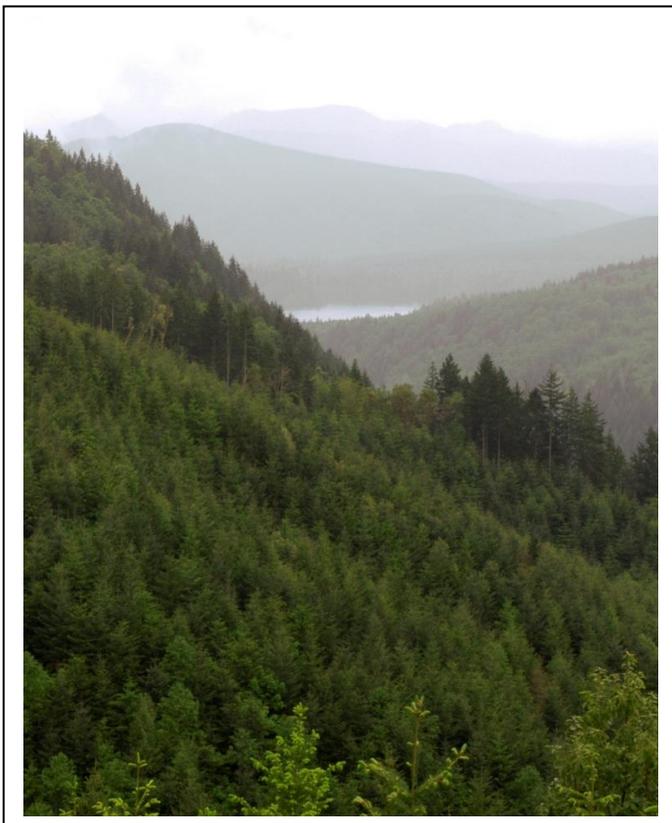


Watershed Services Transaction Project Report: ESHB 2541 (2010)



*Eco-systems Services
Transactions for
Private Forestland Owners
in Washington State:
Lessons and Recommendations*

January 2013



DNR has distributed this report to the following:

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The Honorable Brian Blake, Chair, Washington State House Agriculture and Natural Resources Committee

The Honorable Kirk Pearson, Chair, Washington State Senate Natural Resources and Parks Committee

The Honorable Dave Uptgrove, Chair, Washington State House Environment Committee

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Washington State Department of Natural Resources

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EXECUTIVE SUMMARY

This report responds to legislative direction in ESHB 2541 (2010) for DNR to provide information and recommendations regarding forest landowner conservation incentives. The legislature recognized that incentives that might result from payments for “ecosystem services” by forest landowners could support landowners maintaining their land in forestry. DNR worked with a wide range of partners from 2010 through 2012 to explore such payment systems, and launched a demonstration project in 2011 to bring about one or more “watershed services” transactions in pilot watersheds. Resulting information could contribute to development of larger-scale payment programs. Watershed services of working forest lands could include retention of stormwater, and protection and filtering of drinking water, which would exceed forest practices regulatory requirements and be relevant to the missions and capital spending plans of local water utilities. Preventing loss of working forest lands to non-forest development could be especially beneficial to these utilities.

DNR, with the help of a grant of federal funds administered by Washington Department of Ecology, worked with the Northwest Environmental Forum at the University of Washington, the U.S. Forest Service, Washington Department of Health, and other federal, state, and local agencies, tribes, and organizations, and representatives of key interests in the Snohomish and Nisqually watersheds to launch two pilot projects. During 2011 and 2012, partners worked to: (1) assemble applicable scientific information on forest-water relationships; (2) learn from nationwide experience with payment for ecosystem service projects; (3) identify the specific service scenarios important to interested water utilities in the Snohomish and Nisqually watersheds; (4) perform technical work to identify priority locations and specific forest management activities associated with the targeted services; (5) conduct outreach to forest landowners in priority locations to gauge interest in transactions; (6) conduct economic analysis to compare the value of watershed services to utilities with the landowner cost of associated forest management activities; and (7) develop draft protocols to govern pilot transactions. Through the demonstration project, the most likely potential “buyers” of watershed services from forest landowners are the Snohomish County Surface Water Management Division, interested primarily in stormwater management, and City of Olympia Public Works, interested in aquifer protection for drinking water from the City’s new McAllister well field.

At the time of this report, technical studies are being completed and both utilities are actively pursuing possible transactions in 2013. In addition, discussions are continuing between the Nisqually watershed partners, industrial forest landowners in the Mashel River basin, and others, to structure an innovative conservation transaction in that basin.

A number of important lessons have emerged from project work completed thus far:

- **Scientific Information** A clear understanding of the connections between activities on forest lands and characteristics of water in watersheds and aquifers is crucial to establishing a rationale for payments for watershed services. While general information and modeling can be a suitable starting place, scientific validation will be needed for large-scale programs.
- **Relationship to Regulatory Requirements** Regulatory stability and clarity, both for utilities and forest landowners, is the best context for a functional watershed service payment system. Authorization for utilities supplementing current programs with watershed service incentive payments would advance development of these programs.
- **Conservation Niche for Payments for Watershed Services** Ecosystem service payments, even if fully developed, will not be a conservation panacea. Existing financial incentive programs for forest landowners will continue to be important, along with technical assistance and education, and public or land trust conservation land ownership. Watershed service payments may be most appropriate where there's a clear policy statement and sufficient existing scientific information, and in the middle geographic regions of watersheds, upstream from actively suburbanizing areas and downstream from publicly-owned upper watersheds.
- **Linkage of Transaction Participants and Funding** Without deliberate outreach between water utility-buyers and forest landowner-sellers, watershed service transactions are unlikely to occur. Some aggregation both of water utilities and of forest landowners may be necessary to achieve sufficient buying power and scale. Logically extending the purposes of some existing funding sources could help greatly, if the technical rationale for watershed service payments is well-established. Effective communication of this complex incentive concept to decision-makers and the public will require careful design, to simplify messages without distorting actual circumstances.
- **Transaction Models** At this early stage of development of payment for watershed services programs, transaction costs can be high, time requirements can be prolonged, and reconciling interests of buyers and sellers can be difficult. Flexibility and patience are important, and intermediaries attuned to local circumstances can play a key role. Familiar transaction vehicles such as conservation easements will probably be more useful than novel mechanisms, until case-by-case transactions can develop into larger-scale programs.
- **Expanding to a Larger Scale** The most prudent path toward larger-scale applications of payments for ecosystem services probably involves a combination of incremental accumulation of diverse individual cases and building of policy-level rules, funding, and implementation systems. Participants will need a clear "business case" that's generic enough for broad application yet can be tailored to specific situations. Also needed is better scientific understanding of the relationships between forest conditions generating watershed services and those generating carbon storage, habitat mitigation, or other multiple values.

Additionally, effort could be made to answer the policy questions raised by proposals to create a broad “ecosystem services district” as a public utility of its own, that could focus funding on landowner incentive payments at a broad scale.

Discussions among participants in this demonstration project have resulted in several preliminary suggestions for legislative action. These include:

1. Creating broad enabling authority for public water utilities to explore and engage in watershed services transactions as one means of achieving their mission, as well as broad authority and funding for natural resource agencies to participate in the development of ecosystem service transaction programs.
2. Providing funding or other support for further development of technical foundations for these transaction programs, including targeted scientific work, economic analysis, and guidance for their use in public ecosystem service transactions.

Completion of project activities necessary to enable City of Olympia and Snohomish County to consider approving specific pilot watershed service transactions with forest landowners is expected to be completed in the Spring of 2013, with approved transactions completed later in 2013. Further development of ecosystem service transaction mechanisms will depend on subsequent legislative, agency, and stakeholder discussion and decisions.

INTRODUCTION

The Washington State Department of Natural Resources (DNR) has undertaken a Forest Watershed Services Transaction Demonstration Project in order to create tangible evidence about real examples of market-like relationships among buyers and sellers of ecosystem services. These examples should generate valuable information and lessons that can be applied to a broader-scale application of the concept of monetizing ecosystem services. Many analysts, policy makers, and observers believe that ecosystems services can be the basis for large-scale market incentive systems that reward forest landowners for sustaining critical societal benefits from their lands. These landowner actions then may efficiently provide communities, public utilities, and business, industrial and development interests assurance of delivering specific ecosystem benefits or tangible credits representing such benefits. Ecosystem services may include provision of healthy watersheds, biodiversity, and forest carbon storage. Diligent efforts have been made to develop the institutional frameworks for such markets, and high-profile examples in the United States can be cited, especially involving agriculture lands. However, there have been few examples of actual transactions involving private forest landowners as sellers of services in the Pacific Northwest. The resulting scarcity of transaction evidence and real-world lessons slows progress in developing this sector. Commissioner of Public Lands Peter Goldmark launched DNR’s demonstration project to help fill that gap in real-world experience, as a limited contribution to the development of “Payment for Ecosystem



Services” (PES) systems. DNR is also responding to direction from the Washington legislature in Engrossed Substitute House Bill 2541 of 2010, which asked DNR to develop legislative recommendations for development of landowner conservation incentives such as ecosystem service market development that supports forest landowners maintaining their land in forestry.

This legislative report is provided in response to legislative direction in ESHB 2541 for DNR to present its research and any proposed incentives to the Legislature, Governor, Commissioner of Public Lands and Forest Practices Board. In December 2011, DNR presented a Legislative Progress Report describing the foundation laid to

that point. The present report describes the substantial progress made in 2012 and the expected completion of one or more demonstration transactions in 2013. This report summarizes environmental and policy context; details the specific objectives of the demonstration project; describes relevant activities conducted in 2012, including project deliverables and documentation; identifies major issues, opportunities, and barriers, along with lessons learned; enumerates recommendations; and forecasts next steps.

DNR has undertaken this demonstration project in concert with many partners. DNR would like to thank Brian Boyle of the University of Washington College of the Environment whose several Northwest Environmental Forums devoted to this project generated valuable visibility and momentum at key milestones. The Washington Department of Ecology provided partial project funding from federal National Estuary Program funds. Much of the demonstration project work has been done by DNR's collaborators in the project's two pilot watersheds, Snohomish and Nisqually, including Terry Williams of the Tulalip Tribe, Debbie Terwilleger, Director of the Surface Water Management Division of Snohomish County Public Works and her excellent staff; Michelle Connor of Forterra; and the members of the Nisqually Watershed Pilot Core Team: Dan Stonington, Northwest Natural Resources Group; Justin Hall, Nisqually River Council; Joe Kane, Nisqually Land Trust; and Paula Swedeen, Swedeen Consulting, as well as Liz Hoenig and Donna Buxton, City of Olympia Public Works. A Scientific literature review was conducted by Jodi Schoenen, a Ph.D. student at Portland State University. A nationwide inventory of public drinking water system costs for response to spills and pollution was requested for this project by Kitty Weisman of the Washington State Department of Health, Office of Drinking Water. Thanks also go to Bobby Cochran of the Willamette Partnership, Tracy Stanton of Earth Economics, Todd Gartner of World Resources Institute and Jamie Barbour of the USDA Forest Service Pacific Northwest Research Station for their invaluable advice and comments throughout the project. This report was prepared by Craig Partridge and Nahal Ghoghaie of DNR, who take full responsibility for the content.

ENVIRONMENTAL CONTEXT

Ecosystem Services Concept and Examples

DNR's efforts to assist landowners in gaining access to additional sources of revenue for the benefits they generate from maintaining their lands in forestry are part of a widespread effort to increase understanding of ecosystem services. According to the Millennium Ecosystem Assessment (2005), ecosystem services are the flow of goods and services provided by functioning ecosystems upon which human well-being is based. Building this awareness will help governments, businesses, and the public recognize the extent of nature's value to society, which may result in improved investments in ecosystem protection.

The societal value of ecosystem service benefits, such as carbon sequestration or clean water provision, is difficult to account for in conventional economic assessments. Failure to adequately account for this “natural capital” carries with it the risk of ignoring its deterioration and loss, until a crisis occurs. The average economic planner does not consider ecosystem services as an economic investment because there has yet to be an accepted method to set a price for this form of capital, and estimated benefits may be experienced by future generations. Thus, ecosystem services are difficult to quantify. Yet, emerging research addressing these potential economic values suggests that the costs of investing in ecosystem protection may in some cases prove cheaper and more efficient than investing in new or improved engineered infrastructure. Additionally, intact forests provide services with relatively minimal maintenance costs, and may appreciate in value over time, whereas engineered infrastructure depreciates over time.

In theory, a market that accounts for ecosystem services would allow beneficiaries of healthy ecosystems’ functions to pay those who voluntarily offer to manage and improve those ecosystem benefits. Payments would either be made through actual market mechanisms, or may resemble public or private direct payments to landowners. Currently, such payments are often made by means of transaction tools such as conservation easements or the lease, transfer, and purchase of development rights, or timber rights. The ecosystem services most commonly involved in PES programs include carbon storage in forests, biodiversity, and a range of watershed services important to water quality and/or quantity, including delivery of safe drinking water, and to fish habitat. When ecosystem services primarily involve water, payments may be referred to as “payments for watershed services” or PWS.

Working Forest Loss and Risk of Loss, and Accompanying Loss of Environmental Services

According to DNR’s 2007 [Future of Washington Forests report](#), the counties of Clark, King, Snohomish and Thurston will see the greatest loss of productive forestlands to conversion to non-forest uses.



In response to the rate of forest land conversion and the economic pressures felt by private forest landowners, the State of Washington has attempted to influence conversion patterns through legislative action. As part of this legislative trend, Engrossed Substitute House Bill 2541 establishes intent to

incentivize forest landowners to maintain their lands in forestry.

It calls for evaluation of ecosystem service markets, tax incentives, easements, and technical assistance programs that may provide new sources of revenue to landowners, thereby helping forestland conversion to development. The legislation defines ecosystem services markets as *“a system in which providers of ecosystem services can access financing or market capital to protect, restore, and maintain ecological values.”*

Forests provide fundamental services to society, including carbon sequestration, water quality and quantity regulation, and habitat to various species. Forests in a watershed context are “living filters” that absorb excess nutrients and toxins, reduce erosion, and transform pollutants before they reach drinking water sources. Forests also soak up stormwater, which helps to protect downstream aquatic habitat and reduce downstream flooding. They also provide shade for streams that keeps water cool, which is critical to the health of salmon and other aquatic organisms. Forest conversion to non-forest land uses means the region’s citizens, communities, and businesses lose vital forest watershed benefits, including water flow regulation, water purification and erosion control, as well as losses of biodiversity, recreation, non-timber forest products, and cultural values. Widespread conversion can also result in loss of timber supply and the jobs and tax revenues that accompany it.

Effect of Loss of Watershed Services on Water Utilities

As the ecological integrity of watershed ecosystems degrades, resource managers traditionally resort to engineered solutions, such as levees, water filtration plants, detention ponds, etc., to help protect water quality and quantity from negative impacts. But these structures are costly investments with high operation and maintenance costs. In 2007, New York City addressed this issue by deciding to invest in “green” versus “gray” infrastructure. In order to avoid building a water filtration plant costing between \$6 billion and \$8 billion, New York City opted to purchase and restore \$1 billion to \$1.5 billion worth of Delaware-Catskills watershed ecosystems responsible for water purification. Several US cities are following New York City’s lead in successfully avoiding, delaying, or downsizing conventional filtration systems through forest watershed protection. In the recent Hurricane Sandy many public services like electricity, subways and internet were taken offline, and boil orders were put in place for many regional drinking water supplies that relied on groundwater, due to the risk of contamination. However, the New York City water supply was still working and safe to drink from the tap, due to the filtration services of the Catskills watershed.

Access to a clean water source such as a stream, river, lake or underground aquifer is essential to the health and prosperity of any community. Thus, it is not surprising that

some of the most densely developed regions of the world are located adjacent to a water source. Many hazards associated with development, such as impervious surfaces, chemical spills, and microbial contamination are compromising the reliability of these water sources. Communities around the world are working to ensure their ability to supply sufficient freshwater protection and stormwater management for their inhabitants through forest protection. Municipal authorities and local governments are recognizing these important values of intact forest ecosystems.

In order to maintain the vital functions forested watersheds provide to communities, some water utilities in Washington State have begun working with watershed partners to restore and sustain watershed landscapes. Utilities providing drinking water, stormwater management, and power may be faced with the task of protecting, remediating, and mitigating vulnerable ecosystems. Washington tribes are also partners in watershed efforts, as protecting and restoring salmon resources is a top priority for tribes and Washington State. In order to meet health and safety commitments to their customers and members, such entities must research, identify, and pursue the most advanced protection measures. It is against this background that the Washington legislature has asked DNR to explore the “payment for ecosystem services” concept, and DNR has embarked on demonstration transactions as a means of testing some aspects of the concept.

POLICY CONTEXT

The policy rationale for using payments for ecosystems services, particularly watershed services, as a means of financially incentivizing retention of working forest land in forest uses generating those services, comes from two main directions, operating on sellers (forest landowners) and buyers (e.g. water utilities) respectively. These influences on policies for conservation incentives can exist alongside other policy options such as regulation, public enterprise, public ownership of lands or interest in lands, and volunteer-based stewardship.

Policy Context for Sellers

From the standpoint of forest landowners who might engage as sellers of watershed services, the primary policy context comes from the system of regulatory requirements for forestry activities, coming from the state Forest Practices Act and federal Clean Water Act and Endangered



Species Act. Additionally, land use changes involving forest lands are subject to the requirements of the system of local zoning regulations. These regulatory systems bring to bear governments' police power to protect public health welfare, and public resources from harm. Applicable regulatory requirements establish a baseline of watershed services associated with these protections. Furthermore, Washington State's forest practices regulations are designed in statute to be dynamic and evolutionary through a system of science-based adaptive management. This means that adjustments in the regulatory baseline are inherently expected to occur over time. The Forest Practices Act also calls for maintenance of a viable forest products industry. In the case of zoning regulations, considerations of fairness, vesting and grandfathering, and the need to accommodate the reality of population growth can reduce the long-term certainty of regulatory outcomes for maintaining watershed services.

The overall conclusion may be that adding an incentive component to regulatory approaches, including financial incentives, leading to contractual agreements may often be more efficient and certain over time, and lead to additional public benefits. Also, incentives call attention to the positive societal benefits provided by well-managed forest lands, in addition to the societal harms which regulations are designed to address. Inevitably, the interplay between incentives and regulations for potential watershed service sellers is complex and subject to interpretation. Policy debate results over what watershed services should be provided voluntarily in response to incentives and what should be required of forest landowners as a basic social obligation so as to avoid harms. Many participants in these debates regarding working forest land acknowledge that Washington State's current forest practices regulatory regimes related to such land are strict in relation to other states and that further guarantees of watershed services are likely to be best secured through offering incentives to forest landowners, such as payment for watershed services, for management activities that go beyond regulatory compliance.

Policy Context for Buyers

From the standpoint of the beneficiaries of watershed services who might engage as buyers of those services, there are several policy contexts. They include the core missions of public entities including agencies and utilities, such as providing stormwater management services or restoring salmon habitat. These missions, which may often be governed by state or federal regulatory requirements, could lead the entity to look for achievable benefits from watershed service transactions with forest landowners. In addition, public or private entities may have product quality objectives related to water for customers that can be enhanced through such transactions. Finally, watershed service buyers may be motivated directly by regulatory requirements to mitigate incidental harm to water resources from the buyer's actions, such as development projects, where engaging in transactions with third parties may be an attractive mitigation option. In any of these cases, buyers may also be motivated by the provision of additional "co-benefits"

from potential transactions, such as biodiversity or open space. These additional benefits may or may not be relevant to the buying entity's rate-payers, decision makers, and stakeholders. Each of these policy contexts for potential buyers of watershed services have ramifications for adequate funding for watershed service transactions, and these financing considerations themselves form a crucial part of the context for proposed transactions. For example, in evaluating the credit-worthiness of public utilities issuing bonds to finance investments, bond rating organizations currently do not consider the risk of damage to ecosystems that may affect a utility's basic services, and thus the utility's capability for bond repayment.

Policy Context for Governments

Watershed service transactions as a form of forest landowner conservation incentive would co-exist with a wide range of other existing conservation incentives which may currently be more or less effective at meeting the same or similar conservation goals. These are mostly government payment programs such as the federal Conservation Reserve Program, state grants through salmon recovery programs, the Rivers and Habitat Open Space Program, or the Washington Wildlife and Recreation Program, local purchase of development rights or Conservation Futures expenditures, or provision of technical assistance through university extension programs or agencies. A number of non-profit land trusts are also already actively pursuing landowner conservation easements for a variety of purposes. Existing payment for ecosystem services incentive programs, not funded by government in many cases, take the form of wetland mitigation banks, habitat conservation banks, transfer of development rights, water quality credit trading in Oregon and elsewhere, and forest carbon storage credit sales in California. These existing programs offer many lessons for watershed services transactions, but also differ from such transactions in important ways. For example, these other programs may be significantly less rigorous or more rigorous in the degree of scientific certainty expected about the cause-effect relationship between incentives and market benefits. A number of issues immediately arise when considering the policy context for watershed services transactions. These include issues of legal precedent, either in establishing landowner rights to withhold services, or in allowing potential buyers or stakeholders to instead pursue regulatory means of securing watershed services. There are also issues about the feasibility of a true marketplace: watershed services are geographically constrained, which makes it difficult to achieve the scale that commodity or credit-trading markets require for success. When this is the case, governments usually act as funders or facilitators for transactions. Additionally, transaction costs entailed by the need to satisfy standards of quality, measurability, predictability, and durability in these policy contexts can be daunting for prospective transaction participants. These will be treated more completely in a later section.

PURPOSE AND OBJECTIVES OF PROJECT

In ESHB 2541, the legislature intended to promote the ecosystem services provided by forest management through supporting landowners maintaining their land in forestry. The legislation recognizes that sustainably managed working forest lands are central to the quality of life of all Washingtonians, and that it is necessary to assist landowners in gaining access to additional sources of revenue to help diversify their incomes while improving the ecological functions of their lands. ESHB 2541 intends to develop tools to facilitate small and industrial forest landowners' access to market capital in order to finance the protection,

restoration, and maintenance of ecological functions that protect public resources. Initial attempts to pursue legislative direction in ESHB 2541 involved a multi-stakeholder Forest Carbon Workgroup that was aimed at exploring carbon offset and other ecosystem service market opportunities for Washington forest



landowners. The workgroup provided a 2010 report to the Commissioner of Public Lands Peter Goldmark and Department of Ecology Director Ted Sturdevant that recommended DNR's future investigations of ecosystem service market opportunities involve a pilot project to test the feasibility of various aspects of the PES system. The results of the pilot would then inform the design of future PES work. These recommendations for further work to implement the legislative direction provided by ESHB 2541 led DNR to pursue a demonstration project that addressed an apparent limiting factor – lack of regional PES transaction evidence related to private forest land. Another key finding resulting from stakeholder discussions in 2010 was that watershed services markets and biodiversity markets might have more current potential than forest carbon offset markets. Since that time, a forest carbon market driven by California's regulatory "cap and trade" program has come into operation, which allows forest carbon offset projects to be developed in any of the lower forty-eight states, thus providing a market opportunity for Washington forest landowners.

In response to these findings and stakeholder recommendations, Commissioner of Public Lands Peter Goldmark launched a Watershed Services Market Demonstration Project in March 2011. The project intends to create circumstances leading to one or more watershed service transactions between private forest landowners as "sellers" and

“buyers” who benefit from the generation of watershed services. The objective of this project is to provide needed transaction evidence and other lessons to contribute to understanding ecosystem services provided by well-functioning forestlands. Anticipated outcomes of the initiative include:

- On-the-ground practices that are structured to produce tangible and measurable water and habitat benefits on-site and downstream;
- Contractual agreements among market participants;
- Public transaction evidence regarding services provided and prices paid;
- A monitoring program;
- A detailed analysis of lessons learned and suggestions for broader application; and
- Better understanding of the relationships of watershed services with other ecosystem services such as biodiversity and carbon storage, and the possibility of payments for these services.

In June 2011, the Northwest Environmental Forum, a service of the University of Washington School of Environmental and Forest Sciences (see below), co-convened with DNR a multi-stakeholder event related to working forest retention and watershed service transactions. The Forum was intended to assess the interest in watershed service transactions in Washington, and develop a project framework to develop and carry out feasible watershed service transactions on a demonstration basis. Two key geographic watersheds, Snohomish and Nisqually, emerged from breakout group discussions. These two watersheds represent a moderate level of urbanization, still have substantial commercial forest lands providing watershed services, have local Indian tribes exercising leadership for watershed protection, and have local government leaders, land trusts, and other non-profits who attended the Forum and expressed interest in the pilot opportunity. This Forum event served as a public launch of DNR’s demonstration project.

Participants of the 2011 Northwest Environmental Forum identified the following desirable characteristics of a functioning program of watershed services transactions, many of which may be prerequisites:

- An urgent issue that includes the right geographic location, timing and vision;
- The right mix of stakeholders with clear leadership and engagement at the local watershed level;
- A combination of regulatory and voluntary mechanisms with clear environmental goals and flexible implementation options;
- The use, where feasible, of existing institutional mechanisms;
- A commitment to a cohesive policy with a clear regulatory driver and backstop;
- Linkage to climate change adaptation;
- Clearly identified willing buyers and sellers and an analysis of the potential beneficiaries;

- Clarity on the nature and ownership of the environmental service or services being transacted, including the specific management practices needed to sustain the services;
- A sustainable financing mechanism with diversified funding streams (i.e., government, municipalities, private foundations and corporations);
- Administrative structure to facilitate transactions between willing buyers and willing sellers while controlling transaction costs;
- A mechanism and institution for monitoring and enforcement;
- Transparent record keeping with clear reporting of activities and outcomes;
- The potential to bundle with other ecosystem services including carbon offsets, biodiversity, wildlife habitat, clean drinking water, flood protection, etc.;
- Payment levels which exceed the landowner's opportunity costs associated with engaging in or forgoing target practices;
- A clear understanding of risk (economic, political, ecological) while addressing uncertainty;
- Metrics or units of trade clearly defined within the transaction framework; and
- A clear plan for program evaluation.

The DNR-led demonstration project has attempted to identify or create circumstances with these characteristics.

PROJECT ACTIVITIES



Since DNR launched this demonstration project in March 2011, it and its numerous partners have carried out a wide range of project activities. Activities described in this section include large and small project meetings, negotiated agreements, scientific and technical studies, development of information resources,

outreach to the forest landowners, and interim reports. As discussed below, much of the project work has been performed through the Nisqually and Snohomish pilots.

Northwest Environmental Forum

A critical partnership throughout DNR's watershed services transaction demonstration project has been with the Northwest Environmental Forum. Since 2004, the Forum has conducted multi-stakeholder events on pressing public policy topics, and since 2008 the Forum has focused on ecosystem service payments and retention of working forests. Convened by Brian Boyle, the Forum has provided three focused sessions for key regional stakeholders to participate in neutral and knowledge-rich discussions to advance common understandings and create a sense of direction for watershed service transaction projects. These Forums have identified consensus on the belief that maintaining forests can provide a cost-effective means to manage and provide water for drinking, industrial use, energy production, flood stabilization, drought protection, aquifer protection, reduced erosion and sedimentation, moderation of the effects of human population, and biodiversity of aquatic life and fish resources.

From the outset of the June 2011 Forum, key Nisqually and Snohomish representatives have been active participants. The more than 70 other natural resource managers and policymakers who participated in this Forum represented large and small forest landowners, non-profits, land trusts, environmental organizations, ecosystem service market experts, academic researchers, foundations, water utilities, tribes and local, state and federal government interests.

Key outcomes were to:

- Highlight the critical role forests play in water quality and conservation;
- Identify key forested watersheds in Washington State for a demonstration watershed services marketplace, and attributes that would distinguish these areas;
- Identify actions needed to begin a collaboration to develop and implement a demonstration forest watershed services market project in 2011-12; and
- Secure government and stakeholder commitments to participate in initial project workgroups, including core members of project teams.

In April 2012, a second Northwest Environmental Forum served as a venue for watershed stakeholders to reconvene and expand upon their June 2011 work. More than 50 natural resource managers and policymakers participated in this Forum to review a Portland State University literature review: [*Biophysical Aspects of Forestry Management*](#) (Schoenen, 2012). This work was prepared specifically for this demonstration project through the efforts of the USDA Forest Service Northwest Research Station (PNW). The scientific report highlighted the current state of scientific understanding of the hydrological attributes of forest health. The April 2012 Forum also provided scientific responses and insights into how to develop the factual basis for proposed market transactions, starting with the Nisqually and Snohomish watershed pilot projects. Forum participants identified challenges and recommendations based on the report and their own areas of expertise, which include:

- Issues with scale of land use changes and overall impacts to hydrological processes;
- Linking temperature to riparian cover;
- Difficulties with assessing variations across landscapes;
- Understanding climate change's impacts to timing and quantity of storm flows; and
- Exploring the policy and regulatory framework that supports this work.

A final [Northwest Environmental Forum](#) devoted to DNR's watershed project was held in December 2012. Forum participants were briefed on the progress, challenges, and next steps of the demonstration projects, and were asked to assess, compare and critique them. They were also asked to advise DNR regarding the 2013 Legislative Report. Finally, Forum participants discussed the larger application of watershed services for working forest retention in the Pacific Northwest and elsewhere.

Ecology Grant

In the summer of 2011, the Departments of Ecology and Commerce issued a Request for Proposals for federal funds from the U.S. Environmental Protection Agency's National Estuary Program. In November 2011, DNR submitted a proposal to the Department of Ecology requesting \$200,000 of these funds intended for Puget Sound Watershed Protection and Restoration of Freshwater Ecosystems. Ecology accepted DNR's proposal in December 2011, and the funds were awarded beginning in April 2012.

Grant funds are being used for:

- Project-specific staffing for implementation of transactions and development of project communication and technical reports;
- Development of supportive economic feasibility analysis;
- Developing metrics for specific watershed services and management practices;
- Identifying buyers and sellers; and
- Establishing institutional infrastructure for protocols for markets or market-like transactions in the two pilot watersheds, to eventually be utilized in other watersheds throughout Washington.

Outreach and Communication

DNR project staff, funded with the Ecology grant, coordinated development of informational materials for both the Snohomish and the Nisqually watershed pilots, and created a comprehensive [project web page](#) that includes information about the [related legislation](#), ecosystem service concepts and associated reports, and the involvement of various partners. The website also included links to the [Nisqually](#) and [Snohomish](#) pilot project web pages that further describe watershed-specific efforts.

DNR staff assists in coordinating team meetings for the Nisqually watershed pilot project. Snohomish County Surface Water Management (SWM) also hired project staff to coordinate Snohomish pilot project activities. Both pilot groups have held regularly scheduled team meetings.

Partners

The two watershed teams are committed to building partnerships in their respective watersheds and regionally to encourage successful pilots. Partnerships with drinking water, stormwater, salmon recovery, and forestry interests are expected to advance a scientifically-informed and locally supported approach to developing the rationale for the pilot projects.

Since the earliest phases of project development, DNR has sought ongoing strategic advice from leading national experts in the field. Tracy Stanton, first representing The Freshwater Trust and currently with Earth Economics, Bobby Cochran of Oregon's Willamette Partnership, and Todd Gartner of World Resources Institute have provided valuable perspective, information, and guidance. Kitty Weisman from the Washington Department of Health Office of Drinking Water has provided enthusiastic support for the project as well as substantial technical information. Claire Schary, Water Quality Trading Coordinator for the EPA Region 10, also has offered her experienced perspective and critical wisdom.

The Nisqually Watershed Project Core Team is comprised of a consortium of partners representing the Nisqually River Council, the Nisqually Land Trust, Northwest Natural Resources Group, Swedeen Consulting, and Earth Economics. The core group invited representatives from state agencies, non-profits, academic institutions, tribes, representatives from the Snohomish pilot, and related entities to attend their quarterly Nisqually Watershed Services Advisory Committee meetings. These meetings were held in July and October of 2012, to discuss project progress, implementation, funding, and a list of other project-related details. The project team has also developed a significant partnership with the City of Olympia's Public Works Department, which includes the Drinking Water Utility, which intends to serve in the role of buyer of groundwater recharge area protection services in the lower Nisqually Watershed. The City has recently begun developing the McAllister Well Field, tapping a large groundwater aquifer which will become the primary drinking water source for the city's residents.

Snohomish County SWM managers and staff have taken the lead in developing and implementing the Snohomish pilot project. With the primary ecosystem service of interest being stream flow protection and stormwater management, the Snohomish team has coordinated with several forest, stormwater management, and salmon recovery interests including the Tulalip Tribes, Washington Department of Ecology, Forterra, WSU extension, Northwest Natural Resources Group, and World Resources Institute.

Key partners have met to discuss ideas about potential target sub-basins and associated landowner/seller outreach strategies to support the development of a forest ecosystem service transaction in the Snohomish Basin.

In November 2011, DNR hosted a video conference of principal project partners to assess progress and make commitments to following through with project completion. DNR developed a [December 2011 Legislative Progress Report](#) describing project activities to that time and forecasting anticipated project work in 2012.

Nisqually Watershed Pilot Project

The Nisqually Core Team is exploring a payment program for watershed-based ecosystem services that links private-forest landowner actions with improvements to water quality and quantity within the Nisqually Watershed. On behalf of the watershed pilot project partners, in May 2012, the Nisqually Tribe received a \$170,000 grant from the State Department of Commerce under the same EPA program funding awarded to DNR. Under the grant, the pilot team is coordinating with Washington DNR and Earth Economics to:

- Develop a watershed-based payment for ecosystem services protocol that connects water utilities or others who have funds to purchase watershed services (buyers) and quantifiable actions that forest landowners (sellers) can take to improve water quality and quantity;
- Recruit potential buyers and sellers;
- Develop metrics;
- Secure a demonstration transaction between at least one buyer and one seller that brings additional environmental benefit;
- Quantify those benefits for beneficiaries; and
- Document lessons learned and provide a model that can be scaled up around Puget Sound.

BUYER OUTREACH

The Nisqually Project Core Team has identified and met with several potential upper- and lower-watershed ecosystem service buyers. Upper-watershed meetings were held with the Town of Eatonville, the Nisqually Tribe, and the City of Yelm, and lower-watershed meetings included the City of Olympia, the City of Lacey, and Pierce County. Circumstances in the lower watershed were well suited for prompt buyer involvement. The City of Olympia's drinking water program welcomed the Nisqually team's invitation to act as a buyer of watershed services in the form of protection/restoration of forest land above the aquifer supplying the new McAllister Well Field. The City is in the process of redrafting the land acquisition plan in its state-mandated [Groundwater Protection Plan](#).

Group A public water systems, like City of Olympia, are required by state regulations to develop and implement a source water protection plan. The goal is to ensure safe and reliable drinking water over the long run. Source water protection focuses on maintaining, safeguarding, and improving the quality and quantity of drinking water by delineating the source water protection area, identifying potential contamination sources, and developing strategies for protection over time. Under the federal Safe Drinking Water Act, source water protection is considered the first step in protecting drinking water from contamination and loss of supply.

The Nisqually team's proposal for shaping land acquisition as payment for watershed services has been timely. The City has budgeted funds through 2018 to either purchase or acquire rights to parcels that are particularly vulnerable to contamination, and are in zones representing various travel times of groundwater to the wellhead. By owning land or easements, the City can control land uses and associated activities on land near its water sources and help prevent contamination of critical groundwater resources. The project team recommended that the City consider easements as more economically efficient, in terms of amount of land protected for a given budget and, potentially, more acceptable to landowners.

In the upper Nisqually Watershed, the Nisqually Tribe is already a leader in watershed protection, and has indicated interest in participating as a buyer of watershed services to aid salmon recovery. Tribal analysis has demonstrated sediment and temperature impairments to salmon habitat in several specific reaches of the Nisqually mainstem and its tributary, the Mashel River. The tribe has encouraged the project team to look into funding options that would help finance the Tribe's ability to make watershed service payments. The lack of funding for a recognized buyer has significantly delayed project progress in the upper watershed.

Also, the Town of Eatonville's stormwater management program and drinking water supply would greatly benefit from upper Mashel River Watershed protection work. Although Eatonville property owners are interested in participating in an Upper Mashel sub-basin transaction, the Town is not financially equipped to be involved as an ecosystem service buyer. Therefore, the project team is continuing to seek potential funding sources to provide Eatonville and/or the Nisqually Tribe with adequate funding to purchase ecosystem services from a willing landowner in the upper watershed.

QUANTIFYING BENEFITS

Quantification of benefits, or "metric" development, is a central component of a payment for watershed services transaction. In practice, "metrics" will be targets for forest watershed conditions needed to produce the desired "downstream" results, based on best available science and cost-effective methods of measuring those forest conditions over time. Nisqually pilot metric development is being undertaken by DNR and the Nisqually project team.

For the City of Olympia payment for watershed services transaction involving the new McAllister Well Field, the U.S. Geological Survey (USGS) is performing technical groundwater modeling work in a joint funding agreement with DNR. USGS will produce a report documenting model development, limitations, and the results from approximately four simulations representing a range of potential groundwater recharge conditions, which will be published by April 30, 2013. For the upper Nisqually Watershed, DNR has begun discussions with the U.S. Forest Service for contributions to metric development related to stream shade, sediment delivery, and overall sub-basin forest cover. This watershed analysis may occur in 2013.

ECONOMICS

Economic feasibility analyses, for both buyers and sellers, are included in the project to assist with utilities' decision-making and outreach efforts, and to help determine whether there's a good match between the utility's needs and the landowners' interests. In response to the City of Olympia's interest in a buyer economic feasibility analysis, DNR offered staff time to conduct a literature review and analysis of costs of improved land management protection vs. costs of incident response and damage cleanup. DNR project staff is collecting local and national drinking water contamination and protection data through a literature review and interviews. Data include results from an email survey of state members of the Association of State Drinking Water Administrators on studies of source water contamination costs. Data include contaminant types, cleanup/ response activities, associated costs, utility type, event year, and the state where the cleanup occurred. To date, survey analysis reveals a range of \$4,000 to \$2 million per cleanup for nitrate initial cleanup costs, and an average of \$1.5 million for solvent-related contamination events. DNR's project assistant compiled the data into a cost summary matrix, along with data acquired through the literature, which will be summarized in a final economic feasibility report, expected to be completed by early 2013.

The study will also present a list of risks that face the McAllister Aquifer, and a qualitative cost comparison will describe the co-benefits of interest to the City of Olympia, for example:

- Contamination prevention
- Stormwater run-off prevention
- Carbon sequestration
- Property value enhancement
- Aquifer recharge
- Local climate moderation
- Wildlife habitat

The economic comparison is based on two hypothetical scenarios; full build-out of current zoning, and retained and restored forest and pasture cover with rural residential development. Results of the U.S.G.S. modeling work will help in evaluating differences of risk levels between the two scenarios. Ultimately, the economic analysis will analyze

the economic benefits of ecosystem services that would be secured through the pilot, including maintaining risks at the very low levels desired by the City of Olympia.

Seller economic analysis involves informational discussions with forest landowner transaction experts and appraisers. After the project team conducts enough landowner outreach to focus on most likely sellers, they will consult metric development results, determine conservation easement guidelines, and finally consult an appraisal expert to measure the seller's cost for ecosystem service provision.

LANDOWNER OUTREACH

The project core team researched and identified priority parcels and associated landowners for City of Olympia's McAllister Wellhead protection plan, based on ranking criteria established by the City of Olympia. The City's parcel prioritization criteria emphasizes protecting land with the greatest risk for groundwater contamination and places greatest value on parcels with no confining glacial till layer above the aquifer, and with the shortest travel time of recharge through the aquifer to the wellhead. The City's criteria also emphasize current land use practices, amount of forest cover, and parcel size. The Nisqually Land Trust began contacting landowners of highest priority parcels to gauge their potential interest in receiving payments from watershed service buyers in exchange for quantifiable actions they could take to help protect the aquifer. In general, most landowners were very receptive to these initial contacts.

Landowner discussions involve sharing project details and gauging their needs. Additional required technical information, which is pending, will evaluate the specific management activities or constraints being requested of the landowner. Once USGS completes its modeling and evaluation of linkages between forest cover and groundwater protection, the project team will identify a few properties with the highest likelihood of success. The Nisqually Land Trust and project team will then work with those landowners and the City to develop easement terms.

In the upper Nisqually Watershed, the team has also researched and identified priority parcels with the highest potential for contributing to temperature and sediment impairments in the Mashel River, based on Nisqually Tribe analysis and Department of Ecology's Puget Sound Watershed Characterization analysis. Of the two major commercial timber landowners in the Mashel Watershed, Hancock Timber may be a candidate to enter into large-scale transactions resulting in improved watershed services. Hancock representatives have been actively engaged in communicating with the Nisqually team, and may be interested in further more detailed discussions.

PROTOCOL

Protocol development is a principal task included in both the Nisqually team's Commerce grant, and DNR's Ecology grant. A core team member has drafted a literature review and analysis for related protocol development. So far, this protocol study has led the Nisqually team to determine the most likely transaction mechanism will be a conservation easement. The City of Olympia has experience with conservation

easements, which suggests that the demonstration project does not need to devote effort to developing new market infrastructure.

The protocol report outlines conditions of participation, landowner eligibility criteria, easement commitment length, required acceptable practices that will be incorporated into the terms of the easement, and monitoring and verification criteria for the City of Olympia Wellhead Protection Land/Easement Acquisition program. The protocol document will draw on model conservation easement language for source water protection programs occurring in New Hampshire, San Antonio, North Carolina, Michigan, and Virginia. It also draws from the scientific literature on groundwater/forest dynamics and original modeling done by the United States Geological Survey for the McAllister Wellhead protection area. The protocol provides approaches to easement terms, which should:

- Retain forest cover
- Limit the overall area of impervious surface increase
- Reduce the potential increase in overall number of septic systems
- Limit the potential for the use and storage of hazardous chemicals
- Provide sufficient restrictions and guidance for forest management

CURRENT STATUS

Although the City of Olympia has assigned funding for groundwater protection projects, several steps are involved to gain final approval by the City Council. In December 2012, the City staff and the project team presented plans for the McAllister Wellfield payment for watershed services transaction to the City's Utility Advisory Committee (UAC). The UAC was positive about the project, and invited the team to return with the results of modeling and economic analysis. All technical work will be complete in spring 2013, after which landowner negotiations can take place and a final transaction decision can be made by the City of Olympia.

The Nisqually team is also actively searching for entities willing and able to invest in larger-scale forest land transactions in the upper watershed.

Snohomish Watershed Pilot Project

To support market development for forest ecosystem services in the Snohomish River Watershed, SWM has taken the lead in exploring a pilot transaction. SWM's intent is to generate information which will allow SWM to explore the potential development of a market-based program to protect forest ecosystems that stabilize stream flows, and thereby help to reduce downstream flood risks, and protect salmon habitat.

The Snohomish Pilot Core Team is primarily comprised of SWM staff members who are responsible for administrative tasks, coordination with DNR, hydrologic modeling, and

GIS analyses. The Snohomish Core Team has recently partnered with Forterra to carry out certain analytical and outreach tasks associated with the pilot project.

INTERLOCAL AGREEMENT

In November 2012, DNR and SWM signed an Interlocal Agreement for \$80,000 of grant funding to support project-specific staffing and development of supportive analysis for the Snohomish pilot. Under the Interlocal Agreement, SWM is providing project administration, metric development through modeling, sub-basin and parcel prioritization, support for economic feasibility analysis, and property appraisal as needed. DNR is providing lead staff work for the economic feasibility analysis and coordinating development of a transaction protocol.

PRIORITIZATION

To develop a methodology for prioritizing parcels for potential ecosystem services transactions, SWM staff first assessed the utility of the Conservation Priority Index (CPI) a tool developed by researchers at the University of Massachusetts in cooperation with the U.S. Forest Service, the Trust for Public Land, and the U.S. Environmental Protection Agency. In an initial test study, the CPI was used to score and rank privately owned parcels in the Upper West Fork Woods Creek sub-basin of the Snohomish River watershed in terms of their conservation value. This exercise produced a list of 20 high-priority forest parcels. Subsequently, SWM staff scored and ranked the same parcels in the sub-basin based not only on the CPI, but also on a hypothetical budget limitation and development pressure data provided by the Rural Technology Institute at the University of Washington. This exercise resulted in a different list of high-priority parcels.

At the conclusion of the test study, SWM staff utilized the CPI in combination with Department of Ecology Watershed Characterization results to prioritize and select three sub-basins within the Snohomish watershed for potential transactions, based on their relative importance to the protection of hydrologic processes. Parcels within these sub-basins will be scored and ranked using the CPI and development pressure. The selection of a parcel for a transaction will also hinge on cost and landowner willingness.

QUANTIFYING BENEFITS

In order to evaluate the effects of varying levels of forest cover protection on downstream flow characteristics, such as peak flows, flood flow duration, and flows that support fish habitat, SWM technical staff developed and applied a Hydrologic Simulation Program Fortran (HSPF) model of the Upper West Fork Woods Creek sub-basin.

Hydrologic modeling is being used to assess the effect of a range of forested land conversion scenarios on flood flows and duration of flood flows within this sub-basin, with results also applicable to other areas of the watershed. Modeling results will be used to test whether there is a break point in which the percent of forest lost has a marked effect on flood flow rate, duration, and habitat flow ratio in the stream. The technical team has also conducted a literature review of recent publications on the effects of forest conversion on stream flows and aquatic habitat. Results of this study will be used to

inform forest management practices being requested of forest landowner project participants. A final document to report the modeling assumptions, methods, tested metrics, and results will be submitted to DNR by March 31, 2013.

ECONOMIC ANALYSIS

DNR is taking the lead on an economic feasibility analysis to compare the estimated costs and benefits to the County associated with various ecosystem services transactions to those of alternative projects that would offer similar stormwater management results. The economic feasibility analysis will compare conventional stormwater protection methods and alternative solutions that include forest ecosystem protection. The SWM technical staff is providing cost data for standard stormwater management procedures.

The final economic feasibility report, to be completed in February 2013, will include a list of types and likelihoods of risks and responses, as well as a comparison of the quantitative costs and qualitative benefits of various transactions that the buyer, Snohomish County, could potentially carry out in order to achieve similar levels of stream flow protection.

In addition, Forterra will be conducting an analysis of potential transaction mechanisms that Snohomish County could employ to carry out an ecosystem services transaction. Potential mechanisms to be evaluated include:

- Conservation easements (transfer or purchase of development rights, etc.)
- Short and long-term lease agreements
- Other types of recorded agreements.

Based on the results of Forterra's analysis, SWM is also planning to contract for professional services to produce an appraisal to help determine the amount of compensation a landowner would agree to receive for a secured commitment to adopt forest cover protection and restoration actions.

PROTOCOL

Market protocol development for the Snohomish Watershed pilot project is being coordinated with the work being conducted for the Nisqually watershed pilot. The Nisqually Core Team has agreed to share protocol-related findings and reporting with the Snohomish team, incorporating Snohomish Watershed-specific services and criteria.

CURRENT STATUS

Final work is being completed on all the analytical work, including parcel prioritization, modeling and metric development, and economic feasibility analysis. Landowner outreach will begin in late winter and spring of 2013, followed by a decision to pursue a transaction. Snohomish County will explore the possibility of coordinating this

demonstration project with its recently approved Transfer of Development Rights program.

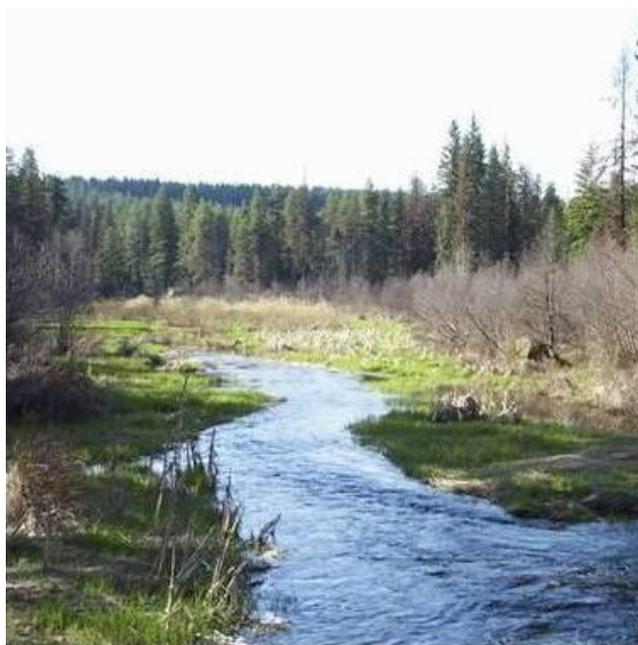
MAJOR ISSUES AND LESSONS LEARNED

The primary purposes of a demonstration project are to show that a particular course of action can be completed at least on a small scale, and to uncover issues that provide the basis for important experiential learning relevant to broader application of the action program. This is consistent with the legislature's purposes in ESHB 2541. The watershed services transaction demonstration project has been undertaken to, first, produce real transaction evidence regarding payments to forest landowners for forest land management outcomes relevant to watershed services sought by water utilities making the payments, and second, provide a basis for critical lessons necessary to understand how to apply this incentive method on a broader scale. This section describes a series of significant issues and attempts to draw initial lessons relevant to legislative recommendations and development of broader forest ecosystem services incentive programs.

1. Scientific Foundations

A good understanding of the ecological relationship between forest land management practices and watershed services is a necessary underpinning for a valid program of payments by watershed services beneficiaries to specific forest landowners to secure such services. Beneficiaries such as water utilities, including their decision-makers, customers, and stakeholders, seek reasonable assurance that proposed payments will actually result in tangible benefits. Landowners need to understand the specific practices and requirements proposed in order to evaluate opportunity costs and needed payments (also see #8). Regulators need to understand how the forest watershed services to be provided relate to existing requirements for the buyers and the landowners (also see #2).

On the other hand, participants will never have perfect information, especially for specific locations, considering the high level of variability in site-specific conditions and natural processes. Waiting for perfect information is not responsive to the urgency of forest loss in areas subject to



growth pressures and to climate change effects. A great deal of general scientific information on forest-water relationships does exist, which has served as the basis for experimentation with ecosystem payment systems in the Pacific Northwest and nationally.

A typical component of a PES system is the “metric” or “metrics” – what can be measured over time to demonstrate that the watershed services being paid for are actually being delivered. Appropriate metrics can be found closer in the cause-effect chain to the beneficiary-buyer, such as water parameters (water quality, water flow, etc.), or closer to the forest landowner-seller, such as forest cover conditions (percent forest cover, streamside protection, etc.). The former relates more directly to the benefits sought, while the latter relates more directly to the practices paid for. Neither approach on its own guarantees to fully measure cause-effect relationships between the two.

A variety of models exist or can be developed to help fill in the gaps in site-specific knowledge by using what is generally known to predict processes and outcomes in specific cases. Modeling can help prioritize areas for protection, develop protection or restoration mechanisms, and evaluate the likelihood of forest activities leading to delivery of watershed services. Modeling can therefore support forest watershed services transactions, including development of suitable metrics.

The pilot projects have used a number of approaches to establishing sound scientific foundations for potential transactions. These approaches included the scientific literature review on forest-water relationships from Portland State University, which provided general information and indicated some broad forest management actions that could be incentivized to help provide watershed services, such as [avoiding conversion to non-forest uses, limiting roads on sensitive soils, and protecting riparian areas](#). Both pilot teams also had access to previous watershed planning work in their watersheds, along with recent salmon recovery studies.

The Nisqually team made use of previous geographic prioritization work by the City of Olympia for the McAllister Wellfield source water protection area, in addition to the USGS aquifer modeling work, and Ecosystem Diagnosis and Treatment analysis by the Nisqually Tribe for the upper watershed.

The Snohomish SWM staff undertook parcel prioritization analysis using the CPI, and performed hydrologic modeling work in a test sub-basin to evaluate the effect of changing forest cover and impermeable surfaces, on various stormwater parameters.

Both pilot groups made use of Puget Sound Watershed Characterization mapping information developed by Washington Department of Ecology.

The scientific work left both pilot teams with a great deal of useful information, as well as important site-specific questions concerning the likely quantifiable outcomes of forest watershed service transactions for utilities.

Another scientific issue is the obvious inability of a single or small number of pilot watershed service transactions to succeed in generating significant benefits at a watershed scale.

Lessons

General scientific information, along with existing local understanding, can provide a good starting point for the development of forest watershed service payments. In addition existing information and modeling capabilities are helpful to prioritize target locations and landowners for transaction proposals. Potential buyers of services, especially if not responding to strict regulatory requirements themselves, may not need highly precise prediction of the outcomes of specific transactions to undertake individual priority transactions or launch a program of transactions. Monitoring can then help verify, refine, or redirect a program over time. However, there will certainly be an ongoing and increasing need for better initial scientific information and validation over time for large-scale programs of payment for forest watershed services. Improved scientific information is also needed to allow greater confidence in the design of specific forest landowner requirements intended to secure watershed services through transactions.

2. Relationship to Regulatory Requirements

Policies for forest landowner conservation incentives, such as to secure watershed services, exist in an overall policy context that includes regulatory laws aimed at the same or similar objectives. Understanding that regulatory context and relationship and identifying a complementary role for incentives can be a major challenge for ecosystem services transaction systems. This dynamic was described above in the Policy Context section.

In the case of the Nisqually Pilot Project, the City of Olympia drinking water utility operates under the authority and requirements of state and federal drinking water and public health laws. The City expects to exceed those requirements in its operation of the McAllister Wellfield, and is pursuing a transactional strategy for source water protection to satisfy City and local interests in gaining a very high level of assurance of long-term drinking water safety and reliability. The strategy also aims to secure forest management and/or restoration commitments from landowners that clearly go beyond the requirements of the state Forest Practices rules and current Thurston County zoning.

In the upper Nisqually Watershed, the pilot project team has approached commercial forest landowners to gauge interest in levels of watershed protection beyond current Forest Practices stream buffer requirements aimed at salmon habitat protection. This raises questions about the future of regulatory requirements, since the Forest Practices

Adaptive Management Program is currently undertaking a scientific review intended to validate or determine necessary adjustments to current stream buffer requirements for providing salmon-friendly stream temperature conditions. Stakeholders have indicated some willingness to reward landowners for early adoption of possible future regulatory requirements, but not to pay for compliance with current regulatory requirements. If regulations are regularly adjusted, it's difficult to achieve a stable and understandable baseline from which to financially incentivize provision of additional ecosystem services. ESHB 2541 amended the Forest Practices Act to include assisting ecosystem service payments to forest landowners as one of a number of policy consideration in forest practices rulemaking.

In the Snohomish watershed, SWM has explored the idea of using up-stream stormwater protection actions by forest landowners to meet an increment of the stormwater mitigation obligations of down-stream developers under the county's stormwater permit. The idea is to use a portion of mitigation payments required of developers to secure the upstream actions. Stormwater program managers at Department of Ecology have indicated that such a transfer of mitigation effort from the site of development to an upstream forest area could only occur in the context of basin planning that demonstrates the upstream actions would provide actual mitigation of the development impacts comparable to what would be expected from on-site mitigation. Additionally, upstream forest stormwater protections induced by the payments would need to go beyond what would be eventually required anyway in the face of future development of the forested property. An issue which emerges from this consideration is how successful current and future application of regulatory requirements is assumed to be. Understandably, regulatory program staff feels accountable for assuming a high level of regulatory success; therefore, they tend to downplay the potential value of incentive programs aimed at similar objectives.

Lessons

Demonstration project participants have generally expressed a desire for regulatory stability and clarity as the best context for development of watershed service payment systems. This context would aid the identification of increments of forest watershed protection that can be confidently pursued through incentive payments, without fears of paying for already-required regulatory compliance or weakening regulatory standards. In addition, watershed service buyers would benefit from a regulatory environment of their own that acknowledges practical limits on direct regulatory systems alone to achieve environmental or public health outcomes efficiently, and encourages exploration of incentive programs that can complement underlying regulatory obligations. This could help motivate demand for watershed services transactions by potential buyers such as water utilities. Local governments themselves, as well as state and federal regulatory agencies such as Department of Ecology and the Environmental Protection Agency could contribute to a context of regulatory stability and clarity that promotes exploration of watershed service payment systems.

This demonstration project supports a judgment that drinking water protection and stormwater management may have regulatory environments both for potential utility-buyers and landowner-sellers that are more conducive to development of viable forest watershed service payment systems than would be the case for the “water quality trading” under the Clean Water Act’s (CWA’s) National Pollution Discharge Elimination System permit structure, which has been the focus of agriculture-centric watershed service market development outside Washington State. This is in part because the water quality regulatory structure of the CWA is met in Washington’s forest sector by “compliance assurances” associated with implementation of state Forest Practices Rules, thus providing a less formal foundation for exchanging water quality protection “credits” among similarly regulated entities.

3. The Appropriate Conservation Niche for Payments for Watershed Services

Interest in payment for watershed services (PWS) programs arises from concern about retention of forest land for its own sake, and from economic efficiency objectives in carrying out the missions of the purchasers of watershed services. While PWS is in its infancy, it shows promise for both these purposes. An important question arises as to how significant a part of the solution to either of these concerns PWS will be, and where it can make its greatest contribution. As introduced in Policy Context earlier, PWS exists side-by-side not only with regulatory programs (See issue #2) but also with other policy approaches both long-standing and emerging, including conservation payment programs. For example, this is true for the water utilities and salmon recovery organizations toward which the demonstration project has gravitated as likely sources of new funded demand for PWS. To what extent should PWS supplement or supplant these other approaches? And is there an appropriate geographic focus for PWS within watersheds, which range from urban areas to wilderness? The demonstration project has focused on larger water utilities because their missions are conducive to PWS possibilities, and because they may have capital budget capability to fund PWS transactions in the short term. This concentrated focus comes at the potential cost of becoming too narrow and ignoring forest benefits not directly relevant to water utility missions. Doing so could result in ignoring other sources of demand and potential payment that might help induce sufficient actions by individual forest landowners and/or achieve results at a significant enough scale within a watershed.

Many advocates of ecosystem services markets support the idea of more comprehensive programs that are based on more comprehensive estimates of total ecosystem service value and that seek to involve as wide a range of potential beneficiaries as possible in paying for these services. One form of this broader focus is the idea of “stacking” multiple ecosystem services from the same land area – stormwater protection and carbon storage, for example – and providing multiple corresponding streams of payment to

landowners from distinct buyers. Another example is the idea of an “ecosystem services district,” a utility in its own right, potentially with taxing authority that can translate general public benefit from ecosystem services into financial support to provide those services. These more comprehensive approaches are conceptually appealing, and simultaneously face significantly more complicated administrative, technical, and political hurdles to become established.

In the Nisqually pilot, the City of Olympia’s efforts to secure protection for its new drinking water aquifer may induce conservation actions that also provide open space and wildlife habitat benefits, which may or may not be of interest to the City’s rate-payers. In the Snohomish Watershed, SWM has both stormwater management and salmon recovery in its mission, but still must make clearly focused stormwater management investments with public funds.

Lessons

The project’s outcomes suggest that utility-based payment for watershed services and such payments generally can be an important element in the overall effort to retain forest cover, but that it is no panacea. Other policy tools will also continue to have their place, including both traditional and new financial incentive programs for forest landowners, technical assistance and education, and public or non-profit ownership of forest lands. Similarly, utilities can view payment for watershed services as one element of their overall capital and operating budget plans to carry out their missions.

Among ecosystem service “market” ideas currently explored across the country, some are primarily discretionary and value-driven, and may include public spending. To date, this kind of program has been limited due to funding constraints. In other initiatives, demand is driven by mandatory regulatory requirements, and more rigorous scientific justification is expected. Limitations on science can constrain the scope in these cases. Participant discussions in this demonstration project have raised the possibility of an intermediate approach, driven by policy directives and modeling based on existing knowledge, midway between purely values-driven or data-driven approaches, but incorporating available data and expressions of value. Such an approach might be integrated into infrastructure investment decisions, for example, to achieve a larger impact than has previously been possible.

Numerous policy tools are aimed at prevention of urban sprawl and providing natural spaces in or near urbanizing areas. In addition to local land use planning and zoning, they include public or non-profit land acquisition, purchase or transfer of development rights (PDR; TDR), ecological cleanup and restoration investments, and decision making for infrastructure development. In more remote commercial forest areas, forest practices regulations are the foundation of public resource protection, and in headwater areas, federal or other public conservation ownership often dominates. Payment for watershed services programs based on stormwater protection or drinking water protection might

complement these other protection programs by focusing geographically on rural zones in the mid-range of watersheds. These are areas subject to some pressure for forest conversion to development, where need for payment for watershed services action relevant to water utility missions could be most apparent, and where existing or contrasting programs may not dominate. In this middle watershed region, the State as a forest landowner and some land trusts are pursuing an “anchor forest” strategy to use existing State land trust ownership along with private land with forest tax classifications as a foundation for efficiently securing adjacent forest retention. A well-targeted payment for watershed services system might complement this strategy.

In the evolution of ecosystem service transaction systems, an ultimate vision and goal may be of broad market demand, multiple services, and wide geographic extent. In the current early phases where demonstration of the basic feasibility of this approach is paramount, it may also be prudent to continue to develop payment programs for single services by single or small groups of buyers, such as utilities focused on limited geographic areas. The issue of scale-up is discussed in issue #11.

4. Capacities of Potential Buyers

Related to the previous issue, not all entities, including water utilities, that benefit from forest watershed services and thus could be buyers in payment for watershed services systems have the organizational and financial capacity to express that demand. Small rural drinking water systems with a narrow rate base are examples. In the Nisqually watershed, the town of Eatonville uses the Mashel River as its drinking water source and is thus sensitive to forest management in that basin. However, the town does not at present have the financial capability to make payments to significantly influence forest management upstream of its water intake. Similarly the State Department of Health Office of Drinking Water has identified numerous small water systems in rural, forested areas that do not own their source water protection areas, and are unable to pay for watershed services to protect these areas. The Nisqually pilot project gravitated toward the City of Olympia, with its new groundwater source in a partially forested area in the lower watershed, largely because of the City’s interest in and financial ability to engage in land protection transactions. Even for Olympia, however, the analytical studies necessary to provide the foundations for the transaction program would be an administrative challenge for the City’s staff. In the Snohomish Watershed, SWM has the size, breadth, and financial capacity to not only undertake payment for watershed services transactions, but also to carry out analytical studies and bear some transactions costs. However, SWM also has limited resources, and has benefited from federal and state financial grants for some of this work. SWM, like Olympia, must balance the benefits of watershed services transactions with other objectives and mandates.

Lessons

Outside assistance will certainly be necessary for small water utilities in low income communities to participate in payment for watershed services programs. Some pooling of

efforts may be helpful, as long as multiple participants can each see a benefit. The lessons for moving to broader, more comprehensive programs mentioned in the previous issue also apply here.

5. Multiple Funding Sources

Inherent to discussions about using payment for watershed services transactions as a form of financial incentives for working forest retention is the concern for adequate funding for payments. This concern is especially relevant to the previous discussion about complementary incentive systems, comprehensive PES programs, and the inability of small utilities to adequately express their interests financially. Many ideas have surfaced during this demonstration project about fund sources. Both pilot project “buyers” are water utilities with rate-payer-derived capital budgets likely to be used to fund initial transactions. Although the City of Olympia and Snohomish County are comfortable considering these investments of public funds, both also feel a strong sense of accountability for prudence in spending decisions, and this fund source for future PWS is not guaranteed. As mentioned previously, Snohomish County SWM has also considered developer impact mitigation fees as a fund source, and mitigation fees are a popular concept for conservation funding in general. Acquisition of development rights, either through purchase alone or purchase and transfer to developers (PDR; TDR), is a related funding mechanism that could either exist in parallel to or be a part of PWS. Federal funding programs are also potentially available, such as the USDA Conservation Reserve Program and water-quality funds like the Drinking Water and Clean Water State Revolving Funds, although these federal funds have other dominant uses now. General state bond-financed capital spending is another potential fund source, including expansion of closely related programs like the farmland preservation and riparian protection elements of the Washington Wildlife and Recreation Program. Diverse private funding sources are also frequently mentioned, including corporate funding associated with generating brand support in a conservation context, especially for corporations that visibly consume or market water. Investment by foundations or other philanthropic entities is also anticipated, especially where below-market return rates are acceptable and a conservation-related stream of revenue can be anticipated.

Lessons

At present, while most additional fund sources are possible contributors to payment for watershed services, in all cases there are constraints on making these contributions a reality. The primary constraints are the priority of current uses of existing conservation funds and the need for a logical connection and a clear demonstration and documentation of value added for contributions to PWS. Use of funds derived from mitigation obligations of development projects must always overcome local reluctance to see the benefits of mitigation shifted away from the immediate vicinity of the associated impact, and mitigation is usually not required for forest loss in and of itself. In general, the most

favorable situation would be for local PWS project proponents to have a menu of funding options available to tailor to specific circumstances. Current recipients of the funding programs listed above could form partnerships through which to pursue PWS.

6. Communication and Education

Payment for watershed services, or for ecosystem services generally, is not a familiar or well-understood concept. [Marketing studies](#) have demonstrated relatively low salience for the phrase among members of the public, and various alternatives like [“nature’s benefits,”](#) [“natural capital,”](#) or [“green infrastructure”](#) are also used. Widespread use of payment for watershed services will require strenuous and carefully designed public outreach efforts. In addition, support for public or private expenditures for payment for watershed services may depend on a sense of urgency or threat, while on the other hand, incentive systems such as PWS can be positively framed as inducing “goods,” which may be a more appealing message. Communication and framing are sensitive to the issue discussed in #3 above regarding whether payment programs are tightly focused on the mission of individual utilities or broadly concerned with comprehensive values of “natural capital.” Appropriate communication for one may not be highly relevant to communication for the other. Although both pilot watershed partners have produced initial communication materials, both are waiting until the most appropriate time to engage in a broad program of communication to the general public about proposed pilot transactions.

Lessons

Communication about payment for watershed services needs to be designed to be both comprehensible and persuasive to the relevant public, and accurate about the benefits of individual transactions and programs of transactions. Multiple considerations can pull framing in different directions, so efforts at integrating multiple messages may be helpful.

7. Connecting Buyers and Sellers

A primary theme of the demonstration project has been to reach out and locate interested and capable payment for watershed services buyers, to make transaction possibilities real beyond the general interest of forest landowners in receiving additional streams of revenue. A corollary has been to work with potential buyers, understand their perspective, and fill in missing project pieces guided by their perspective. Water utilities who may wish to participate in PWS do not necessarily have established relationships with large or small forest landowners, and probably do not have communication resources aimed toward those PWS sellers. In addition, buyers and sellers may not occupy the same watershed, in the case of corporate or philanthropic buyers seeking broad social objectives or approval through their participation in PWS, rather than direct water benefits.

Since achieving watershed services provision at an adequate scale will usually require participation by multiple landowners in a basin, efficiency could be gained by developing the means to aggregate landowner interests, especially for owners of smaller parcels. Also it's likely in some cases that inducing landowner activities to secure desired services at a large enough scale will require coordinating demand from multiple buyers. Buyer and seller coordination will take deliberate effort. This intermediary role includes helping buyers and sellers understand one another's circumstances, objectives, capabilities and specific interest in PWS.

The Nisqually Watershed Team includes organizations skilled at landowner outreach, including the Nisqually Land Trust. This has been an asset to the City of Olympia in making effective contact with forest landowners in the McAllister source water protection area. In the Snohomish Watershed, SWM does not have in-house outreach resources focused on upstream forest landowners. SWM has discussed partnering for landowner outreach with Forterra, Northwest Natural Resources Group, and the WSU County Extension office.

Lessons

Buyers and sellers both need assistance and support in organizing themselves and in locating one another to understand each other's objectives and explore payment for watershed services possibilities. Existing organizations such as land trusts and county extension offices can help provide that support. Coordinating with existing outreach programs will also be important. In the absence of deliberate, focused outreach between sellers and buyers, payment for watershed services transactions are unlikely to occur.

8. Negotiating Needed Landowner Requirements

In order to secure positive increments of forest watershed services, water utilities or other buyers need tangible assurance that payments they make will result in the necessary activities by landowners. In addition to scientific understanding (See issue #1), this entails an understanding of landowner circumstances, interests, and limitations. Meanwhile, landowners must understand that payments cannot be received without commensurate commitments. Gaps between buyer desires and landowner willingness must be anticipated and negotiated. A common example of the gaps involving conservation easements is the desire by conservation buyers for perpetual easements and the desire by landowners to keep future options open for themselves or their heirs.

In the Nisqually watershed, initial contacts with the two commercial forest landowners who own most forest land in the upper Mashel Basin, to seek conservation commitments beyond expanded stream buffers and included harvest rate or forest cover retention requirements across the ownership. Landowner responses indicated that even if such

commitments were financially compensated at the apparent market value, a lingering perceptual cloud on the property's manageability could harm the ultimate marketability of the property. This response reflects in part the global nature of the timber and timber land market in this watershed and Washington State as a whole. However, alternative transaction designs were discussed which may be able to achieve conservation objectives while preserving clearly marketable assets, such as timber cutting rights, for the original landowner as a transitional strategy prior to fully transferring ownership to another entity. Payment for watershed services transactions can also present landowners, especially family forest landowners, with technical analysis burdens and transaction costs they may find difficult to bear.

Lessons

Flexibility by negotiators will increase the likelihood of successfully completing transactions meeting all parties' needs. Preserving long-term or ultimate real estate market options for landowners can be important. Landowners must be prepared to make real conservation commitments in order to receive payments for watershed services. Intermediaries can help landowners with technical requirements and other transaction costs, thereby simplifying the transaction. Active intermediaries with funding may actually participate in the transactions so as to provide a one-time, up-front payment to current landowners, and then receive a stream of performance-based watershed services payments over time. Integrity and trusting relationships among buyers, sellers, and intermediaries will help build confidence that the true interests of buyers and sellers are the real focus of proposed transactions, making successful transactions more likely. Third-party objectives not central to the specific buyer-seller relationship should be identified and removed from primary consideration. These could include conservation outcomes other than watershed services, provision of unnecessary technical services, or inflexible commitment to a specific market mechanism.

9. Time Considerations

Closing any complicated real estate transaction requires time for negotiations and for due diligence by all parties. Involving novel concepts and novel configuration of property interests, terms, and payments can be especially time consuming. However, the urgency associated with loss of forest cover, changing forest land ownership, and the emergence of climate change effects, motivates many supporters of ecosystems services transactions initially to want to learn quickly and move to larger-scale transactions.

In the watershed pilot projects, early hope for relatively prompt transactions has subsided in the face of analytical complexities and uncertainty, evolving objectives, and more accurate expectations for transaction time requirements. Neither pilot project has progressed to the point of launching specific transaction proposals to specific landowners. See Next Steps section below.

Lessons

Watershed services transaction programs must build in realistic expectations about time requirements for prudent transactions that meet the needs of all parties. At the same time, experience and dissemination of information can perhaps speed transactions in the future. More fluid transactions can also be brought about as payments for watershed services programs settle on the most appropriate niche for this type of conversation incentive (See issue #3), scientific knowledge advances, and market mechanisms tailored to PWS programs emerge.

10. Transaction Mechanisms and Instruments

An important original purpose of this demonstration project was to use actual pilot transactions to explore the need for, and characteristics of, mechanisms to support novel payment for watershed services transactions. For example [substantial work has been done in Oregon](#) to develop a market platform for ecosystem service credit transactions, including services related to water temperature, salmon habitat, wetlands, and prairie habitat. An element of the Nisqually pilot has been the development of a formal transaction protocol that establishes rules for participation in PWS. Previous stakeholder discussions raised the idea of “reverse auctions” or buyer auctions (somewhat akin to issuing a Request for Proposals). At the same time, land trusts and others have long-standing experience with conservation easements based on fairly conventional appraisals as the basis of conservation transactions. The question arises as to the basis for, and appropriate timing of, transitions from known methods and instruments to novel and/or more elaborate transactions platforms. One justification for a larger market mechanism would be the development of a supply of and demand for somewhat standardized ecosystem service “credits” with a relatively set price, rather than a series of individual negotiated deals, each with unique characteristics.

Lessons

At this early stage of payment for ecosystem services development, transactions will remain primarily case-by-case rather than standardized. There is room for both “top-down” rules for efficiency, predictability, and security; and “bottom-up” flexibility and diversity to respond to and learn from case-specific details. Conservation easements are the most likely transaction mechanism for watershed service payments, but other kinds of agreement may also be suitable. Meanwhile, efforts should continue, perhaps on a regional basis, to advance more standardized credit-trending systems.

11. Expanding to a Larger Scale

The present demonstration project will have value if technical information and lessons learned are used to expand on the pilot transactions and implement larger scale payment for watershed services activities. Achieving both desired forest conditions and desired water resource benefits depends on broader application of these watershed conservation incentives. Hoped-for broader application should also be understood to take place within an appropriate niche for this method and alongside other forest conservation methods (See issue #3).

At least two possible pathways can be envisioned for moving from limited pilot demonstration projects to larger scale application. One pathway follows an incremental approach, adding more individual projects to enlarge case-by-case learning, incorporate diverse new transaction scenarios and participants, and work carefully toward a future that is as yet unclear. This pathway avoids possibly premature commitments to one or a few models. However, the incremental approach likely entails continuing high transaction costs, due to less ability to achieve economies of scale in developing a common scientific, economic, and institutional foundation for transactions.

The other possible pathway starts at the policy level to establish legal direction, reliable funding sources, scientific knowledge, and implementation structures at the outset. This approach also seeks early engagement from multiple sources of demand for multiple ecosystem services. Efficiency and the potential for earlier watershed-scale outcomes are the attractions of this “build it and they will come” pathway. However, experience shows that a more “top-down” approach won’t fit every site-specific circumstance, and individual tailoring may still be needed.

Lessons

The most prudent path toward larger scale application of payment for ecosystem services (PES) probably involves a combination of incremental and system-building methods. Public and decision-maker confidence in novel conservation strategies is unlikely in the absence of some demonstrated success stories. However, needed momentum demands more than a series of isolated individual examples of transactions.

Each of the lessons in this section describes important pre-requisites for scaling up. These include better scientific understanding (Issue #1), specific integration of incentives with a clear and stable regulatory baseline at a larger scale (Issue #2), appropriate partnering with complementary conservation incentives and policies (Issue #3), broader mobilization and linkage of transaction participants and funding (Issues #4-7), and development of appropriate transaction models (Issues #8-10).

This demonstration project supports the need for priority attention to an explicit “business case” for potential buyers contemplating PES transactions, to bring available technical information to bear on the buyer’s objectives. In some cases this will make clear the

attractiveness of a PES transaction. In other cases, such a transaction may not be prudent. And, potentially, a clear look at available information may lead to a flexing in objectives themselves to accommodate a PES approach. Water utilities should consider their mission and objectives; regulatory requirements; technical, managerial, and financial capacity; and partnership possibilities when determining whether to participate in payments for watershed services. Attention should be paid to the ultimate results of this demonstration project, whether the participating water utilities ultimately conclude transactions, and what can be learned from the transactions specifics.

In Washington State, the work of developing mechanisms for multiple, stacked ecosystem services and multiple categories of buyers on a large scale has not really begun, except in theory. There is an obvious need for better scientific understanding of how multiple ecosystem services relate to one another, which may engage multiple buyers with distinct objectives related, for example, to watershed services, carbon sequestration credits, or habitat mitigation. If, alternatively, a broad multi-faceted ecosystem service is marketed to the general public, such as through a PES “district,” comprehensive estimates of true economic value will be very helpful, and policy and political issues about revenue mechanisms must be addressed. Credit trading for individual watersheds inherently faces challenges of sufficient scale. Aggregating watersheds to the scale of Puget Sound, for example, may open possibilities for much greater demand to be expressed. This could justify larger, more standardized credit trading systems.

Strong interest in large scale systems for ecosystem service transactions exists among a relatively small number of people in Washington State. However, the urgency of protecting forest cover and working forest lands is recognized more broadly. The demonstration project is serving to reinforce the value of ecosystem service payments in serving the critical public purpose of retention of forest cover in the Puget Sound region and Washington State. The evident benefits of a large scale application of PES will now require broader outreach in support of some specific larger scale steps.

LEGISLATIVE RECOMMENDATIONS

Participants are still accumulating experience from this demonstration project (see Next Steps below). However, from lessons learned so far, knowledge of expert advisors, and lessons from other regions, project participants have raised a number of possibilities for legislative action. Many of these were discussed at the recent [Northwest Environmental Forum](#) at the University of Washington in December 2012.



Two general areas of legislative initiative are possible at this stage:

First, authorizing individual payment for ecosystem service transaction participants, especially potential buyers who are public entities such as water utilities, to more confidently explore PES transactions as part of their public mission; Second, beginning to lay improved technical foundations for larger scale transaction programs, such as at the watershed level.

General Authorizing Actions

- The legislature could provide general statutory authorization for water utilities to explore and engage in watershed services transactions as part of carrying out their missions. This could entail placing appropriate language in the enabling statutes of utilities, such as Titles 35 and 36 RCW for cities and counties, Titles 54 and 57 RCW for public utility districts and water and sewer districts, Titles 80 and 86 RCW for public utilities and flood control districts, and RCW 90.48 for stormwater management. Such action would establish broad legislative intent concerning the legal basis and appropriateness of utility exploration of transactional approaches.
- The legislature could authorize specific government entities to participate in the development of market or transaction mechanisms where initiated by private or non-profit entities. These could include general natural resource agencies, such as the Department of Natural Resources through RCW 76.13 relating to stewardship of nonindustrial forests and woodlands. This could also include agencies with more targeted missions such as the Puget Sound Partnership, whose Action Agenda already includes attention to market mechanisms for working forest

retention, and the Recreation and Conservation Office, which administers much state capital investment in conservation.

- The legislature could also begin deliberation concerning broader state-authorized funding sources for public entities to carry out transactions, including appropriate targeting of mitigation payments to upstream conservation actions where efficiencies and multiple conservation benefits can be gained.

Laying Technical Foundations

- The legislature could provide funding or other support for applied, well-targeted scientific study to better understand specific forest watershed relationships in Puget Sound watersheds or more broadly, such as identifying the increment of forest protection, restoration, or management actions that are not provided by other public programs but are most relevant to the missions, needs, and circumstances of drinking water utilities, stormwater managers, or other potential buyers of watershed services.
- The legislature could encourage the use of economic analysis and estimates of the value of ecosystem services, either specific or aggregated, in public investment analysis, such as in public infrastructure investments. This could help allow the true economic contributions of these services to be more explicitly accounted for in a broader range of contexts than is currently the case.
- The legislature could direct and fund studies of the available and likely scale of economic demand for ecosystem services by public utilities in the Puget Sound Basin or elsewhere in comparison to the likely value of transactions sufficient to secure such services from a necessary threshold level of landowners within specific watersheds. The applied scientific results previously described could be one indication of the threshold level of landowner participation.
- The legislature could establish guidelines for the appropriate scientific and economic rationale necessary to encourage and support ecosystem services transactions by public agencies.

Consistent with the legislature's direction in ESHB 2541, because DNR has not secured sufficient non-state sources of funding, it has not studied and is not making legislative recommendations for other working forest conservation incentives mentioned in that legislation. These other incentives include using conservation easements for habitat and biodiversity, and using tax incentives, technical assistance, and market recognition or certification systems. As discussed in Issue #3 in the previous section, all these forms of incentives have a role to play in retaining Washington's working forest land base, and ecosystem service payment systems will find their niche in relation to the entire suite of incentive mechanisms. However, the priority of the legislature in ESHB 2541 was clearly to concentrate on the possibilities for payment for ecosystem service programs, which the department has done.

FINAL STEPS FOR PROJECT COMPLETION

In the December 2011 Progress Report, DNR advised that completion of this demonstration project would be documented in a December 2012 year-end report. Due to delays in grant funding and the untried, innovative nature of this project's activities, DNR and its partners, while making substantial progress toward project completion, have final steps remaining. Most tasks leading up to final consideration of one or more pilot transactions will be finished by spring 2013. This section describes completion of those funded tasks in the two pilot watersheds, pulling from information in the Project Activities section. The City of Olympia and Snohomish County will make final decisions on completing transactions with forest landowners, based on completion of this work.

Nisqually Watershed

The grant received for the Nisqually core team extends throughout 2013; however, the team's current workplan envisions completion of most pilot watershed services transaction work before summer of 2013, with a possible transaction following. The following are major tasks:

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|--|--------------------------|
| ▪ Complete economic feasibility analysis. | January |
| ▪ Complete USGS modeling analysis. | April |
| ▪ Identify probable specific requirements for landowner conservation easements. | April |
| ▪ Gain official City of Olympia funding approval for a transaction. | Early 2013 |
| ▪ Complete transaction program protocol. | Early 2013 |
| ▪ Make contact with final candidate forest landowner(s), confirm interest and begin negotiation. | Feb-Mar |
| ▪ Based on successful negotiation, conduct appraisal. | April |
| ▪ Gain City of Olympia decision on completing a final transaction, that includes a monitoring plan, and record the easement. | Late spring to fall 2012 |

Snohomish Watershed

The DNR-Snohomish County Interlocal Agreement for pass-through of federal project funds describes a workplan for completing a pilot transaction if favorably indicated by project work. The following are major tasks:

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|---|-------------|
| ▪ Complete initial hydrologic modeling. | Completed |
| ▪ Complete follow-up modeling. | Late winter |
| ▪ Complete initial parcel prioritization in test sub-basin. | Completed |
| ▪ Conduct follow-up prioritization in additional sub-basins | Completed |
| ▪ Complete economic feasibility analysis. | February |
| ▪ Complete final reporting. | March |

SWM expects to launch outreach to priority forest landowners in coordination with Forterra and others in spring 2013 to gauge interest in watershed service transactions. Later in 2013, Snohomish County will decide whether to proceed with a pilot transaction, based on completion of analytical work and results of landowner outreach. If proceeding, the county will select a priority parcel, negotiate with the landowner, complete an appraisal, and then execute the transaction.

The expiration of DNR's watershed grant is currently set for April 30, 2013. DNR's scope of work includes preparation of a final project report. That report, expected in April, will document completion of remaining project work, anticipate the likelihood of completing final transactions in 2013, and describe potential strategies for moving to expand beyond this demonstration project. Issue #11 in Major Issues and Lessons Learned, above, and the Legislative Recommendations section lay some groundwork for that forward-looking discussion.

The nature of DNR's further involvement in developing payment for ecosystem services programs aimed at working forest land retention depends on the results of the demonstration project, as well as further discussions with project partners, stakeholders, and the legislature, and the availability of appropriate authorization and funding. Protecting working forests and forest cover is a major goal in DNR's 2010-2014 Strategic Plan.