

PUGET SOUND MONITORING CONSORTIUM  
TECHNICAL ADVISORY COMMITTEE

**PROPOSED PILOT PROJECT #4:**  
**Stormwater Toxicity Study**

The NPDES Phase I Permit requires stormwater toxicity sampling for seasonal first flush from three land uses: residential, commercial and industrial. A single sample is required to be taken on an annual basis from each land use. The design assumes stormwater toxicity is primarily associated with contaminants in the fall “first flush” event.

A different approach would be to sample events associated with each season: spring, summer, fall and winter. This would provide a good foundation for statistical analyses evaluating relationships between seasons, land-uses and contaminants.

Results from multiple seasonal events under a 2-year program would dramatically improve the effectiveness of Toxicity Identification/Reduction Evaluation (TI/RE) work plan/investigation by providing supporting evidence documenting 1) the actual presence of toxicity; 2) any relationships with contaminants measured in the samples; and 3) any relationships with adjoining land-uses. The results from this study would also greatly improve the focus and cost-effectiveness of any subsequent investigations, directed source control efforts and revisions to stormwater program elements (e.g. public education).

**Coordinating the scoping of this potential pilot project: Dana de Leon and Chris Burke, Tacoma**  
Also helping to scope this potential project: David Batts, WSDOT; Bob Cusimano, Ecology; Heather Kibbey (or another representative of), Pierce County; Julie Lowe, Ecology; Jim Simmonds, King County; Rod Swanson, Clark County; Kathy Thornburgh, Snohomish County; and Richard Tveten, WSDOT

**1. What problem(s) is being addressed by the proposal, and what would be the expected outcome(s) of the project?**

There is a current lack of understanding about the distribution and concentration of toxic materials in stormwater. The current NPDES monitoring strategy is insufficient to address this understanding.

This project will address this problem by:

- Providing a method to identify contaminants issues in stormwater to improve understanding of the potential impacts of contaminants carried to receiving waters..
- Evaluating the relationships between land-use, BMPs, season, contaminant concentrations, and toxicity to provide better understanding of seasonal effects, land-use/contaminant relationships and bioavailability.

- Providing a better information basis for planning and executing successful programs to reduce contaminants in stormwater.
- Improving the focus and cost-effectiveness of subsequent investigations, direct source control efforts, and make revisions to stormwater program elements (e.g. public education).

**2. What is the current status of the situation? In other words, is anything underway today to address or resolve the problem or are the “tools” needed to address it in place? Has there been some success, or is the problem getting worse?**

The NPDES Phase I Permit requires a single stormwater toxicity sample for the fall first flush from three land uses: residential, commercial and industrial. A single sample is not adequate to address the concerns of stormwater managers or the goals of the NPDES phase I permit for all the other seasons.

However, it may be possible to improve the design of the study required under the Phase I NPDES Permit to increase the program’s ability to meet objectives. Similarly, altering the parameters measured and distributing the sampling more evenly throughout the year will improve the ability to detect seasonal patterns in contaminant concentrations, as well as relationships between contaminants, sources, and toxicity. Finally, this approach delays development and implementation of a TI/RE plan until after the first two years of sampling have been completed, thus providing a robust database on which to base any necessary follow-up studies.

**3. Who should participate in the project, and why?**

NPDES Permitted Municipalities and Ecology can use the results of this study to target source control efforts and adapted management feed back into Stormwater Management programs and the NPDES Permit. The results of this study could be used to inform any jurisdiction about where to target subsequent investigations, directed source control efforts and/or revise stormwater program elements (e.g. public education). For example, if newly applied fertilizers or herbicides are found to be toxic in spring stormwater, Then all jurisdictions and Ecology can use this information to further educate the public on spring fertilizer/herbicides use and it’s impacts.

**4. What process or steps would be needed to address the problem and achieve the expected outcomes?**

What are the steps to achieve the desired outcomes?

- QAPP development
- Coordination with project participants
- Monitoring
- Data analysis (possible TI/RE)
- Report preparation and recommendations

Key components of the proposed program are:

- Target 8 storm events per year for 2 years: a total of 16 events
- Storm events distributed seasonally; two events per season
- Sampling distributed across 3 land uses during each storm event
- Possible associations with specific BMPs
- Analytical chemistry and Toxicity testing conducted with each event

Data analysis includes:

- Comparisons to benchmarks, frequencies of exceedences
- Evaluation of relationships between land-use, BMPs, season, contaminant concentrations, and toxicity
- TI/RE plan
  - Depends on results, but based on evidence of relationships between contaminant concentrations, seasonal variations, land uses and bioavailability, as well as BMP effectiveness.
  - May be necessary to identify/confirm specific contaminant(s).
  - Commensurate with contaminant identification, focus on design of appropriate BMPs and optimum BMPs for specific land uses/contaminants.
  - Identify threshold concentrations of concern for specific contaminants (BMP targets).
  - Identify appropriate studies to confirm impacts in receiving environment.

**5. What would be the approximate cost of the project? What portion of the costs would be paid out of the funding Department of Ecology received to launch this program? What portion if any, would be paid by others?**

	ISCO Purchase 1 <sup>st</sup> year	Labor	Lab	Total
Per station per event	\$5,000 (one time purchase)	\$2,200	\$1,500 toxicity \$1,500 chemistry	
Per site per false starts		\$1,650		
1 station - 8 events + 2 false starts		\$20,900		
Total 3 stations	\$15,000	\$62,700	\$50,400 toxicity \$36,000 chemistry	
QAPP		\$14,000		
TI/RE if needed		\$11,400		
Data management/ analysis		\$21,000		
Report		\$14,000		
<b>Over All Total</b>		<b>\$111,700</b>	<b>\$86,400</b>	<b>\$198,100</b>

Project costs may vary depending on the final study design. No participants have committed to fund all or a portion of this project. Phase I NPDES Permittees are sampling 2 of the 8 samples in this study, i.e., the fall first flush event collected once every year at each of three land use.

Each Phase I permittee could participate by collecting additional seasonal toxicity samples (i.e., winter, spring and summer). The project timeline could be reduced to one year if each land use is sampled by 2 participants.

If Phase Is provide monitoring labor and costs, a combination of participants' and Ecology's funding could be used for analytical and toxicity testing, QAPP development, TI/RE report and/or final report preparation.

**6. How would this project address interests, needs and concerns of rural communities?**

This project will provide standard techniques to evaluate stormwater contaminants in rural areas. Results for residential land uses should provide some indication of the contaminants that could be expected in rural residential areas common to Western Washington. Phase I NPDES Counties stormwater monitoring includes low density residential. This project could incorporate monitoring of these low density residential areas to address the interests, needs and concerns of rural communities

**7. How would the project meet the criteria agreed to by the Committee in October? Those criteria are: a) Builds the credibility of the program. b) Tests working relationships. c) Provides credible and meaningful information that addresses the framework questions. d) Encourages leveraging of resources. e) Is voluntary ("a coalition of the willing") and attracts additional participants over time. f) Is simple. g) Can get going in less than one year.**

- a) This project will help build the credibility of the monitoring group by providing high quality data and information about the toxicity of stormwater from different land uses and during different seasons of the year.
- b) Phase I permittee collaboration builds upon basic permit requirements to create a more useful study.
- c) The results of this study will be shared with all those interested in managing stormwater thereby eliminating the need for other groups to conduct their own study.
- d) See b
- e) This project is beyond the basic permit requirements and participation would be voluntary.
- f) The project has a clear objective and uses established methods to create a new approach to gathering information to better manage stormwater.
- g) The City of Tacoma will work with other municipalities and interested groups to develop this project and share the results. The proposed project could be conducted by the City of Tacoma and other Phase Is using existing staff and can begin this year once funding is received.