



# **POLICY CORNERSTONES AND ACTION STRATEGIES**

FOR AN  
**INTEGRATED ECOSYSTEM MARKETPLACE IN OREGON**

**JULY 2008**



PREPARED BY **THE INSTITUTE FOR NATURAL RESOURCES** FOR  
THE WILLAMETTE PARTNERSHIP AND DEFENDERS OF WILDLIFE



# **POLICY CORNERSTONES AND ACTION STRATEGIES FOR AN INTEGRATED ECOSYSTEM MARKETPLACE IN OREGON**

JULY 2008

*Prepared by*

**The Institute for Natural Resources**

210 Strand Hall

Oregon State University

Corvallis OR 97331

[inr.oregonstate.edu](http://inr.oregonstate.edu)

*for the*

**Willamette Partnership**

[www.willamettepartnership.org](http://www.willamettepartnership.org)

*and*

**Defenders of Wildlife**

[www.defenders.org](http://www.defenders.org)



## **ACKNOWLEDGEMENTS:**

This report was prepared by the Institute of Natural Resources under a contract with the Willamette Partnership. The policy research team, in alphabetical order, consisted of:

Gail Achterman, Institute of Natural Resources  
Bruce Aylward, Ecosystem Economics LLC  
Sally Duncan, Institute of Natural Resources  
Gina LaRocco, Defenders of Wildlife  
David Primozich, Willamette Partnership  
Sara Vickerman, Defenders of Wildlife

This report is one component in a series of roundtables, workshops, and working groups funded in part by the National Fish and Wildlife Foundation exploring opportunities and issues for ecosystem services markets. The paper draws on two workshops. The first, entitled “Building an Oregon Ecosystem Services Marketplace: Policy Focus Session,” was held in Portland on January 18, 2008. At that workshop, ecosystem service practitioners, state government representatives and ecosystem service experts from other states conducted a brainstorming session on the desired outcomes, market barriers, roles and responsibilities of government, and policy reforms needed to stimulate an ecosystem marketplace in Oregon. A rich discussion and many case studies were gleaned from the day and the team is most grateful to the workshop participants, listed below. The ideas, suggestions and examples shared at the workshop provided the foundation for a draft of this document that was then discussed at a second workshop with state agency directors and staff. This was an all day workshop that took place May 8th in Portland. The agencies provided valuable feedback and input to the ideas expressed in the draft document and helped refine the policy objectives and strategies, which are presented in this final draft. The policy research team wishes to express its gratitude to all those participating in the two workshops (as listed below) for their valuable contribution to this important effort.



## EXECUTIVE SUMMARY

Every year government, businesses and communities spend hundreds of millions of dollars on environmental mitigation and restoration in Oregon. The resulting work targets a very limited range of highly visible environmental problems required to be addressed by specific state and federal regulations. Voluntary expenditures, by contrast, target issues of concern to whomever provides the funds.

Significant financial investments in ecosystem conservation and restoration are necessary to move Oregon towards a sustainable future in which healthy and resilient ecosystems are the foundation of healthy communities and economies, generating a high quality of life for all Oregonians. Today, however, the limited and ad hoc way in which mitigation and restoration is done does not promote focused and integrated ecosystem outcomes and is arguably not timely, efficient or cost-effective.

At the Oregon Business Summit in December 2007, one of the key initiatives presented was “Creating an Ecosystem Services Marketplace.” Individual markets are already active in carbon, wetlands, habitat, open space and hazard reduction, but the proposed initiative recognized the enormous potential value of an integrated ecosystem services marketplace. The proposal was founded on the belief that Oregon’s brand values of integrity, stewardship, and innovation position our state ideally to capitalize on emerging opportunities in the ecosystem services marketplace, in particular the drawing of revenue, talent, and jobs to our region, while enhancing our leadership in sustainability.



*Bruce Taylor, Defenders of Wildlife*

Oregon has the opportunity to take the lead in developing an integrated ecosystem services marketplace, but time

is of the essence. Development and research efforts to develop ecosystem markets are underway across the country and around the world, so Oregon must move immediately to retain its front-line position.

This report derives from two policy work sessions, one in January, one in May, which explored policy cornerstones and action strategies to bring the integrated marketplace to fruition. We took an initial look at ways in which current state policies and practices either promote or inhibit developing a robust ecosystem marketplace. With input from agency heads and staff, we have identified specific strategies agencies can employ to meet the objectives required to develop an integrated marketplace. In many cases, these strategies are already in some stage of development, trial or implementation in Oregon. The report highlights these and compiles examples from across the state to demonstrate the range of experimentation already underway with market incentive mechanisms.

The work sessions identified problems and solutions in the arenas of

- (1) initiatives that will stimulate demand in the marketplace and
- (2) initiatives that will increase efficiency and lower transaction costs.

The report reflects a move from a command-and-control system based on regulatory prescriptions to a more flexible outcomes-based approach that allows for innovation and problem-solving at the site and local level, and encourages development of the ecosystem marketplace for both regulatory and voluntary purposes.



## RECOMMENDATIONS FOR STIMULATING DEMAND INCLUDE:

- Enhance both public and private investment by creating regulatory drivers and positive incentives that stimulate the private sector to invest in ecosystems;
- Capitalize on existing state mitigation efforts to build demand for ecosystem services and stimulate supply and innovation in the private sector;
- Use public lands to support marketplace development and reduce risk;
- Encourage and promote a credit registry, encourage development and use of rapid appraisal tools, and provide mechanisms to encourage landowners and agencies to participate in marketplace through pilot projects.

## RECOMMENDATIONS FOR INCREASING EFFICIENCY AND LOWERING TRANSACTION COSTS INCLUDE:

- Coordinate across agencies to develop a strategic focus for ecosystem conservation and restoration, and promote efficient implementation and monitoring pathways to arrive at ecosystem outcomes;
- Encourage agency culture of adaptive management and risk-taking;
- Integrate existing and new programs across a range of services at an appropriate ecosystem scale, and harmonize conflicting, competing or overlapping programs across jurisdictions, scales and mechanisms to promote clarity and target strategic conservation and restoration actions;
- Streamline the permitting process;
- Encourage voluntary participation in ecosystem markets by recognizing that ecosystems are part of our economic infrastructure;
- Establish transparent and credible ecosystem service accounting protocols;
- Provide a long-term vision for marketplace and broaden acceptance of marketplace concepts.



*Bruce Taylor, Defenders of Wildlife*

Along with shifting priorities in state agencies, is a general legislative framework required to underpin their efforts? Generally speaking, a detailed framework creating new authorities is not recommended by experts in this field. Specific legislation can be helpful in certain cases, or where bureaucratic space is needed to support agency actions. Proposed legislative language is included in this report as Section 5.

Next steps to move the integrated marketplace concept toward fruition, and keep Oregon's leadership position, are outlined as a final section to this document. They include

education and public engagement activities, public and private sector pilot studies, development and evaluation of accounting tools, and ongoing informational and research needs.





# POLICY FOCUS (1ST) WORKSHOP: PARTICIPANTS, TITLES AND ORGANIZATIONS

---

**GAIL ACHTERMAN**

*Director*  
Institute for Natural Resources  
Oregon State University

**PAUL AGRIMIS**

*Principal*  
Vigil-Agrimis, Inc

**BRUCE AYLWARD**

*Director*  
Ecosystem Economics LLC

**JANE BACCHIERI**

*Natural Resources Policy Advisor*  
Office of the Governor, State of Oregon

**BILL BOGGESS**

*Executive Associate Dean*  
College of Agricultural Sciences  
Oregon State University

**MIKE BURNETT**

*Executive Director*  
Climate Trust

**DENNIS CANTY**

*President*  
Evergreen Funding Consultants

**BOBBY COCHRAN**

*Environmental Marketplace Analyst*  
Clean Water Services

**PETE DALKE**

*Associate, Oregon Solutions*  
Portland State University

**ROBERT DEAL**

*Research Scientist*  
PNW Research Station

**SALLY DUNCAN**

*Policy Research Director*  
Institute for Natural Resources, OSU

**GORDON FEIGNER**

*Management Analyst*  
City of Portland Bureau of Env. Services  
1120 SW Fifth Avenue, Room 1000.

**BILL GAFFI**

*General Manager*  
Clean Water Services

**KEVIN HALSEY**

*Senior Policy Analyst*  
Parametrix

**MARK KIESER**

*Senior Scientist*  
Kieser & Associates

**GINA LAROCCO**

*Conservation Program Associate*  
Defenders of Wildlife

**CATHERINE MACDONALD**

*Director of Conservation Programs*  
The Nature Conservancy

**JOHN MILLER**

*President*  
Wildwood, Inc

**BELINDA MORRIS**

*Ecosystem Services Coordinator*  
The Nature Conservancy

**LYDIA OLANDER**

*Associate Director for Ecosystem Services*  
Nicholas Institute for Env. Policy Solutions  
Duke University

**DAVID PRIMOZICH**

*Executive Director*  
Willamette Partnership

**PETER RUFFIER**

*Director, Wastewater Division*  
City of Eugene

**GABRIELLE SCHIFFER**

*Special Projects Coordinator*  
Office of the Governor, State of Oregon

**CAMERON SMITH**

*Policy Advisor*  
Office of the Governor, State of Oregon

**LOUISE SOLLIDAY**

*Director*  
Oregon Department of State Lands

**SARA VICKERMAN**

*Director, West Coast Office*  
Defenders of Wildlife

**DAN VIZZINI**

City of Portland  
Bureau of Environmental Services

**BETTINA VON HAGEN**

*VP, Natural Capital Fund & Forestry Prog.*  
Ecotrust

# AGENCY (2ND) WORKSHOP: PARTICIPANTS, TITLES AND ORGANIZATIONS

---

**GAIL ACHTERMAN**

*Director*  
Institute for Natural Resources  
Oregon State University

**JAS ADAMS**

*General Counsel – Natural Resources*  
Department of Justice (DOJ)

**BRUCE AYLWARD**

*Director*  
Ecosystem Economics LLC

**MARVIN BROWN**

*State Forester*  
Department of Forestry (ODF)

**MARK BROWN**

Bureau of Land Management (BLM)

**BOBBY COCHRAN**

*Environmental Marketplace Analyst*  
Clean Water Services

**SALLY DUNCAN**

*Policy Research Director*  
Institute for Natural Resources, OSU

**BILL GAFFI**

*General Manager*  
Clean Water Services

**ELISE GRANEK**

*Assistant Professor*  
Portland State University

**JESSICA HAMILTON**

*Associate*  
Perkins-Coie

**MARIAN HAMMOND**

Department of Economic and Community  
Development (OECD)

**AUDREY HATCH**

*Conservation Strategy Monitoring Coordinator*  
Oregon Department of Fish and Wildlife  
(ODFW)

**BILL HOGSETT**

Environmental Protection Agency (EPA)

**GINA LAROCCO**

*Conservation Program Associate*  
Defenders of Wildlife

**SUE LURIE**

*Research Associate*  
Institute for Natural Resources, OSU

**RUBEN OCHOA**

*Water Policy Analyst*  
Oregon Water Resources Department  
(OWRD)

**LARRY OJUA**

*Program Manager for Soil and Water  
Conservation Districts*  
Department of Agriculture (ODA)

**DICK PEDERSEN**

*Interim Director*  
Department of Environmental Quality  
(DEQ)

**DAVID POWERS**

*Regional Manager for Forests and Rangelands*  
Environmental Protection Agency (EPA)

**DAVID PRIMOZICH**

*Executive Director*  
Willamette Partnership

**CAMERON SMITH**

*Policy Advisor*  
Office of the Governor, State of Oregon

**LOUISE SOLLIDAY**

*Director*  
Oregon Department of State Lands

**SARA VICKERMAN**

*Director, West Coast Office*  
Defenders of Wildlife

**DENIS WHITE**

*Geographer*  
Environmental Protection Agency (EPA)

*Participants from first workshop who participated  
in the second workshop: Gail Achterman, Bruce  
Aylward, Bobby Cochran, Sally Duncan, Bill  
Gaffi, Gina LaRocco, David Primozich, Louise  
Solliday, Cameron Smith, and Sarah Vickerman.  
Facilitation for this meeting provided by Gillian  
Ockner.*



# CONTENTS

<b>1.</b>	<b>Introduction</b>	<b>1</b>
<b>2.</b>	<b>An Ecosystem Marketplace for Oregon?</b>	<b>3</b>
2.1	Ecosystem Services	3
2.2	The Oregon Vision	3
2.3	An Ecosystem Marketplace	4
2.4	Why a Marketplace?	8
2.5	Ecosystem and Economic Innovation as Competitive Advantage	8
2.6	Marketplace Integration and Public Policy	9
<b>3.</b>	<b>Policies to Stimulate Demand for Ecosystems</b>	<b>10</b>
3.1	Enhance Market-Based Incentives and Create Regulated Markets	10
3.2	Use State Mitigation to Generate Marketplace Demand	11
3.3	Defining the Role of Public Lands in Ecosystem Markets	11
3.4	Provide Market Liquidity and Support Ecosystem Market Pilots	12
<b>4.</b>	<b>Policies to Promote Marketplace Efficiency</b>	<b>14</b>
4.1	Agree on Ecosystem Goals	14
4.2	Balance the Use of Outcome-based and Prescriptive Rules	14
4.3	Encourage Adaptive Management and Risk-Taking	16
4.4	Integrate Agency Responses across Ecosystem Services	17
4.5	Harmonize Incentives and Programs across Jurisdictions	17
4.6	Streamline Permitting Processes	18
4.7	Recognize Ecosystems as Economic Infrastructure	19
4.8	Develop Ecosystem Service Accounting	19
4.9	Provide a Marketplace Vision and Promote Awareness	20
<b>5.</b>	<b>Legislative Concepts</b>	<b>22</b>
<b>6.</b>	<b>Action Agenda</b>	<b>26</b>
	APPENDIX 1: Resources on Ecosystem Services	29
	APPENDIX 2: Glossary of Ecosystem Marketplace Terms	30
	Endnotes	32





# 1. INTRODUCTION

In a global assessment of ecosystem services the United Nations Millennium Ecosystem Assessment concluded in 2005 that, “the challenge of reversing the degradation of ecosystems while meeting increasing demands for their services can be partially met under some scenarios that the Assessment has considered, but these involve significant changes in policies, institutions, and practices that are not currently under way. Many options exist to conserve or enhance specific ecosystem services in ways that reduce negative trade-offs or that provide positive synergies with other ecosystem services.” (emphasis added)<sup>i</sup>

Every year government, businesses and communities spend hundreds of millions of dollars on environmental mitigation and restoration in Oregon. Much of this expenditure is mandated by state and federal regulations designed to meet a very limited range of highly visible environmental problems. Another large portion of this expenditure is voluntary and targeted to specific issues of concern to the business, foundation or individual providing the funds. Significant financial investments in ecosystem conservation and restoration are necessary to move Oregon towards a sustainable future in which healthy and resilient ecosystems are the foundation of healthy communities and economies, generating a high quality of life for all Oregonians. However, the partial and ad hoc way in which these expenditures are now delivered does not promote focused and integrated ecosystem outcomes and is arguably not timely, efficient or cost-effective.



*Bruce Taylor, Defenders of Wildlife*

Worldwide, there has been an explosion of growth in the use of market-based approaches to environmental problems. This movement seeks to harness the power of economic incentives to protect and restore the services that ecosystems provided to society - such as trees taking in carbon dioxide and shading streams, wetlands filtering and recharging groundwater, healthy riparian and instream habitat providing for fish spawning and rearing, and floodplains reducing the impacts of flood events.

Oregon has long nurtured creative thinking, leadership and innovation in the environmental arena. Over the last couple of decades Oregon institutions have likewise led national efforts to experiment with new, market-based approaches. Many of these initiatives are reviewed here to demonstrate how this approach can lead to on-the-ground improvements in ecosystem health. It is necessary to integrate, expand and scale up these isolated cases in order to create an ecosystem marketplace. Such a marketplace would enable buyers of ecosystem services to pay providers of ecosystem services to protect, restore and maintain public goods such as clean air and water, fish and wildlife habitat, biodiversity and sequestered carbon. Such a marketplace would provide a pivotal link between people willing to pay for actions that improve and protect the economic functions of our ecosystems and those who can take those actions.

This report takes an initial look at ways in which current state policies and practices both promote and inhibit the development of a robust ecosystem marketplace. The opportunities and policy objectives for the marketplace emerge from identifying the barriers and obstacles to effective marketplace development. Strategies agencies can employ to meet these objectives are then specified. In many cases, these strategies are already in some stage of development, trial or implementation in Oregon. The report highlights these and compiles examples from across the state to demonstrate the range of experimentation already underway with market incentive mechanisms.

We begin by defining terms and providing a summary of the Oregon Vision for such a marketplace. The rationale for pursuing a marketplace is made explicit. Two sections then follow in which specific problems and solutions are presented. These are organized first in terms of initiatives that will stimulate demand in the marketplace and, second, those that will increase efficiency and lower transaction costs. A short section then outlines a preliminary legislative concept to support agencies and their partners in efforts to further the marketplace. Concluding remarks are provided that outline potential next steps for agencies interested in pursuing a marketplace agenda. It is recognized that all Oregon's ecosystem service efforts are nested and interact within the federal regulatory framework, but the focus of this report is on the potential for innovation and change at the state level.

## 2. AN ECOSYSTEM MARKETPLACE FOR OREGON?

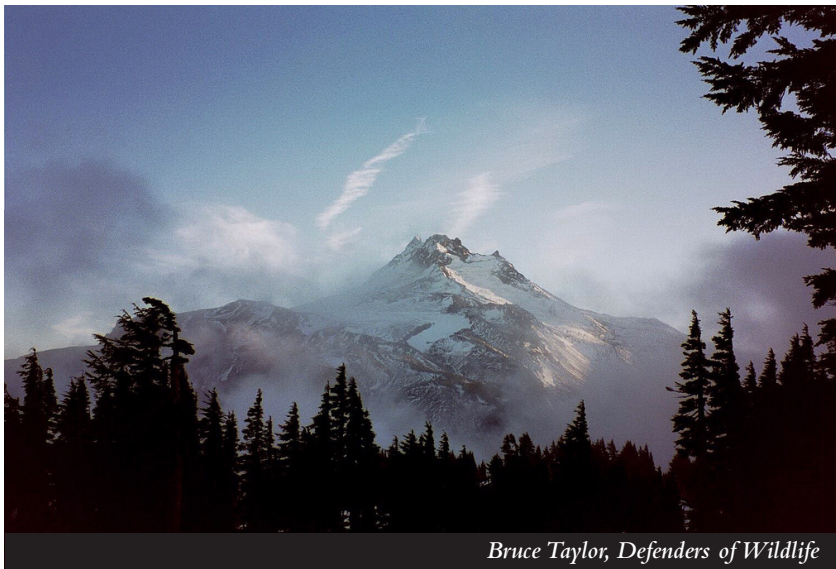
### 2.1 ECOSYSTEM SERVICES

Ecosystem services are defined by the Millennium Assessment as the benefits provided by ecosystems, grouped into four categories:

- provisioning services such as food, water, timber, fiber and genetic resources
- regulating services such as climate, water, erosion and natural hazard regulation
- cultural services such as recreation, aesthetic enjoyment and spiritual fulfillment
- supporting services such as soil formation, pollination and nutrient cycling<sup>ii</sup>

The definition of ecosystem services employed by the Millennium Assessment differs only slightly from that adopted by Oregon legislators. In modifying the Forest Resource Trust HB 2293 the legislature coined this definition of ecosystem services (ORS 526.735 (2)):

“Ecosystem services” means environmental benefits arising from the conservation and management of forestland, including, but not limited to, fish and wildlife habitat, clean water and air, pollination, mitigation of environmental hazards, control of pests and diseases, carbon sequestration, avoidance of carbon dioxide emissions and maintenance of soil productivity.



Bruce Taylor, Defenders of Wildlife

Ecosystem services can of course come from any type of ecosystem, not just forests. That said, much of the early development of systems of payments for ecosystem (or environmental) services occurred in the context of tropical forests.<sup>iii</sup> This concept has since been reincorporated back into temperate forest management in many states and countries as in HB 2293, which directly encourages the Board of Forestry to “assist landowners in securing payments for ecosystem services.”

The concept of ecosystem services is thus already recognized in Oregon Law, although it may be useful to clarify that these benefits originate from the conservation, management *and* restoration of ecosystems *generally*.

### 2.2 THE OREGON VISION

Even with the landmark state and federal environmental laws of the last 30 years in place, our most fervent efforts at conservation and restoration are failing to keep pace with environmental damage. We are falling behind, despite the best of intentions. Continued degradation of our ecosystem health statewide will have negative effects on the region’s economy, the rural resource base, and our quality of life. Furthermore, compliance with environmental regulations has often spawned intransigence, inefficiencies and conflict that contribute little to restoration achievements, indeed creating barriers to timely progress.

### **BOX 1. WHAT THE OREGON BUSINESS PLAN'S 2007 POLICY PLAYBOOK HAS TO SAY ABOUT THE ECOSYSTEM MARKETPLACE:**

Expand the Ecosystem Marketplace. Oregon is taking an early lead in developing infrastructure that allows businesses to purchase ecological services from others as a way of mitigating their own environmental pollution. Oregon has the opportunity to leap ahead in this area. Trading can lead to better environmental outcomes at a lower cost to business. It also creates the opportunity for national and global leadership, with the potential for Oregon to become a center in this field.

Professionals in the field tell us that Oregon is home to many significant innovations in using market-based programs to provide ecosystem services. For example, the Climate Trust, Oregon Water Trust, Deschutes River Conservancy, and Clean Water Services have been national leaders in using carbon and water (quantity and quality) markets for ecosystem restoration (see Boxes 2 through 4). Leadership at the local and regional level has been and continues to be strong and creative. Political leaders at the highest levels in the state are engaged and informed about ecosystem service issues and tools.

In addition to these programs, the Willamette Partnership, a coalition of local leaders, is building the infrastructure required to operate an integrated, multi-credit market—one that accounts for and sells credits for a wide range of ecosystem services. Because it is integrated and will involve many types of credits—and many types of buyers and sellers—the ecosystem marketplace being developed by the Willamette Partnership will drive restoration projects that are more comprehensive than any one party can accomplish alone. No other markets, nationally or internationally, have attempted to be as comprehensive, integrated, and ecosystem-focused as the Willamette marketplace. Other states and countries are watching what is happening in Oregon and looking for concepts, elements, and protocols that can be applied around the country or the world.

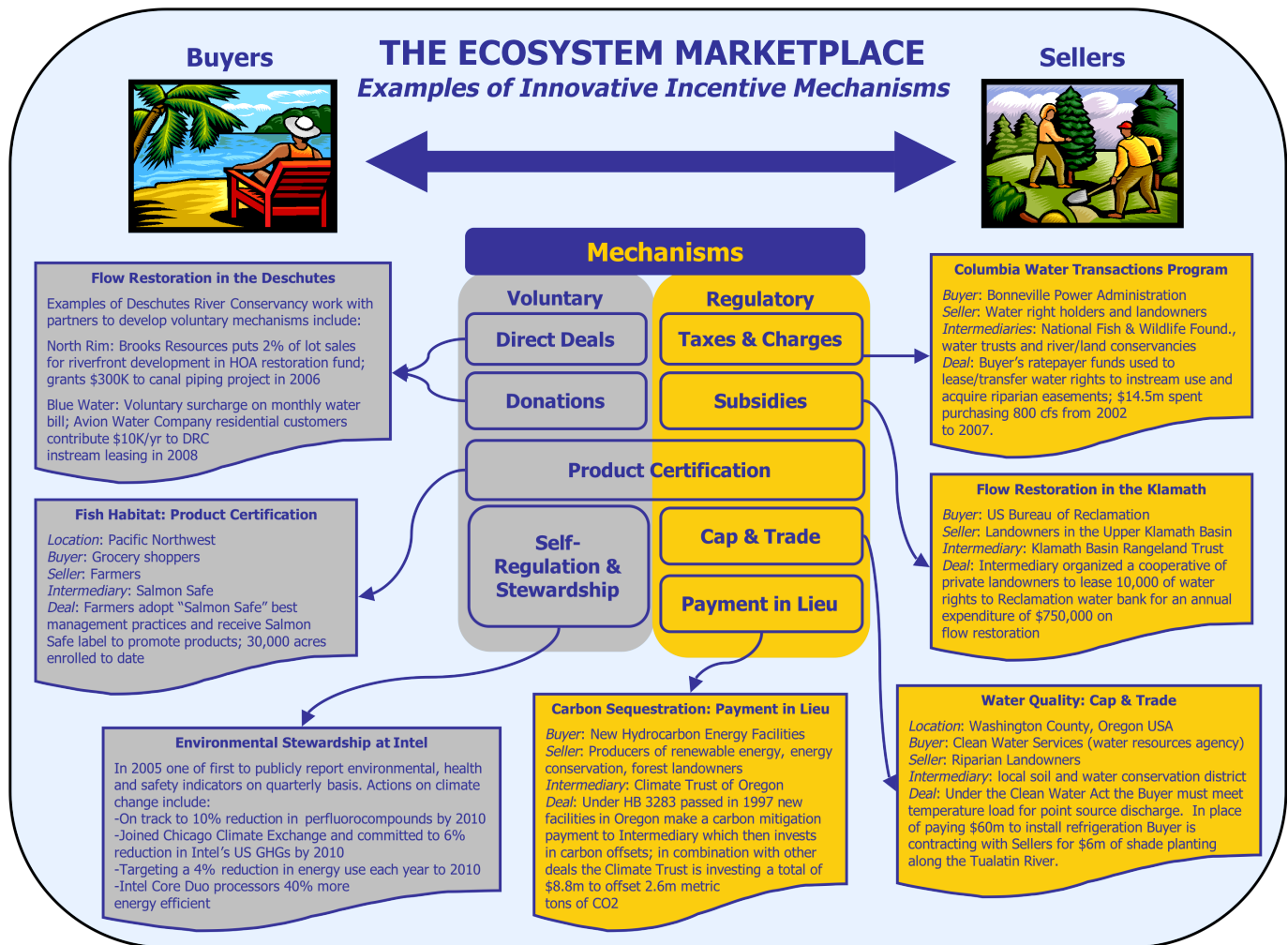
Oregon also has the advantage of similarly engaged and informed neighbors who are likely willing partners in those ecosystem service issues that would benefit from cooperation at a larger scale or across state lines. To our north the Puget Sound Partnership is creating a Sound-wide ecosystem restoration plan and the tools to move a restoration agenda forward. In addition, the Oregon Business Plan supports and encourages expanding the marketplace (see Box 1).

## **2.3 AN ECOSYSTEM MARKETPLACE**

A marketplace is simply a location – real or virtual – where buyers, sellers and intermediaries meet to exchange goods and services. Markets emerge where the buyer perceives that benefits exceed the costs of engaging in trade. Two types of costs predominate in most markets. One is the payment made to sellers to compensate them for providing the good or service. The other is the payments to intermediaries or other costs such as time, processing, fees, appraisals, etc. These latter are called transaction costs. A fundamental requirement for markets to emerge is that there must be *gains from trade* for the buyer, *after* adding up purchase payments and transaction costs.

Ecosystem services present a uniquely complex case in market development. With “products” such as reduced water pollution, restored aquatic habitat, and sequestered carbon, the purchase costs are probably the most studied and relatively well-known element of this equation. At the same time, while many have been convinced that ecosystem conservation and restoration provide important benefits, these benefits are difficult for any one group or individual in society to capture. As a result, the demand to buy these services has often seemed limited. And finally, the general economic principle that transaction costs in new areas of exchange will typically be high has been confirmed by initial experiences with market-based approaches in this field.





**FIGURE 1**

Thus the emergence of a marketplace will require clear financial and economic incentives. Stimulating market demand will be essential, as will efforts to keep transaction costs low. Because government regulations and agencies will be central to stimulating demand, many of the strategies discussed later in this paper revolve around how the State can stimulate demand and act to lower or minimize transaction costs.

For Oregon, an ecosystem marketplace can be viewed as a broad umbrella covering the full suite of mechanisms that promote investment in our ecosystems (see Figure 1). At present we have a well-intentioned but ad hoc set of programs, rules, initiatives and pilots. There are a vast number of regulatory and non-regulatory ("voluntary") programs that span a number of ecosystems and specific ecosystem goods and services. Creating a marketplace using a comprehensive and integrated approach would accomplish the needed ecosystem protection and restoration. In the short run this involves finding and resolving the gaps and overlaps in existing initiatives. In the long run it means moving from less efficient to more efficient strategies for stimulating demand and conducting transactions in the marketplace.

The innovation Oregon is proposing is the development of regulatory and voluntary cap and trade systems that are *integrated across ecosystem services*, so-called "multi-credit ecosystem service markets." It is precisely in the use of such markets that Oregon is ahead of the game (see Boxes 2 through 4). We therefore emphasize this opportunity, particularly in terms of how the State can best enable these markets.

---

**BOX 2. WASTEWATER EFFLUENT TRADING: CLEAN WATER SERVICES AND DEQ**

Water quality credit trading is an innovative approach to achieve water quality goals more efficiently. Trading is based on the fact that sources in a watershed can face very different costs to control the same pollutant. Trading programs allow facilities facing higher pollution control costs to meet their regulatory obligations by purchasing environmentally equivalent (or superior) pollution reductions from another source at lower cost, thus achieving the same water quality improvement at lower overall cost.

Clean Water Services (CWS) is the water resources management agency for Washington County, servicing cities and towns west of Portland. CWS received the first-ever fully integrated municipal National Pollutant Discharge Elimination System (NPDES) permit on February 26, 2004, marking a sea change in the Environmental Protection Agency's approach to water quality permitting. Five permits—four wastewater treatment facilities and one urban stormwater management permit—are now combined into one permit in a comprehensive approach to achieve water quality standards and improve the overall health of the Tualatin River Watershed. The new permit allows trading of water quality credits which will help achieve water quality goals. For example, to meet temperature goals, the District may balance heat released from the treatment facilities with cool water released from Hagg Lake and new shade from planting trees in rural riparian areas. Also new are market incentives to reduce nonpoint source pollution, and better tools for meeting Endangered Species Act challenges.

*Sources: Clean Water Services and Oregon Department of Environmental Quality*

---

**BOX 3. PAYMENT IN LIEU FOR GREENHOUSE GAS OFFSETS: THE CLIMATE TRUST**

In 1997 Oregon became the first state to adopt legislations regulating greenhouse gases. House Bill 3283 requires new Oregon power plants (and other large energy facilities) to offset a significant portion of their carbon dioxide emissions. The law provides emitters with a choice of providing their own offsets or to make a payment in lieu of providing offsets to a qualified non-profit organization. The Climate Trust was created to fulfill this need for an Oregon non-profit corporation to invest in projects that reduce atmospheric carbon dioxide levels.

The Climate Trust has emerged as one of the largest buyers of offsets in the United States. The Climate Trust has placed \$8.8 million in a diverse portfolio of projects that are expected to offset nearly 2.6 million metric tons of carbon dioxide. In addition to the Oregon payment in lieu program the Climate Trust provides customized offset acquisition services for large emitters, as well as a series of offset programs for organizations and events. The Climate Trust provides a user-friendly web “CarbonCounter” facility for individuals wishing to offset their emissions. Finally, the Climate Trust provides consulting services and has emerged as a lead innovator in greenhouse gas market implementation and is an active contributor to the development of regulatory policy nationally and internationally.

*Source: The Climate Trust*

---

**BOX 4. CAP AND TRADE FOR INSTREAM FLOW: THE OREGON INSTREAM WATER RIGHTS ACT**

By allocating water on the basis of “first in time, first in right” the prior appropriation doctrine creates a cap on valuable senior water rights. The Oregon water code has long provided the ability for water right holders to sell and transfer their water rights. However, it was not until the passage of the Instream Water Rights Act in 1987 that instream flow was formally recognized as a beneficial use and the sale, gift and lease of water of existing water rights to instream use was authorized. The Act has created a market for water transfers and



conservation with the explicit intent of attempting to re-water Oregon creeks and streams for ecological, recreational and water quality purposes. A number of innovative organizations and programs have evolved to carry out such environmental water transactions.

*The Oregon Water Trust (OWT)*. Founded in 1993 by a group with diverse water interests, OWT was the first



*Bruce Taylor, Defenders of Wildlife*

water trust in the nation. OWT's mission is to restore surface water flows for healthier streams in Oregon by using cooperative, free-market solutions. With a transactional approach, OWT focuses its effort on small tributary streams where small amounts of water provide significant ecological benefits. Since its first transaction in 1994 OWT's portfolio has risen to 160 cfs of water rights across 86 different streams, representing willing buyer, willing seller transactions with over 200 landowners.

*Deschutes River Conservancy (DRC)*. The DRC is a non-profit working to improve water quantity and quality in the Deschutes

Basin of Central Oregon. Water leasing, conservation and transfers in the Deschutes Basin are helping to meet new environmental and municipal demands on water while sustaining agricultural and other existing uses. In addition to restoration-driven instream flow transactions the DRC has partnered with basin water users to develop a number of novel water banking mechanisms for water reallocation. Under state law, new groundwater permit applicants in the Deschutes Basin need to acquire mitigation credits. These credits mitigate for the effects of new water use on stream flow in the lower Deschutes River. The credits are generated by transferring mitigation water to instream use. The DRC coordinates with local irrigation districts, municipalities, landowners and the Oregon Water Resources Department to create these credits, which are sold to clients that need to mitigate for their groundwater use. As a place-based organization, the DRC has been able to make significant headway in meeting Oregon Department of Fish and Wildlife targets for stream flow on several priority creeks and rivers. Whychus Creek, which previously was dewatered during summer months, saw summer flows of 15 cfs in 2007 – just below the ODFW target of 20 cfs. In the middle Deschutes below Bend, DRC's cooperative approach have raised flows from historic levels of 30 cfs to 115 cfs in 2008 – almost halfway to the 250 cfs target.

*Columbia Basin Water Transactions Program (CBWTP)*. Initiated in 2002, the mission of the CBWTP is to support innovative, voluntary, grassroots water transactions that improve flows to tributary streams and rivers in the communities of the Columbia Basin. The program is made possible in large part through funding by the Bonneville Power Administration (BPA) in cooperation with the Northwest Power and Conservation Council. The program is managed by the National Fish and Wildlife Foundation (NFWF) out of its Portland office where it receives, evaluates, and ranks water transaction proposals submitted by local entities from across the Columbia Basin. Using permanent acquisitions, leases, investments in efficiency and other incentive-based approaches, the CBWTP supports 11 program partners in Oregon, Washington, Idaho and Montana to partner with landowners on stream flow restoration efforts.

*Sources: Oregon Water Trust, Deschutes River Conservancy, Columbia Basin Water Transactions Program*

## **2.4 WHY AN INTEGRATED MARKETPLACE?**

The goal of building an ecosystem marketplace is to attain broader and more effective conservation and restoration. This can be achieved by building a new suite of tools tied to strategic ecological priorities and market-based incentives. Oregon's unique contribution to this field can be a state-wide conservation- and restoration-driven, integrated marketplace. Such a marketplace has the following advantage over the current state of affairs:

- it will directly address continued ecosystem degradation and limited efforts at restoration, by generating financial resources, creating incentives for investment, and increasing business sector involvement in environmental management
- it will support regulation that limits ecosystem degradation, as well as underwriting and motivating voluntary actions to improve ecosystems
- it will catalyze investment in environmentally friendly technologies, thus expanding the associated economic opportunity
- it will promote strategic investments in ecosystems
- the marketplace will greatly enhance Oregon's reputation as a state that has embraced and defined sustainable living, both ecologically and economically.

The concept of an Oregon ecosystem marketplace emerges from three ideas that are deeply ingrained in civic life and state policies:

- ensuring the quality of life of our people
- creating competitive advantage for business
- safeguarding our natural heritage

By taking the initiative to invest in the integrated ecosystem marketplace, Oregon leaders are making a choice to help pioneer a new and rapidly-developing framework for doing business while minding our ecosystems, instead of facing the ecological and economic risks of continuously degrading ecosystems.

## **2.5 ECOSYSTEM AND ECONOMIC INNOVATION AS COMPETITIVE ADVANTAGE**

To develop and maintain a lead position in this national movement, it will be crucial to champion an integrated approach to policy development for the marketplace. Successful and innovative policies will spread beyond Oregon, but the first step is to put our own house in order. To achieve economies of scale, the marketplace must incorporate actions and investments that are both regulatory and voluntary in nature. A critical step is to ensure that the regulatory framework conveys these demand signals to the marketplace in an integrated and coherent fashion, one that supports and contributes to the larger goal of ecosystem health.

The competitive advantage of integration across ecosystems and their services does not preclude the pragmatic, even opportunistic approaches of sound business. Nor does establishing ecological priorities rule out flexibility and adaptation. Underpinning this integration must be a firm grasp of the economic benefits provided by ecosystems, the use of sound science in developing accounting protocols and standards, and a policy commitment to adaptive management and continuous improvement. Building a true functioning marketplace will require innovation across the scientific, technical, legal, economic and financial arenas. Taking the concepts of ecosystem services and market approaches and integrating them into an operational marketplace would be a signature achievement, opening up opportunities for Oregon firms to export ideas, know-how and software to other regions – and simultaneously providing opportunities for outsiders to invest

## BOX 5. INNOVATION AND ECONOMIC OPPORTUNITIES

### Marketplace infrastructure

- Trading floor for multi-credit markets
- Protocols for establishment and verification of credits
- Green construction and development
- Eco-labeling and green business
- Spatial land registry tools

### Financial services innovation

- Credit banking facilities
- Insurance and loans for credits
- Revolving ecosystem credit funds
- Private equity funds

### Education and Workforce innovation potential

- Ecosystem restoration consulting services
- Appraisal, banking, insurance training
- Certification training across multiple resources
- Extension/consulting for landowner interactions
- Policy Cornerstones for the Marketplace

in the maintenance and improvement of Oregon's natural heritage (*see Box 5*).

## 2.6 MARKETPLACE INTEGRATION AND PUBLIC POLICY

It is important to acknowledge that over the last 30 years, landmark changes in public policy and new environmental laws have made progress addressing some of the most visible and egregious sources of environmental degradation. However, these laws have all too often focused solely on specific impacts and individual species and habitats. In addition, legal requirements have typically steered efforts towards the mitigation of specific impacts at or near the site of impact, leading to a hodgepodge of small, localized efforts. Treating isolated problems fails to consider the overall health of our natural environment. While such efforts may reduce the impacts they may not effectively cope with the cumulative nature of gradual erosion and degradation of our ecosystems – as many impacts go unregulated. Further, such efforts presume that forestalling or reducing degradation in one site is better than contributing to ecosystem restoration in another.

The future of ecosystem conservation and restoration will require us to achieve a higher degree of integration across ecosystem objectives. This enables ecological and economic goals to become aligned in the marketplace, providing the needed cash to finance restoration and drive new business opportunities. This report focuses on how better integration can be achieved in the realm of public policy. Integration across services implies a need for integration of policy-making at the state level. In particular we try to identify the barriers and limitations that are encountered where the public sector interacts with conservation and restoration. From these problem areas come the high-level policy goals, policy objectives and agency-level strategies that will assist in the development of an integrated marketplace. Generally, the state will engage in one of two ways: either in taking specific action as a buyer in the marketplace or in acting to promulgate rules or capacity that will structure the market and the interactions between market participants.

The discussion is segregated along the lines suggested above. First, the barriers limiting the demand for ecosystem services are identified, and the objectives and strategies to stimulate the marketplace provided. Second, the limitation in current approaches and processes are identified along with policy objectives that can help improve efficiency, making the marketplace more attractive for buyers and sellers of ecosystem services.

In this section the problems of our current system are highlighted and the broad outlines of forward-looking policy for tackling these problems – the policy cornerstones – are presented. The result is the proposal of a series of high-level policy objectives that may serve to guide decision making, particularly at the state government level.



### 3. POLICIES TO STIMULATE DEMAND FOR ECOSYSTEMS

Demand for ecosystem services will drive the development and volume of conservation and restoration achieved in the marketplace. This demand breaks down into regulatory demand – originating from government policies, legislation and rules – and non-regulatory demand – that which emerges voluntarily in the private and non-profit sectors. By their very nature, voluntary initiatives will need little in the way of support from government. The main issue on the demand side will be how to stimulate regulatory demand for ecosystems. On the supply side of the market are issues related to the role of the private and public sector in generating supply, as well as the problem of how best to provide market liquidity so that there is enough supply to meet initial demand. Given that the focus of this document is on the role of state government in the ecosystem marketplace, below we address mainly those policies the state can promote to *directly stimulate demand and supply* for ecosystem services and to ensure that the development of private sector *supply is supported and timely*. By extension many of the same problems and opportunities present themselves at federal and local government levels.

#### 3.1 ENHANCE MARKET-BASED INCENTIVES AND CREATE REGULATED MARKETS

*Problem:* Existing regulatory caps and tax/incentive programs do not adequately protect ecosystems or generate requisite demand for restoration.



Bruce Taylor, Defenders of Wildlife

*Opportunity:* Enhance and create regulatory drivers and positive incentives that stimulate the private sector to invest in ecosystems.

*Policy Objective:* Ensure that unsustainable resource use and pollution is avoided, minimized or mitigated appropriately and provide positive incentives for strategic investment in ecosystem restoration.

*Agency Strategies:* Examine existing regulations and incentive programs (including local, state and federal initiatives) to identify gaps in coverage and enforcement and propose additions and improvements including:

- new or increased resource charges and user fees, e.g. water use
- tighten limits or caps on use or pollution where necessary, e.g. groundwater withdrawal
- identify areas where new caps are needed, e.g. prairie habitat
- provide guidance on early actions that could be credited toward future regulations
- implement trading systems as caps are established, e.g. water quality trading
- identify new incentive programs, e.g. ecosystem service tax credits/deductions and a special property tax assessment for ecosystem services.

*Discussion.* Despite many positive conservation programs we are still losing ground in restoring and protecting our ecosystems. Environmental regulations are unevenly applied. They address some ecosystems and services,

like water quality and wetlands, while ignoring important elements of biodiversity like oak woodland and prairie habitats and species not currently listed. Users pay for use of public resources in some cases (fishing and hunting) but not in others (water). Tax deductions and credits exist for some actions (reforestation) but not others (forest conservation). Farm use receives a special property tax assessment aimed at protecting open space and biodiversity, but replacing farm ground with native vegetation and restoring water rights to streams does not receive a similar blanket exemption from higher tax rates.

### **3.2 USE STATE MITIGATION TO GENERATE MARKETPLACE DEMAND**

*Problem:* State mitigation responsibilities (to offset impacts of state projects) are not supporting emergence of private sector supply.

*Opportunity:* Capitalize on existing state mitigation efforts to build demand for ecosystem services and stimulate supply and innovation in the private sector.

*Policy Objectives:* Encourage development of markets for private supply of mitigation and define role of government clearly with respect to mitigating state actions.

*Agency Strategies:* Revise State's own mitigation actions to be consistent with marketplace goals and direct state mitigation funds, natural resource damage assessments and penalties to a Strategic Ecosystem Investment Fund to support priority pilot ecosystem restoration projects. State could also provide "guaranteed loans" to bank developers, by which they agree to purchase any unsold credits for a reduced price, and those credits go into the reserve. This could be done, for example, with a section of Measure 66 money, or economic development money.

*Discussion.* Many agencies already have programs that aim to offset the development impacts of their projects and programs. For example, ODOT is required to mitigate the adverse ecological impacts of road construction. Other agencies are involved in cases where enforcement results in damage assessments and penalties; DEQ, for example, can put 80% of penalties received toward supplemental projects. Pooling such funds into a single restoration fund – a Strategic Ecosystem Investment Fund – can be an effective way to kick-start private sector supply and increase experimentation and learning with market mechanisms. Channeling these funds to the private sector mitigation market might be an attractive alternative to agency-generated projects or returning penalties to the general fund. Additionally mitigation funds generated under payment in lieu programs through cap and trade regulations (as discussed above) could likewise be pooled in such a fund – or matched on a case-by-case basis. These public funds can also be matched with funds from the voluntary markets to further leverage their impact into investments that are significant on a landscape scale.

### **3.3 DEFINING THE ROLE OF PUBLIC LANDS IN ECOSYSTEM MARKETS**

*Problem:* If state or federal agencies are allowed to sell credits in the marketplace for ecosystem services produced from public lands, this could swamp initial demand, depress market prices, and drive private sector suppliers out of the market.

*Opportunity:* Use public lands to support marketplace development and reduce risk.

*Policy Objective:* Provide a proactive role for public lands in supporting the marketplace, rather than using the

marketplace to fund conservation and restoration on public lands.

*Agency Strategies.* Work with private and non-profit sectors to find a creative and proactive role for state lands in an ecosystem marketplace, principally to focus on public lands' potential role in seeding the market or as risk mitigation by acting as an insurance pool.

*Discussion.* The question of what role public lands should play in an ecosystem marketplace is a critical one. Some propose that state and federal lands should be used to generate ecosystem credits to be sold to the private sector in order to offset the impacts of development or pollution. While this approach has the potential advantage of attracting funds to invest in restoration projects that might not otherwise be funded, it carries the risk of undermining the development of a private market. Since land costs need not be recovered in the credit price, supply from public lands can be expected to come at low cost. In addition, with the potential volume of credits that could be generated from state and federal lands, such supply could swamp private sector supply. Another potential disadvantage is criticism from the public who believes that public lands should already be managed for conservation values. Adding private funding to existing public funding for public lands may lead decision-makers to gradually reduce natural resource budgets over time.

In some cases, however, there is an argument that using public lands to develop credits does create additional ecosystem benefits. A case in point is state lands that are held for the purposes of revenue generation. In this case, widening the range of activities to include generation of ecosystem service credits may increase revenues from the land, as well as help to seed the market. For example, carbon credits might be generated on state forestlands by reducing harvest levels and lengthening rotations, i.e. by foregoing timber revenue. Such management changes would need to show that a reliance on ecosystem service credits or some combination thereof with resource harvesting would produce a net gain in revenue from the lands. Such credits could serve to attract demand to the marketplace and prompt an expansion of supply on private lands.

An additional role that public lands could play in an ecosystem marketplace is to provide an insurance pool to address the potential failure of projects on private lands or the possibility of a natural disaster. The state could receive payment for managing insurance pools of credits that are held in reserve in the marketplace potentially reducing the need for third financial insurance. For example, state lands restored and managed as a reserve pool of credits could be an attractive alternative to performance bonds and financial insurance that may be required of bank sponsors. By creating a mechanism whereby participants in the market could buy into an insurance pool of credits from state lands, rather than paying premiums to financial institutions whose investments go to Wall Street, dollars spent to cover risk in markets would actually be put to use to accomplish restoration. For instance, if a fire affects a bank selling ecosystem services, acquisition or restoration activities conducted on public lands (over and above those normally expected) can help ensure that the ecological values provided for by the bank are not lost. Overall, looking for creative and proactive role for state lands in an ecosystem marketplace should be a high priority. The uncertainty over whether state lands will be an approved source of supply in the marketplace could delay start-up investments on private lands.

### **3.4 PROVIDE MARKET LIQUIDITY AND SUPPORT ECOSYSTEM MARKET PILOTS**

*Problem:* A lack of ready supply hampers early efforts at stimulating market demand.

*Opportunity:* State should encourage and promote a single credit registry, encourage development and use of rapid appraisal tools, and provide mechanisms to encourage landowners and agencies to participate in marketplace through pilot projects.



*Policy Objective:* Ensure timely supply of ecosystem conservation and restoration, as well as promoting the infrastructure and developing on-ground experience and guidance to help agencies and landowners understand process and benefits.

*Agency Strategies:* Seed the marketplace through various means including:

- support early adopters by setting rules for additionality and look-back dates,
- work with private and non-profit partners to develop a registry for tracking and accounting for conservation and restoration actions
- create public-private ecosystem investment funds and credit projects on state lands as revolving sources of funds and credits (as per the discussions above)
- set dates for the onset of mitigation obligations well in advance so that supply can be developed and available in a timely fashion
- create ecosystem service districts or other place-based legal entities that can access public funds, contract with local government buyers and harness local voluntary markets in order to initiate local ecosystem markets
- support state-chartered private sector banks that provide temporary mitigation supply, e.g. Deschutes groundwater mitigation banks
- support open market participation for all comers, not just regulated buyers, to avoid lack of supply in the short-term.



*Bruce Taylor, Defenders of Wildlife*

*Discussion.* There is a risk of stimulating market demand and then having a lag period with no supply, creating a credibility problem with both private and public sector buyers. Being an early adopter in supplying the market carries with it significant risk, particularly where large capital costs or irreversible land use change is required to generate supply. This risk may be exacerbated by limited on-ground experience for landowners, agencies, and other stakeholders with required actions and processes, as well as uncertainty over outcomes. Emerging experiences with market-based approaches to environmental regulation suggest a range of design elements and facilities that can limit

exposure to this problem. Most important is not to simply assume that creating demand will immediately prompt private sector supply, but rather to include design of market liquidity measures (including those mentioned above) into overall marketplace planning. This includes understanding the likely market dynamics of costs and benefits in the marketplace, the manner in which buyers and sellers will interact to determine price, as well as forecasting the expected transaction costs.

## 4. POLICIES TO PROMOTE MARKETPLACE EFFICIENCY

In order to attract both buyers and sellers of ecosystem services, markets need to be accessible, transparent and not overly burdened by administrative complexity. Agency policies, rules and procedures need to balance precision and risk avoidance with efficiency and cost. Special attention to reducing risk for early market participants may be necessary in order to launch marketplace initiatives and develop pilot projects.

### 4.1 AGREE ON ECOSYSTEM GOALS

*Problem:* Lack of clear, agreed-upon ecosystem restoration goals impedes ability to regulate development, mobilize state funding and direct public and private sector investment.

*Opportunity:* Coordinate across agencies to develop strategic focus for ecosystem conservation and restoration in Oregon.

*Policy Objective:* Adopt a prioritization framework for biodiversity conservation and ecosystem services, and develop priority maps across the state.

*Agency Strategies:* A coordinating body should work with stakeholder groups at different scales to use existing plans and information to select and agree upon priority ecosystems and sites subject to the following caveats:

- priority maps are based on best available science (but will never be perfect)
- priority maps should be dynamic documents, just as the Oregon Conservation Strategy does not yet include habitat connectivity or climate change
- policy should encourage and, where possible, reward the use of priority maps but should not imply that work happens only in priority areas
- while ideally all stakeholders would be involved or consulted in developing priorities, in practice there may be levels of participation and consultation throughout a prioritization process
- local priorities are included alongside state or landscape priorities.

*Discussion.* In the Willamette Valley, different researchers and agencies have developed about 15 different conservation and restoration priority schemes. The Nature Conservancy and Willamette Partnership integrated these disparate schemes into a single synthesis map of conservation priorities, and discovered that there was substantial alignment across the different maps. The synthesis map can be used to direct ecosystem marketplace investments in a much more strategic, ecologically viable manner. Adopting a framework for developing priorities based on the Willamette and other experiences may assist other regions in undertaking similar efforts. Eligibility for some of the funding programs discussed in this paper could be tied to completion of such a prioritization to provide incentives for communities to participate and complete the mapping exercise.

### 4.2 BALANCE THE USE OF OUTCOME-BASED AND PRESCRIPTIVE RULES

*Problem:* Prescriptive rules stifle innovation and fail to promote efficiency and timeliness in achieving outcomes; outcome-based rules can fail if outcomes or their surrogates are not measurable and enforceable.

*Opportunity.* Promote efficient implementation and monitoring pathways to arrive at ecosystem outcomes.

*Policy Objectives:* Shift to outcomes-based rules as measurement and enforcement capacity increases, while

ensuring that existing prescriptive rules lead to outcomes and not to technology lock-in or costly bureaucratic procedures.

*Agency Strategies:* Review agency rules, identify opportunities to improve existing prescriptions and/or shift to outcomes and cap-based approaches in consideration of the following:

- Outcomes need to be tracked against restoration goals, so that it is clear how individual actions and projects contribute to meaningful restoration at scale (as outlined in 4.1 above)
- Outcomes need to be measurable and enforceable to be meaningful
- Straightforward surrogates for the outcome may be chosen as a second-best approach
- Prescribing one or more approaches or technologies that are known to produce the outcome is a third-best approach
- Prescriptions need to be reviewed on a regular basis to account for new approaches and technologies and to ensure that innovation in the marketplace is rewarded
- Whether prescriptive or outcomes-based, regular monitoring and evaluation of outcomes and actions is required
- Agencies may wish to certify third-party firms to carry out evaluations, particularly if similar outcomes or technologies are being evaluated in non-regulatory (voluntary) ecosystem markets.



*Morgan Salisbury, Freelance Photographer*

*Discussion.* The prescriptive nature of many agency rules can lead to a focus on fixing small, specific problems using pre-defined approaches and existing technologies. Such rules may fail to harness market forces and promote private sector innovation. In extreme cases, prescriptive rules are so onerous and costly that they not only fail to contribute to ecosystem-scale conservation and restoration, but dissuade investments in economic development, potentially sending businesses to other less restrictive jurisdictions. Further, the monitoring and evaluation of prescriptive rules typically focus on whether a technology

is installed or an action taken. The lack of direct measurement of whether the outcome is achieved may lead to large expenditures without proof of their effectiveness.

An alternative to a focus on narrow prescriptive measures is to clearly state the desired outcomes of regulations and the acceptable indicators of having achieved the outcomes. For example, rather than prescribing the technology required to avoid or reduce thermal pollution, the cap and trade approach was used by DEQ to stimulate landowners and polluters to identify and implement ecosystem service approaches to the problem, e.g. developing a market for stream shading as opposed to purchase of mechanical chillers. Specifying the outcome and leaving the path to the outcome open is a spur to innovation. Still, not all ecosystem services are amenable to measurement and enforcement. There is little point in developing an outcome-based approach if the resulting rule will be unclear or lack “teeth.” The route to compliance needs to be clear if confusion is to be avoided with firms being regulated. Surrogates for outcomes are one alternative, as are prescriptive approaches that specify required technologies or actions. In such cases, it is important that from time to time research focuses on assessing whether the desired outcome is being attained. Further, as scientific methods and knowledge increase it may be feasible over time to move rules from a prescriptive basis to outcomes. Thus,



regular review of agency rules and protocols is advised to ensure continuous improvement in the efficiency of regulations.

### 4.3 ENCOURAGE ADAPTIVE MANAGEMENT AND RISK-TAKING

*Problem:* Risk aversion on the part of agency staff leading to prescriptive rules, and long and costly routes to regulatory approval – Oregon law does not provide agencies with the authority to engage in adaptive management.

*Opportunity:* Encourage agency culture of adaptive management and risk-taking.

*Policy Objectives:* Train agency staff to recognize opportunities, as well as risks; reward experimentation and learning, and demonstrate commitment to risk-taking from the leadership level.

*Agency Strategies:* Address root problems and change institutional incentives to promote risk-taking including:

- work with Department of Justice to assess utility and applicability of “safe harbor” provisions that reduce future liability to regulations upon performance in good faith of voluntary conservation actions
- provide for oversight but lighten the regulatory requirements so as to avoid litigation when testing out new and promising approaches
- use internal management directions to provide staff with incentives to take risks and develop new internal procedures and infrastructure
- build safety margins in to mitigation obligations (or trading ratios)
- seek authority for agencies to adopt an adaptive management approach.

*Discussion.* Threat of third-party litigation can make agencies risk-averse, by training and experience. Risk aversion is a fundamental cause of prescriptive rule-making (as addressed above) as agencies seek to limit the ability of those being regulated, or those providing mitigation, to deviate from the prescribed path for fear



Bruce Taylor, *Defenders of Wildlife*

that the agency would then be culpable. This can lead to long and costly routes to regulatory approval and discourages uptake of newer outcome-based approaches. At OWRD risk-taking led to the development of an instream leasing approval process that takes just over a month – five months faster than usual. The premise was that a lease is temporary so any injury problems emerging subsequently can be resolved easily and quickly by terminating the lease. Despite the overwhelming success of this innovative concept, department staff still labor through an exhaustive review of each and every lease application for other facets of these applications, requiring considerable

preparation and processing effort by irrigation districts, providing a disincentive to landowners to participate, and diverting scarce agency staff from other more productive tasks. Altering institutional incentives within agencies will be central to promoting a willingness to take risks, experiment with new approaches, and then

learn and adjust as needed – including ensuring that line staff understand the need for efficient processing. This is a large and complicated task and not one taken lightly. However, if agencies cannot make this shift the regulatory portion of the ecosystem marketplace will have great difficulty getting off the ground.

#### **4.4 INTEGRATE AGENCY RESPONSES ACROSS ECOSYSTEM SERVICES**

*Problem:* The large number of resource agencies in the state leads to compartmentalization of ecosystem response with agencies working only in their own “silo.”

*Opportunity:* Integrate existing and new programs across a range of services at an appropriate ecosystem scale.

*Policy Objective:* Integrate marketplace activities across agencies, jurisdictions, and ecosystem services.

*Agency Strategies:* Identify complementary ecosystem services and assess opportunities for integrated approaches to regulations and incentives, bearing in mind that:

- integration is best achieved in a particular location where all the silos and levels of government come together
- integration may require a new, place-based organization (such as a non-profit or ecosystem service district organization) with an explicit mandate to undertake the integration (as agencies have little authority to work together)
- to succeed integration may require an explicit funding source to initiate and underpin the necessary inter-agency collaboration.

*Discussion.* Agency-by-agency and service-by-service nature of regulatory response leads to “silo” approaches and single purpose markets, which are too thin to be economically viable, and are likely to be ineffective ecologically if they simply facilitate many small, disconnected conservation projects. Instead, opportunities to bundle and stack credits and other incentive programs need to be exploited so that landowners can capitalize on a sufficient set of ecosystem services to warrant adoption of new land uses and practices. For example, TMDLs and NPDES permits may stimulate investments in water quality in coming years. Simultaneously, OWEB restoration funding and hydropower mitigation monies are already funding stream flow restoration. However, although improving stream flow and water quality are complementary actions, there is little to no crossover between regulatory agencies. Cross-fertilization is required both between agencies and between voluntary and regulatory market actors.

#### **4.5 HARMONIZE INCENTIVES AND PROGRAMS ACROSS JURISDICTIONS**

*Problem:* Government programs occur at different jurisdictional levels and scales, and employ a variety of mechanisms, creating overlapping programs and conflicting incentives.

*Opportunity:* Harmonize conflicting, competing or overlapping programs across jurisdictions, scales and mechanisms to promote clarity and target strategic conservation and restoration actions.

*Policy Objective:* Ensure consistency across local, state and federal programs in the marketplace.

*Agency Strategies:* Maintain a broad suite of tools to promote demand but work with partner governments to

integrate efforts and shift to cost-effective tools over time:

- assess which activities can be harmonized without legislation or rule changes, as such changes are costly and time-consuming
- negotiate with federal agencies to redirect subsidy/payment programs (like USDA-CRP) to state priorities and channel funds through the ecosystem marketplace and ecosystem credit markets
- align existing state and federal tax credits/deduction and property tax assessments with multi-credit ecosystem markets.

*Discussion.* Over time regulatory and incentive programs have developed at local, state and federal levels to respond to a variety of conservation and restoration needs. These programs employ a mix of different instruments and occur at different scales. This can confuse interested service providers and also create overlapping programs or conflicting incentives. For example, regulatory incentive programs and OWRD programs promote the lease and transfer of irrigation water rights to meet instream water rights. However, in the Deschutes Basin, state and county regulations regarding zoning and the special farm tax assessment penalize participants by subjecting them to higher property tax payments for engaging in these restoration activities.

#### **4.6 STREAMLINE PERMITTING PROCESSES**

*Problem:* Complex, agency-by-agency permitting leads to costly, time-consuming and uncertain processes for developers, while adding to the money and time costs of restoration projects.

*Opportunity:* Increase the contribution of developers to restoration funds, while decreasing the costs of restoration projects.

*Policy Objective:* Streamline or eliminate restoration permitting processes across relevant agencies and develop comprehensive and convenient offset programs for developers.

*Agency Strategies:* Where feasible eliminate agency permit requirements for restoration projects (e.g. State Lands requesting authority to waive permits for restoration work) and improve permitting processes that regulate developments within and across agencies in accordance with emerging federal rules that require that:

- avoidance and reduction of impacts is first achieved
- compensation for remaining impacts is then provided
- compensation is preferred on the following basis: (a) the acquisition of marketed offsets (or banked credits), (b) in lieu payment of fees or (c) permittee-provided mitigation
- permittee-provide mitigation is in turn preferred on the following basis: (i) a watershed approach, (ii) on-site/in-kind and (iii) off-site/out-of-kind.

*Discussion:* Private sector permittees often end up getting involved in design, planning and implementation of actions that mitigate the various impacts of development activities one by one. Most such permittees are not overly concerned with the exact nature and extent of mitigation but with their primary business activity and are willing to pay to avoid becoming entangled in the details of mitigation activities. This is particularly true where different regulations and agencies are involved in a series of permits leading to a complex set of independent mitigation actions that if repackaged could better address ecosystem needs. Developing a composite ecosystem service credit or payment in lieu program that addresses the many impacts of a development represents a long run endpoint for the effort to direct permitting processes and mitigation to



the benefit of priority ecosystems. In the meantime, moving each agency's permitting process to a consistent set of procedures for determining compensatory obligations and then adopting a consistent hierarchy for compensatory actions would be a significant improvement.

#### 4.7 RECOGNIZE ECOSYSTEMS AS ECONOMIC INFRASTRUCTURE

*Problem:* Investments in ecosystems are not valued appropriately, making it less likely that investors will direct funds to conservation and restoration.

*Opportunity:* Encourage voluntary participation in ecosystem markets by recognizing that ecosystems are part of our economic infrastructure.

*Policy Objective:* Ensure level economic playing field for capital investments directed toward ecosystem conservation and restoration.

*Agency Strategies:* Update financial and accounting principles, standards and procedures to account for the value of ecosystem services:



Bruce Taylor, Defenders of Wildlife

- change accounting and auditing standards so that investments in ecosystems are counted as capital rather than operating expenditure
- include ecosystem values as part of real estate appraisals
- ensure that ecosystem values count as collateral
- develop protocols for disclosure and registration of multiple ecosystem values on properties.

*Discussion.* Ecosystem services are the benefits, or annual income stream, produced

by ecosystems. Ecosystems and their constituent biodiversity are therefore capital assets. This natural capital is part of our economic infrastructure and should be included in our financial practices just as with man-made capital. Similarly, the value of ecosystems can be derived from the future stream of costs and benefits associated with the ecosystem. Admittedly, in the abstract, valuing ecosystem services and biodiversity is an inherently difficult task. Increasingly however, emerging non-market valuation methods can assist in pricing those services that are economically significant and that, if left out of our financial accounting, will not enable ecosystems and their services to be brought into the marketplace on an equal footing with other assets. As important as valuation are the changes that need to be made in policies that govern financial principles, standards, and procedures so that ecosystem services can increasingly become part of accounting, taxes, lending and other day-to-day transactions.

#### 4.8 DEVELOP ECOSYSTEM SERVICE ACCOUNTING

*Problem:* Accepted accounting system and standards not yet available.

*Opportunities:* Establish transparent and credible ecosystem service accounting protocols.

**Policy Objective:** State collaborates with other stakeholders to develop multi-credit accounting system applicable across regions.

**Agency Strategies:** Agency work group to collaborate with Ecosystem Services Council and others to:

- define double-dipping, baseline, additionality
- develop/approve standards, measures, protocols
- create registry infrastructure
- test the accounting system on pilot projects.

**Discussion.** A key component of an ecosystem marketplace is the technical capability to clearly identify and quantify relationships between development actions and required mitigation or offsets, and between private



*Morgan Salisbury, Freelance Photographer*

sector landowners' adoption of land and water uses, best practices and other measures, and the ecosystem services provided.

Developing the scientific and technical baselines and modeling/predictive ability in order to develop, certify and track such ecosystem service obligations and credits will be critical to the development of both supply and demand in the market. Without this technical underpinning the market – negotiations, auctions, trading platforms – cannot even begin to function. As much of this technical knowledge and information technology infrastructure will service

voluntary and regulatory markets, this is an important area for public-private partnership on financing, design and development. Further, as seen in voluntary carbon markets, the potential for proliferation of standards and protocols can lead to confusion, uncertainty and a race to the bottom in the marketplace. Having state government vouch for Oregon ecosystem service accounting protocols would be an important step forward in providing an integrated voluntary/regulatory market environment.

#### **4.9 PROVIDE A MARKETPLACE VISION AND PROMOTE AWARENESS**

**Problem:** Lack of a vision and awareness regarding what the ecosystem marketplace could be and what it could do for Oregonians.

**Opportunity:** Provide a long-term vision for marketplace and broaden acceptance of marketplace concepts.

**Policy Objective:** Develop an integrated vision and educate and inform citizens about value of ecosystems and their role in the Oregon economy.

**Agency Strategy:** Involve legislators, agencies, governor's office, landowners, business and the emerging Ecosystem Services Council in a partnership to:

- develop a state-wide vision of an integrated ecosystem marketplace, including clear statements of the potential value of the marketplace for Oregonians
- develop state-wide education and outreach materials on regulatory and voluntary marketplace

- programs, jointly with Ecosystem Service Council.
- Publicized pilot studies that illustrate potential values of habitat conservation or sustainable farming/forestry practices.

*Discussion:* Work on developing a clear vision of what the ecosystem marketplace represents to Oregonians is underway on different levels, but needs to be integrated – particularly so that the linkages between the voluntary and regulatory markets are clear and mutually reinforcing. The scope of the marketplace and how it expands in the long run to cover new services and geographies remains to be defined and there is a lack of legal and practical sideboards for market development. Further, a lack of familiarity with ecosystems and ecosystem services impedes development of voluntary/regulatory markets. Developing an integrated marketplace implies the need to overcome a large number of institutional and political obstacles, many of which are chronicled above. For example, where agencies are resistant to or skeptical of the notion of a multi-credit system this is often reflected in their respective policies. Transforming this resistance and skepticism can be difficult since a multi-credit ecosystem marketplace lacks successful precedent. Developing a mutually reinforcing vision of an integrated voluntary/regulator marketplace and sharing this vision with stakeholders across the state is an essential step in developing the marketplace.

## 5. LEGISLATIVE CONCEPTS

The intent of this report is to identify policies and strategies that could be adopted by agencies, business leaders, and legislators to help develop an ecosystem marketplace in Oregon. Thus far the report has sought to show how state agencies can provide leadership in the emergence of an effective and integrated ecosystem marketplace that can provide cost-effective and timely ecosystem conservation and restoration. A further question is, what legislative support do agencies require to move in this direction, and is a general legislative framework required to underpin their efforts? Generally speaking, a detailed framework creating new authorities is not recommended by experts in this field. However, specific legislation can be helpful in cases where new property rights, appropriations or institutions are required, where new limits on ecosystem use are required, or where existing laws are creating perverse incentives that work against conservation actions.

### BOX 6. 2008 WASHINGTON LEGISLATION

In Senate Bill 6805, passed during the 2008 session, the Washington legislature declared its intent to pursue farm or forest-based “conservation market” opportunities. Broadly, the act recognizes the potential of actions by farmers and small forest landowners to maintain or enhance environmental benefits originating on their lands. The bill seeks to appropriate funds for a feasibility study to explore how these “conservation practices” and “restoration products” can lead to credits that could be redeemed to meet environmental mitigation and compliance requirements, accelerate permitting of public infrastructure, as well as provide income to landowners, and create environmental benefits.

A further use of legislation can be to create bureaucratic space. For example, in the European Union (EU), in order to overcome agricultural departments’ single-minded focus on commodity production, the EU passed legislation specifically to authorize programs of payments for sustainable agriculture.<sup>4</sup> In Washington, recent legislation on “conservation markets” was used to authorize funds for a feasibility study (see Box 6). It is expected that much progress can be made here in Oregon through rule-making and effective marshalling of existing agency resources and programs. But there may also be specific barriers in existing legislation that need to be

overcome, or new enabling authorities or funding that need to be established. It is not possible at this point to lay out the need and content of such case-by-case legislative needs. Rather, it is expected that agencies would prefer first to see what can and cannot be done and then to devise the appropriate legislative strategy.

Still, a clear statement that the legislature supports and encourages a policy of moving forward with exploring and developing an ecosystem marketplace would be helpful. An appropriation of funds, such as in Washington, would also be useful in ensuring that the marketplace does not become another unfunded mandate for the agencies. Such a legislative proposal for the 2009 Oregon Legislature could define ecosystem services, introduce the concept of an ecosystem marketplace, encourage agencies to work together to develop integrated mechanisms to support an efficient and effective system, provide funding to support the process, and request a report back to the next legislature that identifies specific programs, resources and legislative needs of a marketplace. An example of such draft legislation is provided below in Box 7. As a number of agencies are already pushing ahead on parts of the agenda laid out above, the effort does not live or die with this legislation. However, if it is to be state policy to work in the direction of an ecosystem marketplace, legislative support of this nature would help create bureaucratic space allowing agencies to move quickly and efficiently in the direction of the marketplace.



---

## BOX 7. DRAFT LEGISLATIVE CONCEPT

### SECTION 1.

The Legislative Assembly finds that:

- (1) Oregon's natural resources, including native plants and animals and ecological processes are important to Oregonians because they provide food and shelter, clean air and water, fish and wildlife habitat, recreational opportunities, aesthetic benefits and a high quality of life. Many natural ecosystems that have been degraded through overuse and improper management in the past continue to deteriorate in spite of many conservation and restoration efforts undertaken by public and private interests. Adverse impacts of climate change may stress some systems to the point that they are no longer viable habitat for some native plants and animals. It is necessary to improve the overall health of our natural ecosystems in order to maintain these values for present and future generations.
- (2) Maintaining the integrity of rural and forested landscapes is important to the quality of life for all Oregonians. Sustainable forestry, farming and ranching practices can help maintain and restore the vitality of these communities while helping to preserve Oregon's natural landscapes and ecosystems.



*Bruce Taylor, Defenders of Wildlife*

It is necessary to assist landowners in accessing additional sources of revenue, such as emerging ecosystem services markets, to help diversify their incomes, improve the ecological functions of these landscapes, and allow them to pass on the land and its associated benefits to future generations.

- (3) Employment and economic opportunities are important to Oregonians in order to maintain a high quality of life and prosperity. A scarcity of developable land in appropriate locations for economic expansion is a significant limiting factor in some regions of the state. A system is needed that will direct development in suitable locations that are not ecologically sensitive or in priority habitats, while ensuring that overall ecological conditions improve.
- (4) Many different local, state, and federal agencies and the private sector have obligations to protect natural resources and systems, to regulate uses of natural resources, and to promote economic development while minimizing adverse impacts to ecosystems and wildlife. However, these efforts are generally fragmented, uncoordinated, and often work at cross purposes.
- (5) Conservation and restoration of ecosystem services will help address impacts associated with climate change and can help natural systems adapt to such impacts. New or improved regulatory schemes and increased public awareness will make additional resources available to protect and enhance ecosystem services. Oregon has the opportunity to be a leader in developing and improving the ecological effectiveness and economic viability of ecosystem services markets.

## SECTION 2. Definitions

- (1) Ecosystem services are the benefits that human communities enjoy as a result of natural processes and biological diversity including (but not limited to) fish and wildlife habitat, the water cycle, filtration of air and water pollution, pollination, mitigation of environmental hazards, control of pests and diseases, carbon sequestration, avoidance of carbon dioxide emissions, and maintenance of soil productivity.



*Bruce Taylor, Defenders of Wildlife*

Conservation and sustainable land and resource management can protect and promote ecosystem services.

- (2) Ecosystem services markets include the full spectrum of regulatory, quasi-regulatory (cap-and-trade) and voluntary mitigation markets, such as wetland mitigation banking, habitat/conservation banking, water quality trading, environmental water transactions and carbon markets.
- (3) An ecosystem marketplace is a system in which providers of ecosystem services can access financing to protect, restore and maintain a variety of ecological values including clean air, clean and abundant water, fish and wildlife habitat, and other values that are generally considered public goods.
- (4) Adaptive management mechanisms are the processes of implementing programs in a scientifically-based, systematically structured approach that tests and monitors assumptions and predictions in management activities and uses the resulting information to improve the programs or management activities used to implement them.
- (5) Mitigation projects are activities conducted to offset the residual environmental impacts of development, resource use or pollution; once these impacts have first been avoided or reduced to the extent practicable.

## SECTION 3.

- (1) It shall be the policy of the State of Oregon to support the maintenance, enhancement and restoration of ecosystem services across all land ownerships and land uses, addressing land, water, air, soil, and native plants and animals.
- (2) State agencies are authorized and encouraged to adopt and incorporate adaptive management mechanisms in their programs so as to support maintaining, restoring and enhancing ecosystem services.
- (3) State agencies are encouraged to use ecosystem services markets as a means to meet mitigation needs, after carefully avoiding the most sensitive resources and minimizing adverse impacts where development occurs. When agencies adopt a strategy or decision calling for mitigation of potentially adverse environmental consequences of a proposed action, agencies shall implement mitigation strategies that



recognize the need for biological connectivity and appropriate size and location of mitigation efforts rather than an automatic preference for smaller on-site, in-kind mitigation projects.

#### SECTION 4.

- (1) The Oregon Sustainability Board, with the assistance of the Institute of Natural Resources, shall convene a working group consisting of local and state agencies, as well as other relevant parties, including federal agencies, tribes, the private sector (including developers and private landowners), conservation organizations, coalitions active in improving the ecological effectiveness of markets for ecosystem services, and other interested non-profit entities, in the development and implementation of an ecosystem services marketplace to ensure that it has positive economic and ecological outcomes.
- (2) The working group shall address which entity (or entities) would be most appropriate to govern the ecosystem marketplace.
- (3) The working group shall address the need for a consistent methodology to describe and quantify ecological values and make recommendations concerning the development of appropriate ecological evaluation and accounting systems.
- (4) The working group shall consider the appropriate role of government participation in ecosystem services markets to ensure that public agencies maintain a positive influence in maximizing ecological, social and economic benefits for the public and private sector.
- (5) The Oregon Sustainability Board and Institute for Natural Resources shall present a report to the 2011 legislative assembly, based on the working group's efforts, summarizing the issues associated with developing and implementing an ecosystem marketplace in Oregon and offering policy recommendations.

#### SECTION 5.

- (1) In order to enable and encourage the development of an ecosystem services marketplace, there is appropriated to the Oregon Sustainability Board for the biennium 2009-10 in the amount of \$500,000. The Board may contract with the Institute for Natural Resources and other public or private entities to accomplish the tasks outlined in this act.

## 6. ACTION AGENDA

Considerable interest and enthusiasm for moving forward with the ecosystem marketplace was demonstrated in the workshops convened as part of this project. At the final workshop with agency directors and staff, participants identified a set of actions necessary to move this agenda, which is categorized below by time frame. Near- to short-term actions are those already underway or that should be undertaken in the next 1-2 years. The medium term actions are those that are still down the road but that should be initiated in the next 3 to 5 years. Where potential leads or partners in these actions have been identified they are specified in parenthesis.

The near-term actions agencies and stakeholders can take to move forward in implementing the ecosystem marketplace are:



*Bruce Taylor, Defenders of Wildlife*

- promote the legislative concept contained in this document (All)
- create a marketplace vision document (Willamette Partnership)
- develop informational materials, addressing both buyers and sellers (Willamette Partnership)
- create a Strategic Ecosystem Investment Fund for ecosystem projects as described in Section 3.2 (Department of State Lands and Department of Environmental Quality with other agencies )
- develop a registry of technical experts (Institute for Natural Resources)
- create private sector pilot projects to test stacking of ecosystem service credits and agency integration (Willamette Partnership)

Medium-term actions that agencies and stakeholders can take to move forward in implementing the ecosystem marketplace are:

- replicate successful examples around the state through community training sessions (OSU extension)
- develop public sector pilot ecosystem service credit projects on public lands that already have defined ecosystem objectives to seed the market, and then revolve out and employ as an insurance pool (Department of State Lands)
- fund, develop and test accounting tools on pilot projects; bring forward into marketplace (Willamette Partnership, Institute for Natural Resources, private and federal partners)
- establish public-private, place-based entities to scope and develop local ecosystem marketplace in selected high priority or high opportunity areas (Willamette Partnership)
- develop ecosystem service credit systems and payment in lieu programs for services based on market price plus safety margin (or trading ratio) (Agencies)

In long-term actions, an important task would be the development of a composite ecosystem service credit and composite payment in lieu program for development projects based on overall value of net loss in dollars (or ecosystem service units).

To achieve the above steps to develop and implement the marketplace, we will need to fill a number of information gaps, including:

- assessing how much money is currently available from state-provided mitigation funds, damage assessments and enforcement penalties
- identifying which obstacles to the marketplace can be overcome by (a) immediate directed administrative action (b) rule-making or (c) legislation
- establishing the nexus of agreement on specific conservation goals and a process for vetting and updating priority maps
- agency evaluation of which rules should be prescriptive, which outcomes-based
- agency evaluation of where existing limits, targets and caps are insufficient or not enforced
- compiling and evaluating ecosystem service accounting schemes that already exist
- develop rapid assessment methods and identify what are the most promising areas and regions of the state for implementation of a local marketplace through priority mapping, inventory of service providers, assessment of opportunities, and integration/harmonization across services and agencies.



## APPENDIX 1: RESOURCES ON ECOSYSTEM SERVICES

---

Publications, guides and technical resources on ecosystem services and market initiatives can be found at the following websites:

### **WILLAMETTE MARKETPLACE**

[www.willamettepartnership.org](http://www.willamettepartnership.org)

### **MILLENNIUM ECOSYSTEM ASSESSMENT**

[www.maweb.org](http://www.maweb.org)

### **THE ECOSYSTEM MARKETPLACE**

[www.ecosystemmarketplace.com](http://www.ecosystemmarketplace.com)

### **WORLD RESOURCES INSTITUTE**

[www.wri.org/ecosystems/ecosystem-services](http://www.wri.org/ecosystems/ecosystem-services)

### **WORLD WILDLIFE FUND**

[www.panda.org/mpo](http://www.panda.org/mpo)

### **US FOREST SERVICE**

[www.fs.fed.us/ecosystemservices/](http://www.fs.fed.us/ecosystemservices/)

### **WORLD BUSINESS COUNCIL ON SUSTAINABLE DEVELOPMENT (WBCSD)**

[www.wbcsd.org/templates/TemplateWBCSD5/layout.asp?type=p&MenuId=NzE&doOpen=1&ClickMenu=LeftMenu](http://www.wbcsd.org/templates/TemplateWBCSD5/layout.asp?type=p&MenuId=NzE&doOpen=1&ClickMenu=LeftMenu)



## APPENDIX 2: A GLOSSARY OF ECOSYSTEM MARKETPLACE TERMS

---

**ADDITIONALITY:** the concept that calls for credited ecosystem improvements to represent an overall increase in, or avoided reduction of, ecosystem services, relative to those services that would have existed without creating the credits. Financial additionality refers to the ability to demonstrate that absent payments for credits the benefits of the action that generated the credits would not have exceeded the costs; therefore proving that the credits truly provided the financial incentive to undertake the action.

**STACKING CREDITS:** the creation of different credit types in the same geographic area. It allows landowners to market multiple ecological values at a single site, including those with and without specific geographic delineation.

**CAP AND TRADE:** A cap and trade system sets an aggregate cap on pollution or resource use. Tradable allowances (or permits) take the form of individual quota shares of the aggregate cap. These permits are assigned or auctioned to polluters or resource users who are then allowed to buy and sell allowances such that their actual pollution or resource uses is equal to or less than the allowances held. Cap and trade systems often have provisions for allowing participants and third parties to provide offsets to the market.

**CREDIT:** a single unit of trade that quantifies the provision (or right of use) of a regulated or non-regulated ecosystem service.

**CREDIT REGISTRY:** A database and accounting system to track, register, certify, and bank credits and debits for an ecosystem marketplace. The system needs to accommodate credit definition and verification protocols across ecosystem services, geographies and jurisdictions. An ecosystem services credit registry differs from traditional commodity exchange platforms in that it will require strict performance standards, long contractual arrangements, and regular verification.

**ECOSYSTEM SERVICES:** Ecosystem services are the benefits that human communities enjoy as a result of natural processes and biological diversity including (but not limited to) fish and wildlife habitat, the water cycle, filtration of air and water pollution, pollination, mitigation of environmental hazards, control of pests and diseases, carbon sequestration, avoidance of carbon dioxide emissions, and maintenance of soil productivity. Conservation and sustainable land and resource management can protect and promote ecosystem services.

**ECOSYSTEM SERVICES MARKETS:** Ecosystem service markets include the full spectrum of regulatory, quasi-regulatory (cap-and-trade) and voluntary mitigation markets, such as wetland mitigation banking, habitat/conservation banking, water quality trading, environmental water transactions and carbon markets.

**ECOSYSTEM MARKETPLACE:** An ecosystem marketplace is a system where regulations and voluntary mechanisms are designed to provide financial incentives for the conservation and restoration of multiple types of ecosystem services.

**EXCHANGE:** An institution that inventories and accounts for all of the different credits available within a market or a marketplace by documenting their generation, ownership, and trade. An exchange generally requires credit traders to pass some sort of legitimacy or competency test prior to participation.

**LOOK-BACK PERIOD:** To ensure additionality it is typical to specify a date before which actions will not count towards the generation of credits or offsets.

**MITIGATION:** Generally, a reduction in impacts. While used generically to refer to actions taken to reduce impacts, a more precise term is offset if the objective is no net loss as in regulatory programs that call for mitigation or offset of impacts (see below).

**MITIGATION (OR OFFSET) PROGRAMS:** In mitigation programs the emphasis is typically on regulations that call for 'no net loss' from that point forward. In other words the overall cap for pollution or resource use is set at current levels and no further increase in pollution or use is allowed (on net). In effect (or by default) all existing polluters and resource users are allocated permits equal to their current pollution or resource uses. Any entity that needs to produce additional pollution or increase their use of the resource then needs to find credits to offset this new pollution or resource use. Ideally, before assessing mitigation obligations the developer, resource user or polluter should first see what impacts can be avoided or reduced and then proceed to find a way to offset the remaining impacts – for example through protection or restoration of similar habitat, or reduction of resource use or pollution elsewhere.

**MITIGATION OR CONSERVATION BANK:** A land account that is drawn on to compensate for adverse environmental impacts elsewhere.

**MULTI-CREDIT ECOSYSTEM MARKET:** A centralized system of buying and selling multiple types of ecosystem services, both for regulatory (mitigation requirements) and non-regulatory (voluntary) purposes.

**OFFSET:** Generally, the act of fully compensating for unavoidable impacts. In a cap and trade system an offset is an action carried out by a third party to generate credits (by reducing or avoiding pollution or resource use). These offset credits can then be sold to polluters or resource (often new) users. These offset credits are often called mitigation credits.

**OUT OF KIND:** Mitigation activities where the habitat functions and values created are not an exact equivalent to the impacted habitat functions and values being mitigated.

**PAYMENT IN LIEU:** In place of requiring a regulated entity from providing a mitigation project or mitigation credits, a payment in lieu program allows the entity to make a payment (in place of mitigation). The payment is usually made to a state fund or agency, or to an authorized or contracted non-profit. The recipient is then responsible for funding projects or transaction that provide the required mitigation. Payment in Lieu programs are an alternative or extension of a pure cap and trade program.

**SERVICE AREA:** The geographic areas in which a bank's credits may be applied to offset debits associated with impact sites.

## ENDNOTES

<sup>i</sup> Millennium Ecosystem Assessment. 2005. Ecosystems and Human Well-being: Synthesis. Washington DC: Island Press. Page 1.

<sup>ii</sup> Millennium Ecosystem Assessment. 2005. Ecosystems and Human Well-being: Synthesis. Washington DC: Island Press.

<sup>iii</sup> Landell-Mills, Natasha, and Ina Porras. 2002. Silver Bullet or Fools' Gold: Developing Markets for Forest Environmental Services and the Poor. London: International Institute for Environment and Development (IIED).

<sup>iv</sup> Asquith, Nigel, and Sven Wunder. 2008. Payments for Watershed Services: Lessons from Bellagio. Bogor: CIFOR.

