

## NOAA In Your State

# Michigan

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**NOAA** is an agency that enriches life through science. Our reach goes from the surface of the sun to the depths of the ocean floor as we work to keep citizens informed of the changing environment around them. From daily weather forecasts, severe storm warnings, and climate monitoring to fisheries management, coastal restoration and supporting marine commerce, NOAA's products and services support economic vitality and affect more than one-third of America's gross domestic product. NOAA's dedicated scientists use cutting-edge research and high-tech instrumentation to provide citizens, planners, emergency managers and other decision makers with reliable information they need when they need it. The following is a summary of NOAA facilities, staff, programs, or activities based in, or focused on, your state or territory. The entries are listed by statewide, region, and then by congressional districts and cities or towns.

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### MI

#### Statewide

#### **National Marine Fisheries Service (NMFS) and National Ocean Service (NOS) - [Damage Assessment, Remediation, and Restoration Program](#)**

NOAA's Damage Assessment, Remediation, and Restoration Program (DARRP) assesses and restores habitat, fisheries, protected species and recreational uses that have been harmed by oil spills, chemical releases, and ship groundings. Working with federal, state, and tribal entities, and responsible parties, we have recovered \$10.4 billion for restoration of critical habitats, fisheries, protected species and recreational uses nationwide. These projects promote recovery of the ecosystem and provide economic benefits from tourism, recreation, green jobs, coastal resiliency, property values and quality of life. In Michigan, the Program is currently working to restore natural resources in cases including the Kalamazoo River hazardous waste site and the Enbridge Pipeline oil spill.

#### **National Ocean Service (NOS) – [Regional Geodetic Advisor](#)**

The Regional Geodetic Advisor is a National Ocean Service (NOS) employee that resides in a region and serves as a liaison between the National Geodetic Survey (NGS) and its public, academic and private sector constituents within their assigned region. NGS has a Regional Geodetic Advisor stationed in Black River Falls, Wisconsin serving the Great Lakes region – Wisconsin, Illinois, Indiana, and Michigan. The Geodetic Advisor provides training, guidance and assistance to constituents managing geospatial activities that are tied to the National Spatial Reference System (NSRS), the framework and coordinate system for all positioning activities in the Nation. The Geodetic Advisor serves as a subject matter expert in geodesy and regional geodetic issues, collaborating internally across NOS and NOAA to ensure that all regional geospatial activities are properly referenced to the NSRS.

### **National Weather Service (NWS) - [Automated Surface Observing Systems Stations](#)**

The Automated Surface Observing Systems (ASOS) program is a joint effort of the National Weather Service (NWS), the Federal Aviation Administration (FAA), and the Department of Defense (DOD). ASOS serves as the Nation's primary surface weather observing network. ASOS is designed to support weather forecast activities and aviation operations while supporting the needs of the meteorological, hydrological, and climatological research communities. ASOS works non-stop, observing basic weather elements, such as cloud cover, precipitation, wind, sea level pressure, and conditions, such as rain, snow, freezing rain, thunderstorms, and fog. There are 27 ASOS stations in Michigan.

### **National Weather Service (NWS) - [Cooperative Observer Program Sites](#)**

The National Weather Service (NWS) Cooperative Observer Program (COOP) is truly the Nation's weather and climate observing network of, by and for the people. More than 10,000 volunteers take observations on farms, in urban and suburban areas, National Parks, seashores, and mountaintops. The data are representative of where people live, work and play. The COOP was formally created in 1890 under the NWS Organic Act to provide observational meteorological data, usually consisting of daily maximum and minimum temperatures, snowfall, and 24-hour precipitation totals, required to define the climate of the United States and to help measure long-term climate changes, and to provide observational meteorological data in near real-time to support forecast, warning and other public service programs of the NWS. The data are also used by other federal (including the Department of Homeland Security), state and local entities, as well as private companies (such as the energy and insurance industries). In some cases, the data are used to make billions of dollars' worth of decisions. For example, the energy sector uses COOP data to calculate the Heating and Cooling Degree Days which are used to determine individuals' energy bills monthly.

There are 265 COOP sites in Michigan.

### **National Weather Service (NWS) - [NOAA Weather Radio All Hazards Transmitters](#)**

NOAA Weather Radio All Hazards (NWR) is a nationwide network of radio stations broadcasting continuous weather information directly from the nearest National Weather Service (NWS) forecast office. NWR broadcasts official NWS warnings, watches, forecasts and other hazard information 24 hours a day, 7 days a week. Working with the Federal Communication Commission's (FCC) Emergency Alert System, NWR is an "All Hazards" radio network, making it the single source for comprehensive weather and emergency information. In conjunction with federal, state, and local emergency managers and other public officials, NWR also broadcasts warning and post-event information for all types of hazards – including natural (such as earthquakes or avalanches), environmental (such as chemical releases or oil spills), and public safety (such as AMBER alerts or 911 Telephone outages). Known as the "Voice of NOAA's National Weather Service," NWR is provided as a public service by the NWS. NWR includes 1,100 transmitters covering all 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands, and the U.S. Pacific Territories. There are 28 NWR transmitters in Michigan.

### **Office of Oceanic and Atmospheric Research (OAR) – [Michigan Sea Grant College Program](#)**

NOAA's National Sea Grant College Program is a federal-university partnership that integrates research, education and outreach. Sea Grant forms a network of 33 programs in all U.S. coastal and Great Lakes states, Puerto Rico, and Guam. Michigan Sea Grant College Program promotes better understanding, conservation and use of Michigan's coastal resources. The program supports research, education and outreach efforts designed to foster science-based decisions about the use and conservation of Great Lakes resources. Michigan Sea Grant is in the heart of one of the most biologically diverse freshwater ecosystems in the world. With more than 3,288 miles of Great Lakes shoreline, 11,000 inland lakes and 36,000 miles of rivers — water is what makes Michigan a special place. The Great Lakes are not just a "local" issue, housing about one-fifth of the world's fresh surface water supply, and nine-tenths of the U.S. supply. A collaborative effort of University of Michigan and Michigan State University, Michigan Sea Grant supports efforts in coastal regions throughout the state. The program was established in 1969 at the University of Michigan.

## **Great Lakes**

### **National Marine Fisheries Service (NMFS) - [Restoration Center](#)**

The NOAA Restoration Center, within the Office of Habitat Conservation, works with private and public partners locally and nationwide to increase fisheries productivity by restoring coastal habitat. Projects support sustainable fisheries, help recover threatened and endangered species, and reverse damage from disasters like oil spills, ship groundings, and severe storms. Since 1992, they have provided more than \$750 million to implement more 3,300 coastal habitat restoration projects. In the Great Lakes and Michigan, the Restoration Center focuses on restoring the most degraded environments--designated Areas of Concern.

### **National Ocean Service (NOS) - [National Water Level Observation Network](#)**

The National Ocean Service (NOS) operates 30 long-term continuously operating water level stations in the state of Michigan, which provide data and information on Great Lakes and interconnecting waterways datum and lake level regulation and are capable of producing real-time data for storm surge warning. These stations are located on Lake Michigan at Port Inland, Holland, Ludington, and Menominee; on Lake Huron at Lakeport, Harbor Beach, Essexville, Alpena, Mackinaw City and De Tour Village; on Lake Erie at Fermi Power Plant; on the Detroit River at Gibraltar, Wyandotte, Fort Wayne, and Windmill Point; on the Lake St. Clair and River at St. Clair Shores, Algonac, St. Clair State Police, Dry Dock, Mouth of the Black River, Dunn Paper, and Fort Gratiot; on Lake Superior at Ontonagon, Marquette C.G. and Point Iroquois; and on the St. Mary's River at U.S. Slip, S.W. Pier, West Neebish Island, and Rock Cut.

### **National Ocean Service (NOS) - [Phytoplankton Monitoring Network](#)**

The Phytoplankton Monitoring Network (PMN) engages volunteers in monitoring for marine phytoplankton and HABs. Data collected by PMN volunteers is used to better understand species composition and distribution in coastal and Great Lakes waters, and to identify areas for further research and monitoring. Through this program, we have alerted managers to previously undetected toxins in commercial shellfish beds, and the potential for human Amnesic Shellfish Poisoning and domoic acid toxicity in marine animals. This year PMN is active along the West Coast from CA to AK, in Lake Erie, in the Gulf of Maine, and the Gulf of Mexico.

### **National Ocean Service (NOS) - [Great Lakes Environmental Response Management Application](#)**

Assessing important spatial information and designing successful restoration projects rely upon interpreting and mapping geographic information, including the location, duration, and impacts from oil spills, other hazardous materials, or debris released into the environment. Great Lakes Environmental Response Management Application (ERMA®) is an online mapping tool that integrates both static and real-time data, such as Environmental Sensitivity Index maps, ship locations, weather, and ocean currents in a centralized, easy-to-use format for environmental responders and decision makers.

### **National Ocean Service (NOS) - [National Estuarine Research Reserve System Science Collaborative](#)**

The focus of this program is to develop the science needed to manage the nation's coastal resources. Administered through a five-year cooperative agreement with the University of Michigan, the collaborative sponsors reserve-based local science to address the impacts of land use, habitat change, and pollution on coastal environments. This program is the mechanism by which most of the NOAA-funded research undertaken at the nation's research reserves is accomplished; an average of \$3 million is awarded each year. Through the interconnectivity of the reserve system, project results from one reserve are more easily transferred to benefit the broader coastal management community. All projects contribute to the national effort to make the coast more resilient to natural and man-made changes.

### **National Ocean Service (NOS) - [Coastal and Estuarine Land Conservation Program](#)**

The Coastal and Estuarine Land Conservation Program brings conservation partners together to protect coastal and estuarine lands considered important for their ecological, conservation, recreational, historical, or aesthetic values. To date the program has protected more than 100,000 acres of land with program funds and over 16,000 acres with an in-kind match. The program provides state and local governments with matching funds to purchase coastal and estuarine lands or obtain conservation easements for important lands threatened by development. Three grants in Michigan have been administered using these funds. Another three projects have been awarded using funds from EPA's Great Lakes Restoration Initiative, including the new Stearns Creek project. Through this project, Ottawa County Parks plans to acquire 117 acres that include a portion of the Stearns Creek estuary, a site the supports wild rice stands. The property will be managed as a park available for all to enjoy year-round, nature-based outdoor recreation, with an emphasis on protecting the wild rice stand.

### **National Ocean Service (NOS) – [National Coastal Zone Management Program](#)**

Through a unique federal-state partnership, NOAA's Office for Coastal Management works with the Michigan Department of Environmental Quality to implement the National Coastal Zone Management Program in Michigan. NOAA provides the state coastal management program with financial and technical assistance to further the goals of the Coastal Zone Management Act and ensure coastal waters and lands are used in a balanced way to support jobs, reduce use conflicts, and sustain natural resources.

### **National Ocean Service (NOS) – [Scientific Support Coordinator and Regional Resource Coordinator](#)**

NOAA's Office of Response and Restoration (OR&R) brings decades of experience, technical expertise and scientific analysis in response to oil and hazardous chemical spills. In addition to events that draw the national eye like the Kalamazoo River oil spill, OR&R also supports response to local emergencies. Nine regionally based Scientific Support Coordinators (SSCs) harness the input of a multi-disciplinary team to address issues such as oil slick trajectory forecasting, environmental tradeoffs, best practices, resources at risk, oil science and properties, and chemical hazard assessment to reduce risks to coastal habitats and resources. The SSC works directly with U.S. Coast Guard and the U.S. Environmental Protection Agency to provide critical scientific support to the Federal On-Scene Coordinator. OR&R also helps develop preparedness plans that identify spill response actions with the greatest environmental benefit and trains hundreds of members of the response community each year on the scientific and technical aspects of spills. OR&R's Regional Resource Coordinators (RRCs) provide scientific and technical expertise and timely response to oil spills or hazardous materials releases to collect information, samples, and evidence that are time dependent and critical to support natural resource damage assessments throughout the coastal US. RRCs work on multi-disciplinary scientific, economic, and legal teams and are responsible for determining and quantifying injuries to NOAA trust natural resources following events like the Kalamazoo River oil spill through determination of injuries and pathway, and demonstration of causal mechanisms. The goal of the RRCs efforts is to determine, often through the Damage Assessment, Remediation, and Restoration Program, the appropriate amount and type of restoration required to restore injured NOAA trust resources and compensate the public for their lost use. Michigan's RRC is based in Ann Arbor.

### **National Ocean Service (NOS) - [Marine Debris Projects and Partnerships](#)**

The NOAA Marine Debris Program (MDP) leads national and international efforts to research, prevent, and reduce the impacts of marine debris. The program supports marine debris removal, education and outreach, and research projects in partnership with state and local agencies, tribes, non-governmental organizations, academia, and industry. Previous MDP projects in Michigan include the removal of 200 tons of large debris items including concrete, metal and other debris from the shoreline of Belle Isle, engaging the community through the Belle Isle Nature Zoo, and encouraging participation in shoreline cleanups through the Alliance's Adopt-a-Beach Program. The MDP has also worked with state and local governments, and stakeholders, to develop the Great Lakes Land-Based Marine Debris Action Plan.

### **National Ocean Service (NOS) - [Great Lakes Observing System](#)**

The U.S. Integrated Ocean Observing System, or IOOS®, is a federally and regionally coordinated observing system with 17 interagency and 11 regional partners. The System addresses regional and national needs for coastal, ocean, and Great Lakes data and information. This includes gathering and disseminating regional observations; data management; modeling and analysis; education and outreach; and research and development. The Great Lakes Observing System (GLOS), one of the 11 IOOS regional coastal ocean observing systems, provides public access to critical, real-time and historical data and information about the Great Lakes, St. Lawrence River and interconnecting waterways for use in managing, safeguarding and understanding these immensely valuable freshwater resources. GLOS is intended to gather and integrate chemical, biologic and hydrologic data, and monitor lake conditions and trends over time.

### **National Weather Service (NWS) - [Michigan Buoys](#)**

The National Weather Service (NWS), through its National Data Buoy Center (NDBC), develops, deploys, operates, and maintains the current national data buoy network of moored and drifting weather buoys and land stations that serve all of the Nation's coastal states and territories. Within this network, 110 of the buoys and 51 of the land stations are maintained directly by NDBC. Located at NASA's Stennis Space Center in Mississippi, supports weather and marine warning and forecast services in real time by providing deep ocean and coastal meteorological and oceanographic observations. These data provide valuable information used by NWS supercomputers to produce computer-generated model forecasts of the atmosphere and climate. NDBC manages the Volunteer Observing Ship program to acquire additional meteorological and oceanographic observations supporting NWS mission requirements. NDBC also supports operational and research programs of NOAA and other national and international organizations.

*MI-1, 2, 5, 10*

*Muskegon, Alpena, Saginaw*

### **Office of Oceanic and Atmospheric Research (OAR) - [Real-time Environmental Coastal Observation Network Stations](#)**

The goal of the Great Lakes Environmental Research Laboratory's Real-time Environmental Coastal Observation Network (RECON) project is to develop a national network of low cost coastal buoys capable of seabed to sea-surface observations. This wireless Internet observation system, with shore stations at coastal locations covering approximately 800 square miles of sea surface, uses commercially available networking equipment allowing straightforward integration into a nationwide network. The seasonal buoys are located offshore of Muskegon, MI in Lake Michigan, and in Saginaw Bay and Thunderbay, in Lake Huron. The buoys collect meteorological data air data (wind direction, barometric pressure, wind speed, maximum wind speed, air temperature; water near-surface data) and provides lake surface and sub surface measurements of chemical, biological, and physical parameters including water temperature, significant wave height, maximum wave height, dissolved oxygen, and conductivity. The system is designed to allow controlled access to multi-institutional users through surface buoys and sub-surface sensor guest ports located on an underwater hub. The observation network currently provides environmental data to state, federal, and university researchers, educators and resource managers.

*MI-1*

*Alpena*

### **National Ocean Service (NOS) - [Great Lakes Bay-Watershed Education Training Program](#)**

The NOAA Bay-Watershed Education and Training (B-WET) Program is an environmental education program that promotes locally relevant, experiential learning in the K-12 environment. The primary delivery of B-WET is through competitive funding that promotes Meaningful Watershed Educational Experiences (MWEEs). B-WET currently serves seven areas of the country: California, Chesapeake Bay, Great Lakes, Gulf of Mexico, Hawai'i, New England, and the Pacific Northwest. The Great Lakes B-WET program recognizes that knowledge and commitment built from firsthand



experience, especially in the context of one's community and culture, is essential for achieving environmental stewardship. Great Lakes B-WET responds to regional education and environmental priorities through local implementation of competitive grant funds. Please see regional funding opportunity for priorities and eligibility details.

**National Ocean Service (NOS) - [Thunder Bay National Marine Sanctuary](#)**

Thunder Bay National Marine Sanctuary in Lake Huron encompasses 4,300 square miles, protecting 99 known historic shipwrecks in Alpena, Alcona and Presque Isle counties, and five shipwrecks from Mackinaw and Cheboygan counties. Protection and management of the sanctuary is entirely focused on Thunder Bay's extraordinary collection of underwater cultural resources (primarily shipwrecks). Dubbed "Shipwreck Alley," historic research indicates that as many as 100 additional shipwrecks may be found in the treacherous waters around Thunder Bay. Intense weather patterns, islands and rocky shoals, and heavy vessel traffic and converging shipping lanes all contributed to the area's vast collection of shipwrecks. These submerged archaeological sites are nearly a complete collection of Great Lakes vessel types from small schooners and pioneer steamboats of the 1830s, to enormous industrial bulk carriers that supported the Midwest's heavy industries during the twentieth century.

Well preserved by Lake Huron's cold, fresh water, the sites are a haven for historians, archaeologists and the public. The sanctuary's waters are important to the local economy as a destination for snorkeling, diving, kayaking. Additionally, NOAA's 20,000 square foot Great Lake Marine Heritage Center brings nearly 100,000 visitors to the region annually. Through research, education and community involvement the sanctuary seeks to protect these unique and non-renewable historic sites for future generations.

**Office of Oceanic and Atmospheric Research (OAR) - [Science On a Sphere® at Great Lakes Maritime Heritage Center](#)**

Science On a Sphere (SOS) is a room-sized global display system that uses computers and video projectors to display planetary data onto a six foot diameter sphere, analogous to a giant animated globe. Researchers at NOAA developed Science On a Sphere® as an educational tool to help illustrate Earth System science to people of all ages. Animated images of atmospheric storms, climate change, and ocean temperature can be shown on the sphere which is used to explain complex environmental processes in a way that is simultaneously intuitive and captivating.

**Office of Oceanic and Atmospheric Research (OAR) - [Real-Time Meteorological Observation Network](#)**

The Marine Instrumentation Laboratory at the Great Lakes Environmental Research Laboratory (GLERL) has deployed and is maintaining a real-time network of meteorological instrument packages including Alpena, MI. The Alpena station measures/records wind speed, max wind speed, wind direction, and air temperature, and wind chill at 2-minute increments updated twice per hour. In addition there is a web cam with four views, images are updated six times per hour, six hour animation loops are of these images are also posted.

**[Catham](#)**

**National Environmental Satellite, Data, and Information Service (NESDIS) and Office of Oceanic and Atmospheric Research (OAR) - [U.S. Climate Reference Network](#)**

The U.S. Climate Reference Network (USCRN) is an operationally viable research network of 135 climate stations that are deployed nationwide. Data from the USCRN are used in various climate monitoring activities and for placing current climate anomalies into an historical perspective. The USCRN provides the United States with a reference network that contributes to an International network under the auspices of the Global Climate Observing System (GCOS).

## **Gaylord**

### **National Environmental Satellite, Data, and Information Service (NESDIS) and Office of Oceanic and Atmospheric Research (OAR) - [U.S. Climate Reference Network](#)**

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### **National Weather Service (NWS) - [Weather Forecast Office](#)**

Located near Gaylord, this NWS Weather Forecast Office (WFO) is staffed around-the-clock every day, and provides the best possible weather, water, and climate forecasts and warnings to residents of 25 counties in the northern section of Michigan's Lower Peninsula and two counties in the eastern Upper Peninsula, and provides marine forecasts and warnings for near-shore waters of Lake Huron, Lake Michigan and Lake Superior. Highly trained forecasters issue warnings and forecasts for events, including severe thunderstorms, tornadoes, winter storms, floods, and heat waves. This essential information is provided to the general public, media, emergency management and law enforcement officials, the aviation and marine communities, agricultural interests, businesses, and others. Information is disseminated in many ways, including through dedicated government channels, satellite, the Internet, and NOAA Weather Radio All Hazards.

Forecasters also provide Impact-based Decision-Support Services (IDSS), both remotely and on-site, during critical emergencies, such as wildfires, floods, chemical spills, and for major recovery efforts such as those following the Joplin and Moore tornadoes, Hurricanes Katrina and Sandy, and the Sept. 11, 2001, terrorist attacks in New York City and Washington D.C. The WFO collects and disseminates precipitation, river, and rainfall data, and prepares local climatological data. Each WFO has a Warning Coordination Meteorologist who actively conducts outreach and educational programs, which helps build strong working relationships with local partners in emergency management, government, the media and academic communities. The WFO operates Automated Surface Observing Stations (ASOS), as well as the local Doppler Weather Radar, which provides critical information about current weather conditions. The radar data enables forecasters to issue warnings for tornadoes, severe thunderstorms, and flash floods.

## **Marquette**

### **National Weather Service (NWS) - [Weather Forecast Office](#)**

Located in Negaunee Township, this NWS Weather Forecast Office (WFO) is staffed around-the-clock every day, and provides the best possible weather, water, and climate forecasts and warnings to residents of 13 counties in Michigan's Upper Peninsula, and provides marine forecasts and warnings for near-shore waters of Lake Michigan and Lake Superior, and for the open waters of Lake Superior. Highly trained forecasters issue warnings and forecasts for events, including severe thunderstorms, tornadoes, winter storms, floods, and heat waves. This essential information is provided to the general public, media, emergency management and law enforcement officials, the aviation and marine communities, agricultural interests, businesses, and others. Information is disseminated in many ways, including through dedicated government channels, satellite, the Internet, and NOAA Weather Radio All Hazards.

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#### ***Sault Ste. Marie***

##### **National Ocean Service (NOS) - [Soo Locks PORTS®](#)**

A Physical Oceanographic Real-Time System (PORTS®) is operated cooperatively with the U.S. Army Corps of Engineers and provides real-time data quality-controlled and disseminated to local users for safe and efficient navigation. Real-time data are available for water levels from seven stations and meteorological data from six locations.

#### ***Thunder Bay Island***

##### **Office of Oceanic and Atmospheric Research (OAR) - [Real-Time Meteorological Observation Network](#)**

The Marine Instrumentation Laboratory at the Great Lakes Environmental Research Laboratory (GLERL) has deployed and is maintaining a real-time network of meteorological instrument packages including Alpena, MI. The Alpena station measures/records wind speed, max wind speed, wind direction, and air temperature, and wind chill at 2-minute increments updated twice per hour. In addition there is a web cam with four views, images are updated six times per hour, six hour animation loops of these images are also posted.

#### ***Traverse City***

##### **National Ocean Service (NOS) – [Office for Coastal Management](#)**

The NOAA Office for Coastal Management practices a partner-based, boots on the ground approach to coastal management. The organization currently has staff in the eight regions who provide assistance to local, state, and regional coastal resource management efforts and facilitate customer feedback and assessments. Great Lakes regional staff are located in Chanhassen, MN and Traverse City, MI. In addition to providing NOAA products and services, these staff represent NOAA on multiple regional governance structures (e.g. Conference of Great Lakes and St. Lawrence Governors and Premiers; Upper Midwest and Great Lakes Landscape Conservation Cooperative; Great Lakes Restoration Initiative; and the Great Lakes Regional Collaboration) to improve the management of natural resources.

#### ***MI-1 through 10***

##### ***Great Lakes and tributary cities***

##### **National Ocean Service (NOS) - [Great Lakes Real-Time Currents Monitoring](#)**

The Center for Operational Oceanographic Products and Services (CO-OPS) collects, analyzes, and distributes observations and predictions of currents. The goals are to ensure safe, efficient and environmentally sound maritime commerce, and to support environmental needs such as HAZMAT response. The principal product generated by this program is information used to maintain and update the Tidal Current Tables. There is one real-time current meter operating in Michigan at the St. Clair River.

#### ***MI-2***

##### ***Muskegon***

##### **Office of Oceanic and Atmospheric Research (OAR) –[Lake Michigan Field Station](#)**

The NOAA Great Lakes Environmental Research Laboratory (GLERL) Lake Michigan Field Station (LMFS) is strategically located on the eastern shore of Lake Michigan in Muskegon, Michigan. The LMFS serves as the home base for field operations, research, and GLERL vessel operations - critical assets in providing physical access to the Great Lakes and advancing NOAA's mission in the region. Located on Lake Michigan's Muskegon Channel, GLERL's field station occupies three buildings. There are currently 12 employees at the facility, including research staff, vessel crew, a marine superintendent, and administrative personnel. Additionally, the proximity of the field station to Lake Michigan provides a unique opportunity for engagement with tourists, recreational users, and members of the community.



**Office of Oceanic and Atmospheric Research (OAR) – [Marine Instrumentation Laboratory](#)**

The Marine Instrumentation Laboratory at the Great Lakes Environmental Research Laboratory (GLERL) has deployed and is maintaining a real-time network of shore-based meteorological instrument packages including locations on Lake Michigan. The meteorological observations obtained from the network are being used in GLERL's Great Lakes Coastal Forecasting System to improve nowcasts and forecasts of wind, waves, water levels, ice cover and circulation. The South Haven station measures wind speed, max wind speed, wind direction, air temperature, dew point, relative humidity, station pressure, sea level pressure, and PAR at 2-minute increments. Additionally there are two South Haven web cam views, images are updated six times per hour.

**Office of Oceanic and Atmospheric Research (OAR), National Marine Fisheries Service (NMFS), National Ocean Service (NOS) - [Habitat Focus Area](#)**

As part of the Habitat Blueprint administered by the NOAA Fisheries Office of Habitat Conservation, NOAA has selected ten Habitat Focus Areas (HFAs), place-based locations across the country to maximize the effectiveness of habitat conservation. While each HFA focuses on individual habitat conservation goals outlined in their Implementation Plan, the overarching goal is to demonstrate results in a focused area in a short time period. Muskegon Lake has been selected as a Habitat Focus Area. The Muskegon Lake watershed has been a center for industrial activity since the late 1800s. To address the impact of this industrial legacy, the Muskegon Lake Habitat Focus Area team has identified a number of objectives they will target over the next five years including addressing loss of fish and wildlife habitat within Muskegon and Bear lakes, rebuilding sport fisheries and populations of aquatic organisms to sustainable levels, and increasing coastal tourism, access and recreation opportunities.

***MI-3***

***Grand Rapids***

**National Weather Service - [Weather Forecast Office](#)**

Located at the Kent County International Airport in Grand Rapids, this NWS Weather Forecast Office (WFO) is staffed around-the-clock and provides the best possible weather, water, and climate forecasts and warnings to residents of 23 counties in western Michigan and provides marine forecasts and warnings for near-shore waters of Lake Michigan. Forecasters issue warnings for events including severe thunderstorms, tornadoes, winter storms, floods, and heat waves. This essential information is provided to the general public, media, emergency management and law enforcement officials, the aviation and marine communities, agricultural interests, businesses, and others. Information is disseminated in many ways, including through dedicated government channels, satellite, the Internet, and NOAA Weather Radio All Hazards.

Forecasters also provide Impact-based Decision-Support Services (IDSS), both remotely and on-site, during critical emergencies, such as wildfires, floods, chemical spills, and for major recovery efforts such as those following the Joplin and Moore tornadoes, Hurricanes Katrina and Sandy, and the Sept. 11, 2001, terrorist attacks in New York City and Washington D.C. The WFO collects and disseminates precipitation, river, and rainfall data, and prepares local climatological data. Each WFO has a Warning Coordination Meteorologist who actively conducts outreach and educational programs, which helps build strong working relationships with local partners in emergency management, government, the media and academic communities. The WFO operates Automated Surface Observing Stations (ASOS), as well as the local Doppler Weather Radar, which provides critical information about current weather conditions. The radar data enables forecasters to issue warnings for tornadoes, severe thunderstorms, and flash floods.

## **MI-6**

### **Kalamazoo**

#### **Office of Oceanic and Atmospheric Research (OAR) – [Science On a Sphere® at Kalamazoo Valley Museum](#)**

Science On a Sphere (SOS) is a room-sized global display system that uses computers and video projectors to display planetary data onto a six-foot diameter sphere, analogous to a giant animated globe. Researchers at NOAA developed Science On a Sphere® as an educational tool to help illustrate Earth System science to people of all ages. Animated images of atmospheric storms, climate change, and ocean temperature can be shown on the sphere, which is used to explain what are sometimes complex environmental processes, in a way that is simultaneously intuitive and captivating.

#### **NOAA Office of Education - [Environmental Literacy Program](#)**

NOAA's Environmental Literacy Program (ELP), administered by the Office of Education, provides grants and in-kind support to build the capacity of institutions and networks to advance NOAA's mission through formal (K-12) and informal education at national, regional, and local levels. In Michigan, ELP supports the Detroit Zoological Society (Royal Oak), Great Lakes Maritime Heritage Center (Alpena), Kalamazoo Valley Museum, which have permanent exhibits featuring NOAA's Science On a Sphere and are members of NOAA's SOS Users Collaborative Network. The SOS Network has more than 100 institutions worldwide, reaching over 60 million people, and shares best practices in using the sphere to bring the latest global forecasts and models to the public. ELP supports the Great Lakes Bowl in Michigan, one of 25 regional competitions of the National Ocean Sciences Bowl (NOSB). The NOSB is an academic competition that engages high school students in learning about ocean sciences and related STEM careers while helping them become knowledgeable citizens and environmental stewards. ELP also supports the AMS DataStreme courses for K-12 educators through a grant and in-kind support. Local implementation teams in the state offer DataStreme courses that use weather, climate, and the ocean as contexts for teaching science and improving understanding about the Earth system.

## **MI- 8**

### **Lansing**

#### **National Ocean Service (NOS) – [Regional Geodetic Advisor](#)**

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## **MI-9**

### **Royal Oak**

#### **Office of Oceanic and Atmospheric Research (OAR) - [Science On a Sphere® at the Detroit Zoo](#)**

Science On a Sphere (SOS) is a room-sized global display system that uses computers and video projectors to display planetary data onto a six foot diameter sphere, analogous to a giant animated globe. Researchers at NOAA developed Science On a Sphere® as an educational tool to help illustrate Earth System science to people of all ages. Animated images of atmospheric storms, climate change, and ocean temperature can be shown on the sphere which is used to explain complex environmental processes in a way that is simultaneously intuitive and captivating.

## **NOAA Office of Education - [Environmental Literacy Program](#)**

NOAA's Environmental Literacy Program (ELP), administered by the Office of Education, provides grants and in-kind support to build the capacity of institutions and networks to advance NOAA's mission through formal (K-12) and informal education at national, regional, and local levels. In Michigan, ELP supports the Detroit Zoological Society (Royal Oak), Great Lakes Maritime Heritage Center (Alpena), Kalamazoo Valley Museum, which have permanent exhibits featuring NOAA's Science On a Sphere and are members of NOAA's SOS Users Collaborative Network. The SOS Network has more than 100 institutions worldwide, reaching over 60 million people, and shares best practices in using the sphere to bring the latest global forecasts and models to the public. ELP supports the Great Lakes Bowl in Michigan, one of 25 regional competitions of the National Ocean Sciences Bowl (NOSB). The NOSB is an academic competition that engages high school students in learning about ocean sciences and related STEM careers while helping them become knowledgeable citizens and environmental stewards. ELP also supports the AMS DataStreme courses for K-12 educators through a grant and in-kind support. Local implementation teams in the state offer DataStreme courses that use weather, climate, and the ocean as contexts for teaching science and improving understanding about the Earth system.

### ***MI-11***

#### ***White Lake/Metro Detroit***

### **National Weather Service (NWS) - [Weather Forecast Office](#)**

Located in White Lake Township, this NWS Weather Service Office (WFO) is staffed around-the-clock every day, and provides the best possible weather, water, and climate forecasts and warnings to residents of southeast Michigan and provides marine forecasts and warnings for near-shore and open waters of Lake Huron. Highly trained forecasters issue warnings and forecasts for events, including severe thunderstorms, tornadoes, winter storms, floods, and heat waves. This essential information is provided to the general public, media, emergency management and law enforcement officials, the aviation and marine communities, agricultural interests, businesses, and others. Information is disseminated in many ways, including through dedicated government channels, satellite, the Internet, and NOAA Weather Radio All Hazards.

Forecasters also provide Impact-based Decision-Support Services (IDSS), both remotely and on-site, during critical emergencies, such as wildfires, floods, chemical spills, and for major recovery efforts such as those following the Joplin and Moore tornadoes, Hurricanes Katrina and Sandy, and the Sept. 11, 2001, terrorist attacks in New York City and Washington D.C. The WFO collects and disseminates precipitation, river, and rainfall data, and prepares local climatological data. The WFO operates Automated Surface Observing Stations (ASOS), as well as the local Doppler Weather Radar, which provides critical information about current weather conditions. The radar data enables forecasters to issue warnings for tornadoes, severe thunderstorms, and flash floods.

### ***MI-12***

#### ***Ann Arbor***

### **Office of Oceanic and Atmospheric Research (OAR) – Great Lakes [Regional Integrated Sciences and Assessments](#)**

The Great Lakes Regional Integrated Sciences and Assessments Center (GLISA) was established as a cooperative agreement between NOAA's Climate Program Office and University of Michigan and Michigan State University. GLISA integrates information from a wide array of scientific fields, develops collaborations between entities with similar goals, and helps inform decision makers throughout the region with sound science. GLISA offers a unique approach to building climate literacy, long-term sustainability, and facilitating smart decision-making across the eight Great Lakes states (Minnesota, Wisconsin, Illinois, Indiana, Ohio, Michigan, New York, and Pennsylvania) and the province of Ontario.

GLISA focuses on three critical sectors in the Great Lakes region—agriculture, watershed management, and natural resources-based recreation and tourism—which are interconnected through issues of water quality and quantity. The two overarching goals of GLISA are to contribute to the long-term sustainability of the region in the face of a changing climate and to improve the utility of scientific knowledge in decision making. Cooperating institutions are University of Michigan, Michigan State University, and The Ohio State University with funding from NOAA's Regional Integrated Sciences and Assessments (RISA) Program.

**Office of Oceanic and Atmospheric Research (OAR) - [Cooperative Institute for Great Lakes Research](#)**

Established in 2007, Cooperative Institute for Great Lakes Research (CIGLR) (formerly the Cooperative Institute for Limnology and Ecosystems Research) conducts collaborative research through a ten-member consortium of academic institutions in the Great Lakes region. CIGLR's primary NOAA research partner is the Great Lakes Environmental Research Laboratory; CIGLR also collaborates with NOAA's Office of Oceanic and Atmospheric Research, National Ocean Service, National Weather Service, and National Environment Satellite, Data, and Information Service. CIGLR is administratively housed at the University of Michigan, and is comprised of Grand Valley State University, Michigan State University, Ohio State University, Penn State University, State University of New York-Stony Brook, University of Illinois of Urbana-Champaign, University of Michigan, University of Minnesota, University of Toledo, and University of Wisconsin. CIGLR conducts research across six scientific themes: (1) Great Lakes forecasting; (2) invasive species; (3) observing systems; (4) protection and restoration of resources; (5) integrated assessment; and (6) education and outreach.

**Office of Oceanic and Atmospheric Research (OAR) - [Great Lakes Coastal Forecast System](#)**

The Great Lakes Coastal Forecasting System is useful to all users of the Great Lakes coastal waters who require real-time information and forecasts of air and water temperatures, currents, water levels, ice cover, cloud cover, simulated river particular tracks, and waves. Physical processes have a major impact on environmental, chemical, and biological processes and influence many other types of user activities, such as water supply management, waste water management, power plant sitings, shipping, recreational and commercial boating and fishing, shoreline erosion and redistribution of sedimentary material. Planners and managers responsible for any part of the Great Lakes ecosystem that is affected by lake circulation, such as transport of toxic material or nutrient enrichment processes have full access to the information provided by Great Lakes Coastal Forecast System (GLCFS web site) to assist them in the decision making process.

**Office of Oceanic and Atmospheric Research (OAR) - [Great Lakes Environmental Research Laboratory](#)**

The Great Lakes Environmental Research Laboratory (GLERL) is a scientific research facility based in Ann Arbor, Michigan, operating as part of the National Oceanic and Atmospheric Administration (NOAA) Office of Oceanic and Atmospheric Research (OAR). GLERL's Ann Arbor facility houses experimental and marine instrumentation laboratories furnished with state-of-the-art equipment and technology to support GLERL's scientific research. GLERL's research capacity is further strengthened by its in-house partnership with NOAA's Great Lakes Cooperative Institute, comprised of a consortium of academic institutions in the region. In addition, NOAA's Great Lakes Sea Grant Network serves as a vital in-house partnership that functions to connect NOAA research to the communication and outreach capabilities of NOAA Sea Grant.

**Office of Oceanic and Atmospheric Research (OAR) - [CoastWatch](#)**

The NOAA CoastWatch Great Lakes regional node obtains, produces, and delivers environmental data and products for near real-time observation of the Great Lakes to support environmental science, decision making, and supporting research. This is achieved by providing Internet access to near real-time and retrospective satellite data and products, as well as in-situ Great Lakes data. The CoastWatch node at Great Lakes Environmental Research Laboratory provides clients including Federal, state, and local agencies, academic institutions, commercial/industries, and the public, both within and outside of the Great Lakes region, with access to near real-time satellite observations and in-situ data for the

Great Lakes. CoastWatch data are used in a variety of ways, including near real-time observation and tracking of algal blooms, plumes, ice cover, wind speed/direction, surface water intake temperatures at fish hatcheries, two and three dimensional modeling of Great Lakes physical parameters, such as wave height and currents, damage assessment modeling, research, and educational and recreational activities. In addition, through a cooperative project with Michigan Sea Grant, Great Lakes CoastWatch satellite-derived surface water temperature imagery is contoured and made available via Michigan State Sea Grant's web site. Great Lakes CoastWatch data and products benefit riparians as well as research, operational, and recreational users.

**MI-15**

**Ann Arbor**

**National Ocean Service (NOS) - [Centers of Excellence](#)**

The Center of Excellence for Great Lakes and Human Health (CEGLHH) focuses on understanding the inter-relationships between the Great Lakes ecosystem, water quality and human health. The Center employs a multidisciplinary approach to understand and forecast coastal-related human health impacts for natural resource and public policy decision-making, and develop tools to reduce human health risks associated with three research priority areas: beach closures, harmful algal blooms, and drinking water quality.

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## **NOAA In Your State**

# **Michigan**

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