

MSU Extension programs improve public understanding and knowledge of Michigan's natural resources, help landowners and communities use those assets for sustainable long-term social and economic development, conserve our natural resources base for future generations, and broaden stakeholder engagement in natural resources decision-making.

Together with key partners such as Michigan Sea Grant and the Michigan Natural Features Inventory (MNFI), MSU Extension educators and specialists also work with individuals and community leaders to provide customized programming and educational opportunities based on the latest evidence-based research and county-specific needs. We encourage you to contact your local MSU Extension office about crafting programming that is right for you, your family and your community.

🌿 Environmental & Earth Science

Youth participants explore the broad scope of environmental and earth science through real-life scenarios and educational opportunities related to natural resources and wildlife in this project area. Participants can explore topics such as environmental resource management, entomology, outdoor recreation and education, soils, wildlife, fisheries and marine life.

Energy

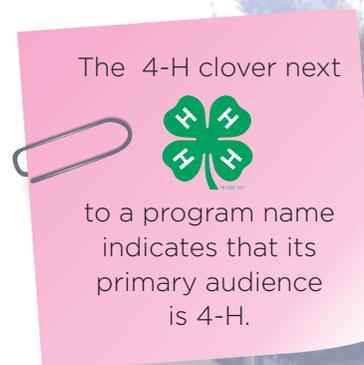
The growing traditional and renewable energy industries in the state have tremendous potential to expand Michigan's economy. MSU Extension educators and researchers work with landowners to produce green energy crops sustainably and with local and state officials to develop energy policies.

Biodiesel Demonstrations

MSU Extension offers hands-on demonstrations of how to produce biodiesel fuel from oilseed crops and used vegetable oil. Researchers have developed a biodiesel conversion unit that allows them to do mobile demonstrations on farms. The mobile unit is also a great resource for teaching students at technology centers and community colleges the process of making biodiesel.

Energy Conservation: Impact on the Bottom Line

MSU Extension hosts an annual four-phase program designed to help people become certified farm energy auditors. Individuals can become certified to complete dairy, greenhouse, irrigation, grain dryer, poultry, swine and rural business audits. On average, dairy farms that have implemented the energy conservation practices recommended in energy audits have seen 46-percent reductions in their energy costs.





✿ 4-H Renewable Energy Camp

During this weeklong 4-H precollege program, youth participants explore how ideas, research and opportunities in Michigan's agriculture and natural resources sectors can be used to create renewable energy. Participants tour a power plant, an ethanol facility and a wind farm, and visit the Kellogg Biological Station and MSU campus labs. They also conduct experiments and create their own biofuel.

Oil & Gas Leasing

Many Michigan landowners don't understand the fundamentals of oil and gas leasing rights when they are first approached by an oil and gas company representative. MSU Extension educators help translate contract terms about negotiating royalty percentages, postproduction costs, pooling, protecting land and water resources, and land damage reimbursement. Similar information is available on wind farm leasing.

USDA REAP Grant & Loan Preparation Workshops

This annual workshop helps small businesses, farmers and ranchers work through the Rural Energy for America Program (REAP) loan and grant application process. REAP offers grants and loan guarantees for the purchase and installation of renewable energy generating systems.

Wind Farm Turbine Siting

While wind energy isn't subject to some of the environmental concerns associated with use of fossil fuels, it's not without its own environmental risks, including bird and bat mortality at wind farms. MSU Extension's Michigan Natural Features Inventory helps decision-makers assess the potential for turbine interactions with animals and provides useful information on siting wind turbines.

Fisheries & Wildlife

MSU Extension works with fisheries and wildlife agencies, stakeholder organizations and landowners to protect and enhance the state's fish and wildlife populations and habitats. We offer a variety of up-to-date resources in everything from human-wildlife interactions and animal damage control to commercial and recreational fishing and invasive species identification and control.

Regional Fisheries Workshops

Michigan Sea Grant Extension annually hosts regional public workshops for lakes Huron, Michigan and Erie. The workshops are free and provide valuable information for anglers, charter captains, natural resources professionals and other community members. Topics covered in the workshops include the status of fish populations, angler catch data, the resurgence of native species, results from forage fish surveys, results from an ongoing predator diet study and updates on fisheries management activities.

Support of Charter Fishery & Fisheries Stakeholders

Michigan Sea Grant Extension works closely with the state's charter fishing industry to develop and propose resource management policies and regulations that achieve a balance between the economic benefits of charter fishing and the state's natural resources and conservation goals. We provide technical support in areas like increasing business opportunities and obtaining and maintaining licenses and certifications.

Wildlife Management

MSU Extension bridges the science-policy interface by disseminating knowledge intended to improve understanding of complex wildlife-related issues. By delivering this evidence-based education on wildlife conservation policies, MSU Extension helps decision-makers become better informed about wildlife populations and habitats and the importance of wildlife to the social and economic vitality of Michigan.

Forestry

Michigan's forests support more than 125,000 jobs and contribute more than \$17 billion to Michigan's economy annually. MSU Extension forestry programs help landowners become effective stewards, managing their forests for today while preserving future economic, environmental and communal benefits.

Forest Health

MSU Extension's network of faculty and educators host classroom and outdoor workshops on topics related to forest health such as identifying and managing invasive species, diseases and pests. Workshops may also focus on management activities forest landowners can undertake to improve the health of their land and forests.

Forest Investment Analysis

Forest land investment is a long-term enterprise that helps secure Michigan's natural resources and boost the state's economic outlook. MSU Extension offers intensive workshops on how to use widely available software to perform investment analyses for private forest land managers and forest owners.

Forestland Taxation

It's common for private forest landowners to go for years between sales of timber and other forest products from their land. The long intervals between sales often mean that landowners aren't familiar with the pertinent federal income tax and Michigan property tax provisions. MSU Extension timber tax workshops for forest landowners and forestry and tax professionals provide tax law updates and help forest landowners identify ways to minimize their tax burden from timber sales.



Making the Most of Our Natural Assets

When you support MSU Extension's natural resources education programs, participants learn about income-generating opportunities, ecological principles, natural resource issues and the role of natural resource professionals. They also explore public policy issues related to environmental stewardship. Our programs can lead to increased income for families that retain their natural resource assets, help landowners become better stewards of their land, and protect land management opportunities for future generations. Better land stewardship benefits communities by protecting and enhancing Michigan's natural resource assets.



Master Woodland Steward Program

This intensive training course helps those who own or are interested in wooded lands and want to become better stewards of forest resources. Participants learn about forest ecology, goal-setting, and woodland and wildlife management techniques in classroom and outdoor settings.

Natural Resource Enterprises

Natural resources enterprises such as growing Christmas trees, tapping trees to make maple syrup and growing wild mushrooms all help landowners generate income from their property. MSU Extension delivers evidence-based information on how individuals can create profitable enterprises based on resources available on their private land. This information helps landowners and community leaders make better informed decisions.

Ties to the Land

Michigan boasts more than 20 million acres of forestland, and more than 40 percent of it is owned by private individuals. This workshop helps forest landowners learn how to pass their forest lands to the next generation, focusing on the interpersonal and legal issues related to succession and estate planning.

Timber Marketing

Harvesting timber is one of the primary ways landowners derive income from their forest land. When done correctly, timber harvests can help ensure a sustainable forest and financial returns for generations. MSU Extension timber marketing workshops help landowners understand the basic steps involved in planning and executing timber sales that meet their stewardship objectives.

Invasive Species

Invasive plant and animal species pose an enormous threat to Michigan's biodiversity and economic well-being. Emerald ash borers, garlic mustard and zebra mussels are notable examples of invasive species that harm our state's land and water resources. MSU Extension provides educational resources to help landowners and natural resources professionals identify, assess and control invasive species.

AIS Awareness & Response

The total economic losses to aquatic invasive species (AIS) were estimated at \$5 billion a year in 2005. MSU Extension works to raise public awareness of AIS in the Great Lakes region. We partner with volunteer organizations on preventing the introduction of new species, developing rapid response programs, controlling the spread of established species, and mitigating invasive species' ecological and socioeconomic impacts. We help create and educate volunteer networks whose work can increase community pride and leverage funding to maximize control of invasive species at the minimum cost.



Erin Lizotte, MSU Extension



AIS-HACCP & Aquaculture Biosecurity

Controlling the spread of invasive species is as important to the aquaculture and baitfish industries as it is to other sectors of the Great Lakes ecosystem. The AIS-HACCP (Aquatic Invasive Species – Hazard Analysis and Critical Control Point) program helps prevent the spread of aquatic invasive species. Regular workshops offered by Michigan Sea Grant Extension help businesses understand AIS-HACCP principles. Participants study practical examples and work through hands-on exercises to help them develop plans specific to their aquaculture operations.

Asian Carp

The possibility of Asian carp reaching the Great Lakes is a major threat to the health of the entire Great Lakes ecosystem. The Michigan Sea Grant Extension program works to keep Michigan residents, scientists, and representatives from federal and state agencies and natural resources organizations informed of the threat and about efforts to stop the spread of the Asian carp.

Lakes, Streams & Watersheds

MSU Extension’s focus on lakes, streams and watersheds brings together educators and researchers with local, state, regional and federal agencies and stakeholder organizations to protect and promote the sustainable use of the state’s distinctive aquatic resources. MSU Extension educators also consult with contractors working on inland lake shorelines. Michigan Sea Grant Extension educators provide programming for students and families and offer online resources that help incorporate Great Lakes data into science and math curricula.

Clean Boats, Clean Waters

Destructive aquatic invasive species like zebra mussels and hydrilla can easily hitch rides on recreational boating equipment. Through this program, local volunteers teach boaters about the damage invasive species can cause. They demonstrate how to inspect and clean boating and fishing gear to avoid unintentionally giving rides to any invasive hitchhikers.

CoastWatch

The CoastWatch system for reporting Great Lakes surface water temperatures is a cooperative project between the NOAA CoastWatch Great Lakes regional node and the Great Lakes Sea Grant Extension Network. It was created and is maintained by Michigan Sea Grant Extension and the MSU Remote Sensing and GIS Research and Outreach Services program.

Dangerous Currents & Recreational Water Safety

Identifying and knowing what to do about dangerous currents on a local waterfront enables communities to be proactive in offering waterfront safety education. Michigan Sea Grant coordinates a series of such workshops with regional partners. The workshops teach local, state and federal parks personnel, emergency responders, volunteers, researchers, educators and others about Great Lakes beach hazards.





🌿 4-H Great Lakes & Natural Resources Camp

Science doesn't get any more fun than 4-H GLNRC. Campers explore dunes, hike forest trails, wade through wetlands, fish, snorkel and sail on Lake Huron while educators and scientists teach them about the Great Lakes ecosystem. The weeklong camp for young people aged 13 to 15 is held near the northern shores of Lake Huron in Presque Isle.

🌿 Great Lakes Education Program

This weeklong 4-H precollege program integrates elements of geography, history, biology and physical sciences to stimulate participants' interest in their role in protecting our freshwater resources. The program, conducted in cooperation with the Huron-Clinton Metropolitan Authority, introduces fourth-graders to various features of the Great Lakes through classroom learning and hands-on experiences.

Great Lakes Literacy

Many residents of Michigan are unaware of the economic, environmental and social value of the Great Lakes. Michigan Sea Grant Extension believes that an informed public makes informed decisions. That's why we provide a variety of lifelong learning opportunities focused on the Great Lakes that are designed to enhance science education and encourage stewardship.

Introduction to Lakes Webinars

This six-module webinar series is for lakefront residents, lake association and lake improvement association members, elected officials and natural resource professionals. It's designed to increase participant understanding of lakes, lake ecology, the importance of sound lake and shoreline management practices, and a variety of lake management issues.

Lake & Stream Leaders Institute

Michigan's lakes and streams are valuable environmental, cultural and economic resources. The Lake and Stream Leaders Institute develops the skills and knowledge base that participants need to become local water resource leaders. They learn about the ecology of lakes and streams, develop leadership skills and gain an understanding of the legal frameworks that guide water protection and management efforts in Michigan.

🌿 The Life of Lake Superior

Youth participants in this program discover the varied opportunities that exist in the arts, natural resources, history, culture, recreation and careers along the Lake Superior shoreline. The program, offered through the Alger County MSU Extension outdoor education program, gives young people ages 9 to 14 a taste of some of the many ways Lake Superior affects their lives.

Michigan Certified Natural Shoreline Professional Program

Landscapers, marine contractors and other participants in this intensive four-day classroom and field training program can earn certification as natural shoreline professionals through the Michigan Natural Shoreline Partnership. Sessions cover topics such as the relationship between lakes and shorelines, the role and use of native plants in natural shoreline landscaping, bioengineered shoreline erosion control and shoreline permits.

Natural Shoreline Educational Workshops for Homeowners

These workshops are designed to help inland lakefront residents understand the importance of natural shoreline landscaping. Participants learn about bioengineering techniques that use natural materials and native vegetation to help control erosion, create and preserve fish and wildlife habitat, and maintain the aesthetic quality of the lakefront.

Northern Lake Huron Shipboard Education

Educators who participate in this Michigan Sea Grant Extension workshop aboard a research vessel learn about the Great Lakes and the many ways humans interconnect with the lakes. They return to their classrooms ready to employ a variety of hands-on techniques to increase their students' Great Lakes literacy.

Summer Discovery Cruises

Young people and adults in urban areas of Michigan can cruise and explore Lake Erie, the Detroit River and Lake St. Clair in this program. Participants are out on the water while learning about lighthouses, bootleggers, sturgeon, the environment and much more. With more than 20 themes to choose from, each cruise is unique, interesting and engaging.

Vessel-Based Education

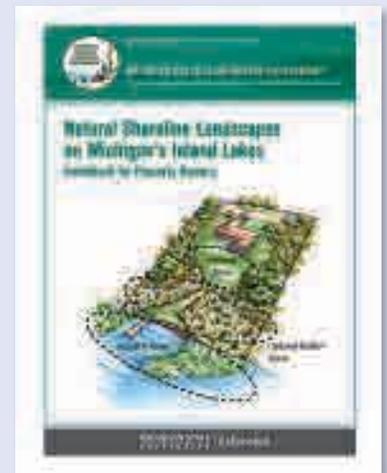
MSU Extension's vessel-based workshops are designed to help teachers combine Great Lakes science with more traditional classroom lessons. Educators go through hands-on and feet-wet opportunities to learn about the Great Lakes, work with leading research scientists and prepare to use what they've learned and experienced back in their classrooms.

Natural Resources Conservation

Michigan is blessed with an abundance of natural resources, including forests, wetlands, lakes, streams, thousands of species of plants and animals, and of course, four of the five Great Lakes touch the state's borders. To ensure that future generations can enjoy and use these resources, we must manage them sustainably. This requires conservation policies and practices based on a firm understanding of the resources. MSU Extension works with the public, public officials and resource managers to put sustainable practices based on that knowledge into action. MSU Extension also conducts applied research on key and emerging issues related to the conservation of natural resources.



MSUE PUBLICATIONS



Natural Shoreline Landscapes on Michigan's Inland Lakes

This 70-page book provides lakefront property owners a broad understanding of healthy inland lake ecosystems and why natural shorelines are important for lakes. It offers ideas for creating attractive, more natural shorelines and provides soft shoreline alternatives to hard shoreline structures in low-energy conditions. It also discusses regulatory requirements affecting work done at the shoreline.

bookstore.msue.msu.edu



Climate Change Planning & Adaptation

Michigan is part of a dynamic coastal ecosystem. It's not clear how climate change might affect that ecosystem and the state's weather, but some of the possibilities include more frequent and stronger storms, heavier stormwater runoff, and wider, faster and more frequent fluctuations in water levels than we've experienced before. Michigan Sea Grant Extension lends its expertise to help state residents plan how to thrive in the midst of climate extremes.

Climate Literacy

MSU Extension's climate literacy programs are designed to help Michigan residents learn more about climate literacy principles, particularly as they relate to the Great Lakes region. Michigan Sea Grant Extension educators, climate scientists, and formal and informal educators developed the research-based science curriculum that serves as the backbone of Michigan Sea Grant's climate literacy outreach and education efforts.

Conservation Planning & Education

To ensure that Michigan's natural resources are available for future generations, conservation measures must be undertaken today. Youth and adults, the novice and the knowledgeable, can benefit from and expand their skills and understanding through systematic exposure to conservation principles. MSU Extension educators guide local planners and other officials through the complex process of conservation planning.

Geographic Information Services

Knowing and understanding the spatial patterns underlying possible courses of action is critical to providing adequate and cost-effective programmatic services to landowners, local officials, agencies and conservation organizations. MSU Extension's Michigan Natural Features Inventory provides a range of geographic information services, from basic mapping to complex spatial analysis, with a focus on natural systems.



Michigan Conservation Stewards Program

Participants in this program undergo intensive classroom and field training in natural resource ecology and conservation and ecosystem-based management. They learn how to promote, support, actively contribute to and lead significant volunteer conservation management activities on public and private lands.

✿ Michigan 4-H Youth Conservation Council

Designed for young people with an interest in environmental stewardship and conservation, this precollege program group is formed annually with youth ages 13 to 19 from across the state. Collectively, council members research a natural resources-related issue they've chosen and develop a plan for addressing the issue on a statewide basis. The capstone of the group's year of service is presenting their plan to a Michigan Senate committee, which considers putting the recommendations into a bill to be considered by the full Senate.



Natural Features Inventories

Conservation efforts must start with good baseline information about an area’s natural resources. MSU Extension’s Michigan Natural Features Inventory helps planners assess the quality and distribution of natural assets that are essential to conservation-related efforts. Such efforts include park planning, green infrastructure planning, community development and comprehensive conservation planning.

Threatened & Endangered Species Conservation

As private citizens and local governments plan, they must consider the potential effects of their activities on threatened and endangered species in the area and decide how to protect those species. MSU Extension’s Michigan Natural Features Inventory maintains the most comprehensive database on the location of rare species in the state. State and federal agencies charged with protecting vulnerable species rely on the MNFI database during their regulatory reviews of proposed development activities.

Water Conservation Program

Michigan Sea Grant Extension provides educational outreach for this classroom-based program, which is designed for first- through third-graders. The children explore water conservation topics such as where water comes from, how to use water wisely, and how to protect and conserve this precious resource.



Water Quality

Protecting and improving the quality of Michigan’s water resources is critical for our state’s future. MSU Extension educators and researchers work with community leaders to create water-protection strategies, with landowners and industry to reduce the risks of water pollution, and with state agencies to develop water-quality information systems.

Comprehensive Wastewater Management Education

This educational initiative is designed for homeowners and wastewater system designers, fabricators and operators. It covers topics related to onsite and cluster wastewater systems (including their design and operation), and water conservation and reuse.

Landscaping for Water Quality

Stormwater carries excess nutrients and other contaminants across impervious surfaces and directly into Michigan’s valuable water resources. This program introduces landscaping techniques designed to collect and process stormwater onsite to prevent runoff to nearby water bodies. The presentation covers stormwater basics, low-impact development and ways to protect water through smart landscaping techniques.

