

Memorandum To: PSP Science Panel

Re: Recommendations for the “Human Well Being Indicators” Indicators Action Team

From: Katharine F. Wellman, Northern Economics, Inc. and Jacque White, Long Live the Kings

Date: June 3, 2010

## **Process for Identification of Dashboard Indicators for Puget Sound Regional Human Well-Being**

One of the six statutory goals of the Puget Sound Partnership is "A quality of human life that is sustained by a functioning Puget Sound ecosystem". Section 1. (C) of Engrossed Substitute Senate Bill 5372, the enabling legislation for the Puget Sound Partnership states:

“Puget Sound must be restored and protected in a more coherent and effective manner. The current system is highly fragmented. Immediate and concerted action is necessary by all levels of government working with the public, nongovernmental organizations, and the private sector to ensure a thriving natural system that exists in harmony with a vibrant economy.”

Therefore, in order to demonstrate that Puget Sound recovery can occur in the midst of one of our nation’s and the Pacific Rim’s most economically active and productive urban areas, home to about four million people (not counting Canadian drainages to the basin), the Washington State Legislature recognized that it is necessary to develop indicators that gauge human well-being and health as we also evaluate progress on protecting and restoring the region’s natural systems.

The process of generating indicators of human well-being began in 2008 and has been ongoing in a variety of different forums since that time. The human well-being indicators found in the Draft Ecosystem Indicators Dashboard are based on the expert opinion of the authors of this memo in consultation with social scientists from various disciplines and informed by previous work conducted over the last 2 years. Previous work included a literature review on human well-being indicators, a ranking of potential indicators using criteria established by the NOAA NW Fisheries Science Center staff (O’Neill, Bravo and Collier, 2008), input from social scientists and stakeholders in the Performance Management/Open Standards process conducted by PSP staff (PSP, 2009), and a review of human well-being indicators in Part 2b of the PSP Science Update (Mercer et al, 2010).

Each of these efforts is briefly described below.

**Literature Review and Provisional Indicators of Human Well-being:** A comprehensive literature review was conducted in 2008 by Morgan Schneider who was at the time employed by the NW Fisheries Science Center. The literature review was designed to identify a comprehensive list of human well-being indicators that addressed the quality of life goals of the PSP. Morgan Schneider, Mark Plummer (NW Fisheries Science Center) and Katharine Wellman (Northern Economics, Inc, and PSP Science Panel Member) worked with the original Provisional Indicators Task Group led by Sandi O’Neill. This group generated a set of possible indicators for human well-being. These indicators were divided into subsets according to a general scheme for ensuring coverage of distinct elements of human well-being (Please

see Schneidler and Plummer, 2009). For each subset, the task group listed potential indicators that fall into four categories:

- Good Provisional Indicator: Indicators that satisfy the criteria listed in "*Criteria and Framework for Selecting Provisional Environmental Indicators*" or *Criteria* (Bravo and O'Neill, 2008).
- Potential Indicators: Indicators that satisfy some but not all of the criteria identified in *Criteria*.
- Indicators from other Group: Indicators that are being used by other groups but also can be used for human well-being
- Future Work: Areas where future work needs to be done to develop indicators.

**Open Standards Performance Management Indicators of Human Well-being:** Mark Plummer and Katharine Wellman worked with the PSP Cross Partnership Performance Management Work Group to identify appropriate human well-being focal components within the context of the Open Standards Process (Conservation Measures Partnership, 2007) in 2009. A short list of focal components were generated, including (1) the built environment, (2) working marine industries, (3) working resource lands and industries, (4) nature oriented recreation, (5) aesthetics, scenic resources and existence values. Please see the list of indicators under each of these focal components in PSP (2009). Refinement and identification of data sources for related indicators was only completed for two of these components (Working Marine Industries and Working Resource Lands and Industries). The two indicators selected for inclusion in the 2009 State of the Sound (PSP, 2010) were Puget Sound Commercial Finfish and Shellfish Harvest and Forestland Acreage.

One recommendation that the Indicators Action Team has as Puget Sound recovery efforts advance is for the Partnership to fully flesh out the Open Standards process and to select a detailed set of related strategies and indicators so that the results may serve as the backbone and logic supporting the next generation of the Action Agenda. The authors believe that this set of logically derived, connected and prioritized strategies and indicators should fully embrace human health and well-being as intended in the original enabling legislation. Doing so will provide the Partnership and those tasked with implementation of the Action Agenda a clear path from objectives, strategies and challenges through measure of success, and the ability to track condition of both the human and natural dimensions of the Puget Sound system as we go forward.

**PSP Science Update:** Doug Mercer and colleagues (2010) are in the process of generating a chapter for the Puget Sound Science Update. Their work has focused on indicators of demographic change in the Puget Sound region and develops a compelling argument for the inclusion of indicators of institutional change and social capital. However, there are not adequate data sources for the latter. This work informed the PSP Indicators Action Team but was not in complete enough form to be adequately integrated into the Draft Ecosystem Indicators Dashboard.

**Draft Ecosystem Indicators Dashboard – Human Well-being and Human Health Indicators:** Based on the former efforts and further refinement of data availability and recognition of potential overlap with

natural system indicators, the Indicators Action Team has identified 4 dashboard indicators for human well-being, and 1 for human health (see Draft Ecosystem Indicators Dashboard, 2010). These indicators were chosen to represent one or more of each of the following 6 “Strategic Outcome Measures” (using the language of the Indicators Action Team but also referred to as “Focal Components” in Open Standards (Conservation Measures Partnership, 2007) terminology). This list of strategic outcome measures has reoccurred throughout nearly all the work on human well-being indicators over the last 3 years, and a focus of discussion among various PSP workgroups. They include:

1. Regional makeup (including demographics, economic, water use and transportation trends).
2. Social capital (e.g. environmental stewardship, citizen scientists).
3. Impact of recovery strategies on marine and land based natural resource industries (unintended consequences of Action Agenda implementation)
4. Ecosystem services which provide benefits to people
5. Behavioral change of public as awareness increases
6. Existence value of the ecosystem (including aesthetics and willingness to pay to assure the continued survival of individual species or general health of the ecosystem)

Table 1 lists the 6 strategic outcome measures or “Components” (and associated indicators where possible) identified by the authors and vetted with members of the Indicators Action Team, Doug Mercer, and Mark Plummer. For the purposes of our 2010 Dashboard, indicators with current robust data sources were selected for 4 of the 6 strategic outcome measures:

- Regional makeup – Puget Sound Regional Council Index (please see attached)
- Impact of recovery strategies on marine and land based natural resource industries – Commercial Fisheries Harvest (Tribal and Non-Tribal)(annual wild harvest in pounds)
- Ecosystem services which provide benefits to people – Participation in recreational fish, shellfish and hunting harvest (number of permits issued)
- Behavioral change of public as awareness increases – Personal vehicle miles traveled

The Indicators Action Team members tasked with working on indicators of human well-being recommend advancing at this time the current proposed list of four indicators plus a fifth related to human health and water quality: (the percent of core swimming beaches meeting water quality standards). Going forward, however, we suggest the Puget Sound Partnership and its advisors review this list at least annually, and improve the existing indicators, or add or subtract indicators as needed to effectively represent progress to the public. The authors feel strongly that indicators of working resource lands (agriculture, timber, and aquaculture), existence value and social capital need to be developed and eventually added to the Dashboard to characterize these important dimensions of human engagement and value of the Puget Sound ecosystem. We also suggest that there may be a better indicator of behavioral change. We also believe there is much to be gained with respect to improving existing Indexes of human well-being by either expanding or contracting the geographic range evaluated using the existing underlying data sets. While we recommend the Puget Sound Trends Index for the current Dashboard it could be significantly improved by including coverage of all 12 adjacent

counties. Another example of note is the Cascadia Scorecard developed for the international geography of the Cascade mountain range and adjacent marine environment developed by the organization Sightline. In addition to examining metrics of wildlife condition or pollution, these indexes include a combination of measures that address trends in human health, economy, demographics, land use, energy consumption and transportation. Rescaling or calibrating the underlying datasets so that they coincide with the Puget Sound basin as a whole, and/or match each of the eight action areas identified in the enabling legislation, these indexes or some derivation of their metrics could prove to be tremendously valuable in measuring important and relevant human dimensions as Puget Sound recovery progresses.

Table 1

Component	Indicator	Operational definition	Comments
Regional makeup	Human Well-being Index	Puget Sound Regional Council Puget Sound Trends Index (see attached for entire list of attributes)	<ul style="list-style-type: none"> <li>This index reflects what is guiding the region's economic development and sustainable growth goals</li> <li>it exists and data is being collected and reported monthly – Rick Olsen ROlson@psrc.org</li> </ul>
Behavioral Change	Personal Vehicle Miles	Personal Vehicle Miles Traveled extracted from the Index to represent Changes in Behavior strategic outcome Measure.	<ul style="list-style-type: none"> <li>Includes four counties (King, Kitsap, Snohomish, and Pierce)</li> <li>there is nothing like it elsewhere that covers the geographic scale and time frame that we need</li> </ul>
Action Impact	Commercial Fisheries	Annual harvest (pounds) of non-tribal commercial fisheries (salmon, crab, shellfish, groundfish, shrimp) in Puget Sound.	<ul style="list-style-type: none"> <li>PacFin data base reported annually by Pacific Marine Fisheries Commission.</li> </ul>
Action Impact	Working Agricultural Lands	Percent of State and Private Forestlands converted to other uses	<ul style="list-style-type: none"> <li>NOAA C-CAP data source (see attached)</li> <li>Alternative future data source is UW Precision Forestry Cooperative Western Washington Land Use Change Data Set: WA State Parcel Data Base (2007 2009) and WA State Forestland Data Base (2007). These to be expanded to include parcel data on agriculture pending funding.</li> <li>The latter would be very helpful in evaluating alternative land use outcomes associated with different policy scenarios as well.</li> </ul>
Action Impact	Working Forest	Percent of private	<ul style="list-style-type: none"> <li>Future data source is UW Precision Forestry Cooperative Western</li> </ul>

	<p>Lands</p> <p>agricultural lands converted to other uses OR Hired Farm labor or number of people employed in agriculture production</p>	<p>Washington Land Use Change Data Set: WA State Parcel Data Base (2007 2009) and WA State Forestland Data Base (2007). These to be expanded to include parcel data on agriculture pending funding. Recommended to be added to Monitoring Program.</p> <ul style="list-style-type: none"> <li>• The latter would be very helpful in evaluating alternative land use outcomes associated with different policy scenarios as well</li> <li>• If interested in number of people employed in agriculture production data source is Census of Agriculture Washington State County Level data</li> </ul>
<p>Ecosystem Services</p>	<p>Number of recreational fishing permits sold annually in Puget Sound</p>	<ul style="list-style-type: none"> <li>• WDFW recreational fishing permit sales - data collected by license type, year issued and number of licenses – Eric Kraig- Eric.Kraig@dfw.wa.gov</li> <li>• Participation rates are indicative of the quality of the recreational experience and access to the resource....lots to harvest (less management restrictions and shellfish beds closed) the greater the participation</li> <li>• 2006 (most recent) Outdoor Recreation Survey, Washington State Recreation and Conservation Office. Recreational regions and data collected by counties every five years.</li> <li>• Present data in stacked form</li> </ul>
<p>Social Capital, Existence Value</p>		<ul style="list-style-type: none"> <li>• Data not currently being collected</li> <li>• Rational for its measurement well-documented in the scientific literature</li> <li>• Social capital might be measured as number of individual membership in environmental organizations, citizen science groups, philanthropic foundations and professional employment</li> <li>• Existence values could be assessed through a willingness to pay survey</li> </ul>

## ***References***

Bravo, C. and S. O'Neill. 2008. Criteria for Indicator Selection from the Provisional Indicators Technical Working Group. NOAA Fisheries Science Center.

Conservation Measures Partnership. 2007. Open Standards for the Practice of Conservation.  
[http://www.conservationmeasures.org/CMP/Site\\_Docs/CMP\\_Open\\_Standards\\_Version\\_2.0.pdf](http://www.conservationmeasures.org/CMP/Site_Docs/CMP_Open_Standards_Version_2.0.pdf)

Mercer, D. et al. 2010. Puget Sound Science Update, Chapter 2B in draft.

O'Neill, C.F. Bravo, and T. K. Collier. 2008. Environmental Indicators for the Puget Sound Partnership: A Regional Effort to Select Provisional Indicators (Phase 1). Summary Report. NOAA Fisheries, NW Fisheries Science Center.

Puget Sound Partnership. 2009. Identification of Ecosystem Components and Their Indicators and Targets. Technical Memorandum.

Puget Sound Partnership. 2010. State of the Sound.

Schneidler, M. and M. Plummer. 2009. Human Well Being Indicators in Puget Sound. NOAA Fisheries, NW Fisheries Science Center

# Puget Sound Trends Index

A monthly report of demographic, economic, transportation and other planning data of interest to government, business and industry in the Puget Sound region.

## [April 2010 Trend:](#) [Employment in Manufacturing-Industrial Centers, 2000-2008](#)

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Jul 2001	<a href="#">Historical County Population Change, 1950-2000</a>	D1

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## *Coastal Change Analysis Program Regional Land Cover*

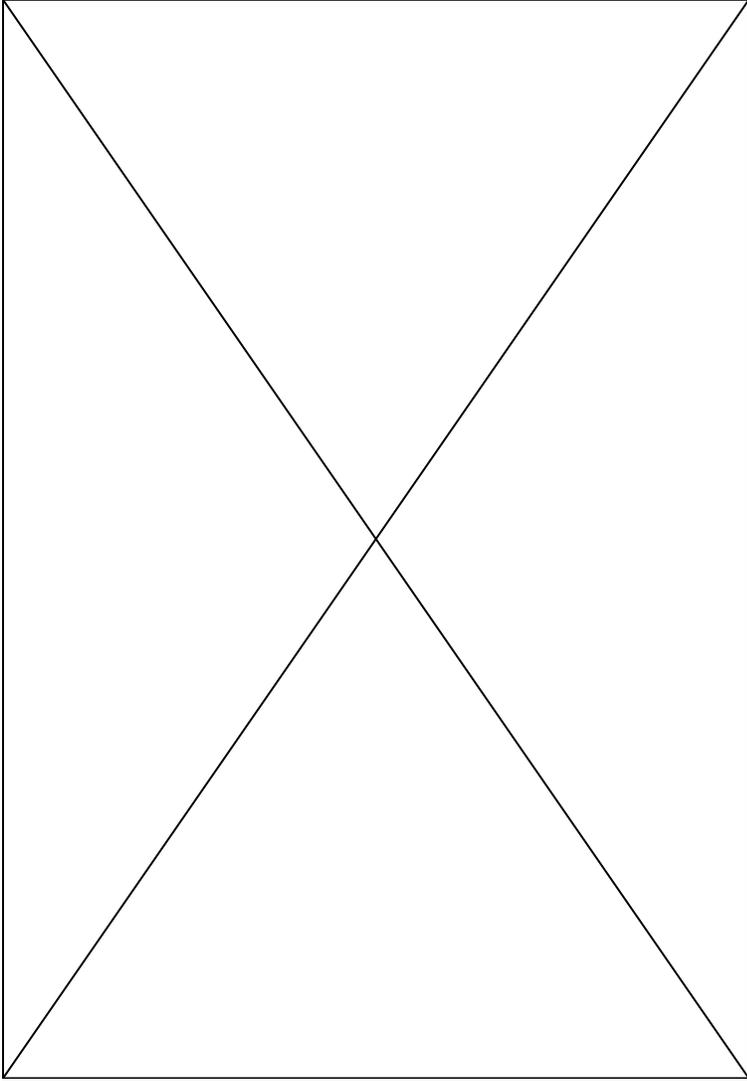
Produced and distributed by the [NOAA Coastal Services Center](#)

The Coastal Change Analysis Program (C-CAP) produces a nationally standardized database of land cover and land change information for the coastal regions of the U.S. C-CAP products provide inventories of coastal intertidal areas, wetlands, and adjacent uplands with the goal of monitoring these habitats by updating the land cover maps every five years. C-CAP products are developed using multiple dates of remotely sensed imagery and consist of raster-based land cover maps for each date of analysis, as well as a file that highlights what changes have occurred between these dates and where the changes were located.

NOAA also produces [high resolution C-CAP land cover products](#), for select geographies. These products focus on bringing NOAA's national mapping framework to the local level, by providing complimentary data, at a more detailed resolution to compliment regional C-CAP land cover. However, high resolution of C-CAP data is not currently collected in the Puget Sound Region.

### Data Specifications

- **Area of Coverage:** Coastal intertidal areas, wetlands, and adjacent uplands of the contiguous U.S., Puerto Rico, the U.S. Virgin Islands, Hawaii, and the Pacific Islands territories
- **Date(s) Available:** 1992, 1996, 2001, and 2005 (vary by location)
- **Format:** IMG, GeoTIFF, GoogleEarth KMZ
- **Resolution/Scale:** 30 meter pixels (1:100,000)
- **Minimum Mapping Unit:** 30 meter pixels (1/4 acres)
- **Accuracy:** Developed to meet an 85 percent overall target accuracy specification but can vary by geography and date.



[View this animation in Google Earth](#)