



Counting on the Environment

Ecosystem Credit Calculator

Willamette General Crediting Protocol

Version I: Water Quality, Wetlands, Prairie

April 17, 2009




Increasing the pace, scope and effectiveness of conservation



A product funded by an NRCS Conservation Innovation Grant
 Contact: David Primozych, Primozych @willamettepartnership.org

Ecosystem Credit Calculator Commenter's Checklist

Documents	Date Available	Action Requested	Date Needed	Completed 
General Crediting 1. General Crediting Protocol: Parts I-II 2. A Framework for Integrating Market Assurances 3. General Crediting Protocol: Parts III-IV	April 3 rd April 3 rd April 17 th	We ask commenter's to look at the overall structure of the protocol and whether the Table of Contents seems to capture the information relevant for the different users in the markets (buyers, sellers, third parties, and agencies). We ask that commenter's focus most of their attention on the recommendations housed within the assurances framework.	May 15 th	<input type="checkbox"/>
Water Quality	Shade-a-lator available on request	None on the credit calculation methods at this time. We ask water quality stakeholders to focus their comments on the proposed integrated package of assurances. There is no current documentation for nutrients/sediments. This will be created for the Tualatin by August 2009. Documentation for temperature can be found on the Willamette Partnership's website.	N/A	<input type="checkbox"/>
Prairie 1. Prairie Credit Calculator 2. Prairie Calculation Guidance 3. Discount factors and scoring	April 3 rd April 3 rd April 17 th	For these documents, we are seeking comments on indicator wording and answer choices and the factors determining the contextual value of the site. After April 17, we will be seeking additional comments on how indicators are rolled into a score for habitat function.	May 15 th	<input type="checkbox"/>
Salmonid 1. Salmon Currency Rules 2. Salmon Discounting Factors	April 3 rd April 17 th	The indicators and functions have been extensively vetted. We are asking for commenter's to focus on the weighting factors applied to functions to account for landscape context and the weighting ratios applied to credit estimates to account for risk.	May 15 th	<input type="checkbox"/>
Wetlands 1. ORWAP Calculator 2. ORWAP Manual 3. ORWAP Discounting Factor Scenarios	April 3 rd April 3 rd April 17 th	None before April 17. After April 17, we will be looking for comments on the discounting factors and approach for combining ORWAP scores with area to create credits.	May 15 th	<input type="checkbox"/>
Field Guide and Pilot Projects 1. Field Guide and Reference sheets 2. Datasheet for everything but wetland 3. Pilot Project summaries	April 3 rd April 3 rd April 3 rd	We ask commenter's to look at the overall structure of the protocol and whether the Table of Contents seems to capture the information relevant for the different users in the markets (buyers, sellers, third parties, and agencies). We ask that commenter's focus most of their attention on the recommendations housed within the assurances framework.	May 15 th	<input type="checkbox"/>



Ecosystem Credit Calculator Protocol Development Status

V.1 03/31/09

Process	Credit Type			
	Wetlands	Prairie	Salmonids	Water Temp
Define method framework	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Compile indicators of site functions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Translate indicator measures into functional scores	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Test in the field for validity	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Revise based on comments	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Apply discount factors for context and risk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Apply assurances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Approve method	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Ecosystem Credit Calculator

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COMMENT DRAFT: Willamette General Crediting Protocol

Summary

The Ecosystem Credit Calculator's General Crediting Protocol will provide the overall framework and process for applying the Calculator. It describes why we think we need an integrated approach to credit calculation, and how a project turns from a good idea in a land manager's head into a portfolio of credit types they can sell. The general crediting protocol focuses on process and the currency-specific protocols focus on the credit calculation methods.

The most significant element of the general crediting protocol is an integrated package of assurances developed to make sure those credit estimates offered by sellers provide the ecological benefits they promise. The general crediting protocol is modeled from similar protocols used in carbon markets and from the Temperature Trading Handbook developed by the Willamette Partnership.

Current status and documents included

The general crediting protocol is very much a work in progress. It will evolve as elements of the credit calculation, assurances package, and other market elements develop. There are still major gaps in the protocol where the Working Group and Project Team have not been able to produce content. There are two documents, the protocol itself and recommendations for an integrated package of assurances.

1. General Crediting Protocol Introduction (GeneralCreditingProtocol_040309.doc)
2. A Framework for Integrating Market Assurances (Assurances 4-03-09.doc)



Action needed

We ask that commenters focus most of their attention on the recommendations housed within the assurances framework. We ask commenters to look at the overall crediting process described in the Introduction and whether the Table of Contents seems to capture the information relevant for the different users in the markets (buyers, sellers, third parties, and agencies).

Questions to guide comments

1. Do these assurances capture the most important categories? Is there anything major missing?
2. Which of these assurances do not represent significant value-added over existing practices?
3. Which of these assurances are the highest priority for you?

Submitting comments

Please submit comments by email to Joni Shaffer at jshaffer@willamettepartnership.org before May 15, 2009. Questions can be directed to Bobby Cochran at cochranb@cleanwaterservices.org or 503-681-4435. Thanks!



Ecosystem Credit Calculator

Willamette General Crediting Protocol

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General Debiting and Crediting Protocol

Part I Introduction 1

1.1 Objectives and How to Use the General Protocol

The Willamette Basin General Crediting Protocol (Protocol) provides market participants (managers, buyers, sellers, and third parties) with the overall framework they need to develop, sell, and buy ecosystem credits in the Willamette River Basin. The information contained in the Protocol was developed under a grant from the USDA Natural Resources Conservation Service and with the guidance of a stakeholder working group. This group is composed of federal, state, and local governments, conservation organizations, potential credit buyers, and potential credit sellers. The Protocol is designed as a general reference guide for activity in the Willamette Marketplace. More detailed protocol documents are available for each credit type supported in the Marketplace. The Protocol is a product of several years' worth of foundational work conducted by hundreds of parties and one year of intense work conducted by the stakeholder Working Group. It describes "Version 1" of an Integrated Ecosystem Accounting System. Version 1 will be updated and adaptively managed as it gets applied. New ecosystem service protocols will be added to it, existing ones will change, and the package will be expanded to new geographies.

1.2 Background on the Willamette Partnership and Counting on the Environment Program

Emerging markets for ecosystem services will connect people in new ways. Markets such as these provide land managers with a new suite of options when it comes to generating profits from their land. Improved water quality, better wetland habitat, increased habitat for fish, and higher quality upland areas represent some of the "products" land managers will soon be able to produce and sell through ecosystem service markets. These markets also provide anyone impacting the environment with viable alternatives for making-up for it—alternatives that meet regulatory standards, reduce costs and fortify natural resources.

The Willamette Partnership formed in 2004 as 501c3 non-profit coalition whose mission is to expand the pace, scope, and effectiveness of restoration. Establishing a marketplace for ecosystem services is a major part of the Partnership's work.

1.3 Program Principles and Context

The Willamette Basin in Northwestern Oregon unfolds between the volcanic cones of the Cascade Range to the East and the forested Coast Range Mountains to the West. Over the last 150 years, the Basin has amassed a large human population and a diversified industrial economy anchored by the Portland Metropolitan Area to the North and the Eugene and Springfield Metropolitan Area to the South.

Amidst all of the Basin's natural amenities and human development, the Willamette River and its tributaries drains enough water to make it the 13th largest river in the lower 48 states. The entire Willamette River Basin includes a land area of around 11,500 square miles, a population of

around 2.5 million and around 75 percent of Oregon's economic activity. This economic activity produces substantial impacts to the environment. All expectations are for the human presence to grow substantially over the next 30 years, along with the impacts such a presence carries with it.

There are several pieces in place to minimize and reduce these impacts (e.g. established prescriptive environmental polices, wetland mitigation banking and species conservation banking), but they do not always work in synergy. The Partnership's work, including the Protocol, is based on the assumption that ecosystem markets should be tied to meeting overall environmental goals rather than just strict interpretations of current rules and program guidelines. As such, the Willamette Marketplace constantly strives to:

1. Produce the highest quality restoration and conservation where it makes the greatest ecological difference
2. Foster transparency, accountability, and credibility in emerging ecosystem markets
3. Facilitate the connections among buyers and sellers that put the greatest amount of resources into real benefits with the least amount of transaction costs

I.4 Overview of the Debiting and Crediting Process

PROJECT DEVELOPERS

The following steps outline the process a land manager would follow to generate, register and sell ecosystem service credits based off of a restoration project.

1. **Site Selection and Validation.** A seller selects a potential site to conduct restoration activities, and works with an approved validator to determine the project's baseline conditions and eligibility.
2. **Initial Credit Calculation.** With a basic understanding of the site's location and the site's potential to generate ecosystem service credits, sellers may then choose to carry on with a more in-depth analysis of the site to determine the exact type and number of credits it can produce using marketplace tools.
3. **Conditional Credit Registration.** Up to this point, potential sellers have evaluated a site's potential to produce ecosystem service credits and conducted the restoration work needed to make them a reality. They now need to open a seller's account on the registry, a step that begins the formal third-party process through which credits will be assessed and approved for entry into the market.
4. **Credit Verification.** It is expected that those interested in generating ecosystem service credits will be acting in good faith. However, to provide assurance to regulators and to the public, all conditionally-accepted credit registrations will undergo independent verification by professionals approved by the market administrator. This process confirms calculations done by (or for) the seller and confirms the work done on the ground.
5. **Credit Issuance.** Certified credits are the only credits available for sale on the Credit Registry. The process through which credits go from conditionally-certified to certified is called the

issuance process. Issuance happens only after verification occurs, the Registry receives a verification report from the verifier and the seller approves of it.

6. Selling and Transferring Credits. The actual sale of credits is a straightforward process that mainly involves the seller and buyer. The Registry and the market's administrator will not be involved with any financial transaction between buyers and sellers. The Registry simply receives a report after a transaction is made and moves credits from one account to another.

7. Track the Credits. Sellers will need to conduct annual verifications of all credits they develop until the credits are sold. The failure to verify credits will result in their removal from the Registry. Sellers will use the same verifier for the first five years.

BUYERS

The buyers of ecosystem service credits include any public or private entity with a regulatory obligation to reduce the impact of their development actions. Buyers might also include any entity interested in purchasing a credit to retire, use or resell. The process for these buyers to purchase credits demands interaction with many parties and a commitment to the long-term monitoring of restoration projects associated with purchased credits.

1. Permit Allowance/Validation. The potential buyers of ecosystem service credits must first receive formal approval from the necessary regulatory agencies to achieve partial or full compliance with their permit requirements through trading credits.

2. Credit Calculation. The number of credits a potential buyer is required to purchase depends on the impact that their development action creates. For development actions covered by Version 1 of the Ecosystem Credit Calculator, the process of determining these ecosystem debits follows the same calculation, registration, and verification process that ecosystem credits do.

3. Set up a Buyer's Account. Buyers must fill-out a buyer's registration form and submit it to the Registry. Buyers will pay an account origination fee to help defer the costs of managing the Registry. This step publicizes a buyer's intent to purchase credits in the marketplace.

4. Negotiate and Finalize a Credit Purchase. The Registry does not set the price of the credits listed, nor does it set the terms and conditions of sales. The price, terms and conditions are all set and agreed upon by the seller and buyer—with the only exception being the monitoring requirements associated with final and ongoing certification.

5. Annual Monitoring Reports. The natural landscape is dynamic, requiring the ongoing monitoring of restoration sites to make sure that they continue to provide the ecosystem services credits they were designed to. Sellers will pay verifiers to conduct a full verification of the entire credit calculation process, which is likely to include a site visit, in years one and five of a credit's life. A verifier will also conduct desk audits in years two, three and four. In every instance, the verifier will be selected through a standard process managed by the Registry and paid for by the seller. Sellers are responsible for submitting annual monitoring reports to the Registry, buyer and necessary regulatory agencies.

For a more detailed outline of the credit generation and credit purchase processes, please proceed to Appendix A.

I.6 Web-Based Debiting and Crediting

Version 1 of the Ecosystem Credit Calculator is automated whenever possible. This automation occurs through the use of web-based applications that seamlessly transfer data entered by land managers and those seeking to purchase ecosystem services credits.

The buyers and sellers of credits will most likely interact with three major web-based tools supported by the marketplace: a user interface or market portal that provides public information, direction to participants and a centralized hub for the rest of the market's tools to connect with; a credit calculator that uses data submitted by buyers and sellers to calculate credits and debits; and a registry that performs the credit and debit tracking functions needed to ensure the transparency and legitimacy of the marketplace.

The level of automation, and therefore the overall efficiency of the marketplace, is expected to increase over time.

I.7 Technical Assistance

The market administrator will provide technical assistance to buyers, sellers and regulators encountering difficulties with the use of Version 1 of the Ecosystem Credit Calculator.

I.8 Training and Orientation

Despite automation, and effort to create a practical system that various parties with different types of expertise can use, Version 1 of the Ecosystem Credit Calculator will require that market participants go through some level of training and orientation prior to using it. Web-based training modules will be incorporated into all the major tools associated with Version 1. Training classes, organized by the market administrator, will also be scheduled on demand to accommodate new users of the system.

I.9 Key Questions

Q: Is Version 1 of the Ecosystem Credit Calculator designed for a specific type of user?

A: The Willamette Partnership designed Version 1 to be used by individuals that already possess some specialized training. Targeted users include trained watershed professionals from private consultancies, Soil and Water Conservation Districts and other public or non-profit organizations.

Q: Why does Version 1 calculate unregulated ecosystem services?

A: Version 1 represents a compromise between ecosystem services for which there is already demand, ecosystem services for which demand may soon emerge and ecosystem services that allow for a more comprehensive approach to restoring the entire landscape. This also allows for the voluntary purchase of unregulated credits.

Q: How many different credit types will there be?

Version 1 will support four primary credit types, but as time goes on and more credit protocols are developed and there is demand for other ecosystem services, the Ecosystem Credit Calculator will include new credit types.

Part II Project Validation and Credit/Debit Calculation

2.1 Project Definition, Eligibility, & Validation

2.1.1 Defining Your Project Boundary

Land managers make two types of essential geographic determinations when using the Ecosystem Credit Calculator. The first determination sets the location of the entire area from which the land manager will seek to generate credits (the project boundary).

The second type of determination a land manager makes sets the locations of map units within the project boundary. These map units are based upon the type of credits that a land manager expects to generate and denote that a homogenous resource type is present within their boundaries. A map unit is a section of a property delineated by common habitat type, habitat structure, and habitat elements. These boundaries are first set through the interpretation of aerial photos and then confirmed or adjusted on the ground. A single project site will have as many map units (polygons) as it has diversity in habitat types. By using this map unit approach, the Calculator will be able to calculate multiple credit types on project sites with multiple habitat types. Each map unit will ultimately be dedicated to the production of one of the credit types listed below.

Developers that are assessing the size and scope of their impact will also determine project and map unit boundaries for their initial impact calculations.

2.1.2 Supported Credit Types & Project Actions

The Ecosystem Credit Calculator currently supports a subset of ecosystem credit types and actions that create benefits and impacts. Credit types and their tradable units include:

- Wetland (functional acre)
- Salmonid habitat (functional linear foot)
- Upland prairie habitat (functional acre)
- Water quality: Temperature (kcal/day)

Initial credit type selection was based on market demand and available assessment methods.

Near-term priorities for additional credit-type development include:

- Water quality: Nitrogen, Phosphorus, and Sediment (lbs/yr) [Available in Tualatin River]
- Generalized stream habitat (functional linear foot)
- Carbon (metric ton of CO₂ equivalent)
- Generalized rare habitat (functional acre)

Each of the credit types above may be generated by conducting different types of restoration actions. Over time the Ecosystem Service Calculator shall include more types of credit generating actions. Approved action types are listed in Table 2a.

Table 2a: Version 1 Eligible Conservation Actions by Target Currency (See detailed list of actions in Appendix C)

	Conservation Actions	
Target Currency	Version 1 actions	Near-term priorities
Water Quality-Temperature	Plant native vegetation	Flow augmentation Floodplain restoration
Wetland Habitat	Improve function of an existing wetland	Protect existing wetland
	Restore and create wetland hydrology	
Salmonid Habitat	Plant native vegetation	Protect existing habitat
	Improve In-stream fish habitat: Large wood placement	Restore channel geomorphology: side channels, remeanders, etc...
	Improve fish passage: Culvert removal	
	Manage sediment inputs: Add fencing	
Prairie Habitat	Improve function of an existing prairie	
	Restore prairie functions	
	Protect existing prairie	
Water Quality-Nitrogen & Phosphorous	Crop cover	
	Fertilizer use	
	Irrigation type	
	Manage sediment	
	Plant native vegetation	

Just as there is an approved suite of credit-generation actions, an approved suite of development actions also exists. This set of approved impact-actions may also be expanded in the future (Table 2b).

Table 2b: Version 1 Eligible Development Actions by Target Currency

Target Currency	Development Actions
Water Quality- Temperature	N/A
Wetland Habitat	Altered vegetation
	Altered hydrology
Salmonid Habitat	Altered vegetation
	Altered hydrology
	Contaminants
	Natural system modifications
Prairie Habitat	Altered fire
	Altered vegetation
Water Quality- Nitrogen & Phosphorous	Change crops, fertilizer, or irrigation
	Altered vegetation
	Contaminants

2.1.3 Determining Eligibility to Trade & Additionality

Eligibility criteria determine who can buy credits, who can sell them and who can trade them with whom. They are designed to keep out overly-risky or inappropriate projects. For example, before conducting a restoration action and generating credits at a site, land managers must first establish the baseline conditions of the proposed site. This provides a reference for measuring additional benefits but also ensures the site complies with existing regulations and has not been degraded recently. Alternatively, for potential buyers like wastewater treatment plants, they must meet baseline standards for technology before they can trade to meet permitted allowances.

All credited projects need to demonstrate they provide “additional” conservation benefits. The additionality requirement ensures that credits are awarded for doing more than what would otherwise have happened without a market. All credits need to result from restoration actions that are: 1) above and beyond a regulatory threshold for compliance, and 2) above and beyond business as usual.

Not all projects will be eligible to enter the Marketplace. Both buyers and sellers will need to meet some minimum standards for reducing impacts and ensuring credit quality.

2.1.4 Project Start Date and Crediting Period

In general, the start date for a project will correspond to the start of the activity that generates environmental benefits or impacts. Specific requirements for determining the start date of a project are contained in each credit-specific protocol. The crediting period, sometimes called the “life of the credit”, is the period where conservation actions are eligible to receive credits. The crediting period differs by credit type and specifics can be found in each credit protocol. For

example, a wetland credit period is perpetual, a nutrient credit is annual, and a riparian shade temperature credit is good for 20 years.

2.1.5 Receiving a Notice of Validation from the Registry

The first step in entering the Marketplace is getting your project validated. Validation is an optional step for buyers to help determine which credit they might be eligible to buy. Validation is mandatory for sellers. It provides them with an idea of which credits they will be eligible to sell, some technical commentary on project design, and an estimate of how many credits they can expect to receive. The Marketplace's administrator maintains a list of approved validators, who are often the same people accredited to verify credit estimates later in the process. A project developer can choose any validator they want. The validator will help the project developer open an account on the Registry and submit a validation opinion. Validators are also free to provide technical advice on project designs. Generally, if this opinion is complete, it will be automatically accepted by the Registry, but acceptance may differ by credit type. Please review the credit protocols for specifics. Validation is a statement by the Registry to the project developer that they have met eligibility requirements. It is not a confirmation on the quantity of credits issued.

2.1.6 Example: Getting Your Project Validated

WILL BE INSERTED LATER.

2.2 Calculating Functional Ecosystem Scores

Once a project developer has delineated the project boundary, come up with a restoration design, and determined their project eligibility, they are ready to begin calculating credits.

2.2.1 Establishing Your Baseline

The first step is establishing baseline ecosystem functions. The baseline defines the current condition from which a conservation action improves function or a development action impacts ecosystems.

Baseline data collection occurs in two phases. The first phase occurs one in the office through the collection of spatial data and information from existing databases. Sources include aerial photos (surrounding land cover), topography, NRCS web soil survey, Oregon Explorer (species occurrences), DEQ (water quality issues), PRISM Data Explorer (precipitation), and the T-Tools extension (for temperature factors).

The second baseline data collection phase, field data collection, confirms the map unit boundaries defined in the office during validation. As map unit boundaries are confirmed, the field team assigns them unique identifiers and collects data for each map unit within the project boundary.

Data is collected on general location, habitat type, and a variety of performance indicators that are associated with structural conditions and also individual habitat elements. Additionally several "Yes/No" questions are also completed. These questions are used within the database to

trigger certain functional calculations, and also to establish the relationships existing between adjacent map units for calculations within the database. Additionally, if present, information relating to existing restoration efforts or opportunities, current management activities, and observations on wildlife activities will also be noted. The datasheet is designed so that data collected for each map unit is comparable from map unit to map unit and from property to property. The datasheet is also designed to allow for the field surveyor to check the information pertinent to each map unit. Finally, the datasheet is also designed so that the data gathered starts at the general level and then moves to the specific. This was done to help in determining if a map unit boundary has been placed incorrectly.

Upon completion of the field inventory, the data from the datasheets is transferred to the Calculator database. Like the datasheet, the majority of the data is entered through the use of check boxes. In a few instances actual numeric or text data is required to be entered, but these will be formatted within the Calculator database to only accept the correct type of data. The field maps are also reviewed and any changes or additions to the map unit boundaries are digitized to match field conditions.

2.2.2 Establishing Levels of Uplift or Impact

Planned conditions must be compared to existing ones to reach the final credit or debit calculation at a site undergoing restoration or development. Restoration and development designs are therefore needed to calculate the ecosystem change from a baseline to a future condition. The more complete these designs are, the more accurate the calculation of ecosystem change will be.

From these designs, a second set of data is created in the office, based on the management activities that are planned or have been implemented on a site. Essentially, answers to the field survey forms are projects based on these planned conditions. The initial field inventory is completed to establish a current or baseline condition. A second set of map units is created where the implementation of the management activities will have changed the shape or size of the baseline map units. This potential future dataset is also entered into the Calculator database. The final step of data entry is to calculate the area of each map unit for baseline and potential future conditions. This is done within a GIS platform using the XTools extension. This area (in acres) is then transferred to the database. Queries within the database calculate the project area for both baseline and future conditions.

2.3 Converting Functional Scores to Debits and Credits

WILL BE COMPLETED IN MORE DETAIL LATER.

2.3.1 Calculating Net Gains and Losses of Ecosystem Function

After future ecosystem functions are projected, the Credit Calculator simply subtracts baseline condition from future condition to get a measure of ecosystem change by individual or overall function.

2.3.2 Applying Discount Factors

Counting on the Environment's credit/debit calculation system applies weighting ratios to the scoring of ecological functions in order to incorporate the *contextual value* of a site. Ratios are used as incentives for good work and restoration in priority areas. Likewise, applying ratios will provide a disincentive to impacting high priority functions in high priority areas.

The scoring of each ecological function reflects how indicators combine to provide that function on a purely scientific basis. These functions are not sensitive to the context of how the watershed itself and the public benefits from them. Thus functional scores require modification in order to represent their value to society and the broader landscape. For example, a site may score high for its water storage and delay function, but that score must be weighted by the site's opportunity to perform that function and the watershed's relative need for that function.

Weighting ratios in this calculation system can be placed at the function level or at the credit/debit level. The application of ratios at the function level addresses the fundamental mitigation goal of replacing functional performance. Applying weights at the function level also provides a transparency to choices about which functions will receive priority. It provides incentives to address limiting factors with restoration and to minimize or avoid impacts to those functions most important to all of us. (Weights at the indicator level would not necessarily prioritize functions, because indicators appear in multiple functions.)

Weighting ratios applied at the credit/debit level have a much greater influence on the amount of credits/debits that are generated. This application of weighting ratios will direct restoration to priority regions and redirect impacts to sites less critical to the watershed.

The following section use salmonid credits as an example. Weighting factors are under development for prairie and wetland credits. Numerous plans have already been completed for salmonid recovery in the basin which identify limiting factors that must be addressed for the successful recovery of the species. Weighting factors can help push restoration toward the actions that have the greatest ecological benefit, but taken too far they can make a project so costly it never gets done. The challenge is applying these weighting ratios in an objective and consistent way so we get wise mitigation and impact decisions via a predictable process for issuing credits and debits.

Weighting factors for salmon will be based on criteria tied to limiting factors and priority populations in the Willamette Basin. Limiting factors are drawn from the Oregon Dept. of Transportation's Comprehensive Mitigation and Conservation Strategy program, which uses work completed by The Technical Recovery Teams (TRT), National Marine Fisheries and Oregon Dept. of Fish and Wildlife. Some of these threats are not issues that the accounting system can immediately address – e.g., hydroelectric and flood control dams. The draft recovery plan identifies limiting factors and threats that provide a basis for applying weighting ratios.¹ The high priority limiting factors and their links to functional categories are listed below.

¹ Oregon Department of Fish and Wildlife. 2007. Draft Upper Willamette Domain Recovery Plan. Chapter 6, Limiting Factors and Threats to Recovery.

Threat	Function	Priority
Land Use: Elevated Water Temperatures	Temperature Regulation	High
Land Use: Impaired Physical Habitat (Large wood, channelization, gravels, etc.)	Habitat Formation	High
Land Use: Loss of Holding Pools	Habitat Formation	High
Hydropower: Low Flows and Reduced Channel Complexity	Channel Diversity	High
Hydropower: Low Peak Flows and Reduced Macrodetrital Inputs	Anadromous Support	High



DISCUSSION DRAFT: A Framework for Integrating Market Assurances

April 3, 2009

I. Introduction

In spite of the best available science, we still can't predict with air tight precision how ecosystems will respond to actions taken by people restoring and developing natural resources. As a result, every type of ecosystem market includes a package of, what is commonly called, assurances. Assurances seek to guarantee the environmental restoration actions completed to offset the impacts of development actually deliver the benefits that they are designed to. Assurances also work to provide process certainty to buyers and sellers in markets. The framework presented below proposes a package of assurances that might be used across many market types. It was developed based on existing market rules, their overlaps and the identification of gaps that could be filled by common approaches.

The framework makes some detailed recommendations drawn from existing rules and practices in wetland mitigation banking, water quality trading, and voluntary carbon markets. Some of the recommendations are hybrids of these and others are newer ideas. We have done our best to document the problem the recommendation is designed to address, the source of the recommendation, and the rationale for choosing it. The recommendations are designed to be as explicit as possible to provoke discussion. In no way are they set in stone, but we are confident they represent a package that will ensure markets produce the environmental benefits they promise. Some of these assurances can be implemented immediately, some will need rulemaking or other administrative action, and some will need further review and evaluation.

Table 1 on the follow page ties the credit issuance process to assurance types and the recommendations presented in this document.

REQUEST FOR COMMENTS

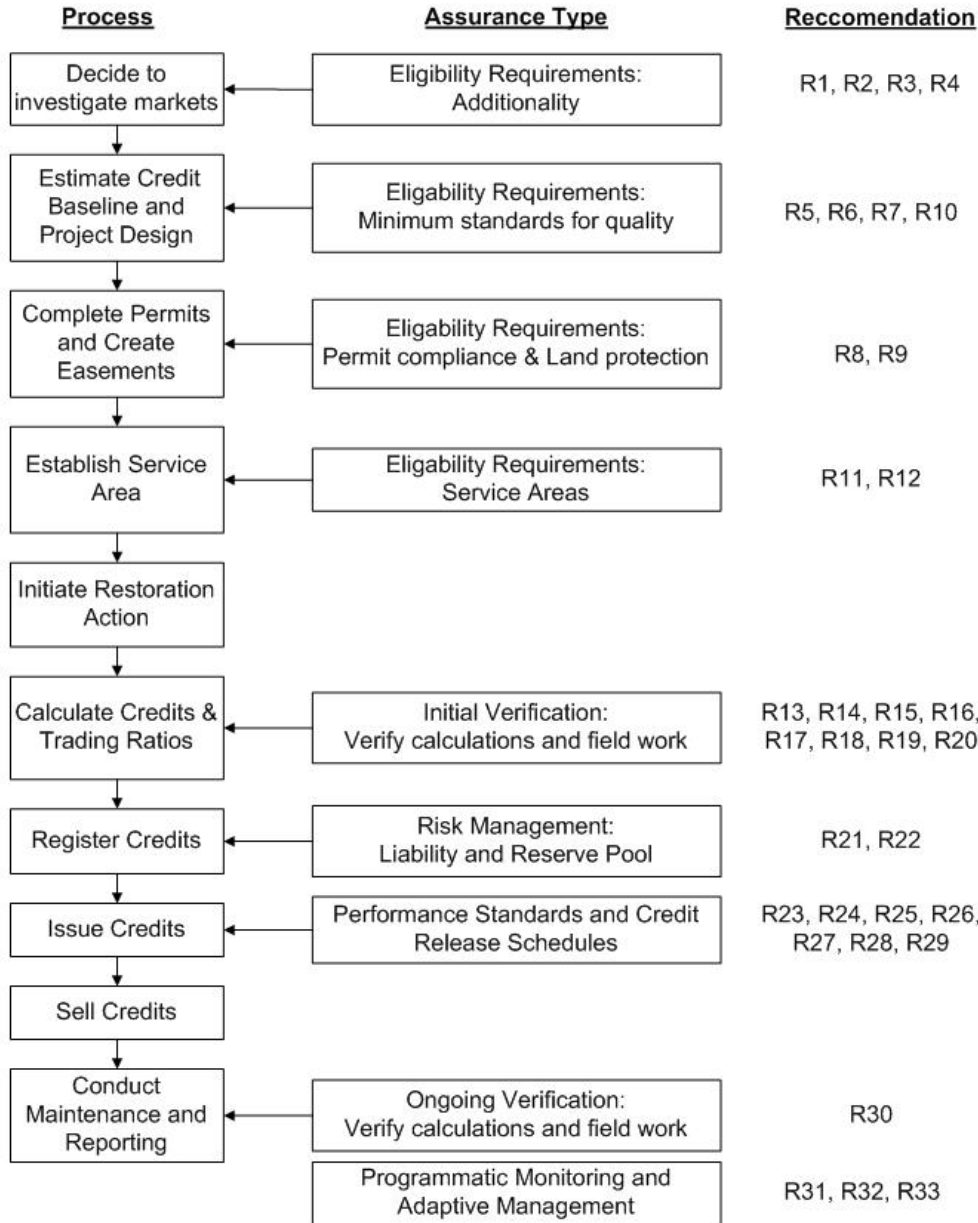
These recommendations are preliminary and meant to spark discussion. We are looking for comments from anyone related to the clarity, sensibility, timing, feasibility, and other characteristics of both the specific recommendations and the characterization of the overall assurances package.

Please submit comments to Joni Shaffer at jshaffer@willamettepartnership.org by May 15, 2009. Questions on the document or recommendations can be directed to Bobby Cochran at 503-681-4435 or cochranb@cleanwaterservices.org.



Assurances: Credit Generation and Sale Counting on the Environment

V.1 03/31/09



II. Background

Uncertainty may be inherent in ecosystem markets. But it can be managed. Uncertainty stems from a lack of knowledge (or inability to assign meaning to that knowledge) and generally comes in three forms: substantive, strategic, and regulatory (Hosterman 2008). Substantive uncertainty comes from the dynamic character of ecosystems. Floods deposit and scour soil, fires destroy some habitats and create new ones, and invasive species upset the ecological equilibrium. All of these forces alter, sometimes radically, existing natural conditions—and there is not much people can do to control them. Next, strategic uncertainty stems from the new relationships formed among ecosystem market participants. Many landowners may not be willing to participate in markets, thereby reducing the supply of such services. On the other hand, industrial buyers may go bankrupt, thereby reducing demand. In either case, formerly isolated groups will be affected by each other’s choices and condition. Lastly, regulatory uncertainty is generated by the flux or opaqueness of government policies and market rules. What is required by the producers and buyers of ecosystem services today may not be required tomorrow, making planning difficult. Together, these three forms of uncertainty raise questions about whether a restoration project will perform its intended functions, who is liable if it does not, and how the marketplace will account for their success or failure. Just as it is possible to articulate the sources of uncertainty in ecosystem markets, it is also possible to articulate and estimate the relative quantity of these uncertainties. In this paper, quantified uncertainty is called risk.

In 2008, Heather Hosterman, working with The Nature Conservancy, captured some ideas on assurances for the Practitioner’s Working Group of the Willamette Partnership. Many of the ideas in this paper are taken from her final report to the Willamette Partnership. The Working Group identified several risk factors that, if managed well, will lead to more successful credit projects or transactions. These are detailed in Table 2.1 below.

Table 2.1: Environmental Market Risk Factors

Risk Factor	Description
Quality of the original site (locally and for broader landscape)	If a site and its adjacent land cover meets a certain set of criteria (e.g. low invasive cover, adjacent to natural lands, located in a priority, etc...), it is more likely to produce lasting ecological value.
Suitability of the restoration design	If a site is restored to historic or reference conditions, it is more likely to reach its site system potential.
Qualifications of the land-manager and/or restoration practitioner	If a manager or practitioner has experience, capacity, and a restoration mission, they are more likely to deliver a successful restoration project.
Timing of credits related to impacts	Credits created after an impact has occurred increase temporal loss of function and create a risk that functions lost may not be replaced if the restoration does not perform as planned. Credits released before performance standards

	are reached increase the risk that the project may never meet these standards.
Known effectiveness of development and conservation action	The response of ecosystems to some human actions is much better understood than others. Wetland restoration generates more predictably measurable benefits than wetland creation.
Long-term management (plan, person, and funds)	Sites that are protected with long-term leases or easements, have money set aside for management and have someone in charge of them are more likely to sustain their benefits.

III. Responses to Risk

Markets use a variety of assurance tools to address sources of uncertainty and the risk factors described above. These tools include:

- Eligibility criteria for the impacts and benefits that are creditable and the trades that are appropriate;
- Verification rules for monitoring conditions on the site in relation to performance
- Liability, trading ratios, and other forms of risk-management;
- Performance standards and credit release schedules; and
- Programmatic monitoring and adaptive management.

The sections below describe each of these assurance tools in more detail.

3.1. Eligibility Requirements

Eligibility criteria determine who can buy credits, who can sell them and who can trade them with whom. They are also designed to keep out overly-risky or inappropriate projects. In many markets, eligibility is determined by a process called “validation”. For example, before conducting a restoration action and generating credits at a site, land managers must first establish the baseline conditions of the proposed site. This provides a reference for measuring additional benefits but also ensures the site complies with existing regulations and has not been degraded recently. Alternatively, for potential buyers like wastewater treatment plants, they must meet baseline standards for technology before they can trade to meet permitted allowances. For agencies and market managers, they can document that buyers have completed their obligation to avoid and minimize impacts.

Service areas (also called trading areas in some markets) are another type of eligibility requirement. In wetlands markets, buyers and sellers must come from the same watershed (e.g. the 4th field hydrologic unit). In current wetland and water quality markets, trading between different watersheds is generally prohibited in order to keep impacts and restoration actions relevant to one another. This may be different for species that cross watershed boundaries. Projects may also set minimum design qualifications as a type of eligibility requirement. For example, projects need appropriate restoration designs that include target species, habitat elements, and diversity. Wetland banks may need a conservation easement. Restoration design may need to be targeted toward a reference site, historic conditions or some theorized optimum condition.

Eligibility criteria have pros and cons. Stricter eligibility criteria generally lead to fewer projects that will actually be able to enter the market. However, the ones that do enter have a better chance of succeeding.

3.2. Verification Rules

Credits traded in a marketplace only have value if participants – buyer, regulators, sellers, and the public – know sites are achieving required performance standards. They seek, in other words, verification. Verification can take on many forms. It can be conducted by agency staff, independent third-parties or by the buyers and sellers themselves. In wetland banking, verification occurs in two ways: by sellers submitting monitoring reports and by agencies conducting annual site visits to confirm those reports. In carbon markets, independent third parties conduct verification on behalf of buyers and sellers. In many water quality markets, buyers are responsible for verifying the credits they buy.

Verification answers two general questions. Are project developers complying with market rules and procedures? Is the site achieving performance standards established by the market? Verification can be conducted on an intensive annual basis, or in cycles of single-party check-ins punctuated with full-verification by an agency at a less frequent interval. Verification may also vary in the type of information that is evaluated. Sometimes verifiers check to make sure decisions and credit estimates are well-documented, other times they may re-run credit or debit calculations to see if modifications to credit calculations need to occur based on performance. Another important element of verification is a clear dispute resolution clause in case verifiers and buyers or sellers cannot agree on credit estimates. The advantage of formal verification is a predictable process that takes buyers and sellers from a credit estimate to documentation that regulatory requirements are met and key issues are decided.

Once credits have been verified, they may also go through a process of credit issuance. Generally, issuing credits is an office task of ensuring all the paper work, documentation and rules are in place. For regulated markets, agencies are the entities that issue credits even if a registry assigns serial numbers for tracking and accounting purposes.

3.3. Risk Management

This catch-all category covers liability rules, trading ratios and other tools markets use to manage risk. In many markets (wetland mitigation banking, species and carbon for instance) permit liability for the performance of credits lies with the seller. In water quality trading and permittee-sponsored wetland mitigation, permit liability remains with the buyer. Generally, liability is a costly proposition. It causes water-quality buyers to hesitate when buying credits and it causes higher prices for many sellers in habitat mitigation markets. For agencies, the question of permit liability is critical. Permits are their mechanism for enforcement, so markets must make it clear where liability lies. Given the expenses associated with liability, some markets have generated ways to share it. For example, a trade association in the North Carolina's Neuse River accepts liability on behalf of a set of water quality buyers.

Trading ratios are another common way to deal with uncertainty and risk. Trading ratios are designed to account for many things, including: the likelihood a project itself will fail, the time it

takes for an action to deliver the benefits it promises, a safety factor for environmental benefit, and the contextual value of a credit in relation to a debit. Trading ratios might also be used to provide incentives for desired actions, investment in priority locations or other environmentally-beneficial actions not captured directly in the debit or credit estimation. For the Counting on the Environment program, trading ratios are included as part of the credit calculation metrics and not a part of the assurances framework.

Markets use other forms of risk management as well. Sometimes wetland bankers are required to purchase performance bonds during construction. The Great Miami program in Ohio established a reserve pool of credits to act as insurance against some of its projects failing. In carbon, the Voluntary Carbon Standard Association requires the retention of “buffer” credits to create a reserve. In both of these cases, project sponsors can only actually sell a portion of the credits their projects generate.

3.4. Performance Standards and Credit Release Schedules

Many markets phase their release of credits over time based on achievement of pre-defined performance standards. Doing this accounts for the fact that the exact benefits of a restoration project are often difficult to predict prior to initiating the work of restoration. In addition, the benefits of restoration typically accumulate over time with active management. The performance standards associated with phased credit releases might include the following: a maximum percent cover of invasive species, a target level for depth to saturation in wetlands, the presence of target species or the implementation of planned practices.

3.5. Programmatic Monitoring and Adaptive Management

There is very little systematic evaluation of most ecosystem markets. Largely, these markets are new and represent a small fraction of the total conservation or development activity in a region. That said, programmatic monitoring and a defined adaptive management plan can go a long way toward mitigating risk. There needs to be a process for rolling verification and site-level monitoring reports into a programmatic picture linked to landscape-level monitoring that includes a full suite of conservation actions and continued impacts.

There also needs to be a predictable schedule and process for updating credit calculation methodologies and market rules to respond to lessons and feedback generated by market activity and new science. These feedback loops that are transparent and fixed for some period of time allow people to take initial actions to learn. But they also adapt in a predictable way, allowing planners to make significant investments with a higher degree of certainty on what their return on investment will be.

IV. Recommendations for an Integrated Assurances Package

The following recommendations are taken from a variety of sources including existing rules and practices in wetland mitigation banking, water quality trading, and voluntary carbon markets. Some of the recommendations are hybrids of these and others are newer ideas. We have done our best to document the problem the recommendation is designed to address, the source of the recommendation, and the rationale for choosing it. The recommendations are designed to be as explicit as possible to provoke discussion. In no way are they set in stone, but we are confident they represent a package that will ensure markets produce the environmental benefits they promise. Some of these assurances can be implemented immediately, some will need rulemaking or other administrative action, and some will need further review and evaluation.

4.1. Eligibility Criteria

As a type of assurance in markets for ecosystem services, eligibility criteria apply to sellers, buyers and to the trades themselves. Eligibility criteria, as noted earlier, serve as minimum standards designed to keep out inappropriate projects or trades. Setting the height of these standards is likely to be an iterative process, reflecting conservation objectives and market conditions. In new markets, a significant amount of time is spent between project developers and agencies. Eligibility criteria can help ensure time is spent on the projects with the highest likelihood of success and avoid conflicts tied to inappropriate projects or trades.

4.1.1 Additionality

All credited projects need to demonstrate they provide “additional” conservation benefits. The additionality requirement ensures credits are awarded for doing more than what would otherwise have happened without a market mechanism in place. Recommendation R.1 borrows from the additionality requirements in carbon markets, and particularly from The Climate Trust guidance based on the Kyoto Protocol and WRI guidance (http://www.climatetrust.org/solicitations_2007_Additionality.php).

R.1: All issued credits result from restoration actions that are 1) above and beyond a regulatory threshold for compliance, and 2) above and beyond business as usual. Defining “business as usual” will be based on a set of questions answered by the landowner during the project validation process.

Many existing markets are focused on restoration and do not provide strong incentives for preserving high quality habitat. In this situation, eligibility requirements can also be used to guard against an incentive to destroy good habitat just to later restore it for credit. The balance lies in providing room for new landowners who want to reverse actions of past landowners to get credit for their actions. Recommendation R.2 is based on The Climate Action Reserve’s forest carbon offset protocol for reforestation projects (<http://www.climateregistry.org/tools/protocols/project-protocols/forests.html>), which states that lands cannot have been subject to intentional, significant disturbance from the landowner in the

last 10 years. Recommendation R.3 is based on the 1985 Food Security Act requirements, and Recommendation R.4 allows new landowners, land trusts, and others to reverse actions taken by previous landowners.

R.2.: Require that all credits result only from restoration actions that occur a minimum of 10 years after a significant, intentional development action on the site. For example, a landowner would be ineligible to sell credits for restoring riparian forest if they had removed any portion of a pre-existing riparian forest in the last 10 years.

R.3.:For wetland projects, any restoration action occurring on prior converted or farmed wetland according to the 1985 Food Security Act are eligible for credits. If a wetland has been converted in the last 10 years, it is not eligible. Standard agricultural and forest practices occurring on wetlands would not necessarily preclude credit eligibility.

R.4. If land changes hands from the landowner conducting the development action to a new land owner conducting the restoration action, the second landowner would be eligible to sell credits.

Comment [c1]: This is meant to allow someone with a conservation interest (e.g. land trust or banker) to acquire a degraded parcel and turn it around. As written, it does not protect against transfers to a cousin or LLC.

4.1.2 Minimum quality standards

Creditable projects also need to meet a minimum standard of quality. The time and investments required to create, verify, and register credits is significant. Quality standards help save people time and money by ensuring good site selection and project design. Recommendations R.5-R.7 are based on riparian restoration goals in the Dept. of Environmental Quality's (DEQ) draft Internal Management Directive on trading.

R.5.: If a restoration action includes planting as a component, that planting must consist of locally-sourced native species to the extent available.

R.6.: Planting must consist of suitable diversity and maturity, which are planted at established density levels based on appropriate reference conditions. Each market will set minimum standards.

R.7.: For riparian planting, the planting plan should include an appropriate mix of trees AND shrubs (e.g. no less than 20% of stems as trees and no less than 20% of stems as shrubs).

4.1.3 Land protection

Creditable projects will also need to include land protection agreements to sell credits. These requirements may vary by market, but land protection ensures benefits are protected as landowners may change. Long-term agreements that run with the land, such as easements, are always preferable to short-term contracts. Yet, requiring permanent easements is a significant barrier to entry and is not recommended for temporal impacts. Recommendation R.8 is based on current wetland rules and DEQ guidance on temperature trading.

R.8.: For permanent impacts (e.g. wetland removal and fill or species take), creditable projects need permanent conservation easements or equivalent (deed restrictions, covenants, or

agreements from public agencies)t. For temporal impacts (e.g. air or water pollution), creditable projects, at a minimum, need a lease covering the crediting period of the project. For example, if nutrient reductions are sold for five years, there needs to be at least a five year lease with the landowner to protect those reductions.

4.1.4 Buyer eligibility

Buyers will also need to meet some minimum standards before accessing markets. These standards are often set in agency rules. This includes targeting credit purchases to priority restoration and conservation areas. Recommendation R.9 is based on Clean Water Act requirements for NPDES permits and removal-fill permits.

R.9: Require that buyers avoid or minimize the impact of their development actions, by being in full compliance with all relevant laws and rules related to offsetting their impact through the best practicable technology and practice, prior to using credits to offset impacts. Agencies will provide buyers with documentation if this requirement is met at the planning level and/or design level of an impact project.

In DEQ's temperature trading guidance, there is a proposed requirement for permitted buyers to purchase a percentage of their credits from a priority area. Investment in priority areas will be incentivized in the Credit Calculator's methodology. Projects in high value areas will get more credits. Most markets deal with priority investment on the seller's side. This requirement for buyers guarantees investment in priority areas.

R.10: Require that buyers maximize their credit purchases from priority locations as defined for each market.

Comment [c2]: Some markets may not be able to direct buyers in this way (e.g. if policy favors one supplier over another). May also not be feasible for buyers offsetting all their impacts from one site, since their choice of site selection will be constrained.
May change "require that" to "urge"

4.1.5 Trade and service areas

Most eligibility will be dealt with as buyers and sellers access markets, but some trades are not appropriate. Service/trading areas make it clear market participants which types of buyers and sellers can conduct trades with each other. Recommendation R.11 comes from current defaults in wetlands and water quality trading programs in Oregon.

R.11: Require all trades abide service area restrictions specific to the currency being traded. For wetlands, salmonids, and water quality, the 4th-field hydrologic unit is the default size of the service/trading area unless a compelling case can be made by any party to expand or constrict the size.

R.12: For prairie and other species, the Willamette Basin is the default size of the service/trading area unless a compelling case can be made by any party to expand or constrict the size. Recovery Plan area will be defined as the service area for listed species with recovery plans.

4.2 Verification and Credit Issuance

Similar to eligibility criteria, verification and credit issuance are types of assurance that apply to sellers, buyers and individual trades. Verification is the process of taking credit estimates produced by project developers, confirming that the project meets the market's minimum quality standards and eligibility, that the quantity of credits were estimated accurately, and that all procedures have been followed and documentation is in place. Verification can range from intense, re-running of calculations and visits to the site, to office review of monitoring reports that confirm no significant changes have occurred. Intense verification is often referred to as "full" or "complete" verification, and the check-ins are often termed "partial" verification. Credit issuance is the act of the market manager to review the verification report and the credit proposal and issue credits. Carbon markets have developed the most standardized processes for credit verification and issuance. Recommendations R.13- R.20 are drawn from the Climate Action Registry's General Verification Protocol

(<http://www.theclimateregistry.org/resources/verification/verification-process-overview.php>) and the Willamette Partnership's Temperature Trading Handbook (www.willamettepartnership.org).

Currently, public agencies fill both the verification and the credit issuance role in many markets. For example, the Interagency Review Team (IRT) for wetland mitigation banks verifies projects via annual site visits and issues credits as it authorizes credit releases. The process is often conducted on a case by case basis, which builds some uncertainty into the system for buyers and sellers. Recommendations R.13-R.20 are modeled off of a third-party verification system with agencies retaining the role of issuing credits. This model is different from current practices in markets like wetlands, but can still work in a system where agencies fill the verification roll.

R.13: Require that all credits, prior to receiving certification and being placed on a registry, undergo verification by a neutral third-party and certification by an agency/market administrator.

R.14: Require that a market administrator accredit a pool of qualified verifiers. Verifiers will be assigned randomly to projects from that pool.

R.15: Require a five-year verification cycle where all credits undergo a full verification in Year 1, which includes confirmation that the credit calculation was done correctly and confirmation that the supporting data accurately represents conditions in the field, when they are first submitted to the registry. Annual, partial verification of monitoring reports submitted by sellers will be conducted in Years 2-4. Site visits in years 2-4 are not required, but can occur at the discretion of the verifier or the responsible agency. Another complete verification will be conducted in Year 5. Verification cycles continue through the life of all credits.

R.16: For permanent impacts, verification will occur in two phases. Phase I is described by the cycle in R.15 and continues through the development life of a credit project. As a project moves into long-term management, only a full verification will occur every five years, and only if required by the agencies/market administrator.

R.17: Require that the debits a buyer is accountable for be verified with the same level of rigor as the credits a seller produces. As buyers move through verification, re-opening clauses in agency or market agreement are minimized.

R.18: Require that verifiers themselves be responsible for avoiding any conflicts of interest, including agreement to a conflict of interest code and changing verifiers for a given project every five years.

R.19: Agencies will certify the reports submitted to the registry by verifiers and issue credits unless they delegate certification to a third party. Credits generated by mitigation done in advance of impacts and in accordance with market rules will count toward future impacts.

R.20: Require the verification of trades through a single credit registry maintained by the agency or a third party market administrator. Require the registry to serialize credits, a process that attributes a unique identifying number to each credit that ties it back to its place of origin, so no credit can be sold more than once. Require annual reporting and that all documentation emerging from the credit verification process be readily available on the registry for agency and public review. In the case where credits can be re-sold, transferred to third parties, or are otherwise fungible, the seller shall remain responsible for verification, and the registry shall track the credit serial numbers and quantities for each account holder.

4.3 Risk Management

In many ways, all assurances are a form of risk management, yet there are three tools commonly used in markets to manage risk. These include the liability rules for who is responsible if a project fails or if something goes wrong, trading ratios or discount factors applied to credits and debits, and increasingly, forms of insurance to account for project failure. For this project, discounting and trading ratios will be incorporated as part of the credit calculation methodology and are not addressed here.

4.3.1 Liability Rules

For existing markets, liability rules are fairly well established. There are two forms of liability. Regulatory liability stems from permits or agency enforcement rules and contract liability that rests in the agreement between buyers and sellers. In most cases, regulatory liability is transferred from buyers to sellers of ecosystem credits. This is true for wetlands, species, and carbon markets. Once an agency approves a buyer's mitigation plan, and the buyer purchases credits, the buyer is not responsible for the performance of credit projects. This is not true for most water quality trading programs, where the buyers or point sources holding discharge permits remain liable. There are some examples of water quality trading programs where a third party or buyers association has taken on collective liability for its member point sources. Unclear liability rules is a problem in many markets, creating hidden costs, distorting credit prices, and causing hesitation for people to enter the market. Recommendation R.21 maintains the status quo for liability in current markets but recommends the model used in wetlands for releasing buyer liability upon purchase of credits.

R.21: Retain liability rules for current markets. For new markets (e.g. prairie and salmonids), transfer regulatory liability from buyer to seller upon purchase of the necessary credits.

4.3.2 Reserve Pools

Increasingly, many markets are using financial insurance and reserve mechanisms as a replacement or supplement to trading ratios. The Voluntary Carbon Association requires a project to hold a percentage of its credits back in reserve in case a project fails. The entire program maintains a reserve to protect the whole program in case an individual's insurance pool cannot cover the loss. The Great Miami water quality trading program uses trading ratios to account for uncertainty, but it dedicates the initial credits generated from those ratios to hold in reserve. Other carbon markets require financial insurance to cover the costs of replacing restoration projects. Wetland markets require performance bonds on many of its banking projects. Performance bonds and insurance cover financial risk, by paying out cash when something goes wrong. Reserves cover ecological risk, covering environmental losses by the reserve of credits. Recommendation R.22 uses the Voluntary Carbon Association model of a reserve pool of credits populated through discount factors in the credit calculator to act as a reserve pool.

R.22: Create a Reserve Pool of credits managed by a regional market coordinator that can be accessed as a last resort for projects that fail because of force majeure or other acts beyond control of the seller, or for project failures that cannot be resolved. In the last case, sellers will need to rent credits from the reserve to provide to buyers until they can arrange to resupply buyers' accounts. In addition, government or other funding may choose to invest in the reserve to acquire more credits/fund more projects to create a stronger back-up to their trading programs. A performance bond or other up-front financial insurance could be used to ensure the money is available to acquire reserve pool credits in cases where a project developer goes bankrupt, or otherwise is unable to cover the costs of accessing the reserve.

4.4 Performance Standards and Credit Release

Ideally, performance standards and management goals will be based on a local reference site. If a local reference site is not available, historical conditions and/or a proxy condition pieced together from other sources can be used. The standards below are drawn from the state's wetland mitigation banking template and the planting goals in DEQ's Internal Management Directive guidance. Mitigation in advance of impacts is always preferred, but not always feasible.

4.4.1 Performance standards

Generally, all projects will have performance standards that they must meet over a given time period that can be verified through annual monitoring. The implications and resolutions for missing performance targets will vary by market. Recommendation R.23 represents a combination of emerging standards in Oregon's wetland mitigation banking program and planting guidelines for the temperature market.

R.23: The targets below represent some of the typical minimal standards:

- A. Less than 15% mean aerial cover of non-native invasive plants over the credited area*
- B. Greater than 55% mean aerial cover of native plant species over the credit area*
- C. For species markets, there is presence of target plant and/or animal species or their habitat (e.g. Kincaid's lupine or salmon habitat)*
- D. For wetlands, wetland hydrology and vegetation, as defined in the 2007 Arid West Supplement to the 1987 Corps Wetland Delineation Manual (U.S. Army Corps of Engineers 2006), shall be present in the wetland area within the first 5 years after construction”.*
- E. The registry will also track progress toward meeting other conditions and commitments made by buyers or sellers as part of their permits/agreements*

4.4.2 Credit release schedules

In some markets, credits are released upon completion of the action. In others, they are released over a phased schedule. In either situation, “advance credits” are those credits released for sale before the project is delivering the fully estimated suite of ecosystem services. Sellers often need to sell advance credits to fund the ongoing construction and maintenance of a project. Yet, as more advanced credits are released, there is greater risk that impacts aren’t fully mitigated. Recommendations R.24-R.29 is based on Oregon wetland mitigation banking guidance.

R.24: No more than 30% of the total estimated credits for a project site can be released in advance without adjusting the trading ratio. In the case of temperate markets, the trading ratio is adjusted up to 2:1 to account for the 100% release of advance credits.

R.25: For advance release, the credits need to be verified and issued based on as-built designs, land protection agreements need to be in place, and the major construction phase of the project must be complete (e.g. channel work, hydrological modification, planting, etc...).

R.26: When the project achieves its first suite of performance targets, up to 50% of the credits can be released.

R.27: When it reaches its second suite of performance targets, up to 80% of the credits can be released.

R.28: Once a project has reached all of its performance targets and a long-term management plan is in place and functioning, and remaining credits can be released.

R.29: If a project reaches 100% of its performance targets sooner than anticipated, and a trading ratio had been applied for releasing greater than 30% of credits in advance, some of these credits can be returned and made available for sale at the sole discretion of the lead agency.

4.5 Programmatic Monitoring and Adaptive Management

Managing emerging markets is an iterative process. To the extent possible, adaptation needs to be designed into the market in a predictable way. In many markets, there is an unclear link between the project-level monitoring needed to verify and issue credits and the programmatic level monitoring needed to evaluate overall performance. As a result, there are incomplete pathways for adapting programs to address new information or adjust for performance problems. Recommendations R.30-R.33 were adapted by the Great Miami water quality trading program in Ohio (http://www.miamiconservancy.org/water/quality_credit.asp). None of these recommendations would affect the credits previously issued to market participants.

R.30: Project-level monitoring will be conducted using the Integrated Ecosystem Credit Calculator methods as part of the annual verification cycle to maintain credits.

R.31: Verification reports will be stored in a central database and made available to the public and managing agencies to assess progress and performance of programs. Data from verification reports needs to be linked to a landscape-level monitoring plan. Individual market participants will not be liable for program/overall market performance.

R.32: In addition, 15% of credited projects should be monitored in detail every year by a third party for the purposes of program evaluation, not credit evaluation. This monitoring information will not affect the allocation of credits to those projects. This information will be used to adjust credit calculators, assurances, and other program elements on a two-year cycle.

R.33: Rule changes that have a major impact on existing market participants will be limited to those two-year windows.



Ecosystem Credit Calculator

A product funded by an NRCS Conservation Innovation Grant

COMMENT DRAFT: Willamette Water Quality Crediting Protocol

Summary

The Ecosystem Credit Calculator's Water Quality Crediting Protocol is based on two sets of models. The temperature crediting portion is built from the Dept. of Environmental Quality's Heat Source Model and Shade-a-Lator version 6.2. The nutrient and sediment portion will be constructed and piloted in the Tualatin basin based on the Agricultural Policy Extender model developed by USDA Natural Resources Conservation Service and the Texas Institute for Applied Environmental Research. The temperature credit portion can be applied to riparian revegetation, and the nutrient/sediment portion can be applied to changes in irrigation, crop cover, fertilizer use, tillage, and use of filter strips. The protocol cannot be applied on the debiting side to point source discharges. Other models will be used. The model can capture the temperature or nutrient contributions from actions taken on the site level that alter land cover and land use. The protocol requires users to first define the assessment area, then divide the site into subunits, and then answer questions tied to indicators. These are used to feed models that generate quantities of temperature or nutrient/sediments reduced at the edge of the field or stream. The output of the protocol is a kilocalorie/day for temperature and a pound/year for nutrients and sediments.

Current status and documents included

The temperature crediting protocols have been vetted extensively. A temperature handbook is available on the Willamette Partnership's website and the Dept. of Environmental Quality has issued guidance on trading. For temperature, some additional work is needed to standardize which model version gets used and which assumptions for vegetation heights are used. For nutrients, work needs to be done to calibrate the models for crops, management practices, and other conditions in Oregon. Work also needs to be completed around discount factors tied to contextual value, delivery of nutrients from field to stream, and then from stream to point of concern.

Action needed

None on the credit calculation methods at this time. We ask water quality stakeholders to focus their comments on the proposed integrated package of assurances. There is no current documentation for nutrients/sediments. This will be created for the Tualatin by August 2009. Documentation for temperature can be found on the Willamette Partnership's website.

Questions to guide comments

1. None at this time

Submitting comments

Please submit comments by email to Joni Shaffer at jshaffer@willamettepartnership.org before May 15, 2009. Questions can be directed to Bobby Cochran at cochranb@cleanwaterservices.org or 503-681-4435. Thanks!





Ecosystem Credit Calculator

A product funded by an NRCS Conservation Innovation Grant

COMMENT DRAFT: Willamette Upland Prairie Crediting Protocol

Summary

The Ecosystem Credit Calculator's Upland Prairie Crediting Protocol uses a new approach developed by Paul Adamus working with a technical group of prairie experts. The prairie protocol captures the habitat functions provided by upland prairies. The credit protocol can be applied to prairie protection, restoration, and enhancement on the crediting side and site-level actions that alter vegetation or other natural systems on the debiting site. The protocol requires users to first define the assessment area, then divide the site into subunits, and then answer questions tied to indicators used to generate scores for a score for habitat function. This score is then weighted based on patch size, connectivity of the site to other prairie patches, and permeability of the site. The output of the protocol is a functional-weighted acre.

The protocol provides for optional indicators based on more detailed plant lists or plot data.

Current status and documents included

The current documentation includes an Excel Workbook with the field datasheet, species lists, and calculator for the site's contextual value. It also includes the beginnings of the additional steps needed to calculate prairie credits. By April 17, we will release additional documentation that rolls the scores for indicators into an overall score for habitat function and describes how discounting will work based on contextual value and risk.

3. Prairie Credit Calculator (PrairieCreditCalculator4.xls)
4. Prairie Calculation Guidance (Steps for using Prairie method April 01_09.doc)



Action needed

For these documents, we are seeking comments on indicator wording and answer choices and the factors determining the contextual value of the site. After April 17, we will be seeking additional comments on how indicators are rolled into a score for habitat function.

Questions to guide comments

2. Do the algorithms turning indicators into scores for ecological function work?
3. Do the discounting factors capture priorities for the context and risk tied to success?
4. Do the discounting factors present a feasible and economical framework?

Submitting comments

Please submit comments by email to Joni Shaffer at jshaffer@willamettepartnership.org before May 15, 2009. Questions can be directed to Bobby Cochran at cochranb@cleanwaterservices.org or 503-681-4435. Thanks!



Ecosystem Credit Calculator

A product funded by an NRCS Conservation Innovation Grant

COMMENT DRAFT: Willamette Salmonid Crediting Protocol

Summary

The Ecosystem Credit Calculator's Salmonid Crediting Protocol uses a library of methods compiled by Paramatrix, INC as its base for credit and debit calculations. The credit protocol can be applied to riparian revegetation, large wood placement, culvert removal, and riparian fencing on the crediting side and site-level actions that alter vegetation, hydrology, contaminant levels, or other natural systems. The protocol requires users to first define the assessment area, then divide the site into subunits, and then answer questions tied to indicators used to generate scores for seven site-level ecosystem functions. These functions are then weighted based on their connection to priority limiting factors in the watershed. The output of the protocol is a functional-weighted linear foot that reflects the percentage of ideal functionality a stream reach provides for salmonids.

The Paramatrix library of methods was developed through work with the Oregon Department of Transportation, Oregon Trout, internally-directed work, and other partners that worked extensively on the kinds of indicators and functions needed to define salmonid habitat.

Current status and documents included

The current documentation includes documentation describing each indicator, and explanation of the discounting approach recommended, and a field reference guide.

5. Salmon Currency Rules (XXXX.pdf)
6. Salmon Discounting Factors (XXXX.doc)
7. Salmon Field Guide (XXXX.pdf)



Action needed

The indicators and functions have been extensively vetted. We are asking for commenters to focus on the weighting factors applied to functions to account for landscape context and the weighting ratios applied to credit estimates to account for risk.

Questions to guide comments

1. Do the discounting factors capture priorities for populations and limiting factors?
2. Do the discounting factors present a feasible and economical framework?

Submitting comments

Please submit comments by email to Joni Shaffer at jshaffer@willamettepartnership.org before May 15, 2009. Questions can be directed to Bobby Cochran at cochranb@cleanwaterservices.org or 503-681-4435. Thanks!



Ecosystem Credit Calculator

A product funded by an NRCS Conservation Innovation Grant

COMMENT DRAFT: Willamette Wetland Crediting Protocol

Summary

The Ecosystem Credit Calculator's Wetland Crediting Protocol uses Version 2 of the Oregon Rapid Wetland Assessment Protocol (ORWAP) as its base for credit and debit calculations. The credit can be applied to wetland enhancement, restoration, and creation on the crediting side and removal/fill actions that alter wetland vegetation and hydrology on the debiting side. The protocol requires users to first define the wetland assessment area, and then answer questions tied to roughly 150 indicators to get scores for site-level ecosystem functions. ORWAP also produces scores to the landscape-level values, and the ecosystem services that the site produces for surrounding communities.

ORWAP was developed by Paul Adamus under contract with the Oregon Dept. of State Lands and with guidance from a Technical Advisory Committee convened by State Lands. It has undergone extensive vetting, repeatability, and sensitivity analysis. It is scheduled for adoption by State Lands and the Army Corps in late April 2009. This protocol takes the ecosystem service scores produced by ORWAP, combines them with area, to produce an estimate of marketable credits or debits.

Current status and documents included

The current documentation includes an Excel sheet with the ORWAP data sheets, algorithms, and outputs. It also includes a field manual to guide users of the methodology. By April 17, this protocol will also include several options for combing ORWAP scores with area to produce credits.

8. ORWAP Calculator (ORWAP_calculator_April01_09.xls)
9. ORWAP Manual (ORWAP_Manual near-final draft_March 30.doc)



Action needed

None before April 17. After April 17, we will be looking for comments on the discounting factors and approach for combing ORWAP scores with area to create credits.

Questions to guide comments

1. There are several options for turning ORWAP scores into measures of credit. Which of these options make the most sense to you? What are the pros and cons of each?
2. Do the discounting factors presented maximize potential ecological gains?
3. Do the discounting factors present a feasible and economical framework?

Submitting comments

Please submit comments by email to Joni Shaffer at jshaffer@willamettepartnership.org before May 15, 2009. Questions can be directed to Bobby Cochran at cochranb@cleanwaterservices.org or 503-681-4435. Thanks!