

**Summary of Sustainable Forestry Research  
FY 2006**

**Michigan Department of Natural Resources**

## **Purpose and Use of this Report**

The State of Michigan, under the Michigan Departments of Natural Resources (DNR), Environmental Quality (DEQ), and Agriculture (MDA), supports research projects to ensure sustainable management of Michigan's forest lands. This document summarizes those projects in place during the fiscal year 2006 (October 1, 2005 - September 30, 2006). This document also fulfills the requirement of Forest Certification Work Instruction 5.1 "Coordinated Natural Resource Management Research" for an annual summary of research activities within forested landscapes. This report should be used to document the Michigan's commitment to sustainable forestry research and to inform discussion on research needs and collaboration opportunities in the DNR, DEQ, and MDA.

## **Research Summaries**

Research is administered and supported differently in each DNR Division. The Wildlife Division and Fisheries Division administer all research activities through their respective research sections. These Divisions also have a significant portion of their research efforts funded by a variety of federal grants that have annual reporting requirements. Forest, Mineral and Fire Management Division (FMFMD) does not have a dedicated research section; administration and support of research occurs through each program area.

The summary of research projects are organized into tables by Department and applicable DNR divisions. Each table is then organized by group based upon the objectives of the study. The group names provide a logical link to the themes of sustainable forestry and allow the reader to assess the breadth and depth of the DNR's research programs. One study could potentially fit into multiple groups. For purposes of simplicity, studies are listed in only one group. The group names are:

- Ecological Processes;
- Human Dimensions;
- Chemical Use;
- Forest Management
- Wildlife Management;
- Fisheries Management;
- Environmental Protection;
- Biological Diversity;
- and Social Economic.

Table 1. DNR Wildlife Division Research Projects.

Title
<p><b><u>Ecological Process</u></b></p> <p>Coastal Wetlands in MI: 1) Effect of isolation on <i>Phragmites communis</i> expansion and use by wetland birds, 2) Effect of wetland isolation via dike construction on avian communities using Great Lakes wetlands (Brown/MNFI)</p> <p>Evaluating the Ecological Contributions of State Game and Wildlife Areas in the Context of a Human Disturbed Landscape (Millenbah/MSU)</p> <p>Importance of Coarse Woody Debris to Forest Songbirds (Brown/MNFI)</p>
<p><b><u>Human Dimensions</u></b></p> <p>Improving the Quality and Impact of Wildlife Management Outreach in Michigan (Riley/MSU)</p> <p>Adaptive Impact Management: Improving Decision-Making Capacity for Wildlife Managers in Michigan (Riley/MSU)</p> <p>Assess Recreational Use of State Game and Wildlife Areas (Nelson/MSU)</p> <p>Enhancing Conservation of Eastern Massasauga Rattlesnake in Michigan: Human Dimensions of Rare Reptile Management (Riley/MSU)</p> <p>Development and Evaluation of a Citizen Conservationist Program in Southern Michigan (Dann/MSU)</p>
<p><b><u>Forest Management</u></b></p> <p>Systematic evaluation of oak regeneration in lower Michigan (Kost/MNFI)</p>
<p><b><u>Wildlife Management</u></b></p> <p>Quantifying Elk Movement Patterns, Social Interactions with White-tailed Deer, and Estimating the Population Size and Demographics in Michigan (Campa/MSU)</p> <p>Moose Population Dynamics and Survey Techniques (Winterstein/MSU)</p> <p>Gray Wolf Population Modeling and Estimation Techniques (Peterson/MTU)</p> <p>Landscape Ecology of White-tailed Deer in Agro-Forest Ecosystems: A Cooperative Approach to Support Management (Multi-State Project, Michigan Component) (Campa/MSU)</p> <p>Assessment of Furbearer Population Size and Effects of Landscape Features on Distribution and Population Structure (Scribner/MSU)</p> <p>Planning for the Management of Wolves in the UP of Michigan (Peyton/MSU)</p> <p>Monitoring Bobcats in the Northern Lower Peninsula of Michigan (T. Gehring/CMU)</p> <p>Genetic Evaluation on Marten in Michigan's Northern Lower Peninsula (Swanson/CMU)</p> <p>Winter use by White-tailed Deer of Remnant Hemlock Stands in the Western Upper Peninsula (Webster/MTU)</p> <p>Developing a Sharp-tailed Grouse Monitoring Program in the Eastern Upper Peninsula (Drummer/MTU)</p> <p>Habitat Requirement of the Endangered Indiana Bat in Southern Michigan: A Comprehensive Analysis (Kurta/ EMU)</p> <p>Locating Important Habitat Types Along West Michigan Shorelines and Dunes: A Novel Approach to Predictive Management for Threatened and Endangered Species (Millenbah/MSU)</p> <p>Modeling Habitat Ecology and Population Viability of the Eastern Massasauga Rattlesnake in Southwestern Lower Michigan (Millenbah/MSU)</p> <p>Refining wildlife habitat models for land use decision support (Maurer/MSU)</p> <p>Adult Dispersal, Habitat Quality, Identification of Management Triggers, and Development of Practical Monitoring Techniques for the Karner Blue Butterfly (Dunn/GVSU)</p>

Massasuaga Ecology and Response to Construction and Restoration Efforts (Kingsbury/IPFW)
Ecology and conservation of eastern fox snake in SE Michigan (Kingsbury/IPFW)
Joint MSU/CMU Furbearer bobcat research
Partners in Ecosystem Research and Management (PERM) (Taylor/MSU)
<b><u>Biological Diversity</u></b>
Modeling the Cumulative Effects of Aspen Management Practices on Wildlife Species, Communities, and Habitat Suitability at Multiple Spatial Scales (Campa/MSU)
Examining the structure and productivity of avian and vegetative grassland communities in Michigan CREP lands (Millenbah/MSU)
Bat community along Black Creek, Lenawee County with emphasis on evening bat and Indiana bat (Kingsbury/IPFW)
<b><u>Social and Economic</u></b>
Michigan Deer Hunters' Mobility, Demand for Hunting Sites and Economic Values (Lupi/MSU)

Table 2. DNR Forest, Mineral, and Fire Management Division Research Projects.

Research Project Title	Project Summary
<b><u>Ecological Processes</u></b>	
Michigan Natural Features Inventory	Natural Features Inventory of the Michigan State Forests & Other Studies of Natural Features.
<b><u>Human Dimensions</u></b>	
<b><u>Chemical Use</u></b>	
<b><u>Forest Management</u></b>	
Integrated Forest Monitoring, Assessment and Prescription (IFMAP)	Development of a GIS-based inventory system for Michigan State Forests.
Vegetative Management System (VMS) for timber treatments.	Develop and implement a computerized timber sale treatment tracking system.
Forest Fire Experiment Station	Design, develop, and build prototype and operational equipment units for mechanized forest fire fighting.
Roscommon Equipment Center	Design and develop specialized equipment for forest fire fighting.
Michigan Tree Improvement Center	Funding for center to do Tree Improvement Studies and implement nursery practices to improve quality of tree seedlings produced in Michigan State Forest Nurseries.
Seedling, Nursery and Tree Improvement Projects	Support for MichCoTip and the Aspen-Larch Cooperative Studies
Wyman Nursery Improvement	Improvements of production of nursery stock and seedlings.
Forest Inventory Analysis	Conduct the re-measurement of the FIA plots for Michigan

**Wildlife Management**

PERM Forester

Support of a PERM Research Forester and forest-based projects that relate to wildlife habitat improvements

**Fisheries Management**

**Environmental Protection**

Beech Bark Disease Monitoring

To develop and implement a statewide beech bark disease monitoring and impact analysis system

Beech Bark Disease

Development of a statewide Beech Bark Disease Monitoring and Impact Analysis Plot Network.

**Biological Diversity**

**Socio-Economic Trends**

Table 3. DNR Fisheries Division Research Projects

**Ecological Processes**

Dynamics of the Lake Erie walleye and yellow perch populations and fisheries

Fish community status in Saginaw Bay, Lake Huron

Assessment of chinook salmon and coho salmon populations and their prey in Eastern Lake Michigan

Evaluation of lake sturgeon populations in the St Clair River and Lake St Clair, Michigan

Continued monitoring of yellow perch and walleye populations in Michigan waters of Green Bay, Lake Michigan

Inventory and classification of Michigan rivers and river fish communities

Prey selection and predation rate of piscivorous fish

Patterns in community structure, life histories, and ecological distributions of fishes in Michigan rivers

The importance of trophic interactions for salmonine fisheries of the Great Lakes

Effects of Piscirickettsia infection on the muskellunge population of Lake St. Clair

Factors Affecting Lake Sturgeon Recruitment: A model system for species recovery in Michigan waters of the Great Lakes

Evaluation of trends in growth and relative abundance of lake whitefish in Lake Michigan

Evaluating movements of juvenile lake sturgeon

Tittabawasee River Assessment

Development and implementation of a Fish Health Initiative for Michigan Inland and Great Lakes Fisheries

Classification and analysis of Great Lakes fisheries habitats

The Digital Water Atlas and resource guide for Michigan's inland waters

Developing a lake classification system for Michigan inland lakes

Streams habitat status and trends

Ecological inventory of inland lakes

**Human Dimensions**

Charter boat catch and effort from the Michigan waters of the Great Lakes

Inland creel surveys

Fisheries Stewardship and Heritage Outreach/Research (SHOR) Initiative

### **Chemical Use**

None

### **Wildlife Management**

None

### **Fisheries Management**

Measurement of sportfishing harvest in lakes Superior, Michigan, Huron, and Erie

Vital statistics of walleye in Saginaw Bay

Evaluation of lake trout stocks in Lake Huron

Statewide coded-wire tagging and tag recovery program

Investigations into causes of, and solutions for, variable survival of chinook salmon stocked into Lake Huron

Population dynamics of yellow perch stocks in Michigan waters of Lake Michigan

Assessment of lake trout populations in Michigan's waters of Lake Michigan

Performance, survival and production of steelhead strains in tributaries of Lake Michigan

Status of Lake St Clair fish community and sport fishery

Assessment of lake trout populations in Michigan waters of Lake Superior

Evaluation of returns of salmonids to weirs in Michigan's waters of the Great Lakes

Evaluation of the relative growth and survival of Assinica, Nipigon, and Iron River-strain brook trout stocked into small inland lakes

Colonization of a brook trout stream by introduced brown trout

Evaluation of Michigan's inland fish stocking program and optimizing allocation of stocking resources by a systems analysis

Influence of lotic and nearshore habitats on fish populations in Great Lakes and inland lake ecosystems, with emphasis on walleye

Assessment of predator-prey balance for Lake Huron fishery management

Quantitative support for inter-jurisdictional fisheries management

Mortality of walleye

Evaluation of brown trout and steelhead competitive interactions in Hunt Creek, Michigan

Evaluation of lake sturgeon populations in northern Michigan

Investigation of causes of declines in Au Sable River brown trout populations

Ecological river classification as a basis for management of cold water streams

Pond rearing of juvenile lake sturgeon

Influence of total length and condition at stocking on chinook salmon survival and time at large

Northern Lake Huron, Coolwater Fish Community Assessment

Comparison of the recreational fisheries produced by stocking of spring and fall yearling brown trout, Lake Huron

Decision-support tools for managing fisheries of inland lakes

Lakewide assessment of the contribution of natural recruitment to the chinook salmon population of Lake Huron

Development of fisheries assessment and harvest allocation methods for inland lakes and streams in Michigan

Improving fishery stock assessments in the Great Lakes

Effects of exploitation and fisheries management on genetic diversity of fish stocks in inland and Great Lakes waters of Michigan

Fisheries assessments in large, inland lakes of Michigan

Status and trends of fish populations and community structure in Michigan streams

<p>Towards comprehensive databases and coordinated fish surveys for ecosystem management in the Great Lakes</p> <p>Evaluation of Eagle Lake and steelhead-strain rainbow trout stocked into inland lakes in Michigan</p> <p>Using population and community dynamic models and quantitative fisheries analysis to promote improved fisheries management in the Great Lakes</p> <p>Linking fish population models with aquatic habitat conditions to enhance lake and stream fishery management in Michigan</p> <p>Developing decision tools for inland lake management through field sampling and statistical models linking lakes to landscape context</p> <p><b><u>Environmental Protection</u></b></p> <p>Groundwater Assessment Tools</p> <p>Managing Michigan Lakes: Evaluating Effects of Watersheds and Habitat Perturbation on Lake Resources</p> <p>Implications of lakeshore development for fishery resources in Michigan</p> <p>Improve and validate river segment identification and classification models for assessing fishery potential and environmental impairment in Michigan</p> <p>Impact of removal of Stronach Dam, Manistee County</p> <p><b><u>Biological Diversity</u></b></p> <p>Status and trends of inland lakes: methods development, program oversight, and ecological assessment</p> <p>Design, analysis, and implementation of aquatic resource inventory in Michigan</p> <p>Development and implementation of conservation genetic initiatives for Michigan inland and Great Lakes fisheries</p> <p>Development of a GIS for inventory, classification, and management of non-game wildlife in Great Lakes waters</p> <p><b><u>Social Economic</u></b></p> <p>Using economic models and quantitative human dimensions analysis to promote improved fisheries management in the Great Lakes</p>
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Table 4. DNR Parks and Recreation Division Research Projects.

Research Project Title	Project Summary
<b><u>Ecological Processes</u></b>	
<b><u>Human Dimensions</u></b>	
<b><u>Chemical Use</u></b>	
<b><u>Forest Management</u></b>	
<b><u>Wildlife Management</u></b>	
Michigan Natural Features Inventory	Aquatic Natural Features Inventories at Fort Custer, Waterloo, and Pinckney State Recreation Areas
<u>Piping Plover Research</u>	Purchase of research supplies.

Table 5. Michigan Department of Agriculture Research Projects.

Title	Duration
<b><u>Ecological Process</u></b>	
Evaluation of Disease and Insect Resistant Elm Hybrids and Selections for the Michigan Climate	3 years
Identifying invasive plants in Michigan through the Michigan Plant Invasiveness Assessment System	1 year
<b><u>Human Dimensions</u></b>	
<b><u>Chemical Use</u></b>	
<b><u>Wildlife Management</u></b>	
<b><u>Environmental Protection</u></b>	
Phytoremediation of Nursery Runoff Water Using Ornamental Plants	3 years
Water Conservation Practices for Michigan Container Nurseries	3 years
<b><u>Biological Diversity</u></b>	
<b><u>Social and Economic</u></b>	

Table 6. Michigan Department of Environmental Quality Research Projects.

Title
<b><u>Ecological Process</u></b>
<b><u>Human Dimensions</u></b>
<b><u>Chemical Use</u></b>
<b><u>Wildlife Management</u></b>
<b><u>Environmental Protection</u></b>
Clean Michigan Initiative grants for water quality monitoring.
<b><u>Biological Diversity</u></b>
<b><u>Social and Economic</u></b>



## Integration and Use of Research in the DNR

Research that supports sustainable forestry in the DNR occurs through a variety of mechanisms. The DNR supports a large number of research projects contracted through multiple universities within the state. The DNR supports university faculty positions through their DNR's Partnership for Ecosystem Research and Management (PERM) program. The DNR also employs its own research and monitoring staff in FMFMD, Wildlife Division, and Fisheries Division.

Michigan DNR research programs cover the entire breadth and depth of sustainable forestry. While each Division uses a different array of means to communicate research findings, the research programs are well integrated with the operations of the DNR and are providing useful information to support improvements in business practices. Division in-service trainings, specialist meetings, and ongoing field and program communications are examples of the means used to convey research information to DNR personnel. For more information about specific research projects listed in the tables above, interested parties should contact the research coordinator for that Division. Table 7 lists the research coordinator for each Division.

Table 7. DNR Research Coordinators.

DNR Division	Coordinator	Phone number	Email
FMFMD	Ronald Murray	517-335-3353	MurrayR@Michigan.gov
Wildlife	Patrick Lederle	517-373-9338	LederleP@Michigan.gov
Fisheries	Paul Seelbach	734-663-3554	SeelbacP@Michigan.gov