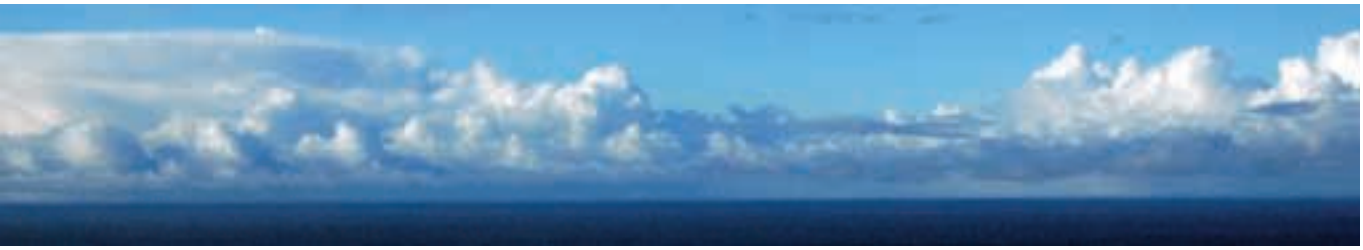

Carbon Offsets and Ecosystem Services Grant

Opportunities and Barriers in Emerging Markets

FINAL REPORT

Prepared by Ecosystem Services for
the Oregon Watershed Enhancement Board and Staff
July 2010

Oregon Watershed Enhancement Board's

Carbon Offset and Ecosystem Services Grant FINAL REPORT

ecosystem services, llc

TABLE OF CONTENTS

I. INTRODUCTION / EXECUTIVE SUMMARY.

II. THE PAST:
- Back casting / A historical survey of OWEB projects and their potential carbon offset / ecosystem services value.

III. THE PRESENT:
- Survey questionnaire and results / Oregon State's carbon offset supply chain members.
- Agenda and summary of key learning's from "Forging the Carbon Offset Supply Chain in Oregon" working group event.
- Reports / Maps on the forest and soil carbon "pilot" projects.
- Report on carbon and leading ecosystem service markets.

IV. THE FUTURE:
- "Carbon Offset Supply Chain Road Map" for OWEB staff and grantees to use as a navigation tool to better understand carbon offsets and/or carbon projects and their attendant ecosystem services.
- Field based criteria/questionnaire for forest based carbon projects.
- OWEB regional carbon and ecosystem service "opportunities and barriers" map.

V. SUMMARY AND RECOMMENDATIONS:
- Project summary
- Project recommendations

VI. APPENDIX:
- Project proposal and final contract.
- Supply chain survey participants.
- List of participants in the "Forging the Carbon Offset
- Supply Chain in Oregon" event.
- Technical carbon offset terms/ Definitions page.
- 9 Foundational project qualification questions.
- Closed Loop Carbon Economy in Oregon" information sheet.
- Final presentation made to OWEB board in June 2010. (Power point deck)

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Carbon Offsets & Ecosystem Services Grant EXECUTIVE SUMMARY

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(See complete original grant proposal and OWEB contract in appendix)

I. INTRODUCTION

The field of ecosystem services is an emerging one in America today and is an equal mix of the natural and economic sciences. It has been described as a method for *"Valuing the critical functions natural systems provide to humankind, as a means to insuring a mutually sustainable future."*[1] The focus of this grant is carbon that is sequestered in soils and plant life, which is arguably the most developed ecosystem service to date, with its mature standards and the rapid growth of its worldwide $90 billion dollar voluntary and regulatory-compliance driven offset markets.

The objectives of this grant were to:

- Understand OWEB's role in ecosystem services and carbon offsets in Oregon.
  Quantify and value what carbon and ecosystem benefits have been delivered through OWEB's historical activities.
- Better understand the opportunities and obstacles in the markets for OWEB's restoration and conservation activities.
- Develop a practical "Carbon Offset Road Map" for the future use of the Agency and its grantees.

Over the nine-month term of this grant the ESS project team delivered on these objectives by:

- Quantifying the carbon storage and ecosystem service benefits OWEB has delivered through their restoration and acquisition activities of the past, who the stakeholders were in this process, and what the potential dollar value of these activities would have been if they had been monetized.
- Learning experientially by developing a pair of forest and soil based carbon pilots and gathering insights from a two-day "Carbon Supply Chain" working group event.
- Analyzing the key *barriers and opportunities* in the markets for projects that provide carbon offsets and multiple other ecosystem service benefits.

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- Creating a user friendly and web based *Carbon Offset Road Map* for the OWEB board, staff and grantees to better
- understand the development of ecosystem services projects and the resources and relationships necessary to do so.
- Making recommendations regarding OWEB's future involvement in ecosystem service projects and markets.

This draft executive summary reflects the same structure used in the final grant report and is divided into a PAST, PRESENT and FUTURE timeline. A final report will be completed after the June 2010 OWEB Board meeting presentation and dialogue with Board members, as well as subsequent review by OWEB staff.

II. THE PAST

During the initial grant interview and proposal process the Ecosystem Services LLC (ESS) / Ecotrust team was clear that they believed OWEB was *already in the ecosystem service business* due to its restoration and acquisition activities that build natural system health. To determine the ecosystem service value OWEB had already delivered, the first activity of the project team was to look carefully at their project history.

A) A "back-casting" report was generated by conducting a detailed analysis of historical OWEB restoration and acquisition projects in order to quantify their carbon offset and ecosystem service values.

The ESS team reviewed 196 OWEB restoration grants (those funded in 2008-2009) and 31 OWEB acquisition grants (those funded since 1998) and grouped their activities into 10 categories: 1) Riparian Planting and Restoration, 2) Logging Road Removal, 3) Hardwood Restoration, 4) Grassland Restoration, 5) Grazing Land Improvement and Management Improvement, 6) Agricultural Management Improvements, 7) Juniper Removal, 8) Conservation Easement (Protection), 9) Conservation Easement (Working Lands), and 10) Fee Simple Acquisition.

The results showed considerable value inherent in activities typical to OWEB's restoration and acquisition grants as follows:

A) <u>Estimated amount of carbon sequestered by RESTORATION PROJECTS in 2008-2009 totaled</u>: **303,500 tonnes of CO2e.**
<u>A range of potential market value for these RESTORATION PROJECTS totaled</u>: **$1,214,000** to **$ 2,280,000***

(303,500 tonnes of CO2e x an assumed value range of $4.00 to $7.50 per tonne of carbon offsets dependent on standards and buyers.)

B) Estimated amount of carbon sequestered by ACQUISITION PROJECTS since 1998 totaled: **725,000 tonnes of CO2e.**
A range of potential market value for these ACQUISITION PROJECTS totaled: **$2,900,000** to **$5,437,500***
(725,000 tonnes of CO2e X an assumed value range of $4.00 to $7.50 per tonne of carbon offsets dependent on standards and buyers.)
* Note: These values are subject to fluctuation on the per tonnage carbon price across time and different markets, what protocols are being applied to projects, an assumption that smaller projects could be aggregated in order to be brought to market, and that this income would be realized over a period of time and not all at once.

Additional substantive ecosystem service benefits delivered by these same projects included: water temperature reductions, Water quantity or quality improvements, storm water management, cycling and movement of nutrients, aquatic and terrestrial habitat, maintenance of biodiversity, erosion control and soil degradation, view-scapes, recreation and tourism. Note: A monetary value was not placed on these benefits as there are very few markets for some and a wide range of values for others.

Recommendations for potentially integrating carbon offset and ecosystem service criteria into the OWEB granting process are contained within Section V, Recommendations at the end of this report. The intention in doing so is to suggest ways of generating new sources of revenue for restoration funding in Oregon and for OWEB's grantee community.

III. THE PRESENT

In order to better understand the opportunities and barriers for carbon and ecosystem services present in Oregon today, the project team used a variety of methods to gather information from a wide variety of sources, including:

A) A statewide survey of the "carbon supply chain," i.e. everyone involved in a step-by-step process of bringing biologically based carbon from its land based origins through project development to the market. The survey goals were to identify and interview potential stakeholders in the carbon offset-ecosystems services markets, and to determine how these activities and markets relate to OWEB's mission. This supply chain is made up of those individuals, companies, NGO's and agencies that provide the critical functions necessary to move ecosystem service projects from the identification of qualifying lands through project feasibility, project design, business transactions and into the markets to a final buyer. Those interviewed included: NGO's, Federal agencies, State

Agencies, Private businesses, Quasi-governmental agencies, Consulting foresters, Carbon field analyzers, CO_2 quantifiers, Land appraisers, Project developers, Carbon wholesalers/traders/marketers, Offset customers, Verification / monitoring entities, Carbon offset registries, Attorneys, and Financing entities/ banks/investors.

This survey showed a range of stakeholder interest in participating or benefiting from these new sources of revenue, ranging from a deeply held suspicion that they were "smoke and mirrors," to an excitement and keen interest to know how they could participate, to entities engaged in developing and transacting millions of dollars of ecosystem service business. Survey results revealed a clear link between ecosystem service projects and OWEB's core mission.

B) Key learning's from a two day *Forging the Carbon Offset Supply Chain in Oregon* working group event that was attended by 75 individuals from throughout the United States. The participant list included representation from the same constituencies interviewed in the survey (i.e., members from each step in the process of moving bio-based carbon offset projects from the ground to the market).

The group of participants concluded that any carbon and ecosystem service projects must verifiably ensure that the project has had an overall net positive effect on the natural systems in which it occurs and that this can occur within working landscapes and not just in conservation based projects. Secondly, that the Oregon carbon offset market, while rich in forest and soil assets, is in its infancy and needs additional projects developed to demonstrate its potential, legislative support and incentives, and voluntary buyers willing to invest, in order to generate substantive volumes. This is especially true until any regulatory markets are mandated through legislation.

A key insight was the need to build strong relationships between land owners/ managers, project developers, and those willing to purchase the resultant offsets, along with the need for a "road map" of how the carbon-project development process works. There was a great deal of interest from those present in the potential of carbon-offset projects (i.e., forest, soil, and wetlands) to produce revenue for landowners, private businesses, NGOs and state agencies.

C) Applied lessons from both the <u>forest and soil carbon pilot projects.</u>
The forest-based project was an actual transaction involving an industrial timber company, a state agency and an Oregon based offset buyer. The soil carbon project's deliverable was to scope out a pilot project that addresses the needs of agencies and ranchers interested in enhancing soil carbon

storage and multiple other ecosystem services. Actual implementation will occur after the completion of this contract with outside funding.

The forest-based project showed that a state agency could engage in the carbon market through the transference of rights to carbon offsets to a quasi-governmental agency purchasing the credits. It also surfaced a variety of issues such as: A) legal precedence, B) minimum scale that projects must reach in order to be commercially viable, C) the conservation benefits of lands involved in carbon deals being put into late-successional forest through a permanent "mixed use" easement, and D) the interests of the people of Oregon being served by providing recreational opportunities they would not have otherwise experienced. (The land will be managed-owned by Oregon Parks and Recreation Department as a recreational park and natural area.)

Lastly, this project has shown that multiple benefits, over and above carbon offsets, can and should flow from any carbon ecosystem services transaction in order to make them viable financially and in terms of natural system health.

The soil based project, while in its development phase, has united a group of federal and state agencies, ranchers, and NGOs and their interest in increasing soil carbon in lands in eastern Oregon and, in doing so, realizing a cascading set of benefits linked to water infiltration and retention, the health of perennial grass stands, and an increase in biodiversity.

D) A report on current carbon and leading ecosystem service <u>markets</u> that provides an overview of current voluntary and compliance driven markets for carbon offsets and their related ecosystem services. This document also outlines opportunities, barriers and requirements of these markets with sensitivity to the information needs of OWEB and its grantees.

The **voluntary** carbon-offset markets in the United States are generally driven by businesses, governments and individuals electing to offset their emissions without a regulatory demand to do so. Businesses are most often incented to do so for "eco-marketing" purposes and public perception, while some individual state governments such as Oregon, have statutory requirements, usually related to utilities or heavy industry, mandating that they achieve carbon neutrality through offsets, thus creating a funding mechanism and market for local projects.

The **compliance** carbon offset markets are driven by those countries that have signed on to the original Kyoto protocols (and upcoming Copenhagen accord) and that have a system in place for government mandated emission offsets. These markets are increasingly interested in developing projects in

the U.S. due to the stability of its government and the ability to effectively monitor and verify the permanence of projects here.

There are national, regional and "place based" ecosystem service markets (other than carbon) that exist or are quickly emerging. The most developed of these are the more traditional wetlands mitigation banks, habitat-biodiversity funds and water-quality and quantity credits.

IV. THE FUTURE

In order to provide OWEB (and its grantee community) the tools necessary to determine its future carbon and ecosystem service policies and practices, the project team drafted the following documents:

A) "A Carbon Offset Road Map" for OWEB staff and grantees to use as a navigation tool to better understand and/or generate carbon offsets and their attendant ecosystem services**.** This is a step-by-step practical tool with a full graphical explanation of the specific activities, participant functions, resources and sequencing for moving carbon projects from "supply to demand." This user-friendly document will be housed on the OWEB web site and published in a booklet form for easy dissemination and use.

B) A field based project criteria/questionnaire to recognize viable forest and soil based carbon projects in their early stages. This set of practical questions is intended to be used in conjunction with the Road Map described above.

C) Opportunities and Barriers in the field of carbon offsets and ecosystem services by OWEB region. This is a practical guide for identifying "location specific" information on ecosystem services and will take the form of a map with customized data for OWEB's six different regions.

D) Projected future developments in the carbon and ecosystem service markets are described in order to allow the reader to anticipate upcoming changes in this emerging and still fluid field.

V. SUMMARY

OWEB has been, and continues to be, one of Oregon's primary funders for ecosystem service projects with their investments in restoring and preserving natural systems.

Despite this role OWEB has had no clear way of quantifying the value or impact of the ecosystem services they are currently delivering, nor do they

have a means for identifying or quantifying those that they have potential for delivering in the future. Through the limited quantitative information related to ecosystem services that is available as part of the granting process, it has been shown that OWEB likely is generating sizeable quantities of monetizable ecosystem services in at least one field: Carbon sequestration.

OWEB's existing rules and granting guidelines do not adequately provide direction to grantees regarding project design and implementation in a way that articulates how ecosystem services should be measured initially, enhanced by specific restoration activities, or tracked through time to ensure measurable improvements to ecosystem services are achieved. Currently, the agency's policies to not provide clarity regarding the relationship of the agency, or their grantees, to ecosystem services markets as a potential source of revenue.

VI. RECOMMENDATIONS

The following five recommendations surfaced during the project activities over the last nine months. They were identified during an internal analysis of OWEB's activities (summarized above) as well as from wide range of external, statewide sources. They represent practical solutions to readily apparent gaps and needs and are offered for consideration by OWEB and the State of Oregon with the intent of enhancing ecosystems and developing additional revenues for restoration work and acquisitions.

#1A) Develop clear guidance and methodologies for the Agency and/or grantees to quantify and monetize carbon-ecosystem services, as well as a protocol for such revenues to be documented, verified and shared between OWEB and the grantee in order to provide a leverageable and renewable source of revenue generated by mission-aligned activities.

#1B) Design a process within OWEB's grant and fiscal processes for revenue from carbon-ecosystem services to become an *annuity* to pay for the long-term management of restored and acquired lands, allowing watershed councils, soil and water conservation districts, and other grantees to develop ensure project effectiveness through time and develop greater self sufficiency in terms of funding. This approach would mesh well with incomes from ecosystem services transactions given that most carbon offset purchases do not pay "up front" monies, but rather generate a stream of funds annually based on the assets' ability to generate revenue.

#2) Develop a simple Return-on-Investment quantification method, contained within granting guidelines to measure and reward performance based outcomes and the delivery of key ecosystem services. Most likely of these would be carbon, specific water services, fish habitat and biodiversity.

#3) Form a rotating *technical services fund* to spark the initial development of carbon-ecosystem service projects that benefit natural systems in Oregon. The lack of funds during the project identification, feasibility and design stages is the principal reason for the lack of a robust pipeline of projects resulting in marketable ecosystem services credits in the state of Oregon. These stages require staff time for project developers, appraisers, surveyors, quantifiers, GIS services, lawyers, generation of financial pro formas, web based resource listing, etc.

#4) Provide a full time FTE to perform oversight and quality control for market-eligible projects from which verifiable, high-quality carbon-ecosystem services could be documented and coordinated among state, national, and international registries. For example, OWEB might hold easements or other legal instruments to give confidence to buyers and markets in terms of permanence.

#5) In concert with the State legislature, stimulate an Oregon-based supply and demand for carbon offsets and ecosystem services. This network would be made up of private, NGO and state agency stakeholders who would both supply projects as well as become carbon neutral in their operations through Oregon based offsets. In addition, this approach would help the State achieve its conservation goals. *(See Closed Loop Carbon Economy summary document in the final report appendix.)*

NOTE: The carbon-offset world has a language of its own; here are some key word definitions:

Carbon Offset: A unit of measure (usually in increments of 1 tonne of a carbon based gas like carbon dioxide or methane), which allows a corresponding tonne of emissions released by an activity to be offset or neutralized by another activity. (Planting trees, capturing or reducing emissions elsewhere, etc)

Standards, Protocols and methodologies: A series of carbon project guidelines, that has been internationally recognized, and which specifies how carbon is measured, what constitutes additionality and permanence, how the project is monitored / verified and when, etc. (See below)

Additionality: The additional carbon that was sequestered over and above what would have been if “business as usual” practices had been followed i.e. altering the future outcome through the carbon transaction itself.

Permanence: The process by which you ensure that the carbon storage achieved by the project is not lost during the period of the project.

Monitoring and verification: Over time insuring that the carbon storage is occurring at the rate projected and that there have been no changes in the ability of the project to do so. (Fire, harvest, plowing, change of use)

11/04/09

BACKCASTING REPORT /

Evaluating Carbon Sequestration Potential of Past OWEB Grant Funded Projects

ecosystem services, llc

I) INTRODUCTION

The goal of the backcasting review is to quantify the amounts of additional carbon that can be sequestered as a result of the activities funded by OWEB grants over one year. While this review shows an estimate of potential monetary value for added sequestration, it does not make any assumptions about whether the value created by OWEB could actually be sold in the marketplace, whether OWEB should be looking to enter the market, or if these values should be considered a revenue source for grantees or OWEB. What the review does provide is some insight into the scale of carbon sequestration impacts associated with OWEB's grant process.

II) BACKCASTING PROCESS:

A) Establishing Criteria and Assumptions:

Ecosystem Services (ESS) first established general criteria with which to review past OWEB projects to determine which ones may result in additional carbon sequestration. It was decided to focus on forest carbon projects such as riparian plantings, improved forest management through conservation easements or acquisition, and reforestation, and soil carbon projects such as rangeland management improvements or changes in agricultural practices. Soil carbon sequestration projects have a potential to sequester large amounts of carbon, however, this market is untested and the science for quantifying carbon sequestration levels is not as developed as for forest carbon projects. This means that uncertainty about carbon sequestration levels for soil carbon projects is higher than for forest projects and risk assessments, when looking at potential projects, should reflect this. Further investigation into this area is being conducted as part of this contract. Wetlands restoration is also another area where research is being conducted to determine sequestration rates but the science is not far enough along to allow these projects to be included in this review.

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It was also decided that projects that involved less than 10 acres of restoration would not be considered in the review. Most of these involved multiple landowners and the complexity of developing a marketable offset from these lands was cost prohibitive. Although in general, projects smaller than 500 acres are difficult to market, it was assumed for this review that a future aggregation model may make use of OWEB projects larger than 10 acres. This is in no means predictable but for the sake of determining overall value of OWEB projects it was decided to keep projects over 10 acres in the study.

It was assumed for this review that projects met all criteria for a marketable, registered, carbon offset transactions. Given that the activities funded by OWEB did not take into consideration such criteria it was impossible to ascertain from the grant applications all the information needed to rule in or out a project on this basis.

B) Project Selection:

ESS was provided access to the OWEB data base to mine restoration projects for the 2008-2009 grant year and all of the acquisition projects done to date by OWEB. ESS did not access any physical files at OWEB for additional project information. The database did include the grant application but no additional reports.

Renee Davis-Born of OWEB began the process by initiating a review of the funded grant requests and provided ESS with a spreadsheet highlighting those projects that may be candidates for assessing carbon sequestration. ESS reviewed those projects and identified those that were potential sequestration candidates and accessed the applications of those for more specific information. An additional cut was made of those projects that were either too small or whose total activities negated any gain of sequestration through plantings or range management. (E.g. rangeland management that involved burning juniper, riparian plantings following the removal of invasive species). ESS then assessed each remaining project based on a low, medium or high probability of market readiness, combining the sequestration gains and the general sense of each project meeting a registry standard into this categorization.

The breakdown of the selection categories is as follows:

RESTORATION:

196 OWEB restoration projects for 2008-09:

- 97 identified as likely or possible by OWEB
- 39 projects selected for further review by ESS
- 1 showed no probability for monetization
- 26 showed low probability
- showed moderate probability
- showed high probability

Quantification:

The 39 projects that were assessed by ESS were broken in to two further categories; those with enough data to assess (HIGH level of accuracy) and those with insufficient data but enough descriptive information to indicate the potential for a project (LOW level of accuracy). The total CO2 sequestered for each of these two categories over a projected fifty-year project are:

Metric Tons for Restoration Projects Reviewed; by Level of Accuracy:

Projects with high level of accuracy: 275,500 tCO2e
Projects with low level of accuracy: 28,500 tCO2e

A general value for these projects was calculated by using a representative per ton price range of $4.00 to $7.50. This price was set by reviewing the current market range for carbon, ($0.10 for "junk" carbon on the CCX to $30 for high quality carbon on the European market. We also considered the price per ton of the voluntary markets in the US and the high quality of the projects funded by OWEB. CO2 tonnage values vary depending on the standards and terms of the agreement used to measure the CO2, the demand, or regulatory need for offsets, and the associated co-benefits with a project producing the additional sequestration. Currently in the US projects produced according to a high standard such as the Voluntary Carbon Standard or the Climate Action Registry standard are selling at the upper end of the range. The voluntary market demand in the US remains small but is increasing. If the US government or individual states adopt a regulatory market in emissions and offsets the demand for offsets will greatly increase. As for OWEB, potential CO2 projects have significant co-benefits of fish and wildlife habitat, water temperature, flow and quality. It would be recommended that if projects are pursued that a high standard such as the VCS or CAR be used to bring the most value to these sales.

The $4.00 to $7.50 amounts that were used as a conservative estimate, but subject to change day to day. It's also most likely to be on the low side if the US regulatory market gets established.

This calculation in no way would indicate the real market value of the total of these projects or any individual project. There is no current market model that would aggregate the projects funded by OWEB, and no individual project in this study was fully vetted for meeting market and registry standards. It does, however give OWEB a general sense of the sequestration value of restoration projects over the course of one year. The potential market values for restoration projects are:

Potential Market Values for Carbon from Restoration Projects in 2008-2009/ Reviewed by Level of Accuracy:

Estimated amount of carbon sequestered by RESTORATION PROJECTS in 2008-2009: **303,500 tons of CO2e.** A range of potential market value for these RESTORATION PROJECTS: **$1,214,000** to **$ 2,280,000.** *(303,500 tons of CO2e x an assumed value range of $4.00 to $7.50 per ton of carbon offsets dependent on standards and buyers.)*

Projects with high level of accuracy total value: (275,500 tCO2e
Projects with low level of accuracy total value: $213,750 (28,500 tCO2e X $7.50)

<u>ACQUISITION:</u>

31 OWEB acquisition projects since 1998:

- 19 selected for further review by ESS
- 2 showed low probability for monetization
- 6 showed medium probability
- 11 showed high probability

Quantification:

The **acquisition** projects were also categorized according to High and Low levels of accuracy based on the data available in the grant application. And again, for general value determination, not market value, a calculation was made estimating the aggregated value of the OWEB projects. The total CO2 sequestered for each of these two categories over a projected fifty year offset project is:
725,000 tons of CO2e.

Projects with high level of accuracy: 620,000 tCO2e
Projects with medium to low level of accuracy: 105,000 tCO2e

Valuation:

A range of potential market value for these ACQUISITION PROJECTS 1998-2009 totaled:
$2,900,000 to $5,437,500. *(725,000 tons of CO2e X an assumed value range of $4.00 to $7.50 per ton of carbon offsets dependent on standards and buyers.)*

Quantification Summary:

ESS then quantified individual projects which had sufficient data to assess according to the methods listed below. A detailed spread-sheet showing our assessments of each project is attached.

In general restoration projects that scored high on the potential for market value were riparian plantings using a significant number of trees and rangeland management improvements over a significant number of acres. This assessment did not factor in uncertainties related to the maturity of forest carbon markets versus soil carbon markets. Issues that would have to be resolved with riparian plantings to qualify for an offset project in the future are maintenance of the trees until they reach "free to grow" status and the negative sequestration value of removing invasive species to plant those trees. For rangeland management, the removal of juniper, which is a part of almost all such projects, needs to be done in a manner that is "carbon neutral" at a minimum. For all restoration projects size makes a difference; the more trees, the more land under management, the more offsets eligible for marketing. Also, multiple landowners in any one project make it difficult to aggregate the lands under one project.

Acquisition projects have significant potential for offset markets, especially those that result in the change of land management practices that result in additional sequestration.

There were potential individual, stand alone projects in all Oregon climates. Obviously the type of sequestration project is different based on location but this review showed the potential for all areas in Oregon to potentially benefit from marketing ecosystem services.

III) GUIDANCE FOR EVALUATING POTENTIAL CARBON SEQUESTRATION FROM RESTORATION PROJECTS:

As a result of its research and work on this study, ESS developed a guide to carbon sequestration for each type of OWEB project, calculating the values per acre for these projects both east and west of the Cascades. We believe this will be beneficial for future study and decision making by OWEB.

General Project Quantification Assumptions:

The following general assumptions have been made concerning the projects analyzed in the backcasting process.

- Calculated volumes of carbon are estimated against a likely alternative scenario that reflects “business as usual” for the region
- In cases where there was a lack of information for certain key variables, an average value was assumed that may not be applicable to the project in question
- Project start date coincides with the time when the project begins to sequester carbon
- Quantification values were based on existing publicly available data sets (Forest Inventory and Analysis (FIA) data from the USFS) and methods outlined in publicly available carbon project protocols (Climate Action Reserve (CAR), Chicago Climate Exchange (CCX)).
- The range of low and high values for a project partly reflects the unknown variables associated with each project. For example, in some cases we know the species planted, but not the density or total area within the project boundary planted. In other cases we may not have detailed species data. With more available data, a much narrower range of carbon values can be determined.

Forest Projects (those that involve planting woody species) could only be assumed to sequester “additional” carbon above the business as usual case under the following assumptions:

- The projects cannot follow immediately after a large timber harvest
- Projects are not required by law
- The project would not have been started without income from sources of the sale of carbon offsets
- The project would meet all the requirements for permanence for the specific project type (20-100 years, generally)

Soil Projects (grassland restoration, grazing improvements, or agricultural management) could only be assumed to sequester “additional” carbon above the business as usual case under the following assumptions:

- Projects are not required by law
- Agricultural or grazing practices that qualify for project development should not represent “business as usual” for the region. For example, in some regions of the country a majority of the farmers practice “no till” agriculture. Most voluntary protocols would not consider a project that proposed adopting “no till” to qualify for carbon credits

- The project would meet the requirements for permanence for specific project type
- The project would not have been started without income from sources of the sale of carbon offsets.

IV) SEQUESTRATION CATEGORIES:

1) Riparian Planting and Restoration (RPR)

Riparian planting projects usually take place in addition to in stream improvements such as reconnecting flood plains to streams, repairing fish passages, or adding woody debris to streams. The carbon sequestration potential of these projects is mostly a factor of vegetative growth. In upland and riparian areas the most valuable types of projects are those where planting is taking place in bare ground. Any site that is being planted that has existing trees or brush that is to be removed will have to account for the carbon impacts of that removal in the overall carbon quantification. Any site preparation that is required for the planting (such as tilling or scarification of the soil) will need to be accounted for not only in carbon emissions but also in releases from disturbed soils.

Key assumptions:

- Only a certain percentage of the total acreage of the project is available for planting
- Large tree species will only take place in areas where they will be truly viable
- The only types of vegetation that will be removed are woody shrubs and smaller herbaceous material
- The estimated sequestered carbon does not reflect emissions that result from soil turning or site preparation which are assumed to be minimal
- Benefits to soil sequestration resulting from reduced erosion are not considered

Most likely co-benefits:

- Water temperature reductions
- Water quantity or quality improvements
- Storm water management
- Cycling and movement of nutrients
- Aquatic and terrestrial habitat
- Maintenance of biodiversity
- Erosion control and soil degradation

2) Logging Road Removal (LRR)

Logging road removal often includes the use of large equipment to turn compacted soil and often requires grading to return the area to its natural slope. Major soil disturbance and heavy equipment use may need to be accounted for if it contributes a great deal to the overall carbon emissions associated with the project. Logging road removal can provide carbon sequestration opportunities if the treatment is of a suitable acreage and the areas of removed road have good growing conditions. If there is a closed canopy over the logging road that will only allow for re-growth of understory tree species and shrubs, there will not likely be additional carbon stored on the site.

Key assumptions:

- Effects of soil disturbance required to replant vegetation is not taken into account
- Canopy is open enough to allow for growth of major timber producing species
- Emissions from additional equipment required for road removal is not taken into consideration.
- No additional trees need to be removed for logistical reasons

Most likely co-benefits and improvements

- Water quantity or quality improvements
- Storm water management
- Cycling and movement of nutrients
- Aquatic and terrestrial habitat
- Maintenance of biodiversity
- Erosion control and soil degradation
- Viewscapes

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3) Conservation Easement (Protection) (CEP)

Conservation easements designed to protect a landscape from planned development, conversion to agricultural land, or recreational developments can provide viable projects in many carbon offset protocols. In all cases the difference in carbon must be modeled by considering a “with project” and “without project” scenario. For forests that remain forests, this means analyzing a comparison of one forest management regime with another, for a

planned development this involves comparing the carbon sequestered by the protected land against carbon sequestered under the drawn up site plans.

Key assumptions:

- In order for the project to be considered a change from one land use to another there must be a demonstrated plan for the alternative scenarios. For example, if the conservation easement is adopted to prevent a planned development , there must be some record of rezoning, draft development plans, or other data that demonstrate a real intent for conversion
- The most likely easement project is assumed to not involve a land use change from one category (forest) to another (residential) but generally involves protecting the existing landscape and assets (i.e. forest remains as forest, farm remains as farm)
- The most viable projects are those that place a permanent conservation easement on the property. In most protocols this results in the generation of more carbon credits that can be sold on the voluntary market.

Most likely co-benefits and improvements:

- Water quantity or quality improvements
- Storm water management
- Cycling and movement of nutrients
- Aquatic and terrestrial habitat
- Maintenance of biodiversity
- Viewscapes
- Recreation/ Tourism

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4) Conservation Easement (Working Lands) (CEWL)

Working land easements allow continued forest harvests, grazing, or other land use activity that generally removes more carbon than a protection project. In this case it is important to understand the carbon implications of the continued allowed uses on the landscape. These projects will generally not sequester as much additional carbon as protecting the land permanently from intensive management activity (see above.)

Key assumptions:

- All working land easements must have a management plan that restricts land use from the standard practices of the region. It must clearly demonstrate that the restrictions go beyond what is allowed under current law.

- The most viable projects are those that place a permanent conservation easement on the property. In most protocols this results in the generation of more carbon credits that can be sold on the voluntary market.

Most likely co-benefits and improvements:

- Water quantity or quality improvements
- Cycling and movement of nutrients
- Erosion control and soil degradation

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5) Fee Simple Acquisition (FSA)

These projects are in general very similar to the conservation easement project and involve the purchase of land to protect the landscape from development or resource extraction. Often these projects convey land to a public agency for public benefit. In cases where the management of lands comes under a public agency or non-profit that will protect certain ecological values on the land, the project will sequester additional carbon. However, land ownership often does not include the same legal restriction that would be found with a conservation easement. Often the management restrictions on these lands are not as transparent as those under conservation easement.

Key assumptions:

- The management of the lands after purchase will generally sequester similar amounts of carbon as a conservation easement project.
- Without a conservation easement, there is a risk that the management could change in the future, so placing an easement on the land prior to purchase will increase the viability of the project to sequester additional carbon.

Most likely co-benefits and improvements:

- Water quantity or quality improvements
- Storm water management
- Cycling and movement of nutrients
- Aquatic and terrestrial habitat
- Maintenance of biodiversity
- Viewscapes

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6) Hardwood Restoration OSR)

Hardwood restoration generally involves the removal of competing woody species and opening up the landscape to allow additional light to reach the hardwood seedlings. This type of restoration does not typically store more additional carbon when there are other tree species that are removed and replaced by oaks. However, oak savannah restoration can sequester more carbon when it is completed on ground that does not contain any tree species.

Key assumptions:

- Those projects where trees are cut down do not qualify for additional carbon
- Those projects where burning or other carbon emitting management activity is practiced will not sequester additional carbon.

Most likely co-benefits and improvements:

- Water temperature reductions
- Water quantity or quality improvements
- Storm water management
- Cycling and movement of nutrients
- Aquatic and terrestrial habitat
- Maintenance of biodiversity
- Erosion control and soil degradation
- Viewscapes

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7) Grassland Restoration (GR)

Most grassland restoration involves switching the land use from grazed land or cropland over to native prairies – an ecosystem that is disappearing rapidly from the state. Grassland restoration is a viable project since the carbon stocks of grassland will increase over time, especially if they are removed from potential grazing stock. Most protocols will require that grassland restoration projects rely on native species and do not include grazing.

Key assumptions:

- Native species are being employed
- The restoration is in areas that have sufficient rainfall to support dense grass communities

- This grassland community must be maintained without grazing for the required length of time to meet permanence requirements.

Most likely co-benefits and improvements:

- Water quantity or quality improvements
- Storm water management
- Aquatic and terrestrial habitat
- Maintenance of biodiversity
- Erosion control and soil degradation
- Viewscapes

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8) Grazing Land Improvement and Management Improvement (GLR, GMI)

Grazing land improvements generally involve less intensive grazing regimes, riparian fencing, and highly scheduled movements of animals. The types of projects that sequester the most carbon are those that retain dead plant material and use the animals to incorporate this organic matter into deeper soil layers. Most of these projects are not high priority projects for carbon sequestration at present.

Key assumptions:

- Grazing intensity must retain more plant organic matter on the site when compared to standard practice.
- Grazing regimes must be maintained for the length of time defined by permanence requirements of major protocols.

Most likely co-benefits and improvements:

- Water quantity or quality improvements
- Cycling and movement of nutrients
- Erosion control and soil degradation

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9) Agricultural Management Improvements (AMI)

Agricultural land improvements are mostly switching to no till agriculture. The additional organic residues that are left on the field form a base of extra carbon that will be stored permanently in soil. These can sequester large amounts of carbon but do have issues with permanence.

Key assumptions:

- The agricultural projects must be continued for the lifetime of the project and meet permanence requirements.
- Any agricultural activities that sequester additional carbon, but are becoming widely adopted in the area will not be considered viable projects.

Most likely co-benefits and improvements:

- Water quantity or quality improvements
- Cycling and movement of nutrients
- Erosion control and soil degradation

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10) Juniper Removal (JR)

Juniper removal projects are undertaken to improve the quality of grazing land and reduce the negative impacts to water resources. Most of the juniper removal projects in eastern Oregon will not qualify as carbon sequestration projects. The major factors that will influence the overall viability are the quantity of removed juniper, the treatment of the removed biomass, and the future mix of timber species that will be planted. Those projects that remove a great deal of woody material will not sequester additional carbon over the project lifetime.

Key assumptions:

- Juniper removal projects where the juniper trees form a greater percentage of biomass than the replacement vegetation will not sequester additional carbon
- Juniper removal projects where the juniper trees are burned as a method of destruction are not viable carbon sequestration projects
- If grazing livestock are replaced on the land, the project will not likely store additional carbon.

Most likely co-benefits and improvements:

- Water temperature reductions
- Water quantity or quality improvements
- Storm water management
- Cycling and movement of nutrients
- Aquatic and terrestrial habitat
- Maintenance of biodiversity
- Erosion control and soil degradation
- Viewscapes

V) RECOMMENDATIONS FOR FUTURE OWEB GRANT APPLICATIONS:

One of the difficulties in this study was lack of sufficient data to calculate reasonable estimates of carbon. Specific acreages for each activity in the project were sometimes missing. As indicated above, certain assumptions were made in our calculations. OWEB may consider requiring detailed information from grantees about acreages treated with each type of restoration activity.

In projects that involve plantings it is necessary to have a more detailed account of what is being planted, in what amounts, and what activities are being undertaken to secure the "free to grow" status of the plantings. We found that some grantee's provided detailed lists of their plantings and maintenance plans. Others did not. Again, future applications may require more specific information on plantings. Some of this information may be available in OWEB files which were not accessed for this review because of time constraints.
If the OWEB grant application is going to be used as an initial screening method to identify potential carbon offset ready projects, then more information from the applicant will be needed to assess whether or not the project meets the minimum criteria of the carbon marketplace. This could be done very simply, even in a narrative by someone who is not familiar with the standards, but who does have access to local information that is needed for the assessment. In summary, the main metrics necessary are 1) acres of project activity, 2) species ratios for planting projects, 3) estimates of woody biomass removal for invasive removal projects, 4) details on disposal of woody material, 5) soil preparation for planting sites, and 6) length of time commitments to monitor or maintain the project over time

There are many activities funded by OWEB that are carbon "negative"; that is they are releasing more CO2 into the atmosphere than the activity is sequestering. Examples of these activities are the mechanical removal of juniper and then field burning what has been removed. The removal of invasive species to create space for more natural riparian plantings, although a good stream restoration practice, may be a carbon negative activity. Even invasive species sequester carbon. Currently the carbon balance is not a criteria for grants but OWEB may wish to consider recommending that funded activities may not be carbon negative.

RESTORATION PROJECTS				
Project No.	**Size**	**Location**	**Likelihood of suitability**	**Comments**
208-2041	5.5. Mile of stream	Eastern (Region 2)	LOW	Focus is on mitigating poor water quality and rising temps thru major re-planting and monitoring. Plan focused on streamside planting and education of landowners and community. Maybe too few plants (3,000+/- "native species") to be worth pursuing. Aggregation issues—minimum nine landowners. "Mowing" invasives not carbon-friendly.
208-2086	Indeterminate	Valley (Region 2)	LOW: Too small	Bank erosion-control and in-stream terracing, weirs etc. Culvert replacement. Invasive removed mechanically and w/ herbicides replaced with natives. Only 1.6 ac.
208-2087	Indeterminate	Coastal (Region 2)	LOW: Large Assemblage; Complex mitigation regimes.	Wetlands protection/preservation Lower Umpqua River. Nine sites w/ several private and public owners; Sites have individually tailored proposed practices, incl. introduction of LWD, culvert replacement, vegetation removal and re-vegetation w/ natives; modification of stream morphology; dredging, removal of dredging spoils, etc.
208-3052	42 ac.	Valley (Region 3)	LOW: Too small	Probably too small (entire park is 56 ac.) Focus is noxious plant removal and re-planting, habitat restoration.
208-3054	Indeterminate	Linn County (Region 3)	LOW: No evident carbon opportunity	Salmon habitat/fish passage restoration: culvert replacement; side channel ; modifications to stream morphology and introduction of LWD. All strategies are instream/
208-3058	14 ac. (of replanting)	Santiam River (Region 3)	LOW: Too small and too little acreage in re-planting	Restoration of a side channel, including eradication of noxious weed and replanting with native species (14 ac.)
208-3063	indeterminate	Valley (Region 3)	MODERATE, depending upon scale and nature of adjacent OWEB project.	Continuation of another OWEB project; Removal of noxious plant and replacement with riparian natives for 1,146 lineal feet of Beaver Creek and addition of shrubs and coniferous trees, esp., Western red cedar up to 100 feet from HOW.
208-4035	60 acres	Eastern (Region 4)	NONE	Diversion change to allow switch from flood irrigation to sprinkler; No applicability
208-4048	1000 ac.	Eastern (Region 4)	POTENTIALLY HIGH depending on carbon release from periodic burns. (SOIL)	Removal of invasive juniper w/ chainsaws, then by controlled burn a year later. Maintain as perennial grassland for minimum 10 years; then period controlled burns. Only the first 10 years as grassland are guaranteed by the landowner; there is potential for a transaction to lengthen the commitment.
208-4056	190 ac.	Eastern (Region 4)	MODERATE, depending upon negative impact of annual burn and potential to extend to rest of the preserve.	Part of a 1400 acre preserve. Focus is on stream rehabilitation and replacement of shallow-rooted invasive grasses with basin wildrye, which is characterize by a deep and extensive root system. Wildrye is rejuvenated by annual controlled burn.
208-4070	100 ac.	Eastern (Region 4)	LOW	Focuses on stream and floodplain rehab, including addition of LWD and logs, respectively. Involves felling of 100± trees in floodplain; mechanical reshaping of eight miles of road, and herbicidal eradication of invasive grasses w/ no indication of re-seeding.
208-4074	Indeterminate	Eastern (Region 4)	LOW	Regional multi-step project (26 separate grants and multiple site-specific projects and monitoring) focused on massive rehabilitation of streams and channel re-location for fish habitat. Includes acquisition of very small easement.
208-5078	157 ac.	Eastern (Region 6)	LOW	Part of 1158=acre Milk Ranch. Mechanical eradication of juniper on a portion of the area and re-seeding w/ alfalfa for grazing.
208-5100	120 ac.	Eastern (Region 6)	LOW	Removal of juniper and re-planting with cottonwood (100) and willow (220 cuttings in riparian area and Ponderosa pine (80) and aspen (30) upland.
208-5111	2087+ ac.	Eastern (Region 5)	POTENTIALLY HIGH depending on carbon release from burns, combination with Devine Canyon project, and sequestration capacity of introduced species. (SOIL)	Joint public lands-private property effort contiguous to another OWEB project comprising 1320 ac. Juniper will be removed using a variety of means including prescribed burns. Natural re-introduction of sagebrush and grazing grasses. Long-term management as grazing land, i.e., no long-term control; however, ranch owner is" environmentally friendly".

208-5114	375 ac.	Eastern (Region 5)	LOW: Too small and involves thinning of existing vegetation.	Tree thinning to achieve more desirable density.
209-1016	Approx. 2 ac	Coastal (Region 1)	LOW: Too small too little re-vegetation.	Removal of 5100 lf of existing logging road and construction 3000 lf road; former will be re-vegetated, presumably, vegetation will be removed from the latter.
209-2008	10 ac.	Coastal (Region 2)	LOW: Too small too little re-vegetation.	Construction of 3.75 miles of "livestock exclusion" fencing in riparian area. Four private landowners. Construction of off-channel watering sites. Thinning of invasive and re-planting w/ native shrubs and trees.
209-2013	13 ac.	Coastal (Region 2)	POTENTIALLY HIGH	Mechanical removal (excavator) of invasives, esp., blackberry and re-planting of 9400 shrubs and trees (Western hemlock, Western red cedar, red alder, myrtle, huckleberry, and Oregon grape). Mechanical weed control for five years.
209-2038	Indeterminate	Coastal (Region 2)	LOW: Too small too little re-vegetation.	Construction of 1.2 miles of "livestock exclusion" fencing in riparian area. Four private landowners. Thinning of invasive and re-planting w/ native shrubs and trees.
209-3010	1,100 ac.	Western Cascades (Region 2)	POTENTIALLY HIGH	Property acquired by OWEB in 2004. Very large and multi-faceted project including channel re-establishment, LWD recruitment, weed removal, and reforestation. Planting of approx. 250 trees per acre and clump plantings of native shrubs. (There appears to be an internal inconsistency in the grant application in terms of how many trees actually will be planted; 250,000 seems high!)
209-3014	40 ac. plus 30 w/ matching funding	Valley (Region 3)	LOW: Too small	Remove noxious and invasive weeds in riparian forest corridor. Plant unspecified native grasses and other understory, shrubs, and trees.
209-3019	Indeterminate	Valley (Region 3)	LOW: Too small	Removal of two culverts to accommodate fish passage and construction of bridge. Install native plant material for erosion control and bank stabilization within a riparian buffer on both sides of the installed bridge within the county right of way.
209-3026	85 ac.	Valley (Region 3)	LOW, replaces forest w/ oak savannah	Part of a previous OWEB-funded project. Remove invasives using safe chemicals. Remove existing slash piles. Existing ponderosa pine will be removed using heavy mechanical equipment top allow natural restoration of oak savannah. Adjacent to 508-ac. preserve owned by The Nature Conservancy.
209-3048	273 ac.	Valley (Region 3)	LOW, replaces forest w/ oak savannah	Adjacent to 1246 ac. Coburg Ridge Conservation Area Invasives will be removed and restored with unspecified native seeds. Existing conifers, especially those encroaching on prairie landscapes be removed; slash will be burned. Existing ash, maple, and non-native fruit trees will be cut and either burned or chipped to restore oak savannah and prairie. Portions of the preserve (approx. 29 ac.) will be periodically burned.
209-3049	600 ac.	Valley (Region 3)	POTENTIALLY HIGH	Massive project to improve riparian, wetland, and upland habitats on severely disturbed land with eventual goal of introducing USFWS Endangered and Threatened species to the sites. Remove blackberries and other no=noxious species and plant native shrubs, trees and understory plants. Controlled burns where appropriate and beneficial. Enhance pollination capabilities using bees and other natural methods.
209-4002	Indeterminate, 10 mi. of creek	Eastern (Region 4)	LOW: Too little acreage in re-planting	Channel improvements for fish passage, bank erosion control and connection with original channel and floodplain. 50-ft buffer (approx. 120 ac.) to be established and managed to allow growth of woody materials. Minimal planting is contemplated.
209-4024	Indeterminate, 2 mi. of creek and 9000 lf of road	Eastern (Region 4)	POTENTIALLY HIGH	Introduction of LWD. Roadway will be removed and prepped for introduction of 4,000 trees along 11,175 feet of obliterated road right-of-way and/or adjacent stream — mix of Douglas fir, ponderosa pine and Western red cedar.
209-4025	336 ac.	Eastern (Region 6)	LOW: Too small (SOIL)	Restore rangeland damaged by fire. Seed with perennial grasses and forbs
209-4039	240 ac.	Eastern (Region 4)	LOW: Too small (SOIL)	Remove existing juniper and use for firewood or leave in piles for upland bird habitat. Overseed with native grasses.
209-4048	Approx. 28 ac.	Eastern (Region 4)	LOW	Replacement of two culverts. No re-planting is proposed.
209-5030	110 ac.	Eastern (Region 6)	LOW	Fencing of a riparian area. No planting is contemplated.

209-5033	6.5 river miles	Eastern (Region 5)	MODERATE, depending upon sequestration potential of specific plants.	Plant 8, 675 native riparian shrubs and trees incl. peachleaf willow, coyote willow and red-osier dogwood, along both sides of the Powder River for 6.5 river miles.
209-5038	Indeterminate due to wording in Grant App. Could be as high as 7000 ac or as low as 2351 ac.	Eastern (Region 5)	POTENTIALLY HIGH depending on sequestration capacity of introduced species. (SOIL)	Removal of approx. 1906 ac. of juniper using mechanical cutting and burning. Habitat restoration on 40 ac. of mahogany, and 5.5 acres of aspen. Weed control and unspecified broadcast seeding on 4,800 acres of sage grouse habitat and seeding and re-planting of 265 riparian acres. Grazing management and fencing will follow the treated juniper, mahogany, aspen, sage grouse and riparian areas. Weed control will occur throughout the entire project.
209-5045	Indeterminate due to wording in Grant App. Could be as high as 344 ac or as low as 170 ac.	Eastern (Region 6)	LOW: Too small	Remove juniper on 170 acres, pile and burn. Reseed 110 acres and control weeds on 64 acres. 110 ac. Will be re-seeded with native grasses.
209-5048	n/a	Eastern (Region 6)	LOW	Focus is on spring development to benefit riparian habitat. 22 ac. Of juniper removal w/ re-planting.
209-5049	n/a	Eastern (Region 6)	LOW	Focus is on consolidation of water diversions to benefit water quality and riparian habitat.
209-5057	1709 ac.	Eastern (Region 5)	MODERATE; need to know more about benefits of strip tillage.	Change from multiple tillage passes with disks, plows, cultivators to a strip tillage operation in the fall and planting in the spring.
209-5091	1180 ac.	Eastern (Region 5)	MODERATE Probably too small, plus carbon release from burns, and sequestration capacity of introduced species.	400 ac. of juniper cutting, piling and slash pile burning. Institution of rotational grazing. Re-seed 72 acres w/ native grasses and prepare a range plan for 1,180 acres.

January 30th 2010

SURVEY OF STAKEHOLDERS

In The Carbon Offset/
Ecosystem Services Supply Chain

ecosystem services, llc

FRAMING:

The following report is the product of a survey that was conducted during November-December of 2009 and January of 2010 by Ecosystem Services LLC (ESS) as a deliverable within its Carbon and Ecosystem Services contract with the Oregon Watershed Enhancement Board (OWEB). These activities encompassed all six of OWEB's statewide geographic regions.

The key objectives under this contract are:

(i) to complete a quantitative evaluation of the contributions that OWEB land acquisition and restoration projects can provide to Oregon's ecosystem services marketplace;

(ii) to develop a comprehensive description of current ecosystem services stakeholders and service providers that might be aligned with future OWEB projects; and

(iii) to formulate business models that will provide OWEB and its grantees an approach to participating in and benefiting from actual transactions in the ecosystem services marketplace.

The first project objective was met with the Backcasting Report (dated and submitted November 4, 2009), which evaluated recent past OWEB acquisition and restoration projects to identify those that exhibit potential for carbon sequestration and/or other ecosystem services benefits.

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The purpose of this survey is to satisfy the second project objective. It is intended to identify and interview potential stakeholders in the bio based carbon offset and other ecosystems services markets, and to determine how these markets relate to OWEB's mission. The survey also is intended to identify potential barriers, both short and long-term, to development and completion of restoration and conservation projects that could have a place in ecosystem markets.

GOALS:

The broad goals of the survey were as follows:

- Gain current knowledge of the activities and capabilities of members of the carbon offset supply chain in Oregon.
- Identify and seek information from supply chain participants critical to successful carbon transactions that would emerge from OWEB-type projects.
- Determine the minimum size, if any, which is necessary for successful completion of a carbon offset transaction.
- Assess what types of carbon projects are being done in Oregon and elsewhere.
- Identify initiatives by public lands agencies related to carbon offsets or ecosystem services.
- Identify the major hurdles that prevent projects from happening in the region.
- Define how risk is identified and quantified at each stage of the market transaction.
- Identify potential project opportunities in Oregon.
- Share with OWEB partners the potential direction, regulations, and standards of future carbon offsets and ecosystem services markets as viewed by the members of the current supply chain.
- Report on stakeholders views of ecosystem service markets other than carbon.

PROCESS:

ESS developed a list of stakeholders that covered the key functions within the carbon offset supply chain in Oregon while representing all six of OWEB's regions. Stakeholders were organized into categories according to each one's place or sequential role in that supply chain, including those owning lands necessary for sequestration of carbon, those involved in project design and support, and those who purchase offsets:

- Landowners / Land Managers
- NGOs
- Federal Agencies
- State Agencies
- Quasi-governmental agencies
- Consulting Foresters
- Carbon Field Analyzers
- CO2 Quantifiers
- Land Appraisers
- Project Developers/Designers
- Wholesalers/Traders/Marketers
- Offset Customers
- Verifiers/Monitors
- Registries
- Attorneys
- Financing Entities/Bankers/Investors

Note: Other entities were identified that are involved in ecosystem service co-benefits that are a natural companion of most carbon-offset projects. This list was vetted with OWEB representatives prior to any contacts. Also, a comprehensive set of questions was developed to guide the interviews. (See APPENDIX.) In many cases, initial stakeholders referred us to others. All of the categories were represented in the survey results.

EXECUTIVE SUMMARY:

- There exists a fairly well developed supply chain that is eager and prepared to advance ecosystem services markets in Oregon. This group needs some “early wins” and tangible project examples to learn from and be inspired by.

- Survey participants identified potential OWEB type projects that could be marketed as “stacked” or with multiple ecosystem services projects to take advantage of outcomes in fish habitat, biodiversity, stream protection and forest carbon.

- Those not currently in the ecosystem service market but in a position to benefit from it are eager to see its development. They expressed a need for guidance on projects, especially in determining the ecosystem services impact of their activities.

- Currently there are very few forest carbon projects occurring in Oregon and there is virtually no soil carbon market nationally at this time. Wetlands carbon projects are in their infancy as protocols are just being released. Tidal wetlands on the Oregon coast may be a major source for soil carbon sequestration as protocols are just being developed.

- The recent economic downturn has affected the carbon offset and ecosystem services markets in general as it has most other market sectors. Although demand for offsets remains high, the supply of projects suffers from a lack of project development funds and pending cap and trade legislation. Also the regulatory demand side in the US has not been sufficient enough to raise offset prices to a point that landowners in particular, see the value in selling their ecosystem service assets.

- Similarly, most project developers and some transaction supporters*,* e.g.*,* banks and investment groups, are

"sitting on the sidelines" awaiting clarity in offset markets, protocols, and the regulatory framework.

- Despite the hesitation of land-owners and project developers to engage, there is a comparatively strong market for purchase of carbon offsets. Some wholesalers report a strong interest both in the regulatory and voluntary market in the services being produced in the U.S. in general and the Northwest in particular.

- While most respondents in the NGO and public sector are somewhat knowledgeable of current markets and eager for more to happen, they expressed a somewhat skeptical "show-me" attitude. Others, particularly those working in fields that are not high priority for ecosystem services markets, (e.g. rangeland, wetlands, slow growth forests with high natural risks) know less of how these markets work and in general have a lot of skepticism based on general news accounts about offsets.

- Many landowners are also skeptical that the values of carbon offsets, even combined with FSC and/or selective harvesting, will compare favorably with a plan of traditional industrial timber harvest.

- Land size is a significant impediment to a more vigorous forest carbon market. Aggregating landowners is problematic for several reasons. In particular, the mechanics of transactions become dramatically more complicated with each additional participant. Also, there currently are no protocols that will support smaller, aggregated projects.

SURVEY FINDINGS:

The summaries below are based on approximately 30 interviews with stakeholders in the forest carbon marketplace, conducted by Guy Sievert and Tom Bartholomew of ESS

between November 2009 and February 2010. Additional information was added from at least fifteen other stakeholders with whom ESS has engaged with in the last six months about ecosystem service markets.

1. **What are the key Supply Chain Groups? Where do they stand with respect to the current state of ecosystem services markets?**

    a. Landowners:
    Currently there are very few forest carbon projects completed, or even being initiated, by landowners and land managers in the Northwest. One industrial timber company representative told ESS that they "are keeping their "powder dry," i.e., waiting for further clarity in the regulatory environment—many are participating legislatively at state and federal levels to influence any possible future legislation or governmental regulation. One major industrial land owner has invested in the Chicago Climate Exchange and now is waiting for that market to recover from a huge drop in prices. Project developers have told ESS that there is "plenty of money chasing offset sales" but few forest projects to provide those offsets. Also, the recent Climate Action Reserve protocol (CAR) release has to now "scared everyone away" from high-carbon-price deals. The CAR standards are very conservative on how they calculate CO2, has a very costly monitoring and verification scheme, requirements for a high percentage of offsets set aside in a buffer for CAR, and contract end dates that most land owners find objectionable. (up to 200 years in some cases) The Voluntary Carbon Standard and The American Carbon Registry seem to be the standards and registries of choice, even by international buyers. Although their per/ton price sales for carbon is slightly lower than CAR, project developers report they are able to glean more tons from those standards than CAR, thus generating roughly the same income per project.

Small woodlot owners have been aggregated in Oregon under grant support but their target market, the Chicago Climate Exchange, is listing carbon prices so low that it is not financially feasible for landowners to commit to contracts of any term length. The CCX is an exchange with very lax standards and thus those seeking offsets that will "survive" and government regulation are not buying off their registry. The price per ton for CCX forest carbon has dropped from highs around $5-7/ton initially to a current $.15/ton. Small Oregon woodlot owners who follow a traditional industrial harvest management plan will not qualify for the higher standard registries. Up to now no registry supports an aggregation model but all are working on it. Most everyone in the survey agrees that this is badly needed for small projects to be a part of the marketplace.

An important albeit transitory reason cited by landowners for the current doldrums in the market is widespread uncertainty with respect to pending and/or potential regulation, e.g., cap and trade. Landowners generally are unwilling to commit to a contract for long periods given the uncertainty of the current market/price, the length of contract required by the registries, and the need to sign a conservation easement or restrictive land management plan for their property.

b. Project Developers:
There are several major project developers with offices in Oregon who are looking for land in the northwest to buy and manage for high quality wood products and ecosystem service offsets. These developers are for the most part well financed, out of state investor groups attracted to the northwest by type of forests in the region. However their need for a minimum parcel size (10,000 acres or more in most cases) limits the number of projects that might be eligible. There are only two project developers with lands in Oregon under management but several others looking for opportunities. There also are several land trusts in the

northwest which are in some stage of project development with the hope of selling ecosystem services in the market.

c. Project Identifiers:
NGOs, including the land trust communities, currently are the most active in identifying projects with potential for carbon offset transactions in Oregon. The Nature Conservancy and The Wetlands Conservancy are the two most active NGOs overall; the Columbia Land Trust may be the most active in that trust community.

Other potential project identifiers are governmental and quasi-governmental organizations—state and federal agencies as well as watershed councils, soil and water conservation districts, tribal councils, and municipalities—once they become more familiar with the process and possibilities of the forest carbon market. Some watershed coordinators, particularly those on the coast, have become familiar with the types of projects that may qualify for a forest carbon offset transaction and have already identified potential projects. OWEB regional staff, council coordinators, and others in eastern Oregon are less knowledgeable in the potential ecosystem services and/or do not believe that projects they are involved in would qualify in a forest carbon market. “Trees don’t grow as fast but do burn faster in this part of the state” was how one participant put it.

d. Transaction supporters:
Oregon has most of the necessary support components to facilitate a carbon-offset transaction. There are sufficient foresters, GIS growth specialists, land cruisers, developers, buyers, and legal counsel to transact a deal. There is no CAR or VCS-certified verifiers or valuators in Oregon; however, this is not a problem since these services have to be independent of others involved in the transaction and can be brought in easily from outside the region. In particular, the legal profession has recently held two Continuing Legal Education conferences in

Portland focused solely on carbon transactions in the last year. Also the Northwest Environmental Business Council sponsored a national ecosystem services conference in Portland last June and continues to provide support to businesses in the carbon market.

Oregon is fortunate to have The Climate Trust, a nonprofit entity established by an act of the legislature to seek offsets for Oregon utility carbon emissions. They provide an excellent source of funds to purchase forest carbon offsets though their funds are limited and the process to sell offsets to them is quite rigorous and often confusing.

Although a comparatively minor player in the supply chain, the land appraisers surveyed were not actively engaged in appraising forestlands for carbon value. The role of the appraiser is to determine value at highest-and-best (economic) use; in this framework the value of the carbon sequestration potential is subsumed by the value of the timber.

2. **Given the current breadth of OWEB project types (acquisition, easements, riparian plantings/reforestation, etc.), which are the most promising vis-à-vis future ecosystem markets?**

   Land acquisition and/or major restoration projects that include multiple benefits to ecosystem services are the most promising of the current OWEB projects. Due to the minimum parcel size necessary for a feasible forest carbon project, land acquisition likely is the only type project that might result in carbon offset trading. Smaller projects could take advantage of markets such as ones being established by the Willamette Partnership and the Bonneville Environmental Foundation to combine water temperature trading, water flow, fish and wildlife habitat, biodiversity and prairie land restoration with carbon to bring the most ecosystem service value to the transaction.

Restoration and reforestation (riparian planting) projects currently being done through the use of OWEB funds would have to use an aggregation mode to become feasible. The Climate Action Registry and others have recognized that the project development and verification costs make small land deals prohibitive. An aggregation model, one where multiple landowners could be joined in one area to share in the overhead costs of an offset deal may bring more OWEB-type projects into the market mix. CAR indicated it hopes to have such a model completed and verified within two years.

3. **What is the consensus on where standards are going? Federal? CAR? VCS? Will there still be a voluntary market if the federal government adopts cap and trade?**

   There are many varied opinions on this question. Most people surveyed believe that federal legislation will be coming within the next two years; however, that was before recent political developments that have led some in Washington to say cap and trade is dead for now. A few people surveyed believe that what may come from the federal government is a set of standards developed by the EPA under their current Climate Leaders program. In general, most believe that if there is federal legislation it will adopt forest carbon standards similar to those of CAR, if only because they will not want to develop them on their own and prefer instead use a high standard already in existence. There are some who we surveyed who believe that CAR must relax its standards for more deals to be made—that the protocols are too restrictive on verification and monitoring regimens, length of contracts required, set asides for leakage (conservation projects that push industrials to harvest more elsewhere) and buffers (set asides for a CAR run risk pool, protecting against loss of CO2 from natural causes like fire or disease).

   No one believes the voluntary market will disappear. Market facilitators such as TMz and others will support VCS and some other standards that allow smaller, aggregated deals to be sold. This may be in addition to the regulatory markets

that the federal legislation will support. Current VCS carbon is selling at a $6 to $8/tonne range, not much lower than CAR tonnes.

There is at least one agency expert who believes the whole forest carbon market will collapse because of flawed assumptions. The general belief is that CO_2 emission is only being delayed, not prevented, by extended harvests or no harvest scenarios, and that projects like methane capture are the only ones that make sense. There is at least one developer in Oregon who also believes that alternative energy projects, including methane capture and biomass generators, are the only real projects that will impact GHG emissions.

4. **According to survey participants have any aggregation models been tried, successfully or not?**

   No current, successful aggregation models were found in the survey other than those involving large parcels outside of the US. The head of the forest carbon protocol for CAR stated that they are working on protocols that will support smaller, aggregated projects. Others knowledgeable of the CAR workings indicated it likely would be years before any protocol is seen from CAR.

5. **Did survey participants identify any potential projects in Oregon?**

   Only projects on the Oregon coast and some past acquisition projects in the Willamette Valley were identified. There are potential forest carbon projects linked to the work of the Willamette Partnership and the Bonneville Environmental Foundations in the Willamette Valley. Many of the participants described a “wait and see” posture rather than identifying potential projects.

6. **Broadly speaking, what is the general knowledge of Oregonians surveyed: land owners, project identifiers such as watershed council coordinators, etc?**

As indicated in section 1 above, there is a broad range of awareness in the overall supply chain regarding the functioning of carbon markets. Those working in ecosystem services generally are very familiar with how the markets work—and don't work—and are knowledgeable about what needs to be done to make function better. Few state agency staff, including some of OWEB staff, are fully aware of how the markets work and are waiting on guidelines and clarification from "higher-ups". This survey and other work of ESS has found some doubters that the forest carbon market is real and that it will actually help them in their work. Many expressed a "show me the money" perspective.

7. **Does the CAR requirement of 100 years after the end of the offset contract of carbon storage deter potential carbon suppliers from doing deals?**

   Unequivocally, yes. Few, if any, landowners will sign easements on their property that would continue for 150 to 200 years.

8. **Is there is a premium or greater demand associated with forest protection over managed forests?**

   The answer varied according to stakeholder group. There are some who, once they identify a key land parcel (because of high ecosystem values), make plans to remove it from any industrial activity and preserve it as a nature reserve. Others in the supply chain believe that lands cannot always be taken out of production and seek ways to balance conservation with economics—provide a balanced mix of ecosystem services (some supported by offsets) and local jobs and tax revenues. Also, in cash strapped counties that depend on timber receipts and commercial lands on the tax rolls, removing large tracks of harvestable timberland is problematic. One county leader expressed concern for removing large parcels but supported the notion of smaller parcels removed to increase ecosystem services in the watershed.

9. **What are the primary barriers to a successful forest carbon offset transaction in Oregon today?**

The number one barrier is funding for project design and development. The costs of preparing a project for pre-verification consideration by a buyer are prohibitive unless the size of the transaction is worth a long-term investment.

The second most significant barrier is the absence of an aggregation model. Most projects in Oregon that produce ecosystem services, particularly forest carbon, involve multiple landowners, are not contiguous properties, and happen over a long period of time. All of these factors work against the need for contracts and assured permanence in offset projects.

The lack of knowledge by those in the field about what may constitute a potential offset transaction also is a hindrance. The need for a "handbook" was raised several times by those in the field. Also, the need for support for those who are in a position to identify projects but don't have the time or expertise to do a project feasibility study or design was identified.

A current barrier to projects in Oregon that should be eliminated soon is the exclusion of Oregon projects from the CAR market. Part of the CAR protocol for CO2 calculation is establishing a baseline scenario for forest growth using the Forest Service's Forest Inventory and Analysis (FIA) data for each state its standards will be used in. That calibration is currently being done for Oregon.

There are no soil carbon projects currently in Oregon. Much of the information included in the soil carbon pilot study proposal as part of this contract responds to the questions below. There is a soil carbon exchange as part of the CCX but the standards are quite low and the price, around $.10/ton, reflects the market confidence in how the protocols were put together.

10. Is anyone in the Oregon/Northwest supply chain working on soil carbon?

ESS with the assistance of OWEB, has found some organizations and agencies interested in conducting monitoring and research to better understand the relationship between soil-carbon sequestration and various rangeland management practices. (See pilot proposal.)

When asked about soil carbon, survey participants indicated that there are many barriers to preparing a project for transaction, not the least of which is clear understanding of the science. Many also indicated that the failure of the CCX soil carbon market is attributable to low standards, resulting in a very low price/ton.

11. Are there potential soil carbon projects in Oregon, according to survey participants?

Among Oregonians surveyed—land owners, project identifiers such as watershed council coordinators etc.- there was very little knowledge of soil–carbon sequestration potential. None had attempted to utilize, nor were even aware of, quantification methodologies. Many of those who are involved in OWEB funded rangeland management projects say that juniper removal is a significant part of each project and until that can be accounted for in the carbon calculation; most soil projects will not be worth much.

There is a high interest in soil carbon credits but wholesalers and other buyers are waiting to see firm protocols and acceptance by the main registries. ESS discussions with CAR about soil carbon indicated that this market is something very far into the future for them but other registries such as VCS are currently developing the protocols.

THE FUTURE:

In general, the survey found most people in federal and state agencies and NGOs eager about the potential for ecosystem service markets and their ability to provide funds to support the conservation mission of each. But it was clear that until there are more successful transactions completed, many will remain skeptical.

In the private sector, landowners are doubtful that revenue from offset credits will replace what past harvesting has brought. Models of working forests such as Pacific Forest Trust and Ecotrust in Oregon have not existed long enough to prove a forest economic model of combined revenue streams from selected harvesting, conservation, and ecosystem services sales over a long period of time.

Survey participants who were knowledgeable about the markets were sure of one thing: the pace of change related to ecosystem markets is rapid and we must be prepared to adapt.

Oregon Carbon Supply Chain

SURVEY OUTLINE

ecosystem services

Questions by Category / used by the ESS survey team in their telephone calls and in person meetings.

1. Project identifiers

   a. Land owners and managers:
      - Generally describe your current properties: size, species, age of stands, and presence of fish and wildlife habitat.
      - How aware are you of the market for ecosystem services in the US and elsewhere? What about CO_2 sequestration, co-benefits of habitat, water temperature, voluntary vs. regulatory markets?
      - What is your current land management practice?
      - What would persuade you to agree to a conservation easement that would change your current management practices to increase the amount of CO_2 sequestered on your property?
      - Would you be willing to make a change for a shorter period of time if it provided less return?
      - Would you or someone you know be interested in talking further about the opportunities of selling ecosystem services on your land?
      - For timber companies: Do you presently have people working on carbon?

   b. NGOs:
      - Have you had any experience with ecosystem service offsets on lands you now manage or have purchased in the past?
      - Has your organization considered using the current voluntary US market to sell services to support your land management or acquisitions?
      - Would your organization be opposed to such selling?
      - Are there current projects in Oregon you are considering that may qualify for ecosystem service offset development and sale?

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- Have you acquired lands in Oregon since 2001 that may qualify for offset projects?
- Does your organization have the expertise to market ecosystem services offsets or would you require assistance in project design and implementation?

c. Governmental and quasi-governmental entities:
   - How aware are you of the voluntary US market in ecosystem services?
   - Have you discussed internally how you might be a part of these markets?
   - Do you foresee any legal or regulatory or other government restrictions to engage in ecosystem services markets?
   - What type of activities do you foresee as potential ecosystem services projects?
   - Are you currently or have you in the near past partnered with a non-government entity on a project that might be considered for an ecosystem services market?

d. Nonprofits, including historical OWEB grantees:
   - What is your current understanding of the ecosystem services marketplace?
   - With what you currently know, what type of projects that you are involved in might qualify for ecosystem services markets?
   - Would the possibility of funding from ecosystem services markets impact your current activities in any way? (Size, type of project, etc)
   - Describe the type of projects you have been involved in?
   - What is the process you must go through to get projects approved?

2. <u>Project Facilitators</u>:

a. Consulting Foresters (experienced with carbon surveying and growth modeling):
   - Have you completed any forest carbon

assessments? How many? Where? For whom?

- What is the most difficult thing to assess that may impact the accuracy of a carbon survey?
- How do you determine the cost of (i) an initial, back of the envelope CO_2 estimate; (ii) an assessment that is verifiable for a third party verification and registry?
- What method do you use to do an initial estimate?
- What are the factors that would influence the timing of a full carbon survey once hired?
- Do you have GIS expertise that would allow you to map the cruise points?

b. Soil scientists:
   - How familiar are you with ecosystem services markets and the possible inclusion of soil carbon?
   - What has been your background in assessing soil carbon sequestration?
   - What is your knowledge/familiarity of soil carbon and eastern Oregon-type rangeland?
   - In general, what types of land management practices increase the sequestration of CO_2 in soil?
   - Who do you know is doing the best research on soil carbon and sequestration?
   - Do you have any potential research sites that could serve as a possible pilot project?
   - Do you have any historical data sets that monitor carbon sequestration and its change in local soils?

c. CO_2 Quantifiers (GIS analysts, Growth and Yield modelers):
   - How familiar are you with current ecosystem services markets in the US?
   - Roughly how many projects have you done calculating the CO_2 sequestration of forests?
   - Roughly, as a percentage, how many “back of the envelope” assessments vs. detailed timber/carbon cruises have you completed?
   - What methods and standards do you use in your calculations?
   - Are the tools you use proprietary?

- What are the most critical pieces of information you need to do a fairly accurate estimate of CO_2 sequestration <u>without</u> the benefit of an actual on the ground cruise?
- How do you determine costs for each type of project?
- Do you have any experience with calculating soil carbon?

d. Land appraisers:
   - Do you conduct timberland appraisals?
   - How familiar are you with ecosystem services markets?
   - Do you ever foresee the inclusion of ecosystem services values in land appraisal?
   - Are professional organizations discussing such appraisals?
   - Is there training for appraisers in the ecosystem services markets?
   - Have you ever considered carbon values or prices in your appraisals?

e. Project developers/designers:
   - What types of projects have you pursued/been successful with in the past?
   - What type of projects are you seeking now?
   - What impacts do you anticipate as the regulatory market matures in the US?
   - What do you believe are the barriers to project implementation?
   - What criteria do you use to determine if a project has potential?
   - Do you line up offset buyers before you commit to project design?
   - What is the best source to find buyers?
   - How do you cover design costs in the beginning of a project?

f. Wholesalers:
   - What are the criteria for you to buy the offsets from a

project, e.g., sizes, types, and standards?
- How do you think the regulatory market is going to influence what you do?
- What is the source of buyers in the current voluntary market?
- Are most interested in pre-compliance?
- How attractive are forest or soil (agricultural) credits versus other project types like landfill methane or industrial gases?
- Do you sell offsets internationally?
- Typically what are the overhead costs, or price spread, for your deals?

g. Land use attorneys (familiar with transactions/ easements, etc.):
   - What are the primary areas in which legal assistance is necessary or advisable for a successful ecosystem services transaction?
   - What types and how many ecosystem services ERPA agreements have you or your firm assisted on?
   - How do you see the potential regulatory changes in the US affecting the legal issues surrounding ecosystem services deals?
   - How does your firm keep pace with the ecosystem services marketplace?
   - Have you worked on conservation easements or other property restrictions?
   - What issues do you and your firm consider to be the most important with respect to 100+ year contracts?
   - Are there tools besides deed restrictions that would allow for a contract to deliver carbon from a forest over long time periods?

h. Banks/ Funds/ Investors:
   - How familiar are you with the ecosystem services marketplace?
   - Have you ever financed/invested in an ecosystem services transaction?
   - How will the possible regulatory ecosystem services market in the US impact your activity, if at all?

- Are the returns on investment at a point that attract outside capital into ecosystem services projects?
- Are there bonds or other creative funding instruments that could help deal with the issue of high upfront development costs and credit delivery that could take decades?
- Are you aware of financial advisors who would assist in creating business models and business plans?

i. Offset customers:
   - Is your primary motivation to complete a transaction to offset your carbon emissions, to be part of a "green project", or something else?
   - Would you be just as likely to buy credits from a landfill project as a forest project?
   - If you are considering buying credits, which are the preferred protocols?
   - Is it more important to complete a project with the most highly respected protocol, or it is enough to have an uninterested third party review the transaction?
   - Does the location matter? Would you be more interested in a project in your state? Region?

j. Verification and Monitoring:
   - What experience do you have in ecosystem services validation/verification?
   - What types of projects have you completed?
   - What training has your staff received?
   - Does any registry certify you?
   - Where have your projects been registered?
   - What factors determine the cost of your services?
   - On average, what are those costs?
   - How will the potential US regulatory market affect your business?
   - What sectors are you approved to verify?
   - Do you have an AFOLU expert on staff?
   - Do you have foresters on staff?

k. Protocol personnel:

- When do you believe CAR standards will be calculated for Oregon?
- How will CAR address the need for small projects?
- How will a US regulatory market affect CAR?
- What are the long-term plans for your protocol? Is it to become part of a regulatory framework, or are you looking to remain in the voluntary market?

I. Registries
- How are your standards for forest carbon different from other registries'?
- What is the cost of registering with you?
- In addition to what your web site states, what other information do by interested clients commonly requested?
- How do the services you provide compare with other registries'?
- How is the potential US regulatory market going to impact your registry?
- Do you have preferences for types of projects, regions of the US?
- What is your staffing like to cover the Northwest?
- Do you have other clients in the Northwest?

Notes From The Working Group Event:

"BUILDING THE CARBON OFFSET SUPPLY CHAIN IN OREGON"

ecosystem services

Note: Please see final report appendix for a listing of all participants. Also view an index of all the original (downloadable) power point presentations made at the conference at: http://esystemservices.com/files/Event-summary/.

Key Learnings:

- Oregon carbon market just beginning.
- Calif – more advanced
- Western Climate Initiative collaborative is potential market
- California, Washington, Oregon or New Mexico, Canadian provinces, own Cap & Trade system.
- California will create its own cap & trade; 8 mmt tons per year allowing offsets from outside the state of Calif.
- 2 principal buying groups: corporate social responsibility, and pre-compliance speculation still in formative stages.
- Still siloed on ecological and regulatory levels.
- Must assign a $ value to ES for mkts to work.
- Addressing cc adapation across agencies.
- Need: Exec branch applying pressure.

- The voluntary market is a good test for cap and trade/ Voluntary offset markets:
  - Carbon offset markets=transitional strategy to long-term environmental health
  - We need to help public understanding
  - Is there a realistic goal?
- Recognize green infrastructure as a need not a want.
- Cost saving thru aggregation=25%+/-.
- Credits are 'escrowed' till verified.

Need to Know/Have:

- Political impact of public sector buying/selling

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- ROI – what products come out of a land purchase for conservation/working landscape? Can offset sales turn a slight money loser into a slight money maker?
- If the state buys land from a poor forester operator and is then required to manage according to BMP's is it additional? Or are they required to manage that way anyway?
- Need to know for offset project:
    - general state of carbon
    - resources & first steps feasibility
    - demand side
    - what docs needed for project completion
    - what legal-financial docs
    - sweet spot for soil & wetland projects, relationship of ccba & VCS
    - Why is VCS seen as less robust than CAR?
    - clear tenure & ownership of land
    - who owns carbon rights
    - clarity of developing the asset
    - who is operating the project management plan?
    - e-mission reduction purchase aliment (Hunt & Williams)

    For a project:
    - project submittal forum to get registered
    - verified – PDD
    - Verification BY3 party
    - Communication agreement (allows a project development)
    - Attestation of compliance (not breaking the law)
    - Attestation of title (can sell credits)
    - P.I.A injury that all would go after the land man. if he defaults
    - what are the puzzle pieces
    - scale: how to scale up
    - pilot projects for multiples e.s.
    - role of public lands
    - relevance of e.s.
    - what are opportunities there

Topics :

- how to get people to recognize value?

- acknowledge synergies – greater benefits when coupled together.
- Multiple benefits.
- How to recognize historical context of regulation and management (unequal, integration issue)?
- What are the mechanisms for analyzing trade-offs & quantifying the services?
- How to prioritize landscapes where unique functions occur within those landscapes?
  Is there a paradigm shift around cc and carbon across (most) fed.agencies?
- Can we drive payments through utility bills? (beneficiaries pay)
- clear rules + 'certainty'
- successful case studies/test cases
- baseline data and interaction studies
- leadership at all levels-regtulators and private marketers
- network to create case studies across landscape
- basic understanding of markets/supply chain
- when does landowner act?
- how does CM relate to other economic tools already in play?
- who gets the credit in funder deals?
- linkages??
- absent market how can climate change spur change?
- tools: buyer--> sellers?
- how to efficiently measure CO w/ out lengthy/complicated process?
- how real is CO2 credit market in PNW?
- how does supply chain work?
- how can it work w/out silos?
- how to take advantage of co benefits? ($)
- how does market work?
- where does demand come from?
- contracts: env credits
- paths in voluntary markets
- aggregation: how does it work?
- how to engage w/markets?
- municipal carbon neutrality (feasibility)
- ecosystem services fees?
- what happens to additionalty when regs are increased/decreased? (time)
- OR SB 513 what is the role of gov't?
- how is value allocated among landowners?
- are credits/benefits commonly (communally) owned?

- are we providing supplier one stop shopping for delivery of services?
- can we do near term/social language for the outcome vs quantification?
- Should standards be Oregon specific?
- What is the role of S&WCD's and watershed councils?
- quantification of outcomes, not just outputs issues of scale weighted scoring for multiple benefits
- distill a set of principles regarding the standards/conflicts/trade-offs-rapid response

Resources Needed:

- Bluecarbon group! Developing w/car C-AG - soil
- Should there be an entity to promote consistence in quantification?

Opportunities/Projects:

- Lincoln City: Protect H2O Supply, CO2, or state lands.
- Sell under performing lands to invest in increased performance.
- OWEB granting process.
- Mission of OPRD and other state/fed agencies.

Hurdles:

- Scale of projects (is it big enough – transaction costs)
- is there room above baseline
- does the land qualify for CO2 offsets
- barriers – cultural, financial, technical
  how do we integrate/monetize/evaluate mulitiple es? (so its not incidental) PILOTS
- how do we measure all the services in one visit
- Difficulty of meeting current standards and protocols
- Expense of meeting current standards and protocols

Collaborations:

- State, Federal, markets
- Aggregated small land owners
- Land owners, project developers, marketers

Next Steps:

- Is there a quicker, robust, Oregon-based model/reg platform?
- Capped mkt only
- Kerry-Graham-Lieberman? (workable?) vs Waxman-Markey latest cap/trade
- What can states do?
    1. Oregon has history of tax incentives
    2. need to be judicious
    3. consider tax deductions for credit purchase
    4. state ref to existing stds
    5. req 3rd party regulation on single registry
    6. req registration

Oregon senate bill 513 working group:

- (role of easements, expectations, baseline requirements)
- how public $ get spent e.g. maintenance till free-to-grow?
- rationalization of regulatory inefficiencies
- project-by-project approach
- 513 a segue into new land use regulation?
- rules of goal 5 can be used to keep local govt accountable
- no enforcement/follow-up/$
- need to involve local communities
- need statewide coverage of key areas
- regulation can't keep up with learning: how to be nimble?
- encode the need for preservation?
- can markets help (be flexible enough) to allow for new listings/other change
- uneven regulations across l'scapes
- regulate them all!
- enforce regs on the books
- state end spp law does not affect private landowners
- forest legacy program-sets up disappearing habitats for focused attention
- discrete list of services we want to focus on in next few years: water, (air) carbon, habitat biodiversity
- move towards outcome based funding strategies
- document/share how different entities handle services (matrix)
- understand protocols in use
- Determine co-benefit standards and find available metrics

FORGING THE CARBON OFFSET SUPPLY CHAIN IN OREGON

March 29-30 / Program of Events

The purpose of this event is to accelerate the development of biologically based carbon offset projects in Oregon by connecting and educating all the critical players in the supply chain from supply to demand.

Join timber companies, government agencies, NGOs, leading scientists, carbon marketing companies, and others who are transacting on-the-ground carbon offset projects in the Northwest.

This will be a practical, step-by-step “road map” event for finding your place in the emerging carbon economy. You will learn about forest, soil, and wetlands based carbon projects in a working group format with plenty of interactive dialogue and question and answer sessions. This will also allow you to build relationships with partners who will be critical to successful transactions. (Approximately 75 participants.)

DATES: March 29-30, 2010

START: Monday the 29th at 11:00 AM (Lunch served)
END: 4:00 PM on Tuesday the 30th

LOCATION: Silver Falls Conference Center.
(www.silverfallsconference.com for driving instructions and gallery)

Monday's Agenda

Registration and check in begins at 11:00. Participants transfer luggage, locate their rooms. Lunch served from 11:30 to 12:30. *Note: Tables will be made available for dissemination of information between participants/ presenters.*

12:30 to 3:15 PM / PLENARY SESSION IN MAIN HALL

12:30 to 1:45 **/ Introductions and event framing / goals:**
Geoff Huntington / Facilitator

1:45 to 2:45 **/ "Ecosystem Services and Carbon Offsets 101":** An introduction to the services nature provides and how they are being monetized as a new tool for conservation and restoration. (Willamette Partnership and others.)

An introduction and update on the voluntary and regulated carbon standards and markets. (Climate Action Reserve, ClearSky Climate Solutions, Climate Trust, Voluntary Carbon Standard Association)

2:45 to 3:15 **/ Q and A**

3:15 to 3:45 **/ "The New Frontier":** A presentation on biologically based carbon offset projects, including forest, soil and wetlands. (Ecotrust, Environmental Protection Agency, Voluntary Carbon Standard Association)

3:45 to 4:00 **/ Q and A**

4:00 to 4:15 / BIO BREAK, SNACKS AND NETWORKING

4:15 to 4:30 **/ Carbon offset "Road Map" and introduction to case studies:** Walk through a graphic depiction of a carbon offset project "road map" explaining how a deal can move from supply to demand, and introduce carbon case studies to come. (Ecosystem Services LLC)

4:30 to 5:15 **/ PRACTICUM #1: A STAND ALONE ACQUISITION PROJECT:**
A Forest based carbon offset transaction that is underway on the Oregon Coast involving a timber company, state agency and a carbon purchaser. Presentation by a panel of those individuals making up the complete supply chain for this project, providing a real-life example of a successful carbon project that will be generating income. These panelists will give brief descriptions of their involvement in the project. (The Wetlands Conservancy, Forest Capital Partners, Oregon Parks and Recreation Department, Climate Trust, Ecotrust,)

5:15 to 5:45 **/ Q and A**

5:45 to 6:00 / REVIEW THE NEXT DAY'S AGENDA & EVENING PROGRAM

6:00 to 7:00 PM / FIRESIDE RECEPTION AND DRINKS IN DINING HALL

7:00 to 8:00 PM / DINNER: Local, Low Carbon Cuisine

8:00 to 9:00 PM / NETWORKING AND ENTERTAINMENT

Tuesday's Agenda

7:30 to 8:30 AM / **BREAKFAST**

8:30 TO 11:30 AM / PLENARY SESSION IN MAIN HALL

8:30 to 9:00 / **Announcements.** Input from participants on opportunities, hurdles and critical resources.

9:00 to 9:45 / **PRACTICUM #2) AGGREGATION OF MULTIPLE PROJECTS:** Forest based projects that on their own are too small but when combined have the potential of being sold into the offset markets. Presentation by three groups working in the carbon offset project development field. (ClearSky Climate Solutions, Ecotrust, Climate Action Reserve.)

9:45 to 10:15 / **Q and A**

10:15 to 10:45 / BIO BREAK, SNACKS AND NETWORKING

10:45 to 11:30 / **PRACTICUM #3) A RESTORATION PROJECT:** A mixed ecosystem service transaction on the Tualatin River involving water temperature trading and a retrospective look at how carbon could have been an additional source of revenue. (Clean Water Services.)

11:30 to 12:00 / **Q and A**

12:00 to 1:00 / **LUNCH (Move out of resident rooms)**

1:00 to 2:30 / **"Finding your place in the emerging carbon economy":**

Participate in working groups led by experts in 3 key areas

#1) How to identify and manage projects.
#2) How to determine project feasibility and design.
#3) How to complete a project transaction and implementation.

These groups will look deeply at their areas of interest and explore resources necessary to facilitate projects at each stage (Who, what, how and when)

2:30 to 3:30 / **What to put here Geoff?**

3:30 to 4:00 PM / **PLENARY AND "GOING FORTH" GOALS:** Next steps for building and accelerating a carbon offset "supply chain" in Oregon. What resources are critical or missing? What hurdles will have to be overcome? Wrap up.

Adjourn.

Note: Break out rooms will be made available until 6:00 PM for follow up meetings and networking.

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Forest Based Carbon Offset

PROJECT PROFILE

I. Project type: Improved forest management.

A) Project title: Oregon Parks and Recreation Department /Beaver Creek Land acquisition / Carbon offset project.

B. Location: Beaver Creek watershed, Oregon's mid-coast. (See map)

C) Size and current ownership: 583 acres currently owned by Forest Capital Partners. (Industrial timber company)

D) Description: This project involves the acquisition of 583 acres of land by the Oregon Parks and Recreation Department from Forest Capital, a major industrial timber company in Oregon. This is a ground breaking carbon offset transaction, the revenue for which is being used to help acquire the property during a time when budget shortfalls would have made the purchase otherwise impossible.

This key property will eventually be part of an 1140-acre natural area which will be managed to enhance and maintain ecological functions. The addition of these 583 acres of Forest Capital land will form a total protected riverine area of 2.2 miles of Beaver Creek and 254 acres of tidal estuarine marsh. The acquisitions will also add to contiguous protected forests, forming a total of 958 acres of early- to late-successional coastal forests within a two-mile radius of the Beaver Creek confluence with the ocean.

The future OPRD land management plan will change the use of this parcel from industrial harvesting every 40-45 years to a nature reserve with selective thinning to encourage a late successional forest which will then support several endangered species, while serving the local economy by bringing recreational visitors from throughout the region.

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E) Ecosystem service attributes:

This project will contribute substantially to the permanent protection of a corridor from the Pacific Ocean to mid- to late-successional forests in the headwaters of the Beaver Creek basin. It will expand the ecological linkages between the estuarine wetlands, adjacent coastal forests, and protected areas in the upper watershed. The proposed acquisitions ecologically connect the upper watershed lands managed for conservation by the US Forest Service, to the wetland complex, riparian areas, and estuarine, coastal forestlands being managed and restored by Oregon Parks and Recreation Department and The Wetlands Conservancy.

The relatively small size, topography, current land uses, ownership and ecological connectivity throughout the whole watershed provide a unique opportunity to develop and implement a conservation and restoration vision from ridge top to estuary in an important coastal watershed.

Fish that spawn in the forested upper Beaver Creek watershed use the marshes, streams and riparian areas that are to be protected by this project for over-wintering habitat. Additionally, the Beaver Creek North Fork sub-watershed is designated as a “Key Watershed” in the Northwest Forest Plan, which makes it a high priority for restoration and management of aquatic habitat and species. The lower reaches of the Beaver Creek Watershed, subject of this proposal, are essential habitat areas for Coho salmon.

Populations of coastal Coho salmon, a species federally listed as endangered, in Beaver Creek are considered among the strongest on the central coast of Oregon (USDA 2001). The presence of Coho salmon in this watershed is likely to increase following the planned restoration of low gradient, unconfined stream habitat on private lands. Most of the stream and estuary portion of properties to be acquired in this project meet this characterization and afford opportunities for successful restoration.

F) Portfolio of opportunities:

<u>Recreation:</u>
Project will provide areas for public use within a key nature reserve on the Oregon coast.

Ecosystem services offset potential:
Over a 75-year period it is estimated that the improved forest management practice will generate an additional 70,000 tonnes of carbon.

I) Carbon offsets:
Currently offered to The Climate Trust in Oregon. Has potential for private sale for buyer who wants story carbon. Climate Action Reserve protocols have been followed in all aspects of the project with the exception of the verification frequency (every 12 years rather than 6) and the duration of the verification. (For the life of the project rather than 100 years following)

II) Fish / Wildlife habitat/biodiversity:
Potential of mitigation offsets within Oregon market still being explored.

G) Principal sources of revenue and applicable markets:
Sale of carbon offsets to U.S. voluntary markets. Estimated value $8.00 to $10.00 per tonne.

A Forest Carbon Pilot Project /

THE BEAVER CREEK LEARNINGS

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I) Identifying CO2 Supply and Demand for Offsets:

The Beaver Creek land acquisition project was one of matching the interests of a unique offset buyer to a potential acquisition for conservation management. Some offset buyers are interested only in the regulatory fulfillment of their emission offsets but others, especially in the voluntary market, are looking for a "story" behind the CO2. This project included the ecosystem co-benefits of the land, the overall context of the property within a larger plan, and the contribution the future land management practice will have on an overall systems approach to a particular watershed.

What was learned?

On the Supply side there were several important lessons learned in identifying properties that would interest a buyer who was looking for conservation value in the offsets and developing the story behind the acquisition.

Such priority lands are best identified by the mutual collaboration between NGOs in the field, watershed council coordinators, and state and federal agencies working in the field of conservation and land management.

Property that, once purchased, will be managed as part of a whole system approach to a natural ecosystem is more appealing to a buyer than a discreet, stand-alone purchase.

Size of the property, or total properties being considered, is critical. In order to cover the costs of the project (to be covered later in this document) there is a minimum CO2 tonnage that must be sequestered within the contract time frame. Until there is a market to sell ecosystem services other than CO2 then forested acres is the main determinant of project feasibility.

The best projects are where "ready for market" carbon meets conservation, even among the regulatory buyers. They want to tell a story as well. In the case of Beaver Creek, the role played

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by Oregon Park and Recreation Department's (OPRD) Natural Resources Director and the Executive Director of the Wetlands Conservancy in describing the "story" behind the carbon was critical to the offset buyer's interest.

The use of Google Earth, tax lot information, and any historical sales information, including previous timber cruises, are very helpful in doing an initial estimate of the feasibility of the project.

An early determination of a willing property seller and buyer needs to be determined. It may take time to develop interest for each depending on their separate circumstances. (e.g. business plan, funds available, approval process). In the case of Beaver Creek, both parties had initial approval to explore the sale and purchase of the land. For the buyer, OPRD, it was more an issue of putting together the total funds needed than it was the desire to own the land. For Forest Capital Partners, the landowner, it was a matter of determining what the highest best use for the property was and how they could maximize the return on the property for their investors.

II) Project Feasibility Analysis:

Once initial interest of all parties was determined an official project request was prepared for the offset buyer. This was Phase I in a three-phase process leading to the Emissions Reduction Purchase Agreement (ERPA), the final step in the offset sale process. None of the parties involved had been through a similar process so throughout all phases of the project there was considerable making up the rules as you go forward. In some cases the agreements reached one month changed the next. In the case of Beaver Creek, project feasibility and project design ran simultaneously for eight months.

What was learned?

The initial project design included the project developer Ecosystem Services LLC, (ESS) purchasing the offsets and selling them to the buyer. For political and public relations reasons that plan was changed to OPRD selling directly to the offset buyer. This caused confusion in the role of the project developer and it was not until six months of further work on the project that a contract was signed between ESS and OPRD.

This role confusion led to some time delays and miscommunication among all parties. The major lesson learned with this is that the roles of each party need to be determined, and in some cases legally contracted, as early in the project as possible. In the case of a state agency, contracting requirements need to be resolved from the beginning.

A key criteria in project feasibility is determining what standard, or protocols, the offset buyer wants used. It helps determine the size of project needed, the legal requirements on the property, the overhead costs of the project, the long-term requirements of the landowner, and most of all, the market price of the carbon.

In the case of Beaver Creek OPRD and ESS were first told that the buyer used their own standard which was flexible and designed to get projects done. During the course of Phase I, the application, Phase II, the Project Information Document and pro forma, (done twice for two different standards), it was never clear exactly what the protocols would be. This partly was responsible for the inability of all parties to get beyond the Phase II stage quickly and efficiently. It also added to the cost of CO2 assessment. Ecotrust, working on a contract with ESS, did three carbon assessments of the property; one initial assessment for the project application, the second for the first PID submission, based broadly on agreed upon forest carbon standards, and the last, based on the most recent iteration of the Climate Action Reserve Forest Protocols, something the offset buyer adopted late in the process. And even that adoption only included some of the protocols, not all.

It is imperative that a clear protocol standard is agreed to in the beginning of the project. Climate Action reserve (CAR) is the most restrictive and least used forest carbon standard but it is being pushed as one to be used in possible federal legislation on cap and trade. The Voluntary Carbon Standard (VCS) is broader and more accepted internationally where most of the offset demand comes from. Whatever the choice, clarity up front is essential.

Less an issue with Beaver Creek but potentially important with other properties is the need for specific information on the property. Some property owners may be unwilling to share information until they are absolutely sure that a deal is in the works. For a feasibility study to determine the most accurate

value of the carbon and total land value, information on age of stands/acre, soil conditions, ground litter, natural threats, etc, are needed. In the case of Beaver Creek, given that the land was owned by a private industrial, certain assumptions could be made about information above. Google Earth and some on the ground observations were also helpful.

III) Project Design:

Project design occurs throughout the process, from initial identification through a final ERPA agreement. Initially it involves a matching process of a willing buyer and seller, using a simple set of metrics to determine if the project will be eligible for ecosystem service offsets, and establishing a time and task document that makes clear who is doing what when.

What was learned?

Even without an agreed to standard it was agreed that the basic elements of most standards would be used in submitting the Project Information Document, the key phase in determining if the project offsets will be accepted. The essential elements required:

- Forest Capital Partners, the current owner of the land, to submit a letter stating that if the property was not sold it would be harvested according to the scheduled cut dates. This established what the "business as usual" scenario would be if the project didn't go forward.
- OPRD to submit a statement that if they did not receive funds from the sale of the carbon offsets that the acquisition project could not go forward.
- OPRD to submit what their land management plan would be for the land, establishing the baseline by which additional sequestered CO2 could be measured.
- A statement indicating that the project was not prompted by any current or expected legal or regulatory requirement affecting this property.

The Project Information Document and the accompanying pro forma required a detailed accounting of the project. This proved impossible to do because OPRD was caught in a "Catch 22" of sorts. They could not enter into formal price discussions with Forest Capital Partners, or authorize and pay for a land appraisal, until they were certain that the money from the sale of carbon offsets would be available for the acquisition.

The offset buyer could not agree to the PID and enter Phase III, the negotiation of an ERPA, unless they had all the financial details of the project. This conundrum led to constant confusion around the pro forma and in general, how much money would be needed from the sale of offsets. When the second PID and pro forma were accepted by the buyer OPRD began the process of appraising the land and authorizing a "carbon cruise" to be used in determining exactly how much carbon would be sequestered over the contract period. If was after the cruise and price negotiations that OPRD was notified that the buyer was no longer interested in the project.

Initially the offset buyer indicated that they were flexible on what they would pay per ton for the carbon and would cover up to half of the acquisition price. They also indicated they would cover all of OPRD costs in developing the project and would cover all the monitoring and verification costs required in the ERPA. But organizational changes by the buyer gradually led to a more restricted financial offer; a limit on per ton price, a limit on how many total funds would be available. Ultimately the process of pulling back promises led to a total pullout by the buyer.

In hindsight it would have been helpful if buyer promises would have been put in formal documents and not in verbal commitments or emails. Even the initial approval by their Board to proceed with the project was communicated by an email. The major lesson learned here is even if the buyer is a respected, semi public agency managing funds prescribed by the state legislature, it is essential to get formal, signed documents throughout the process.

Another hurdle that the project design team and OPRD faced was that all negotiations were done with a mid level staff person. Their supervisor was included in the end but never were the senior management staff present at meetings. This was despite many requests by ESS and OPRD to have such a meeting. OPRD requested a meeting between their director and senior management of the buyer's organization before making a commitment to an appraisal and price negotiations. That happened six weeks before the buyer's pullout. There was some indication at that meeting that the buyer was pulling back some funds from the project but commitments were made to make it happen. Based on that sense of commitment OPRD

proceeded with the land appraisal and subsequent price negotiation with Forest Capital Partners.

There were several issues that were unique to this project because OPRD is a state agency. First it had to be determined that Parks could sell an asset off their land without going through a bid process. It was determined that the buyer was the only organization that could reasonably purchase the offsets at the price needed. The Standstill agreement asked for by the buyer needed Department of Justice review. After some negotiations language was agreed to. More of a hurdle was the Non Disclosure Agreement asked for by the buyer. As a state agency all transactions needed to be transparent. Again language was offered by OPRD to resolve any concerns by the buyer.

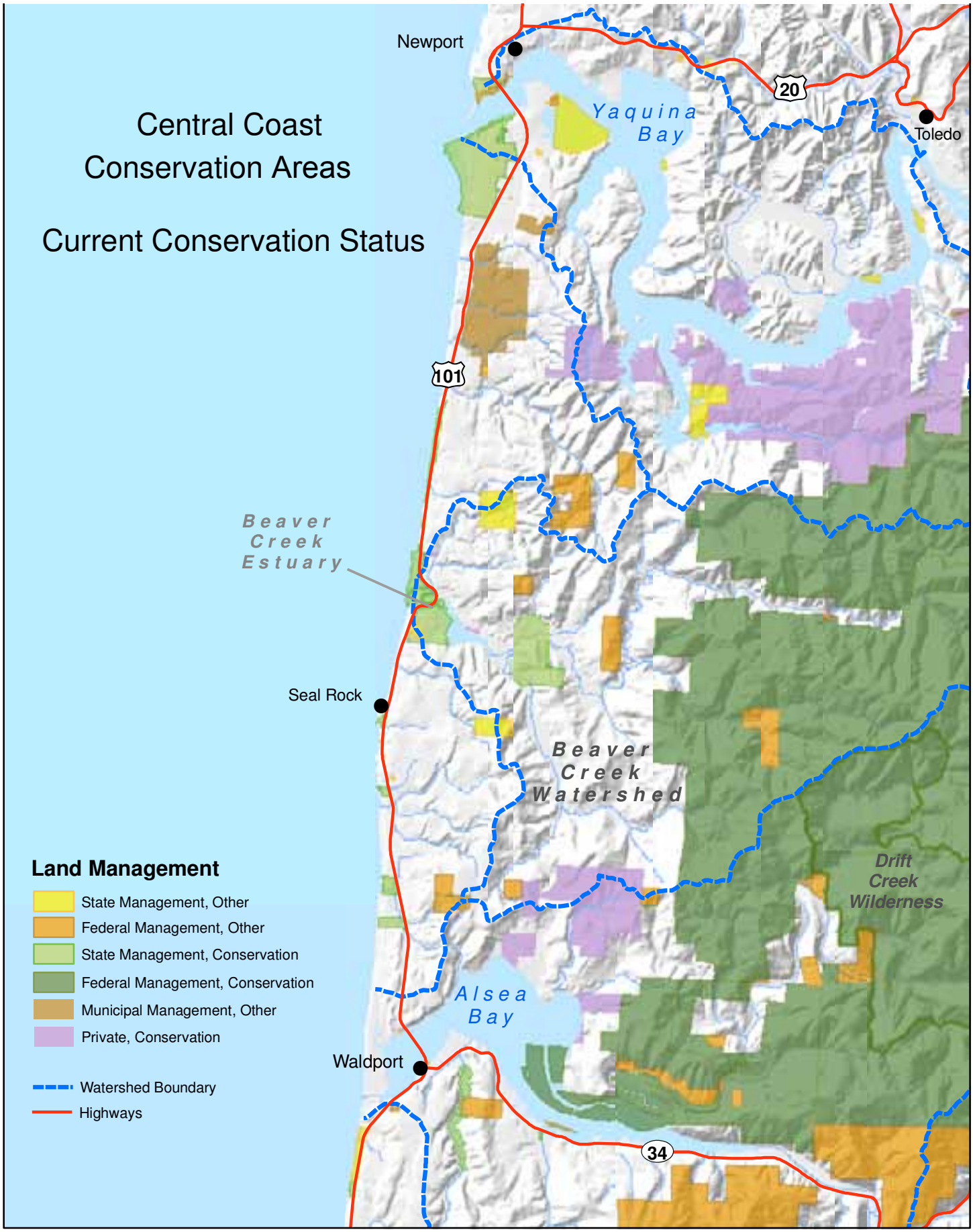
IV) General learning's

The overhead costs of a project using the CAR protocols is nearly prohibitive for small projects unless the buyer is open to negotiate some of the more costly monitoring requirements.

The uncertainty of the US cap and trade legislation has many potential buyers and sellers waiting on the sidelines until there is some indication of how the government will get into the market.

Perseverance matters. Bringing a project to fruition takes patience and determination from all parties. It seems nothing happens easy or on time.

The major parties involved have full time jobs in addition to getting this project done. It is the role of the project design team to keep things moving to the end. It is not an easy task given all the other priorities of those involved.


Central Coast
Conservation Areas
Current Conservation Status
Newport
Toledo
Yaquina Bay
20
101
Beaver Creek Estuary
Seal Rock
Beaver Creek Watershed
Drift Creek Wilderness
Alsea Bay
Waldport
34
Land Management
State Management, Other
Federal Management, Other
State Management, Conservation
Federal Management, Conservation
Municipal Management, Other
Private, Conservation
Watershed Boundary
Highways

Beaver Creek State Natural Area & Ona Beach State Park Vicinity

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725 Summer St. NE, Suite C
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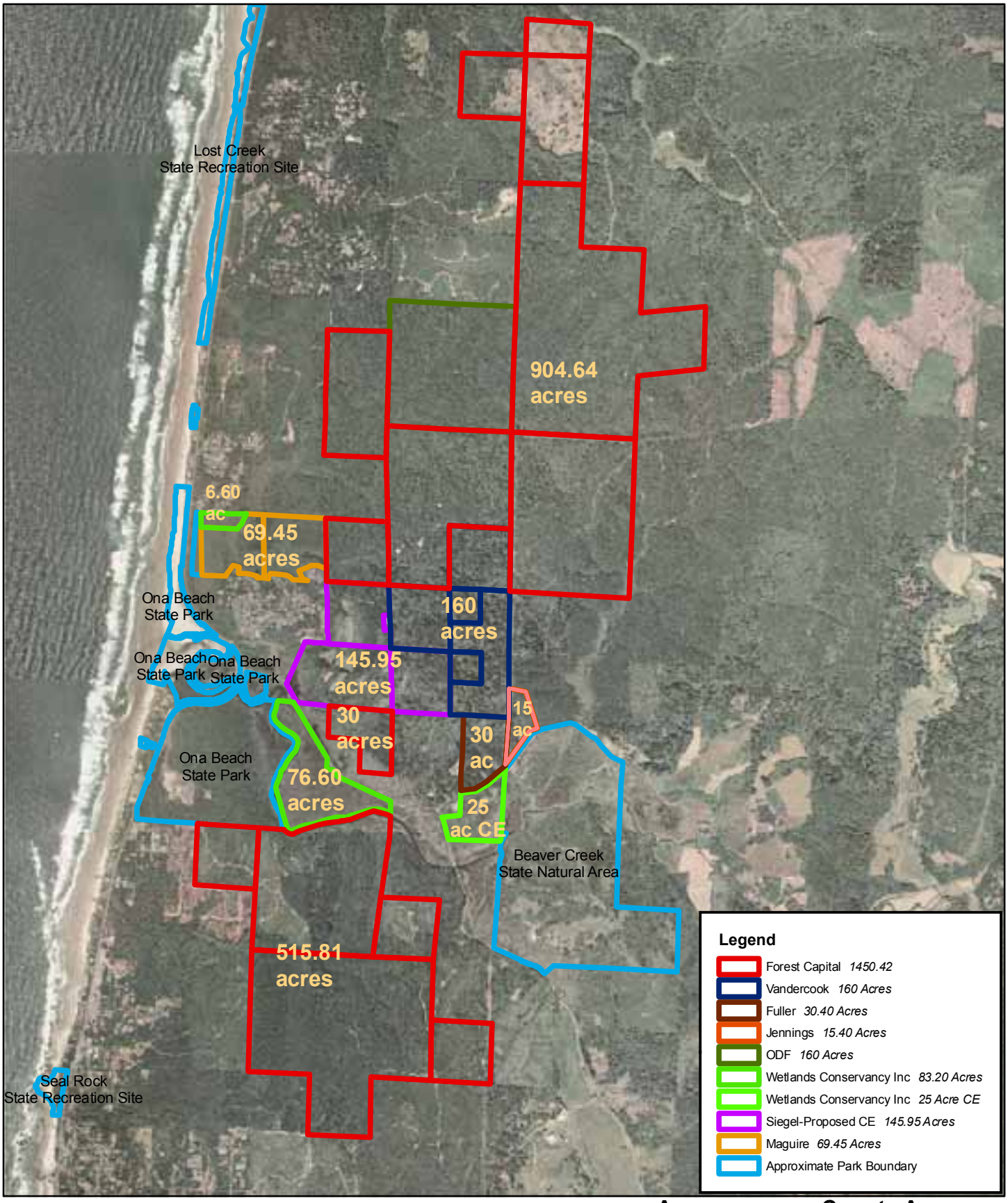

Acreage as per County Assessor

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THE SOIL CARBON CYCLE IN EASTERN OREGON
A DEMONSTRATION PROJECT

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EXECUTIVE SUMMARY:

I) PROJECT DELIVERABLE (To fulfill the scope of the OWEB Carbon Offsets and Ecosystem Services grant contract) *To define the scope of the project and its goals; to form a collaborative project team of stakeholders in the scientific, land management and market sectors, to conduct an initial project design round table and finally to generate a project scoping document and work plan ready for Phase I implementation.*

II) PROJECT GOALS: To clearly understand the role of carbon in the management of lands in eastern Oregon by utilizing adaptive and scientifically tested methods to identify "real world" rangeland management practices that increase the amount of carbon sequestration in soils and result in targeted multiple benefits for natural systems (Water infiltration, perennial grass stands and bio-diversity) and local land managers. (i.e., ranchers, non-governmental organizations [NGOs], and government agencies).

III) PROJECT DESCRIPTION: The design and implementation of this project will employ a whole systems approach to increase the likelihood of a net positive benefit to the natural and human communities involved. Project activities will take place over three years, in two discrete phases:

PHASE I / RESEARCH & DESIGN: Includes a thorough review of current and historical soil carbon literature, projects and practices, including convening a group of regional "leaders" in the soil carbon field; identification of lands in a specific basin in eastern Oregon with the potential for monitoring, modeling, and scaling to inform rangeland management practices; development of specific performance based goals/benefits and identification of methodologies to monitor success in achieving these.

PHASE II / IMPLEMENTATION: Includes soil mapping and baseline measurements of carbon sequestration and other ecological parameters; multi-year and multi-site field demonstration project that monitors soil carbon and other ecological parameters under a limited number of rangeland management practices in order to link these

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practices to quantifiable increases in carbon sequestration and delivery of the projects targeted multiple -benefits. (See “benefits” graphic)

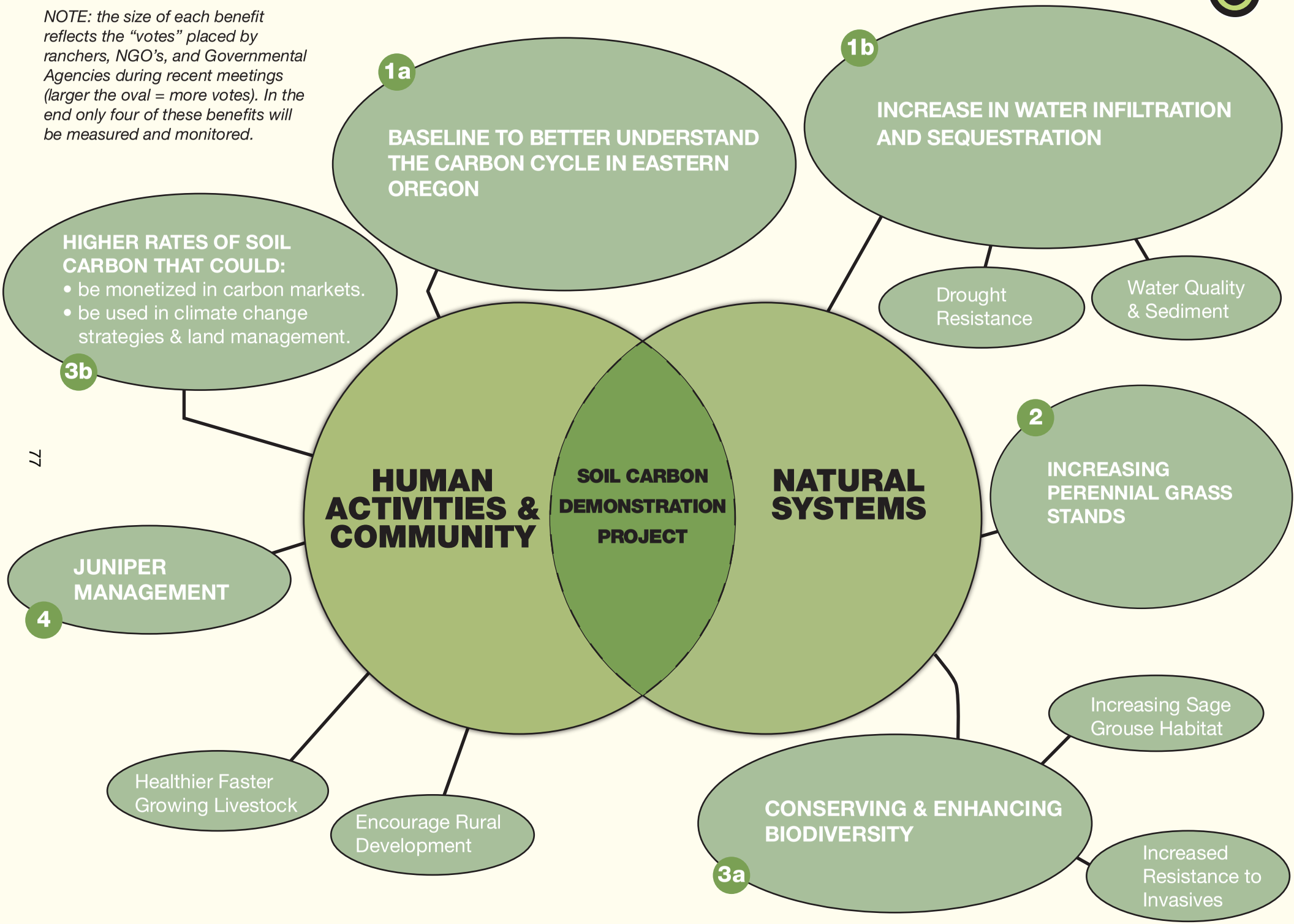
IV) PROJECT DELIVERABLES: This project is a ground-breaking collaboration between the scientific community, land managers and the ecosystem services markets. Project activities will yield a field-tested Demonstration Rangeland Management System for making land management, policy and marketing decisions which will result in multiple benefits for land managers and natural systems in eastern Oregon. Project documentation will include: A) Comprehensive review of rangeland soil carbon literature and projects and its effect on the projects targeted benefits; B) Practical and expandable methodologies to increase, monitor and measure carbon storage and its associated co-benefits including maps delineating new information about soils and carbon storage and detailed annual reports of project findings.

V) PROJECT TEAM:
The core project team will provide five critical functions: Project leader/ Administrator, Science leader/soil scientist, Technical services leader, Field liaisons, and Rangeland owners (e.g., representative ranchers, NGOs, state and federal agencies).

COMMITTED PROJECT RESOURCES: Soil sampling and analysis services (NRCS soils laboratory in Lincoln, Nebraska); In-kind staff time for Science leader/soil scientist (EPA and OWEB) A financial commitment of funds for the year 2010 activities. (BLM) Commitment of lands for field monitoring (USFS, BLM, local ranchers and other landowners.

TARGETED BENEFITS FROM SOIL CARBON DEMONSTRATION PROJECT

NOTE: the size of each benefit reflects the "votes" placed by ranchers, NGO's, and Governmental Agencies during recent meetings (larger the oval = more votes). In the end only four of these benefits will be measured and monitored.



04.09.10

DRAFT V-9

Reflecting comments made by: A) Potential agency partners during a meeting in Salem on March 9th 2010. B) Subsequent edits incorporating comments from Mark Brown of the BLM March 19th. C) "Benefits" input from Eastern Oregon ranchers on April 6th 2010. .

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THE SOIL CARBON CYCLE IN EASTERN OREGON

A DEMONSTRATION PROJECT

THE GOAL OF THIS PROJECT IS TO INCREASE THE MEASUREABLE RATE OF CARBON SEQUESTERED IN SOIL BY USING ADAPTIVE, OBSERVATIONAL SCIENCE TO IDENTIFY SPECIFIC RANGELAND MANAGEMENT PRACTICES THAT GENERATE TANGIBLE MULTIPLE-BENEFITS FOR NATURAL SYSTEMS AND LOCAL LAND MANAGERS IN EASTERN OREGON. (RANCHERS, NGO'S AND GOVERNMENT AGENCIES.)

I. COMPELLING NEEDS:

- COLLABORATION: Ranchers and NGO's are interested in finding science based partners willing to collaboratively identify methods of increasing and monitoring soil carbon with the understanding that this will result in multiple benefits to them. State and Federal agencies want to better understand the soil carbon cycle in Eastern Oregon in order to make well informed policy and management decisions including those related to climate change strategies.

- MULTIPLE BENEFITS: This project will be designed around a group of specific targeted benefits that have been chosen in a consensus process with the constituencies representing the majority of lands managed east of the mountains: Ranchers, NGO's and state and federal agencies.

- MONITORING: There are both observational and methodological needs for monitoring: A) The first need is observational science. Explore possibilities for accruing soil carbon based on initial baseline testing, monitoring of new activities on test sites and adapting practices by interpreting

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- the monitoring data and practical input from land managers. This process would be open-ended, yet strategic in the questions it would ask such as: Can grazing outperform CRP's in carbon sequestration, water retention, or diversity of wildlife? Under what circumstances? What multiple-benefits or costs are emerging? How can we help or empower land managers to accrue soil organic matter? B) The second need is to utilize a full range of monitoring methodologies including recent breakthroughs in remote sensing technology, which will hopefully enable this project to over come the historical barrier of high monitoring and verification expenses. This will also be accomplished through testing cost effective ways to measure rates of soil change and the cause-and-effect relationships of soil to changing conditions.

- VERIFIABLE RESULTS: There is currently no field-tested and verifiable rangeland management system that has resulted in increased carbon sequestration in soils. Nor has there been a clear definition and measurement of the multiple-benefits, of the adaptive management of grazing lands.

- LEADERSHIP: Circumstances are ripe for Oregon to lead the way in alternative rangeland practices that could result in a variety of tangible incentives for ranchers and improve the condition of lands and waterways throughout the state.

II. PROJECT GOALS:

- A BASELINE: Establish baseline information on the soil carbon cycle in Eastern Oregon ecosystems. This knowledge will provide public and private land managers with a better understanding of management options.

- FIELD TESTED PRACTICES: To utilize the best of current soil carbon science and realistic input from the stakeholder communities involved to identify a suite of quantifiable practices which will be field-tested on a variety of rangelands.

- MULTIPLE APPLICATIONS FOR APPLYING NEW KNOWLEDGE: Data and information from this project will increase understanding of how carbon is stored in soils in Eastern Oregon and practical methods to increase its storage through changes in rangeland management. This project will provide products that land managers can use for multiple applications.

- IMPROVED STEWARDSHIP AND GREEN MARKETING: Ranchers, NGO's and agencies that own land can improve stewardship by applying refined management approaches that are shown to increase soil carbon storage. In addition, land owners can apply simple-to-use monitoring methods emerging from this project to quantify multiple ecological benefits on their lands linked to a verification process that can be used as a tool for "green marketing" of their products.

- DEVELOPMENT OF A DEMONSTRATION LAND MANAGEMENT SYSTEM: Through performance based monitoring of field conditions over a multi-year period, a small number of the most successful practices will be reviewed and developed into a Demonstration Rangeland Management System. (DRMS)

- DRAFT PROTOCOL FOR CARBON OFFSETS: One outcome of this demonstration project may be the creation of a "draft protocol" which would be invaluable for encouraging the confidence of offset purchasers in soil carbon projects nationwide. This would be a rigorous field-tested standard for the market to employ as well as potentially providing identification and description of the multiple additional benefits the DRMS generated for the participating rangeland partners.

III. PROJECT BENEFITS:

In order to incentivize the ranching community, NGO's and state and federal agencies to participate, the project scientists, will work with representatives from these three groups to collaboratively identify an initial list of desired benefits resulting from the projects activities.

Recognizing that the project partners will have diverse interests the following list of benefits derived from increased soil carbon has been generated as a baseline for initial project design meetings: (Note these would be prioritized into a small group prior to implementing field application and testing)

- Increasing perennial grass stand density.
- Healthier and faster growing livestock.
- Juniper management.
- Increased water infiltration, sequestration and drought resistance.
- Sediment abatement/ Water quality improvement.
- Increased resistance to invasive plant species.
- Improved litter cover.
- Enhanced nutrient cycling.
- Deeper rooting by vegetation.
- Increased biodiversity (Vertebrates and invertebrates)

- Protection of native prairie remnants.
- Increase in Sage Grouse habitat.
- Increase health of rural communities/ development.
- Establishing a baseline to better understand the soil carbon Cycle in Eastern Oregon and assist in landscape level management planning and policy development.
- Building and maintaining large parcels under best management. Eliminating fragmentation.
- Higher rates of carbon sequestration in rangeland soil that could be monetized in the voluntary carbon market or used as a strategy in climate change management.
- Ability for ranchers to certifiably market products as lower in carbon emissions and superior in building natural systems health.

IV. OBJECTIVES AND METHODS:

There are two over lapping phases to the soil carbon demonstration project:

PHASE I: BASELINE RESEARCH AND PROJECT DESIGN: (6 to 9 months)

Step #1 / Building a strong project team:

Organize the core project team around the functions of:

- Project leader/ Administrator.
- Science leader and soil scientists.
- Technical services leader.
- Field liaisons with land managers.
- Rangeland owner(s).
- NGO ('s).
- State and federal agency representatives.

A second team would be formed for specific expertise in reviewing and funding the project. This would involve key community stakeholders as active participants in each step of the process, from "ground to market." Enroll members of the business, conservation, scientific and governmental/ regulatory communities whose missions are served by the multiple benefits of participating in a practical, action-based demonstration project.

Step #2: Literature and project review: Gather historical soil carbon research and field data from throughout the region and the nation, in order to ensure that the most current and practical science is used to determine the DRMS practices to be field tested and that there is no duplication in the project's activities. This would include literature and project reviews *most pertinent to the project's goals and benefits*. (Including close coordination with ARS and other agencies) The project team would partner with land managers throughout

Eastern Oregon to ensure their ownership and participation in the development of the DRMS practices as well as increasing the likelihood of their application in the future.

The historical data acquisition may include identification of "unmanaged" native rangelands or long term fenced exclusionary sites within the region. These sites should be baseline sampled to document the natural "high end" soil organic carbon storage capacities of regional soils.

Step #3) Establishing an initial "field generated" baseline: It is important to emphasize the importance of learning what exists in terms of carbon in the soils of Eastern Oregon and its relationship to management practices, climactic conditions, soil variability, etc. The initial gathering of baseline data will be an iterative and adaptive process which will heavily influence both the methodologies used in the design and implementation of the project to reach the stated benefits and goals, how these are measured and monitored and what sites are ultimately chosen.

Step #4) Project design:

A) Learning from the past: In order to achieve the projects goals and deliver its intended benefits the project team would address those key "social and physical" obstacles that have historically kept alternative rangeland practices from being widely adopted. These obstacles have included:

- Lack of rancher interest or incentives for action.
- Policy or funding restrictions.
- Unrealistic "best management practices".
- Variability of soils and climate.
- Intensity and timing of grazing.
- High costs of monitoring and verification.
- Gaps in critical baseline data to inform decisions.
- Lack of knowledge regarding what practices verifiably increase soil carbon and why.

Note: Specific solutions to these obstacles would be integrated into the design and methodologies used to field trial the DRMS's practices.

B) Site selection: The final project design will include guidelines for identifying optimum demonstration project sites* to ensure that the selected locations will represent as wide a geographic and climatic range as possible. These would include site stratification that addresses regional patterns and processes of soil organic carbon sequestration, (how the landscape is aggregated), plant biology, etc. (*A group of potential rangeland owners and sites has been identified

awaiting these guidelines. Other potential sites include BLM east-side districts; USFS exclusion grasslands, NRCS study units, NGO holdings, etc.)

C) Incentives for the private-NGO land managers involved in this demonstration pilot:

After initial monitoring provides the necessary feedback for the selection of the DRMS practices, a baseline and method of measurement will form the rough basis of a metric to measure those practices that have been selected from the menu of benefits listed in *"III. Project Benefits"* above IE grass production, animal health/growth, improved water quality, biodiversity or certifiable marketing claims, etc. The project team will then explore the potential of an Oregon "in-state market" for the multiple benefits generated by the project.

Carbon offset buyers would also be contacted regarding the alignment of the project protocols with accepted standards and to determine their potential interest in purchasing the resultant soil carbon offsets. Additionally an existing standards framework (VCS, CAR, etc.) would be engaged to co-develop the potential "draft protocol" for national/ international adoption. (This has cost implications that must be discussed)

D) Incentives for the agencies involved in this demonstration project:

Project partners that are not specifically interested in the market aspects of this research could simultaneously utilize these findings-practices to improve stewardship of their lands and inform policy and management decisions.

PHASE II IMPLEMENTATION: (24 to 36 months)

<u>Step #1 / Site selection / Annual data gathering and field-testing.</u>
The project team will employ a minimum of three land management /grazing practices on the selected sites. These locations will be sufficient in size and of a climatic and geographic diversity to fit the project's design criteria. On going data will be gathered on soil carbon sequestered at these sites and measured against a baseline data set collected at the same site prior to the change in activity or at a site determined to have the same local conditions. The minimum period of this data collection will be three years. Based on data collected each year, the project will disseminate the research findings to all project partners as well as calculating the dollar value of the multiple-benefits resulting from the change in management practices.

<u>Step #2 / Verification and monitoring:</u>
This project will overcome the historical hurdles of high verification and monitoring costs by matching on-site testing of plot vegetation with remotely

sensed data collected by the USDA, NRCS or other parties. In addition to assessments and provided to ranchers on their management activities, a statistical analysis will determine the accuracy of the current remote sensing data available on the same plots. If the correlation were strong, it would support clear best practices and a more cost- effective monitoring regimen in the future. Acquisition, calibration and use of remotely sensed data to assess forage stand quality would permit rapid, cost-effective identification of other locations that would benefit from DRMS applications. This will allow larger parcels to take part in the project as well as lowering the over project cost. While it appears that the duration of these tests would need to be a minimum of three years, historical climate data averaging would also be used to address seasonal variability of forage growth and soil organic carbon sequestration.

Step #3 / Influence on protocols and standards:
As previously mentioned, the project team will potentially create a draft soil carbon protocol, which will be aligned with an existing standards framework. (Voluntary Carbon Standards, Climate Action Reserve, Climate, Community and Biodiversity, Environmental Protection Agencies guidelines, etc), This protocol will address the major issues of additionality, permanence, leakage, and risk. The goal of this draft protocol will be to provide a "soil carbon sequestration determination methodology" and pave the way for greater confidence in the soil carbon market.

Step #4/ Going to market:
Each of the project benefits listed above have different methods of valuation with greater and lesser degrees of specificity and ability to be quantified:

Multiple benefits: Qualitative (and quantitative where possible) data will be captured on a list of multiple-benefits *as selected collaboratively by the core project team, the ranching community, NGO's and agency partners*

Carbon offsets: The project team will explore the soil carbon marketplace, assessing throughout the term of the project the changing markets, standards and protocols for soil carbon sequestration. They will also monitor and adjust data collection based on potential federal regulations that may be implemented during this project and which most likely will impact the soil carbon market. (Absent strong standards, the current CCX market, the only substantive soil market in the US, is selling its soil-based offsets at ten cents/metric ton making, it economically prohibitive to develop offsets without standards to drive the price towards forest based levels of $6.00 to $20.00 per ton).

Carbon emission reductions and sequestration are also key components of federal and state mandated plans and this demonstration project would provide important research data and field verification to help to inform and execute these strategic plans.

V. DELIVERABLES:

- Generation of a science-based and field-tested, Demonstration Rangeland Management System that will enhance soil carbon sequestration, and provide multiple benefits to land owners and natural systems. This will include:

- Project Design:
  Soil carbon project and literature review.
  Identification of lands with widest scaling and modeling potential.
  Setting of specific performance based goals.
  Methodologies for reaching those goals.

- Project Implementation:
  Baseline measurements and soil mapping.
  Multi-year and multi-site field demonstration project.
  Annual reports on findings including mapping.
  Monitoring & verification of soil carbon & targeted co-benefits.
  Measurable benefits summary, methodologies and maps drafted into a user friendly DRMS for informing management, policy and marketing decisions.

- Provide potential new market based sources for carbon and other co-benefits resulting in tangible financial incentives for rangeland owners, NGO's and potentially state agencies. Identification of actual project opportunities and assistance in bringing these to market.

- Development of a draft protocol for high quality soil carbon offsets.

VI. THE PROJECT TEAM:

A) Core team:

- Project leader: Ecosystem Services LLC (ESS) Duncan Berry and Guy Sievert.
- Field liaisons and technical coordination: Soil Carbon Coalition / Peter Donovan and others.
- Science leader: Methodologies, testing-verification and monitoring. Environmental Protection Agency/ OWEB David Hammer.
- Technical leader: Carbon quantification and valuation, protocol development, and additional carbon science: Ecotrust

- Rangeland partners: Ranchers in North Eastern Oregon. (Country Natural Beef Co-Operative / Others)
- Federal and state agency partners: To date: BLM, NRCS, USFS, EPA and OWEB.)

Other potential partners:

Federal:
United States Fish and Wildlife Service.

State:
Oregon Department of State Lands.
Oregon Department of Fish and Wildlife.
Oregon Department of Environmental Quality

Non-Governmental Organizations:
The Nature Conservancy
TBD

VII. SCHEDULE:

Proposed Project Duration / First and Second Phases: June 2010 to June 2013. *Note: Additional phases may be required to fully develop the soil protocol and/ or finalize field tests with accurate averaging of climactic cycles.*

Pre-Project Scoping and Proposal Work:

January-February 2010: The initial "core" team held meetings-telephone conferences. These involved those individuals providing key functions to the project (as outlined above) who successfully framed the overall scoping of the project, established its goals and identified initial benefits and methodologies.

March 2010: A meeting was held with state and federal agencies to gain alignment and gage interest in their participation in the project. Project proposal, formation of core project team and identification of funding sources to be complete no later than March 30th 2010.This would include full input from the ranching community.

April 2010: A meeting was held with the ranching community to provide input on the proposed Soil Carbon Demonstration Project and to engage in open dialogue with a group of the projects core team members and representatives from potential state and federal project partners.

May 2010: All scientific, governmental, NGO and ranching input will be fully integrated into the final formal project proposal which is projected to be

completed before the end of the month and tendered to potential funding partners for their review.

Project Start:

June /December 2010: Funding secured. Phase I baseline research, literature/project review and project design activities (as described above) would begin Final "start up" date will depend on optimal seasonal cycles.

January 2011 / January 2013: It is expected that the implementation, field trials, monitoring, and documentation activities of the soil carbon demonstration project will take an additional 24 to 36 months to complete.

VIII. COST: The costs of the project activities outlined above are heavily dependent on:

- Final scope and duration of project proposal.
- Confirmation of project methodologies. (Field trials, monitoring, etc)
- Selection of key team members and their fees or in kind status.
- Function of soil testing being fee based or contributed.
- Development of a draft protocol.

Costs to include:

- Core team daily rates for functions described above.
- Travel and expenses.
- Field sampling.
- Test sample transport to lab.
- Soil sample testing.
- Monitoring related expenses.
- Quantification services.
- Potential protocol development and double validation process.

It is anticipated that the project costs for a three to four year project will run approx $100,000 per year. (To be confirmed in a project pro forma as part of the May 2010 formal project proposal.)

Updated: July 19th 2010

SOIL CARBON PROJECT WORK PLAN 1.2 / Phase One.

TASK	RESPONSIBLE PARTY	TIMING	COST/HOURS	STATUS
			Re $$ costs: See project staffing plan and budget for details.	
I) PRE WORK ON FINALIZING PROJECT DESCRIPTION, BUDGETING AND TEAM:				
Finalization of project description including 4 goals. (Schedule tele conference with experts prior to finalization? Interview more stakeholders?)	Duncan/ team.	Week of 6/7	DH 3 hours DB: 5 hours	Complete
Identify and engage final team members. (Rangeland ecologist, (RE) hydrologist, plant and animal biologist and potentially a technologist.) Determine schedule and hours for same.	Rangeland ecologist & hydrologist: David H. Plant and animal biologist: USFW / Duncan Technologist: Steve D.	Finalize team by 7/30	DH 5 hours DB: 2 hours SD: 2 hours	90% complete. Need to define rangeland ecologist role(s) and USFW participation. Discuss hydrologist and Technologist.
Finalization of Phase One work and staffing plan. All members input, review and approve. Use with BLM to determine deliverables/ report outs.	Duncan and Guy/ team	Drafts: 6/28 Final: 7/23	DB/ GS: 12 hours total Others 6 hours.	75% complete. Needs team review.
Finalization of Phase One BUDGET. (Conform to $75 K / June '10 to First quarter '11) All members input,	Duncan/ team DH Meet w/ Chad M. Call NSSC	Drafts: 6/28 Final: 7/23	DB: 8 hours Others: 4 hours DH 5 hours	75% complete needs team and client review

review and approve.				
Schedule and attend mtg to confirm activities, budget & deliverables with Mark Brown.	Brent, Steve and Duncan	Call week of 7/19	Brent: 2 hours. Steve: 2hours Duncan: 2hours	
Draft integrated project document after round table meeting. Follow up with "funding team" for an update. Identify & confirm source for last two years of project funding. Need commitment to $150 to $200 K.	Duncan / team.	Funding proposals: 7/30 and ongoing until secured.	DB: 12 hours	Funding still needed.
Make list of targeted potential land management partners including field test sites (Ranchers, USFS, BLM. and NGO partner?)	Duncan and Guy.	7/19 onwards	DB/ GS: 10 hours	Potential partners in BLM/ Jack Southworth and TNC. Confirm
II) LITERATURE AND PROJECT REVIEW / STAKEHOLDER ENGAGEMENT				
Outreach to scientific and agency community with list of questions regarding soil carbon activities/ publications and projects. (Generate questions tied to project goals and targeted entities with emphasis on "what's working-what's missing") Establish clear method for organizing data electronically. Implement.	David Hammer with review and support from Steve. Caitlin and Guy. John Buckhouse? Agency partners?	5/17 thru 9/1?	DH: 60 hours? SD / CB: 20 hours? GS: 20 hours?	Need update from DH / others. Set method and targets.
Organize brain-trust round table event in July'10: Identify: key participants, (Paid and un paid) the agenda and proposed location and dates. Reach out and engage/invite participants.	David/ Steve/ Guy & Duncan. Involve David Powers, Mark Brown, Karen Bennett and Chad Mc Grath. Ranchers and NGO's?	5/24 thru 7/15	DH: 6 hours DB/GS: 12 hours DS: 4 hours Other: 6 hours	Complete.
Convene (2 day?) brain-trust. Initial goals/ agenda for meeting:	David, Duncan with team and agency	July 2010	Total of 16 hours X team members.	Complete.

	partners		$1500 hard costs?	
Write summary from literature and project review: Establish eastern Oregon SOC baseline from existing data. Identify where there are gaps and methods of filling them: Field work? Additional research? Field interviews? Goal is to determine our initial "Demonstration Rangeland Practices" that have the highest chance of delivering the project goals and benefits.	David/ Steve /Caitlin/ John B and team.	8/15 - 9/15?	DH: 80 hours lit rev/40 hours data acquisition/review Team: 20 hours.	
Conduct additional land managers input meeting(s) in eastern Oregon. (Ranchers, agencies and NGO's)	Team	7/15-8/30	24 hours	
III) IDENTIFY FIELD TRIALS SITE				
Determine criteria for ideal site: Scale, presence of participating agencies / land owners, applicable to wide range of landscapes. Promising: hydrology/climate/ soil/ plant community/ continuum of degraded landscape/ existing projects or data. Answer the Q: Should these all be in one basin where whole system results can be captured?	Entire team and agency partners.	Start: 6/15 Finish: 8/15	DH: 8 hours SD: 4 hours RE: 8 hours	
Determine who will be field coordinator. Draft activities and communication description.	ESS	8/01	DB: and team: 4 hours.	
Create initial mapping from soil data and geo-reference to nominated landscapes. Organize layers into a system that can be used interactively for planning and implementing	David Hammer and Ecotrust / Mike Mertens. NRCS?	8/15 or sooner?	DH: 18 hours ET: 20 hours	

project.				
Choose (top 3?) location sites and approach targeted land-owners with proposals. (1 NGO.1 Agency, 1 Rancher?)	Team. ESS and rangeland ecologist. Land managers.	8/30 thru 10/15	24 hours	
Draft model MOU between ESS and land managers/ owners allowing access and both parties clarifying and agreeing to terms of relationship, activities, etc.	Duncan / atty. Land managers?	8/30	DB: 4 hours Hard cost: $250.	
IV) IDENTIFY METHODS FOR REACHING PROJECT BENEFITS/ GOALS. / Prior to selecting field sites/ An initial draft of these methods will be one of the principal outcomes from brain-trust mtg.				
Using soil carbon as the project "gateway" and information gathered from processes described above; identify specific strategies/ methodologies to: • Increase water infiltration and retention. • Increase perennial grass stands. • Increase carbon sequestration in soils. See Section V below for establishing baseline before implementation of methodologies.	Entire team and experts from braintrust mtg.	7/15-8/15	40 hours for team.	
V) CREATING A FIELD GENERATED BASELINE (To be finalized after brain-trust mtg)				
This section of the plan will not be fully				

complete until we have completed our literature and project review, and held our braintrust and stakeholder meetings. Need to identify specifically what will be measured of the 3 project goals, at what scales in space and time, with what units, and for what outcomes. This needs to be carefully coordinated with Chad @ NRCS.				
Determine locations and schedule for baseline measurements. (Should take place before first quarter 2011)	Team	9/1	DH: 20 hours Others?	
Identify which baseline measurement points to include: • Water infiltration rates cm/sec • Carbon sequestration t/acre • Biodiversity # species. • Perhaps plant rooting depth and volume of plant roots. • Others? Note that these measurements will be both quantitative and qualitative and will involve graphic and photographic records as well as data.	Team	9/15	???	
A) Methodology:				
Specify what will be measured in the field and how as well as what will be estimated by remote sensing.	David Hammer. Steve Dettman Rangeland ecologist. NRCS.	9/1-15	DH: 20 hours SD: 10 hours RE: 20 hours NRCS: In kind	
B) Field sampling plan:				
Sampling for baseline soil, water, plant, species-habitat data.	David Hammer. Steve Dettman Rangeland ecologist. NRCS. USFW	9/1-15	DH: 20 hours SD: 10 hours RE: 20 hours NRCS: In kind.	
Procedures for field sampling to verify remotely sensed data.	David Hammer. Steve Dettman	9/1-15	DH: 8 hours Others?	

C) Field work:				
Implement field sampling plan on targeted sites utilizing project specific methodologies called out above.	David Hammer Rangeland ecologist. NRCS field team. Land managers		DH: 40 hours RE:30 NRCS: In kind	
D) Soil laboratory analysis:				
To be performed at NSSC Laboratory. Current average sample turnaround is less than three months. Establish an anticipatory schedule with NRCS.	NSSC Lab personnel David Hammer coordination Land managers.	10-1 thru 3-1	DH: 24 NSSC: In kind	
E) Scaling and mapping outcomes:				
Keys here are terrain attribute information (LiDAR or DEM's), existing soil survey maps, and locations of current and new sampling sites.	David Hammer. Mike Mertens Rangeland ecologist. NRCS field personnel.	1/15-4/30	DH: 15 hours MM: 10 hours RE: Needed?	
VI) FINALIZE PROJECT DESIGN / Wrap up Phase I activities.				
Draft detailed action plan for implementing rangeland management practices, in the field trial landscape, in order to realize project goals and incent all participants.	David Hammer, Steve Dettman, Guy Sievert, rangeland ecologist, plant and animal biologist and hydrologist. Ranchers, agency and NGO partners?	9/30 thru 11/15	DH: 30 hours SD: 24 hours GS: 18 hours RE: 60 hours	
Generate a "road map" showing graphically how the rangeland manager would practically apply the methodologies and what their resources and time investment would be for doing so.	Duncan Berry, rangeland ecologist, plant and animal biologist and hydrologist.	10/15 thru 11/15	DB: 6 hours RE: 4 hours.	
Quantify anticipated increases in each of the 3 benefit-goals and calculate the "business case" for	Duncan, Guy and Steve working with team		DB /GS: 20 hours SD: 20 hours	

carrying out the methodologies. Meet with the participants to review their "return for effort invested." (Both financial and/or in terms of other benefits)				
Include a "soil carbon cycle 101" and methodology training of land managers as key activity/ deliverable of the project.	Duncan, Guy, Steve / Caitlin.		DB:16 hours GS: 8 hours SD:16 hours	
Draft plan to address those key "social and physical" obstacles that have historically kept alternative rangeland practices from being widely adopted. (See list of 8 in project scoping doc)	Team		16 hours.	
Determine how to measure and monitor changes in SOC over time? What is the role (and cost) of remote sensing technology (and which ones?) with mechanical methods. Design monitoring process for first year trials and test.	David, Steve and agency partners.		DH: 10 hours SD: 24 hours	
Implement methodologies and publish first annual report after initial field trials are complete.	Team / See Phase 2 work plan.	Trials: Spring 2011 Report: Fall 2011	See Phase 2 work plan. Report: 40 hours.	

PROJECT MANAGEMENT/ ADMINISTRATION / Ecosystem Services LLC
General project management and administration.
Manage timeline, budget and project work plan.

Organize and run weekly staff meetings.
Presentations to agency partners & others.
Event organization and hosting
Provide documentation and billing to Ecotrust.
Resourcing personnel-expertise, research materials, funding, etc.
Land manager coordination.

A Review Of Bio-Based Carbon Offset
And Other Ecosystem Service

MARKETS

ecosystem services

Introduction:

Ecosystem Services LLC conducted an extensive survey of those participating in the carbon offset markets in the United States. The purpose of the survey was to ascertain how past and future OWEB type projects might fare in the marketplace and what, if any, changes OWEB may wish to consider to better position their funded projects for potential marketability.

The field of eco-system services (ESS) is just beginning to emerge in a defined state that can be programmatically linked to a mission such as OWEB's. Yet, the potential role for market-based mechanisms providing additional resources to citizen based restoration projects on privately owned lands within Oregon's watersheds is significant.

Because the ecosystem service marketplace is dynamic, it is, and will continue to be, shaped by state and federal actions as well as regional, national and worldwide markets. What is true today may not be tomorrow. But with federal action pending and the desire of most states, including Oregon, to engage the ESS marketplace in some way that will reduce CO2 emissions, the general direction is positive and the future is full of possibilities. In this environment it is important for potential participants in the ESS markets to stay current and be ready to engage the markets as opportunities present themselves.

Contract Deliverable:

Provide an overview of current voluntary and compliance driven markets for carbon offsets and their related co-benefit ecosystem services. In addition, describe opportunities, potential barriers and requirements of these markets as they relate to OWEB and its grantees.

Introduction

The market potential for ecosystem services projects in Oregon, and specifically within the OWEB grant program, may be assessed by determining the following: *Note: These determinations are dynamic and will change over time which necessitates that the readers assess these factors specific to a current opportunity/ project.*

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1. If the ecosystem services arising from restoration projects and/or acquisitions have value in existing voluntary and regulatory markets.

2. If an existing baseline for the provision of these services can be established and verified and used to quantify what a change in "business as usual" may produce in carbon sequestration.

3. That the improvement in ecosystem service benefits derived from the project can be measured over time in ways that markets will recognize and value.

4. If the necessary infrastructure is in place to bring projects to markets, including technical assistance, project development funds, recognized standards, and willing buyers of offset credits.

5. If the required legal framework, needed to sell ecosystem service assets produced by OWEB projects, is in place.

I. An o*verview of current voluntary and regulatory markets for carbon offsets:*

A) Voluntary Markets:

U.S.A.: The carbon offset markets in the United States are generally driven by businesses, governments and individuals electing to offset their emissions on a voluntary basis. In some cases individual states such as Oregon have statutory requirements, usually related to utilities or heavy industry, mandating that they achieve carbon neutrality.

The voluntary carbon market worldwide: Among the several types of restoration and acquisition projects OWEB funds the two that have the best potential for marketability in the carbon markets are rangeland and grazing management and land acquisition for the purposes of reforestation, avoided deforestation or improved forest management. Reviewing past OWEB projects these two have the size needed to cover the administrative costs of preparing a project for market and they both meet other common standards of the registry protocols. These opportunities may offer OWEB additional funds by leveraging the outcomes of grants with offset sales.

Most OWEB funded projects however are too small and produce too little CO2 sequestration to be viable to take to market. The administrative costs of developing and verifying a project make smaller projects too expensive for the revenue that they may produce.

For those projects that may be eligible OWEB may need to adopt a different funding scheme that would allow grantee's monies to invest in developing a project for market. Funds from an offset sale may not come for several years and OWEB or some other agency or NGO may have to risk capital to do the feasibility studies and due diligence needed to prepare documents and calculate the CO2 sequestered prior to receiving proceeds from the sale. This is a significant barrier in the current granting process.

B) Standards serving the markets: There are three primary standards, or certifying agencies for carbon offsets, in the U.S.: the Climate Action Reserve (CAR), the Voluntary Carbon Standard (VCS), and The American Carbon Registry (ACR), in order of the most rigorous to the least. The more rigorous the standard generally the higher price per ton for CO2. Each of the standards presents some particular difficulties for OWEB projects. CAR, requires a very expensive on-going verification and monitoring regimen over the course of the offset contract, which with CAR exceeds 100 years. VCS, which uses very similar methods in calculating CO2, requires a very large buffer, or set aside, of credits to protect the buyers from unintentional loss. These credits are gradually sold over time as the risk proves less, but a significant amount of funds will come late in the life of a project. This means that the sponsoring agency will have to wait years to see the financial benefits from the sale of the CO2 offsets. The ACR, once the most used voluntary standard in the world, has been eclipsed by the VCS, now the most dominant in the world and CAR, the standard many point to as the model for the up-coming U.S. federal cap and trade legislation.

One major issue with all standards is that they are now just developing standards for OWEB type projects. In particular, improved forest management was just released by CAR and VCS has only recently released a FSC improved forest management protocol. The only soil carbon protocol in use today in the U.S. is at the Chicago Climate Exchange, and it is so general in nature that the price per ton for carbon is less than $.15.

C) Demand: Our surveys have shown that there is a significant demand in the voluntary market, primarily from those who want to get ahead of the US federal legislation. They may be hoping to buy credits "cheap" and use them to satisfy the U.S. regulatory legislation which they believe is forthcoming. We found essentially two types of major offset buyers; those who believe that they will be subject to federal legislation in the future, and those who want to be "carbon neutral" for marketing purposes. In some ways the latter group may be the primary buyer of OWEB type projects because they are looking for a broad array of co-benefits to a carbon offset and OWEB projects have an impact on multiple ecosystem services. (Referred to as "story carbon or "boutique carbon") There has also been some informal discussion within Oregon that a voluntary market could be created within the state and that buyers could use

the fact that their money/offsets are benefiting the people and natural systems of Oregon.

See Key Resources under Step #2 /" Project Feasibility" of the Carbon Offset Road Map for businesses active in developing and marketing offsets.

II) Regulatory/ Compliance Carbon Markets: The compliance carbon offset markets are driven by those countries that have signed on to the original Kyoto protocols (and upcoming Copenhagen accord) and have a system in place for government mandated emission offsets. These markets are increasingly interested in developing projects in North America due to the stability of its government and the ability to effectively monitor and verify the permanence of projects here. However the generally small scale of projects available in the US is definitely a deterrent. Of the major US protocols the Voluntary Carbon Standard is the most used internationally.

III) Voluntary and regulatory-based markets for other ecosystem services.

Currently there are mainly mitigation markets for ecosystem services other that carbon. This is true both in the US voluntary and international markets. In Oregon the most successful mitigation project was completed by Clean Water Services and the Department of Environmental Quality with water temperature requirements on the Tualatin River. This indirectly led to the formation of The Willamette Partnership which developed an extensive mitigation protocol in four areas to be used with their "Counting on the Environment" marketplace. Other successful mitigation efforts have been done in the Chesapeake Bay region and the New York City source water watershed. It is anticipated that as protocols evolve in services other than carbon they will also be traded on the voluntary and compliance markets.

The Climate, Community and Bio-diversity Alliance, (CCBA) provides a protocol to assess ecosystem services as co-benefits to a carbon sequestration project but there is no market that trades using their standards. It is up to the buyer to assess what these benefits are worth in terms of their mission or objectives. However the CCBA has taken the first step in developing these protocols that with time may result in direct value to the current carbon offset.

VI) Emerging carbon & ecosystem service market opportunities in Oregon.

Near term opportunities: Since carbon offset standards and markets are the most developed ecosystem service world-wide, we would expect this to present the most significant set of near-term opportunities in Oregon with a variety of services performed by water being the second most significant. The

current Oregon carbon offset market on the demand side is primarily based on voluntary US buyers and potential international corporate buyers whose countries are under the Kyoto cap and trade compliance protocol (and anticipated upcoming Copenhagen re-writes.) Ecosystem Services LLC has a working relationship with several international marketers and continues to work with them to supply the domestic and world markets. In addition, Ecosystem Services LLC has already engaged in extensive work with another major presence defining the Northwest carbon markets -- the Climate Trust, and will bring the results of that ongoing work on coastal Oregon carbon sequestration projects into the road map contemplated as a deliverable for Objective #1. (Task 1 and 2) Please note: The “co-benefits” of other ecosystem services when bundled with carbon projects, drive up the price of the carbon offsets and thus are an early form of monetization.

Mid and long-term opportunities: There are a host of other ecosystem services being delivered to Oregon on a daily basis whose standards, quantification, markets and valuation have not matured fully. The key is to develop a depth perception as to which will mature when, and what role OWEB and others may play in accelerating them in support of ongoing restoration and acquisition priorities.

CARBON OFFSET PROJECT ROAD MAP

NOTE: This document is available in A) electronic form on the OWEB web site @ http://oregon.gov/OWEB/docs/CarbonOffsetRoadmap-ProjectQuestionnaire.pdf and B) in a printable PDF form at www.esystemservices.com

ROAD MAP USER GUIDE

WHY: This Carbon Offset Project Road Map was designed to make the process of identifying and developing a carbon offset project less mysterious to those who are new to the field of carbon or only partially aware of the steps necessary to generate this new form of revenue for themselves or their organizations.

WHAT: A step by step road map that guides you from the initial identification of a bio-based carbon project through its final post transaction monitoring and verification. At each step along the way it provides "What questions you should ask", "What actions to take" and what "Key resources" (with links) you will need along the way.

HOW: The initial two steps on the road map are the most critical for most local watershed council and SWCD users of this guide as they are key to determining whether or not there is a viable project. The final steps to a transaction usually need the assistance of a project developer to bring the legal, technical and market expertise needed to complete a project.

WHO: Federal agencies (If nothing else to understand what opportunities your partners might have), state agencies, Soil and Water Conservation Districts, Watershed Councils. Conservation NGO's. Timber companies ranchers or any other land managers/ owners. Attorneys, foresters, appraisers, etc.

WHERE: This guide is principally focused on forest and soil based carbon sequestration projects in Oregon, though it generally applies to almost any geographical location in the northern hemisphere. It is particularly useful for projects in the coastal temperate rain forests and the rangelands of eastern Oregon.

KEY DEFINITIONS

Carbon Offset: A unit of measure (usually in increments of 1 tonne of a carbon based gas like carbon dioxide or methane) which allows a corresponding tonne of emissions released by an activity to be offset or neutralized by another activity. (Planting trees, capturing or reducing emissions elsewhere, etc)

Standards, Protocols and Methodologies: A series of carbon project guidelines, that has been internationally recognized, and which specifies how carbon is measured, what constitutes additionality and permanence, how the project is monitored / verified and when, etc. (See below)

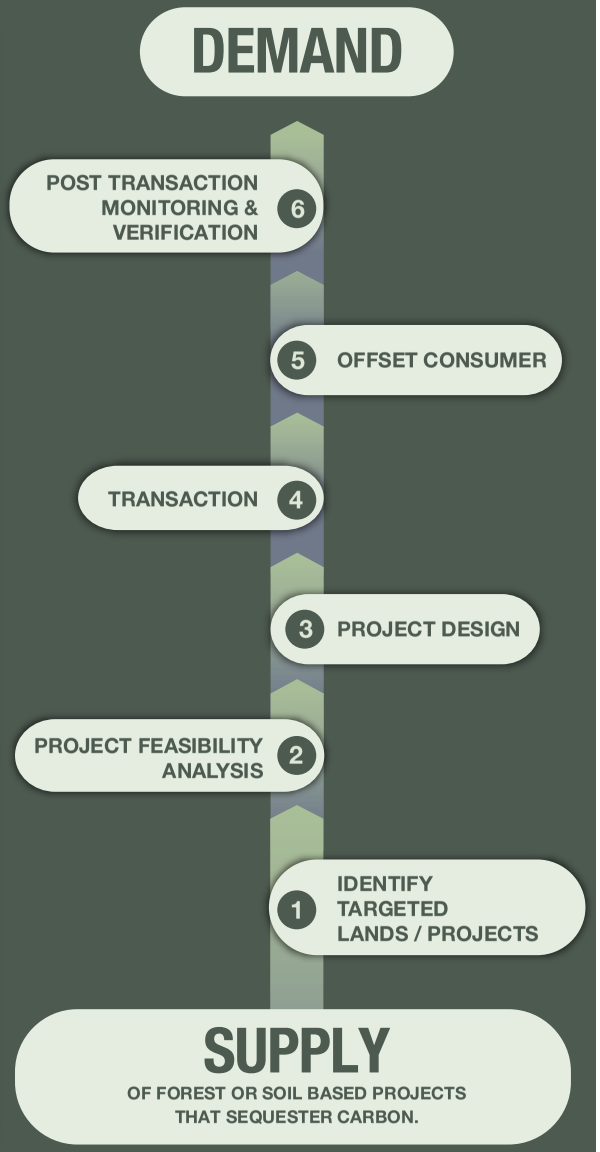
Additionality: The standard that allows only carbon sequestered over and above what would have been if "business as usual" practices had been followed i.e. altering the future outcome through the carbon transaction itself.

Permanence: The standard that ensures that the additional carbon storage achieved by the project is not lost during the term of the agreement.

Monitoring and verification: Over time ensuring that there have been no changes in the land management plan or natural disturbances to the land. (e.g. fire, excessive harvest, grazing or tilling, change of use) that would change the amount of carbon storage guaranteed in the project.

For any questions or inquiries please contact:

Guy Sievert / Managing partner at Ecosystem Services LLC:
TEL: 541.392.3550 - guy@esystemservices.com.

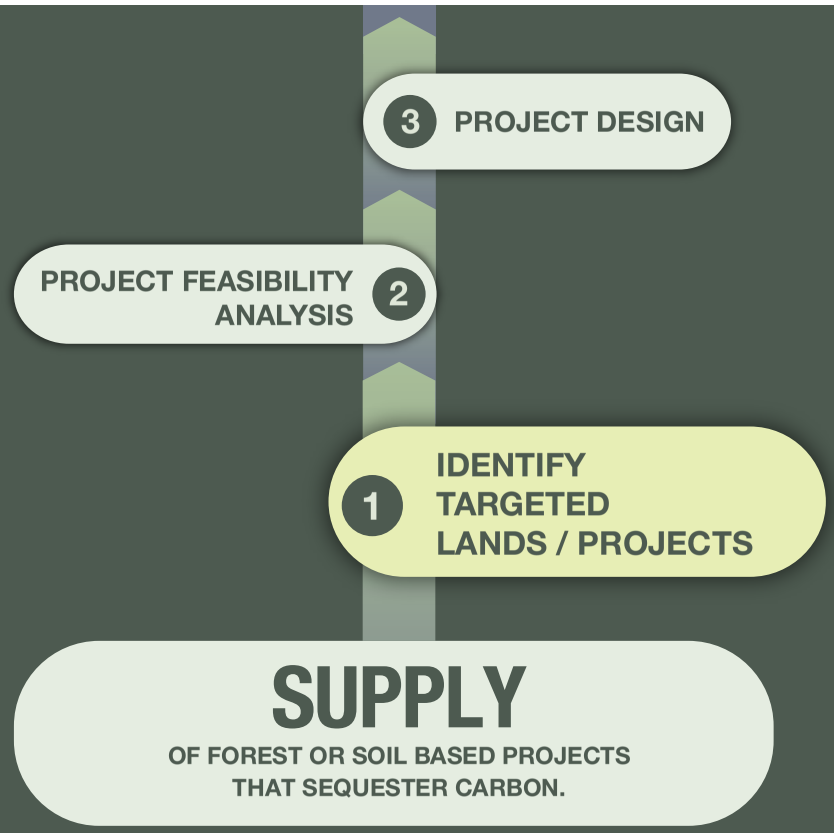


QUESTIONS TO ASK:

- **MULTIPLE VALUES?** Does the site or project in question have critical ecosystem values or other pressing needs (over and above) carbon sequestration that warrant the effort? High biological value, need for restoration, working landscape potential, a critical water source? Etc.
- **A DIFFERENT FUTURE?** Is there an alternative future for the land or project in question that increases CO2 sequestration by changing its long term management or use? Does it have a willing owner or manager?
- **RESOURCES?** Are additional financial resources needed to bring about change?
- **CONVERGENCE OF INTERESTS?** Are there multiple parties interested in the project? Listed in state or federal protection strategies, NGO's to partner with, critical riparian or terrestrial resources to be shared or sustained?
- **A MODEL?** Would the project provide a valuable model to inform management, restoration, decision-making or policy affecting other lands?

ACTIONS TO TAKE:

Initial research into land use history, acreage and/ or topography and riparian zones or other habitat, existing maps or LIDAR, tax lots/ ownership, and natural resource description, ESA listed species, adjacent lands, as well as possible partners, etc.



KEY RESOURCES:

- **"9 simple questions"** document that will help you determine the viability of a particular project or property. *(See Road Map appendix)*
- **County tax lot maps** for ownership, size and zoning. Google map (http://maps.google.com) or Google Earth (http://earth.google.com/) for recent images of natural attributes, roads, riparian areas, general topography, adjacencies, etc.
- **NGO's and other entities:** Ideal partners for identifying biologically valuable lands/habitats in need of restoration or purchase and in some cases aggregating carbon projects to reach the size necessary to market the offsets. (Nature Conservancy, Wetlands Conservancy, Defenders of Wildlife, local watershed councils and soil and water conservation districts, etc.)
- **Determine the biological significance** of the project location and/or species presence by cross-referencing to state and federal strategic protection plans; **A)** Oregon DEQ strategic source water protection plan; www.deq.state.or.us/wq/dwp/intro.htm. **B)** Oregon Conservation Strategy. www.dfw.state.or.us. **C)** Northwest Forest plan; www.fs.fed.us/r6/pdx/northwest-forest-plan.shtm. **D)** The Oregon Plan; www.oregon.gov/OWEB. **E)** Endangered Species Act and local ESA listed species and their ranges; www.fws.gov/endangered/ etc.

QUESTIONS TO ASK:

If the answers to the questions from Step #1 "Identification of Lands/ Projects" indicate a viable project then the next level of QUESTIONS are:

- **MANDATED?** Has the project been mandated by any legal or other regulatory requirement? If "yes" then stop the project development process as it will not qualify as an action creating "additional" carbon storage.
- **RESOURCES NEEDED?** Does the project require additional funding in order to be completed?
- **WILLING SELLER?** In the case of land acquisition is there a land owner(s) willing to enter into a purchase and sale agreement or in the case of a restoration project, other legal instruments, (such as an easement) for reasonable compensation?
- **DURATION?** Is it agreeable to all parties that the land and offset sales contracts include language that defines a predictable and consistent use of the property for a defined period of time? (No less than 20 years and up to 100 years)
- **RIGHT SIZE?** Is the property 500 acres or more in size in the case of a forest based acquisition project (Depending on location and species mix) or approx 1000 acres if a restoration project? (Or could the property in question be aggregated with adjoining properties to equal these totals?)
- **WHOLE SYSTEM HEALTH?** Will the project have a net positive effect on the natural system(s) in which it occurs?

ACTIONS TO TAKE

Project Developer:

- Decide whether to engage carbon offset project developer or not.

Valuation and Contracts:

- Run initial rough carbon sequestration calculation with the help of a project developer or quantification firm. (See *key resources*)
- Identify legal status of land/project: Conservation easement.
- Create a proposal / contract for land owner that outlines the carbon potential and cost to move forward and what rough per ton price they estimate the project's credits might bring on the voluntary market.
- Execute a non-binding contract with land owner.
- List the project on registry.
- Request existing documentation for lands/ projects. (Timber cruise, title report, mapping, etc.)
- Estimate quantity of carbon sequestered over time using new land management practices.

KEY RESOURCES:

- Ecosystem Services Project Criteria/ Questionnaire: This document is a proven method for identifying the feasibility of a forest or soil carbon project and its ecosystem service co-benefits. *(See Questionnaire doc to follow this road map)*
- Bio-Carbon Offset project developers: Choose whether to engage a developer to help you identify the viability of your project and run initial carbon quantification estimates, financial pro formas, etc. Some will do this for a fee others will "risk" their time to share in the final carbon offset sale dollars. **Ecosystem Services LLC;** www.esystemservices.com. **ClearSky Climate Solutions**; www.clearskyclimatesolutions.com. **Finite Carbon**; www.finitecarbon.com. **Equator**; www.equatorllc.com, **Ecotrust** www.ecotrust.org, etc.
- Research which standard best fits the needs of the project. **Climate Action Reserve**; www.climateactionreserve.org, **Voluntary Carbon Standard**; www.v-c-s.org/, **Climate, Community Bio-Diversity Alliance**; http://www.climate-standards.org/ etc.)
- The carbon offsets your project would generate will also need to be registered as there is a worldwide control on how many offsets can be traded. More on this under transaction.

QUESTIONS TO ASK:

If the answers to the questions from Step #2 "Project Feasibility" indicate a viable project then the next set of QUESTIONS are:

OWNER / MANAGER? Do you have an entity that wants to own or manage the land/project for the term of the contract?

TEAM MEMBERS? Have you chosen the key team members necessary to fulfill the functions for a successful project? (See *key resources*)

OFFSET BUYER? Have you identified an entity willing to purchase the carbon offsets?

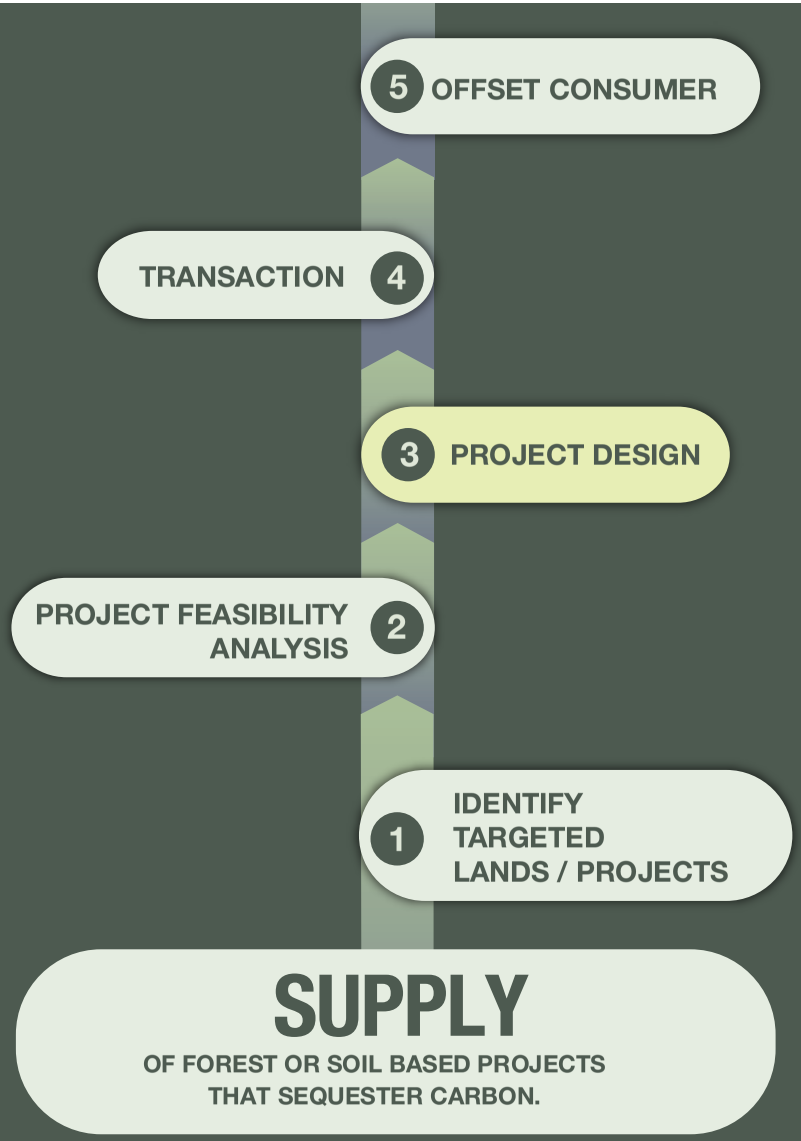
CARBON STANDARDS? Have you confirmed the standards, protocols and registry you will use for the project?

COSTS? Do you have an accurate calculation of all project costs organized into a project budget/ proforma including professional services (lawyers, foresters, quantifiers, project developers, etc) , expenses related to acquisition or restoration, project verification and monitoring, etc.

VINTAGE AND TONNAGE? Has there been a clear determination of the duration of the carbon sequestration and an independent verification/ carbon cruise of the overall tonnes of projected carbon to be sequestered?

ACTIONS TO TAKE

- Quantification: further documentation, mapping, site visits and calculations.
- Identify legal status of land/project: Conservation easement, management plan, purchase, etc.
- Encourage input from potential carbon buyers/wholesalers and land owner on project design.
- Determination of Additionality / Permanence / Verifiability. *(See definitions in appendix)*
- Finalize land management practices, monitoring and verification plan.
- Finalize standard to be used.
- Finalize carbon documentation.
- Finalize pro forma and project design, (Including all costs/income and ROI to all parties).



KEY RESOURCES:

- The team you identified in the feasibility phase; a carbon offset project developer / carbon offset buyer, potential land owner or manager and the entity whose carbon standards will be applied (see project developers/ buyers and standards list under "Feasibility/ Key resources" listing).
- A carbon cruise of the lands involved may be required (Jackson & Prochnau, www.timbercruising.com. Trout Mountain Forestry; www.troutmountain.com and/or references from Ecotrust, www.ecotrust.org or Pacific Forest Trust; www.pacificforest.org.
- A financial entity may be involved to provide assistance with a project pro forma and/ or to provide funding. (No specific listing)

QUESTIONS TO ASK:

You are now fully engaged in the final process leading to a successful project/ transaction. The next set of critical QUESTIONS TO ASK are:

- **THE RIGHT AGREEMENTS?** What form will the legal agreements take, both with the land owner and the offset buyer? Purchase and sale agreement? Easement? Emissions Reduction Purchase Agreement?
- **MANAGEMENT PLAN?** Is there a management plan that has been drafted and agreed to by all parties that specifically aligns with the carbon standards and protocols being applied?
- **COST VERIFICATION?** Have all $$ figures used in the project budget/ pro forma been verified by all parties, resulting in a final price per ton?

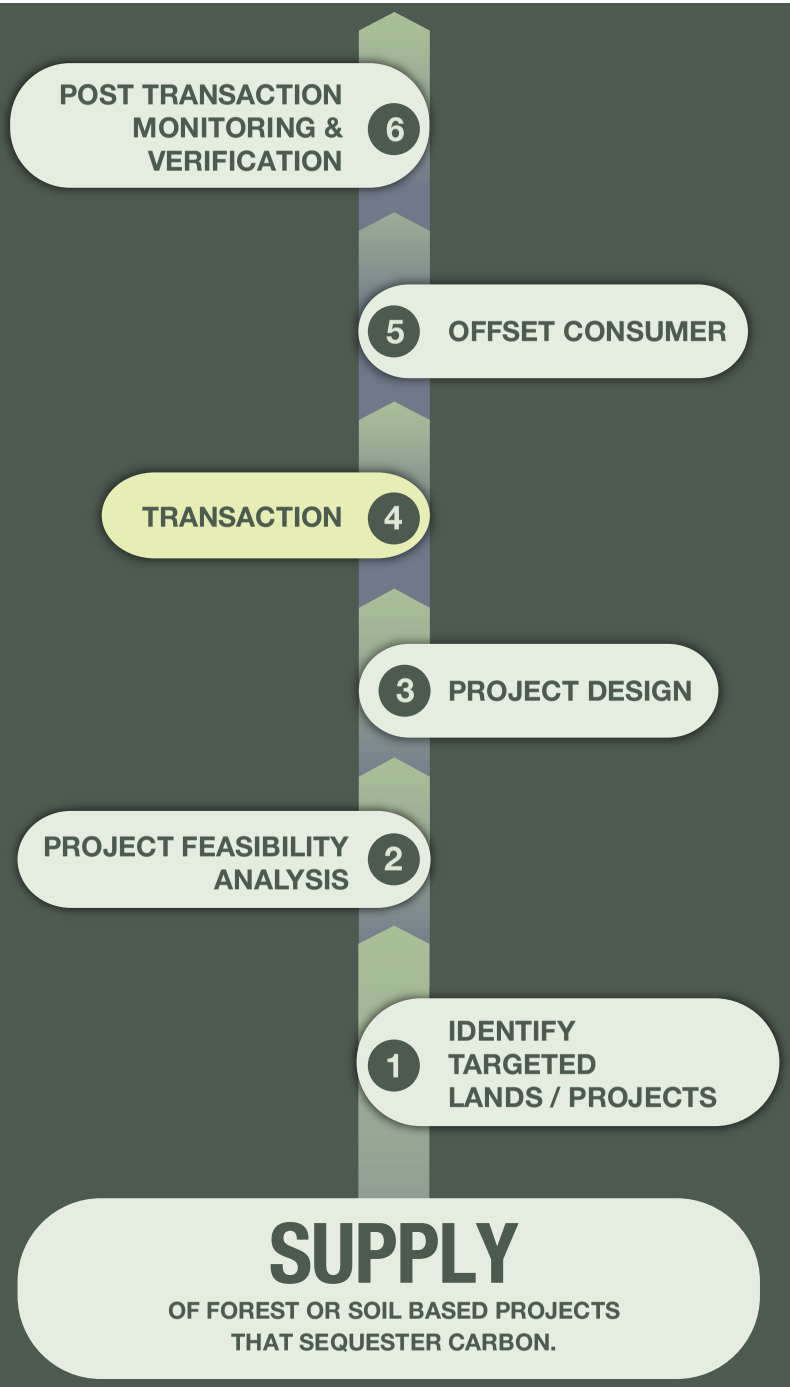
ACTIONS TO TAKE

TRANSACTION NEGOTIATED:

- Management plan in place that aligns with standards/ protocols.
- Separate legal reviews of ERPA / agreement by buyer and seller.
- Confirmation of the quantity of Carbon Emission Reduction credits to be delivered.
- Responsibility for monitoring and verification activities and costs settled.
- Schedule of payments agreed to.
- Registry placement determined.
- Consequences of non-delivery or other default events anticipated.

KEY RESOURCES:

- In addition to the project team outlined above you may need the services of legal counsel for the writing and/or negotiation of the Emission Reduction Purchase Agreement (ERPA = The contract through which the offsets are actually purchased) Lane Powell PS; www.lanepowell.com and Perkins Coie; www.perkinscoie.com.



QUESTIONS TO ASK:

The ultimate owner of the offset credits may be the land owner themselves, the project developer, or a business needing to offset emissions through a regulatory requirement, an investor who may intend to trade the offsets in a future market if their value increases.

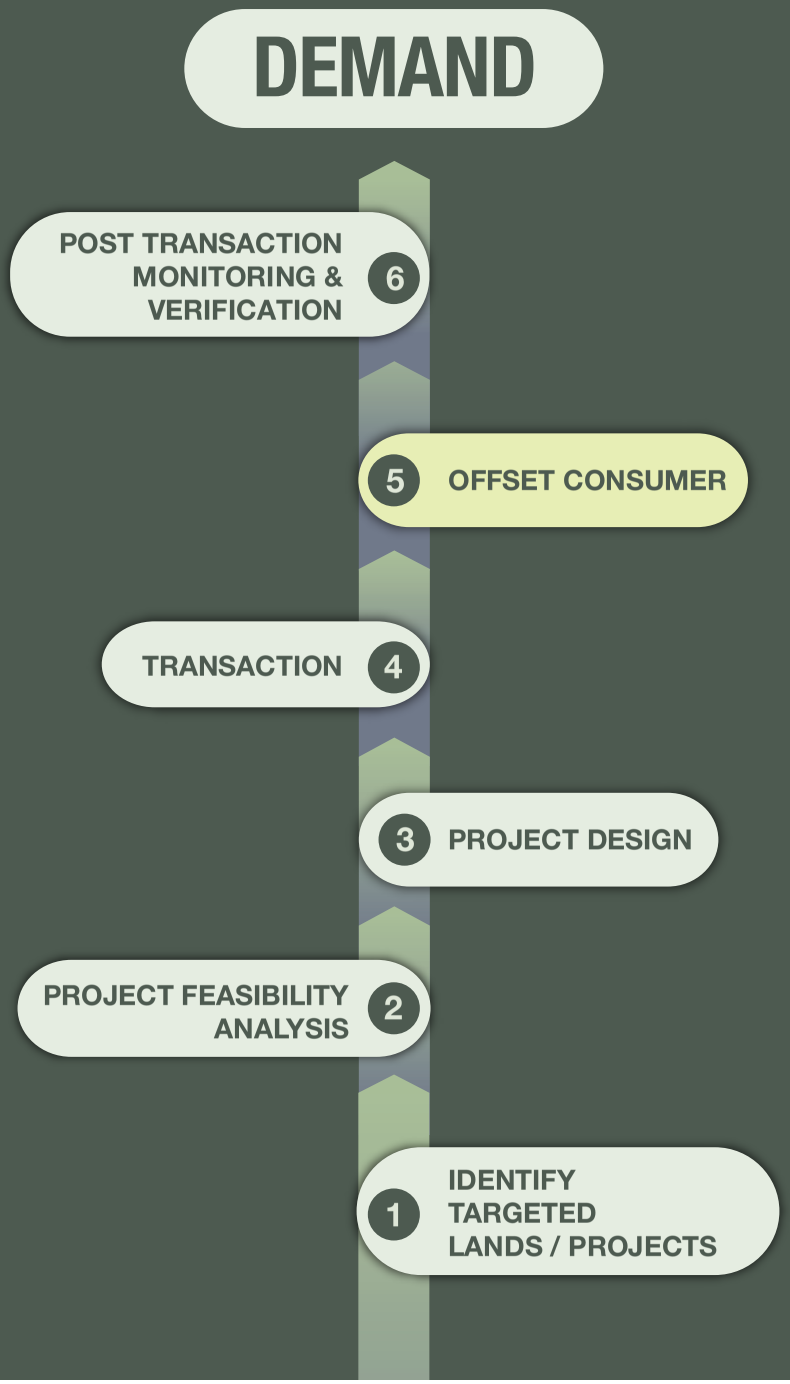
- What is the long term price future for carbon offsets?
- Does owning offsets fit into my overall investment strategy?
- What standards/protocols are being used to create the offsets and who are other prospective buyers using these standards?
- Will I need to invest in the project to get it certified?

ACTIONS TO BE TAKEN BY THE END CONSUMER:

- If the buyer is a wholesaler then offsets are listed on a registry site for sale.
- If purchase is direct then buyer may use the offsets to meet legal or regulatory requirements, use to market green image of the organization, or possibly sell the certificates in the open market at a later date.

KEY RESOURCES:

- Entities purchasing or arranging for the sale of carbon offsets. World Energy; www.worldenergy.net, Climate Trust of Oregon; www.climatetrust.org, ClearSky Climate Solutions; www.clearskyclimatesolutions.com Finite Carbon; www.finitecarbon.com, Equator; www.equatorllc.com. These entities will typically arrange for sale of the projects carbon offsets (Usually in minimums of 50,000 tonnes to 225,000 tonnes over the life of a project) and in some cases will offer upfront $'s to cover "pre-contract" costs.



QUESTIONS TO ASK

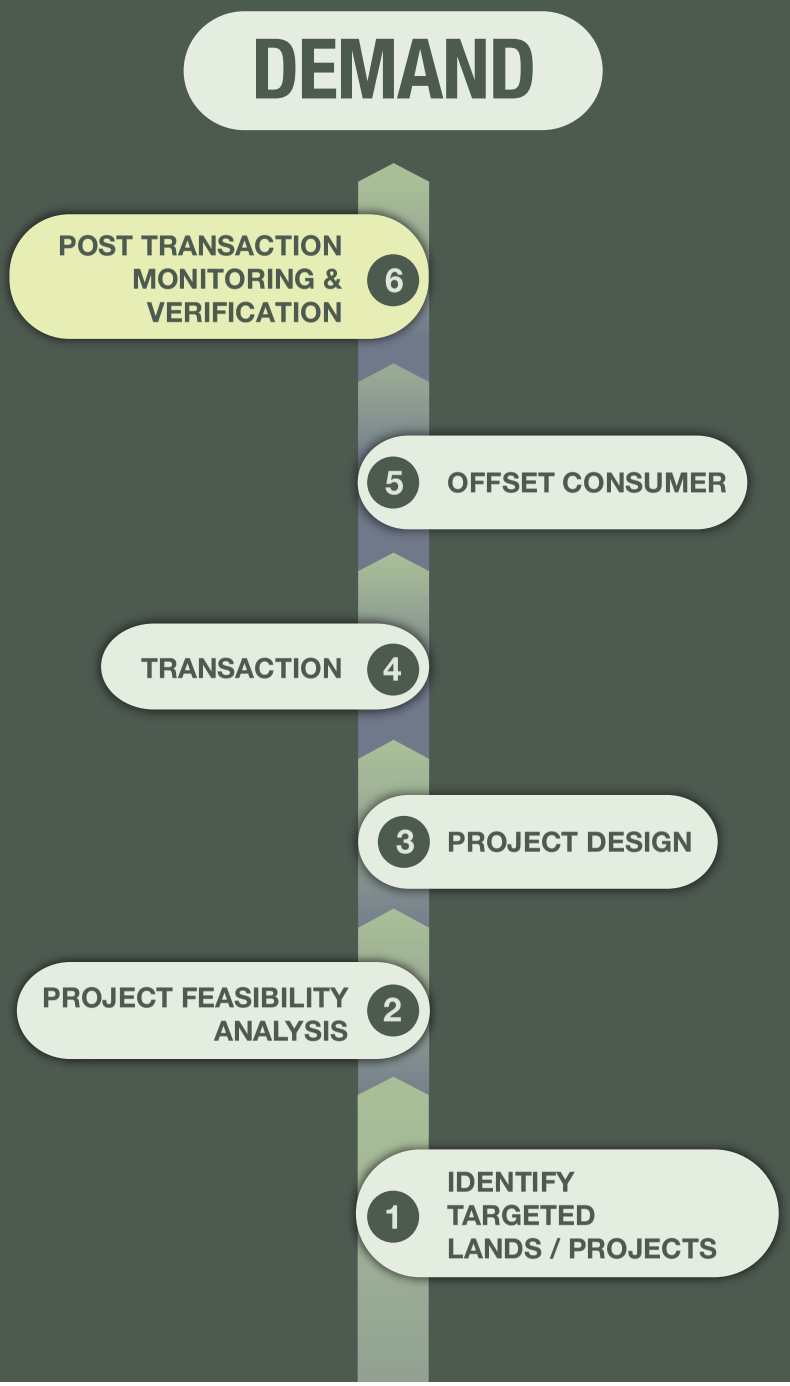
- What are the monitoring and verification requirements of the protocols used?
- Who will carry out these activities?
- Do the project design documents make it clear whose responsibility it is to assure these requirements are being met to standard?

ACTIONS TO TAKEN BY THE OFFSET BUYER, LAND OWNER AND/OR PROJECT DEVELOPER:

- The party responsible for the land/project manages it to fulfill the terms of the project design documents.
- The party responsible to provide independent monitoring and verification outlined in the agreement/contract pays for the assessments throughout the term of the agreement.

KEY RESOURCES

- VCS, CAR, CCBA, and ACR protocols (as previously listed).
- Certified verifiers as listed on all standards/registries as described above.
- Local land managers or experts who can provide information on best growth and sequestration land management practices.



July 23 2010

Forest Based Carbon Sequestration

PROJECT QUALIFICATION QUESTIONNAIRE

CONTENTS:

I. The nine foundational questions for identifying viable forest based carbon offset projects.

II. Forest based carbon sequestration projects.
(With a section on related ecosystem service co-benefits.)

III. Other bio-based carbon sequestration project types:
- Soil
- Wetlands

I. THE NINE FOUNDATIONAL QUESTIONS FOR IDENTIFYING A VIABLE FOREST BASED CARBON OFFSET PROJECT:

#1) Has the project been mandated by any enforced law, statute or other regulatory framework?

#2) Does the project require additional funding in order for it to proceed?

#3) Would the future use of the property be altered from current "business as usual" and would this increase its capacity to store carbon?

#4) In the case of land acquisition is there a land owner(s) willing to enter into a purchase and sale agreement or other legal instrument, (such as an easement) for reasonable compensation?

#5) Would it be agreeable to all parties that this contract include language that defines a predictable and consistent

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use of the property for a defined period in the future? (No less than 20 years and up to 100 years)

#6) Is the wooded property 500 acres or more in size ?(Or could
the property in question be aggregated with adjoining properties
to equal 500 acres or more)

#7) Is the project/ property in question accessible for annual
monitoring and verification activities?

#8) Is there current land information available such as timber cruises, appraisals, etc?

#9) Will the project have a net positive (or neutral) effect on the natural system(s) in which it occurs ?

II. FOREST BASED CARBON SEQUESTRATION PROJECTS

A. QUESTIONS TO CONSIDER WHEN DETERMINING IF A CARBON OFFSET TRANSACTION IS VIABLE:

Property Owner:

- What is the motivation of the property owner to do a deal?
- Is the owner more motivated by financial, conservation, values?
- How much does the deal financially benefit the owner?
- Does the owner understand the basic principles of the deal and will they need legal advice on contracts?
- Does the owner have complete control over the property?

Wholesaler:

- Does the deal meet requirements of a potential wholesaler?
- What is the time frame for the purchase of the offsets?

- Is the wholesaler interested in co-benefits and will it result in additional dollars for carbon?
- How far forward will the wholesaler sell/buy?
- Will the wholesaler fund upfront the cost of getting the offsets "market ready" IE project feasibility and design?
- What is the "price target" they will place on the offsets?(and their potential co benefits?)

Standards:

- What standards will be applied?
- Is this moving into the voluntary or compliance markets?
- Will the sequestration be additional according to VCS or CAR standards?
- Is the carbon sequestered verifiable (access to property, timber cruise data, and other records)?
- Is permanence for the duration of the contract achievable?
- Has the leakage potential for the project been calculated?
- Who will be responsible for verification and monitoring for the full term of the contract?

Financial Considerations:

- What are the costs of preparing the offsets for market?
- What is the projected monetary value of the carbon sequestered as determined by wholesaler?
- Is the value of the carbon greater than the costs of the deal?
- Is there carbon value immediately?
- What is the proposed term for the sequestration agreement?
- Is there an opportunity to use Forest Stewardship Council value as an incentive?
- Are there potential complementary financing sources?

B. PROPERTY CHARACTERISTICS:

Property Name: _____

General Location: _____

Site location coordinates: _____ / _____

Tax Lot # _____

General Property Description: _____

_____

_____

Contact Info for Property Owner: _____

_____

Summary of why this property is a viable candidate for a carbon offset transaction: _____

_____

_____

_____

Ownership Category:

____ Private Individual

____ Industrial Timber

____ Developer

____ Small Woodlot

____ Agriculture

____ Public Land

What conditions are present?

____ Riparian

____ Landslide prone

____ Older intact forest

____ Along a fish-bearing stream

____ Headwater stream headwall

____ Is property contiguous with or abutting lands being managed for conservation?

____ Is it an in-holding in publicly-owned lands?

C. PROJECT CHARACTERISTICS:

Type of Project:

____ Aforestation

____ Reforestation

____ Improved Forest Management

____ Avoided Deforestation

____ Riparian plantings

Deal Type:

____ Purchase

____ Easement

____ Timber Contract

____ Other Contract

Standards & protocols used to assess the project (list all):

_____

_____

_____

Proposed Project start date: _____

Proposed Carbon crediting period (month/year):

From: _____To: _____

Project size (# of acres): _____

Amount of carbon sequestration the project is expected achieve (measured in metric tons of CO2 equivalent:

(MTCO2e): First year: _____Total over Project time_____

D. Identification of forest based carbon sequestration's related ecosystem service co-benefits

What is the range of ecosystem co-benefit categories present?

Provisioning services:

____ Foods (including seafood and game) and spices

____ Precursors to pharmaceutical and industrial products

____ Energy (hydropower, biomass fuels)

Regulating services:

____ Carbon sequestration and climate regulation

____ Waste decomposition and detoxification

____ Nutrient dispersal and cycling

Supporting services:

____ Purification of water and air

____ Crop pollination and seed dispersal

____ Pest and disease control

Cultural services:

____ Cultural, intellectual and spiritual inspiration

____ Recreational experiences (including ecotourism)

____ Scientific discovery

Preserving services:

____ Genetic and species diversity for future use

____ Accounting for uncertainty

____ Protection of options

Which specific eco system service values will it deliver?

____ Water temperature

____ Water quantity or quality

____ Aquatic or terrestrial habitat

____ Bio-Diversity

____ Viewscapes

____ Recreation/ Tourism

____ Other

What is the valuation and alignment of ecosystem service?

____ Are the eco-values/co-benefits such that they can be monetized for sale?

____ Have the eco-values/co-benefits been assessed using CCBA or some other standard?

____ Will the project advance the stated goals of one or more state agencies or participating NGO groups

IV. OTHER CARBON SEQUESTRATION PROJECT TYPES:

Soil: Soil has powerful carbon sequestration capacity. Unfortunately when compared with their forest based counterparts robust, high quality standards and markets for soil based carbon offsets are still emerging and will require additional practical case studies and the development of methodologies that give confidence to the market that the carbon offsets being delivered will actually be stored in the soil.

Wetlands: Wetlands are also capable of sequestering high volumes of carbon. They too are in their infancy in terms of standards and markets but due to their high biological value provide extra incentive for these to be developed rapidly.

OWEB REGIONS

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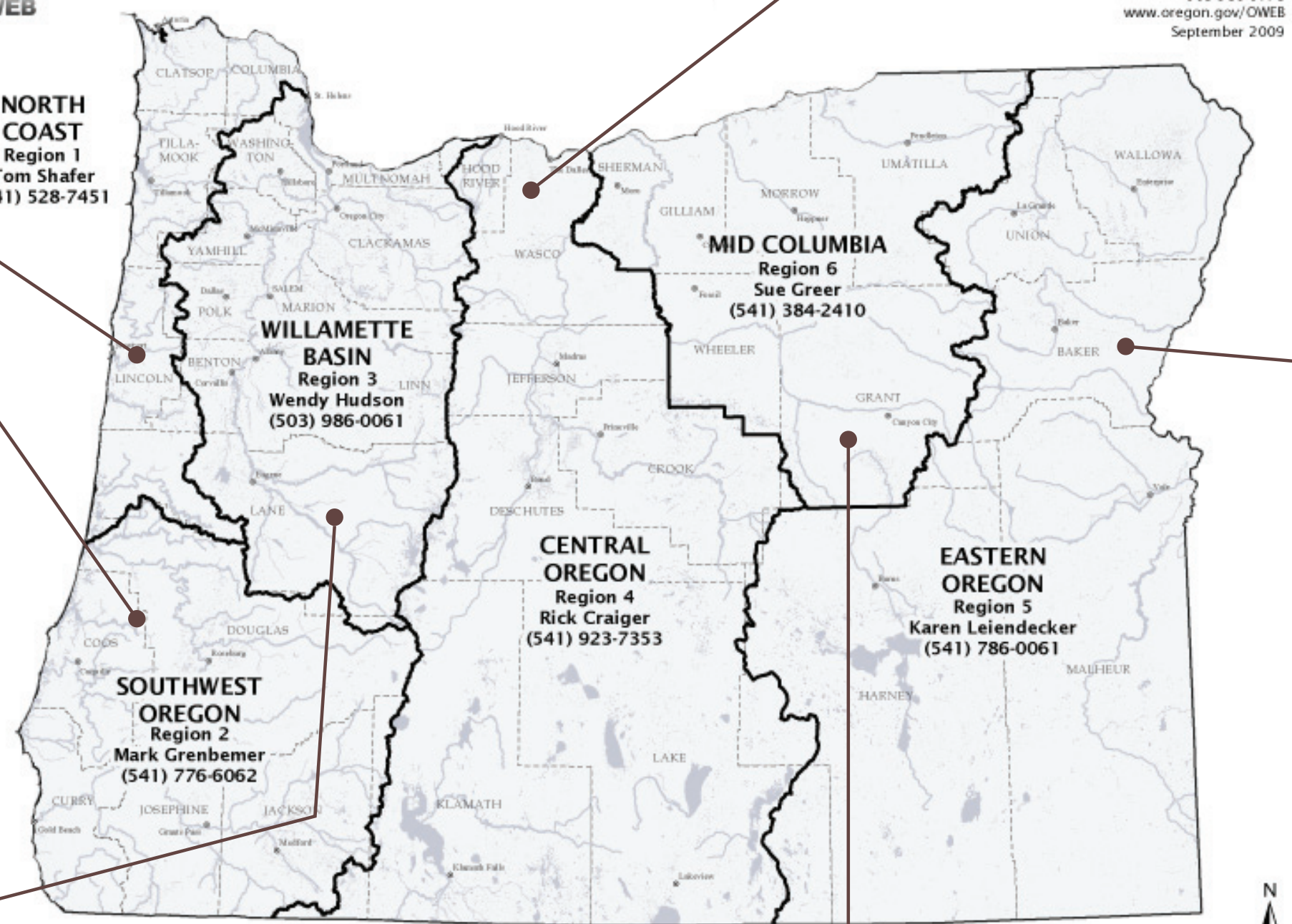

REGION #1 / North Coast:

OPPORTUNITIES:
- High carbon sequestration capacity of coastal temperate rain forests.
- Abundance of biologically sensitive estuarine and riverine habitat that can be un- productive to timber companies or private ownership.
- Presence of ESA listed species and need for restoration and protection of habitats.
- High need for restoration, land management and acquisition funding from new sources.
- Relatively inexpensive land.

BARRIERS:
- Scale of projects need to be big enough to generate the revenue necessary to pay the costs of project development. (Roughly 500 to 1000 acres of acquisition or restoration)
- Lack of development in national bio-carbon standards and markets resulting in lower prices and less buyers.
- Forest and wetlands based projects only.

REGION #2 / Southwest Oregon:

OPPORTUNITIES:
- High carbon sequestration capacity of coastal temperate rain forests.
- Abundance of biologically sensitive estuarine and riverine habitat that can be un-productive to timber companies or private ownership.
- Presence of ESA listed species and need for restoration and protection of habitats.
- High need for land management, restoration and acquisition funding from new sources.
- Relatively inexpensive land.

BARRIERS:
- Scale of projects need to be big enough to generate the revenue necessary to pay the costs of project development. (Roughly 500 to 1000 acres of acquisition or restoration)
- Lack of development in national bio-carbon standards and markets resulting in lower prices and less buyers.
- Forest and wetlands based projects only.

*Forest, soil and wetlands.

REGION #3 / Willamette Basin:

OPPORTUNITIES:
- Blend of forest and soil based (Crop and grazing lands) carbon storage project opportunities.
- Large river systems and riparian zones with associated eco-system service co-benefits.
- Frequency of degraded landscapes in need of restoration which offer high "additionality" or added carbon sequestration values as example.
- Dense interface between large human populations and riparian and uplands environments which increases the chances of the delivery of multiple ecosystem services, e.g. upland forests insuring clean water for drinking supplies while sequestering carbon.
- High need for restoration, land management and acquisition funding from new sources.
- Development of unique regulatory platforms for ecosystem services like Willamette Partnerships "Counting on The Environment" and Freshwater Trusts "Streambank" project.

BARRIERS:
- Most carbon offset projects in this area are focused on industrial emissions and/ or methane recapture.
- Scale of projects need to be big enough to generate the revenue necessary to pay the costs of project development. (Roughly 500 to 1000 acres of acquisition or restoration)
- Lack of development in national bio-carbon standards and markets resulting in lower prices and less buyers.

REGION #4 / Central Oregon:

OPPORTUNITIES:
- Blend of forest, riparian and soil based (Crop and grazing lands) carbon storage project opportunities.
- Presence of ESA listed species and need for restoration and protection of habitats.
- High need for restoration, land management and acquisition funding from new sources. Including issues with invasives, Juniper, soil degradation/disturbance, etc.)
- Relatively inexpensive land.

BARRIERS:
- Scale of projects need to be big enough to generate the revenue necessary to pay the costs of project development. (Roughly 500 to 1000 acres of acquisition or restoration)
- Lack of development in national bio-carbon standards and markets resulting in lower prices and less buyers.

REGION #5 / Eastern Oregon:

OPPORTUNITIES:
- Adaptive methods of rangeland management yielding increases in soil carbon storage which can be monetized. Co-benefits include increased water infiltration, perennial grass stand health, generation of bio-diversity and habitat, etc.
- Large tracts of "single owner" land. (Including state, NGO and private.)
- Presence of ESA listed species and need for restoration and protection of habitats.
- High need for restoration, land management and acquisition funding from new sources. Including issues with invasives, Juniper, soil degradation/disturbance, etc.)
- Relatively inexpensive land.

BARRIERS:
- Lack of annual rain fall (Direct relationship to % of carbon in the soil) and bio diversity.
- Scale of soil based projects need to be big enough to generate the revenue necessary to pay the costs of project development. (Roughly 4000 acres and above for acquisition or restoration) Restoration of riparian areas would require less acreage on a case by case basis.
- Lack of development in national bio-carbon standards and markets resulting in lower prices and less buyers.

REGION #6 / Mid-Columbia:

OPPORTUNITIES:
- Large riverine and tributary segments offer potential restoration and acquisition projects.
- Adaptive methods of rangeland management yielding increases in soil carbon storage which can be monetized. Co-benefits include increased water infiltration, perennial grass stand health, generation of bio-diversity and habitat, etc.
- Large tracts of "single owner" land. (Including state, NGO and private.)
- Presence of ESA listed species and need for restoration and protection of habitats.
- High need for restoration, land management and acquisition funding from new sources. Including issues with invasives, Juniper, soil degradation/disturbance, etc.)
- Relatively inexpensive land.

BARRIERS:
- In a portion of this region a lack of annual rain fall (Direct relationship to % of carbon in the soil) and bio diversity.
- Scale of soil based projects need to be big enough to generate the revenue necessary to pay the costs of project development. (Roughly 4000 acres and above for acquisition or restoration) Restoration of riparian areas would require less acreage on a case by case basis.
- Lack of development in national bio-carbon standards and markets resulting in lower prices and less buyers.
- Lack of development in national bio-carbon standards and markets resulting in lower prices and less buyers.

Carbon Offsets and Ecosystem Services Grant

SUMMARY & RECOMMENDATIONS

ecosystem services

I) SUMMARY

OWEB has been, and continues to be, one of Oregon's primary funders for ecosystem service projects with their investments in restoring and preserving natural systems and their role in Senate Bill 513 activities.

Despite these roles OWEB has had no clear way of quantifying the value or impact of the increase in ecosystem services they have delivered, nor do they have the means for identifying those that they may deliver in the future.

Through the limited quantitative information related to ecosystem services that is available as part of the granting process, it has been shown that OWEB is most likely generating sizeable quantities of monetizable ecosystem services in at least one field; carbon sequestration.

OWEB's existing rules and granting guidelines do not adequately provide direction to grantees regarding project design and implementation in a way that: A) quantifies the ecosystem service values, B) shows how the ecosystem service values are enhanced by specific restoration activities, C) describes the purpose and impact of land acquisition, and D) lays the groundwork for a method for verification of the measurable improvements delivered by ecosystem services over time.

In addition the agency's policies to not provide clarity regarding the relationship of the agency, or their grantees, to ecosystem services markets as a potential source of revenue.

II) RECOMMENDATIONS

The following five recommendations surfaced during the nine months of project activities. They were identified during an internal analysis of OWEB's activities (summarized above) as well as from a review of a wide range of external, statewide sources. They represent practical solutions to readily apparent gaps and needs and are offered for consideration by OWEB and the State of Oregon with the intent of enhancing ecosystems and developing additional

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revenues for restoration work, acquisitions and organizational capacity building.

There is also a convergence of hardship and opportunity that has led to these recommendations: On one hand there are record revenue shortfalls in our state and on the other, Oregon has the ability and know how to benefit financially in the ecosystem service markets because of it's abundant natural resources.

#1A) Develop clear guidance and methodologies for the Agency and/or grantees to quantify and monetize carbon-ecosystem services. This includes finding ways that revenues be documented, verified and shared between OWEB and grantees in order to leverage market and state funding for mission-aligned activities.

In the case of carbon: If the OWEB grant application is going to be used as an initial screening method to identify potential carbon offset ready projects, then more information from the applicant will be needed to assess whether or not the project meets the minimum criteria of the carbon marketplace. This could be done very simply, even in a narrative by someone who is not familiar with the standards, but who does have access to local information that is needed for the assessment. In summary, the main metrics necessary are 1) acres of project activity, 2) species ratios for planting projects, 3) estimates of woody biomass removal for invasive removal projects, 4) details on disposal of woody material, 5) soil preparation for planting sites, and 6) length of time commitments to monitor or maintain the project over time.

There are many activities funded by OWEB that are carbon "negative"; that is they are releasing more CO2 into the atmosphere than the activity is sequestering. An example of this is the removal of juniper and field burning what has been removed. The removal of invasive species to create space for more natural riparian plantings, although a good stream restoration practice, may also be a carbon negative activity. Even invasive species sequester carbon.

Currently the carbon balance is not a criteria for grants but OWEB may wish to consider recommending that funded activities may not be carbon negative.

#1B) Develop a policy within OWEB's grant program to allow revenue from carbon-ecosystem services to become an *annuity* to pay for organizational capacity expenses and the long-term management of restored and acquired lands, allowing watershed councils, soil and water conservation districts, and other grantees to ensure project longevity over time and greater self sufficiency in terms of funding. This approach would

mesh well most credit purchases that do not pay “up front” monies, but rather generate a stream of income periodically based on the projects ability to sequester carbon. (This could mean that acquisition projects, typically higher in ecosystem service value generation, could be a potential source of revenue and support for restoration projects.)

#2) Develop a simple Return-on-Investment quantification method, (using the back casting methodology employed in this grant) to measure and reward performance based outcomes and the delivery of key ecosystem services in OWEB funded projects. Outcomes could be set for carbon, specific water services, fish habitat and biodiversity. Outcome based grants may be more easily tied to existing market mechanisms like the voluntary carbon markets, mitigation banking, the Willamette Partnership’s “Counting on the Environment” currencies, etc.

#3) Establish a revolving technical services fund to overcome the major barrier that keeps most ecosystem service projects in Oregon from progressing beyond the initial stages of development. The lack of funds during the project identification, feasibility and design stages is a significant reason for the lack of a robust pipeline of projects resulting in marketable ecosystem services credits. These stages are outlined in detail in the project Road Map and require time from project developers, appraisers, surveyors, quantifiers, GIS services, and lawyers among others, to be successful. Further the monies from this revolving fund could be returned to the fund upon the consummation of the successful transaction.

This revolving fund could be established by OWEB or more widely by a variety of state agencies that could then screen which projects met their goals and eligible for investment. A project fee could be assessed on each transaction to build a buffer against the potential future losses from projects that did not reach maturity.

#4) Add one FTE for oversight and guidance with those interested in developing market-eligible projects from which verifiable, high-quality carbon-ecosystem services could be generated. This would provide the critical function of guiding projects and their initial developers through the various state, national, and international markets, protocols and registries. Note: A further function for OWEB might be to hold easements, or other legal instruments, to assure buyers and markets of a projects permanence.

#5) In concert with the state legislature, structure an Oregon-based supply and demand marketplace for carbon offsets and ecosystem services. This Oregon only market would be made up of private, NGO and state agency stakeholders who would both supply projects as well as

become carbon neutral in their operations through Oregon sourced offsets. In addition, this approach would help the State achieve its promised WCI conservation goals.

Key components of recommendation #5:

Context: Thanks to the abundant natural assets of its soils, forests and wetlands, Oregon has world-class carbon sequestration capacity. For a variety of reasons this valuable capacity, potentially capable of offsetting all of Oregon's carbon emissions while generating jobs and revenues, lies largely untapped.

Every day Oregon businesses and individuals voluntarily offset their carbon emissions by supporting carbon mitigation projects, the majority of which are industrially based and located outside the state/country. These represent a fraction of the potential offsets that would be purchased if the process was made easier (or mandated) and the investments were being made locally in our own communities.

Proposed state, regional and national carbon regulations are in various stages of development with many players in the carbon markets and in the field of carbon project development "sitting on the sidelines" until they are enacted. Meanwhile the parts per million in the climate has climbed above 385 parts per million, a dangerous threshold. A stream of studies, standards and climate change strategies have been generated, but to date only a trickle of "pull your boots on and do it" bio-based carbon projects have been completed in our state.

These are the conditions that have led to the proposed formation of this "Closed Loop Carbon Economy in Oregon".

Goals: Building a carbon offset supply chain in Oregon that links the generation of jobs in rural areas to the conservation and management of Oregon's most biologically sensitive areas through the development and sale of carbon offsets (and other ecosystem services).

- Support for a generative vs. extractive rural economy that will create jobs in local communities.

- Sustainable use of Oregon's greatest assets that supports economic development, conserves the environment, and contributes to the reversal of increasing Green House Gases in the atmosphere.

- Stops a flow of capital out of state. Potential for bringing increasing amounts of outside capital into the sate.

- An Oregon Carbon Standard that recognizes conservation efforts and allows for working landscapes to deliver goods and ecosystem services to residents. (By helping to jump start the development of a robust carbon offset supply chain)

- Without waiting for regional or federal cap and trade initiatives this effort would generate a supply of Oregon offset projects that will give Oregon companies in-state verifiable offset credits immediately while aligning with other mandatory regulations as they come on line.

- An Oregon carbon neutrality brand that will serve as a marketing tool in the new green economy.

Source of Supply: Oregon is poised with the natural assets that can be monetized into verifiable offset credits. This supply of assets has the potential of coming from:

A) State Agencies: Primarily those involved in acquisition or restoration such as OWEB and OPRD, and those who manage and/or lease large tracts of land such as DSL. (There are currently a small handful of projects in the state that offer precedence for this transfer of a natural resource right from a state agency into the markets)

B) NGO's: Those involved in land acquisition or conservation easement purchases such as The Nature Conservancy, The Wetlands Conservancy, The Columbia Land Trust, etc.

C) Municipalities: Carbon can provide a valuable new financial tool for municipalities to gain control over their source water and watersheds.

D) Tribal nations: Many current land holdings could benefit from changes in business as usual harvesting. Also, tribal nations are among the most active in land acquisition from industrial timber companies.

E) Private timber industrials: Interest in market models that would increase revenue streams or willing to sell unproductive property for HBU.

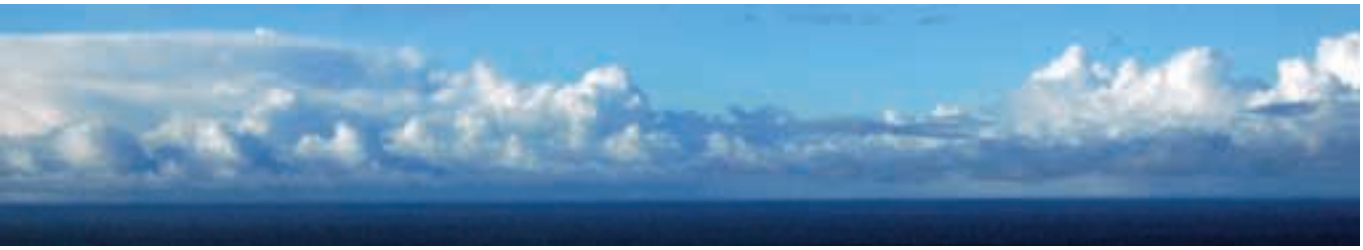
Needs:

- A fully functioning and connected carbon supply chain from the ground to the markets that make it easy for businesses to become carbon neutral.

- A regulated marketplace.

- Incented project developers.
- Technical assistance funds to assist in early stage project feasibility assessments and legal and technical services.
- A legal framework for transactions including the Oregon equivalent of Project Design Assessment's, ERPAs.
- More qualified organizations, in addition to The Climate Trust, that may purchase offsets on behalf of Oregon businesses / agencies.

See further description of the "Closed Loop Carbon Economy in Oregon" in the project's final report appendix



Proposal

The evaluation of ecosystem services marketplace and opportunities for voluntary registration projects.

Submitted by
Ecosystem Services, LLC.
May 14th, 2009

05.14.09

P R O P O S A L

ecosystem services, llc

"Evaluation of ecosystem services' marketplace and opportunities for voluntary restoration projects."

Tendered by:
Ecosystem Services LLC (ESS)
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www.esystemservices.com

To:
Mr. Greg B. Sieglitz
Oregon Watershed Enhancement Board (OWEB)
775 Summer Street NE, Suite 360
Salem, Oregon. 97301

Contents:

I. References
II. Ongoing Relationships
III. Resumes/ Team
IV. Fee Structure
V. Meeting Project Objectives
VI. Qualifications
VII. Enclosures

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I. REFERENCES

I. Mr. Wayne Hoffman / Director / Mid Coast Watershed Council
23 North Coast Highway, Newport, OR 97365
mcwc@midcoastpartners.org / 541.265.9195

II. Ms. Esther Lev / Executive Director/ Wetlands Conservancy
P.O. Box 119, Tualatin, Oregon. 97062.
estherlev@wetlandsconservancy.org / 503.885.1084

III. Ms. Lori Hollingsworth / Mayor / Lincoln City, Oregon.
Dave Hawker / City Manager / Lincoln City, Oregon.
P.O. Box 50, Lincoln City Oregon 97367.
mayor@lincolncity.org / Davidh@lincolncity.org
LH: 541.996.1205 DH: 541.996.2152

IV. Ms. Monica Thilges / Offset project coordinator/ Climate Trust.
65 S.W. Yamhill St., Suite 400, Portland, Oregon 97204
mthilges@climatetrust.org / 503.238.1915 X 212

II. ONGOING RELATIONSHIPS IN THE ECOSYSTEM SERVICES MARKET PLACE

NGO Community:

- The Wetlands Conservancy
- The Nature Conservancy
- Salmon-Drift Creek / Nestucca- Neskowin-Sand Lake and Mid Coast Watershed Councils.
- Carbon Collaborative.

Governmental Agencies:

- U.S. Forest Service.
- Environmental Protection Agency
- Oregon Parks and Recreation Department.
- Lincoln County Soil and Water Conservation District
- City of Lincoln City. (Mayor / City Manager/ City Council)

Marketers: (Carbon and other Eco System Services)

- The Climate Trust
- Equator LLC
- Clear Skies Climate Solutions
- Ecosecurities
- World Energy

III. RESUMES / FUNCTIONS OF THE TEAM

Ecosystem Services LLC (ESS) will provide: *Project leadership and fiduciary management, coordination of contractor activities, development and application of ecosystem service metrics and calculators, presentations and proposed events, coordination of all "on the ground" activities associated with the pilot projects and authoring of the final report. (www.esystemservices.com)*

A. ECOSYSTEM SERVICES LLC (Bidder/ Project Lead)

Duncan Berry is president of Ecosystem Services LLC. He brings 30 years of combining a career in international business with land conservation activities. As founder and President of several large companies, he pioneered field to shelf organic and fair trade "supply chain communities" in the Americas, the Indian Sub-Continent, the Far East and Africa. These communities had substantial impact on eco systems, communities and economies in these countries and anticipated the development of international ecosystem service markets. Duncan's work in the field of conservation has included the conservation of an intact estuarine complex on Vashon Island, Washington, and the founding of the Westwind Stewardship Group who purchased (with OWEB's key financial assistance) and now manages the 529-acre Westwind site on Oregon's mid coast. Duncan's work in ecosystem services has included the development of "on the ground" projects featuring carbon, water and bio-diversity .

Dr. Guy Sievert is the managing partner of Ecosystem Services LLC. He is a founding member of The Carbon Collaborative and has extensive experience in management, budget administration and computer services. As a vice president and chief academic officer at two Oregon colleges and universities, he has both authored and directed faculty

research grants for state and federal agencies. Dr. Sievert started his involvement with ecosystem services over three years ago coordinating an effort centered on Cascade Head and the Salmon and Neskowin watersheds. He has worked extensively with local watershed councils and soil and water district coordinators as well as collaborated with The Nature Conservancy, The Wetlands Conservancy and the Federal Fish and Wildlife office on ecosystem services projects in the mid coast watersheds. Guy is chair of the Citizen Planning Advisory Committee in south Tillamook County and vice chair of the Neskowin Valley School Board.

B. ECOTRUST (Sub-contractor)

Ecotrust will provide: *Technical services, GIS and spatial analysis, ecosystem services quantification / modeling and transaction economics.*

Brent Davies is the **Director of Forestry** for Ecotrust. Brent has spent the last fifteen years working with rural communities on market-based incentives for conservation. Brent provides strategic guidance related to project execution and deliverables on all Ecotrust's forest carbon and watershed restoration projects. Brent manages several large-scale whole watershed restoration and protection projects ($3 million+) which involve dozens of community-based organizations, tribes, local, regional and national government agencies (including OWEB, NOAA, EPA, Forest Service), and other private businesses and organizations. She also leads our work to develop a replicable system to aggregate the forest carbon generated from the forests small landowners; she is piloting this effort with a group of Forest Stewardship Council certified landowners in Oregon.

Mike Mertens is Ecotrust's **Director of Spatial Analysis / GIS Manager**. Mike served as lead analyst on the Forestry 2100 Project, which contrasted industrial and ecological forest management on a number of variables, and was responsible for oversight of analytic framework developed for assessing probable future scenarios under different forest management objectives in the Pacific Northwest. Mertens was the principal investigator and lead analyst on classification of forest composition and structure for the coastal temperate rainforest of North America using remotely sensed information, geographic information systems and multivariate statistical analysis. In terms of carbon and ecosystem service work,

Mertens has developed and advised on carbon quantification, protocol and monitoring tools to a variety of projects and organizations engaged in increasing forest and land use carbon for potential sale to emerging carbon markets.

Sarah Kruse, PhD, Senior Economist: will provide research and analysis pertaining to the cash flow model and opportunity cost assumptions included in the tool. Sarah has a PhD in Environmental Economics from The Ohio State University and has extensive experience using economics in a wide range of environmental, natural resource and social applications, including forest carbon and timber market analysis and forecasting

C) SUSTAIN LLC (Sub-Contractor)

Sustain LLC will provide: *Guidance on a strategic level to meet OWEB's objectives and deliverables.*

Geoff Huntington is managing partner of Sustain LLC. Geoff specializes in leading complex sustainability initiatives requiring participation and buy-in of supply chain members and stakeholder groups. He brings 23 years of public and private sector experience designing and implementing transparent decision making processes to accomplish tangible environmental and conservation objectives.

Through strategic listening and questioning, he helps clients design and execute initiatives that draw upon the untapped business value derived from executing sustainable practices. In both the public and private sectors, Geoff has employed an ethic of community participation to lead bold initiatives encouraging holistic solutions to complex natural resource problems.

Before founding Sustain, Geoff spent nearly a decade as an environmental trial attorney for two state Attorney General's offices, followed by nine years of service as a member of the natural resources cabinet of Oregon's Governor working on key policy initiatives and as an agency director. Following his tenure in public service, Geoff served Fortune 50 clients as a member of the Blu Skye Sustainability Consulting Group.

IV. FEE STRUCTURE (All amounts listed cover per site costs.)

The fee structure for the Ecosystem Services team (Bidder) will be:

- Duncan Berry @ $125.00 per hour.
- Guy Sievert @ $110.00 per hour.
- Support staff @ $42.00 per hour.

Utilization is approx 55% of grant amount.

The fee structure for the Ecotrust team will be:

- Brent Davies, Sara Kruse and Mike Mertens @ $110.00 per hour.

Utilization is approx. 40% of grant amount.

The fee structure for the Sustain team will be:

- Geoff Huntington @ $125.00 per hour.

Utilization is approx. 5% of grant amount.

Note: Based on the cost estimate of a previous OWEB proposal by Ecosystem Services which had a related but more limited scope ($95,000) the additional objectives outlined in the current RFP will add an estimated $40,000 to the cost of the proposal for a total of $135,000.

V. MEETING PROJECT OBJECTIVES:

I. Developing a description of the current ecosystem services and potential markets in Oregon that might be closely aligned with OWEB projects.

The field of eco-system services is only just beginning to emerge in a defined state that can be programmatically linked to a mission

such as OWEB's. Yet, the potential role for market-based mechanisms providing additional resources to citizen based restoration projects on privately owned lands within Oregon's watersheds is significant.

The future market potential for ecosystem services in Oregon is dependent on the answers to five basic questions, which should frame the deliverables for Objective #1 of this project. Those questions are as follow:

1. *Specifically, what are the ecosystem services arising from proposed restoration projects and/or conservation acquisitions that are of value to existing and potential markets?*
2. *Can an existing baseline for the provision of these services be established and verified based on existing watershed protocols or via the addition of compatible metrics not currently used to evaluate and fund voluntary restoration/acquisition projects?*
3. *Can the improvement in ecosystem service benefits derived from the project/acquisition be measured over time in ways that markets will recognize and value?*
4. *Can the "supply" of these services (from projects / acquisitions) be linked to the "demand" of existing markets, and in what geographic locations in Oregon?*
5. *Is there an agreed upon market valuation which can be established for the services to be provided by the project?*

Meeting Objective #1: ESS will present to OWEB an analysis of current and future markets, in the context of these questions e.g. a practical "road map" for the sequence in which specific markets will mature and how these can be standardized and monetized within the context of OWEB's ongoing grant programs and conservation mission. *(Task 1 and 2)* This document will provide OWEB with a platform for the strategic planning and application of this emerging field in Oregon.

Because ecosystem services is a dynamic marketplace, it is, and will continue to be, shaped by state and federal actions as well as regional, national and worldwide markets. Project deliverables identified below will help OWEB prepare for the

multiple opportunities that the market place may present – both near-term and mid to long-term.

Near term opportunities: Since carbon offset standards and markets are the most developed ecosystem service world-wide, we would expect this to present the most significant set of near-term opportunities in Oregon with a variety of services performed by water being the second most significant. The current Oregon carbon offset market on the "demand" side is primarily based on voluntary US buyers and potential international corporate buyers whose countries are under the Kyoto cap and trade compliance protocol (and anticipated upcoming Copenhagen re-writes.) ESS has a working relationship with several international marketers and continues to work with them to supply the domestic and world markets. In addition, ESS has already engaged in extensive work with another major presence defining the Northwest carbon markets -- the Climate Trust, and will bring the results of that ongoing work on coastal Oregon carbon sequestration projects into the road map contemplated as a deliverable for Objective #1. *(Task 1 and 2)* Please note: The "co-benefits" of other ecosystem services when bundled with carbon projects, drive up the price of the carbon offsets and thus are an early form of monetization.

Mid and long-term opportunities: There are a host of other ecosystem services being delivered to Oregon on a daily basis whose standards, quantification, markets and valuation have not matured fully. The key is to develop a "depth perception" as to <u>which</u> will mature <u>when,</u> and what role can OWEB and others play in accelerating them in support of ongoing restoration and acquisition priorities. This will be the work of the ecosystem services roadmap described in detail below.

<u>Objective #1 Deliverables:</u>

A. September 2009 OWEB Board "In process update": Work with OWEB staff to develop a preview of outcomes of Objective #1 with the Board to enhance their understanding and conceptualization of ecosystem services generally and its potential in Oregon. *(Task 5)*

B. Two Day Ecosystem Services "Supply Chain" event: (Tasks 2 and 5) Due to the importance and complexity of this subject, additional exposure for key OWEB staff and board members to the ecosystem services community they would be

partnering with, would prove invaluable. (Participants would include NGO's, governmental agencies, AG's office, landowners, marketers, etc) While this event will serve several objectives, the main goal will be to share the results of the OWEB grants research regarding the current state of ecosystem services and markets in Oregon, with the entire supply chain represented, and to identify what resources and collaboration is required to accelerate the practical monetization of these services and market. A summary report from this event would be integrated into the final grant report.

C. Ecosystem Services Roadmap
(Tasks 1 and 2 / Critical element of final report.)

This document will:

- Identify near, mid, and long-term market opportunities in Oregon, in the framework of the five key ecosystem service parameters identified above.

- Place these opportunities within the context of their providing resources for OWEB's ongoing program opportunities and mission.

- Establish clarity around barriers to entry for OWEB constituencies, and market place and grant program opportunities for overcoming those barriers.

- Report on results from a statewide canvas of stakeholder input regarding project candidates for application of an ecosystem service business model in each of the five OWEB regions.

II. Conduct an evaluation of the contributions that OWEB land acquisition and restoration projects can provide in the ecosystem services' marketplace.

OWEB has been in the forefront of ecosystem services since its inception. What has changed and continues to change is the development of commodity markets that recognize the monetary value of the benefits that OWEB and its grantee's have been producing all along. Some of these ecosystem

services delivered by OWEB projects have accepted standards by which they may be quantified and sold in the marketplace. What has been a major barrier to developing these markets in the US is the lack of a regulatory market and agreed upon protocols. It is anticipated that in the near future these will exist in Oregon and other western states if not the whole US for at least one ecosystem market – carbon.

In collaboration with OWEB staff, ESS will refine existing metrics and field questionnaires to evaluate projects to determine if there are ecosystem credits that may be sold in the marketplace. *(Task 2)* ESS and Ecotrust, over the past year, have evaluated potential ecosystem services projects for market using proprietary metrics developed specifically for restoration and conservation acquisition projects. ESS has also worked with a team comprised of representatives from a major NGO and two watershed council coordinators to further develop a set of metrics that would apply to future projects. Specifically, a set of metrics was developed that would evaluate for ecosystem credits riparian plantings funded by OWEB. Also, additional metrics were developed to assess key properties that were targets of the Nature Conservancies Protection Plan for the Salmon River watershed. These metrics will serve as a starting point for future tools as part of OWEB's evaluation of projects. *(Task 1 and 2)*

ESS is currently working on a project design with The Climate Trust that will quantify the ecosystem services of a key land acquisition by Oregon Parks and Recreation. This purchase of land currently slated for harvesting would mean the protection of key fish and wildlife habitat in the Beaver Creek watershed. It appears that this will be the first land acquisition by a state agency in Oregon that will also result in revenues generated from the sale of ecosystem offset credits. ESS will use the knowledge and experience gained in this transaction to assist OWEB in planning their future acquisition strategy. (*Tasks 1, 2, 3, 4*)

The metrics we will prepare as part of this proposal will be tailored to evaluate OWEB funded programs in a manner consistent with existing, core program criteria. (*Tasks 1 and 2)* For example, our current metrics for ecosystem services evaluation, in addition to carbon, include the potential for clean and clear water, fish and wildlife habitat and view-scapes. We have experience in world markets and in the US voluntary

market, that offset values other than carbon may increase the sale price of the carbon sequestered. This would generate more revenue for projects entering into carbon offset contracts.

The purpose of the metrics and field questionnaire will be to assist OWEB's review of future grant proposals to help determine if there is potential for an ecosystem market return as part of the grant. *(Tasks 1 and 3)* ESS has already used its metrics to evaluate an OWEB funded riparian planting project done by the Nestucca/Neskowin/Sand Lake Watershed Council. (See Enclosure) *(Task 3 and 4)*

The current ecosystem services marketplace is not yet developed to support OWEB projects that focus on increasing salmon runs through fish friendly culverts, riparian plantings or other methods of enhancing fish habitat in streams. Aforestation and reforestation efforts, (e.g. riparian plantings) are potentially marketable for the carbon they sequester and the presence of co-benefits such as increased salmon habitat. As part of this proposal ESS will explore a model of aggregating OWEB projects that have as a co-benefit, carbon sequestration. *(Tasks 1, 2, 3, and 4)* See Objective 3 for further discussion.

Objective #2 Deliverables

- Develop metrics to assess the potential ecosystem values of OWEB land acquisition projects.

- Develop metrics that will assess the potential aggregated value of OWEBs current annual granting process for riparian plantings.

- Identify potential markets for the ecosystem credits generated as a result of OWEB projects.

- Prepare an overall gap analysis of the ecosystem credits produced by OWEB projects and those that have value in the marketplace.

- Explore potential of a ecosystem services revolving fund through the I.P process.

III. Create business application models that provide OWEB and its grantees an approach to participating in ecosystem marketplace transactions.

ESS proposes to develop and test different financial models that will result in revenues to OWEB and/or its grantees to support restoration, conservation, and/or capacity building activities in Oregon's watersheds. *(Tasks 2 and 4)* Ecosystem Services LLC's would fulfill this objective with an "applied", not "conceptual" action plan. We have spent years building working relationships with key players comprising the entire ecosystem "supply chain" in Oregon from field to markets. We are currently engaged in tangible, on-the-ground ecosystem service projects that can be integrated into the objectives of this OWEB RFP initiative.

As part of meeting the deliverables of Objective #3, the ongoing ecosystem service projects of ESS will be accelerated, evaluated, and transformed into a replicable model for delivering ecosystem service opportunities across the state. In short, we propose to design a "tested," programmatic approach based on "real life" learning's from one OWEB region (Region 1) that can be exported in the form of a model/template to OWEB and its constituencies across the state. *(Task 4).* ESS will develop with OWEB a set of both financial cost/benefit and ecosystem offset metrics that may be used to evaluate future grant proposals. *(Task 2 and 3).* ESS will assist OWEB in applying these metrics to pilot projects to determine their effectiveness in evaluating projects that will produce marketable ecosystem offsets. *(Task 4)*

While our geographic focus for these model projects would be the working communities and watersheds of Oregon's Central Coast, they would take place in both <u>rural</u> and <u>urban</u> settings in order to *provide universal and scalable templates for all of Oregon's watersheds.* (See enclosed map of 7-targeted mid-coast watersheds)

We propose working with OWEB staff to select two projects from our portfolio that would provide "proof of concept" for the assumptions made in our recommended ecosystem services restoration framework**.** Because we are capable of monetizing these projects in 2009, ESS will be able to conduct the evaluation and conversion of learning's into a programmatic template that is

scalable and transferable as part of the deliverables for this objective. We know of no other entity in Oregon who is capable of producing such a deliverable with the participation of OWEB stakeholders and real time, revenue generating application of the principles of ecosystem services “road mapped” in objective #1.

The following are two project examples from the ESS portfolio:

A) Rural Conservation Acquisition Project Example

- **Project:** Park/ Natural area.
- **Deal type:** Land purchase for conservation and restoration.
- **Ecosystem Service:** Carbon Offsets
- **Estimated Ecosystem Service Value:** $525,000
- **Size:** 500 acres
- **Location:** Alsea River Watershed
- **Owner:** Industrial / Timber Company
- **Purchaser:** State Agency

Note: Ecosystem Services, with support from Ecotrust, have been working closely with the Wetlands Conservancy and State Parks to quantify the ecosystem service values of this specific property in order to accelerate its purchase by the state. The current future of this property is to be harvested on a 40-year cycle. It is anticipated that the “additional” carbon value of the conifer forests will generate the bulk of its purchase price. The “co-benefits” of this transaction (beyond carbon) are numerous and have increased the per-acre value to the offset marketer.

B) Urban Restoration Project Example:

- **Project:** Conservation and restoration of lands to create surety of municipal water supply.
- **Deal type:** Land easements-purchase for restoration.
- **Ecosystem Services:** Combo: Quantity and quality of clean water and carbon offsets.
- **Estimated Ecosystem Service Value:** Combined approx value of $700,000.
- **Size:** TBD
- **Location:** Schooner Creek Watershed.
- **Owner:** Land management company.
- **Purchaser:** Municipality.

Note: The Carbon Collaborative and Ecosystem Services is working with the City of Lincoln City to become Oregon's first carbon neutral municipality and has 10 conservation, generation and sequestration initiatives they have identified. Several of these directly utilize ecosystem services to lower carbon but also deliver "doubles or triples" in the form of other services valuable to the city.

Objective #3 Deliverables:

- Collaboration with OWEB staff on project selection, and execution.
- Project evaluation report and briefing on learning's to OWEB staff and Board.
- Financial cost/benefit and ecosystem services metrics for evaluating future grant proposals by OWEB.
- Recommendations for a model/template for initiating a phased programmatic approach to incorporating ecosystem service values into the existing OWEB grant program in all five OWEB regions. Supporting materials and presentation to OWEB Board with final recommendations.

VI. QUALIFICATIONS:

A) Must have expertise in ecosystem economics.

Ecosystem Services LLC (ESS), and Ecotrust have combined expertise in the ecosystem marketplace for over a decade. This includes the development of complex ecosystem services quantification and valuation and the capturing of the complete costs of these transactions from each function within the supply chain. Ecotrust, through their subsidiary Ecotrust Forest Management LLC has been active in the ecosystem markets since 2004. ESS has developed a relationship with a variety of world marketers of ecosystem-offset credits, including The Climate Trust in Oregon.

B) Must have at least two years experience in evaluating or participation in the ecosystem services' marketplace.

As previously stated the ESS and Ecotrust team have been active in different aspects of the ecosystem services market place for over 10 years, including projects related to water, fisheries, forestry and carbon. Specific to carbon these efforts have benefited from the knowledge and support from Ecotrust Forest Management which is currently in the term-sheet stage with four institutional buyers of forest carbon under the Voluntary Carbon Standard (VCS) and the California Climate Action Registry forest protocols (CCAR). Underlying these term sheets is extensive knowledge and due diligence including but not limited to: regional, state, federal and global regulatory analysis and tracking; voluntary carbon market analysis and tracking; voluntary standards analysis- VCS, CCAR, CCX, etc; carbon asset quantification under a variety of standards; Methodology development; methodology validation; Emission Reduction Purchase Agreement ("ERPA") preparation and negotiation; Project Design Document ("PDD") preparation; Comparable market analysis; Carbon counter party due diligence and Strategic forest/forest carbon relationships

C) Must be familiar with the OWEB grant and restoration program.

Members of ESS management have written and been awarded large scale OWEB grants in the past dealing with conservation and restoration as well as working with various members of the OWEB board on different projects. Additionally Ecotrust is currently administering a significant grant from OWEB for its Siuslaw Watershed Initiative, which partners with the Siuslaw Watershed Council, the Siuslaw Soil and Water Conservation District among others, to take a whole watershed systems approach. In addition, members of the Ecotrust team have had significant experience working with watershed councils and others involved in OWEB projects. ESS has been in on going discussions with mid coast watershed councils and soil and water districts on how to support their riparian planting projects and in identifying key properties for reforestation projects or alternative forest management plans. ESS and Ecotrust have drafted a carbon offset project proposal to The Climate Trust that would aggregate the riparian plantings in five council districts.

Sustain LLC will provide strategic guidance and framing to insure that the OWEB program context and guidelines are taken into account during development of work product.

D) Must be experienced in GIS mapping, data management, and modeling.

ESS and Ecotrust have together developed a tool that combines property tax lot data with key topographic features. This has been used to identify high valued properties for watershed health, especially when combined with GIS data from other systems such as one developed by The Nature Conservancy. This combination has been used to target high valued projects as part of TNCs protection plan for the Salmon River watershed.

In addition, The Ecotrust Knowledge Systems group has developed a unique set of expertise and software tools to assess carbon sequestration rates of coastal temperate forests from Alaska to northern California. We have adapted these tools to address the challenges of the variation in availability and quality of forest inventory information. We have extensive experience in using the Forest Inventory Analysis (FIA) reference database and the Forest Vegetation Simulator (FVS) growth and yield model of the USDA Forest Service as a benchmark in helping landowners quantify the carbon storage potential of their forest-lands. The Ecotrust system integrates cutting edge mapping technologies, industry standard growth and yield models and standard accounting mechanisms within an open source environment. This tool allows for the rapid assessment and valuation of Carbon resources under varying management options for different carbon protocols. Included as part of the process is data collection and standardization, data development, growth and yield modeling, scheduling, development of baseline and alternative management prescriptions and or reporting of sequestration potential and value at varying market rates

E) Must be able to work with landowners, local watershed councils and soil and water conservation districts.

ESS has been working on alternative forest management practices, including carbon offsets, with private landowners from the Alsea to the Nestucca watersheds. Most recently ESS

has neared completion of a digital “Priority Lands” map by collating the shared protection plans and land acquisition targets of the statewide NGO and state agency communities. This has included a close working relationship with Mid-Coast, Salmon / Drift Creek and Nestucca / Neskowin / Sand Lake watershed councils. ESS has also worked with the Lincoln County Soil and Water Conservation District manager on projects centered around Lincoln City and the Salmon River watershed protection plan. Ecotrust has had extensive work experience over 17 years with landowners, councils and many NGOs from Alaska to California.

Sustain LLC will be advising project principals on appropriate strategy and tactics to achieve the right mix of OWEB stakeholder involvement and input into final products.

F) Must have experience giving concise presentations.

Both partners at ESS have long histories of dynamic and concise public presentations, including multiple concepts presented to the OWEB Board and staff.

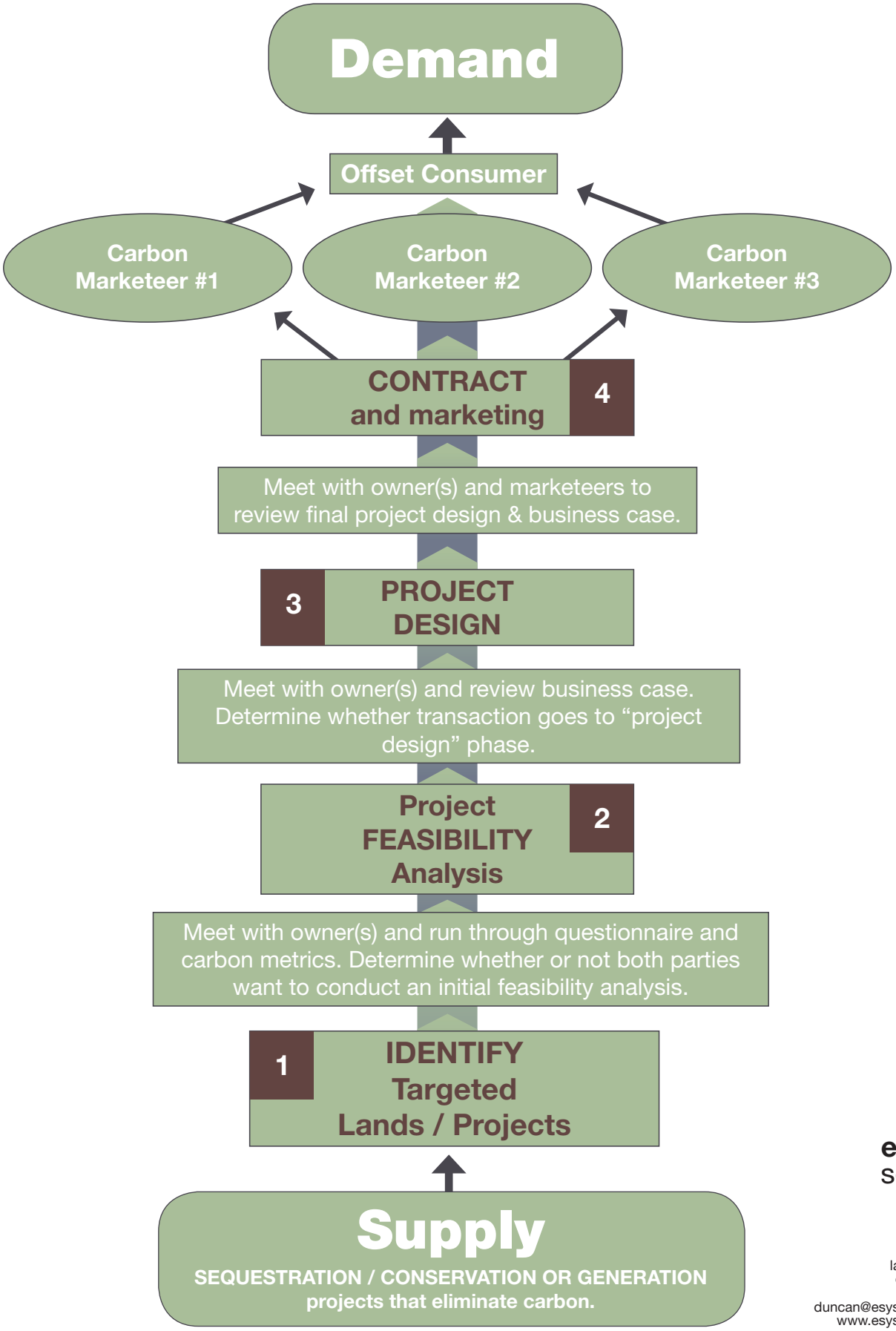
G) Must be able to meet all deadlines outlined in this RFP.

The combined knowledge, expertise and capacity of ESS, Ecotrust and Sustain LLC will ensure the completion of all work assigned in a timely manner. (All three entities have histories of managing complex projects on schedule and on budget)

VII. ENCLOSURES

- *“Road Map for a Carbon Transaction” Diagram*
- *“Case study” / Riparian plantings.*
- *“A generative economy” illustration*

A CARBON TRANSACTION ROAD MAP



ecosystem services, llc

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President

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Small Scale

Project Example

"Coastal Watershed Riparian Plantings"

Guy Sievert
Managing Partner
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cell 503.866.4489
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Otis, OR 97368
esystemservices.com

Ecosystem Services, LLC has coordinated the design of this project (as well as the purchase of these offsets) with the Nestucca/Neskowin Watersheds Council whose program reforest riparian areas with native species.* The amount of sequestration is being quantified according to a state-of-the-art ROI calculator and monitoring/verification plan in coordination with Ecotrust.

Project Example: The Nestucca Watershed Councils 2009 Riparian Plantings

Project Acreage: 26 acres (in private ownership)

Tree Quantity: 6500 Total Trees

Tree Types: Sitka Spruce, Western Red Cedar, Big Leaf Maple, Black Cottonwood & Alder

Carbon Calculation: Approximately 80 tons of carbon per acre or a total of 7,642 Tons of C02 in a 50 year rotation.

How the Project Reduces Carbon: Ecosystem Services works with local landowners to create new stands of mixed conifer and other native trees to stabilize banks, lower water temperatures and create riparian zones.

Additional Benefits of the Project:

- Improved water quality, temperature and stream flows.
- Improved fish and wildlife habitat.
- Increased viewscapes
- Sediment capture and flood plain control

Partners: Neskowin/ Nestucca Watersheds Council (Non Profit) The Carbon Collaborative (Non profit) and Ecotrust (Non Profit)

**Note: This is only the first of a series of riparian plantings that Ecosystem Services will be co-developing with watershed councils and soil and water districts in the CWI Watersheds.*

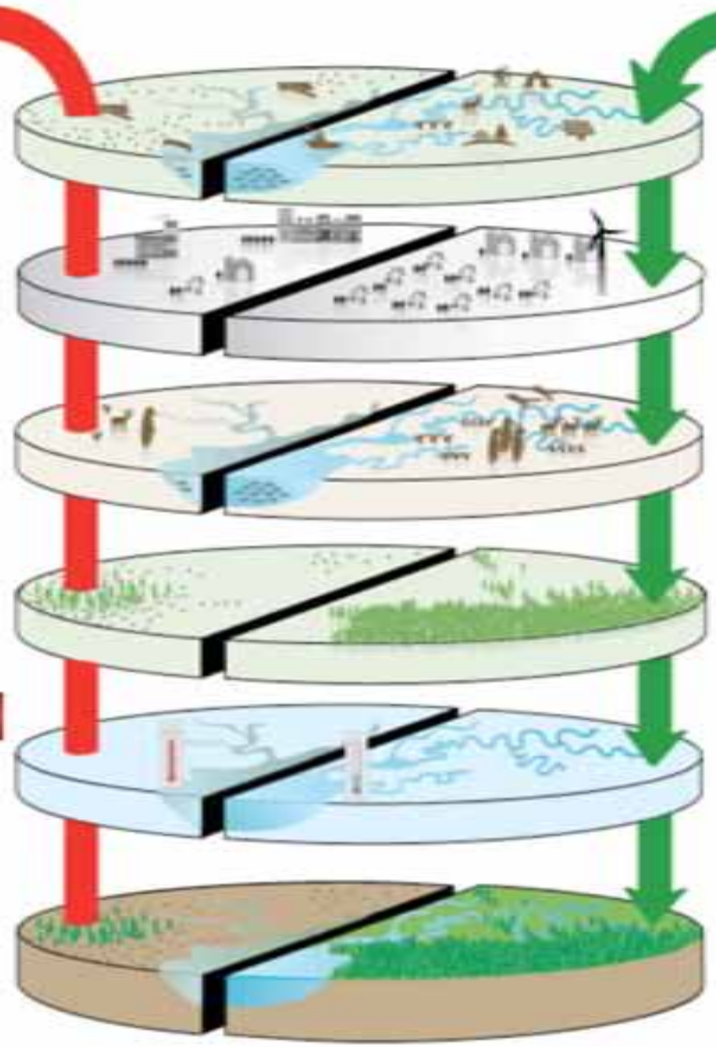
ecosystem
services, llc

IMPACT ON NATURAL SYSTEMS & HUMAN COMMUNITIES

Historical Extractive Economy

Natural resources are depleted forcing businesses to compete in low end commodities market. Best and brightest migrate to the valley for higher paying more values based jobs.

unsustainable



$$$ Regenerative Economy

Building healthier natural systems and human communities who are benefiting from a new source of income from outside the watershed.

sustainable

NOTE: *The combined total carbon sequestration capacity of the CWI watersheds is 100 million metric tons.*

ecosystem services, llc

STATE OF OREGON
CONTRACT FOR THE
PURCHASE OF SERVICES
(Contract # 209-912-7325)

This Contract is between the State of Oregon ("State") acting by and through the **Oregon Watershed Enhancement Board** (**"Agency"**), and **Ecosystem Services, LLC., an Oregon corporation** (**"Contractor"**). This Contract is effective on the date it has been signed by all parties and all required State of Oregon approvals have been obtained. This Contract expires on **June 15, 2010**, the date all warranties have expired or the date Contractor has completed all Services in accordance with the requirements of this Contract, as determined by Agency. The parties may extend the term of this Contract provided that the total Contract term does not extend beyond **December 31, 2010**.

Contractor agrees to perform, and Agency agrees to pay for, the services and deliverables described in section I (the "Services"). Contractor also agrees to deliver the goods described in section I (the "Goods").

I. STATEMENT OF SERVICES

A. GENERAL INFORMATION

The Agency is responsible for some $200 million in watershed improvement grants in the form of more than 2,500 on-the-ground restoration projects throughout the state of Oregon. While the watershed improvement and restoration projects strive for and continue to achieve watershed and site specific outcomes, the economies and marketplaces of ecosystem services are maturing. Many ecosystem marketplace concepts are in formative and developmental stages; others are reaching mainstream acceptance and application (e.g. carbon emissions crediting). The purpose of this contract is assist the Agency's Board and staff in exploring and understanding the growth of the ecosystem services' market place with the intent of developing a roadmap and set of models that can be utilized by the Agency and its grantees.

B. REQUIRED SERVICES, DELIVERABLES AND DELIVERY SCHEDULE

i. SUMMARY PROJECT OBJECTIVES AND TASKS

The key objectives of this project are.

1. Develop a description of the current ecosystem services and the potential markets in Oregon that might be closely aligned with Agency projects;
2. Conduct an evaluation of the contributions that Agency land acquisition and restoration projects can provide in the ecosystem services' marketplace; AND
3. Create business application models that provide the Agency and its grantees an approach to participating in ecosystem service marketplace transactions

Task 1.
Quantify and evaluate the possible ecosystem services that could be delivered through watershed restoration activities.

Task 2.
Develop models that are appropriate for a range of Agency investment areas (focused on restoration) that build a framework for understanding the likely marketplace. Models should include GIS-based systems for scaling flexibility and analysis of alternatives.

Task 3.
Calculate the values and potential revenue generated for different restoration practices and in multiple geographic areas.

Task 4.
Test assumptions through pilot projects as appropriate.

Task 5.
Summarize results in a final report.

ii. SPECIFIC RESPONSIBILITIES AND PROJECT PHASES:

This project consists of three primary phases that when completed will contribute to the objectives and tasks listed above. The phases may overlap in time, as parts of different phases may be conducted concurrently

a. Phase I - Identify current ecosystems services markets and potentially eligible OWEB projects. Activities and work products:

Work with Oregon's ecosystem marketplace leaders such as the Willamette Partnership, Defenders of Wildlife, The Nature Conservancy, and other organizations and agencies in the early scoping of the project.

Frame process elements for insuring that contract deliverables and tasks will be accomplished with appropriate input and participation of key stakeholder groups.

Quantify and evaluate the carbon offset and related co-benefit ecosystem services that currently exist and which could be delivered through land acquisition and watershed restoration activities within the 6 Agency regions given current markets. While focused on carbon, this task will address various types of restoration actions such as tree planting or altered agricultural practices that may be undertaken in forests, wetlands and riparian areas, or uplands. The contractor will analyze appropriate restoration OWEB projects from the Agency's 2008 and 2009 project portfolio, and OWEB acquisition projects from the same period and possibly previous to 2008 as necessary to evaluate a representative sample of restoration and conservation projects.

Identify current voluntary and regulatory-based markets for these ecosystem services. Provide context about the markets through description of standards, quantification approaches, market registration. Describe Agency projects that are potentially eligible for these markets through the use of actual project examples from the Agency's portfolio.

Prepare an analysis of the potential monetary values of carbon offsets and related co-benefit ecosystem service credits produced by Agency restoration projects awarded in 2008 and 2009 and acquisition projects during this period and possibly previously, and identify those that have value in the marketplace.

Survey those in Oregon in a position to identify potential carbon offset projects and their related co-benefit ecosystem services projects (e.g., agencies, NGOs, associations, market wholesalers and project designers with a focus on Agency grantees), and identify those projects that may serve Agency objectives. Include in this report the potential barriers to

project development and completion.

Work with Agency staff to develop a preview of outcomes from this phase of the project for presentation to the Agency's Board to enhance its understanding of carbon offsets and their related co benefit ecosystem services, their linkage to ecosystem services markets in Oregon, and how these relate to current OWEB activities.

Monitor and conduct outreach to key stakeholders and the Agency during the duration of the contract to facilitate successful performance of contract deliverables.

b. **Phase II- Evaluate the market opportunities for OWEB for ecosystems services credits.** Activities and work products:

Develop two specific models that are appropriate for a limited range of Agency restoration and acquisition investments that build a framework for understanding the marketplace and how to advance projects to market. These models will inform pilot projects (see Phase III). Models will allow scaling and will focus on carbon offsets and their related co-benefit ecosystem services, while accounting for the varied natural systems throughout the state. The models should be exportable to other potential users through the use of GIS-based and empirical approaches.

Identification of near, mid, and long-term market opportunities in Oregon providing depth perception as to which markets are maturing and those that are likely to mature first. Place these opportunities within the context of providing resources for the Agency's ongoing program opportunities and mission.

Develop draft metrics / questionnaire to assess the potential carbon offset and related co-benefit ecosystem services values of the Agency's land acquisition and restoration projects and identify potential markets for the ecosystem credits generated as a result of these projects.

Provide overview of barriers to entry for Agency constituencies, as well as the marketplace and grant program opportunities for overcoming those barriers.

Describe how market transactions may interface with the Agency's business processes, and identify financial or legal issues that would require resolution for such transactions to occur.

c. **Phase III- Develop up to two pilot projects for ecosystem services market transactions.** Activities and work products:

Select up to two carbon offset pilot projects that have related co-benefit ecosystem services. One pilot will be focused on temperate forests along the Oregon coast and will be fully implemented. A second pilot would focus on soil-based carbon sequestration, and ideally would occur east of the Cascades. These projects will test the models and assumptions from Phases I and II. The contractor and Agency staff will determine an appropriate course of actions for the second pilot. At a minimum, lessons learned from similar soil carbon sequestration projects would be described. If possible within the timeframe of this project, the second pilot would be fully planned and implemented.

Frame, convene and apply insights from the contractor's "Supply Chain" event, tentatively scheduled for Spring 2010. The summary report from this event will capture lessons learned

from actual Oregon-based carbon transactions, information about co-benefit ecosystem services, resources and collaborations required to accelerate the practical monetization of carbon offsets, and opportunities for future projects

Draft an Ecosystem Services roadmap describing the vertical pathway from "supply to demand" including a step-by-step description of a carbon offset transaction. Steps include, but are not limited to identification, feasibility, project design and market transaction (including key service providers). This document will be based on knowledge of OWEB projects and insights gained from the pilot project, and will be "user friendly" for Agency staff and Board as well as future grantees. It will include a "bridge" for connecting with existing regulatory frameworks and standards for the co-benefit ecosystem services related to carbon transaction.

Share iterative findings of the project with OWEB Board, staff, grantees and other interested parties. These groups represent many of the parties necessary for successful "on the ground" ecosystem service transactions, including NGOs, governmental agencies, landowners, etc.

Finalize the Ecosystem Services roadmap for inclusion in the final report, along with a summary report from the Spring 2010 event. Deliverables will be framed and presented to have maximum utility for Agency staff, Board, and key constituency groups.

iii. DELIVERABLES

Phase 1:

- Analysis of 2008 and 2009 (and previous for acquisition) "historical" carbon offset and related co-benefit ecosystem services provided by Agency grantees,
- Survey of the supply chain in all of the Agency's 6 regions to identify applicable carbon offset opportunities / projects.
- Quantification and valuation of specific carbon offset projects and the related co-benefit ecosystem services associated with Agency restoration and acquisition activities.

Phase 2:

- Development of models carbon models that connect OWEB projects to associated ecosystem services and markets
- Draft metrics/questionnaire
- Draft report including description of carbon-related market opportunities, potential barriers to entry, and possible solutions (due March 9, 2010)

Phase 3:

- Transacting up to two business application "pilots," focused on carbon,
- Summary report from the Spring 2010 "Supply Chain" event
- Generation of a final Roadmap document describing the "step-by-step" process for moving identified ecosystem services from their source of supply to the fulfillment of specific market demands.
- Presenting preliminary project findings to obtain feedback
- Final report (due June 15, 2010)

iv. TIMELINE:

Monthly Milepost meetings of Contractor, Subcontractors and the Agency
Agency Board briefing on January 20, 2010
Draft report due to Agency March 9, 2010
Agency Board briefing March 17, 2010

Agency comments due March 31, 2010
Supply Chain event to be held during Spring of 2010
Presentation: Agency Board June 1, 2010
Final Report due: June 15, 2010

C. ACCEPTANCE CRITERIA AND PROCESS

Contractor shall submit invoices for work performed. The invoices shall describe all work performed with particularity and by whom it was performed and shall itemize and explain all expenses for which reimbursement is claimed. Contractor shall send invoices to Agency's contract administrator for approval. Agency shall inspect and either accept or reject each deliverable and Goods delivered within thirty (30) calendar days from the date Contractor delivers the deliverable or Goods to Agency. If Agency does not provide written notice of acceptance or rejection of the deliverable of Goods to Contractor within thirty (30) calendar days following the date of delivery, Agency is deemed to have accepted the deliverable or Goods. If Agency rejects the deliverable or Goods, then Agency's written notice of rejection shall, at a minimum, itemize the apparent defects and include

i. a description of nonconformance between the deliverable or Goods and the Contract requirements and specifications for that deliverable or Goods, including warranties;

ii. a description of any other nonconformance of the deliverable or Goods (including late delivery); and

iii. a statement indicating whether Contractor may cure the nonconformance and if so, the method in which and time period within which Contractor shall cure.

Contractor's failure to deliver the deliverables and Goods in accordance with the requirements of this Contract is a material breach of this Contract.

D. SPECIAL REQUIREMENTS. NONE

E. SUBCONTRACTORS. For purposes of section 3.T, Agency approves the following subcontractors of Contractor to perform the specified Services:

Ecotrust: Brent Davies, Sara Kruse, Mike Mertens, Steve Dettmann.
Subcontractor will provide the following services to Ecosystem Services LLC:

1. Participate in initial project design meetings and with other entities active in the ecosystem services field.

2. Assist in quantifying values associated with carbon offset and related co-benefit ecosystem services which could be delivered by land acquisition and watershed restoration activities within the six Agency regions given current markets. Provide context through a description of currently accepted protocols, quantification methodologies, current standards, quantification, markets and completed examples.

3. Assist in the analysis of potential revenue streams generated by the sales of carbon offset and related co-benefit ecosystems service credits produced by Agency funded projects in 2008 / 2009 within currently active markets.

4. Assist in the drafting of the "Roadmap" document with a focus in the areas of project feasibility and design.

5. Participate as a presenter in the Spring 2010 carbon supply chain event identified in the contract.

6. Provide technical services in support of all three objectives including GIS and mapping, carbon and other ecosystem services quantification, metrics, questionnaires, empirical models, etc.

7. Assist in the drafting and preparation of materials for the final presentation and report to the Agency Board.

Contractor shall provide written notice to Agency when any approved subcontractor is no longer performing the specified Services if those Services have not been successfully completed.

2. **COMPENSATION.** The total amount available for payment to Contractor under section 2.A and for authorized reimbursement to Contractor under section 2.C is **$117,000.00.**

A. METHOD OF PAYMENT FOR SERVICES.

Agency shall pay Contractor for services at the following hourly rates:

Ecosytem Services
1. Duncan Berry @ $125.00 per hour
2. Guy Sievert @ $110.00 per hour
3. Support Staff @ $42.00 per hour

Subcontractors
1. Ecotrust all staff @ $110.00 per hour

B. BASIS OF PAYMENT FOR SERVICES

Agency shall pay Contractor progress payments upon Agency's approval of Contractor's invoice submitted for completed Services and delivered Goods, but only after Agency has determined that Contractor has completed, and Agency has accepted the completed Services and Agency has accepted the delivered goods in accordance with section 1.C.

C. EXPENSE REIMBURSEMENT

Travel Expenses and Other Expenses - Agency will reimburse Contractor for Travel and Other Expenses at the rates specified in the Oregon Accounting Manual as of the date Contractor incurs the travel or other expenses. The Oregon Accounting Manual is available at http://sed.das.state.or.us/oam/sedpolicy/tableofcontent.htm. "Other Expenses" means: Contractor shall travel in the most efficient and cost-effective manner resulting in the best value to Agency. Contractor shall provide Agency with receipts for all travel and other expenses incurred, except meals, for which Contractor seeks reimbursement. Receipts are required from Subcontractors. Contractor / Subcontractors shall rent only economy or compact sized vehicles unless Contractor pays the difference to rent any other type of vehicle. Agency must approve in advance, in writing, all out-of-state travel for which Contractor intends to seek reimbursement under this

Contract. Travel and Other expenses shall be included in the total amount listed in Item 2. Compensation.

D. GENERAL PAYMENT PROVISIONS

i. Agency's Payment. Agency shall pay Contractor for Services performed and Goods delivered at the rates and prices specified in section 2. Contractor shall look solely to Agency for payment of all amounts Agency owes to Contractor. Contractor shall not be compensated by any agency or department of State other than Agency for Services performed and Goods delivered.

ii. If Contractor is a nonresident alien as defined in 26 USC § 7701(b)(1)(B), then Contractor shall, upon execution of this Contract, deliver to Agency a completed and signed W-8 form, 8233 form, or W-9 form, as applicable, from the Internal Revenue Service ("IRS"), as evidence that Agency is not required by 26 USC 1441 to withhold part of Contractor's payment. Such forms are currently available at http://www.irs.gov. Agency may withhold payments to Contractor pending Agency's receipt from Contractor of the applicable, completed and signed form. If Agency does not receive the applicable, completed and signed form from Contractor, or if the IRS provides notice to Agency that Contractor's information on the form provided is incorrect, Agency will withhold as federal income tax 30% of all amounts Agency owes to Contractor under this Contract.

iii. Funds Available and Authorized; Payments. Contractor understands and agrees that Agency's payment of amounts under this Contract is contingent on Agency receiving funding, appropriations, limitations, allotments or other expenditure authority at levels sufficient to allow Agency, in the exercise of its reasonable administrative discretion, to make payments under this Contract.

E. INVOICES

Contractor shall send invoices to Agency for Services completed and Goods delivered and accepted by Agency in accordance with Section 1. Contractor shall include in each invoice:

i. The Contract number;
ii. A detailed description of Services performed, including the name or names of the individuals who performed Services and prepared the deliverables to which the invoice applies, the dates Services were performed, all deliverables delivered during the period of the invoices, the rate or rates for Services performed, and the total cost of Services;
iii. Itemization and explanation of all expenses for which Contractor claims reimbursement authorized under this Contract;
iv. The quantity of Goods delivered, the date the Goods were delivered, the price per unit, if applicable; and
v. The total amount due and the payment address.

Contractor shall send all invoices to Agency's Contract Administrator at the address specified in section 7 or to any other address as Agency may indicate in writing to Contractor. Contractor's claims to Agency for overdue payments on invoices are subject to ORS 293.462.

3. GENERAL TERMS AND CONDITIONS.

A. INTELLECTUAL PROPERTY & OPEN SOURCE; TITLE TO GOODS.

i. Definitions. As used in this Contract, the following terms have the meanings set forth below:
   a. "Contractor Intellectual Property" means any intellectual property owned by Contractor and developed independently from Services.
   b. "Open Source Elements" means any Work Product subject to any open source initiative certified license, including Work Product based upon any open source initiative certified licensed work.
   c. "Third Party Intellectual Property" means any intellectual property owned by parties other than Agency or Contractor.
   d. "Work Product" means all Services and Goods Contractor delivers or is required to deliver to Agency pursuant to this Contract.

ii. New Works. All intellectual property rights in the Work Product created by Contractor under this Contract shall be the exclusive property of Agency. All Work Product authored by Contractor under this Contract shall be deemed "works made for hire" to the extent permitted by the United States Copyright Act. To the extent Agency is not the owner of the intellectual property rights in such Work Product, Contractor hereby irrevocably assigns to Agency any and all of its rights, title, and interest in such Work Product. Upon Agency's reasonable request, Contractor shall execute such further documents and instruments reasonably necessary to fully vest such rights in Agency. Contractor forever waives any and all rights relating to such Work Product created under this Contract, including without limitation, any and all rights arising under 17 USC §106A or any other rights of identification of authorship or rights of approval, restriction or limitation on use or subsequent modifications.

iii. Contractor Intellectual Property. If intellectual property rights in the Work Product are Contractor Intellectual Property, Contractor hereby grants to Agency an irrevocable, non-exclusive, perpetual, royalty-free license to use, make, reproduce, prepare derivative works based upon, distribute copies of, perform and display the Contractor Intellectual Property, and to authorize others to do the same on Agency's behalf.

iv. Third Party Intellectual Property. To the extent Contractor has the authority, Contractor shall sublicense or pass through to Agency all Third Party Intellectual Property. Contractor represents and warrants that it has provided written disclosure to Agency of all Third Party Intellectual Property that must be independently licensed by Agency to fully enjoy the benefit of the Work Product. If Contractor failed to provide such written disclosure, Contractor shall secure on the Agency's behalf and in the name of the Agency, an irrevocable, non-exclusive, perpetual, royalty-free license to use, make, reproduce, prepare derivative works based upon, distribute copies of, perform and display the Third Party Intellectual Property, and to authorize others to do the same on Agency's behalf.

v. Open Source Approval and Notice. Any Open Source Elements in the Work Product must be approved in advance and in writing by Agency. If Agency approves the use of Open Source Elements, Contractor shall:
   a. Notify Agency in writing that the Work Product contains Open Source Elements;
   b. Identify the specific portion of the Work Product that contain Open Source Elements; and
   c. Provide a copy of the applicable license for each Open Source Element to Agency.

[Option – use the following provision below as a substitute if Services have security/confidentiality issues that prohibit distribution. Use in place of, not in addition to, section 3.A.v. above:

v. Open Source Prohibited. Contractor represents and warrants that the Work Product contains no Open Source Elements.]

vi. Title to Goods. Title to Goods passes to Agency in accordance with ORS 72.4010.

B. OTHER REPRESENTATIONS AND WARRANTIES.

i. All express and implied warranties that are applicable to goods under ORS Chapter 72 apply to the Goods delivered under this Contract. Contractor represents and further warrants that:

a. Contractor has the authority to enter into and perform in accordance with this Contract and that this Contract, when executed and delivered, is a valid and binding obligation of Contractor that is enforceable in accordance with its terms;

b. Contractor has the skill and knowledge possessed by well-informed members of its industry, trade or profession and Contractor will apply that skill and knowledge with care and diligence and perform Services in a timely, professional and workmanlike manner in accordance with standards applicable to Contractor's industry, trade or profession;

c. Contractor is and shall be, at all times during the term of this Contract, qualified, professionally competent, and duly licensed to perform Services; and

d. When used as authorized by this Contract, no Work Product infringes nor will Agency's use, duplication or transfer of the Work Product infringe any copyright, patent, trade secret or other proprietary right of any third party.

ii. The warranties specified in this section are in addition to, and not in lieu of, any other warranties provided. All warranties are cumulative and shall be interpreted broadly to give Agency the greatest warranty protection available.

C. COMPLIANCE WITH APPLICABLE LAWS AND STANDARDS

i. Contractor shall comply with all federal, state and local laws, regulations, and ordinances applicable to this Contract or to Contractor's obligations under this Contract, as those laws, regulations and ordinances may be adopted or amended from time to time.

ii. Agency's performance under this Contract is conditioned upon Contractor's compliance with the obligations intended for contractors under ORS 279B.220, 279B.225 (if applicable to this Contract), 279B.230 and 279B.235 (if applicable to this Contract), which are incorporated by reference herein. Contractor shall, to the maximum extent economically feasible in the performance of this Contract, use recycled paper (as defined in ORS 279A.010(1)(ee)), recycled PETE products (as defined in ORS 279A.010(1)(ff)), and other recycled plastic resin products and recycled products (as "recycled product" is defined in ORS 279A.010(1)(gg)).

D. AMENDMENTS

i. All amendments to this Contract are Unanticipated Amendments unless subsections ii and iii of this section D are completed for Anticipated Amendments. OAR 125-246-0560 applies to all Contract amendments.

ii. Circumstances Requiring Amendments.

iii. Amendment Method.

E. TIME IS OF THE ESSENCE

Contractor agrees that time is of the essence in the performance of this Contract.

F. FORCE MAJEURE

Neither Agency nor Contractor shall be responsible for any failure to perform or for any delay in the performance of any obligation under this Contract caused by fire, riot, acts of God, terrorism, war, or any other cause which is beyond the breaching party's reasonable control. Contractor shall, however, make all reasonable efforts to remove or eliminate the cause of Contractor's delay or breach and shall, upon the cessation of the cause, continue performing under this Contract. Agency may terminate this Contract upon written notice to Contractor after reasonably determining that the delay or breach will likely prevent successful performance of this Contract.

G. INSURANCE

Contractor shall obtain the insurance required under section 4 prior to performing under this Contract and shall maintain the required insurance throughout the duration of this Contract and all warranty periods.

H. INDEPENDENT CONTRACTOR STATUS; RESPONSIBILITY FOR TAXES AND WITHHOLDING.

i. Contractor shall perform all Services as an independent Contractor. Although Agency may (a) determine and modify the delivery schedule for Services to be performed and (b) evaluate the quality of the completed performance, Agency cannot and will not control the means or manner of Contractor's performance. Contractor is responsible for determining the appropriate means and manner of performing any Services required under this Contract. Contractor certifies, represents and warrants that Contractor is an independent contractor of Agency under all applicable State and federal law. Contractor is not an "officer", "employee", or "agent" of Agency as those terms are used in ORS 30.265.

ii. If Contractor is currently performing work for State or the federal government, Contractor by signature to this Contract represents and warrants; Contractor's performance of this Contract creates no potential or actual conflict of interest as defined by ORS 244 and that no rules or regulations of Contractor's employing agency (state or federal) would prohibit Contractor's performance of this Contract.

iii. Contractor is responsible for all federal and state taxes applicable to compensation or payments paid to Contractor under this Contract, and unless required by prevailing federal law or regulations, Agency will not withhold from compensation or payments to Contractor

any amount(s) to cover Contractor's federal or state tax obligations unless Contractor is subject to backup withholding. Contractor is not eligible for any social security, unemployment insurance or workers' compensation benefits from compensation or payments paid to Contractor under this Contract.

I. INDEMNIFICATION

i. GENERAL INDEMNITY. CONTRACTOR SHALL DEFEND, SAVE, HOLD HARMLESS, AND INDEMNIFY STATE, ITS AGENCIES, OFFICERS, DIRECTORS, AGENTS AND EMPLOYEES FROM AND AGAINST ALL CLAIMS, SUITS, ACTIONS, LOSSES, DAMAGES, LIABILITIES, COSTS AND EXPENSES OF ANY NATURE WHATSOEVER ("CLAIMS") RESULTING FROM, ARISING OUT OF, OR RELATING TO THE ACTS OR OMISSIONS OF CONTRACTOR OR ITS OFFICERS, EMPLOYEES, SUBCONTRACTORS, OR AGENTS UNDER THIS CONTRACT.

ii. INDEMNITY FOR INFRINGEMENT CLAIMS. WITHOUT LIMITING THE GENERALITY OF SECTION 3.I.i, CONTRACTOR SHALL DEFEND, SAVE, HOLD HARMLESS AND INDEMNIFY STATE, ITS AGENCIES, OFFICERS, DIRECTORS, AGENTS, AND EMPLOYEES FROM AND AGAINST ALL CLAIMS, SUITS, ACTIONS, LOSSES, DAMAGES, LIABILITIES, COSTS, AND EXPENSES, INCLUDING ATTORNEYS FEES, ARISING OUT OF OR RELATING TO ANY CLAIMS THAT THE WORK, THE WORK PRODUCT OR ANY OTHER TANGIBLE OR INTANGIBLE ITEM DELIVERED UNDER THIS CONTRACT BY CONTRACTOR THAT MAY BE THE SUBJECT OF PROTECTION UNDER ANY STATE OR FEDERAL INTELLECTUAL PROPERTY LAW OR DOCTRINE, OR AGENCY'S REASONABLE USE THEREOF, INFRINGES ANY PATENT, COPYRIGHT, TRADE SECRET, TRADEMARK, TRADE DRESS, MASK WORK, UTILITY DESIGN, OR OTHER PROPRIETARY RIGHT OF ANY THIRD PARTY ("INFRINGEMENT CLAIM"); PROVIDED, THAT STATE SHALL PROVIDE CONTRACTOR WITH PROMPT WRITTEN NOTICE OF ANY INFRINGEMENT CLAIM.

iii. STATE SHALL REASONABLY COOPERATE IN GOOD FAITH, AT CONTRACTOR'S REASONABLE EXPENSE, IN THE DEFENSE OF CLAIMS AND INFRINGEMENT CLAIMS, AND CONTRACTOR SHALL SELECT COUNSEL REASONABLY ACCEPTABLE TO THE OREGON ATTORNEY GENERAL TO DEFEND SUCH CLAIMS AND INFRINGEMENT CLAIMS AND SHALL BEAR ALL COSTS OF SUCH COUNSEL. COUNSEL MUST ACCEPT APPOINTMENT AS A SPECIAL ASSISTANT ATTORNEY GENERAL UNDER ORS CHAPTER 180 BEFORE COUNSEL MAY ACT IN THE NAME OF, OR REPRESENT THE INTERESTS OF, STATE, ITS AGENCIES, OFFICERS, EMPLOYEES OR AGENTS. STATE MAY ELECT TO ASSUME ITS OWN DEFENSE WITH AN ATTORNEY OF ITS OWN CHOICE AND AT ITS OWN EXPENSE AT ANY TIME STATE DETERMINES IMPORTANT GOVERNMENTAL INTERESTS ARE AT STAKE. SUBJECT TO THE LIMITATIONS NOTED ABOVE, CONTRACTOR MAY DEFEND SUCH CLAIMS AND INFRINGEMENT CLAIMS WITH COUNSEL OF ITS OWN CHOOSING PROVIDED THAT NO SETTLEMENT OR COMPROMISE OF ANY SUCH CLAIMS AND INFRINGEMENT CLAIMS SHALL OCCUR WITHOUT THE CONSENT OF STATE, WHICH CONSENT SHALL NOT BE UNREASOABLY WITHHELD, CONDITIONED OR DELAYED.

J. ASSIGNMENT OF ANTITRUST RIGHTS

i. CONTRACTOR IRREVOCABLY ASSIGNS TO STATE ANY CLAIM FOR RELIEF OR CAUSE OF ACTION WHICH CONTRACTOR NOW HAS OR WHICH MAY ACCRUE TO CONTRACTOR IN THE FUTURE BY REASON OF ANY VIOLATION OF 15 U.S.C. § 1-15 OR ORS 646.725 OR ORS 646.730, IN CONNECTION WITH ANY GOODS OR SERVICES PROVIDED TO CONTRACTOR FOR THE PURPOSE OF CARRYING OUT CONTRACTOR'S OBLIGATIONS UNDER THIS CONTRACT, INCLUDING, AT STATE'S OPTION, THE RIGHT TO CONTROL ANY SUCH LITIGATION ON SUCH CLAIM FOR RELIEF OR CAUSE OF ACTION

ii. CONTRACTOR SHALL REQUIRE ANY SUBCONTRACTORS HIRED TO PERFORM ANY OF CONTRACTOR'S DUTIES UNDER THIS CONTRACT TO IRREVOCABLY ASSIGN TO STATE, AS THIRD PARTY BENEFICIARY, ANY RIGHT, TITLE OR INTEREST THAT HAS ACCRUED OR WHICH MAY ACCRUE IN THE FUTURE BY REASON OF ANY VIOLATION OF 15 U.S.C. § 1-15 OR ORS 646.725 OR ORS 646.730, IN CONNECTION WITH ANY GOODS OR SERVICES PROVIDED TO THE SUBCONTRACTOR FOR THE PURPOSE OF CARRYING OUT THE SUBCONTRACTOR'S OBLIGATIONS TO CONTRACTOR IN PURSUANCE OF THIS CONTRACT, INCLUDING, AT STATE'S OPTION, THE RIGHT TO CONTROL ANY SUCH LITIGATION ON SUCH CLAIM FOR RELIEF OR CAUSE OF ACTION.

K. EVENTS OF BREACH

i. Breach by Contractor. Contractor breaches this Contract if:

a. Contractor institutes or has instituted against it insolvency, receivership or bankruptcy proceedings, makes an assignment for the benefit of creditors, or ceases doing business on a regular basis;

b. Contractor no longer holds a license or certificate that is required for Contractor to perform its obligations under this Contract and Contractor has not obtained the license or certificate within fourteen (14) calendar days after Agency delivers notice of breach to Contractor or a longer period as Agency may specify in the notice; or

c. Contractor commits any material breach of any covenant, warranty, obligation or certification under this Contract, fails to perform its obligations under this Contract within the time specified or any extension of that time, and Contractor fails to cure the breach within fourteen (14) calendar days after Agency delivers notice of breach to Contractor or a longer period as Agency may specify in the notice.

ii. Breach by Agency. Agency breaches this Contract if:

a. Agency fails to pay Contractor any amount pursuant to the terms of this Contract, and Agency fails to cure its failure to pay within fourteen (14) calendar days after Contractor delivers notice of breach to Agency or a longer period as Contractor may specify in the notice; or

b. Agency commits any material breach of any covenant, warranty, or obligation under this Contract, fails to perform its obligations hereunder within the time specified or any extension thereof, and Agency fails to cure the breach within fourteen (14) calendar days

after Contractor delivers notice of breach to Agency or a longer period as Contractor may specify in the notice.

L. REMEDIES

i. State's Remedies. If Contractor is in breach under section 3.K.i, then in addition to the remedies afforded elsewhere in this Contract, State shall be entitled to recover for any and all damages suffered as the result of Contractor's breach of this Contract, including but not limited to direct, indirect, incidental and consequential damages. State may, at Agency's option, pursue any or all of the remedies available under this Contract and at law or in equity, including, but not limited to:

a. Termination of this Contract under section 3.M.ii;

b. Withholding payment of all amounts in Contractor's invoices for Services that Contractor is obligated to but has failed to deliver or perform within any scheduled completion dates or has performed inadequately or defectively;

c. Initiation of an action or proceeding for damages, specific performance, declaratory or injunctive relief; or

d. Exercise of the right of setoff, and withholding of amounts otherwise due and owing to Contractor in an amount equal to State's setoff right, without penalty.

These remedies are cumulative to the extent the remedies are not inconsistent, and State may pursue any remedy or remedies singly, collectively, successively or in any order whatsoever. If it is determined for any reason that Contractor was not in breach under section 3.K.i, the rights and obligations of the parties shall be the same as if this Contract was terminated pursuant to section 3.M.ii.a.

ii. Contractor's Remedies. If Agency terminates this Contract for convenience under section 3.M.ii.a, or if Agency is in breach under section 3.K.ii and whether or not Contractor elects to exercise its right to terminate this Contract under section 3.M.iii, Contractor's sole remedy is one of the following, as applicable:

a. For Services compensable on an hourly basis, a claim against Agency for unpaid invoices, hours worked but not yet invoiced, and authorized expenses for Services completed and accepted by Agency less any claims State has against Contractor.

b. For deliverable-based Services, a claim against Agency for the sum designated for completing the deliverable multiplied by the percentage of Services completed and accepted by Agency, less previous amounts paid and any claims State has against Contractor.

If previous amounts paid to Contractor for Services and Goods exceed the amount due to Contractor under this section 3.L.ii, Contractor shall pay the excess amount to Agency immediately upon written demand.

iii. ATTORNEYS' FEES

Except for defense costs and expenses pursuant to section 3.I, neither Agency nor Contractor is entitled to recover attorney's fees, court and investigative costs, or any other fees or expenses associated with pursuing a remedy for damages arising out of or relating to this Contract.

M. TERMINATION

i. MUTUAL CONSENT. This Contract may be terminated at any time by mutual written consent of the parties.

ii. Agency:

a. Agency may, at its sole discretion, terminate this Contract for its convenience upon 30 days written notice by Agency to Contractor.

b. Agency may, in its sole discretion, terminate this Contract, immediately upon notice to Contractor, or at a later date as Agency may establish in the notice, upon the occurrence of any of the following events:

A. Agency fails to receive funding, appropriations, limitations, allotments or other expenditure authority at levels sufficient to pay for Services;

B. Federal or state laws, regulations, or guidelines are modified or interpreted in a way that either the purchase of Services by Agency under this Contract is prohibited, or Agency is prohibited from paying for Services from the planned funding source; or

C. Contractor is in breach under section 3.K.i.

Contractor shall stop performance under this Contract as directed by Agency in any written notice of termination delivered to Contractor under this section 3.M.ii.

iii. Contractor: Contractor may terminate this Contract immediately upon written notice to Agency, or at a later date as Contractor may establish in the notice, if Agency is in breach pursuant to section 3.K.ii.

N. ACCESS TO RECORDS

Contractor shall retain, maintain, and keep accessible all records relevant to this Contract ("Records") for minimum of six (6) years, or a longer period as may be required by applicable law, following Contract termination or full performance, the period required by applicable law following Contract termination or full performance, or until the conclusion of any audit, controversy or litigation arising out of or related to this Contract, whichever ending is later. Contractor shall maintain all financial Records in accordance with generally accepted accounting principles. During this Record-retention period, Contractor shall permit State, its duly authorized representatives, and the federal government access to the Records at reasonable times and places for purposes of examination and copying.

O. NOTICES

All notices required under this Contract shall be in writing and addressed to the party's authorized representative. For State, the authorized representative is the Agency contact person identified in section 7. Contractor's authorized representative is the contact person identified in section 6. Mailed notices are deemed received five (5) days after the post mark date when properly addressed and deposited prepaid into the U.S. postal service. Faxed notices are deemed received upon electronic confirmation of successful transmission to the designated fax number. Notices delivered by personal delivery are deemed received when delivered to the address specified for the receiving party's authorized representative.

P. GOVERNING LAW

The Contract is governed by and construed in accordance with the laws of State, without regard to principles of conflicts of laws. To the extent not modified by the terms of this Contract, the Uniform Commercial Code as codified in ORS Chapters 71 and 72 governs the Goods sold under this Contract.

Q. VENUE; CONSENT TO JURISDICTION

Any claim, action, suit or proceeding (collectively, "Proceeding") between State and Contractor that arises from or relates to this Contract shall be brought and conducted solely and exclusively within the Circuit Court of State for Marion County; provided, however, if a Proceeding must be brought in a federal forum, then unless otherwise prohibited by law, it shall be brought and conducted solely and exclusively within the United States District Court for the District of Oregon. CONTRACTOR HEREBY CONSENTS TO THE IN PERSONAM JURISDICTION OF THESE COURTS AND WAIVES ANY OBJECTION TO VENUE IN THESE COURTS AND ANY CLAIM THAT THE FORUM IS AN INCONVENIENT FORUM. Nothing in these provisions shall be construed as a waiver of State's sovereign or governmental immunity, whether derived from the Eleventh Amendment to the United States Constitution or otherwise, or a waiver of any defenses to Proceedings or jurisdiction based thereon

R. SUBCONTRACTS; ASSIGNMENT; SUCCESSORS

i. SUBCONTRACTS. Contractor shall not enter into any subcontracts for any of Services required under this Contract without Agency's prior written consent. In addition to any other provisions Agency may require, Contractor shall include in any permitted subcontract provisions to ensure that Agency will receive the benefit of subcontractor's performance as if the subcontractor were Contractor with respect to sections 1.C, 3.A, 3.B, 3.E, 3.I, 3.J, 3.N, 3.P and 3.R. Agency's consent to any subcontract shall not relieve Contractor of any of its duties or obligations under this Contract.

ii. Contractor shall not assign, delegate or transfer any of its rights or obligations under this Contract without Agency's prior written consent. Agency's written consent does not relieve Contractor of any obligations under this Contract, and any assignee, transferee, or delegate is considered Contractor's agent.

iii. The provisions of this Contract are binding upon, and inure to the benefit the parties and their respective successors and permitted assigns, if any.

S. THIRD PARTY BENEFICIARIES

State and Contractor are the only parties to this Contract and are the only parties entitled to enforce the terms of this Contract. Nothing in this Contract gives, is intended to give, or shall be construed to give or provide any benefit or right not held by or made generally available to the public, whether directly, indirectly or otherwise, to third persons unless the third persons are individually identified by name herein and expressly described as intended beneficiaries of the terms of this Contract. Agency is an intended beneficiary of the terms of this Contract.

T. SEVERABILITY

If any provision of this Contract is declared by a court of competent jurisdiction to be illegal or otherwise invalid, the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if this Contract did not contain the particular provision held to be invalid.

U. COUNTERPARTS

This Contract may be executed in several counterparts, all of which when taken together shall constitute one agreement binding on all parties, notwithstanding that all parties are not signatories to the same counterpart. Each copy of this Contract so executed shall constitute an original.

V. INTEGRATION AND MERGER

This Contract constitutes the entire agreement between the parties on the subject matter thereof. There are no understandings, agreements, or representations, oral or written, not specified herein regarding this Contract.

W. AMENDMENTS; WAIVER

This Contract may be amended to the extent permitted by applicable statutes and administrative rules and as the amendment scope and process may be further described in section 1, Statement of Services. No waiver, consent, or amendment of terms of this Contract shall bind either party unless in writing and signed by Agency and Contractor, and all necessary approvals have been obtained. Waivers and consents shall be effective only in the specific instance and for the specific purpose given. The failure of State to enforce any provision of this Contract shall not constitute a waiver by State of that or any other provision.

X. SURVIVAL.

In addition to all provisions which by their nature extend beyond Contract termination or full performance, the following provisions shall remain in effect beyond any Contract termination or full performance: sections 2.D, 3.A, 3.H, 3.G, 3.I, 3.J, 3.L, 3.N, 3.P, 3.Q, 3.S, 3.X and 4.

4. INSURANCE

A. REQUIRED INSURANCE. Contractor shall obtain the insurance specified in this section 5 prior to performing under this Contract and shall maintain it in full force and at its own expense throughout the duration of this Contract and all warranty periods. Contractor shall obtain the following insurance from insurance companies or entities that are authorized to transact the business of insurance and issue coverage in State and that are acceptable to Agency.

i. WORKERS COMPENSATION. All employers, including Contractor, that employ subject workers who work under this Contract in State shall comply with ORS 656.017 and provide the required workers' compensation coverage, unless the employers are exempt under ORS 656.126(2). Contractor shall require each of its subcontractors, if any, to comply with, and shall ensure that each of its subcontractors, if any, complies with, these requirements.

ii. PROFESSIONAL LIABILITY

☐ **Required by Agency** ☒ **Not required by Agency**

Professional Liability Insurance with a combined single limit, or the equivalent, of not less than $ [enter amount] each claim, incident or occurrence This is to cover damages caused by error, omission or negligent acts related to the professional services to be provided under this Contract

iii. COMMERCIAL GENERAL LIABILITY

☒ **Required by Agency** ☐ **Not required by Agency**

Commercial General Liability Insurance covering bodily injury and property damage in a form and with coverages that are satisfactory to Agency. This insurance shall include personal and advertising injury liability, products liability and completed operations liability. Coverage may be written in combination with Automobile Liability Insurance (with separate limits). Combined single limit per occurrence shall not be less than $ 1,000,000 for each job site or location. Each annual aggregate limit shall not be less than $ 1,000,000.

iv. AUTOMOBILE LIABILITY INSURANCE: AUTOMOBILE LIABILITY

☒ **Required by Agency** ☐ **Not required by Agency**

Automobile Liability Insurance covering all owned, non-owned, and hired vehicles. This coverage may be written in combination with the Commercial General Liability Insurance. Combined single limit per occurrence shall not be less than $[enter amount], each accident for bodily injury and property damage.

AUTOMOBILE LIABILITY. Automobile Liability Insurance, including MCS-90 endorsement, with a combined single limit of no less than $1,000,000 or equal to the U.S. Department of Transportation requirements, whichever is greater. The policy shall insure against bodily injury, property damage, or environmental damage arising out of the use (including loading, transporting and unloading) by or on behalf of Contractor, it agents and employees of owned, non-owned or hired vehicles.

v. EMPLOYERS' LIABILITY

☐ **Required by Agency** ☒ **Not required by Agency**

If Contractor is a subject employer, as defined in ORS 656.023, Contractor shall obtain employers' liability insurance coverage with combined single limit per occurrence of not less that $500,000, and annual aggregate limits of not less than $1 million.

B. ADDITIONAL INSURED

The commercial general liability insurance and automobile liability insurance required under this Contract shall include State, and its agencies, departments, divisions, commissions, branches, officers and employees as Additional Insured's with respect to Contractor's performance obligations under this Contract. Contractor shall ensure that coverage is primary and non-contributory with any other insurance and self-insurance.

C. "TAIL" COVERAGE

If any of the required liability insurance is on a "claims made" basis, Contractor shall either maintain either "tail" coverage or continuous "claims made" liability coverage, provided the effective date of the continuous "claims made" coverage is on or before the effective date of this Contract, for a minimum of 24 months following the later of (i) Contractor's completion of all Services and Agency's acceptance of all Services required under this Contract, or (iii) the expiration of all warranty periods provided under this Contract. Notwithstanding the foregoing 24-month requirement, if Contractor elects to maintain "tail" coverage and if the maximum time period "tail" coverage reasonably available in the marketplace is less than the 24-month period described above, then Contractor shall maintain "tail" coverage for the maximum time period that "tail" coverage is reasonably available in the marketplace for the coverage required under this Contract. Contractor shall provide to Agency, upon Agency's request, certification of the coverage required under this section 4.C.

D. NOTICE OF CANCELLATION OR CHANGE

There shall be no cancellation, material change, potential exhaustion of aggregate limits or non-renewal of insurance coverage(s) without sixty (60) days' written notice from this Contractor or its insurer(s) to Agency. Any failure to comply with the reporting provisions of this clause shall constitute a material breach of Contract and shall be grounds for immediate termination of this Contract by Agency.

E. CERTIFICATE(S) OF INSURANCE

Contractor shall provide to Agency Certificate(s) of Insurance for all required insurance before delivering any Goods and performing any Services required under this Contract. The Certificate(s) must specify all entities and individuals who are endorsed on the policy as Additional Insured (or Loss Payees). Contractor shall pay for all deductibles, self-insured retention and self-insurance, if any.

[USE SECTION 5 IF HIPAA APPLIES TO SERVICES. IF QUESTIONS ABOUT HIPAA APPLICABILITY, PLEASE CONSULT WITH DOJ. IF HIPAA DOES NOT APPLY, THEN DELETE THE SUBSTANCE OF SECTION 5 AND RESERVE SECTION 5 AS FOLLOWS TO PRESERVE THE NUMBERING IN THE FORM

5. HEALTH INSURANCE PORTABILITY AND ACCOUNTABILITY ACT

Contractor shall deliver Services in compliance with the Health Insurance Portability and Accountability Act and the federal regulations implementing the Act (collectively referred to as HIPAA). Contractor shall comply and cause all subcontractors to comply with the following.

A. Privacy and Security Of Individually Identifiable Health Information. Individually Identifiable Health Information about specific individuals is confidential. Individually Identifiable Health Information relating to specific individuals may be exchanged between Contractor and Agency for purposes directly related to the provision of Services. However, Contractor shall not use or disclose any Individually Identifiable Health Information about specific individuals in a manner that would violate any applicable privacy rules.

B. Consultation and Testing. If Contractor reasonably believes that Contractor's or Agency's data transactions system or other application of HIPAA privacy or security compliance policy may result in a violation of HIPAA requirements, Contractor shall promptly consult with Agency. Contractor or Agency may initiate a request for testing of HIPAA transaction requirements, subject to available resources./

If Services performed or Goods delivered under this Contract require Contractor to have access to or use of any Agency computer system or other Agency Information Asset for which Agency imposes security requirements, Contractor shall comply and require subcontractors to comply with the information security requirements imposed under this section. "Information Asset" means all confidential information in any form (e.g., written, verbal, oral or electronic) which Agency determines requires security measures, including confidential information created by Agency, gathered for Agency, or stored by Agency for external parties. All other terms not defined in this section shall have the meaning used in the HIPAA Security Rules, 45 CFR § 164.304.

A. All requirements imposed on Contractor under this section 6 shall also apply to its officers, employees, agents and subcontractors that have access to any Agency information computer system or other Agency Information Asset, and Contractor shall include these requirements in any subcontract that may provide such access by a subcontractor, its officers, employees or agents to any Agency computer system or other Agency Information Asset. Contractor shall:

Cooperate with Agency in identifying Information Assets that will be utilized in the performance of Services or for the delivery of Goods and applicable security measures that will be undertaken to protect the Information Assets, and provide updated information to Agency within fourteen (14) calendar days of the date such information changes for any reason;

Implement security measures that reasonably and appropriately provide administrative, physical and technical safeguards that protect the confidentiality, integrity and availability of the Information Assets that it creates, receives, maintains or transmits on behalf of Agency. Contractor's security measures must be documented in writing and be available for review by Agency upon request. Agency's review of the reasonableness of security measures, as well as Contractor's compliance with Agency's assigned access control or security requirements, will take into account Contractor's physical, administrative, and technical capabilities related to security measures and the potential risk of unauthorized use or disclosure of Information Assets by Contractor, its officers, employees, agents or subcontractors.

Prevent any unauthorized access to or disclosure of Agency's information systems and information assets

Take necessary actions to comply with Agency's determinations of the level of access that may be granted, as well as changes in level of access, or suspension or termination of access as determined by Agency;

Keep any Agency-assigned access control requirements such as identification of authorized user(s) and access-control information in a secure location until access is terminated; monitor and securely maintain access by Contractor and its agents or subcontractors in accordance with security requirements or access controls assigned by Agency; and make available to Agency, upon request, all information about Contractor's use or application of Agency access-controlled computer systems or Information Assets.

Report to Agency any privacy or security incidents by Contractor, its officers, employees, agents or subcontractors that compromise, damage, or cause a loss of protection to Agency Information Assets. Contractor shall report in the following manner:

Report to Agency in writing within five (5) business days of the date on which Contractor becomes aware of such incident; and

Provide Agency the results of the incident assessment findings and resolution strategies.

Contractor shall comply with Agency requests for corrective action concerning a privacy or security incident, and with laws requiring mitigation of harm caused by the unauthorized use or disclosure of confidential information, if any.

A. Agency determines that Contractor's security measures or actions required under section 5.A are inadequate to address the security requirements of Agency, Agency will notify Contractor. Agency and Contractor may meet to discuss appropriate security measures or action. If security measures or corrective actions acceptable to Agency cannot be agreed upon, Agency may take such actions as it determines appropriate under the circumstances. Actions may include but are not limited to restricting access to computer systems or Information Assets, or Agency amending or terminating the Contract.

B. Agency may request additional information from Contractor related to security measures, and may change, suspend or terminate access to or use of an Agency computer system or Information Assets by Contractor, its officers, employees, agents or subcontractors.

C. Wrongful use of Agency computer systems, wrongful use or disclosure of Information Assets by Contractor, officers, its employees, agents or its subcontractors may cause the immediate suspension or revocation of any access granted through this Contract, in the sole discretion of Agency. Agency may also pursue any other legal remedies provided under the law.

6. CERTIFICATIONS AND SIGNATURE OF CONTRACTOR'S AUTHORIZED REPRESENTATIVE

THIS CONTRACT MUST BE SIGNED IN INK BY AN AUTHORIZED REPRESENTATIVE OF CONTRACTOR.

The undersigned certifies under penalty of perjury both individually and on behalf of Contractor that:

A. The undersigned is a duly authorized representative of Contractor, has been authorized by Contractor to make all representations, attestations, and certifications contained in this Contract and to execute this Contract on behalf of Contractor;

B. The undersigned is authorized to act on behalf of Contractor and that Contractor is, to the best of the undersigned's knowledge, not in violation of any Oregon Tax Laws. For purposes of this

certification, "Oregon Tax Laws" means a state tax imposed by ORS 401.792 to 401.816 (Tax For Emergency Communications), 118 (Inheritance Tax), 314 (Income Tax), 316 (Personal Income Tax), 317 (Corporation Excise Tax), 318 (Corporation Income Tax), 320 (Amusement Device and Transient Lodging Taxes), 321 (Timber and Forestland Tax), 323 (Cigarettes and Tobacco Products Tax), and the elderly rental assistance program under ORS 310.630 to 310.706; and any local taxes administered by the Department of Revenue under ORS 305.620.

C. To the best of the undersigned's knowledge, Contractor has not discriminated against and will not discriminate against minority, women or emerging small business enterprises certified under ORS 200.055 in obtaining any required subcontracts.

D. Contractor and Contractor's employees and agents are not included on the list titled "Specially Designated Nationals and Blocked Persons" maintained by the Office of Foreign Assets Control of the United States Department of the Treasury and currently found at http://www.treas.gov/offices/enforcement/ofac/sdn/t11sdn.pdf.

E. Contractor is bound by and will comply with all requirements, terms and conditions contained in this Contract; and

F. Contractor ___ is / ✓ is not a nonresident alien as defined in 26 USC § 7701(b)(1) (check one). *See* section 2.D.ii.

Contractor Name: Ecosystem Services, LLC.
Contractor Address: 1940 N. Three Arch Rocks Road
Otis, Oregon 97368
Contractor Phone: 541-996-2313
Contractor Fax:
Contractor Email: Duncan@esystemservices.com
State of Oregon Supplier Number:

Authorized Signature: Duncan Berg

By (print name): DUNCAN BERG

Title: PRESIDENT

Date: AUGUST 11TH 2009

7. SIGNATURE OF STATE'S AUTHORIZED REPRESENTATIVE

State of Oregon acting by and through the Agency
Address: 775 Summer Street N.E. - Suite 360
Salem, Oregon 97301-1290

Authorized Signature:
By: Tom Byler
Title: Executive Director

Date: 8/11/09

Agency Contact Person: Renee Davis-Born
Contact Telephone Number: 503-986-0029
Fax Number: 503-986-0199
E-Mail Address: renee.davis-born@oweb.state.or.us

8. SIGNATURE OF STATE'S DEPARTMENT OF JUSTICE

Authorized Signature:

By (print name): PAUL J. DEDDLE

Title: Senior Asst. Atty. General

Date: 8/12/09

PHON-A-THON		LAST NAME	FIRST NAM	EMAIL	AFFILIATION	LIST	ADDRESS	E-MAIL CONTACT	PHONE #	RESPONSE YES	RESPONSE NO	SCHOLARSHIP	ACCOMMODATIONS REQUEST/OTHER NOTES	CONFIRM
GS		Achterman	Gail	gail.achterman@oregonstate.edu	Institute for Nat. Res.	G								
		Alban	Josh	jalban@worldenergy.com	World Energy	G								
TB		Ashton	David	david.ashton@portofportland	Port of Portland	G								
RBD		Aunan	Laurie	lauri.aunan@oweb.state.or.us	OWEB	OWEB								
DB		Bachus	Edwardo	ebackus@ecotrust.org	Ecotrust	DB		E MAILED 3/08	C:503.939.5500					
		Bartholomew	Tom	tom@esystemservices.com	EcoSystem Services LLC	ESS	2304 E Newton St; Seattle WA 98112		206 409 4232	1		1	Blueberry #8	
		Barton	Walt	Walt.barton@oacd.org	Douglas SWCD	S	2741 W. Harvard Ave; Roseburg 97471		541 957 5061	1		1	emailed about accommodations	
		Bennett	Karen	kabennett@fs.fed.us	USFS	DB								
		Berry	Duncan	duncan@esystemservices.com	EcoSystem Services LLC	ESS	1949 Three Rocks Rd. Otis OR 97368		206 697 0204	1		1	Cabin #1	
TB		Binyon	Bob	bob@umpquarivers.org	Partnership of the Umpqua Rivers	S								
		Bolling	Kevin	kboling@forestcap.com	Forest Capital Partners/Westslope	G	687 W. Canfield Ave., Ste. 101; Coeur d'Alene ID 83815		208 661 0909	1			getting own lodging	
RBD		Born-Davis	Renee	renee.davis-born@oweb.state.or.us	OWEB	OWEB				1		1		
TB		Bowers	Virginia	vbowers@trlc.org	Three Rivers Land Conservancy	S								
		Boyer	Barbara	gourmethay@onlinemac.com	Umpqua SWCD	S								
		Brandt-Erichsen	Svend	svendbe@martenlaw.com	Marten Law Group	G								
GS		Breckenridge	Lisa	lisabreckenbridge@ctuir.com	Conf. Tribes of the Umatilla	G								
DB		Brick	Sally	sally.brick@klgates.com	KL Gates LLC	G								
		Broekhoff	Derik	derik@climateactionreserve.org	CAR	G				1				
		Bronner	Bret	bbronner@v-c-s.org	VCS	G								
		Brown	Kate	jackie.cleary@state.or.us	Secretary of State	TB					1			
		Broekhoff			Climate Action Reserve									
TB		Bucy	Lisa	lisa.bucy@oacd.org	Clackamas SWCD	S								
RDB		Byler	Tom	tom.byler@oweb.state.or.us	OWEB	OWEB				1		1		
		Cannon	Sharon							1				
		Campagna	John	campagna@benchmarkam.com	Benchmark Asset Mgmt.	G								
GS		Cathcart	Jim	jim.cathcart@state.or.us	ODF	G								
DB		Chaille	Gregory	gchaille@oregoncf.org	OR Community Foundation	DB			503.227. 6846					
DB		Chalfant	Brad	bsc@deschuteslandtrust.org	Deschutes Land Trust/OPRD Comm	U		E MAILED 3/08	541.330.0017					
RBD		Chang	Phillip	pchang@coic.org	Central OR Intergovernmental Council	S								
TB		Charles	John	john@cascadepolicy.org	Cascade Policy Ins	G								
TB		Chavez	Anthony	anthony.chavez@weyerhaeuser.com	Weyerhaeuser Company	G								
DB		Chen	David	chen@eq-cap.com	Equilibrium Capital	DB		E MAILED 3/08	503.706.350					
??		Clark	Sean	sclark@climatetrust.org	Climate Trust	G								
GS		Cochrane	Bobby	cochrane@willamettepartnership.org	Willamette Partnership	G								
DB		Collins	Sally	Sally.Collins@usda.gov	Dir. Ecosystem Services & Markets	G								
GS		Corbin	Greg	gdcorbon@stoel.com	Stoel Rives	G								
DB		Cowan	Stuart	scowan@apoiesis.com	Autopoieis	G			503 230 7721 x 2					
RBD		Craiger	Rick	rick.craiger@oweb.state.or.us	OWEB	DB								
TB		Dalton	Madeline	mdalton@columbiaestuary.org	North Coast WC	S								
DB		Davies	Brent	bdavies@ecotrust.org	Ecotrust	DB-P		EMAILED 3/08	(503) 453-9166	1				
DB		Deal	Robert	rdeal@fs.fed.us	US Forest Service			E MAILED 3/08	503 808 2015			#NAME?		
GS		DeBerry	Drue	ddeberry@forestfoundation.org	Am. Forest Found.	G								
DB		Delany	Matt	MDelaney@finitecarbon.com	Finite Carbon	G		E-MAILED 3/08	541.258.3001				Called 3/9	
		Dettman	Steve	sdettman@ecotrust.org	Ecotrust	G								
		Donegan	Matt	mdonegan@forestcap.com	Forest Capital Partners	G					1			
		DuBuisson	Max	max@climateactionreserve.org	Climate Action Reserve	G								
GS		Duncan	Sally	sally.duncan@oregonstate.edu	OR State University	G				1				
DB		Duncan	Angus	aduncan@b-e-f.org	Bonneville Enviro. Found	G		E-MAILED 3/09	503-248-1905					

GS		Dunsmoor	Larry	ldunsmoor@aol.com	Warm Springs	G								
DB		Duvernoy	Gene	gened@cascadeland.org	Cascade Land Trust	G		E-MAILED 3/09	(206) 292-5907					
DB		**Eisenstadt**	**Keegan**	**keegan@clearskyclimates**	**Clear Sky**	G				1				
DB		Engelmeyer	Paul	engelmeyer@peak.org	Wetland Conservancy	DB		E-MAILED 3/09						
GS		Fehrenbacher	Matt	mfehrenbacher@pacificforest.org	Pacific Forest Trust	G								
		Fike	Jean	jean@emswcd.org	East Multnomah SWCD	S	5211 North Williams Ave; PDX 97217		503-935-5352	1		1	Alder #3	Y
GS		Fletcher	Richard	rick.fletcher@oregonstate.edu	OR State University	G								
		Ford	David	davidford27@gmail.com	Small Woodlands Association	G								
DB		Gaffi	Bill	bgfaffi@cleanwaterservices.org	Clean Water Services	G			503 681 3603					
GS		Gahlsdorf	Alan	agahlsdorf@comcast.net	NW Forest Resources	G								
TB		Garcia	Diane	diane@landconserve.org	So. OR Land Conservancy	S								
		Gaudern	Mike	woodlandscarbronco@gmail.com	OR Small Woodlots Assoc.	G								
TB		Gordon	John	jgordon@iforest.com	Interforest, Candlewood	G								
		Graves	Rod	Ron.Graves@or.nacdnet.net	Wasco SWCD	S					1			
GS		Grott	Robert	robert@nbec.org	NW Enviro Bus Council	G								
GS		Halsey	Kevin	khalsey@parametrix.com	Parametrix	G								
		Handler	Stephen	stephen@clearskyclimatesolutions.com	Clear Sky	G								
		Hanson	Kirk	kirk@nnrg.org	Northwest Natural Reesources Group	G								
GS		Harmon	Rob	robharmon@b-e-f.org	Bonneville Enviro. Found	G								
DB/GS		Hawker	David	Davidh@lincolncity.org	Lincoln City	G					1			
		Hayes	Peter	peter_hayes@comcast.net	Hylawoods	DB					1			
RDB		Heagarty	Dan	dan.heagarty@oweb.state.or.us	OWEB	DB				1				
TB		Heide	Peter	pheide@wfpa.org	WFPA	G								
DB		Henson	Paul	paul_henson@fws.gov	Fish and Wildlife Service	DB		E-MAILED 3/11	503 231 6195					
TB		Hicks	Lee	LeeMVnews@aol.com	Independent Broker	G								
		Hoffman	Wayne	MCWC@midcoastpartners.org	Midcoast WC	S				1			declined scholarship; own lodging	
DB		Hollingsworth	Lori	llhollingsworth@charter.net	Lincoln City	G				1				
GS		Horton	Alan	alan@thefreshwatertrust.org	Freshwater Trust	G								
GS		Houck	Cliff	cliff.houck@state.or.us	State(Parks,DSL,ODF&W)	G				1				
		Houston	Ryan	rhouston@deschuteswatersheds.org	Upper Deschutes	S					1			
		Hudson	Wendy	wendy.hudson@oweb.state.or.us	OWEB	DB					1			
GS		Hunter	Howard	Howard_Hunter@or.blm.gov	Portland State	G								
		Huntington	**Geoff**	**geoff@sustain.biz**	**Sustain**	ESS				1		1		
		Jenkins	Jeff	tjjenkins@atterbury.com	Atterbury Consultants	G								
		Keeley	**Erica**	**ekeeley@climatetrust**	**Climate Trust**	G				1				
		Kernohan	**Brian**	**bkernohan@forestcap.co**	**Forest Capital Partners**	DB-P	111 SW 5th Ave, Ste 3850; PDX 97204		503 200 2740	1			own lodging	
TB		Kerns	Tim	takerns@bmi.net	Burnt River SWCD	S								
GS		Klein	Steve	klein.steve@epa.gov	EPA	G								
TB		Kopperud	Bev	umcoswcd@oregontrail.net	Umatilla County SWCD	S	200 SE Hailey Ave Ste 108; Pendleton OR 97801		541 276 8131	1		1	emailed about accommodations	
TB		Krahmer	Doug	upperwillamette.swcd@oacd.org	Upper Willamette SWCD	S								
TB		Kroger	John	damien.t.munsinger@doj.state.or.us	Attorney General	TB								
		Kulongoski	Theodore	SchedOffice@das.state.or.us	Governor	TB							Conflict	
TB		Lamb	Glenn	glamb@columbialandtrust.org	Columbia Land Trust	G								
DB		**Lev**	**Esther**	**estherlev@wetlandconse**	**Wetland Conservancy**	G			503 239 4065	1				
GS		Light	Jeff	jeff.light@plumcreek.com	Plum Creek	G								
RDB		Linares	Jose	jlinares@fs.fed.us	USFS	DB								
		Liverman	Alex	alex.liverman@deq.state.or.us	OR DEQ	G								
GS		Lloyd	Jane	jane.lloyd@markit.com	TZ1	G								
RBD		Loftsgaarden	Meta	meta.loftsgaarden@or.usda.gov	NRCS	DB			(503) 414-3236		1			
TB		Logan	Dan	danlogan@easystreet.net	Columbia SWCD	S								
GS		Lowe	Roy	roy_lowe@fws.gov	USF & W	G								
TB		Lumley	Paul	lump@critfc.org	Klamath Indian Nation	G								
TB		McCabe	Karlene	karlene@greenbeltlandtrust.org	Greenbelt Land Trust	S								
GS		McCaulou	Scott	scott@deschutesriver.org	Deschutes River conservancy	G								

TB		McDonald	John	oacd@oacd.org	OACD	S								
DB		McDonald	Catherine	cmacdonald@tnc.org	Nature Conservancy	G		E-MAILED 3/12	503-230-1221					
GS		McFarland	Brian	bmcfarland@carbonfund.org	Carbon Fund	G								
		McKee	Colin	colin.m.mckee@uk.pwc.com	Price Waterhouse Cooper	G								
DB		Michael	Holly	holly_michael@fws.gov	ODF&W	G								
TB		Miller	Adrian	amiler@wfpa.org	WFPA	G								
DB		Miller	John	john@wildwoodcoc.com	Wildwood	G		E-MAILED 3/12	503 363 9136					
TB		Moll	Joe	jmoll@mckenzieriver.org	McKenzie River Trust	S								
TB		Monroe	Ginny	info@klamathpartneship.org	Klamath Watershed Partnership	S								
TB		Montanaro	Eve	director@mfwwc.org	Middle Fork Willamette WC	S								
DB		**Morgan**	**Jim**	**jim.morgan@state.or.us**	**State(Parks,DSL,ODF&W**	S				1				
TB		Moriarty	John	john@oregonwatersheds.org	Oregon Watersheds	S								
DB		Moryc	David	dmoryc@americanrivers.org	Am. Rivers	G			202) 347-9242.					
DB		Murray	Nick	nick@biologicalcapital.com	Biological Capital	DB			Mobile: 303-589-3731					
TB		Myers	Todd	tmyers@washingtonpolicy.org	Washington Policy Center	G								
GS		Nesteroff	Mike	mnesteroff@lanepowell.com	Lane Powell	G								
DB		Nickerson	John	john@climateactionreserve.org	CCAR	G	NOT COMING			1				
		O'Brien	Tom	tom@oregonwatersheds.org	Network of OR W'sheds	S	PO Box 10027; Eugene OR 97440		541 682 8323	1		1	refunded thru PayPal; asked about accommodations	
DB		O'Halloran	Kathy	kohalloran@fs.fed.us	US Forest Service	G		E-MAILED 3/12						
GS		Ortloff	Wolfgang	wolfgang.ortloff@equatorllc.com	Equator	DB			360 956 2430					
GS		Ouderkirk	Brad	bouderkirk@ecoconsulting.com	Ecos	G								
TB		Oveson	Jeff	jeff@grmw.org	Grande Ronde Watershed Model	S								
TB		Owens	Laurie	laurie.owens@or.nacdnet.net	Baker Valley SWCD	S								
		Parker	Doug	douglas.parker@state.or.us.	Dept. of State Lands	G	775 Summer St. NE, Suite 100; Salem OR 97301		503 986 5246	1			Cedar Lodge #13 (w/John Russell)	
		Patrino	Beth	beth.patrino@state.or.us	Legislature	G								
TB		Polkowske	Stacy	stacy.polkowske@ornacdnet.net	Water Conservancy	S								
TB		Potter	Judy	wheelerSWCD@gmail.com	Wheeler County	S								
DB*		Potter	John	john.potter@state.or.us	State (Parks,DSL,ODF&W)	S		E-MAILED 3/12						
DB		Powers	David	powers.david@epamail.epa.gov	EPA	DB			: 503_326_5874	1				
DB		**Primozich**	**David**	**primozich@willamettepar**	**Willamette Partnership**	S-P	2550 SW Hillsboro Hwy; Hillsboro OR 97123		503 434 8033	1		1	Alder #1	
GS		Prochnau	Steve	steve@jacksonandprochnau.com	Jackson & Prochnau	G								
GS		Pruett	Mike	swalker2@greendiamond.com	Green Diamond	G								
DB		Purkey	Andrew	andrew.purkey@nfwf.org	Nat'l Fish and Wildlife Foundation	G		E-MAILED 3/12	417.8700, ext. 6009					
TB		Redon	Liz	council@nsantiamwatershed.org	North Santiam WC	S								
		Roll	**Bruce**	**rollb@cleanwaterservices**	**Clean Water Services**	S-P	2550 SW Hillsboro Highway; Hillsboro OR 97123		503 681 3637	1		1	sent email re: accommodations	
		Russell	John	john.russell@state.or.us.	Dept. of State Lands	G	775 Summer St. NE, Suite 100; Salem OR 97301		503 986 5291	1			payment didn't go thru, sent email; Cedar Lodge #13 (w/ Doug Parker)	
TB		Sanders	Steve		Widow Creek Tree Farm	G								
GS		Schay	Alex	renewableschay@qwestoffice.net	Carbon Solutions NW	G								
TB		Sheets	Chris	chris.sheets@wwbwc.org	Walla Walla WC	S								
		Shepard	Rod	rshepard@westslopeproperties.com	Westslope Properties	G	219 NW Reed Lane; Dallas OR 97338			1			payment didn't go thru, sent email; getting own lodging	
RBD		Sieglitz	Greg	greg.sieglitz@oweb.state.or.us	OWEB	DB								
		Sievert	Guy	guy@esystemservices.com	EcoSystem Services LLC	ESS				1		1	Cabin #2	
GS		Sifford	Alex	alexs@oregoncoast.com		G								
GS		Sims	Barry	barry@troutmountain.com	Trout Mountain Forestry	G								
		Smith	David	apilat40@yahoo.com	Wetlands Conservancy	G	3410 NE Multnomah St.		503-708-9409	1			Alder #2	
DB		**Smith**	**Kendra**	**ksmith@b-e-f.org**	**Bonneville Enviro. Foun**	G			503.553.3949	1				
GS		Smith	Evan	postmaster@conservationfund.org	Conservation Fund	G								
GS		Smith	Gordon	gsmith@ecofor.org	Ecofor LLC	G								
		Smith	Nikola	nmsmith@fs.fed.us	US Forest Service	G								
RBD		Snyder	Diane	diane.snyder@oweb.state.or.us	OWEB	DB								
		Solliday	Louise	louise.c.solliday@state.or.us	Dept. of State Lands	G					1			
GS		Sperry	Fred	freds@sperryridge.com	Sperry Ridge Inc.	G								
TB		Springer	Dick	dick@wmswcd.org	West Multnomah	S								
DB		Stamm	Doug	dstamm@mmt.org	Meyer Memrorial Trust	DB			(503) 228-5512					

TB		Stieber	Tom	tim.stieber@or.nacdnet.net	Yamhill SWCD	S								
GS		Sugden	Brian	brian.sugden@plumcreek.com	Plum Creek	G								
GS		Sweeden	Paula	psweeden@pacificforest.org	Pacific Forest Trust	G								
DB		**Swickard**	**Naomi**	**nswickard@v-c-s.org**	**VCS**	**P**				1				
DB?		**Thilges**	**Monica**	**mthilges@climatetrust.or**	**Climate Trust**	**G**				1				
		Till	Dustin	dtill@martenlaw.com	Marten Law Group	G	1001 SW 5th Avenue - Suite 1500 PDX 97204		503 241 2641	1			Chickaree #25	
		Tornek	Rachel	rachel@climateactionreserve.org	CCAR	G								
TB		Tuchman	Tom	tuchmann@usforestcapital.com	US Forest Capital	G			503 220-8103					
DB		Vanderschaff	Dick	dickvanderschaff@tnc.org	Nature Conservancy	G			503 802 8100 X 136					
		Vickerman	Sara	svickerman@defenders.org	Defenders of Wildlife	G	3080 Westview Circle; Lake Oswego 97034		503-697-3222	1			Blueberry #7	
		Vitale	Ben	bvitale@climatetrust.org	Climate Trust	G					1			
TB		Voelke	Katie	nclctrust@theoregonshore.com	No. Coast Land Conservancy	S								
DB		Vogt	Caroline	vogtc@lanepowell.com	Lane Powell	G				1				
TB		Vollmer-Buhl	Liz	coordinator@siuslaw.org	Siuslaw WC	S								
DB		von Hagen	Bettina	bettina@ecotrustforests.com	Ecotrust Forest Management	DB								
TB		Watson	Danette	watershed.klamath@oregonstate.edu	Klamath WC	S								
TB		Weideman	Kelly	malheurwatershed@fmtc.com	Malheur WC	S								
DB		Weiden	Dan	Dan.Weiden@wk.com	Weiden + Kennedy	DB								
TB		Weitz	Dan	weitz@bmi.net	Powder Basin WC	S								
TB		Westlund	Ben	josh.balloch@state.or.us	Secretary of Treasury	TB					1			
GS		Whitworth	Joe	joe@thefreshwatertrust.org	Freshwater Trust	G								
TB		Williams	David	dwilliams@shorebankpacific.com	Shorebank	G								
TB		Wolcott	Brian	brian.wolcott@wwbwc.org	Walla Walla WC	S								
DB		Wolfstone	Jeff	wolfstonej@lanepowell.com	Lane Powell	DB								
DB		Wolniakowski	Krystyna	wolniakowski@nfwf.org	Nat'l Fish and Wildlife Foundation	DB			503.417.8700					
TB		Wood	Sharon	swood@trlc.org	Three Rivers Land Conservancy	S								
DB		Wood	Tim	Tim.Wood@state.or.us	OPRD	g								
GS		Wyse	Barbara	bwyse@entrix.com	Entrix	G								
TB		Zwissler	Sarah	necanicumwatersheds@gmail.com	Necanicum and Lower Nehalem WC	S								
		TOTALS								38	8	#NAME?		
				GROSS REVENUE	#NAME?									

TECHNICAL TERMS/ DEFINITIONS

The carbon-offset world has a language of its own; here are some key word definitions:

Carbon Offset: A unit of measure (usually in increments of 1 tonne of a carbon based gas like carbon dioxide or methane), which allows a corresponding tonne of emissions released by an activity to be offset or neutralized by another activity. (Planting trees, capturing or reducing emissions elsewhere, etc)

Standards, Protocols and methodologies: A series of carbon project guidelines, that has been internationally recognized, and which specifies how carbon is measured, what constitutes additionality and permanence, how the project is monitored / verified and when, etc. (See below)

Additionality: The standard that allows only carbon sequestered over and above what would have been if "business as usual" practices had been followed i.e. altering the future outcome through the carbon transaction itself.

Permanence: The standard that ensures that the additional carbon storage achieved by the project is not lost during the term of the agreement.

Monitoring and verification: Over time ensuring that there have been no changes in the land management plan or natural disturbances to the land. (e.g. fire, excessive harvest, grazing or tilling, change of use) that would change the amount of carbon storage guaranteed in the project.

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THE NINE FOUNDATIONAL QUESTIONS FOR IDENTIFYING A VIABLE FOREST BASED CARBON OFFSET PROJECT:

#1) Has the project been mandated by any enforced law, statute or other regulatory framework?

#2) Does the project require additional funding in order for it to proceed?

#3) Would the future use of the property be altered from current "business as usual" and would this increase its capacity to store carbon?

#4) In the case of land acquisition is there a land owner(s) willing to enter into a purchase and sale agreement or other legal instrument, (such as an easement) for reasonable compensation?

#5) Would it be agreeable to all parties that this contract include language that defines a predictable and consistent use of the property for a defined period in the future? (No less than 20 years and up to 100 years)

#6) Is the wooded property 500 acres or more in size ?(Or could the property in question be aggregated with adjoining properties to equal 500 acres or more)

#7) Is the project/ property in question accessible for annual monitoring and verification activities?

#8) Is there current land information available such as timber cruises, appraisals, etc?

#9) Will the project have a net positive (or neutral) effect on the natural system(s) in which it occurs ?

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DRAFT

Closed Loop Carbon Economy in Oregon

Local solutions to a global problem.

The Context

Thanks to the abundant natural assets of its soils, forests and wetlands, Oregon has world-class carbon sequestration capacity. For a variety of reasons this valuable resource lies largely undeveloped despite its ability to generate jobs and revenue as well as potentially offsetting all of Oregon's carbon emissions as a state.

Every day Oregon businesses and individuals voluntarily offset their carbon emissions by supporting carbon mitigation projects, the majority of which are industrially based and located outside the state/country. These represent a fraction of the potential offsets that would be purchased if the process was made easier (or mandated) and the investments were being made locally in our own communities.

Proposed state, regional and national carbon regulations are in various stages of development causing many participants in the carbon markets and in the field of carbon project development waiting until the rules of the market become clear. Meanwhile the parts per million in the climate has climbed above 385 parts per million, a dangerous threshold. A stream of studies, standards and climate change strategies have been generated, but to date only a trickle of bio-based carbon projects have been completed in our state.

These are the conditions that have led to the proposed formation of the "Closed Loop Carbon Economy in Oregon (CLCEO)" model.

The Goals

1. A carbon offset supply chain in Oregon that links the generation of jobs in rural and urban areas to the conservation and management of Oregon's most biologically sensitive areas through the development and sale of carbon offsets (and other ecosystem services).

2. Support for a generative vs. extractive rural economy.

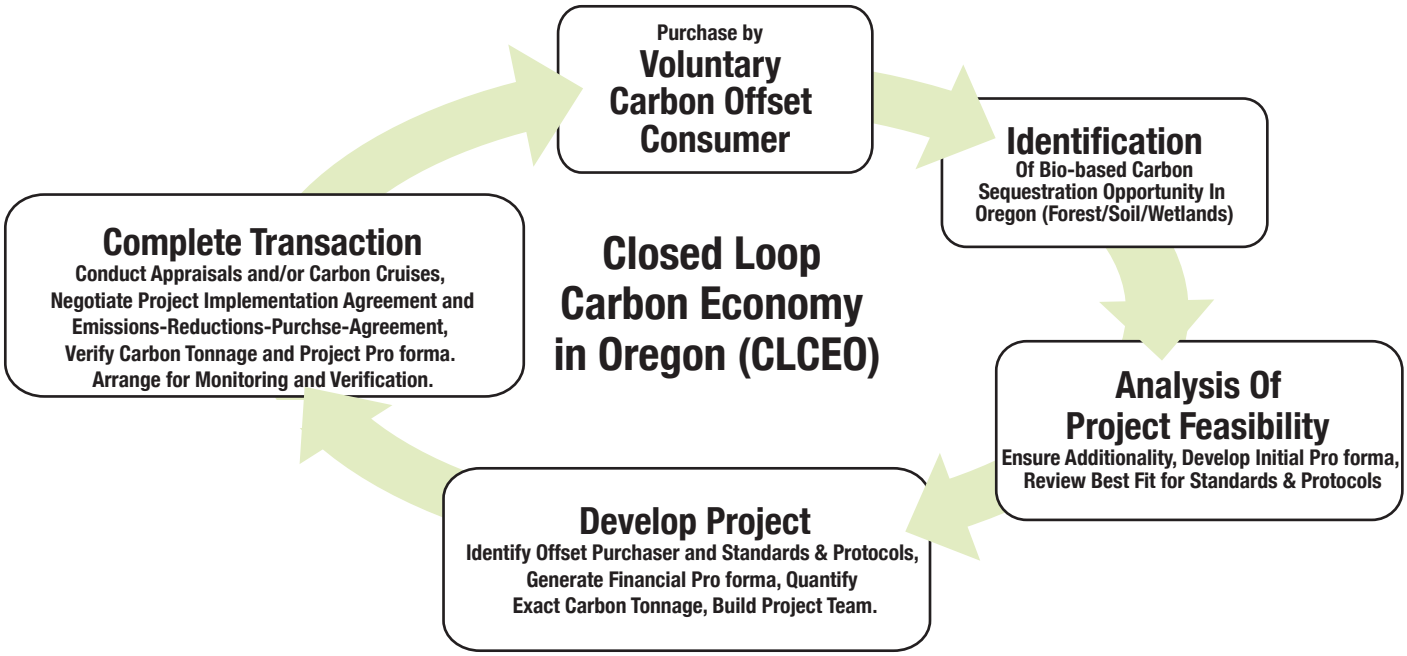
3. Sustainable use of Oregon's greatest assets that supports economic development, conserves the environment, and contributes to the reversal of increasing greenhouse gases in the atmosphere.

4. Stop the flow of capital out of state. Potential for bringing additional outside revenue into the state.

5. An Oregon Carbon Standard that recognizes conservation efforts and allows for working landscapes to deliver goods and ecosystem services to residents and addresses the lack of realistic and carbon protocols in the markets today. (By helping to jump start the development of a robust carbon offset supply chain)

6. Provide Oregon companies in-state verifiable offset credits immediately while aligning with other mandatory regulations as they come on line.

7. An Oregon carbon neutrality brand that will serve as a marketing tool in the new green economy.



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Closed Loop Carbon Economy in Oregon

Local solutions to a global problem.

The Supply

Oregon has natural assets that may be monetized through the development and sale of carbon offset credits. This supply of assets has the potential of being generated by:

A) State Agencies: Primarily those involved in acquisition or restoration such as OWEB and OPRD, and those who manage and/or lease large tracts of land such as DSL. (There are currently a small handful of projects in the state that offer precedence for this transfer of a natural resource asset from a state agency into the markets.)

B) NGO's: Those involved in land acquisition or conservation easement purchases such as The Nature Conservancy, The Wetlands Conservancy, etc.

C) Municipalities: Carbon can provide a valuable new financial tool for municipalities to gain control over their watersheds.

D) Tribal Nations: Many current land holdings could benefit from changes in business as usual harvesting. Also, tribal nations are among the most active in land acquisition from industrial timber companies.

E) Private Timber Industrials: Interest in market models (carbon in combination with other ecosystem services or sustainable harvests) that would increase returns to shareholders and/or generate revenue from unproductive lands.

The Demand

Oregon is already a state with a mandatory carbon emission "tax" charged to utilities and collected and offset by The Climate Trust, as mandated by 1997 legislation. The carbon/GHG tax idea could be expanded by state legislative action or by federal cap and trade legislation to target the largest industrial emitters in every sector. There is already an existing voluntary market consisting of individuals offsetting travel and other aspects of every day life that create emissions. There is a small but growing business community that sees the advantages of being carbon neutral in green marketing and to satisfy shareholder demand.

The Marketplace and Standards

There is no existing Oregon based carbon or ecosystem services market that is working. The Willamette Partnership has created a model of mitigation banking for Oregon that has not been operationalized. Current projects must rely on the Climate Action Registry, (CAR) and the Voluntary Carbon Standard. (VCS) CAR is the most rigorous protocol and may be used as a model for any federal legislation. VCS is the most used in international trades. One barrier these out of state protocols pose is their high transaction costs and the difficulty they present in taking advantage of the type of projects Oregon has to offer; those with multiple ecosystem services that can be stacked in a project to sell as a package. (See previous section on the development of an Oregon standard.)

What Oregon Needs

- A fully functioning and connected carbon supply chain from the ground to the markets that make it easy for businesses to become carbon neutral.
- A regulated marketplace.
- Incented project developers.
- Technical assistance funds to assist in early stage project feasibility assessments and legal and technical services.
- A legal framework for transactions including the Oregon equivalent of Project Implementation Agreements, Emission Reduction Purchase Agreements (EPRAs), etc.
- More qualified organizations, in addition to The Climate Trust, that may purchase offsets on behalf of Oregon businesses and agencies.

A current *real world* example of how a transaction works:

One of the reasons carbon offset projects have struggled to gain support and traction is that potential revenues are not sufficient to cover transaction costs and make it profitable to the offset buyer. Ecosystem Service markets are also hightly abstract and not understandable to those not involved in current makrets. The basic hallmark of a CLCEO project is that it must show multiple benefits to be viable and must be designed from the start to do so.

Beaver Creek Bio-Carbon Project

A land acquisition will be made mid 2010 by Oregon Parks and Recreation Department, (OPRD) who will be purchasing a parcel from Forest Capital Partners (Timber industrial) that has multiple ecosystem services present (ESAs, carbon offsets, fish and wildlife habitat, biodiversity, recreation). The offsets generated by this change in use will create enough revenue to address the shortfall in this state agencies budget for acquisition of this site. And in the process this purchase will move 580 acres of sensitive lands into recreational use for the people of Oregon in support of the #1 job creator on Oregon's coast tourism. The jobs it will create and support far outweigh the jobs lost from harvesting and milling the industrial timber parcel every thirty-five years.

This Project's Triple Bottomline

People - Creates additional year round jobs.

Planet - Protects sensitive lands containing riparian zones and ESA listed species as part of a contiguous estuarine complex on Oregon's iconic coastline.

Profit - Provision of funds to a state agency in exchange for carbon rights.

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Oregon Watershed Enhancement Board's

Carbon Offset and Ecosystem Services Grant

FINAL REPORT PRESENTATION / JUNE 3, 2010

OWEB

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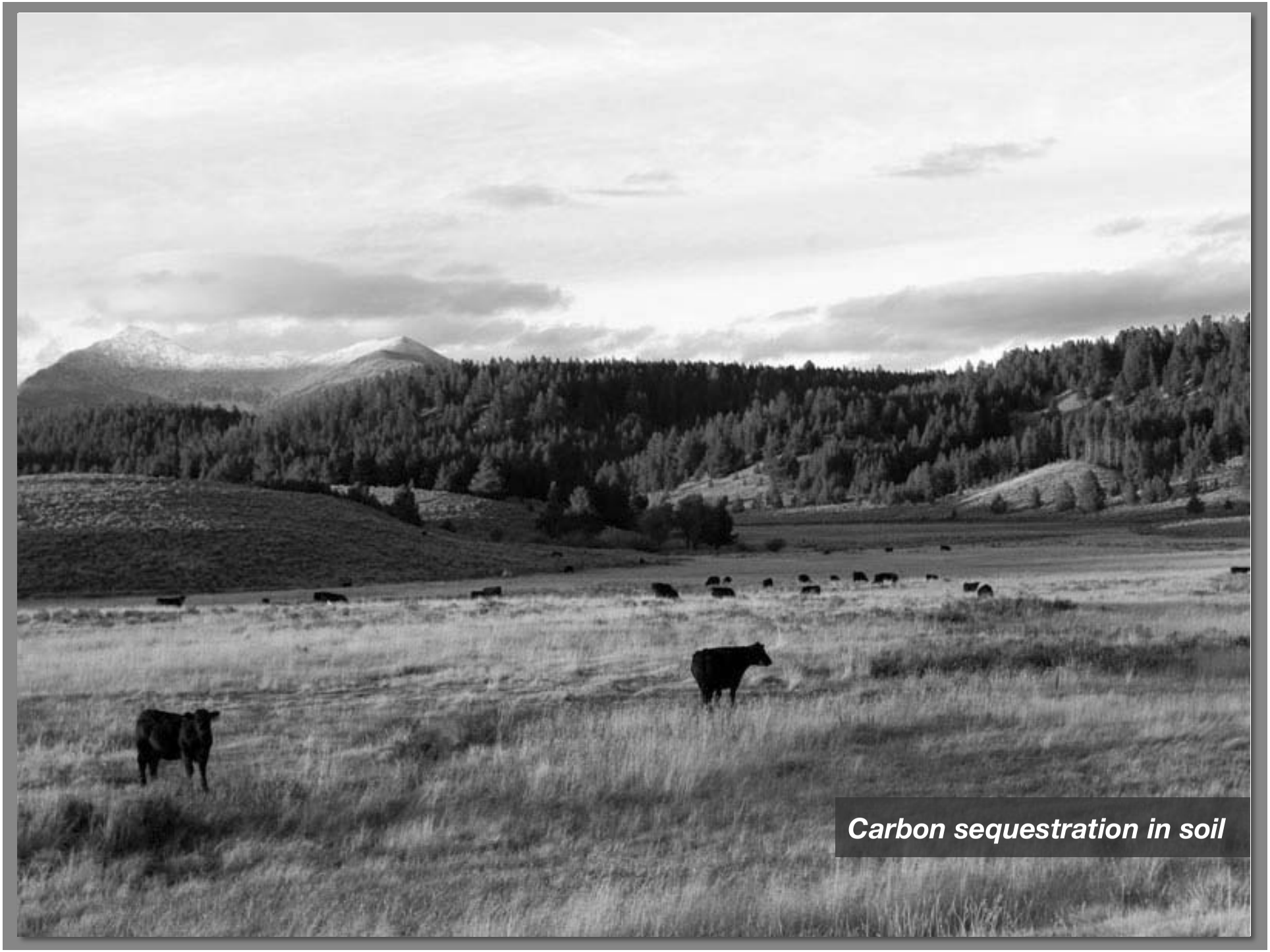
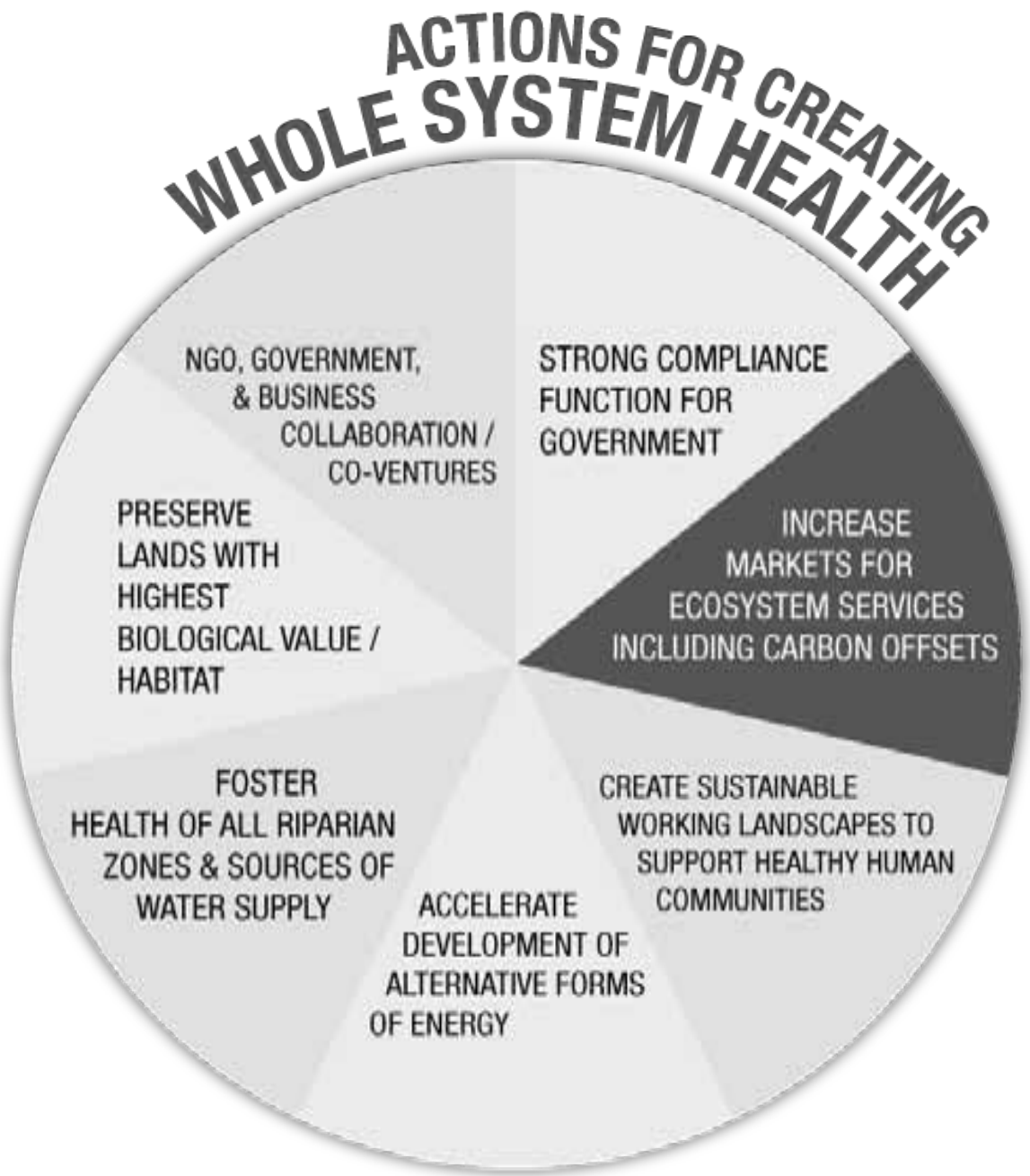
BIOLOGICALLY BASED CARBON PROJECTS
Carbon sequestration in plant life


Carbon sequestration in soil

Carbon sequestration in wetlands & the ocean

CARBON OFFSETS



One of many tools to achieve whole system health NOT a "silver bullet".

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Maintaining Habitats

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Water Temperature

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Species Diversity

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Storm Water Management

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OWEB AND ECOSYSTEM SERVICES & CARBON OFFSETS

The Past
The Present
The Future

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THE PAST

PAST

BACK-CASTING **ACTIVITY:**

A "Back-casting" report was generated by conducting a detailed analysis of historical OWEB restoration and acquisition projects in order to quantify their carbon offset and ecosystem service values.

The ESS team reviewed 196 OWEB restoration grants (In 2008-2009) and 31 OWEB acquisition grants (Since 1998) and grouped their activities into 10 categories.

1) *Riparian Planting and Restoration.*
2) *Logging Road Removal.*
3) *Hardwood Restoration.*
4) *Grassland Restoration.*
5) *Grazing Land Improvement and Management Improvement.*
6) *Agricultural Management Improvements.*
7) *Juniper Removal.*
8) *Conservation Easement (Protection).*
9) *Conservation Easement (Working Lands).*
10) *Fee Simple Acquisition.*

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PAST

BACK-CASTING **RESULTS (A):**

Westwind Coho Access Culvert Project

Estimated amount of carbon sequestered by RESTORATION PROJECTS in 2008-2009: **303,500 tons of CO2e.**

A range of potential market value for these RESTORATION PROJECTS:

$1,214,000 to **$ 2,280,000.**

(303,500 tons of CO2e x an assumed value range of $4.00 to $7.50 per ton of carbon offsets dependent on standards and buyers.)

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PAST

BACK-CASTING **RESULTS (B):**

529 Acre Westwind Acquisition Project

Estimated amount of carbon sequestered by ACQUISITION PROJECTS since 1998 totaled:

725,000 tons of CO2e.

A range of potential market value for these ACQUISITION PROJECTS totaled:

$2,900,000 to **$5,437,500.**

(725,000 tons of CO2e X an assumed value range of $4.00 to $7.50 per ton of carbon offsets dependent on standards and buyers.)

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THE PRESENT

PRESENT

To better understand the **opportunities and barriers** for carbon and ecosystem services present in Oregon today:

- STAKEHOLDER SURVEY
- TWO DAY CARBON EVENT
- PILOT PROJECTS
- MARKETS

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PRESENT

SURVEY **RESULTS:**

Stakeholder input showed a wide range of interest in participating and benefiting from these new sources of revenue:

From a deeply held suspicion that it was all just “smoke and mirrors”.

To an excitement and keen interest to know how they could participate.

To entities already engaged in developing and transacting millions of dollars of ecosystem service business.

Survey results showed that this field is young and emerging but also revealed a clear link between ecosystem service projects and OWEB’s core mission.

“ ***OWEB's mission*** *is to help create and maintain healthy watersheds and natural habitats that support thriving communities and strong economies.*

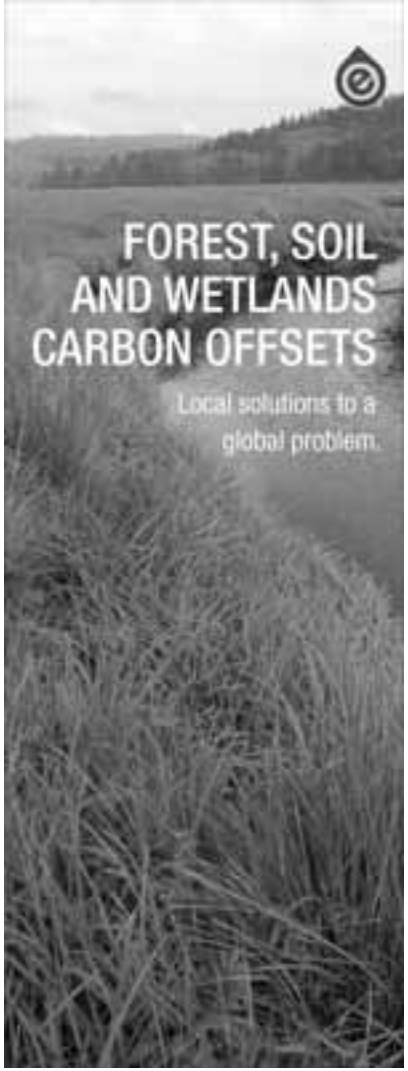
EVENT **ACTIVITY:**

ESS hosted a two day working group event entitled "Forging the carbon offset supply chain in Oregon."

The purpose of this event was to accelerate the development of biologically based carbon offset projects in Oregon by connecting and educating all the critical players in the supply chain from supply to demand.

Participants included: timber companies, government agencies, NGOs, leading scientists, carbon marketing companies, and others who are currently transacting on-the-ground carbon offset projects in the Northwest.

PRESENT



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PRESENT

PILOT PROJECT **ACTIVITY:**

Two carbon offset pilot projects: A **forest based project** adjacent to an Oregon coastal estuarine complex and a **soil based project** on eastern Oregon rangelands.

Coastal Forest Project in Western Oregon

Rangelands Project in Eastern Oregon

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PRESENT

FOREST BASED PROJECT **RESULTS:**

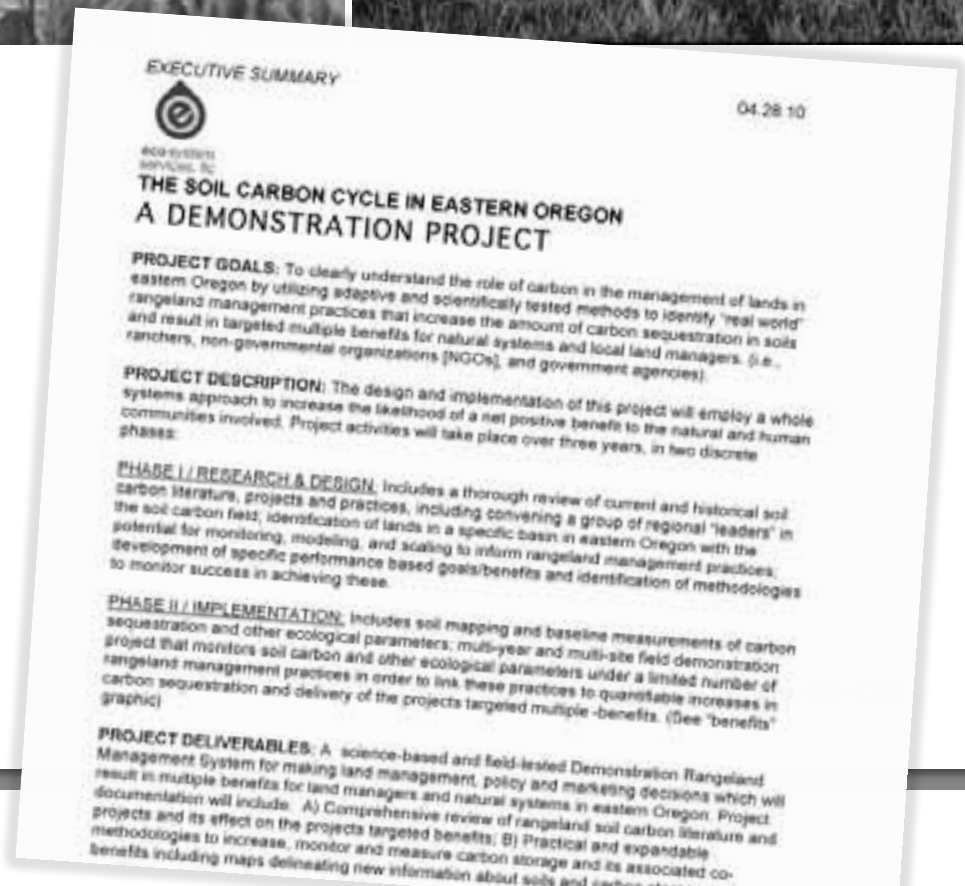
State agency transfer of carbon offset rights to a quasi-governmental agency purchasing the credits. **This project surfaced a variety of issues:**

- **Legal precedence.**
- **Minimum scale needed to be commercially viable.**
- Conservation benefits **protected through a permanent "mixed use" easement.**
- People of Oregon **receive recreational opportunities.**
- **Multiple benefits, over and above carbon offsets, can and should flow from any carbon ecosystem services transaction** in order to make them viable financially and in terms of natural system health and human communities.

PRESENT

SOIL BASED PROJECT **RESULTS:**

- In development phase
- Uniting federal and state agencies, ranchers, and NGOs.
- Aims to increase soil carbon in lands in eastern.
- Intends to realize a cascading set of benefits such as **water infiltration and retention, the health of perennial grass stands, and an increase in biodiversity.**



EXECUTIVE SUMMARY

04.28.10

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THE SOIL CARBON CYCLE IN EASTERN OREGON
A DEMONSTRATION PROJECT

PROJECT GOALS: To clearly understand the role of carbon in the management of lands in eastern Oregon by utilizing adaptive and scientifically tested methods to identify "real world" rangeland management practices that increase the amount of carbon sequestration in soils and result in targeted multiple benefits for natural systems and local land managers. (i.e., ranchers, non-governmental organizations [NGOs], and government agencies).

PROJECT DESCRIPTION: The design and implementation of this project will employ a whole systems approach to increase the likelihood of a net positive benefit to the natural and human communities involved. Project activities will take place over three years, in two discrete phases:

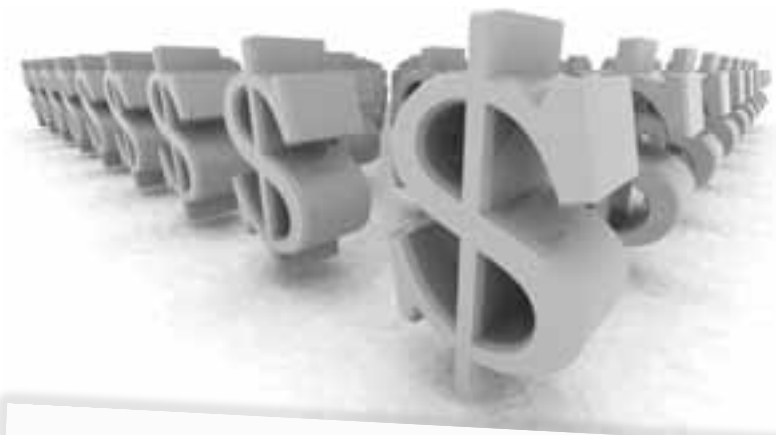
PHASE I / RESEARCH & DESIGN: Includes a thorough review of current and historical soil carbon literature, projects and practices, including convening a group of regional "leaders" in the soil carbon field; identification of lands in a specific basin in eastern Oregon with the potential for monitoring, modeling, and scaling to inform rangeland management practices; development of specific performance based goals/benefits and identification of methodologies to monitor success in achieving these.

PHASE II / IMPLEMENTATION: Includes soil mapping and baseline measurements of carbon sequestration and other ecological parameters; multi-year and multi-site field demonstration project that monitors soil carbon and other ecological parameters under a limited number of rangeland management practices in order to link these practices to quantifiable increases in carbon sequestration and delivery of the projects targeted multiple -benefits. (See "benefits" graphic)

PROJECT DELIVERABLES: A science-based and field-tested Demonstration Rangeland Management System for making land management, policy and marketing decisions which will result in multiple benefits for land managers and natural systems in eastern Oregon. Project documentation will include: A) Comprehensive review of rangeland soil carbon literature and projects and its effect on the projects targeted benefits; B) Practical and expandable methodologies to increase, monitor and measure carbon storage and its associated co-benefits including maps delineating new information about soils and carbon

MARKET **ACTIVITY:**

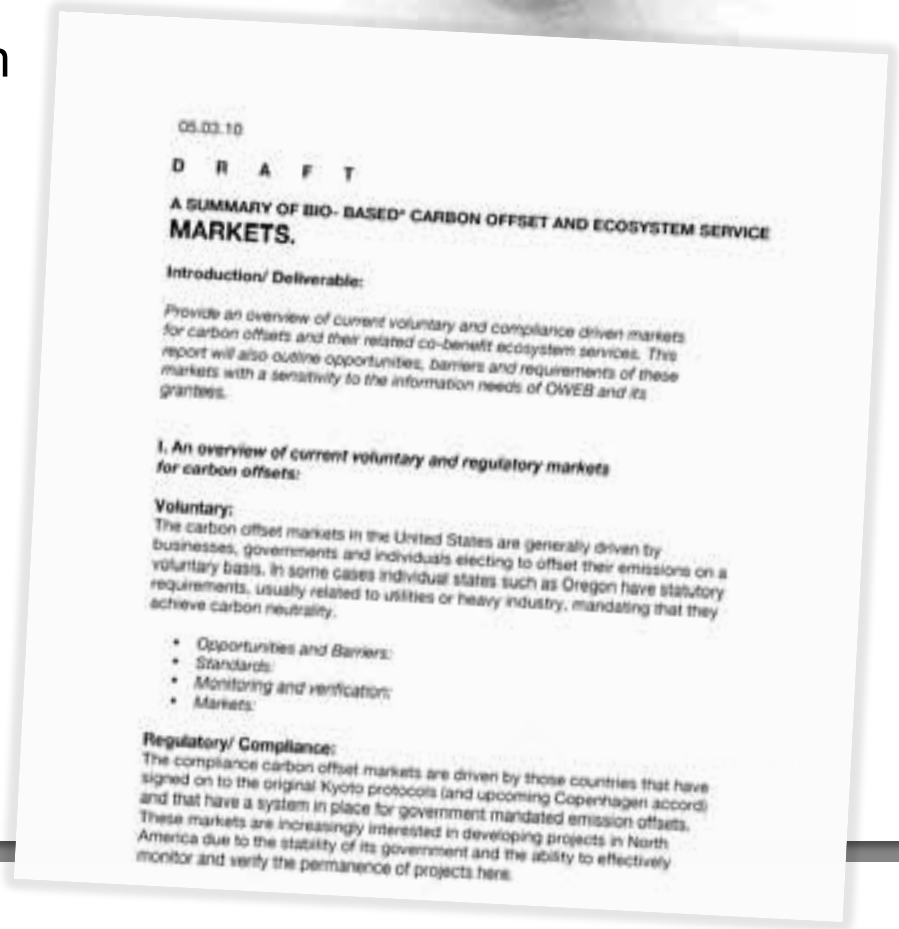
PRESENT



A report on current carbon and leading ecosystem service <u>markets.</u>

•Overview of current voluntary and compliance driven markets for carbon offsets and their related ecosystem services.

•Opportunities, barriers and requirements of these markets with sensitivity to the information needs of OWEB and its grantees.



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D R A F T

A SUMMARY OF BIO- BASED* CARBON OFFSET AND ECOSYSTEM SERVICE MARKETS.

Introduction/ Deliverable:

Provide an overview of current voluntary and compliance driven markets for carbon offsets and their related co-benefit ecosystem services. This report will also outline opportunities, barriers and requirements of these markets with a sensitivity to the information needs of OWEB and its grantees.

I. An overview of current voluntary and regulatory markets for carbon offsets:

Voluntary:
The carbon offset markets in the United States are generally driven by businesses, governments and individuals electing to offset their emissions on a voluntary basis. In some cases individual states such as Oregon have statutory requirements, usually related to utilities or heavy industry, mandating that they achieve carbon neutrality.

- *Opportunities and Barriers:*
- *Standards:*
- *Monitoring and verification:*
- *Markets:*

Regulatory/ Compliance:
The compliance carbon offset markets are driven by those countries that have signed on to the original Kyoto protocols (and upcoming Copenhagen accord) and that have a system in place for government mandated emission offsets. These markets are increasingly interested in developing projects in North America due to the stability of its government and the ability to effectively monitor and verify the permanence of projects here.

THE FUTURE

FUTURE

To help OWEB and its grantees determine its future carbon and ecosystem service policies and practices:

A Carbon Offset "Road Map" And Field Based Project Criteria And Questionnaire.

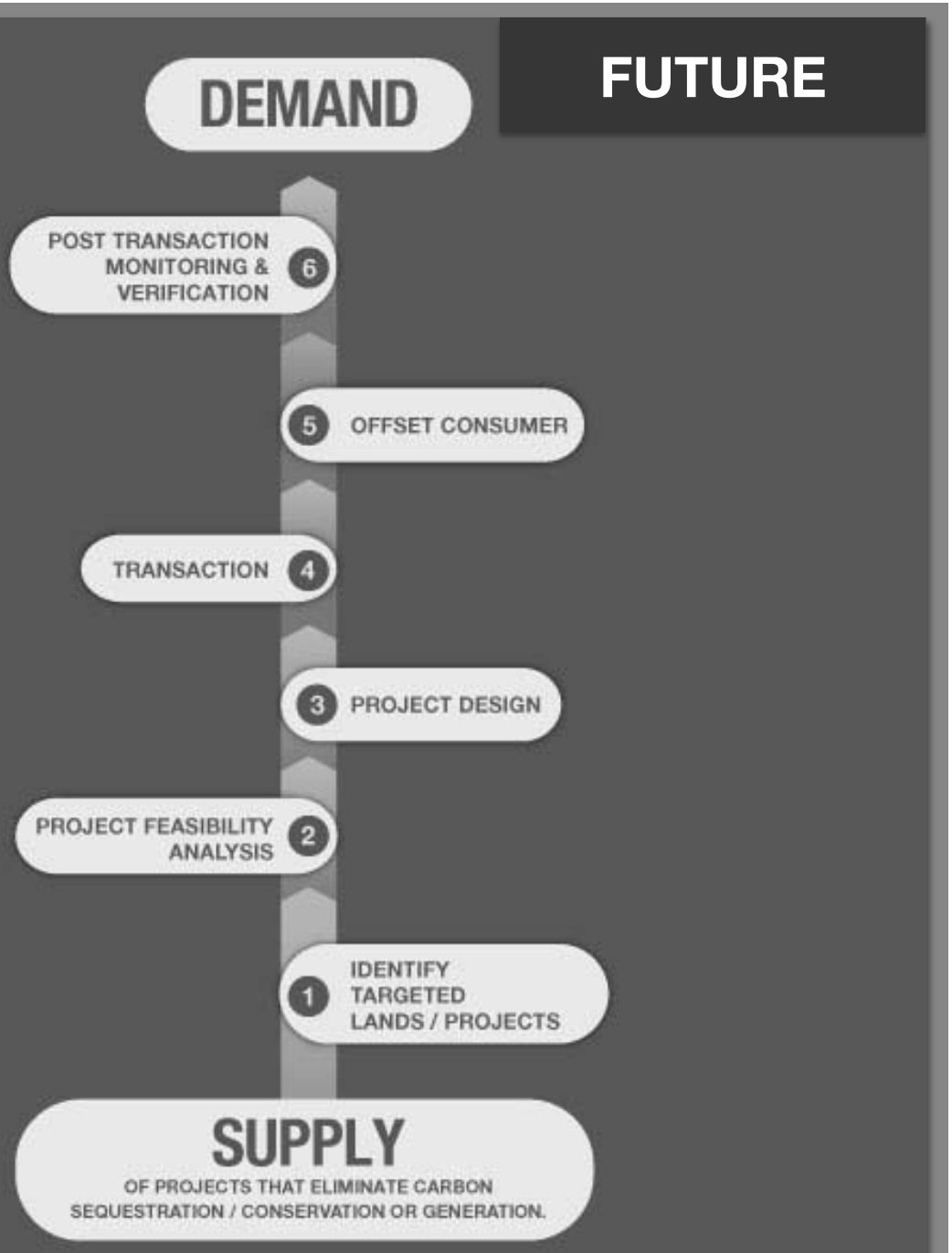
An OWEB Regional Guide To Opportunities And Barriers In The Field Of Carbon Offsets And Ecosystem Services.

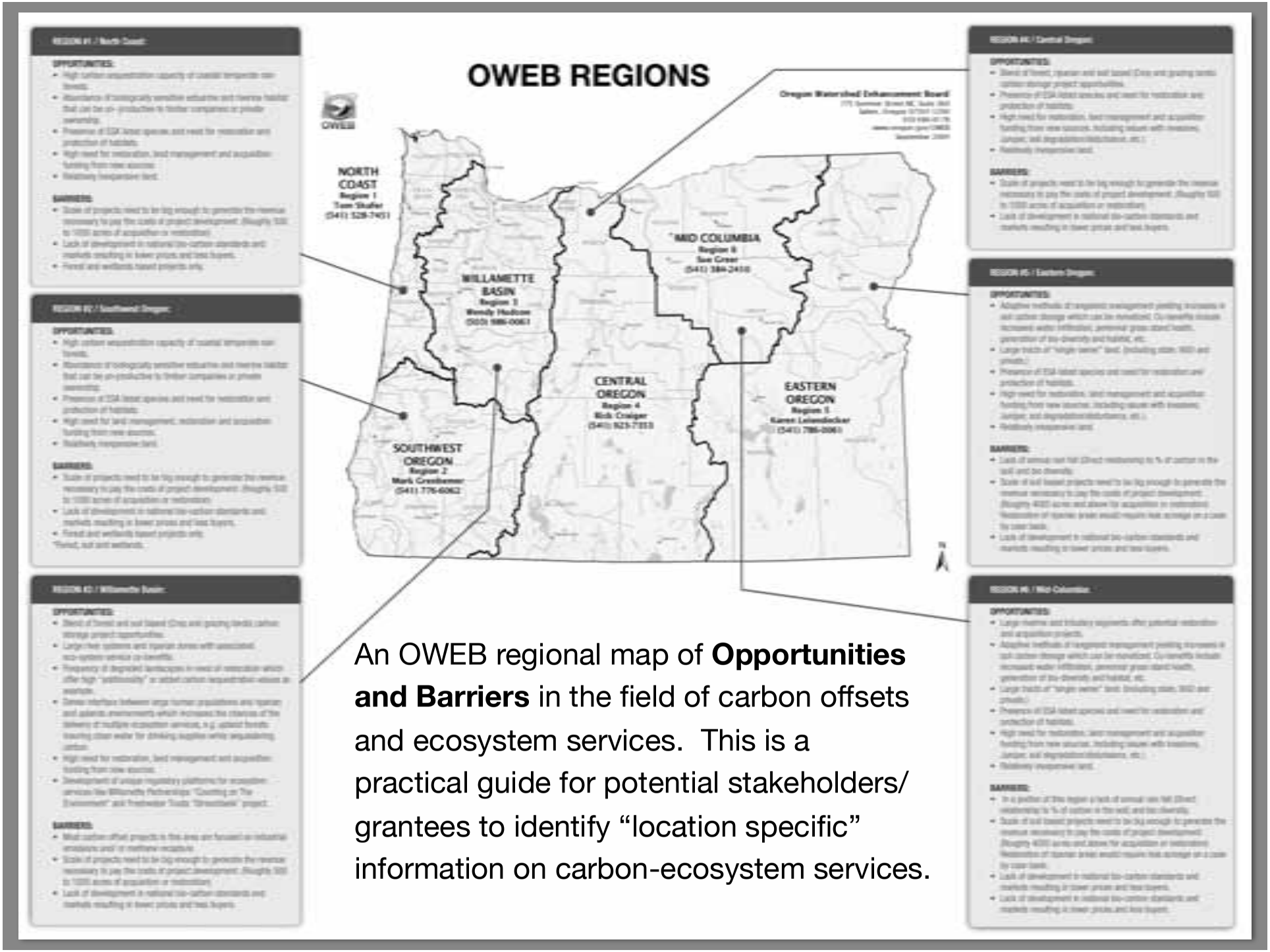
Projected Future Developments In The Carbon And Ecosystem Service Markets.

ecosystem services

THE CARBON ROAD MAP

A step-by-step practical tool with a full graphical explanation of participants, actions to take and critical resources for moving carbon projects from "supply to demand".





An OWEB regional map of **Opportunities and Barriers** in the field of carbon offsets and ecosystem services. This is a practical guide for potential stakeholders/ grantees to identify “location specific” information on carbon-ecosystem services.

FUTURE MARKETS

Projected future developments in the carbon and ecosystem service markets are described in order to allow the reader to anticipate upcoming changes in this emerging and still fluid field.

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GRANT SUMMARY

GRANT SUMMARY

OWEB is one of Oregon's primary funders for ecosystem service projects

Yet, OWEB at present has **no clear way of quantifying the value or impact of the ecosystem services they are currently delivering.**

OWEB **is likely generating sizeable quantities of monetizable ecosystem services** in at least one field: Carbon sequestration.

Existing rules do not provide **adequate direction to grantees regarding project design and implementation** specific to ecosystem services.

Agency's policies to not provide clarity regarding the **relationship of the agency or their grantees to ecosystem services markets as a potential source of revenue.**

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RECOMMENDATIONS

RECOMMENDATIONS FOR THE FUTURE

1 a) **Develop clear guidance and methodologies** for the Agency and/or grantees to quantify and monetize carbon-ecosystem services.

1 b) **Design a process within OWEB's grant and fiscal processes for revenue from carbon-ecosystem services to become an "annuity"** to pay for the long-term management of restored and acquired lands.

ecosystem services

RECOMMENDATIONS FOR THE FUTURE

2) **Develop a simple "Return on Investment" quantification method to capture the value of key ecosystem services** (e.g., carbon, water related services, fish habitat and biodiversity).

3) **Form a rotating "technical services" fund** to spark the initial development of carbon-ecosystem service projects that benefit natural systems in Oregon.

ecosystem services

RECOMMENDATIONS FOR THE FUTURE

4) **Provide a full time FTE to perform oversight and quality-control for market-eligible projects** through which verifiable, high-quality carbon-ecosystem services could be documented and coordinated among state, national, and international registries. For example, OWEB might hold easements or other legal instruments to give confidence to buyers and markets in terms of permanence.

5) **In partnership with the Legislature and others, stimulate an Oregon-based supply and demand for carbon offsets and ecosystem services**. This network would be made up of private, NGO and state agency stakeholders who would both supply projects as well as become carbon neutral in their operations through Oregon based offsets. In addition, this approach would help the State achieve its conservation goals.

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