This is an informational discussion on the outcomes of the County’s Ag-Watershed Project, as authorized by Council through grant contract agreement between Whatcom County and the WA Department of Commerce for a planning-only land use grant for watershed protection and restoration.

The Whatcom County Ag-Watershed Project is examining how a marketplace approach can strengthen agricultural endeavors while enhancing larger-scale watershed processes and functions. This 3 year research and development project is nearing completion, and the project team will provide an update and information on project status, outcomes and final draft work products. See the project website at: http://www.whatcomcounty.us/1146/Current-Initiatives
Memorandum

TO:       Honorable Whatcom County Councilmembers
FROM:     Karin Beringer – Planner 1
THROUGH:  Mark Personius – Assistant Director, PDS
DATE:     July 29, 2016
SUBJECT:  Agriculture-Watershed Project Briefing

The Whatcom County Ag-Watershed Project has been examining how a marketplace approach can strengthen agricultural endeavors while enhancing larger-scale watershed processes and functions. This grant-funded 3 year research and development project is nearly complete, and the project team would like to provide an update and information on project status, outcomes and final draft work products.

Key outcomes of the Ag-Watershed Project include development of planning, measurement, accounting and administrative tools that could be used in a functional, formal marketplace, such as the Natural Resources Marketplace which has been discussed locally. However, even without a functioning marketplace, these tools can be applied together or separately within ongoing local processes such as land use, watershed and agricultural planning.

The Watershed Improvement Districts (WIDs) are now taking up the agriculture-watershed characterization and mapping results created through this project into their ongoing comprehensive planning processes. The WIDs are at different stages of planning, since some of them are newly established and will rely on this information to support the development of their first plan, while others already have comprehensive plans and are now updating those.

The watershed metrics that were tested in the project are suited for local use, and the Ag Metric has been developed using local agricultural knowledge and expertise and is designed for local use in Whatcom County.

The General Crediting Protocol v2.0 that was tested offers a robust, transparent and credible framework for securing the beneficial outcomes of investments in agricultural and watershed enhancements. However, the transaction costs associated with baseline assessment, ongoing monitoring and verification in a protocol such as this are not fully reflected in current business and budgeting processes, either those of Whatcom County or those of other potential participants.

Whatcom County will be able to use the work produced from this project in many different ways. The work will be especially helpful when the County and Cities convene the multi-stakeholder workgroup to develop a workable TDR Program (new Comprehensive Plan Policy 2A-14). Many of the deliverables from the Ag-Watershed Project will have immediate
benefits to the workgroup including the Ag Metric, and the memos on an agricultural mitigation framework, and legal constraints.

Both the Ag and Watershed metrics created and refined through this work may be helpful in future zoning decisions or designation changes. The “Drivers of Ag Land Conversion” memo provides a platform from which to review and revise the Ag Strategic Plan to best address agricultural land conversion.

Through this project, the County has created a beneficial working relationship with the WIDs and is looking forward to continuing to work with them to address water resource management issues in the County.

While this grant did not result in a fully operational Natural Resources Marketplace, the work products will be available in the continuing discussion around a Natural Resources Marketplace for Whatcom County and Washington State. Currently, King County is working on developing similar metrics for agriculture and watershed values. There is a lot of potential for future collaboration in this area.

Please reference the included Project Summary document, and the project website at http://www.whatcomcounty.us/2260/Agricultural-Watershed-Pilot-Project for more information.
Project Summary
(Preliminary Draft July 2016)
Whatcom County Ag-Watershed Project

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Appendix A: Project Review Committee

THIS PROJECT HAS BEEN FUNDED WHOLLY OR IN PART BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY UNDER PUGET SOUND ECOSYSTEM RESTORATION AND PROTECTION COOPERATIVE AGREEMENT GRANT PC-0020101 WITH THE WASHINGTON DEPARTMENT OF ECOLOGY. THE CONTENTS OF THIS DOCUMENT DO NOT NECESSARILY REFLECT THE VIEWS AND POLICIES OF THE ENVIRONMENTAL PROTECTION AGENCY, NOR DOES MENTION OF TRADE NAMES OR COMMERCIAL PRODUCTS CONSTITUTE ENDORSEMENT OR RECOMMENDATION FOR USE.

PROJECT PARTNERS

CONSULTING PROJECT MANAGER
FHB Consulting Services Inc.
1 INTRODUCTION

The Ag-Watershed Project is a research and development project funded by a National Estuary Program Watershed Protection and Restoration Grant (June 2012 to June 2016) to Whatcom County Planning & Development Services, administered by the Washington Department of Commerce. Project Partners include: Whatcom Farm Friends—Community Education, Whatcom Conservation District and Washington State Department of Fish & Wildlife.

Agricultural operations and watershed features have long been key components of Whatcom County’s distinct landscape. Both are critical for our community’s economy and health. While it may seem that agriculture and watershed functions are at odds with one another after decades of regulations and planning, there are in fact many locations where protection of agricultural lands and enhancement of watershed functions can result in mutual benefits.

The Whatcom County Agriculture-Watershed Pilot Project (the “Ag-Watershed Project”) has been examining ways to reward the good things that farmers already do - those beneficial actions that go beyond existing regulation to maintain, enhance or protect large-scale watershed processes, while also strengthening agriculture in Whatcom County.

The project has explored quantitative tools to help measure, recognize and account for voluntary actions that go above and beyond what is required by regulation, and that can generate benefits for agricultural and watershed functions. This is part of a larger effort within the project to examine how incentive-based approaches can work with current regulation to strengthen agricultural endeavors while also enhancing large-scale watershed processes.

The project fact sheets provide a broad overview of the objectives of the project and the tools that were tested in the pilots:

Fact sheet 1: Applying a Natural Resources Marketplace approach to achieve agricultural and watershed priorities.
Fact sheet 2: Identifying opportunities to strengthen agriculture & watershed systems in Whatcom County.
Fact sheet 3: Beneficial actions for agriculture & watersheds: Accounting tools and protocols.
Fact sheet 4: Implementing and testing a Natural Resources Marketplace approach: Phase 2 Pilots in Whatcom County.
Fact sheet 5: Planning, designing and implementing beneficial actions for agricultural and watershed enhancement.
2PROJECT OVERVIEW

2.1 Approach
The Ag-Watershed Project has focused on "learning by doing" in two small-scale pilot projects located within the pilot focus area (the North Lynden watersheds – Bertrand, Fishtrap and Kamm watersheds). In the overall approach for the project, we:

• developed and applied an integrated and transparent planning process for finding situations where watershed improvement and agricultural protection actions on the ground can be mutually supportive ("win-win" solutions), or at least can reflect acceptable tradeoffs between agricultural protection and watershed enhancement;
• worked with landowners in the two pilot sites to design site-specific projects that demonstrate how watershed enhancement actions might complement and strengthen agricultural endeavors and how to seek acceptable tradeoffs when needed between agricultural protection and watershed enhancement;
• explored a structured "marketplace approach" to implementation of such projects, incorporating the use of incentives and other market-based tools to encourage and reward voluntary actions that can achieve measurable outcomes towards both agricultural protection and watershed enhancement objectives;
• tested and evaluated a set of measurement, accounting and administrative tools for quantifying, verifying, tracking and reporting over time of the agricultural and watershed benefits of specific voluntary actions taken at farm-scale or reach-scale, and
• applied the planning and accounting tools in two ongoing local processes, viz. supporting comprehensive planning efforts by the Watershed Improvement Districts, and working with the

More detailed information on the rationale and objectives for the Ag-Watershed Project is provided in the Program Strategy Report (2013). The most recent version of this report can be downloaded from https://sites.google.com/site/wcwatershedag/documents
2.2 Project scope

Phase 1 (June 2012 to July 2013) laid the groundwork for pilot testing, including:

a. Developing the ag-watershed characterization and mapping process for identifying priorities and needs in local agricultural and watershed systems in the pilot focus area (Bertrand, Fishtrap and Kamm watersheds) – see Fact Sheets 1 and 2;

b. Outreach and discussions with landowners and stakeholders to gather inputs on locally-suited tools and pilot concepts;

c. Review and selection of suitable scientific measurement tools and structured tracking, accounting and reporting protocols for quantifying benefits and securing value from actions intended to enhance watershed and/or agricultural functions on agricultural land - see Fact Sheet 3;

d. Exploration and consideration of potential pilot sites, with two sites identified for demonstration and testing of measurement tools and protocols – see Fact Sheet 4.

Phase 2 (June 2012 to September 2015) included field work and testing of the tools and protocols in pilot applications:

a. Field-testing of scientific measurement tools that can connect specific actions taken on agricultural land to measurable agricultural or watershed benefits as outcomes of the specific actions;

b. Testing and evaluation of robust accounting protocols to measure, verify, report and track the benefits generated;

c. Implementation of actual pilot transactions to demonstrate how agricultural and watershed benefits generated by agricultural landowners can be recognized and accounted for;

d. Documentation and sharing of key learning from this project across technical disciplines and with nontechnical participants.

Phase 2 extension (October 2015 to June 2016) included implementation of selected pilot work products in ongoing local policy and planning processes:

a. Working with the Agricultural Advisory Committee (AAC) during their 2015-2016 program to develop recommendations for an agricultural mitigation policy framework, using the work products and learning from both Phases 1 and 2;

b. Working with the Watershed Improvement Districts (WIDs) in the county to extend the ag-watershed characterization and mapping beyond the original pilot focus area. The results are intended for use in the WIDs’ ongoing comprehensive planning processes.

2.3 Desired longer-term outcomes of the Ag-Watershed Project

The tasks and achievements during this project represent short-term targets that help lead the way to the much broader long-term outcomes we are trying to achieve in Whatcom County in the arena of agricultural and watershed planning, and the overall goal of greater efficiency in local government. While these are beyond the scope of the Ag-Watershed Project itself, they help to illustrate the direction in which we are going with the current project and are important to keep in mind as we move forward. Some of these long-term outcomes include:

• Achieving better integration of planning for water, watersheds and agricultural land in Whatcom County;
• Putting in place a non-regulatory, marketplace approach to provide incentives for implementing high-quality, high-priority watershed enhancement and/or resource land protection projects;
• Making opportunities available for public agencies to more effectively and efficiently mitigate for environmental impacts and for impacts on resource lands of necessary public works projects such as road construction or flood control levee work;
• Moving towards a consistent policy framework and procedures for governing impacts to and conversion of agricultural lands, in order to help achieve Comprehensive Plan goals for resource lands.

2.4 Project management, review and outreach

Whatcom County entered into grant agreement #201203014 with the Washington State Department of Commerce to implement an Agricultural-Watershed pilot project on April 10, 2012. Whatcom County Planning and Development Services (Bellingham) has been the lead entity for this project. The Project Partners (Whatcom Farm Friends-Community Education, Whatcom Conservation District and Washington State Department of Fish & Wildlife) have provided in-kind contributions of staff time, expertise, knowledge and data. The consultant team has been led by FHB Consulting Services Inc. of Lynden.

An interdisciplinary Project Review Committee was formed to advise and guide the technical work of the project in Phase 1. The Review Committee was reconstituted for Phase 2, with some changes to the membership in order to reflect the change in focus of the project from laying the groundwork in Phase 1 to pilot implementation in Phase 2. The Review Committee has been comprised of citizens and compensated agency personnel, with members serving as individuals to provide a broad range of interests and perspectives regarding the development, application and testing of work products. A majority of the Committee members are agricultural landowners and/or agricultural producers, who have brought knowledge of local agricultural priorities and local knowledge regarding flooding and drainage in the project focus area. Review Committee membership for Phases 1 and 2 of the project is shown in Appendix A.

Review and guidance in the Phase 2 extension work on agricultural mitigation policy recommendations was provided by the Whatcom County Agricultural Advisory Committee. Review and guidance for the extended ag-watershed characterization and mapping was provided by the Commissioners and members of the six Watershed Improvement Districts (WIDs: Bertrand, North Lynden, South Lynden, Laurel, Sumas and Drayton).

A public outreach plan was prepared for each of Phases 1 and 2. A transparent and integrated approach was used to involve Project Partners, Review Committee (RC) and a broad mix of stakeholders in project outreach activities implemented concurrently along multiple tracks, including:
• Engagement with Project Partners, their constituents, including landowners in focus area;
• Interdisciplinary Review Committee work sessions and input opportunities, including two field tours;
• A publicly-accessible website with regular posting of work products for review and input;
• Project briefings to Whatcom County Council committees, related advisory boards and interested stakeholders via email and committee presentations;
• Regular work sessions with Project Partners and their constituents, and
• Scientific conference presentations.

Ag-Watershed Project Summary – Preliminary Draft July 2016
3 PROJECT WORK PRODUCTS AND OUTCOMES

This section provides brief descriptions of the different kinds of tools developed during the Ag-Watershed Project, explains how they are intended to be used in a “marketplace approach”, and summarizes the results of pilot testing and application. The figure below (Figure 1) is a schematic illustration of how the tools would work together to support a marketplace approach, beginning with the planning and prioritization tools developed in Phase 1 of the project to characterize and map both agricultural and watershed priorities, and leading in to the measurement and accounting tools that were tested in the Phase 2 pilot studies.

Figure 1. Illustration of how the various project work products fit together for implementation

3.1 Groundwork and strategy development: a marketplace approach

Current programs to implement either watershed enhancement or agricultural protection activities rely to a large degree on grant funding, regulatory compliance or voluntary stewardship actions. This project has explored the use of additional implementation tools based on incentives and trades and applied within a structured marketplace approach, that could be used to encourage voluntary actions, to secure credit for measurable outcomes on the ground, and to reward those who do more than the minimum required to enhance watersheds and/or protect agricultural land.

A marketplace approach should complement existing regulatory and voluntary programs for both agriculture and watershed enhancement, and should help to advance adopted goals for both. A marketplace approach cannot replace either regulatory or voluntary programs, and in fact depends on there being a robust regulatory framework in place against which to measure the benefits of specific enhancement actions that go beyond what is required by regulation.

Quick summary
During Phase 1 of the Ag Watershed Project, we developed the concept of a marketplace approach further and considered the types of planning, measurement, accounting and administrative tools that would be needed to implement it. For more information, see the Program Strategy Report (2013) and Fact Sheet #1.
Resources for implementation of watershed planning and agricultural planning objectives are limited and we can expect that to be the case for the foreseeable future, whether the resources are public or private. Smaller one-off or opportunistic watershed enhancement projects or agricultural protection actions will always be a necessary part of the implementation mix. However, the results of this project indicate that a marketplace approach could help to make more strategic, targeted and efficient use of available resources in projects which can generate high-value, measurable outcomes against recognized priorities for watershed enhancement and agricultural protection.

3.2 Planning tools: agriculture-watershed characterization & mapping

The methodology for agriculture-watershed characterization and mapping was developed and pilot-tested during Phase 1 of the Ag-Watershed Project. A range of stakeholders, including farmers, partners and Review Committee members, provided inputs to identify WHAT is important for agriculture and watershed systems (see Figure 2) and WHY these issues are important. Pilot characterization and mapping work identified WHERE these are important, so that they could be mapped concurrently. The mapping process allows agricultural priorities to be integrated into routine spatial planning for consideration alongside adopted watershed priorities in Whatcom County’s lowland areas and the Puget Sound region.

The pilot focus area covered the Bertrand, Fishtrap and Kamm watersheds. The results are reported in the Phase 1 report on pilot mapping and characterization (Gill, 2013). Project Fact Sheet #2 provides additional information on the pilot agriculture-watershed characterization and mapping process and results, while Fact Sheet #5 shows how those results can be used for planning, design and implementation of local enhancement projects and actions.

Later in the project, we extended the agriculture-watershed characterization from the initial pilot focus area to all six Watershed Improvement Districts (see section 3.7.2 of this document).


2 Ag-Watershed Project fact sheets can be downloaded from http://whatcomcounty.us/2260/Agricultural-Watershed-Pilot-Project

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3.3 Measurement tools: connecting measurable outcomes to specific beneficial actions

One of the two fundamental principles of the marketplace approach is that you can’t get credit for what you can’t measure. What this means is that credit for specific beneficial actions can only be generated and recognized or rewarded if the potential or actual agricultural and watershed enhancement benefits of those actions can be measured, using credible scientific methods which can directly connect the actions and their benefits to specific agricultural and/or watershed enhancement outcomes.

Having tools to quantify and track the benefits of enhancement actions over time, based on consistent and measurable performance criteria, underpins the delivery of incentives and payments for actions that go beyond the minimum required. During Phase 1 of the Ag-Watershed Project, we reviewed a number of potential measurement tools (metrics), as we looked for scientific, robust methods to connect a specific enhancement action to a measurable outcome, either for the agricultural system or the watershed system. The criteria for selection of metrics included: availability of the metric or model for rapid adoption in Whatcom County, with modification or adaptation if necessary; relevance to and proven accuracy in local watershed ecosystems and agricultural systems; sensitivity to priority enhancement actions that had already been identified; simplicity and data availability.

We chose three metrics to test the watershed benefits of selected specific actions in the pilot studies (see Figure 3): (i) the Shadalator model, which was originally developed for Washington and Oregon watersheds and which measures the effects on water temperature of providing shading vegetation on smaller streams; (ii) a method being developed in Oregon, the Stream Function Assessment Methodology (SFAM), which supports measurement of the benefits to smaller lowland streams of actions to improve hydrology, instream and riparian habitat, water quality and biological characteristics; (iii) the Washington Wetland Credit-Debit Method for measurement of the watershed benefits of restoring, protecting or enhancing wetland habitat. While all three watershed

---

Quick summary

During Phase 1, we reviewed potential measurement tools (metrics) for use in the Phase 2 pilot studies to quantify the agricultural and watershed benefits of specific voluntary actions taken on agricultural land. For more information on metric selection, see the Credit Accounting System Report (2013) and Fact Sheet #3.

---

Metrics allow us to connect measurable outcomes to specific beneficial actions

1. **Shade calculator** to quantify thermal load blocked by riparian shade (kCal/ft)
2. **SFAM** STREAM FUNCTION ASSESSMENT METHODOLOGY integrates measurements of stream functions and values: (points)
   - Hydrologic
   - Geomorphic
   - Biological
   - Water quality
3. **Wetland function** assesses changes in wetland function (acre-points):
   - Water quality improvement
   - Flood storage & flood flow reductions
   - Habitat for plants and animals
   (Dept of Ecology’s Wetland Credit/Debit method)
4. **Ag metric** integrates simple measurements of ag functions & values (ag acre-points or ag benefit points):
   - Flood protection
   - Drainage
   - Ag land protection
   - Site assessment
   - Land evaluation

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Figure 3. Metrics used in the Ag-Watershed Project pilot studies

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3 See the Credit Accounting System Report (2013: Technical Memorandum #3). The most recent version of the report can be downloaded from https://sites.google.com/site/wcwatershedag/documents

*Ag-Watershed Project Summary – Preliminary Draft July 2016*
metrics are potentially suitable for application here, each has its particular strengths and weaknesses, which are discussed further in the report on the pilot studies.

We also developed a new metric, the “ag metric,” for local use in measurement of the agricultural benefits of specific actions (discussed in more detail below). The ag metric expands on the existing method used in the Whatcom County Purchase of Development Rights (PDR) Program for evaluating agricultural properties.

3.3.1 The “Ag Metric”
The agricultural metric (“ag metric”) is a simple measurement tool that calculates the benefits for agriculture of actions taken on a single farm or in an area comprising multiple farms to enhance priority agricultural services and functions that are related to the natural infrastructure for agriculture. For example, protection of land from conversion to non-agricultural uses, maintenance of drainage for farm fields and protection of fields from flooding at critical times in the growing season are all specific actions that help to maintain or enhance the viability of agricultural operations and the local agricultural economy.

The prototype ag metric was developed in Phase 2 of the project and was tested in the pilot projects and a number of additional local case studies. The metric is used to connect specific actions to measurable outcomes for the agricultural system, in a similar way to the watershed metrics which connect specific actions to measurable outcomes for watershed systems (such as improved fish habitat, reduced water temperatures or enhanced groundwater recharge). Because it measures either the positive or the negative changes in overall agricultural benefit points due to specific actions (see Figure 4), the ag metric can be used as a supporting tool in agricultural mitigation. When applied in a mitigation context, the ag metric could be used to help determine what kind of mitigation might be required for the unavoidable conversion of agricultural land.

<table>
<thead>
<tr>
<th>Category</th>
<th>How is the ag benefit score calculated?</th>
<th>Sample property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site information</td>
<td>How big is the site?</td>
<td>Soil scores</td>
</tr>
<tr>
<td></td>
<td>How much is farmable?</td>
<td></td>
</tr>
<tr>
<td>1. Land evaluation</td>
<td>Soil-based quality and capability</td>
<td></td>
</tr>
<tr>
<td>2. Site evaluation</td>
<td>Current farming activity, ag</td>
<td></td>
</tr>
<tr>
<td></td>
<td>neighborhood, access to water</td>
<td></td>
</tr>
<tr>
<td></td>
<td>fragmentation</td>
<td></td>
</tr>
<tr>
<td>3. Ag land base protection</td>
<td>Potential density, level of protection</td>
<td></td>
</tr>
<tr>
<td>4. Maintenance of ag drainage</td>
<td>Active maintenance of existing drainage</td>
<td></td>
</tr>
<tr>
<td>5. Protection from flooding</td>
<td>Active maintenance of flood</td>
<td></td>
</tr>
<tr>
<td></td>
<td>protection infrastructure</td>
<td></td>
</tr>
<tr>
<td>Overall site score</td>
<td>Ag benefit points</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ag acre-points</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4. Overview of the Ag Metric
3.4 Administrative tools: Protocols for verification, tracking and oversight

The second fundamental principle of a marketplace approach is that You can’t get credit for what isn’t taking place, meaning that credit for specific beneficial actions can only be secured where baseline and post-action calculations of credit have been independently verified, work done on the ground has been confirmed, and ongoing monitoring and verification reports indicate that the required performance standards are being met. This is described in more detail in the Credit Accounting System Report (2013)\(^4\) and Fact Sheet #4.

In the Ag-Watershed Project, we tested a protocol for verification, tracking and accounting that is already in use in the Willamette Ecosystem Marketplace in Oregon, viz. the Willamette General Crediting Protocol Version 2.0 (GCPv2.0).\(^5\) A simplified overview of the protocol steps is shown in Figure 5 below. The protocol can be modified to suit local conditions and needs, and the template was provided by the Willamette Partnership for that purpose. An advantage of using this template as the basis for a prototype Credit Accounting System for the Ag-Watershed Project is that several other similar marketplace initiatives in the Northwest are also using the same template. The collaborative use of regional infrastructure in this way can significantly reduce initial development costs, as well as potentially provide a much broader geographic base for marketplace implementation.

We applied the GCPv2.0 in our two pilot studies. The GCPv2.0 offers a robust and transparent system that can underpin implementation of a marketplace approach locally. Potential adaptations for local use and consideration of the pros and cons of this protocol, including transaction costs, resource and data needs and implications for institutional arrangements, are discussed in more detail in the report on the pilot studies.

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\(^4\) See the Credit Accounting System Report (2013: Technical Memorandum #3). The most recent version of the report can be downloaded from [https://sites.google.com/site/wcwatershedag/documents](https://sites.google.com/site/wcwatershedag/documents)


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**TAC Protocol:** account for, track & monitor specific actions & outcomes

1. **Validation checklist**
   - Site information & history
   - Proposed specific actions
   - Types of benefits/credits
   - Additionality

2. **Project design report & credit estimate**
   - Detailed assessment of design vs baseline conditions
   - Estimated uplift/credit

3. **Project stewardship & monitoring plan**
   - Enhancement actions to be taken on site, timelines
   - Maintenance and management practices to be followed on site
   - Monitoring, reporting & verification responsibilities

4. **Buyer-Seller transaction**
   - Purchase /sale agreement
   - Easement if applicable
   - Closing & payment

---

Preliminary draft – based on WP GCPv2.0

Figure 5. Simplified view of the protocol for tracking, accounting and crediting
### 3.5 Demonstration pilots

An initial list of 11 potential pilot projects was drawn up based on the results of the agricultural and watershed mapping and characterization analysis. The initial list was then refined iteratively over the course of discussions at project team work sessions and discussions with landowners, with members of the project Review Committee, project partners and staff of the Department of Ecology. Two pilots were finally selected. The pilots and the proposed specific actions are described briefly in the boxes below and in Table 1. A more detailed description of the process for development and selection of pilot projects is provided in the report on potential agricultural and watershed pilot projects.\(^6\)

#### Quick summary

During Phase 2 we tested the measurement and accounting tools in two pilots on agricultural land in the North Lynden area. One pilot included avoided conversion of wetland habitat which had become established on agricultural land as a result of beaver activity; the other entailed enhancement of instream and riparian habitat in exchange for improved drainage and flood protection for agricultural fields in the floodplain. For more information, see Fact Sheets 4 and 5.

---

**Pilot 1 (single landowner)**

**Proposed enhancement:** Avoided conversion of wetland habitat resulting from beaver activity in the headwaters of an important salmon bearing stream, on a site that could be returned to active farming at the end of the Conservation Reserve Enhancement Program (CREP) lease.

**Agricultural benefits:** Diversification of revenue from payment for permanent wetland conservation easement on marginal farmland.

**Watershed benefits:** Wetland habitat and surface water storage capacity in the upper watershed are permanently protected.

**Learning from the pilot:**

1. The wetland credit-debit method was reasonably well suited to measure the benefits of avoiding conversion of the wetland habitat, but was not particularly well suited to measure the baseflow support benefits provided by the water storage that had resulted from beaver activity at the site.

2. Appraisal of the value of a conservation easement needs to be able to reflect not only the value of agricultural production lost by the landowner in a case such as this, but also the value of watershed benefits generated by the landowner.

---

**Pilot 2 (multiple landowners):**

Improve flood protection and field drainage for low-lying farmland, while concurrently increasing stream width and channel complexity, improving stream-floodplain connectivity and restoring riparian vegetation in a highly channelized reach.

**Agricultural benefits:** Improved flood protection and drainage for fields on prime farmland. [Proposed project design addresses faster removal of flood waters from fields & improved efficiency of drainage ditches].

**Watershed benefits:** Stream function and habitat condition in the reach are enhanced in exchange for a small amount of agricultural land taken out of production to accommodate.

**Outcomes:**

Four scenarios involving different configurations for stream function enhancements and agricultural enhancements were discussed with landowners and assessed for their agricultural and watershed benefits using the SFAM, the Shadalator and the ag metric.

The results allow comparison and optimization of possible actions that could generate mutual benefits for agriculture and the watershed. This allows landowners to ensure that agricultural needs will be adequately addressed in any future process for detailed project design.
Table 1. Specific actions proposed for Phase 2 pilot studies

<table>
<thead>
<tr>
<th>AGRICULTURE ENHANCEMENT BENEFITS PROPOSED IN PHASE 2 PILOTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhancement benefit</td>
</tr>
<tr>
<td>Drainage of agricultural fields</td>
</tr>
<tr>
<td>Flood protection for ag fields</td>
</tr>
<tr>
<td>Ag land protection</td>
</tr>
<tr>
<td>Ag resilience &amp; diversity of revenue</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WATERSHED ENHANCEMENT BENEFITS PROPOSED IN PHASE 2 PILOTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhancement benefit</td>
</tr>
<tr>
<td>Water quality-temperature</td>
</tr>
<tr>
<td>Habitat-Chinook</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Habitat-other anadromous fish</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Habitat-wetlands</td>
</tr>
</tbody>
</table>

\(^7\) In coordination with Hydraulic Project Approval requirements that may need to be met
\(^8\) Conservation Reserve Enhancement Program — see Whatcom Conservation District website

Ag-Watershed Project Summary – Preliminary Draft July 2016
<table>
<thead>
<tr>
<th>Water quantity-wetland storage capacity</th>
<th>- Protect, enhance or restore wetland hydrological functions for water storage</th>
<th>WA credit-debit method</th>
</tr>
</thead>
</table>

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3.6 Implementing a marketplace approach

3.6.1 Characterizing demand

The Ag-Watershed Project team has drawn on regional collaboration already underway in the Northwest to identify, characterize and mobilize potential demand for the kinds of benefits that could be supplied by landowners who wish to participate in marketplace approaches. At this time, three main drivers of potential demand have been identified both within the Ag-Watershed Project Phase 1 work as well as other regional marketplace initiatives:

1. Demand for “compliance-grade credits.” This refers to demand originating in specific regulatory and permitting requirements for mitigation, and focuses primarily on allowable off-site mitigation for unavoidable environmental impacts. Wetland mitigation is an example that is already being implemented locally, through current Washington State regulations.

2. Demand for “voluntary credits.” This refers to demand for credits through programs which aim to restore, enhance or protect certain habitats or features of the landscape, generally for public benefit or to meet public policy objectives, but not related to offsite mitigation requirements associated with specific permits. Such programs are funded by public/government agencies, private donors or corporate entities.

3. Demand from direct beneficiaries. This refers to demand from beneficiaries (often downstream) who seek improvements in conditions (such as water quality) upstream or elsewhere in the watershed for their own direct benefits.

While not all of these types of demands can be met through a supply source generated by individual landowners, groups of landowners can work together on connected sections of streams or adjacent land areas to “aggregate” their benefits into a larger project that can deliver benefits at the scale required by the buyers or investors.

3.6.2 Quantifying demand

The Ag-Watershed Project has focused primarily on voluntary credits, both in the two pilot studies and in the development of measurement and accounting tools.

Demand for voluntary credits for watershed enhancement is difficult to quantify accurately, since many groups and organizations are receiving short-term grant funding from an array of sources to implement various kinds of watershed enhancement and restoration work in Whatcom County. Projects tend to be relatively small, and long-term follow up and monitoring of results is limited. There is no central source of information that would allow an accurate assessment of the resources currently being directed to small-scale watershed restoration, which might give a fuller picture of the actual demand for watershed benefits.
Agricultural land protection actions are funded primarily through the Whatcom County Purchase of Development Rights Program, which receives funding from the Conservation Futures Fund and additional State, Federal, and local matching programs.

3.6.3 Institutional and financial implications

The quantitative assessments, independent verification and ongoing long-term monitoring that are built into a protocol such as the Willamette General Crediting Protocol, which we tested for local use, are focused on assuring measurable outcomes from investments in watershed or agricultural enhancement. Providing this kind of assurance and credibility adds to the cost of each transaction.

During Phase 2 of the Ag-Watershed Project, we considered the potential transaction costs associated with use of the measurement and administrative tools in a number of ways.

• The Willamette Partnership provided information on the time and costs involved in applying the General Crediting Protocol in individual projects.

• Our two pilots provided information on the likely time and costs for desk and field work associated with baseline assessment, project design and field verification for the benefit types tested in those pilots. The ready availability of recent, credible data for use with the assessment methods will be a significant factor in keeping these costs down.

• Our smaller pilot provided information on the likely long-term monitoring, verification and stewardship costs associated with securing wetland benefits. These costs would need to be reflected in the price of the wetland conservation easement and can be significant if the easement is permanent.

• The PDR Program currently includes independent oversight of compliance by landowners with the conditions of agricultural easements, and these costs are well documented.

There are a number of possible institutional configurations for implementing a marketplace approach locally, depending on local preferences, needs and capacity. We have reviewed examples of other similar approaches in the Northwest to provide information on possible options. More information is provided in the draft Marketplace Report.
3.7 Application of selected project work products in ongoing processes

3.7.1 Agricultural mitigation policy framework and supporting procedures

During the 2015-2016 work year, the Agricultural Advisory Committee (AAC) has explored the development of a consistent policy framework and procedures for agricultural mitigation. Agricultural mitigation is a potential tool that could be applied to minimize impacts to and conversion of agricultural lands, in order to achieve Comprehensive Plan goals for agricultural land. Agricultural mitigation policy options include approaches such as In Lieu Fee (ILF), Purchase of Development Rights (PDR), Transfer of Development Rights (TDR), incentives and trades.

The development of options for agricultural mitigation has been based on Whatcom County Council Resolution 2009-040, which confirms that: “100,000 acres of land available for agricultural use is the minimum goal for ensuring a land base necessary to support a viable agriculture industry in Whatcom County”. An earlier research report on options for mitigating impacts to agricultural land (June 2013) was prepared in Phase 1 of the Ag-Watershed Project and was transmitted to the Agricultural Advisory Committee (AAC). Current work has built on that earlier research and on previous work by the AAC on options for protection of agricultural lands.

The AAC worked with PDS staff and the consultant team to explore a potential framework and procedures for agricultural mitigation policy, as part of the scope of work of Task 5 in the Ag-Watershed Project.

Core work products related to the agricultural mitigation task are listed below:

- A summary of the AAC work and findings related to agricultural mitigation (June 2016).
- An emerging framework for program design (July 2016) that addresses program objectives, mitigation criteria, location of sending and receiving sites, actions that might trigger mitigation. The framework also includes a number of design questions still to be resolved, supporting notes and maps, examples of other mitigation programs as well as worked examples of various conversion scenarios to illustrate possible mitigation options.
- Project Memo on regulatory constraints for agricultural mitigation (July 2016), which provides the basis for the regulatory and procedural design of mitigation program options, including integration of mitigation into current planning and permitting procedures, administration and oversight issues.
- Project Memo on drivers of agricultural land conversion (July 2016), which provides the basis for the technical and operational design of mitigation program options, including issues such as which drivers of agricultural land conversion should be the main focus of mitigation, where to locate sending and receiving zones, and implications for mitigation criteria, ratios, fees and costs.
- Research Report on options for agricultural mitigation (June 2013).

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9 This work was identified as a medium term priority task in the Whatcom County Agricultural Strategic Plan (2011).
11 The most recent versions of these documents can be downloaded from https://sites.google.com/site/wcwatershedag/home/ag-mitigation-working-docs
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3.7.2 Extended agriculture-watershed characterization and mapping for the six Watershed Improvement Districts

During the period October 2015 to June 2016, the pilot methodology was refined and extended to provide characterization and mapping results for the six Watershed Improvement Districts in Whatcom County.

Each Watershed Improvement District (WID) is a unique agricultural neighborhood in Whatcom County's broader farming community. Natural characteristics of the soil, locations of surface and ground waters and topography of the area help to delineate viable areas for the many types of agricultural production taking place. The boundaries of the WIDs not only reflect the characteristics and interests of different agricultural neighborhoods, but also align where possible with the geographic boundaries of water management areas used in mapping and planning of water resources by local and state governments and the agricultural land classifications used by local land use planners and agricultural specialists.

The watershed characterization and mapping results for each WID include tables and summary maps which describe the watershed services that are most needed for a healthy watershed (including the restoration of salmon populations) and where they could be enhanced in the watershed. In order to generate these tables and summary maps for each WID, the information contained in the watershed reference maps was combined with the results of water flow assessments (provided by the Department of Ecology in a series of watershed characterization maps showing the areas which are most in need of either restoration or protection of larger-scale water flow processes). The work session participants reviewed this information, provided additional local field knowledge on site-specific watershed priorities, and identified potential actions or projects that could help to achieve watershed priorities.

The agricultural characterization and mapping results for each WID include tables and summary maps which describe the agricultural services that are most needed for the long term success of agriculture, and where they could be enhanced in the watershed. The primary focus was on the “natural infrastructure” for agriculture: soils, water, adequate drainage and flood protection, and long-term protection of the agricultural land base. Methods used to prioritize agricultural needs are based on a combination of: information from (i) existing agricultural protection programs in Whatcom County, (ii) available GIS data and (iii) local knowledge provided at the WID work sessions.

The agriculture-watershed characterization maps and tables generated in this task combine existing spatial data with field experience and farmers’ local knowledge to identify agricultural priorities and needs in the lowland areas of Whatcom County and to bring those into the planning conversation with watershed priorities and needs. The characterization maps and tables, which incorporate local knowledge and farmer insights, should help each WID to identify, prioritize, and strategically locate practical beneficial projects and actions at the farm or reach-scale, that can enhance agricultural operations and watershed functions in the WID area. The results can also be used to communicate the WIDs’ priority enhancement needs to planners for consideration in broader integrated planning efforts such as Whatcom County’s Comprehensive Planning process.

12 Links to each WID website can be found at http://www.agwaterboard.com/
13 Watershed ‘characterization’ is a set of water and habitat assessments that compare areas within a watershed for restoration and protection value. It is a coarse-scale tool that supports decisions regarding where on the landscape should efforts be focused first, and what types of actions are most appropriate to that place. See http://www.ecy.wa.gov/puget_sound/characterization/index.html
A customized report on the agriculture-watershed characterization and mapping has been prepared for each of the six Watershed Improvement Districts in Whatcom County. The results of the characterization and mapping will also be incorporated into an online story map for wider access to the information.

More information on how to use the characterization tables and maps can be found in Fact Sheet 5.

4 IN CONCLUSION

The planning, measurement, accounting and administrative tools that have been the focus of work in the Ag-Watershed Project could be used in a functional, formal marketplace, such as the Natural Resources Marketplace which has been discussed locally. However, even without a functioning marketplace, these tools can be applied together or separately within ongoing local processes such as comprehensive planning, watershed planning and agricultural planning.

The Watershed Improvement Districts are now taking up the agriculture-watershed characterization and mapping results into their ongoing comprehensive planning processes. The WIDs are at different stages of planning, since some of them are newly established and will rely on this information to support the development of their first plan, while others already have comprehensive plans and are now updating those.

The watershed metrics that we tested are suited for local use, but only the Shadalator is ready for use without additional adaptation and validation for local conditions. The ag metric has been developed using local agricultural knowledge and expertise and is designed for local use in Whatcom County.

The General Crediting Protocol v2.0 that we tested offers a robust, transparent and credible framework for securing the beneficial outcomes of investments in agricultural and watershed enhancements. However, the transaction costs associated with baseline assessment, ongoing monitoring and verification in a protocol such as this are not fully reflected in current business and budgeting processes, either those of Whatcom County or those of other potential participants.

5 FUTURE DIRECTIONS

Whatcom County will be able to use the work produced from this project in many different ways. The work will be especially helpful when the County and Cities convene the multi-stakeholder workgroup to develop a workable TDR Program (new Policy 2A-14). Many of the deliverables from this project will have immediate benefits to the workgroup including the Ag Metric, and the memos on an agricultural mitigation framework, and legal constraints.

14 The most recent versions are available at the project website https://sites.google.com/site/wcwatershedag/home/wid-mapping-working-docs. Final versions will be available from each WID website http://www.agwaterboard.com/ and http://www.co.whatcom.wa.us/2260/Agricultural-Watershed-Pilot-Project

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Both the Ag and Watershed metrics created and refined through this work will be helpful in future zoning decisions or designation changes. The “Drivers of Ag Land Conversion” memo will provide a platform off which to review and revise the Ag Strategic Plan to best address ag land conversion.

Through this project, the County has created a beneficial working relationship with the Watershed Improvement Districts, and is looking forward to continue working with them to address water issues in the County.

While this grant did not result in a fully operational Natural Resources Marketplace, the work products will be available in the continuing discussion around a Natural Resources Marketplace for Whatcom County and Washington State. Currently, King County is working on developing similar metrics for agriculture and watershed values. There is the a lot of potential for future collaboration in this area.
APPENDIX A: PROJECT REVIEW COMMITTEE

The Ag-Watershed Project Review Committee (RC) is a community-based, interdisciplinary body comprised of citizens and compensated agency personnel, with members serving as individuals to provide a broad range of interests, perspectives and knowledge regarding the conceptual approach to the project, technical resources used, development and potential application of work products, and educational information. Whenever possible, recommendations in final work products will call out those areas where RC members found consensus on key concepts, working definitions, and options for future use of tools and protocols. Work products will also include outstanding concerns or issues for future analysis by decision-makers.

This technical Project Review Committee includes individuals from a variety of government and public agencies, related citizen-advisory bodies, and community members engaged in watershed and agricultural protection efforts in Whatcom County, as well as lead staff from the ag-watershed project partner organizations. See general criteria below, used to identify invitees for phase 1 (July 2012-June 2013) and phase 2 (July 2013-Dec. 2014).

General Criteria: Areas of local knowledge and technical expertise were identified for Review Committee (RC) input regarding science-based tools available for application and use in WRIA 1, local, state and federal agricultural and watershed planning, see list below. Phase 1 focused on general knowledge; phase 2 includes specific focus on the work planned for the two pilots in the project focus area.

- Agriculture System Functions
- Watershed System Functions
- Agricultural Preservation & Planning
- Watershed Protection & Planning
- Flooding, Drainage & River Management
- Landowners & Agricultural Producers in the project focus area
- Ecosystem Services & Mitigation

Additional phase 2 criteria requested by Whatcom Co. Council included: majority membership of landowners and/or agricultural producers, with preference for large acreage owners and/or local knowledge regarding flooding and drainage in the project focus area (see phase 2 RC roster below; members who meet the additional criteria are indicated by “*”).
<table>
<thead>
<tr>
<th>Phase 1 Members</th>
<th>Affiliations as identified by invitees who confirmed participation</th>
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<tbody>
<tr>
<td><strong>July 2012—June 2013</strong></td>
<td><strong>Board member, Nooksack Salmon Enhancement Association</strong></td>
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<tr>
<td>Analiese Burns</td>
<td>Commissioner, North Lynden Watershed Improvement District</td>
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<tr>
<td>Casey Lankhaar</td>
<td>Member, Whatcom County Ag Advisory Committee</td>
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<tr>
<td>Debbie VanderVeen</td>
<td>Citizen, Professor, WWU</td>
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<tr>
<td>Jean Melious</td>
<td>Staff, Lummi Nation Natural Resource</td>
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<tr>
<td>Jeremy Freimund</td>
<td>Commissioner, North Lynden Watershed Improvement District</td>
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<tr>
<td>Larry Stap</td>
<td>Member, Whatcom County Ag Advisory Committee</td>
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<tr>
<td>Leroy Plagerman</td>
<td>Staff, Nooksack Tribe Natural Resources</td>
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<tr>
<td>Oliver Grah</td>
<td>Commissioner, Bertrand Watershed Improvement District</td>
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<tr>
<td>Skip Richards</td>
<td>Member, Whatcom County Ag Advisory Committee</td>
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<tr>
<td>Todd Jones</td>
<td>Commissioner, Whatcom County Ag Advisory Committee</td>
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<tr>
<td>Vern VandeGarde</td>
<td>Citizen, Retired Attorney</td>
</tr>
<tr>
<td>Wendy Harris</td>
<td>Staff, Whatcom County Planning &amp; Development Services*</td>
</tr>
<tr>
<td>Samya Lutz</td>
<td>Staff, WA Dept of Fish &amp; Wildlife*</td>
</tr>
<tr>
<td>Steve Seymour</td>
<td>Director, Whatcom Conservation District*</td>
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<tr>
<td>George Boggs</td>
<td>Director, Whatcom Farm Friends*</td>
</tr>
<tr>
<td>Henry Bierlink</td>
<td>Staff, Dept of Ecology*</td>
</tr>
<tr>
<td>Ben Rau</td>
<td>Staff, WA Dept of Commerce*</td>
</tr>
<tr>
<td>Doug Peters</td>
<td>Project Lead, FHB Consulting Services Inc.</td>
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* Project Partner organizational lead staff participate in Review Committee meetings and are also responsible for additional outreach and engagement of agency personnel, constituents and relevant project partners.
<table>
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<tr>
<th>Phase 2 Members</th>
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<td><strong>Sept. 2013—Dec. 2014</strong></td>
<td><strong>descriptions provided by invitees who confirmed participation</strong></td>
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<tr>
<td>Chris Benedict</td>
<td>WSU Whatcom County Extension</td>
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<td>Debbie VanderVeen</td>
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<tr>
<td>Eric Sundstrom</td>
<td>Citizen</td>
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<td>Jeremy Freimund</td>
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<tr>
<td>John Clark</td>
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<tr>
<td>Karen Steensma</td>
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<td>Board member, Nooksack Salmon Enhancement Association</td>
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<td>Todd Jones</td>
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<td>Tom Buroker</td>
<td>Staff, Washington Department of Ecology, Bellingham Field Office</td>
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<td>Heather MacKay</td>
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