

| Goal | Critical Area | Benchmarks that State Agency Monitoring Could Inform | Resource name | Ongoing program or Static document | Possible Results of Resource Utilization | Who to Contact | Scale | Geography | Relative cost to workgroups | Relevant to VSP, what questions can this answer? | Link |
|--|-------------------|--|--|------------------------------------|---|----------------|---------------|--|-----------------------------|---|--|
| CA Goal-III: Protect fish and wildlife populations and their associated habitats | Fish and Wildlife | Maintain riparian vegetation along waterbodies | High Resolution Change Detection | Ongoing | % change of natural vegetation (tree and shrub) between 2011 - 2020 in riparian areas | WDFW | fine to broad | Currently Puget Sound-wide * Available elsewhere for VSP upon request | none | Where has canopy been lost? Where has impervious surface increased? | www.pshrcd.com |
| CA Goal-III: Protect fish and wildlife populations and their associated habitats | Fish and Wildlife | Extent of mapped or documented Priority habitat in areas of intersect or in sub-basins where intersection occurs are maintained or increased during monitoring period. | Monitoring Resources on State Wildlife Lands | Ongoing | | WDFW | fine to broad | Statewide | none | | http://wdfw.wa.gov/conservation/research/projects/wla_monitoring/index.html |
| CA Goal-III: Protect fish and wildlife populations and their associated habitats | Fish and Wildlife | Habitat for complementary wildlife species is maintained or increased (e.g., pollinators, raptors, bats, etc.). | Ecological Integrity Assessments: Monitoring and Evaluation of Wildlife Areas in Washington | Static | Measuring ecological integrity by ecosystem type | WDFW | Fine to mid | Statewide | none | How does ecological integrity compare between occurrences of the same ecological system? How to improve decisions on monitoring individual ecological attributes? | http://wdfw.wa.gov/publications/01314/wdfw01314.pdf see also: http://wdfw.wa.gov/publications/01395/ |
| CA Goal-III: Protect fish and wildlife populations and their associated habitats | Fish and Wildlife | Extent of mapped or documented Priority habitat in areas of intersect or in sub-basins where intersection occurs are maintained or increased during monitoring period. | Fragmentation by Agriculture Influences Reproductive Success of Birds in a Shrubsteppe Landscape | Static | Understanding fragmentation effects on bird populations in shrubsteppe landscape | WDFW | Fine | Shrubsteppe | none | What is the effect of fragmentation on bird populations in shrubsteppe systems? | http://wdfw.wa.gov/publications/00417/ |
| CA Goal-III: Protect fish and wildlife populations and their associated habitats | Fish and Wildlife | Extent of mapped or documented Priority habitat in areas of intersect or in sub-basins where intersection occurs are maintained or increased during monitoring period. | Historical and Current Approaches to Monitoring Greater Sage-Grouse | Static | Understanding/Developing monitoring strategies for Sage-grouse | WDFW | Fine | Shrubsteppe | none | How do we monitor sage grouse populations in our area of concern? | http://wdfw.wa.gov/publications/01120/ |

| | | | | | | | | | | | |
|--|-------------------|---|--|--|--|---------|---------------|--|---|--|---|
| CA Goal-III: Protect fish and wildlife populations and their associated habitats | Fish and Wildlife | Miles of fencing for wildlife exclusion | Protocol for Monitoring Effectiveness of Riparian Livestock Exclusion Projects | Static | Developing protocol for monitoring effectiveness of exclusion projects | SRFB | Fine | Statewide | none | How do we develop a strategy to understand the effectiveness of a livestock exclusion fence? | http://hws.ekosystem.us/content/MC-4_Protocol_for_Effectiveness_Monitoring_of_Livestock_Exclusion_Projects_2011.pdf |
| CA Goal-III: Protect fish and wildlife populations and their associated habitats | Fish and Wildlife | Habitat for complementary wildlife species is maintained or increased (e.g., pollinators, raptors, bats, etc.). | StateWide Action Plan (SWAP) | Static | General species-specific info (including range maps and suitable habitat descriptions) | WDFW | fine to broad | Statewide | none | | http://wdfw.wa.gov/conservation/cwcs/ |
| CA Goal: Protect wetland area, functions and values | Wetlands | wetland habitats and functions are maintained or increased | Wetlands Change Analysis | ongoing, base layer for 2011 and the change analysis run every 5 years | Net change in wetland area | Ecology | mid | Western Washington and east slope of the cascades | none, to be rerun every 5 years | Has there been a change in wetland area and type? The Wetlands Change Analysis will be rerun every 5 years. | http://www.ecy.wa.gov/programs/sea/wetlands/StatusAndTrends.html |
| CA Goal: Protect wetland area, functions and values | Wetlands | wetland area and functions are maintained or increased | National wetland inventory | Static though the USFWS is updating the maps as opportunities arise Check USFWS site for most current maps | baseline map of wetlands | USFWS | mid-broad | statewide though limited mapping in Agricultural lands | none | NWI can provide baseline for wetlands, but many agricultural areas were not mapped and wetlands are hence undershown in agricultural lands | https://www.fws.gov/wetlands/index.html |
| CA Goal: Protect wetland functions and values | Wetlands | Wetland functions and values are maintained or enhanced | Wetlands rating system | Static method | assessment of functions | Ecology | fine | statewide/parcel | 4-8 hours staff time/site. Technical providers needs training in the rating system and wetland delineation. | Are the levels of functions in water quality, water quantity and habitat maintaining, increasing or decreasing? | http://www.ecy.wa.gov/programs/sea/wetlands/ratingsystems/index.html |

| | | | | | | | | | | | |
|--|--|---|--|----------------|---|---|----------------------|--------------------------|--|--|--|
| <p>CA Goal: Minimize the impacts of erosion and landslides on ESA-Listed fish streams</p> | <p>Geologic Hazardous Areas</p> | <p>Minimize impacts from agricultural activities to maintain and improve stream sediment conditions</p> | <p>Water Quality Monitoring and streambed assessment: water turbidity continuous sensors, percent fines in streambed, total suspended solids</p> | <p>Ongoing</p> | <p>Tracking conditions over time in bracketed areas to eliminate upstream sources. Can link to near-real time web reporting so people can see results nearly instantly.</p> | <p>Ecology Environmental Assessment</p> | <p>Fine to broad</p> | <p>Statewide/parcel</p> | <p>*There are multiple ways to measure sediment: 1) instream: \$1700-\$5000/year/site plus travel 2) water quality turbidity: \$6,000/year/site staff time if local staff can help. If new station equipment is needed, a one-time cost of \$5,200. 3) water quality, multi-parameter: costs vary, some details below.</p> | <p>Are sediment conditions in streams improving, declining, or the same as 2011 baseline conditions?</p> | <p>https://fortress.wa.gov/ecy/eap/flows/regions/state.asp contact: casm461@ecy.wa.gov</p> |
| <p>CA Goal: maintain or improve groundwater quality by reducing contamination from agricultural activities</p> | <p>Critical Aquifer Recharge Areas</p> | <p>Avoid and minimize groundwater contamination from agricultural activities</p> | <p>Groundwater quality monitoring</p> | <p>Ongoing</p> | <p>Track groundwater quality conditions over time in response to potential changes in agricultural practices</p> | <p>Ecology Environmental Assessment</p> | <p>Broad</p> | <p>Statewide/aquifer</p> | <p>** 3-4 hours staff time/well + travel + laboratory analytical costs. New well installation if needed: 1-2+K per well depending on depth and design + staff time + travel</p> | <p>Is groundwater quality improving, declining, or the same as baseline conditions?</p> | <p>contact: casm461@ecy.wa.gov</p> |
| <p>CA Goal: maintain or improve groundwater levels in sensitive aquifers</p> | <p>Critical Aquifer Recharge Areas</p> | <p>Prevent the decline in critical aquifers due to agricultural water use</p> | <p>Monitoring water level trends in sensitive aquifers</p> | <p>Ongoing</p> | <p>Track groundwater levels over time in response to potential changes in agricultural water use practices</p> | <p>Ecology Environmental Assessment</p> | <p>Broad</p> | <p>Statewide/aquifer</p> | <p>** 0.5-2 hours staff time/well + travel + equipment cost (if instrumented with a transducer). New well installation if needed: 1-2+K per well depending on depth and design + staff time + travel</p> | <p>Are groundwater levels remaining stable, declining, or increasing over time?</p> | <p>contact: casm461@ecy.wa.gov</p> |

*More details on water quality measurements: equipment costs range from \$5,200 for a stand-alone turbidity monitoring station to \$35,000 for a near real time stream flow gage that collect a suite of up to 5 water quality parameters every fifteen minutes and the capability to collect discrete water quality sample based on predetermined water quality sensor thresholds. Staffing is also flexible depending on the skills, ability and desires of the VSP partners. From the basic training and side by side comparison studies for around \$6,000 per year per site. To the other extreme, where the VSP partner only providing minimal onsite field support and Ecology staff manages all aspects of the station and hands off the data to VSP partners for between \$20,000 - \$27,000 depending on the location and complexity of the specific site.

** the above staff time estimates assume a two person sampling team. They don't include in-office staff time to prepare for field sampling, or to process, QA, and report data results to clients.