

Ecosystem Services in Ottawa's Biosphere Region

The services and products provided by natural landscapes are also known as **ecosystem services**. There are four types of ecosystem services: provisioning, regulating, cultural, and supporting. **Provisioning** services describe the products provided to us by nature, like food, water, and resources. **Regulating** services describe the services provided to humans by natural processes and functioning of ecosystems. **Cultural** services describe the non material benefits that people get from nature, like spiritual and intellectual enrichment, recreation, and aesthetic values. The last type of ecosystem service are **supporting** services, which describe the benefits we derive from natural cycles in nature like photosynthesis, water cycle, and other nutrient cycles [1].



Forests

The great state of Michigan boasts many kinds of forests, like deciduous forests and evergreen forests. Despite the fact that different forest ecosystems are made up of different species, they serve similar functions for humanity. Forests provide **provisioning** services through wood for building and development, charcoal for fuel, and food from the plants and animals that grow in the forest. Forests provide **regulating** services through water and air purification, preventing water runoff, and aiding in heat island reduction. Many people take advantage of the **cultural** services of the forest through hiking and mountain biking. Being in nature is also shown to have mental health benefits and improve happiness and wellbeing. The forest provides **supporting** services like carbon storage through photosynthesis, and nutrient cycling. There are currently more than 20 million acres of forest and much of it is in good shape. However, major threats to Michigan forest include invasive species and pests [2].

Wetlands

Another major habitat type featured in Michigan are woody and herbaceous wetlands. As with forests, different wetland types have different species, but they serve the same purposes for humans. For **provisioning** services, wetlands provide food in the form of ducks that are popular for hunting and they serve as prime fishing locations. Wetlands provide **regulating** services in the form of powerful water filtration, erosion control, and storing floodwaters. Wetlands provide **cultural** services through the many beautiful birds that are enjoyed by bird watchers every season. Wetlands are an immense source of inspiration for many artists and writers, the everglades were written about wetlands. The **supporting** services of wetlands are carbon storage, maintaining surface water flow during dry periods, and capturing nutrients from

runoff. Wetlands are also important as they serve as important habitat for many species of wildlife, at least one third of all threatened and endangered species spend a portion of their lives in wetlands [3].



The approximately 6.5 million acres of wetland in Michigan are home to thousands of species, however pre-European settlement, Michigan had more than 10 million acres of wetland [4]. Currently, Michigan wetlands are *threatened* by invasive cattails that form monoculture stands in previously complex habitats. Cattail stands also make it difficult for native and culturally important manoomin/ wild rice seeds to develop.

Beaches and Dunes

Dunes are one of the most unique and iconic ecosystems that we have in Michigan. Aside from the allure of the existence of these mounds of sand formed by winds and dune grass. These Michigan ecosystems also provide **provisioning** services in the form of birds and fish that feed people. Dunes provide **regulating** services by being a protective barrier from flooding and erosion and as defense from surge and waves during storms [5]. They also provide important habitats for plants and animals, including critical nesting areas for great lakes piping plovers. Dunes provide **cultural**

services through the thousands of people who visit them each year, including landmarks like the Sleeping Bear dunes along the coast of Lake Michigan .They are also important cultural sites to many Native American communities. Dunes have also inspired literature, most famously the now adapted to film series Dune by Frank Herbert that describes a planet covered in dune formations. Lastly, Dunes provide **supporting** services through sediment stabilization and nutrient cycling. Dunes are also important for the study of our Earth's climate, as the many layers of dunes contain information about past climate conditions.



It is no surprise that Michigan has more beaches than Dunes, with our Great Lakes and others creating 3228 miles of coastline for people and wildlife to enjoy. Beaches provide many of the same ecosystem services as Dunes over a greater area. However, Michigan beaches are subject to erosion and rising lake levels that deteriorate the ability of beaches to provide their baseline services. Dune ecosystems are an iconic part of the Michigan landscape, yet despite, and because of human enjoyment, they are threatened. Human activities, such as construction and off-road vehicle use, can

severely damage dune ecosystems. Stabilization using vegetation or artificial structures is essential in preventing coastal erosion [6].

Conclusion

The ecosystems of Michigan are so much more valuable than we can appreciate. Aside from their obvious beauty and the enjoyment we get from a trip to the lake or a hike in the woods, forests, dunes, beaches and wetlands provide *priceless services* to the 10.5 million people that live in this great state. It would cost *millions of dollars* or more to replace these services if these ecosystems were to lose the ability to purify our air or filter our water. This is why we must make the importance of our ecosystem a priority. Every individual can make a difference in protecting these ecosystems by using their voices in open comments hosted by city governments and municipalities. Ask your representatives what they are doing to protect these ecosystems. Volunteer for non-profits and other environmental organizations that are working to protect and restore these landscapes. Finally, individuals that own land on which these ecosystems exist have a *responsibility* to themselves and future generations to maintain the function of the ecosystem by restricting development, or consulting environmental authorities before potentially harming them.

References

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3. <https://www.nps.gov/subjects/wetlands/why.htm>
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5. [Understanding Processes Driving Sand Dune Erosion and Creation on an Atlantic Seashore – NCCOS Coastal Science Website \(noaa.gov\)](#)
6. [Shoreline Mileage of the U.S. \(noaa.gov\)](#)