlife Grants have been critical to implementing the Wildlife Action Plan. This funding comes from revenues collected from Outer Continental Shelf Oil and Gas royalties and is appropriated to the states through the U.S. Fish and Wildlife Service. Although these funds have been provided every year since 2002, they are appropriated through the annual federal budget process. Unlike Pittman-Robertson or Dingle Johnson funds, State Wildlife Grants are not automatically appropriated; consequently, the Department of Natural Resources (Department) must wait for each year's federal budget to know how much will be available, if any. These funds also require a non-federal match, with states required to provide 35% of the funds for implementation projects and 25% of the funds for planning projects.

As such, this funding source leverages significant additional resources that benefit wildlife and their habitats in Michigan. This small amount of funding has a huge impact, especially for wildlife most in need of conservation.

Competitive State Wildlife Grants
Competitive State Wildlife Grants are another federal funding resource to implement state Wildlife Action Plans. This competitive grants program is managed by the U.S. Fish and Wildlife Service with funding also derived from the revenues collected from Outer Continental Shelf oil and gas royalties. Each year, the U.S. Fish and Wildlife Service puts out a call for proposals and states can apply and propose work intended to improve the status of species of greatest conservation need or their habitats, with a special focus on promoting and advancing cooperative partnerships that result in large-scale landscape conservation. Funds are then awarded to the highest-scoring applications. Michigan has been successful in receiving these funds to do additional work towards implementing the Wildlife Action Plan.

What is this report?
This report provides short summaries for projects that have been fully or partially funded by State Wildlife Grants. Many of the projects provide critical information to help us better manage a species or ecosystem. The report provides information about who the lead of the project was, who the partners were, and where it occurred. Citations for all published literature, reports, or web sites produced through the project are also listed in the back of the report. This report is set up in different sections to provide easier access to specific topics that are of interest to the reader.

Why was this report produced?
The work reported here was conducted because there was an information or management need identified by staff to help better manage Michigan's wildlife and their habitats. This report is designed to communicate the results of the work back to our staff and partners, thereby completing the communication loop.

For more information about the Wildlife Action Plan visit: www.michigan.gov/dnrwildlifeactionplan

For more information about State Wildlife Grants visit: http://wsfrprograms.fws.gov/Subpages/GrantPrograms/SWG/SWG.htm

For more information about the projects describe in this publication contact the author or Amy Derosier, the Wildlife Action Plan Coordinator at derosiera@michigan.gov or 517-284-WILD.

Habitat Management - Project Summaries

On-the-Ground Habitat and Management

Michigan Department of Natural Resources - Wildlife Division and Parks and Recreation Division

The following table describes the habitat restoration and management efforts that occurred at different state game areas, recreation areas, and parks using State Wildlife Grants. This is only part of the story of restoration efforts that the Department conducts. This work benefits endangered and threatened species, species of greatest conservation need, game species, as well as many other more common wildlife.

Location	Acres of habitat management 2011	Notes	Acres of habitat management 2012	Notes
Southeast Michigan				
Algonac State Park	420	Wild parsnip, garlic mustard, phragmites, purple loosestrife, reed canary grass, buckthorn, and invasive woody plants such as buckthorn were pulled, mowed, and foliar sprayed.	405	Wild parsnip, garlic mustard, phragmites, purple loosestrife, reed canary grass, buckthorn, and invasive woody plants such as buckthorn were pulled, mowed, and foliar sprayed.
Bald Mountain Recreation Area	29.9	Hand pulled garlic mustard. Cut and stump treated invasive woody plants, mainly glossy buckthorn.	25	Hand pulled garlic mustard. Cut and stump treated invasive woody plants, mainly glossy buckthorn.
Bay City Recreation Area	18.1	Hand pulled and foliar sprayed purple loosestrife, leafy spurge, sweet clover, Japanese knotweed, phragmites, and reed canary grass.	379	Hand pulled and foliar sprayed purple loosestrife, leafy spurge, sweetclover, Japanese knotweed, phragmites, and reed canary grass.
Brighton Recreation Area	542	Hand pulled spotted knapweed and Japanese hedge parsley. Cut and stump treated woody invasives including buckthorn.	38	Hand pulled spotted knapweed, Japanese hedge parsley and sweet clover. Cut and stump treated woody invasives including buckthorn.
Cambridge State Park	1	Cut and stump treated woody invasives.	-	
Highland Recreation Area	349.5	Hand pulled and foliar sprayed garlic mustard, Japanese knotweed, swallow-wort, bittersweet, and Chinese lespedeza. Cut and stump treated woody invasives.	100	Hand pulled and foliar sprayed garlic mustard, swallow-wort, bittersweet, and Chinese lespedeza. Cut and stump treated woody invasives.
Holly Recreation Area	0.01	Foliar sprayed phragmites.	9	Foliar sprayed phragmites, purple loosestrife, reed canary grass, glossy buckthorn, and other woody invasives.
Island Lake Recreation Area	148	Hand pulled spotted knapweed, garlic mustard. Foliar sprayed Chinese lespedeza, Japanese knotweed and woody invasives. Cut and stump treated invasive woody plants.	35	Hand pulled spotted knapweed, garlic mustard. Foliar sprayed Chinese lespedeza, Japanese knotweed and woody invasives. Removed black locust, buckthorn, and Asian bittersweet.
Ortonville Recreation Area	6.4	Hand pulled and cut buckthorn.	1	Cut buckthorn.
Petersburg State Game Area	?	Woody vegetation was removed.	0	Woody vegetation was removed.
Pinckney Recreation Area	150	Hand pulled wild parsnip, spotted knapweed, Japanese hedge clover, and sweet clover. Foliar sprayed garlic mustard. Cut and stump treated woody invasives.	102	Hand pulled wild parsnip, spotted knapweed, Japanese hedge clover, and sweet clover. Foliar sprayed garlic mustard. Cut and stump treated woody invasives.
Pte. Mouilee State Game Area	200	Chemically treated phragmites.	-	
Port Crescent State Park	-		174	Completed two prescribed burns.
Pontiac Lake Recreation Area	-		189	Completed one prescribed burn.
St. Clair Flats State Wildlife Area	200	Chemically treated phragmites.	-	
Seven Lakes State Park	86.2	Foliar sprayed swallow-wort, phragmites, and herbaceous invasives. Hand pulled wild parsnip.	1	Foliar sprayed invasive herbaceous and woody plants.
Sterling State Park	23	Hand pulled garlic mustard. Foliar sprayed purple loosestrife, garlic mustard, phragmites, and reed canary grass, and herbaceous invasive species. Stump treated woody plants.	144	Hand pulled garlic mustard.
Waterloo Recreation Area	119	Foliar sprayed swallow-wort. Hand pulled sweet clover, spotted knapweed, swallow-wort, and garlic mustard.	43	Foliar sprayed swallow-wort. Hand pulled sweet clover, spotted knapweed, swallow-wort, Japanese hedge parsley, and garlic mustard. Cut and stump treated woody invasives .

Location	Acres of habitat management 2011	Notes	Acres of habitat management 2012	Notes
Northern Lower Peninsula				
AuSable River System	Several Miles	Hand removal of purple loosestrife.	-	
Cheyboygan State Park	148	Hand pulled and foliar sprayed sweet clover, spotted knapweed, and phragmites.	160	Hand pulled and foliar sprayed sweet clover and spotted knapweed.
Roscommon Forest Management Unit	3 sites	Herbicide treatment of phragmites and glossy buckthorn.	-	
Southwest Michigan				
Allegan State Game Area	40	Grasslands planted.	-	
Flat River State Game Area	268	Herbicide treatment of phragmites, autumn olive, and American hazel .	-	
Fort Custer Recreation Area	163	Hand pulled and foliar sprayed herbaceous invasives..	248	Hand pulled, foliar sprayed, and mowed herbaceous invasives. Cut and stump treated woody invasives .
Grand Mere State Park	-		2	Hand pulled spotted knapweed.
Gratiot-Saginaw State Game Area	20/28 zones?	Priority invasive species mapped, including phragmites, garlic mustard, and glossy buckthorn.	-	
Hoffmaster State Park	-		58	Hand pulled garlic mustard. Cut and stump treated woody invasives.
Ionia Recreation Area	-		12	Cut and stump treated woody invasive plants.
Maple River State Game Area	45	Native grasses and wildflowers planted. Cut and stump treated woody invasive plants.	-	
Saugatuck Dunes State Park	-		67	Hand pulled garlic mustard. Cut and stump treated woody invasives.
Warren Woods State Park	-		112	Hand pulled garlic mustard. Cut and stump treated woody invasives.
Yankee Springs Recreation Area	-		37	Hand pulled spotted knapweed and garlic mustard. Cut and stump treated woody invasives.
Total Acres of Habitat Managed:	2957		2341	

If a dash (-) is present in the habitat management columns, it indicates habitat management did not occur at the site or the type of habitat management was not reported.

Competitive State Wildlife Grants
Prairie Fen and Associated Savanna Restoration in Michigan and Indiana for Species of Greatest Conservation Need

Mark Sargent, Chris May and Nate Fuller
Michigan Department of Natural Resources – Wildlife Division, The Nature Conservancy and Southwest Michigan Land Conservancy

Historically, northern Indiana and southern Michigan had approximately one million acres of grasslands. Two critically imperiled grassland ecosystems are located within this region: oak savanna and prairie fens (NatureServe 2008). These natural communities are disproportionately rich in biodiversity. Prairie fens are the principal habitat for the federally endangered Mitchell's satyr butterfly and both prairie fens and savannas harbor the federal candidate eastern massasauga rattlesnake. These habitats are home to more rare and declining species than any other natural community in Michigan. These communities are also important habitats to more common species such as deer and turkey.

The three main objectives of this project were:

1. Restore or enhance 200 acres of Mitchell's saytr butterfly habitat;
2. Restore or enhance 400 acres of habitat for eastern massasauga rattlesnake and 32 other species of greatest conservation need;
3. Protect 11.7 acres in Cass County.

This work also benefited deer and turkey at these sites.

This project was focused on at least 12 of the 18 prairie fens known to harbor the Mitchell's satyr in Michigan and Indiana, and 4 fens that historically harbored the butterfly. In addition, 11.7 acres of prairie fen currently occupied by the butterfly were protected and maintained in Cass County, in partnership with Southwest Michigan Land Conservancy.

This project restored or enhanced at least 400 acres of prairie fen and associated savanna to benefit the eastern massasauga rattlesnake and many other species of greatest conservation need. This work took place at 24 sites.

The partners on this project exceeded the planned accomplishments and have worked with many private landowners to restore or enhance habitat for these important rare species. This project has one more year of work planned.

Location: Southern Lower Peninsula
Year(s): 2011-2012
Partners: The Nature Conservancy - Michigan and Indiana chapter, Michigan Natural Features Inventory, Southwest Michigan Land Conservancy, Michigan Nature Association, Michigan Department of Natural Resources – Parks and Recreation Division

Accomplishments

Project Objectives	Planned	Accomplishments			
		2010	2011	2012	Total
1. Restoration of Mitchell's satyr habitat	200 acres	204 acres	108.5 acres	80 acres	392.5 acres
2. Restoration of habitat for eastern massasauga and 32 other species in need	400 acres	712.3 acres	352 acres	185 acres	1,249.3 acres
3. Habitat protection	11.7 acres	0	11.7 acres	0	11.7 acres

Competitive State Wildlife Grants
Oak Savanna, Pine Barrens and Jack Pine Forest Restoration in Michigan and Ohio for Species of Greatest Conservation Need

Mark Sargent and Chris May
Michigan Department of Natural Resources – Wildlife Division and The Nature Conservancy

Oak savanna, pine barrens, and jack pine forests are critical habitats to many species of greatest conservation need. Approximately 90% of Michigan's historic oak savannas and barrens have been converted to forest, agriculture, or urban development. Dry conifer forests of early successional jack pine have severely declined and are considered rare. Historically, wildfire maintained these habitats, but as naturally occurring wildfires have been suppressed, many of these fire-dependent ecosystems have shrunk in size.

Key species of greatest conservation need that rely on these habitats are the Karner blue butterfly, eastern massasauga rattlesnake, Kirtland's warbler, and sharp-tailed grouse. When looking at the needs of these species, habitat enhancements and management are needed to help secure their populations. These species are found on both public and private lands, and hence this project conducted work on key sites on both types of ownerships. Biologists work with private landowners to help them meet their management objectives while enhancing or increasing habitat for these rare species.

This project restored or enhanced at least 600 acres of oak savanna for the federally endangered Karner blue butterfly, eastern massasauga rattlesnake, and a diverse array of species of greatest conservation need. This work also benefited wild turkey and deer. This project specifically improved suitable habitat on at least 10 sites known to harbor the Karner blue butterfly in Michigan and Ohio. In addition, 5 sites were enhanced that had suitable habitat for Karner blue butterfly, but at the time did not harbor any butterflies. These restoration activities are designed to improve the long-term sustainability of Karner blue butterfly and other SGCN that utilize oak savanna in Michigan and Ohio.

This work also enhanced habitat for deer, turkey, bear, and a diverse array of species of greatest conservation need. We proposed to improve suitable habitat for Kirtland's warbler on at least 10 sites in northern Michigan. These restoration activities are designed to improve the long-term sustainability of Kirtland's warbler and other species in need that use pine barrens and jack pine forests.

Accomplishments
The partners on this project have worked with many private landowners to restore or enhance habitat for the Karner blue butterfly, eastern massasauga, and Kirtland's warbler, and have exceeded the planned accomplishments for the project. This project had at least one more year of work planned (see table below).

Location: Statewide
Year(s): 2011-2012
Partners: The Nature Conservancy - Michigan and Ohio chapter, Michigan Natural Features Inventory, National Wild Turkey Federation

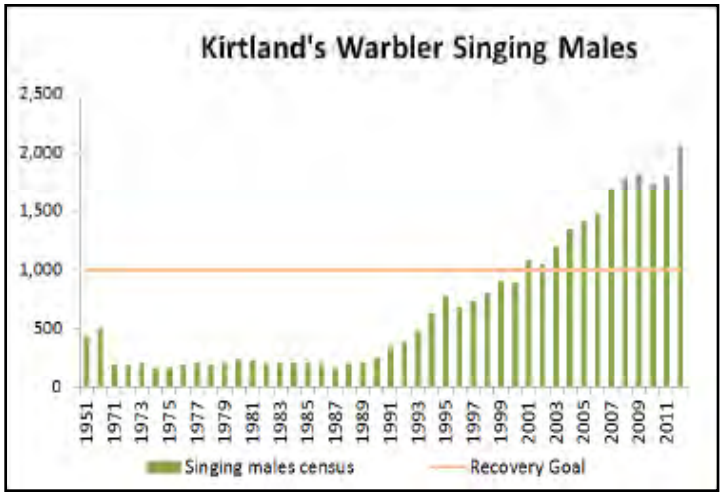
Project Objectives	Planned	Accomplishments		
The objectives of this project were to:		2011	2012	Total
1. Restoration of oak savanna for Karner blue butterfly and eastern massasauga rattlesnake	600 acres	166.5 acres	188.5 acres	355 acres
2. Restoration of pine barrens and jack pine forests for Kirtland's warbler and associated SGCN	400 acres	491 acres	-	491 acres
3. Restoration work on private lands	450 acres	657.5 acres	188.5 acres	846 acres

Jack Pine Forest Management and Kirtland's Warbler Recovery

Michigan Department of Natural Resources – Wildlife and Forest Resources Divisions

The Kirtland's warbler is the rarest warbler in North America and is federally listed as endangered. This songbird is dependent on dense, young jack pine habitat for breeding. This habitat type was historically created and maintained by periodic wildfires. Prescribed fire can be used to create Kirtland's warbler breeding habitat. However, concerns regarding the safety of humans and property limit the use of prescribed fire. Other mechanical techniques are needed to mimic the natural disturbance regime of the jack pine ecosystem. Techniques include seeding and planting activities to regenerate new stands of jack pine.

Approximately 190,000 acres of state and federal forest land are managed for jack pine in Michigan, with a goal of maintaining 38,000 acres as occupied habitat for the Kirtland's warbler. The Department is responsible for managing 90,700 acres of Kirtland's warbler habitat and attempts to regenerate approximately 1,560 acres per year, averaged over a 10-year-time span. Jack pine regeneration surveys occur one and three years after planting and are conducted to assess the development of the stand, identify limiting factors such as disease or browsing, and determine the need for replanting.



The management of the jack pine ecosystem also provides important habitats for the white-tailed deer, black bear, snowshoe hare, and the eastern bluebird. In addition, by managing jack pine stands on a 50-year harvest rotation, nesting habitat can be maintained for the warblers and other important wildlife species, while supporting the commercial harvest of jack pine. In addition to providing habitat for other species, Kirtland's warbler management provides economic stimulus to the region through timber harvest and wildlife viewing opportunities.

Accomplishments

2011: 1,750 acres of jack pine were regenerated; 3,328 jack pine acres were surveyed.

2012: 1,266 acres of jack pine were regenerated through planting, preceded by trenching for site preparation. This exceeded our planned accomplishments by 766 acres. Further, approximately 2,500 acres of regeneration surveys were conducted; however State Wildlife Grants were not used for this work.

The Kirtland's warbler program has been a huge success. The species has exceeded its recovery goals and discussions now revolve around how to continue management while de-listing the species.

Location: Northern Lower Peninsula
Year(s): 2011-2012
Partners: Michigan Department of Natural Resources – Forest Resources Division, Forest Industry

Evaluating Projects Funded through the Inland Fisheries Cooperative Grants Program

Christian LeSage
Michigan Department of Natural Resources – Fisheries Division

The Inland Fisheries Cooperative Grant Program (IFG) was developed in 1987 to forge partnerships that promoted stewardship by involving local communities in ecosystem-based projects that benefit inland fisheries resources. Between 1998 and 2009, at total of 100 projects received IFG funding, including: 72 habitat projects, 20 fishing access projects, and 8 educational projects. This study was designed to document the effectiveness of individual IFG habitat projects and the program as a whole. By identifying and evaluating effective projects, as well as unsuccessful ones, the results will help guide future management and programmatic decisions.

Fifty-five habitat projects were evaluated; habitat projects included streambank stabilization, habitat structure improvement, barrier removal, stream crossing improvement, spawning improvement, channel improvement, stair and drainage improvement, and several combination projects. These projects benefitted both in-stream and riparian habitat in dozens of cold-water and cool-water streams throughout the state and in four inland lakes. Staff performed on-site evaluations at 30 habitat projects and another 25 projects were evaluated without a site visit. Project sites were evaluated based on pool substrate characterization, pool variability, substrate type, bank stability, vegetative protection, and modification durability, watershed context, and staff opinion of project success.

Results

Five of the six highest scoring projects were barrier removal stream projects. These projects were highly valued due to the benefits of restoring connectivity across a stream system. Specific projects funded under this category included: removal of old concrete dam and spillway, removal of old electrical barrier and infrastructure, berm and culvert removal, and concrete slab and apron removal. Barrier removal projects often involve adding rock or other materials to armor shorelines against erosion, installing w-weirs or j-hooks, adding vegetation to the shoreline areas, and incorporating natural channel design. These complex projects can be very expensive (in the millions of dollars) and can take several years to complete. Projects of this magnitude often combine several project types which resulted in higher scores compared with other project focused on a single project type.

Overall, the habitat project evaluations indicated that all but four projects were considered to be an ecological success (93%); the four lowest scoring projects were not considered to be successes and hence will not be recommended by staff in the future under similar stream conditions.

Location: Statewide
Year(s): 2011-2012

Riverways Protection and Rehabilitation

Chris Freiburger
Michigan Department of Natural Resources – Fisheries Division

The Department of Natural Resources Fisheries Habitat Management Unit works to protect fish and wildlife habitat and other natural values and conditions on watersheds and rivers throughout all of Michigan. This group supports river restoration by: collecting and analyzing data to support assessments pre and post construction and benchmarks for project effectiveness, working with partner organizations on project planning and design, and providing technical assistance to citizens, municipalities, local drain or road commissioners, watershed groups, and regulatory agencies.

Accomplishments

- Conducted geomorphic assessments for river restoration projects:
  - Butternut Creek (Eaton County)
  - Kalamazoo River (Allegan County)
  - Thornapple River (Eaton and Barry County)
  - North Branch of the Clinton River (Macomb County)
  - Manton Creek (Wexford County)
  - St. Joseph River (Hillsdale)

- Provided technical assistance on a variety of dam removal, culvert, and bridge projects across the state.

- Worked with the Department of Environmental Quality (DEQ) to develop fish and wildlife friendly DEQ Minor Permit Category language for new and replacement culverts that was incorporated into the final version.

- Initiated a GIS barrier inventory project with an associated database and data viewer for the Au Sable, Manistee, and Muskegon River watersheds.

- Provided technical assistance to fish passage projects across the state.

- Provided trainings on stream simulation design, applied fluvial geomorphology, and bankfull.

- Worked with partners on Federal Energy Regulatory Commission licensing and compliance of hydropower operations.

Location: Statewide
Year(s): 2011-2012
Partners: Department of Environmental Quality, Michigan Tech Transportation Institute, U.S. Fish and Wildlife Service

Protecting High Quality Riparian Corridors Utilizing the Natural Rivers Program

Steve Sutton
Michigan Department of Natural Resources – Fisheries Division

The Natural River Act was authorized to develop a system of natural rivers in the interest of the people of the state and future generations, for the purpose of preserving and enhancing a river's values for a variety of reasons, including aesthetics, free-flowing condition, recreation, boating, historic interest, water conservation, floodplain values, and fisheries and wildlife habitat. Sixteen rivers or segments of rivers have been designated: Jordan, Betsie, Rogue, Two Hearted, White Boardman, Huron, Pere Marquette, Flat, Rifle, Lower Kalamazoo, Pigeon, AuSable, Fox, Pine, and Upper Manistee rivers.

In fulfilling this act, staff within the Fisheries Division reviewed permits and monitored compliance to ensure that buildings and other modifications within the designated Natural River corridors were consistent with existing Natural River management plans, administrative rules, and Department best management practices. Further, they provided guidance to land owners, engaged with local zoning Boards, and assisted in the development and review of proposed zoning ordinances that helped implement riparian area protections in designated Natural River districts. This program was a cooperative effort between the Department of Natural Resources and local boards and citizens.

Location: Statewide
Year(s): 2011-2012
Partners: Department of Environmental Quality, private landowners, local zoning boards

Conservation Tools – Project Summaries

The Natural Heritage Database

Michigan Natural Features Inventory

The Natural Heritage Database is a comprehensive resource that documents significant natural features within the state. The Natural Heritage Database houses information on species that are threatened or endangered in Michigan, as well as other rare species and high-quality examples of natural communities. The Natural Heritage Database is absolutely unique in this regard; it is the only comprehensive source of known information on the location of rare species in the state of Michigan. The Natural Heritage Database provides many agencies and organizations with critical information related to distribution, abundance, and population status of threatened and endangered species, and the factors that threaten these species' viability.

The database is a compilation of information from a broad range of sources including museum and herbarium collection records, publications, knowledgeable experts, and field work. The database is continuously updated and improved as new data become available. The database tracks 304 animals, 400 plants, and 76 natural communities that are exemplary, rare, or imperiled at the state or global level. The database contains more than 20,000 records of locations for rare plants, animals, and natural communities that have been quality controlled and geo-referenced. In addition, Michigan Natural Features Inventory has conducted a variety of programmatic activities that have contributed to maintenance and enhancement of the Natural Heritage Database .

The Department makes extensive use of the Natural Heritage Database to help ensure the activities necessary for the management of public trust resources do not have adverse impacts on threatened and endangered species. The Natural Heritage Database is critical during environmental crises such as oil spills and dam failures. The data are used in the state's Geographic Decision Support Environment and subsequently accessed via the Integrated Forest Monitoring, Assessment, and Prescription system.

This information is used by many state and federal agencies as well as consultants to ensure management or development activities consider rare species and their habitats.

The Natural Heritage Database also has regional and national implications. The data in the Natural Heritage Database is aggregated at least annually to the NatureServe database, which is a national-level database on species and natural communities. This database in turn is used by federal agencies to conduct "multi-jurisdictional" reviews and assessments of activities at the federal level. Similarly, individual groups may cooperate on a regional basis to address natural resource issues and use the NatureServe database.

Location: Statewide
Year(s): 2011-2012
Partners: Michigan Department of Natural Resources, Michigan Department of Environmental Quality, agencies, universities, and individuals contribute data to the Natural Heritage Database ; users of the information include state and federal agencies, consultants, industry, local governments, and individuals.

Environmental Review

Lori Sargent
Michigan Department of Natural Resources

The environmental review process plays a key role in wildlife conservation. Environmental reviews evaluate the impact of proposed development or land management activities on federal and state endangered, threatened, and special concern species, high-quality natural communities, and other unique natural features. Over 2,000 permits are reviewed annually; about 25% of them have the potential to affect rare wildlife species and/or their associated habitats. If impacts to species are identified, the Department works closely with the permittees to either modify the planned project to remove the impacts or mitigate the expected impacts. The reviews are based on the State's comprehensive Natural Heritage Database that is maintained by Michigan Natural Features Inventory (MNFI).

The Endangered Species Assessment website (http://www.mcgi.state.mi.us/esa/) was maintained until September 2011 to provide a simplified and preliminary evaluation for agencies and the public on whether endangered, threatened, or special concern species, high-quality natural communities, or other unique natural features have been known to occur at or near a site of interest.

The environmental review process helps the Department maintain compliance with Part 365, Endangered Species Protection, of the Natural Resources and Environmental Protection Act (Act 451 of the Michigan Public Acts of 1994).

Accomplishments

2011: The Department continued to have a full time staff person dedicated to environmental review. The Department also worked with MNFI to conduct compartment reviews of State Forest lands by evaluating the potential effects of proposed forest treatments on threatened and endangered species.

2012: Due to budget cuts, the Department's participation in the environmental review process was greatly reduced in 2012. People and organizations seeking reviews were referred to MNFI for consultation. If projects evaluated by MNFI or other consultants revealed likely impacts to state-listed species, they were referred to the Wildlife Division for further consultation.

Year	Number of Projects Reviewed
2011	2,132
2012	49

Location: Statewide
Year(s): 2011- 2012
Partners: Department of Environmental Quality, Michigan Natural Features Inventory

Rare Species Explorer

Michael Penskar and David Cuthrell
Michigan Natural Features Inventory

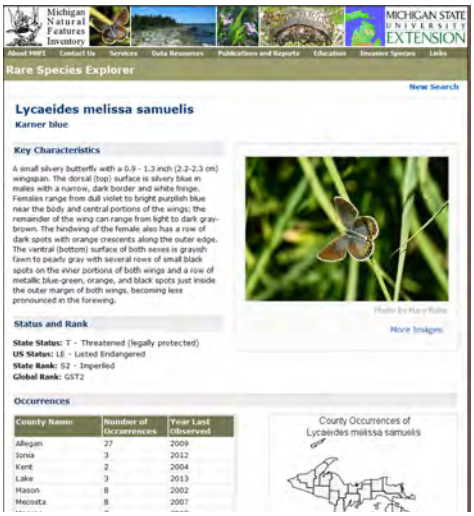
Michigan Natural Features Inventory completed an update to their Rare Species Explorer, an interactive website that helps users learn about rare species. The site features user-defined queries by taxa group or species, associated natural community, and listing status. To use the tool, go to: http://mnfi.anr.msu.edu/explorer/.

In 2011, species pages for the 66 newly listed animals as endangered, threatened, or special concern animals were added to the Explorer during the 2009 list review; these included 34 aquatic species and 32 terrestrial species. Species pages include information on identification, distribution, habitat requirements, management needs, recommended survey windows and techniques, and pertinent literature.

Additionally, occurrence data for several newly listed fingernail clam and gastropod species were gathered from the University of Michigan Museum of Zoology mollusk collection. New element occurrence information, which are basic conservation units indicating the area of land and/or water currently or previously occupied by a species or ecological community, was gathered and transcribed from the Michigan Odonata Survey and the Michigan Lepidoptera Survey. These new data were added to the state's Natural Heritage Database.

Other enhancements included an added query option to search by geographic area and a revision of the natural community and rare plant species crosswalk to aid in a better understanding of species of greatest conservation need habitat needs. Future improvements should include adding additional photographs, developing new and updated species and community abstracts, and acquiring further distribution data for the newly listed species.

Location: Statewide
Year(s): 2011
Partners: Department of Natural Resources, University of Michigan Museum of Zoology, Volunteers



Developing Conservation Tools for the Management of Mussels and Snails in Michigan

Peter Badra
Michigan Natural Features Inventory

Unionid mussels and gastropods are two of the most at-risk aquatic animals in Michigan. To better facilitate management and research in these declining groups, a robust Natural Heritage Database is critical, as well as a user-friendly identification tool specific to Michigan.

A total of 483 new or updated element occurrence records were entered into the Natural Heritage Database. These records included 12 gastropod species, 17 unionid mussel species, and two sphaeriid clam species. Sources of this data included The University of Michigan Museum of Zoology mollusk collection, Michigan Natural Features Inventory survey reports (older reports with recently listed species), Chicago Field Museum, Philadelphia Academy of Natural Science, Marine Science Institute, University of California Santa Barbara, and published literature.

A draft computer-based identification key was completed for aquatic gastropods and unionid mussels occurring in Michigan. Key characters for identification were determined for each of the 73 aquatic gastropod and 48 bivalve species. A Microsoft Access database houses the key characteristics and how they relate to

each individual species. A query was developed as the basis for the user interface for identifying shells. Initial tests of the keys were made to determine appropriate character ranks for each of the species and to evaluate which characters are most useful in distinguishing species. This is the first year of a three year project; however, due to a lack of funding in 2012, the project was put on hold.

Location: Statewide
Year(s): 2011
Partners: Department of Natural Resources

Invasive Species Conservation Tools and Outreach

Phyllis Higman and Sue Tangora
Michigan Natural Feature Inventory and Michigan Department of Natural Resources - Wildlife Division

Invasive species can pose a significant threat to many species of greatest conservation need and their habitats. Once established, they out-compete native species, reducing diversity and altering ecosystem structure, composition, and function. The Department and Michigan Natural Features Inventory (MNFI) developed a strategy to address their negative impacts to wildlife in 2011; this project helps to implement that strategy.

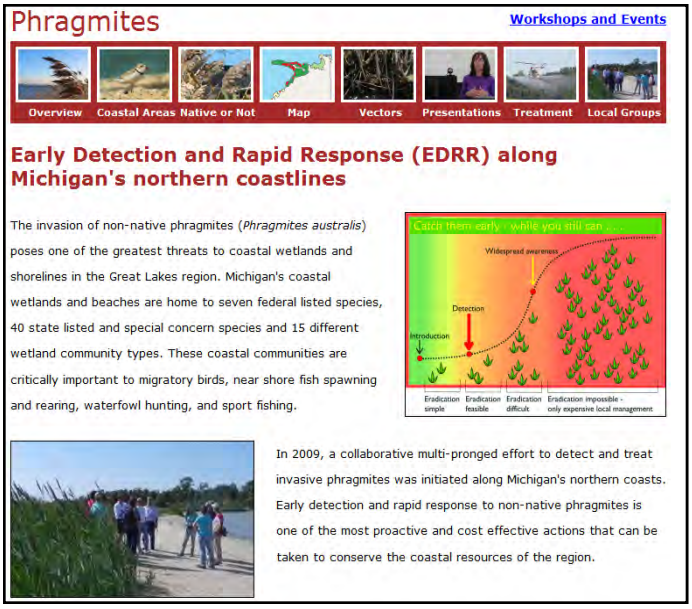
Conservation tools
This project undertook a substantial review of the literature and worked with key stewards in Michigan to improve the existing best control practices fact sheets. These fact sheets are posted at: http://mnfi.anr.msu.edu/invasive-species/best-control-practice-guides.cfm.

Improvements were also made to the Phragmites page on MNFI's website (http://mnfi.anr.msu.edu/phragmites/native-or-not.cfm), including a segment on how to distinguish native and non-native Phragmites in Michigan. This was also printed as a brochure for dissemination: Phragmites – Native or Not? (http://mnfi.anr.msu.edu/phragmites/phragmites-native-non-native.pdf).

Training modules for six aquatic invasive plants were developed and posted on the Midwest Invasive Species Information Network (MISIN; http://www.misin.msu.edu/training/).

MNFI staff worked with Department field staff, The Nature Conservancy, regional Cooperative Weed Management Areas (CWMAs), the Grand Traverse Conservation Invasive Species Information Network, and MISIN to develop standardized mapping protocols that were incorporated into the MISIN data entry portal. These protocols have been subsequently incorporated into field apps by both the Wildlife and Forest Management Divisions. MNFI provided technical assistance to partners for developing and using the protocols, developing quality assurance plans, and uploading data into MISIN. For the latter, data were compiled from MNFI and Department staff, contractors working for the Department, CWMA's, Conservation Districts, the Ottawa National Forest, and the IFMAP database.

Early Detection and Response
MNFI continued to work with the Department and other partners to target and treat high threat species where they are not widespread. The focus was primarily on Phragmites, swallow-wort, Japanese knotweed, and kudzu. Assistance was also given to Ottawa County with the development of a regional response to invasive Phragmites. MNFI also confirmed the first report of Chinese yam in Three Rivers State Game Area. A pilot project for rapid invasive species inventory was also conducted at Gratiot-Saginaw State Game Area.



Invasive species workshops were coordinated with the Forest Resources Division Forest Health Workshop in Escanaba and Newberry, and 12 additional invasive species presentations were delivered to various audiences during 2011. Considerable effort was also spent assisting the development and delivery of Phragmites Invasions in Michigan: *A Symposium to Build Capacity for Management*. This Symposium was initiated by the Great Lakes Commission and was widely attended by conservation partners from as far away as New York. It provided a far-reaching platform for focusing attention on the threat of invasive plants in Michigan.

Information on early detection monitoring and mapping of priority invasive species was incorporated into all of MNFI's presentations and workshops, reaching over 500 stakeholders. High demand for the invasive species field guide resulted in a second printing in 2011 and several hundred copies of the new aquatic invasive field guide have been purchased to date.

Location: Statewide
Year(s): 2011
Partners: Michigan Department of Natural Resources, Midwest Invasive Species Information Network, The Nature Conservancy, regional Cooperative Weed Management Areas, Grand Traverse Conservation Invasive Species Information Network, Conservation Districts, Ottawa National Forest, Ottawa County, Great Lakes Commission

Outreach

Increasing the Capacity of Local Units of Government to Support Wildlife Conservation

John Paskus
Michigan Natural Features Inventory

Decisions on land use in Michigan are made at the smallest unit of government, typically a township, city, or village. These decisions directly affect wildlife and their habitats. Many of these local units don't have the staff, resources, or knowledge to effectively include wildlife values into their planning.

The Wildlife Division, along with other agencies and organizations, is interested in the development of a comprehensive web-based information delivery system to assist local units of government, conservation organizations, and other entities with land use planning activities, protection efforts, and conservation initiatives. With over 1,850 local units of government in Michigan, the tool could lead to the long-term conservation of Michigan's diversity of wildlife and associated habitats across the state. This is particularly true in areas that have significant wildlife values, and are experiencing high levels of development pressure, habitat fragmentation, and/or habitat degradation.

This project focused on exploring the integration of wildlife related information into a variety of local and regional planning, conservation, and protection efforts to improve wildlife conservation throughout the state. In 2011, an executive summary of the work that MNFI has been involved in regarding land use and natural resource conservation was created. A short summary of similar efforts in other states, as well as a brief discussion about common data layers themes that might be applicable to this project was provided. The development of a prototype website for delivering wildlife information to local units of government was also initiated.

Due to budget cuts, there was insufficient funding to continue this project in 2012.

Location: Statewide
Year(s): 2011
Partners: Michigan Department of Natural Resources – Wildlife Division

A Climate Change Vulnerability Assessment of Natural Features in Michigan's Coastal Zone

Christopher L. Hoving, Yu Man Lee, Peter J. Badra, and Brian J. Klatt
Michigan Department of Natural Resources – Wildlife Division and Michigan Natural Features Inventory

Michigan wildlife face a myriad of conservation challenges, including land use change, habitat loss, habitat fragmentation, competition from invasive species, altered ecological processes, and a rapidly changing climate. Michigan's climate has been warming, and the warming trend is accelerating. The best available science indicates the acceleration is likely to continue, and warming in the next 40 years will be roughly 10 times as fast as the warming over the past 100 years in Michigan. It is important to understand how Michigan's animals, plants, and their habitats may respond to these changes to help us understand future management challenges and opportunities.

In 2010, the Michigan Natural Features Inventory (MNFI) received funding from the Michigan Department of Environmental Quality Coastal Management Program to assess vulnerability of animal and plant species in the coastal zone using the Climate Change Vulnerability Index (CCVI) developed by NatureServe. MNFI assessed a total of 198 species including 131 animal species and 67 plant species. The Wildlife Division used State Wildlife Grants and Pittman-Robertson funds to assess vulnerability of 281 animal species using the same methods. Vulnerable species are those expected to experience reductions in range extent or abundance by 2050 due to climate change. The report is available at: http://www.michigan.gov/documents/dnr/3564_Climate_Vulnerability_Division_Report_4.24.13_418644_7.pdf

Results
The CCVI analysis suggests that 17% of terrestrial game species and 61% of terrestrial and aquatic species of greatest conservation need (SGCN) are likely vulnerable. Other conservation threats or programs aside, these species will likely experience range or population reductions due to climate change. Vulnerable species included important game species, such as moose, American marten, snowshoe hare, and ruffed grouse. Vulnerable species of greatest conservation need include conservation icons, such as the Karner blue butterfly and common loon.

Discussion
Other vulnerability analyses suggest that ecological communities in Michigan will change dramatically as species respond individually. Some characteristic northern species, such as spruce, fir, and birch may fade from the landscape. Quaking aspen is predicted not to regenerate nor compete with the same health and vigor in a warmer and drier Michigan. Other species, such as red maple and some oaks and hickories, are expected to do better in a warming climate. This analysis focused on vulnerabilities of individual species, independent of changes in habitat or competitive interactions.

The CCVI predicts the strength and direction of the influence of a changing climate. Management action (or inaction) can offset or reinforce the climate influence. The CCVI is a useful first step in climate adaptation, but it is only one tool to use to develop

climate adaptive management plans for species or habitats. Initial suggestions of management actions are provided in the report to help managers begin thinking about how these adaptive plans can be formulated. However, adaptation (e.g., climate-smart management) will need to be context specific; it will depend on existing management goals, priorities, funds, and local site conditions.

Location: Statewide
Year(s): 2012
Partners: Michigan Department of Environmental Quality Coastal Management Program, The Nature Conservancy, NatureServe, U.S. Fish and Wildlife Service – Wildlife Restoration Program

Development of a GIS for Inventory, Classification, and Management of Nongame Wildlife in Great Lakes Waters

Dr. Edward Rutherford, Lacey Mason, and Jason Breck
Michigan Department of Natural Resources – Fisheries Division

This project is a continuation of the Great Lakes Geographical Information System project to provide geospatial tools to assist in developing management plans and updating and implementing the Wildlife Action Plan. The main objectives for this project include:

1. Develop an ecological database on aquatic habitats in the Great Lakes;
2. Create ecological classification of nearshore and offshore Great Lakes habitats in Lakes Huron, Superior, and Ontario;
3. Determine suitable indices of relative habitat quality for sensitive life stages of priority non-game species;
4. Develop GIS-based decision support projects to facilitate evaluation of potential impacts to non-game wildlife habitats;
5. Develop and implement long-term, internet-based strategies for project maintenance and distribution.

Database accomplishments
The process of attributing existing physical habitat data has been completed. Current data layers incorporated into the framework and habitat classification include depth, slope, substrate, surface temperature, and rate of warming for all lakes with the addition of temperature at depth for Lake Michigan. Other variables that are also being incorporated are fetch, current direction and strength, circulation gyres, temperature at depth, cumulative degree days, chlorophyll-a, and light attenuation data layers for all lakes. Data was further developed to classify the thermal habitats of the Great Lakes coastal zone. These data included cumulative degree-days, spring rate of warming, and upwelling index. We also added several other data layers including seasonal ice thickness, wave height and wave energy (NOAA GLERL), and chlorophyll a, suspended sediment, transparency, dissolved organic carbon, and submerged aquatic vegetation

Classification accomplishments
With the availability of seamless data sets between Great Lakes and inland waters, a common spatial framework and units were defined for classification and ecological modeling that extends from watersheds to the Great Lakes. Two lake habitat zones, coastal and offshore, were defined.

Habitat suitability accomplishments
Habitat suitability maps were created for each of the 5 native species (lake whitefish, lake herring, lake trout, emerald shiner, yellow perch) using the best logistic regressions determined for each species. Habitat suitability models were statistically significant for lake herring, lake trout (for Lakes Erie, Huron, Ontario, and Superior), and lake whitefish using depth, slope, cumulative degree days, and distance from river mouth physical habitat variables. Presence of emerald shiner was explained by the combined habitat variables of depth, distance from river mouth, and cumulative degree days, while the presence of yellow perch was related to depth, slope, and cumulative degree days.

Spawning habitat suitability models for lake herring and lake trout (not in Lake Michigan) were statistically significant for 5 of the 6 physical habitat variables, excluding substrate. For lake trout only in Lake Michigan, depth and average surface temperature were included in the model. Habitat suitability models for lake whitefish were statistically significant for depth, slope, CDD, and average surface temperature during spawning. The model for Emerald shiner was significant for depth, slope, and substrate, while the model for Yellow perch was significant for depth, slope, and average surface temperature. The best model selected correctly classified more than 93% of the presence values, and misclassified less than 0.5% of the absence values.

Decision support accomplishments
The Lakebed Alteration Decision Support Tool (LADST) was enhanced and extended from Michigan's coastal waters to coastal and offshore waters of the Great Lakes. Users of the LADST can create their own siting suitability maps, based upon criteria of their own choosing, just by visiting a public web site (http://glgis.org/ladst). The LADST is novel in that it makes this type of customized suitability analysis easily accessible to users who have no specialized software and no experience with geographic information systems (GIS).

Maintenance and distribution accomplishments
In 2011 and 2012, we continued to develop workshops and self-paced tutorials to familiarize end-users with data in the Great Lakes GIS and uses for science inquiry and decision support. We actively pursued several means of releasing the public website for the Great Lakes GIS Online and the LADST, but due to security restrictions, storage space requirements, software licensing, and bandwidth restrictions, these options did not come to fruition this year.

Location: Statewide
Year(s): 2011-2012
Partners: National Oceanic and Atmospheric Administration, University of Michigan - School of Natural Resources and Environment, Michigan Department of Natural Resources - Institute for Fisheries Research.

Development of Lake Spatial Information and Tools for Aquatic Life Conservation

Dr. James Breck and Trevor Havelka
Michigan Department of Natural Resources – Fisheries Division

This project is designed to facilitate the conservation, protection, and management of Michigan's aquatic habitats and species of greatest conservation need (SGCN) by developing spatial databases, tools, and models. This work added to past work on lake and river assessments using spatial data. The main objectives for this project included:

1. Generating data sets for lakes based on demographic variables;
2. Exploring lake conditions based on future climate scenarios.

Accomplishments

Data were assembled and generated that describes societal use for 6,810 inland lakes that are 10 acres or larger. Summaries were calculated for population totals, median income, total income, total households, number of campgrounds, density of boats, and total fishing license sales for 10 separate buffers (0.1, 1, 5, 10, 20, 30, 40, 50, 75, and 100 km) around each lake. These variables are stored in an Access database. A cross reference table was developed to link lake and stream arc catchments to their upstream catchments. Within the cross reference table, lakes and stream arcs were identified. Using this cross reference table, any upstream landscape variables can be linked to a specific lake or stream arc.

Current climate conditions and projected future climate conditions were attributed to the Institute for Fisheries Research Hydrological Dataset (IFRHD) lake polygons. Current climate conditions were summarized for mean annual precipitation and maximum, minimum, and mean annual air temperatures for the 1992-2002 time period (centered on 1997). Future climate air temperature projections, using the A2 climate scenario and three climate change models (ECH5, GENMOM, and GFDL), were attributed to the IFRHD lakes for six time steps: 1997, 2022, 2032, 2042, and 2062, and 2087. A program was developed that processes lake temperature and dissolved oxygen profile data, and allows managers to classify the habitat suitability of each lake. This program produces a spreadsheet and a series of graphs that show the temperature and dissolved oxygen profiles for each lake, along with calculated values such as the depths of the metalimnion and hypolimnion and the depth at which dissolved oxygen concentration equals 2 ppm.

Morphometric calculations, such as mean depth and volume, were completed for 138 lakes in 2011, and 62 lakes were completed in 2012. With the addition of the new lakes this year, the total number of lakes completed with morphometric calculations is 2,289 out of 2,832 lakes.

Species distributions for SGCN mussels (438 sites), snails (44 sites), and aquatic insects (63 sites) were linked to stream and lake features of the IFRHD. In addition, stream survey data from the Department fish collection system (fish and limnology surveys) from 2002 to the present were linked to stream reaches in the IFRHD dataset (total of approximately 3000 surveys).

Location: Statewide
Year(s): 2011-2012
Partners: University of Michigan - Institute for Fisheries Research and Michigan State University

Refinement of the Aquatic Portion of Michigan's Wildlife Action Plan and Development of Tools to Support the Plan

Minako Edgar, Liz Hay-Chmielewski, Dr. Lizhu Wang, and Kevin Wehrly
Michigan Department of Natural Resources – Fisheries Division

This project was designed to help refine the aquatic portion of Michigan's Wildlife Action Plan by updating and maintaining GIS databases, developing classification frameworks, identifying high priority conservation areas, assessing environmental conditions of Michigan's rivers and inland lakes, identifying key environmental threats to each water body, and developing GIS application tools to help implement and update the plan.

Specifically, this project refined data on physical and biological variables for lakes and their buffers.

Data
The aquatic habitat database for the Michigan Wildlife Action Plan was updated and maintained. A total of 441 inland lakes were added to the database; these were initially incorrectly labeled as a stream/river in the National Hydrography Dataset (NHD). The assignment and inclusion of each lake in the Institute for Fisheries Research Hydrological Dataset (IFRHD) was manually verified and their polygon geometry was modified based on the topographical maps and aerial photos.

Local and network catchments were updated based on previously developed boundaries for all lakes and river reaches in the IFRHD. Riparian buffers were created with a new 10 meter resolution national elevation dataset (previous elevation data was at a 30 meter resolution). The rivers were divided into two categories; narrow and wide. Riparian zones were created for each river category and were then dissolved to the reach level of streams with connectivity of confluence-to-confluence. Over 100 landscape and river network variables were attributed to each catchment and riparian zone. Groundwater recharging areas were also calculated at each of the spatial scales.

Additional updates include:

- Large rivers were buffered using the NHD Area features (river polygons)
- Instead of extending into Great Lake polygons, the newly created buffers were cutoff at Great Lakes by incorporating shoreline arcs.
- All connected lakes (lakes that are part of connected river network) and disconnected lakes 5 acres and larger were given a 100 meter buffer zone. Disconnected lakes less than 5 acres were excluded from the catchment delineation process.
- Attributes were generated for buffers and catchments at three spatial scales: 1) local scale, which includes the land area immediately adjacent (buffer) or draining to (catchment) a given river reach or lake, 2) incoming scale, which includes all upstream contributing areas only (local scale not included), and 3) network scale, which includes all upstream contributing areas and the local zone of the target river reach/lake polygon. Attributes summarized for these zones include mean annual precipitation, mean annual growing degree days, forest canopy cover, and numerous others.

EDUs and AESs
The boundaries of the previous version of Michigan's ecological drainage units (EDUs) developed by The Nature Conservancy were refined and updated using the process developed by the USGS Aquatic Program (McKenna and Castiglione 2010). EDUs were developed by combining multiple similar aquatic ecological systems (AESs). The most recent version of the AES delineation tool uses fish occurrence (Steen et al. 2008), river classification (Brenden et al. 2008, Seelbach unpublished data), and landscape characteristics to classify the AESs.

Within Michigan's EDUs, 99 AESs were constructed. Each EDU consists of up to 27 AESs and the same types of AESs exist in different EDUs. This spatial delineation provides a framework for developing multi-scale classifications for diverse management needs and conservation situations in freshwater ecosystems. For example, FCMs may be suitable for local-level management or assessment efforts, whereas AESs would be appropriate units for addressing many broad-scale conservation and assessment issues.

Tools
A GIS database is now ready to be used by Department biologists and managers. This database consists of stream/river reaches, lakes, and their associated local, network, and riparian catchments. The components of the database are all hydrologically connected and linked with all available physical and biological information. We also added high priority conservation areas into our database. All of the information within the database can be queried to satisfy multiple management and conservation needs.

A web-based tool displaying aquatic habitat data, called the Aquatic Habitat Viewer (AHV), was developed using ArcGIS Server and the web API for Flex. Data layers in the AHV included, but were not limited to, species of greatest conservation need, lake contours, and cold water habitat stream classification. Base layers included conservation and recreation lands (CARL), surficial geology, management units, and others. Basic tools were added that allow users to search for features, bookmark locations, and search for addresses.

Location: Statewide
Year(s): 2011-2012
Partners: University of Michigan and United States Geological Survey

Wildlife – Project Summaries

Karner Blue Butterfly Population and Habitat Monitoring

Maria Albright
Michigan Department of Natural Resources – Wildlife Division

The Karner blue butterfly is a federally endangered species that occupies oak savanna and barrens habitats and relies on lupine as a main food source. Identifying species distribution and occupied habitat provides needed information on management for the species. The conservation community interested in Karner blue butterfly works together every year to conduct surveys to monitor their populations and habitat.

Accomplishments
Presence/absence surveys were conducted at 93 occupied and unoccupied sites in the Allegan State Game Area and at five potential Karner blue butterfly sites in the Flat River State Game Area. Sites selected for surveys were those that were historic savannas with key savanna plant species including lupine. Six distance surveys were also conducted at the Allegan State Game Area and two distance surveys were conducted at Flat River State game Area during the butterfly's second flight in 2012.

Lupine mapping was conducted on a subset of potential Karner blue butterfly sites during the spring, and a total of 10 acres of lupine was digitally mapped and added to the existing GIS data layer of lupine distribution. Lupine mapping is used to help define site extent and boundaries, that are useful for planning future habitat management and population survey activities.

Location: Statewide
Year(s): 2012
Partners: Michigan Department of Natural Resources – Wildlife Division, U.S. Fish and Wildlife Services

Michigan Frog and Toad Survey

Lori Sargent
Michigan Department of Natural Resources – Wildlife Division

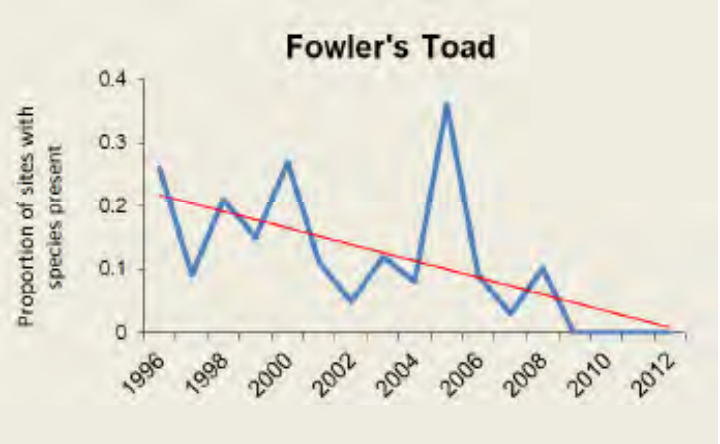
Frogs and toads can be great indicators of environmental health because their permeable skins are sensitive to environmental conditions. Additionally, they rely on both aquatic and terrestrial habitats during their life cycles, making them particularly vulnerable to a variety of threats. Globally, amphibian populations have declined over the last three decades, likely due to habitat degradation or loss, invasive species, and pathogens. In 1996, the annual Michigan Frog and Toad Survey was initiated to provide baseline data on Michigan's calling frog and toad populations and to evaluate trends in the state. This survey is a citizen science program. Volunteers conduct surveys three times annually: early spring, late spring, and summer.

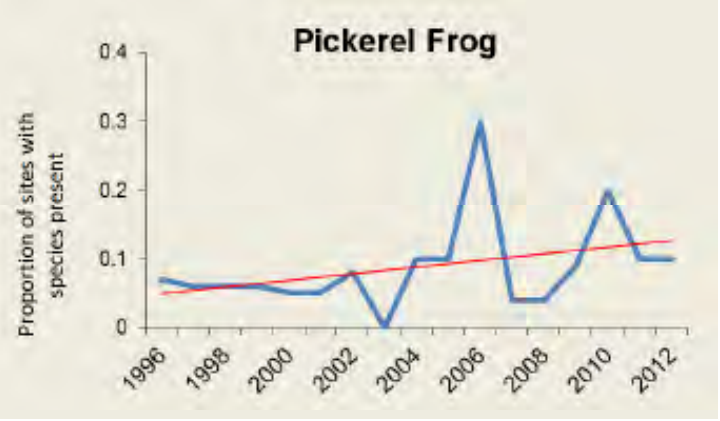
The survey was conducted by trained volunteers and coordinated by the Wildlife Division. In 2011, the total number of sites visited statewide was 1,064; in 2012 there were only 858 sites visited, which was slightly less than the survey goal due to decreased volunteer recruitment and participation.

Overall, most frog and toad species appear to be stable in Michigan. However, there is some evidence that local and regional declines have occurred in Fowler's toads, pickerel frogs, mink frogs, wood frogs, and Cope's gray treefrogs.

Recommendations
There continues to be concern over Fowler's toad populations. Targeted surveys are needed to get a better understanding of what is happening to their populations in Michigan. Mink frog observations continue to be low, however this species can be difficult to survey since they call at very early hours in the morning; targeted surveys for this species are also needed. To continue to gather data from a sufficient number of sites, more recruitment, and encouragement of current volunteers to continue to participate is needed.

Location: Statewide
Year(s): 2011-2012
Partners: Volunteers, Non-Game Wildlife Fund





	Number of sites surveyed				
Year	Zone 1	Zone 2	Zone 3	Zone 4	Notes
2011	695	199	50	120	For a third year in a row, Fowler's toads were not heard. Mink frog, pickerel frog, Cope's gray treefrog observations continue to be low. Northern Leopard frog observations are increasing.
2012	560	150	50	98	For a fourth year in a row, Fowler's toads were not heard. Mink frog, pickerel frog, Cope's gray treefrog observations continue to be low. Northern Leopard frog observations are increasing.

Competitive State Wildlife Grants
State Wildlife Action Plan Implementation Resources and Capacity Building Tools for Amphibian and Reptile Conservation

Yu Man Lee and Lori Sargent
Michigan Natural Features Inventory and Michigan Department of Natural Resources – Wildlife Division
Project leads: Missouri Department of Conservation and Association of Fish and Wildlife Agencies

Amphibians and reptiles are included on every state's Wildlife Action Plan species of greatest conservation need list. Populations for many of these species have declined because amphibians and reptiles face unique challenges including vulnerability to climate change, declining water quality, habitat loss, pet trade demands, and regulatory issues (collection, possession, and movement) across state and international boundaries. In fact, amphibians are more imperiled worldwide than either birds or mammals. Baseline information for amphibians and reptiles is lacking in comparison to virtually any other vertebrate species and there is a need for basic tools and resources to provide information at a broad scale, which in turn can assist management at a local scale. This project was designed to help close several information gaps related to amphibians and reptiles by working across states to develop useful tools for their conservation and management.

This project was a cooperative effort between the Association of Fish and Wildlife Agencies and multiple states that received a comprehensive State Wildlife Grant. The main objectives for the project were:

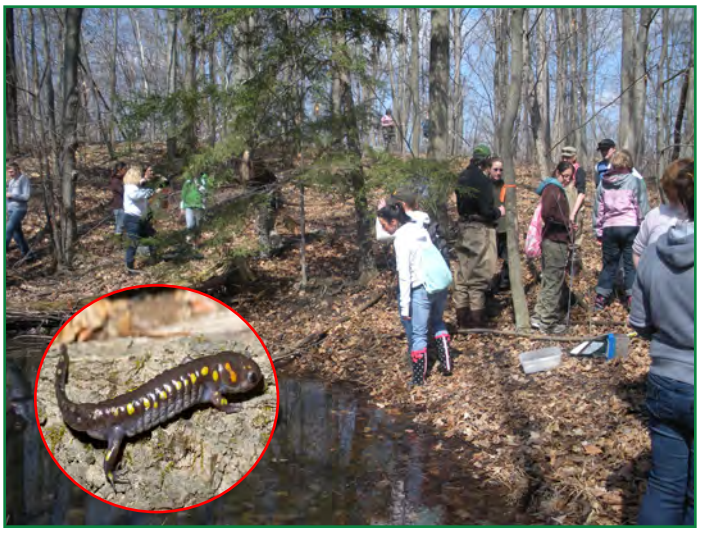
1. To evaluate and produce State Wildlife Action Plan implementation resources for amphibian and reptile species of greatest conservation need, including an assessment of vulnerabilities to climate change, identification of priority habitats, and development of a volunteer monitoring plan and conceptual design.
2. To provide capacity building opportunities for State Wildlife Agencies in habitat management, inventory and monitoring, regulatory and law enforcement with respect to amphibians and reptiles.

To accomplish these objectives, Michigan: a) conducted amphibian and reptile (herp) inventories in select Michigan counties while developing recommendations for volunteer data collection, b) compared and evaluated volunteer monitoring efforts with assistance from California and Nevada partners; and 3) tested volunteer monitoring frameworks and associated data analysis.

Results

A total of 63 examples of volunteer-based herp monitoring programs from 30 states or provinces and 8 different countries were compiled. Of the monitoring programs compiled, 37 programs included inventory and/or monitoring for frogs and toads, 33 included salamanders, 27 included turtles/tortoises, 23 included snakes, 21 included lizards, and 1 included alligators. The most common survey method across all herp groups was visual encounter surveys.

In the pilot volunteer field testing of non-calling herp monitoring methods, we worked with 47 faculty, and student and community volunteers from the University of Michigan-Flint and Eastern



Michigan University. Visual encounter surveys, egg mass count surveys, dip net/sweep sampling, aquatic funnel trapping, and artificial cover/cover boards were included in the volunteer field testing conducted at the Murphy Lake State Game Area. Volunteer surveyors were able to document a total of 1,344 adults, tadpoles, and egg masses of 15 different species over three days of surveys in 2011 and 2012. One species of special concern and three additional species of greatest conservation need in Michigan were also observed. Volunteers seemed to enjoy the experience and provided feedback indicating they could successfully conduct all or most of the survey techniques and accurately complete the data forms with adequate training. All volunteers expressed interest in participating in additional herp monitoring surveys. All data collected through his project was submitted to the Michigan Herp Atlas.

The review of other programs, consultations with taxa experts, study design and statistical experts, and the pilot test provided the basis for the development of a draft conceptual framework for monitoring amphibian and reptiles using non-calling or non-auditory surveys and volunteers. This framework will be reviewed and finalized to aid state agencies in gathering more complete information on the distribution and status of amphibians and reptiles, while providing opportunities for partnerships and engagement with the public. The conceptual framework report can be found here: http://mnfi.anr.msu.edu/reports/2012-11%20CSWG%20Herp%20Monitoring%20Conceptual%20Framework.pdf

Location: Statewide
Year(s): 2011-2012
Partners: Missouri Department of Conservation, California Department of Game and Fish, Georgia Department of Natural Resources, and the Nevada Department of Wildlife Expenditures

Effects of Temperature on Functional Relationships Among Michigan's Fluvial Fish Assemblages: Identifying Management Opportunities in the Face of Environmental Changes

Dana Infante
Michigan State University – Department of Fisheries and Wildlife

In Michigan, a stream's thermal regime is one of the most important characteristics influencing distributions and abundances of stream fishes. Water temperatures are known to directly affect individual species by triggering key events such as spawning and hatching for many fish. In addition to their direct influences on fish, stream temperatures may also have numerous indirect effects on a particular species as they control that species' predators, prey, and/or competitors. Consequently, the response of a particular species to temperatures depends not only on the preferences and tolerances of that species but also on those of other fishes. Under altered thermal regimes, competitive dominance can shift, favoring new species in the changed environment, which could lead to species loss. Understanding these direct and indirect responses of stream fishes to varied thermal characteristics requires explicit evaluation of relationships among stream fishes and consideration of how these relationships are structured by temperature. The objectives of this project were to:

1. Collect and compile data characterizing late summer and early fall stream fish assemblages and thermal regimes from targeted river segments throughout Michigan;
2. Quantify the extent to which fish assemblages are related to thermal characteristics;
3. Develop management strategies based on results.

Results

Fish and water temperature data were collected from 46 stream sites located throughout Michigan. Sites were identified from a pool of historically under-sampled stream types defined by their thermal characteristics including warm-transitional streams and warm streams located throughout the Upper Peninsula, in the thumb in Michigan's Lower Peninsula, and in southwestern Michigan.

A total of 24,290 fish specimens representing 79 species in 15 families were collected from the study sites. For each site, estimates of total species richness, diversity, and relative abundances were calculated. Fish were also summarized by functional metrics including relative abundance of species comprising various trophic groups, having different spawning strategies, and with different habitat preferences and tolerances to stressors.

Temperature data were also summarized by various metrics including July 7-day minimum, maximum, and mean to allow for integration with a larger set of state-wide temperature data. Combined analysis of biological and temperature data have shown strong relationships with groups of fish and different characteristics of stream thermal regimes. Analyses have shown that at a statewide scale, natural landscape factors including geology, slope, and estimates of groundwater delivery strongly control stream thermal regimes and distributions of fishes. However, at a finer, regional scale, anthropogenic land uses are important, especially in regions where they comprise a large portion of the landscape.

These analyses have provided clear direction for future work, which will incorporate regional investigations of landscape controls on stream fish and water temperatures to best capture interactions among fishes. Our results suggest that different characteristics of stream thermal regimes are important to stream fishes and management actions should be tailored to account for these differences, which also vary regionally due to differences in landscape-scale drivers.

Location: Statewide
Year(s): 2011-2012
Partners: Department of Natural Resources – Fisheries Division, Lake Superior State University, Michigan Technological University

Piping Plover Recovery Management

Christopher Hoving
Michigan Department of Natural Resources – Wildlife Division

The Great Lakes population of piping plover is listed as endangered at both the federal and state level. Their reproductive success is affected by human disturbance and predation at nesting sites located on open sandy beaches. Therefore, the Department and conservation partners developed a nest protection program. This nest protection program included the following activities: identification of nesting areas, enclosing individual nests to prevent trampling and predation of the eggs, banding chicks and adults to determine reproductive success, and educating beach-goers from inadvertently disturbing nests and chicks.

Accomplishments
Work continued on this program in 2011; however activities were funded through a Cooperative Endangered Species Conservation Fund grant.

In 2012, the Department staff worked with partners to coordinate nest protection efforts and banding. All nest enclosures and nest protection activities were conducted by agency partners.

Location: Great Lakes Coast
Year(s): 2011-2012

Partners: U.S. Fish and Wildlife Services, U.S. Forest Services, Little Traverse Bay band of Odawa Indians, University of Minnesota, University of Michigan Biological Station, Central Michigan University Biological Station, Detroit Zoo, John Ball Zoo, Saginaw Zoo, and many local volunteers

Monitoring of Peregrine Falcon Breeding Activity

Joe Rogers
Wildlife Recovery Association

Peregrine falcons were re-introduced to Michigan's Upper Peninsula from 1988 to 1992. Monitoring has continued to ensure the success of the re-introduction. Coordination of volunteers and partners to monitor nesting sites of peregrine falcons begins annually in March as pairs begin to revisit nest sites and begin breeding, continuing through July-August when fledging of chicks occurred.

Accomplishments

Year	Number of Sites Observational Data was Collected	Number of Chicks Banded Statewide	Number of Sites at Which Chicks Were Banded
2011	40	33	14
2012	37	40	15

During the 2011 and 2012 breeding season, the number of nests monitored significantly surpassed the goal of nine. Further, in 2012, there were two new nesting sites documented.

The increase in number of chicks banded is due primarily to several larger than average successful clutches of 4-5 chicks. Both years yielded a higher number of chicks banded than the expected number of 28. Further, banding was possible at one site for the first time in 2012. Additional chicks were produced at these and other sites but could not be banded due to inaccessible conditions at the nest site.

Location: Statewide
Year(s): 2011-2012
Partners: Michigan Department of Natural Resources – Wildlife Division, Non-Game Wildlife Fund

Breeding Bird Atlas

Kalamazoo Nature Center

In 1983, the Department initiated Michigan's first comprehensive statewide breeding bird survey, leading to the publication of the first statewide Atlas of Breeding Birds of Michigan in 1991. This information provided a reference point for the abundance and distribution of birds statewide. Since its publication, the book and data have provided vital information for a number of planning and management efforts across the state and nationally. This information was vital in developing the species of greatest conservation need list as well as priority threats and conservation needs for many avian species in the Wildlife Action Plan. Updated information is critical for understanding population trends and providing up-to-date information for management and planning activities. The Breeding Bird Atlas (BBA) II data will also provide the basis for re-assessing the species of greatest conservation need list. The project objectives were to:

1. Collect bird data using an accepted and standardized protocol that will allow for long-term monitoring of trends;
2. Gather information on the habitat use of nesting species at the landscape level that can be used in conservation planning and management.

The Michigan Breeding Bird Atlas II effort also provides an opportunity to improve and increase the data collected on species or guilds that are rare, were under surveyed in the initial project, or are inherently difficult to survey. This project is still on-going. Species accounts have been drafted and data has been entered into a database.

Accomplishments

2012: The Kalamazoo Nature Center has made all species accounts and introductory text freely available online at http://www.mibirdatlas.org.

The entire state, including waters of the Great Lakes, was incorporated into a single GIS data layer in 2012. It was designed to serve as a common mapping frame to compare the BBA I and BBA II data products and provide a basis for data collection and analysis when a third Breeding Bird Atlas project is planned. A metadata document was begun for this GIS data layer and the accompanying BBA I and BBA II data products. This metadata is expected to be complete in 2013 and the full data set available for free public download.

Location: Statewide
Year(s): 2012
Partners: Michigan Department of Natural Resources – Wildlife Division, Michigan Natural Features Inventory, U.S. Fish and Wildlife Services, Michigan Audubon Society, Arcus Gay and Lesbian Fund, Herbert H. and Grace A. Dow Foundation, Saginaw Bay Watershed Initiative Network, Kalamazoo Community Foundation, Frey Foundation, and volunteers

Competitive State Wildlife Grants
A Coordinated Response to a Deadly, Emerging Threat: White-Nose Syndrome in Bats

Christopher Hoving and Bill Scullon
Michigan Department of Natural Resources – Wildlife Division
Project lead: Arkansas Game and Fish Commission

White-Nose Syndrome (WNS) is associated with massive bat mortality in the northeastern and mid-Atlantic United States. Since the winter of 2006–2007, bat population declines ranging from 80–97% have been documented at severely affected hibernacula. An estimated mortality of more than one million bats since 2007 represents the most precipitous decline of North American wildlife caused by infectious disease in recorded history. Given the current rapid rate of spread of this malady, it is imperative that states coordinate to increase preparedness when/if WNS affects more sites, more states, and more bat species.

This project supported a multi-state coordinated response to White Noes Syndrome through communications, development of response plans, surveillance efforts, outreach and education, and research. Michigan's planned accomplishments were to:

1. Develop a statewide white-nose syndrome disease response plan and implement the plan upon detection of the disease in Michigan.
2. Survey 25 bat hibernacula over two years in late winter to look for white-nose syndrome affected bats near entrances or inside the hibernaculum.
3. Determine baseline winter bat population numbers for 5 mines that are not normally visited and are used by large numbers of non-endangered bats.
4. Educate the public about white-nose syndrome and the need for targeted cave/mine closures and how to respond to signs of potential white-nose syndrome infections.

Response plan
Michigan's White-Nose Syndrome Response Plan was written and adopted by the Department of Natural Resources – Wildlife Division. This statewide disease response plan has been thoroughly reviewed and is available on the Department website (http://www.michigan.gov/documents/emergingdiseases/MichiganWNSPlanFINAL122010_342261_7.pdf). The plan addresses issues relating to systematic surveys, hibernacula database development, internal and external communication, public awareness campaign and materials, species status, rehabilitation, decontamination protocols, post disease conservation strategy, and other related topics.

Surveys and baseline data
The majority of winter bat hibernacula are abandoned mines located in the Upper Peninsula of Michigan, and subsequent survey/outreach efforts target this region. In the winter of 2010-2011 Eastern Michigan University in conjunction with Department staff conducted surveys on 21 sites in Alpena, Dickinson, Mackinac, Marquette, and Ontonagon Counties. Eight mine sites were examined for the first time. Surveys at the previously visited mines, caves, and tunnels suggested steady or slightly increasing populations at most sites. Five bats with suspicious fungal growths were tested for White-Nose Syndrome, but all tests were negative.

A hibernacula/bat database was developed summarizing available information on location, ownership, size, ambient conditions, and number and types of bats hibernating in 119 mines, 17 caves, 2 man-made tunnels, 1 bridge, and a hydroelectric dam in the state that have been surveyed. Currently, over 75 of these abandoned mines are known to harbor some hibernating bats, and these sites are used by almost all numerically significant populations of bats in the state. This data set will be used in prioritizing and scheduling surveys.

Outreach
A critical part of the development of Michigan's White-Nose Syndrome Response Plan, a public reporting process/form for unusual wildlife activities/disease was deployed in December 2010 and is available on the Department website at: http://www.michigandnr.com/diseasedwildlifereporting/disease_obsreport.asp.

Other key outreach efforts included: presentations at public venues; press releases about white-nose syndrome, partnering to develop and distribute an outreach poster entitled Michigan's Brilliant Bat; developing a *Bat in the School* educators' program that included the posters, lessons plans, activity suggestions, and bat flash cards for teachers to use in their classrooms; distributing *Bat in the School* to 44 schools located in the Western Upper Peninsula that are most likely to see white-nose syndrome first due to the large amount of caves and abandoned mines.

Location: Statewide
Year(s): 2011-2012
Partners – Grant: Arkansas Game and Fish Commission, Bat Conservation International, Alabama DCNR, Florida Fish and Wildlife Conservation Commission, Delaware DNREC, North Carolina Wildlife Resources Commission, Tennessee Wildlife Resources Agency, West Virginia DNR, Wisconsin DNR
Partners – in state: Michigan DNR - Forest Resources Division, USDA-NRCS, USFWS, U.S. Forest Service, MDARD, Michigan Department of Community Health, Eastern Michigan University, Organization for Bat Conservation, Michigan State University, NGO's, state academic institutions, and various other partners.

Terrestrial Research – Project Summaries

Southern Michigan DNR Lands Integrated Inventory Project

Michael Kost, Joshua Cohen, and Michael Donovan
Michigan Natural Features Inventory
Michigan Department of Natural Resources - Wildlife Division

To responsibly manage Michigan's natural resources, staff require thorough knowledge of the features on state lands. Updated natural feature maps and their associated data will help Department biologists plan and assess management activities that serve the Wildlife Action Plan. Specifically, the information can guide invasive species removal, prescribed burns, stewardship of unique sites, wildlife management, forest management, and general maintenance of desired landscape features. This data is useful for guiding subsequent surveys for rare species and high-quality natural communities. Potential new rare species or community occurrences and problematic non-native, invasive species were recorded with a GPS during field inventories, and these data will expedite future detailed surveys and response activities, respectively.

The primary goal of this project was to delineate forested and non-forested stands in management areas to be incorporated into the Integrated Forest Monitoring, Assessment, and Prescription (IFMAP) system. This was accomplished by: 1) delineating non-forested and forested stands prior to field work using aerial photos in ArcGIS; 2) verifying and adjusting stand boundaries in the field while recording specified inventory data for non-forested and forested stands; 3) transferring the final pre-inventory layer to the Stage-1 non-forested and forested stand layers in the IFMAP GDSE; and 4) suggesting improvements in the protocol for future inventory work. The IFMAP Stage 1 inventory is a good preliminary process for identifying potential high quality natural areas and important areas for rare and more common species.

Accomplishments

2011: Over 5,000 stands totaling more than 93,000 acres were inventoried and mapped in management areas including Flat River, Gratiot-Saginaw, Lapeer, Middleville, and Port Huron State Game Areas, and Holly Recreation Area. Specifically:

- Flat River State Game Area – 595 stands were established within the 7,373 acres.
- Gratiot-Saginaw State Game Area – 855 stands were established within the 16,991 acres.
- Lapeer State Game Area – 529 stands were established within the 8,533 acres.
- Middleville State Game Area – 313 stands were established within the 4,546 acres.
- Holly Recreation Area: 227 stands were established within the 2,665 acres
- Port Huron State Game Area – 345 stands were established within the 6,690 acres; 15 new rare species or community occurrences were documented, and 21 were updated. Further, 14 additional species of greatest conservation need were recorded, including: Hooded Warbler\, American Bittern, Blanding's turtle, and Black sandshell mussel species. In total, 23 of the 46 mussel species known to occur in Michigan were documented in these rivers during the surveys.

2012: Significant progress in field inventory was accomplished in addition to the completion of Stage-1 pre-inventory boundary checks and stand delineation for 16 compartments in 4 management areas: Allegan, Deford, Lost Nation, and Sharonville State Game Areas, specifically:

- Allegan State Game Area – 850 stands were established within the 19,698 acres.
- Deford State Game Area – 126 stands were established within the 1,859 acres.
- Lost Nation State Game Area – 155 stands were established within the 2,431 acres.
- Sharonville State Game Area – 355 stands were established within the 4,287 acres.

The information generated by the completion of IFMAP Stage-1 inventories provides a foundation for subsequent management activities in these state game or recreation areas.

Location: Allegan State Game Area, Barry State Game Area, Flat River State Game Area, Gratiot-Saginaw State Game Area, Holly Recreation Area, Lapeer State Game Area, Middleville State Game Area, Muskegon State Game Area, Port Huron State Game Area.
Year(s): 2011-2012

Characteristics of Coarse Woody Debris in Northern Michigan Forests

Michael Monfils, Christopher Weber, Michael Kost, Dr. Patrick Brown
Michigan Natural Features Inventory

Forest management has increasingly focused on maintaining biodiversity and sustainability. Coarse woody debris (CWD) on the forest floor is a large contributor to biodiversity within Michigan forests. Although some research has been conducted in northern hardwood forests of the Great Lakes region to examine levels of CWD in old-growth stands (Tyrrell and Crow 1994) and to compare old-growth and managed stands (Goodburn and Lorimer 1998, Hale et al. 1999, McGee et al. 1999), information on CWD remains limited for the region. The Michigan Natural Features Inventory (MNFI) estimated levels of CWD in northern Michigan forests as part of a study to evaluate methods of sampling CWD (see Monfils et al. 2009). However, more study is needed to assess the range of variation of CWD parameters in managed and unmanaged forests of the region, especially with regard to levels of CWD within various decay and size classes. Because changes to CWD levels within decay and size classes over time could affect ecosystem functioning, it is important to determine if current management practices are influencing CWD patterns in Michigan forests

Decomposition Class Comparisons
This study indicated low levels of CWD in advanced stages of decay in managed northern Michigan forests. A significantly lower volume of CWD was found in managed compared to unmanaged forests in all five decomposition classes. Goodburn and Lorimer (1998) similarly observed greater CWD volumes across all decay classes in old-growth forests compared to selective and even-aged harvested stands in northern Michigan and Wisconsin.

Size Class Comparisons
The managed forests examined in northern Michigan generally lacked CWD of sizes larger than 25 cm in diameter. Goodburn and Lorimer (1998) also observed greater volumes of large-diameter (>40 cm) debris in old-growth compared to managed forests in northern Michigan and Wisconsin. McGee et al. (1999) documented similar patterns of CWD within size class categories when comparing old-growth and managed northern hardwood forests in New York. Along with overall volume and density, the size of CWD present in a forest will likely influence wildlife use. The final report can be found at: http://mnfi.anr.msu.edu/reports/2011-13_coarse_woody_debris_characteristics.pdf.

Recommendations
Future studies of the importance of CWD to wildlife and successful conifer regeneration will help improve our ability to sustainably manage Michigan's forests.

Location: Statewide
Year(s): 2011
Partners: Michigan Department of Natural Resources – Wildlife Division, Michigan State University

Evaluating the Success of Wetland Management

Michael Monfils
Michigan Natural Features Inventory

Wetland management is an integral activity of the Department at many state wildlife areas used to provide habitat for waterfowl, waterbirds, shorebirds, and many other species. A variety of techniques are used to encourage desirable vegetation and optimal foraging conditions for birds, including managing water levels, mowing, burning, and herbicide application. A typical goal of wetland management is a hemi-marsh, which has been to provide greater densities and diversities of waterfowl and other wetland birds compared to other marshes. Monitoring is needed to evaluate the results of wetland management occurring on state wildlife areas to determine if goals were met, provide an opportunity to adjust management strategies if goals were not achieved, and reduce the uncertainty associated with management by providing information on the response of animal and plant communities.

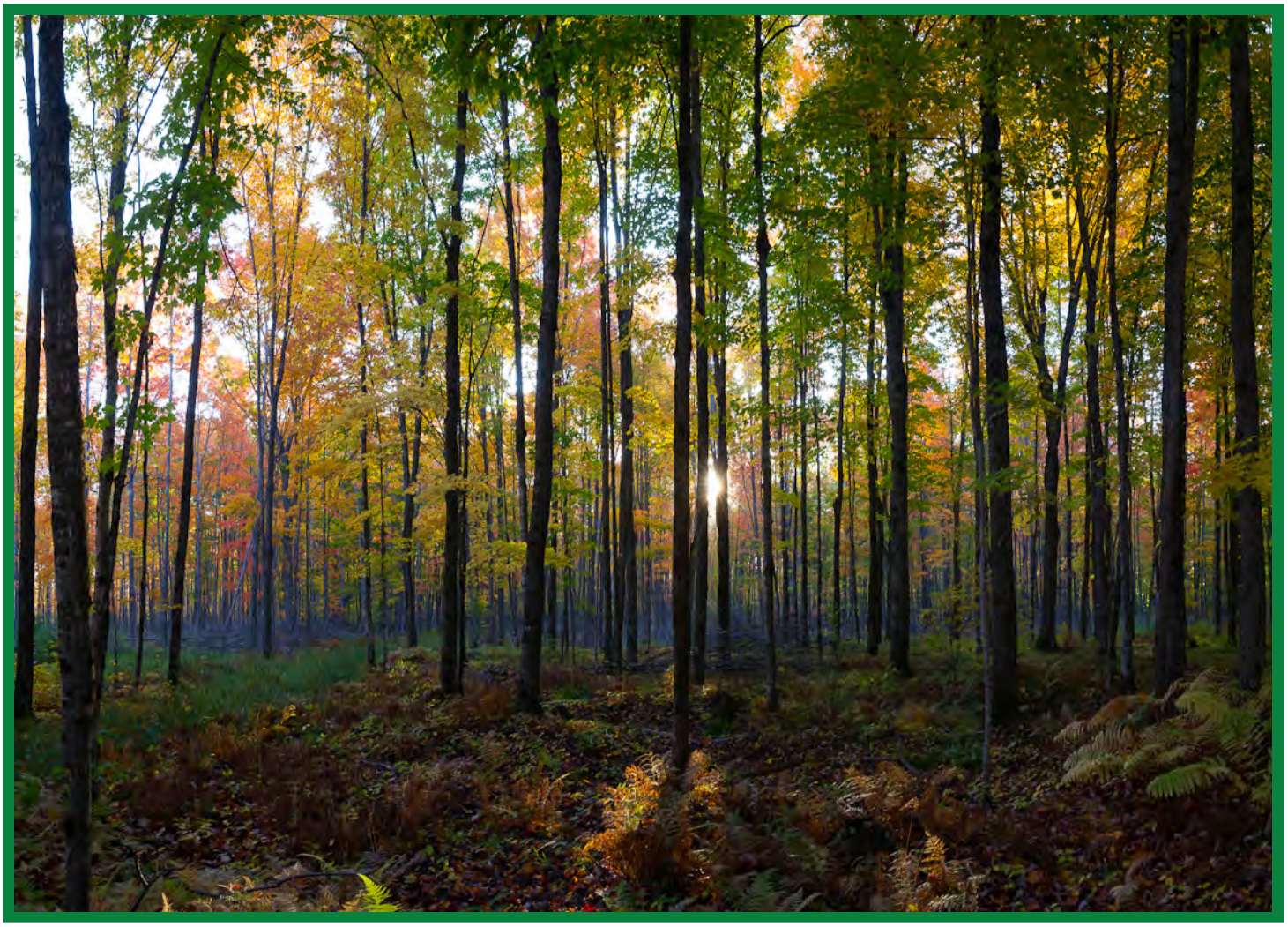
Two techniques, burning and mowing, were evaluated to determine which would increase wetland bird use of cattail-dominated wetlands. To guide this study, densities of birds-of-management-interest were compared in burned, mowed, and unmanaged cattail-dominated wetlands. The vegetation and physical conditions within these differently managed wetlands were also measured.

Accomplishments
Bird surveys were conducted and vegetation and physical conditions were sampled at 11 wetlands within the following areas: Crow Island State Game Area, Fish Point State Wildlife Area, Nayanquing Point State Wildlife Area, Quanicassee State Wildlife Area, and Bay City State Research Area (Tobico Marsh Wildlife Management Unit). Three of the wetlands sampled in 2011 were designated for burning during the study, three were identified for scarification, and five sites served as reference wetlands. We completed 169 ten-minute point counts at randomly selected locations to evaluate breeding marsh bird use of emergent zones (i.e., cattail-dominated marshes). We sampled the vegetation and physical conditions in 460 randomly selected quadrats near the point count stations. To evaluate marsh bird use of open water/aquatic bed zones, we conducted 109 forty-five-minute surveys of randomly selected areas. After each open water survey, we collected information on water depths, dominant vegetation, and soil types at approximately 10 systematically placed points within the area surveyed.

**Due to funding constraints this project was not continued in 2013.*

Location: Saginaw Bay watershed
Year(s): 2011
Partner: Michigan Department of Natural Resources – Wildlife Division

Administration and Coordination



State Wildlife Grants in Action

Amy Derosier
Michigan Department of Natural Resources – Wildlife Division

State Wildlife Grants have been critical to implementing the Wildlife Action Plan. This funding comes from revenues collected from Outer Continental Shelf oil and gas royalties, and is appropriated to the states through the U.S. Fish and Wildlife Service annually. This funding leverages significant additional resources that benefit species of greatest conservation need and their habitats in Michigan.

Two reports were developed to better communicate to Department staff, partners, and legislators the work that has been conducted in support of the Wildlife Action Plan. Much of the work funded by State Wildlife Grants was conducted because there was an information or management need identified to help better manage Michigan's wildlife and their habitats. These reports are designed to communicate the results of the work. They have also proven useful to inform legislators about the important wildlife work that has occurred in their districts.

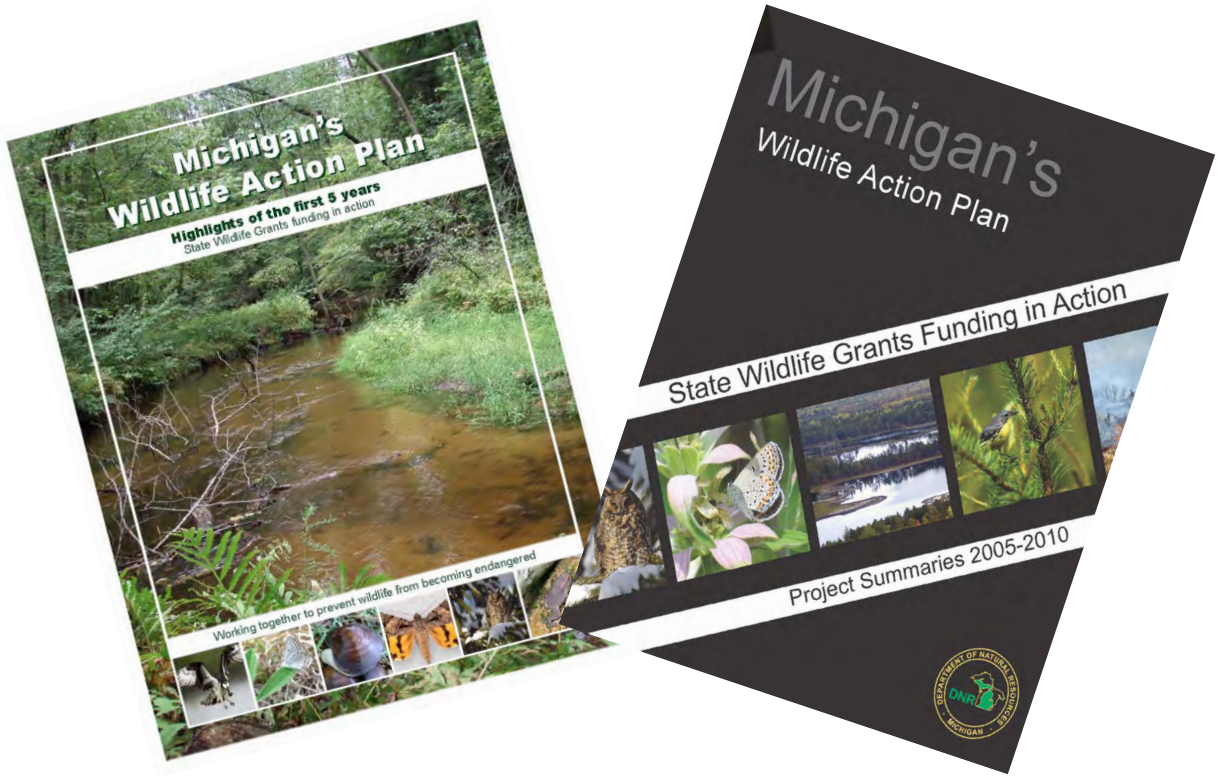
In 2011, Michigan's Wildlife Action Plan: Highlights of the First 5 Years – State Wildlife Grants funding in Action was created. This glossy brochure communicates to our public and legislators about the work that has been done using State Wildlife Grants funding and implementation efforts of the Wildlife Action Plan.

To view Highlights of the first 5 years visit: http://www.michigan.gov/dnr/0,4570,7-153-10370_30909-254248--,00.html.

In 2012, the report Michigan's Wildlife Action Plan: State Wildlife Grants Funding in Action – Project Summaries 2005-2010 was completed. This report provides detail on projects funded by State Wildlife Grants.

To view the State Wildlife Grants in Action report please visit: www.michigan.gov/wildlifeactionplan

Year(s): 2011-2012
Partners: Too many to name, please see the reports for full lists of partners.



Implementing the Wildlife Action Plan through Planning

Amy Derosier
Michigan Department of Natural Resources – Wildlife Division

Implementation of the Wildlife Action Plan can take many approaches. Habitat and direct species management, like that done for the piping plover, are tangible ways people can see the implementation of the Wildlife Action Plan for wildlife. Although planning may not at first blush appear to be implementation, coordinating planning efforts can often leverage huge gains in implementation of the Wildlife Action Plan given the limited State Wildlife Grant funding available.

Accomplishments

2011:

- Habitat management guidance for the species of greatest conservation need on the Wildlife Division's featured species list was developed.
- The Wildlife Division is starting to focus habitat management within state game areas on our featured species list, some of which are species of greatest conservation need.
- Development of ecoregional plans that will be a major vehicle in implementing the Wildlife Action Plan on state forest lands are ongoing.

2012:

- Department staff continued to work on the development of Wildlife TRACS, a spatially-explicit accomplishment reporting system.
- Department staff participated in the formation of the Michigan Mussel Work Group to bring partners together to move mussel conservation forward.
- Ecoregional forest management plans that integrate conservation needs outlined in the Wildlife Action Plan were completed and available for public review
- Continued to partner with Michigan Natural Features Inventory and NatureServe on a project called *incorporating plants into the Wildlife Action Plan.* This project was funded by Doris Duke.
- Staff and partners continued to participate on a work group to guide a project on developing an approach for identifying, mapping, and assessing vernal pools in Michigan.
- Staff and partners developed a competitive State Wildlife Grant with partners on diverse grassland complexes for species of greatest conservation need.

Location: Statewide
Year(s): 2011, 2012
Partners: Michigan Natural Features Inventory; NatureServe; Doris Duke; The Nature Conservancy Indiana, Michigan and Ohio chapters; Southwest Michigan Land Conservancy; Michigan Nature Association; U.S. Fish and Wildlife Service; National Wild Turkey Federation, Michigan Department of Environmental Quality Coastal Management Program; Environmental Protection Agency; Michigan Pheasants Forever; Ducks Unlimited.

Invasive Species Program Administration

Susan Tangora
Michigan Department of Natural Resources – Wildlife Division

The Wildlife Division developed a strategic framework for invasive species management in the state. Administrative work to implement the framework was conducted in 2011 and focused on developing and maintaining priority species lists, compiling information on best control techniques, prioritizing control efforts, providing technical support to field practitioners, developing research, surveys, and monitoring needs. Administrative work to implement the framework continued in 2012, but was funded through outside grant funding. More information about implementation of invasive species work is discussed in the habitat management section of this report.


Invasive Species—Best Control Practices

Autumn olive


Invasive Species—Best Control Practices

Black and Pale Swallow-worts

For more information, visit our website: http://www.michigan.gov/dnr/0,4570,7-153-10370_59996---,00.html

Location: Statewide
Year(s): 2011
Partners: Michigan Natural Features Inventory

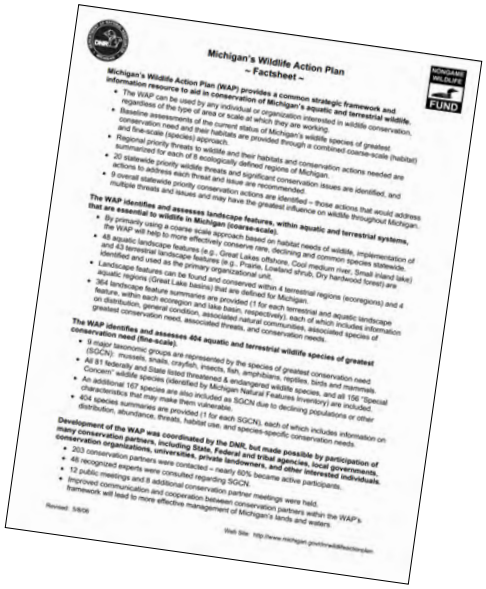
Preparing for the Wildlife Action Plan Revision

Amy Derosier
Michigan Department of Natural Resources – Wildlife Division

Department staff begin outlining the process for the revision of the Wildlife Action Plan, which is due by October 2015. The plan must be revised every 10 years.

One major step towards revising the Wildlife Action Plan is to prioritize efforts. The current plan is a status assessment of 404 species of greatest conservation need, which has been an indispensable resource to the conservation of those species. To further conservation, the next version of the plan will be focused on priorities and what is achievable in 10 years.

Department staff developed an initial draft list of criteria to use to prioritize species. In October 2011, a partner meeting was held to discuss the criteria and develop recommendations on which criteria were the most important to prioritizing species of greatest conservation need for the Wildlife Action Plan revision. The meeting was a success; partners recommended a short list of criteria to help focus efforts. Species-specific information based on the criteria was added to the Wildlife Action Plan database. In 2012, information began to be gathered about conservation needs and goals for the draft list of priority species.


Michigan's Wildlife Action Plan
~ Factsheet ~

Location: Statewide
Year(s): 2011-2012
Partners: Ducks Unlimited, Michigan Association of Conservation Districts, Michigan Audubon, Michigan Climate Coalition, Michigan United Conservation Clubs, National Wildlife Federation, Ruffed Grouse Society, Sierra Club, Stewardship Network, The Nature Conservancy, US Forest Service, US Geological Survey, Wildlife Habitat Council.

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The State Wildlife Grants Program is a
State and Federal partnership to conserve species of
greatest conservation need