CHESAPEAKE AND COASTAL SERVICE

# MARYLAND'S RETURN ON ENVIRONMENT



## Summary

Maryland's diverse ecosystems provide many benefits to the people that reside there. Forests clean air, wetlands clean water and the Bay provides fish and recreational opportunities. An **ecosystem service** is a term that can describe any benefit that people receive from the environment. Ecosystem services are commonly divided into four categories: provisioning services (timber, firewood, food), regulating services (water purification, wildlife habitat), cultural services (recreation, spiritual benefits) and supporting services (nutrient cycling, soil formation). For some of these benefits, like fish, timber and recreation, an economic market exists to set a dollar value.

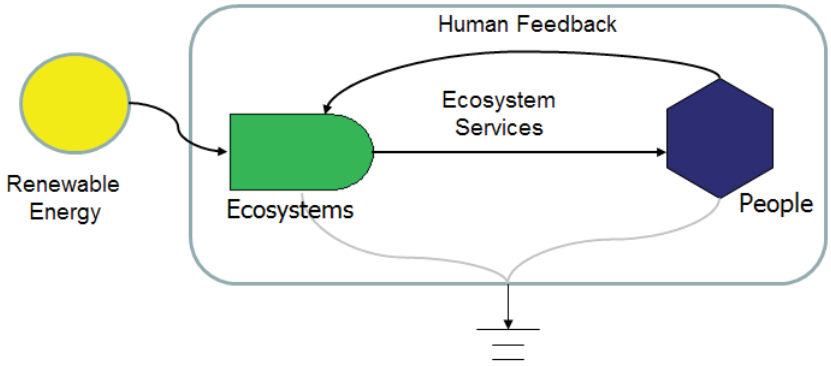




*Diagram of the ecosystem service concept. People (represented by the hexagon) benefit from the work of ecosystems (green symbol, reliant on renewable energy, e.g. the sun and rain, being represented by the yellow circle) and their actions affect the ability of an ecosystem to provide ecosystem services in a positive or negative way. The heat sink represents the loss of energy which occurs in any interaction, as dictated by the second law of thermodynamics.*

However, many of the benefits from our natural environments are not accounted for at all in the economy, and are treated as a free benefit for society (termed a positive market externality in economic terms). As human impacts on the environment increase we run the danger of degrading our vital environmental support system, fundamental to human wellbeing. The phenomenon of overexploitation of a common resource is often termed the "tragedy of the commons". Communities begin experiencing this in a variety of ways, such as poor air quality, polluted water, flood damage, or decline in wildlife diversity.

## By the Numbers

***Return on Environment***

**$11.4 billion**

In total, the ecosystems of Maryland are estimated to provide $11.4 billion in benefits to the people of Maryland every year.

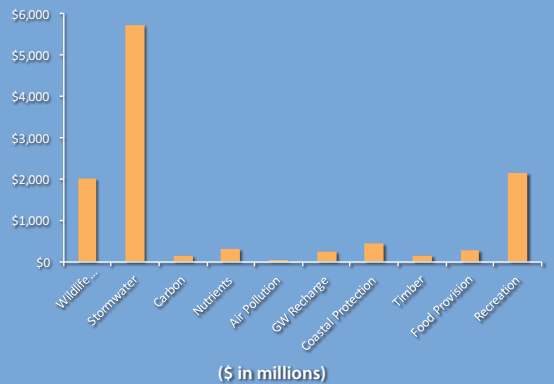
**$6 billion**

Of the individual ecosystem services stormwater mitigation/ flood protection is the largest service, providing nearly $6 billion worth of benefits per year.

**$2 billion**

Recreation and wildlife protection are also very important, providing ~ $2 billion per year of benefits.

***Yearly Value of Individual Ecosystem Services (in millions)***



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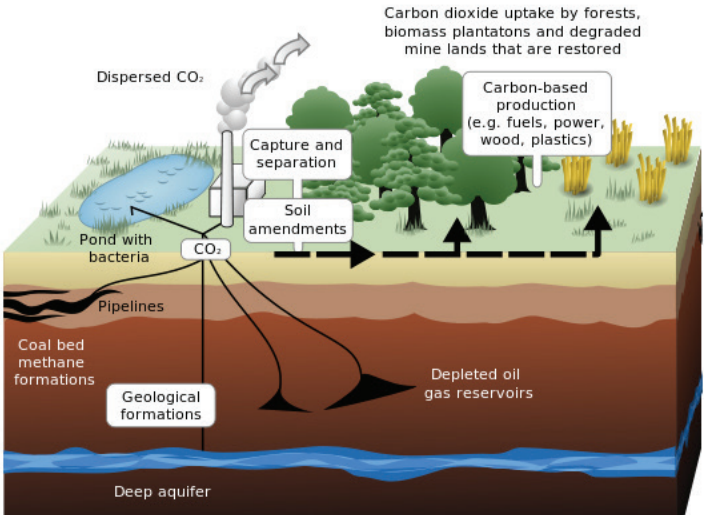
## Why Value Ecosystem Services?

Since nature provides many of these services for free, decision making often neglects the impacts on ecosystem services and consequences for our communities. Determining economic value of our environmental assets helps us to be better decision makers and calculate the **return on environment** of our investments. Ecosystem service valuation does not replace the conservation values held by many people, including the intrinsic value of a species, spiritual health, and natural beauty. It is a piece of the decision making process, to be weighed along with the ethical rationale for conserving and restoring natural lands and the potential economic benefits of other land-uses.

## How to Value Ecosystem Services

Our approach seeks to understand the links between our natural environments and economy in a holistic way; revealing the connections between ecosystems and people by looking at how people are paying for to preserve, replace, or recover benefits provided by the environment. We measure the condition of our ecosystems and how the condition affects people. For example, carbon is taken from the atmosphere by forests and wetlands through plant growth and building of soils at different rates, with hardwood forests sequestering more carbon than softwoods. We put a value on the service by looking at where people have paid for, paid to preserve, or paid to replace the service. Sticking with the example of carbon; Maryland participates in the Regional Greenhouse Gas Inventory (RGGI) where carbon is traded in a market, the EPA calculates the social cost of carbon (an estimate of the economic cost of climate change impacts per ton of carbon emissions), and it costs a certain amount to implement carbon reducing technologies at power plants. Averaged together, these multiple examples of valuing carbon indicate the **social preference** for reducing carbon emissions.




## Make Better Decisions

- Calculate the Return on Environment (ROE) for conservation or restoration investments, regulatory actions, or mitigation requirements.
- Guide zoning and land-use decision making at the state or local level.
- Assist in prioritization of land acquisition or grant awards.
- Compare green and grey infrastructure alternatives.
- Incorporating ecosystem service values in a business sustainability plan or other "triple bottom line" (social, economic, and environmental) accounting practices.

Maryland is a special place, from its mountains to its farms, the Bay and our ocean coast. This diversity is a foundation for a strong economy and maintaining the high quality of life we enjoy. Economic benefits of the services provided by the ecosystem is natural capital. Understanding this provides elected officials, policy makers, and the public with a perspective on our forests and wetlands that contributes to informed decision making.

## Spotlight: Wetland Restoration through the Chesapeake and Coastal Bays Trust Fund

Since its creation in 2009, the Chesapeake and Coastal Bays Trust Fund has provided over $295 million of state assistance to restoration projects in Maryland, with the goal of reducing nutrient pollution and improving water quality.

One of the approved practices for reducing nutrient pollution is wetland restoration. Our analysis of ecosystem services indicates that the average freshwater wetland in Maryland will provide nearly $4,000 of benefits every year, with a natural capital value of over $63,000.

*The Maryland Conservation Corps restoring a stream in Western Maryland.*

Since 2010, 454 acres of wetland restoration have been sponsored through the Trust Fund, at an average cost of $27,600 per acre. Based on these results, the public receives $2.3 of natural capital benefit for every $1 invested by the Trust Fund in wetland restoration. Another way to look at it is that the initial investment is "paid back", in terms of ecosystem services provided, in seven years.

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