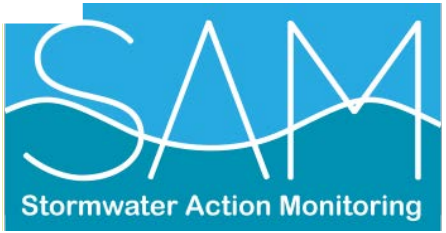
Lunch Break

We'll resume at 1:00

Welcome to the SAM Priorities Workshop for Receiving Waters

Dana de Leon, City of Tacoma
SWG Chair
February 27, 2019

ABOUT



Stormwater Action Monitoring (SAM) is

Collaborative

Regional

Funded by permittees in Western Washington: 91 cities, towns, counties; 2 ports; WSDOT

Funded in-kind by Ecology, WSDA, USGS, Redmond, Penn Cove Shellfish, Cedar Grove, hundreds of mussel monitoring volunteers

SAM's goals:

To improve stormwater management, reduce pollution, improve water quality, and reduce flooding by measuring stormwater impacts on the environment and evaluating the effectiveness of stormwater management actions

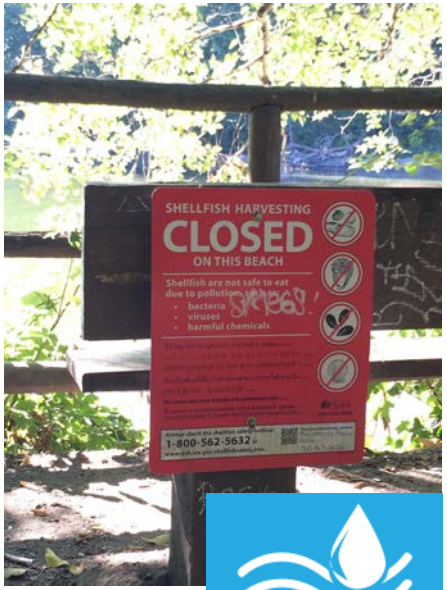
Regulatory Context for SAM and How SAM Works

Karen Dinicola, SWG Project Manager
Ecology's Policy and Technical Lead Stormwater Adaptive Management
February 27, 2019

SAM is a new approach

- Replaces monitoring by individual MS4 permittees that was
  - Compliance focused
  - Complicated and expensive
- Permittees requested a different approach
- PCHB agreed
- Huge effort to launch and maintain

Investigations to answer key questions



Receiving Waters

- Are we protecting receiving waters?
- Are conditions getting better or worse?

Effectiveness Study

Source Identification

- What works and under what conditions?
- How can we better address common problems?

So many things we might monitor…

Who gets to decide?

Everyone gets to weigh in

- Stormwater Work Group is SAM's Steering Committee
  - Sets priorities
    - Sends recommendations to Ecology
  - Selects and approves studies
  - Formal oversight process

Permittees choose to either:

- Pay into the cost-share fund for SAM, or
- Conduct individual monitoring

Decisions about SAM's priorities and study selection take place *outside* of the permit

Annual SAM payments completely fulfill permit monitoring requirements in S8

Freedom from the shackles!

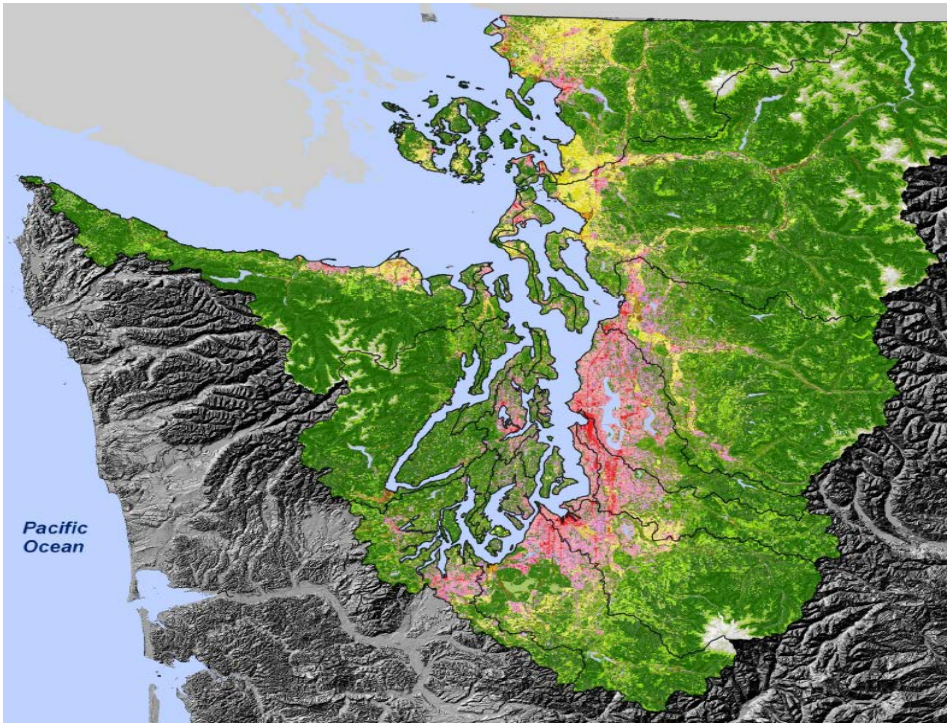
- Diversity of topics
- Mix of short- and long-term projects
- No timeframes or ceilings
- Many studies are longer, larger than typical grant projects
- Multi-year studies can be done in phases
- Share interim findings

Context for Future SAM Receiving Water Monitoring

Brandi Lubliner, SAM Coordinator
February 27, 2019

Status and Trends in receiving waters 2013-2018

- Environments monitored:
  - Puget Lowland streams
  - Puget Sound nearshore
- What's measured:
  - Water quality
  - Sediment quality
  - Biotic endpoints

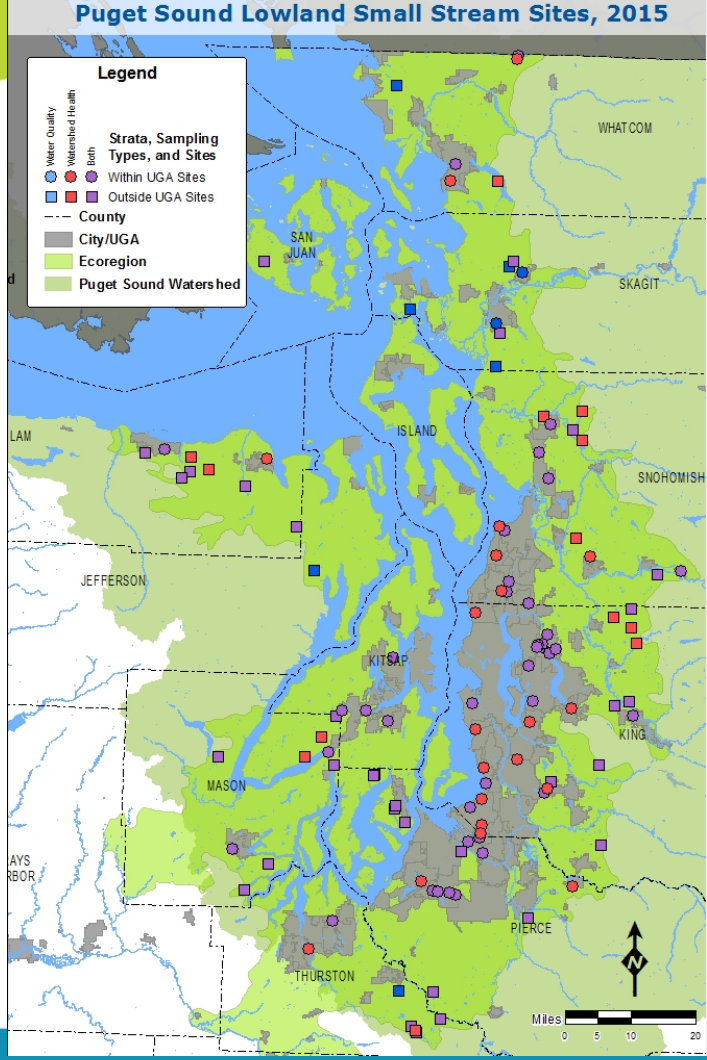


Puget Lowland Ecoregion Streams (PLES)

- EPA's randomized site design
  - 100 sites sampled year of 2015
- 20 agreements
  - 100s of parameters: chemistry, biology, habitat, watershed landuse
- Team: USGS, King Co, San Juan Island CD, Snohomish Co, Ecology-EAP, & 13 labs

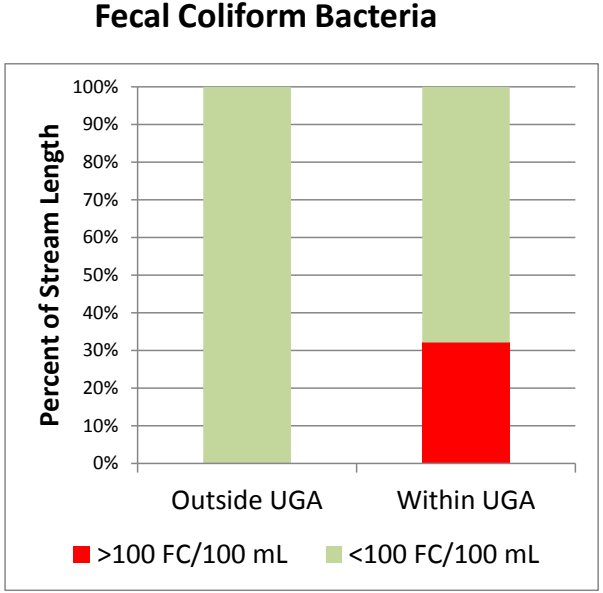
PLES design variables:

- Within and outside urban growth area (UGAs)
- Whole year of monthly water quality
  - Conventional parameters, metals, PAHs, stream flow
- Single summer watershed health monitoring
  - Water quality (conventional parameters)
  - Benthic macroinvertebrates
  - Periphyton
  - Sediment chemistry (TOC, metals, phthalates, PAHs, PCBs, PBDEs, common roadside-use pesticides)



PLES Findings - comparison to standards

- Criteria exceedances were not a widespread problem.
  - Within UGAs: streams in poorer condition for fecal coliform and total phosphorus
  - Within UGA = Outside UGA
    - similar rate of exceedance of temperature, pH, and dissolved oxygen
    - Sediment quality standards not typically exceeded
  - Outside UGA: metals typically below acute or chronic standards for aquatic life.

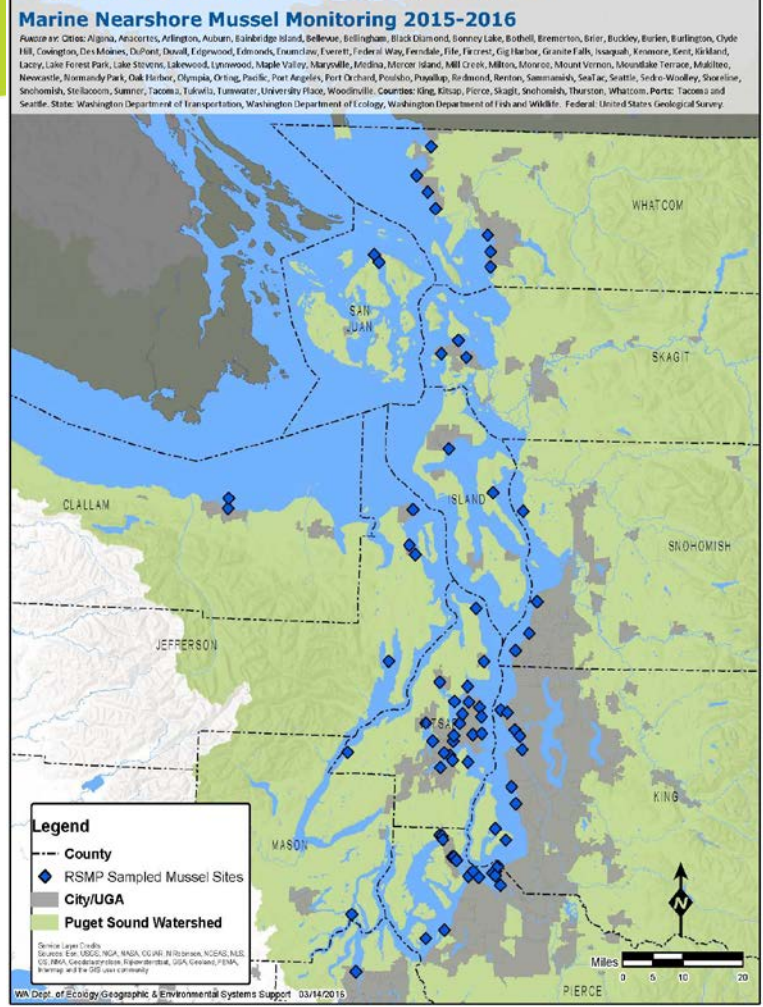


PLES Findings - important stressors for B-IBI scores

Stream Health Category	Significant Stressors
Land cover	• Watershed Canopy Cover • Riparian Canopy Cover • Percent Urban Development
Water	• Total Nitrogen • Total Phosphorus
Sediment	• Total Zinc • Substrate Embeddedness • Substrate Particle Diameter

Puget Sound nearshore

- Mussels (WDFW) sampled winter 15-16 and 17-18
- Sediment chemistry (USGS, WDNR, King Co), summer 2016
- Bacteria (Ecology, DOH)
  - No sampling, data compiled from 27 entities, 2010-15



SAM
Stormwater Action Monitoring

Mussel cages deployed & retrieved by 100+ volunteers

Nearshore Mussels Findings

- Mussels are effective biotic endpoint in the nearshore environment and are a good tool for the randomized study design.
- PAHs, PCBs, PBDEs, and DDTs were the most abundant organic contaminants in mussel tissue
- Concentrations significantly higher in urbanized areas as measured by -
  - Municipal Land-Use Classification (City vs. Unincorporated-UGA)
  - Impervious Surface in Adjacent Watersheds
- Concentrations of metals in mussel tissue were relatively low

Nearshore Sediment Findings

- Sediment chemical concentrations are generally low and below current State criteria.
- Sediment chemical concentrations not related to land cover, like mussels data showed.
- Current randomized probabilistic design appropriate for Puget Sound status and trends as a whole, but future sampling of nearshore sediment will need to take into consideration the effects of drift cells to examine specific stormwater management actions.

Nearshore bacterial data review – Recommendations to SWG

- A new regional sampling program does not appear to be needed.
  - Puget Sound is too large for a storm chasing focus, and ambient bacteria levels tracked by BEACH and DOH Shellfish sound-wide.
- IF a new stormwater bacteria focus, then:
  - Find sites co-located with outfalls or mouths of rivers and streams that drain densely populated urban areas.
  - Standardize method of collection. BEACH or DOH Shellfish differ (boat vs wade in)
  - Consider effectiveness study objectives where changes may be measured due to source control and treatment activities in draining watershed. Need more specific questions.

“Add-on” to SAM Receiving Water Studies

- Leveraging the SAM sites is cost effective - ideal for exploratory work.
- WSDA added to PLES
  - pesticides in stream sediments
- USGS & WDFW added to nearshore
  - micro plastics methodology in sediments and mussels
  - pharmaceuticals in mussels


SAM Receiving Water Video

Adjustments to the Core Design for SAM Status and Trends

Keunyea Song, SAM Scientist
February 27, 2019

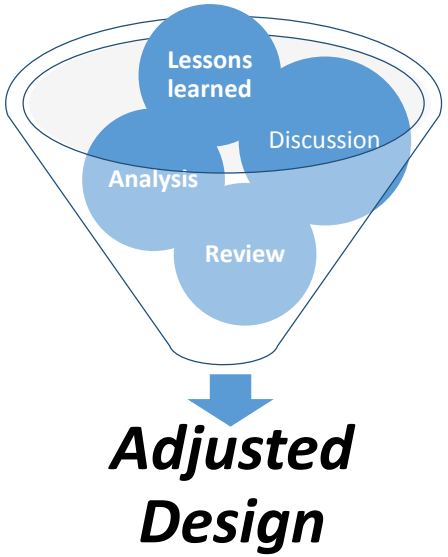
Receiving Water Monitoring Design

Status and Trend Scientists

Abby Barnes, Bob Black, Curtis DeGasperi, Karen Dinicola, Leska Fore, Mariko Langness, Jennifer Lanksbury, Chad Larson, Brandi Lubliner, Rich Sheibley, Keunyea Song

Monitoring Design Adjustment

- **One-year process** for determining overall scientific framework
  - ✓**Review** previous studies (Jan-April 2018)
  - ✓**Eight** team meetings (April-Dec 2018)
  - ✓**One** consultation meeting with Tony Olsen (May 14, 2018)
  - ✓**Two days training** session in EPA (Jun 23-24, 2018)
  - ✓Spatial design & analysis **workshop** (Oct 23-24, 2018)
  - ✓Joint PSEMP workgroup meeting (Feb 6, 2019)
  - ✓**SAM public workshop (Feb 27, 2019)**



Confirming the questions

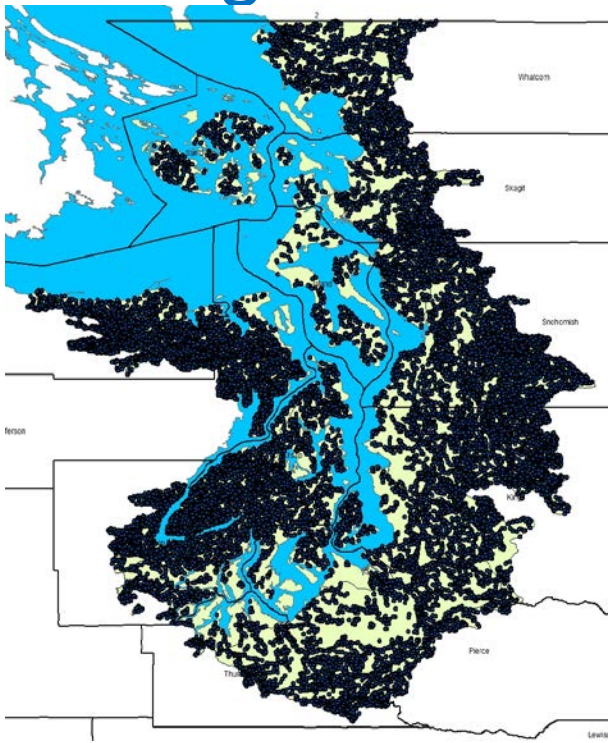
Are we protecting receiving waters?

Q.1. What is the current condition of receiving waters in Puget Sound?

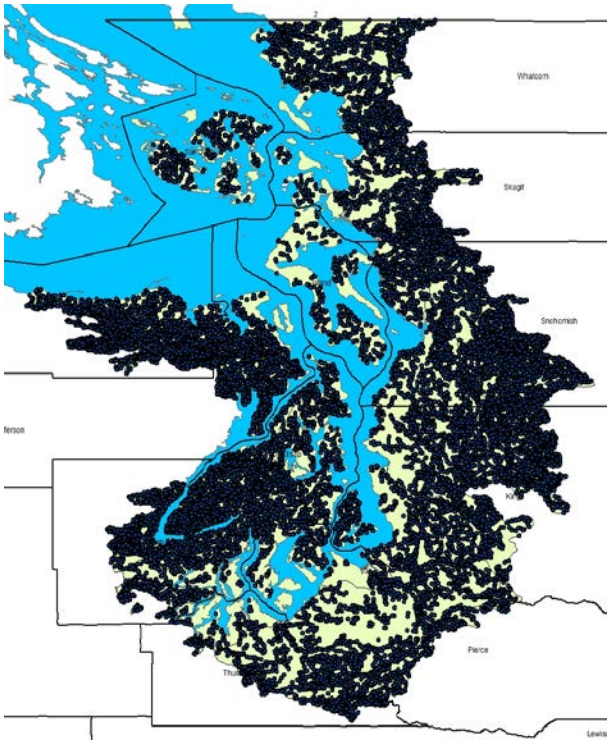
Q.2. How does the condition of receiving waters change over time in relation to urban growth and stormwater management efforts in the region?

Monitoring Design
GRTS probabilistic spatial design

Generalized Random Tessellation Stratified Design (GRTS)

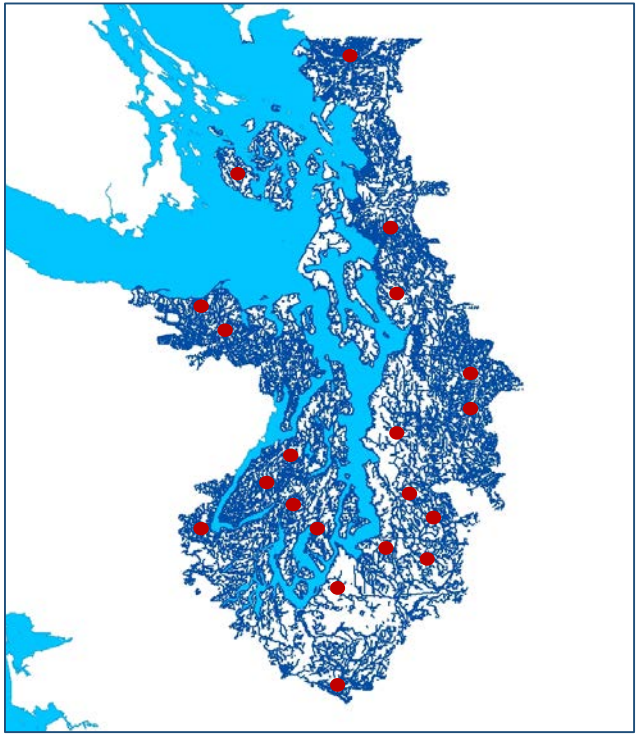


Monitoring Design
GRTS probabilistic spatial design

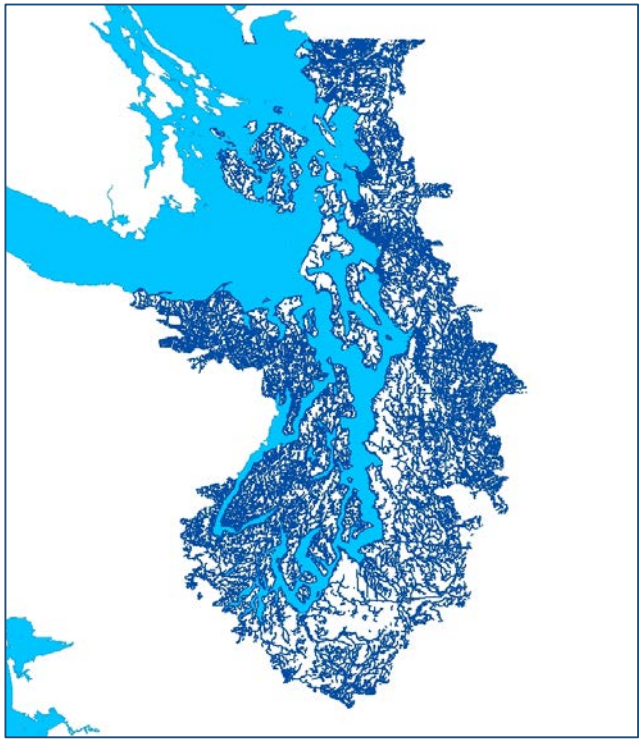


Generalized Random Tessellation Stratified Design (GRTS)

Random Site selection

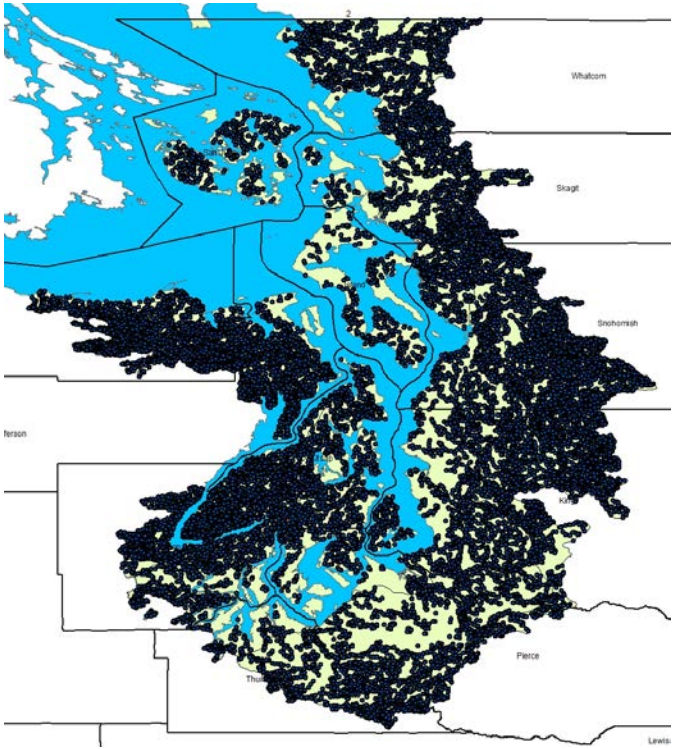


Monitoring Design Adjustment 1: Receiving water identification



Monitoring Design Adjustment 2: Study area-Small streams

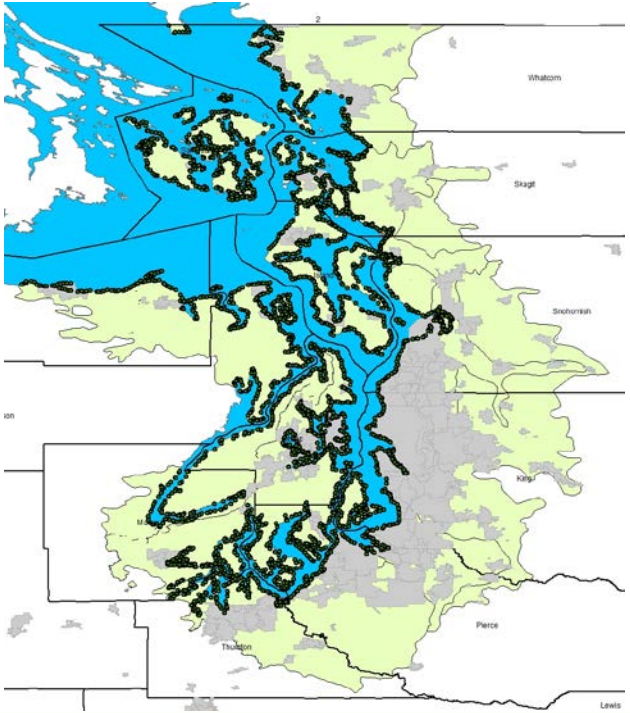
NHD high res layer



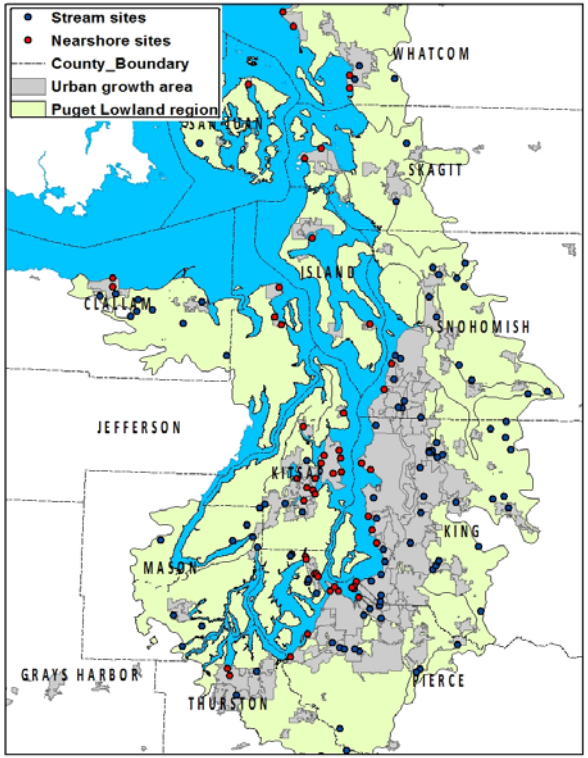
Target: watershed size within 2.5-50 km^2

Monitoring Design Adjustment 3: Study area-Nearshore

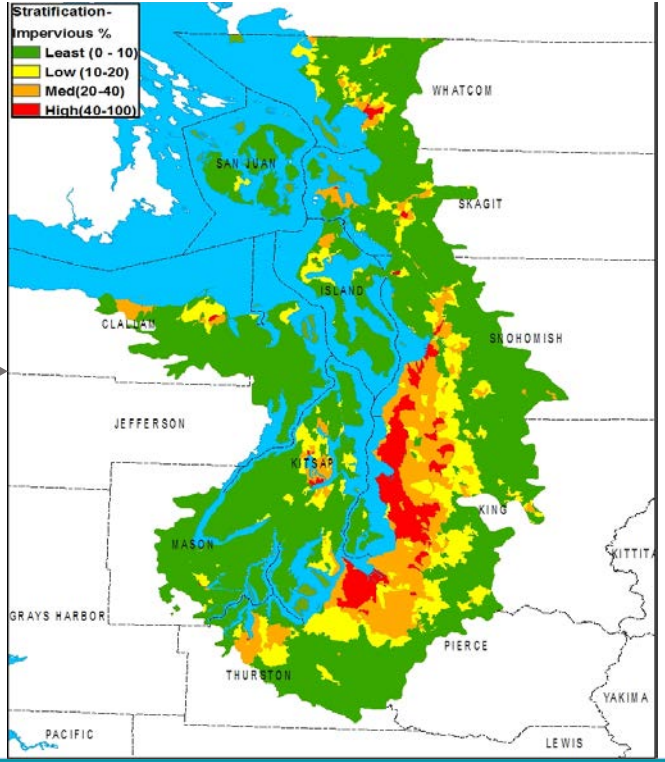
NHD high res layer



Monitoring Design Adjustment 4: Stratification by percent impervious



More sites in urban areas



Monitoring Design Adjustment 5: Focus of Integrated Indicators

- **Integrated health indicators**
  - Sediment chemistry (streams)
    - ✓ metals,
    - ✓ organic chemicals,
    - ✓ nutrients and
    - ✓ basic conventional parameters
  - Biotic endpoints
    - ✓ benthic macroinvertbrates, periphyton, & mussels
- **Add** continuous stage monitoring for water flow information
- Water sampling: **Drop** monthly sampling

Index period water sampling?

Parameters	Index period
PAHs and Metals	Fall, first storms of the season
PAHs and Metals	Fall-winter, during ongoing storm season
Pesticides	Spring
B-IBI related stressors	1-2 months prior to B-IBI sampling
None	None

Monitoring Design Adjustment 6: Frequency of Monitoring

Before

- Streams- Once (105 sites) every 5 years
- Mussels- Once (40 sites) in 2 years - same
- Nearshore sediment- Once (40 sites) in 5 years

S&T team meetings

Objectives

- Strong trend power (Revisit the same sites)
- Strong regional status power (New site visits)
- Captures annual climate variations

New

- Streams- New + Revisit sites Every year (~30 sites)
- Mussels- New + Revisit sites Every 2 years (~30 sites)
- Nearshore sediment- Less frequently (every 10 years)

Monitoring Design Adjustments Summary

- Streams and nearshore sites selected probabilistically on updated NHD high-res, extended nearshore study area.
- Stratification of region using impervious cover (%) gradient
- Focus on integrated response to stormwater on receiving water
- Continuous monitoring of stage
- Combination of new sites and revisited sites to improve status and trend power
- Streams every year, mussels every 2 years, nearshore sediment every 10 years

Table Discussions

1) Feedback on the adjustments to the core design (10 min)

2) Priorities for an “index period” for stream water quality sampling (15 min)

3) Priorities for questions to answer with other receiving water studies (20 min)

Table Discussion #1

10 minutes for this discussion

Index period water sampling?

Parameters	Index period
PAHs and Metals	Fall, first storms of the season
PAHs and Metals	Fall-winter, during ongoing storm season
Pesticides	Spring
B-IBI related stressors	1-2 months prior to B-IBI sampling
None	None

Table Discussion #2

15 minutes for this discussion

“Add-on” studies?

- Special studies could answer any number of questions
- Not likely SAM can do more than 1 or 2 this permit term

OR

- SAM could do more analysis of the data already collected

Table Discussion #3

20 minutes for this discussion

Report out

What's Next?

- SWG will use feedback from today to compile a set of draft recommendations
  - Draft package will be completed at March 20 meeting
  - SWG Caucuses will discuss
- Final decisions at June 5 SWG meeting
- Next round of mussel monitoring this winter
- Next round of stream monitoring next year

More information

SWG webpages sites.google.com/site/pugetsoundstormwaterworkgroup

- SWG meeting dates, agendas, and materials
- SWG and SAM listserv signup links

SAM webpages ecology.wa.gov/SAM

- Final project reports and Fact Sheets for each finished project
- SAM annual reports and quarterly budget reports

Thank you!!