

# Washington Conservation Markets Study

## Final Report

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**Prepared for the Washington State Conservation Commission**  
By Evergreen Funding Consultants

With support from  
Cascadia Consulting Group and  
American Farmland Trust

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# Introduction

## *Purpose of this Report*

This report evaluates the feasibility of establishing conservation markets in rural communities in Washington to pay farmers and foresters for environmental benefits from conservation projects on their land. The conservation markets project originated in a bill passed by the Washington State Legislature in 2008 that directs the Washington State Conservation Commission to perform a two-part study of the potential for rural conservation markets in Washington. As defined in the bill<sup>1</sup>, a conservation market is a “farm or forest-based market for selling credits for wetland or habitat restoration or water quality cleanup to agencies in need of such credits to fulfill mitigation, compliance requirements, and other environmental needs.”

While the primary focus of the project has therefore been on markets created to fulfill mitigation and compliance needs, the legislation also states that conservation markets “shall also be broadly interpreted to include any program that provides ongoing revenue to sustain the long-term viability of farms and small forestry operations as a result of maintaining or enhancing environmental benefits.”

The legislation directs the Conservation Commission to produce a report by December 2008 that evaluates the feasibility of conservation markets in Washington. The bill specifies that the evaluation include an analysis of other rural conservation markets in the United States, an assessment of market supply and demand, consultation with key stakeholders, and consideration of options for design and management of the market. If the outcome of this study indicates that conservation markets are feasible and desirable for use in Washington, the legislation directs the Commission to initiate at least two pilot market projects in the state and report on the results of the pilots by December 2009.

Due to budget and contracting issues in state government, the project was delayed until November 2008 and findings were presented to the Legislature in January 2009.

## *About Conservation Markets*

Most of the existing conservation markets in the United States are known by other names, including mitigation banks, conservation banks, in-lieu-fee programs, greenhouse gas (GHG) allowance trading, and water quality trading programs. These markets share the following characteristics:

1. They involve rural landowners in supplying conservation “products” of various sorts, including wetlands, fish and wildlife habitats, GHG offsets, or water quality improvements;

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<sup>1</sup> Substitute Senate Bill 6805.

2. They result in direct payments to the landowner for supplying the conservation products;
3. They are voluntary for all participants;
4. They are driven in whole or in part by a mitigation or compliance requirement under federal, state, or local environmental regulations.

While conservation markets that meet all of these criteria are few in number – with perhaps 60-70 examples nationwide – there is wide and growing interest in these mechanisms. In part, this interest is fueled by the potential of land management to improve water quality, provide habitat, sequester carbon, and otherwise provide environmental benefits in a cost-effective way. In addition, there is a growing recognition of the importance of maintaining the rural landscape and rural communities for their environmental, social, and economic values. Conservation markets may provide a sustainable revenue source for rural landowners.

### ***About the Project***

The conservation markets study was conducted by Evergreen Funding Consultants on contract to the Washington State Conservation Commission, with support from Cascadia Consulting Group and American Farmland Trust. The consultants were advised by a committee with members from farming, forestry, environmental, and regulatory interests. The study included the following tasks:

- An analysis of existing conservation markets in the United States and internationally, with implications for Washington markets (documented in Chapter 1 of this report);
- A brief assessment of supply and demand for conservation market products in Washington (Chapter 2);
- An analysis of the opinions and concerns of key stakeholders, including permitting staff, rural landowners, and potential credit buyers (Chapter 3); and
- An evaluation of organization models for conservation markets (Chapter 4).

Each chapter begins with a summary of key findings, followed by further explanation.

## Executive Summary

Conservation markets are a bit like skydiving or polygamy: lots of people talk about them but few participate.

People talk about conservation markets because they offer a way to pay for things that people value but cannot always afford – things like keeping farmland in production, restoring entire ecosystems, and reducing global warming. Since the dawn of the U.S. environmental movement in the 1970's, the American public has demanded more and more out of the environment – cleaner air and water, larger parks and preserves, better management of fish and wildlife. Spending on the environment matched this trend for more than thirty years, waxing and waning a bit according to the administration but always progressing upwards.

At some point, it was inevitable that the money for environmental improvements would get tighter. After all, many of the quick and inexpensive things – eliminating the worst polluters, setting aside headwaters for parks and preserves, and the like – have been done. But few could have expected the economic crunch that the nation is currently experiencing. For the first time in the 35-year history of the American environmental movement, it seems quite possible that spending on the environment will face a serious long-term decline.

Conservation markets offer the promise of squeezing more out of each dollar spent on the environment. They do so first by applying economic values to resources that have long been considered immeasurable, such as a block of riparian forest, a functioning wetland, or an undeveloped farm. Then, by encouraging voluntary investment and allowing people to opt for improving these resources in their mitigation and compliance plans, conservation markets provide a way to focus environmental dollars on the most efficient and effective solutions.

This concept – using markets to get more value out of spending on the environment – has proven irresistible in national policy discussions. An entire sector of agencies and think tanks has sprung up to focus on conservation markets in all their guises, including, in recent weeks, the development of a brand new Office of Ecosystem Services and Markets in the U.S. Department of Agriculture.

The reason why these markets are much discussed but little practiced is simply that creating a working conservation market is extremely difficult to accomplish.

### **What's a conservation market?**

A conservation market is a program that facilitates payments to landowners for environmental improvements. The focus of this report is on markets designed to meet federal and state environmental regulations. In a regulatory context, conservation markets provide a way to fulfill mitigation and compliance responsibilities by paying landowners for conservation projects. Conservation markets are also known as ecosystem service markets, conservation and mitigation banks, and water quality trading programs.

The full study report includes a selective profile of operating conservation markets in the U.S., with a particular focus on those used in regulatory programs. At first glance, it is impressive in the number of markets that are operating, with a wide range of water quality, air quality, habitat, and wetland applications. But it is also important to remember that this is the culmination of more than a decade of discussion, incubation, and active financial support. Thought about this way, the number of successful markets is modest.

The few really successful regulation-driven models in the U.S. tend to have an unusual combination of features, including:

- A well-defined environmental standard to meet, such as a specific temperature or nutrient requirement;
- A flexible regulatory scheme for attaining that standard, and particularly one that allows for consideration of an unusually wide set of alternatives;
- A highly motivated buyer, most often a large agency seeking environmental permits;
- Many individuals and groups interested in creating, marketing, and selling credits from conservation actions;
- A platform for valuing credits, brokering transactions, and accounting for trades; and
- A political environment that supports the development and implementation of the trading program.

The two features that are hardest to find – and the most constraining to markets generally – are **flexibility in regulations** and **motivated buyers**.

With regard to **regulations**, conservation markets and the individual transactions under markets are regulated by a variety of federal, state, and local agencies using a regulatory scheme that has its foundations in the 1970's. The scheme emerged from laws focused on individual resources (endangered species, wetlands, and wastewater) and on the biggest environmental threats of the day, particularly polluted industrial and municipal discharges and smokestack emissions. Many of these regulations were remarkably successful at addressing these problems, but do not lend themselves well to the consideration of a wide variety of conservation actions, including a mix of end-of-pipe treatment and landscape source control, that could be offered through conservation markets.

The problem with **buyers** is linked to the regulatory issue. Research and interviews indicate that many agencies and private entities would be enthusiastic about market solutions that reduce regulatory costs or increase their compliance options, and some have suggested that they would pay more for quicker resolution of permitting issues. However, participation in markets is the “road less traveled” toward compliance and few buyers have the luxury of extra time or money to work through the uncertainties and risks of a market solution.

Washington State has been neither a leader nor a laggard in the creation of conservation markets. The state made an early foray into wetland banking in the

1990's, then put its program on hold in 2002 due to budget constraints, and has recently revived it through publication of a draft banking rule and implementation of pilot projects. The first salmon bank is nearly permitted and work is underway on cap-and-trade concepts for addressing greenhouse gas emissions through the Western Climate Initiative. In addition, there are many examples of incentive programs that have supported conservation work on private farms and forest parcels.

The state is in a good position to become a leader in the new generation of U.S. conservation markets. The economy, while battered by the recession, is still fundamentally strong and able to support new development activity, the engine behind conservation markets. State government is progressive and focused on efficiencies, and both the Governor's office and the Legislature seem open to market-oriented changes in regulation. There are also some major prospective buyers, including agencies responsible for major highway and utility improvements in the state.

The remainder of this executive summary identifies the overall findings of the conservation markets study and recommendations on how to facilitate markets in Washington.

### ***Summary of Study Findings***

1. Private farms and forests could supply substantial conservation gains in Washington. Existing conservation markets in the U.S. indicate that conservation actions on private farms and forests can be a viable, sustainable, and cost-effective way to achieve a wide variety of environmental goals. Existing incentive programs and markets are leaving most of this potential untapped. Contacts with landowners and farm and forest organizations indicate that there will be strong interest in participating in markets if the price is right and if removal of land from production is minimized.
2. Markets at greenhouse gas emissions (or carbon markets) appear to be the most promising for early implementation. It is widely predicted that the Obama administration will take a more energetic stance on greenhouse gas emissions, including establishment of a national cap-and-trade system. The state has been actively engaged in the Western Climate Initiative and its cap-and-trade policies, which should fit well in the national program. All signals are pointing to active greenhouse gas emissions markets within a few years, and this is an excellent time to consider an expansive role for farmers and foresters in creation of greenhouse gas credits.
3. Water quality markets are also somewhat promising, but will take longer to develop. Of the more than 40 existing markets investigated in the study, many of the most energetic and successful focus on alternative ways point sources can achieve water quality compliance. Conservation actions on private farms and forests have promise as tools to reduce temperature, dissolved oxygen, and nutrient pollution, all significant issues in Washington waters. However, there is a well-developed regulatory system aimed at end-of-pipe solutions that is widely considered to be successful, and it will take

time and further work to determine how to integrate point/nonpoint trading into this regulatory scheme, including establishing baselines for crediting.

4. The growth in conservation markets in Washington would be stimulated by more energetic governmental leadership and coordination of efforts. No fewer than eight state agencies and offices have conservation markets within their purview, including the Washington State Conservation Commission, the Departments of Ecology, Agriculture, Natural Resources, and Fish and Wildlife, the Puget Sound Partnership, the Washington Biodiversity Council, and the Recreation and Conservation Office. It would be helpful to establish a nucleus of market activity in Washington government to coordinate efforts and stimulate the creation of markets, much of which has been done recently at the federal level with the creation of the Office of Ecosystem Services and Markets in USDA.
5. Attention is needed to establish the appropriate market institutions before new markets take off. Conservation markets are complicated to establish, administer, and monitor. It makes little sense to have many different markets operating in Washington, each with different procedures and organizations. Some level of centralized organization and functions will be useful in ensuring the accountability and efficiency of new markets.

### ***Summary of Study Recommendations***

1. Establish a center for state efforts to stimulate the creation of new conservation markets. At the moment, it is unclear where the center should be. The Washington Department of Ecology would make the most sense from a regulatory purview standpoint, although the Washington State Conservation Commission has a longer track record with state farmers and the Department of Natural Resources has stronger relationships with foresters. What is important is that the state move forward decisively on this promising new concept, and that the Governor and Legislature determine who should lead this work.
2. Develop a template for structuring new regional or statewide conservation markets, potentially based on the in-lieu-fee program being developed by the Puget Sound Partnership. Many of the aspects of markets, including maintenance of credit registries, fiscal accounting, and credit tracking, should be centralized to avoid duplication of costs and effort. The Puget Sound program is likely to be the full functional multi-credit trading program in the state and should be investigated as a model for a trading institution.
3. Pursue a strong role for farmers and foresters in production and marketing of greenhouse gas credits. There appears to be an excellent opportunity for landowner involvement in this incipient market. Agencies, farm and forest organizations, and individual farmers and foresters should test methods for producing, aggregating, and marketing greenhouse gas credits based on the work of the Northwest Natural Resources Group, the Pacific Northwest Direct Seed Association, and others. The Governor's office and others engaged in the

Western Climate Initiative should ensure that farmers and foresters have a voice in discussions of greenhouse gas markets.

4. Provide stronger incentives for conservation actions on farms and forests. The Washington Department of Ecology, the Washington Conservation Commission, and the Washington Department of Natural Resources should collaborate to identify meaningful incentives to farmers and foresters to encourage conservation actions on their land. The Department of Ecology in particular should consider ways to more routinely consider payments for farm and forest source control in permitting of point source discharges in the same watershed. In doing so, the agency should continue to develop a workable definition of baseline conditions to allow participation of rural landowners in markets.
5. Pursue pilot projects to continue development of conservation market policies and procedures. The Conservation Commission and Department of Natural Resources should lead efforts to identify and pursue pilot projects in farm and forest communities. As stated in the enabling legislation for this study, the Department of Ecology should support this effort by clarifying their standards and conditions for approval of market pilots. Particular attention should be focused on pilots that could demonstrate the potential of greenhouse gas and water quality markets.

## Chapter 1: Analysis of Existing Markets

This chapter summarizes a review of over 40 representative conservation market programs in operation and under consideration in the U.S. to determine relevant lessons for Washington conservation markets. Given the emphasis of the enabling legislation on markets driven by regulatory compliance, the study focused on markets used in regulatory processes<sup>2</sup>, including:

- **Water quality** markets that typically trade in nutrients and temperature.
- **Habitat** markets that protect or restore habitat for species that are endangered, threatened, or otherwise of interest to buyers.
- **Wetland** markets that preserve, restore, enhance, or create wetlands, typically for mitigation purposes.
- **Carbon or greenhouse gas** markets that store or reduce the emissions of greenhouse gases to be sold as offsets.

Lessons learned from this review include factors affecting successful conservation market conditions, structure, contracts, and credits. Further details regarding each type of market are discussed in the following sections.

### *Key Findings on Existing Markets*

- There are a wide variety of conservation markets operating on working lands in rural areas in the United States that can serve as models for similar markets in Washington. This review encompassed over 40 programs.
- The most vigorous markets in rural America are those focused on water quality. This appears to be due to the strong regulatory context for water quality regulation and early initiatives to stimulate water quality trading.
- Greenhouse gas markets are becoming vigorous, and are thought to be very promising as tools for addressing climate change in the future.
- Most of the vigorous markets feature one or more highly motivated credit buyers, often industries or municipalities that face strong regulatory burdens.
- Successful conservation markets rely on a strong technical basis to inform the quantification of credits.
- Many successful markets employ aggregators to assemble many small transactions into larger, market-significant deals for large buyers, thus

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<sup>2</sup> There are many programs that provide incentives for landowner conservation outside of regulatory processes, particularly the Farm Bill programs. Readers should consult the Washington Biodiversity Council for information on landowner incentives.

- making transactions more manageable for large buyers and helping individual sellers reach larger markets.
- Commitments for landowner participation range widely from 3-15 years in length for water quality offsets, to the 50-100 years often required for forest carbon credits, to perpetuity for wetland and habitat programs.
  - While conservation markets can theoretically trade in multiple resources, operating markets tend to focus on one resource only (e.g. carbon, habitat, water quality).

## ***Methodology***

This review encompasses existing or developing programs in each of the four market areas which involve the purchase of credits from farmers, ranchers, and foresters. Information on transaction methods, how credits are created and valued, typical sellers and buyers, and the level of market activity, was used to identify specific lessons learned from existing markets. Markets considered highly relevant to Washington included those in which:

- Land used to create credits remains in production;
- Practices can be undertaken in Washington;
- The program involves numerous sellers conducting small projects; and
- The market structure is simple, with transactions either directly arranged among buyers and sellers or brokered by a single community institution.

Details on the type and format of information gathered on each program are included in Appendix B.

## ***Summary of Programs Reviewed***

### **Water Quality**

Conservation markets for water quality are typically housed in water quality trading programs. Since the publication of their Draft Framework for Watershed-Based Trading in 1996, the Environmental Protection Agency has supported water quality trading to address sediment and nutrient pollution in selective cases, particularly where a Total Maximum Daily Load (TMDL) assessment has been completed and where there is a significant difference in cost and effectiveness of various source control and treatment alternatives. The policy (updated in 2003) allows trades between a permitted point source and other point or nonpoint sources to achieve permit compliance. For a more complete discussion of trading, see the following EPA trading website: <http://www.epa.gov/owow/watershed/trading/tradingfaq.html>.

EPA has funded and otherwise supported more than a dozen pilot water quality trading programs in the U.S., and this study looked at several that use nonpoint source control actions on farm and forest lands in the trading scheme.

Most of the examples, including the more vigorous markets, feature one or more highly motivated credit buyers, often industries, or municipalities that face strong regulatory burdens. In typical circumstances, the buyer pays nearby or upstream farmers and ranchers to implement best management practices, such as reduced tillage or larger stream buffers, that reduce nutrients or temperature in the affected streams. These markets are justified by a strong technical and scientific basis that translates these best management practices (BMPs) into the quantified outcomes (e.g. reduced nutrients) needed to address permit conditions.

Many water quality markets incorporate trading ratios that require greater application of BMPs to reduce uncertainty in long term performance. Even with ratios, credits can provide a less expensive alternative to installing technological solutions or may be used to improve water quality beyond what can be achieved through technology alone.

In the active markets reviewed, buyers tend to be wastewater treatment plants or food processors<sup>3</sup>. Sellers typically interact with a single point of contact, either the sole buyer in the market or a broker. In many vibrant markets, even where there is one regulated buyer there is frequently also a strong community partner to help arrange transactions, such as a conservation district, farm bureau, or watershed council, whose primary interest is the farmers and the BMPs.

Landowner participation in these markets tends to be sensitive to price. Several programs piggyback on existing USDA programs such as the Conservation Reserve Enhancement Program (CREP) by providing enhanced payments. Currently CREP in Washington is undersubscribed, reportedly due in part to low rental payments. New York City's Watershed Program has reportedly achieved 85-90% participation among targeted farmers by paying 100% of implementation costs.

It is worth noting that a recent EPA-funded study concluded that there have been relatively few transactions in many trading programs. It can be difficult to orchestrate the combination of motivated credit buyers, flexibility in regulation, and an approved trading framework necessary to support an active trading program. Interviews conducted in this study indicate that there are a couple of areas in Washington in which circumstances may be promising for trading, including the Spokane River watershed and south Puget Sound, but that widespread water quality trading is unlikely.

## **Habitat Conservation**

Most market activity for habitat conservation purposes has occurred through conservation banks. In a typical conservation bank, a piece of intact habitat for the target species is preserved, funded by the sale of credits to agencies and other permittees who disturb habitats for the same species on their development sites.

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<sup>3</sup> In one unusual program, a group of irrigation districts under a joint cap on selenium discharge traded credits among themselves. Trades were made at the district rather than farmer level. See Appendix B for details.

Conservation banks typically operate under state and federal endangered species legislation.

As with water quality trading, conservation banking is governed by federal policy, in this case a 1995 U.S. Fish and Wildlife Service guidance document. California has a similar policy that has been influential in the creation of conservation banks in that state. According to a 2004 study, there were 76 conservation banks in operation in the U.S., with the majority in California.

Several conservation banks were evaluated in this study and presented in Appendix B. Most programs reviewed here kept the bank site in agricultural production (grazing, selective harvest, and crop rotation). To sell credits into a regulatory system, landowners generally have established a permitted conservation bank in perpetuity, either independently or through an experienced conservation banking firm. Contracts for habitat or species mitigation credits tend to be perpetual. Credits are commonly certified by the U.S. Fish and Wildlife Service and relevant state and local permitting agencies.

The examples seem to underscore the benefit of a strong state-level endangered species regulation as the foundation for a successful conservation bank program. Washington has no such regulation. There are circumstances, however, where a voluntary conservation bank may be possible, as has recently been discussed for prairie habitats in the Puget Sound region. In an innovative, voluntary transaction in Washington, three farmers jointly created a “walking wetland” for migratory bird habitat that integrates into their crop rotations for three years. The wetland also improves soil and will help one farmer switch to organic production without losing revenue.

## **Wetlands**

Conservation markets for wetlands are generally in the form of wetland banks or wetland-oriented in-lieu-fee (ILF) mitigation programs, although banks are far more numerous. Wetland banks are governed by regulations and policies under the EPA, Corps of Engineers, and Department of Ecology, with the most recent policy a 2008 rule focused on approved practices for compensatory mitigation. Many states also have state wetland laws and regulations, including Washington.

As with other markets, sellers create tradable credits by restoring, creating, enhancing, or preserving resources, in this case wetlands. In the programs reviewed here, landowners typically set up their own wetland bank, worked with a private banking firm, or contracted with an ILF program run by a public agency. Contracts for wetland credits tend to be perpetual. Credits are generally certified by the Corps of Engineers, Department of Ecology, local government, and other relevant state and federal permitting agencies.

The trend in wetland banking has been to convert an entire agricultural parcel to bank use, and it is far less common to maintain part of the property in continuing farm uses. In some parts of Washington, the conversion of agricultural land to mitigation banks has become controversial. At the same time, it will be difficult to permit smaller wetland projects on actively worked farm and forest parcels.

Until these issues are resolved, wetland banking on working farm and forest land will probably be very challenging in Washington.

## **Greenhouse Gases**

Markets exist and are in development in the U.S. and internationally to pay for activities which reduce the amount of carbon and other greenhouse gases released into the atmosphere. Currently most markets in the U.S. are voluntary, driven in part by public concern about climate change and in part by industry concern about future regulations of greenhouse gas emissions. The largest voluntary markets in the U.S. are the Chicago Climate Exchange (CCX) and the California Climate Action Registry (CCAR). However, some regulatory markets exist, such as Oregon's CO<sub>2</sub> standard for power plants and the Regional Greenhouse Gas Initiative (RGGI) cap and trade program for the electricity sector in 10 Northeastern U.S. states.

Due to the emerging state of regulatory markets in the U.S., this review largely focused on voluntary markets in which farmers, ranchers, and foresters sell GHG credits to private aggregators who, in turn, sell the credits on carbon exchanges, to offset firms, or directly to the end buyer. Aggregators include member-based associations, private corporations, and private-public partnerships. End buyers include power plants, businesses, and individuals.

Current forestry offset sellers range from small foresters on working land to large foresters setting aside large tracts of land for preservation. Contracts tend to range in length from 50-100 years. Credits per acre vary widely depending on stand characteristics. Major agricultural offset projects include soil sequestration and manure management. Soil sequestration may include conservation tillage, establishment and maintenance of grass, and rangeland management.

Contract lengths range from 5-10 years, but most aggregators sell credits and make payments to farmers annually or semi-annually, using current CCX prices. Prices on the CCX have varied from above \$7/ton to \$1.65/ton most recently.

A recently proposed cap-and-trade program in Washington, if passed by the Legislature and implemented, would create a new regional market in the state for greenhouse gas offset projects. Offsets certified in Washington under the cap-and-trade program would be marketable throughout the Western Climate Initiative (WCI). The Department of Ecology is also looking into linking Washington's standards to the RGGI and the European Union Emissions Trading Scheme (EU ETS), making credits marketable on a global scale. These initiatives and the absence of a constraining regulatory framework make greenhouse gas markets an attractive option in Washington.

## **Chapter 2: Market Supply and Demand in Washington**

As with other economic markets, conservation markets depend on a supply of products from motivated sellers and demand for the same products from motivated buyers, as well as a market framework in which they can transact business. This chapter will address the potential demand for and supply of conservation products that could be exchanged in rural conservation markets in Washington.

### ***Key Findings on Supply and Demand***

- There is considerable demand for mitigation and compliance projects in Washington, a portion of which could be met through conservation markets.
- There is also a considerable supply of restoration and conservation projects on private farm and forest land that could be purchased through conservation markets.
- The best match between high demand and large supply is in the areas of greenhouse gas emissions offsets and water quality improvements (particularly for temperature, nutrients, and sediment).
- There is not as strong a match for wetlands: although there is high demand, supply appears limited at this time.

### ***Demand from Environmental Mitigation***

A host of local, state, and federal environmental laws require that environmental impacts of new development actions are avoided, minimized, and, if necessary, compensated through mitigating actions. When impacts are to environmental features such as wetlands, compensatory mitigation typically takes the form of enhancement or creation of similar features off the development site. In some cases, it will be suitable to mitigate these features on farms and forests via conservation markets.

Demand from environmental mitigation is associated with both public and private sector development projects. Major public sector demands arise from:

- Transportation projects, particularly the \$11 billion in state road construction projects funded in the 2003 and 2005 legislative sessions;
- Utility projects, particularly transmission lines and pipelines with linear alignments; and
- New public buildings, parking lots, and other structures.

Recent studies of mitigation from state highway construction projects<sup>4</sup> indicate that the major resources addressed in environmental mitigation are wetlands and stormwater, with lesser spending on stream impacts. Based on these studies, spending on mitigation for public sector projects is likely to be a significant source of demand.

Private sector spending on mitigation has yet to be fully evaluated, but private spending on new residential, commercial, and industrial development has greatly exceeded public sector spending in all but the worst economic cycles in Washington. With private sector development subject to the same environmental requirements as apply to public projects, private spending on mitigation is likely to be substantially higher than public spending.

### ***Demand from Water Quality Compliance***

State and federal laws require permitting of point-source discharges into streams, rivers, bays, and estuaries to ensure that the quality of these receiving waters is not diminished. These permits are collectively known as the National Pollution Discharge Elimination System or NPDES permits. There are more than 5,000 NPDES permittees in the Puget Sound basin alone, including all major industries, wastewater utilities, and larger cities.

Most permittees are required to renew NPDES permits every five years. Often, there are changes in regulatory requirements that compel permittees to implement higher levels of treatment. These are frequently the result of loading studies known as Total Maximum Daily Load or TMDL assessments. These assessments are required by federal law for all water bodies that fail to meet water quality standards under the Clean Water Act. TMDLs are typically focused on one or more water quality parameters, such as temperature, metals, or nutrients, which are the pollutants of concern in the impaired water body.

Farm- and forest-based source control measures such as planting of riparian areas and construction of sediment dams can be an effective way to reduce nutrients, temperature loading, and sediment. In addition, experience with water quality trading programs indicates that these measures may be considerably less costly than end-of-pipe treatment solutions<sup>5</sup>.

Therefore, the most promising circumstances for use of conservation markets to meet water quality compliance requirements are watersheds with the following characteristics:

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<sup>4</sup> Washington State Department of Transportation, project mitigation case studies can be found at [http://www.wsdot.wa.gov/NR/rdonlyres/81ADC6F8-D9EE-4164-9F93-2F285E02D3AC/0/2006\\_ExecutiveSummary.pdf](http://www.wsdot.wa.gov/NR/rdonlyres/81ADC6F8-D9EE-4164-9F93-2F285E02D3AC/0/2006_ExecutiveSummary.pdf) and <http://www.wsdot.wa.gov/NR/rdonlyres/E4C452AE-2D0E-4B0F-825F-D5AE3D93742C/0/ExecutiveSummary.pdf>.

<sup>5</sup> In the Tualatin basin in Oregon, the local sewage treatment utility spent \$10 million on buffer restoration on upstream farms in lieu of a \$55 million investment for a refrigeration unit on its sewage treatment plant. The transaction was approved in the utility's NPDES permit.

- Recent TMDLs for temperature, nutrients, or sediment;
- Permittees who may face expensive end-of-pipe treatment options for control of these pollutants;
- Farmers and foresters who have the capability to implement additional practices (above their legal baseline requirements) to reduce runoff of these pollutants; and
- A framework or platform, such as a conservation market, for negotiating and consummating a trade of credits.

Further analysis will be needed to determine where these circumstances exist and identify the likely demand for water quality products.

### ***Demand from Greenhouse Gas Initiatives***

There is growing recognition internationally for the role that farms and forests can play in greenhouse gas mitigation. The Washington Department of Ecology is proposing a cap-and-trade program to regulate greenhouse gas emissions in Washington State, which would involve farm and forest offsets to compensate for emissions in other sectors of the economy statewide, regionally, and nationally. President Obama and the incoming Congress seem likely to implement a mandatory cap-and-trade program on greenhouse gas emissions in coming years, which is expected to increase the size and scope of the offset market considerably. The current voluntary U.S. offset market is estimated at \$3 billion in annual activity.

### ***Potential Supply from Farms and Forests***

Working farms, ranches, and forest lands have already proven capable of supplying marketable environmental services, as discussed in Chapter 1. The following is a summary of conservation management practices which benefit the environment and are above baseline compliance with state law, and thus could be considered tradable commodities.

### **Water Quality**

Agricultural management practices which can have positive impacts to water quality include management of amounts and rates of nutrient and chemical application, soil monitoring, use of planted filtration areas and riparian buffers, reduced tillage, strip cropping, managed application of irrigation water, and integrated pest management. These actions can reduce chemical runoff, reduce sedimentation, improve filtration and plant uptake for nitrogen, phosphorous, and other excess nutrients, and decrease water temperature. However, not all of these activities may create tradable credits. Before credits can be determined, clear baselines must be established.

Possible tradable forestry management practices include riparian buffers, selective and rotational harvest, proper road building, and replanting, to reduce erosion and sediment inputs to surface water and cool stream temperatures.

Some of these practices involve significant additional management expense, but many are relatively inexpensive to implement. Many provide ancillary business benefits such as lower pesticide or fertilizer costs, improved soil quality, or lower labor or fuel costs. Some of these practices, such as riparian buffers, may take land out of production at substantial cost to farm and forest businesses.

Water quality protection is a benefit of many of the standard conservation practices in the U.S. Department of Agriculture's Natural Resources Conservation Service Field Office Technical Guide (FOTG), and the existing institutional infrastructure of NRCS and conservation district personnel can assist with implementation<sup>6</sup>. Many of the practices in forestry affecting water quality are, however, already required under the Forest Practices Act, creating a higher baseline for forest practices compared to agriculture and limiting the range of cost-effective, marketable actions forest landowners can take<sup>7</sup>. Both the Washington Department of Natural Resources and the conservation districts provide technical assistance and implementation services to the forest industry.

## **Habitat Conservation**

Farms and forests can provide protected (or enhanced) habitat for fish and wildlife by providing feed and forage, water, open natural and semi-natural areas, migration corridors, cover, roosting and nesting locations, ponds, riparian protections, aquifer recharge, storm water detention, and other important habitat conditions.

Typical mitigation requirements involve conservation easements to preserve the land for agriculture or forestry combined with management practices consistent with wildlife needs. Examples include: in forestry, the use of selective or rotational harvest; for livestock, managed and rotational grazing; and in farming, the use of appropriate wildlife-friendly cover crops or of native vegetation along field borders or in unproductive areas, facilitating migration, "walking wetlands," etc. There are standardized and generally accepted habitat conservation practices in the FOTG, the Forest Practices Act, and industry publications.

U.S. Fish & Wildlife Service rules<sup>8</sup> do not require that mitigation habitat be replaced. Therefore, except for buffers, the removal of lands from agriculture/forestry is not necessarily involved. As with water quality, many of the actions called for can be accomplished in ways that are consistent with agriculture and forestry. However, for both timber and for agriculture, buffer requirements may result in land being removed from production. The salient Pacific Northwest example is riparian buffers for salmon habitat along

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<sup>6</sup> See the NRCS Electronic Field Office Technical Guide on line at: <http://www.nrcs.usda.gov/technical/eFOTG/>.

<sup>7</sup> RCW Ch. 76.09.

<sup>8</sup> See: "Guidance for the Establishment, Use, and Operation of Conservation Banks" at: <http://www.fws.gov/Endangered/pdfs/MemosLetters/conservation-banking.pdf>.

waterways. Conservation easements supplied to mitigation markets will probably need to be perpetual.

## **Wetlands**

Farms are frequently located in low flat areas that may originally have been drained and that sometimes still contain some wetlands or areas of wet unproductive land. This makes them easy to convert to wetlands. Existing farmland is generally surrounded by other farmland that is zoned and protected for agriculture. This reduces the threat that the surrounding land will be developed and enhances the probable long-term effectiveness of the new wetland – also making farms attractive to buyers. Farms may be low in a watershed and conveniently near the site of development that requires wetland mitigation. Because the land is zoned for agriculture, it can frequently be acquired at a lower cost than can land in a more urban setting. Therefore, farms are definitely capable of providing a supply of wetlands. Forest lands are often a bit higher in the watershed and may be on steeper ground, but many of the same possibilities apply.

The demand for wetland mitigation mostly requires that new, fully functional wetlands be created to replace those lost. There is increasing preference for large, contiguous wetlands rather than small patches sprinkled across the landscape. In some cases wetland mitigation can be provided by improving or enhancing existing wetlands or by converting areas of currently wet unproductive soils. Where demand is driven by wetland mitigation, perpetual easements, long term management to preserve the services, and a clearly identified party that is responsible for the long-term success of the site(s) will generally be required. However, in some areas, existing mitigation banks and in-lieu-fee programs may limit demand for mitigation from agriculture and forestry lands.

Land to be covered by a fully functional wetland will be lost to traditional agriculture. Some will argue that creating wetlands is simply “farming” an alternative crop; however, the potential for loss of supporting supply, service, and processing infrastructure makes this highly controversial. (See Chapter 3) Wetlands can also cause drainage, weed, and other issues for surrounding land. Farm and forest landowners do, however, often own areas of marginally usable ground that are impractical to drain and that might be preserved or improved for wetland credits without impairing the use of the balance of their land. There may be estuaries, riparian areas, or other aquatic resources on the property that can be improved without disrupting operations. However, the trend toward mitigation in large contiguous wetland areas will limit demand for these smaller patches of wetland or aquatic land.

## **Greenhouse Gases**

Living soils, trees, grasses, and other plants sequester carbon. Therefore, planting them, keeping them alive longer, or preventing their decay, through farming and forestry practices, can be marketable. An additional significant

greenhouse gas emission reduction achievable on farms is reducing methane emissions from livestock manure.

Current examples of practices and products that can be sold in greenhouse gas markets include afforestation/reforestation, forest management, preservation or conservation, forest products that sequester carbon, soil sequestration (conservation tillage, establishment and maintenance of grass, and/or rangeland management) and manure management.

Washington State University's Climate Friendly Farming project is researching other practices that can be used while producing other agricultural commodities<sup>9</sup>. Some practices in the organic industry also hold promise<sup>10</sup>.

The above actions are generally consistent with current farm or forest operations. All have some impact on operating costs. Manure digesters in particular can involve a large initial investment.

There is a fair amount of uncertainty associated with long-term contracts, as natural processes such as floods or fires may release any carbon sequestered. Definition of baseline practices may preclude the participation of many small forest landowners who already employ those practices. The number of marketable agricultural practices is limited, and only a few segments of the industry can yet participate.

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<sup>9</sup> WSU's Center for Sustaining Agriculture and Natural Resources (CSANR) is studying, for example, projects in irrigated agriculture. See: <http://cff.wsu.edu/Project/irrigated.html>.

<sup>10</sup> The Rodale Institute has completed a study suggesting positive results for some practices used in organic farming. See: Regenerative Organic Farming: A Solution to Global Warming at: [http://www.rodaleinstitute.org/files/Rodale\\_Research\\_Paper-07\\_30\\_08.pdf](http://www.rodaleinstitute.org/files/Rodale_Research_Paper-07_30_08.pdf).

## Chapter 3: Stakeholder Opinion and Issues

The viability of conservation markets in Washington will depend in large part on support from several key groups: potential farm and forest suppliers, potential buyers of conservation market credits, and regulatory agencies that review transactions to fulfill regulatory requirements. This chapter identifies the opinions of and issues for each of these key stakeholder groups.

### ***Key Findings on Stakeholder Issues***

Based on initial discussions with key stakeholders, there are seven issues that are sufficiently important that they will make or break the potential for conservation markets in Washington:

- Support from the Washington Department of Ecology, US Army Corps of Engineers, EPA and local governments: As the key regulators for water quality discharges and aquatic habitat mitigation, these agencies are in a key position to determine if conservation markets succeed.
- Clear standards for acceptable transactions: Particularly in the early stages of conservation markets, buyers and sellers need clarity and specificity in the regulatory requirements as they pertain to market transactions. This includes having a scientifically defensible and universally acceptable method for determining credits.
- Enthusiastic buyers: The pace of markets elsewhere in the U.S. depends on the motivations of buyers, with the most active markets backed by well-funded, active agencies and institutions.
- Impacts on agricultural practices and the agricultural land base: It will be vital that markets are fully compatible with continuing agricultural practices on participating farms and on maintaining the critical mass of farmland.
- Defining baseline and additionality: Defining baseline standards and determining which practices are additional in greenhouse gas markets presents a challenging balance between ensuring credits are for actual sequestration and encouraging early adopters to continue to participate.
- Limited regulatory risk for landowners: Farmers, ranchers, and foresters are especially concerned that after they begin providing and being compensated for conservation, it may become a regulatory requirement or expose them to future lawsuits.
- Simple, consistent procedures and trusted players: Acceptance of conservation markets in rural communities will depend on keeping the administration of the market familiar, consistent, and simple for participating landowners.

## ***Permitters***

The opinions of permitting agencies were identified through comments on the draft of this report, follow-up conversations, and extensive outreach efforts associated with the Puget Sound in-lieu-fee mitigation program, an independent but related project. As with all of the following summaries, these should not be construed as the concerns and preferences of specific agencies.

Permitting agencies have strong interest in but also some wariness of conservation markets. Their interest arises because conservation markets provide another tool to improve the effectiveness of environmental mitigation and compliance. There is widespread awareness of the need for improvements in traditional mitigation practices and a strong commitment to improving performance, as is evidenced by the Department of Ecology's "Mitigation that Works" initiative. There is also longstanding concern about the ability of existing compliance measures to address dispersed nonpoint pollutants which are widely regarded as significant pollution sources.

Permitting agencies are interested in the potential of conservation markets to provide incentives for landowner action to reduce nonpoint pollution and improve habitat. There is also optimism that markets could be an alternative to regulation as a way to achieve a more cooperative relationship between permitting agencies and rural communities.

The wariness arises from concerns that markets could be oversold as an alternative to environmental regulation and that markets could be misused to reward landowners with poor environmental practices. Permitting agencies expressed a strong interest in establishing a baseline condition of reasonable stewardship practices and awarding credits only for actions above that baseline, taking care not to award credits for actions that are already required by regulation.

Regarding the type of markets to be pursued, the agencies are already committed to improvements in wetland mitigation and are interested in market approaches to encourage landowner participation in wetland mitigation. Carbon or greenhouse gas markets are also viewed as promising. Water quality trading is thought to be more problematic, partially because of the baseline issue.

## ***Buyers***

The compressed schedule of the study prevented contact with many prospective buyers and this section is based on a few contacts and on outreach for the Puget Sound in-lieu-fee mitigation program. It is expected that buyers could include public and private sector applicants for environmental permits for the mitigation markets, and industrial and municipal dischargers for compliance-driven markets.

There is strong interest among prospective buyers in practically any approach that can accelerate permitting or reduce compliance costs. Conservation markets tend to be viewed favorably because of their potential to accelerate permitting and reduce compliance costs. However, there is also uncertainty and some

skepticism among prospective buyers that markets can achieve faster and/or cheaper permitting. Some cite prior state efforts to streamline regulations as reasons to doubt the potential of markets as an element of a viable compliance strategy. Others question the ability to integrate consideration of conservation markets into tight permitting schedules.

Some buyers have jumped into markets regardless of these uncertainties, particularly in the use of wetland mitigation banks to fulfill mitigation needs. It appears that buyers will be looking carefully at signals from the regulatory agencies that conservation market products are acceptable as mitigation and compliance conditions before widespread adoption is likely.

Research conducted for this study indicates that a single major buyer such as a municipal utility or state transportation agency can be a powerful motivator for a conservation market. While there are many prospective buyers in Washington, so far there does not seem to be a lead buyer likely to drive market creation in new arenas such as habitat conservation or water quality trading.

## **Sellers**

In general, farmers, ranchers, foresters are interested in generating and selling credits in conservation markets. They see ecosystem products as a potential source of revenue to keep their working lands in operation but must be fully engaged in the design, development, and operation of future conservation markets if they are to work.

Stakeholder opinion and advice from farmers and foresters was solicited through a “Conservation Markets Workshop and Listening Session for Agriculture” in Vancouver, Washington, interviews with key leaders in the Washington agriculture and forest industries, discussion in the Conservation Markets Advisory Committee, presentations and discussions in agriculture and forestry venues, and informal conversations with agriculture and forest leaders over the course of fall 2008. Details on the Vancouver workshop are in Appendix A.

Frequently-mentioned issues in conversations with farmers and foresters included regulatory risk, loss of working land, and compensating early adopters, as well as incorporating trusted points of contact and integrating the market into existing operations, as described below. If these issues can be solved, ample supplies of services are likely to be available from the agriculture and forest industries in Washington.

## **Loss of Working Land**

Landowners are concerned both about losing their own working land through conversion to other uses, and about the resulting impacts to the remainder of the industry. A critical mass of active farming and ranching is needed to support local supply, processing, and service businesses that, in turn, support farms and ranches. Consequently, participants in the conservation marketplace should be able to maintain high-quality lands in production, as desired. This issue may be of less concern to forest landowners, who appear to expect that a sound, well-

paying conservation marketplace could replace timber production as a meaningful source of revenue.

## **Regulatory Risk**

One common concern is that by participating in conservation markets, landowners will subject themselves to new regulations. For example, by creating habitat which is used by an endangered species, a farmer may later be subject to regulations under the Endangered Species Act. Landowners would like to have safeguards from lawsuits or regulatory action stemming from their participation in conservation markets, and limited disclosure of the information shared as part of a market transaction.

## **Early Adopters**

Many influential leaders in the agriculture and forest industries have proactively and voluntarily implemented conservation practices in advance of a marketplace. Striking the balance between meeting additionality standards while compensating and encouraging early adopters is critical to ensure the current and future participation of farmers and foresters.

## **Trusted Points of Contact**

Conservation markets are still an unfamiliar topic for many farmers, ranchers, and foresters. Creating a conservation marketplace in Washington will require close collaboration between working landowners, environmentalists, and regulators. Transactions will require frank disclosure of details about current agricultural and forest operations and at least some on-site monitoring of future activities. The market should involve trusted and familiar brokers or points of contact, and trusted technical service providers. Other successful conservation markets have involved trusted entities such as existing farm or forestry organizations, groups with strong representation from agriculture and forestry, or conservation districts.

## **Integration with Current Agriculture and Forest Operations**

To ensure landowners participate in conservation markets, a few steps could be taken to simplify their involvement:

- Easy transactions with a single point of contact, simple paperwork, clear prices, transparent transactions, and technical assistance.
- Flexible contract lengths with the option for perpetual easements, depending on the resource type and needs of the buyer and regulator. Depending on what the services are used for, perpetual easements may be required.
- More flexibility than exists in Farm Bill programs to allow a conservation service or practice to be site-designed in a way that maximizes both the ecological service benefit and the landowner's production.

- Insurance and contracts that minimize risk and responsibility for unforeseen failures.
- Clear performance measures that can be monitored objectively and with minimally-intrusive site visits.
- A clear methodology for determining credits.

## **Chapter 4: Design of the Washington Conservation Marketplace**

Given the many different conservation products that can be supplied by Washington farms and forests and the varied demands of potential credit buyers, it seems likely that there could be many different conservation markets operating in Washington, each focused on a different community and suite of products. At the same time, some level of consistency and coordination would be useful in ensuring the value of the conservation credits and simplicity in administration. This chapter discusses the models of market design that appear promising for Washington, the overall organization of the marketplace, and roles for key players. A final section addresses the ideal characteristics of a market credit.

### ***Key Findings on Market Design***

- Identifying local parties to serve as brokers between credit buyers and sellers appears to be essential to a successful conservation market in Washington. These entities would aggregate the credits generated by farmers and foresters, arrange sales, and provide technical assistance with meeting standards and protocols. Working with aggregators which are familiar to and trusted by rural landowners would help to build landowner participation.
- Conservation markets in Washington should probably be organized at the regional or statewide level for overall program administration. Transactions are expected to occur at the watershed scale in water quality markets, and statewide or regionally in greenhouse gas markets.
- The newly proposed Puget Sound in-lieu-fee mitigation program could serve as the program administrator for conservation markets in the Puget Sound region, although this would require further consideration of how the two programs would interact.

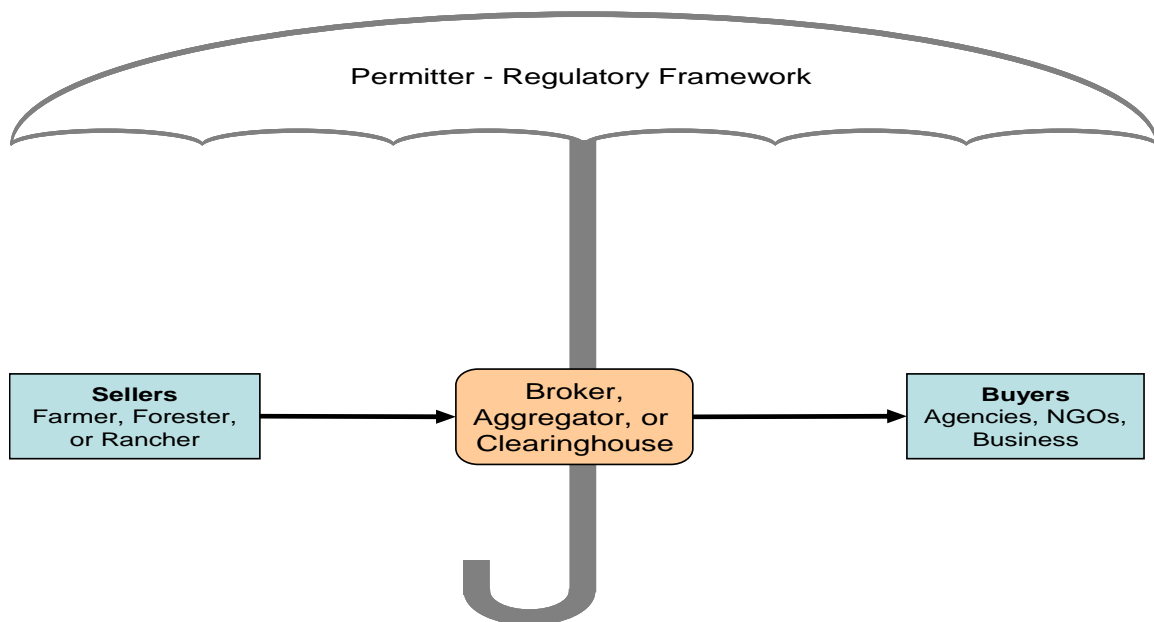
### ***Models of Market Design***

The simplest form of a conservation market would have two parties: a buyer and a seller. The seller would presumably be a Washington farmer, forester, or rancher. The buyer would be a regulated business and industry, a state and local agency, an environmental non-profit, or simply a motivated individual. The buyer and seller would then directly arrange a transaction.

Conservation markets that fulfill mitigation and compliance requirements will have another crucial party, the regulator or regulators, who oversees the transaction and ensure that it meets regulatory requirements. For example, a local utility could pay a forester to enlarge a riparian buffer to meet NPDES permit requirements for sediment reduction, a transaction that would need to be approved by the Washington Department of Ecology.

An intermediary serving as a broker between buyers and sellers appears to increase market activity. These intermediaries generally take the form of aggregators who combine the credits generated by multiple landowners and sell them to buyers. Possible aggregators could include organizations such as the Northwest Natural Resources Group or the Pacific Northwest Direct Seed Association, which are piloting greenhouse gas markets with farmers and foresters, or conservation districts, which currently provide technical assistance and manage Farm Bill incentive programs statewide.

Regulated markets would require verification and certification to confirm the value and validity of credits bought and sold on the market. Verification and certification could be provided by the broker or regulator, by the permitter, or by third-party organizations. An illustration of the four-party regulated market is shown below.



### ***Overall Organization of the Marketplace***

There would likely be at least two distinct levels of organization in conservation markets in Washington. The first level of organization will depend on what functions and resources are involved as well as what the regulatory requirements are. For example, greenhouse gas credits are likely to be sold on a statewide or regional basis while water quality transactions must be at the watershed or sub-basin scale, depending on the TMDL. In both cases, however, existing local cooperatives or producer associations could be engaged as local partners to help develop participation. Those functions should be retained by the regional or state-level administering program, as well as relevant regulatory agencies. Local partners are assumed to work within watersheds, conservation districts, or counties, which are generally a useful scale for the organization of farmer and forester social and economic communities.

The first level of market organization includes a network of local partners and local program officers to encourage seller participation. Each local community (watershed, conservation district, or county) has its own characteristics based on the capabilities and interest of local farmers and foresters as well as the conservation priorities of the area. Trust and trusted points of contact were key factors for success identified by both potential sellers consulted and programs reviewed. Existing, trusted, local partners could help inform potential sellers about the program, explain the benefits of participating, and address their particular concerns. Local program officers would provide technical assistance, process applications, conduct site visits, and provide other local functions necessary for the program.

The second level of organization is at the regional or statewide scale. No matter which type of credits are traded or the size of the service area, Washington conservation markets will require certain support systems, such as a credit registry, that are most efficiently provided at the statewide level. The focus at this scale would be to provide the services needed to operate all of the conservation markets, including permitting of the overall market structure, fiscal management and accounting, facilitating permit negotiation with regulatory agencies, reporting, registering and tracking credits, and other program-wide requirements.

### ***Key Roles***

Based on the preceding information on structure and organization, the following key roles emerge, with respective definitions:

Credit suppliers: Farmers, foresters, or ranchers who act independently or through producer cooperatives to produce credits for sale in conservation markets.

Aggregators: Entities that facilitate transactions between buyers and sellers. Their roles may include maintenance of an inventory of prospects, matchmaking between prospective buyers and sellers, and holding of credits. This role could be provided by an independent cooperative, a private broker, or an agency such as the local conservation district.

Service providers: Public or private entities that provide project support services, such as watering, planting, and site maintenance.

Credit buyers: Agencies and private entities that wish to buy credits in conservation markets.

Regional or statewide program manager: One or more entities that oversee the conservation markets program, develop program-wide agreements and permits, and manage finances. This could be an agency such as the Washington State Conservation Commission or a non-profit organization.

Regional or statewide service providers: Entities that support the program manager with services most efficiently offered at a regional or statewide level, such as fiscal administration or monitoring.

Regulators: Agencies such as the Washington Department of Ecology that establish and enforce standards for transactions under conservation markets.

## **Appendices**

### ***Appendix A: Summary of the Vancouver Listening Session***

A “Conservation Markets Workshop/Listening Session for Agriculture” was held November 5, 2008, at the Water Resources Education Center in Vancouver, WA. Thirty-eight farmers, ranchers, and agriculture leaders from Washington and Oregon gathered to discuss concerns and barriers and to suggest ideas and solutions that would make it possible for conservation markets to work successfully for agricultural producers.

Participants in this event were active leaders in agriculture from both states. They included representation from most of the major commodities and geographic areas in the two states, from most of the major agriculture organizations, and from among conventional and organic, wholesale and direct market, and large and small producers. There were a few invited observers that sat in on this event, but active participation was limited to farmers and ranchers or their organizational representatives in agriculture groups. This was done to assure mutual clarity that the foundational purpose for the meeting was to provide farmers and ranchers with an open opportunity to discuss their concerns and needs for conservation markets as well as to engage the interest of the agriculture community.

In a morning session, the group heard informational presentations on:

- The fundamentals of ecosystem markets (David Primozich, Willamette Partnership, Salem, OR);
- Trading opportunities in carbon sequestration (Chad Kruger, Washington State University’s Climate-Friendly Farming Project, Wenatchee, WA);
- Water quality trading (Jeremy Sokulsky, Environmental Incentives, Tahoe, CA);
- The agriculture role in environmental mitigation (Dennis Canty, Evergreen Funding Consultants, Seattle, WA); and
- Why farmers have an interest (Ron Shultz, Washington State Conservation Commission, Olympia, WA).

After lunch, participants broke up into four facilitated discussion groups. Each group was asked to project their thinking five years into a hypothetical future at a point in time when robust conservation markets with broad and successful agriculture participation had come into existence. They were requested to ask themselves two broad questions about how we got to that point:

1. What issues or concerns did we need to address - what opportunities existed that we needed to recognize and take advantage of?
2. What structures, arrangements, institutions, ideas, and solutions were needed to make it happen – what were the “must have” components needed to make it work?

Following this discussion, the full group reconvened with each of the breakout groups reporting on its priority issues and concerns and on the “must have” components that they felt would be needed to make conservation markets work for agriculture.

### “Must Haves” to Make It Work

The following is a preliminary list of “must have” components of conservation markets that resulted from the large group session. This list is not shown in any priority order.

- **Fair payment:** Agricultural producers must receive a fair and realistic price for the services rendered and payment amounts must be substantial enough to justify participation.
- **Reliable marketplace:** The market must be consistent and reliable over time so farmers can plan on participation and rely on payment being made. The marketplace must be economically sustainable over time.
- **Strong, credible and defensible markets:** This must be a real marketplace that produces real credits with a genuine value. Outcomes must be measurable and trades credible to all.
- **Trust:** There needs to be trust among the players in the market – needs to be buy-in from the environmental community on the markets.
- **Safe harbor:** There needs to be provision for “safe harbor” so that information revealed through participation does not expose the landowner to potential enforcement or increased regulatory action. Private property rights need to be protected.
- **Insulation from regulation:** There need to be protection against/assurance that creation of these markets does not create increased pressure for or new opportunities to increase regulation to take their place. There is a need to be sure regulations are not simply increased to make products of the market ineligible for market additionality.
- **Contract avoidance & consequences:** Where circumstances change, farmer-rancher participants need to be able to terminate contract obligations without undue consequences;
- **Insurance:** There needs to be insurance that protects participants against unmanageable liabilities involved in these transactions.
- **Clearinghouse:** There needs to be a trusted clearinghouse that can provide farmers and ranchers with credible information about credit values and practices. This needs to be run by non-farmers.
- **Database:** There will need to be a database of buyers, sellers, and transactions.

- **Flexibility:** The system must be sufficiently flexible or allow for participation by farmers and ranchers to change over time with new crops, new market conditions, or other altered circumstances in agriculture.
- **Demand driven by regulation:** To ensure strong and sufficient demand for services from agriculture, the market will need to be driven by regulation rather than simply by voluntary action and “green” demand.
- **Ag engagement:** The agriculture industry will need to be engaged fully in the creation and operation of these markets.
- **Transparency:** The market operation will need to be open, public, and transparent so that the process, values, and system is clear to all.
- **Education:** Farmers, environmentalists, and the public will need to be educated as to the benefits and operations of these markets.
- **Trusted science:** The market, its measures, practices, and policies need to be based on trusted science from credible trusted sources.

### Priority Issues, Concerns, and Opportunities

What issues or concerns need to be addressed - what opportunities exist that need to be taken advantage of?

- **Image:** A strong conservation market may have an image problem – it must be seen as a solution to conservation needs rather than as a way to avoid dealing with them.
- **Conflict with environmentalists:** Designing the program so that it can be used by farmers is likely to create conflict with environmentalists. Both farmers and environmentalists will need to see this as advantageous.
- **Fair payment:** The program must generate an actual market value for the services delivered and participation must produce sufficient revenue overall to make it worthwhile to be involved.
- **Complexity:** The program seems likely to be complex. Farmers may not have sufficient time or inclination to study and fully understand the system sufficiently to be willing to become involved in it. The rewards must be sufficient to pay for the time-cost of involvement. The program will need a fully-informed buyer and seller both who understand the value of participation.
- **Engaging the interest of agriculture:** It will be difficult to get information about the program out broadly throughout the agriculture community so that there is broad understanding, support, and participation throughout the industry.
- **Technical assistance and monitoring:** We will need trusted sources for technical assistance, implementation, and monitoring of the program (e.g. conservation districts and NRCS) if it is to be seen in the agriculture community as credible and if it is to be possible for farmers and ranchers to

participate. These functions must be completed by agencies that are trusted by agriculture.

- **Contract length:** There is a limit to the length of the commitment that a producer can agree to – it must remain flexible to be able to adapt to changes in the commodity market.
- **Oversight:** Who will provide oversight? Will it be someone agriculture can trust?
- **Measurement:** There will need to be clear and agreed-on measures of performance that will require modeling and fully understanding of how conservation practices work.
- **Baseline and early adopters:** The baseline issues are difficult – if too high, nobody will be able to earn anything from such a market. And we need to deal with early adopters in a way that honors their continued efforts. They should not be eliminated from participation just because they were good citizens before the program got started.
- **Unintended consequences:** It seems possible that, once such markets get underway, regulators could see the processes they create as an opportunity to simply require such performance rather than support markets to pay for it. The baseline could be set by regulation, and then slowly elevated, closing out the marketplace.
- **Eminent domain:** Government could also undermine these markets through the use of condemnation, by simply buying farmland and converting it to environmental uses.
- **Transparency and standardization:** For these complex markets to be fully effective as markets and to be credible with the public they will need to be fully transparent to all and will need to operate in accordance with orderly standardized rules that all can accept. Establishing these rules will be a challenge.
- **Funding possibilities:** The possible available funding seems ample with large sums being spent on environmental mitigation and carbon and water quality offsets. This suggests the possibility that, if things work as they should, agriculture ought to be able to sell at a price that truly does cover costs and provide a possible profit.
- **Green market enhancements:** Certification and participation in these markets ought to also provide opportunities to take advantage of eco-markets and to earn additional money through green “value added” products.
- **Use of agriculture groups:** It seems possible that existing organizations that represent the agriculture industry and that are trusted by it ought to be able to take on some of the roles called for by these markets.

***Appendix B: Details on Existing Markets***

Appendix B is a separate document provided with the report.

<b>Deschutes Riparian Reforestation</b>	
Relevance to WA	High - small landowners sell credits on working land, broker has established community role, many buyers are in-state power plants complying with Oregon CO2 standard.
What traded / Credits	Greenhouse gases through reforestation in riparian zone. Reforestation is targeted along the Deschutes River, thus additional benefits include improved water quality and stream flows and improved fish & wildlife habitat.
Transaction Methods	The Climate Trust pays the Deschutes River Conservancy to recruit and provide incentives to landowners to participate.
Age/ Maturity	Initiated in 2002. Landowners agree to preserve planted trees for at least 50 years.
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	Landowners agree to preserve planted trees for at least 50 years.
Location	Deschutes Basin, OR
Sponsor and Partners	The Climate Trust and Deschutes River Conservancy
Buyers and Sellers	Buyers are purchasers of Climate Trust offsets (power plants, businesses, organizations, individuals). Sellers are landowners in Deschutes River Basin.
Service Area Size	1500-1800 riparian acres projected by 2008
Sources and Contacts	Information from <a href="http://www.climatetrust.org/offset_deschutes.php">http://www.climatetrust.org/offset_deschutes.php</a>

<b>Northwest Neutral Carbon Offsets (NW Neutral)</b>	
Relevance to WA	High - focused on small forest landowners, will be an aggregator with a previously-established relationship and reputation among producers.
What traded / Credits	Greenhouse gases through forest management practices - rotations and retention.
Transaction Methods	NNRG will aggregate offsets generated by landowners.
Age/ Maturity	Initial trades are just being completed. NNRG is working to develop appropriate baselines and verification approaches to encourage participation among small forest landowners.
Success criteria / Market drivers	N/A
Pricing / Costs	Expect to receive prices significantly higher than CCX (about \$20 - \$30 per ton).
Contract lengths	Contracts are for 100 years, with some potential for heavily discounted 50 year contracts. Sales will be made at 5-year intervals.
Location	Washington and Oregon
Sponsor and Partners	Northwest Natural Resource Group and Forest Stewardship Council (NNRG is working with FSC to modify FSC standards to be more applicable to small forest landowners).
Buyers and Sellers	Buyers have been identified, but not yet made public. Sellers are small forest landowners.
Service Area Size	Small forest holdings dispersed across Washington and Oregon
Sources and Contacts	Information from <a href="http://www.nnrg.org/innovations/NW-Neutral">http://www.nnrg.org/innovations/NW-Neutral</a>

<b>Pacific Northwest Direct Seed</b>	
Relevance to WA	High - in WA, small farmers, local aggregator
What traded / Credits	Greenhouse gases through direct seeding on land in production, at rate of 0.55 tons CO2 sequestered per acre per year.
Transaction Methods	PNDSA contracts with Entergy and 77 growers whose credits are aggregated.
Age/ Maturity	Contract with Entergy initiated in 2002 for sequestering 3,000 tons of CO2.
Success criteria / Market drivers	N/A
Pricing / Costs	Approximately \$1 per acre
Contract lengths	Contracts with farmers to lease credits are for 10 years.
Location	Washington, Oregon, Idaho, Montana, California
Sponsor and Partners	Pacific Northwest Direct Seed Association (non-profit, based in Idaho). Local Conservation Districts will monitor and verify direct seeding.
Buyers and Sellers	Buyer is Entergy (energy company based in New Orleans). Sellers are 77 small farmers, each generating credits on a maximum of 100 acres.
Service Area Size	6,470 acres in production
Sources and Contacts	Information from <a href="http://www.directseed.org">www.directseed.org</a>

<b>AgraGate Climate Credits Corp.</b>	
Relevance to WA	Medium - landowners sell credits from working land, active participation, multiple buyers, but prices on CCX are low.
What traded / Credits	Greenhouse gases through no-till or strip-till (0.2-0.6 tons/acre), rangeland, grass cover (0.75 tons/acre), methane capture. Cropland that was put into CRP prior to Jan 1, 1999 is ineligible. Credits can be earned on land that has been no-tilled, seeded to grass (post-1999) or grazed previously.
Transaction Methods	AgraGate aggregates offsets from farmers, ranchers, and foresters.
Age/ Maturity	Iowa Farm Bureau Federation program began in 2003, expanded as AgraGate, actively aggregates and sells credits on CCX.
Success criteria / Market drivers	AgraGate was created to expand on the Iowa Farm Bureau Federations' Carbon Credit Aggregation Program, initiated in 2003.
Pricing / Costs	N/A
Contract lengths	Contracts are for five years.
Location	24 states, initiated in Iowa
Sponsor and Partners	AgraGate Climate Credits Corporation (subsidiary of Iowa Farm Bureau). AgraGate works with local farm bureaus (e.g., South Dakota Farm Bureau, Montana Farm Bureau Federation).
Buyers and Sellers	Buyers are Chicago Climate Exchange (CCX) members. Sellers are farmers, ranchers, and foresters.
Service Area Size	1.5 million acres in 24 states
Sources and Contacts	Information from <a href="http://www.iowafarmbureau.com/special/carbon/default.aspx">http://www.iowafarmbureau.com/special/carbon/default.aspx</a>

<b>Delta P2E2 Center Carbon Program</b>	
Relevance to WA	Medium - small farm and forest landowners, aggregator, but buyer is Chicago Climate Exchange where prices are low.
What traded / Credits	Greenhouse gases through conservation farming (continuous no-till and strip-till), permanent grass plantings, methane digesters, reforestation, or sustainable forest management
Transaction Methods	Delta P2E2 Center aggregates and sells carbon credits on behalf of landowners on the Chicago Climate Exchange.
Age/ Maturity	Operating since 2006
Success criteria / Market drivers	N/A
Pricing / Costs	Pricing not available, but Delta P2E2 Center manages a revolving fund to assist forest landowners (in Michigan only) with conducting initial forest inventory needed to establish a baseline
Contract lengths	N/A
Location	Farm program in Michigan, Illinois, Indiana, Washington, Arkansas, Minnesota, Kansas, Texas, Colorado, Iowa, North Dakota, and Missouri. Forest program in Michigan, Illinois, Indiana, Arkansas, Louisiana, Wisconsin, Minnesota, Alabama, Pennsylvania
Sponsor and Partners	Delta Pollution Prevention & Energy Efficiency (P2E2) Center and Michigan Department of Natural Resources
Buyers and Sellers	Buyers are Chicago Climate Exchange (CCX) members. Sellers are farmers and public and private forest landowners.
Service Area Size	211, 882 acres enrolled for tillage practices and/or grass plantings. 121,932 acres enrolled for reforestation or sustainable management
Sources and Contacts	Information from <a href="http://www.p2e2center.org">www.p2e2center.org</a>

<b>Dogwood Carbon Solutions</b>	
Relevance to WA	Medium - small forest landowners sell credits on working land, aggregator without previously-established relationship, buyer is Chicago Climate Exchange where prices are low.
What traded / Credits	Afforestation and reforestation; forest management is in development.
Transaction Methods	Dogwood sells credits on multiple private markets; Tatanka Resources aggregates credits for sale on Chicago Climate Exchange.
Age/ Maturity	N/A
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	Multiple states
Sponsor and Partners	Dogwood Carbon Solutions and Tatanka Resources provides link to Chicago Climate Exchange (registered aggregator).
Buyers and Sellers	Buyers are Chicago Climate Exchange (CCX) members and purchasers on other carbon markets. Sellers are forest landowners.
Service Area Size	N/A
Sources and Contacts	Information from <a href="http://www.dogwoodcarbon.com/index.htm">http://www.dogwoodcarbon.com/index.htm</a>

<b>Farmers Union Carbon Credit Program</b>	
Relevance to WA	Medium - landowners sell credits from working land, active participation, multiple buyers, but buyer is Chicago Climate Exchange where prices are low
What traded / Credits	Greenhouse gases through no-till/hayed alfalfa (0.2-0.6 tons/acre), rangeland (0.12-0.52 tons/acre), grass cover (0.4-1.0 tons/acre), methane capture, and reforestation/afforestation post-1990
Transaction Methods	North Dakota Farmers Union aggregates offsets from other state Farmers Unions and the National Farmers Union
Age/ Maturity	Began in ND in spring 2006, in other approved states in October 2006. Credits can be earned on land that has been no-tilled, seeded to grass (post-1999) or grazed previously.
Success criteria / Market drivers	N/A
Pricing / Costs	Carbon credits prices are revised at the end of each year during the contract
Contract lengths	Contracts are for 5-6 years.
Location	North Dakota and other approved states
Sponsor and Partners	North Dakota Farmers Union, other state Farmers Unions, and National Farmers Union.
Buyers and Sellers	Buyers are Chicago Climate Exchange (CCX) members. Sellers are farmers and foresters.
Service Area Size	N/A
Sources and Contacts	Information from <a href="http://carboncredit.ndfu.org/">http://carboncredit.ndfu.org/</a>

<b>Garcia River Forest</b>	
Relevance to WA	Medium working forest land, but is one large parcel managed by a conservation organization; direct sale to PG&E facilitated by registration on California Climate Action Registry (CCAR).
What traded / Credits	Greenhouse gases through sustainable management of working forest. Also protects coast redwoods on the North Coast.
Transaction Methods	Direct sale to PG&E; credits are registered with the California Climate Action Registry (CCAR).
Age/ Maturity	Operating since 2008
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	Mendocino County, Ca
Sponsor and Partners	The Conservation Fund, California Climate Action Registry (CCAR), SGS Environmental Services, Inc. (the verifier).
Buyers and Sellers	Buyer is PG&E's Climate Smart Program. Seller is the Conservation Fund.
Service Area Size	23,780 acres
Sources and Contacts	Information from <a href="http://www.conservationfund.org/west/california/garcia">http://www.conservationfund.org/west/california/garcia</a>

<b>Kentucky Corn Growers Association Carbon Trading Program</b>	
Relevance to WA	Medium - landowners sell credits from working land, active participation, multiple buyers, but buyer is Chicago Climate Exchange where prices are low
What traded / Credits	Greenhouse gases through no till/strip till (0.6 tons/acre) and grass cover (1.0 tons/acre).
Transaction Methods	Association aggregates credits.
Age/ Maturity	Began in 2005.
Success criteria / Market drivers	N/A
Pricing / Costs	Carbon credits prices are revised at the end of each year during the contract.
Contract lengths	Contracts are for five years.
Location	Kentucky, growers in other states may participate for a fee
Sponsor and Partners	Kentucky Corn Growers Association/Kentucky Small Grain Growers Association
Buyers and Sellers	Buyers are Chicago Climate Exchange (CCX) members. Sellers are 100 farms in Kentucky
Service Area Size	100 farms
Sources and Contacts	Information from <a href="http://www.kycorn.org/ccx/index.htm">http://www.kycorn.org/ccx/index.htm</a>

<b>New South Wales Greenhouse Gas Reduction Scheme (NSW GGAS)</b>	
Relevance to WA	Medium- for afforestation/reforestation only, forest must remain planted for 100 years
What traded / Credits	Greenhouse gases through planting forests and maintenance of planted forests.
Transaction Methods	Parties with reduction targets purchase credits (NGACs - New South Wales Greenhouse Abatement Certificates).
Age/ Maturity	Operating since 2003
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	New South Wales, Australia
Sponsor and Partners	Government of New South Wales
Buyers and Sellers	Buyers are parties with annual targets for emissions reductions under the GGAS. Sellers are companies/individuals accredited to plant and grow trees in New South Wales, under specifications.
Service Area Size	Occurs throughout New South Wales (about the size of California)
Sources and Contacts	Information from <a href="http://www.greenhousegas.nsw.gov.au/forestry.asp">http://www.greenhousegas.nsw.gov.au/forestry.asp</a>

<b>VanderHaak Dairy anaerobic digester</b>	
Relevance to WA	Medium - practices common in the Northwest, but high initial investment and buyer is Chicago Climate Exchange where prices are low
What traded / Credits	Greenhouse gases: anaerobic digester handles waste from 1,500 cows, eliminating 560 tons of methane annually (10,000 tons eCO <sub>2</sub> ), at a rate of 9.47 tons/cow/year eCO <sub>2</sub> .
Transaction Methods	Environmental Credit Corporation aggregates credits.
Age/ Maturity	Digester was constructed in 2004.
Success criteria / Market drivers	N/A
Pricing / Costs	Anticipated payback on investment of 7-9 years with current CO <sub>2</sub> prices.
Contract lengths	N/A
Location	Lynden, WA
Sponsor and Partners	VanderHaak Dairy, with some financial support (USDA, WSU). Also USDA, WSU's Climate Friendly Farming project, Andgar Corporation, Whatcom County WSU Extension, Port of Bellingham, Whatcom Conservation District, Whatcom PUD #1, and Puget Sound Energy.
Buyers and Sellers	Buyers are Chicago Climate Exchange (CCX) members. Seller is VanderHaak Dairy.
Service Area Size	3 local dairies, 1,500 cows
Sources and Contacts	Information from <a href="http://www.terrapass.com/projects/details/vanderhaak-dairy.html">http://www.terrapass.com/projects/details/vanderhaak-dairy.html</a>

<b>Woodlands Carbon Co.</b>	
Relevance to WA	Medium - based in Oregon, producer-trusted aggregator that is involving landowners in program development.
What traded / Credits	Greenhouse gases through afforestation, reforestation, sustainable forest management
Transaction Methods	N/A
Age/ Maturity	Began in 2008.
Success criteria / Market drivers	N/A
Pricing / Costs	Pricing not available, but zero-interest loans will be offered to cover the costs of initial forest baseline inventories. Loans will be repaid through the sale of carbon credits
Contract lengths	N/A
Location	Oregon, Washington
Sponsor and Partners	Oregon Small Woodlands Association and American Forest Foundation (initial grant to launch program)
Buyers and Sellers	Buyers are Chicago Climate Exchange (CCX) members. Sellers are small foresters
Service Area Size	N/A
Sources and Contacts	Information from <a href="http://www.oswa.org/">http://www.oswa.org/</a>

<b>Lompico Headwaters Forest</b>	
Relevance to WA	Low - one large portion of preserved land rather than multiple parcels on working lands under multiple ownerships
What traded / Credits	Greenhouse gases through avoided deforestation through forest protection. Also protects coast redwoods in Santa Cruz Mountains, watershed which is area water supply, habitat.
Transaction Methods	Direct sale to PG&E; credits are registered with the California Climate Action Registry (CCAR).
Age/ Maturity	Initiated in 2007.
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	Santa Cruz County, CA
Sponsor and Partners	Sempervirens Fund and California Climate Action Registry (CCAR)
Buyers and Sellers	Buyer is PG&E's Climate Smart Program. Seller is Sempervirens Fund.
Service Area Size	202 acres
Sources and Contacts	Information from <a href="http://www.sempervirens.org/sempervirensPGEdeal.htm">http://www.sempervirens.org/sempervirensPGEdeal.htm</a>

<b>Preservation of a Native Northwest Forest</b>	
Relevance to WA	Low - one large portion of preserved land rather than multiple parcels on working lands under multiple ownerships
What traded / Credits	Greenhouse gases through reforestation and avoided deforestation through forest protection in the Arlecho Creek watershed. Preservation and reforestation will also sustain fish and wildlife habitat.
Transaction Methods	The Climate Trust helped the Lummi Indian Tribe to acquire the site from a logging company.
Age/ Maturity	Initiated in 2002, with a 100 year conservation easement.
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	100 year conservation easement
Location	Near Mt Vernon, WA
Sponsor and Partners	The Climate Trust and Lummi Indian Tribe
Buyers and Sellers	Buyers are purchasers of Climate Trust offsets (power plants, businesses, organizations, individuals). Seller is the Lummi Indian Tribe.
Service Area Size	1,654 acres
Sources and Contacts	Information from <a href="http://www.climatetrust.org/offset_native.php">http://www.climatetrust.org/offset_native.php</a>

<b>Van Eck Forest Project</b>	
Relevance to WA	Low - involves one large portion of preserved land rather than multiple parcels on working lands under multiple ownerships
What traded / Credits	Greenhouse gases through sustainable management of working forestlands. Project also helps to protect wildlife habitat and water quality and quantity.
Transaction Methods	Offsets are sold by BeGreen.
Age/ Maturity	Conservation easement was executed in 2001.
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	Humboldt County, CA
Sponsor and Partners	<b>Pacific Forest Trust</b> manages the forest and holds the conservation easement. The Fred M. van Eck Forest Foundation is California Climate Action Registry (CCAR)-verified. Registered and certified under California's Forest Protocols.
Buyers and Sellers	Buyers are Individuals. Seller is a single forestry management operation.
Service Area Size	2,200 acres
Sources and Contacts	Information from <a href="http://www.pacificforest.org/stewardship/vaneck/index.html">http://www.pacificforest.org/stewardship/vaneck/index.html</a>

<b>Waddle Ranch</b>	
Relevance to WA	Low - one large portion of preserved land rather than multiple parcels on working lands under multiple ownerships
What traded / Credits	Greenhouse gases through avoided deforestation through forest protection.
Transaction Methods	In development
Age/ Maturity	In development
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	Truckee/Tahoe, CA
Sponsor and Partners	Sierra Business Council and California Climate Action Registry (CCAR)
Buyers and Sellers	Seller is Sierra Business Council. No buyers yet.
Service Area Size	N/A
Sources and Contacts	Information from <a href="http://www.sbcouncil.org/Waddle-Ranch">http://www.sbcouncil.org/Waddle-Ranch</a>

<b>Great Miami River Watershed</b>	
Relevance to WA	High - active, brokered market with multiple buyers and sellers.
What traded / Credits	Phosphorus and nitrogen. Credits generated through implementing BMPs. Considering carbon. Credits don't go to projects that are already getting funding from either Farm Bill conservation dollars or state dollars allocated under CWA -- requested by both the dischargers and farmers. The goal is additionality rather than overlapping.
Transaction Methods	WWTPs evaluate offset needs and tell Miami Conservation District (MCD) their willingness to pay. They serve as buyers and contract with MCD. MCD serves as an "aggregator." MCD then announces bidding round (RFP / reverse auction). MCD contracts with Soil and Water Conservation Districts (SWCDs). Farmers submit bids to SWCDs. SWCDs submit them to the advisory group, which in turn matches up the bids to the offers. SWCDs then contract with farmers. SWCDs serve as brokers to purchase phosphorus & nitrogen credits from farmers. Greatest amount of phosphorus and nitrogen is purchased at the most efficient rates.
Age/ Maturity	Launched in 2005 at the same time the state was to begin phasing in water quality criteria that would create an incentive for wastewater treatment plants to buy offsets from farmers (though TMDL was so weak, that "incentive" didn't materialize). Between 2006 and 2007 the program reduced 335,636 credits (pounds of nitrogen and phosphorus). In the first year, the program traded 78,000 credits from 13 projects. Still in "pilot phase". Currently restricted set of buyers and sellers, based on set of criteria and conditions.
Success criteria / Market drivers	(1) Certainty in the "commodity" (credit) purchased by buyers. There is no direct link between farmers and wastewater treatment plants, and the program discourages direct bilateral offsets between the two to avoid transfer of liability. No specific farm project is traceable to any particular wastewater treatment plant -- provides some protection to both parties and makes trading less risky and attractive. (2) Received \$1.3 million in startup grants.
Pricing / Costs	Phosphorous currently trading at about \$1.90/lb phosphorous. That includes the transaction costs incurred by the SWCDs that contract, monitor, and model the phosphorous levels (around \$0.20/lb). Transaction costs, above the \$1.90/lb, is around 100%. Therefore, program implementation estimates are ~ \$4/lb. For smaller WWTP, onsite end-of-pipe avoidance cost is \$20-40/lb phosphorus. Smaller, more isolated WWTPs are more likely to participate. Larger WWTP are more efficient in onsite solutions.
Contract lengths	Field projects have 5-10 year contracts with annual payments. Capital projects have 15-20 year contracts (lifespan of installation), but with most of investment upfront. MCD would prefer to pay 85% upfront, remainder in annual payments; undecided with SWCDs.
Location	Ohio
Sponsor and Partners	Miami Conservation District (supported by stakeholders), Ohio Farm Bureau, USDA-FSA, Soil and Water Conservation Districts, USDA-NRCS.
Buyers and Sellers	Buyers are wastewater treatment utilities (7 plants, 5 owners, 1 primary buyer). Sellers are small local farmers and ranchers.
Service Area Size	3,800 square miles and 314 regulated point sources
Sources and Contacts	Conversation with Dusty Hall, Miami Conservation District. Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008). Steve Zwick, "Ohio Water Trading: Driving Without Drivers" ( <a href="http://ecosystemmarketplace.com">http://ecosystemmarketplace.com</a> ). Katherine Hamilton "Testing the Waters: The Great Miami River Watershed Water Quality Credit Trading Program,"( <a href="http://ecosystemmarketplace.com">http://ecosystemmarketplace.com</a> ).

<b>New York City Watershed Program</b>	
Relevance to WA	High - very active program with many sellers, although driven by one buyer rather than a true market. Focus on technical assistance provision.
What traded / Credits	Drinking water quality ensured through BMPs, easements, CREP, and a variety of BMPs. Not "credits" per se. Do have "Nutrient Management Program" with "NM Credit." Program also purchases development rights and offers economic development program to keep farmers on the land.
Transaction Methods	NYC Watershed Program (Watershed Agricultural Council) contracts BMPs with farmers.
Age/ Maturity	Driven by one buyer (NYC). Many active trades ("contracts") - over 90% of farmers participate. (85% participation from "known" farms)
Success criteria / Market drivers	(1) Program offers relatively high payments including full compensation for implementing BMPs, enhanced CREP payments to cover the full cost of implementation, fully funded from NYC (no cost-share). (2) Voluntary to landowner, locally controlled. (3) Science-based and mutually-beneficial BMPs. (4) Farm plan developed with WAC are much like that with NRCS, but process is faster.
Pricing / Costs	Landowner incentive is 100% cost-share of capital costs; the project benefits their operation and they pay for nothing but operation and maintenance. Rental agreements (e.g., CREP) are paid for by FSA-NRCS. Rental payments are not matched by NYC/WAC. In the Nutrient Management Program (NM Credits), payment is claimed by reimbursements for repayment receipts of spreading equipment (but does not cover full cost of spreading). Not a direct payment for services rendered.
Contract lengths	In exchange for BMP paid for on their property, landowners sign 10-year MOI. If they go out of business, the program is not paid back. If they want to sell or cancel, the contract is amortized (depreciation), and landowner must payback to the program. Nutrient Management Program operates with 3-year rotations.
Location	New York
Sponsor and Partners	New York City Watershed Program, Watershed Agricultural Council, local community leaders
Buyers and Sellers	Buyer is New York City. Sellers are farmers
Service Area Size	1,900 square miles including 350 farms
Sources and Contacts	Conversation with Tom O'Brien, Executive Director, Watershed Agricultural Council, New York City Watershed Program. Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>South Nations (Canada)</b>	
Relevance to WA	High - all new point source dischargers (or increases permits) are required to buy phosphorus credits from rural landowners (nonpoint sources) to be permitted
What traded / Credits	Phosphorus (kg). 4:1 ratio of removal. The Provincial Ministry of Environment (MOE) treats the watershed as a unit; therefore, a treatment plant discharging phosphorus in the lower reaches of the watershed can pay for measures to reduce phosphorus in the upper reaches, or any other part, of the watershed.
Transaction Methods	SNC serves as broker between permitted point source dischargers and rural landowners (nonpoint sources). To enter into a offset program, a discharger must agree to the 4:1 ratio, and must show to MOE their plans for reducing phosphorus.
Age/ Maturity	Active and driven by multiple buyers and sellers. In 1998, the Provincial Ministry of Environment (MOE) required all new dischargers to have zero discharge of phosphorus from their plants. While dischargers have the option of using the Total Phosphorus Management (TPM) program by either buying credits or using enhanced wastewater treatment, all dischargers have chosen credits since its inception.
Success criteria / Market drivers	(1) Driven by regulation. In 1998, the Provincial Ministry of Environment (MOE) required all new dischargers to have zero discharge of phosphorus from their plants. (2) The issue of responsibility for phosphorus reduction was key to success. Initially, the agricultural community opposed TPM, but extensive consultation over three years achieved consensus on the roles and responsibilities for the various partners. This consensus became a Statement of Roles and Responsibilities document that was signed by all stakeholders. Consultation also resulted in a higher ratio for phosphorus reduction (4:1 instead of the initial 2:1), higher costs per kg phosphorus removed, and an evaluation and monitoring strategy to ensure the phosphorus load reduction is achieved. Neither SNC, nor the landowners as the recipient of the funds, have any legal responsibility should phosphorus targets not be met. This responsibility rests solely with the discharger who must prove to MOE that they are meeting their phosphorus reduction targets. Also, use of farmers as field representatives to do all site visits.
Pricing / Costs	Estimated cost of phosphorus removal is Cdn\$300/kg (\$136/lb) for nonpoint projects; thus, using the 4:1 ratio, the cost to remove phosphorus using credits is about \$1,200 per kg. Price includes all transaction costs, including project management (staffing, administration), water sampling, communications to promote the grants available to landowners, and yearly reporting. Cost benefit studies done in the South Nation watershed show that the cost for complete removal of phosphorus using traditional wastewater treatment methods is around \$2,000 (Cdn) per kg of phosphorus removed.
Contract lengths	Most TPM agreements have a four-year deadline to reduce the full amount of phosphorus. With SNC's experience in grants for similar projects in the past, there is no forecasted shortage of phosphorus reduction projects for several more years.
Location	Ontario, Canada
Sponsor and Partners	South Nation Conservation (SNC), a community based watershed organization set up to manage the natural resources of the South Nation River watershed, and Canada's Ministry of the Environment
Buyers and Sellers	Buyers are new emitters of phosphorous (point source dischargers). Sellers are rural landowners
Service Area Size	N/A
Sources and Contacts	Dennis O'Grady & Mary Ann Wilson, Phosphorus Trading in the South Nation River Watershed, Ontario, Canada (2002) (unpublished manuscript, on file with authors).

<b>Alpine Cheese Company</b>	
Relevance to WA	Medium - brokered market with only one buyer, but monitoring arrangements may be relevant.
What traded / Credits	Phosphorus. Credits generated through implementing BMPs. 1 pound phosphorus = 1 credit; 1 pound nitrogen = 1 credit. OH Dept. of Natural Resources manages a spreadsheet (like NRCS) where BMP variables are input and phosphorous (lbs.) are calculated. Initially required 10-15% more reductions through BMPs to account for uncertainty.
Transaction Methods	Brokerage. Farmers are paid to adopt BMPs, then conservation district brokered the BMPs to the Alpine Cheese Company so Alpine Cheese could acquire NPDES permit.
Age/ Maturity	Driven by one buyer. Transactions completed. Demand for contracting a BMP on farm is steady, and Alpine is meeting its reduction goals.
Success criteria / Market drivers	(1) Monitoring designed to be minimally intrusive and conducted through OSU extension. (2) Focus of conservation district is on the farmers, not on lowest price (not on "efficient price"). Not trying to set up trading system per se: primarily trying to help fund BMPs with farmers. (3) Synergy with university, factory and CD. (4) Alternative to onsite treatment required to achieve final reductions in phosphorus.
Pricing / Costs	Pricing varies by BMP, but program caps farms at \$30/lb of phosphorous to remain cost effective. The cap does not include labor, which is covered through different funding stream from Alpine Cheese. Each BMP has different value associated with it because BMP costs vary from farm to farm and each BMP has different savings of nitrogen or phosphorous. Some BMPs are more efficient at saving nitrogen & phosphorus than other BMPs.
Contract lengths	Pressure for long term contracts not there. Considering interest of farmer. Program still in infancy. Despite "sale of the BMPs" with lifespans of 15-20 yrs, they're only contracting for 5yrs.
Location	Sugar Creek, Ohio
Sponsor and Partners	Alpine Cheese Company, Holmes Soil and Water Conservation District. and Ohio State University
Buyers and Sellers	Buyer is Alpine Cheese Company. Sellers are local farmers and ranchers
Service Area Size	N/A
Sources and Contacts	Richard Moore, Ohio State University Extension. Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Kalamazoo River Demonstration</b>	
Relevance to WA	Medium - brokered market under TMDL, but maybe no trades yet.
What traded / Credits	Phosphorus. Credits generated through implementing BMPs. Requires 2:1 ratio - farmers undertake BMPs to create double the credits they can sell to decrease uncertainty. TMDL in place.
Transaction Methods	Brokered transactions in which the Steering Committee acts as a bank. May use NutrientNet, an online trading registry ( <a href="http://kalamazoo.nutrientnet.org">http://kalamazoo.nutrientnet.org</a> )
Age/ Maturity	Demonstration project, potentially with transactions completed.
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	Michigan
Sponsor and Partners	Steering Committee, including MI Dept. of Agriculture, MI Farm Bureau, USDA-NRCS, MI Integrated Food & Farming Services, and MI Agricultural Stewardship Association.
Buyers and Sellers	Buyers are NPDES-permitted point sources. Sellers are local farmers and ranchers
Service Area Size	2,000 square miles and 50 regulated point sources
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Rahr Malting Company</b>	
Relevance to WA	Medium - active program but driven by (and written into) one permit rather than a true market.
What traded / Credits	CBOD5 (5 day carbonaceous biochemical oxygen demand). A 2:1 trading ratio was used to account for the uncertainties. Used CBOD5 conversion ratios of 1:8 for phosphorus (for every unit of phosphorus load reduction, eight units of CBOD5 would be credited) and 1:4 for nitrogen (1:1 upstream of the TMDL zone). Two trades converted farmland back to its original floodplain status and planted native grasses and trees to stabilize the soil and prevent flood scouring. Two other trades used structural work and bioengineering methods to stabilize eroding riverbanks; nutrient reduction credits were generated from reduced sediment and soil loss from the trade sites.
Transaction Methods	Driven by one buyer. Direct transactions between farmers and the malting company, with some assistance provided by Coalition for Clean Minnesota River (broad-based local group)
Age/ Maturity	Driven by one buyer. Four successful transactions that accomplished program's discharge goals in building a waste treatment facility. During the five years of implementation, Rahr was able to achieve the credit requirement through these four nonpoint source trades.
Success criteria / Market drivers	(1) Regulation: TMDL established (all loads already allocated). Trading required by Rahr's permit as the only way to offset desired new discharges under a TMDL. (2) Ratios used to account for uncertainties (2:1). (3) Rahr also agreed to provide a \$250,000 trust fund to financially guarantee the realization of the trades.
Pricing / Costs	Price based on cost of BMP because farmer losing land to river. Price paid to landowner negotiated by Scott Wallace, N. American Wetlands PA (proprietary information).
Contract lengths	3 of 4 sites were permanent easements. 4th site was bank stabilization with 13 year contract.
Location	Minnesota River, MN
Sponsor and Partners	Rahr Malting Company, Coalition for Clean Minnesota River (broad-based local group), Minnesota Pollution Control Agency
Buyers and Sellers	Buyer is Rahr Malting Company. Sellers are farmers and ranchers
Service Area Size	N/A
Sources and Contacts	Jim Klang, Keiser & Associates (formerly with Minnesota Pollution Control Agency). Pollution Trading to Offset New Pollutant Loadings, Fang & Easter, 2003. Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Red Cedar River Nutrient Trading Pilot</b>	
Relevance to WA	Medium - brokered transactions driven by one buyer rather than a true market.
What traded / Credits	Phosphorus credits generated on a per-acre basis through no-till and conservation tillage (4 lb. phosphorous/acre no-till). Use a 2:1 ratio for uncertainty.
Transaction Methods	Brokered contracts with farmers through Land Conservation Department. Farmers come to LCD, who pays farmers directly. LCD is not compensated through city.
Age/ Maturity	Driven by one buyer. Active contracts with 22 farmers per year (5,000 pounds of phosphorus credits)
Success criteria / Market drivers	(1) Credible partner (Land Conservation Department), (2) clear price, (3) well-understood and easily verifiable BMPs, (4) no extra payment to LCD (three other county's projects have failed to launch because they requested extra to pay for conservation district services). (4) Goal for them is to reduce phosphorous and encourage BMPs, not necessarily to implement markets with multiple buyers.
Pricing / Costs	\$18.50/acre of no-till. 4 lbs. phosphorous (reduced) per 1 acre no-till. (Equate to \$4.63/lbs phosphorous). Price guidance from EQIP. \$14-15/acre for conventional conservation tillage.
Contract lengths	1 year contracts for a total of 3yrs, after which they have to contract on different field. No attempt at lengthening contracts. LCD is satisfied with current length.
Location	City of Cumberland, Wisconsin
Sponsor and Partners	City of Cumberland, WI; Barron County Land Conservation Department; and Wisconsin Dept of NR
Buyers and Sellers	Buyer is City of Cumberland, WI. Sellers are farmers
Service Area Size	1,800 square miles and 18 municipality point-sources
Sources and Contacts	Dale Hanson, County Conservationist, Barron County SWCD. Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Southern Minnesota Beet Sugar Cooperative</b>	
Relevance to WA	Medium - active program but driven by (and written into) one permit rather than a true market; sellers are constituents of the buyer.
What traded / Credits	Phosphorous, mainly through implementing BMPs (primarily planting spring cover crop). Trading ratio set at 2.6:1. Permit specifically defined the trading ratio as follows: 1.0 for the basic load offsetting, 0.6 for "engineering safety factor reflecting potential site-to-site variations," and 1.0 for water quality improvement. Translated into a total of 12,954 credits (12,954 lbs phosphorus/yr or 5,876 kg/yr) that would have to be purchased from nonpoint sources to meet the requirement if the WWTP reaches its permitted annual phosphorus emission limit.
Transaction Methods	Mitigating for nonpoint source (NPDES permit). Brokered by private consultant (Dale Finnerefgaard, Barr Engineering). BMP contracts required proprietary clause. Board administers a \$300,000 trust fund to implement non-point projects.
Age/ Maturity	Driven by one buyer. Began in 1999. In 2005 traded 15,767 pounds of phosphorus from 579 sites. Some 200 cover crop contracts were executed between 2000 and spring 2004.
Success criteria / Market drivers	(1) Regulation driven, NPDES permit for new SMBSC WWTP. Trading required by SMBSC's permit as the only way to offset desired new discharges under a TMDL with all loads already allocated (must offset 4,982 lbs phosphorus/yr). (2) All sellers are members of SMBSC. (3) In addition to the annual payments, the Cooperative established a \$300,000 trust fund.
Pricing / Costs	Fang-Easter (2003) report that for years 2000 and 2001 the cost to growers averaged \$6/acre and the price paid to growers was \$2/acre. Credits generated averaged 0.32lb/acre (cost to Rahr Malting averaged \$6.22/lb. Cost to growers averaged \$18.65/lb). The large number of trades (367 in total for 2000 and 2001 alone) and the strict trade-by-trade credit verification process required more time by MPCA staff for site visits, credit auditing, and other necessary administrative work. The phosphorus reduction cost for cover cropping, when the transaction costs are included (incomplete at time of study), will very likely exceed \$24/lb Klang reports that SMBSC disputes this price and cost information as the "value" per acre because reducing phosphorous via spring cover crop wasn't the only motivation for the BMP.
Contract lengths	1 year contracts. No longer than 1 year because (a) sugar beets are a commodity (subsidized), so its difficult to predict pricing too far in advance, and (b) difficult to predict fungus concerns from year to year.
Location	Minnesota River, MN
Sponsor and Partners	A board including SMBSC representative, conservation district representative, watershed coordinator, environmental advocate; Southern MN Beet Sugar Cooperative; MN Pollution Control Agency; environmental and river advocacy groups; and local governments
Buyers and Sellers	Buyer is Southern Minnesota Beet Sugar Cooperative. Sellers are farmers, mainly members of Southern Minnesota Beet Sugar Cooperative
Service Area Size	N/A
Sources and Contacts	Conversation with Jim Klang, Keiser & Associates (formerly with Minnesota Pollution Control Agency). Conversation with Dale Finnerefgaard, Barr Engineering. Pollution Trading to Offset New Pollutant Loadings, Fang & Easter, 2003. Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Tualatin Basin Shade Credit Temperature Trading Program</b>	
Relevance to WA	Medium - active program but driven by (and written into) one permit rather than a true market.
What traded / Credits	Mainly addresses thermal load. To date, only "shade" credits from riparian restoration projects have been purchased (mainly through planting trees). Shading credits measured in Kcal/day; requirement based on 2:1 ratio. Thermal credits also scheduled as flow augmentation (reservoir releases, 30cfs July August) and effluent reuse (in lieu of irrigation withdrawals). Designed to also address bacteria, dissolved oxygen, ammonia, and phosphorus.
Transaction Methods	CWS offers enhanced payments for land in the existing CREP system (37% more) or a less restrictive Vegetated Buffer Areas for Conservation and Commerce (VEGBACC) program. Brokered thru the Soil and water Conservation District (SWCD); incentive payments to SWCD.
Age/ Maturity	Driven by one buyer. Transactions completed - now 27 CREP/ECREP participants. Began ~2004.
Success criteria / Market drivers	Regulation: Trading required by CWS's permit as alternative to additional treatment; TMDL in place.
Pricing / Costs	Program pays a 37% premium to the basic USDA-CREP rental rates, as well as additional payments for maintenance activities. Estimated 5-year cost for CWS is \$820,000 (30cfs reservoir release and 35 miles of stream shaded) and partners (CREP) share cost of \$1.38M, so total 5-year estimated cost is \$2.2M. Traditional mechanical solution cost estimated at \$50M in capital plus \$2M per year. Consequently, ecosystem credit estimated to be 2% of traditional costs.
Contract lengths	Standard CREP agreements are for 15 years. Regulatory obligation is for 20 years. Arrangements for years 16-20 are to be determined.
Location	Oregon
Sponsor and Partners	Clean Water Services (CWS), Tualatin SWCD, and USDA CREP program
Buyers and Sellers	Buyer is Clean Water Services, a local public wastewater utility. Sellers are local landowners with riparian areas.
Service Area Size	712 square miles and one wastewater treatment provider
Sources and Contacts	Conversation with Charles Logue, Clean Water Services. Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Chesapeake Bay Nutrient Trading</b>	
Relevance to WA	Low - may not be active yet, but the NutrientNet registry is worth exploring.
What traded / Credits	Nitrogen and phosphorus
Transaction Methods	Potentially through NutrientNet, an online trading registry ( <a href="http://www.nutrientnet.org">www.nutrientnet.org</a> ). Pennsylvania has a NutrientNet account. Each state adopts its own rules under the Chesapeake Bay Program's guidelines.
Age/ Maturity	Unclear whether state programs are active yet. States created collective cap to reduce nutrients by 2010 and avoid a TMDL.
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	Virginia, Maryland, Pennsylvania, District of Columbia
Sponsor and Partners	Each state develops their own program using common guidelines, USDA-NRCS
Buyers and Sellers	N/A
Service Area Size	Multiple service areas - trades will likely initially occur within states.
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Grassland Area Farmers Tradable Loads Program</b>	
Relevance to WA	Low - retroactive transactions at the district (not farmer) level based on regulations on agriculture.
What traded / Credits	Selenium, reduced by practices such as reusing drainage water on salt-tolerant crops.
Transaction Methods	Trades are conducted retroactively among districts, not farmers. Actual selenium loading is measured in all seven districts. Districts that discharge below their allocation generate credits to sell, while districts that over-discharge can either buy credits or pay a fee.
Age/ Maturity	Active trading system with at least 39 formal trades and an unknown number of informal trades
Success criteria / Market drivers	Regulation: market driven by a TMDL cap on selenium. If the districts together exceed the selenium by 20%, they lose their ability to use the San Luis Drain (helps farmers by removing irrigation drainage but can harm the San Joaquin River).
Pricing / Costs	N/A
Contract lengths	N/A
Location	Lower San Joaquin River, California
Sponsor and Partners	Seven irrigation and drainage districts in the San Luis & Delta-Mendota Water Authority
Buyers and Sellers	Buyers and sellers are the same: seven irrigation and drainage districts in the San Luis & Delta-Mendota Water Authority
Service Area Size	N/A
Sources and Contacts	US EPA, "Water Quality Trading Toolkit for Permit Writers, Appendix A," (August 2007).

<b>Lower Boise River Effluent Trading Demonstration Project</b>	
Relevance to WA	Low - pilot market with two-party transactions, but no trades yet.
What traded / Credits	Phosphorus. Credits generated through implementing BMPs.
Transaction Methods	Unclear: could be two-party transactions or transactions brokered by irrigation districts.
Age/ Maturity	No trades yet
Success criteria / Market drivers	Created due to expectation of TMDL. As follow-up to project, Idaho Division of Environmental Quality has created a water quality trading handbook.
Pricing / Costs	N/A
Contract lengths	N/A
Location	Idaho
Sponsor and Partners	ID Dept. of Environmental Quality, USEPA Region 10, ID Soil Conservation Commission, ID Clean Water Cooperative, NRCS, ID Rivers United, Bureau of Reclamation, municipal governments
Buyers and Sellers	Buyers would be point sources. Sellers would be local farmers, ranchers, irrigation districts, and point sources.
Service Area Size	1,290 square miles
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Piasa Creek Watershed Project</b>	
Relevance to WA	Low - brokered transactions driven by one buyer rather than a true market.
What traded / Credits	Sediment; sediment reduction created through land acquisition and BMPs. Not considered "credits". Required to reduce 3300 tons sediment for NPDES, but goal of reducing 6600 tons using a 2:1 ratio.
Transaction Methods	Driven by one buyer. Great Rivers Land Trust brokers projects. (Not "transactions", do not consider them to be tradable "credits") .
Age/ Maturity	Driven by one buyer. Active
Success criteria / Market drivers	Note that they are not working towards "market-based" system. Goal is conservation of rivers and 78,000 acres.
Pricing / Costs	Case by case pricing/acre (pricing/bmp). Primarily easements. No caps set; no averages available.
Contract lengths	10-year agreement to implement 2:1 ratio (reduce 6600 tons). Exceeded goal in 6 years. Contracts modeled after SWCDs (FSA programs), typically for 10 years. The larger the project, the longer the contract (20-30 years). Many projects' commitment length are in perpetuity (fee simple) or the "life" of the structures constructed. At the conclusion of contract lengths, intention is to renegotiate and provide incentive again.
Location	Illinois
Sponsor and Partners	Great Rivers Land Trust, Soil and Water Conservation Districts, and Illinois Environmental Protection Agency
Buyers and Sellers	Buyer is Illinois-American Water Company. Sellers are landowners
Service Area Size	N/A
Sources and Contacts	Alley Ringhausen, Director Piasa Creek Watershed Project, Great Rivers Land Trust. Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Red Barn Trading Company</b>	
Relevance to WA	Low - brokered transactions by private firm with existing client base; credits created only through transporting manure.
What traded / Credits	Water quality through exporting chicken manure outside the Chesapeake Bay watershed.
Transaction Methods	Red Barn, an agricultural consulting firm, brokers and aggregates credits
Age/ Maturity	At least one major aggregation and sales transaction
Success criteria / Market drivers	Red Barn had existing client base of 500 farmers. However, program may not be profitable enough to continue in the future.
Pricing / Costs	N/A
Contract lengths	N/A
Location	Lancaster, Pennsylvania
Sponsor and Partners	Red Barn Trading Company and Pennsylvania Chesapeake Bay Watershed Program
Buyers and Sellers	Buyers are Municipalities. Sellers are farmers
Service Area Size	Chesapeake Bay Watershed
Sources and Contacts	Red Barn Trading Company ( <a href="http://www.redbartrading.com">http://www.redbartrading.com</a> ). Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Tar-Pamlico (&amp; Neuse) Basin</b>	
Relevance to WA	Low - not an active market, just an extension of existing state/federal BMP programs. In-lieu-fee program.
What traded / Credits	Nitrogen and phosphorus through implementing BMPs.
Transaction Methods	Brokered transactions through in-lieu-fee program. One mitigation option available to offset nutrients is to pay a fee into the Riparian Buffer Restoration Fund, which is managed by NCEEP. NCEEP uses these funds to construct nutrient-reduction projects in the Neuse and Tar-Pamlico river basins to achieve the needed nutrient reductions.
Age/ Maturity	Program began in 1984, very mature market (over 45,000 contracts approved by 2005)
Success criteria / Market drivers	Point-sources in the Tar-Pamlico Basin Assoc. (94% of basin discharges) are under a joint nitrogen and phosphorus cap. The Association has consistently discharged below the nutrient cap without engaging in trading. In Phase I, however, it did allocate nearly \$1 million to fund agricultural BMPs in anticipation of needing nonpoint source offsets. The Association gave \$150,000 to the Dept. of Environmental Management during Phase I to fund a staff position, and the trading ratio includes 10% for administrative costs. Cost-share utilized with nonpoint source projects. Projected costs of meeting nutrient cap in Phase 1 were \$50-100 million through individual technology-based limits and \$11.8 million through offsets by agricultural BMPs. The actual cost to the Association in Phases I and II totaled \$1.35 million.
Pricing / Costs	In-lieu fees paid by buyers are \$28.35/lb nitrogen in Neuse River basin, \$21.67/lb phosphorus in Tar-Pamlico River basin, and \$21.62/0.1lb nitrogen in Tar-Pamlico River basin. The per-pound rate is multiplied by the total number of pounds of offset required for the total area of the development for a 30-year period. In the Tar-Pamlico basin, if a development project has both nitrogen and phosphorus reduction requirements, the offset-requirement and payment-amount calculations are performed for both nutrients, but only the higher amount is required to be paid. North Carolina Agricultural Cost-Share Program (NCACSP) then uses fees to pay farmers 75% of BMP implementation through existing programs such as EQIP. (NCACSP also funded by state appropriations, but fees cover all aspect of the program including implementation and administration).
Contract lengths	Mitigation credit good for 30 years. BMP contracts typically follow NRCS schedules, if partnered. Urban projects are typically donated (use of land). Every easement is perpetual. Enhancement projects (habitat/wetland) typically done through easement. Typically sign contract 7-8 years for "cradle-to-grave" projects (e.g. rip rap removal), includes implementation and monitoring.
Location	North Carolina
Sponsor and Partners	Managed through North Carolina Ecosystem Enhancement Program (NCEEP). Contracted with North Carolina Agricultural Cost Share Program (NCACSP), implemented through Soil & Water Conservation Districts. The Nutrient Offset Program is administered by the NC Department of Environment and Natural Resources (NCDENR) Division of Water Quality (DWQ).
Buyers and Sellers	Buyer is NCACSP and NCEEP. Sellers are farmers
Service Area Size	Tar-Pamlico: 5,440 square miles (180 miles of river)
Sources and Contacts	Conversation with Jeff Jurak, NCEEP. NCEEP website ( <a href="http://www.nceep.net/services/stratplan/Nutrient_Offset_Program.htm#top7">http://www.nceep.net/services/stratplan/Nutrient_Offset_Program.htm#top7</a> ). Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Farming for Wildlife</b>	
Relevance to WA	High - in Washington and integrates wetlands with traditional farming.
What traded / Credits	Migratory bird habitat through "Walking wetlands" rotated with mowing and grazing/row-crops.
Transaction Methods	Case study funded by The Nature Conservancy
Age/ Maturity	Case study in progress
Success criteria / Market drivers	Three-year case study that does not take land out of agriculture, improves soil for farmers, and helps one farmer switch to certified organic.
Pricing / Costs	Entire case study cost \$21,000, including implementation, sampling, administration, and land rental.
Contract lengths	N/A
Location	Skagit County, Washington
Sponsor and Partners	The Nature Conservancy and USEPA
Buyers and Sellers	Funding from private and public funds including USEPA grant. Participants are three farmers.
Service Area Size	N/A
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Gordon Dairy</b>	
Relevance to WA	High - in Washington and integrates grazing
What traded / Credits	Conservation easement that allows sustainable grazing to continue.
Transaction Methods	Single transaction through Trumpeter Swan Society.
Age/ Maturity	Single transaction completed
Success criteria / Market drivers	This seems to have been a one-off transaction rather than part of a larger program; however, it demonstrates a successful transaction of the type desired in Washington.
Pricing / Costs	N/A
Contract lengths	N/A
Location	Grays Harbor County, Washington
Sponsor and Partners	Trumpeter Swan Society
Buyers and Sellers	Buyer is National Parks Foundation (dam removal mitigation funding). Seller is Gordon Dairy.
Service Area Size	N/A
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Skykomish Habitat Mitigation Bank</b>	
Relevance to WA	High - in Washington
What traded / Credits	Credits for habitat and wetlands mitigation.
Transaction Methods	Banking transactions
Age/ Maturity	Project nearly complete, sales unknown.
Success criteria / Market drivers	Under-productive farmland converted to mitigation bank, providing credits and flood relief for neighbors.
Pricing / Costs	N/A
Contract lengths	N/A
Location	Skykomish, Washington
Sponsor and Partners	Skykomish Habitat Mitigation Bank
Buyers and Sellers	Buyers are developers, businesses, and local governments. Seller is a private banker.
Service Area Size	N/A
Sources and Contacts	Conversation with Eric Gleason, TRC.

<b>Wildlands, Inc.</b>	
Relevance to WA	High - Wildlands has three projects in WA: Nookachamps Mitigation Bank, Blue Heron Slough, and Blackjack Creek Mitigation Project.
What traded / Credits	Conservation and wetland credits. In some cases Wildlands incorporates crops and livestock into their banks or uses sites as nurseries for other projects. Wildlands also purchases conservation easements from neighboring farmers and ranchers with few changes in farming or ranching practices.
Transaction Methods	Banking transactions, credits sold by Wildlands, Inc.
Age/ Maturity	Mature - Wildlands has several active projects across the country.
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	Washington, Oregon, Georgia, North Carolina, California
Sponsor and Partners	Wildlands, Inc. and farmers and ranchers
Buyers and Sellers	Buyer is Wildlands and, ultimately, developers, businesses, and local governments. Sellers are farmers and ranchers.
Service Area Size	N/A
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Bryte Ranch Conservation Bank</b>	
Relevance to WA	Medium - banking arrangement allows continued operation, but little information available
What traded / Credits	Conservation credits for protecting vernal pools while continuing grazing.
Transaction Methods	Brokered sales through real estate firm.
Age/ Maturity	Single transaction completed; not clear whether credits actually sold yet.
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	Sacramento County, California
Sponsor and Partners	Bryte Ranch and Charter Properties of Sacramento, a real estate brokerage.
Buyers and Sellers	Buyers are developers, businesses, and local governments. Seller is Bryte Ranch.
Service Area Size	N/A
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Campbell Ranch Conservation Bank</b>	
Relevance to WA	Medium - banking arrangement allows continued operation
What traded / Credits	Conservation credits for protecting vernal pools while continuing grazing.
Transaction Methods	Brokered sales through real estate firm.
Age/ Maturity	Single transaction complete on 160 acres; not clear whether credits actually sold yet.
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	California
Sponsor and Partners	Campbell Ranch and Real Estate Solutions
Buyers and Sellers	Buyers are developers, businesses, and local governments. Seller is Campbell Ranch.
Service Area Size	N/A
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Fitzgerald Ranch Conservation Bank</b>	
Relevance to WA	Medium - banking arrangement allows continued operation
What traded / Credits	Conservation credits for protecting vernal pools and buffers only (excluding surrounding grazing land).
Transaction Methods	Unclear whether credits sold by Wildlands, Inc. or by Fitzgerald Ranch directly.
Age/ Maturity	Single transaction complete on 37 acres; not clear whether credits actually sold yet.
Success criteria / Market drivers	N/A
Pricing / Costs	Owner created 62 credits and will receive approximately \$65,000 per credit.
Contract lengths	N/A
Location	California
Sponsor and Partners	Fitzgerald Ranch. Owner learned of conservation banks through Wildlands, Inc. but set up bank himself.
Buyers and Sellers	Buyers are developers, businesses, and local governments. Seller is Fitzgerald Ranch.
Service Area Size	N/A
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Van Vleck Ranch</b>	
Relevance to WA	Medium - banking arrangement
What traded / Credits	Conservation easement that protects wildlife habitat, a vernal pool, and Swainson's hawk migration habitat while allowing traditional grazing.
Transaction Methods	Banking transactions; credits sold by Westervelt Ecological Services.
Age/ Maturity	Single transaction completed on 775 acres; not clear whether credits actually sold yet.
Success criteria / Market drivers	Westervelt Ecological Services routinely purchases conservation banks and deals with the details of regulatory approval and credit sales.
Pricing / Costs	N/A
Contract lengths	N/A
Location	Sacramento County, California
Sponsor and Partners	Westervelt Ecological Services
Buyers and Sellers	Buyer is Westervelt Ecological Services and, ultimately, developers, businesses, and local governments. Seller is Van Vleck Ranch.
Service Area Size	N/A
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Hickory Pass Ranch</b>	
Relevance to WA	Low - bank-like transaction on one property
What traded / Credits	Conservation credits for the endangered golden-cheeked warbler. Credits created through conservation easement and management practices.
Transaction Methods	Bank-like transactions certified by the US FWS.
Age/ Maturity	N/A
Success criteria / Market drivers	US FWS originally wanted to purchase the ranch but did not have the funds; Johnston family wanted to continue ranching.
Pricing / Costs	N/A
Contract lengths	N/A
Location	Texas
Sponsor and Partners	Johnston Family and U.S. Fish and Wildlife Service
Buyers and Sellers	Buyers are developers, businesses, and local governments. Seller is Hickory Pass Ranch.
Service Area Size	N/A
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Southlands Forest</b>	
Relevance to WA	Low - venture specific to a large timber landowner and its particular situation
What traded / Credits	Conservation credits for protecting Red-cockaded Woodpeckers (measured in family groups).
Transaction Methods	N/A
Age/ Maturity	Project progressing on track, not clear that credits created or sold yet.
Success criteria / Market drivers	Because smaller populations seemed doomed, FWS and Environmental Defense let International Paper consolidate 18 woodpecker families from four states into one 5,300 acre parcel for breeding.
Pricing / Costs	Family groups are used to offset IP's impacts elsewhere and could be sold as credits for \$150,000-\$250,000 per family.
Contract lengths	N/A
Location	Decatur, Georgia
Sponsor and Partners	International Paper, US Fish & Wildlife Service, and Environmental Defense
Buyers and Sellers	Credits traded internally or, if possible, to other entities such as timber companies or developers. Seller is International Paper.
Service Area Size	N/A
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>North Carolina Ecosystem Enhancement Program (NCEEP)</b>	
Relevance to WA	Medium - well-regarded program.
What traded / Credits	Stream, wetland, and riparian buffer credits provided through protection and restoration; nutrient offsets provided through BMPs. (see "Neuse and Tar-Pamlico River Basins").
Transaction Methods	Brokered transactions through in-lieu-fee program.
Age/ Maturity	Active program with completed transactions.
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	North Carolina
Sponsor and Partners	North Carolina Ecosystem Enhancement Program (NCEEP) and the NC Dept. of Environment and Natural Resources Division of Water Quality.
Buyers and Sellers	Buyers are developers, businesses, and local governments. Sellers are landowners, including some farmers.
Service Area Size	Stream, wetland, and riparian buffer programs available statewide.
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Kentucky Wetland and Stream Mitigation Fund</b>	
Relevance to WA	Low - agriculture is a minor part of the program.
What traded / Credits	Wetland credits through mitigation projects. Projects could take meaningful amounts of land out of agricultural, but could also benefit uplands (e.g., stream bank stabilization).
Transaction Methods	Banking or in-lieu-fee transactions.
Age/ Maturity	Active since 2000.
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	Kentucky
Sponsor and Partners	Kentucky Wetland and Stream Mitigation Fund (State of Kentucky).
Buyers and Sellers	Primary buyer is the Kentucky Department of Transportation. Sellers are landowners, including some farmers.
Service Area Size	Kentucky, divided by watersheds
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Montana Wetland Legacy Program and In-lieu-fee Program</b>	
Relevance to WA	Low - ILFM program
What traded / Credits	Wetlands mainly through easements, land acquisition, land swaps. Program may take some land out of operation but also may ensure continued agricultural operations through easements that include grazing. Highlighted projects encompass whole ranches.
Transaction Methods	Brokered transactions through Montana Wetlands Legacy Program.
Age/ Maturity	Mature - 800,000 acres have been protected or improved.
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	Montana
Sponsor and Partners	Montana Wetlands Legacy Program (Montana Department of Fish, Wildlife, and Parks), Federal Bureau of Land Management, other Montana state agencies, and US Corps of Engineers.
Buyers and Sellers	Buyers are Montana Department of Fish, Wildlife, and Parks as well as developers. Sellers are farmers, ranchers, and other landowners.
Service Area Size	Montana
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>New Hampshire In-lieu-fee Aquatic Resource Mitigation Fund</b>	
Relevance to WA	Low - program details unclear
What traded / Credits	Aquatic resources, credits created through creation, restoration, or preservation; may include preservation of uplands. Program may help farmers if preservation can include conserving uplands in agriculture.
Transaction Methods	Brokered transactions through in-lieu-fee program.
Age/ Maturity	N/A
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	New Hampshire
Sponsor and Partners	New Hampshire Aquatic Resource Mitigation Fund
Buyers and Sellers	Buyers are developers. Sellers are landowners.
Service Area Size	N/A
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).

<b>Oregon Department of State Lands In-lieu-fee Program</b>	
Relevance to WA	Low - program not yet active
What traded / Credits	Aquatic resources credits created through creation, restoration, or enhancement of wetlands permanently protected.
Transaction Methods	Brokered transactions through in-lieu-fee program.
Age/ Maturity	Not active yet
Success criteria / Market drivers	N/A
Pricing / Costs	N/A
Contract lengths	N/A
Location	Oregon
Sponsor and Partners	Oregon Department of State Lands
Buyers and Sellers	Buyers are developers. Sellers are landowners.
Service Area Size	N/A
Sources and Contacts	Don Stewart, "Conservation Markets for Agriculture (Discussion Paper)" American Farmland Trust (November 2008).