Project Title: Using Integrated Habitat and Biodiversity Information System (IBIS) to implement a Wildlife Monitoring Strategy for the Columbia River Basin

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Project Background: IBIS is a core data management project that contains peer-reviewed scientific data about fish, wildlife, and their habitats for the Columbia River Basin's (CRB) Fish and Wildlife Program (www.nwhi.org/index/ibis). IBIS includes work objectives for developing a digital library and repository for GIS habitat data, developing wildlife high-level indicator information, and integrating habitat inventories and evaluations. IBIS and GNLCC objectives appear to overlap; hence, this proposal is based on the premise that by combining efforts we will both achieve our objectives in a shorter timeframe than by pursuing them individually. IBIS project has been supported by CRB wildlife managers, the Northwest Power and Conservation Council (NPCC) and Bonneville Power Administration (BPA) since 1999. This effort is a continuation, and integral component, of a multi-year effort to develop wildlife high level indicators in the CRB through the Wildlife Monitoring Implementation Strategy which directly translates to needs of the GNLCC to identify and track stressors related to climate and land use change.

Project Summary: Our proposal builds on the existing IBIS framework to complete fish and wildlife regional ranges maps, as well as establishes useful high level indicators, like abundance, distribution and change of riparian habitat that can be used for both fish and wildlife monitoring programs. IBIS is an informational resource that uses data management and reporting infrastructure to provide ongoing, easy access to support decision making for species and habitat investments. The project will rely on ongoing coordination with, and participation of Federal, State, and Tribal wildlife managers through the Columbia River Basin wildlife focus work group (formerly Columbia Basin Fish and Wildlife Authority Wildlife Advisory Committee (WAC)) and enhanced interaction with the GNLCC.

Need: The Great Northern Landscape Conservation Cooperative (GNLCC) aims to improve the use and dissemination of landscape assessment information for making natural resource management decisions across boundaries and jurisdictions. This project will support that mission by developing regionally compatible wildlife habitat distribution data and assessing existing habitat data layers for consistency and compatibility. The information provided from this project can be used to guide conservation investment decisions by multiple agencies and authorities. Results from this project will also indirectly support evaluating habitat connectivity and assessing climate change vulnerability of specific habitat cover types.

Goal: To continue the development of high value data sets using common formats and methods to inventory, monitor, and evaluate habitats and to make these data sets available to the public or other reporting purposes for landscape scale planning and monitoring.

Objectives: 1) Update IBIS data sets with regional range maps for remaining fish and wildlife species and develop the necessary interface to be consistent with designated high level indicators; 2) Develop regionally accepted, relevant, high level indicators for riparian habitat through collaboration with

Federal, State, and Tribal wildlife managers within the CRB; 3) Provide broad access to regional decision makers for fish and wildlife species information and riparian habitat status and trends consistent with the high level indicators through the IBIS website; 4) Complement and support the ongoing effort to develop regionally accepted high level indicators for other habitat cover types (e.g., shrub-steppe, grassland, ponderosa pine, etc.); and 5) facilitate coordination and collaboration between the efforts of the GNLCC, CRB wildlife managers, and the CRB Fish and Wildlife Program.

Specifically the first year of this grant's funding would largely be directed towards updating, digitizing and importing into IBIS all remaining fish and wildlife range maps and starting riparian habitat baseline condition mapping. NHI would develop the species range maps and riparian mapping so that the new range maps meet existing IBIS standards while CBFWF would coordinate the peer-review process and coordinate the riparian mapping effort with the resource managers. This project will be directly integrated with, and compliment, BPA funding for the CBFWF and NHI work that will continue the development of a Wildlife Monitoring Implementation Strategy (see link provided below).

Deliverables: NHI would create species range maps for the remaining species not yet in IBIS. This includes about 100 wildlife species and 100 fish species. The wildlife range maps would be created with methodology consistent to the rest of the IBIS range maps. Existing distribution data would be collected from already peer reviewed sources such as GAP coverages and range maps from appropriate wildlife atlases. These distributions's would be updated to the newest 6th HUC coverage's and imported into IBIS once they are vetted. Many of the fish range maps however require that we start from scratch without existing range maps to work from. The first step will still be to collect all pertinent distribution data but then this data will be internally vetted; and reviewed before being used in the construction of new range maps within the 6th HUC coverage. Finally these maps will be sent out for a final review and then imported into IBIS when certified.

Next, we will start a watershed riparian habitat mapping project at an intermediate and fine scale that would dovetail with an area that is being surveyed for instream salmonid habitat. The riparian habitat classification will be developed in concert with the resource managers through the CRB wildlife focus workgroup. Both scales of the riparian mapping will be made available in a GIS product to GNLLC.

CBFWF will facilitate meetings of the CRB wildlife focus work group to review initial NHI products and provide overall direction, and integration, for the project. CBFWF staff will also interact with GLNCC staff to ensure coordination and collaboration between the efforts of the GNLCC and the efforts of the wildlife managers in the CRB.

Species Range Maps: To date NHI has 373 range maps (32 of which are fish species), including all of the identified focal species updated to cover the entire CRB, that is: Oregon, Washington, Idaho, western Montana, and parts of Nevada, Utah and Wyoming. BPA supported the development of the 109 focal species as identified in subbasin plans. NHI's website also has 150 species range maps for those wildlife species that having relationships with salmonids (http://www.nwhi.org/index/gisdata). These data have all been converted to fit with the recently released national hydrography dataset that is the first unified 6th HUC coverage for the continental United States. This conversion will allow for the seamless representation of species rangemaps across the region regardless of political boundaries (see Figure 1).

Web applications are envisioned to consume web services that will allow for dynamic queries of species lists for a given area and individual rangemaps. Eventually, we will add several hundred more species rangemaps once the proper source data has been identified and converted to fit in the IBIS system. The creation of these rangemaps is the culmination of many years work and will support many functions at

multiple scales from a regional habitat landscape perspective, to the mapping and analysis of habitats at the subbasin scale, all the way to assessment work at the site level.

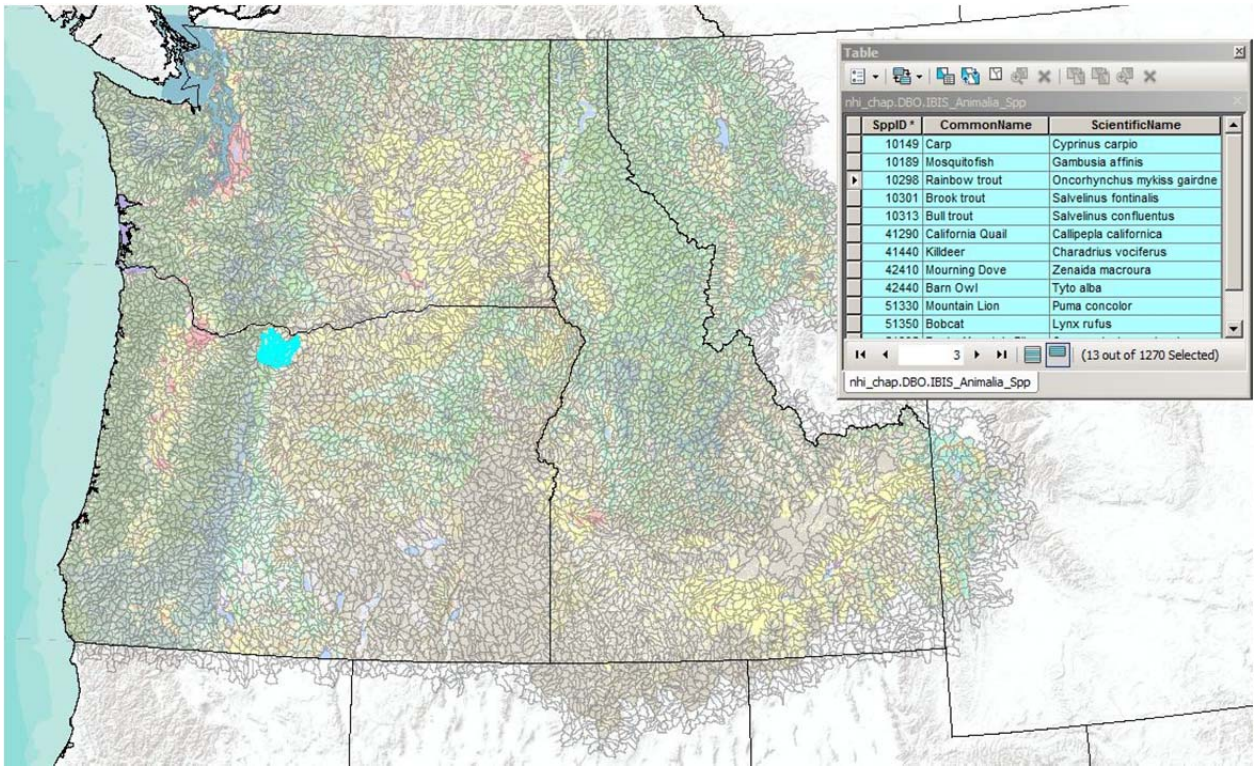

Figure 1. Example of the IBIS data sets joined with the National hydrography 6th HUC coverage to show the current fish and wildlife species associated with the highlighted 6th HUCs. Conversely, individual species can be highlighted in the pull down menu to show existing species range.

Mapping Riparian Habitat as a High-Level Indicator: NHI will work with the CBFWF, who would coordinate with resource managers, to develop riparian data layers that would serve as baseline conditions for comparison of past and future change detection mapping. One of the best methods to gauge human and natural influences on our environment is to evaluate landscapes and the populations that reside within them to determine the amount of change. We live in a dynamic world where the only constant seems to be change. Knowing the rate, amount and location of change can provide valuable information to planning and monitoring programs for resource management decision making.

Mapping at different Scales: Understanding scale is an important concept because various environment components within a landscape require multi-scale approaches. For instance, regarding habitat types, habitats that cover large expanses, like shrub-steppe, can be mapped at a coarse scale while fine feature habitats like riparian habitat require an intermediate to fine scale mapping to detect change (Figure 2).

Each wildlife habitat type that is identified as a High Level Indicator has a relative importance based on the scale on which it is measured and reported. By combining the use of aerial image interpretation and extensive ocular surveys of riparian stands, it is possible to map the quantities and distribution of this and other habitat types on a continual basis. The National Agriculture Imagery Program (NAIP) program run by the Farm Service Agency routinely captures high resolution imagery every few years, and we currently see this as the base platform for mapping.

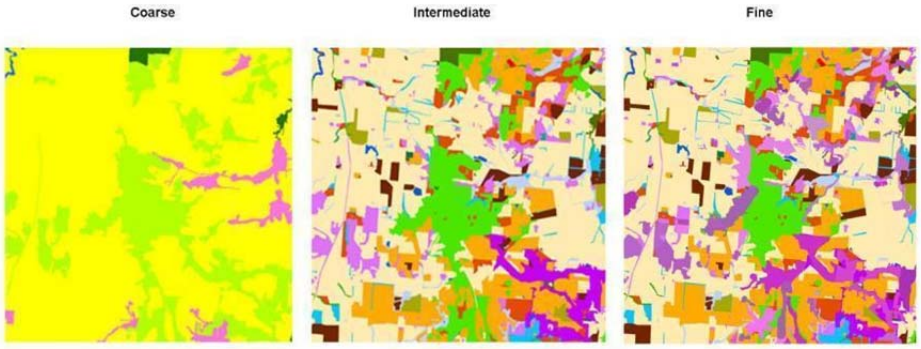

Figure 2. Example of mapping at various hierarchical scales that combines both a wildlife habitat classification scheme and relational databases.

Satellite remote sensing has been the traditional source of subbasin wide habitat and vegetation maps for several decades now. The reduced costs associated with large scale remote sensing efforts have been a main driver. However, many of the focal habitats of interest (such as riparian forests along with species composition and their structural conditions) are not well defined using 30 meter pixels. Recent advances in GIS technologies allows for the capture of small spatial areas, (~2 acre MMU) using NAIP imagery and targeted field visits. Once an area or subbasin has undergone initial baseline mapping, subsequent dates of NAIP imagery can be used to detect where changes have occurred and field visits can then focus on identifying these changes. Other areas that do not experience change in a given cycle can be revisited with an ocular survey on a much more extended frequency, for instance every 5 years.

When baseline conditions are mapped, and the map itself is maintained on an ongoing basis, a wealth of information becomes available. The datasets become 'living', if you will, growing and reducing as needed to reflect real world conditions. As the datasets grow, they will be able to become 'time-aware', that is containing the knowledge of not only that change occurred, but when that change occurred. This will certainly help in understanding the intricate processes that control our upland and aquatic regimes. The ability to monitor these indicators will also help coordination between projects and to provide the best protections for our valuable natural resources. Especially important is how the information can be dovetailed to support not only upland wildlife projects, but also to relieve the burden of upland riparian data collection for fish related projects, an area not necessarily within fishery biologists' expertise. Note: as part of the riparian mapping, hydrologic regime is also mapped so it to can be used in change detection so to be able to identify catastrophic events, dynamic and adaptive management areas.

NHI as a Data Repository: NHI's goal is to collect and be the repository for any habitat related data. Much of our focus is on GIS datasets, but we strive to collect any data pertaining to habitat in the CRB. These may be habitat surveys, status and trends monitoring datasets, upland and stream related habitat GIS datasets, regional habitat maps, and baseline habitat information. We have worked with the USGS metadata forum team to establish protocols for documenting our data with effective metadata that is compliant with national standards. We use ESRI's imbedded metadata tools with other supporting documents where necessary to ensure that all of our data is properly catalogued and retrievable from our archives in a timely manner. Supporting metadata is included with all of our downloads.

Coordinating Regional Fish Range Map Reviews & Mapping Riparian Habitat: In 2009, the fish and wildlife managers in the CRB agreed to support and facilitate coordinated basinwide assessments for the purpose of evaluating the status of the species and implementation of strategies to help determine

success of the Fish and Wildlife Program. Due to the overlap in work priorities and planning activities, CBFWF staff and NPCC staff worked together to coordinate their separate efforts to implement the Columbia Basin Fish and Wildlife Authority (CBFWA) work plan and develop implementation strategies to address the Council's draft Monitoring, Evaluation, Research, and Reporting Plan (see www.cbfwa.org and NPCC Document 2010-17 http://www.nwcouncil.org/library). Since fall 2009, the wildlife managers have worked on the framework for a draft Wildlife Monitoring Implementation Strategy (WMIS) (http://www.cbfwa.org/WMIS/files/DRAFT_WMIS2011_1111.pdf).

The draft WMIS was developed through the Wildlife Advisory Committee (WAC) of the CBFWA in collaboration with staff of the NPCC. A representative of the Kootenai Tribe of Idaho (KTI) led the effort as Chair of the WAC during calendar year 2010. A representative of the Warm Springs Tribe originated the effort as WAC chair during calendar year 2009. WAC participants and contributing authors included representatives from the Confederated Tribes of the Umatilla Indian Reservation, Nez Perce Tribe, Yakama Nation, Burns Paiute Tribe, Shoshone-Bannock Tribe, Shoshone-Paiute Tribe, Confederated Tribes of the Grand Ronde, Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife, Montana Fish Wildlife and Parks, Idaho Fish and Game, Bonneville Power Administration, and the Upper Columbia United Tribes. Tom Iverson (CBFWF) facilitated the WAC meetings and coordinated writing and edits to the document. Developing relevant high level indicators for wildlife within the context of the NPCC's Program has been a challenge and will require continued discussion and coordination into the future among the CRB wildlife managers, BPA, and NPCC staff.

Reporting high level indicators for wildlife, at the scale of the CRB or GNLCC, is a daunting challenge. The impact of individual conservation or wildlife mitigation projects, while significant, may not be detectable within the environmental noise of such a large landscape. Individual wildlife populations are generally highly migratory, and trends in population size is not an appropriate indicator of Program success as species ranges are far greater than the individual project areas, and in many cases far greater the CRB. Habitat quantity and quality is the currency for implementation of the BPA funded wildlife mitigation program and should be taken into account when developing HLIs for areas within the Program influence.

Statement of compliance: The Project Coordinator and Principal Investigator have read Great Northern Landscape Conservation Cooperative Information Management, Delivery, and Sharing Standards and agree to comply with those standards if the proposal is selected. Aside: IBIS is a core data management program for the CRB Fish and Wildlife Program and we might suggest that GNLCC consider not duplicating efforts and possibly developing stronger connectivity with the IBIS programs. The IBIS program has been reviewed several times by the NPCC's Independent Scientific Review Panel.

Timeline:
Task 1: Collect pertinent distribution data for remaining species – 6/01/2012 to 12/01/2012
Task 2: Develop draft species range maps - 9/01/2012 to 3/01/2013
Task 3: Review and finalize species range maps – 12/01/2012 to 5/31/2013
Task 4: Select riparian mapping area – 6/01/2012 to 7/01/2012
Task 5: Map riparian area at intermediate scale – 7/01/2012 to 10/01/2012
Task 6: Map riparian area at a fine scale – 8/01/2012 to 11/01/2012 and 4/1/2013 to 5/15/2013
Task 7: Schedule and facilitate meetings with the CRB wildlife managers on a quarterly basis to review and approve range maps and overall approach for documentation and delivery of data
Task 8: CBFWF staff will attend appropriate GNLCC hosted meetings and will make time available on wildlife focus work group agendas for GNLCC staff participation - 6/01/2012 to 6/01/2013