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STATE OF WASHINGTON

**Regional Stormwater Monitoring Program**
**Written Update**

**Prepared by:** Nathalie Hamel (Puget Sound Partnership), Karen Dinicola (Washington Department of Ecology) and Bruce Wulkan (Puget Sound Partnership).

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**Proposed Action:** Written update only

**Summary:**
The Stormwater Work Group (SWG) submitted their final report entitled "2010 Stormwater Monitoring and Assessment Strategy for the Puget Sound Region" to the Puget Sound Partnership and the Department of Ecology on July 1, 2010. The stormwater monitoring strategy is the result of many hours of collaborative and detailed work by representatives from local, state, federal agencies, tribes, businesses, and environmental organizations to improve upon current stormwater monitoring efforts to understand the local and regional impacts of stormwater and ultimately make better decisions about how to manage stormwater.

The stormwater monitoring strategy includes regional status and trends monitoring of physical and biological aspects of the nearshore and wadeable streams, source identification and diagnostic monitoring, and studies to evaluate the effectiveness of management strategies. The strategy will require engagement from various organizations (including local governments covered under the National Pollutant Discharge Elimination System (NPDES) municipal stormwater permits, and state and federal agencies currently engaged in monitoring efforts).

The program is currently estimated to cost $14.9M annually. A "pay-in" option is proposed as a mechanism to collect the permittees' contributions and cover their allocated portion of the cost of the monitoring. Currently, municipal permittees are spending between $6M and $8M annually, and nearly $2M is currently being spent by state and federal agencies on status-and-trends monitoring activities that are included in the strategy.

**Background:**
The SWG has been working since October 2008 to develop a regional stormwater monitoring and assessment strategy for Puget Sound. The effort was launched at the Partnership's and Ecology's requests for recommendations by June 30, 2010. The SWG has twice presented draft versions of a stormwater monitoring strategy for Puget Sound to the Science Panel, in November 2009 and June 2010. The Washington Forum on Monitoring was briefed in June 2010. The SWG presented their recommendations at the Leadership Council meeting in July 2010. A high-level summary was included in the stormwater session at the July ECB meeting (presented by Chris Townsend).

In developing the strategy, the SWG provided broad public feedback opportunities through a series of public workshops and two comment periods. The first draft of the scientific framework underwent a robust peer review by five nationally recognized experts in stormwater and/or regional monitoring programs. The SWG worked diligently to respond to the recommendations provided. Support for the strategy is broad.

The SWG proposes a regional stormwater monitoring program that (1) assesses stormwater impacts to biological endpoints in small streams and nearshore areas, (2) diagnoses sources of both localized and regional problems, and (3) evaluates effectiveness of stormwater management programs and practices. The initial starting point for implementing the program is through (1) NPDES municipal stormwater permittees through permit requirements and (2) state and federal agencies, tribes and other organizations through continuation and strategic expansion of ongoing programs. The SWG recommends creating a "pay-in" mechanism to be administered by an independent entity for permittees and others to fund and implement the monitoring plan. Ecology supports creating an independent entity to serve in this role if the SWG can provide more details on the administrative, roles and responsibilities, and financial requirements of the pay-in option by October.

The recommended program is estimated to cost about $14.9M annually. The SWG proposes that implementation costs be covered by:

- Redirecting current permit-related monitoring expenditures by the NPDES Phase I municipal stormwater permittees (the 5 largest jurisdictions and 2 ports in Puget Sound), estimated at $6 to $8 M/yr.
- Ongoing monitoring programs deployed by state and federal budgets, estimated at $2M/yr.

The SWG envisions that the funding gap be filled by:

- Strategic expansion of state and federal investments.
- Another 80 smaller NPDES Phase II jurisdictions who will participate in the program.
- Other permittees and programs when added to the program.

The SWG is the first work group in the broader Puget Sound Coordinated Ecosystem Monitoring program (Ecosystem Monitoring program) and will link to the overall strategy to monitoring strategy for Puget Sound. A multi-stakeholder "Launch" Committee was convened in July 2010 to help with the initial operations of the Ecosystem Monitoring program. The primary task of the Launch Committee is to develop the Ecosystem Monitoring Program charter, including program components, roles and responsibilities, decision-making processes and information flow. The Stormwater Work Group serves as a model for other topic-based work groups and the Launch Committee will build on the work to develop the program's charter.

**Analysis:**
The SWG has provided 55 consensus recommendations for guiding the development of a regional stormwater monitoring program that, while requiring further detail to be developed prior to implementation, provide a sound foundation appropriate for including in a regional ecosystem monitoring program.

The SWG developed an innovative approach for monitoring a problem as complex as stormwater by: focusing on biological impacts of stormwater, monitoring a range of ecological and physical indicators in two broad habitat types (nearshore and streams), by designing a regional plan that coordinates monitoring of multiple jurisdictions, by working collaboratively across a range of organizations, and by proposing a creative funding and cost-sharing solution with the "pay-in" mechanism.

The Partnership recognizes the achievement of SWG as a model for the Coordinated Ecosystem Monitoring Program and the critical role of the stakeholder process in the success of the group.

The data and findings derived from the stormwater strategy will help improve stormwater management efforts in the region and will inform decision makers working to solve the stormwater problem.

**Staff Recommendation:**
Staff recommends that the ECB support the Puget Sound stormwater monitoring strategy and recognize the importance of a comprehensive monitoring strategy that addresses all sources of stormwater pollution. The data and findings that will emerge from the strategy should inform management decisions and policy for solving the stormwater problem. Should the ECB decide to form a committee on stormwater, the SWG would be pleased to share their strategy and provide input on their activities.

**Next Steps:**
The SWG is refining and prioritizing the costs and allocation of funding responsibilities for the proposed monitoring and will ask the Partnership to advocate for state and federal cost-shares to implement the program. The SWG plans to continue work over the late summer and fall through the rest of this calendar year to create an administrative mechanism to facilitate cost-sharing for local jurisdictions. In the next year, the SWG will work to move the strategy towards implementation in 2013, most notably by: developing standard methods and protocols, identifying data management systems, and selecting monitoring sites. Further more, the SWG will work to include other types of permittees (industrial, construction) in the stormwater monitoring program and address non-permitted stormwater sources (e.g. rural non-point runoff).

The Puget Sound Partnership will continue to work with Ecology and EPA to ensure that the SWG has the necessary staffing and support to continue its efforts into the next biennium.

**Attachments:**
- *Key Recommendations*: *2010 Stormwater Monitoring and Assessment Strategy for the Puget Sound Region*, and cover letter

The full report, appendices, and cover letter can be found here:
http://www.ecy.wa.gov/programs/wq/psmonitoring/swworkgroup.html

July 1, 2010

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Puget Sound Partnership
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Olympia, WA 98504-4900

Ted Sturdevant, Director
Washington Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Dear David and Ted,

The Puget Sound Stormwater Work Group (SWG) has developed a stormwater monitoring and assessment strategy for the broader community of Puget Sound. On behalf of the members of the SWG I am pleased to deliver the *2010 Stormwater Monitoring and Assessment Strategy for the Puget Sound Region* (the strategy). We have been working since October 2008 to achieve this milestone at the request of the Puget Sound Partnership (Partnership) and the Washington Department of Ecology (Ecology).

The strategy includes 55 Key Recommendations for establishing the Stormwater Assessment and Monitoring Program for Puget Sound (SWAMPPS). These Key Recommendations have been agreed to by consensus of the broad group of stakeholders that have participated in our meetings during the past six months. SWAMPPS is envisioned to be a founding component of the larger regional ecosystem monitoring program for Puget Sound. We believe that implementing SWAMPSS is critical to the success of the *Puget Sound Action Agenda.*

This is the third version of the strategy the SWG has released. A draft scientific framework released in November 2009 was peer-reviewed by five nationally recognized experts in stormwater and monitoring and the SWG received more than 800 stakeholder comments. The SWG addressed these comments in a revised draft scientific framework and an implementation plan that was released in April 2010 for a second public comment period.

This document represents a major milestone we have reached. However, the SWG has more work to do. More detail is needed to adopt and implement the proposed strategy. Due to time constraints, we have not addressed all of the comments received on the April 2010 version of the strategy. Issues that are yet to be addressed are highlighted in the final strategy. The SWG is committed to continuing to work on key issues over the next four months and to deliver further recommendations at the end of October 2010 to address:

- Ecology's specific requests for information to inform the 2012-2017 NPDES Phase I and Phase II municipal stormwater permits. In particular we plan to:
    - Develop an administrative entity to facilitate cost-sharing to implement regional monitoring and assessment (a "pay-in option").
    - Provide further detail on costs and experimental designs and approaches for the proposed categories of monitoring and assessment activities.
- The Partnership's need to provide the Office of Financial Management with prioritized costs estimates for implementing SWAMPPS as part of the *Action Agenda.*
- Other participants' and stakeholders' needs to better understand their roles and responsibilities in implementing the strategy.
- The overarching need to ensure funding for this effort.

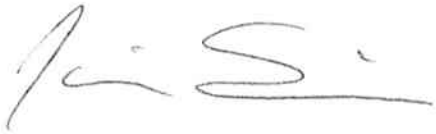
The SWG will continue to address remaining issues in future work. We ask both the Partnership and Ecology to procure and advocate for future state and federal funding to implement the strategy. This includes continuation of key monitoring and assessment efforts already under way and launching the new efforts proposed in the strategy. We understand that the state and federal budget requests will depend upon final allocation of costs among local, state, federal entities.

The strategy indicates a placeholder, planning-level cost estimate of at least $14.9 million annually to implement SWAMPPS. This includes ongoing monitoring activities that might already be included in the *Action Agenda*. For comparison: we estimate that current annual monitoring expenditures in Puget Sound by Phase I jurisdictions (the largest 3 counties, 2 cities, and 2 ports) exceed $6 million; and at least $1.7 million is being spent annually on existing status and trends monitoring that is included in the proposed strategy. We anticipate that another 80 smaller Phase II jurisdictions will participate in SWAMPPS.

In October 2010 we will provide you with recommendations for establishing the "pay-in option" along with updated, prioritized cost estimates and proposed allocations of those costs among local, state, and federal government agencies. During this time frame we will also provide additional detail on designs and approaches for status and trends, source identification, and effectiveness studies. We will continue to work after October on other issues that were raised during the May 2010 public comment period on the strategy.

Please feel free to contact me at 206.296.1986 or Jim.Simmonds@kingcounty.gov, or Karen Dinicola, our Project Manager, at 360.407.6550 or karen.dinicola@ecy.wa.gov for further information.

Sincerely,



Jim Simmonds, Chair
Stormwater Work Group

Enclosures

**Stormwater Work Group Members**
(January-June 2010 participants)

Local Governments:

*Representatives*: Dana de Leon, City of Tacoma; Mindy Fohn, Kitsap County; Jonathan Frodge, City of Seattle; Heather Kibbey, City of Everett; Kit Paulsen, City of Bellevue; Jim Simmonds, King County.

*Alternates*: Neil Aaland, WA Assn. of Counties; Alison Chamberlin, Mason County; Rick Haley, Skagit County; Andy Meyer, Assn. of WA Cities; Jerallyn Roetemeyer, City of Redmond.

State Agencies:

*Representatives*: Shayne Cothern, Dept. of Natural Resources; Tim Determan, Dept. of Health; Dick Gersib, Dept. of Transportation; Bill Moore, Ecology; Bruce Wulkan, Partnership.

*Alternates*: Fred Bergdolt, Dept. of Transportation; Nathalie Hamel, Partnership; Julie Lowe, Ecology.

Federal Agencies:

*Representatives*: Jay Davis, U.S. Fish and Wildlife Service; DeeAnn Kirkpatrick, NOAA Fisheries; Tony Paulson, U.S. Geological Survey.

Environmental Groups:

*Representatives*: Tom Putnam, Puget Soundkeeper Alliance; Heather Trim, People For Puget Sound.

Business Groups:

*Representatives*: Allison Butcher, Master Builders Assn. of King and Snohomish Counties; Mel Oleson, The Boeing Company.

*Alternates*: Kris Holm, Assn. of Washington Business.

Agriculture:

*Representative*: Carol Smith, WA Conservation Commission.

# KEY RECOMMENDATIONS

Stormwater is a significant stressor affecting the health of the Puget Sound ecosystem. Efficiently and effectively managing stormwater to prevent, reduce, and mitigate harm to the ecosystem is a common goal of local, state, and federal governments and agencies, tribes, environmental groups, the business community, and the citizens of Puget Sound. To achieve that goal, a coordinated, integrated approach to quantifying the stormwater problem in Puget Sound and evaluating the effectiveness of stormwater management activities is needed and does not currently exist. The Puget Sound Stormwater Work Group (SWG) was created to recommend such an approach.

These are our 55 key recommendations to the Puget Sound Partnership (Partnership), the Washington State Department of Ecology (Ecology), and others for establishing a Stormwater Assessment and Monitoring Program for Puget Sound (SWAMPPS).

The recommendations are organized into five categories: Strategic priorities and overall framework, status and trends monitoring, source identification and diagnostic monitoring, effectiveness studies, and regional program implementation.

## Strategic Priorities and Overall Framework

The Stormwater Work Group (SWG) recommends:

1. The initial starting point for the Stormwater Assessment and Monitoring Program for Puget Sound (SWAMPPS) is focused on stormwater-related impacts from urban and urbanizing land uses. Robust, fully-scoped monitoring and assessment programs for other land uses need to be cooperatively developed in the future.
2. The initial starting point for SWAMPPS is focused on stormwater-related impacts to small streams and marine nearshore areas. Robust, fully-scoped monitoring and assessment programs for other water bodies should be cooperatively developed as specific priority questions are identified.
3. The initial priorities identified for SWAMPPS are rooted in an adaptive management framework and will inform important policy decisions.
4. The initial categories of experimental designs to be included in SWAMPPS include status and trends, source identification and diagnostic monitoring, and effectiveness studies. Research activities may be added later as specific priority questions are identified.

## Status and Trends Monitoring

The SWG recommends:

5. The proposed number and allocation of samples, specific locations, and temporal aspects of the experimental design need to be further defined relative to the specific parameters of concern. A technical committee will refine these aspects of the experimental design and submit recommendations to the SWG.

## Scientific Framework for Small Stream Status and Trends Monitoring

The SWG recommends:

6. Stormwater-related indicators for small streams:
    a. Water quality.
    b. Benthic macroinvertebrates.
    c. Physical features.
    d. Fish diversity and abundance.
    e. Flow.
    f. Temperature.
    g. Streambed sediment chemistry (metals and toxics).
7. Experimental design for small streams:
    a. Probabilistic sampling of randomly selected sites to assess chemical, physical, and biological status and trends over time.
    b. Approach is compatible with Ecology's statewide status-and-trend monitoring program (State EMAP) methodology for wadeable streams.
    c. At the Puget Sound scale: use the existing 30 State EMAP sites located in Puget Sound and/or historical water quality monitoring sites that meet statistical considerations, collect samples for the current State EMAP parameters, and also collect samples for sediment toxic chemicals and water quality.
    d. At a minimum of thirteen stations across Puget Sound (one in each Water Resource Inventory Area (WRIA)), also monitor continuous flow and temperature at existing (non-random) stream gauging stations identified in the final study design.
    e. Within the first year, identify relevant existing data that could further refine the final sampling frequency and design.
8. Identification of small stream sites:
    a. Target second- and third-order "wadeable" streams that are more directly (but not exclusively) affected by stormwater,
    b. Identify 30 sites at the Puget Sound scale for trend assessment:
        i. Use sites selected for State EMAP.
        ii. To the extent possible without compromising the probabilistic design, existing long-term monitoring sites should be included and used.
    c. Focus on the watershed scale using a probabilistic site-selection approach that can be more densely focused within urban growth areas if appropriate.
    d. Add sites to total 30 within each of the thirteen local salmon recovery areas in Puget Sound (WRIAs, and combinations of WRIAs), for a total of 390 sites.

   e. Island-based watersheds would not be included in this component of the monitoring program due to the limited number of wadeable streams.

9. Small stream monitoring frequency:
   a. At the regional scale: Follow State EMAP protocols, and conduct:
      i. Annual sediment chemistry sampling at the 30 State EMAP sites,
      ii. Monthly water quality sampling at the 30 State EMAP sites, and
      iii. Continuous measurements at the 13 flow and temperature stations.
   b. At the WRIA scale: Consider, as a target: Ramp-up and conduct two rounds of wadeable stream status and trends sampling within a five year cycle from 2012 to 2017 to match the NPDES municipal stormwater permit cycle (begins in 2012), and allow sufficient time for analyses to refine the monitoring program design and inform the following five-year cycle of permits and other efforts.

## Implementation Plan for Small Stream Status and Trends Monitoring

The SWG recommends:

10. Local governments and others will use protocols compatible with Ecology's statewide status and trend monitoring (State EMAP) protocols, coordinate with WRIA groups, and partner with others as needed to standardize data collection methods.
11. Local governments will help coordinate sampling among the WRIA groups and other entities involved in conducting monitoring of stream benthos, fish, habitat, water quality, and other parameters to avoid duplication of field efforts and achieve cost savings. Sampling is conducted by NPDES municipal stormwater permittees, Ecology, and others. Within the first year, identify other opportunities for collaboration.
12. Salmon recovery entities, Ecology, the Partnership, and others will coordinate with local governments to fund and conduct two rounds in a five-year period of fish diversity and abundance monitoring and physical feature monitoring.
13. Ecology will fund and oversee the State EMAP program within the Puget Sound basin. Local Governments will coordinate with these efforts.
14. The SWG will compile information within the next year on current streamflow gauging stations in Puget Sound, analyze current regional streamflow monitoring capacity, and develop a regional network of stream gauges associated to the greatest extent possible with the water quality and habitat monitoring sites.
15. Local governments in Puget Sound covered under NPDES municipal stormwater permits will, collectively, fund and conduct the remaining elements of the regional small stream status and trends monitoring program (most of the watershed-scale sampling) as part of their overall mandate. The financial contribution and/or level of effort required of each permittee will be based on equitable factors, and permittees will be allowed flexibility to either pay into a collective fund or conduct the monitoring themselves.

16. The SWG will coordinate with the Partnership, Puget Sound Salmon Recovery Council, and others to seek additional funding and in-kind contributions for this proposed monitoring and assessment.

## Scientific Framework for Nearshore Area Status and Trends Monitoring

The SWG recommends:

17. Stormwater-related indicators for nearshore areas:
    a. Fecal coliform,
    b. Bioaccumulation toxicity, and
    c. Sediment chemistry (metals and toxics).
18. Experimental design for nearshore areas:
    a. Probabilistic sampling of randomly selected stratified sites to assess biological and chemical status and trends over time.
    b. Approach is compatible with Washington Department of Health (WDOH) protocols for fecal coliform monitoring.
    c. Approach is compatible with NOAA's national Mussel Watch protocols for bioaccumulation toxicity.
    d. Approach is compatible with PSAMP protocols for sediment chemistry and other nearshore monitoring.
19. Identification of nearshore sites:
    a. Continue bioaccumulation toxicity monitoring at existing ambient Mussel Watch sites.
    b. Randomly select 30 new sites for conducting annual bioaccumulation toxicity monitoring near stormwater outfalls to Puget Sound.
    c. Continue to conduct PSAMP sediment chemistry and other monitoring at nearshore sites.
    d. Conduct sediment chemistry monitoring at 30 randomly selected depositional locations in Puget Sound. Evaluate, statistically and logistically, whether these can be aligned with the Mussel Watch sites.
    e. Focus on areas of the marine nearshore environment that meet Mussel Watch and PSAMP sediment monitoring criteria but are more directly (but not exclusively) affected by stormwater.
    f. Randomly select 50 sites for fecal coliform monitoring at the Puget Sound regional scale, utilizing WDOH, tribal, or other shellfish monitoring data in areas of overlap.
20. Nearshore monitoring frequency:
    a. Monthly fecal coliform sampling,

b. Annual bioaccumulation toxicity monitoring, and

c. Annual sediment chemistry monitoring.

### Implementation Plan for Nearshore Area Status and Trends Monitoring

The SWG recommends:

21. Local governments with stormwater outfalls to Puget Sound will partner with the Mussel Watch program to develop a probabilistic survey approach to select new sites for conducting bioaccumulation toxicity and sediment chemistry sampling.
22. Local governments with stormwater outfalls to Puget Sound will use protocols compatible with WDOH, Mussel Watch, and PSAMP, and partner with others as needed to standardize data collection methods.
23. Mussel Watch, WDOH, and PSAMP will help coordinate sampling among the entities involved in conducting monitoring of fecal coliform, bioaccumulation toxicity, and sediment chemistry to avoid duplication of field efforts and achieve cost savings. Sampling is conducted by local governments, WDOH, Washington Dept. of Fish and Wildlife, volunteers, Ecology, and others. Within the first year, identify other opportunities for collaboration.
24. Local governments in Puget Sound covered under NPDES municipal stormwater permits will, collectively, conduct the following elements of the regional program as part of their overall mandate. The financial contribution and/or level of effort required of each permittee is based on equitable factors and permittees are allowed flexibility to either pay into a collective fund or conduct the monitoring themselves.
    a. Monthly fecal coliform monitoring at 50 sites,
    b. Annual bioaccumulation toxicity (Mussel Watch) monitoring at 30 sites, and
    c. Annual nearshore sediment chemistry monitoring at 30 sites.
25. Local governments will coordinate with salmon recovery efforts, Puget Sound clean-up efforts, local Departments of Health, the Puget Sound Nearshore Restoration Partnership (PSNRP), and other existing nearshore monitoring efforts.
26. The SWG will coordinate with the Partnership and others to seek additional funding and in-kind resources for this proposed monitoring and assessment.

## Source Identification and Diagnostic Monitoring

### Scientific Framework for Source Identification and Diagnostic Monitoring

The SWG recommends:

27. A comprehensive regional stormwater-related source identification framework is needed to help inform and prioritize both local and regional source control activities.

28. Source identification is conducted to address long-term receiving-water problems, as part of a broader effort to identify and eliminate pollution sources. Watershed-specific priorities should be set to target initial source identification efforts on the problems of greatest local concern. Regional and local monitoring data and assessment findings need to be reviewed at least once every five years to identify and prioritize problems to address.
29. Key components of source identification include:
    a. Determine the existing problem sources/impairments to beneficial uses.
    b. Prioritize sources/impairments.
    c. Set a target for source reduction.
    d. Locate sources/impairments.
    e. Plan the regulatory framework and actions to remove the source(s).
    f. Implement source removal actions/programs.
    g. Monitor to provide feedback on status of the source.
    h. Sustain or implement monitoring to diagnose emerging sources.

    These activities occur in an iterative process to track improvements in the receiving waters and to identify needs for additional controls. Multiple entities need to cooperate in situations where the impairment is not confined within the boundaries of a single jurisdiction.

## Implementation Plan for Source Identification and Diagnostic Monitoring

The SWG recommends:

30. NPDES municipal stormwater permittees will coordinate with WRIA groups or watershed lead entities to initiate and oversee a process to prioritize problems in each watershed. After prioritization, lead entities will coordinate the development of a plan to address the top priority problem and proceed to implement early management actions and begin appropriate monitoring.
31. In the next six months, Ecology will lead a process, through the SWG, to recommend an approach to source identification monitoring for the NPDES municipal stormwater permits, including appropriate roles and responsibilities.
32. Source identification and diagnostic monitoring, TMDLs, toxic waste clean-ups, and other activities should be coordinated to share resources, reduce costs, and focus on the most important problems.
33. Review source identification and diagnostic monitoring data on a Sound-wide basis at least once every five years to inform and target regional source control initiatives.

# Effectiveness Studies

## Scientific Framework for Effectiveness Studies

The SWG recommends:

34. Initial studies to assess effectiveness of stormwater best management practices (BMPs) and other urban/urbanizing stormwater management activities will be conducted to address the following three priority areas of investigation:
    a. Testing the effectiveness of low-impact development (LID) techniques to minimize impacts from future new development and in areas of redevelopment.
    b. Testing the effectiveness of retrofitting urban areas with various flow management and water quality treatment approaches to decrease impacts from the built environment.
    c. Testing the effectiveness of non-structural (i.e., operational, behavior-change, planning) and programmatic approaches used in stormwater management programs, and in particular, of various provisions of the NPDES municipal stormwater permits.

    Future studies should:

    d. Evaluate new technologies.
    e. Fill key knowledge gaps about existing technologies to provide better tools for managing stormwater in the future.

    In general, studies will be directed to evaluating stormwater management programs as well as specific practices and activities. The SWG will reevaluate the focus of regional, prioritized effectiveness studies on a periodic basis.
35. Studies to assess effectiveness of stormwater BMPs will occur at the site scale, basin scale, and regional scale.
36. Studies to assess effectiveness of stormwater BMPs will be designed to answer specific questions with clearly articulated hypotheses for testing.
37. Studies to assess effectiveness of stormwater BMPs will include quantification of the cost of implementing the stormwater management activities being studied, so that cost-effectiveness can be judged by stormwater managers and policy makers.
38. Stormwater impacts from other land use management approaches and other stormwater permits also need to be addressed.
    a. An initial effort for agricultural land use will test the effects of agricultural BMPs.
39. In the area of evaluating new technologies, emerging techniques are a recommended focus. Examples include reducing fecal coliform and metals.

## Implementation Plan for Effectiveness Studies

The SWG recommends:

40. A literature review needs to be conducted as soon as possible to focus data collection efforts on studies that are needed and to avoid addressing questions that have already been answered and to build on existing work.
41. Requests for proposals will be issued for effectiveness studies, based on the guidance and priorities identified by the SWG. The SWG will develop and propose an open and transparent process to evaluate the submitted proposals and select studies for initial implementation.
    a. The first round of this process needs to be expedited in fall 2010 in order to meet Ecology's needs to identify effectiveness studies that will be included for implementation in the coming NPDES municipal stormwater permit cycle.
42. A transparent public process will identify and prioritize future and more specific topics, questions, and hypotheses for effectiveness studies, applying the following criteria for evaluating and selecting effectiveness studies:
    a. Meets the criteria for a sufficiently defined working hypothesis.
    b. Important stressors are addressed.
    c. Selected studies address a range of the prioritized topics and categories.
    d. The practices to be evaluated are likely to result in improvements to beneficial uses.
    e. The study is likely to contribute to our collectively ability to implement more cost-effective stormwater management actions.
    f. The study is strongly linked to the Puget Sound Action Agenda and results chains.
43. The Technology Assessment Program - Ecology (TAP-E), which evaluates the effectiveness of new technologies, should continue with funding from new technology proponents and other long-term, reliable funding sources.
44. The Washington State Conservation Commission, Ecology, and other key entities and stakeholders will define a broader effort to assess stormwater impacts from agricultural areas and effectiveness of agricultural BMPs.

## Regional Program Implementation

The SWG recommends:

45. Ecology and the Partnership should evaluate and decide upon a permanent Stormwater Work Group (SWG) charter, composition, host agency, long-term funding, and support of participation. In doing so they should make modifications as needed to improve the SWG's ability to perform our essential functions.
    a. Formalize the SWG as an ongoing part of the broader ecosystem monitoring program being created by the Partnership.
    b. Approve future SWG work plans.
    c. Continue to use the SWG to prioritize SWAMPPS activities.
    d. Maintain SWG roles of decision making and leadership, coordination, and informing the regional stormwater control strategy.

46. The Partnership should include a preliminary annual cost estimate of $14.9 million to implement this strategy for SWAMPPS as part of the Action Agenda. The SWG will provide a more detailed and prioritized cost estimate and recommend the means to meet and sustain the overall funding needs of this strategy for SWAMPPS via contributions from local, state, and federal governments, private sources, and others. The SWG will also estimate start-up costs to establish SWAMPPS.
    a. The new monitoring program should be conducted using efficiently coordinated existing capacities to the extent possible and strategically adding new capacities to fill the remaining need.
    b. Monitoring costs should be reasonably shared between participating entities. The proportions may be different for each category of monitoring. The SWG will propose recommendations to allocate costs.
    c. The SWAMPPS components should be supported and maintained through funding contributions and/or in-kind services from all entities participating in the program.
47. The SWG will identify and recommend to Ecology the means to create an independent entity to administer a fund dedicated to stormwater-related monitoring and assessment activities. The SWG will task a subgroup to address the following topics and present a proposal to the SWG in September 2010. The SWG will make a final recommendation to Ecology in October 2010.
    a. The fund overseen by this independent entity will provide a "pay-in option" for entities covered under NPDES municipal stormwater permits that:
        i. Allows permittees flexibility to meet requirements by either paying into the fund, or conducting monitoring activities themselves.
        ii. Ensures that permittees' contributions are spent exclusively on stormwater-related monitoring and assessment activities.
        iii. Is managed by an independent entity whose budget is permanently dedicated to monitoring and cannot be re-appropriated to other purposes by any legislative body.
    b. The independent entity will allow and encourage all entities in the region to contribute to and participate in coordinated regional monitoring and assessment activities.
    c. The independent entity will provide businesses and other NPDES permittees with a future pay-in option.
48. Entities conducting the regional monitoring and assessment activities should partner to share resources and reduce costs.
49. An ongoing inventory of monitoring and assessment activities in Puget Sound, which includes stormwater-related programs, should be created and maintained.
50. Recent and ongoing stormwater-related studies and findings in Puget Sound should be analyzed. A gap analysis and targeted literature reviews are needed to help refine and direct future priorities and experimental designs.

51. Credible data must be collected in a quality manner.
    a. Ensure that:
        i. Data quality objectives are identified.
        ii. Project plans are approved and shared.
        iii. Standard field collection and data reporting protocols are followed.
        iv. Appropriate analytical accuracy, precision, detection, and reporting limits are used at accredited laboratories.
        v. Geographic information system (GIS) data follow state guidelines.
    b. Formulate and support a process to develop and approve standard methods.
    c. Populate an on-line library with approved methods.
    d. Maintain a prioritized list of methods that need to be developed.
    e. Require NPDES permittees to select from a web-accessible list of approved analytical methods.
52. Data management systems for the regional monitoring and assessment program data and findings should be created and maintained:
    a. Include data repository, storage, and management structures.
    b. Use appropriate meta-data, data descriptors, and qualifiers.
    c. Provide easy public access to all data and findings.
    d. Assign responsibility for providing quality assurance information and for correcting, editing, and updating data to the generators of data or findings.
    e. Build upon existing regional data management systems.
53. Monitoring conducted for all categories of SWAMPPS should be required to follow all applicable regional protocols; and all data and findings should be submitted to the data management system (Key Recommendation #51) and readily available to the public.
54. A collective analysis and synthesis of the data and findings of SWAMPPS and other relevant regional and national science activities should be conducted at least once every five years.
55. Regional stormwater-related modeling needs should be identified and prioritized.