How much is that little stream worth?

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Often the public and local officials have a general sense of the intrinsic value of our waterways, but that ideal is pushed to the bottom of the priority list when the community is confronted by financial realities. This does not have to be the case if we stop to evaluate the benefits of stream preservation and realize the numerous funding opportunities available.

Both the public and private value of our natural streams is much more than the just intrinsic value. The benefits of maintaining a natural stream corridor are numerous, however, they are difficult to quantify. Just some of those benefits include making space for flood water storage, improved water quality, maintenance of green infrastructure, and erosion control. A starting point may be to identify the quantifiable economic benefits and costs to preserving these natural amenities. Once we put a dollar value on the benefits to preservation, we may find that we can't afford to lose our remaining natural streams to make way for new development.

While there are many ideas on how best to categorize these economic benefits, actually performing the calculations and determining a dollar value is much more difficult. Below is a general discussion on a few of the simplest ways to quantify the benefits of preserving a natural stream, with the goal of introducing each category and pointing you to additional resources to assist in your evaluation. Numerous studies have been produced on all of these subjects and can be used to help structure your evaluation.

To begin assessing your community's economic benefit for preserving the remaining natural stream corridors, you should consider both the public and private values. Simply locating development further away from a flooding source will reduce damages as well as maintain the natural flood water storage capacity of the floodplain. Some of the less obvious functions of an undisturbed stream corridor include the natural ability to absorb more water before it gets to the channel and slow the movement of water as it moves towards the channel. These benefits are achieved only with maintenance of a sufficient number of native plants as well as natural meandering of both the main channels and smaller tributaries. Ohio's riparian plant species often have deep roots that create breaks in the soil surface to allow water absorption. These plants also create additional ground friction that slows the water down, allowing more of it to find alternative pathways to groundwater sources. Plant transpiration also reduces the amount of water that ever gets to the stream. All of these natural functions result in moderated velocity and peak flow–in other words–the water has a better chance of being contained within the channel and the occurrence of excessive overland flooding events is reduced. So, through stream preservation, we will not only reduce the number of flooding events, but also reduce the flood heights of those events that do occur. Dissipated flood flows mean a reduced impact area and ultimately less damage to your citizens' property.

Benefits of Preserving a Natural Stream Corridor

- Flood water storage
- Green infrastructure
- Recreation and Ecotourism
- Water quality improvement
- Bank stabilization
- Erosion control
- Adjacent real estate value
- Noise reduction
- Groundwater recharge
- Ecosystem integrity
- Reduced site development cost

Thus, we can measure the flood damage costs *not* incurred because of the natural flood reduction value of the natural stream corridor. The savings associated with avoided flood damages is one of the most straight forward ways to quantify the potential associated with preserving a natural stream corridor. To quantify these savings use your community land use plan and zoning code to identify expected structural densities and values. County auditor land and structural values are also a good source of information for comparison purposes. In addition, ODNR produced the Ohio Structure Inventory a few years ago, which can be used to identify the number of existing structures in high risk areas as well as their proximity to the flooding source. Free HAZUS software can also be used to quantify the number and value of existing structures that will benefit from the maintenance of a natural stream corridor.

Improved water quality is another important benefit of maintaining a natural stream corridor. Those benefits directly apply to both human and wildlife populations. The cheapest path to improved drinking water quality is preserving the natural function of the vegetated stream corridor. Through nature's intricate filtration system, riparian vegetation removes sediment,

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nutrients, and toxic chemicals from fresh water sources. To obtain this benefit we must have a diverse system of riparian species – a mowed lawn is simply not going to provide the same kind of benefit. Other related benefits from a riparian filtration system includes reduced algae blooms in feeder ponds, lower levels of chemicals in drinking water, and enhanced habitat and ecological integrity to perpetuate this cycle.

When discussing natural stream corridors, "green infrastructure" refers to the fact that our streams and the adjacent land areas represent a valuable functioning amenity to society. Infrastructure is often narrowly considered as the man-made backbone to our built environment including roads, bridges, utility lines, *etc*. That perspective misses the valuable services that our stream corridors can represent if we give them the proper protection. Some of the most fertile soils can be found directly adjacent to our streams. Thus, there are particularly important implications for preserving green infrastructure to both agriculture and the food chain as a whole. Streams are natural highways that act as travel corridors for migrating birds and other species providing valuable service to wildlife; however, this service benefits people by reducing the "pests" that are forced to travel through our neighborhoods. Recreational and aesthetic opportunities that depend upon high quality natural stream corridors are intrinsically and economically valuable to all of us, both now and in future generations. Because terrestrial and aquatic systems are intricately connected, the areas that have been preserved as small, isolated natural parks are not going to provide a lasting natural amenity. If the natural areas surrounding our parks are ecologically degraded, the quality of our preserved areas will suffer as well.

Recreation-based tourism represents a significant portion of the economy in many Ohio communities. Many times, the integrity of our natural systems is critical to maintaining the tourism sector of the economy in these communities. The US Census Bureau produces an economic census that is easily accessible and can provide some of the information needed. However, the direct economic benefits of recreation-based tourism are not the entire picture. The economic trickle-down effect of what is sometimes referred to as "eco-tourism" must be considered as well.

Erosion control and bank stabilization are two facets of an underlying problem – the naturally regulated dynamic system of channel meandering is not convenient for development purposes. Traditional methods to control this process such as channel armoring require constant maintenance and increasingly damage our natural systems. However, preservation of a natural stream corridor can allow for some of these natural changes without adverse impacts and allow for some self-regulation of the associated problems. Our watercourses and the surrounding land areas create a dynamic, changing landscape where channels migrate widely, soil is arranged and rearranged, and the vegetation is in a constant state of flux through succession patterns. Vegetation along the streambank will trap soil particles, reduce bank erosion, and minimize disturbance along valley slopes—for free. In addition, the vegetative cover will deflect stormwater runoff and minimize the displacement of soil downstream. This slows the meandering process, which keeps the channel from drastically relocating and potentially undercutting infrastructure or homes.

Real estate values are increased by proximity to natural amenities such as an unspoiled natural stream corridor. Whether it is a result of the view, access to recreation, the intangible feeling associated with a connection to nature, or some other reason – people will pay more to live near a natural stream corridor. As a result, open space and conservation-based developments have been springing up as a valuable alternative to the traditional suburban subdivision all over Ohio and the rest of the country. By preserving a small natural stream corridor, the nearby development potential will dramatically increase in value.

There are costs associated with meeting existing water quality standards in developed stream corridors. By setting aside a stream corridor to be left undeveloped, you will reduce the costs of silt fencing, monitoring, reporting *etc*. that must be borne by both the developer and the community. Some of these costs are associated with meeting the regulatory requirements for TMDL, MS4, 404, and 401 permits. Also, the costs of mitigating wetland and endangered species impacts could be partially or completely avoided. Other costs that might be avoided are those associated with other regulatory requirements such as dewatering the project area, wildlife compensation, environmental review, State Scenic River approvals, levee approvals, and others.

Once you have determined the value of your natural streams by comparing costs and savings, it is up to you to decide what to do with this information. If your community decides to pursue preservation, the following approaches could be used. Outright purchase of the riparian corridor can be accomplished with the help of many different funding sources. A popular and legally viable way to preserve water resources is to create a riparian buffer along your watercourse

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(see related article *The Antediluvian*, Summer 2007, page 6). Riparian buffers can be created through adopting a vegetated setback requirement into a variety of different codes or deeding conservation easements with qualitative maintenance requirements.

Many of the ecological benefits discussed above also have direct economic value. By protecting the natural functions of the stream corridor, there are a variety of ways that property owners can directly obtain a financial gain. For example, transfer or purchase of development rights allows for the owner to make a profit while protecting the sensitive stream corridor. This can be accomplished through purchase of conservation easements, density transfers, and programs such as floodplain or wetland mitigation banking.

For additional information on assistance with preserving the natural stream corridor contact local resources including OSU Extension, watershed groups, conservancy districts, local land trusts, or county, state, or federal conservation partners.

Fall 2008 Map Modernization Update

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FEMA's Map Modernization Initiative is nationwide, with a projected need of one billion dollars to support the goal of modernizing the nation's inventory of flood maps. The ODNR-Division of Water, Floodplain Management Program is coordinating the state's involvement. Until the initiative is finished, ***The Antediluvian*** will regularly carry this feature, highlighting the status of flood map updates that are ongoing.

Seventy-three counties have begun the map update process to-date. The figure below better illustrates the process and each county's current stage of map update.

ODNR recently received information from FEMA Region V regarding Map Modernization funding for Fiscal Year 2008. The Region received a lower level of funding than anticipated earlier in the fiscal year, and several county projects were deferred indefinitely. ODNR provided input to FEMA regarding the rationale used for flood risk priorities, and FEMA compromised on the counties selected. These counties will be priorities with future funding for continuing Map Modernization past Fiscal Year 2008. Counties recently deferred include: Auglaize, Logan, Meigs, Mercer, Putnam, and Shelby.

All *Pre-Scoping Activities* and *Scoping Meetings* are completed for this phase of Map Modernization. *Scoping Meetings* were recently conducted with the following counties: Allen, Auglaize, Crawford, Darke, Defiance, Fulton, Hancock, Hocking, Huron, Logan, Marion, Mercer, Miami, Perry, Pike, Putnam, Sandusky, Scioto, Seneca, Shelby, and Wood. (Please note that five of these county projects were deferred, as mentioned above.)

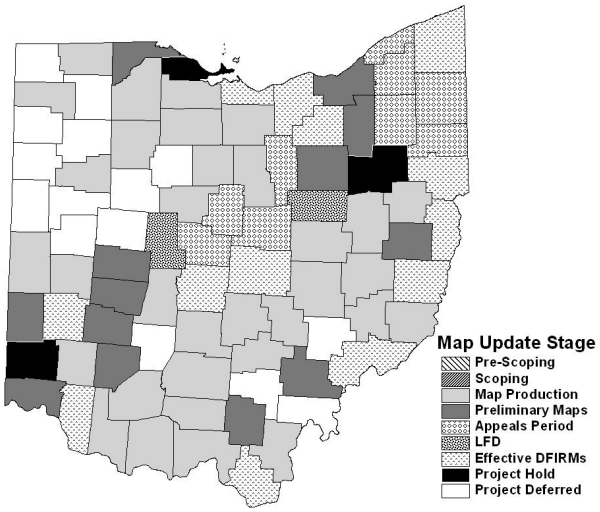

Figure 1: This figure represents each county's current stage in the map update process.

Counties in the *Map Production* phase are: Adams, Allen, Brown, Carroll, Coshocton, Crawford, Darke, Defiance, Fairfield, Fulton, Gallia, Guernsey, Hancock, Highland, Hocking, Huron, Madison, Marion, Miami, Monroe, Muskingum, Noble, Perry, Pickaway, Pike, Richland, Ross, Sandusky, Scioto, Seneca, Tuscarawas, Warren, and Wood.

FEMA has issued new flood mapping guidance for areas landward of levees currently shown as being protective to the 1-percent-annual-chance flood.

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