

Evaluating Ecosystem Services in the Willamette River Basin, Oregon

John P. Bolte^{1,2}, Robert B. McKane¹, Donald L. Phillips¹, Nathan H. Schumaker¹, Denis White¹, Allen Brookes¹, David M. Olszyk¹

ABSTRACT

Ecosystem services are the many life-sustaining benefits we receive from nature — clean air and water, food and fiber production, greenhouse gas regulation, maintenance of biodiversity, etc. These ecosystem services are vital to our well-being, yet they are limited and often taken for granted as being free. Society is in the early stages of developing processes and methodologies to quantify and value these ecosystem services. In response to this critical need, the U.S. Environmental Protection Agency (EPA) initiated the Ecosystem Services Research Program to help assess the benefits of ecosystem services to human well-being, and, in turn, to inform policy and management actions of local, state and federal governments and other decision makers that aim to address immediate needs and long-term (years to decades) planning goals. As part of this national research program, we established the Willamette Ecosystems Services Project (WESP) in the Willamette River Basin (WRB) of Oregon, USA. The WRB covers an area larger than the state of Maryland and supports a mosaic of freshwater, agricultural, forest and recreational resources, as well as several growing urban centers and their water supplies. There is considerable interest by citizens, businesses, and local and state governments in sustainable economic growth. A number of key services of interest to EPA were identified that address the role ecosystems play in regulating stream water quality and quantity, biological sources of greenhouse gases, wildlife populations and habitat, fish populations and habitat, air quality, and production of food and fiber (timber and biofuels). WESP focuses on two pressures that have the greatest potential to significantly alter ecosystem services within the WRB: climate change and land use/land cover management. Here we describe a robust decision support framework, *Envision*, which links environmental data, mapping tools, models and economic valuation methods for projecting future effects of alternative decisions that affect the quantity and distribution of ecosystem goods and services within landscapes. We demonstrate how we are applying *Envision* to the entire WRB to quantify tradeoffs among multiple ecosystem services in response to alternative scenarios of future population growth and land management for the time period 2010-2060.