



# Kootenai Tribe of Idaho

P.O. Box 1269  
Bonners Ferry, ID 83805  
Ph# (208) 267-3519  
Fax (208) 267-2960

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May 12, 2009

Nancy Leonard  
Fish, Wildlife and Ecosystem M&E Report Manager  
Northwest Power & Conservation Council  
851 SW 6th Avenue, Suite 1100  
Portland, Oregon 97204-1348

200-005-06

RE: Comment on Fish & Wildlife Program High Level Indicators

Dear Ms. Leonard,

On March 13, 2009, the Northwest Power and Conservation Council (Council) requested comments to assist in the advancement of Fish & Wildlife Program High Level Indicators (HLIs). The Kootenai Tribe of Idaho would like to thank the Council for the opportunity to comment and encourage the continued development of the HLI components for use in the Fish and Wildlife Program.

The Tribe has devoted significant time and resources into assessing, defining and reporting on ecological resources within the Mountain Columbia Province and provides these comments for your consideration. As part of it's ongoing BPA-funded Hydro Operational Loss Assessment Project (BPA 200201100), the Kootenai Tribe of Idaho has been on the forefront of developing a transferable template that will directly address the Council's need to develop its programmatic HLIs. In a recent and timely review of the Tribe's BPA project renewal proposal, the Council's Independent Scientific Review Panel (ISRP) commented that: "Development and validation of the Operational Loss Assessment tool are technically and scientifically justified...and this project continues to model how research can be usefully integrated to meet [NPCC] Program goals. This project is not only benefiting the subbasin but the Program overall by demonstrating what could be achieved elsewhere in terms of interdisciplinary value, program integration, and community involvement, all to benefit fish and wildlife"(ISRP 2009-7).

An important central component of the Operational Loss Assessment template is the Index of Biological Integrity (IBI). IBIs have a long accepted and rigorous scientific background and application history, as developed and summarized by Karr (1996, 2006), who reported that *Integrity* implies an unimpaired condition, or the quality or state of being complete or undivided. Accordingly, *biological integrity* was defined as "the ability to support and maintain a balanced, integrated, adaptive biological system having the full range of parts (e.g. genes, species, and assemblages) and processes (e.g. mutation, demography, biotic interactions, nutrient and energy dynamics, and metapopulation processes) expected in the natural habitat of a region".

IBIs and their concepts have been widely used and accepted in the scientific, conservation, and natural resource management communities (Groom et al. 2006). The phrase *biological integrity* was first used in 1972 to establish the goal of the Clean Water Act, "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." More recently, the 1997 National Wildlife Refuge System Improvement Act clarifies its conservation goal with a clear directive: "Ensure that the biological integrity, diversity, and environmental health of the System are maintained." These mandates established a legal foundation for protecting the nation's biological heritage (Karr 1991; Adler 2003; Natural Resources Journal 2004).

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To implement biological criteria, managers need standard, formal methods for sampling the biota, evaluating the resulting data, and clearly describing the condition of sampled areas. The IBI was developed to address this need (Karr 1981, 1991), and its purpose and range of applications are well suited to address the needs stated in the Council's request for HLIs for the Columbia basin. Addressing the complexity of biological systems and the array of associated hydro impacts requires a broadly based, multi-metric index that integrates information from individual, population, assemblage, and landscape levels. Thus, IBIs, applied to the region in the transferable Tribal BPA project template to fish and wildlife populations and habitats in the Columbia Basin, are the recommended approach to standardizing Program evaluation and valuable HLI development.

One of many advantages of the IBI is that it is founded on empirical data so its use does not require resolution of all higher-order theoretical debates in contemporary ecology (Karr 2006). Rather, specific IBI metrics are chosen locally or regionally because they reflect specific and predictable responses of the biota to human activities across the landscapes at particular locations and scales, as relevant to implementation of the Program. The IBI is based in empirically defined metrics because they: (1) are biologically and ecologically meaningful; (2) increase or decrease as human influence increases; (3) are sensitive to a range of stresses; (4) distinguish stress-induced variation from natural and sampling variation; (5) are relevant to societal concerns; and (6) are easy to measure and interpret (Karr and Chu 2000).

Like the Tribal BPA project template, the IBI has many applications to development of HLIs, including analyses framed for selecting high-quality areas as acquisition and conservation priorities and as a means for diagnosing the likely cause of damage at degraded sites (Karr 2006). These and other IBI components will assist basin managers responsible for implementing fish, wildlife, and habitat improvement projects funded under the Council's Fish and Wildlife Program.

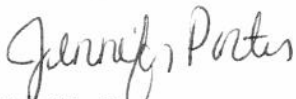
Thus, the Tribe's BPA project provides the template to address the Council's requirements for HLIs ([http://www.nwccouncil.org/fw/program/hli/2009\\_03.htm](http://www.nwccouncil.org/fw/program/hli/2009_03.htm)), through the use of established Indices of Biological Integrity (IBIs). IBIs, in turn, can serve as broadly applicable and transferable HLIs of habitat quality, which is a major determinant of wildlife population health and sustainability.

Finally, the Tribal BPA project 200201100, with its component IBIs, is the recommended framework for the Council to effectively:

- 1) Communicate the Program's progress by assessing losses, tracking restoration and evaluating progress;
- 2) Balance the biological, ecological, and habitat needs of fish and wildlife; and
- 3) Begin the process of aligning existing indicators used by other researchers and managers in the region for reporting the status and trends of the regions' natural resources.

We are committed to working with the Council as you develop and adopt HLIs for tracking progress in fish and wildlife restoration in the Columbia Basin. Please contact Scott Soult, Wildlife Manager, (208 267-3620; [soult@kootenai.org](mailto:soult@kootenai.org)) if you have any questions regarding our recommendation.

Sincerely,



Jennifer Porter  
Tribal Council Chairperson

Enclosures (2)

**Proposed Biological and Implementation High Level Indicators**  
(Kootenai Tribe of Idaho - BPA Operational Loss Assessment Project # 200201100)

<b>Indicator</b>	<b>Description</b>	<b>Example Metrics (not inclusive)</b>	<b>Data Sources (not inclusive)</b>
Index of Hydrologic Alteration (IHA) - <i>Abiotic Indicator</i>	An index based on the deviation of hydrologic metrics from the central tendency recorded prior to river regulation.	<ul style="list-style-type: none"> <li>• Base flow</li> <li>• Mean monthly flow</li> <li>• Flow predictability</li> <li>• High pulse count</li> </ul>	<ul style="list-style-type: none"> <li>• River gaging station data</li> </ul>
Index of Fluvial Alteration (IFA) - <i>Abiotic Indicator</i>	An index based on the deviation of fluvial metrics from the central tendency recorded prior to river regulation.	<ul style="list-style-type: none"> <li>• River depth and width</li> <li>• Sediment transport</li> <li>• Bed shear stress</li> <li>• Stream power</li> <li>• Wetland acreage</li> </ul>	<ul style="list-style-type: none"> <li>• River gaging station data</li> <li>• River cross section data</li> <li>• Topographic data</li> <li>• Hydrologic models</li> </ul>
Aquatic Index of Biological Integrity (A-IBI) - <i>Biotic Indicators</i>	An index to assess the aquatic biota based on balance, integrated, and adaptive capability, which have the full range of elements and processes expected in the region's natural environment. May be broken out into numerous IBIs (i.e., Water quality, fish, macrophytes, macroinvertebrates).	<ul style="list-style-type: none"> <li>• Nutrient levels</li> <li>• Macroinvertebrate diversity</li> <li>• Macroinvertebrate abundance</li> <li>• Fish length/age</li> <li>• Fish density</li> </ul>	<ul style="list-style-type: none"> <li>• Water quality data</li> <li>• Macrophyte data</li> <li>• Macroinvertebrate data</li> <li>• Creel/fish sampling data</li> </ul>
Terrestrial Index of Biological Integrity (T-IBI) - <i>Biotic Indicators</i>	An index to assess the terrestrial biota based on balance, integrated, and adaptive capability, which have the full range of elements and processes expected in the region's natural environment. May be broken out into numerous IBIs (i.e., vegetation, invertebrate, avian, herpetiles, mammals).	<ul style="list-style-type: none"> <li>• Normalize Difference</li> <li>• Vegetation Index (NDVI)</li> <li>• Habitat - patch size/edge and related community measures</li> <li>• Specific species presence/abundance</li> <li>• Diversity measures</li> <li>• Functional redundancy</li> </ul>	<ul style="list-style-type: none"> <li>• NAIP imagery</li> <li>• Landsat TM</li> <li>• Land cover classification</li> <li>• Sampling data - invertebrate, avian, herpetile, mammal</li> <li>• Avian surveys - breeding bird, Christmas counts, etc.</li> <li>• Big/non game survey data</li> </ul>

## Literature Cited

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