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Mr. David Dicks and Staff
Puget Sound Partnership
P.O. Box 40900
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Dear David and Partnership Staff:

Thank you for the opportunity to review the Partnership's Draft Action Agenda and the Science Panel's Biennial Science Work Plan. It is apparent that a lot of time and energy has been put into the development of both papers and it is encouraging to see the region moving towards designing a healthy ecosystem.

For the past seven years the SeaDoc Society, a marine ecosystem health program of the UC Davis Wildlife Health Center, has had a focus on the Puget Sound Region. We staff a full-time translational scientist in the San Juan Islands and fund and conduct critical marine ecosystem-focused research. Under the guidance of a science- and community-based Board of Directors, the SeaDoc Society uses privately raised funds for our annual competitive grants program we have supported almost 50 highly targeted critical research projects and worked to translate and transmit the findings from this science into management and policy.

Comments on the Draft Action Agenda

We recently identified what we consider to be the top ten ecological principles for designing healthy ecosystems. These principles have been crafted into a manuscript, which is in-press at the international journal *EcoHealth*.ⁱ We use these 10 principles to evaluate the region-wide and site-specific recommendations put forth in the Draft Action Agenda.

1. Think ecosystem

Issues at political boundaries can be resolved with cooperation, while nature's boundaries are immutable dynamic connections that cannot be negotiated or changed by policy. Although this is a major Washington State effort to restore Puget Sound, the Puget Sound basin is only one half of a large and unified ecosystem that includes the inland marine waters of British Columbia. This ecosystem is often called the Salish Sea in honor of the Coast Salish people who first inhabited the region. As in Washington, similar efforts are underway to improve the health of British Columbia's inland waters and the Action Agenda needs to better acknowledge and stress that efforts on both sides of the border need to be coordinated at the scientific and policy level. The Partnership, with the help of the US

Federal Environmental Protection Agency, should play a critical role in coordinating the science and the policy that need to occur in the US and in Canada to design a healthy Salish Sea. This fundamental concept needs to be incorporated into the Guiding Principles for Ecosystem Management (Question 3, Page 4) and reinforced throughout the Action Agenda.

2. **Account for ecosystem connectivity**

Great thinkers and philosophers from Henry David Thoreau to Edward O. Wilson have espoused the global interdependence of people and other parts of nature that is inescapable in designing sustainable communities. The Action Agenda uses the term “restore” or “restoration.” Efforts at ecosystem restoration generally look backward in time, attempting to reconstruct complex, dynamic, self-organizing systems of living and non-living elements. The challenge is that conditions that existed prior to the present might never reoccur or could be impossible to recreate as species are extirpated, invasive species are introduced, and atmospheric and oceanic conditions change. We suggest that it is more appropriate to talk about **designing** future ecosystems that reflect current societal values. This also reinforces the idea that humans are a part of the ecosystem and are instrumental in determining how our ecosystem looks and functions.

3. **Understand the food web**

Knowing how plants and animals are related to each other by their diets is a practical way to visualize connectivity, interdependence, and system integrity and helps predict how nature will respond to stresses. It is laudable that the Action Agenda acknowledges that there are concerns about the integrity of Puget Sound’s food web (Question 2, page 2; page 4; etc.), and calls out the need to better understand the food web (Question 3, page 7) and the stressors on it (Question 3, page 4).

4. **Avoid fragmentation**

Habitats of adequate size and quality to support high levels of biodiversity are critical characteristics of healthy ecosystems. Human activities that break otherwise contiguous habitat (land and seascapes) into smaller pieces fragment ecosystems, reduce ecological integrity, and threaten the capacity of an ecosystem to renew. Critical in the case of Puget Sound is the repairing of the fragmentation that has occurred where fresh water flows into marine waters, and where the land meets the sea, the nearshore. The Action Agenda recognizes this and adroitly points out the need to protect intact habitat as well as to improve instream flows and reestablish nearshore processes that have been destroyed by upland practices of shoreline hardening, deforestation and the creation of impermeable surfaces.

5. **Respect Ecosystem Integrity**

Ecological integrity, in which a system has all its parts and no "extra" ones, is a hallmark of environmental health. Loss of integrity threatens nature’s stability, beauty, and capacity for self-renewal, but integrity can be rebuilt and sustained by design. The Action Agenda does a good job of recognizing that invasive species and contaminants are “extra” parts that we should not be adding to the ecosystem. The Agenda also points out that derelict fishing gear (Question 3, page 16) is an “extra”



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part of the system that needs to and can be removed. While there are no regional goals to remove all known derelict fishing gear (which would be admirable), related items are called out in the Action Area Priorities for Island County, Whatcom County and San Juan County. However, the lack of a call for the actual removal of gear is a big oversight in the Action Plan. There are good data showing that derelict fishing gear has a demonstrable impact on living marine resources, many of them of high commercial value. Also there are data on exact locations of derelict nets and crab pots. The Action Agenda needs to support the actual removal of this gear instead of simply prioritizing it for removal (Whidbey Action Area Priority) or only quantifying the impact of derelict gear (Whatcom Action Area Priority and San Juan Action Area).

The Action Agenda also points out that “parts” of the ecosystem are missing: many species are in decline. The Agenda points out that there needs to be work recovering species such as salmon and killer whales, but there is no mention of the efforts needed to recovery the many other species that are listed as threatened or endangered or are candidates for listing, including but not limited to, marine birds, rockfish, several important stocks of herring and pinto abalone. One small, but important step should be legislative action that grants Washington State the ability to list declining fish and invertebrates. The Washington Fish and Wildlife Commission lists species of concern under the provisions of Washington Administrative Code (WAC) 232-12-297 (Endangered, Threatened, and Sensitive Wildlife Species Classification). Currently, Washington State can list marine birds and marine mammals as threatened or endangered, however marine invertebrates and marine and anadromous fishes can only be listed as candidates-for-listing. There is no legal framework for listing marine invertebrates or fish as threatened or endangered, which is the next step beyond candidate listing and brings with it a suite of legal and recovery ramifications. Granting the Fish and Wildlife Commission the ability to list marine invertebrates and fish enables Counties to consider listed marine invertebrates and fish under their Critical Areas Ordinances and would enable WDFW to write and enact recovery plans for species listed. Additionally, the Action Agenda should recommend that all efforts to recover threatened and endangered species be better coordinated between Washington and British Columbia. While this has been done to some degree with killer whales, pinto abalone and some other species, a more formal and agency-sanctioned format needs to be established. Finally, there are currently 30 marine species listed by Washington State as Candidates. Based on Washington law, a written Status Review is supposed to be prepared for all Candidate species, which serves as the basis for a final listing decision. Due to lack of funding and capacity at WDFW, many species have been listed as Candidates for years without having a status review written. The Action Agenda should make it a high priority to provide the funding for Status Reviews to be written for each of the Candidate species over the next several years.

6. **Support nature’s resilience**

Resilience is a measure of health and indicates how much stress a system can absorb before it permanently changes into an alternate state or collapses. While healthy ecosystems have tremendous capacity for self-renewal, resilience can be overwhelmed by collective human activities. We can restore resilience by design and this concept needs to be expounded in the Guiding Principles for



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Ecosystem Management (Question 3, page 4) to include the concept that strategies and actions that increase ecosystem resilience should be a priority.

7. **Value nature; its money in your pocket**

Human well-being is derived from access to and often the marketing of essential ecological goods and services provided by ecosystems. Healthy ecosystems save on repair costs and deliver essential goods and services. This is pointed out (Question 1, page 1; Question 2, page 2; and other areas), however in a time of a national economic recession and a state budget crisis, the Action Agenda needs to better point out how a healthy Puget Sound and Salish Sea will translate into a healthy regional economy.

8. **Watch Wildlife Health**

Diseases in marine animals are closely linked to human health and can provide early warnings as sentinels of ecosystem stress. With the exception of the correct mention that introduced species have the potential to introduce new diseases, there is little time spent acknowledging that diseases in wildlife can have catastrophic population-level impacts on already endangered species such as the southern resident killer whale population, and that disease in wildlife can serve as a sentinel of ecosystem stress often can provide early warnings about human health risks. In fact, human, animal and environmental health are so inextricably linked that physicians, veterinarians and environmental scientists and managers now speak of a “One-Health” concept. Using an integrated One Health approach to solving major emerging global health problems has been endorsed by the United Nations, the American Medical Association, the American Veterinary Medical Association, and the US Centers for Disease Control. While there are scattered efforts to study diseases in certain marine species within the Salish Sea, neither Washington nor British Columbia have dedicated systems for monitoring and reporting diseases in marine wildlife. Starting such a system will be important for designing a healthy ecosystem and should be included in the Action Agenda. An early actionable item could be to organize already existing efforts to study wildlife health and link them more formally to human health organizations as well as to the Partnership’s science and education and outreach teams.

9. **Plan for Natural Extremes**

From an ecosystem perspective, extreme natural events such as droughts, floods, earthquakes and El Niño Southern Oscillation events test fitness, mediate competition, and assure diverse opportunities. Unfortunately many people still view these kinds of events only as disasters that wreak havoc on society and cause humanitarian tragedies. The Action Agenda treats natural events such as earthquakes (Question 2, page 4) and flooding (Question 3, page 15) as events that we should try to avoid rather than plan for and fails to recognize that as we design a healthy Puget Sound, we need policies, laws, and management actions that accounts and plans for extreme but natural events. This is another example of a concept that should be included in the section Guiding Principles for Ecosystem Management (Question 3, page 4).



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10. Share the knowledge

People matter from grassroots to government and little will happen without educating and incorporating humans at every level into designing a healthy ecosystem for the future. If there is no buy-in by the citizens and policy makers in the region, the most scientifically based and well-funded Action Agenda will fail. The Partnership obviously recognizes this (Question 3, page 2; page 48, etc.). The need to create specific messages for target audiences is critical and the Action Agenda calls out a need to strengthen K-12 environmental programs and to address a variety of audiences, however it is critical that we specifically try and target our policy makers at the Federal, State and County levels as well as our business leaders. Our government and our businesses (both large and small) have had and will continue to have huge impacts on the way we interact with our environment. Targeted and effective education of these groups will be critical to develop a long-term sustained effort to design a healthy ecosystem. Additionally, the Action Agenda specifically calls out the need to “implement the WSU Beach Watcher Sustainability Plan to sustain current programs and expand the effort to all 12 Puget Sound Counties (Question 3, page 50).” This is a great idea. We also recommend including other important citizen-based initiatives such as the Northwest Straits Initiative and their 7 county-based Marine Resource Committees (MRCs) that are doing important education, outreach and restoration work. Expanding the MRC model to all 12 Puget Sound Counties will be equally as important.

We commend the Partnership for recognizing that the entire effort to design a healthy Puget Sound is a case study in adaptive management and appreciate that the Action Agenda acknowledges that strategic priorities and related action will need to be refined as we learn more over time. We applaud the Partnership for acknowledging that scientific information should provide a basis for this design as well as the ecosystem-level approach itself.

Additional comments on the Action Agenda:

- A continuous numbering system with a table of contents and index will improve readability of the final Action Agenda.
- The linkages between Goals, Actions and Performance measures need to be strengthened. For example, there are not even provisional indicators for each of the six criteria used to define success (Question 1, pages 2-4).
- The difference between the benchmark and target for the provisional indicator (Question 1, page 4) “Percent exceedance of instream flows” should be better clarified.
- Harbor seals have long been used to understand and monitor contaminants throughout the Salish Sea. We have good data on their natural history and they are good integrators of the system, making them ideal indicators for toxics, including PBDE levels. We recommend using harbor seals over pelagic fish as a provisional indicator for toxics.
- The word diseases (Question 2, Page 5) should technically be pathogens, which are the infectious agents that cause disease.
- Although pelagic food webs are important, it would be better to just call out a need to better understand the stressors affecting the entire food web (Question 3, page 47)



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Comments on the Draft Biennial Science Work Plan 2009-2011

As stated previously, the SeaDoc Society is a science-based marine ecosystem health program. In addition to conducting critical, targeted research, we have funded nearly 50 research projects over the last eight years. Through a competitive grants program we have funded researchers at over 30 institutions and agencies to answer questions as varied as the source of contaminants in southern resident killer whales to the effectiveness of different out-plant methodologies for the successful release and growth of hatchery-reared northern abalone. Having funded nearly \$2 million in targeted projects, we are in no way close to serving as the National Science Foundation for the Salish Sea, but we have been successful in answering important questions so that we can better understand how the ecosystem functions and how we can design a healthy ecosystem.

The Biennial Science Plan points out the need to identify high-priority research needs and begins by identifying four projects. Beyond this, we recommend that the Partnership's Science Panel work closely with the SeaDoc Society, Washington Sea Grant, Tribes, State and Federal resource and human health agencies and regional foundations that fund research to identify additional high priority research needs. As stated earlier in this letter, these efforts should be transboundary and should include Canadian scientists, agencies, managers, Tribes, and policy makers. Such a collaborative effort will have several long-term benefits. First, a broad-spectrum integrated approach will help identify research that will provide information that is applicable to improving management or policy related to designing healthy ecosystems. Additionally, it will provide a list that multiple funding agencies can use. The Partnership will not be able to fund all of the research needed, but by having multiple organizations identify research needs at multiple levels, there will be broad-scale buy-in for other organizations to seek or provide funding for the identified needs. Finally, the identified needs would provide a foundation for the Partnership's RFP process (Page 22).

The Science Plan identifies the intent to produce a 2009 State of the Sound report and a 2010 Puget Sound Science Update. In keeping with our first top principle for designing healthy ecosystems, the Science Panel should consider collaborating with British Columbia and producing a 2009 State of the Salish Sea report and a 2010 Salish Sea Science Update.

The Science Plan (page 19) calls out the need to present scientific knowledge to the public and students to "empower people who use and affect the land and waters of Puget Sound." While it will be important for the Science Panel to serve as advocates for science and science training, relying on the Science Panel to do this will be like trying to drain a lake with a straw, as the science team is too small to undertake this effort effectively. All scientists in the region with the capacity and interest should be called upon to serve as science advocates and be asked to provide information for scientific updates as well as for the Partnership's Education and Outreach efforts. The three tenants of place-based conservation are to know, connect and protect. Science reveals fascinating information that helps the general public know and connect to the Salish Sea and the wide-spread dissemination of scientific



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information to multiple audiences will be critical for empowering the region's citizens and policy makers who daily make decisions that impact the health of the ecosystem.

Thank you again for the opportunity to review and comment on the Draft Action Agenda and Biennial Science Plan. There are no examples of people designing healthy ecosystems for Puget Sound to follow; we are creating that model. If it were easy to do this, people would have done it long ago. We believe that while there is room for improvement, the Puget Sound Partnership is on the right track for designing a healthy Salish Sea. The SeaDoc Society looks forward to working with you on this effort.

Sincerely,



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ⁱ Gaydos, J. K., L. Dierauf, G. Kirby, D. Brosnan, K. Gilardi and G. E. Davis. In Press. Top Ten Principles for Designing Healthy Coastal Ecosystems like the Salish Sea. *EcoHealth*



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