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The Value of Ecosystem Services in Portland, Oregon

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Like most urban areas in the U.S., Portland, Oregon faces degraded water and declining populations of native aquatic and riparian species as well as increasing costs in managing its water. Much of the degradation stems directly from past and ongoing disturbances that the built environment imposes on water and related ecosystem services and functions.

The City of Portland is establishing plans to protect and improve parts of the ecosystem services provided by the City's urban and suburban watersheds and waterways. Stakeholders typically focus on the costs of implementing these types of projects without necessarily considering the ecological and economic benefits of the restored ecosystem services. Studying the ecosystem-economic implications of projects will help illustrate the types of economic benefits created by protecting and improving these ecosystem services. Information on ecosystem economics will also help planners and decision makers design and rank management options.

In a project supported by the City of Portland, an interdisciplinary team developed a method for quantifying the economic values associated with riparian restoration projects. The team included ecologists, environmental planners and scientists, natural-resource policy advisors, and natural-resource economists from David Evans and Associates, ECONorthwest, and the City. The team's approach, termed Comparative Valuation of Ecosystem Services (CVES), combines a systems-dynamic model of changing ecosystem services with ecosystem-economics data and information on the value of ecosystem services.

The CVES approach has two parts. In Part One, we developed the CVES model and collected the relevant data. In Part Two, which is ongoing, we are applying the CVES model to a flood-mitigation project that emphasizes restoring ecosystem services.

We began Part One by identifying the water-regulatory issues and riparian-ecosystem services most important to the City. We also evaluated proposed and existing riparian-restoration projects for their effectiveness in addressing the selected regulatory issues. The team conducted a review of the economics literature for estimates of values of ecological functions and ecosystem services in riparian areas. Based on this review, we developed a database of economic values that we will use in the analysis of the case study. Development of the systems-dynamics model focused on causal-loop mapping of factors that affect ecosystem services and estimating the incremental changes in services generated by a given project. The team described ecological and economic variables using a mix of quantitative and qualitative measures.

In Part Two of the analysis the team applied the systems-dynamics model and ecosystem-economic data to the City's Lents Flood Management Project. The Lents area of Portland faces significant flood risks from Johnson Creek each winter. The objective of the flood-management plan, developed by the City's Bureau of Environmental Services in consultation with local stakeholders, is to store a sufficient volume of water so that the average 10-year flood event does not threaten the area. The plan provides flood-management services primarily by rehabilitating riparian areas along Johnson Creek.

Restoring riparian areas will enhance ecosystem services beyond flood management. For example, part of the restored wetland will provide recreation and open-space amenities. Wildlife will benefit from the additional habitat available in the improved riparian areas. Riparian areas will also help improve water quality by filtering sediment and toxins from surface runoff and by reducing high water temperatures that threaten salmon.

Using the CVES model, the team is estimating the impacts of the Lents Project on the area's ecosystem services and the related economic value of these services. We will compare these results with the impacts on ecosystem services and related values of an alternative flood-management plan that relies on storing floodwaters in concrete vaults.

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