



# **SUMMARY OF SUSTAINABLE FORESTRY RESEARCH FY 2013**

## **MICHIGAN DEPARTMENT OF NATURAL RESOURCES MISSION STATEMENT**

*"The Michigan Department of Natural Resources is committed to the conservation, protection, management, use and enjoyment of the state's natural and cultural resources for current and future generations."*

## **NATURAL RESOURCES COMMISSION STATEMENT**

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

The Michigan Department of Natural Resources (DNR) 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.

If you believe that you have been discriminated against in any program, activity, or facility, or if you desire additional information, please write: Human Resources, Michigan Department of Natural Resources, PO Box 30028, Lansing MI 48909-7528, or Michigan Department of Civil Rights, Cadillac Place, 3054 West Grand Blvd, Suite 3-600, Detroit, MI 48202, or Division of Federal Assistance, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, Mail Stop MBSP-4020, Arlington, VA 22203.

For information or assistance on this publication, contact Forest Planning & Operations Section, Forest Resources Division, Michigan Department of Natural Resources, PO Box 30452, Lansing MI 48909-7952. This publication is available in alternative formats upon request.

## TABLE OF CONTENTS

<b>PURPOSE AND USE OF THIS REPORT .....</b>	<b>1</b>
<b>RESEARCH SUMMARIES .....</b>	<b>1</b>
<b>INTEGRATION AND USE OF RESEARCH IN THE DNR.....</b>	<b>1</b>
<b>TABLE 1 - FOREST RESOURCES DIVISION .....</b>	<b>2</b>
<b>TABLE 2 -PARKS AND RECREATION DIVISION .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>TABLE 3 – WILDLIFE DIVISION.....</b>	<b>7</b>
<b>TABLE 4 - FISHERIES DIVISION .....</b>	<b>7</b>

## Purpose and Use of this Report

The State of Michigan, under the Michigan Department of Natural Resources (DNR) supports research projects to ensure sustainable management of Michigan's forest lands. This document summarizes those projects in place during fiscal year 2013 (October 1, 2012 - September 30, 2013). 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 DNR.

## Research Summaries

Research is administered and supported differently in each department and DNR division. The Wildlife Division (WD) and Fisheries Division (FI) 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 Resources Division (FRD) 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 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	Environmental Protection
Human Dimensions	Forest Management	Biological Diversity
Chemical Use	Wildlife Management	Social and Economic

## 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 Partnership for Ecosystem Research and Management (PERM) program. The DNR also employs its own research and monitoring staff in FRD, WD, and FDI.

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, interested parties should contact the research coordinator for that division. The research coordinator for each division is listed as the contact at the beginning of each division's section.

**MICHIGAN DEPARTMENT OF NATURAL RESOURCES  
RESEARCH PROJECTS – 2013**

**Table 1 - Forest Resources Division**

**FY 2013 Research Funded by DNR-FRD**

Primary Contact for all projects:  
Ronald Murray, Research Coordinator  
DNR, FRD  
517-284.5886, [murrayr@michigan.gov](mailto: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](mailto:spugh@fs.fed.us)*  
USDA Forest Service, Forest Inventory Analysis - \$ 87,998.00
- Design, Develop, and Build Prototype and Operational Equipment Units for Mechanized Forest Fire Fighting  
*Contact: Kirk Bradley, Assistant Unit Leader, DNR, FRD, [bradleyk@michigan.gov](mailto:bradleyk@michigan.gov)*  
Forest Fire Experiment Station - \$716,290
- Design and Develop Specialized Equipment for Forest Fire Fighting  
*Contact: Kirk Bradley, Assistant Unit Leader, DNR, FRD, [bradleyk@michigan.gov](mailto:bradleyk@michigan.gov)*  
Roscommon Equipment Center - \$154,148.00
- Tree Improvement Studies and Implementation of Nursery Practices to Improve Quality of Tree Seedlings Produced in Michigan State Forest Nurseries  
*Contact: Richard Mergener, DNR, FRD, [mergenerr@michigan.gov](mailto:mergenerr@michigan.gov)*  
Michigan Tree Improvement Center - \$50,785.00
- Improvement of Production of Nursery Stock and Seedlings  
*Contact: Richard Mergener, DNR, FRD, [mergenerr@michigan.gov](mailto:mergenerr@michigan.gov)*  
Wyman Nursery Improvement - \$396,015.00
- Development of a GIS-based Inventory System for the Michigan State Forests –Integrated Forest Monitoring Assessment and Prescription (IFMAP)  
*Contact: Jason Stephens, DNR, FRD, [stephensj@michigan.gov](mailto:stephensj@michigan.gov)*  
Michigan Department of Information Technology - \$736,039.00
- Support of Projects Conducted by the PERM Research Forester and Forest-based Projects that Relate to Wildlife Habitat Improvements - \$35,000.00  
*Contact: Michael Walters, PERM Research Forester, [mwalters@msu.edu](mailto:mwalters@msu.edu)*
- Support for Research on Seedling, Nursery, & Tree Improvement Projects  
*Contact: David Neumann, Silviculturist, DNR, FRD, [neumannd@michigan.gov](mailto:neumannd@michigan.gov)*  
MICHCOTIP - \$6,000.00

- Develop and Implement a Computerized Timber Sale Treatment Tracking System  
*Contact: Douglas Heym, Timber Sales Specialist, DNR, FRD, [heymd@michigan.gov](mailto:heymd@michigan.gov)*  
 Michigan Department of Information Technology - \$562.00

**FY 2013 Research Permitted on FRD-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](mailto:storer@mtu.edu)*  
 Michigan Technological University, direct grant to MTU from USDA-FS
- Oak Wilt Sample Analysis for Delimitation of Infected Areas  
*Contact: Dr. Ray Hammerschmidt, Chair, Department of Plant Pathology, Michigan State University, [hammers1@msu.edu](mailto:hammers1@msu.edu); Cooperator: Dr. Dana Richter, Professor of Forest Pathology, Michigan Technological University, [dlrichte@mtu.edu](mailto:dlrichte@mtu.edu), direct grant to MSU from USDA-FS*

**Ecological Processes**

- Natural Features Inventory of Michigan State Forests & Other Studies of Natural Features  
*Contact: Joshua Cohen, DNR, WI, [cohenj@michigan.gov](mailto: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  
*Contact: Dr. Deb McCullough, Professor of Entomology and Forestry, Michigan State University, [mccullo6@msu.edu](mailto:mccullo6@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](mailto: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](mailto:storer@mtu.edu)*  
 Michigan Technological University with support from the National Science Foundation
- Emerald Ash Borer Parasite Releases on State Forest Lands  
*Contact: Dr. Leah Bauer, Research Entomologist, USDA-FS Northern Research Station, [lbauer@fs.fed.us](mailto:lbauer@fs.fed.us)*
- National Wetlands Condition Assessment  
*Contact: Michelle Moore, Research Scientist, Great Lakes Environmental Center [mmoore@glec.com](mailto:mmoore@glec.com)*

- Forest fuels and vegetation in wildfire-regenerated jack pine (*Pinus banksiana* Lamb.) forests: informing ecological forestry in the Lake States region.  
*Contact: Jessica R. Miesel, School of Environment and Natural Resources, The Ohio State University, Wooster, OH., [jrmiesel@gmail.com](mailto:jrmiesel@gmail.com)*
- USEPA-Great Lakes Restoration Initiative Project Munuscong Wildlife Management Area. A sustainable approach for restoring wetland biodiversity.  
*Contact: Nancy Tuchman, Dennis Albert, and Shane Lishawa, Loyola University Chicago,*
- Emerald Ash Borer Parasitoid Rearing  
*Contact: Derek Lamarand, USDA-APHIS, [Derek.Lamarand@aphis.usda.gov](mailto:Derek.Lamarand@aphis.usda.gov)*

## **Table 2**

### **Parks and Recreation Division**

#### **FY 2013 Ongoing Research Funded by DNR-PRD**

Primary Contact for all projects: Alicia Ihnken, Research Coordinator,  
Parks and Recreation Division, 517-284-6129, [IhnkenA@michigan.gov](mailto:IhnkenA@michigan.gov)

#### **Ecological Processes**

- Natural community surveys within six State Park and Recreation Area lands  
*Michigan Natural Features Inventory - \$32,106*

#### **Wildlife Management**

- Evaluation of Eastern box turtle population status and response to prescribed fire at Fort Custer Recreation Area  
*Michigan Department of Natural Resources, PRD - \$10,850*

#### **FY 2013 Ongoing Research Permitted on PRD-Administered Lands But Not Directly Sponsored**

#### **Biological Diversity**

- Amur honeysuckle (*Lonicera maackii*) genetic variation research  
*Contact: Shannon McCarragher, Northern Illinois University, [smccarragher@niu.edu](mailto:smccarragher@niu.edu)*
- Characterize microbial contents and genetic diversity within pitcher plants  
*Contact: Dr. Margaret Hanes, Eastern Michigan University, [mkoopma2@emich.edu](mailto:mkoopma2@emich.edu)*
- Entomology course: survey and collection of insect diversity

Contact: *Dr. Brian Scholtens, University of Michigan Biological Station*

- Coastal wetland monitoring

Contact: *Josh Dumke, University of Minnesota Duluth*

- Comparative phylogeographic analysis of geographic distribution of *Rubus parviflorus*, *Oplopanax horridus*, *Agoseris glauca*

Contact: *Chloe Drummond, University Wisconsin-Madison*

- Marsh bird surveys

Contact: *Mike Monfils, Michigan Natural Features Inventory (MNFI)*

- Bay City Recreation Area - Tobico marsh fish, macroinvertebrate, plant, and soil sampling

Contact: *Dennis Albert, Oregon State University, [albertyd@hort.oregon.edu](mailto:albertyd@hort.oregon.edu)*

- Population biology of Pitcher's thistle

Contact: *Dr. Claudia Jolls, East Carolina University*

- Research investigating the variability in cattail genetics

Contact: *Pamela Geddes, Northeastern Illinois University*

- Rock cress genetics (*Arabidopsis lyrata*)

Contact: *Yvonne Willi, University of Neuchatel, Switzerland*

- Understanding Rose Pink populations in Michigan (investigating re-colonization with restoration efforts)

Contact: *Sheila Lyons-Sobaski, Albion College*

- Vascular plant survey of Ludington State Park

Contact: *David Dister, [david.dister@gmail.com](mailto:david.dister@gmail.com)*

## **Ecological Processes**

- A morphological indicator of sperm competition in spiders

Contact: *Anne Danielson-Francois, University of Michigan - Dearborn*

- American sea rocket seed dispersal (*Cakile edentula*)

Contact: *Elizabeth LaRue, Purdue University, [elarue@purdue.edu](mailto:elarue@purdue.edu)*

- Can microbial symbiots mediate effects of climate changes or the functioning of an ecosystem engineer?

Contact: *Dr. Sarah Emery, University of Louisville, [sarah.emery@louisville.edu](mailto:sarah.emery@louisville.edu)*

- Micro-meteorological monitoring of lake effect temperature inversion

Contact: *Dr. Kenneth Hinkel, University of Cincinnati, [Kenneth.hinkel@uc.edu](mailto:Kenneth.hinkel@uc.edu)*

- Photographic measurement of sand dune erosion at P.J. Hoffmaster and Saugatuck Dunes State Parks  
Contact: *Dr. Brian Bodenbender, Geology Department, Hope College*
- Prairie fen plant biodiversity: the influence of landscape and local factors on plant community assemblages  
Contact: *Rachel Hackett, Central Michigan University*
- Predicting the invasion of invasive plants  
Contact: *Nichole Kupisz, Grand Valley State University, [kupiszn@mail.gvsu.edu](mailto:kupiszn@mail.gvsu.edu)*
- Ecological impacts of emerald ash borer on Michigan state lands  
Contact: *Dr. Daniel Herms, Ohio State University, [herms.2@osu.edu](mailto:herms.2@osu.edu)*
- Establishment of a diverse assemblage of native grasses & forbs on a degraded, knapweed infested site in Bass River Recreation Area  
Contact: *Dr. Neil MacDonald, Grand Valley State University, [macdonan@gvsu.edu](mailto:macdonan@gvsu.edu)*
- Study of beach-coastal dune processes in Hoffmaster State Park  
Contact: *Dr. Deanna Van Dijk, Calvin College, [dvandijk@calvin.edu](mailto:dvandijk@calvin.edu)*
- Use of Warren Woods old growth forest as a control/base for restoration and preservation of University of Notre Dame woodlots  
Contact: *Dr. Dominic Chaloner, University of Notre Dame, [dchalone@nd.edu](mailto:dchalone@nd.edu)*

### **Environmental Protection**

- Birds as indicators of contaminant exposure on Great Lakes  
Contact: *Christine Custer, USGS, Upper Midwest Environmental Sciences Center, [ccuster@usgs.gov](mailto:ccuster@usgs.gov)*

### **Fisheries Management**

- Origin of sea lampreys in upper Cheboygan River  
Contact: *Nicholas Johnson, USGS Hammond Bay Biological Station, [njohnson@usgs.gov](mailto:njohnson@usgs.gov)*

### **Forest Management**

- Development of technologies for rapid, early detection of emerald ash borer (EAB)  
Contact: *Sophan Chhin, Michigan State University*
- Emerald Ash Borer research on DNR lands  
Contact: *Dr. Deb McCullough, Michigan State University, [mccullo6@msu.edu](mailto:mccullo6@msu.edu)*
- Trapping of exotic forest pests  
Contact: *Deb McCullough and Sara Tanis, Michigan State University, [mccullo6@msu.edu](mailto:mccullo6@msu.edu)*

- Raising EAB parasitoids  
Contact: *Derek Lamarand, USDA APHIS PPQ*

### **Human Dimensions**

- Tick invasion and Lyme disease research in Michigan's Lower Peninsula  
Contact: *Jean Tsao, Michigan State University, [tsao@msu.edu](mailto:tsao@msu.edu)*

### **Wildlife Management**

- Assessing behavior, health and fitness of migratory birds along an urban-rural gradient  
Alarm calling and risks of brood parasitism and predation in yellow warblers  
The influence of anthropogenic noise on acoustic mating signal effectiveness in Hylid Frogs  
Contact: *Dr. Sharon Gill, Western Michigan University, [Sharon.gill@wmich.edu](mailto:Sharon.gill@wmich.edu)*
- Bird and bat use of island and coastal areas of Northern Lake Michigan  
Contact: *Nancy Seefelt, Central Michigan University*
- Cerulean warbler survey and banding  
Contact: *John Brenneman, Kalamazoo Nature Center, [jbrenneman@naturecenter.org](mailto:jbrenneman@naturecenter.org)*
- Habitat use by spring migrating landbirds within the Great Lakes basin with special emphasis on shoreline habitats  
Contact: *Jen Owen, Michigan State University*
- How coyotes adapt and respond to urbanization  
Contact: *William Dodge, Wayne State University*
- Seasonal deer migration affects the distribution of nutrients in forest ecosystem  
Contact: *Bryan Murray, Michigan Technological University, [bdmurray@mtu.edu](mailto:bdmurray@mtu.edu)*

## **Table 3 – Wildlife Division**

### **FY 2013 Research Funded by DNR-WD**

Primary Contact for all projects: Steve Beyer, Research Coordinator  
DNR-Wildlife Division (WD), 517-243-5179, [beyers1@michigan.gov](mailto:beyers1@michigan.gov)

### **Ecological Process**

- Role of Predators, Winter Weather, and Habitat on White-tailed Deer Fawn Survival in Michigan  
Contact: *Dr. Dean Beyer, DNR-WD, [BEYERD@michigan.gov](mailto:BEYERD@michigan.gov)*  
Mississippi State University
- Downscaling climate predictions for Michigan & the Great Lakes  
Contact: *Christopher Hoving, DNR-WD, [HOVINGC@michigan.gov](mailto:HOVINGC@michigan.gov)*  
Board of Regents of the University of WI System

## Human Dimensions

- Partners in Ecosystem Research and Management: Human Dimensions of Wildlife Health; Human-Wildlife Interactions; Developing Capacity for Living With Wildlife  
*Contact: Steve Beyer, DNR-WD, [beyers1@michigan.gov](mailto:beyers1@michigan.gov)*  
Michigan State University
- Assessing Effects of Social Capital among Michigan Deer Management Cooperatives  
*Contact: Dr. Brent Rudolph, DNR-WD, [RUDOLPHB@michigan.gov](mailto:RUDOLPHB@michigan.gov)*  
Michigan State University
- Facilitating urban-suburban deer management in Michigan: social, spatial, and population considerations  
*Contact: Dr. Brent Rudolph, DNR-WD, [RUDOLPHB@michigan.gov](mailto:RUDOLPHB@michigan.gov)*  
Michigan State University

## Wildlife Management

- Adaptive Management of Sharp-Tailed Grouse in the Eastern Upper Peninsula of Michigan  
*Contact: Dr. Dave Luukkonen, DNR-WD, [LuukkonenD@michigan.gov](mailto:LuukkonenD@michigan.gov)*  
Michigan State University
- Factors Influencing Snowshoe Hare Occupancy and Abundance  
*Contact: Dr. Dwayne Etter, DNR-WD, [ETTERD@michigan.gov](mailto:ETTERD@michigan.gov)*  
Michigan State University
- Improving the Effectiveness of Wolf Management Approaches in Michigan  
*Contact: Dr. Pat Lederle, DNR-WD, [lederlep@michigan.gov](mailto:lederlep@michigan.gov)*  
Michigan State University
- Statistical Catch-at-age Assessment of Michigan Black Bear Population Dynamics  
*Contact: Sarah Mayhew, DNR-WD, [MAYHEWS@michigan.gov](mailto:MAYHEWS@michigan.gov)*  
Michigan State University
- Analytical Support Refining Black Bear Abundance Estimates in the Northern Lower Peninsula and Addressing Action Items in Michigan's Bear Management Plan.  
*Contact: Dr. Dwayne Etter, DNR-WD, [ETTERD@michigan.gov](mailto:ETTERD@michigan.gov)*  
Michigan State University

## Social and Economic

- An Evaluation of Moving to a Learning Organization in the Wildlife Division: Measuring Collaboration, Trust, Performance and Effectiveness of Decisions  
*Contact: Dr. Pat Lederle, DNR-WD, [lederlep@michigan.gov](mailto:lederlep@michigan.gov)*  
Michigan State University

## Table 4 Fisheries Division

## FY 2013 Research Funded by DNR - FD

Primary Contact for all projects: David F. Clapp, Acting Research Program Manager,  
Fisheries Division, 231-547-2914, Ext. 237, [ClappD@michigan.gov](mailto:ClappD@michigan.gov)

### **Ecological Processes**

Influence of Lotic and Nearshore Habitats on Fish Populations in Great Lakes and Inland Lake  
Ecosystems, with Emphasis on Walleye (F-80, 230521)

*Contact: Zorn*

Fisheries Division - \$81,647

Effects of Sediment Traps on Michigan River Channels (F-80, 230702)

*Contact: Wills*

Fisheries Division - \$7,888

Evaluation of the Relative Growth and Survival of Wild Rose and Sturgeon River Brown Trout  
Stocked into Michigan Lakes and Reservoir Tailwaters (F-80, 230746)

*Contact: Wills*

Fisheries Division - \$9,045

Development of Management Scenarios for Lake and Stream Habitat and Fisheries Under Current  
and Future Land-use and Climate Conditions (F-80, 230756)

*Contact: Wehrly*

Fisheries Division - \$137,492

Walleye Dynamics in Michigan's Inland Waterway: the Burt-Mullett-Pickerel-Crooked Lake System (F-  
80, 230761)

*Contact: Hayes*

Michigan State University - \$102,556

Fish Community Status in Saginaw Bay, Lake Huron (F-81, 230466)

*Contact: Fielder*

Fisheries Division - \$158,970

Northern Lake Huron, Coolwater Fish Community Assessment (F-81, 230695)

*Contact: Fielder*

Fisheries Division - \$46,855

Evaluation of Lake Sturgeon Populations in the St Clair River and Lake St Clair, Michigan (F-81,  
230491)

*Contact: Thomas*

Fisheries Division - \$66,203

Strengthening Habitat Elements of Michigan's Statewide River Segment GIS in Support of Aquatic  
Ecosystem Management (SWG T-10-T-3, 230748)

*Contact: Zorn*

Fisheries Division - \$186,929

- Development of a GIS for Inventory, Classification, and Management of Non-game Wildlife in Great Lakes Waters (SWG T-10-T-3, 237000)  
*Contact: Rutherford*  
University of Michigan - \$124,422
- Development of Lake Spatial Information and Tools for Aquatic Life Conservation (SWG T-10-T-3 & SWG T-10-T-4, 237001)  
*Contact: Breck*  
Fisheries Division - \$124,422 + \$173,867
- Instream Habitat Management through Groundwater Conservation (SWG T-10-T-4, 237025)  
*Contact: Newcomb*  
Fisheries Division - \$46,141

### **Human Dimensions**

Comprehensive Analysis and Improvement of Michigan Statewide Angler Survey Data (F-80, 230557)

*Contact: Su*

Fisheries Division - \$52,764

Michigan Statewide Angler Survey Program (F-81, 230499)

*Contact: Clapp, Su*

Fisheries Division - \$2,035,498

A Statewide Survey of Michigan's Licensed Anglers (F-81, 230548)

*Contact: Lupi*

Michigan State University - \$66,909

### **Fisheries Management**

Assessment of Predator - Prey Balance for Lake Huron Fishery Management (F-80, 230522)

*Contact: He*

Fisheries Division - \$51,002

Energetics Approach to Predicting Growth, Maturation, and Fecundity of Largemouth Bass, Bluegill, and Walleye (F-80, 230550)

*Contact: Breck*

Fisheries Division - \$9,678

Effects of Restrictive Minimum Size Limits and Gear Restrictions on Brook Trout Populations in the Black River, Michigan (F-80, 230556)

*Contact: Wills*

Fisheries Division - \$1,266

Hooking Mortality of Lake Trout in the Upper Great Lakes (F-80, 230564)

*Contact: Sitar*

Fisheries Division - \$66,053

- Development of Databases, Classification Systems, and Fisheries Management Tools for Inland Lakes of Michigan (F-80, 230567)  
*Contact: Wehrly*  
Fisheries Division - \$11,420
- Compare and Improve Lake Trout Abundance Indices and Evaluate Optimal Allocation of Creel Survey Resource for Lake Huron (F-80, 230568)  
*Contact: Su*  
Fisheries Division - \$7,354
- Influence of Total Length and Condition at Stocking on Chinook Salmon Survival and Time at Large (F-80, 230692)  
*Contact: Jonas*  
Fisheries Division - \$23,340
- Investigation of Stocking Methods for Expanding the Steelhead Fishery in Lake Huron (F-80, 230763)  
*Contact: Johnson*  
Fisheries Division – \$13,965
- Vital Statistics of Walleye in Saginaw Bay (F-81, 230436)  
*Contact: Fielder*  
Fisheries Division - \$20,512
- Evaluation of Lake Trout Stocks in Lake Huron (F-81, 230451)  
*Contact: He*  
Fisheries Division - \$117,493
- Dynamics of the Lake Erie Walleye and Yellow Perch Populations and Fisheries (F-81, 230460)  
*Contact: Thomas*  
Fisheries Division - \$28,634
- Charter Boat Catch and Effort From the Michigan Waters of the Great Lakes (F-81, 230462)  
*Contact: Wesander*  
Fisheries Division - \$98,510
- Statewide Coded-wire Tagging and Tag Recovery Program (F-81, 230464)  
*Contact: Clapp*  
Fisheries Division - \$113,544
- Population Dynamics of Yellow Perch Stocks in Michigan Waters of Lake Michigan (F-81, 230484)  
*Contact: Clapp*  
Fisheries Division - \$78,494
- Assessment of Chinook Salmon and Coho Salmon Populations and their Prey in Eastern Lake Michigan (F-81, 230485)  
*Contact: Claramunt*  
Fisheries Division - \$109,406
- Assessment of Lake Trout Populations in Michigan's Waters of Lake Michigan (F-81, 230486)  
*Contact: Jonas*  
Fisheries Division - \$139,289

Status of Lake St. Clair Fish Community and Sport Fishery (F-81, 230488)

*Contact: Thomas*

Fisheries Division - \$84,262

Assessment of Lake Trout Populations in Michigan Waters of Lake Superior (F-81, 230495)

*Contact: Sitar*

Fisheries Division - \$301,291

Evaluation of Returns of Salmonids to Weirs in Michigan's Waters of the Great Lakes (F-81, 230513)

*Contact: Claramunt, Jonas*

Fisheries Division - \$27,262

Assessment of Nearshore Fish Communities in Northern Lake Michigan (F-81, 230747)

*Contact: Zorn*

Fisheries Division - \$97,167

Refinement of the Aquatic Portion of Michigan's Wildlife Action Plan and Development of Tools to Support the Plan (SWG T-10-T-3 & SWG T-10-T-4, 237016)

*Contact: Wehrly*

Fisheries Division - \$156,530 + \$127,644

### **Biological Diversity**

Lake Sturgeon Population Status in the Cheboygan River Watershed Lakes, Michigan (F-81, 230563)

*Contact: Baker*

Fisheries Division - \$129,893

Status and Trends of Inland Lakes: Methods Development, Program Oversight, and Ecological Assessment (F-81, 230712)

*Contact: Wehrly*

Fisheries Division - \$46,926

Status and Trends of Fish Populations and Community Structure in Michigan Streams (F-81, 230737)

*Contact: Wills*

Fisheries Division - \$17,401

Review of Inland Fisheries Cooperative Grants Funded Projects for Efficacy and Biological Benefit (SWG T-10-T-3, 237018)

*Contact: LeSage*

Fisheries Division - \$10,001

Sturgeon Rehabilitation Plan (SWG T-10-T-4, 237026)

*Contact: Baker*

Fisheries Division - \$339,462

Lake Herring Rehabilitation (SWG T-10-T-4, 237027)

*Contact: Claramunt*

Fisheries Division - \$53,414