



# Yakima Basin Ecosystem Services Market Analysis

Assessing Market Potential as a Tool for Reaching Water Quality Goals



South Central Washington Resource Conservation & Development Council

Yakima Basin Clean Water Partnership – RC&D Committee  
Report Number 2012 - 02

# **Yakima Basin Ecosystem Services Market Analysis Assessing Market Potential as a Tool for Reaching Water Quality Goals**

By Heather Simmons-Rigdon  
Executive Director, South Central Washington RC&D Council

Prepared in cooperation with the  
Natural Resources Conservation Service  
Under Agreement No. 65-0546-11-006

Report Number 2012 – 02

November 2012

South Central Washington RC&D Council  
Yakima Basin Clean Water Partnership – RC&D Committee

Yakima, WA

# Table of Contents

<b>1. Introduction</b>	4
<b>2. Ecosystem Services Market - Purpose and Need</b>	5
<b>3. Elements of Functional Ecosystem Services Market</b>	6
3.1 <i>Environmental Standards in the Yakima Basin</i>	7
3.1.1 Current Environment	7
3.1.2 Challenges	8
3.1.3 Opportunities	8
3.2 <i>Regulatory Atmosphere in the Yakima Basin</i>	8
3.2.1 Current Environment	8
3.2.2 Challenges	9
3.2.3 Opportunity	10
3.3 <i>Diverse Collaboration in the Yakima Basin</i>	10
3.3.1 Current Environment	10
3.3.2 Challenges	10
3.3.3 Opportunities	10
3.4 <i>Motivated Buyers in the Yakima Basin</i>	11
3.4.1 Current Environment	11
3.4.2 Challenges	11
3.4.3 Opportunities	12
3.5 <i>Potential Sellers in the Yakima Basin</i>	12
3.5.1 Current Environment	12
3.5.2 Challenges	13
3.5.3 Opportunities	13
3.6 <i>Politics and Policy</i>	15
3.6.1 Current Environment	15
3.6.2 Challenges	15
3.6.3 Opportunities	16
<b>4. Water Quality Market Design</b>	16
4.1 <i>Validation Stage</i>	17
4.1.1 Identify Water Quality Need	18
4.1.2 Credit Validator	18
4.1.3 Project Prioritization & Selection	18
4.2 <i>Calculation Phase</i>	19
4.2.1 Seller / Seller's Agent	19
4.2.2 Technical Service Providers (TSPS)	20
4.2.3 Credit Calculation	21
4.3 <i>Verification Phase</i>	21
4.3.1 Credit Verifier	21
4.3.2 Credit Certification	22
4.3.2 Project Monitoring	23
4.4 <i>Registration Phase</i>	23
4.4.1 Credit Registry Tools	23
4.5 <i>Credit Trading</i>	24
4.6 <i>Credit Tracking</i>	24
<b>5. Conclusions</b>	24
<b>6. Literature Cited</b>	25
<b>7. Acknowledgements</b>	25

## 1. Introduction

The Yakima Basin provides our communities with valuable natural and economic resources. Here, there are hundreds of thousands of acres of agriculture, providing some of the nation's most valuable sources of apples, hops, wine grapes, cherries, dairy, and wheat, as well as a variety of other crops. The Yakima Basin also experiences a drastic elevation and precipitation range, starting with high alpine forests in the upper basin and ending in expansive regions of dry shrub-steppe, providing for a diversity of plant and wildlife species. The Yakima River and its tributaries are fed by mountain snow run-off and tie all of these natural and man-made landscapes together, providing our communities with a way of life that they work hard to protect and sustain.

The Yakima Basin Clean Water Partnership (Partnership) is a committee of the South Central Washington Resource Conservation and Development (RC&D) Council ([www.scwrcd.org](http://www.scwrcd.org)). Formed in 2010, the Partnership is composed of diverse stakeholders working together to increase the availability and applicability of market based tools to meet common water quality goals in the Yakima Basin. The mission of the Partnership is to lead in developing, promoting, and advancing market based, or other payment for ecosystem services strategies to improve water quality for the benefit of all communities in the Yakima River Basin.

The Partnership believes the development of conservation tools for quantification, tracking, and potentially having a trading program, or other process for paying for water quality improvements could support a more holistic and effective approach to solving water quality issues in the Yakima Basin.

Three overarching goals for the Partnership are to:

1. Develop new tools that will increase conservation actions, quantify the benefits of those conservation actions, and better prioritize limited conservation dollars.
2. Decrease future investments in high cost, low benefit technology and redirect funding to increasing watershed functions through the restoration or improvement of ecosystem services.
3. Improve water quality and other ecosystem services provided by the Yakima River watershed.

Our approach at the watershed level would benefit from the development and adaptation of tools that quantify the services provided by various conservation actions, develop credits to represent those services, and move potential buyers and sellers of those credits closer to the point where they could participate in a market. One option is to develop a highly functional market infrastructure that ensures transparency, provides conservation benefits, includes properly brokered trading transactions, and effective project monitoring, among other things. But it is also important to be open to other Payment for Ecosystem Services opportunities that may not require a fully developed market infrastructure.

The Partnership feels the Yakima Basin is a key locality for developing a Payment for Ecosystem Services approach to water quality restoration, due to its agricultural economy, correlation between designated uses and ecosystem services, and longtime and consistent efforts to improve water quality. A market could help both to restore ecosystem services and foster collaborative efforts in conservation. An Ecosystem Services Market in the Yakima Basin can also help get steam behind other efforts at developing markets in the state. Tools developed or adapted for use in the Yakima Basin may be applicable, or easily modified, for

use throughout the state, or integrated with other efforts in the Pacific Northwest and nationally.

To design an Ecosystem Services Market platform, we need to understand the elements that make up a “typical” market and how these elements could look in the Yakima Basin. Even though many roles and responsibilities may not always be concrete until actual pilot trades take place, by developing a “template” market platform that is locally relevant, the committee partners and stakeholders can better visualize their potential role as either a market participant, supporter, or beneficiary.

This document will discuss the following three areas:

1. Ecosystem Services Market - Purpose and Need.
2. Elements of a Functioning Ecosystem Services Market.
3. Ecosystem Services Market Design.

## **2. Ecosystem Services Market - Purpose and Need**

One of the primary purposes of an Ecosystem Services Market is to allow for the most efficient investments in restoration of processes that improve the environment. In relation to water quality, this has often resulted in a payment for ecosystem services approach to incentivize nonpoint source reductions and restoration of aquatic habitats. Ultimately the goal of an Ecosystem Services Market is to allow a watershed to invest in water quality improvements with the highest and longest term investment. Interestingly, the Clean Water Act doesn't always result in this type of investment, so a market allows the re-distribution of investments away from things that are not sustainable, to things that are sustainable.

Conservation and restoration efforts have greatly improved watershed conditions and water quality in the Yakima River Basin. Yet, the Yakima River, and surrounding ground and surface water, are still impaired.<sup>1</sup>

Significant investments in sewer, wastewater treatment, stormwater improvements, agricultural BMPs, and habitat improvements have been made throughout the basin. Yet water quality impairments still occur in many areas. Impairments include habitat degradation, sediment runoff, and drastically fluctuating temperature, pH and oxygen levels in many areas. In addition, costs for addressing regulatory requirements could become exponentially high for some communities and may provide only limited or single location benefits. Baseline levels of technology are necessary, but beyond a certain point, technology will not address watershed level problems, nor does it make up for the dynamic value of functioning ecosystems. More holistic tools are needed for water quality conservation in the Yakima Basin.

Ecosystem service restoration, water quality trading, and market based conservation strategies have been discussed in the Yakima Basin for several years, but did not begin to gain traction until the 2010 formation of the Partnership, that strived to fill a niche amongst conservation groups in the Yakima Basin. The Partnership chose to focus initially on water quality. While some discussion regarding the development of temperature credits for trading has occurred, it has become clear that nutrient trading, specifically for phosphorous and

---

<sup>1</sup> USGS 2009; Ecology 2010

nitrogen, is likely to be more successful at this time. Some of the reasons for that will be discussed later.

In some watersheds (Willamette<sup>2</sup>, Chesapeake<sup>3</sup>), markets were initially developed in response to governmental directives. In Washington State no such directive has yet been given. In the Yakima Basin, we are looking to develop a proactive and locally led approach to addressing foreseen increases in water quality improvement costs, decreased federal funding, and increased regulatory pressures. As a first step, we wish to develop tools to evaluate the services provided by the improvement of ecosystems. In time, the development of an Ecosystem Services Market, or other Payment for Ecosystem Services projects, could emerge out of these efforts. By exploring how a market would look or function before regulations increase or mandates are created adds flexibility in the design that would be based in a strong scientific foundation with transparent and accountable processes.

### 3. Elements of Functional Ecosystem Services Market

In Washington State, and in the nation, Ecosystem Services Markets for water quality have been studied extensively to identify common threads that help markets succeed. In Washington State, the Washington Conservation Commission funded a study<sup>4</sup> looking at various conservation markets, including for water quality. The study found that for regulatory driven markets, few succeeded. The two most limiting aspects were identified as 1) flexibility in regulations, and 2) motivated buyers.

In addition, the study concluded that any successful market would need the following combination of features:

1. **Environmental Standards:** an environmental standard or requirement, such as temperature or nutrient levels, that is well defined and enforced.
2. **Regulatory Atmosphere:** there must be a flexible regulatory scheme (and regulatory agency) that will reach standards while allowing for a wide set of alternatives in permits.
3. **Diverse Collaboration:** a diversity of stakeholders must be interested in creating, marketing, and selling credits as a conservation tool.
4. **Motivated Buyers:** a market needs a highly motivated buyer seeking environmental permits, permit relief, delay of permitting, or pre-permit assurances in exchange for water quality improvements elsewhere.
5. **Potential Sellers:** landowners must have the capability to implement additional practices (above their legal baseline requirements) to reduce runoff of pollutants or restore function of land (e.g., increase shade, change practice).
6. **Policy and Politics:** there needs to be a political environment that supports the development and implementation of a trading program, and policies in place that allow, or even require, the participation of regulatory agencies and other units of government.

---

<sup>2</sup> Counting on The Environment Program, The Willamette Partnership - <http://willamettepartnership.org/>

<sup>3</sup> Maryland Nutrient Trading Program, The Maryland Department of Agriculture - <http://mdnutrienttrading.org/>; The Chesapeake Fund, The Chesapeake Bay Foundation, Forest Trends & the World Resources Institute – [www.chesapeakefund.org](http://www.chesapeakefund.org)

<sup>4</sup>Washington Conservation Markets Study' (EFC 2009)

7. **Market Platform:** a platform is needed for quantifying ecosystem services, valuing credits, brokering transactions, accounting for trades, and other roles.

In the Yakima River Basin, to achieve successful market transactions that attain real conservation benefits, each of the above items must be assessed and addressed. Each requires different strategies and presents different challenges. We will look more closely at each element and outline the current environment, challenges, and opportunities that exist.

### **3.1 Environmental Standards in the Yakima Basin**

#### **3.1.1 Current Environment**

Hundreds of segments of the Yakima River and its tributaries are listed as impaired on the Washington State 303 (d) list for a variety of different parameters<sup>5</sup>. A Total Maximum Daily Load (TMDL) is a tool for implementing State water quality standards and is based on the relationship between pollution sources and in-stream water quality conditions<sup>6</sup>. While Ecology has developed TMDL and TMDL implementation plans for many segments of the Yakima Basin, several are still un-addressed. Relevant to this market analysis, temperature, pH and DO are highly dependent on environmental variables within the control of a standard TMDL and outside of the control of the TMDL. In the Yakima Basin, a collection of nutrient loading, altered flow regimes, and habitat degradation influence pH and DO. Generally, a TMDL would only address nutrient loading. In particular, a TMDL only sets enforceable limits from permitted facilities and relies on yet well-defined approaches for nonpoint source reduction and habitat improvements. A TMDL is not allowed to interrupt the constitutionally protected rights of landowners, so modifying stream flow with a TMDL is very difficult.

In the Yakima Basin there are 20 Wastewater Treatment Plants (WWTPs) and around 200 other dischargers with water quality permits collectively known as National Pollution Discharge Elimination System or NPDES permits<sup>7</sup>. The NPDES permit is the regulatory agency document issued by either a federal or state agency which is designated to control all discharges of pollutants from point sources into U.S. waterways<sup>8</sup>.

There are nine water bodies in the Yakima Basin with TMDLs and several with TMDLs likely to be established soon (see tables 1 and 2).

---

<sup>5</sup> Washington Water Quality Assessment Report, Assessed Waters of Washington by Watershed: [http://iaspub.epa.gov/waters10/attains\\_index.search\\_wb?p\\_area=WA&p\\_cycle=2008](http://iaspub.epa.gov/waters10/attains_index.search_wb?p_area=WA&p_cycle=2008).

<sup>6</sup> EPA 1991.

<sup>7</sup> EPA 2010.

<sup>8</sup> EPA 2010.

Table 1. Current TMDLs in place in the Yakima Basin.

WRIA	Completed TMDLs	Non Point Action
37	Lower Yakima River TSS and DDT TMDL	reduce soil erosion
37	Granger Drain Fecal Coliform TMDL	keep feces out of water
39	Selah Ditch Multi-parameter TMDL	shade creek
39	Upper Yakima River TSS and OCP TMDL	reduce soil erosion
39	Wilson Creek Fecal Coliform Bacteria TMDL	keep feces out of water
39	Teaway River Temperature TMDL	shade stream
38	Upper Naches and Cowiche Creek Temperature	shade streams
39	Crystal Creek Fecal Coliform and Residual Chlorine	keep feces out of water
30	Little Klickitat River Temperature TMDL	shade streams

Table 2. TMDLs, or TMDL-like, projects under development.

WRIA	Completed TMDLs	Non Point Action
39	Upper Yakima Tributaries Temperature TMDL*	shade streams
37/38	Yakima Area Creeks Bacteria TMDL*	keep feces out of stream
37/38/39	Yakima Toxics Project*	reduce erosion

\*officially started by Ecology as a TMDL, scoping, QAPP, data collection and modeling completed.

### 3.1.2 Challenges

The current challenge with a market approach in the Yakima Basin is the lack of evidence environmental damage caused by any one “point source”, and the source of pollution is instead a collective contribution of all sources. Currently regulatory authorities have no real plan in place to address the collective pollution. Another challenge is that water quality standards cannot be achieved in the Yakima without addressing habitat impairments and flow impairments. Thus, nutrient reductions from all of the sources would not achieve water quality standards for many parameters in the Yakima River.

### 3.1.3 Opportunities

Many stakeholders in the Yakima Basin have advocated for an adaptive, holistic approach to improving water quality. This would require a non-standard TMDL approach. Through this approach, common sense solutions to improve water quality would be coordinated implemented and tracked through the YBCWP. Results would be tracked and information would be generated to determine the type and extent of the next measures to be implemented for water quality improvements. The tracking system developed for this approach should be developed so that it would be compatible with a market or trading scenario in the future.

## 3.2 Regulatory Atmosphere in the Yakima Basin

### 3.2.1 Current Environment

There are two regulatory agencies that set standards and enforce the Clean Water Act in the Yakima Basin; the Washington Department of Ecology (Ecology) and the Environmental

Protection Agency (EPA). Ecology sets and enforces standards in most of the basin, except on the Yakama Reservation. On the Reservation, Ecology has no authority, so EPA serves this role. This includes activities for municipal wastewater treatment facilities within the reservation boundaries. The Yakama Nation could receive jurisdiction by EPA to enforce the Clean Water Act on the reservation, but currently has not taken all necessary steps to do so. The authorities and relationships between these three agencies are complicated and will not be covered in detail here.

### 3.2.2 Challenges

In the Yakima Basin, it has been difficult for Ecology to identify potential trading scenarios, especially for temperature (*see sidebar*). The current regulatory atmosphere in Washington State tends to focus on end of pipe standards for water quality, adding further difficulty for regulatory agencies to allow trading in a treatment facility permit and limits a holistic approach to clean water. EPA has expressed that trading for nutrients, specifically nitrogen and phosphorous, has more potential in Washington State than temperature (pers. comm.).

Individual staff of Ecology and EPA have (unofficially) expressed an interest in how a water quality market could help reach water quality goals in Washington State. In addition, several national EPA policies and documents have been released, providing guidance on how to utilize water quality markets within a regulatory process<sup>9</sup>. However, in Washington State, it has been difficult to identify an actual trade scenario that either Ecology or EPA will support.

Ecology and EPA have expressed an interest in seeing a pilot project in the Yakima Basin to demonstrate how trading could meet permit requirements and improve environmental conditions. However, Ecology has stated they are not yet prepared to provide commitments or assurances that such a pilot would provide relief or an offset of a permit standard. This makes it difficult

#### **Why is Temperature Trading a Challenge in the Yakima Basin?**

The development of temperature trading is currently not supported by Ecology due to the 100% site potential shade assumptions where Temperature TMDLs are in place.

An example in the Yakima Basin is the North Fork Cowiche Creek, which is part of the Upper Naches River Temperature TMDL. Within the load allocation of the TMDL for nonpoint sources there is a requirement for 100% of site potential shade along 100% of the creek, even though historically this has never been documented. This shade standard is for non-point sources along the creek only and is in addition to the standards set on point sources, such as the Cowiche Wastewater Treatment Plant. This makes it, according to Ecology, impossible for shade creation to be a tradable credit that can be earned by landowners along the creek, since it is already required as a baseline standard. It is generally believed that credit generation should only qualify for activities that help reach water quality conditions above the baseline standard. This would require landowners to implement additional temperature reduction actions for temperature trading to occur, which is more difficult.

Although Ecology does not enforce shade requirements and does not intend to enforce the temperature limit on point sources if it means they would have to chill their effluent, they have stated that shade creation cannot generate credits for trade to a point source needing to meet TMDL requirements. This leaves Ecology, and local stakeholders, without a real plan of action for actually reducing temperature in this creek. This is a common scenario across Washington State.

---

<sup>9</sup>EPA 2004, 2007.

to recruit potential pilot buyers or sellers.

This situation has resulted in the need to explore other “payment for ecosystem services” that would not necessarily hinge on a regulatory assurance, but instead provide some other benefit to both the “buyer” and “seller”, as well as demonstrating the conservation benefits that would result.

### 3.2.3 Opportunity

The first opportunities to work with regulating agencies will likely be on upcoming permit drafts. By working with a regulator before a permit is finalized, there may be opportunities to discuss how nutrient reduction could really be achieved in that area, where the likely sources are, where conservation activities would be most effective, and how language in the permit could be written to accommodate a more holistic approach that works with both point and non-point sources. Our hope is that when these opportunities arise, that both sides will be willing and able to develop an adaptive management plan that lays out goals that would make a real difference in water quality and provide incentives to reach those goals.

## **3.3 Diverse Collaboration in the Yakima Basin**

### 3.3.1 Current Environment

Diverse collaboration early in market analysis is important to ensure participation from all facets of stakeholders. Collaboration can help decrease confusion or mistrust in the use of the market platform if and when it is developed. A diverse collaboration may include representatives of environmental groups, agricultural groups, government groups, universities, and others. This collaboration will help ensure the market development efforts take into account various interests and needs in the basin and pull in resources available to stakeholders.

In the Yakima Basin, this collaboration is currently led by the Yakima Basin Clean Water Partnership and includes the RC&D, municipalities, the Washington Conservation Commission, Yakama Nation, Forterra, Conservation Districts, universities, local non-profits, United State Department of Agriculture (USDA) agencies, counties, regulating agencies, and others.

### 3.3.2 Challenges

Although enthusiasm for an Ecosystem Services Market has been high, there has been little movement toward an actual trade with the challenges faced working within a regulatory system. Many conservation staff have seen new ideas and efforts come and go -- there is hardly a shortage of ideas and meetings. It is clear that for continued participation from many of the conservation entities, the Partnership must continue to work toward producing tools that both help build the foundation of an Environmental Services Market, but also meet the needs of conservation entities. The biggest challenge is that there is no incentive to create credits and no incentive to buy them.

### 3.3.3 Opportunities

The Yakima Basin Clean Water Partnership was fortunate in receiving funding early on to address some of the data gaps that were identified during early market analysis. Specifically some of the questions were, 1) are there enough under functioning floodplains remaining that could be available for credit generation?, 2) what reasonable efforts must potential buyers of

credits make before they can participate in a market?, and 3) how do we quantify nutrient reductions as a result of improved on farm practices? Although a functional market is clearly more difficult to achieve than first hoped, the process of assessing market potential still works toward identifying some very important information and tools needed, with or without a market, that has help rebuild enthusiasm for our efforts.

### 3.4 Motivated Buyers in the Yakima Basin

#### 3.4.1 Current Environment

Motivated buyers, in markets elsewhere, are most often regulated point source dischargers, such as wastewater treatment plants or food processors. Many potential buyers in the Yakima Basin would likely be interested in participating in a market if they could be assured they would receive regulatory relief. While most point source entities recognize a certain level of water quality technology is necessary, they also feel they should be offered alternatives to costly and ineffective technology. NPDES permit holders often feel that there is a decreasing rate of return on technological investments. That is, the cost of removing incrementally smaller amounts of nutrients or heat from wastewater far outpace the environmental return on the investment compared to the same or reduced amounts of expenditure/effort to restore stream function or reduce nonpoint sources.

In the case of municipalities facing current or future TMDLs and permits on WWTPs, upgrades are necessary to meet a technological baseline that will significantly improve water quality. These upgrades are usually at a cost relatively proportionate to the water quality benefit. This baseline should be met by each facility through upgrades and/or new technology purchases, which would result in real water quality benefits to the river overall. An assessment for all wastewater treatment plants in the Yakima Basin has been completed to determine a level of “reasonable” technology and phosphorous limits for individual facilities. This assessment is set to be completed before the end of 2012<sup>10</sup>.

#### 3.4.2 Challenges

Once facilities achieve a “reasonable” or “baseline” level of technology in their treatment, it has been shown that further upgrades necessary to meet additional nutrient and temperature reductions have far less benefit coupled with a far greater cost (tables 3 and 4).

If regulatory agencies with authority within the Yakima Basin chose to put in place standard implementation TMDLs for nutrients for Wastewater Treatment plants, they will be forced to put in place high cost technology (level 4 and 5) that will results in significantly lower reductions in nutrients than level 1-3 technology. This will not take the Yakima River out of impairment, and it will not effectively address nutrients in the watershed.

Table 3. Levels of treatment and resulting amount of nutrient in water quality output<sup>\*§</sup>.

Level	Total Nitrogen (mg/L)	Total Phosphorous (mg/L)
1	No removal	No removal
2	8	1
3	4-8	0.1-0.3
4	3	<0.1
5	1	<0.01

<sup>10</sup> Stensel and Barnard, 2012.

Table 4. Levels of reduction of nitrogen and phosphorous compared to capital and operation costs\*<sup>§</sup>.

Level	Relative Capital Costs	Relative Operations Cost <sup>‡</sup>
1	1.0	1.0
2	1.7	1.8
3	1.8	2.7
4	1.9	3.6
5	2.7	6.2

\*Adapted from: Falk, M. "Finding the Sustainable Balance on Nutrient Removal" Water Environment Research Foundation Webinar, Latest Research Findings on Nutrient Removal: It's more than Water Quality – Bs, Cs, Gs and more. October 5, 2011.

<sup>§</sup> Figures based on one site study, results will vary from site to site.

<sup>‡</sup> Operations cost = energy and chemical cost. Labor and maintenance costs are excluded.

### 3.4.3 Opportunities

Once facilities meet their technological baselines, taking a watershed level, ecosystem services approach that could be provided through trading, may result in greater overall water quality improvements. Even being able to "buy" a postponement in the compliance schedule could be an attractive "trade". This would allow stakeholders more time to understand the water quality problems of a specific creek, drain, or sub watershed, and develop more effective solutions for addressing them.

To move forward in the Yakima Basin, a process needs to be developed to include trading options into new TMDLs that satisfy Ecology's and EPA's obligation to the Clean Water Act. This process must provide options to point source polluters to choose better options for meeting water quality goals, where appropriate.

## 3.5 Potential Sellers in the Yakima Basin

### 3.5.1 Current Environment

Agricultural owners and operators represent some of the best potential for increased ecosystem services in the Yakima Basin. Although many farmers have taken measures to greatly improve their practices to conserve water, energy, and nutrients, there are still many more improvements that could be made.

By developing a process that allows point sources and non-point sources to work together on water quality solutions in a market context could have additional benefits to agriculture producers and companies. For example, the funding provided through a market could allow a dairy to adopt new technology for manure management being developed by Washington State University that they would otherwise not be able to afford. By adopting some of these new technologies, there would be other streams of revenue provided through the capture and better use of nutrients found in manure.

In addition, many of the companies that process food in the Yakima Valley discharge to their local wastewater treatment facility. The costs of implementing necessary technology to meet very low nutrient regulations could force these companies to move out of the basin, hurting our local economy and farmers.

### 3.5.2 Challenges

Nonpoint source issues are dissimilar to those for point source regarding permit limits and technology requirements. Nonpoint sources of water pollution are generated from diffuse areas, at varying rates, frequencies, and amplitudes. This makes it very difficult to determine exactly which, if any one, specific source or sources of pollution caused a water of the state to exceed water quality standards.

In cases where one specific un-permitted source of pollution has been documented to cause a water quality standard violation, the Department of Ecology can use its regulatory authority under state law (RCW 90.48.080) to enforce against the pollution<sup>11</sup>. This is a deterrent for many egregious sources of pollution, but not necessarily useful for more complex situations where a water quality violation is caused by contributions from multiple sources. In this case, a broad application of Best Management Practices (BMPs) and/or stream restoration practices need to be applied for each nonpoint source to be reduced until water quality standards are met.

To do the later, described above, it is necessary to employ various programs/projects to be successful. The state, under Section 319 of the Clean Water Act, develops nonpoint pollution management plans which outline projects and programs that, if implemented, will reduce nonpoint pollution loading.

When Ecology completes a TMDL, they often identify types of BMPs necessary to reduce nonpoint source pollution for a particular pollutant- such as suspended sediment, fecal coliform bacteria or temperature. TMDL's identify general strategies for reducing these pollutants such as:

- Working with local health districts to insure that septic tanks and drain fields are functioning.
- Working with conservation districts to leverage conservation incentive programs for implementing erosion control methods or riparian planting project.
- Working with local salmon recovery groups to sponsor projects that increase stream shading.

Projects that implement the states' 319 Nonpoint Plan or implement the nonpoint portion of a TMDL are eligible for competitive grant funding from the 319/Centennial Clean Water Fund. In addition, TMDLs implementation relies on support from NRCS programs and other incentive based programs to help encourage the adoption of more and more protective BMPs.

Other than in the most egregious cases, Ecology and other regulatory agencies have very little regulatory authority to effect changes in nonpoint loading. They do have the ability to develop and support nonpoint programs, projects, and activities that when implemented at the watershed scale, help reduce nonpoint loading. There are a few examples of successful implementation of nonpoint TMDLs ongoing in the state. Primarily, these are suspended sediment and temperature TMDLs in the Yakima and Little Klickitat River watersheds.

### 3.5.3 Opportunities

Before identifying potential market opportunities that exist for sellers, the baseline standard must first be defined and have regulatory and technical acceptance. A baseline standard is

---

<sup>11</sup> <http://apps.leg.wa.gov/rcw/default.aspx?cite=90.48.080>

the water quality standard that potential sellers must meet before they can participate in a Ecosystem Services Market. Once landowners meet this baseline, they could then generate and sell credits.

The most likely sellers of nutrient credits in the Yakima Basin are agricultural non-point sources, such as an irrigator. The focus of developing a nutrient credit is the reduction of a specific pollutant, typically phosphorous or nitrogen, through the adoption of a new practice (e.g., installing Scientific Irrigation Scheduling) or the modification of an existing practice (e.g., changing irrigation delivery from furrow irrigation to drip lines or center pivots). It could also include the use of new and innovative technology to capture and better distribute nutrients, such as nutrient recovery technology for manure.

Adequate monitoring to quantify the results of restoration or the adoption of BMPs is ideal. This does however take significant time and financial resources that are scarce. Models can be more efficient for predicting the nutrient impacts of various practices. However, these models need to be locally applicable, scientifically justifiable, and have wide acceptance. By having good tools for predicting nutrient benefits, credit generation value can be calculated in advance. Examples of other tools used elsewhere to rank and select projects are shown below.

### Examples of Quantification Models for Nutrients

- **Chesapeake Bay - NutrientNet Calculator**
  - Maryland (<http://nutrientnet.mdnutrienttrading.com/>)
  - Pennsylvania (<http://pa.nutrientnet.org/>)
  - Kalamazoo (<http://kalamazoo.nutrientnet.org/>)
- **Oregon / Washington State – Shade-a-lator**
  - Willamette Partnership - [http://willamettepartnership.org/ecosystem-credit-accounting/water-quality/copy\\_of\\_water-quality-temperature/](http://willamettepartnership.org/ecosystem-credit-accounting/water-quality/copy_of_water-quality-temperature/)
- **Ohio River Basin**
  - STEPL (developed by EPA) - [http://it.tetratech-ffx.com/steplweb/models\\$docs.htm](http://it.tetratech-ffx.com/steplweb/models$docs.htm)
  - WARMF (developed by EPA) - <http://www.epa.gov/athens/wwqtsc/html/warmf.html>
- **Yakima Basin**
  - SPARROW (developed by USGS) - <http://wa.water.usgs.gov/projects/sparrow/>

In 2012 and 2013, the Partnership will be working with the Tarleton University and Texas Institute of Applied Environmental Research (TIAER) to adapt and calibrate the Nutrient Tracking Tool<sup>12</sup> for use in the Yakima Basin. The Partnership has contracted with Dr. Ali

---

<sup>12</sup> Nutrient Tracking Tool - <http://nn.tarleton.edu/NTTWebARS/>

Saleh with the TIAER<sup>13</sup> to oversee and complete this project. This project will focus on a specific nutrient, a series of crops and practices unique to the Yakima Basin. If successful, the Partnership will then seek partners to help expand this model for broader use in the Yakima Basin and Washington State.

The Nutrient Tracking Tool is also being used, or developed for use, in other watersheds to estimate nutrient reduction and credit development. Already, TIAER scientists have applied NTT to Maryland, Missouri, Mississippi, Ohio, and Oregon<sup>14</sup>. The Partnership hopes that this unique model will, in time, provide the scientific justification for nutrient trading in the Yakima Basin and confidence that trading can result in measurable water quality benefits.

There are additional considerations in regards to generating and selling credits. A credit can only be developed and sold once a practice is implemented. The practice must be maintained and properly operated for an indefinite amount of time. Also, the baseline conditions from which improvement results in credit development must itself have been maintained for a specified amount of time. In other words, a land owner cannot degrade land or an operation for the purpose of then improving it and gaining credits. These are just some of the market platform policies that must be put in place to ensure credibility.

### **3.6 Politics and Policy**

#### **3.6.1 Current Environment**

There is policy interest in Ecosystem Services Markets at a national and international level. Despite the limited number of functional water quality markets and actual trades nationwide, there is still support for regional and state wide market efforts.

In Washington State, and in the Yakima Basin, many agencies and organizations have demonstrated an interest in the use of Ecosystem Services Market tools for quantifying conservation practices and better prioritizing limited conservation dollars.

Eight state agencies and offices have Ecosystem Services Markets within their purview. These include 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. Additional non-governmental state organizations include Forterra, WACD, and the American Farmland Trust.

In the Yakima Basin, there have been many studies done on improving water quality and quantity, such as the Yakima River Basin Water Enhancement Project<sup>15</sup>, but few have mentioned markets as an option. Most water market discussions focus on water reallocation.

#### **3.6.2 Challenges**

Much of the challenges regarding governmental agencies and markets revolve around a lack of consistent direction, communication, and policy regarding markets. In some states, the regulatory authorities, and their staff, are able to find ways to integrate trading into their often

---

<sup>13</sup> Ali Saleh, PhD., Associate Director of TIAER - [http://tiaer.tarleton.edu/staff\\_page/Ali%20Saleh,%20Ph.D.html](http://tiaer.tarleton.edu/staff_page/Ali%20Saleh,%20Ph.D.html)

<sup>14</sup> <http://tiaer.tarleton.edu/newsevents/tiaer-receives-300k-usda-grant-to-track-conservation-practices-in-mississippi.html>

<sup>15</sup> Yakima River Basin Integrated Water Resources Management Plan (USBR 2011)

restrictive responsibilities. In other states, such as in Washington State, the regulatory authority has a difficult time understanding how trading can both improve environmental condition and still meet the requirements of the Clean Water Act. Much funding and effort can be spent to build a market structure, with support provided by multiple federal, state, and local agencies and agriculture and conservation groups, but if the regulating authority is unwilling to adapt trading into their process, local groups can quickly run into a brick wall.

### 3.6.3 Opportunities

For a successful regional effort, there needs to be a focus on key localities where an Ecosystem Services Market could be most beneficial and where there is already momentum. By supporting market efforts within a few key basins and synchronizing those efforts to increase consistency and ability to share common tools, success at developing a regional market will be more successful.

Success for local Ecosystem Services Markets needs political, regulatory, and scientific support. Political support leads to the development of policies and financial resources needed to support local and regional markets. This would enable regulators to develop permits which allow permitted entities to meet water quality requirements through an established Ecosystem Services Market platform.

Scientific support can be generated by demonstrating the value of ecosystem services projects such as floodplain restoration. Careful documentation of the benefits of floodplain restoration will show what ratios such practices would be traded, for real credit or time, in the future. In addition, demonstration of advanced soil and water nutrient management BMPs could help calibrate the NTT tool. Stream shading demonstration projects could also be helpful to advance the prioritization of stream shading ahead of technology adoption at wastewater plants.

## **4. Water Quality Market Design**

Designing an Ecosystem Services Market is necessary to identify what is needed to assess, develop, trade, and track credits. However, without an actual market in operation in the Yakima Basin, or Washington State, the following design is hypothetical and used for discussion purposes only. It is based on market models that are in use or design in other partially or fully operational water quality markets. However, this is still a useful and necessary process to identify roles and responsibilities as well as our biggest challenges and data gaps.

A carefully designed and transparent Ecosystem Services Market will be needed for quantifying conservation actions, valuing credits, brokering transactions, and accounting for trades. Ecosystem Services Market development in the Yakima Basin should also take into consideration not only what would work in this basin, but what could work in Washington and other states. The long term goal will be to develop a locally relevant and operational Ecosystem Services Market in the Yakima Basin, while simultaneously integrating this market into other operational or developing water quality markets throughout the state and Pacific Northwest.

## Elements of a Typical Market Design

1. Validation Stage
  - a. Water Quality Need
  - b. Credit Validator
  - c. Project Prioritization & Selection
2. Calculation Stage
  - a. Sellers / Seller's Agent
  - b. Project (s)
  - c. Technical Service Provider
  - d. Credit Calculation
3. Verification Stage
  - a. Credit Certification
  - b. Project Monitoring
4. Registration Stage
  - a. Credit Registry
  - b. Credit Registration
5. Credit Trading Stage
  - a. Buyer / Buyer's Agent
6. Credit Tracking Stage

To begin the development of an Ecosystem Services Market, all the elements of that market must be defined (keeping in mind that they should remain somewhat flexible as new information surfaces). It must be composed of dedicated organizations that are qualified and interested in serving the roles needed by the market. It would also require specific tracking and trading tools that are scientifically sound and accepted by a majority of stakeholders.

To understand how each of these elements work, we will list each market stage, provide necessary definitions, explain the steps that take place during that stage, discuss roles and responsibilities, and give some examples of how that element might look in the Yakima Basin, or looks in other markets either in place or in development elsewhere.

As a visual, the above elements are also outlined in figure 3.

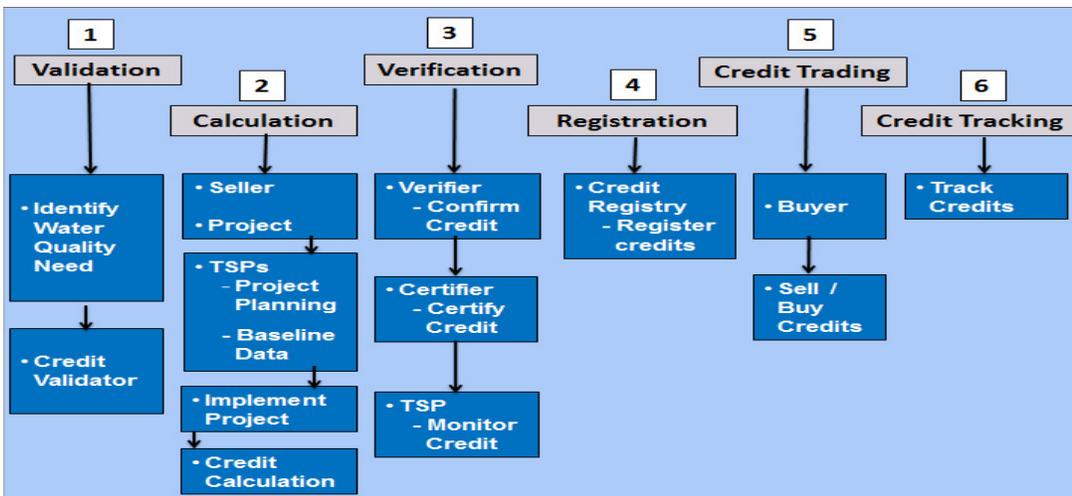


Figure 3. A generic market design.

### 4.1 Validation Stage

Validation is the important first step that ensures potential investors, regulators, and other stakeholders that projects selected will result in real and significant conservation benefit and a credit equivalency that is tradable in the market. A prioritization process must be developed to select the best projects when limited investment funds are available.

To ensure proper credit validation, the conservation benefit must be first understood and clearly quantified. The Credit Validator is responsible to assess project potential to deliver those conservation benefits.

#### 4.1.1 Identify Water Quality Need

Although assessing water quality priorities prior to market development may seem obvious, it can be easily overlooked. Clearly identifying and defining a single need that will be addressed by an Ecosystem Services Market better communicates to stakeholders how that market will help meet water quality goals. An Ecosystem Services Market is only one tool to addressing a water quality need. By focusing initially on a specific goal, (i.e., reducing nitrogen in runoff), and designing a market that will address that goal, market designers will greatly simplify and focus market development and help make efforts at gaining support and participation more successful. Once a market is in place and operational, there may be need to expand its use to other water quality or conservation goals.

In the Yakima Basin, many conservation needs were discussed in the very early stages of market exploration, from water quality to forest health. Eventually the Yakima Basin Clean Water Partnership was formed to focus the development of market tools to improve water quality. For the Yakima Basin, a nutrient focused Ecosystem Services Market appears to be the best fit for early market development.

#### 4.1.2 Credit Validator

A 'Credit Validator' oversees the market to ensure integrity of process and overall environmental benefits of each transaction. In addition, a Credit Validator must be:

- A non-stakeholder that can work effectively with all market participants.
- Capable of managing multiple facets of market processes.
- Responsible to identify potential and appropriate buyers, sellers, and projects that can participate in a market.

The South Central Washington RC&D Council is exploring, through the Partnership, whether they might fill this credit validator role in the Yakima Basin. The RC&D is a non-stakeholder organization dedicated to providing a wide variety of services to conservation entities in the basin to increase their success. But legal liabilities, financial requirements, staff requirements, and other consideration must all be made before RC&D, or any entity, can take on this role.

#### 4.1.3 Project Prioritization & Selection

The Credit Validator, along with their partners, must develop and carry out standards for ranking project eligibility and prioritization. A seller with a project would complete a validation

#### **Terms Covered in This Stage:**

**Validation** – evaluating a project to assess the environment benefit that would occur and the credit that could be generated.

**Credit Validator** – The entity responsible for assessing projects and assigning potential credit value.

**BMPs** – Best Management Practices, farming methods that assure optimum plant growth and minimize adverse environmental effects

**Credit** – a unit that can be sold or bought in a market. It represents both an environmental benefit and an economic value (cost).

**Seller** – an individual or entity that can generate and sell credits in a market.

checklist and application to submit to the Credit Validator. This process is important to reduce time (and money) spent on ineligible or low priority projects.

Projects must be ranked, using a predetermined ranking process, for eligibility to decide whether they qualify for credit generation. Involvement from local stakeholders and regulatory authorities is necessary to define what eligibility criteria will be required for credit generation. This could be different in each watershed and be nutrient specific depending on environmental conditions in the area.

Once projects are deemed eligible, they then should be ranked, again using a predetermined second ranking process, against other projects to prioritize the commitment of limited funding and staff to the highest priority projects. Examples of how projects might be prioritized include:

- Location in relation to high priority areas;
- Land ownership;
- BMPs proposed;
- Current use or condition of property; and,
- Amount of nutrient reduction predicted and acreage of project.

#### 4.2 Calculation Phase

This step involves a lot of assistance from a Technical Service Provider (TSP), who will work with a specific seller and project to help plan and implement the project once it has been approved by the Credit Validator. The seller may choose to plan and implement the project on their own, but a qualified third party TSP is needed to confirm the baseline status of the project area and verify the project was implemented correctly.

##### Terms Covered in This Stage:

**Technical Service Provider** - provides expertise on technical and legal aspects of planning, implementing, and monitoring a project.

**Seller's Agent** – an outside entity that represents multiple sellers' during credit transactions and assists them during market transactions.

Once the project is completed, the Credit Validator will receive TSP confirmation that the project was implemented correctly. Next, the Credit Validator will supply the credit calculation and supplemental information for the Verification phase (phase 3). This part of the process does not include monitoring the project to ensure it is functioning as predicted or resulting in the predicted benefit.

##### 4.2.1 Seller / Seller's Agent

This step in this process starts with a Seller, as described in Section 3.5, who has successfully presented a project to the Credit Validator for credit generation. The seller has shown they meet the required baseline for regulated conditions. The seller must also be able to conduct activities which result in additional water quality benefit. In addition, the seller has shown a plan for implementation which involves how the project will be funded upfront and how it will be completed, either with TSP assistance or done by the landowner themselves.

Some potential sellers may choose to operate through a seller's agent. This agent may work with multiple sellers, such as adjacent landowners along a single stream, to consolidate multiple projects that, by themselves, would not rank high. A seller's agent could help facilitate outreach to potential sellers, coordinate the application, planning, implementation,

and monitoring process for each project and seller, and in return receive some of the financial profits.

In addition, a seller's agent may have the funding and ability to take risk for upfront payments of the restoration. An example of this is The Freshwater Trust<sup>16</sup> which currently operates in the Willamette Basin. Utilizing private dollars, The Freshwater Trust has the ability to provide up front financing for projects which allows for payment in services for projects occurring on private agricultural land. The Freshwater Trust has expressed an interest in playing this role in other watersheds as well.

Examples of local entities that could potentially be a seller's agent include the Yakama Nation; the Yakima Basin Salmon Recovery Board; the Mid-Columbia Fisheries Enhancement Group; non-profits such as The Nature Conservancy and local RC&D's; and governmental groups such as the Washington Conservation Commission. We are not promoting any of these entities, just listing them as examples.

Seller's agents must have upfront, unrestricted funding to fund projects and staff to work with potential sellers. None of the above groups have discussed or committed to being seller's agents, they are only being named as examples of potential groups that may have resources available to play this role.

In addition, certain agencies could provide environmental improvement on their lands, but have policies that limit their involvement as a Seller of credits, or at least necessitate a different kind of transaction. An example would be a policy that does not allow an entity to make a profit on transactions. An entity with this limitation might only be interested in receiving reimbursement of their direct costs of planning, implementing, and monitoring the project.

#### 4.2.2 Technical Service Providers (TSPS)

TSPs provide expertise on technical and legal aspects of planning, implementing, and monitoring a project. TSPs may vary in the services they provide and have specific areas of expertise.

For example one TSP might specialize in project planning and monitoring. Still another might help obtain necessary permits and conduct implementation or another may do project assessment, development, reporting, and marketing.

The role of the TSP comes with some assumed risk. In the case of project failure, the TSP would have responsibilities in determining the cause of project failure. In the event it was due to faulty implementation or maintenance, they may be responsible to cover project and legal costs.

In turn, a TSP would establish necessary agreements with the private landowner to ensure proper project maintenance and other aspects the landowner will be responsible for. All responsibilities and liabilities should be worked out in advance between the TSP and the Seller. The TSP, or seller's agent, should clearly establish in writing any liabilities and responsibilities with the seller before project planning. These agreements, or contracts, should clearly lay out all roles and responsibilities and should stipulate a payment-on-delivery system to provide assurance the practices are properly installed and maintained. Additional

---

<sup>16</sup><http://www.thefreshwatertrust.org/>

contractual protections against non-performance on the part of a supplier will include stop payments or reparations through replacement credits.

Projects that fail due to “Acts of Nature” will be covered by an insurance pool of credits. The project area may be eligible once again to support a similar project and credit generation. It may also be determined the practice for which the credits were generated are not appropriate for the project area. An example would be planting trees in an area where it is determined frequent flooding is a natural and frequent occurrence that does not support tree establishment.

Local entities in the Yakima Basin that could serve as a TSP include Conservation Districts, the Yakama Nation, individual contractors, or any entity that has shown to have the necessary staff and skillset. Entities that are the TSP for a project cannot be the verifier, validator, seller, seller’s agent, or buyer for the same project. Care must be taken when proposing to play multiple roles within a market transaction to avoid conflicts of interest.

### 4.2.3 Credit Calculation

How credits are calculated varies across markets. Along with environmental benefits, economic considerations of the landowner play a role in the value of the credit. If, for example, engaging in a new or modified practice reduces overall acreage or yield of a crop, the value of the credit must be adjusted to provide adequate incentive for the seller to be able to generate and sell that credit.

Some other questions that will need to be answered when developing a market design include:

- Would the seller be able to sell credits earned over the life of a project or just for the first year?
- If a project is expected to reduce 100 pounds of nitrogen per year over 15 years, is the project eligible to sell 100 credits (1 credit = 1 lb of nitrogen reduced) or 1500?
- How many credits need to be purchased when offsetting nutrient reduction requirements of the buyer to adequately compensate for uncertainties and added value needs?
- Would there be different credit types (e.g., edge of field reductions vs. watershed reductions)?
- What tools / models are acceptable to be used to calculate credits and are they accepted by all parties of a market schematic (e.g., buyer, seller, regulator)?

## **4.3 Verification Phase**

Verification is the phase in which proper project completion and credit generation is confirmed, the credit is certified, and a monitoring plan is put into place to ensure the project is operated and maintained properly.

### 4.3.1 Credit Verifier

A ‘Credit Verifier’ is the entity that conducts the project and credit verification, and can be the same or different entity that serves as a Credit

#### **Terms Covered in This Stage:**

**Credit Verifier**—a third party entity that verifies the project was completed as planned, credits were generated, and that project continues to be maintained and operated properly.

**Credit Certification** – the final step in certifying the proper generation and value of the credit. This is completed by the regulatory authority.

Validator, depending on the capacity of the area.

In verifying the project, the Credit Verifier (especially if also the Credit Validator) may contract the actual on-the-ground verification to a TSP. In this case, the TSP cannot be the same TSP that implemented the project. This part of the process involves monitoring the project throughout its lifespan.

There can be variations to the common point source – non-point source model. In the Chesapeake Bay, the Verifier is Water Stewardship, Inc.<sup>17</sup>, a non-profit whose goal is to: “Reduce nitrogen and phosphorus water pollution by implementing strategic and innovative approaches to nutrient management.” They do this by focusing on the private sector food industry and working with them to reduce pollution as a way of boosting consumer confidence and bottom line. In this case the Chesapeake Fund still maintains documentation of the verification procedures.

For the Maryland Nutrient Trading Program<sup>18</sup>, Water Stewardship, Inc.<sup>19</sup>, a for profit company, has been contracted by Environmental Bank and Exchange<sup>20</sup>, another for profit company, to provide independent, third-party assessment, certification, and verification services to identify, quantify, and certify nitrogen and phosphorus reductions associated with best management practice implementation for use in the Maryland Nutrient Trading Program. Environmental Bank Exchange provides capital and technical resources for the actual restoration work.

Another scenario is that the TSP (project implementer) would work the verification and monitoring costs into their landowner agreements and be responsible for assuring third party verification.

#### 4.3.2 Credit Certification

Credit certification is the final approval of the credit, both of ecological value and trading dollar value. In a regulatory framework, the Credit Certifier is the regulating agency with authority over the project area. For a water quality market in the Yakima Basin, that role is limited to Ecology and, on the Yakama Reservation, EPA.

For a trade to occur, the Credit Certifier must provide eligible buyers with assurances of permit compliance through credit purchase. This is achieved by allowing for pollution permits to include allowances for trading to meet at least some of the regulatory requirements (see Section 3.2).

Without assurances provided by the regulatory authority, the buyer has no incentive to purchase credits and the seller has no one to sell them to. To even reach this step, the regulatory authorities must be involved in the development of the market and approve the tools used for credit calculation. Whether the regulatory authority would even consider providing assurances, and under what circumstances, must be determined before the development of a market can even be considered.

---

<sup>17</sup>(<http://corporatewaterstewardship.org/about.php>)

<sup>18</sup><http://mdnutrienttrading.org/>

<sup>19</sup><http://corporatewaterstewardship.org/>

<sup>20</sup><http://www.ebxusa.com/>

The regulatory authority must be involved in all aspects of market development and implementation, so once this step occurs, there are no surprises. Once a market is fully functional, the regulatory authority should fully understand the market and how credits are created and traded. Once operational, the regulatory authority should not have to, and may not want to actually inspect or certify each trade, as long as they have approved of the market process.

Not all Ecosystem Services Markets operate under a regulatory framework. The Chesapeake Fund focuses on providing businesses with voluntary ways to boost their bottom line by purchasing nutrient offsets to reduce their pollution footprint. This may be appealing to their customers and provide a marketing tool. This type of incentive would take longer to develop in the Yakima Basin and has had mixed results elsewhere.

#### 4.3.2 Project Monitoring

Project monitoring is needed to meet two goals: 1) to ensure that a specific project was implemented properly and functioning as expected, and 2) to determine how all market projects collectively are impacting water quality throughout the basin. The first goal requires short term monitoring, and is the responsibility of the seller, seller's agent, or other project investor. The responsible party should be determined, with necessary contracts in place, before the project is implemented. The responsible party is responsible for securing and funding monitoring services to ensure each project was implemented as planned and functioning at a basic level.

The second goal requires more long term monitoring and is more expensive. A local market will need to decide what long term monitoring will be required. Resources to assist with long term monitoring of one or multiple projects could be made available through local conservation entities, and should be part of a broader effort to assess the impact of a market on water quality throughout the entire basin. Still, it can take years of monitoring completed projects to sufficiently show impacts on water quality. Multiple federal, state, and local conservation entities must collaborate on utilizing existing monitoring tools and stations, and other resources to track market progress on water quality goals.

### **4.4 Registration Phase**

Registration of credits is the necessary step between verifying credit development and actually trading that credit in a market. Assistance from outside the geographical area in the form of Market Registries is necessary to ensure that the trading and tracking process is accountable and fully transparent.

#### 4.4.1 Credit Registry Tools

A credit registry is a way to track the buying and selling of credits in a way that ensures transparency and integrity. A registry can hold projects and credits, provide them with a unique tracking number, and ensure that they can be publicly viewed, are compliant with the relevant market standard, and are retired properly so that they cannot be sold again at a later date. Examples of current registry services provided are:

- **MarkIt**<sup>21</sup> – used by The Willamette Partnership and the Chesapeake Bay Bank.
- **NutrientNet**<sup>22</sup> – used by the Chesapeake Bay / Maryland Nutrient Trading Program.

---

<sup>21</sup><http://www.markit.com/en/>

In the Yakima Basin, a market will also need to enlist one of the above entities, or other outside entity, which has international acceptance and very specific abilities, to manage the tracking and sale of credits.

#### **4.5 Credit Trading**

A third party market administrator should negotiate all trades. Factors that go into negotiating a trade include: credit generation; buyer required offsets; locations of buyers and sellers; the number of credits that can be purchased, and the anticipated offsets. This must also be approved by the Certifier.

A local non-stakeholder entity will likely play this role in a market in the Yakima Basin. The RC&D may be able to play this role, but it will need to be decided what roles a single entity can simultaneously play, as RC&D could also be a Credit Validator or Verifier. Care needs to be taken to ensure partiality and capacity for any entity playing one or more of these market roles.

#### **4.6 Credit Tracking**

To ensure transparency and accountability, credits that are generated, placed on sale, and purchased should be tracked in an online public forum.

Examples of active online tracking systems include:

- Chesapeake Bay Bank - Marketplace<sup>23</sup>
- Willamette Partnership - Ecosystem Crediting Platform<sup>24</sup>
- PENNVEST – Nutrient Credit Trading Program<sup>25</sup>

### **5. Conclusions**

An Ecosystem Services Market could be one tool to help the Yakima basin reach their many water quality goals. This tool would need to work in conjunction with the many other tools (i.e., federal grants, mitigation, or regulation) already available to us. Along with helping to increase incentives available to address non-point pollution sources, it can also help prevent highly expensive and ineffectual investments in infrastructure. It is also an approach that utilizes resources within our watershed, instead of increasing our reliance outside our watershed. A market that is locally developed and implemented would create an internal and sustainable source of conservation funding, providing more holistic solutions to our water quality problems.

But for an Ecosystem Services Market to work, it needs support from regional regulators and local stakeholders. It needs nationally accepted standards of accountability and transparency. It needs to be founded on sound science and have clear water quality goals. The community needs to know that it is being provided water quality benefits in a proactive, market driven environment.

---

<sup>22</sup><http://www.nutrientnet.mdnutrienttrading.com>

<sup>23</sup>[www.thebaybank.org/marketplace](http://www.thebaybank.org/marketplace)

<sup>24</sup>[www.willamettepartnership.ecosystemcredits.org](http://www.willamettepartnership.ecosystemcredits.org)

<sup>25</sup>[www.portal.state.pa.us/portal/server.pt/community/nutrient\\_credit\\_trading/19518](http://www.portal.state.pa.us/portal/server.pt/community/nutrient_credit_trading/19518)

An Ecosystem Services Market will not be developed overnight. Currently the Yakima Basin Clean Water Partnership is still trying to work with EPA and Ecology to understand how a market can be a tool to meet TMDL requirements and we are also working to develop tools for quantifying conservation benefits of non-point source practice alterations and opportunities for restoration. These tools will be beneficial with or without a market, for quantifying the benefits of our conservation actions is becoming more critical as conservation dollars become more scarce. We need to better prioritize all our conservation activities.

Whether a market will be developed in the Yakima Basin remains to be seen, but any process that continues to improve how conservation entities work together and address water quality issues will help us move forward.

## 6. Literature Cited

- Stensel, D.H. and Barnard, J.L. 2012. Yakima Basin Point Source Watershed Assessment. Report Number 2012 – 03, 59 p. [www.scwrcd.org/cleanwater.html](http://www.scwrcd.org/cleanwater.html).
- U.S. Bureau of Reclamation (USBR). 2011. Yakima River Basin Integrated Water Resource Management Plan Framework for Implementation Report. 104 pp. <http://www.usbr.gov/pn/programs/yrbwep/2011integratedplan/plan/framework.pdf>.
- U.S. Environmental Protection Agency (EPA). 1991. Guidance for Water Quality-Based Decisions: The TMDL Process. EPA 440/4-91-001. [http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/decisions\\_index.cfm](http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/decisions_index.cfm).
- U.S. Environmental Protection Agency (EPA). 2010. U.S. EPA NPDES Permit Writers' Manual. EPA-833-B-96-003, pp 1-28.
- U.S. Environmental Protection Agency (EPA). 2004. Water Quality Trading Assessment Handbook – Can Water Quality Trading Advance Your Watershed Goals? EPA 841-B-04-001, 120 pp. ([Water Quality Trading Assessment Handbook - PDF Online](#)).
- U.S. Environmental Protection Agency (EPA). 2007. Water Quality Trading Toolkit for Permit Writers. *EPA-833-R-07-004*, 55 p. ([Water Quality Trading Toolkit - PDF Online](#)).
- U.S. Geological Survey (USGS). 2009. Assessment of Eutrophication in the Lower Yakima River Basin, Washington 2004-2007. Scientific Investigations Report 2009-5078, 122 p. <http://pubs.usgs.gov/sir/2009/5078/>.
- Washington Department of Ecology (Ecology). 2010. Lower Yakima Valley Groundwater Study. Preliminary Assessment and Recommendations Document. Ecology publication No. 10-10-009. <https://fortress.wa.gov/ecy/publications/publications/1010009.pdf>
- Washington State Conservation Commission. 2009. Washington Conservation Markets Study - Final Report, 81 p. ([Washington Conservation Markets Study - PDF Online](#))

## 7. Acknowledgements

I would like to acknowledge the invaluable input into this report provided by Josh Giuntoli (Washington State Conservation Commission) and Ryan Anderson (City of Yakima), as well as Nicole Berg (Benton Conservation District). This report was entirely funded by the Natural

Resources Conservation Service (Washington State), and we appreciate their support of the RC&D.