



Children learn about the connection between horseshoe crabs and shorebirds at the Delaware Bay WHSRN Site. Photo: John King

Lesson Five: Understanding why Nature Matters

FOR YOUNGER STUDENTS:

Habitat: Valuable to People and Shorebirds

Wetlands are important habitats to people. They are a source of water for power, crop irrigation, transportation, drinking water, and recreation. More and more people are finding wetlands attractive home sites. Highway bridges span them, sewer plants are built near them, and ports are developed on them. Grasslands provide people with space and rich soil for farmers to raise cattle, horses, and crops like corn, soybeans, and sunflowers. They are also important places for people to enjoy nature, observe wildlife, hunt, or fish.

As these vital habitats shrink, shorebirds and countless other animals and plants lose the habitats they rely on. People will lose the benefits of clean water, flood control, fishing areas, and beauty that wetlands provide. We lose the rich soil, vast space, and diversity of life in grasslands. Is it possible that people and shorebirds can survive, possibly even thrive, together using these habitats? Yes, if we are dedicated to good land stewardship. The more we learn about these ecosystems and the intricate interactions among all the organisms living there, the better our chances of making good resource management decisions in the future!

FOR OLDER STUDENTS:

What is an ecosystem?

An ecosystem is a community of animals and plants interacting with one another and with their physical environment. Ecosystems include physical and chemical components, such as soils, water, and nutrients that support the organisms living within them. These organisms may range from large animals and plants to microscopic bacteria. Ecosystems include the interactions among all organisms in a given habitat. People are part of ecosystems. The health and wellbeing of human populations depends upon the services provided by ecosystems and their components - organisms, soil, water, and nutrients.

To try to understand the concept of ecosystem services, we need to put it in a context where a "system" can be described at different levels. A cell is one level, an organism is another. Organisms build up ecosystems that in turn create a biosphere consisting of a variety of ecosystems that interact with each other and exchange services. In each level, processes are developed that combine forces to create a working system at that particular level. All systems strive to evolve and stay alive. Each level also contributes so that the entire system in turn is a part and can develop. Everything is connected.

Healthy Ecosystems Benefit Human Well-being

Ecosystem services are the natural benefits that people derive from intact ecosystems. They are broken into four categories: Provisioning services are the products we obtain directly from the natural world. Regulating services are the natural services that allow nature to resist or fix temporary problems and also protect humans from some difficulties. Cultural services are the non-material benefits that make humans happy and give meaning to life. Supporting services are the fundamental processes to maintain basic ecological functions – all other ecosystem services rely on these supporting services.

Ecosystems provide "services" that:

- moderate weather extremes and their impacts
- disperse seeds
- mitigate drought and floods
- cycle and move nutrients
- protect stream and river channels and coastal shores from erosion
- detoxify and decompose wastes
- control agricultural pests
- maintain biodiversity
- generate and preserve soils and renew their fertility
- contribute to climate stability
- purify the air and water
- regulate disease carrying organisms
- pollinate crops and natural vegetation



Why should we care about ecosystem services?

In our daily lives we use a variety of goods, services and experiences that nature offers us, and that we take for granted. Lots of living organisms' and their interactions provide us with an amazing and complex machinery of food, water, clean air, energy, clothing, housing and medicine, as well as cultural and aesthetic experiences. Everything that is vital for people to live.

Much of these vital factors are invisible to our eyes, and therefore relatively unknown and poorly appreciated, even though we are completely dependent on their existence and functioning. Biodiversity and the services that ecosystems provide are too poorly

protected in our society's physical and economic planning. If people are unaware of these benefits, they are unlikely to care about protecting them.

Threats to ecosystem services

Various human activities threaten and affect ecosystems in many ways. A few examples of these are:

- Development can cause landscape and ecosystem changes.
- Excessive resource extraction due to poverty or short-term gain, such as overfishing or logging, can upset the balance of an ecosystem.
- Pollution, both wastes and toxins in general, make it harder for organisms to survive.
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- Invasion of non-native species due to human transfer between ecosystems can crowd out native species access to resources.
- Climate change stresses many ecosystems and makes them less effective.

Putting value on nature

Ecosystems and the services they provide have existed long before humans, but due to the over-exploitation of resources for human consumption, these ecosystem services are at risk. Unless we begin valuing ecosystems in a more conscious way, the benefits provided by ecosystem services will decline until they are no longer available. In order to continue benefiting from these services, humans must find ways to support the organisms living in these ecosystems and the relationships they have with their environment.

Because ecosystem services are considered public goods for which economists find it difficult to set realistic values, they are undervalued in decision-making processes. In modern society, ecosystems are often managed for the sole purpose of maximizing the benefits that can be sold in a market, such as food or timber. This has led to important ecosystem services being reduced or entire ecosystems being lost. Economic systems depend on social and ecological systems, and nature's full value is not easy to quantify.

The purpose of the valuation of ecosystem services is not to put price tags on nature so that someone can make money from them, it is so we can better understand how dependent we are on nature's complex functions and processes, and how expensive and difficult it would be to replace them. We can make better decisions about how we plan our societies and our lives, embracing wiser economic priorities.

Many people believe that natural resources are free, but this is not the case! With increased understand of ecosystem services such as air purification and pollination, decision-makers and landowners are able to incorporate these ecosystem services in management decisions, ensuring that all benefits are valued.

Additional Resources:

Ecosystem Services at WHSRN

<https://whsrn.org/site-support/ecosystem-services/>

Food and Agriculture Organization at the United States

<https://bit.ly/faoprovisioning>

Harte Research Institute

<https://www.youtube.com/watch?v=EgzfsKHfAtw>

Environmental Protection Agency:

<https://www.epa.gov/eco-research/ecosystem-services>

Human Welfare and Shorebird Conservation

<https://bit.ly/humansandshorebirds>

Shorebirds in working landscapes

<https://bit.ly/workinglandscapes>

Example of restoration in Nova Scotia, Canada

<https://www.transcoastaladaptations.com/onslow-north-river>

