

# Recommendations for Regional Stormwater Monitoring

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October 31, 2013

- Decision
- Discussion
- Information

**SUBJECT:            Monitoring of Nutrients and Sediment from Cropland Production**

**ISSUE:**

Cropland is a common land use in some Puget Sound Counties, particularly in north Puget Sound (Figure 1). Cropland activities can result in potential impacts to surface waters. These include pesticide pollution, excess sediment, and excess nutrient input. Last year, the Agriculture Stormwater Sub-Group developed recommendations for pesticide monitoring associated with croplands. These were approved by the Puget Sound Stormwater Workgroup. This year, we focused on monitoring recommendations for nutrient and sediment inputs from cropland.

**Figure 1. Puget Sound Cropland**  
(WA Dept. Ag. 2012)

<b>County</b>	<b>Acres of Cropland</b>	<b>% of PS Cropland</b>
Whatcom	61983	30.88
Skagit	57762	28.78
Snohomish	21896	10.91
Thurston	14535	7.24
King	12576	6.27
Pierce	10837	5.40
Island	6232	3.10
Clallam	4537	2.26
Jefferson	2796	1.39
Mason	1667	0.83
Kitsap	821	0.41

**BACKGROUND:**

What monitoring and assessment information is needed and why?

The Ag Stormwater committee reviewed current monitoring efforts on nutrient and sediment inputs from cropland. We also reviewed the distribution of cropland across Puget Sound. Data indicates that most cropland acreage is in north Puget, which points out a regional need. After reviewing current monitoring activities, we found the following.

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1) Whatcom County. Cropland monitoring is especially lacking for both nutrients and sediment. Fecal coliform appears to be sampled by two programs, and total suspended solids in a new program (Natural Resource Assessment Program) that will focus on Bertrand Creek. Even with the new sampling in Bertrand for total suspended solids, there is a remaining need for sediment monitoring in other areas of the county. There are numerous ditches on agricultural land that has an impact on transporting sediment and nutrients downstream to beneficial use areas. Also, annual crops and perennial crops that are rotated out of production and for which no cover crop has been established, can contribute sediment that impacts salmon redds directly. The accumulation of sediment over time diminishes watercourse drainage capacity. This results in the desire/need to dredge out watercourse, eliminating fish habitat. Current monitoring does not record the magnitude of this problem.

2) Skagit County. The Skagit County Monitoring Program samples for nutrients and total suspended solids. Originally, they sampled monthly from 2003-2008. Now they sample quarterly. While they don't specifically target crop locations, many of the sites are in actively-farmed crop areas. It is ambient monitoring every two weeks for fecal, DO, temperature, pH, conductivity, and turbidity. Given the size of their data set, the county believes it has data showing impacts from storm events.

3) Whidbey and Camano Islands. The county has a similar program to Skagit that includes both nutrients and sediment with about 5 years worth of data. However, it probably is not linked to storm events. It was developed with Critical Area Ordinance issues in mind.

### Current Monitoring Programs Reviewed:

- The Natural Resources Assessment Section (NRAS) implemented by the Washington Dept. of Agriculture and Washington Dept. of Ecology. This program added two new sites in 2013 along Bertrand Creek in Whatcom County in addition to the seven sites already sampled in Skagit and King Counties. They will collect weekly samples from mid-March through the 3<sup>rd</sup> week of September and analyzes samples for over 170 pesticides, copper, DO, pH, temperature, total suspended solids, and turbidity. They will not be measuring nutrients and phosphate. They plan to report to berry growers regularly during the season with about a month of lag time after each collection. This will allow for adaptive management. The focus of this program is on ESA-listed salmonids.
- NW Indian College in Whatcom County. The sites included in this program are not specifically located around croplands. This routine monitoring program provides data for "nodes" at the lower end of major drainages in areas where fecal coliform is a concern. They are beginning to implement targeted monitoring in priority drainages by segmenting tributaries. This might give a better tie to adjacent land uses. They are not planning to sample directly from a particular parcel.
- Department of Ecology water quality sampling led by Steve Hood samples the full suite of parameters, but does so at a large scale, and it is difficult to tie to croplands.

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- The Whatcom Clean Water Program will be sampling fecal coliform. They are currently working on the QAPP. This program is led by Andrea Hood (Department of Health). Will get more details when the QAPP is final.

Who was involved in the Subgroup, and how were decisions made?

**Involvement:** Heather Kibbey (City of Everett), Bobbi Lindemulder (Snohomish Conservation District), Karen Bishop (Whidbey Island Conservation District, phone), Bob Cusimano (ECY), Chery Sullivan (Washington Dept. of Agriculture), John Bolender (Mason Conservation District), George Boggs (Whatcom Conservation District), Rich Doenges (Thurston County), Monte Marti (Snohomish Conservation District), Rick Haley (Skagit County), Kelly McLain (Washington Dept. of Agriculture), and Carol Smith (WA Conservation Commission) participated in one or both of the two meetings when these were developed. In addition, Meghan Adamire (Clallam Conservation District), Adam Lorio (Samish Indian Nation), Dino Marshalonis (EPA), Jay Gordon (WA Dairy Fed), Joe Holtrop (Clallam Conservation District), Carolyn Kelly (Skagit Conservation District), Western WA Agriculture, Clare Flanagan (NRCS), Sherre Copeland (NRCS), Bill Bowe (Snohomish Conservation District), Seth Book (Mason Conservation District), and Michael See (Skagit County) were provided with opportunities to participate in email reviews and discussions and a few of these did provide comment.

**Decision Making Process:** These recommendations were developed using the following process. 1) Identify existing monitoring programs that relate to nutrient and sediment monitoring from croplands in Puget Sound. 2) Review those programs for relevancy and to define current status of monitoring these parameters. 3) Identify data gaps. 4) Develop recommendations to fill data gaps.

Decisions were achieved via consensus of those present at the meetings. The decisions (recommendations) were sent out for review to all sub-group members. Questions from others were posed to the group and answered/addressed via email. All of the included recommendations were agreed-to by the Agriculture Stormwater Workgroup without dissent.

Where are we in the SWG approval process, and when are decisions needed?  
Recommendations will be presented at the November 2013 meeting with decision at the January 2014 meeting.

How and when are recommendations envisioned to be implemented?

The agriculture stormwater subgroup will develop an implementation and funding plan in a future set of meetings. We want to develop this plan after we have a full set of agriculture recommendations to facilitate prioritization. Also, we only want to develop this plan for approved recommendations.

What are the funding implications? See answer above.

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## ALTERNATIVES CONSIDERED:

Alternative:

- 1) No adoption of recommendations. No change or improvement. Lack of coordination across areas.
- 2) Partial adoption of recommendations.

## RECOMMENDATIONS AND REASONING:

1) Coordinate existing sampling of sediments, nitrogen, and phosphorus with future sampling. This includes the edge-of-field monitoring funded by NRCS in Fishtrap and Bertrand Creeks and the Dept. of Ecology and Washington Dept. of Agriculture (pesticide) sampling which occur at various scales. This would leverage the work in existing programs. Sampling should include stormwater events.

Discussion: How fits at Puget Sound scale to understand croplands in general? What is the vision for expansion of this pilot project or application of findings to other watersheds? (Project is effectiveness, not status and trends monitoring, with source identification.) Add discussion of adaptive management use of the analysis of these data. Perhaps analyze existing data first, before collecting additional samples. Also discuss potential inefficiency of having multiple field crews. SWG role: ensure regional monitoring strategy includes the ag component for S&T, effectiveness, and source ID; that watershed work informs regional understanding and adaptive management. Articulate the questions at each scale (site, basin, PS) with respect to impacts of nutrients and sediment from cropland. Put detailed descriptions of existing work in appendix (based on this info...)

2) Develop a strategy for data sharing, particularly for the NRCS edge-of-field monitoring. Currently, some data from this funding source are prohibited from sharing under the federal Farm Bill. A signed agreement will be needed to assure landowners of data use limitations, while also allowing landowner data to be used by coordinated monitoring efforts, including those by the Dept. of Ecology.

3) Increased nutrients can reduce dissolved oxygen levels by triggering algae blooms that upon decomposition, lower oxygen levels; prior work has been focused in freshwaters. We need better loading estimates. One source of nutrients is from agricultural lands (animals and cropland) to support effectiveness monitoring and better understanding of the imports and exports from watersheds. As Before BMPs are installed to decrease these loads, monitoring should be done to establish a baseline and continued to show the effectiveness in nearby marine areas (what is time scale, ~10yrs? – look at Jean Spooner’s work in NC and also learn from Chesapeake Bay). Articulate adaptive management applications of this work.

The Puget Sound dissolved oxygen model nutrient load summary is supporting documentation for this need, and can be found here:

<https://fortress.wa.gov/ecy/publications/publications/1103057.pdf>

4) Sub-surface drainage structures, such as tiles, need to be inventoried in many areas ~~of~~ throughout Puget Sound, including but not limited to Whatcom, Island, Snohomish, Jefferson

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(Chimacum Creek Valley) and Skagit Counties. Once inventoried, areas should be prioritized to address problem areas. This work may also need a data sharing agreement as mentioned in Recommendation 2. Look at existing sources of this information, from federal funding and from watershed studies. Tile drains are present throughout PS in river valleys. Apply of the findings to better understand specific (faster) type of conduit of nutrients and other contaminants.

5) Additional monitoring of nutrients and sediment from croplands is needed in the Marshland, French Creek, and Warm Beach areas of Snohomish County and Ebey's watershed on Whidbey Island. Monitoring should be bracketed to separate non-ag sources from ag sources. These areas have significant cropland and are lacking in monitoring. The Ebey Watershed has potential inputs from other (residential) land uses upland that make it a unique monitoring scenario.