AN OREGON TECHNICAL GUIDE FOR DEVELOPING WILDLIFE ELEMENTS OF A SUBBASIN PLAN

April 16, 2003

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) Subbasin Planning program. This guidance varies slightly from a similar document prepared for Oregon and Washington in order to tailor it to the particular needs of Oregon subbasin planners. It attempts to show how the subbasin and provincial levels will be integrated, but it does not indicate how this will be accomplished.

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.

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.]

Approach to Incorporate 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 local stakeholder levels want to avoid this pitfall when developing subbasin plans. To this end, we have developed an approach for wildlife planning at the subbasin level that can be integrated into planning at the province or ecoregion (ecoprovince) level. Subbasin planners, however, are responsible only for work at the subbasin level unless explicit arrangements are made to work at a higher level with adjacent subbasins.

Ideally, a two-tier approach would be used 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) would develop wildlife information primarily at the province/regional level. Focal species/habitats of concern (FSHOC), such as pygmy rabbits/shrub-steppe, would be addressed initially at the regional level (Tier 1). Most of the information necessary to achieve this is available in the IBIS database, 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 would 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, local stakeholders, and local governments) would 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 would identify data gaps. The Lead Entity will provide their findings to the Tier 1 groups to assist with making ecoprovince-level adjustments.

<u>No funding has been provided to implement the Tier 1 approach.</u> It is described here because subbasin planners may voluntarily wish to join with others to work at a provincial level, since so many of the wildlife issues reach considerably beyond the borders of each subbasin. <u>Such joint efforts are not a requirement.</u> Section 4 describes how a provincial level wildlife analysis would be conducted.

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

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). NHI has received considerable support in developing IBIS from OSU and the Oregon Natural Heritage Information Center. 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.

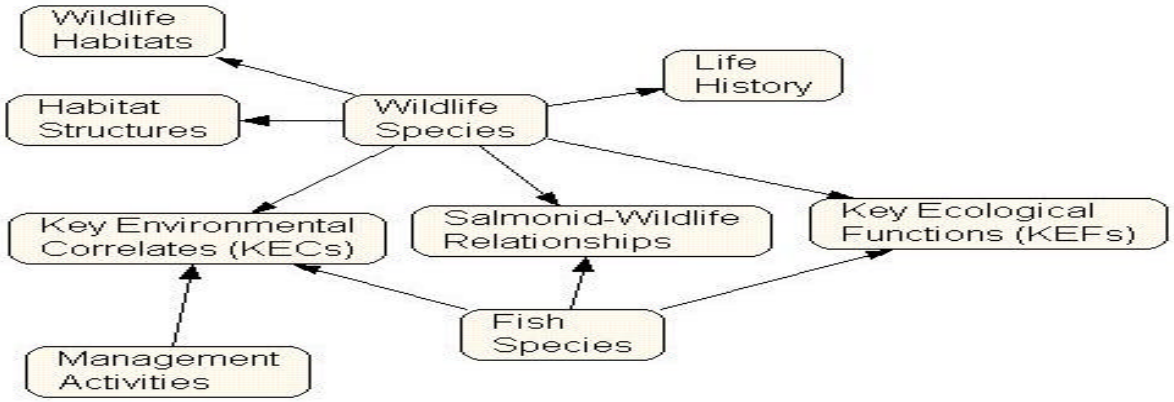

Figure 1: The Nine Primary Matrices that Make-up IBIS

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)[1]. 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 watershed (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.

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

Assessment Methodology

The specific assessment methods detailed here generally follow those of the Multi-Species Framework Approach for the Columbia River Basin[2].

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*.

Note: in the sections below where NHI is identified as the Principal provider of information, it will provide the IBIS assessment information 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-served basis. Subbasins may have to pay for this service 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.

Task 1. Identify Focal Species

Focal species should be selected from, but are not limited to, the following:

1. Threatened, endangered, and state sensitive species
2. Species listed in the Partners in Flight program[3]
3. Species used to model impacts from adjacent hydro-development under the USFWS Habitat Evaluation Procedure (HEP Species)
4. Culturally important species (as defined in each subbasin)
5. Managed Species (i.e. game species)
6. Functional Specialist and Critically linked species (These are species that represent the only species performing a few functions or filling a critical functional role in a given analysis area).
7. Species with an association with salmon.

[2] Marcot, B.G., W.E. McConnaha, P.H. Whitney, T.A. O'Neil, P.J. Paquet, L. Mobrand, G.R. Blair, L.C. Lestelle, K.M. Malone, and K.I. Jenkins. 2002. A multi-species framework approach for the Columbia River Basin: integrating fish, wildlife, and ecological functions. Northwest Power Planning Council, Portland, Oregon. CD-ROM and Web www.edthome.org/framework

[3] Access information at: http://www.partnersinflight.org/

Task 1 Responsibilities for Identification of Focal Species			
Sub-Task	**Subbasin Team**	**TOAST**	**NHI**
1. Identify candidate focal species	P[4]	S	
2. Provide species lists for above items #1, #2, #3, # 5, # 6, and #7		S	P
3. Provide list for above item #4	P	S	
4. Develop final list of focal species	P	R	R
P = principal responsibility; R = review responsibility; S = provide support/consultation			

Task 2. Overall Wildlife Habitat Assessment:

A wildlife habitat assessment provides information to identify change in wildlife habitat distributions of focal species. The assessment spatially identifies wildlife habitat increases and decreases between historic and current times.

Task 2 Responsibility for Wildlife Habitat Assessment of Focal Species			
Sub-Task	**Subbasin Team**	**TOAST**	**NHI**
1. Provide Wildlife-Habitat Maps of current and historic conditions for subbasin and the ecoprovince where it resides.	R	S	P
2. 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 and figure format	R	S	P
3. Map wildlife-habitat distributions throughout the ecoprovince to illustrate the extent of each wildlife habitat within a subbasin	R	S	P
4. Determine how much wildlife- habitat/acreage is protected by ownership	R	S	P
5.. Map percent change from historic to current times of each WH in each subbasin 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.	R	S	P
6. Option: Subbasin planners can 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	P	R	R

[4] The group designated as having principal responsibility (P) will provide all analyses, figures, tables, and text required for each task.

to rely on the IBIS information, as supplemented by local knowledge provided during writing the subbasin plan.			
P = principal responsibility; R = review responsibility; S = provide support/consultation			

Task 3. 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 can evaluate the status and changes in these structural condition classes.

Task 3 Responsibility for Structural Condition Assessment			
Sub-Task	**Subbasin Team**	**TOAST**	**NHI**
1. Query IBIS on focal species to determine which structural condition classes these species use as close association, for each WH	R	S	P
2. Evaluate the status and changes in these structural condition classes.	P	S	
Option: 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.	P	S	
Option: Conduct the same analysis as above to identify subbasins and specific WH-SC combinations for potential restoration and conservation.	P	S	R
Option: 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	P	R	R
P = principal responsibility; R = review responsibility; S = provide support/consultation			

Task 4. 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:

Task 4 Responsibility for Key Environmental Correlate (KEC) Assessment			
Sub-Task	**Subbasin Team**	**TOAST**	**NHI**
1. Determine which KECs the focal species use as close association, for each WH; and then the subbasin team could	R	R	P

evaluate the status and changes in these correlates.			
Option: map presence or abundance (area, numbers, percent cover, etc.) of selected KECs in each subbasin; and	P	S	S
Option: If subbasin planners find a need to evaluate total wildlife assemblages, NHI can provide lists of entire wildlife assemblages given occurrence, extent, and changes in WHs, in subbasins. Where finer-resolution data are available, 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. 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.	P	S	S
Option: 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)	P	S	
P = principal responsibility; R = review responsibility; S = provide support/consultation			

Task 5. 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:

Task 5 Responsibilities for Identification of Focal Species			
Sub-Task	**Subbasin Team**	**TOAST**	**HRI**
1. 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 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.)	S	S	P
2. 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	S	S	P

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.			
3. 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, if desired. 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.	S	S	P
4. Tally total area in each change quantile class and map change. For selective KEFs graphs changes in redundancy, . (This helps to identify which KEFs have declined or have been best preserved). Since there are so many categories of KEFs, this analysis will focus on a select subset of KEFs 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.	R	S	P
P = principal responsibility; R = review responsibility; S = provide support/consultation			

Task 6. 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.

Task 6 Integration of Wildlife and Fish Analyses			
Sub-Task	**Subbasin Team**	**TOAST**	**NHI**
1. Obtain fish reach-specific (that is, 6HUC-specific) information on presence or levels of fish KECs (i.e., level-2 attributes in EDT)	R	S	P
2. Crosswalk these to the wildlife KEC categories, and determine which wildlife species associate with those KECs, in each 6HUC.	R	S	P

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.	R	S	P
4. I think we did this in #2?.	R	S	P
5. Produce a count of KEFs performed by the wildlife species listed above.	R		P
6. Compare lists of wildlife species and KEFs counts derived above based on presence and then absence of the fish KECs.	P	R	S
P = principal responsibility; R = review responsibility; S = provide support/consultation			

Through a process of crosswalking fish KECs and wildlife KECs, subbasin 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, but it is not required). The following are some of the relationships that subbasin planners may want 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.

Task 7. Provincial Considerations (Optional Task)

Note: this is an optional task and may be skipped. Subbasin planners are advised to check with The Nature Conservancy on the status of SITES information for their subbasin, for this may be useful for planning purposes even if the subbasin chooses not to do this optional task.

The evaluation of Provincial factors for wildlife requires a different approach from aquatics because subbasin boundaries are often irrelevant to describing the areas they inhabit or the factors affecting their survival. Ideally, the wildlife assessments for subbasin plans would be done 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.

Unfortunately, the current round of subbasin planning does not include funding in Oregon to develop landscape-scale ecoregional wildlife assessments for subbasin planning. Fortunately, much of the work needed to develop an ecoregional assessment and recommended plan elements has been done by The Nature Conservancy (TNC).

The TNC has developed a computer model called SITES which identifies critical lands and waters in ecoregions. 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 tool 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 whether the SITES model is used by planners, habitat may still be used as a course filter for locating conservation actions in an ecoprovincial context.

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.

For subbasin planners in Oregon, The Nature Conservancy proposes to provide data, map products, written and documentation 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.

The TNC can deliver the following to assist Subbsin planners with determining Provincial impacts and as a critical input to the Management Plan phase.

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 Technical Committees of the SITES V 1.0 software (Site Selection Model) and written documentation; and one complete set to each member of the Technical Committees 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) 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 for subbasin specific support from TNC. This will vary depending on the level of technical expertise in the subbasin team.

Task 8. Out-of-subbasin Effects

No specific methodology is proposed for this task, and subbasin planners cannot be assured that the information will be provided by others due to lack of budgets. Therefore, subbasin planners will need to use informed opinion from wildlife managers familiar with wildlife in their subbasin. Where quantitative information is not available, use approximations.

Task 9. Limiting Factors

Based in part upon the information developed above, subbasin planners will identify the factors responsible for the declines in focal species and the factors limiting their recovery. At this point in the analysis, the processes for wildlife and aquatic species analysis are the same.

Task 9 **Responsibilities for Developing Limiting Factors**			
Sub-Task	**Subbasin Team**	**TOAST**	**TNC/Sites**
1. Describe the factors or conditions that historically led to the decline of each focal species and of associated ecological functions and processes.	P	S	S
2. Determine key factors or conditions that currently inhibit populations and ecological processes and functions relative to their potential.	P	S	S
3. Identify current threats or risks for focal species and their habitats.	P	S	S
4. Distinguish between those factors or conditions that can be corrected or influenced by human intervention from those where human intervention would have little if any effect.	P	S	S
5. Identify opportunities that directly reduce these threats.	P	S	S
P = principal responsibility; R = review responsibility; S = provide support/consultation			

Task 10. Synthesis and Interpretation

The subbasin planners will summarize all of the above information in the final section of the Subbasin Assessment.

Task 10 Responsibility for Developing Synthesis			
Sub-Task	**Subbasin Team**	**TOAST**	**TNC/Sites**
1. Define species abundance/productivity	P	S	S
2. Develop working hypotheses	P	S	S
3. Define desired future conditions	P	S	S
4. Define opportunities	P	S	S
P = principal responsibility; R = review responsibility; S = provide support/consultation			