A TECHNICAL GUIDE FOR DEVELOPING WILDLIFE ELEMENTS OF A SUBBASIN PLAN

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Overview: This document provides a template to assist subbasin planners in developing the wildlife element of subbasin plans as part of the Northwest Power Planning Council's (NWPPC) Provincial/Subbasin Planning program. It will also be useful to ecoprovincial planners for it attempts to show how the subbasin and provincial levels will be integrated. This document was developed to promote planning consistency in the Columbia River Basin, to provide a structure for the main wildlife components of a subbasin plan, and provide information on the analysis tools. While the ecoprovincial level guidance is primarily directed at subbasin planners in Oregon and Washington, the principles are also applicable to Idaho and Montana planners.

This guidance is provided in six sections: 1) Context for Wildlife in Subbasin Planning, 2) Approach to Incorporation of Wildlife in Subbasin Planning, 3) Approach to Wildlife Assessment, 4) Connecting Subbasin and Ecoprovince Planning Efforts, 5) Outline for Subbasin Plan (with terrestrial/wildlife sections highlighted) and 6) Literature Cited.

1) CONTEXT FOR WILDLIFE IN SUBBASIN PLANNING

There are some 772 species and subspecies of mammals, birds, reptiles and amphibians (hereinafter called wildlife) that commonly occur in the Columbia River Basin. Of these, 23 are formally listed as threatened or endangered under the Federal Endangered Species Act (ESA) with 8 more listed as Federal 'candidates'. In addition, many are listed by the State Fish and Wildlife agencies of Oregon, Washington, Idaho, and Montana.

Subbasin planning and implementation efforts require significant interaction and cooperation with Native American Tribes (Tribes), recognizing Tribes' sovereignty, interests in co-management of effected wildlife resources, and cultural and spiritual interests in fish and wildlife resources. Additionally, interaction with stakeholders including landowners with properties that support wildlife species and their habitats, is critical to the ultimate success of plan development and implementation. The following Guidance recognizes the importance of these interactions.

'Equitable treatment' for fish and wildlife has been explicitly written into the 1980 Pacific Northwest Electric Power Planning and Conservation Act, which states:

> *839b(h)(11)(A). The Administrator and other Federal agencies responsible for managing, operating, or regulating Federal or non-Federal hydroelectric facilities located on the Columbia River or its tributaries shall—*
> *839b(h)(11)(A)(i). exercise such responsibilities consistent with the purposes of this chapter and other applicable laws, to adequately protect, mitigate, and enhance fish and wildlife, including related spawning grounds and habitat, affected by such projects or facilities in a manner that provides equitable treatment for such fish and wildlife with the other purposes for which such system and facilities are managed and operated; [Northwest Power Act, §4(h)(11)(A)(i), 94 Stat. 2710.]*

2) APPROACH TO INCORPORATION OF WILDLIFE IN SUBBASIN PLANNING

Wildlife conservation activities are usually conducted in a fragmented way that emphasizes a single species or a habitat type in a small geographic area. Land-use managers at the state, Federal, tribal, watershed, local, and NGO levels want to avoid this pitfall when developing subbasin plans. To this end, we have developed an approach for wildlife planning at two scales, the province or ecoregion (ecoprovince) and the subbasin.

Baseline terrestrial assessments can be accomplished through the use of existing databases, assessments and currently available planning tools. These include but are not limited to: a) IBIS (Interactive Biodiversity Information System), developed by the Northwest Habitat Institute in collaboration with the Council; b) two assessment tools developed by The Nature Conservancy – Conservation by Design (2000) and SITES analytical regional planning model; c) the Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-Scale Trends and Management Implications (Wisdom et al. 2000) and d) the Managed Data Layer (National GAP Analysis Program; this reflects GIS maps of lands currently under some form of conservation protection). Where available, these tools can be used to assess the ecological and/or functional conditions of terrestrial biotic and abiotic systems, as well as to prioritize strategies for ecological protection and restoration.

For the Columbia River Basin, we suggest using a two-tier approach to develop the wildlife sections for subbasin plans:

Tier 1: Lead wildlife agencies (e.g., WDFW, ODFW, IDFW, MTFWP, Tribes, USFWS or another entity having statewide or large geographic responsibilities) will develop wildlife information primarily at the province/regional level (Regional teams in Washington, TOAST in coordination with subbasin teams in Oregon) Focal species/habitats of concern (FSHOC), such as pygmy rabbits/shrub-steppe, will be addressed initially at the regional level (Tier 1). Most of the information necessary to achieve this is available in the IBIS data base, existing regional plans or in existing subbasin summaries. Some of the information in subbasin summaries may

need to be aggregated over several subbasins to achieve an integrated view of the ecoprovince These agencies will provide this regional perspective to the subbasin teams to help ensure consistency and a large-scale context for the development of subbasin goals, objectives and strategies.

Tier 2: The Lead Entity in a subbasin (working with wildlife agencies, local conservation and watershed districts, land owners, NGOs, and local governments) will develop wildlife and habitat information at the subbasin scale providing species- and habitat-related detail down to the watershed/6th HUC level, as needed. The Northwest Habitat Institute, under contract to the Council, will provide a significant amount of this information directly to subbasin planners. Budget restrictions will limit how much additional information subbasin planners will be able to develop, but at a minimum subbasin plans should identify data gaps. The Lead Entity will provide their findings to the Tier 1 groups to assist with making ecoprovince-level adjustments.

Information will be shared and/or co-developed as needed between the Tiers to ensure that completed wildlife sections of the plan represent input from all interested parties.

3) APPROACH TO WILDLIFE ASSESSMENT

PURPOSE AND SCOPE

This section provides a generalized procedure. Work products from this procedure can be used at the subbasin, provincial, and basin scales to integrate wildlife and fish assessments.

This assessment methodology can:

- provide an evaluation of historic (normative) conditions
- provide an evaluation of current conditions
- provide an evaluation of changes in conditions between historic (normative) and current
- provide data, methods, tools, and evaluations that can be useful to address more specific management objectives and strategies (which occurs in the plan)
- can provide an evaluation of the interactions of fish and wildlife

This assessment methodology cannot:

- provide specific management goals and objectives for desired future conditions (this is a question of policy, informed by science)
- answer all possible questions, for example, about population levels of wildlife species, and economic, policy, and social questions
- provide a single set of "best" strategies to meet management objectives
- review and apply all possible data, methods, models, and evaluation tools to evaluate historic (normative) and current conditions

ASSESSMENT PHASE - USING IBIS AS A BASIS FOR PLANNING

The subbasin assessment for wildlife (and fish-wildlife relations) presented here consists of three major components: assessment of wildlife *habitats*, wildlife *species*, and patterns of *key*

ecological functions. We describe below a core set of assessments that can be conducted using the Interactive Biodiversity Information System (IBIS) database of Northwest Habitat Institute (NHI). Guidance is also provided on how to integrate some other local or regional datasets.

IBIS is a wildlife-habitat relationships database of species in the Columbia Basin, expanded to include: key ecological functions of all wildlife and selected fish species, wildlife habitats, habitat structural conditions, key environmental correlates, management activities, selected fish species, and salmonid-wildlife relationships. The scope of IBIS is the Columbia River Basin in the U.S. and Canada, all the rest of Oregon and Washington, including the coastal, estuarine, and marine environments off Oregon and Washington. IBIS contains information on amphibians, reptiles, birds, mammals and fish. IBIS information will be provided by NHI in a text, figure, map or table format and delivered to the subbasin planners via the Internet, e-mail, or CD-Rom. The IBIS wildlife habitat GIS dataset and structural condition class data is at a scale of 1:100,000, or 4th-level hydrologic unit codes or 4HUCs. In general, work at the subbasin scale will need to use a 1:24,000 scale, or 6HUC scale. Work is underway in Oregon to provide enhanced habitat data layers for Oregon that should be available in time for subbasin planning.

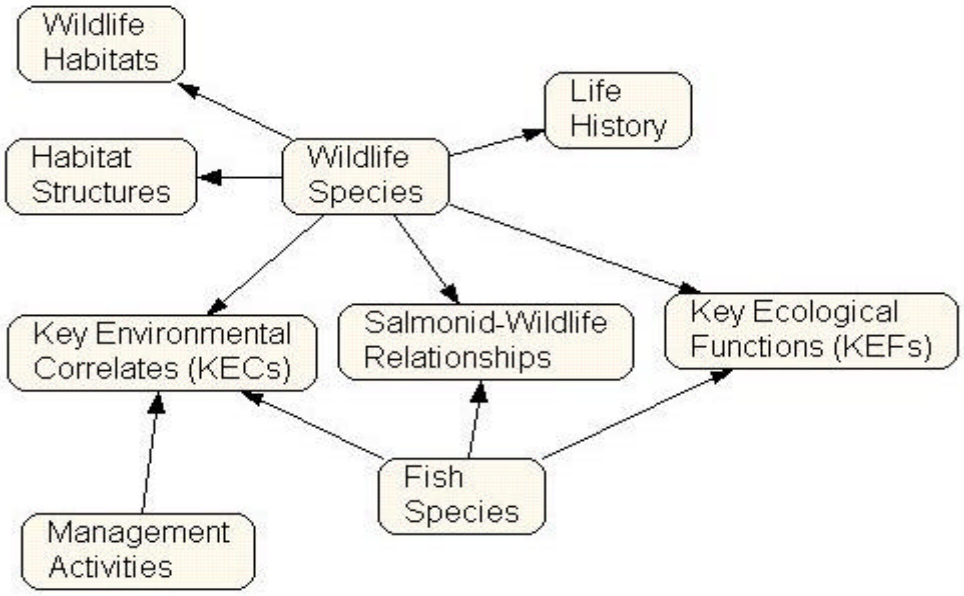

Figure 1: The Nine Primary Matrices that Make-up IBIS

Assessment of wildlife habitats. The approach uses GIS data on historic and current wildlife habitats in the US.

Assessment of wildlife species. The IBIS database contains wildlife habitat and ecological functional data on all 618 wildlife species that are tracked in the Columbia River Basin. IBIS also currently contains range maps of 137 wildlife species that are associated with salmonids; these maps were developed to depict historic breeding, current breeding, and current wintering ranges, showing presence/absence of each wildlife species in each 6HUC. For the rest of the wildlife species, a database lists presence/absence by county in all US states within the Columbia

River Basin. The Canadian portion of the CRB may have range maps of all the wildlife species occurring in that portion.

The IBIS database also currently contains historic and current range maps of 27 fish species (9 anadromous and 18 resident species) showing presence/absence in each 6HUC.

Assessment of key ecological functions (KEFs). The IBIS database currently contains information on 111 categories of KEFs (this list contains some overlap as it pertains to a hierarchical classification) for all 618 wildlife species (including marine species) and 27 fish species (not including subspecies) in the CRB in US and Canada. A functional analysis of KEF patterns can be done for all of these species at the subbasin (4HUC) scale, comparing historic and current geographic patterns of functional patterns (levels of functional redundancy or numbers of wildlife species with each KEF), and comparing functional patterns of all wildlife species with patterns of just the 137 wildlife species associated with salmonids. At the 6HUC scale, such functional assessments can be done more reliably for the 137 wildlife species with some salmonid association because the ranges of these species were mapped more precisely at this scale.

For further explanation of KEF and its applicability in the US and Canada, planners can download a recent paper from the following site:
www.subbasins.org/admin/level3/KEFs.htm

ASSESSMENT METHODS

The specific assessment methods detailed here generally follow those of the Multi-Species Framework Approach for the Columbia River Basin (Marcot et al. 2002).

Each of the following assessments can be done and mapped at either the subbasin and/or provincial level. The assessment focuses on historic and current conditions and serves: a) to identify locations where habitats, species, and functions have deviated the most from historic conditions, b) to help identify areas for potential *restoration*, and c) to identify areas that have most retained their historic character to help identify potential priority areas for *conservation*.

Assessment of Wildlife Habitats (WH)

Overall Wildlife Habitat Assessment:

A wildlife habitat assessment provides information to identify change in wildlife habitat distributions. The assessment spatially identifies wildlife habitat increases and decreases between historic and current times. To do this, the following assessments would be done using the IBIS database:

- Use IBIS-based maps to depict and tally acreages of historic and current wildlife habitats within each subbasin and/or ecoprovince as a whole (future or potential changes in habitat will be addressed under specific planning strategies);
- Calculate percent change in total area of each WH in each subbasin; and
- Map percent change from historic to current times of each WH in each subbasin within an ecoprovince, as a color-ramped map using quintiles (e.g., in 20% increments, such as

0-20% loss, 21-40% loss, etc.), using red to denote greatest loss and blue to denote least loss or greatest gain; also map as absolute change in total area of each WH; these conditions and changes can also be summarized by WH and by subbasin in a table displaying percents and areas changed.

Subbasin planner's will then be able to recognize subbasins with greatest loss (reds) and greatest retention (blues) for each WH and can also identify the WHs of greatest concern or interest and focus on those WHs and associated subbasins, and can use the data to prioritize habitats for restoration and conservation at subbasin and provincial scales

Subbasin planners, budget permitting, should develop finer-scale data on WH distribution patterns for their subbasin to evaluate spatial patterns for specific WHs corresponding with specific historic or current wildlife occurrences. Where such data cannot be developed, the subbasin plan will need to rely on the IBIS information, as supplemented by local knowledge provided during writing the subbasin plan.

Structural Condition (SC) Assessment:

Because structural conditions information is neither available nor consistent across the Columbia River Basin, NHI will use the subbasin team's focal species list to query IBIS to determine which structural condition classes these species use as close association, for each WH; and then the subbasin team could evaluate the status and changes in these structural condition classes.

As local subbasin, watershed, or subwatershed-specific data permit, the local subbasin planners could also conduct the following assessments, budgets permitting:

- Add structural condition classes of each WH, as provided by local data. There may be specific structural conditions (e.g., dense old-growth forests, open old pine forests, mature sagebrush steppe, etc.) of specific conservation concern to the manager, and these can be evaluated individually.
- Conduct the same analysis as above to identify subbasins and specific WH-SC combinations for potential restoration and conservation.
- Evaluate spatial patterns of specific WH-SC combinations as corresponding with specific historic or current wildlife occurrences, as local management issues direct, to further help map WH-SC conditions

Key Environmental Correlate (KEC) Assessment:

Because KEC information is neither available nor consistent across the Columbia River Basin, the NHI data provided to subbasin planners will use IBIS and the subbasin team's focal species list to:

- Determine which KECs these species use as close association, for each WH; and then the subbasin team could evaluate the status and changes in these correlates.

As local subbasin, watershed, or subwatershed-specific data permit, the local subbasin analyst could also conduct the following assessments:

- map presence or abundance (area, numbers, percent cover, etc.) of selected KECs in each subbasin; and
- evaluate current conditions with additional information for identifying subbasins and KECs for potential restoration or conservation. (it is recognized that many terrestrial KECs, being fine-scale attributes, have not been specifically mapped)

Assessment of Wildlife Species

Selected Focal Species:

Focal species lists should include, but are not be limited to, the following:

1. Threatened, endangered, and state sensitive species
2. Species listed in the Partners in Flight program
3. Species used to model impacts from adjacent hydro-development under the USFWS Habitat Evaluation Procedure (HEP Species)
4. Culturally important species
5. Managed Species (i.e. game species)

For each species, NHI will provide a report on associations with wildlife habitats, structural conditions, KECs, KEFs, a selection of life history attributes, and other information requested by the subbasin planners.

Subbasin planners may use local models and evaluations of specific habitat conditions and stressors for any set of focal species selected as management concerns. For example, local subbasin planners may wish to use locally-derived HEP models or other such tools. These are not part of the IBIS database.

Entire Wildlife Assemblages:

If subbasin planners find a need to evaluate total wildlife assemblages, NHI will provide lists of entire wildlife assemblages given occurrence, extent, and changes in WHs, in subbasins. Where finer-resolution data are available from subbasin teams, IBIS also can be used to evaluate the implications of the occurrence of and changes in WHs, structural conditions, and KECs, in each subbasin. This would help identify associated wildlife species and species groups that may have declined or been retained the most since historic conditions; can use relative percent cover of each WH or WH-SC in each 4HUC or 6HUC as a weighting factor; map as changes in overall number of species expected by occurrence of WHs and WH-SCs; color-ramp changes thereof to denote decline in number of species. While this is merely a species richness assessment; it can also be extended to occurrence of selected individual or subgroups of species as desired.

Assessment of Wildlife Key Ecological Functions

A key component of ecosystem-based management is to determine how our natural systems are functioning and how they may have changed over time. To address this, NHI will produce the following assessments for the subbasin planning teams to interpret and use as needed:

- Develop a functional profile for each subbasin using all the species that may occur within it and compare this to the functional roles of the focal species. This helps determine the functional role of the focal species, and how that contributes to ecological functions across a broader, ecoprovince scale. That is, it helps determine if the focal species play ecological roles *not* generally performed by other species. (A "functional profile" is a simple chart showing the number of wildlife species -- the "functional redundancy" -- of selected, or all, categories of key ecological functions), occurring in each WH in the subbasin.)
- Using the functional profiles and the IBIS information, determine which wildlife species are *functional specialists.* Functional specialists are those wildlife species that perform very few ecological roles, that is, that are coded in the IBIS database with very few key ecological functions. An example is Turkey Vulture, which has the functional role of carrion feeding and little else; it is a functional specialist. The implication is that loss of habitat and resource conditions required by a functional specialist species means loss of that species – e.g., loss of carrion would mean loss of the functional specialist species associated with carrion-feeding.
- Determine *critical functional link species*. A "critical functional link species" is a species that is the only species, or one of just a few species, in a particular WH that performs a particular key ecological function. The implication is that, loss of this species may mean loss of this function in that WH. Categories of functional specialist species and critical functional links species could be added to the overall focal species list as needed. Determine and map change in functional redundancy from historic to current conditions, for selected KEF categories (that can be determined by the subbasin team) and for total functional diversity; map as color-ramped quantiles with red denoting lowest redundancy levels and blue highest. These maps will be based on linking species to WHs, and when possible, given time and budget constraints also link to WH-SCs and presence of KECs.
- Tally total area in each change quantile class, and graph overall change, for each KEF, rank-ordering KEFs. (This helps to identify which KEFs have declined or have been best preserved). Since there are so many categories of KEFs, this analysis could focus on a subset of them that have the least overlap of wildlife species (defined here as <20% similarity in wildlife species). In this way, analyzing just this subset of KEFs will still tell a lot about overall patterns and trends of ecological functions as a whole. This subset of KEF categories includes the following (the numbers here refer to the codes of KEF categories as listed in the IBIS wildlife-habitat relationships database):

  KEF 1.1.1.3 - browser (leaf, stem eater)
  KEF 1.1.1.4 - grazer (grass, forb eater)
  KEF 1.1.1.9 - fungivore (fungus feeder)
  KEF 3.5 - creates feeding, roosting, denning, or nesting opportunities for other organisms
  KEF 3.6 - primary creation of structures (possibly used by other organisms)
  KEF 3.9 - primary cavity excavator in snags or live trees
  KEF 5.1 - physically affects (improves) soil structure, aeration (typically by digging)

Subbasin teams may focus on more salient changes in functional redundancy such as by setting a threshold (e.g., a 30% decrease or increase in functional redundancy).

Integrated Assessments of Fish and Wildlife Populations and Ecological Functions

The goal of an integrated assessment of fish and wildlife populations is to determine:

- Influence of Fish Habitats and KECs on Wildlife Populations and Functions
- Influence of wildlife KECs on fish populations and functions

The following assessment is dependent on fish habitat data from EDT or other aquatic habitat assessments. It can be applied to all of the 27 fish species present in the IBIS database, or just salmonids.

1. Use fish reach-specific (that is, 6HUC-specific) information on presence or levels of fish KECs (i.e., level-2 attributes in EDT)
2. Crosswalk these to the wildlife KEC categories, and determine which wildlife species associate with those KECs, in each 6HUC.
3. Produce an overall list of wildlife species for the subbasin that is associated with these fish KECs and that also would occur in the subbasin based on county occurrence, and/or range maps, and wildlife habitat associations.
4. At the 6HUC level, produce a similar list of wildlife species.
5. Produce a list of KEFs performed by the wildlife species listed above.
6. Compare lists of wildlife species and KEFs derived above based on presence and then absence of the fish KECs.

KECs Shared by Fish and Wildlife

Through a process of crosswalking fish KECs and wildlife KECs, planners can gain insight into the interrelationships between aquatic and terrestrial species assemblages and habitats. Some of these relationships are identified below for consideration. Some level of modeling outside the IBIS system is desirable to optimize our understanding of these relationships. However, inadequacies of certain information, such as population data for terrestrial species, may limit what can be done. The following are some of the relationships that it is desirable to analyze:

- Influence of Populations on Other Populations
- Influence of Fish Populations on Wildlife Populations and Functions
- Specific KEF categories are most influenced by wildlife-salmonid associations (pertains to just salmonid fish)
- Influence of Wildlife Populations and Functions on Fish Populations and Functions
- Influence of Populations on Habitats and KECs
- Influence of Fish Populations and Functions on Fish Habitats and KECs
- This is a feedback loop or a fish cross-species influence that is not addressed here.
- Influence of Wildlife Populations and Functions on Fish Habitats and KECs:
- Determine which wildlife species have KEFs that pertain to at least one of the fish KECs.

TYPES OF PRODUCTS THAT COULD BE EXPECTED FROM REGIONAL SUPPORT

The NWPPC/NHI will provide subbasin planners with coarse-screened terrestrial data outputs, including initial assessments of Functional Specialists and Critical Functional Linked Species and the habitats they are associated with in the subbasin.

The following is an example of products that have been developed using the IBIS data system for the Kootenai and Flathead Subbasins. Similar products can be developed for subbasin planners on request of NHI:

1) Tally the acreages of historic and current wildlife habitat types within each subbasin and tally the percent change in each type. This information will be presented in table format;
2) Map percent change from historic to current of each wildlife habitat type and break out the changes in increments of 20%; this map will be color ramped using red, white and blue colors. These maps will be of the individual subbasins within each ecoprovince (an example of this was shown at the meeting);
3) Local planning person will identify vegetation types of concern. Once these are identified they will be crosswalked with the appropriate habitat types and graphically depicted (in a GIS map format) showing them as red, white, and blue depending on the percent change for the associated wildlife habitat type;
4) Local planning person will forward focus species list, and using this list, IBIS will crosstab these species with their appropriate wildlife habitat type and structural conditions using the species associations of closely and generally associated; this information is to be depicted in a table format. Local planning person will review this information and will let us know the status and change of each structural stage. Also, for each focal species produce a species account that depict all habitat associations selective life history characteristics (that can be determined by the subbasin team), salmon associations, riparian obligates, wetland obligates and species range maps, if available;
5) Determine function specialists and critical functional linked species and also include them into the above (#4);
6) Determine KECs that are shared by Fish and Wildlife for each subbasin; this information will be put into a graphic format;
7) Map KEF categories for change of overall functional diversity and for change of several selective KEFs (selective KEFs can either be identified by the subbasin team or by regional support staff);
8) Using species that are associated with salmon, determine the KEF tally (functional redundancy) for each KEF category [Managers may want to look at setting a threshold (like 30% increase or decrease); and
9) If appropriate, identify IBIS's output products that are inputs for the SITES Model.

Using IBIS (www.nwhi.org/ibis) go to the pull down menu for projects and highlight subbasin planning. You will then be asked to login, please do, it is free. If you have troubles or

aversions to logging in a generic login and password has been established; it is: login: guest@nwhi.org with a password: backdoor. Then go to the primary Columbia River Basin map and highlight Ecoprovince Data. Then select Mountain Columbia Ecorprovince and view the above mentioned products.

Note: NHI will provide the basic IBIS assessment information to subbasin planners via internet or CDROM. The NWPCC will prioritize provinces for analysis by NHI. Additional assessment requests may be made to NHI and will be addressed on a first come first serve basis. Some subbasin level funding support may be required depending on the scope of the request. For questions about the IBIS database and data/analysis requests, NHI may be reached by phone at (541) 753-2199, or at habitat@nwhi.org.

4). CONNECTING SUBBASIN AND ECOPROVINCE PLANNING EFFORTS

Ecoprovince Level Assessment and Strategies: With the large number of wildlife that we actively manage for in the Columbia Basin, and because most wildlife populations extend beyond subbasin boundaries and given that we have limited time and funding for subbasin planning, we suggest the development of wildlife assessments, biological objectives, and general strategies begin at the eco*province level*. Advances in conservation biology emphasize the need for a holistic approach - protecting the full range of biological diversity at a landscape scale with attention to size and condition of core areas (or reserves), physical connections between core areas, and buffer zones surrounding core areas to ameliorate impacts from incompatible land uses. This "conservation network" must contain habitat of sufficient quantity and quality to ensure long-term viability of wildlife species. Incorporation of unique species, critical habitats, habitat linkages, and specific strategies will be more successfully addressed at the subbasin scale. Subbasin-specific objectives and strategies must be linked to ecoprovince and/or region-wide goals and objectives.

General goals can apply to either an EcoProvince or Subbasin, and they should compliment existing agencies missions and goals where possible. An example of general goals that could be established for wildlife-habitats, wildlife species, and ecological functions are as follows:

Wildlife-Habitats

- Priority will be given to manage public and where possible private lands for native habitats;
- Emphasis for maintenance and protection should be given to wildlife-habitats, structural conditions, and key environmental correlates of habitats that take a long time to develop;
- Emphasis for restoration of habitats should be given to habitats that have been lost or greatly diminished within an Ecoprovince or Subbasin;
- Subbasin Planners recognize that many wildlife-habitats can be fragmented and can have various ecological conditions. And, there is a desire to seek to improve these habitats. To this end, wildlife-habitats will be identified and managed for their greatest ecological benefits and to enhance there connectivity potential;

- Partnerships to help maintain wildlife habitats of interest or concern will be enjoined where there are willing landowners

Wildlife Species

- Priority will be given to manage public and where possible private lands for the potential of multiple wildlife species to occur presently and in the future except where restrictions apply;
- Subbasin Planners recognize that we live in a multi-species world but can have single species concerns. To this end, multiple species assessments will be emphasized and conducted as part of a project development, then focal species (like T&E, state sensitive, species that no longer occur in a Ecoprovince or Subbasin Area, species associated with salmon or others of interest) that require specific management will be assessed and managed where appropriate;
- Emphasis will be given to native species for management and where appropriate controlling introduced species that do not have a game status;
- Species that are functional specialist and/or are considered a critical functional link species for an Ecoprovince or Subbasin area will also be considered in any assessment and managed for where it is appropriate;
- Partnerships to help maintain focal wildlife species viability and productivity will be enjoined where there are willing landowners, feasible areas and biological opportunities.

Ecological Functions

- Priority will be given to assessing ecological functions, which are performed by wildlife species, as it may relate to Ecoprovinces or Subbasins or influenced by our projects;
- Subbasin Planners recognize that ecosystems resilience, redundancy, productivity, and biological diversity rely on the ecological roles species play within the system. And, recognizes that the lands they manage and make plans for are part of a greater ecosystem. To this end, Subbasin analysis will evaluate functions in context to their contribution to the Ecoprovince;
- Priority will be given to those functions that have increase or decrease by more than 30%. These functions will be evaluated and tracked, and where appropriate those functions that have been reduced by 30% or more will be evaluated for management opportunities;
- Subbasin Planners will also track and evaluate the biotic functions of introduced wildlife;
- Partnerships to help maintain key ecological functions performed by wildlife species will be enjoined where there are willing landowners, feasible areas and biological opportunities.

Biological objective are statements that further refine a goal. For example, if a goal was to enhance riparian habitat throughout a subbasin, then a biological (habitat) objective would be to plant 100 acres along the John Day River in a mixture of 30% conifer and 70% deciduous trees in such a manner that there is a 75% survival rate and tree heights are 6 feet in 5 years. That is, the biological objectives are stated so that monitoring can determine the success of achievement. Response by terrestrial vertebrate species to this habitat objective is also a biological objective

that can and in some cases should be measured. Planners should recognize that they may achieve a desired habitat condition but not the desired focal species response.

While there are several existing options to provide ecoprovince context to subbasin planning, many entities are partnering with The Nature Conservancy on ecoprovince conservation planning (ECP). In these instances ECP information will be integrated where possible into the province/subbasin plans. *The major contribution of ECP is the spatial identification of priority areas where conservation strategies should be implemented first*. If entities are not involved with ECP they can provide an ecoprovince context through evaluation and incorporation of existing large scale assessments or may conduct such assessments using an alternate methodology.

An Analytical Tool – Sites Model: The Nature Conservancy is a nonprofit conservation organization dedicated to the conservation of plants, animals and natural communities that represent the diversity of life on earth. To achieve this goal, the Conservancy employs an adaptive management framework with science-based conservation planning at its core

In order to identify all of the lands and waters that with conservation attention would conserve the biological diversity, The Nature Conservancy designs portfolios of conservation areas within and across ecoregions that include multiple occurrences and sufficient area of habitat to maintain the diversity of native species, natural communities and ecological systems. The primary products from this ecoregional planning process are: 1) map products of the lands and waters needed to sustain the biological diversity of the region, 2) the supporting data used to develop the map products, and 3) written documentation outlining the process, the methodology, and the broad strategies necessary to achieve conservation of the portfolio of conservation areas.

The Nature Conservancy uses a computer program called SITES, an analytical tool for optimizing the identification of critical lands and waters in ecoregional planning. The importance of using optimization is based on two premises: (1) the extent of habitat protection is limited by economic and social constraints; and (2) such limitations necessitate that habitat protection be economically efficient. SITES takes: (1) species and habitat location data; and (2) a cost index derived from various spatial data layers to identify a system of lands and waters that meets conservation objectives in the most economically efficient manner.

Inputs from the IBIS database, EDT analysis and other modeling and assessment tools can be integrated in various ways with the Sites tools to improve our overall ability to target project actions and predict success of conservation and restoration efforts. Sites uses priority habitats as a course filter and species as a fine filter to site conservation efforts. Regardless of weather the sites model is used by planners, habitat may still be used as a course filter for locating conservation actions in an ecoprovincial context prior to selecting focal species.

The Nature Conservancy is presently working with the Washington Department of Fish and Wildlife and others in the Columbia Basin to complete ecoregional planning throughout the Basin. In Washington this information will be made available to subbasin planners by WDFW.

For subbasin planners in Oregon, The Nature Conservancy proposes to provide data, map products, written documentation from completed and draft ecoregional plans to the members of the state level teams and to provide technical assistance and consultation on the use and interpretation of these data to members of the state level team and select subbasin planning teams as requested. The Conservancy also proposes to provide other conservation planning tools including SITES V 1.0 (Site Selection Model) and the "Conservation Area Planning and Measures" workbook and technical assistance and training on the use of these tools to members of the state level teams.

Within Oregon, The Nature Conservancy has completed or draft ecoregional plans for much of the state. The completed ecoregional plans include the Middle Rockies/Blue Mountains and Columbia Plateau. The draft plans, which include completed portfolios of conservation areas include Willamette Valley/Puget Trough. Data has been compiled for the Pacific NW Forests Ecoregion.

Deliverables for Oregon subbasin planners will include:

1) One complete set of all spatial data, tabular data, maps and conservation plans will be provided to each member group of the Oregon TOAST and subbasin leads for the Middle Rockies-Blue Mountains Columbia Plateau, Willamette Puget and the Pacific NW Coast.
2) One complete set to each member group of the Committee of the SITES V 1.0 software (Site Selection Model) and written documentation; and one complete set to each member of the Committee of the conservation area planning tools including the "Five-S Framework for Site Conservation" (Vols. 1 and 2) and the Conservation Planning and Measures workbook (spreadsheets).
3) Two, one-day training sessions on the use of SITES V 1.0 as a conservation planning tool. Subbasin planners will be notified of these training sessions by TOAST and are invited to attend. TOAST will pay for these sessions out of the state-wide technical funding.
4) Technical assistance in the use of sites, interpretation of results, and other general ecological information for describing, developing and evaluating wildlife conservation priorities for individual subbasins in the context of the conservation status and needs of associated ecoregions. Individual subbasin teams wishing to take advantage of this technical assistance will need to budget approximately $1000 for subbasin specific support from TNC. This will vary depending on the level of technical expertise in the subbasin team.

Within Idaho, The Nature Conservancy has draft or completed ecoregional plans for the entire state. The completed ecoregional plans include the Middle Rockies/Blue Mountains, Canadian Rockies, and a draft plan for the Columbia Plateau. They are providing the same products as proposed for Oregon to the Idaho Subbasin Planning Steering Committee.

5) OUTLINE FOR SUBBASIN PLAN

This section presents an outline of the basic elements that should be included in a subbasin plan. The list was derived from the Northwest Power Planning Council's *Technical Guide for Subbasin Planners* (Council Document 2001-20), released in October, 2001 and incorporates a more complete terrestrial and wildlife view. This outline is offered as guidance; the actual information that will be included in subbasin plans will vary among subbasins. Adherence to this outline will promote consistency between subbasin plans and aid larger scale planning at the provincial and Basin levels. Elements that relate primarily to wildlife and terrestrial habitat, or where information might be derived from IBIS, are highlighted in *italics*.

1. Executive Summary

2. Introduction
   - 2.1. Description of Planning Entity
   - 2.2. List of Participants
   - 2.3. Stakeholder Involvement Process
   - 2.4. Overall Approach
   - 2.5. Process and Schedule for Revising/Updating the Plan

3. Subbasin Assessment
   - 3.1 Subbasin Overview
     - 3.1.1. General Description
       - 3.1.1.1.Location
       - 3.1.1.2.Size
       - 3.1.1.3.Geology
       - 3.1.1.4.Climate and Weather
       - 3.1.1.5.Vegetation
       - 3.1.1.6.Land Use and Population
       - 3.1.1.7.Economy
       - 3.1.1.8.Land Ownership
       - 3.1.1.9.Human Disturbances to the Aquatic and Terrestrial Environments
     - 3.1.2. Subbasin Water Resources
       - 3.1.2.1.Watershed Hydrography
       - 3.1.2.2.Hydrologic Regime
       - 3.1.2.3.Water Quality
       - 3.1.2.4.Riparian Resources
       - 3.1.2.5.Wetland Resources
     - 3.1.3. Identification of Hydrologic and Ecologic Trends in the Subbasin
       - 3.1.3.1.Macro-climate and influence on Hydrology in the Subbasin
       - 3.1.3.2.Macro-climate and influence on Ecology in the Subbasin
       - 3.1.3.3.Human Use Influence on Hydrology in the Subbasin
       - 3.1.3.4.Human Use Influence on Ecology in the Subbasin
     - 3.1.4. Regional Context

3.1.4.1.Relation to the Columbia Basin
3.1.4.2.Relation to the Ecoprovince
3.1.4.3.Relation to other Subbasins in the Province
3.1.4.4.Unique Qualities of the Subbasin
3.1.4.5.NMFS Evolutionary Significant Units
3.1.4.6.USFWS Designated Bull Trout Planning Units
3.1.4.7.Priority Species and Habitats
3.1.4.8.Ecoprovince Planning
3.1.4.9.Summary of External Environmental Conditions on Fish and Wildlife

3.2. Focal Species Characterization and Status

3.2.1. Method for selection of Focal Species Selection (describe categories from below plus any additions made at a subbasin level)

3.2.2. Native/non-native *Wildlife*, Plant and Resident/Anadromous Fish of Ecological Importance. (Table of all focal species and their status as per 3.2.2.1 through 3.2.2.8)

3.2.2.1.Fish and *Wildlife* Species Designated as Threatened, Endangered, Sensitive or of Special Concern (State or Federal)
3.2.2.2.Fish and *Wildlife* Species Recognized as Rare or Significant to Local Area
3.2.2.3.Fish and *Wildlife* Species with Special Ecological Importance to Subbasin
3.2.2.4.Fish and *Wildlife* Species Recognized as Culturally or Spiritually Significant
3.2.2.5.Managed Wildlife Species
3.2.2.6.HEP Species (those used in loss assessments for adjacent hydrosystem development)
3.2.2.7.Partners in Flight high priority bird species used for monitoring
3.2.2.8.*Critical functionally linked species from IBIS (critical link to be described in individual* species specific section)

3.2.3. Aquatic Focal Species Population Delineation and Characterization

3.2.3.1.Population Data and Status by Species
3.2.3.1.1. Abundance
3.2.3.1.2. Capacity
3.2.3.1.3. Productivity
3.2.3.1.4. Life History Diversity
3.2.3.1.5. Carrying Capacity
3.2.3.1.6. Population Trend and Risk Assessment
3.2.3.1.7. Unique Population Units
3.2.3.1.8. Life History Characteristics of Unique Populations
3.2.3.1.9. Genetic Integrity of Unique Populations
3.2.3.1.10. Estimate of Historic Status
3.2.3.1.11. Estimate of Desired Future Condition for Long-term Sustainability

3.2.3.2.Distribution by Species
3.2.3.2.1. Current Distribution/spatial Diversity
3.2.3.2.2. Historic Distribution
3.2.3.2.3. Identification of Differences in Distribution Due to Human Disturbance

3.2.3.3.Description of Aquatic Introductions, Artificial Production and Captive Breeding programs
3.2.3.3.1. Introduction: Current
3.2.3.3.2. Introduction: Historic
3.2.3.3.3. Introduction: Affect of Straying/ecologic Consequences

3.2.3.3.4. Artificial Production: Current
3.2.3.3.5. Artificial Production: Historic
3.2.3.3.6. Artificial Production: Affect of Straying/ecologic Consequences
3.2.3.3.7. Relationship Between Naturally and Artificially-Produced Populations
3.2.3.4.Harvest in the Subbasin
3.2.3.4.1. Current In-basin Harvest Levels
3.2.3.4.2. Historic In-basin Harvest Levels
3.2.4. Environmental Conditions at HUC6 Level for Aquatic Focal Species
3.2.4.1.Characterization of Historic
3.2.4.2.Characterization of Current
3.2.4.3.Characterization of Potential
3.2.4.4.Characterization of Future with No New Actions
3.2.5. Out-of-Subbasin Effects for Aquatic Species
3.2.5.1.Limiting Factors Outside Subbasin
3.2.5.2.Estuary
3.2.5.3.Nearshore
3.2.5.4.Marine
3.2.5.5.Mainstem Habitat
3.2.5.6.Hydropower
3.2.5.7.Out-of-subbasin Harvest
3.2.5.8.Out-of-subbasin Hatcheries
3.2.5.9.Basin-wide Assumptions - Effects on Productivity and Sustainability
3.2.5.10. Assumptions about Productivity
3.2.6. Terrestrial Focal Species Population Delineation and Characterization
3.2.6.1.Historic Distribution (Range Map(s) from IBIS if available)
3.2.6.2.Present Distribution (Range Map(s) from IBIS if available)
3.2.6.3.Current Population Data and Status
3.2.6.4.Locally extirpated and introduced species
3.2.6.5.In Basin Effects on Terrestrial Species (current threats to wildlife and habitats)
3.2.6.6.Assumptions about Productivity
3.2.7. Environmental Conditions at HUC6 Level for Terrestrial Focal Species
3.2.7.1.Historic Habitat Distribution (IBIS Map for each habitat type)
3.2.7.2.Current Habitat Distribution (IBIS Maps for each habitat type)
3.2.7.3.Condition, Trend, Connectivity and Spatial Issues
3.2.7.4.Habitats currently protected on public and private lands
3.2.7.5.Potential and Projected Future Condition with no future actions
3.2.8. Out of Basin Factors
3.2.8.1.1. Limiting Factors Outside Subbasin for Migratory Species,
3.2.8.1.1.1.Out-of-subbasin Harvest of Managed Species,
3.2.8.1.1.2.Basin-wide Assumptions - Effects on Productivity and Sustainability
3.3. Integrated Assessments of Fish and Wildlife Populations and Ecological Functions
3.3.1. Influence of Habitats on Populations and Functions
3.3.1.1.Influence of Fish Habitats and KECs on Fish Populations – Use of EDT
3.3.1.2.Influence of Fish Habitats and KECs on Wildlife Populations and Functions

3.3.1.3.KECs Shared by Fish and Wildlife

3.3.2. Influence of Populations on Habitats and KECs

3.3.2.1.Influence of Wildlife Populations and Functions on Fish Habitats and KECs

3.4. Identification and Analysis of Limiting Factors/Conditions

3.4.1. Description of Historic Factors Leading to Decline of Focal Species/ecological Function-process - Aquatic

3.4.1.1.Key Factors Inhibiting Populations and Ecological Processes

3.4.1.2.Key Factors for All Life Stages

3.4.1.3.Key Disturbance Factors Inside Subbasin Limiting Populations

3.4.1.4.Key Disturbance Factors Outside Subbasin Limiting Populations

3.4.1.5.Opportunities for Human Intervention to Have/not have a Beneficial Effect

3.4.1.6.Conditions That Can be Corrected by Human Intervention

3.4.2. Historic Factors Leading to Decline of Focal Species/ecological Function-process - Terrestrial

3.4.2.1.Key Factors Inhibiting Populations and Ecological Processes

3.4.2.2.Key Disturbance Factors Inside Subbasin Limiting Populations.

3.4.2.3.Key Disturbance Factors Outside Subbasin Limiting Populations (Including Hydro-power Developments)

3.4.2.4.Opportunities for Human Intervention to Have/not have a Beneficial Effect

3.4.2.5.Conditions That Can be Corrected by Human Intervention

3.5. Synthesis/Interpretation

3.5.1. Subbasin-wide Working Hypotheses – Aquatic

3.5.1.1.Hypotheses

3.5.1.2.Evidence Supporting Hypotheses

3.5.2. Subbasin-wide Working Hypotheses - Terrestrial

3.5.2.1.Hypotheses

3.5.2.2.Evidence Supporting hypotheses

3.5.3. Desired Future Conditions – Aquatic

3.5.3.1.Federally Listed Species (Recovery Goals)

3.5.3.2.Non-listed Species

3.5.3.3.Habitat

3.5.4. Desired Future Conditions – Terrestrial

3.5.4.1.Federally Listed Species (Recovery Goals)

3.5.4.2.Non-listed Species

3.5.4.3.Habitat

3.5.5. Opportunities

3.5.5.1.Habitat for High Priority Protection

3.5.5.2.Habitats to Reestablish Access

3.5.5.3.Habitat for Restoration

3.5.5.4.Restoration of Ecological Processes

4. Inventory of Existing Activities (Private, Local, State, Federal)

4.1. Existing Legal Protection

4.2. Existing Plans

4.3. Existing Management Programs

4.4. Existing Restoration and Conservation Projects

4.5. Gap Assessment of Existing Protections, Plans, Programs and Projects.

5. Management Plan
   5.1. Vision for the Subbasin
      5.1.1. Human Use of the Environment
      5.1.2. Aquatic Species
      5.1.3. Terrestrial Species
      5.1.4. DFC's or Goal Statements
   5.2. Biological Objectives
      5.2.1. Aquatic Species
      5.2.2. Terrestrial Species
   5.3. Socio-Economic Objectives
   5.4. Prioritized Strategies
      5.4.1. Aquatic Species
      5.4.2. Terrestrial Species
      5.4.3. Socio-Economic Condition
   5.5. Consistency with ESA/CWA Requirements
   5.6. Research, Monitoring and Evaluation

6. Appendices

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