

WHAT WE GAIN FROM NATURAL SYSTEMS AND HOW TO ASSIGN VALUE TO THOSE BENEFITS

What land should be set aside for open space and habitat—and why? What level of public funding should be applied to efforts to protect water resources? If we can't preserve all the areas of significance, then what should be the priorities we follow in making those determinations?

Economists have developed techniques to estimate monetary values of unpriced goods, and they have applied these methods to estimate values for the services provided by natural resources. Before we can start attaching price tags, it's a good idea to explore just what we mean by "goods and services," in this particular context.

GOODS AND SERVICES

Every type of natural community performs a complex array of biological functions that serve to sustain that particular ecosystem. Through nature's cycles of renewal, growth, and decay, natural resources also provide society with a whole slate of goods and services that not only help to make life here on earth possible, but make it better, cleaner, more productive, and more enjoyable. The term "green infrastructure" has frequently been applied to natural resources. It's an apt label, since it conveys the message that the vital functions performed by these natural systems are worthy of serious public planning and investment. A closer look reveals an amazing variety of benefits provided by these habitat types.

WATER QUALITY/QUANTITY

Wetland plants and tree root networks effectively filter pollutants, preventing contaminants from entering waterways. By slowing runoff, they increase the time available for absorption and help to ensure that groundwater supplies are continually being replenished.

There are intricate connections between wetlands, streams, and groundwater which affect water supply. Wetlands store and slowly release water into streams and groundwater, where it later resurfaces at springs. Groundwater can contribute to surface flow in streams and rivers—and surface waters can also recharge groundwater. The quality and amount of water from both these sources can be affected when these connections are disrupted. Since the entire public water supply comes from these two sources, this issue impacts us all.

Small streams and wetlands trap excess sediment, which is the single greatest contributor to poor water quality. The amount of sediment washing into streams and rivers is impacted significantly by vegetative cover. Urbanization creates a proliferation of impervious surfaces (rooftops, paved roads, parking lots, etc.) that reduce the amount of rainfall and absorbs into the ground. This stormwater runoff flows quickly over the land, picking up sediment along the way and depositing it into streams. Excess sediment washed downstream results in increased water filtration costs. Preserving forests, riparian buffers and other vegetative cover dramatically reduces sedimentation, saves money and protects water quality.

AIR QUALITY

With increasing attention to urban air quality problems, the air-cleaning properties of forests cannot be overlooked. A wide greenbelt along a busy highway can help read just the air balance along that transportation corridor. Vegetation controls air pollution by introducing excess oxygen into oxygen-deficient air. It removes carbon dioxide, which is produced from burning fossil fuels and is closely associated with trapping heat in the atmosphere; this affecting global climate change. Trees clean the air by absorbing pollutants directly into their leaves and assimilating them. Vegetation can absorb ozone, sulfur dioxide, carbon monoxide and airborne particles of heavy metals.

FLOOD CONTROL

The importance of wetlands with regard to flood damage reduction can hardly be over-estimated. According to the non-profit conservation organization American Rivers, **"a single wetland acre saturated to a depth of one foot retains 333,000 gallons of water—enough to flood thirteen average-sized homes thigh-deep."**

When floods pass through forested lands, trees and other forms of vegetation resist the flow and dissipate the energy of the water, minimizing damage to riverbanks and mitigating the effects of downstream flooding.

Forests act as sponges, soaking up and storing water when it is abundant and then releasing it through the leaves of trees during dry periods. This serves to even out annual flows from forested watersheds and reduce the impact of downstream flood and drought cycles.

When deforestation occurs, the volume of stormwater runoff increases to the extent that natural streams are altered. Banks are washed away by more frequent and larger floods. Floodwaters coursing through a stream channel can change the channel itself, thus exacerbating the situation. By contrast, small streams and wetlands in their natural state can absorb significant amounts of rainfall, runoff, and snowmelt before flooding.

WILDLIFE HABITAT/BIODIVERSITY

In terms of aquatic diversity, **rivers and streams in the Southeast are second only to the Amazon River Basin. More than 250 species of crayfish, nearly 300 mussel species and over half of all freshwater fish species in the U.S. are found in the waters of our region.** Major threats to the health of aquatic species include loss of habitat, over-harvesting, and introduction of non-native species.

Trees provide shelter and food for a wide variety of birds and animals. Intact, mature forests enhance biodiversity by creating an environment that facilitates the growth of plants that would otherwise not be able to

survive. Streamside trees provide shade which serves to regulate water temperature and enhance conditions for aquatic life. Many species use riparian buffers as travel corridors during various stages of their life cycles.

Conservation of estuarine waters and wetlands is extremely important to the economies of coastal communities. Approximately 300 estuaries in the Southeast contain about 17.2 million acres of marsh and other habitat. These specialized environments provide critical nursery areas (a source of protection and food) for a vast number of fish and shellfish. **Shrimp production, in particular, has been shown to be directly proportional to the acreage of vegetated wetlands in an estuary.** In his 2002 book, "The Restoration Economy," author Storm Cunningham describes the necessity of protecting estuaries: The fact that estuary restoration increases both water quality and nursery habitat for ocean fisheries—and because they are (were) important fisheries themselves—makes them triply important.

"Wetlands in coastal states continue to be lost to development at a higher rate than is occurring in inland areas, particularly in the Southeast." Strong estuary/wetland protection efforts are needed to avoid additional loss, which would impact fisheries that depend upon wetlands and, in turn, the coastal communities that depend upon the commercial fishing industry.



SOIL STABILIZATION/EROSION CONTROL

Forests help prevent erosion by trapping soil; vegetation also slows runoff, allowing more water to be absorbed into the ground and minimizing sediment washing into streams. Riparian buffers (zones of vegetation along the banks of streams) hold soils in place, preventing property loss and reducing silt. Sediment loading impacts fish eggs and harms aquatic insects that live in the spaces between rocks along the stream bottom.

Addition to benefits that are the result of biological functions, natural resources also provide other amenities that, in some cases, are perhaps easier to quantify in monetary terms.

RECREATION/TOURISM

“According to a 1999 report of the Southern Appalachian Forest Coalition, recreational tourism in portions of Alabama, Georgia, North Carolina, South Carolina, Tennessee and Virginia generated nearly \$6 billion per year in total economic impacts.”

National forests were the setting for much of this activity. Additional report findings estimate the total economic impact of hunting and wildlife viewing in the Southern Appalachians as \$594 million and \$407 million, respectively, in 1996.

Our region's abundant water resources stimulate additional recreation spending. The same report found that **“rafting on North Carolina's Nantabala River generated local economic impacts of more than \$14 million in 1993.”** Southeastern streams, rivers, and lakes provide opportunities for sportfishing, boating, swimming, canoeing, kayaking, rowing, and water-skiing. The aesthetic value of forest scenery is well documented. During every season of the year, tourists come to hike, camp, hunt, bird-watch, photograph wildlife, and sightsee in Southeastern forests.

Commercial and recreational fishing is big business in the Southeast. For example, North Carolina contains one of the largest and most productive aquatic systems in North America: Albemarle-Pamlico Sound. According to a report issued by the National Oceanic and Atmospheric Administration's National Fisheries Service, the dockside value of commercial landings of fish and shellfish at Beaufort, Morehead City, Wences, Stumpy Point, and other North Carolina seafood centers exceeded \$110 million in 1995.

“Recreational fishing also plays an important role in the economy of Alabama, generating almost \$20 million in state sales tax in 1991.”

PROPERTY VALUES

It's an undisputed fact that property values increase in proximity to parks, greenways, and streams. According to an Audubon Society report, adjacent property values can be as much as 32% higher than property located only 3,200 feet away. Conserving forests on residential and commercial sites can enhance property values by an average of six to fifteen percent. (Morales, 1980; Weyerhaeuser, 1989)

A publication by the University of Wisconsin Extension Service refers to a study that found that **“home values near stream restoration projects were 3% to 13% higher than similar homes on un-restored streams.”** Another study in the same

report revealed that good water quality added as much as \$200 per frontage foot to the value of shoreland properties.

Natural open space and trails are prime attractions for potential home buyers. **According to a 1995 study conducted by American Lives, Inc. for the real estate industry, 77.7% of all home buyers and shoppers rated natural open space as either “essential” or “very important” in planned communities.** An Atlanta study showed that the presence of trees and natural areas measurably increased the residential property base. (Anderson and Cordell, 1982)

Not surprisingly, developers are capitalizing on this trend. The American Hiking Society cites an example from Front Royal, Virginia: A land developer donated a 50-foot-wide, seven-mile easement for the Big Blue Trail after volunteers from a local hiking club asked him to provide a critical trail link along the perimeter of his subdivision. Recognizing the amenity value of the trail, the developer advertised that the trail would cross approximately 50 parcels. Every one of the tracts was sold within four months.

OPEN SPACE

This hard-to-put-your-finger-on quality is more about aesthetics and the strong desire on the part of most of us

for “elbow room,” if you will. The idea is not so much about the specific character of the open space itself (it could be a meadow, a forest, a wetland, a park, or farm land), but rather the fact that it's there. **“When natural open space provides a sort of buffer from encroaching development, it offers a much-needed visual respite from the man-made structures that are features of residential and commercial development.”** It also provides habitat for wildlife, and many animals use open spaces as travel corridors between prime habitat areas.

Lands valued for open space are often agricultural; all over the Southeast, this farmland is being lost to other developed uses. As rural land disappears, its value as wildlife habitat is gone forever.

Local ordinances may provide incentives for developers to set aside open space and habitat areas. For example, in return for preserving critical habitat, developers in Lee County, Florida, were permitted to transfer development rights from the preserved area to other portions of the parcel.

