



June 30, 2008

Mark Walker  
Public Affairs  
Northwest Power & Conservation Council  
851 SW 6th Avenue, Suite 1100  
Portland, Oregon 97204-1348

RE: Comments on Fish and Wildlife High Level Indicators

Dear Mr. Walker,

The Northwest Habitat Institute (NHI) offers the following comments on the Biological and Implementation High Level Indicators for the Fish and Wildlife Program that the Northwest Power and Conservation Council released for public comment on June 12, 2008. First, the high level indicators listed are predominantly fish centric; hence our comments will be directed towards enhancing the *Habitat*, *Wildlife* and *Watershed Health* Indicators. Also, a major portion of the Council's program is not addressed, which is Subbasin Planning. The high level indicators that have been released suggest a reporting schema every year; we would suggest that certain other indicators also be reported on a time continuum of a 3 or 6-year cycle, given that projects of late have been working on 3-year intervals for funding. Lastly, we also focus our comments on a key aspect of any high level indicator, which is the ability to map it because if you cannot map it, you likely can not manage it.

The Council's fish and wildlife program is predominately habitat based. Under *Habitat* the only listing is for "productivity of wild fish" which might be viewed as a population response to adequate habitat within a watershed. But, there are no other *Habitat* indicators? Clearly with a predominately habitat based program there should be. Thus, we suggest including the following as indicators that will not only show the progress of the fish and wildlife program as well as subbasin management plans but are also symptomatic indicators of the ecosystem: 1) focal habitats that have been identified in the subbasin plans need to be mapped at a fine level of resolution and monitored. Every year a subbasin or ecoprovince should be mapped and reported on with a cumulative view done every 6 years to evaluate the progress made to date. Because the intent of high level indicators is to serve as symptomatic gauge for fine features (such as sediment, nutrient, or temperature) in the environment, surrogates that are easier to map are also suggested. Like, riparian vegetation, recent logging, tillage and agricultural practices, and point source pollution sites within a subbasin or ecoprovince should be reported on a rotating schema every 6 years. 2) amount of acreages and distribute of all wildlife habitat types should be reported basin wide (at a coarse scale) every 6 -years. Floodplains and associated upland habitats should be mapped and reported every 3 to 6-years. Invasive species (plant and animal) abundance and distribution should also be documented and reported either at the coarse or fine scale level of reporting. The purpose of mapping focal habitats at multiple scales is to establish a baseline line condition from which to report against, as well as to detect change. For example, just reporting amount of miles of riparian habitat restored from a project would not necessarily be a positive symptom of the environment i.e. because it is an increase in this habitat type unless one knows how much riparian exists within the area or watershed.

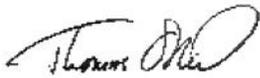
As for the *Wildlife* high level indicator component, only reporting "Habitat Units" may support a fish and wildlife program reporting need but would not be symptomatic of any population indicator. Population response to habitat is very difficult without long-term monitoring, and then may not be indicative of habitat

condition. But, the subbasin plans do identify a subset of wildlife species or focal species for monitoring and evaluation. Thus, we would suggest that the focal wildlife species for each subbasin be monitored, and if need be researched to indicate estimates and trends of viable population levels. In addition, exotic or introduced wildlife species population levels should also be reported. These monitoring results along with the focal habitat mapping should be reported and evaluated every 3 to 6-years.

Regarding *Watershed Health* high level indicators, the Integrated Habitat and Biodiversity Information System (IBIS [www.nwhi.org/index/ibis](http://www.nwhi.org/index/ibis)) currently supports the Columbia River Basin Subbasin Planning effort. Subbasin Plans are supposed to be periodically updated as called for in the Fish and Wildlife program. IBIS can give a comprehensive look at subbasins and is an excellent source for accessing and updating focal habitat and species information that is recommended above. IBIS can also depict spatially and graphically other high level indicators that should be included like functional redundancy and total functional diversity which can be derived from evaluating habitat and species composition and distribution. These components can also be used to track climate change. IBIS is a “core program” of the Council’s Fish and Wildlife program and would be a great web source to show along with Subbasin Planning continual progress towards High Level Indicators of the Fish and Wildlife Program.

Finally, we would suggest adding to the current high level indicator as shown in Table 1; I have also included an Adobe PDF file of a Powerpoint presentation that was made to several organizations in March 2007 to show the rationale for determining and mapping of high level indicators for your perusal and reference. I thank you for your time and consideration of our comments.

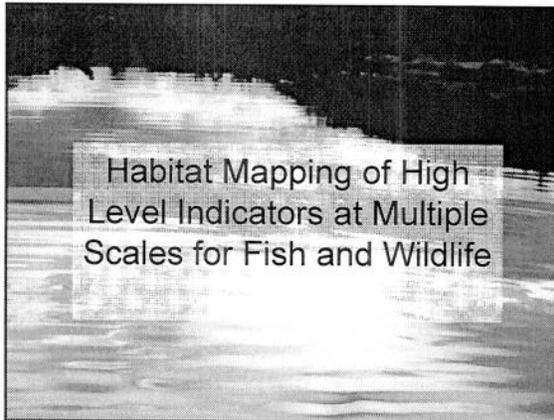
Sincerely,

A handwritten signature in black ink, appearing to read "Thomas O'Neill", written in a cursive style.

Thomas O'Neill  
Director

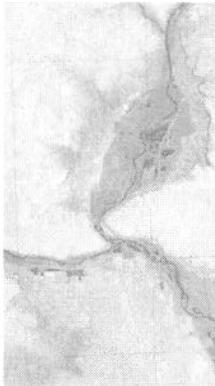
**Table 1.** Suggested additions to the High Level Indicators; much of the information could be obtained through IBIS project.

<b>Habitat - Mapping</b> [reported yearly, or 3years or cumulative every 6 years]	
Amount (acreage) of focal habitats identified in subbasin plans	Fine Scale - Initially to establish a baseline, then for change detection ~ increasing or decreasing.
Amount of acreages and spatial distribution of all wildlife habitat types should be reported basin wide (at a coarse scale).	Coarse Scale - Initially to establish a baseline then for change detection ~ increasing or decreasing [Coarse scale information already exists at IBIS's Subbasin Planning site].
Amount of acreages that is floodplains and its associated upland habitats. Invasive species (plant and animal) abundance and distribution should also be documented and reported at the coarse, or where practical, at the fine scale level.	Initially to establish a baseline then for change detection ~ increasing or decreasing.
Amount or acreage of riparian vegetation, recent logging, tillage and agricultural practices, and point source pollution sites within a subbasin or ecoprovince.	Surrogates for fine featured elements such as sedimentation, temperature, and nutrients
<b>Wildlife – Monitoring and Evaluation</b>	
Identify a subset of focal wildlife species (including those associated with salmonids) for monitoring and evaluation, and if need be researched to indicate estimates and trends of viable population levels. In addition, exotic or introduced wildlife species population levels should also be reported. These monitoring results along with the focal habitat mapping should be reported and evaluated every 3 to 6-years.	Report trends (increasing, decreasing, stable or unknown) by region and where possible estimates of viable population levels. Include regional estimates from other efforts like Breeding Bird Surveys and Christmas Bird Counts, etc.
Update wildlife range maps every 6 years.	GIS maps depicting range expansions and truncations and/or shifts in habitat types associated with focal species
Amount of acreages of key habitat components for focal species by subbasin	Map key habitat components for focal wildlife species to determine trends.
<b>Watershed Health Indicators</b>	
Depict spatially functional redundancy and total functional diversity levels by subbasin or ecoprovince.	GIS maps that highlight trends that are increasing, decreasing or stable (these already exist at IBIS's Subbasin Planning site)
Several habitat components listed above can also be used to help determine Watershed Health. For example, amount of riparian habitat mapped can indicate amount and acreage of riparian connectivity as well as percentages of stream susceptible to temperature increases. Or, amount of agricultural activities along a stream to indicate the potential for nutrient loading.	Percent of certain focal habitats or agricultural practices along a river or stream to help determine potential symptomatic gauges within a watershed.



## Multi-Scale Approach

- LEVEL 1: Map area of focus  
→ Floodplain + adjacent upland
- LEVEL 2: Map projects collecting habitat variables
- LEVEL 3: Map surrogates for habitat variables
- LEVEL 4: Focal habitats and focal species

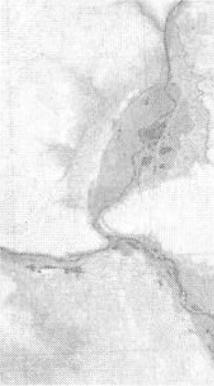


### What habitat data to map?

**LEVEL 1** → Map FLOODPLAIN plus adjacent upland habitat in subbasins

**GIS maps to include:**

- Stream channels
- FEMA flood plain data layer (100 & 500 year)
- Riparian
- Wetlands
- Roads
- Upland habitats adjacent (1/2 to 3 miles) to floodplain



### How to map floodplain habitat?

**USE:**

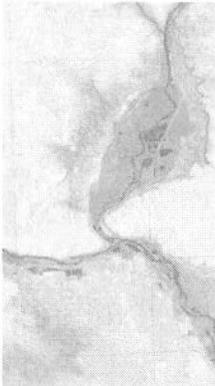
- Digital Elevation Model
- Channel data
- Soils (NRCS hydric soils data)
- National Wetlands Inventory
- Other pertinent data

**MAP:**

- Current habitat types using existing fish and wildlife habitat mapping protocols

**PRODUCT:**

- GIS map with multiple data layers
- Floodplain delineated (using above data)
- Habitat types mapped within floodplain and adjacent upland areas



### Additional habitat measures

Potential data layers to add to LEVEL 1 map:

- Soil data layer including:
  - Erosion potential
  - Compaction
- Floodplain gradient
- Grazing (may have to be surrogate for soil compaction)
- Agricultural practices/tillage (may have to be another surrogate for soil compaction)
- Point-Source Pollution sites



### What habitat data to map?

**LEVEL 2** → Map Projects that collect specific Habitat Variables and Enhancements in subbasins

Projects that collect or conduct:

- Water temperature
- Sedimentation
- Large Woody Debris (LWD)
- Fence Installation/Removal
- Vegetation Plantings
- Invasive species Control
- Instream flow
- Nutrient inputs



### What habitat data to map?

**LEVEL 3** → Map Surrogates for specific Habitat Variables subbasins

**Variables – Surrogates:**

- **Sedimentation** – areas susceptible to landslides, mining locations, recent logged areas
- **Large Woody Debris (LWD)** – recent logged areas, and riparian areas with medium to large trees
- **Nutrients** – salmon carcass/spawning areas, agricultural land use

### Why were these LEVEL 2 habitat variables chosen?

- **Large Woody Debris**
  - Found often in habitat classification systems
  - Influences other instream elements with high occurrence in classification systems (e.g. pools, riffles)
  - Included in Lower Columbia Salmon Recovery and Subbasin Plan (Dec 2004)
  - Included as habitat actions in NOAA report
- **Temperature**
  - Although not occurring frequently in classification systems (likely this is captured in water quality assessments), a critical habitat element for salmonids and wildlife
  - Influences other water quality variables, and strongly associated with riparian habitat
  - Included in Lower Columbia Salmon Recovery and Subbasin Plan (Dec 2004)
- **Sedimentation**
  - Although not occurring frequently in classification systems (likely this is captured in water quality assessments), a critical habitat element for salmonids and wildlife
  - Acts as surrogate for turbidity and embeddedness
  - Strongly associated with riparian and upland habitat and land-use practices
  - Included in Lower Columbia Salmon Recovery and Subbasin Plan (Dec 2004)
  - Included as habitat actions in NOAA report

### Why were these LEVEL 2 habitat variables chosen? (con't.)

- **Instream Flow**
  - Included in Lower Columbia Salmon Recovery and Subbasin Plan (Dec 2004)
  - Included as habitat actions in NOAA report
- **Nutrient Inputs**
  - Included in Lower Columbia Salmon Recovery and Subbasin Plan (Dec 2004)
  - Included as habitat actions in NOAA report
  - Associated with riparian and upland habitat and land-use practices
- **Habitat Enhancements**
  - These are part of recorded projects, therefore would be fairly easy to map (i.e. should already be recorded)



### Additional LEVEL 2 habitat variables

Other habitat variables could be added, such as obstructions to fish passage, including:

- Dams (natural and man-made)
- Culverts
- Water diversion structures
- Large waterfalls
- Channel gradient

### What habitat data to map?

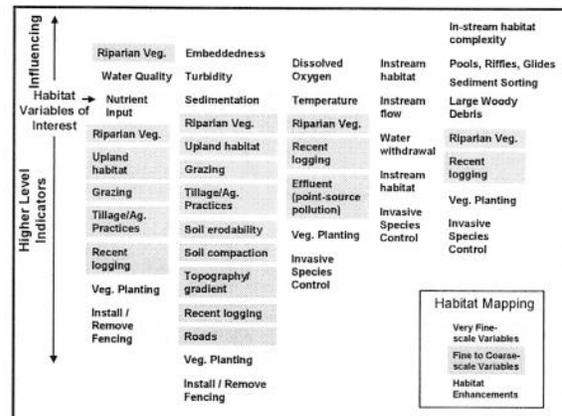
**LEVEL 4** → Map Focal Habitat and Species information in subbasins

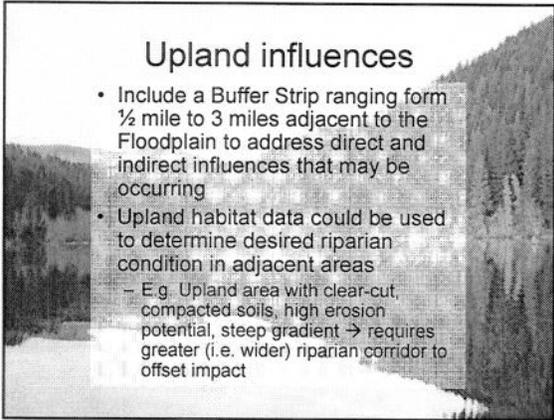
**Components:**

- Big Game Winter Range
- Focal Species Range Maps
- Location of Focal Habitats
- Link Population Information – e.g. Breeding Bird Survey



Photo courtesy of Dr. Richard Pomeroy





### Upland influences

- Include a Buffer Strip ranging from ½ mile to 3 miles adjacent to the Floodplain to address direct and indirect influences that may be occurring
- Upland habitat data could be used to determine desired riparian condition in adjacent areas
  - E.g. Upland area with clear-cut, compacted soils, high erosion potential, steep gradient → requires greater (i.e. wider) riparian corridor to offset impact

### Habitat Mapping Needs

<p>Data we have or can get:</p> <ul style="list-style-type: none"> <li>• DEM</li> <li>• FEMA flood plain</li> <li>• Hydric soils</li> <li>• Channels</li> <li>• Grazing</li> <li>• Some upland habitat types</li> <li>• Some coarse-scale physical obstructions</li> <li>• Habitat enhancements</li> </ul>	<p>Data we need:</p> <ul style="list-style-type: none"> <li>• Riparian habitats</li> <li>• Wetland habitats</li> <li>• Instream temperature</li> <li>• Instream sedimentation</li> <li>• Instream LWD</li> <li>• Fine-scale physical obstructions</li> <li>• Point-source pollution</li> <li>• Logging</li> </ul>	<p>Unknowns (potential gaps):</p> <ul style="list-style-type: none"> <li>• Soil erodability</li> <li>• Soil compaction</li> <li>• Non-point source pollution</li> </ul>
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### Habitat Elements occurring most frequently in Classification Systems

The top 1/3 of all habitat elements in each category are:

<p><b>Aquatic</b></p> <ul style="list-style-type: none"> <li>• Pools</li> <li>• Instream coarse woody debris</li> <li>• Riffles</li> <li>• Channel width</li> <li>• Runs/glides</li> </ul>	<p><b>Terrestrial</b></p> <ul style="list-style-type: none"> <li>• Down wood</li> </ul>	<p><b>Anthropogenic</b></p> <ul style="list-style-type: none"> <li>• Water diversion structures</li> <li>• Culverts</li> <li>• Irrigation ditches/canals</li> <li>• Bridges</li> <li>• Roads</li> </ul>
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### Habitat Types occurring most frequently in Classification Systems

- Lakes, ponds, reservoirs and rivers
- Bays and estuaries
- Riparian-wetlands
- Herbaceous wetlands
- Ponderosa pine & eastside oak forests and woodlands
- Lodgepole pine forests and woodlands
- Westside oak and dry Douglas-fir forests and woodlands
- Westside lowland conifer-deciduous forests