



**PUGET SOUND ECOSYSTEM
MONITORING PROGRAM**

Effectiveness Monitoring: What's Working to Restore Puget Sound

Stormwater Work Group,

November 12, 2014

Leska Fore, Puget Sound Partnership

Effectiveness Monitoring & Adaptive Management



Effectiveness Monitoring & Adaptive Management

Who needs to know?



Did action work?

Share results of Effectiveness Monitoring

Who is the audience?

- Project Sponsors
- Project Implementers
- Funders

What do they need to know?

- Actions
- Outcomes
- Costs
- Challenges

Samish Basin:

Keeping shellfish beds open by reducing fecal coliform bacteria

A look at successes and lessons learned



In the Samish River watershed, bacteria often reach levels so high that local shellfish are not safe to eat and the water is not clean enough to allow swimming. Shellfish harvest in the Samish Bay is worth about \$3 million each year, but high levels of bacteria in the water regularly reduce harvest from 4,000 acres of shellfish beds. To improve the situation more than 20 government, business and nonprofit organizations have come together as part of the Clean Samish Initiative with the goal of identifying and eliminating sources of bacteria.

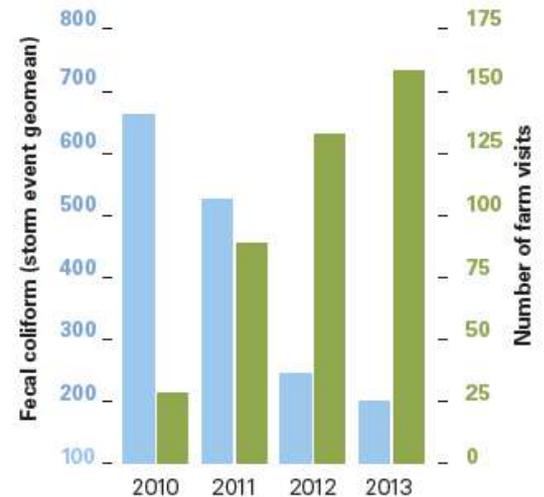
What worked

- ▶ Working closely with other agencies to cooperate and coordinate actions.
- ▶ Working with farmers to reduce manure that can run into streams during storms.
- ▶ Applying manure as fertilizer during dry periods only.
- ▶ Fencing to keep livestock away from streams.
- ▶ Inspecting on-site sewage systems regularly.
- ▶ Volunteer sampling to help open shellfish beds sooner after storms.

Since 2010, fecal contamination has dropped by 80% at the sampling site closest to the shellfish beds.

In 2010, 80% of shellfish bed closures were confirmed; in 2013 confirmed closures dropped to 50%.

Fecal bacteria declined as farm visits increased



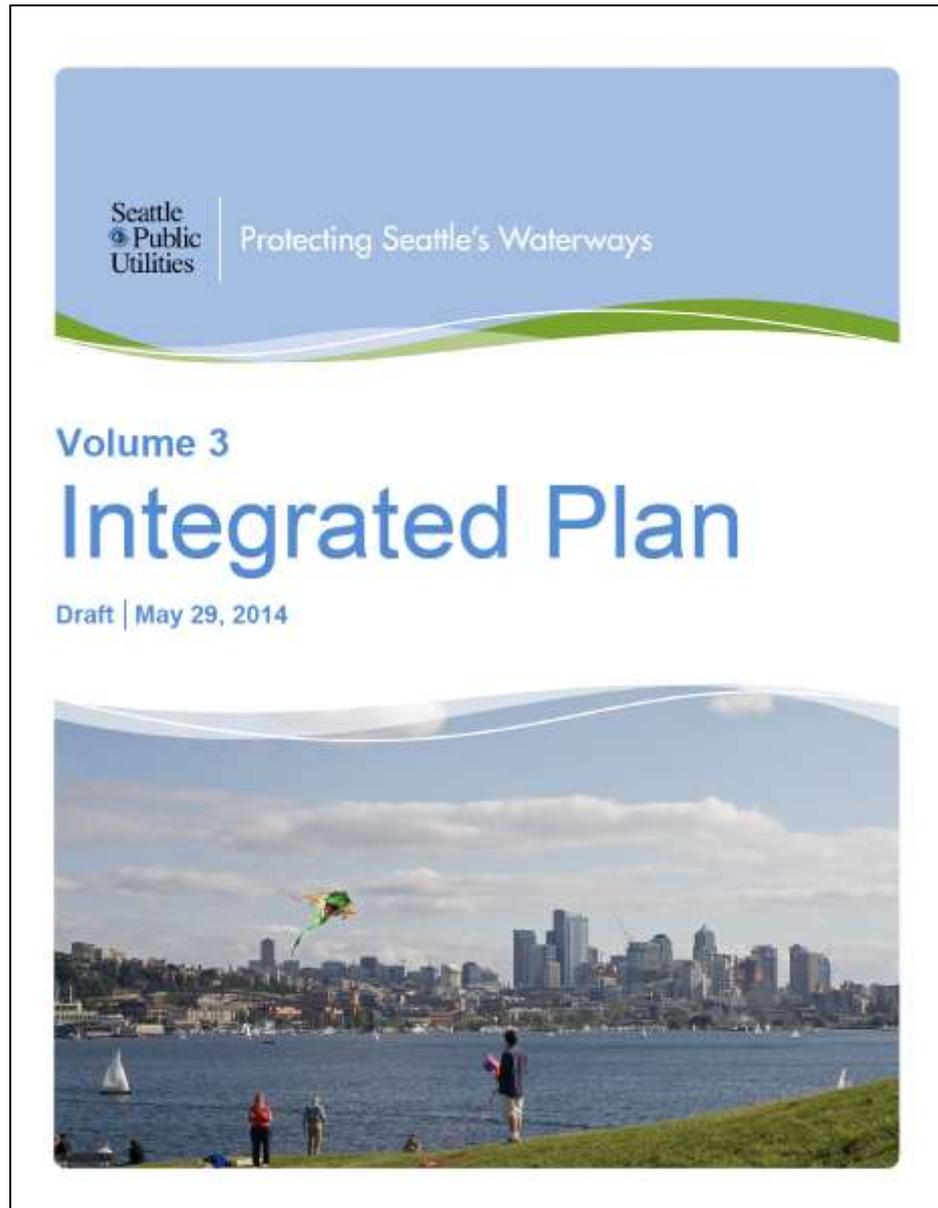
An overview of actions taken to reduce fecal coliform and protect shellfish beds in the Samish Basin watershed from January 2010 to July 2014

<i>Program</i>	<i>Action</i>	<i>Results</i>	<i>Challenges</i>
<p><i>Pollution ID and Correction</i> \$1,700,000</p>	<ul style="list-style-type: none"> • 6,330 parcels evaluated • 53 farm plans implemented 	<ul style="list-style-type: none"> • Pollution caused by fecal coliform bacteria decreased annually at most sites • Shellfish beds were closed fewer days • Cleaner water • 100 best management practices implemented 	<ul style="list-style-type: none"> • Levels of fecal coliform bacteria still exceed state standards at many sites • Shellfish beds are still closing • Livestock move between inspections
<p><i>On-site Septic System Assessment Program</i> \$2,800,000</p>	<ul style="list-style-type: none"> • 4,253 septic systems assessed • 500 people took septic system classes (Skagit County) 	<ul style="list-style-type: none"> • 95% passed • 3% needed repairs • 2% failed 	<ul style="list-style-type: none"> • Owners need help with expensive repairs • Continued inspections necessary
<p><i>Natural Resources Stewardship Program</i> \$472,000</p>	<ul style="list-style-type: none"> • Farms with livestock inspected • 22,905 linear ft of fencing installed to keep manure out of streams 	<ul style="list-style-type: none"> • 30 acres of habitat upgraded 	<ul style="list-style-type: none"> • Extreme weather events can overwhelm normally acceptable BMP's
<p><i>Regulatory</i> \$174,000</p>	<ul style="list-style-type: none"> • Enforcement actions taken on a few parcels 	<ul style="list-style-type: none"> • Overall compliance increased • 4 out of 6 parcels in violation improved 	<ul style="list-style-type: none"> • Regulatory enforcement is sometimes necessary when voluntary actions are not sufficient

Insights from Samish Basin

- ▶ Small changes add up to large reductions in fecal contamination.
- ▶ Conversations with individual land owners work best for improving manure management.
- ▶ Regulatory actions are needed in some instances, but are best used sparingly.
- ▶ Continued follow-up and site inspections are necessary even after problem sites have been identified and addressed.

Example: *Stormwater* Effectiveness Monitoring



Example: *Stormwater* Effectiveness Monitoring

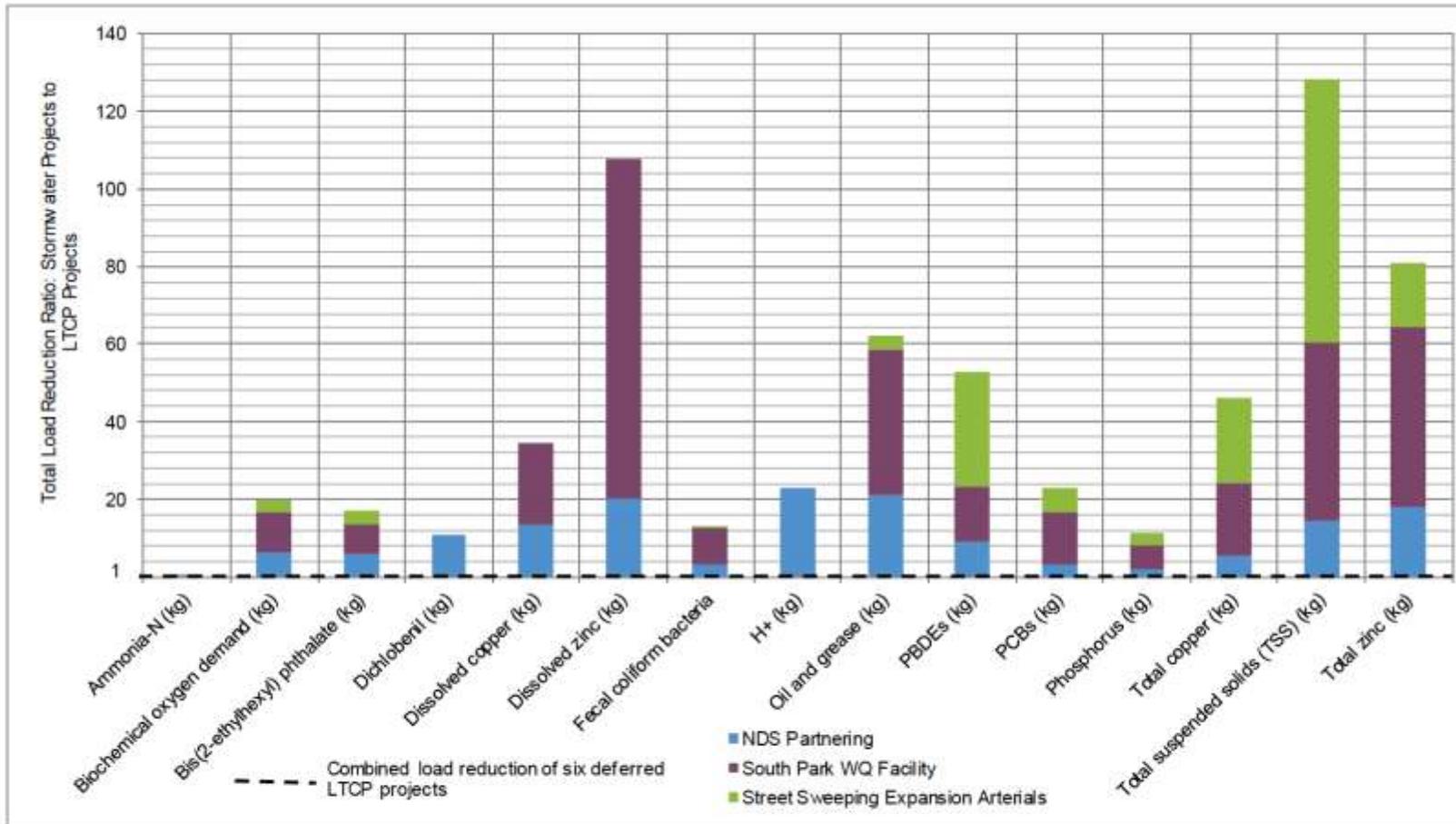


Figure 8-6. Significant pollutant load reduction benefits of Integrated Plan stormwater projects

The bars show the proposed stormwater projects estimated pollutant load reduction above the pollutant load reduction from the six deferred LTCP projects, which is represented by the black dashed line.

Share results of Effectiveness Monitoring

Who is the audience?

- Project Sponsors
- Project Implementers
- Funders

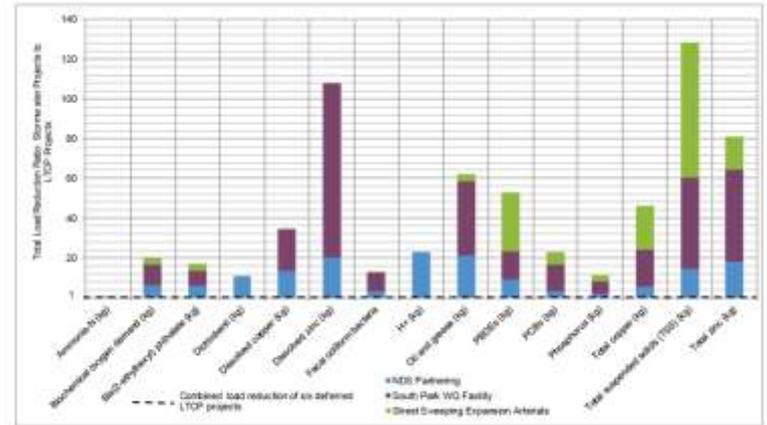


Figure 8-6. Significant pollutant load reduction benefits of Integrated Plan stormwater projects

The bars show the proposed stormwater projects estimated pollutant load reduction above the pollutant load reduction from the six deferred LTCP projects, which is represented by the black dashed line.

What do they need to know?

- Actions
- Outcomes
- Costs
- Challenges

Framework for Effectiveness Monitoring

