

**Species/Biodiversity
Comments Submitted via Discussion Forum
4/14/2008 – 5/9/2008**

From: Grant Kirby

Date: 05/06/2008

Comment: Prevention is a priority measure to reduce the invasion of invasive non-native species by eliminating introductions at the pathways. The present Ballast Water regulations requiring mid-ocean exchange eliminates 95% of the non-native coastal organisms from the discharge (Ruiz and Reid 2007). As ballast water treatment technology becomes available, the threat will be reduce further via this pathway.

ref: G.M. Ruiz and D.F. Reid. 2007. Current State of Understanding about the Effectiveness of Ballast Water Exchange (BWE) in Reducing Aquatic Nonindigenous Species (ANS) Introductions to the Great Lakes Basin and Chesapeake Bay, USA: Synthesis and Analysis of Existing Information. NOAA Technical Memorandum GLERL-142.

From: Herbert Curl, Jr

Date: 05/01/2008

Comment: This forum is management-centric: higher trophic level species plans, commercial species harvest, hatchery management, cultured species (some of which are invasive or disruptive to habitat). Lip service is paid to “ecosystem-based management” but there’s virtually no recognition of what we know or don’t know about how the Puget Sound ecosystem functions quantitatively. Estimates of primary productivity for the Sound would indicate the maximum sustainable biomass of higher trophic level organisms. That number could be compared to what actually exists.

What are they key processes and pressure points in food webs and how are affected by all kinds of stressors? If you don’t know you’re just looking at inputs and outputs from a black box without being able to affect the most important stressors.

Bottom fish, seabirds and forage fish have declined and continue to decline. Why? What processes are in play and how do we affect them? Changing hunting regulations for sea ducks does not address the causes of declines; they merely affect a reduction from some arbitrary number. How many sea ducks should be here and how to conditions in other states affect what we see here?

The problem with this topic/forum is that it is top down, starting with the products of

biological processes and assumes if we manage harvest we can ignore other stressors or measure them but not devise ways to control them in a holistic way. "You can't do just one thing" because everything is connected to everything else."

So where is the basic conceptual model for physical, chemical and biological processes in the Sound with numerical submodels to test our understanding and data sufficiency? Conceptual models are mentioned in the document but are hardly the centerpiece.

The emphasis here is on a few trees and not on the forest consisting of a biodiversity of trees.

From: Herbert Curl, Jr

Date: 05/01/2008

Comment: What are the tools? Measurement of conventional pollutants and changes in higher trophic levels? If these and other "documented findings" aren't put into some kind of context as part of a conceptual understanding of ecosystem functioning, all you have is a jumble of miscellaneous information.

The most effective tool is a conceptual model with submodels based on how you think things work: internal biotic and abiotic forcing functions, productivity outputs, and then external forcing functions. When you have the relationships organized in some logically consistent manner you start plugging numbers in to the best of your ability. The results should look like what we actually observe. If not we need to learn more or find more and better tools.

From: Herbert Curl, Jr

Date: 05/01/2008

Comment: The answer to the first question is "yes," As far as I can tell what we're doing now is to regulate harvest of commercial species. But that tool is based on wanting your cake and eating it too. Halfway measures. Even if you've missed major programs or projects, so what? What's important beyond a catalog of programs and projects is an assessment of how effective they are and whether they're the right programs and projects.

This question is about strategies. The overarching question is: does "what we are doing" now constitute an overall strategy?

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From: Herbert Curl, Jr

Date: 05/01/2008

Comment: I applaud the foregoing statement. However, the Caucus appears to have partially accepted the regulatory, upper trophic level, single species approach that appears throughout the topic paper. ESA species recovery, HCPs, marine reserves, commercial harvest regulations, etc. are pieces of a strategy but do not constitute a strategy.

A little carping here: ESA recovery of large birds has resulted from a national program, not local action; most HCPs are at the behest of industry which wants "no surprises" but nature and climate change don't operate on a fixed 50 year time scale, marine reserves are usually too small to act as 'seed' areas and if they are to perform that function there needs to be habitat for the seed to fall on; commercial harvest regulations are there to guarantee some kind of harvest, not to guarantee recovery and sustainability, etc.

A strategy for the recovery of Puget Sound is going to take some bold steps at the state level, and for which the Partnership has no authority, only persuasiveness. My conclusion is that we need to have a much better handle on how the ecosystem works in order to have 'ecosystem-based management' a buzz phrase. The strategy does need to look at the system on a watershed basis. Special interest advocates for commercial and sports harvests, including fishing and aquaculture of all kinds need to be parties to the solutions, not just clients.

So, it appears we don't yet have a strategy or a strategic pathway, just fiddling with presumed causes and obvious effects.

From: Herbert Curl, Jr

Date: 05/01/2008

Comment: For all species of concern: forage fish, bottom fish, sea birds, marine mammals, salmonids, invasive species, etc., we need a Report Card. The State of the Sound Reports are a step in the right direction.

We need for each indicator or ecological keystone species the following: a quantitative assessment, at least once every five years, of distribution and abundance; a statement of the goal for distribution and abundance of each species on a longer time scale; a list of the measures being used to increase or suppress a species; a quantitative statement of achievement of the goal (whether we're gaining or losing.)

This is the only way we'll know if we're achieving a stated goal and the cost. A parallel activity should be the running of scenarios of what if: what if we stopped the activity, what if we lost in spite of the activity, what if we spent less or more money on the activity. In other words cost/benefit analyses of the measures we're taking to augment or suppress particular indicators,

From: Herbert Curl, Jr

Date: 05/01/2008

Comment: The prioritization is focused on higher trophic levels and regulatory management. The prioritization needs to be based on goals established for sustainable populations of the species and communities most important to us.

Is the goal a return to pre-Caucasian arrival conditions? No? Conditions in 1900? If not some past set-point then how is the sustainable goal described? Where do we want to be 50 or 100 years from now, recognizing that some things are out of our immediate control, global climate change being No. 1.

From: Kit Rawson

Date: 04/28/2008

Comment: p. 14 " Marine reserves established in Puget Sound by WDFW appear to have some benefit to rockfish and lingcod;" In general, it is important to get the history, intent, and results of current management strategies right. For example, partial no-fishing zones were established in the San Juan Islands at the request of the Friday harbor Laboratories in the early 1990s to set aside areas where natural marine communities would continue to be available for research and long-term monitoring. The laboratories approached both the state and tribal managers, who both closed fisheries in the areas requested. Thus, these areas were not "established ... by WDFW", nor were they established specifically to benefit rockfish and lingcod. Furthermore, although the fisheries managers' regulation of these areas extends only to fishery harvest, most of these are bordered by lands that are protected from development, some of the effects of which can harm marine communities and specifically rockfish. Thus these zones are really more than no-fishing reserves and any beneficial effects are likely due to a combination of factors. Also, while it is interesting and important that there is improvement in the numbers and size of rockfish as compared with nearby control sites, there has not been an assessment of these sites' effectiveness towards the original goal of protecting areas for marine research.

The June 26, 2003, "Tribal policy statement on marine protected areas, marine

reserves, marine sanctuaries, and fishery conservation zones" sets out a logical framework for evaluating marine protected areas, or any new management proposal, in light of both existing management plans and management objectives. It should be consulted and cited in this document.

From: Emily Livengood

Date: 04/24/2008

Comment: Note to Reader: This paper represents the preliminary work and initial consensus of the Puget Sound Environmental Caucus to answer questions posed on the Puget Sound Partnership's "Initial Discussion Draft Species, Biodiversity and Food Web," April 14, 2008. We present this paper to help provide context, ask key questions and suggest a path toward common solutions that might be discussed at the May 1, topic forum and beyond as the Partnership and community partners develop a Puget Sound Action Plan. We expect information in this white paper to be updated, changed and added to.

The Caucus Species, Biodiversity and Food Web Committee will be refining this paper into a more finished product to submit to the Partnership prior to the Synthesis Workshop on May 28, 2008.

Introduction

Tackling any of the Puget Sound Partnership (PSP) issue topics is a large task. The Puget Sound Environmental Caucus appreciates the work that went into the "Initial Discussion Draft Species, Biodiversity and Food Web" paper. Our comments are meant to assist the authors in fleshing out the topic paper with additional information from the large body of work that has been undertaken over 30 years to understand and solve the many species health problems within the Puget Sound.

Specific Questions:

The initial Puget Sound Partnership discussion paper of the Species, Biodiversity and the Food Web topic provides a good overview of the threats and stresses to species in the Puget Sound watershed and a brief introduction to the strategies, management tools, and criteria for the evaluation of this topic. However, we feel the paper is incomplete, contradictory in places and confusing, especially as it relates to the proposed ecosystem management strategy often offered as a possible panacea to species diversity concerns.

1. Can ecosystem management be conducted in the vacuum of no habitat?
 - a. The Partnership explicitly states the Species Biodiversity issue does not address habitat, yet in many instances throughout the paper ecosystem management is

- presented as the best approach forward. Ecosystem management implies habitat no?
2. The paper jumps from touting individual species recovery plans (page 12), to warning against species recovery plans for multi-species (page 12), to fully promoting ecosystem based management that does not mention species (page 14). Is the Partnership going to promote individual species recovery plans, a broad based ecosystem management approach or multi-species recovery?
 3. More details are needed from the Partnership to adequately explain ecosystem management-where has it been successful, what is the basic approach and most importantly how does the Partnership foresee the development and implementation of an ecosystem wide approach?
 4. Current HCPs and other recovery plans need to be critically evaluated by an independent science panel for their effectiveness before used as a model for a Puget Sound ecosystem management plan. The PSP white paper touts several plans including the Bald Eagle and Brown Pelican. Why were these efforts successful? Why have others failed?
 5. We need to address the threat from aquatic invasive species often introduced through the discharge of ballast water.
 6. There are inconsistencies in the paper related to forage fish populations and their actual status. The paper both implies a decline (page 1) and a stable population (page 8). There should be special attention paid to the Cherry Point herring stock which used to comprise half the State's spawning biomass of 15000 tons and now only constitutes 2000 tons.
 7. Regardless of the contradictions there are many species that need updated population health status reports.
 8. We need to proactively address recovery plans from the perspective of 'listed' as well as non-listed species of concern.
 9. We cannot wait until all the baseline data is in for critical species populations. We need to start acting now on a comprehensive Sound-wide recovery plan and maintain individual action already in the works.
 10. We have to avoid inconsistent actions, like those of NOAA in regards to Orca management concurred with the Army Corps decision to dump contaminated dredge spoils into the Sound as not being seen as contradictory to the recovery efforts of the Orca. Fortunately this decision was overturned by the Port of Seattle's Commission and celebrated by the Partnership.
 11. The Partnership needs to get involved with local governments and land use decision-makers as their decisions impact at risk species. Ensuring the support of local governments is critical to create support for an ecosystem management plan and to avoid repeating the mistakes of the past.

Recommendations and Discussion

The Puget Sound is on a downward trend. Numerous indicators suggest that species and biodiversity issues need immediate attention if we are to preserve the vast diversity of life in the Puget Sound. The main problem is that we are adding inputs

into this fragile system that are overwhelming its ability to recover. In other words, the Sound is becoming less and less resilient as time goes on, is currently on a downward trajectory, and may be heading for a crash. In addition to these general trends, we have other indicators that clearly point toward growing negative cumulative impacts, like toxic accumulation in Orcas (killer whales). We could spend many years and many dollars trying to identify the direct cause and effect relationships of these impacts when common sense already tells us we need to change dramatically the way “we do business” in the Puget Sound. In order to accomplish this, the Partnership needs to take bold actions and steps to change the direction of this dangerous course.

The Partnership has sent a clear message that they are trying to base all of their decisions on sound science that is already complete and vetted. In other words we get the impression that we should focus on species that already have been studied, already have data available on their population trends and even have some strategies in place to improve populations. While this is a very valid and important step we are reminded that no science is complete or conclusive. We cannot have one snapshot in time with all the information. Therefore we recommend that the Partnership moves forward in a two-tiered approach. First, of course, we develop a long-term approach to comprehensively address the problems within the Puget Sound and its watershed. To do this well we will need to engage in further scientific research and create baseline population numbers, species diversity indicators and overall species health measurements. This suggests the long-term solution is Ecosystem Management (our some form similar), but the disturbing trends also indicate the need to do some things immediately before all the baseline data is available. The Partnership cannot wait until all the data is in before action is taken, nor can we move forward on an Action Plan for Puget Sound that only focuses on species with clear baseline data. We recommend that as the Action Agenda and implementation plans are developed, the Partnership make sure that all efforts are made by all local, state, and federal agencies to ensure Puget Sound remains or improves upon its current state. This includes three key steps:

1. Ensure existing rules and regulations are enforced in the most protective manner at both the local and state level and hold local jurisdictions, developers, and others with a direct impact on the Sound accountable.
2. Take seriously the threat of a manmade catastrophe like an oil spill that will make the entire process of developing an action plan useless.
3. Work with local governments to ensure their actions are not counter to the goals of the Partnership and begin to develop genuine buy-in from local units of government.

The number one overarching recommendation we have to the Partnership is to keep each individual stakeholder, whether it's a local government, a developer, a

commercial fisherman or a private homeowner focused on the ‘big’ picture and to continue to raise awareness to the fact that small impacts from seemingly small actors can lead to catastrophic cumulative impacts.

One good example of this collaborative effort is the Bald Eagle recovery plan. Throughout the Partnership’s species diversity discussion the Bald Eagle recovery plan was touted as a major success. This recovery would never have occurred if local jurisdictions were not involved in the entire process and held accountable for their actions. But regardless of this cooperation and this great partnership and outcome the entire reason the Bald Eagle declined in the first place was the application of one chemical — DDT. Yes, a widespread application at that, but how many chemicals is we adding into the system everyday? How many other examples of DDT are out there? We need to be more proactive than just creating recovery plans as needed to address crisis situations.

Our second overarching recommendation is that we should not wait until a species is listed as threatened or endangered, by either the state or federal government, to take action. A truly successful action plan will create a strategy to protect all species within their habits regardless of their ‘official’ status.

Our third overarching recommendation is to make sure we do not continue to make the same mistakes of the past. We need to look toward the future with a creative eye, but also one that is grounded in the reality of successful implementation. Currently, many of our good intentions are ground to a halt because of four critical barriers including (a) lack of full funding, implementation and enforcement of existing federal, state and local regulatory programs; (b) lack of adequately protective permit language and clean up plans; (c) lack of political will and attention to existing institutional barriers, public outreach and education by governments, including the legislature; and (d) an over-reliance on mitigation, which several local studies have shown to fail more often than succeed.

As part of the issue paper topics and upcoming forum the Partnership has asked a few specific questions that we attempt to answer below and provide additional recommendations and feedback.

1. What is a healthy Sound?

A healthy Puget Sound is a resilient Puget Sound where healthy species populations are protected in numerous areas throughout the Sound to ensure redundancy.

For example, there are about 19 Herring subpopulations identified in the Puget Sound Basin. Some of these populations are doing well while some are in steep decline such as the State’s once largest stock at Cherry Point. An ecosystem-based

species plan should not separate or focus attention only on the Herring subpopulations that are in decline, but look to ensure healthy and stable populations in all 19. However, it is critical that the status of all stocks are closely monitored and accurately portrayed in the issue paper which was not done in the first draft.

Taking guidance for the Partnership's statutory goals our subcommittee felt that all 8 of the statutory goals are relevant to this issue. The most directly applicable goal is #7 "Protect ecosystem biodiversity and recover imperiled species." A healthy Puget Sound will include abundant, spatially well-distributed populations of multiple indicator species. Our subcommittee included the five indicator species identified by the Partnership and added a few additional indicator species to help guide the creation of an ecosystem based plan.

- a) Seabird colonies (e.g., Western Grebe or Pigeon Guillemot)
- b) Shorebird colonies
- c) Chinook Salmon
- d) Herring spawning biomass and trends for each of the 19 stocks
- e) Intertidal species richness (Shellfish)
- f) Aquatic mammals (e.g., Orcas and Harbor Porpoises)
- g) Upland-dependent species (e.g., Bull Trout, Steelhead, or Great Blue Herons)
- h) Reptiles and amphibians (e.g., Western Pond Turtles, Oregon Spotted Frog or salamanders—Cascade Torrent, Dunn's, Van Dyke's)
- i) Subtidal species richness (e.g., Rockfish)

We also suggested using all Pacific salmon as indicator species rather than only using Chinook Salmon. This inclusion covers a broader range of habitat needs and life histories, and looks beyond just the ESA listed stocks. A key criterion in selecting indicators is the availability of adequate data/assessment sources and our committee feels there is good data available for many of these additional indicators.

2. What is current status of Puget Sound's Health and what are the biggest threats? Numerous species are in poor health, with the threats running the range of human activities represented in the other topic papers (water quality, water quantity, habitat, etc.) Specific threats that may be identified in the other topic papers but should be discussed at length here include single species management (including artificial enhancement), the introduction of marine and terrestrial invasive species, oil spills, and human activities such as sonar testing and underwater explosives training by the Navy.

3. What actions must be taken that will move us from where we are today toward a healthy Puget Sound?

Better monitoring and data collection is necessary, but is only a piece. There is equal need to move simultaneously on actions items that will meet specific measurable

benchmarks for the various indicator species.

Specific indicator species should include a mix of species that are a representative cross section of the full range of species in the Puget Sound watershed. As suggested above (in response to question #1), our subcommittee recommends that the indicators include fish, avian, marine mammal, and upland species.

Examples of specific benchmarks for marine waters could be:

- . Protection of existing herring spawning areas (no net loss)
- . Enhancement of existing herring spawning areas (net increase of size/quality)
- . Restoration of historic herring spawning areas (including spatial and temporal distribution)

. Net increase in the total volume of all forage fish throughout Puget Sound

Similar benchmarks for freshwater and terrestrial actions would be needed as well.

Our committee also discussed the value of evaluating not only the number, abundance and distribution of species, but the also the physical health of individual animals and populations over time. The example discussed was the WDFW's collection and tracking of blood samples from harbor seals. This longitudinal data set can provide a benchmark for measuring progress on the species health improvements or declines as toxins are removed from the environment. Monitoring of a mammal that eats high on the food chain is particularly important to address cumulative impacts and trends as they may affect human health.

4. Where should we start?

While developing benchmarks and implementation plans for all of the indicator species is warranted, we propose that the Puget Sound Partnership start this process by focusing on the management of one or two forage fish as key benchmark species.

Herring, for example, can serve as a reliable indicator of the health of a wide range of species. These forage fish rely upon habitat conditions, water quality, etc. that encompass a broad cross section of Puget Sound. Herring in turn serve as a food source for multiple other species up the food web, from salmon to seabirds to orcas. If herring were to be restored to healthy populations, both in spatial distribution and abundance, our subcommittee feels that there would likely be huge benefits for a wide set of species. Sandlance and surf smelt are other forage fish that could be used as additional key benchmark species (covering more habitats than herring alone).

While it is often easier to rally the public (and therefore decision-makers) around more charismatic species such as salmon or orcas, our subcommittee feels it is likely that greater Sound-wide benefits will accrue from a focus on a less glamorous species such as herring and other forage fish. The health status of forage fish also correlates to other species across Puget Sound. Focusing on the protection of herring

spawning beds would also afford the Partnership the opportunity to demonstrate how they intend to tie upland/shoreline management to marine conservation.

Conclusion

If we are going to promote an ecosystem-based approach to restoring the Puget Sound watershed we must first fully understand what this means. An ecosystem-based approach implies habitat and it implies a much larger scope than individual species recovery plans. Neither has been fully defined by the Partnership. At a very minimum we might look toward a working model that creates a suite of recovery plans for species that are both 'listed' and unlisted aiming to manage species for recovery and sustainability rather than harvest. These individual recovery plans would focus on critical habitats that would link together to form the basis of a Sound wide recovery plan. The Puget Sound Environmental Caucus Species, Biodiversity and Food Web Subcommittee recommends that forage fish be the base of the pyramid of this Sound-wide recovery plan and that the Partnership seriously consider the interconnections among all of the issue groups or at least identify the potential unintended consequences of dealing with each issue separately.

From: Joyce Gerald

Date: 04/22/2008

Comment: The document fails to recognize the ongoing threat from aquatic invasive species. While purple loosestrife, *Spartina* spp., *Sargassum muticum*, knotweed, and Scotch broom are ongoing and visible threats, they are only one class of the invasive species that threatens the long-term health of Puget Sound. As we have seen over the last few years, three species of non-native tunicates, *Styela clava*, *Didemnum* sp., and *Ciona savignyi* have become established and are spreading. We must recognize that until the sources of introductions are eliminated, we will continue seeing non-native species becoming established. While the State and Federal governments are addressing some of these sources through proposed regulations on ballast water and sediment discharge, the dangers of introduction of species via ship hull-fouling, sea chest fouling, and from the transport of recreational vessels remains very high. With the ongoing increase of water temperatures, we will be finding more species capable of establishing populations in our waters. We need to recognize that this can yield into massive colonization as has been the case in San Francisco Bay. In a 1998 report (Cohen, Dr. Andrew, San Francisco Estuary Institute, *Ships' Ballast Water and the Introduction of Exotic Organisms into the San Francisco Estuary*, p. 12, Oct. 1998), it was shown that a new species is established every 14 weeks, up from one every 55 weeks in 1960 and that in some areas of the Bay more than 234 non-native plant and animal species are now established and that up to 99% of the biomass and 97% of the organisms are non-native species.

A fairly old sampling (1999-2000) of known aquatic invasive species in parts of Puget Sound is available for A Rapid Survey of Exotic Species in the Shallow Waters of Elliott Bay, Totten and Eld Inlets, and Willapa Bay, 2001. (Available at: http://www.dnr.wa.gov/Publications/aqr_nrsh_exotic_exped2000.pdf).

From: Doug Bulthuis

Date: 04/20/2008

Comment: A few specific comments:

Science Question 1, Key Findings, A. (pp. 1-2): This is a list of broad categories with some examples, but it is not abundance, nor productivity, nor spatial distribution, nor diversity of key species in Puget Sound.

Macroalgae should be mentioned as marine and estuarine primary producers because they are an important group of primary producers and are important in providing habitat and structure for marine and estuarine organisms.

SQ 1, Threats (pp. 5-6): Climate change is a future threat. All of the other "threats" have caused serious decline of species and populations in Puget Sound and are doing so in the present. Climate change may be important in the future (as indicated in the discussion) but the emphasis in the next decade or so should be on addressing the current and continuing causes of decline.

p.13 2nd paragraph under "Harvest management": the last sentence is a repeat.

"Harvest" and "Harvest management" in each section should include some consideration of hunting for waterfowl.