October 26, 2006

Puget Sound Partnership
c/o Puget Sound Action Team,
P.O. Box 40900
Olympia, WA 98504-0900

Dear Puget Sound Partners

SUBJECT: PARTNERSHIP RECOMMENDATIONS TO:

IMPROVE WATER QUALITY AND HABITAT BY MANAGING STORMWATER RUNOFF

PROTECT ECOSYSTEM BIODIVERSITY AND RECOVER IMPERILED SPECIES

PROVIDE WATER FOR PEOPLE, FISH AND WILDLIFE, AND THE ENVIRONMENT

We, the undersigned members of Washington State's scientific community, have been studying impacts of urbanization on habitat and aquatic life for decades. There is a large body of literature regarding the relationship of urban runoff and the health of waterbodies. We have had the privilege of contributing papers describing the status and trends in Northwest rivers, wetlands, and coastal environments, the impacts of urban runoff (and other effects of human activities on Puget Sound waters), the effectiveness of mitigation measures, and original and effective methods for monitoring waterbody health. All undersigned have credentials to comment on effective approaches for urban runoff management.

These comments are in response to preliminary recommendations by the Puget Sound Partnership, dated October 2006, for action to preserve and recover Puget Sound.

IMPORTANCE OF STORMWATER RUNOFF MANAGEMENT IN THE PUGET SOUND BASIN

Urban runoff scours streams, destroys aquatic life characteristic of a healthy ecosystem, and carries enormous loads of contaminants to Puget Sound. Stormwater is most likely a primary source of destructive flows and contaminants leading to the precipitous decline in the health of the Puget Sound ecosystem.

Because of urbanization, peak stormwater flows can increase stream discharge by factors of up to 10-fold over predevelopment peaks. Annual flow volumes can double.

Contaminants in and volumes of urban runoff discharged to streams change the types and numbers of aquatic species, changes that are key signals of declining ecological health.

The decline in stream health begins with the clearing of the forest and modification of river channels in a watershed. Stream flow usually increases dramatically after clearing and often streams are devastated even before any development takes place. Every square foot of effective impervious surface then added to a watershed counts further toward the stream's decline. ("Effective" impervious area is that connected by a conveyance system to surface water.) With the first increments of effective impervious area in a watershed, the numbers of the most sensitive species decline dramatically. Contrary to popular dogma, there is no threshold of development below which there will be no biological degradation.

Although all groups of aquatic organisms are affected by the actions of humans, anadromous fish in our region are the most widely understood and appreciated species that suffer enormously in streams draining urbanized watersheds. Salmon and sea-run cutthroat trout spawned and nurtured in Puget Sound's streams are important for several reasons: regional icons, contributors to regional economies, and key players in the food webs that range from mountain forests to the health of Puget Sound orcas. In short, a healthy Puget Sound depends on a healthy regional biota, especially anadromous fish populations.

END-OF-PIPE TREATMENT AND DETENTION DISCREDITED

"End-of-Pipe" management of stormwater refers to the practice of treating and detaining runoff from urban land uses before discharging it to surface water. Underlying the employment of end-of-pipe management is the assumption that forested watersheds can be converted to any type of land use (including 100% impervious) and that the impacts of these changes on receiving waters can be negated through the use of engineered stormwater-management hardware.

The prescriptions and methods for design of such hardware are found in drainage design manuals in use by every jurisdiction in the basin. An example of such a manual is the DOE's "Stormwater Management Manual for Western Washington". Newly written NPDES permits require that jurisdictions use this manual (or its equivalent) in mitigating for urban runoff. However, the DOE manual itself disavows claims to protect aquatic life. From Volume 1, Section 1.7.5: …*land development as practiced today is incompatible with the achievement of sustainable ecosystems*. And also from Volume 1, Section 1.7.5: *The engineered stormwater … systems advocated by this and other stormwater manuals … cannot replicate … hydrologic functions of the natural watershed that existed before development, nor can they remove sufficient pollutants to replicate the water quality of predevelopment conditions*.

End-of-pipe stormwater management has been and continues to be a failure at adequately protecting streams, wetlands, and Puget Sound. The literature in the past 30 years documents the negative effects of stormwater discharges on receiving waters.

In the past 5 years several papers have been published describing the marginal differences in stream damage between those watersheds where treatment and detention is installed and those where discharges are unmitigated. Hydrological studies are available that show that no amount of end-of-pipe mitigation can protect streams from urban runoff. In short, conversion of forests to traditional urban land uses cannot be mitigated by end-of-pipe prescriptions.

Since 1996, the correlation between urbanization (and concomitant decline in forest cover, loss of stream buffers, new impervious area) and stream health has been documented in detail. It is now possible to predict, with considerable confidence, the ill-effect of continuing urbanization on the last vestiges of healthy streams in the basin if such development follows the same formula employed in the past.

THE PARTNERSHIP LEANS ON FAILED PRACTICES FOR PROTECTION

The following is the stormwater recommendation from the latest draft of Puget Sound Partners recommendations (dated October 2006):

> *1. Issue NPDES Phase I and Phase II permits that brings 80% of the Puget Sound's population (and some 80 cities) into active stormwater management. Also:*
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> > *a. Implement a coordinated water quality monitoring program.*
> > *b. Expand programs to maximize stormwater infiltration.*
> > *c. Promote a basin approach to stormwater by sponsoring pilot projects.*
> > *d. Increase funding for Low Impact Development (LID) demonstration projects and develop incentives to encourage the use of LID.*

The Partnership recommendation to issue NPDES permits is unnecessary in that this will be done regardless of Partnership stance.

Furthermore it is widely known that NPDES offers little hope of protecting streams and Puget Sound. NPDES permits issued by Washington State require only that permittees adhere to the state's "Stormwater Management Manual for Western Washington", a set of prescriptions for end-of-pipe engineering hardware. The manual recognizes that end-of-pipe engineering will not protect streams and source control is necessary (Volume 1). But, in the subsequent volumes containing its prescriptions, the manual is silent about the advisability of conversion of forests to intense forms of land use. The manual allows development projects that convert up to 100% of a forested site to impervious area. The manual's prescriptions are concerned only with sizing of hardware. The scientific literature demonstrates that it is not possible to fully mitigate for any such conversions regardless of hardware size.

The Partnership should not expect that NPDES or continued end-of-pipe management of runoff will lead to the protection or recovery of Puget Sound.

Encouraging infiltration (in the absence of LID standards) is meaningless ("*b*." above). For traditional high-impact development, jurisdictions disallow infiltration on till soils. Encouragement to "maximize" infiltration will not make soils more porous. And the Partnership should not be "encouraging" anything. The Partnership should be describing practices and standards that are vital to Sound recovery and recommending that they be implemented and enforced.

More low impact development pilot and demonstration projects, at best, will delay essential action ("*c"* and "*d*." above). We have sufficient experience with traditional end-of-pipe stormwater management to know that it is not an alternative and we must turn from it as quickly as possible. Sufficient projects have been constructed to show that LID projects can be successful at retaining runoff on project site. To recommend more such projects (in the absence of action to introduce changes into development code to require them) reflects unjustifiable timidity in the face of great danger to the Sound. Moreover, the Partnership recommendation for incentives ("d" above) to abide by LID standards, in the absence of regulations to force such changes, is destined to fall far short of the goal to protect and restore Puget Sound.

We regrettably conclude that, if the above is the extent of the Partnership recommendations regarding stormwater, little hope should be held for restoration of Puget Sound. Indeed it is far more likely, with the arrival of millions more newcomers and concomitant high-impact development, that the health of Puget Sound will continue in its precipitous decline.

PRACTICES THAT MUST BE IMPLEMENTED IF PUGET SOUND IS TO BE SAVED

Science supports the following actions and practices related to land use as necessary to halt the decline of Puget Sound ecosystem, provide for recovery of anadromous fish, halt the increase in and reduce the load of pollutants carried by stormwater to Puget Sound, and begin the steep climb toward restoration. This list is not all-inclusive. It is left to others to urge the many other action items needed to restore Puget Sound and other regional water bodies to healthy condition.

1. **Preserve Existing Least-Disturbed Watersheds and Subwatersheds**. The scientific literature is clear that the healthiest and most biologically productive streams are found in undisturbed watersheds. Very small levels of disturbance in the healthiest watersheds immediately start their inevitable biological or ecological decline, beginning with the loss of their most sensitive species, to decline in predators and to the increase in the most tolerant species.

Such watersheds and associated streams should be set aside and protected from disturbance. If we are serious about preserving Puget Sound, we must identify those watersheds that we can characterize as in good or excellent condition and preserve them. The means employed for preservation must ensure that it is certain and permanent.

2. **No Net Loss of Forest Cover in the Puget Sound Basin**. Forest loss must be limited in the process of conversion to urban purposes, and such loss must be balanced by increasing/restoring forest cover in disturbed areas within the basin.

   Forest loss owing to new development should be limited through development code. An example of such code can be found in DOE's "Stormwater Management Manual for Western Washington", Volume V, BMP T5.30. The Partnership should recommend that this code be used to guide all new development.

   To mitigate for the fraction of forest cleared in each new development (i.e. the fraction not preserved by code), the Partnership should recommend a program of clearing trading rights. Such a program would ensure that for each portion of a site cleared for development an equivalent forest area is restored elsewhere in the basin. (Forest restoration in disturbed areas can be affected by a variety of programs. Restoration of buffers along urban streams is an example.)

3. **Halt Runoff From New Impervious Area in the Puget Sound Basin**. Methods for eliminating runoff from impervious surfaces include (but are not limited to) using pervious paving materials, associating impervious area with bioretention facilities, reducing such areas to functional minimums, and so on.

   The Partnership should recommend code changes requiring that most new paving and roofing be constructed using materials and practices to prevent them from generating runoff to surface water.

   These methods are some of the tools in the practice of "low impact development".

4. **Preserve Existing and Restore Destroyed Buffer Areas Adjacent to Streams**. Destroyed buffers are often found in private ownership. The Partnership should recommend that these be purchased, or otherwise protected, and that soil and riparian vegetation be restored. The protection of Puget Sound as a public good requires creative approaches to these activities. The Partnership should recommend that jurisdictions adopt a system of prioritization of stream buffers to be restored and a time table for restoration. Obviously, restoration of existing problem-buffers may take decades; even so, the Partnership should set reasonable targets for buffer restoration for year 2020 and other milestone dates.

5. **Reduce the Amount of Runoff From Existing Impervious Area**. Much existing impervious area is unnecessary and should be removed. (For example, two-way streets could be converted to one-way and a lane eliminated.) Existing impervious area could be disconnected from surface water by repaving using pervious materials or bordering with bioretention facilities or both.

   The Partnership should recommend a program of prescriptions and incentives to reduce existing total and effective impervious area.

The Puget Sound Partnership has a daunting task and carries the burden of responsibility for the fate of the basin's ecosystem. We the undersigned applaud the effort, and offer our services in making the best possible recommendations to the Governor.

Sincerely,

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