

Ecosystem Services: Making Benefits More Tangible



Photo by Will Parson, Chesapeake Bay Program.

Defining Ecosystem Services

Ecosystem services is a term used to describe human benefits derived from ecosystems. At Department of Defense (DoD) installations, best management practices (BMPs) are most often implemented to reduce peak storm runoff and improve water quality. Yet, when BMPs mimic natural ecosystems, they may also provide an additive effect through beneficial ecosystem services. In these cases, the BMP provides multiple benefits.

Several Goals and Outcomes recognized in the 2014 Chesapeake Bay Watershed Agreement (Bay Agreement), such as the Stream Health Outcome, also represent ecosystem services provided by BMPs. For example, a restored stream will reduce the flow rate in the stream, prevent erosion of the stream bed and bank, and create new or improved habitat for plants and wildlife, which may then lead to increased removal of pollutants. In turn, the restored stream provides ecosystem services, which deliver multiple benefits that are also aligned with the Bay Agreement, including Abundant Life and Clean Water. In other cases, benefits may also translate to financial gain like revenue collected from access to recreation or natural areas. Other economic benefits do not necessarily have a defined monetary value, such as long-term property protection and risk avoidance provided by shoreline management.

Economic benefits can also be tied to human health issues. The figure below illustrates the translation from a BMP (change in urban tree cover) to the result of an ecosystem service (reduction in air temperature) to a benefit (reduced heat-related illness), which can then be assigned a monetary value. A similar approach can be applied for many bonus benefits of ecosystem services provided by BMPs. In some cases, benefits may be derived from non-uses, such as the satisfaction of protecting species and ecosystems that enhance social well-being.

In December 2017, the Science and Technology Advisory Committee (STAC) released the recommendations from a workshop to identify the ecosystem services of greatest value in the Chesapeake Bay and discuss existing methods and future efforts to quantify their benefits. For DoD installations, understanding the benefits from ecosystem services can initiate discussion on the integration of these services into decision-making processes to select BMPs that meet not only meet regulatory and policy objectives, but other mission readiness requirements.¹



Ecosystem services can lead to beneficial outcomes like reduction in air temperature and heat-related illnesses.

Quantifying and Valuing Benefits from Ecosystem Services

As described above, the benefits of environmental restoration initiatives can be measured by establishing clear between cause and effect. After the action, the outcome of the resulting ecosystem services can be identified. Then, the outcome can be measured in terms of a benefit indicator. From the example above, the change in ambient air temperature due to increased tree cover can be measured and combined with epidemiological literature to estimate the resulting health effects. Additionally, from this data, a value could be determined based on those health benefits (i.e. lower health care costs, long term care).



Environmental restoration benefits can be measured by establishing clear links.



