



SUMMARY OF SUSTAINABLE FORESTRY RESEARCH FY 2010

**Michigan Department of Natural Resources
Forest Management Division**

MICHIGAN DEPARTMENT OF NATURAL RESOURCES MISSION STATEMENT

"The Michigan Department of Natural Resources and Environment is committed to the conservation, protection, management, and accessible use and enjoyment of the State's environment, natural resources, and related economic interests for current and future generations."

NATURAL RESOURCES COMMISSION STATEMENT

The Natural Resources Commission, as the governing body for the Michigan Department of Natural Resources and Environment, provides a strategic framework for the DNRE to effectively manage your resources. The NRC holds monthly, public meetings throughout Michigan, working closely with its constituencies in establishing and improving natural resources management policy.

The Michigan Department of Natural Resources provides equal opportunities for employment and access to Michigan's natural resources. Both State and Federal laws prohibit discrimination on the basis of race, color, national origin, religion, disability, age, sex, height, weight or marital status under the U.S. Civil Rights Acts of 1964 as amended, 1976 MI PA 453, 1976 MI PA 220, Title V of the Rehabilitation Act of 1973 as amended, and the 1990 Americans with Disabilities Act, as amended.

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For information or assistance on this publication, contact the Forest Management Division, Michigan Department of Natural Resources, P.O. Box 30452, Lansing, MI 48909-7952.

This publication is available in alternative formats upon request.

Note: Effective March 13, 2011 the Department of Natural Resources and Environment (DNRE) was restructured and separated into the Department of Natural Resources and Department of Environmental Quality.

Purpose and Use of this Report

The State of Michigan, under the Michigan Departments of Natural Resources and Environment (DNRE), and Agriculture (MDA), supports research projects to ensure sustainable management of Michigan's forest lands. This document summarizes those projects in place during fiscal year 2010 (October 1, 2009 - September 30, 2010). 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 Michigan's commitment to sustainable forestry research and to inform discussion on research needs and collaboration opportunities in the DNRE and the MDA.

Research Summaries

Research is administered and supported differently in each department and DNRE 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 Management Division (FMD) 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 DNRE 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 DNRE 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	Fisheries Management
Human Dimensions	Environmental Protection
Chemical Use	Biological Diversity
Forest Management	Social and Economic
Wildlife Management	

Integration and Use of Research in the DNRE

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

Michigan DNRE 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 DNRE 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 DNRE personnel. For more information about specific research projects listed in the tables, interested parties should contact the research coordinator for that division. The research coordinator for each division, and their contact information, is listed at the beginning of each division's section of the report.

**MICHIGAN DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENT
RESEARCH PROJECTS – 2010**

**Table 1
Forest Management Division
FY 2010 Research Funded by DNRE-FMD**

Primary Contact for all projects:
Ronald Murray, Research Coordinator
DNR, Forest Management Division
517-335-3353, murrayr@michigan.gov

Forest Management

- Conduct the Re-Measurement of the FIA Plots for Michigan
Contact: Scott A Pugh, USDA-Forest Service, FIA, spugh@fs.fed.us
USDA Forest Service, Forest Inventory Analysis - \$34,568.25
- Design, Develop, and Build Prototype and Operational Equipment Units for Mechanized Forest Fire Fighting
Contact: Kirk Bradley, Assistant Unit Leader, DNRE, FMD, bradleyk@michigan.gov
Forest Fire Experiment Station - \$550,946.87
- Design and Develop Specialized Equipment for Forest Fire Fighting
Contact: Kirk Bradley, Assistant Unit Leader, DNRE, FMD, bradleyk@michigan.gov
Roscommon Equipment Center - \$160,325.85
- Tree Improvement Studies and Implementation of Nursery Practices to Improve Quality of Tree Seedlings Produced in Michigan State Forest Nurseries
Contact: Richard Mergener, DNRE, FMD, mergenerr@michigan.gov
Michigan Tree Improvement Center - \$126,162.93
- Improvement of Production of Nursery Stock and Seedlings
Contact: Richard Mergener, DNRE, FMD, mergenerr@michigan.gov
Wyman Nursery Improvement - \$329,767.61
- Development of a GIS-based Inventory System for the Michigan State Forests –Integrated Forest Monitoring Assessment and Prescription (IFMAP)
Contact: Jason Stephens, DNRE, FMD, stephensj@michigan.gov
Michigan Department of Information Technology - \$1,975,258.02
- Support of Projects Conducted by the PERM Research Forester and Forest-based Projects that Relate to Wildlife Habitat Improvements
Contact: Michael Walters, PERM Research Forester, mwalters@msu.edu
- Support for Research on Seedling, Nursery, & Tree Improvement Projects
Contact: David Neumann, Silviculturist, DNRE, FMD, neumannnd@michigan.gov
MICHCOTIP - \$6,000.00

- Develop and Implement a Computerized Timber Sale Treatment Tracking System
Contact: Douglas Heym, Timber Sales Specialist, DNRE, FMD, heyimd@michigan.gov
Michigan Department of Information Technology - \$211,023.71
- Sirex Trapping - Bark Beetle Survey
Contact: Dr. Anthony Cognato, Professor, Michigan State University, acognato@msu.edu
Michigan State University - \$25,000.00 (Funding received from USDA-FS in 2010, but not spent due to inability to obtain correct trap lures in a timely manner. Funding carried forward to 2011 when the project is planned for completion.)

FY 2010 Research Permitted on FMD-Administered Lands But Not Directly Sponsored

Forest Management

- Development of a Statewide Beech Bark Disease Monitoring and Impact Analysis Plot Network
Contact: Dr. Andrew Storer, Professor, Michigan Technological University, storer@mtu.edu
Michigan Technological University, direct grant to MTU from USDA-FS
- Oak Wilt Sample Analysis for Delimitation of Infected Areas
Contact: Dr. Dana Richter, Professor of Forest Pathology, Michigan Technological University, drrichte@mtu.edu
Michigan Technological University, direct grant to MTU from USDA-FS
- MTU Maple Decline Study - The geographic extent and rate of spread of the current sugar maple dieback is being examined along with potential contributing factors associated with historical dieback. Relationships between management activities, climatic events, insect or pathogen activity, soil chemistry or other factors associated with the current dieback should be clarified. These relationships will help with recommendations for management to prevent, anticipate, reduce, or salvage stands with dieback in the future.
Contact: Dr. Andrew Storer, Professor, Michigan Technological University, storer@mtu.edu
- MSU Knapweed Weevil Research – Releases and Studies of Population Dynamics and Impacts
Contact: Doug Landis, Professor, Michigan State University
- USDA-FS NRS Growth & Yield Research – Sampling of 3 stands in an UP FMU that are: Northern Hardwood Cover-type, were harvested in the past 3-4 years, and are over 20 acres in size
Contact: Trevor Roberts, Researcher, Michigan Technological University, tlrobert@mtu.edu

Ecological Processes

- Natural Features Inventory of Michigan State Forests & Other Studies of Natural Features
Contact: Joshua Cohen, DNRE, WLD, cohenj@michigan.gov
- A Project to Study the Biology and Methods of Reducing the Rate of Spread of the Emerald Ash Borer in Newly Established or Low Density Sites on Forested Sites
Michigan State University funded by APHIS PPQ CPHST
- Sirex Woodwasp Monitoring to Detect Sirex Using Herbicide Treated Trap Trees
Contact: Dr. Andrew Storer, Professor, Michigan Technological University, storer@mtu.edu
Michigan Technological University

- Causes of Ash Decline in Michigan - to Determine Their Role in Mortality of Ash and Relationship to the Emerald Ash Borer Mortality Across the State
Contact: Dr. Gerry Adams, Associate Professor of Botany and Plant Pathology, Michigan State University, gadams@msu.edu
- Development of a Statewide Beech Bark Disease Monitoring and Impact Analysis Plot Network
Contact: Dr. Deb McCullough, Professor of Entomology and Forestry, Michigan State University, mccullo6@msu.edu
- Michigan Gradient Study on Nitrogen Gradients to Understand the Mechanisms Controlling Carbon and Nitrogen (N) Cycling in the Face of Chronic N Deposition and the Long-term Consequences of N Saturation
Contact: Dr. Andrew Storer, Professor, Michigan Technological University, storer@mtu.edu
Michigan Technological University with support from the National Science Foundation

Fisheries Management

- Sampling Fish and Freshwater Mussels in Streams Throughout the UP and Recording Stream Summer Temperature Data
Contact: Dr. Ashley Moerke, Lake Superior State University

Table 2 Recreation Division FY 2010 Ongoing Research Funded by DNRE-RD

Primary Contact for all projects:
Glenn Palmgren, Research Coordinator
DNR, Recreation Division
517-373-7844, palmgreng@michigan.gov

Ecological Processes

- Natural community surveys of known element occurrences on State Park and Recreation Area lands,
Michigan Natural Features Inventory - \$60,000

FY 2010 Ongoing Research Permitted on RD-Administered Lands But Not Directly Sponsored

Biological Diversity

- Floral Interactions and the Role of Pollination in the Assembly of Spring Ephemeral Plant Communities,
University of Guelph
- Impacts of Reservoirs on Food Webs Downstream From Dams on the Kalamazoo River
Michigan State University
- Integrating Long-term Demographic Data and Repeated Genetic Sampling for Viability Analysis of Natural and Restored Populations of Pitcher's Thistle
East Carolina University

- Phylogeny of North American Plums (*Prunus* spp.)
University of Florida
- Rock Cress (*Arabidopsis lyrata*) Research
University of Neuchatel, Switzerland
- The Distribution and Ecological Association of Liana and Herbaceous Vines in the Eastern Deciduous Forest/Prairie Transition Zones
University of Illinois – Chicago
- Using Phylogeography for Conservation of American Ginseng (*Panax quinquefolius* L.)
Appalachian State University
- Vascular Plant Survey at Ludington State Park
Mr. David Dister

Chemical Use

- Research on the Control of Japanese Knotweed
Michigan State University
- Research on the Control of Phragmites
Wooster College

Ecological Processes

- Can Microbial Symbionts Mediate Effects of Climate Changes or the Functioning of an Ecosystem Engineer?
University of Louisville
- Community Composition and Co-evolution: a Generalist Plant and its Specialist Pollinator
Michigan State University - Kellogg Biological Station
- Ecological Impacts of EAB on Michigan State Lands
Ohio State University
- Establishment of a Diverse Assemblage of Native Grasses & Forbs on a Degraded, Knapweed Infested Site in Bass River RA, Ottawa Co, MI
Grand Valley State University
- Geophysical Investigation of a Barrier Bar System, Grand Mere State Park
University of Toledo
- Impacts of EAB Ash Mortality on Amphibian Community Diversity in Southeast Michigan
Wayne State University
- Micro-meteorological Monitoring of Lake Effect Temperature Inversion
University of Cincinnati
- Photographic Measurement of Sand Dune Erosion at P.J. Hoffmaster & Saugatuck Dunes State Parks
Hope College

- Seasonal Deer Migration Effects on the Distribution of Nitrogen in Forest Ecosystems
Michigan Technological University
- Study of Beach - Coastal Dune Processes from December 2009 - August 2010 in P.J. Hoffmaster State Park, Michigan
Calvin College

Environmental Protection

- Cooperative Weed Control within Michigan State Parks (Baby's Breath Survey and Eradication)
The Nature Conservancy

Fisheries Management

- Assessment and Control of Sea Lamprey
US Fish & Wildlife Service
- Lamprey Experiments to Determine Whether Native Lamprey Species are Attracted to 3k PZS Pheromones
US Geological Survey - Hammond Bay

Forest Management

- Collection of Lingering Ash from Permanent Research Plots
US Forest Service
- EAB Research on State Parks and Wildlife Areas
Michigan State University
- Emerald Ash Borer Detection Tools Project – 2010
Michigan Technological University

Human Dimensions

- Investigations into the Prevalence of Zoonotic Diseases in Michigan
Michigan Dept of Community Health
- Tick Invasion and Lyme Disease Research in Michigan's Lower Peninsula
Michigan State University

Wildlife Management

- American Robin and Gray Catbird Captive Research Study
Michigan State University
- Northern Saw-whet Owl Banding at Muskegon State Park
Mr. Brian Johnson
- Owl Banding at Cheboygan State Park
North Central Michigan College
- Research Project on Bird and Bat Migration
Michigan Natural Features Inventory
- Rodent Field Study at Wilderness State Park
Northwestern Michigan College

Table 3 Wildlife Division FY 2010 Research Funded by DNRE-WLD

Primary Contact for all projects:
Patrick Lederle, Research Coordinator
DNR, Wildlife Division
517-373-9338, lederlep@michigan.gov

Ecological Process

- Role of Predators, Winter Weather, and Habitat on White-tailed Deer Fawn Survival in Michigan
Mississippi State University - \$132,000
- Expansion of Black Bear Range in the Agro-forested Region of Central Michigan
University of Wisconsin, Madison - \$33,000

Human Dimensions

- Reducing Partial Controllability: An Assessment of Bovine TB Management Interventions
Michigan State University - \$13,800

Biological Diversity

- Effectiveness of Residual Structure Retention in Clear-cut Harvest Units for Conserving Biodiversity and Wildlife Habitat
Michigan State University - \$137,400
- Statewide Analysis and Surveys to Develop an Approach for Identifying Priority Conservation Areas in Michigan
Michigan State University - \$65,000
- Southern Michigan DNR Lands Integrated Inventory Project
Michigan State University - \$100,000

Social and Economic

- Partners in Ecosystem Research and Management: Modeling the Demand and Values for Michigan's Hunted Wildlife Resources
Michigan State University - \$38,400
- Partners in Ecosystem Research and Management: Evaluating the Role of Social Networks and Capital in the Stewardship Activities Impacting Wildlife Resources
Michigan State University - \$51,400

Table 4 Fisheries Division FY 2010 Research Funded by DNRE - FD

Primary Contact for all projects:
Tammy Newcomb, Research Coordinator
DNR, Fisheries Division
517-373-3960 newcombt@michigan.gov

Ecological Processes

- Northern Lake Huron, Cool Water Fish Community Assessment
Contact: Fielder
Fisheries Division - \$37,496
- Fish Community Status in Saginaw Bay, Lake Huron
Contact: Fielder
Fisheries Division - \$162,429
- Lake-wide Assessment of the Contribution of Natural Recruitment to the Chinook Salmon Population of Lake Huron
Contact: Johnson
Fisheries Division - \$2,866
- Colonization of a Brook Trout Stream by Introduced Brown Trout
Contact: Nuhfer
Fisheries Division - \$44,867

- Evaluation of Brown Trout and Steelhead Competitive Interactions in Hunt Creek, Michigan
Contact: Nuhfer
Fisheries Division - \$17,274
- Evaluation of Lake Sturgeon Populations in the St Clair River and Lake St Clair, Michigan
Contact: Thomas
Fisheries Division - \$54,349
- Effects of Sediment Traps on Michigan River Channels
Contact: Wills
Fisheries Division - \$30,874
- Influence of Lotic and Nearshore Habitats on Fish Populations in Great Lakes and Inland Lake Ecosystems, with Emphasis on Walleye
Contact: Zorn
Fisheries Division - \$66,004
- Evaluation of the Relative Growth and Survival of Wild Rose and Sturgeon River Brown Trout Stocked into Michigan Lakes and Reservoir Tailwaters
Contact: Wills
Fisheries Division - \$10,226
- Investigation of Watershed Influences, Riparian Condition, and Instream Habitat Dynamics on Stream Fish Communities: Prioritizing Watershed Rehabilitation Opportunities and Tradeoffs by Evaluating Functional Relationships
Contact: Infante
Michigan State University - \$50,875
- Developing Decision Tools for Inland Lake Management Through Field Sampling and Statistical Models Linking Lakes to Landscape Context
Contact: Bremigan
Michigan State University - \$61,617

Human Dimensions

- Michigan Statewide Angler Survey Program
Contact: Clapp, Su
Fisheries Division - \$1,892,634
- A Statewide Survey of Michigan's Licensed Anglers
Contact: Lupi
Michigan State University - \$82,026
- Comprehensive Analysis and Improvement of Michigan Statewide Angler Survey Data
Contact: Su
Fisheries Division - \$43,437

Fisheries Management

- Improving Fishery Stock Assessments in the Great Lakes
Contact: Bence
Michigan State University - \$210,759
- Energetics Approach to Predicting Growth, Maturation, and Fecundity of Largemouth Bass, Bluegill, and Walleye
Contact Breck
Fisheries Division - \$41,823
- Decision-support Tools for Managing Fisheries of Inland Lakes
Contact: Breck
Fisheries Division - \$9,736
- Statewide Coded-wire Tagging and Tag Recovery Program
Contact: Clapp
Fisheries Division - \$153,281
- Population Dynamics of Yellow Perch Stocks in Michigan Waters of Lake Michigan
Contact: Clapp
Fisheries Division - \$80,028
- Assessment of Chinook Salmon and Coho Salmon Populations and their Prey in Eastern Lake Michigan
Contact: Claramunt
Fisheries Division - \$162,258
- Evaluation of Returns of Salmonids to Weirs in Michigan's Waters of the Great Lakes
Contact: Claramunt, Jonas
Fisheries Division - \$23,589
- Vital Statistics of Walleye in Saginaw Bay
Contact: Felder
Fisheries Division - \$53,512
- Dynamics of the Lake Erie Walleye and Yellow Perch Populations and Fisheries
Contact: Haas
Fisheries Division - \$127,843
- Fisheries Assessments in Large Inland Lakes of Michigan
Contact: Hanchin
Fisheries Division - \$150,625
- Design, Analysis, and Implementation of Aquatic Resource Inventory in Michigan
Contact: Hayes
Michigan State University - \$69,586
- Evaluation of Lake Trout Stocks in Lake Huron
Contact: He
Fisheries Division - \$145,372

- Assessment of Predator - Prey Balance for Lake Huron Fishery Management
Contact: He
Fisheries Division - \$53,077
- Assessment of Lake Trout Populations in Michigan's Waters of Lake Michigan
Contact: Jonas
Fisheries Division - \$117,529
- Influence of Total Length and Condition at Stocking on Chinook Salmon Survival and Time at Large
Contact: Jonas
Fisheries Division - \$18,744
- Evaluation of the Relative Growth and Survival of Assinica, Nipigon, and Iron River-strain Brook Trout Stocked into Small Inland Lakes
Contact: Nuhfer
Fisheries Division - \$2,720
- Effects of Restrictive Minimum Size Limits and Gear Restrictions on Brook Trout Populations in the Black River, Michigan
Contact: Nuhfer
Fisheries Division - \$51,951
- Evaluation of Eagle Lake and Steelhead-strain Rainbow Trout Stocked into Inland Lakes in Michigan
Contact: Nuhfer
Fisheries Division - \$17,773
- Assessment of Lake Trout Populations in Michigan Waters of Lake Superior
Contact: Sitar
Fisheries Division - \$189,611
- Status of Lake St. Clair Fish Community and Sport Fishery
Contact: Thomas
- Fisheries Division - \$117,810
- Charter Boat Catch and Effort From the Michigan Waters of the Great Lakes
Contact: Wesander
Fisheries Division - \$54,082
- Assessment of Nearshore Fish Communities in Northern Lake Michigan
Contact: Zorn
Fisheries Division - \$2,633
- Assessing the Effects of Spring Fishing Regulations on Reproductive Dynamics and Population Demographics of Black Bass in Michigan Lakes
Contact: Bremigan
Michigan State University - \$59,251
- Hooking Mortality of Lake Trout in the Upper Great Lakes
Contact: Sitar
Fisheries Division - \$77,505

- Development of Databases, Classification Systems, and Fisheries Management Tools for Inland Lakes of Michigan
Contact: Wang
Fisheries Division - \$99,322
- Compare and Improve Lake Trout Abundance Indices and Evaluate Optimal Allocation of Creel Survey Resource for Lake Huron
Contact: Su
Fisheries Division - \$38,901

Biological Diversity

- Improve and Validate River Segment Identification and Classification Models for Assessing Fishery Potential and Environmental Impairment in Michigan
Contact: Wang
Fisheries Division - \$1,671
- Status and Trends of Inland Lakes: Methods Development, Program Oversight, and Ecological Assessment
Contact: Wehrly
Fisheries Division - \$57,180
- Status and Trends of Fish Populations and Community Structure in Michigan Streams
Contact: Wills, Nuhfer
Fisheries Division - \$55,060
- Lake Sturgeon Population Status in the Cheboygan River Watershed Lakes, Michigan
Contact: Baker
Fisheries Division - \$121,673
- Assessment of Nearshore Fish Communities in Northern Lake Michigan
Contact: Zorn
Fisheries Division - \$98,128
- Genetic Diversity of Fish Populations in Michigan: Effects of Environmental and Anthropogenic Factors on Recruitment and Apportionment of Phenotypic and Genetic Diversity of Fish Populations in Inland and Great Lakes Habitats
Contact: Scribner
Michigan State University - \$140,531