







PACIFIC COUNTY VOLUNTARY STEWARDSHIP PROGRAM

WORK PLAN | JUNE 2017

Pacific County Working Group

Work Plan

Pacific County Voluntary Stewardship Program

Prepared on behalf of:

The Pacific County VSP Working Group

Pacific County
1216 W. Robert Bush Drive
P.O. Box 68
South Bend, WA 98586

Prepared by:

THE WATERSHED COMPANY
750 Sixth Street South
Kirkland . WA 98033
p 425.822.5242
f 425.827.8136
watershedco.com

LeadToResults
P.O. Box 1130
Ocean Park, WA 98640
(503)708-1623
leadtoresults.com

June 2017
The Watershed Company Reference Number:
151026

Acknowledgments

The Working Group recognizes the efforts and contributions of the following individuals in developing this Work Plan:

Kelly McLain, Washington State Department of Agriculture
Zach Meyer, Washington State Department of Ecology
Matt Muller, Washington State Department of Fish and Wildlife
Kristine Nevitt, resident, City of Raymond
Kim Patten, Washington State University Extension
Evan Sheffels, Washington State Farm Bureau

Pacific County staff:
Tim Crose, Director, Department of Community Development
Nichol Duff, Clerk

Consultant team:
Kelly Rupp of LeadToResults
Tess Brandon, Sarah Sandstrom, and Dan Nickel of The Watershed Company

Funded by:
Washington State Conservation Commission

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[1] Meeting minutes and outreach materials are included as part of the record of Work Plan development, rather than as formal components of the Work Plan.

1 Introduction

1.1 Purpose

The Voluntary Stewardship Program (VSP) is an alternative to traditional top-down regulations for the protection of critical areas on agricultural lands. Enabled under the Washington State Growth Management Act (RCW 36.70A), the VSP uses a collaborative, stakeholder-driven process to identify, coordinate, and build on existing programs and practices that address agricultural effects on critical areas. These practices are then implemented by individual farmers through voluntary, site-specific stewardship plans.

The purpose of this Work Plan is to fulfill VSP legislative requirements to create a voluntary set of goals, benchmarks, and planned activities, in order to protect and enhance critical areas while maintaining and improving agricultural viability in Pacific County.

1.2 Core Elements of the Work Plan

1.2.1 Applicable Area

Pacific County includes portions of four Water Resource Inventory Areas (WRIAs): Lower Chehalis (WRIA 22), Upper Chehalis (WRIA 23), Willapa (WRIA 24), and Grays-Elochoman (WRIA 25) (see Figure 1-1). In addition, the County includes a portion of the Lower Columbia Watershed (defined by USGS cataloging unit 17080006), where the Columbia River enters the Pacific Ocean. Finally, the entirety of the County's western boundary is along the Pacific Ocean. Agricultural uses are mapped as occurring within WRIA 24 and the Lower Columbia Watershed only.

In 2012, under Resolution 2012-003, the Board of Pacific County Commissioners enrolled the entirety of unincorporated Pacific County in VSP, and nominated the Willapa watershed (WRIA 24) as a priority watershed.

The goals of the VSP are to:

(a) Promote plans to protect and enhance critical areas within the area where agricultural activities are conducted, while maintaining and improving the long-term viability of agriculture in the state of Washington and reducing the conversion of farmland to other uses;
(b) Focus and maximize voluntary incentive programs to encourage good riparian and ecosystem stewardship as an alternative to historic approaches used to protect critical areas;
(c) Rely upon critical areas development regulations for the protection of critical areas for those counties that do not choose to participate in this program;
(d) Leverage existing resources by relying upon existing work and plans in counties and local watersheds, as well as existing state and federal programs to the maximum extent practicable to achieve program goals;
(e) Encourage and foster a spirit of cooperation and partnership among county, tribal, environmental, and agricultural interests to better assure the program success;
(f) Improve compliance with other laws designed to protect water quality and fish habitat; and
(g) Rely upon voluntary stewardship practices as the primary method of protecting critical areas and not require cessation of agricultural activities.

RCW 36.70A.700

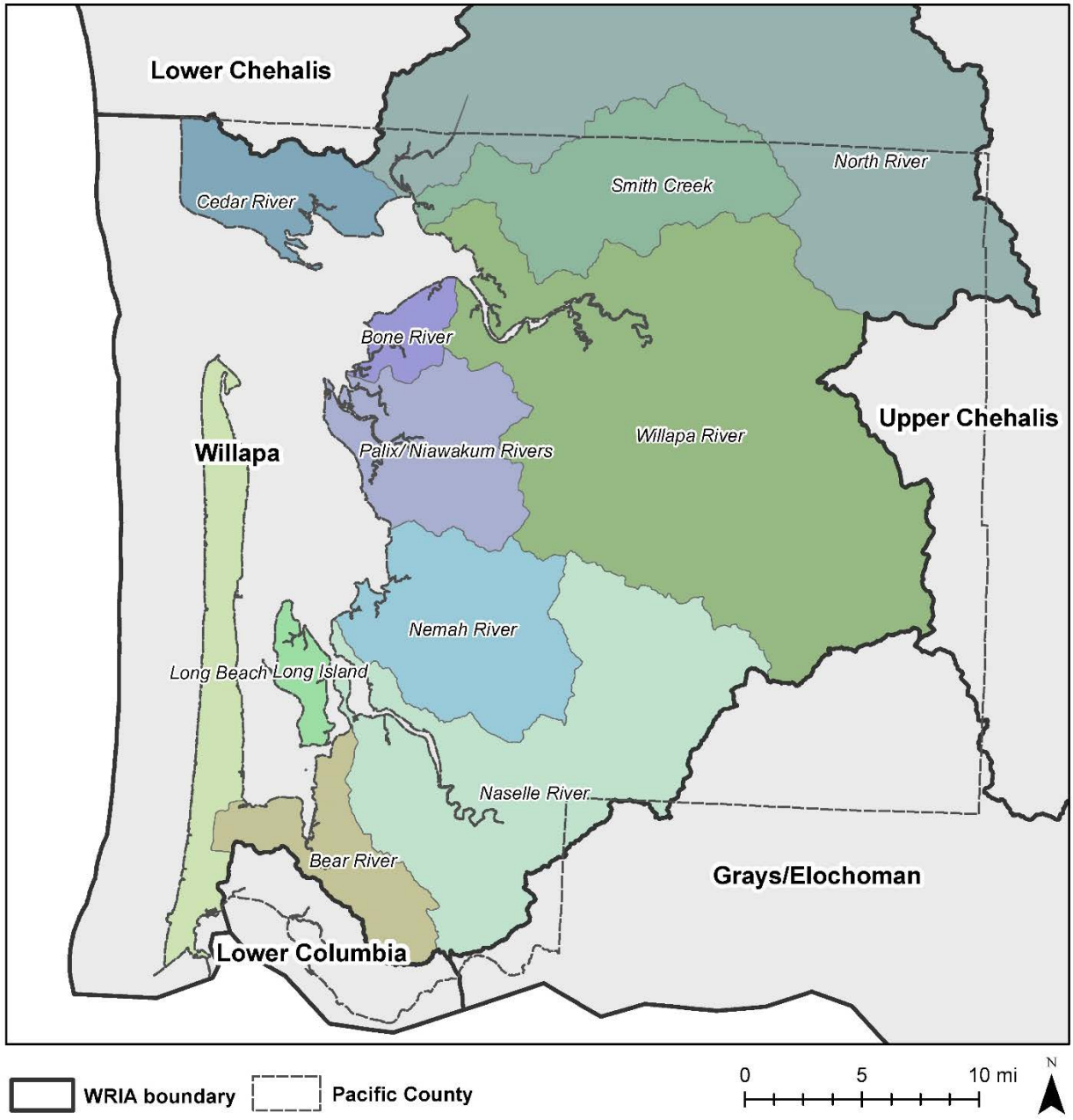

Figure 1-1. Map of watersheds and subbasins in Pacific County. Note that the Lower Columbia Estuary is officially included in WRIA 24.

1.2.2 Roles and Responsibilities

Working Group

> ***The watershed group must include broad representation of key watershed stakeholders and, at a minimum, representatives of agricultural and environmental groups and tribes that agree to participate.***
>
> ***RCW 36.70A.715(3)***

Table 1-1 lists the members of the Pacific County VSP watershed group (Working Group). In forming the Working Group, the intent was to have representation from all major agricultural production types and geographic areas in the county, as well as from environmental organizations, agencies, and tribes. Participation was solicited directly by County and Pacific Conservation District staff, and through introductory meetings targeted at major grower communities in the county. For the purposes of Work Plan development, three subcommittees were formed from Working Group membership to represent and discuss issues specific to dairy and livestock agriculture, cranberry agriculture, and aquaculture.

The Working Group was responsible for developing and agreeing to this Work Plan. This responsibility comprised the following tasks: designating technical assistance providers; identifying outreach and implementation approaches; setting goals and benchmarks; and establishing a monitoring and adaptive management plan. To accomplish these tasks, the Working Group met monthly between June 2016 and June 2017. Minutes from Working Group meetings, including subcommittee meetings, are provided in Appendix M.

Following approval of the Work Plan by the Washington State Conservation Commission, the Working Group will be responsible for developing and administering the Work Plan on an ongoing basis throughout implementation, monitoring, and adaptive management. The Pacific Conservation District will oversee ongoing administration of the Working Group, including maintaining membership that is representative of the county's agricultural community. Any new members will be approved by the Pacific Conservation District Board of Supervisors.

Table 1-1. Working Group membership

Name	Organization/Affiliation
Joe Arndt	Cranberry farmer, Grayland Cranberry Grower Advisory Board
Hugh Barrett	Pacific County landowner and independent natural resources and range land management consultant; Member, Society for Range Management
David Cottrell	D&F Cottrell Cranberries, Ptr and farmer; Commission Chairman, Pacific County Drainage District No. 1.
Warren Cowell	Willapa Grays Harbor Oyster Growers Association (WGHOGA) shellfish farmer
Tucker Glenn	Jubilee Farms (cranberry farmer)
Kevin Hatton	Grayland Cranberry (cranberry farmer)
Megan Martin-Aust	Pacific Conservation District
Kelly McLain	WSDA

Name	Organization/Affiliation
Key McMurry	Key Environmental Solutions, LLC (independent ecosystems management consultant)
Malcom & Ardell McPhail	Cranmac Farms (cranberry farmer)
Mike Nordin	Pacific Conservation District
Kim Patten	WSU Extension
Larissa Pfleeger	Shoalwater Bay Tribe (biologist)
Andy Portmann	Portmann Dairy (dairy operator)
Marcus Reaves	WDFW Habitat Biologist
Jim Rose	Rose Ranch (livestock rancher)
Brian Sheldon	WGHOGA shellfish farmer
Terry Smaciarz	Dairy producer
Stan Smith	Pacific County Planning Commission
Nick Somero	Cattle/hay farmer and timber manager
Jessika Tantisook	Starvation Alley Cranberry Farms (cranberry farmer)
Ken Wiegardt	WGHOGA shellfish farmer

County Government

The Pacific County Department of Community Development is responsible for receiving and administering state VSP funds, including submittal of quarterly reports to the Washington State Conservation Commission. The Work Plan is not formally adopted or approved by County government. The County also maintains the VSP website.

1.2.3 Document Organization and Relationship to State Requirements

The VSP statute specifically outlines the duties of the Working Group relative to development of the Work Plan, and its required elements, as follows: (RCW 36.70A.720(1))

"A watershed group designated by a county… must develop a work plan to protect critical areas while maintaining the viability of agriculture in the watershed. The work plan must include goals and benchmarks for the protection and enhancement of critical areas. In developing and implementing the work plan, the watershed group must:

(a) Review and incorporate applicable water quality, watershed management, farmland protection, and species recovery data and plans;

(b) Seek input from tribes, agencies, and stakeholders;

(c) Develop goals for participation by agricultural operators conducting commercial and noncommercial agricultural activities in the watershed necessary to meet the protection and enhancement benchmarks of the work plan;

(d) Ensure outreach and technical assistance is provided to agricultural operators in the watershed;

(e) Create measurable benchmarks that, within ten years after the receipt of funding, are designed to result in (i) the protection of critical area functions and values and (ii) the enhancement of critical area functions and values through voluntary, incentive-based measures;

(f) Designate the entity or entities that will provide technical assistance;

(g) Work with the entity providing technical assistance to ensure that individual stewardship plans contribute to the goals and benchmarks of the work plan;

(h) Incorporate into the work plan any existing development regulations relied upon to achieve the goals and benchmarks for protection;

(i) Establish baseline monitoring for: (i) Participation activities and implementation of the voluntary stewardship plans and projects; (ii) stewardship activities; and (iii) the effects on critical areas and agriculture relevant to the protection and enhancement benchmarks developed for the watershed;

(j) Conduct periodic evaluations, institute adaptive management, and provide a written report of the status of plans and accomplishments to the county and to the commission within sixty days after the end of each biennium;

(k) Assist state agencies in their monitoring programs; and

(l) Satisfy any other reporting requirements of the program."

Table 1-2 shows the relationship between sections of this Work Plan document and the required elements (a) through (l) listed in the statute.

Table 1-2. Relationship between Work Plan sections and state requirements

Requirements listed in RCW 36.70A.720(1)	Pacific County VSP Work Plan Section(s)
(a) Review and incorporate applicable plans	Section 2.4 Related Watershed Plans Chapter 4 Goals, Benchmarks, and Strategies
(b) Seek input from stakeholders	Section 1.2.2 Working Group
(c) Develop goals for participation to meet protection and enhancement benchmarks	Chapter 4 Goals, Benchmarks, and Strategies Section 6.1.2 Participation
(d) Ensure outreach and technical assistance	Section 6.2 Outreach and Technical Assistance
(e) Create measurable benchmarks for protection and enhancement	Chapter 4 Goals, Benchmarks, and Strategies
(f) Designate technical assistance provider(s)	Section 6.2 Outreach and Technical Assistance
(g) Ensure Individual Stewardship Plans contribute to goals and benchmarks	Section 6.1 Individual Stewardship Plans
(h) Incorporate existing development regulations relied upon for protection	Section 2.2 Relationship to County Regulations Section 2.3 Federal and State Regulations

Requirements listed in RCW 36.70A.720(1)	Pacific County VSP Work Plan Section(s)
(i) Establish baseline monitoring	Chapter 5 Monitoring, Reporting, and Adaptive Management Chapter 3 Baseline Conditions
(j) Perform evaluations, adaptive management, and reporting biennially	Chapter 5 Monitoring, Reporting, and Adaptive Management
(k) Assist state agencies in their monitoring programs	Chapter 5 Monitoring, Reporting, and Adaptive Management
(l) Satisfy any other reporting requirements	Section 5.2 Reporting

2 Planning and Regulatory Context

2.1 Applicability

So long as the County participates in the VSP, regulatory requirements under the County's Critical Areas Ordinance (CAO) (Ordinance No. 180) will not apply to "agricultural activities" in unincorporated areas of the county. County participation in the VSP is defined as developing and implementing a work plan that protects critical areas and maintains agricultural viability under the timeline established by the state.

The VSP applies to agricultural activities where they intersect with critical areas. Agricultural activities include commercial as well as non-commercial operations regardless of scale, and are inclusive of all types of agriculture and aquaculture. The five critical areas defined under the Growth Management Act (RCW 36.70A.030) include fish and wildlife habitat conservation areas, wetlands, geologically hazardous areas, critical aquifer recharge areas, and frequently flooded areas. The definitions of these critical areas in the Growth Management Act and its administering rules (WAC 365-190) and in the Pacific County Code are described in detail in Appendix A. These critical area definitions are summarized below, and critical areas are mapped in Appendix D.

The Growth Management Act (RCW 36.70A) refers to the Shoreline Management Act (RCW 90.58) for the definition of "agricultural activities."

"Agricultural activities" means agricultural uses and practices including, but not limited to: Producing, breeding, or increasing agricultural products; rotating and changing agricultural crops; allowing land used for agricultural activities to lie fallow in which it is plowed and tilled but left unseeded; allowing land used for agricultural activities to lie dormant as a result of adverse agricultural market conditions; allowing land used for agricultural activities to lie dormant because the land is enrolled in a local, state, or federal conservation program, or the land is subject to a conservation easement; conducting agricultural operations; maintaining, repairing, and replacing agricultural facilities, provided that the replacement facility is no closer to the shoreline than the original facility; and maintaining agricultural lands under production or cultivation.

RCW 90.58.065

2.1.1 Fish and Wildlife Habitat Conservation Areas

Fish and wildlife habitat conservation areas are lands and waters that provide habitat to support fish and wildlife species throughout their life stages; these areas include:

- Areas with which endangered, threatened, and sensitive species have a primary association. In Pacific County, this includes estuarine habitats for green sturgeon, eulachon, and marbled murrelet; ocean habitats for a number of fish species and marine mammals, coastal habitats for Oregon silverspot butterfly; shoreline habitat for bald eagle, brown pelican, peregrine falcon; snowy plover, and streaked horned lark; and forested habitat for marbled murrelet, fisher, and northern spotted owl.

- Commercial and recreational shellfish areas.
- Kelp and native eelgrass (*Zostera marina*) beds; herring and smelt spawning areas.
- Naturally occurring ponds under twenty (20) acres and their submerged aquatic beds that provide fish or wildlife habitat.
- Waters of the state, including lakes, rivers, ponds, streams, and salt waters.
- Lakes, ponds, streams, and rivers planted with game fish by a governmental or tribal entity.
- State Natural Area Preserves (NAP), Natural Resource Conservation Areas (NRCA), and State Wildlife Areas. In Pacific County, these include:
    - Bone River NAP
    - Gunpowder Island NAP
    - Niawiakum NAP
    - Willapa Divide NAP
    - Ellsworth Creek NRCA
    - South Nemah NRCA
    - Teal Slough NRCAs
    - Johns River Wildlife Area, including:
        - Oregon Silverspot Recovery Unit
        - Chinook Unit
        - Nemah River Estuary Unit
        - Palix Unit
        - Willapa Wetlands (Potter's Slough) Unit
        - Willapa Estuary (Willapa Slough) Unit
        - Smith Creek-North River Unit

In addition, WAC 365-190-080 directs cities and counties to give special consideration to the conservation or protection measures necessary to preserve or enhance anadromous fisheries.

2.1.2 Wetlands

Wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation adapted for life in saturated soil conditions. Wetlands do not include those artificial wetlands intentionally created from non-wetland sites, including, but not limited to irrigation and drainage ditches and farm ponds (RCW 36.70A.030). Certain wetlands in coastal areas of Pacific County are characterized as interdunal wetlands. The county also supports estuarine, riverine, palustrine, lacustrine, and slope wetlands.

2.1.3 Critical Aquifer Recharge Areas

Aquifer recharge areas are those areas with geologic and hydrologic conditions that promote rapid infiltration of recharge waters to groundwater aquifers. In Pacific County, critical aquifer

recharge areas (CARAs) are identified by areas of rapidly infiltrating soils, sole source aquifers, special protection areas, wellhead protection areas, and groundwater management areas. In Pacific County, CARAs are present along the entirety of the Long Beach (North Beach) Peninsula and along the northern coast. Given the topographic setting and the relatively dense residential development of the Long Beach (North Beach) Peninsula, the aquifer is particularly significant for public water supply.

2.1.4 Frequently Flooded Areas

Frequently flooded areas include "areas of special flood hazard" identified by the Federal Emergency Management Agency (FEMA) and those floodways and associated floodplains delineated by a Pacific County comprehensive flood hazard management plan as being with the 100-year floodplain or having experienced historic flooding. In addition, those areas of periodic inundation within Flood Control Zone District No. 1 on the Long Beach (North Beach) Peninsula, as mapped by the Pacific County Department of Public Works on July 24, 2015 are included as frequently flooded areas. Frequently flooded areas are concentrated along the major rivers in the County and along Willapa Bay and the Pacific Ocean.

2.1.5 Geologically Hazardous Areas

Geologically hazardous areas include areas susceptible to erosion, sliding, earthquake, or other geological events (WAC 365-190-120). In Pacific County, erosion and landslide areas are generally concentrated in the Willapa Hills, and typically associated more with forestry than agricultural uses. Coastal erosion hazard areas are designated in areas subject to coastal wave action, and a coastal erosion hazard is identified at North Cove. Areas of high liquefaction susceptibility extend along major river valleys as well as the Long Beach (North Beach) Peninsula. Tsunami hazard areas also occur along low-lying coastal areas.

2.2 Relationship to County Regulations

2.2.1 Critical Areas Ordinance

The VSP applies only where critical areas and agricultural activities overlap in unincorporated areas of the county. Critical areas are defined under the Washington State Growth Management Act (GMA) and include fish and wildlife habitat conservation areas, wetlands, frequently flooded areas, geologically hazardous areas, and areas with a critical recharging effect on aquifers used for potable water (critical aquifer recharge areas). Specific definitions and criteria for the five critical areas based on the state GMA and Pacific County CAO are provided in Appendix A.

The approach to developing and implementing the VSP differs from the regulatory approach to protecting critical areas under the CAO. Key differences between the CAO and VSP are highlighted in Table 2-1.

Table 2-1. Comparison of characteristics of the Critical Areas Ordinance and Voluntary Stewardship Program

	Critical Areas Ordinance	Voluntary Stewardship Program
Approach	Protective regulatory provisions, such as buffers, and enforcement, applied to individual properties	Voluntary participation in individual stewardship plans to protect critical area functions at the watershed level
Protection Standard	Preserve the functions and values of the natural environment, or safeguard the public from hazards to health and safety (WAC 365-196-830)	Prevent the degradation of functions and values [due to agricultural activities] existing as of July 22, 2011 (RCW 36.70A.703(8)) Maintain agricultural viability (RCW 36.70A.720(1))
Enhancement Standard	None	Improve the processes, structure, and functions, existing as of July 22, 2011, of ecosystems and habitats associated with critical areas (RCW 36.70A.703(4)) Improve long-term viability of agriculture and reduce the conversion of farmland to other uses (RCW 36.70A.700(2)(a))
Scale	Site-by-site basis	Collective, watershed basis
Monitoring	None required	Monitoring required to demonstrate that measurable benchmarks of critical area protection are met. Progress reports are submitted every five years to demonstrate progress.
Adaptive Management	Periodic updates to the critical area ordinance are required based on best available science	Adaptive management required if measureable benchmarks are not met
Responsible Party (Parties)	Pacific County	Pacific County VSP Working Group and Washington Conservation Commission
Other County, State, and Federal Regulations	Continue to apply	Continue to apply

Although the critical areas provisions do not apply to agricultural activities under the VSP, Resource Land provisions in the County's CAO continue to apply. Section 9 of the CAO addresses agricultural lands. These provisions designate Agricultural Lands of Long-Term

Commercial Significance and Agricultural Lands of Local Importance. These designations specifically include land used for aquaculture, cranberry production, and diked tidelands with NRCS soil types 104 and 107. These lands may not be converted to non-agricultural uses. The Agricultural Land provisions also establish required building setbacks for lands adjacent to designated agricultural lands. These setbacks are intended to prevent potential constraints on agricultural practices imposed by adjacent incompatible uses. These provisions continue to apply.

2.2.2 Shoreline Master Program

Shoreline jurisdiction extends 200 feet from the ordinary high water mark (OHWM) of all marine waters, rivers and streams with over 20 cubic feet per second mean annual flow, and lakes and reservoirs greater than 20 acres in area. Shoreline jurisdiction also encompasses wetlands associated with the above-listed waters, as well as floodways, coastal high hazard areas, and the full extent of shoreline buffers on the eastern side of the Long Beach (North Beach) Peninsula. The County's Shoreline Master Program (SMP) (Resolution 2016-036) does not apply to existing or ongoing agricultural activities occurring on agricultural lands or to ongoing aquaculture, including maintenance, harvest, replanting, or changing shellfish culturing techniques or species already cultured in the State of Washington. However, shoreline provisions do apply to new and expanded agriculture and aquaculture activities.

The Pacific County SMP refers to the CAO for the regulation of critical areas and critical area buffers (including shoreline buffers) in shoreline jurisdiction. Therefore, under the VSP, the critical area standards, including shoreline buffers, do not apply to agricultural activities in shoreline jurisdiction. However, all other provisions in the SMP, including those related to agricultural and aquacultural shoreline uses, continue to apply.

2.2.3 Other County Regulations

The VSP does not "limit the authority of a state agency, local government, or landowner to carry out its obligations under any other federal, state, or local law" (RCW 36.70A.702(5)). Outside of the CAO, all applicable local development regulations (for example, County Construction Code) still apply. Local development regulations particularly relevant to agriculture and critical areas include the County Flood Damage Prevention Ordinance and the County's permit procedures for agricultural structures, described further below.

Flood Damage Prevention Ordinance

Frequently flooded areas are defined as critical areas under the GMA; however, the County's CAO refers to the Flood Damage Prevention Ordinance (No. 176) for protection of frequently flooded areas (CAO Section 6.C). All provisions of the Flood Damage Prevention Ordinance continue to apply to agricultural lands within special flood hazard areas, as defined in the ordinance.

Agricultural Structures

Under Pacific County Code, agricultural structures are exempt from the requirement to obtain a building permit. However, new or expanded agricultural structures do require a critical area review. Both the building permit exemption and the critical area review requirement remain in place under VSP.

2.3 Federal and State Regulations

As with local regulations, all state and federal regulations still apply under the VSP. Indeed, one objective of the VSP is to "improve compliance with other laws designed to protect water quality and fish habitat" (RCW 36.70A.700(2)(f)). These provisions provide a regulatory backstop, which can help provide assurances that the voluntary nature of the VSP can effectively protect critical areas. Key federal and state regulations relevant to agriculture and critical areas in Pacific County are described below. A more detailed description of applicable federal, state, and local provisions is provided in Appendix B.

Clean Water Act

Section 402 of the federal Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) Program to regulate point-source discharges of pollutants. The Washington State Department of Ecology (Ecology) is authorized by the EPA to administer NPDES permits. NPDES permits are not required for most agricultural activities, as they are non-point sources of pollutants. However, NPDES permits are required for aquaculture producers using aquatic pesticides, and for discharges from shellfish processing facilities.

Under the NPDES program, a no-discharge permit is required of livestock operations meeting the definition of a Concentrated Animal Feeding Operation (CAFO). The permit requires large-scale livestock operations to implement specific practices to protect groundwater and surface water bodies from manure pollution. Ecology administers and processes CAFO permits, while the Washington State Department of Agriculture (WSDA) inspects permitted facilities and provides technical support.

Section 404 of the Clean Water Act regulates the discharge of dredged or fill material into waters of the U.S., including wetlands. Normal farming practices are generally exempt from Section 404; however, activities that convert a wetland that has not been used for farming into farming use are not exempt. A Nationwide Permit (NWP 34) for cranberry production activities allows for discharges of dredged or fill material for dikes, berms, pumps, water control structures, or leveling of cranberry beds associated with expansion, enhancement, or modification activities at existing cranberry production operations. The cumulative total acreage of disturbance cannot exceed 10 acres of waters of the U.S., and the activity must not result in a net loss of wetland acreage.

The Department of Ecology is designated as the state water pollution control authority for purpose of the federal Clean Water Act (RCW 90.48). State water quality standards for surface water and groundwater are set forth in WAC 173-201A and 173-200, respectively.

Dairy Nutrient Management Act

Under the Washington State Dairy Nutrient Management Act, WSDA administers the Dairy Nutrient Management Program to protect water quality from livestock nutrient discharges. The program requires all licensed cow dairies to develop and implement nutrient management plans, register with WSDA, and participate in a program of regular inspections and compliance.

National Shellfish Sanitation Program

The National Shellfish Sanitation Program is a federal/state cooperative program to promote and improve the sanitation of shellfish produced and sold for human consumption. In Washington State, the Department of Health (DOH) works to ensure that shellfish produced in Washington meets the requirements of the national program so that products can be sold across the country and the world. DOH licenses and regulates companies that commercially harvest and sell shellfish, certifies harvest sites as being safe for shellfish aquaculture, and monitors water quality to ensure the safety of shellfish being harvested for human consumption. If unsafe levels of pollutants or biotoxins are detected, DOH closes shellfish growing areas for harvest.

Pesticides

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) regulates pesticide usage, storage, and disposal to protect human health and the environment. Under the authorization of this act, the EPA has banned the use of certain pesticides and limited the use of others. In addition, the EPA has been directed to engage with state and tribal agencies in the development of pollinator protection plans. WSDA is currently working to initiate the development of a Managed Pollinator Protection Program for Washington State.

At the state level, the Washington Pesticide Control Act and Pesticide Application Act regulate the distribution, disposal, and application of pesticides for the protection of public health. Chemigation and fertigation are regulated under WAC 16-202.

Water Rights

Title 90 of the RCW establishes and regulates water rights. Chapter 90.03 RCW, the Water code, establishes water rights appropriate standards and procedures. Water use is subject to the "first in time, first in right" clause. Chapter 90.44 RCW, Regulation of public groundwaters, extends the application of the water code to groundwater use. Agricultural exceptions to the permit requirement for withdrawals of groundwater include the provision of water for livestock (no gallon per day limit), and the provision of water for industrial purposes, including irrigation (limited to 5,000 gallons per day, with no acre limit).

In addition to regulatory requirements, agricultural producers in the county may be subject to obligations associated with grower cooperatives or certification programs. These obligations typically result in additional protections for human health and the environment, and are discussed in Section 3.2.

2.4 Related Watershed Plans

To leverage existing resources and avoid redundancy with ongoing watershed planning efforts, the Working Group performed a review of existing water quality, watershed management, farmland protection, and species recovery plans, consistent with the requirements of RCW 36.70A.720(1)(a). Pacific County includes portions of four WRIAs; however, agricultural uses are mapped as occurring within WRIA 24 and the Lower Columbia Watershed only. Appendix C, "Related Watershed Management, Species Recovery, Water Quality, and Farmland Protection Plans and Data," provides a detailed summary of watershed-scale issues by key critical area function, including water quality, water quantity, habitat, physical safety, and agricultural viability, as applicable, for WRIA 24 and the Lower Columbia Watershed.

These plans identify major watershed-scale issues related to natural resource functions; factors contributing to the degradation of those functions; and strategies recommended to improve those functions and/or prevent their further degradation. As described further in Section 4.1 of this Work Plan, these issues served as a foundation for building the Work Plan's goals for critical areas protection and enhancement.

3 Baseline Conditions

For the purpose of the VSP, baseline conditions are those conditions occurring on the effective date of VSP legislation, or July 22, 2011 (RCW 36.70A.703(8)). These are the conditions against which future conditions will be evaluated to determine the progress of the Work Plan towards its stated goals and measurable benchmarks for critical areas protection and enhancement. It is important to note that conditions on July 22, 2011 do not necessarily represent ideal or even desirable conditions with respect to critical area functions and values or agricultural viability. In many cases, true ecological baseline conditions far predate that statutory date.[2] Instead, the baseline conditions described in this Work Plan are those conditions, per statute, against which monitoring results will be evaluated.

This chapter describes the baseline conditions of critical areas, agricultural activities, and their intersection in Pacific County. Quantitative summaries are provided where possible. However, in many cases, detailed information dating back to 2011 is not available, and a qualitative assessment is provided. Additional baseline information will be collected during the first biennial monitoring effort.

3.1 Agriculture in Pacific County

3.1.1 Types and Extent of Agricultural Activities

Agricultural activities in Pacific County are geographically concentrated and highly specialized. Just over 10 percent of the county, including aquatic lands, is estimated to be in agricultural production. Looking only at upland acreage, agricultural activities occupy just under three percent of land in the county. Major types of agricultural production include dairy, livestock (including hay and silage), cranberries, shellfish aquaculture, and upland crops such as berries and short-rotation woody crops. The majority of upland agricultural activities are located within the Willapa River valley, along the Long Beach (North Beach) Peninsula, and in the Grayland area along the northern county shoreline. Additional clusters of agricultural activity are located along the Cedar, Palix, Nemah, and Naselle Rivers, and in Tokeland. Aquaculture activities are located throughout Willapa Bay. A map of agriculture in the county is provided in Appendix D.

Table 3-1 summarizes the acres of agricultural land and the number of agricultural landowners in the county by type of agriculture. In total, there are approximately 859 agricultural landowners in Pacific County. This number likely overestimates the actual number of agricultural landowners, as it does not correct for parcels that are owned by the same entity but

[2] For example, the infestation of invasive eelgrass (*Zostera japonica*) in Willapa Bay is not a baseline condition, but began long before 2011 and has degraded thousands of acres of habitat.

listed under slightly different names in the assessor records. Appendix E summarizes the data sources and methods used to produce this summary.

Table 3-1. Summary of agricultural acreage and landowners by type

	Land (acres)	Percent total land (all / upland only)	Landowners	Percent total landowners	Average farm size (acres)
Dairy	1,535	3.3 / 9.2	17	2.0	90.3
Cranberry	3,547	7.5 / 21.2	146	17.0	24.0
Livestock	6,647	14.1 / 39.8	126	14.7	53.2
Crop	5	0.01 / 0.03	1	0.1	5.1
Unknown/other	4,980	10.6 / 29.8	230	26.8	21.5
Aquaculture	30,311[1]	64.5 / NA	339[1]	39.5[1]	89.4[1]
Total	**47,025**		**859**		**54.5**

1. Includes only privately-owned parcels; does not include publicly-owned tidelands leased by growers. An additional 33,990 acres are publicly owned and may be leased by aquaculture producers.

Livestock and Dairy

There are 10 operating commercial dairy farmers and one commercial heifer grower in Pacific County. All but two of these operations are members of the Darigold, Inc. cooperative, which includes over 500 farms throughout the northwest U.S. With an average farm size of 90 acres, dairies are generally larger than other farm types in the county, but are very small relative to the average dairy in Washington State. Most dairy operators farm considerably more acreage than what is owned by the dairy, leasing additional grassland from other property owners. The USDA census of agriculture estimates approximately $4.8 million in annual sales value of milk from cows in the county (USDA 2012).

Figure 3-1. Cattle grazing on Rose Ranch. *Image: Jim Rose.*

The majority of livestock farmers in Pacific County produce beef cattle, with a small number of farms producing laying hens, sheep and lambs, and horses and ponies. Livestock farmers make up approximately 15 percent of all landowners practicing upland agriculture in the county, and own approximately 40 percent of the upland agricultural land in

production. The USDA census of agriculture estimates approximately $2.1 million in annual sales value of cattle and calves in the county (USDA 2012).

Cranberries

Cranberry farms are concentrated in Grayland in the north county and on the southern half of the Long Beach (North Beach) Peninsula in the south county. Farm sizes range from one to 130 acres, with an average farm size of 24 acres. Farms in the Grayland area are more densely clustered, often abutting each other's property lines, while farms on the Peninsula are more dispersed. There are three small certified Organic farms. Cranberry acreage in the county is the highest in the state, and eighth nationwide (USDA 2012). Cranberry production is estimated to be an $8 million industry in the county.

Figure 3-2. Cranberry farming operations in Pacific County. From left to right: wet harvest using a drag boom; a dry harvester; and cranberries coated with ice for frost protection. *Images: Kim Patten, WSU Extension.*

Shellfish Aquaculture

Shellfish aquaculture is the largest agricultural industry in the county, representing almost two thirds of all acreage in production in the county. According to a 2015 analysis by Washington Sea Grant, Pacific County's economy is more dependent on shellfish aquaculture than any other county in the state, with more than one dollar in profit for each pound of shellfish produced, and $510 in annualized profit for each acre under production (Washington Sea Grant 2015). Willapa Bay is the second largest bottom-culture oyster aquaculture region in the state, representing 25 percent of statewide production. Shellfish farmers in the bay primarily produce Pacific oysters (82 percent) and Manila clams (16 percent) (Cascade Economics 2015). Shellfish operations include tidelands as well as uplands used for processing, equipment and gear storage, seeding operations, maintenance, and other supporting activities. Farms are almost all family-owned, ranging in size from small operations that farm relatively small parcels of aquatic lands to large complex operations with thousands of acres of productive land (Cascade Economics 2015). The USDA Census of Agriculture estimated shellfish aquaculture sales of approximately $21 million in 2012 (USDA 2014); however, this number is likely an underestimate due to underreporting, and may be as high as $70 million (WGHOGA 2017).

Figure 3-3. Shellfish aquaculture in Pacific County. Clockwise from top left: Off-bottom oyster farming using flip-bags; mechanical clam harvesting; upland oyster shell piles; and hand harvest of bottom-farmed oysters. *Images: Kim Patten, WSU Extension and Mike Johnson.*

Upland Crops

Crop agriculture in Pacific County is largely forage feed crops (hay), complemented with acreages of orchards, berry patches, and vegetables. Other than forage operations, crop farming operations are generally small; however, the total percentage of agricultural land in crop production in the county is not known.

The county also supports an unknown number of permaculture operations. These operations do not fall into one of the agricultural types described above, but instead may incorporate one or more of them into integrated agricultural systems. The majority of uncategorized agricultural lands, including unidentified croplands, permaculture farms, and others, are located in the north county, with concentrations in the Tokeland and South Bend areas.

3.1.2 Threats to Agricultural Viability

Agriculture in Pacific County is not a growing industry. According to the USDA census of agriculture, the county lost 15 percent of its farms and 16 percent of its farmland between 2007

and 2012 (USDA 2012). It is not known what portion of this loss is due to issues of agricultural viability in the county. However, the agricultural community faces undeniable challenges in maintaining long-term economic viability.

The voluntary critical area protection and enhancement actions implemented through the VSP must not add to these challenges. On the contrary, a goal of the VSP is to maintain and improve long-term agricultural viability and reduce farmland conversions. As such, agricultural viability should be a criterion, or filter, through which critical area protections and enhancements are incorporated into the VSP and the Work Plan. Major threats to the viability of agriculture in the county are summarized below, as identified by the Working Group. This characterization of agricultural viability in the county, and threats to it, informed specific agricultural viability aims and strategies, presented in Chapter 4.

Water

The agricultural community has adapted to the uniquely wet conditions of the county, which include between 90 and 140 inches of rain annually, hundreds of freshwater streams and rivers, and the second largest estuary on the U.S. Pacific Coast. Water plays an essential role in all agricultural activities in the county, and also has the potential to introduce serious threats.

Agricultural operators are held to high water quality standards under state and federal regulations. Pollutants exceeding allowed levels, but coming from non-agricultural sources, can provide a serious threat to agricultural producers. In particular, failing septic and sewer systems, pets, and wildlife all have the potential to contribute fecal coliform pollutants to county waterways. In addition to raising regulatory concerns, these pollutants can lead to shellfish closures with significant financial impacts.

Drainage of county roadways can also degrade water quality and impact farmers. Use of culverts and covered drainage along roadways eliminates the natural opportunity for vegetation in open ditches to filter pollutants. Road maintenance projects, if not coordinated with adjacent agricultural landowners, can increase runoff of pollutants and sediment into existing drainage ditches.

Despite many areas in the county receiving upwards of 100 inches of rainfall annually, the county's Mediterranean climate deprives it of significant precipitation beginning in midsummer and continuing until early fall. If the aquifers serving the irrigation ponds and sumps of cranberry growers in Pacific County are severely depleted during this time, there may not be enough water for irrigation and harvest. Wet cranberry harvesting activities have a critical need for large volumes of water. A recent shift in fruit quality criteria and the planting of early-maturing varieties has led growers to begin wet harvesting in early- to mid-September. In recent years water availability has become increasingly inadequate for these activities, and growers have had to delay harvest well past the time for receiving premium value for their fruit.

Additionally, the public water supply in the South Bend/Raymond area lacks capacity to support the shrimp, fish, and shellfish processing plants in that area, compromising the

sustainability of those operations. Expansion of the public water capacity in that area, through wells or additional water reservoirs, could help ensure the viability of these operations.

Continuity of water rights also presents a challenge due to "use it or lose it" requirements. In many cases, rights permissions need to be updated for current quantity needs. Use of state trusts to protect water rights from relinquishment, as well as long-term water rights planning, could help address this threat.

Climate change introduces uncertainty regarding long-term water quality and quantity concerns. Washington's coastal waters are particularly vulnerable to ocean acidification. Ocean acidification, increase in water temperature, and increase in severity and unpredictability of harmful algal blooms due to climate change could have devastating effects on shellfish aquaculture in Willapa Bay.

Adjacent Land Use

Residential landowners adjacent to agriculture may present issues related to pets, as well as nuisance complaints from noises or odors emanating from the agricultural activity. While farmers are protected under the County's "right-to-farm" rules, conflicts still arise between neighbors. Animal rights activists protesting livestock confinement and/or treatment can threaten agricultural viability through the spread of negative public relations campaigns, which may influence consumer behavior and have political consequences. Both of these threats center on agriculture's reputation, and could be addressed through education and outreach to increase awareness of farming practices and regulations.

Issues may result from incompatible adjacent farming practices. For example, pesticides may spread via air or water from a traditional farm to an organic one. In the case of aquaculture, different culturing methods may interfere with each other through impacts to water circulation or sediment accumulation when located close together. Where cranberry farms are clustered very densely in the Grayland area, unclear property lines and easement agreements can also lead to disputes with neighbors or County authorities. Additionally, inaccurately-aimed spray heads on irrigation and fertigation equipment may deposit unwanted fertilizer or herbicides on neighboring bogs.

Spread of invasive species from adjacent lands is an issue for farms located next to publicly owned state or County lands that may not be adequately managed to control invasive populations. Similarly, abandoned agricultural lands can serve as major sources of invasive weeds and pests.

Regulatory Oversight

Clarity, consistency, and predictability of regulatory oversight is crucial to agricultural viability in the county. Agricultural operators are appropriately held to strict state and federal standards, and often must dedicate significant time and resources to ensuring, documenting, and demonstrating regulatory compliance. However, conflicting and frequently changing guidance from different enforcement agencies can result in excessive regulatory burden. For example,

different interpretations of the legal definition of "agriculture" – and whether that definition includes or excludes aquaculture – can lead to uncertainty for shellfish producers, particularly when shellfish facilities upland from aquaculture tidelands are not protected as agricultural uses.

In addition, a "one size fits all approach" to regulation fails to strike a balance between resource protection and accommodation of variable circumstances and site constraints. For example, strict calendar controls for nutrient application by dairies fails to recognize natural weather variability. An outcome-based approach to regulation would better align with agricultural needs while ensuring resource protection.

Flood Control

Surge wetlands in the county protect agriculture by allowing natural flood events to evenly distribute waters. Loss of these wetlands increases risks of agricultural flood losses.

Cranberry growers in the Grayland area are particularly vulnerable to natural flood events. The Grayland tide gates, which drain excess water from thousands of cranberry-producing acres and protects against saltwater intrusion, must be maintained in proper function and protected from coastal erosion. Sea level rise due to climate change will increase the risk of flooding and saltwater intrusion, threatening the viability of cranberry farming in the county.

Fish and Wildlife Habitat

Agricultural producers operating in both the upland and aquatic environments face losses from wildlife and critical pest species. Deer and elk damage can have significant economic impact on commercial cropland and pastures, as can migratory waterfowl. Shellfish beds in Willapa Bay are threatened by imbalances in burrowing shrimp populations and non-native eelgrass (*Zostera japonica*) establishment. Agricultural producers must have adequate license and solution protocols to control populations of critical pest species and minimize losses.

Decline in pollinator and other beneficial insect populations and associated habitat is also a threat to agricultural production.

Physical and Technical Resources

Continued losses of funding have led to reductions in personnel and programs supporting WSU Extension and the Pacific Conservation District, two major sources of technical assistance for local producers in the county, are a serious threat to agricultural viability.

In addition to technical resources, access to physical resources such as tools, chemicals, and specialty equipment is a limiting factor for producers in the county. The county's relatively small agricultural community does not consistently provide the critical mass needed to ensure adequate stocking by local retailers of important supplies and equipment.

Access to adequate labor and transportation infrastructure also represent limiting factors. Improved road and bridge maintenance, particularly along State Route 6 connecting Pacific

County directly to the Interstate 5 corridor, could help improve the viability of agricultural operations in the county.

Succession Planning

In 2012, the average age of the principal agricultural operator in the county was 59 (USDA 2012). Most farms facing aging ownership do not have formal succession plans in place to ensure the continued operation of the farm in future generations and stewardship of institutional knowledge. A determined effort is needed to facilitate succession planning for Pacific County farms.

3.2 Critical Area Functions

Critical areas and their functions in Pacific County are characterized in a number of documents. The Shoreline Analysis Report for Shorelines in Pacific County (June 2015) summarizes available literature to describe watershed conditions, as well as historical and current ecological functions and processes in Pacific County. The Pacific County Critical Areas and Resource Lands Ordinance Update: Gap Analysis (June 2015) further describes critical area functions and references summaries of best available science. Other references include the 2015 WRIA 24 Lead Entity Manual (WRIA 24 2015), the Washington Coast Sustainable Salmon Plan (Washington Coast Sustainable Salmon Partnership 2013), the Willapa Watershed Assessment (Pacific Conservation District 2008), and the Washington Lower Columbia Salmon Recover and Fish and Wildlife Subbasin Plan (Lower Columbia Fish Recovery Board 2010) (see Appendix C). Appendix F summarizes baseline measurements for select critical area monitoring parameters used as indicators in the VSP monitoring plan (see Chapter 5). Together, these reports, analyses, and data sources characterize the baseline conditions of critical area functions in the county.

Per the VSP statute, protecting critical areas means protecting their functions and values (RCW 36.70A.703(8).

The Work Plan is designed to result in "(i) the protection of critical area functions and values, and (ii) the enhancement of critical area functions and values through voluntary, incentive-based measures" (RCW 36.70A.720(1)(e)).

The key functions associated with the critical areas can be broken into four primary categories. These include: water quality, which is defined by factors including sediment, nutrients, temperature, bacteria, and other contaminants such as metals and chemicals; water quantity, including flow and storage; habitat; and physical safety. Table 3-2 identifies which functions relate to each type of critical area.

Table 3-2. Critical areas and key functions. Shaded areas represent functions associated with each critical area.

Critical Area	Critical Area Functions							
	Water quantity		Water quality				Habitat	Physical Safety
	Flow	Storage	Sediment	Bacteria and Nutrients	Temperature	Contaminants		
Fish and Wildlife Habitat Conservation Areas: Aquatic								
Fish and Wildlife Habitat Conservation Areas: Upland								
Wetlands								
Critical Aquifer Recharge Areas								
Frequently Flooded Areas								
Geologically Hazardous Areas								

3.2.1 Fish and Wildlife Habitat Conservation Areas

Fish and wildlife habitat conservation areas in Pacific County encompass freshwater streams, Willapa Bay, the Pacific Ocean, and upland habitat areas. The functions of these different habitats can be summarized by functions related to water quantity, water quality, and habitat, as shown in Table 3-3.

Table 3-3. Summary of fish and wildlife habitat conservation area functions

	Freshwater	Saltwater	Upland
Water Quantity	Adequate flows are needed throughout the year to allow salmonid access to spawning grounds and maintain water temperatures that support salmonids.	Periodic tidal inundation is necessary to sustain intertidal salt marshes and mud flats. Tidal currents are necessary to support native eelgrass beds and shellfish beds.	Not Applicable

	Freshwater	Saltwater	Upland
Water Quality	Riparian areas reduce erosion by stabilizing stream banks, provide water filtration, and moderate water temperature by providing shade. Temperature, nutrient load, bacterial load, and chemicals all influence water quality conditions that affect sensitive fish species. A balance of sediment load and transport helps to maintain complex channel form and viable salmon redds.	Tidal marshes provide nutrient and contaminant uptake. Native eelgrass bed distribution is affected by water clarity. Shellfish beds are important for cycling nutrients, stabilizing substrates, and enhancing water quality (filtering and retention). Pathogens can present health hazards from shellfish consumption.	Not Applicable
Habitat	Instream habitat functions are characterized by a diversity of pools and riffles, and this diversity is often improved by the presence of woody debris. Riparian areas help improve instream habitat. Free access to spawning and rearing areas is critical to provide habitat opportunity.	Tidal marshes support rearing salmon. Native eelgrass beds provide nursery habitat for juvenile salmon and other fish and invertebrates. Shellfish beds provide nutrient cycling, substrate stabilization and habitat structure, and food for a wide variety of marine invertebrates, birds, fish, and mammals, as well as humans.	Habitat functions are associated with vegetation communities. Snowy plovers and streaked horned larks require patchy sand dune vegetation communities; marbled murrelet, fisher, and northern spotted owl rely on mature forests. Typically, these habitats have minimal interactions with agriculture.

3.2.2 Wetlands

As with fish and wildlife habitat conservation areas, wetland functions can be separated into water quantity (recharge and discharge), water quality (filtration and assimilation of nutrients and contaminants), and habitat (Sheldon et al. 2005). Each of these functions is summarized in Table 3-4.

Table 3-4. Summary of wetland functions

Water Quantity	Wetlands store water, recharge groundwater, and discharge groundwater into streams. Periodic tidal inundation is necessary to sustain intertidal salt marshes.
Water Quality	Periodic inundation allows for effective biofiltration of nutrients, bacteria, and other chemicals; moderation of temperature; and reduced siltation and erosion. Tidal marshes provide nutrient and contaminant uptake.
Habitat	Wetlands support a range of birds, mammals, and amphibians. Tidal marshes support rearing salmon. Upland areas surrounding wetlands often support a portion of the lifecycle of wetland dependent species.

3.2.3 Critical Aquifer Recharge Areas

As noted in Chapter 2, CARAs are concentrated in the coastal dune areas of the county, which exhibit very rapid infiltration rates (Blakemore 1995). These coastal CARAs are not only vulnerable to contamination because of their rapid infiltration rates, but they are also vulnerable to saltwater intrusion. Critical area functions of CARAs are summarized in Table 3-5.

Table 3-5. Summary of critical aquifer recharge area functions

Water Quantity	Rapid infiltration of rainwater recharges the aquifer. Adequate groundwater levels are necessary to protect against saltwater intrusion.
Water Quality	CARAs are designated and protected because of their vulnerability to contamination. Clean water supplies are critical for drinking water sources. Nutrient contamination is a particular concern because of serious health implications.

3.2.4 Frequently Flooded Areas

Frequently flooded areas are important for the temporary storage of floodwaters. Deep and high velocity floodwaters pose safety concerns when they overlap with certain land uses. The key functions of frequently flooded areas are summarized in Table 3-6.

Table 3-6. Summary of frequently flooded area functions

Water Quantity	Floodplains provide overbank storage; this helps reduce peak flows and contributes to groundwater recharge.
Habitat	Many aquatic species, including salmon species, rely on off–channel areas of floodplains for rearing. Floodplains provide pulses of organic detritus and insect prey following flood events.
Physical Safety	Fast moving or rapidly rising floodwaters present risks to structures and people. Where floodwaters spread across floodplains, velocities decrease and peak flows are reduced downstream.

3.2.5 Geologically Hazardous Areas

Geologically hazardous areas include areas susceptible to landslides, erosion, earthquakes, liquefaction, mine hazards, and tsunami inundation. As described in WAC 365-190-120, geologically hazardous areas pose a threat to the health and safety of citizens when incompatible uses are sited in areas of significant hazard. As such, the primary function associated with protection of geologically hazardous areas is related to ensuring physical safety. Protection of landslide hazard areas and erosion hazard areas also serves an important water quality function, as activities in these areas may be more prone to significant erosion.

Table 3-7. Summary of geologically hazardous area functions

Water Quality	Landslide hazard areas and erosion hazard areas serve as potentially significant sources of sediment to surface waters. Avoiding development in these areas may protect against adverse impacts to water quality.
Physical Safety	Geologically hazardous areas pose a threat to the health and safety of citizens when incompatible uses are sited in areas of significant hazard.

3.3 Relationship between Agriculture and Critical Areas

3.3.1 Geographic Intersection of Critical Areas and Agriculture

Table 3-8 presents a summary of the amount of intersection between agriculture and critical areas in Pacific County. Appendix D presents a series of maps showing the areas of intersection between agriculture and critical areas in the county. Appendix E summarizes the data sources and methods used to produce the maps and associated summary. As shown in the table, essentially all agricultural producers in the county have one or more critical area on their property. Waters of the state are present on the vast majority of both upland agriculture and aquaculture properties. The majority of upland agricultural properties also intersect with mapped wetlands, liquefaction zones, erosion hazard areas, or tsunami hazard areas, while the majority of aquaculture properties also intersect with fish and wildlife habitat conservation areas and frequently flooded areas.

Table 3-8. Summary of intersections between critical areas and agriculture

Type of Critical Area	Upland Agriculture				Aquaculture[1]			
	No. parcels	% parcels	Total acres	% acres	No. parcels	% parcels	Total acres	% acres
Fish and wildlife habitat conservation areas – waters of the state	788	66	14,793	89	1,207	96	30,276	100
Fish and wildlife habitat conservation areas – excluding waters of the state	209	17	5,482	33	1,214	97	30,225	100
Wetlands	800	65	13,170	79	255	20	3,434	11

Type of Critical Area	Upland Agriculture				Aquaculture[1]			
	No. parcels	% parcels	Total acres	% acres	No. parcels	% parcels	Total acres	% acres
Geologically hazardous areas	1,145	95	16,470	99	375	30	4,575	15
Critical aquifer recharge areas	555	46	5,891	35	151	12	1,520	5
Frequently flooded areas	295	24	6,776	41	1,244	99	30,274	100
None	35	3	56	0.3	0	0	0	0
	Total parcels: 1,207		**Total acres: 16,714**		**Total parcels: 1,255**		**Total acres: 30,311**	

1. Includes only privately-owned parcels; does not include publicly-owned tidelands leased by growers.

3.3.2 Functional Linkages between Critical Areas and Agriculture

As stated in Section 3.1.2, agriculture in Pacific County is not a growing industry. Accordingly, conversion of non-agricultural land to new agricultural acreage that intersects with critical areas is not a major concern in the county. Where agricultural activities and critical areas do intersect, the key interactions between them, and the key issues resulting from those interactions, are in terms of critical area **functions**. Certain agricultural activities have the potential to degrade critical area functions, while others may benefit functions (see Section 3.4). Agricultural activities may also rely on critical area functions, such as water quality or in-stream flow, to support viable production.

The following sections briefly describe the relationships between agricultural activities and critical area functions in Pacific County. Understanding these relationships provides a foundation for identifying priority critical area and agricultural viability issues that the agricultural community can and should address through the VSP. Non-agricultural activities such as industrial development, residential development, forest practices, natural disasters, and climate change also affect critical area functions; however, these activities are outside of the scope of the VSP and are not addressed in this Work Plan.

Agricultural Activities and Water Quality

Many agricultural activities in Pacific County rely on clean water sources. Willapa Bay is widely recognized for its clean water, which supports its healthy and productive oyster-growing conditions. Commercial shellfish beds are recognized as an agricultural activity under the Pacific VSP and they are also recognized as a critical area, and as noted in Table 3-3, shellfish beds provide water quality filtration functions. Animal wastes, both from livestock and from pets and wildlife, and shellfish processing processes can harbor and transmit biological pathogens to surface waters. The presence of biological pathogens can result in shellfish consumption restrictions. Pathogens in surface waters also affect cranberry growers, who must monitor harvests to ensure that they meet standards for consumption.

Cranberry growers may use chemigation and fertigation methods to apply chemicals and fertilizer, respectively, to crops by means of irrigation water. Over the past decades, cranberry growers have developed several approaches to reduce pesticides and nutrients reaching drainage canals. Livestock waste provides another source of nutrients, which is managed through manure lagoons, rotational grazing, and stocking rates, among other practices. Excess nutrient loads contribute to eutrophication, which can result in excess algal growth and low dissolved oxygen levels. These conditions can lead to fish and invertebrate mortality or avoidance of the low oxygenated areas.

Soil quality is critical for productive crops and livestock. Disturbed soils are more likely to erode, particularly in areas of steep slopes and in wet weather conditions. Eroding sediment can enter streams and adversely affect salmonid habitat by filling pools necessary for migrating and rearing, embedding spawning gravels, reducing gravel permeability, and increasing turbidity.

Agricultural activities are often closely tied to water sources and drainage pathways. Where upland agriculture extends to the edge of these aquatic areas, it may be associated with removal or degradation of riparian vegetation. Intact riparian vegetation enhances a number of water quality functions, including shading and moderation of water temperatures and filtration of sediment and nutrients. It is significant to recognize that much of Pacific County's agricultural production is closely tied to estuarine areas. Cranberries are farmed in coastal wetlands, and flooded fields are drained directly to drainage ditches that drain to Willapa Bay. Most livestock and dairy operations are located on diked farmlands along Willapa Bay and the lower Willapa River. Aquaculture production encompasses shellfish beds, and may overlap both native and non-native eelgrass beds in estuarine areas. Given these unique features of the county's agricultural activities, riparian areas play a lesser role in protecting water quality from agricultural impacts in Pacific County compared to other regions in Washington State.

Finally, operation of machinery near or in water has the potential to result in oil spills or leaks of toxic contaminants.

Agricultural Activities and Water Quantity

Most agricultural activities rely on water sources for irrigation or watering of livestock. Water sources may come from surface waters, such as streams or ditches, or from groundwater wells. For example, cranberry growers may draw from surface water and supplement from groundwater wells for irrigation or flood harvest. Where cranberry-growing practices maintain surface water within bogs, groundwater storage may be increased. Alternatively, groundwater consumption from CARAs for cranberry irrigation could contribute to the risk of saltwater intrusion to the aquifer if freshwater levels are low. However, given the high volume of annual precipitation, surface flows and groundwater supplies are generally not limiting. The County monitors groundwater levels in coastal aquifers to identify areas of salinity intrusion, elevated nutrients, and groundwater depletion. This monitoring has not identified significant concerns to date.

Given the wet climate of Pacific County, most agricultural activities also rely on surface water drainages (either streams or ditches) to maintain farmable dry lands and pasture. Where ditches are wholly artificial, they are not considered critical areas; however, even ditches that have been heavily altered are considered critical areas if they historically carried flow. Ditched systems are typically maintained to quickly and efficiently convey water away from farmed lands. Quick conveyance can reduce groundwater recharge and increase peak flows in receiving waters.

Agricultural dikes, levees, and tidegates are common in Pacific County to maintain productive farmlands adjacent to estuarine waters and to protect farms from flooding. These features restrict tidal hydrology from historic estuarine wetlands; freshwater wetlands may persist instead. Although new agricultural levees are generally not being created, several projects have been completed in recent years to modify or remove historic levees to restore estuarine wetland functions.

Agricultural Activities and Habitat

Clearing of habitat areas or features associated with sensitive species can eliminate or degrade habitat functions, including foraging, nesting, or migration. In Pacific County, most sensitive species habitats are concentrated in aquatic areas, wetlands, and riparian areas.

As described above, agricultural activities often rely on maintenance of drainage ditches to manage drainage and maintain farmable uplands. Where drainage ditches are modified from natural stream channels, drainage ditch maintenance can also result in the simplification of instream habitat. Instream habitat can also be affected by fish barriers created by culverts, bridges, or dams.

Shellfish beds are affected by habitat changes associated with invasive and non-native species. A non-native eelgrass, *Zostera japonica,* is a concern for commercial shellfish production, as it limits the growth, productivity, harvest efficiency, and quality of Manila clams (*Ruditapes philippinarum*) (Patten 2014). *Z. japonica* impacts revenue from aquaculture practices where it displaces existing cultivated beds, increases costs for management, or reduces yields (Fisher et al. 2011). Although native, populations of burrowing shrimp (*Neotrypaea californiensis* and *Upogebia pugettensis*) also adversely affect commercial shellfish bed production. To date, pesticide applications provide the only option to control these pest species. Some growers have moved to off-bottom culture since off-bottom practices are less affected by these species. Both on- and off-bottom culture involve some level of sediment or in-water disturbance that alters natural habitat functions.

Agricultural Activities and Physical Safety

In Pacific County, agricultural activities are concentrated in floodplain valleys and coastal areas. Development in the floodplain is prone to risks associated with flooding. Along the Willapa River in the Menlo Valley, many farms are affected by river channel migration as it meanders through fields and near buildings. Where new flood protection facilities, including dikes or levees, reduce floodplain storage, flood risks may be transferred to downstream areas. In Pacific

County, new agricultural dikes or levees are not anticipated; however, repair and maintenance of levees and dikes will continue.

Coastal erosion is noted as a risk to agricultural viability where loss of natural protective dunes and beaches can result in saltwater intrusion into crop areas. This is of special concern to Grayland-area cranberry growers whose bog lands risk saltwater intrusion should channel erosion along the north shore of Willapa Bay continue unabated. A building and development moratorium has been imposed by the County along the North Cove shoreline to acknowledge the threat of continued coastal erosion, and shoreline protection measures have been proposed for the area.

With the exception of areas susceptible to liquefaction or coastal erosion, agricultural activities are not commonly associated with geologically hazardous areas in Pacific County. Where agricultural activities do intersect with steep or unstable slopes, activities that result in significant clearing on or near the slope may contribute to soil destabilization.

3.4 Changes to Baseline Conditions

In addition to the complex relationships described above, agricultural activities also have the potential to benefit key critical area functions. Beneficial effects may occur through normal agricultural operations (e.g. management of invasive vegetation in upland crops, or water filtration and habitat formation in shellfish beds); through implementation of stewardship activities in agricultural operations; or through completion of direct restoration and conservation projects on agricultural lands.

Beneficial effects to critical areas resulting from normal agricultural operations can be difficult to quantify. The following sections summarize stewardship activities and restoration, enhancement, and conservation projects implemented on agricultural lands since 2011. Stewardship activities and conservation projects help maintain, or protect, critical area functions relative to baseline conditions, while restoration and enhancement projects improve critical area functions relative to baseline conditions.

3.4.1 Typical Stewardship Activities

Stewardship activities are the primary implementation tools of the VSP. The Work Plan identifies stewardship activities for individual agricultural producers to implement voluntarily in order to meet the watershed-scale goals and benchmarks for critical areas protection (see Chapter 4). These stewardship activities have been selected for their relevance to agriculture in Pacific County, and many agricultural producers in the county already implement one or more of them, either voluntarily or as a required element of a certification program or growers collective. Below are descriptions of some of the typical stewardship activities implemented by agricultural producers in Pacific County. Baseline stewardship activity implementation levels will be collected from individual agricultural producers via Individual Stewardship Plans (ISPs) (see Chapter 5).

Livestock and Dairy

As described in Chapter 2, state law requires that all licensed cow dairies develop and implement nutrient management plans and participate in a program of regular inspections. The plans are intended to specify use of farm nutrients (manure) in a way that maximizes forage and crop growth, protects soil and water resources, and increases farm efficiency and productivity.

Stewardship activities for livestock farmers largely focus on sustainable use of pasture. Considerations include stocking rates relative to pasture loading; rotational grazing depending on climate and forage growth and condition; using fences and/or riparian buffers to keep livestock away from critical areas; and managing transition zones, or buffers, between confinement and forage areas. Livestock farmers also recognize the importance of managing vegetation adjacent to waterways in order to protect bank integrity and prevent erosion.

Figure 3-4. Examples of stewardship activities for livestock farming. Clockwise from top left: Concrete pad to protect heavy traffic areas around water sources; gravel- and shell-lined confinement areas allow drainage, protection from elk, and easy maintenance; pasture rotation to ensure forage recovery; and fencing of waterway access while providing a more convenient water source nearby. *Images: Jim Rose.*

Shellfish Aquaculture

Shellfish farmers depend upon the health of the estuaries in which they farm, and as a result, play a critical stewardship role in protecting and restoring water quality and habitat. The Pacific

Coast Shellfish Growers Association developed the Environmental Codes of Practice (ECOP) in 2011 to identify shellfish farming practices that affect the estuarine environment in order to minimize adverse environmental effects and maximize beneficial effects. The ECOP recommends sound and sustainable environmental practices that enhance the marine environment while ensuring viable productivity. Practices address farm siting, waste management, various culturing methods, processing and storage, and many other issues.

The Willapa Bay-Grays Harbor Oyster Growers Association (WGHOGA) developed a set of best management practices (BMPs) specific to off-bottom aquaculture in the Willapa Bay and Grays Harbor growing regions. These BMPs build upon and supplement the ECOP guidelines to create a set of more specific, locally relevant practices and stewardship activities for off-bottom growers. The group adopted the BMPs on April 4th, 2017.

Cranberries

As producers of fresh fruit, cranberry growers are subject to strict standards in order to ensure consumer safety. Additionally, many cranberry growers adhere to USDA CranGap standards, a subset of the Global Good Agricultural Practices (GAP) standards. CranGap standards address waste and pollution management, pesticide and fertilizer application, soil erosion control, water usage, and many other issues. Typical practices include drainage ditch covering using crib and cover and other methods, and installation and maintenance of efficient irrigation equipment.

Figure 3-5. Examples of stewardship activities for cranberry farming. Left: Cribbed drainage ditch with new planting. Right: New bed construction with cover and cribbing. *Images: Kim Patten, WSU Extension.*

Upland Crops

Stewardship activities relevant to upland crop agriculture focus on management of runoff, including loading of pesticides, nutrients, and sediment; and management of water usage through irrigation efficiencies and capture. Farmers may use contouring, planting of field borders, or other physical controls to their lands to manage runoff. Integrated pest management practices can also be used to minimize use of pesticides.

3.4.2 USDA Practices and Programs

The Pacific Conservation District works with agricultural producers to help those producers implement NRCS stewardship practices on their land and enroll in USDA cost-share and other incentive programs, where applicable. These activities may be incorporated and documented in a formal conservation plan, or farm plan, developed jointly by the agricultural producer and the Conservation District. Since 2011, 12 agricultural producers, including nine dairies, have developed farm plans with the Conservation District.

Table 3-9 summarizes NRCS stewardship practices implemented in the county with the assistance of the Conservation District since 2011. Completion of ISPs with individual agricultural operators will supplement this information to provide a more complete assessment of USDA practices and programs in use by Pacific County producers before and after the 2011 baseline (see Chapter 6).

Table 3-9. NRCS stewardship practices implemented in the Willapa watershed, 2011-2016[1]

Stewardship Practice	NRCS Code	Amount	Number of Producers	Year(s) Implemented	Critical Area Functions
Livestock Exclusion Fencing	382	14,700 feet	6	2012-2015	Water quality (bacteria and nutrients, sediment), habitat
Integrated Pest Management	595	292 acres	5	2015	Water quality (pollutants), habitat
Watering Facilities	614	4 units	3	2015	Water quality (bacteria and nutrients, sediment), habitat
Chemigation (Pumping Plant)	533	73 units/ 652 acres	36	2015-2016	Water quantity (flow)
Crib and Cover	554	7,345 feet/ 652 acres	36	2015-2016	Water quality (pollutants)

1. Seven additional enrollments are pending or proposed for 2017-2018 implementation.

The Conservation Reserve Enhancement Program (CREP) is a USDA Farm Service Agency program that pays agricultural landowners annual rent to remove environmentally sensitive lands from agricultural production, and to plant vegetation on those lands that will improve environmental health and quality. CREP targets high-priority conservation issues including water quality, soil erosion, and wildlife habitat. Since 2011, the Conservation District has helped seven agricultural producers enroll in CREP. As of 2017, an additional seven enrollments were either pending or planned for the next year. Table 3-10 summarizes the amount of land enrolled in CREP since 2011.

Table 3-10. Enrollment in Conservation Reserve Enhancement Program, 2011-2017

Year Implemented	Area Planted (acres)	Width of Buffer (feet)	Stream Length Enrolled (feet)
2015	0.93	49	823
2014	3.3	180	1,045
2014	14	180	3,900
2016	34.26	180	8,842
2014	5.3	135	1,750
2016	0.79	35	955
Total	***64.74***	***N/A***	***18,847***

Figure 3-6. Two examples of riparian planting as part of the Conservation Reserve Enhancement Program (CREP). *Images: Mike Johnson.*

3.4.3 Restoration, Enhancement, and Conservation Projects

Many agencies and non-governmental organizations have completed restoration and conservation projects on agricultural lands that contribute to critical area functions in the Willapa watershed. Table 3-11 summarizes projects in the watershed completed since 2011 on agricultural lands. Restoration and enhancement projects improve the quality of critical area functions, while acquisition and conservation projects focus on protection and preservation of high-quality habitat.

Table 3-11. Restoration, enhancement, and acquisition projects in the Willapa watershed, 2011-2017

Year Completed	Project	Metric	Critical Area Functions
2014	McCaslin-Robinson Creek Culvert Barrier Removal	1.64 miles	Water quality, water quantity, habitat
2014	McCaslin-Robinson Creek Stream Bank and Channel Restoration	0.35 miles	Water quality, habitat
2016	Fred Johnson Culvert Replacement, Stream Channel Restoration, and Riparian Planting	4 miles	Water quality, habitat
2017	Lower Forks Creek Stream Bank and Channel Restoration	22 miles	Water quality, habitat

4 Goals, Benchmarks, and Strategies

This chapter defines the goals, benchmarks, and strategies for critical areas protection and enhancement, and identifies aims and associated strategies for the maintenance and enhancement of agricultural viability.

4.1 Approach

Chapter 3 summarized the complex relationships between agricultural activities and critical areas in Pacific County, identifying key issues in terms of the critical area functions of water quantity, water quality, habitat, and physical safety. The focus of this Work Plan is therefore on the strategies agricultural producers can employ to address effects to those critical area functions while maintaining agricultural viability; and on goals and benchmarks built around those strategies. This approach aligns with the focus of the statute on critical area functions and values (RCW 36.70A.703(4), .703(8), .710(7), .720(1)(e), .735(1)(b), .755(1), .755(2)).

The statute requires that the Work Plan create measurable benchmarks designed to result in the protection and enhancement of critical area functions and values (RCW 36.70A.720(1)(e)).

According to the statute, "'Protect' or 'protecting' means to prevent the degradation of functions and values existing as of July 22, 2011;" and "'Enhance' or 'enhancement' means to improve the processes, structure, and functions existing, as of July 22, 2011, of ecosystems and habitats associated with critical areas" (RCW 36.70A.705(8) and (4), respectively).

4.1.1 Critical Area Goals

In developing the Work Plan, the watershed-scale issues identified in Appendix C served as a foundation for building the goals for critical areas protection and enhancement presented in this chapter. Using an understanding of baseline conditions for agriculture, critical areas, and the relationships between them (see Chapter 3), issues were selected for their relevance and importance not only to the protection and enhancement of critical area functions and values in the county, but also to existing agricultural activities in the county. These issues were then refined and supplemented by the Working Group. Goals relate directly to key critical area functions.

4.1.2 Benchmarks

For each function-based critical area goal, one or more benchmarks serve as measurable standards to indicate whether the VSP achieves protection or enhancement of that function over time. Protection benchmarks indicate whether functions are maintained over time relative to the 2011 baseline, and enhancement benchmarks indicate whether functions have improved since 2011. Each benchmark is associated with one or more critical areas depending on the specific critical area functions and agricultural impacts it addresses.

Both protection and enhancement benchmarks measure agricultural effects on critical area functions. Protection benchmarks focus on avoiding increasing negative impacts to critical areas

from agricultural activities, while enhancement benchmarks focus on either reducing negative impacts or increasing positive effects to critical areas from agricultural activities.

Associated Agricultural Viability Aims

Per the VSP statute, measurable benchmarks are not required for agricultural viability, and trends in agricultural viability over time cannot determine the success or failure of the VSP. However, implementation of the critical area goals, benchmarks, and strategies in the Work Plan should also maintain and enhance agricultural viability. Thus for each critical area benchmark, there is one or more associated agricultural viability aim(s) identified. Additional agricultural viability aims not directly related to critical areas are summarized in Section 4.6.

4.1.3 Strategies and Stewardship Activities

The Working Group identified one or more strategies to address each of the VSP benchmarks for protection and enhancement of water quality, water quantity, habitat, and physical safety. Similar to the development of critical area goals, the strategies summarized from related plans in Appendix C served as a foundation for the strategies presented in this chapter. Strategies were selected for their relevance and importance not only to the protection and enhancement of critical areas in the county, but also to existing agricultural activities in the county. These strategies were then refined and supplemented by the Working Group.

Strategies may be applicable to all agricultural sectors or they may apply to only one or a few types of agriculture. Some strategies may be "programmatic," or representative of broader, longer-term program objectives rather than short term results. To the extent possible, strategies align with existing regulatory requirements and certification program requirements, so that agricultural producers subject to such requirements may appropriately capture their efforts to protect and enhance critical areas as part of the VSP.

Appendix G, "Strategies and Stewardship Activities," lists potential stewardship activities that could be implemented by agricultural producers for each strategy. These activities have been selected from established sources of agricultural best management practices, such as the NRCS Field Office Technical Guide, the Global GAP Certification for Washington State Cranberry Producers, or the Pacific Coast Shellfish Growers Association Environmental Code of Practice. Each source uses a body of scientific data and understanding to link best management practices to specific, desired environmental outcomes. A description of each source is provided in Appendix G.

Similar to strategies, stewardship activities may be applicable to all agricultural sectors, or may only apply to one or a few types of agriculture. These activities are intended as guidance for agricultural producers, and do not provide a comprehensive list of actions an agricultural producer could take to implement a given priority strategy. Taken together, the priority strategies and stewardship activities are intended to help agricultural producers achieve the Work Plan's stated goals for protection and enhancement of critical areas.

Pacific County's approach to selecting strategies and stewardship activities aligns with the statutory intent of the VSP to "(d) Leverage existing resources by relying upon existing work and plans in counties and local watersheds, as well as existing state and federal programs to the maximum extent practicable to achieve program goals; and (f) Improve compliance with other laws designed to protect water quality and fish habitat" (RCW 36.70A.700(2)).

Additionally the statute directs the Working Group, in developing stewardship practices to implement the Work Plan, to "Administer the program in a manner that allows participants to be eligible for public or private environmental protection and enhancement incentives while protecting and enhancing critical area functions and values" (RCW 36.70A.755(2)).

4.2 Water Quality

The VSP goal for the water quality functions of critical areas in Pacific County is to **maintain or enhance water quality functions of surface water and groundwater in wetlands, fish and wildlife habitat conservation areas, and critical aquifer recharge areas**. Protection and enhancement benchmarks for water quality, associated agricultural viability aims, and strategies are summarized in Table 4-1.

Table 4-1. Benchmarks and strategies for protection and enhancement of water quality functions

Benchmark ID	Benchmark	Associated Critical Area(s)[1]	Associated Agricultural Viability Aim(s)	Strategies	Strategy Type
WQl-1	**PROTECT: *Avoid increasing*** agricultural contributions to fecal coliform bacteria and nutrient loading to surface waters, wetlands, and critical aquifer recharge areas **ENHANCE: *Reduce*** agricultural contributions to fecal coliform bacteria and nutrient loading to surface waters, wetlands, and critical aquifer recharge areas	FWHCAs – Aquatic, Wetlands, CARAs	Facilitate regulatory certainty by ensuring operations meet water quality standards, and reduce areas of shellfish closures	1.1 Advocate changes to County management of septic and sewer outputs into water bodies	Programmatic
				1.2 Identify source(s) (animal species) of fecal coliform pollution	
				1.3 Monitor for failed septic systems and/or direct detection of septic flows	
				1.4 Implement stewardship practices for animal waste management	Livestock and Dairy
				1.5 Install/maintain off-stream watering and barriers (vegetation, fencing, berms) to discourage livestock from entering streams	
				1.6 Avoid overstocking and implement rotational grazing	
				1.7 Ensure compliance with NPDES permitting of processing facilities	Aquaculture
WQl-2	**PROTECT: *Avoid increasing*** agricultural contributions to known surface water and groundwater quality impairments by pesticides	FWHCAs – Aquatic, Wetlands, CARAs	Maintain or reduce loading on agricultural lands from adjacent sources	2.1 Implement integrated pest management (IPM) and best practices for pesticide application	All
				2.2 Implement proper storage and disposal of pesticides, including abandoned storage depots	

Benchmark ID	Benchmark	Associated Critical Area(s)[1]	Associated Agricultural Viability Aim(s)	Strategies	Strategy Type
	considered by EPA to be an environmental risk **ENHANCE: *Reduce*** agricultural contributions to known surface water and groundwater quality impairments by pesticides considered by EPA to be an environmental risk			2.3 Ensure strict compliance with WSDA mandates (new RCWs and WACs) regarding application of pesticides and fertilizers	
				2.4 Implement stewardship practices to manage agricultural runoff and leaching	
				2.5. Ensure compliance with NPDES permit requirements for WSDA-approved pesticide application on marine lands, as applicable	Aquaculture
				2.6 Increase coordination between adjacent incompatible farming practices	Programmatic
				2.7 Advocate coordination with County drainage projects	
				2.8 Provide instructional presentations (2-3 per year) on use of organophosphates and proper pesticide application methods	
				2.9 Perform annual chemigation system checks	Cranberry
				2.10 Implement stewardship practices to reduce nutrient, pathogen, and/or pesticide transfer to drainage	
				2.11 Develop fertilization plans to minimize nitrogen quantities	
WQI-3	**PROTECT: *Avoid increasing*** agricultural contributions	FWHCAs – Aquatic	Maintain or improve soil quality	3.1 Implement stewardship practices to manage agricultural runoff	All

Benchmark ID	Benchmark	Associated Critical Area(s)[1]	Associated Agricultural Viability Aim(s)	Strategies	Strategy Type
	to the transport of fine sediment in runoff to surface waters **ENHANCE: *Reduce*** agricultural contributions to the transport of fine sediment in runoff to surface waters			3.2 Implement road improvement projects	
				3.3 Implement stream-crossing improvement projects	Livestock and Dairy
				3.4 Install/maintain off-stream watering and barriers (vegetation, fencing, berms), to discourage livestock from entering streams	
				3.5 Avoid overstocking and implement rotational grazing	
WQl-4	**PROTECT: *Maintain*** preparedness for emergency spill response to avoid contamination of surface and groundwater **ENHANCE: *Improve*** preparedness for emergency spill response to avoid contamination of surface and groundwater	FWHCAs – Aquatic, Wetlands, CARAs	Improve preparedness for emergency spill response on farms, and improve response to out-of-area oil spills	4.1 Practice spill prevention measures, such as secondary containment	All
				4.2 Implement emergency protocols, including booms and protection for tide-gate defenses	
				4.3 Protect against contamination from flooding events	
				4.4 Advocate for increased Coast Guard and/or Emergency Management capabilities	Programmatic

1. FWHCAs = Fish and wildlife habitat conservation areas; CARAs = Critical aquifer recharge area; FFAs = Frequently flooded areas; GHAs = Geologically hazardous areas.

4.3 Water Quantity

The VSP goal for the water quantity functions if critical areas in Pacific County is to **maintain or enhance in-stream flows and groundwater supplies in fish and wildlife habitat conservation areas, wetlands, frequently flooded areas, and critical aquifer recharge areas**. Protection and enhancement benchmarks for water quantity, associated agricultural viability aims, and strategies are summarized in Table 4-2.

Table 4-2. Benchmarks and strategies for protection and enhancement of water quantity functions

Benchmark ID	Benchmark	Associated Critical Area(s)[1]	Associated Agricultural Viability Aim(s)	Strategies	Strategy Type
WQt-5	**PROTECT:** Ensure that agricultural activities ***do not reduce*** in-stream flows during critical low-flow periods **ENHANCE:** Modify agricultural activities to ***enhance*** in-stream flows during critical low-flow periods	FWHCAs – Aquatic	Ensure sufficient water availability for agricultural needs	5.1 Improve water catchment and retention strategies for agriculture, including use of retention ponds or rainwater harvest	All
				5.2 Improve irrigation systems and implement water management practices	
				5.3 Update and improve water rights permissions and usage	Programmatic
				5.4 Develop and implement assistance programs for filing/petitioning for water rights	
				5.5 Advocate for long-term water quantity planning, considering climate change	
WQt-6	**PROTECT:** Ensure that agricultural activities ***do not reduce*** existing floodplain connectivity and storage **ENHANCE:** Modify agricultural activities to	FFAs	Avoid losses to agricultural lands or production due to flooding	6.1 Ensure no increase in tide-gates or reduce the effect of existing tide-gates on fish passage and tidal exchange, provided that any changes will not adversely affect upland agriculture or downstream shellfish habitat	All

Benchmark ID	Benchmark	Associated Critical Area(s)[1]	Associated Agricultural Viability Aim(s)	Strategies	Strategy Type
	restore floodplain functions to reduce the frequency and intensity of flood events			6.2 Protect or restore surge wetland and floodplain recharge functions	

1. FWHCAs = Fish and wildlife habitat conservation areas; CARAs = Critical aquifer recharge area; FFAs = Frequently flooded areas; GHAs = Geologically hazardous areas.

4.4 Habitat

The VSP goal for the habitat functions of critical areas in Pacific County is to **maintain or enhance fish and wildlife habitat functions of fish and wildlife habitat conservation areas and wetlands**. Protection and enhancement benchmarks for habitat, associated agricultural viability aims, and strategies are summarized in Table 4-3.

Table 4-3. Benchmarks and strategies for protection and enhancement of habitat functions

Benchmark ID	Benchmark	Associated Critical Area(s)[1]	Associated Agricultural Viability Aim(s)	Strategies	Strategy Type
H-7	**PROTECT:** Ensure that agricultural activities ***protect*** in-stream and riparian habitat **ENHANCE:** Modify agricultural activities to ***enhance*** in-stream and riparian habitat	FWHCAs –Aquatic, Wetlands	Protect against erosion risk on agricultural lands	7.1 Maintain or improve the quality and quantity of riparian areas	All
				7.2 Maintain or improve the conditions of existing in-stream freshwater habitat	
				7.3 Maintain easy (100%) fish passage through culverts and tide-gates in fish-bearing streams and fish rearing areas	
				7.4 Avoid overstocking and implement rotational grazing	Livestock and Dairy
				7.5 Install/maintain off-stream watering and barriers (vegetation, fencing, berms) to discourage livestock from entering streams	
				7.6 Increase knowledge of proper stocking rates to help prevent overstocking of riparian areas	
H-8	**PROTECT:** Ensure that agricultural activities ***protect*** existing high-functioning estuarine	FWHCAs – Aquatic	Ensure protection and sustained health of shellfish beds, and allow for ongoing agriculture	8.1 Maintain or increase the area of functional estuarine habitat	All
				8.2 Maintain or increase areas suitable for native eelgrass and shellfish beds	Aquaculture

Benchmark ID	Benchmark	Associated Critical Area(s)[1]	Associated Agricultural Viability Aim(s)	Strategies	Strategy Type
	and riverine aquatic areas that provide habitat for fish and wildlife **ENHANCE:** Modify agricultural activities to ***restore and enhance*** lower-functioning estuarine and riverine aquatic areas that provide habitat for fish and wildlife		activities in areas protected by tide-gates, floodgates, and dikes	8.3 Implement stewardship practices for shellfish harvesting	
				8.4 Implement stewardship practices for removing aquaculture gear from tidelands	
H-9	**PROTECT:** Ensure that agricultural activities ***protect*** current wetlands in natural condition **ENHANCE:** Modify agricultural activities to ***enhance*** wetland function	Wetlands	Protect wetland habitats supporting traditional agricultural activities	9.1 Maintain or improve the water quality, hydrologic, and/or habitat value of wetlands	All
H-10	**PROTECT:** Ensure that agricultural activities ***protect*** existing habitat for state and federally listed species **ENHANCE:** Modify agricultural activities to ***enhance*** habitat for state and federally listed species	FWHCAs – Upland and Aquatic	Facilitate regulatory certainty by avoiding "take" of state and federally listed species by agricultural activities	10.1 Maintain or improve the conditions of designated habitat for state and federally listed sensitive, threatened, and endangered species	All
				10.2 Encourage development and use of compensation and funding/incentive programs for land protection/dedication	Programmatic

1. FWHCAs = Fish and wildlife habitat conservation areas; CARAs = Critical aquifer recharge area; FFAs = Frequently flooded areas; GHAs = Geologically hazardous areas.

4.5 Physical Safety

The VSP goal for the physical safety functions of critical areas in Pacific County is to **maintain or reduce hazards to physical safety associated with geologically hazardous areas and frequently flooded areas**. Protection and enhancement benchmarks for physical safety, associated agricultural viability aims, and strategies are summarized in Table 4-4.

Table 4-4. Benchmarks and strategies for protection and enhancement of physical safety

Benchmark ID	Benchmark	Associated Critical Area(s)[1]	Associated Agricultural Viability Aim(s)	Strategies	Strategy Type
PS-11	**PROTECT:** Ensure that agricultural activities ***maintain*** flood and erosion protection measures **ENHANCE:** Modify agricultural activities to ***reduce*** risk from flooding or erosion	FFAs, GHAs	Protect agricultural activities from erosion and flooding hazards	11.1 Ensure no increase in or reduce the number of agricultural structures in the floodway	All
				11.2 Maintain and upgrade flood control structures, including system of dikes and tide-gates in Pacific County (including Drainage Ditch #1, Pacific County South Main, Tarlett Slough, etc.) in good condition	
				11.3 Implement stewardship practices to control drainage in geologically sensitive areas	
				11.4 Protect Grayland growing area from saltwater intrusion through partnership with state, federal, and tribal agencies	Cranberry

1. FWHCAs = Fish and wildlife habitat conservation areas; CARAs = Critical aquifer recharge area; FFAs = Frequently flooded areas; GHAs = Geologically hazardous areas.

4.6 Additional Agricultural Viability Aims and Strategies

In addition to agricultural viability aims associated with critical areas protection and enhancement, several additional agricultural viability aims have been defined to meet the overall VSP goal of maintenance and enhancement of agricultural viability in the county. Table 4-5 summarizes these aims and associated strategies to achieve them.

Table 4-5. Agricultural viability aims and strategies not directly associated with critical areas

Aim	Strategies
A-1. Maximize economic value for Pacific County agricultural products and income potential for agricultural activities	Take advantage of marketing incentives/programs for Pacific County products
	Encourage development of new products or varieties of existing products
	Promote options for agritourism, with consideration of concerns relative to Global GAP compliance
	Advocate for flexible use permissions on agricultural lands
A-2. Improve implementation of open space ag taxation program to include ag support lands	Work with the County to ensure non-producing lands used as buffers or for access are included in the program
A-3. Maintain resilient shellfish yields	Improve hatchery and culturing best management practices to address shellfish survival in acidifying waters
A-4. Maintain resilient agricultural production in the face of sea level rise	Anticipate and adaptively plan for loss of agricultural lands due to forecasted sea level rise
	Promote sharing and communication of climate change research across the agricultural community
	Advocate for targeted climate change studies and modeling
A-5. Protect agricultural operators from losses due to human-made and natural disasters	Encourage operators to document and detail current asset values and model expected future production
	Advocate for eligibility of shellfish growers for crop insurance
A-6. Facilitate an adequate supply of labor	Advocate for expedited guest worker visas, worker training, labor recruitment, immigration reform to create local administrative and support services, and public transit options
A-7. Ensure accessibility of technical assistance providers who are knowledgeable about the needs of the Pacific County agricultural community	Advocate for staffing of local NRCS personnel with expertise in Pacific County agricultural activities and crops
	Advocate for ongoing investment in local research and consulting expertise, including WSU Extension resources
	Identify and gain access to additional technical resources in support of organic/sustainable farming practices
A-8. Protect and promote voluntary enhancement of pollinator populations,	Broaden awareness and increase implementation of integrated pest management (IPM) practices

Aim	Strategies
and ensure adequate pollination of cranberry farms	Increase the quantity and quality of pollinator habitat
	Ensure the use of pesticides not harmful to pollinators, and application protocols which avoid use of pollinator-toxic pesticides during bloom periods
	Advocate for education programs about native beekeeping and preservation and expansion of native pollinator habitat
	Participate in development of the Washington State Managed Pollinator Protection Plan
	Conserve and enhance a diverse assemblage of pollinators on cranberry farms
A-9. Maintain resilient agricultural production in the face of an aging agricultural community	Broaden availability of resources to support estate planning, and increase implementation of estate planning practices
A-10. Maintain infrastructure to support agriculture	Advocate for new or improved "hard" infrastructure, including transportation, water and waste utilities, drainage systems, access to markets, processing facilities, and equipment
	Develop and steward "soft" infrastructure systems, including human capital, community networks, labor, training and education, university and field research, technical assistance, and farm succession resources
A-11. Control populations of noxious, nuisance, and pest species on agricultural lands	Broaden awareness and increase implementation of IPM practices
	Advocate for pest and noxious species management protocols on adjacent lands, both public and private
	Advocate for special depredation permits and Master Hunter programs to address negative wildlife impacts on critical areas and agricultural lands
	Decrease production loss from wildlife damages (e.g. elk, unprotected geese, nutria, beaver)
	Advocate for the development and maintenance of a countywide map to track population growth of critical pest species

5 Monitoring, Reporting, and Adaptive Management

The overall objective of monitoring is to track trends at the watershed scale in order to demonstrate whether the VSP is meeting its goals. This chapter presents a program to monitor the progress of the VSP against its stated goals and benchmarks; report the results of that monitoring; and, in the event that monitoring results indicate that stated goals and benchmarks are not being met, institute adaptive management.

> ***The Working Group must "establish baseline monitoring for: (i) participation activities and implementation of the voluntary stewardship plans and projects; (ii) stewardship activities; and (iii) the effects on critical areas and agriculture relevant to the protection and enhancement benchmarks developed for the watershed."***
>
> ***RCW 36.70A.720(1)(i)***

5.1 Monitoring Program Components

5.1.1 Implementation Monitoring

Purpose

The purpose of implementation monitoring is to measure what, and how much, agricultural producers are doing to protect and enhance critical areas under the VSP. One or more implementation performance metrics are defined for each of the benchmarks established in Chapter 4, Goals, Benchmarks, and Strategies. These metrics measure trends in implementation of the strategies and stewardship activities included in the VSP. Implementation performance metrics are presented for each benchmark in Table 1 of Appendix H ("Monitoring and Adaptive Management Matrix").

Monitoring Methods

Individual Stewardship Plans

The vast majority of implementation monitoring information will be collected through the Individual Stewardship Plans (ISPs), completed by individual agricultural producers and described in more detail in Chapter 6, Implementation. ISPs are designed to collect as much of the information required for monitoring as possible, and all questions in the ISP are clearly linked to protection and enhancement benchmarks or agricultural viability aims, allowing for tracking and reporting progress over time. Participants answer questions about implementation of stewardship practices relative to 2011 (for example, "I have maintained practices since 2011") in order to both establish an implementation baseline and track trends relative to that baseline. Additionally, participation in the VSP is defined by completion of an ISP. Thus, monitoring progress toward participation benchmarks, including the number of producers and the number of acres enrolled, will also be accomplished through the ISP process.

The Pacific Conservation District (PCD) is responsible for facilitating, collecting, and summarizing the results of the ISPs on a collective basis. The PCD will conduct an office review of every ISP to ensure that responses are internally consistent and representative of general conditions. It is anticipated that nearly all ISPs will be completed with the some degree of assistance from PCD staff, further contributing to integrity and consistency of producer-supplied information. For those ISPs completed independently, the PCD will randomly select a subset to visit and perform on-site validation of ISP answers. No on-site validation will be performed without prior approval by the property owner.

External Monitoring Activities

The PCD will collect information on implementation of restoration, enhancement, and conservation projects implemented on agricultural lands during each biennial monitoring period and not otherwise captured by ISPs. This information will be collected from external sources where necessary, and will be incorporated into the appropriate implementation performance metrics results. Conservation projects may contribute to protection benchmarks, while restoration and enhancement projects may contribute to enhancement benchmarks.

Programmatic Checklist

In addition to those strategies implemented by individual agricultural producers through specific stewardship activities and projects, the Working Group identified several programmatic strategies. These may be implemented by the Working Group, technical assistance providers, or other parties involved in the VSP to further the overall goals of the VSP. Progress toward programmatic strategies is not measured against benchmarks that determine the success or failure of the VSP. Monitoring of programmatic strategies instead gives the Working Group an opportunity to be reminded of those strategies, to evaluate their continued relevance, and to document any progress made. This qualitative assessment is captured in a Programmatic Checklist, completed by the PCD at the end of each biennial monitoring period and incorporated into associated reporting (see Section 5.2). The Programmatic Checklist is included as Appendix J.

5.1.2 Effectiveness Monitoring

Purpose

The purpose of effectiveness monitoring is to directly measure the effects of stewardship activities on the critical area functions intended to benefit from those stewardship activities under the VSP. Effectiveness monitoring also serves to validate the scientific assumptions linking the implementation of stewardship activities and critical area functional outcomes. Importantly, effectiveness monitoring must be able to demonstrate, at a watershed-scale, that agricultural activities are not resulting in degradation of critical area functions. As such, effectiveness monitoring results must be directly attributable to agricultural activities (see Section 5.1.3, Indicator Tracking). Together, effectiveness monitoring and implementation

monitoring collect a complete picture of the progress of the VSP relative to its measurable benchmarks.

Monitoring Methods

VSP-Sponsored Monitoring Activities

Isolating the effects of agricultural activities on critical area conditions, while honoring the voluntary, non-regulatory nature and watershed scale of the VSP, is a challenge. In certain cases, existing environmental monitoring programs collect information that can be used to parse the role of agriculture. For example, the Department of Ecology prepares official spill reports that include source and damage information. This information can be used to monitor the occurrence of spills related to agricultural activities. In other cases, existing regulations applicable to agriculture include a requirement for monitoring and/or reporting. For example, to spray aquatic pesticides and for processing facilities, aquaculture growers must obtain NPDES permits that include requirements for monitoring and reporting. However, relevant and readily available effectiveness monitoring programs are the exception rather than the rule. At the same time, the geographic scale of the VSP and its level of funding mean that site-scale monitoring of all potential effectiveness parameters is neither feasible nor appropriate.

To address this challenge, the Working Group identified priority effectiveness monitoring needs based on the following county-specific criteria: 1) priority or urgency of the critical area concern; 2) degree of nexus with agricultural activities/impacts; and 3) availability of monitoring data and/or adequacy of regulatory backstop in addressing the concern. In other words, effectiveness monitoring parameters must align with both the key effects of agricultural activities on critical area functions (Chapter 3) and the strategies selected to address those effects (Chapter 4). Due to the specialized nature of the different types of agriculture in the county, this analysis identified different monitoring needs for different agriculture types. For example, while change in riparian cover could be used as a proxy for the effectiveness of certain stewardship activities implemented by livestock and upland crop farmers, it would generally not apply to cranberry or aquaculture operations.

Based on these priority needs, the Working Group developed a set of new monitoring programs, summarized in Table 5-1. This approach allows for monitoring efforts to target specific focal issues associated with each type of agricultural production in the county, while ensuring that, together with implementation monitoring and compliance with regulatory requirements, VSP effectiveness can be demonstrated. These programs will be implemented by VSP partners using VSP funds.

As described further in Section 5.2, effectiveness monitoring results will be reported in terms of trends relative to benchmarks and adaptive management thresholds on a watershed basis. Specific data results will be held in confidence by the PCD and used only to identify trends that will direct adaptive management activities. This clarification is made to ensure that VSP effectiveness monitoring is used strictly as a tool for collaboration with producers on a voluntary basis through the VSP, rather than as the basis for regulatory measures.

One or more effectiveness performance metrics are defined for each monitoring activity described in Table 5-1. Effectiveness performance metrics and specific monitoring data sources are presented for each benchmark in Table 1 of Appendix H.

Table 5-1. VSP-sponsored effectiveness monitoring for priority critical area issues

Priority Critical Area Issue (Benchmark ID)	Agricultural Focus	Effectiveness Monitoring Approach	VSP Partner(s)
Fecal coliform (WQl-1)	Livestock	Annual focal watershed water quality monitoring for fecal coliform with speciation	Pacific Conservation District, with technical assistance from WSU for SOP development
Pesticides (WQl-2)	Cranberries	Collection and testing of water samples at the outflows of Tarlett Slough and Grayland Ditch for known water quality impairments. Annual monitoring will be timed to align with pesticide application activities (mid-July)	Pacific Conservation District, with technical assistance from WSU for Standard Operation Procedure (SOP) development
Nutrients (WQl-1)	Cranberries, Livestock	Collection and testing of water samples at outflows of Tarlett Slough, Grayland Ditch, and Willapa River for nitrates and phosphates, timed to align with fertilizer application (spring and fall annually)	Pacific Conservation District, with technical assistance from WSU for SOP development
Riparian habitat (H-8 and WQl-3, sediment/turbidity)	Livestock, Upland Crop Agriculture	Change in riparian (adjacent to streams and wetlands) cover on agricultural lands, as detected by High Resolution Aerial Imagery Change Detection [3]	WDFW

External Monitoring Activities

The VSP monitoring program relies on external, independent sources of data and information for monitoring of two effectiveness performance metrics (E-5 and E-6 per Table 1 of Appendix H). Use of external sources of data may change as monitoring programs evolve to meet information needs.

The PCD is responsible for all tasks associated with incorporation of monitoring data and information, including from VSP-sponsored monitoring activities, into biennial reporting of monitoring results. This includes, as necessary: data collection or transfer, data processing, identification of gaps, recommendations to the Working Group for supplemental targeted

[3] Pacific County VSP funds will support the continued production of this data set, pursuant to RCW 36.70A.720(1)(k). See Appendix L for full budget.

monitoring, and summarization relative to protection and enhancement benchmarks. Use of external data sources is contingent upon their continued currency and relevance to the performance metrics identified. Where these data sources are found to be inadequate, and implementation metric results from ISP monitoring are not sufficient as a fallback, the Working Group may direct additional funds (as available) to additional targeted monitoring efforts.

5.1.3 Indicator Tracking

Purpose

In addition to performance metrics, indicators are used where changes in a particular monitoring parameter cannot be directly attributed to agricultural activities. For example, while the number of fish passage barriers on agricultural lands is a good metric for fish habitat availability related to agriculture, whether or not fish use that available habitat is the result of numerous variables, including many outside of the control of the agricultural community. As a result, fish use should not be used to determine the success or failure of the VSP. However, indicators such as fish use may provide information valuable to adaptive management if other performance metrics demonstrate that VSP benchmarks are not being met (see Section 5.3). Indicator information is gathered and evaluated in response to negative trends in implementation or effectiveness performance metrics.

Monitoring Methods

External Monitoring Activities

The VSP monitoring program relies exclusively on external, independent sources of data and information for monitoring of indicators. Sources include existing monitoring programs operated by state or federal agencies; ongoing studies by university and University Extension resources and non-profit organizations; and information collected by the Pacific County government. Indicators and their associated data sources are identified in Table 1 of Appendix H. The PCD determines the need for external information on indicators based on trends in other monitoring parameters, and performs data collection, processing, and evaluation of external data and information.

Programmatic Checklist

The relationship between observed trends in indicators and agricultural activities may not always be fully understood. In such cases, the Working Group may develop one or more programmatic strategies to develop better understanding of that relationship. These strategies are then tracked and reported on a biennial basis using the Programmatic Checklist (Appendix J).

5.1.4 Agricultural Viability Tracking

Purpose

Progress toward agricultural viability aims are tracked over time through monitoring measures, defined in Table 2 of Appendix H. Unlike performance metrics for critical areas protection, monitoring measures for agricultural viability aims are not tied to measurable benchmarks (RCW 36.70A.720). Therefore, like indicators, agricultural viability monitoring measures should not be used to determine the success or failure of the VSP. However, also like indicators, monitoring measures may provide information valuable to adaptive management (see Section 5.3).

Monitoring Methods

Individual Stewardship Plans

As detailed in Chapter 6, the ISP includes questions designed to collect monitoring information for agricultural viability monitoring measures. Those monitoring measures not collected via the ISP will be tracked using data from external monitoring activities, or using the Programmatic Checklist.

External Monitoring Activities

Agricultural viability monitoring measures that rely on external sources of data include countywide market indicators, land use and taxation information collected by the Pacific County Tax Assessor, and scientific analyses related to climate change. External monitoring of agricultural viability monitoring measures will be performed at the discretion of the PCD, and at a minimum in response to negative trends in other monitoring data, including implementation and effectiveness performance metrics and agricultural viability monitoring measures collected via the ISP. The PCD determines the need for external information on agricultural viability monitoring measures based on trends in other monitoring parameters, and performs data collection, processing, and evaluation of external data and information.

Programmatic Checklist

Agricultural viability monitoring measures tracked using the Programmatic Checklist include those related to programmatic functions such as outreach and technical assistance (e.g. the number of educational workshops held), and those measured at the county level rather than at the individual producer level (e.g. availability of infrastructure). The PCD is responsible for conducting a qualitative assessment of each of these measures and documenting it in the Checklist (Appendix J).

5.1.5 Mapping of Critical Areas and Agriculture

Purpose

Section 3.3, Tables 3-1 and 3-8 present a summary of agriculture in the county, and the nature and degree of its intersection with critical areas. The information in these tables defines the universe to which the VSP applies. It is used to track participation in VSP as a percentage of all agricultural producers that intersect critical areas. Importantly, as areas of intersection change over time, the nature of the relationship between critical areas and agriculture will also change, requiring reevaluation of Work Plan goals, benchmarks, and strategies.

Monitoring Method

The PCD will update the mapping of critical areas and agriculture every five years according to the methodology described in Appendix E. The updated maps will incorporate new and revised data sources wherever possible. The PCD will then amend Appendix E accordingly to capture new data sources and/or methodology.

5.1.6 Comparison to Baseline Conditions and Evaluation of Success

All monitoring components, including performance metrics, indicators, and agricultural viability monitoring measures, are evaluated relative to baseline conditions to track trends, monitor progress toward VSP goals, and inform adaptive management. Baseline conditions are defined for each monitoring component in Table 5-2.

Only performance metrics (implementation and effectiveness) are used to evaluate the success or failure of the VSP relative to its measurable protection and enhancement benchmarks. For each performance metric, protection would be indicated by no significant change in the metric; enhancement would be indicated by a significant positive change, or improvement, in the metric; and degradation would be indicated by a significant negative change in the metric, and would trigger adaptive management (see Figure 5-1). Significant change is defined differently depending on the type of performance metric. For implementation performance metrics, statistical significance will be determined using a 2-way t-test with an alpha (α) value of 0.05.[4] A statistically significant deviation from baseline in the negative or positive direction would indicate degradation or enhancement, respectively.

For effectiveness performance metrics, the definition and interpretation of significant change depends on the data set. For the High Resolution Aerial Imagery Change Detection data, an observed loss in riparian vegetation of greater than five percent is considered significant (double the error rate for false positives) (Pierce 2015). For water quality monitoring data collected by the PCD (WQl-1 and -2, Table 5-1), significance will be defined as part of SOP development and then refined based on the baseline established in the first five years of

[4] Given anticipated participation levels, we assume a statistical power well above 0.8. If statistical power is lower than 0.8, an α value of 0.1 should be used.

monitoring (see Table 5-2). Data reporting will be focused on trends relative to that baseline, and these trends will be reported generally rather than with specific measures to ensure that data are used in a manner consistent with the intent of this Work Plan to encourage voluntary, collaborative participation by agricultural operators.

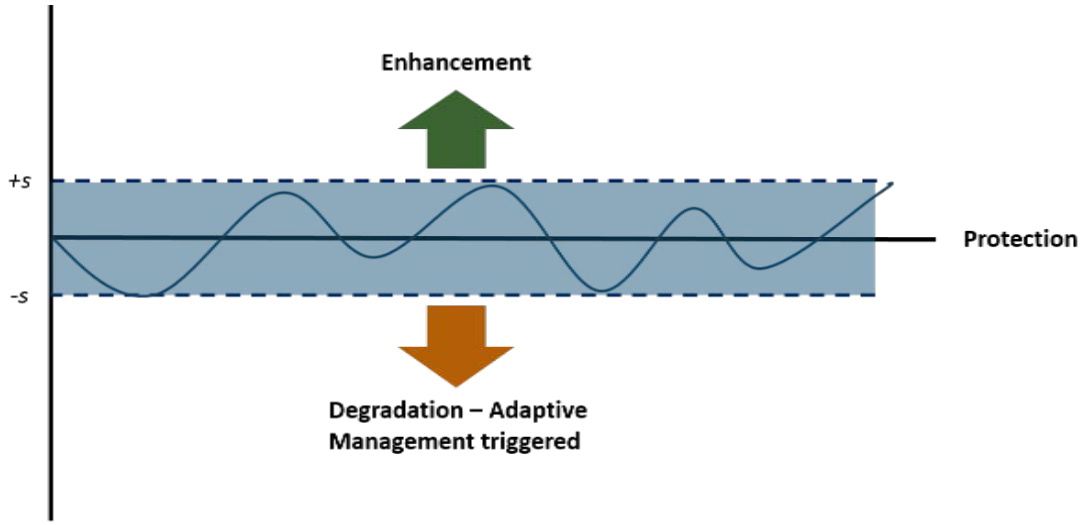

Figure 5-1. Evaluating performance metric trends against protection and enhancement benchmarks. Scale on the Y axis represents critical area functions and values, as represented by performance metrics. Change would be detected when the difference from baseline is statistically significant.

Evaluating success or failure relative to measurable benchmarks is also approached differently depending on the type of performance metric. If any single **effectiveness** performance metric fails to meet its associated protection benchmark (i.e. shows a significant negative change), the VSP as a whole fails to meet that benchmark for the given monitoring period. However, failure of any single **implementation** performance metric to meet its associated protection benchmark does not necessarily indicate overall failure to meet that benchmark. For example, agricultural producers may not install any livestock exclusion fencing to address sediment loading because they are installing riparian buffers instead – a protective practice which serves an equivalent purpose. As a result, implementation performance metrics are tracked individually to provide information to the overall monitoring and adaptive management process; however, to determine success or failure relative to the benchmark, they are evaluated as a collection. Chapter 6 further explains how implementation performance metrics collected in the ISP are summarized and evaluated against benchmarks.

5.1.7 Schedule

Table 5-2 summarizes the schedule for each of the monitoring methods described above, including the source of baseline information. In many cases, adequate baseline information does not exist and will be collected (in the case of ISP responses) or established during the first monitoring period. Due to the highly variable nature of water quality sampling, baseline

conditions for VSP-sponsored water quality monitoring parameters will be established based on monitoring results from the first five years.

All monitoring tasks must be completed by December 31st prior to the end of each biennium. Monitoring results will then be reviewed and incorporated into the reports required of the Working Group under RCW 36.70A.720(1)(j). Under this schedule, the first round of biennial monitoring activities will be completed by December 31st of 2018.

Table 5-2. Summary of monitoring methods

Monitoring Method	Baseline	Schedule	Monitoring Components Collected
Individual Stewardship Plans	Responses related to 2011 practices, summarized at first biennial monitoring period	Completion of ISPs: ongoing On-site validation: ongoing Roll-up of results: biennially	• Implementation performance metrics • Agricultural viability monitoring measures
VSP-sponsored water quality monitoring	Pesticides: Monitoring results from first five years [1]	Pesticides: Monthly for the first year; annually (mid-July) thereafter	• Effectiveness performance metrics
	Fecal coliform from livestock: Monitoring results from first five years	Fecal coliform: Monthly for the first year; twice annually (spring and fall) thereafter	
	Nutrients: Monitoring results from first five years	Nutrients: Monthly for the first year; twice annually (spring and fall) thereafter	
WDFW High Resolution Aerial Imagery Change Detection	2011	Biennially	• Effectiveness performance metrics
External monitoring activities	See Appendix F (critical areas only)	Biennially [2]	• Implementation performance metrics • Effectiveness performance metrics • Indicators • Agricultural viability monitoring measures
Programmatic Checklist	Results of first biennial monitoring period	Biennially	• Implementation of programmatic strategies • Agricultural viability monitoring measures • Indicator trends and relationships

Monitoring Method	Baseline	Schedule	Monitoring Components Collected
Mapping of critical areas and agriculture (Intersection maps)	Results of mapping completed as part of this Work Plan	Every five years	• Participation (implementation performance metrics) • Work Plan focus

1. Applies to water quality impairments as documented in 2011 (see Appendix F). As specific chemical usages change over time, sampling activities may be modified.
2. Use of external monitoring sources is contingent upon data availability and continued relevance to benchmarks.

5.2 Reporting

The VSP statute requires reporting to the Washington State Conservation Commission on two schedules: 1) every two years; and 2) every five years. The Working Group is responsible for both types of reporting. The purpose of both reporting efforts is to summarize progress toward goals and benchmarks and report on adaptive management measures. To encourage participation and ensure that reporting is not viewed or used in any way as a regulatory tool, reporting of implementation and effectiveness data collected by the PCD will be limited to documentation of trends observed at a watershed scale. The PCD will collect and maintain specific data on implementation and effectiveness measures, which it will use to evaluate progress toward benchmarks and to determine when adaptive management thresholds are met. In recognition that the results of effectiveness monitoring are site-specific and are not intended to provide data for regulatory measures, reporting on these effectiveness measures will not include specific results. Instead, reports will identify whether benchmarks were met, and if not, how adaptive management was implemented.

No later than 60 days after the end of each biennium (August 29th of 2019, 2021, 2023, etc.), the Working Group will collect summaries of the monitoring results completed by the PCD and supporting entities and provide a written report of "the status of plans and accomplishments" to Pacific County and to the Washington State Conservation Commission (WSCC) (RCW 36.70A.720(1)(j)). This report will address overall participation; trends in stewardship activities being implemented by enrolled agricultural producers; trends in agricultural viability; a qualitative assessment of progress for programmatic strategies; and any completed or planned programmatic activities such as outreach, education, and collaboration with other governmental or non-governmental entities. This report will also describe any adaptive management measures completed or planned to address issues identified in the monitoring results.

Every five years, the Working Group, with assistance from the PCD, will complete a formal evaluation of the VSP relative to its overall goals and protection and enhancement benchmarks. This evaluation will be based on the results of all monitoring activities and biennial reports completed during the five-year period, and will be provided to Pacific County and to the director of the WSCC (RCW 36.70A.720)(2)(b) and (c)). Based on the initial VSP funding date of December 2015 in Pacific County, the first five-year evaluation will be due by December 31st of 2020.

5.3 Adaptive Management

Each biennial reporting period represents an opportunity to institute adaptive management measures. Where monitoring results indicate that performance metrics have fallen below adaptive management thresholds, the Working Group will identify and implement appropriate corrective measures. Appendix H, "Monitoring and Adaptive Management Matrix," defines one or more adaptive management thresholds and associated actions for each benchmark. Where the adaptive management actions prescribed in Appendix H direct the Working Group to evaluate the issue in order to determine the most appropriate specific action, the first step will be to review results and trends for all potentially related performance metrics, indicators, and agricultural viability monitoring measures to determine the likely cause for why metrics are not met. Included in this review should be consideration of whether the performance metric is appropriately reflective of progress toward meeting a benchmark, and whether the benchmark remains appropriate for protecting critical area functions. This review should also include consideration of external factors, such as changes in climate, development patterns, or the regulatory environment. Based on this analysis, the Working Group will then select one or more measures to correct the problem. Measures may include direct corrective actions, implemented on a voluntary basis with participants; changes to particular elements of the Work Plan (including goals and benchmarks) or Individual Stewardship Plan; or a combination of both. Selected adaptive management measures and the rationale behind them will be described in the biennial report and five-year summary.

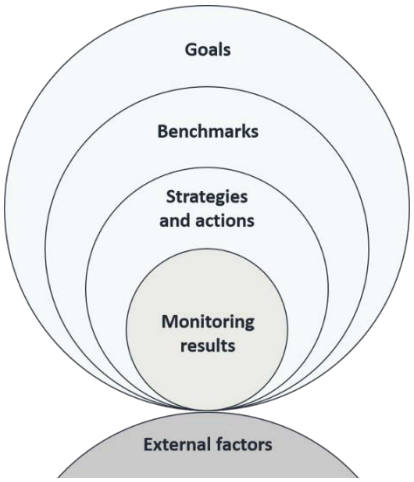

Figure 5-2. Schematic showing the layers of information used in adaptive management. Each layer is reviewed and considered for revision in an iterative, non-linear process.

Evaluating VSP progress and instituting adaptive management on an ongoing basis is intended to ensure that the program can respond to new information and unforeseen challenges as it progresses toward successful achievement of all benchmarks. However, if the five-year formal evaluation indicates that protection goals and benchmarks have not been met, the Working Group will develop an adaptive management plan following the same process described above. The plan will be submitted to the director of the WSCC and subject to approval per RCW 36.70A.720(2)(b)(iii).

6 Implementation

6.1 Individual Stewardship Plans

6.1.1 Purpose and Content

> ***"Agricultural operators implementing an individual stewardship plan consistent with a work plan are presumed to be working toward the protection and enhancement of critical areas" (RCW 36.70A.750(1)).***

The primary implementation mechanism for the VSP is the Individual Stewardship Plan (ISP), to be completed by individual agricultural operators. The ISP is designed to achieve several purposes simultaneously, including:

- Registering agricultural producers as participants in the VSP;
- Developing an understanding of the baseline of conservation practices implemented by agricultural producers in 2011, and tracking trends in conservation practices implemented by agricultural producers over time relative to that baseline understanding (see Chapter 5);
- Identifying and tracking threats to and progress toward agricultural viability based on cumulative assessment of individual reporting;
- Identifying additional practices that the producer may be interested in, and/or that may be applicable to the farm and its needs, particularly if additional funds become available;
- Identifying opportunities for further conversation and exchange of information between the farmer and the technical assistance provider; and
- Increasing awareness about the VSP and about conservation in general.

To achieve these purposes, the ISP includes several components, described below. The ISP is included as Appendix I.

Site Assessment

The first section of the ISP includes an assessment of site-specific conditions, including the presence of critical areas, and any existing issues related to critical areas or production. In addition to collecting background information, this section enhances awareness of on-site critical areas and associated issues, and can help inform which conservation approaches may or may not be appropriate for the property.

Tracking Agricultural Viability

Following the site assessment, the ISP addresses questions related to previously identified threats to agricultural viability. Questions directly relate to agricultural viability monitoring measures. Questions address issues related to crop and equipment/operations insurance, disaster preparedness, estate planning, labor availability, and availability of technical assistance. These questions are intended to both improve mindfulness of common practices that support agricultural viability on an individual basis, as well as provide a method of tracking cumulative changes in these practices. This section of the ISP also provides an opportunity for producers to identify additional viability issues. Unlike critical area performance metrics, answers to agricultural viability questions are not summarized in a numerical index score or tracked against measurable benchmarks.

Tracking Conservation Practices

Next, the ISP addresses conservation practices and implementation trends since 2011. For example, a dairy/livestock producer would be asked, "Do you maintain barriers (vegetation, fencing, berms) to discourage livestock from entering streams?" for both 2011 and the current monitoring year. Each of the questions is directly related to a performance metric and associated benchmark, as defined in the monitoring and adaptive management plan (see Chapter 5 and Appendix H). Answers are coded according to Table 6-1 to generate a numerical index score for each question (performance metric). The ISP also collects additional numerical metrics related to certain enhancement activities, as applicable (e.g. acres of riparian planting installed).

Table 6-1. Measuring trends in implementation in the ISP: Calculating individual index score

2011 Answer	2019 Answer	Index Score
Yes	Yes, Improve	+1
	Yes, Maintain	0
	Yes, Degrade	-1
	No	-1
No	Yes, Improve	+1
	No	0

For each question, the producer can indicate an interest in doing more if funding becomes available. As an added resource, each question also provides an associated list of conservation practices identified by the Working Group as relevant to producers in Pacific County (see Appendix G).

Evaluating and Reporting Results

The completed ISP presents an average of the numerical index scores described above, by benchmark. Where a particular question/performance metric is not applicable to the producer,

the question is not included in this average. The result is a number between -1 and 1 for each benchmark, with 0 representing no change, or maintenance of the baseline. Individual ISP results can then be summarized at the watershed or sub-watershed scale for monitoring and reporting (see Chapter 5). Figure 6-1 illustrates this concept.

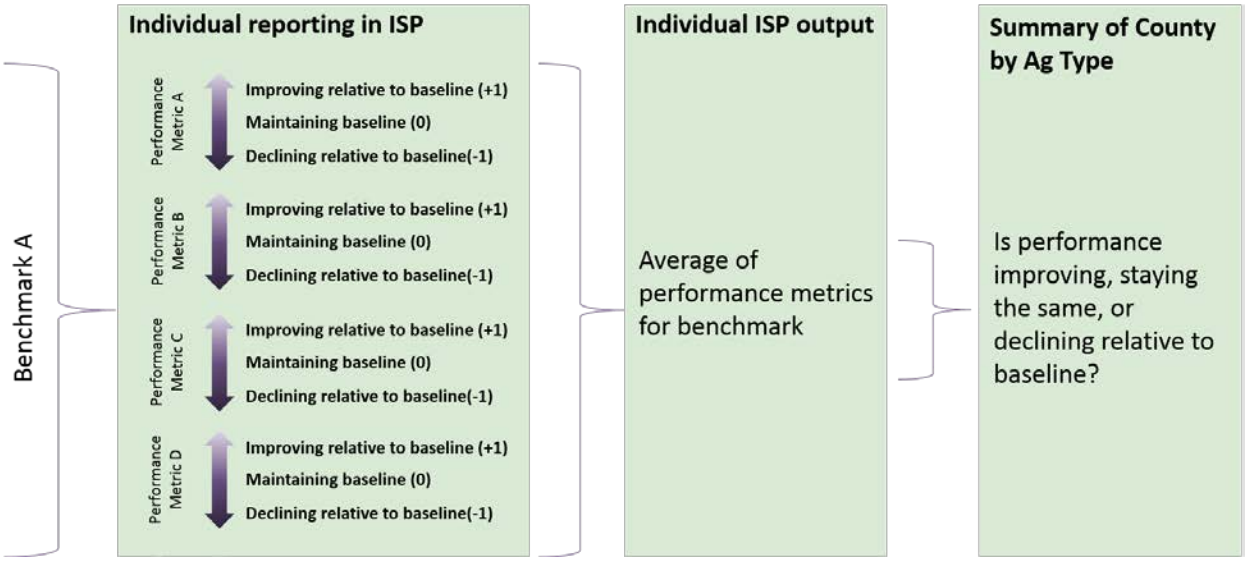

Figure 6-1. Evaluation of ISP monitoring results relative to baseline for a hypothetical benchmark, Benchmark A.

As described in Chapter 4, each benchmark is associated with one or more critical areas depending on the specific critical area functions and agricultural impacts it addresses. Results from the ISP can therefore be used to summarize progress by critical area – for example, the number of participants with wetlands on their property; the percent of those participants implementing conservation practices beneficial to wetland functions; and the overall degree of protection or enhancement of wetlands across all VSP participants.

6.1.2 Completion Process

The ISP is available to producers in two formats: as an online survey through Google Forms, and as a paper form. ISP responses submitted through Google Forms are automatically transmitted to the PCD. These responses are then summarized for interpretation by the PCD using an automated spreadsheet tool (Appendix I.i, "ISP Data Summary"). The tool calculates trends and evaluates statistical significance for each benchmark at the watershed scale. ISP responses submitted using the paper form (Appendix I.ii, "ISP Paper Form") will be manually entered into Google Forms or the data summary tool by the PCD for interpretation of results.

This approach allows for ISP completion using different methods appropriate to different agricultural producers throughout the county. Producers may complete an ISP independently using either format, or may contact the PCD to assist them with the process. Assistance by the PCD will involve a visit to the property at the discretion of the property owner. The PCD will

also initiate ISP completion with selected producers as part of its overall outreach activities (see Section 6.2.1).

The PCD will facilitate ISP completion in coordination with the biennial monitoring schedule (see Chapter 5). The content and format of the ISP itself will also be reviewed as part of the required biennial evaluation. Any major revisions will be discussed and agreed upon by the Working Group and implemented by the PCD.

Information Management

Completed ISPs are kept and maintained by the PCD. VSP success depends on open, transparent, and honest participation by producers. This participation hinges on the assurance that confidential business information will not be disclosed. According to guidance from the Washington State Conservation Commission, statutory provisions on the confidentiality and disclosure of a Conservation District-prepared farm plan also apply to ISPs collected by the PCD. Importantly, information contained in individual ISPs will be maintained by the PCD as confidential information. ISP results will be summarized at the watershed or sub-watershed scale such that no personally identifying information is available.

Validation

Each biennium, the PCD will conduct a follow-up exercise with an aim of conducting site visits for a minimum of 10 percent of producers for each type of agriculture who opted to self-report their ISPs. The producers contacted will be randomly selected. The PCD will contact the randomly selected producers to request permission for an on-site visit. For each on-site visit, the PCD will confirm the information stated in the ISP and evaluate whether the stewardship practices identified in the ISP for that property have been implemented and are having the intended effect. The PCD may offer recommendations or technical assistance to the producer. Any different or additional stewardship practices identified by the PCD will be implemented by the agricultural producer on a voluntary basis only, and may be eligible to receive funding per RCW 36.70A.750(2). The validation site visits will be used to assess the reliability of information provided in self-reported ISPs.

6.1.3 Participation

Individual participation in VSP is defined as completion of an ISP and submittal to the PCD. Producers maintain their participation through biennial updates to completed ISPs, initiated by the PCD. ISP participation is necessary in order to demonstrate that a significant portion of the county's producers are implementing conservation practices to protect critical areas. In other words, ISP participation is essential to ensure that critical area protection benchmarks are met, and that the VSP is a success.

Participation benchmarks are defined as a minimum percentage of all agriculture in the county that intersects one or more critical areas enrolled in VSP, in terms of both the number of producers and the number of acres countywide. These percentages increase over time to allow for an initial "ramp up" period in the first five years of program implementation (see Figure 6-2).

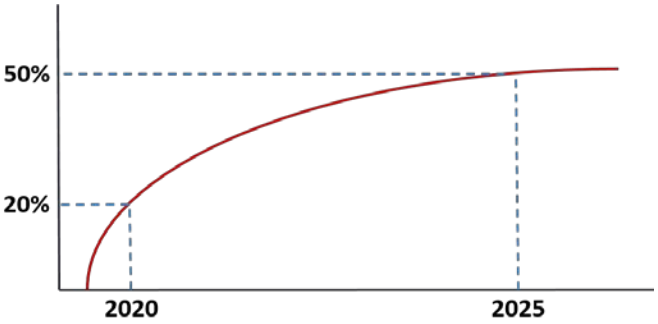

Figure 6-2. Participation as a percentage of total agricultural producers, measured over time.

To reflect the highly specialized nature of agriculture in the county, benchmarks are defined and measured separately for each agricultural type, and range from 50 to 85 percent of the total agriculture of that type that intersects one or more critical areas, countywide, by 2025. Benchmarks, performance metrics, and monitoring methods for participation are presented in Appendix H.

6.2 Outreach and Technical Assistance

The statute requires that the Work Plan "ensure outreach and technical assistance is provided to agricultural operators in the watershed," and that it "designate the entity or entities that will provide technical assistance" (RCW 36.70A.720(1)(d) and (f), respectively).

6.2.1 Outreach

The primary goal of outreach is to ensure that all agricultural producers in the county are aware of the VSP. Its secondary goal is to ensure that the program's benchmarks for participation are met. The VSP outreach plan is implemented in two phases: 1) during Work Plan development; and 2) during VSP implementation, following Work Plan approval.

Phase I: Outreach during Work Plan Development

Outreach during Work Plan development included Working Group and subcommittee meetings and communications and public workshops. Working Group meetings were held monthly between June 2016 and June 2017. All meetings were open to the public, and materials and full meeting recordings were posted on the County's VSP website following each meeting. The Working Group itself included broad representation from agricultural producer groups throughout the county, as well as technical assistance providers, tribal representatives, and agency staff (see Section 1.2.2 for a full list of Working Group members).

The Working Group included three subcommittees, each representing one of the major agricultural producer groups (cranberries, dairies/livestock, and aquaculture). Subcommittee meetings and communication was coordinated by the project facilitator, Kelly Rupp of LeadToResults. Subcommittees provided input on draft Work Plan materials in advance of full

Working Group meetings. Minutes from Working Group meetings, including subcommittee meetings, are provided in Appendix M.[5]

To facilitate participation in Working Group meetings and gather input from additional agricultural producers and county residents during the initial stages of Work Plan development, a series of four public workshops were held in August of 2016. Workshop locations were distributed across agricultural centers in the county to maximize outreach. Workshop and general outreach materials are provided in Appendix N.

Finally, a series of public open houses are planned to be held immediately following approval of the Work Plan. Four open houses will be held in locations throughout the county. The goal of these open houses will be to increase awareness of the VSP, with a particular focus on participation and implementation.

Phase II: Outreach over the Life of the VSP

The primary outreach strategy following approval of the Work Plan is to leverage existing peer networks and established agricultural organizations in order to inform agricultural producers about the VSP and encourage participation. The small, specialized, and highly collaborative nature of the agricultural community in Pacific County, as described in Section 3.2, recommends non-traditional strategy as appropriate and likely to succeed. Members of the Working Group who are leaders in their respective agricultural communities will serve as representatives and VSP "ambassadors" to those communities. Outreach will be initiated by these VSP ambassadors at the regular meetings of their respective agricultural organizations (e.g. the Grayland Cranberry Association, Pacific Coast Shellfish Growers Association, Darigold Cooperative) and further disseminated via word of mouth through established peer networks among producers. Presentations and discussions about the VSP are already scheduled at a number of grower meetings for the months immediately following anticipated approval of the Work Plan.

Complementing this strategy will be the ongoing promotion and recruitment efforts of the PCD, which has over 60 years' experience and history working with the county's agricultural producers in support of their operations and conservation goals. Based on the analysis of existing agriculture in the county summarized in Section 3.2, PCD staff are personally acquainted with over half of all agricultural producers in the county, and are recognized enthusiastically as trusted advisors and expert providers of technical assistance. The PCD will encourage producers with whom they are already engaged to participate in VSP. For lesser known agricultural communities, and as agricultural communities evolve, the PCD will conduct targeted outreach directly or work with Working Group members to determine the most appropriate avenue(s) for outreach. The PCD currently employs a part-time staff member to

[5] Complete meeting materials for all full Working Group and subcommittee meetings are available on the Pacific County VSP website.

conduct VSP outreach; this staff member will begin working on a full-time basis following Work Plan approval.

As described in Chapter 5, the PCD is responsible for biennial monitoring of participation in the VSP, as indicated by completion of ISPs. While participants may come and go over the course of program implementation, net participation levels are expected to meet or achieve defined benchmarks. However, if monitoring results indicate that participation benchmarks are not being met, the Working Group may undertake additional, traditional outreach activities such as targeted presentations, mailers, or use of local newspapers. Pacific County will maintain its VSP website as a public online presence and information repository throughout the life of the VSP.

Ongoing outreach efforts also include continued engagement with the Shoalwater Bay Tribe and local county, state, and federal agencies.

6.2.2 Technical Assistance

Primary federal, state, county, and nonprofit technical providers operating in Pacific County, and some of the types of technical assistance they offer, are listed in Table 6-2:

Table 6-2. Primary technical assistance providers in Pacific County

Provider	Type(s) of Assistance Offered
Pacific Conservation District	Cost-share assistance; implementation of conservation practices; site assessment and planning
Washington State University (WSU) Extension	Research and monitoring supporting agricultural needs, issues, and best practices; information clearinghouse for external research; SOP development for VSP-sponsored effectiveness monitoring
United States Department of Agriculture, Natural Resources Conservation Service (NRCS)	Funding source; research and development of Field Office Technical Guides
Washington Department of Fish and Wildlife	Local coordination on fish and wildlife issues; permitting assistance
Pacific County Department of Community Development	Critical areas information and consultation; open space ag taxation enrollment; permitting assistance

These entities provide direct assistance to agricultural operators in the county to address conservation practices that improve the environment and help productivity.

Secondary, or topic-specific, technical assistance providers include, but are not limited to:

- Willapa Grays Harbor Oyster Growers Association (WGHOGA)
- Pacific Shellfish Institute
- Shoalwater Tribe

These entities provide expertise in industry-specific best management practices, and a resource for information sharing. They also represent potential outlets by which participation in the VSP can be encouraged.

6.3 Incentive Measures

This section addresses how the VSP can use incentives to increase participation while providing agricultural viability benefits for participating producers. Incentive measures presented here have been identified by the Working Group as top priorities for implementation using VSP funds. These measures will require further development and, in some cases, formal approval prior to use in the VSP.

6.3.1 Facilitating Participation in Existing Voluntary Incentive Programs

One purpose of the VSP is to "focus and maximize voluntary incentive programs to encourage good riparian and ecosystem stewardship as an alternative to historic approaches used to protect critical areas" (RCW 36.70A.700(2)(b)).

Specifically, in developing stewardship practices to implement, the Work Plan should "administer the program in a manner that allows participants to be eligible for public or private environmental protection and enhancement incentives (RCW 36.70A.755(2)).

Appendix K summarizes existing voluntary, incentive-based programs available to agricultural producers in Pacific County. As a whole, the Work Plan aims to facilitate participation in these programs by including strategies and stewardship activities that align with existing voluntary incentive programs in the county (see Chapter 4). For example, a livestock farmer implementing stewardship activities selected from the NRCS Field Office Technical Guide may be eligible for NRCS financial assistance programs such as the Conservation Reserve Enhancement Program (CREP).

A significant portion of existing programs, including NRCS programs and many PCD programs, use cost-share as the primary incentive mechanism, requiring producers to provide a portion of the funds needed for the project. Under this incentive, agricultural producers participating in VSP would be eligible for a more favorable cost-share ratio. The additional funds provided to the producer could come from ISP implementation funds, and/or from an equal and opposite adjustment to cost-share ratios for non-participants.

6.3.2 Enhancing Access to Technical Assistance

The technical assistance providers identified in the previous section may hold workshops for agricultural producers on specific technical topics. Specifically, technical assistance providers such as the PCD and WSU Extension may hold workshops to address agricultural viability concerns such as succession planning or regulatory requirements. Under this incentive, VSP participants would be granted priority admission and access to resources for these workshops. Also, recommendations for workshop topics and consulting assistance from VSP participants would be prioritized over non-participants.

6.3.3 Enhancing Marketability

In an effort to enhance marketability of agricultural products from Pacific County, particularly in local markets, the Working Group proposes to develop VSP branding. Branding would

potentially include a logo, additional graphics, slogans, signage, and marketing materials such as pamphlets and copy. Use of the VSP brand and associated materials would be available only to those agricultural producers participating in VSP. Specifically, posters or other signage would be provided to participants for display on their properties to advertise their participation and broaden awareness of the program.

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Table 1. Monitoring Tasks and Adaptive Management Thresholds for Critical Areas Protection

Benchmark No.	Critical Area Benchmark [1] (Protect/Enhance)	Performance Metrics and Indicators [2] Im-#: Implementation performance metric E-#: Effectiveness performance metric In-#: Indicator	Monitoring Method [3, 4]	Party Collecting Data	Adaptive Management Threshold [4, 5]	Adaptive Management Action
GOAL: Maintain or increase participation in VSP to meet program goals [6]						
P-1	Achieve and maintain participation levels by livestock agricultural producers of ***at least 20 percent by 2020 and at least 50 percent by 2025*** Achieve and maintain participation levels by livestock agricultural producers of ***greater than 20 percent by 2020 and greater than 50 percent by 2025***	Im-1. Percent of livestock agricultural producers that intersect critical areas enrolled in VSP Im-2. Percent of livestock agricultural acres that intersect critical areas enrolled in VSP	*Number and acres enrolled:* Individual Stewardship Plans *Total number of producers/acres that intersect critical areas:* Intersection maps (every five years)	Pacific Conservation District	Participation significantly below benchmark levels	1. Evaluate: outreach activities completed to date, agricultural viability measures, and other contextual considerations to determine cause 2. Reevaluate whether benchmark is achievable or necessary to achieve protection 3. If necessary, encourage more participation (may include increasing outreach and education efforts)
P-2	Achieve and maintain participation levels by dairy producers of ***at least 50 percent by 2020 and at least 85 percent by 2025*** Achieve and maintain participation levels by dairy producers of ***greater than 50 percent by 2020 and greater than 85 percent by 2025***	Im-3. Percent of dairy producers that intersect critical areas enrolled in VSP Im-4. Percent of dairy agriculture acres that intersect critical areas enrolled in VSP	*Number and acres enrolled:* Individual Stewardship Plans *Total number of producers/acres that intersect critical areas:* Intersection maps (every five years)	Pacific Conservation District	Participation significantly below benchmark levels	1. Evaluate: outreach activities completed to date, agricultural viability measures, and other contextual considerations to determine cause 2. Reevaluate whether benchmark is achievable or necessary to achieve protection 3. If necessary, encourage more participation (may include increasing outreach and education efforts)
P-3	Achieve and maintain participation levels by cranberry producers of ***at least 20 percent by 2020 and at least 50 percent by 2025***	Im-5. Percent of cranberry producers that intersect critical areas enrolled in VSP	*Number and acres enrolled:* Individual Stewardship Plans *Total number of producers/acres that intersect critical areas:*	Pacific Conservation District	Participation significantly below benchmark levels	1. Evaluate: outreach activities completed to date, agricultural viability measures, and other contextual considerations to determine cause 2. Reevaluate whether benchmark is achievable or necessary to achieve protection

Table notes:

1. Critical area benchmarks are introduced in Chapter 4 of the Work Plan, including for each: associated critical area(s), associated agricultural viability aim(s), and strategies identified to achieve each benchmark. Specific stewardship activities potentially associated with each strategy are identified in Appendix G, "Strategies and Stewardship Activities."

2. Implementation monitoring, effectiveness monitoring, and indicator tracking are described in Chapter 5 of the Work Plan (sections 5.1.1, 5.1.2, and 5.1.3, respectively).

3. Monitoring methods, described in Chapter 5 of the Work Plan, include: Individual Stewardship Plans; VSP-sponsored monitoring; WDFW High Resolution Aerial Imagery Change Detection; External monitoring; and Programmatic Checklist. Where the table indicates External monitoring, a specific program or data source is also listed.

4. Chapter 6 of the Work Plan describes the Individual Stewardship Plan, including its purpose and content, completion process, validation, and synthesis of results.

5. As used in adaptive management thresholds, the term "significant" has a specific statistical meaning, defined in Section 5.1.6 of the Work Plan. Per VSP statute, the term "baseline" refers to conditions on July 22nd, 2011, but has a different practical meaning depending on the monitoring method and/or data source (see Table 5-2 of the Work Plan).

6. Participation is defined in Section 6.1.2 of the Work Plan as completion of an ISP and submittal to the Pacific Conservation District.

Benchmark No.	Critical Area Benchmark [1] (Protect/Enhance)	Performance Metrics and Indicators [2] Im-#: Implementation performance metric E-#: Effectiveness performance metric In-#: Indicator	Monitoring Method [3, 4]	Party Collecting Data	Adaptive Management Threshold [4, 5]	Adaptive Management Action
	Achieve and maintain participation levels by cranberry producers of ***greater than 20 percent by 2020 and greater than 50 percent by 2025***	Im-6. Percent of cranberry agriculture acres that intersect critical areas enrolled in VSP	Intersection maps (every five years)			3. If necessary, encourage more participation (may include increasing outreach and education efforts)
P-4	Achieve and maintain participation levels by upland crop agriculture producers of ***at least 20 percent by 2020 and at least 50 percent by 2025*** Achieve and maintain participation levels by upland crop agriculture producers of ***greater than 20 percent by 2020 and greater than 50 percent by 2025***	Im-7. Percent of upland crop agriculture producers that intersect critical areas enrolled in VSP Im-8. Percent of upland crop agriculture acres that intersect critical areas enrolled in VSP	*Number and acres enrolled:* Individual Stewardship Plans *Total number of producers/acres that intersect critical areas:* Intersection maps (every five years)	Pacific Conservation District	Participation significantly below benchmark levels	1. Evaluate: outreach activities completed to date, agricultural viability measures, and other contextual considerations to determine cause 2. Reevaluate whether benchmark is achievable or necessary to achieve protection 3. If necessary, encourage more participation (may include increasing outreach and education efforts)
P-5	Achieve and maintain participation levels by aquaculture producers of ***at least 20 percent by 2020 and at least 50 percent by 2025*** Achieve and maintain participation levels by aquaculture producers of ***greater than 20 percent by 2020 and greater than 50 percent by 2025***	Im-9. Percent of aquaculture producers that intersect critical areas enrolled in VSP Im-10. Percent of aquaculture acres that intersect critical areas enrolled in VSP	*Number and acres enrolled:* Individual Stewardship Plans *Total number of producers/acres that intersect critical areas:* Intersection maps (every five years)	Pacific Conservation District	Participation significantly below benchmark levels	1. Evaluate: outreach activities completed to date, agricultural viability measures, and other contextual considerations to determine cause 2. Reevaluate whether benchmark is achievable or necessary to achieve protection 3. If necessary, encourage more participation (may include increasing outreach and education efforts)

Table notes:

1. Critical area benchmarks are introduced in Chapter 4 of the Work Plan, including for each: associated critical area(s), associated agricultural viability aim(s), and strategies identified to achieve each benchmark. Specific stewardship activities potentially associated with each strategy are identified in Appendix G, "Strategies and Stewardship Activities."

2. Implementation monitoring, effectiveness monitoring, and indicator tracking are described in Chapter 5 of the Work Plan (sections 5.1.1, 5.1.2, and 5.1.3, respectively).

3. Monitoring methods, described in Chapter 5 of the Work Plan, include: Individual Stewardship Plans; VSP-sponsored monitoring; WDFW High Resolution Aerial Imagery Change Detection; External monitoring; and Programmatic Checklist. Where the table indicates External monitoring, a specific program or data source is also listed.

4. Chapter 6 of the Work Plan describes the Individual Stewardship Plan, including its purpose and content, completion process, validation, and synthesis of results.

5. As used in adaptive management thresholds, the term "significant" has a specific statistical meaning, defined in Section 5.1.6 of the Work Plan. Per VSP statute, the term "baseline" refers to conditions on July 22nd, 2011, but has a different practical meaning depending on the monitoring method and/or data source (see Table 5-2 of the Work Plan).

6. Participation is defined in Section 6.1.2 of the Work Plan as completion of an ISP and submittal to the Pacific Conservation District.

Benchmark No.	Critical Area Benchmark [1] (Protect/Enhance)	Performance Metrics and Indicators [2] Im-#: Implementation performance metric E-#: Effectiveness performance metric In-#: Indicator	Monitoring Method [3, 4]	Party Collecting Data	Adaptive Management Threshold [4, 5]	Adaptive Management Action
GOAL: Maintain or enhance water quality functions of surface water and groundwater in critical areas						
WQI-1	***Avoid increasing*** agricultural contributions to fecal coliform bacteria and nutrient loading ***Reduce*** agricultural contributions to fecal coliform bacteria and nutrient loading	Im-11. Trend in implementation of waste management practices	Individual Stewardship Plans	Pacific Conservation District	Significant decrease in implementation	1. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 2. Evaluate effectiveness measures and indicators to reassess connection between implementation metrics and critical area functions and modify Work Plan if appropriate 3. Work with existing and potential VSP participants to implement additional or different stewardship practices to prevent fecal coliform bacteria and nutrients from agricultural sources from entering surface waters and groundwater
		Im-12. Trend in training on stocking rates or rotational grazing				
		Im-13. Trend in implementation of rotational grazing to prevent overstocking				
		Im-14. Length of barriers (e.g. vegetation, fencing, berms) to prevent or discourage livestock from entering streams				
		Im-15. Number of off-stream watering facilities				
		Im-16. Number of riparian planting/enhancement projects	Individual Stewardship Plans; External monitoring: Habitat Work Schedule, PRiSM	Pacific Conservation District	*Enhancement only. No adaptive management response.*	*Enhancement only. No adaptive management response.*
		Im-17. Acres and linear feet of riparian planting/enhancement				
		E-1. Fecal coliform bacteria in surface waters from agricultural sources (focus: livestock)	VSP-sponsored monitoring: annual focal watershed water quality sampling for fecal coliform with speciation	Pacific Conservation District, with technical assistance from WSU for SOP development	Significant increase in bacteria levels relative to baseline	1. Repeat testing to confirm result 2. Work with existing and potential VSP participants to identify corrective actions to existing stewardship practices and/or implement additional or different stewardship practices to prevent fecal coliform bacteria from agricultural sources from entering surface waters and groundwater
		E-2. Nutrients in surface waters from agricultural sources (focus: cranberries, livestock)	Collection and testing of water samples at outflows of Tarlett Slough, Grayland ditch, and Willapa River for nitrates and phosphates, timed to align with fertilizer application (spring and fall annually)	Pacific Conservation District, with technical assistance from WSU for SOP development	Significant increase in nutrient levels relative to baseline	1. Repeat testing to confirm result 2. Work with current and new VSP participants to identify corrective actions to existing stewardship practices and/or implement additional or different stewardship practices to prevent nutrients from agricultural sources from entering surface waters and groundwater
		In-1. Fecal coliform in drainages to Willapa Bay	External monitoring: Monthly sampling of Willapa Bay drainages from Long Beach (North Beach) Peninsula	Pacific County Department of Public Works	Significant increase in bacteria levels relative to baseline	1. Evaluate potential nexus with agriculture 2. If nexus present, evaluate efficacy of benchmarks and performance metrics and revise as necessary

Table notes:

1. Critical area benchmarks are introduced in Chapter 4 of the Work Plan, including for each: associated critical area(s), associated agricultural viability aim(s), and strategies identified to achieve each benchmark. Specific stewardship activities potentially associated with each strategy are identified in Appendix G, "Strategies and Stewardship Activities."

2. Implementation monitoring, effectiveness monitoring, and indicator tracking are described in Chapter 5 of the Work Plan (sections 5.1.1, 5.1.2, and 5.1.3, respectively).

3. Monitoring methods, described in Chapter 5 of the Work Plan, include: Individual Stewardship Plans; VSP-sponsored monitoring; WDFW High Resolution Aerial Imagery Change Detection; External monitoring; and Programmatic Checklist. Where the table indicates External monitoring, a specific program or data source is also listed.

4. Chapter 6 of the Work Plan describes the Individual Stewardship Plan, including its purpose and content, completion process, validation, and synthesis of results.

5. As used in adaptive management thresholds, the term "significant" has a specific statistical meaning, defined in Section 5.1.6 of the Work Plan. Per VSP statute, the term "baseline" refers to conditions on July 22nd, 2011, but has a different practical meaning depending on the monitoring method and/or data source (see Table 5-2 of the Work Plan).

6. Participation is defined in Section 6.1.2 of the Work Plan as completion of an ISP and submittal to the Pacific Conservation District.

Benchmark No.	Critical Area Benchmark [1] (Protect/Enhance)	Performance Metrics and Indicators [2] Im-#: Implementation performance metric E-#: Effectiveness performance metric In-#: Indicator	Monitoring Method [3, 4]	Party Collecting Data	Adaptive Management Threshold [4, 5]	Adaptive Management Action
		In-2. Nutrients in groundwater	External monitoring: Biennial well sampling on Long Beach (North Beach) Peninsula	Pacific County Environmental Health Division	Significant increase in nutrient levels relative to baseline	3. If nexus unknown, develop and track programmatic strategy to decipher relationship
		In-3. Number and duration of shellfish closures	External monitoring: Washington State Department of Health Biotoxin Program	Washington State Department of Health	Significant increase in number or duration relative to baseline	
		In-4. State impaired waters list for fecal coliform and nutrients	External monitoring: WA State Water Quality Assessment 305(b)/303(d) Integrated Report	Washington State Department of Ecology	Waterbodies added to impaired waters list	
WQI-2	***Avoid increasing*** agricultural contributions to known surface water and groundwater quality impairments by pesticides considered by EPA to be an environmental risk ***Reduce*** agricultural contributions to known surface water and groundwater quality impairments by pesticides considered by EPA to be an environmental risk	Im-18. Trend in self-reported compliance with pesticide application rules Im-19. Trend in implementation of IPM and pesticide application BMPs Im-20. Trend in pesticide storage and disposal BMPs Im-21. Trend in annual chemigation checks completion on cranberry farms Im-22. Number of cranberry farms with crib and cover installed Im-23. Trend in measures to limit transfer of pesticides, herbicides, or fertilizers to drainage	Individual Stewardship Plans	Pacific Conservation District	Significant decrease in implementation	1. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 2. Evaluate effectiveness measures and indicators to reassess connection between implementation metrics and critical area functions and modify Work Plan if appropriate 3. Work with existing and potential VSP participants to implement additional or different stewardship practices to prevent pesticides from agricultural sources from entering surface waters and groundwater
		E-3. Pesticides in surface waters from agricultural sources (focus: cranberries)	VSP-sponsored monitoring: Collection and testing of water samples at the outflows of Tarlett Slough and Grayland Ditch for known water quality impairments; annual monitoring will be timed to align with pesticide usage (mid-July)	Pacific Conservation District, with technical assistance from WSU for SOP development	Significant increase in pesticide levels relative to baseline	1. Repeat testing to confirm result 2. Work with current and new VSP participants to identify corrective actions to existing stewardship practices and/or implement additional or different stewardship practices to prevent pesticides from agricultural sources from entering surface waters and groundwater
		In-5. Pesticide levels in Grayland Ditch	*Data not presently collected*		Significant increase in pesticide levels relative to baseline	1. Evaluate potential nexus with agriculture 2. If nexus present, evaluate efficacy of benchmarks and performance metrics and revise as necessary

Table notes:

1. Critical area benchmarks are introduced in Chapter 4 of the Work Plan, including for each: associated critical area(s), associated agricultural viability aim(s), and strategies identified to achieve each benchmark. Specific stewardship activities potentially associated with each strategy are identified in Appendix G, "Strategies and Stewardship Activities."

2. Implementation monitoring, effectiveness monitoring, and indicator tracking are described in Chapter 5 of the Work Plan (sections 5.1.1, 5.1.2, and 5.1.3, respectively).

3. Monitoring methods, described in Chapter 5 of the Work Plan, include: Individual Stewardship Plans; VSP-sponsored monitoring; WDFW High Resolution Aerial Imagery Change Detection; External monitoring; and Programmatic Checklist. Where the table indicates External monitoring, a specific program or data source is also listed.

4. Chapter 6 of the Work Plan describes the Individual Stewardship Plan, including its purpose and content, completion process, validation, and synthesis of results.

5. As used in adaptive management thresholds, the term "significant" has a specific statistical meaning, defined in Section 5.1.6 of the Work Plan. Per VSP statute, the term "baseline" refers to conditions on July 22nd, 2011, but has a different practical meaning depending on the monitoring method and/or data source (see Table 5-2 of the Work Plan).

6. Participation is defined in Section 6.1.2 of the Work Plan as completion of an ISP and submittal to the Pacific Conservation District.

Benchmark No.	Critical Area Benchmark [1] (Protect/Enhance)	Performance Metrics and Indicators [2] Im-#: Implementation performance metric E-#: Effectiveness performance metric In-#: Indicator	Monitoring Method [3, 4]	Party Collecting Data	Adaptive Management Threshold [4, 5]	Adaptive Management Action
						3. If nexus unknown, develop and track programmatic strategy to decipher relationship
		In-6. Change in status of Grayland ditch on state impaired waters list from Category 5 to Category 4(b) (pollutant control program in place)	External monitoring: WA State Water Quality Assessment 305(b)/303(d) Integrated Report	Washington State Department of Ecology	*Enhancement only. No adaptive management threshold.*	*Enhancement only. No adaptive management response.*
WQI-3	***Avoid increasing*** in agricultural contributions to the transport of fine sediment in runoff ***Reduce*** agricultural contributions to the transport of fine sediment in runoff	Im-14. Length of barriers (e.g. vegetation, fencing, berms) to prevent or discourage livestock from entering streams	Individual Stewardship Plans	Pacific Conservation District	Significant decrease in implementation	1. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 2. Evaluate effectiveness measures and indicators to reassess connection between implementation metrics and critical area functions and modify Work Plan if appropriate 3. Work with existing and potential VSP participants to implement additional or different stewardship practices to prevent sediment in runoff from agricultural sources
		Im-15. Number of off-stream watering facilities				
		Im-22. Number of cranberry farms with crib and cover installed				
		Im-24. Trend implementation of soil erosion control measures				
		Im-25. Number of road improvement projects completed	Individual Stewardship Plans; External monitoring: Habitat Work Schedule, PRiSM	Pacific Conservation District	*Enhancement only. No adaptive management threshold.*	*Enhancement only. No adaptive management response.*
		Im-26. Number of stream crossing projects completed				
		E-4. Extent of riparian vegetation on agricultural lands in the watershed	High Resolution Aerial Imagery Change Detection	Washington Department of Fish and Wildlife	Significant decrease in riparian vegetation in the watershed relative to baseline	1. Perform ground-truthing of change detection results in areas of significant decrease 2. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 3. Identify opportunity areas for improvement 4. Work with current and new VSP participants to reestablish riparian vegetation 5. Work with current and new VSP participants to identify corrective actions to existing stewardship practices and/or implement additional or different stewardship practices to prevent sediment in runoff from agricultural sources
		In-7. Sediment loading of salmonid redds	*Data not presently collected*		Significant increase in sediment loading relative to baseline	1. Evaluate potential nexus with agriculture

Table notes:

1. Critical area benchmarks are introduced in Chapter 4 of the Work Plan, including for each: associated critical area(s), associated agricultural viability aim(s), and strategies identified to achieve each benchmark. Specific stewardship activities potentially associated with each strategy are identified in Appendix G, "Strategies and Stewardship Activities."

2. Implementation monitoring, effectiveness monitoring, and indicator tracking are described in Chapter 5 of the Work Plan (sections 5.1.1, 5.1.2, and 5.1.3, respectively).

3. Monitoring methods, described in Chapter 5 of the Work Plan, include: Individual Stewardship Plans; VSP-sponsored monitoring; WDFW High Resolution Aerial Imagery Change Detection; External monitoring; and Programmatic Checklist. Where the table indicates External monitoring, a specific program or data source is also listed.

4. Chapter 6 of the Work Plan describes the Individual Stewardship Plan, including its purpose and content, completion process, validation, and synthesis of results.

5. As used in adaptive management thresholds, the term "significant" has a specific statistical meaning, defined in Section 5.1.6 of the Work Plan. Per VSP statute, the term "baseline" refers to conditions on July 22nd, 2011, but has a different practical meaning depending on the monitoring method and/or data source (see Table 5-2 of the Work Plan).

6. Participation is defined in Section 6.1.2 of the Work Plan as completion of an ISP and submittal to the Pacific Conservation District.

Benchmark No.	Critical Area Benchmark [1] (Protect/Enhance)	Performance Metrics and Indicators [2] Im-#: Implementation performance metric E-#: Effectiveness performance metric In-#: Indicator	Monitoring Method [3, 4]	Party Collecting Data	Adaptive Management Threshold [4, 5]	Adaptive Management Action
						2. If nexus present, evaluate efficacy of benchmarks and performance metrics and revise as necessary 3. If nexus unknown, develop and track programmatic strategy to decipher relationship
WQl-4	***Maintain*** preparedness for emergency spill response ***Improve*** preparedness for emergency spill response	Im-27. Trend in implementation of spill prevention measures Im-28. Trend in maintenance of emergency spill response protocols and materials Im-29. Trend in maintenance measures to protect contamination resulting from flooding	Individual Stewardship Plans	Pacific Conservation District	Significant decrease in implementation	1. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 2. Evaluate effectiveness measures and indicators to reassess connection between implementation metrics and critical area functions and modify Work Plan if appropriate 3. Work with existing and potential VSP participants to implement additional or different stewardship practices to maintain preparedness for emergency spill response
		Im-30. Number of trainings and response kits provided	External monitoring: Annual spill report	Pacific County Department of Emergency Management	*Enhancement only. No adaptive management threshold.*	*Enhancement only. No adaptive management response.*
		E-5. Damage (quantity of pollutant) from spills resulting from agricultural activities reported	External monitoring: Official spill reports	Washington Department of Ecology and Pacific County Department of Emergency Management	Significant increase in annual damage from spills resulting from agricultural activities relative to baseline	1. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 2. Work with current and new VSP participants to identify corrective actions to existing stewardship practices and/or implement additional or different stewardship practices to improve preparedness for emergency spill response
GOAL: Maintain or enhance in-stream flows and groundwater supplies in critical areas						
WQt-5	Ensure that agricultural activities ***do not reduce*** in-stream flows during critical low-flow periods Modify agricultural activities to ***enhance*** in-stream flows	Im-31. Trend in implementation of water catchment and retention strategies Im-32. Trend in implementation of irrigation efficiencies	Individual Stewardship Plans	Pacific Conservation District	Significant decrease in implementation	1. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 2. Evaluate effectiveness measures and indicators to reassess connection between implementation metrics and critical area functions and modify Work Plan if appropriate

Table notes:

1. Critical area benchmarks are introduced in Chapter 4 of the Work Plan, including for each: associated critical area(s), associated agricultural viability aim(s), and strategies identified to achieve each benchmark. Specific stewardship activities potentially associated with each strategy are identified in Appendix G, "Strategies and Stewardship Activities."

2. Implementation monitoring, effectiveness monitoring, and indicator tracking are described in Chapter 5 of the Work Plan (sections 5.1.1, 5.1.2, and 5.1.3, respectively).

3. Monitoring methods, described in Chapter 5 of the Work Plan, include: Individual Stewardship Plans; VSP-sponsored monitoring; WDFW High Resolution Aerial Imagery Change Detection; External monitoring; and Programmatic Checklist. Where the table indicates External monitoring, a specific program or data source is also listed.

4. Chapter 6 of the Work Plan describes the Individual Stewardship Plan, including its purpose and content, completion process, validation, and synthesis of results.

5. As used in adaptive management thresholds, the term "significant" has a specific statistical meaning, defined in Section 5.1.6 of the Work Plan. Per VSP statute, the term "baseline" refers to conditions on July 22nd, 2011, but has a different practical meaning depending on the monitoring method and/or data source (see Table 5-2 of the Work Plan).

6. Participation is defined in Section 6.1.2 of the Work Plan as completion of an ISP and submittal to the Pacific Conservation District.

Benchmark No.	Critical Area Benchmark [1] (Protect/Enhance)	Performance Metrics and Indicators [2] Im-#: Implementation performance metric E-#: Effectiveness performance metric In-#: Indicator	Monitoring Method [3, 4]	Party Collecting Data	Adaptive Management Threshold [4, 5]	Adaptive Management Action
	during critical low-flow periods					3. Work with existing and potential VSP participants to implement additional or different stewardship practices to protect in-stream flows
		In-8. In-stream flow levels during critical low-flow periods	External monitoring: Environmental Assessment Program; USGS National Water Information System	Washington Department of Ecology and USGS	Significant decrease in flow levels relative to baseline	1. Evaluate potential nexus with agriculture 2. If nexus present, evaluate efficacy of benchmarks and performance metrics and revise as necessary 3. If nexus unknown, develop and track programmatic strategy to decipher relationship
		In-9. Groundwater salinity intrusion in groundwater on Long Beach (North Beach) Peninsula	External monitoring: Biennial well sampling	Pacific County Environmental Health Division	Significant decrease in groundwater levels or significant increase in salinity relative to baseline	
		In-10. New water rights and exempt wells issued by Ecology	External monitoring: Water rights records	Washington Department of Ecology	*Tracked to inform adaptive management only. No adaptive management threshold.*	*Tracked to inform adaptive management only. No adaptive management response.*
WQt-6	Ensure that agricultural activities ***do not reduce*** existing floodplain connectivity and storage Modify agricultural activities to ***restore*** floodplain functions to reduce the frequency and intensity of flood events	Im-33. Trend in agricultural practices in the floodplain compatible with occasional or seasonal flooding	Individual Stewardship Plans	Pacific Conservation District	Significant decrease in implementation	1. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 2. Evaluate effectiveness measures and indicators to reassess connection between implementation metrics and critical area functions and modify Work Plan if appropriate 3. Work with existing and potential VSP participants to implement additional or different stewardship practices to protect floodplain connectivity and storage
		Im-34. Trend in maintenance or modification activities of tide-gates to allow fish passage and/or tidal exchange to the extent feasible				
		Im-35. Number of floodplain or surge wetland protection/enhancement projects	Individual Stewardship Plans; External monitoring: Habitat Work Schedule, PRiSM	Pacific Conservation District	*Enhancement only. No adaptive management threshold.*	*Enhancement only. No adaptive management response.*
		Im-36. Acres of floodplain or surge wetlands protected/restored				
		In-11. Losses (land, value) from seasonal flooding events	*Data not presently collected*		Significant increase in annual average losses relative to baseline	1. Evaluate potential nexus with agriculture 2. If nexus present, evaluate efficacy of benchmarks and performance metrics and revise as necessary 3. If nexus unknown, develop and track programmatic strategy to decipher relationship

Table notes:

1. Critical area benchmarks are introduced in Chapter 4 of the Work Plan, including for each: associated critical area(s), associated agricultural viability aim(s), and strategies identified to achieve each benchmark. Specific stewardship activities potentially associated with each strategy are identified in Appendix G, "Strategies and Stewardship Activities."

2. Implementation monitoring, effectiveness monitoring, and indicator tracking are described in Chapter 5 of the Work Plan (sections 5.1.1, 5.1.2, and 5.1.3, respectively).

3. Monitoring methods, described in Chapter 5 of the Work Plan, include: Individual Stewardship Plans; VSP-sponsored monitoring; WDFW High Resolution Aerial Imagery Change Detection; External monitoring; and Programmatic Checklist. Where the table indicates External monitoring, a specific program or data source is also listed.

4. Chapter 6 of the Work Plan describes the Individual Stewardship Plan, including its purpose and content, completion process, validation, and synthesis of results.

5. As used in adaptive management thresholds, the term "significant" has a specific statistical meaning, defined in Section 5.1.6 of the Work Plan. Per VSP statute, the term "baseline" refers to conditions on July 22nd, 2011, but has a different practical meaning depending on the monitoring method and/or data source (see Table 5-2 of the Work Plan).

6. Participation is defined in Section 6.1.2 of the Work Plan as completion of an ISP and submittal to the Pacific Conservation District.

Benchmark No.	Critical Area Benchmark [1] (Protect/Enhance)	Performance Metrics and Indicators [2] Im-#: Implementation performance metric E-#: Effectiveness performance metric In-#: Indicator	Monitoring Method [3, 4]	Party Collecting Data	Adaptive Management Threshold [4, 5]	Adaptive Management Action
GOAL: Maintain or enhance fish and wildlife habitat functions of critical areas						
H-7	Ensure that agricultural activities ***protect*** in-stream and riparian habitat Modify agricultural activities to ***enhance*** in-stream and riparian habitat	Im-13. Trend in implementation of rotational grazing to prevent overstocking	Individual Stewardship Plans	Pacific Conservation District	Significant decrease in implementation	1. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 2. Evaluate effectiveness measures and indicators to reassess connection between implementation metrics and critical area functions and modify Work Plan if appropriate 3. Work with existing and potential VSP participants to implement additional or different stewardship practices to protect in-stream and riparian habitat
		Im-14. Length of barriers (e.g. vegetation, fencing, berms) to prevent or discourage livestock from entering streams				
		Im-16. Number of riparian planting/enhancement projects	Individual Stewardship Plans; External monitoring: Habitat Work Schedule, PRiSM	Pacific Conservation District	*Enhancement only. No adaptive management threshold.*	*Enhancement only. No adaptive management response.*
		Im-17. Acres and linear feet of riparian planting/enhancement				
		Im-26. Number of stream crossing projects completed				
		Im-37. Number of culverts repaired or replaced that improved fish passage				
		Im-38. Number of stream habitat protection/enhancement/restoration projects on agricultural lands				
		Im-39. Acres of stream habitat protected/enhanced/restored on agricultural lands				
		E-4. Extent of riparian vegetation on agricultural lands in the watershed	High Resolution Aerial Imagery Change Detection	Washington Department of Fish and Wildlife	Significant decrease in riparian vegetation in the watershed relative to baseline	1. Perform ground-truthing of change detection results in areas of significant decrease 2. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 3. Identify opportunity areas for improvement

Table notes:

1. Critical area benchmarks are introduced in Chapter 4 of the Work Plan, including for each: associated critical area(s), associated agricultural viability aim(s), and strategies identified to achieve each benchmark. Specific stewardship activities potentially associated with each strategy are identified in Appendix G, "Strategies and Stewardship Activities."

2. Implementation monitoring, effectiveness monitoring, and indicator tracking are described in Chapter 5 of the Work Plan (sections 5.1.1, 5.1.2, and 5.1.3, respectively).

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6. Participation is defined in Section 6.1.2 of the Work Plan as completion of an ISP and submittal to the Pacific Conservation District.

Benchmark No.	Critical Area Benchmark [1] (Protect/Enhance)	Performance Metrics and Indicators [2] Im-#: Implementation performance metric E-#: Effectiveness performance metric In-#: Indicator	Monitoring Method [3, 4]	Party Collecting Data	Adaptive Management Threshold [4, 5]	Adaptive Management Action
						4. Work with current and new VSP participants to reestablish lost vegetation 5. Work with current and new VSP participants to identify corrective actions to existing stewardship practices and/or implement additional or different stewardship practices to protect in-stream and riparian habitat
H-8	Ensure that agricultural activities ***protect*** existing high-functioning estuarine and riverine aquatic areas that provide habitat for fish and wildlife Modify agricultural activities to ***restore and enhance*** lower-functioning estuarine and riverine aquatic areas that provide habitat for fish and wildlife	Im-34. Trend in maintenance or modification activities of tide-gates to allow fish passage and/or tidal exchange to the extent feasible	Individual Stewardship Plans	Pacific Conservation District	Significant decrease in implementation	1. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 2. Evaluate effectiveness measures and indicators to reassess connection between implementation metrics and critical area functions and modify Work Plan if appropriate 3. Work with existing and potential VSP participants to implement additional or different stewardship practices to protect estuarine and riverine aquatic areas
		Im-40. Trend in implementation of shellfish harvest practices that minimize disturbance to adjacent lands (specific to mechanical harvest)				
		Im-41. Trend in removal of derelict equipment/materials				
		Im-42. Number of estuarine habitat protection/enhancement/restoration projects on agricultural lands	Individual Stewardship Plans; External monitoring: Habitat Work Schedule, PRiSM	Pacific Conservation District	*Enhancement only. No adaptive management threshold.*	*Enhancement only. No adaptive management response.*
		Im-43. Acres of estuarine habitat protected/enhanced/restored on agricultural lands				
		In-12. Fish and wildlife use of/occurrence in estuarine and riverine aquatic habitat	External monitoring: Population and sensitive species surveys	Washington Department of Fish and Wildlife, US Fish and Wildlife Service	Significant decrease relative to baseline	1. Evaluate potential nexus with agriculture 2. If nexus present, evaluate efficacy of benchmarks and performance metrics and revise as necessary 3. If nexus unknown, develop and track programmatic strategy to decipher relationship
		In-13. Area of native eelgrass (focus: Willapa Bay)	External monitoring: Eelgrass sampling	Washington Department of Natural Resources, WSU Extension		
H-9	Ensure that agricultural activities ***protect*** current wetlands in natural condition Modify agricultural activities to ***enhance*** wetland function	Im-44. Trend in implementation of measures to protect or enhance water quality or habitat functions of wetlands, including farmed bogs	Individual Stewardship Plans	Pacific Conservation District	Significant decrease in implementation	1. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 2. Evaluate effectiveness measures and indicators to reassess connection between implementation metrics and critical area functions and modify Work Plan if appropriate

Table notes:

1. Critical area benchmarks are introduced in Chapter 4 of the Work Plan, including for each: associated critical area(s), associated agricultural viability aim(s), and strategies identified to achieve each benchmark. Specific stewardship activities potentially associated with each strategy are identified in Appendix G, "Strategies and Stewardship Activities."

2. Implementation monitoring, effectiveness monitoring, and indicator tracking are described in Chapter 5 of the Work Plan (sections 5.1.1, 5.1.2, and 5.1.3, respectively).

3. Monitoring methods, described in Chapter 5 of the Work Plan, include: Individual Stewardship Plans; VSP-sponsored monitoring; WDFW High Resolution Aerial Imagery Change Detection; External monitoring; and Programmatic Checklist. Where the table indicates External monitoring, a specific program or data source is also listed.

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6. Participation is defined in Section 6.1.2 of the Work Plan as completion of an ISP and submittal to the Pacific Conservation District.

Benchmark No.	Critical Area Benchmark [1] (Protect/Enhance)	Performance Metrics and Indicators [2] Im-#: Implementation performance metric E-#: Effectiveness performance metric In-#: Indicator	Monitoring Method [3, 4]	Party Collecting Data	Adaptive Management Threshold [4, 5]	Adaptive Management Action
						3. Work with existing and potential VSP participants to implement additional or different stewardship practices to protect wetlands
		Im-45. Number of wetland restoration, enhancement, and creation projects implemented	Individual Stewardship Plans; External monitoring: Habitat Work Schedule, PRiSM	Pacific Conservation District	*Enhancement only. No adaptive management threshold.*	*Enhancement only. No adaptive management response.*
		Im-46. Acres of wetlands restored, enhanced, or created				
H-10	Ensure that agricultural activities ***protect*** existing habitat for state and federally listed species Modify agricultural activities to ***enhance*** habitat for state and federally listed species	Im-47. Trend in implementation of measures to maintain or improve habitat for listed species	Individual Stewardship Plans	Pacific Conservation District	Significant decrease in implementation	1. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 2. Evaluate effectiveness measures and indicators to reassess connection between implementation metrics and critical area functions and modify Work Plan if appropriate 3. Work with existing and potential VSP participants to implement additional or different stewardship practices to protect habitat for listed species
		Im-48. Number of acres of habitat for state or federally listed species protected/enhanced	Individual Stewardship Plans; External monitoring: Habitat Work Schedule, PRiSM	Pacific Conservation District	*Enhancement only. No adaptive management threshold.*	*Enhancement only. No adaptive management response.*
GOAL: Maintain or reduce hazards to physical safety associated with critical areas						
PS-11	Ensure that agricultural activities ***maintain*** flood and erosion protection measures Modify agricultural activities to ***reduce*** risk from flooding or erosion	Im-49. Trend in implementation of good drainage practices near geologically hazardous areas	Individual Stewardship Plans	Pacific Conservation District	Significant decrease in implementation	1. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 2. Evaluate effectiveness measures and indicators to reassess connection between implementation metrics and critical area functions and modify Work Plan if appropriate 3. Work with existing and potential VSP participants to implement additional or different stewardship practices to maintain flood and erosion protection measures
		Im-50. Maintenance of dikes and tide-gates				
		Im-51. Number and size of structures re-sited out of the mapped floodway	Individual Stewardship Plans	Pacific Conservation District	*Enhancement only. No adaptive management threshold.*	*Enhancement only. No adaptive management response.*

Table notes:

1. Critical area benchmarks are introduced in Chapter 4 of the Work Plan, including for each: associated critical area(s), associated agricultural viability aim(s), and strategies identified to achieve each benchmark. Specific stewardship activities potentially associated with each strategy are identified in Appendix G, "Strategies and Stewardship Activities."

2. Implementation monitoring, effectiveness monitoring, and indicator tracking are described in Chapter 5 of the Work Plan (sections 5.1.1, 5.1.2, and 5.1.3, respectively).

3. Monitoring methods, described in Chapter 5 of the Work Plan, include: Individual Stewardship Plans; VSP-sponsored monitoring; WDFW High Resolution Aerial Imagery Change Detection; External monitoring; and Programmatic Checklist. Where the table indicates External monitoring, a specific program or data source is also listed.

4. Chapter 6 of the Work Plan describes the Individual Stewardship Plan, including its purpose and content, completion process, validation, and synthesis of results.

5. As used in adaptive management thresholds, the term "significant" has a specific statistical meaning, defined in Section 5.1.6 of the Work Plan. Per VSP statute, the term "baseline" refers to conditions on July 22nd, 2011, but has a different practical meaning depending on the monitoring method and/or data source (see Table 5-2 of the Work Plan).

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Benchmark No.	Critical Area Benchmark [1] (Protect/Enhance)	Performance Metrics and Indicators [2] Im-#: Implementation performance metric E-#: Effectiveness performance metric In-#: Indicator	Monitoring Method [3, 4]	Party Collecting Data	Adaptive Management Threshold [4, 5]	Adaptive Management Action
		E-6. Functional performance status of Grayland tide-gate	External monitoring: Field surveys	Pacific County Department of Public Works	Tide-gate in non-functional status during >5% of two-year monitoring period	1. Evaluate outreach activities completed to date, agricultural viability measures, applicability of performance metrics to agricultural practices, and other contextual considerations to determine cause 2. Identify opportunity areas for improvement 3. Work with current and new VSP participants to reestablish tide-gate functionality
		In-14. Losses (land, value) from seasonal flooding events	*Data not presently collected*		Significant increase in annual average losses relative to baseline	1. Evaluate potential nexus with agriculture 2. If nexus present, evaluate efficacy of benchmarks and performance metrics and revise as necessary 3. If nexus unknown, develop and track programmatic strategy to decipher relationship
		In-15. Losses (land, value) from erosion	External monitoring: Southwest Coastal Erosion Study	USGS/Washington Department of Ecology	Significant increase in annual average losses relative to baseline	

Table notes:

1. Critical area benchmarks are introduced in Chapter 4 of the Work Plan, including for each: associated critical area(s), associated agricultural viability aim(s), and strategies identified to achieve each benchmark. Specific stewardship activities potentially associated with each strategy are identified in Appendix G, "Strategies and Stewardship Activities."

2. Implementation monitoring, effectiveness monitoring, and indicator tracking are described in Chapter 5 of the Work Plan (sections 5.1.1, 5.1.2, and 5.1.3, respectively).

3. Monitoring methods, described in Chapter 5 of the Work Plan, include: Individual Stewardship Plans; VSP-sponsored monitoring; WDFW High Resolution Aerial Imagery Change Detection; External monitoring; and Programmatic Checklist. Where the table indicates External monitoring, a specific program or data source is also listed.

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Table 2. Monitoring Tasks for Agricultural Viability

Aim No.	Agricultural Viability Aim [1]	Monitoring Measures [2]	Monitoring Method [3, 4]	Party Collecting Data	Adaptive Management Threshold [5,6]	Adaptive Management Action
A-1	Maximize economic value for Pacific County agricultural products and income potential for agricultural activities	M-1. Acres of land in agricultural use	External monitoring: Pacific County Tax Assessor data (every two years), supplemented by WSDA inventory (every five years) and NASS data	Pacific County Tax Assessor, WSDA, USDA	Decreasing trend in market viability of Pacific County agricultural products; decreasing trend in agricultural activities	1. Evaluate outreach activities completed to date, critical area monitoring results, regulatory context, and other contextual considerations to determine cause 2. Work with agricultural operators to identify new or additional program components to protect and enhance agricultural viability
		M-2. Acres of abandoned farmlands				
		M-3. Use and awareness of marketing/incentive programs	Individual Stewardship Plans	Pacific Conservation District		
		M-4. Overall adaptability of Pacific County agricultural products to changing market conditions	Individual Stewardship Plans	Pacific Conservation District		
		M-5. Pricing and demand levels for commodity products	External monitoring: USDA NASS weekly crop progress, Cranberry Marketing Committee data and reports	USDA, WSU Extension		
		M-6. WSDA promotion/support for Pacific County products	External monitoring: WSDA reports	WSDA		
A-2	Improve participation in current use taxation program	M-11. Acres and type of agricultural land (producing and non-producing) enrolled in current use taxation program	External monitoring: Pacific County Current Use Taxation Program	Pacific County	Decreasing trend in the number of acres enrolled in current use taxation program	1. Evaluate outreach activities completed to date and other contextual considerations to determine cause 2. Discuss trend with Pacific County Current Use Taxation Program staff 3. Increase outreach and education efforts
A-3	Maintain resilient shellfish yields in the face of changing ocean chemistry and pest infestations	M-12. Estimate of lost shellfish yields due to changing chemistry	External monitoring: OSU "Oyster Condition Index, WDFW aquaculture harvest reports, Pacific Shellfish Institute Ocean Acidification Monitoring, Individual Stewardship Plans	OSU, WDFW, Pacific Shellfish Institute, Pacific Conservation District	Increasing trend in shellfish losses due to changing ocean conditions	1. Identify additional technical resources related to ocean acidification and changing ocean conditions relevant to shellfish production 2. Work with shellfish producers to identify new or additional program components to address resilience to changing ocean conditions
		M-13. Estimate of acres of shellfish beds lost or unproductive due to changing ocean conditions				
A-4	Maintain resilient agricultural production in the face of sea level rise	M-14. Trends in understanding of sea level rise projections and impacts specific to Pacific County	Programmatic Checklist	Pacific Conservation District	Increasing trend in uncertainty, concern regarding sea level rise	1. Evaluate outreach and education activities completed to date and other contextual considerations to determine cause 2. Identify additional technical resources related to sea level rise 3. Work with agricultural operators to identify new or additional program components to address resilience to sea level rise 4. Increase outreach and education efforts

Table notes:
1. Agricultural viability aims and associated strategies are identified in Section 4.6 of the Work Plan.
2. Agricultural viability tracking is described in Chapter 5 of the Work Plan (Section 5.1.4).
3. Monitoring methods for agricultural viability aims include: Individual Stewardship Plans; External monitoring; and Programmatic Checklist. Where the table indicates External monitoring, a specific program or data source is also listed. Each monitoring method is described in Chapter 5 of the Work Plan.
4. Chapter 6 of the Work Plan describes the Individual Stewardship Plan, including its purpose and content, completion process, validation, and synthesis of results.
5. Unlike for critical area benchmarks, adaptive management thresholds for agricultural viability aims are evaluated qualitatively rather than quantitatively based on monitoring results. Importantly, Pacific County cannot "fail out" of the VSP for failing to meeting agricultural viability aims.
6. Per VSP statute, trends are relative to the "baseline" conditions on July 22nd, 2011.

Aim No.	Agricultural Viability Aim [1]	Monitoring Measures [2]	Monitoring Method [3, 4]	Party Collecting Data	Adaptive Management Threshold [5,6]	Adaptive Management Action
A-5	Protect agricultural operators from losses due to human-made and natural disasters	M-15. Number of agricultural operators with asset documentation M-16. Number of insured agricultural operators with property and equipment insurance	Individual Stewardship Plans; External monitoring: reporting from outreach providers, Pacific County Economic Development Council	Pacific Conservation District, Pacific County Economic Development Council	Declining trend in the level of preparedness of agricultural operators	1. Evaluate outreach and education activities completed to date and other contextual considerations to determine cause 2. Increase outreach and education efforts
A-6	Facilitate an adequate supply of labor	M-17. Trends in labor availability	Individual Stewardship Plans; External monitoring: report from outreach provider(s)	Pacific Conservation District	Declining trend in labor availability	1. Evaluate regulatory context and other contextual considerations to determine cause 2. Work with agricultural operators to identify new or additional program components to address labor availability
A-7	Ensure accessibility of technical assistance providers who are knowledgeable about the needs of the Pacific County agricultural community	M-18. Trends in availability and use of research, educational, and technical assistance providers M-19. Continuation of WSU Extension Office services for Pacific County	Individual Stewardship Plans	Pacific Conservation District	Declining trend in resources available; loss of WSU Extension Office	
A-8	Protect and promote voluntary enhancement of pollinator populations, and ensure adequate pollination of cranberry farms	Im-19. Trend in implementation of IPM and pesticide application BMPs M-20. Implementation of measures to protect or improve pollinator habitat M-21. Implementation of measures to reduce pest management activities harmful to pollinators	Individual Stewardship Plans	Pacific Conservation District	Declining trend in implementation of measures to protect pollinators; declining trend in pollination levels	1. Evaluate outreach activities completed to date, critical area monitoring results, regulatory context, and other contextual considerations to determine cause 2. Work with existing and potential VSP participants to identify corrective actions to existing stewardship practices and/or implement additional or different stewardship practices to protect pollinators 3. Work with agricultural operators to identify new or additional program components to address pollinator health 4. Increase outreach and education efforts
		M-22. Number of training programs offered and attended	Programmatic Checklist	Pacific Conservation District		
		M-23. Adequacy of pollination levels on farms	Individual Stewardship Plans	Pacific Conservation District		
A-9	Maintain resilient agricultural production in the face of an aging agricultural community	M-1. Acres of land in agricultural use M-2. Acres of abandoned farmlands	External monitoring: Pacific County Tax Assessor data (every two years), supplemented by Intersection maps (every five years) and NASS data	Pacific County Tax Assessor, Pacific Conservation District, USDA	Declining trend in agricultural activities; declining trend in the level of engagement of agricultural operators in estate planning	1. Evaluate outreach activities completed to date, critical area monitoring results, regulatory context, and other contextual considerations to determine cause 2. Work with agricultural operators to identify new or additional program components to protect and enhance agricultural viability 3. Increase outreach and education efforts
		M-24. Number of training programs offered and attended M-25. Trend in implementation of estate planning practices	Individual Stewardship Plans; External monitoring: report from outreach provider(s)	Pacific Conservation District		

Table notes:
1. Agricultural viability aims and associated strategies are identified in Section 4.6 of the Work Plan.
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3. Monitoring methods for agricultural viability aims include: Individual Stewardship Plans; External monitoring; and Programmatic Checklist. Where the table indicates External monitoring, a specific program or data source is also listed. Each monitoring method is described in Chapter 5 of the Work Plan.
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5. Unlike for critical area benchmarks, adaptive management thresholds for agricultural viability aims are evaluated qualitatively rather than quantitatively based on monitoring results. Importantly, Pacific County cannot "fail out" of the VSP for failing to meeting agricultural viability aims.
6. Per VSP statute, trends are relative to the "baseline" conditions on July 22nd, 2011.

Aim No.	Agricultural Viability Aim [1]	Monitoring Measures [2]	Monitoring Method [3, 4]	Party Collecting Data	Adaptive Management Threshold [5,6]	Adaptive Management Action
A-10	Maintain infrastructure to support agriculture	M-26. New or improved agriculture infrastructure	Programmatic Checklist	Pacific Conservation District	Declining trend in the availability of infrastructure, including professional networks and technical resources	1. Evaluate regulatory context and other contextual considerations to determine cause 2. Work with agricultural operators to identify new or additional program components to address infrastructure availability 3. Increase outreach and education efforts
		M-27. Number of events or workshops for networking among farmers or between farmers and agencies				
		M-28. Number of assistance courses, educational workshops, pilot projects, or demonstration events				
A-11	Control populations of noxious, nuisance, and pest species on agricultural lands	Im-19. Trend in implementation of IPM and pesticide application BMPs	Individual Stewardship Plans	Pacific Conservation District	Increasing trend in production loss from invasive/nuisance/pest species	1. Evaluate outreach activities completed to date, critical area monitoring results, regulatory context, and other contextual considerations to determine cause 2. Work with existing and potential VSP participants to identify corrective actions to existing stewardship practices and/or implement additional or different stewardship practices to control invasive/nuisance/pest species 3. Work with agricultural operators to identify new or additional program components to address invasive/nuisance/pest species 4. Increase outreach and education efforts
		M-29. Trend in invasive/critical pest species management on public lands	*Data not presently collected*			
		M-30. Distribution and abundance of invasive vegetation and critical pest species	External monitoring: Existing monitoring efforts by state and federal agencies, and Pacific County Weed Board annual records	WNDR, USFWS, USDA, WDFW, WSU Extension; Pacific County Weed Board		
		M-31. State impaired waters list for Invasive Exotic Species	External monitoring: WA State Water Quality Assessment 305(b)/303(d) Integrated Report	Washington State Department of Ecology		
		M-32. Estimated production loss from invasive/nuisance species	*Data not presently collected*			

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