Application of NMFS' Northwest Region Framework
for Jeopardy and Destruction/Adverse Modification Analyses
for Pacific Salmon and Steelhead
December 2, 2008

This document provides an explanation for use of ***NMFS Northwest Region Analytical Steps to Complete Jeopardy and Adverse Modification Analyses*** (Table 1). This approach may not be appropriate for all proposed actions and should be modified as necessary to fit actions such as Federal Energy Regulatory Commission (FERC) relicensing proceedings. Information useful to the application of this framework may be found in recovery plans for listed salmon and steelhead. Consideration of recovery planning material will improve the efficiency and effectiveness with which we integrate recovery plans with consultations conducted under section 7 of the Endangered Species Act (ESA). A more complete treatment of how recovery plans and section 7 consultations may be integrated is presented in NMFS' "*Integrating Recovery Plan Products and Section 7 Consultations in the NMFS Northwest Region, July 24, 2008*"

The jeopardy and adverse modification analyses both begin with effects of the action, are hierarchical, and must be interpreted using appropriate status and baseline information. Beyond that, however, each analysis has a very different purpose. The jeopardy analysis is used to analyse the effects of the action on individual fish within the action area; determine the importance of those effects at the population and species scale; then conclude whether completing the action would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild. The destruction or adverse modification of critical habitat analysis is used to analyse the effects of the action on individual primary constituent elements (PCEs) or the comparable descriptor used in critical habitat designations completed before 2005; determine the importance of those effects on the conservation role of individual watersheds identified in the designation at the 5th-field watershed scale as containing those PCEs, then designation wide; then conclude whether the critical habitat will remain functional, or retain its current ability to become functional, as necessary to serve its intended conservation role.

1. Proposed Action. Develop a concise summary and incorporate by reference or append the complete description of the action as proposed. Determine whether the Proposed Action is sufficiently defined for NOAA to identify its likely effects. Discuss the full scope of the action agency's discretion as necessary to frame the analysis of effects of the action properly and include any conservation measures and other details that are relevant to the effects analysis. Determine whether any interrelated or interdependent actions whose effects should be combined with this consultation.

2. Action Area. Clearly and concisely describe the geographic area likely to be affected, directly or indirectly, by the proposed action using the watershed hydrologic code (HUC), recognizable landmarks (e.g., cities), and river-mile notation.

3. Status of the Species. Address the considerations for the status analytical step described in Table 1. Incorporate published information by reference, whenever possible. Only include details that are necessary for the reader to understand the analysis clearly.

4. Status of the Critical Habitat. Address the considerations for the status analytical step described in Table 1. Incorporate published information by reference, whenever possible. Only include details that are necessary for the reader to understand the analysis clearly.

5. Environmental Baseline. Address the considerations for the environmental baseline analytical step described in Table 1. For FERC relicensing proceedings, consider FERC's ability to require decommissioning as part of the environmental baseline.

- **Northwest Geospatial Data Viewer (NGDV) and Public Consultation Tracking System (PCTS)** - Use the NGDV,

  NGDV.html

  and PCTS to describe environmental conditions in the action area, including as assessment of the adverse and beneficial effects of actions already consulted on. Actions that may become part of a habitat conservation plan (HCP) belong in the Cumulative Effects until consultation on the application is complete.
- **Viable Salmonid Population (VSP)** - Use VSP status information to describe the "importance" of the affected population to recovery of the listed species.
- **Critical Habitat Analytical Review Team (CHART)** - Use status, CHART and baseline information to describe the "importance" of the 5th-field HUC or habitat unit containing the action area to the conservation value of a designated critical habitat
- **Technical Recovery Team (TRT)** - Use TRT work products and other information to identify and discuss key limiting factors, key limiting population attributes, and threats.

Only include details that are necessary for the reader to understand the analysis clearly.

6. Effects of the Action. Analyse the likely environmental change within the action area that will be caused by the proposed action. This information will be used in step 7 to examine the effects of the action on individual fish in the action area, and in step 8 to examine the effects of the action on PCEs of critical habitat. For FERC relicensing proceedings, analyse the environmental effects of the dam in place now and also under a new license.

Consider the following factors, as modified from the Endangered Species Consultation Handbook (1998), at pp. 4-23 through 4-30, in evaluating the environmental effects of the proposed action.

- **Proximity** - How close (in space and time) is the environmental change caused by the proposed action to listed species or its habitat?
- **Distribution** - What will be the likely geographic extent of the environmental change?
- **Nature** - What type of effects do you predict on individuals and PCEs?
- **Intensity** - How much habitat or how many individuals or populations in the action area are likely to be affected?

- **Timing** - When will the likely effects occur in relation to the species' life-history patterns?
- **Frequency** - How often is the environmental change and its effects likely to occur?
- **Duration** - How long are the effects likely to last? Potential categories include (a) short-term effects that subside immediately (pulse effect); (b) sustained, long-term, or chronic effects (press effect); and (c) permanent change that sets a new threshold for a species' environment (threshold effect).

We recommend use of these factors in the order they are presented above because that is a logical sequence for analysis. However, this order may be changed to meet the needs of an individual consultation. Only include details that are necessary for the reader to understand the analysis clearly.

7. Effects of the Action on Listed Species. Describe the effects of the action on listed species as the likely response of individual fish (for each individual species, if appropriate) ***in the action area*** to the environmental effects of the action. Address the considerations for this analytical step in Table 1.

Please remember that this section serves as the analytical basis for the incidental take statement in cases where the proposed action is found to not jeopardize listed species or result in the adverse modification of critical habitats. In that context it is important that you objectively establish the basis for individual fish being affected in a way that conforms to the regulatory definition of take, but do not use the regulatory terms associated with take. Simply lay out the biological response of individual fish to the proposed action (e.g., are individual fish likely to be captured or killed; is the behavior of individual fish likely to be disrupted to an extent that will create a reasonable likelihood of injury?). For FERC relicensing proceedings, take into account the possibility of no dam.

Although acknowledgment of uncertainty is a good scientific practice, the legal standard for anticipating take is **"reasonable certainty"** - no more, no less. Thus, **reasonably certain** (or something stronger) is the key phrase that must be used by opinion writers to describe the likelihood that biological effects (all or some of which may conform to the definition of take) to individual fish will be caused by the proposed Federal action. On that basis, if the following terms apply to a given effect, that effect should not be considered as take in the incidental take statement: can be, conceivably, could be, credible, feasible, may be, perhaps, possibly, potentially, might be, weather-permitting.

Discuss the following, but include only details that are necessary for the reader to clearly understand the effects analysis.

- **Individual fish** - Effects of the likely environmental change on individual fish within the action area, by life history stages, including specifically any injury or death due to altered development, bioenergetics, growth, or essential behaviors (territoriality, reproduction, feeding, migration, avoidance); and susceptibility to parasites, disease, or predation.
- **Population** - Use information about effects on individual fish to determine whether the action will alter VSP characteristics of affected populations (i.e., abundance, spatial

structure, diversity, and productivity). Use status and baseline information to describe whether the effects of the action are contributing to a key limiting population attribute. Also note whether the trend of that attribute is reasonably certain to improve because other timely and effective action has been, or will be, taken to improve it.

8. Effects on Critical Habitat. Briefly describe the likely change in individual PCEs ***in the action area*** as a subset of the habitat-related effects already discussed in the Effects of the Action section. Account for additional Snake River critical habitat elements as necessary. PCEs that will not be affected may be marked as "no effect." For FERC relicensing proceedings, take into account the possibility of no dam.

Discuss the following. Only include details that are necessary for the reader to understand the effects clearly analysis.

- **Individual PCEs** - Effects of the likely environmental change on the conservation value of individual PCEs, i.e., changes in habitat conditions within the action area compared with the physiological tolerance of individuals in the affected population (within the optimum physiological range, within the zone of tolerance but increasingly stressful, or lethal).
- **HUC** - Effects of the likely environmental change on the conservation value of the critical habitat at the 5th-field HUC scale. Discuss whether those effects will result in the critical habitat remaining functional or retaining its current ability to be functionally established to serve the intended conservation role for the species. Use status and baseline information to describe whether the effects of the action will worsen the condition of a PCE, and whether that PCE is, or may become, a key limiting factor. Also note whether the trend of that factor is reasonably certain to improve because other timely and effective action has been, or will be, taken to reverse the trend. Note, however, that this part of the analysis must focus exclusively on critical habitat - any conservation or mitigation action taken outside of critical habitat cannot be considered at this stage.

9. Cumulative effects. Address the considerations for the cumulative effects analytical step described in Table 1. Incorporate published information by reference, whenever possible. Only include details that are necessary for the reader to understand the analysis clearly.

10. Conclusion. This section presents a synthesis of the preceding analyses. As such, it requires more careful thought than any other part of the opinion. Recent QAQC reviews found that this section in nearly all opinions needs to be strengthened. Continue with care!

Draw separate conclusions for jeopardy and critical habitat. Present each conclusion as an explicit summary ("integration and synthesis") of the thought or weight that you gave to the status of the listed species and its designated critical habitat, the environmental baseline, effects of the action, cumulative effects, and the way these factors interact - not simply a list of general considerations or primary conservation measures.

For the jeopardy determination, consider the importance of the affected population to the species, and whether the action is likely to affect the VSP attributes of that population. Generally, an

action is not **likely to result in jeopardy** unless it will affect one or more populations with a major role in the survival and recovery of the species by making a key limiting population attribute worse, or the effect will be large, long lasting, or both. An action that, by itself, is likely to have a relatively minor effect may nonetheless contribute to serious degradation of a limiting factor. This will occur if that factor will be gradually weakened by the combined outcome of a larger pattern of similar actions as described in the environmental baseline and cumulative effects sections. These considerations may be outweighed and a determination of no jeopardy may still be appropriate if the trend of the limiting population attribute is reasonably certain to improve because timely and effective action has been, or will be, taken to improve it.

For a discussion of the framework NMFS uses to discount present harm, based on projection, with reasonable certainty, of future improvements, see, the policy for evaluation of conservation efforts (PECE) when making listing decisions, at 68 FR 15100 (March 28, 2003). The greater the weight being given to projected offsetting improvement, the more detailed needs to be application of the PECE factors to explain that weight, i.e., certainty of implementation, certainty of effectiveness, and extinction risk assessment.

Similarly, for the destruction or adverse modification of critical habitat determination, consider the conservation value of the affected watershed, and whether the action will have an important effect on the PCEs within that watershed. Generally, an action is not **likely to result in destruction or adverse modification of critical habitats** unless it will affect one or more watersheds with a major role in the conservation of the species by causing the habitat to be no longer functional (or to lose its current ability to become functionally established) as necessary to serve its intended conservation role, or the effect will be large, long lasting or both. As before, an action that, by itself, is likely to have a relatively minor effect may nonetheless contribute to serious degradation of critical habitats, if that conservation value of that critical habitat will be gradually weakened by the combined outcome of a larger pattern of similar actions as described in the environmental baseline and cumulative effects sections.

As for the jeopardy analysis, these considerations may be outweighed and a determination of not likely to result in destruction or adverse modification of critical habitat may still be appropriate if the trend of conservation value is reasonably certain to improve because timely and effective action has been, or will be, taken to provide the necessary conservation value at the watershed scale.

Table 1. Suggested NMFS' NWR Analytical Steps to Complete Jeopardy and Adverse Modification Analyses for Pacific Salmon and Steelhead.

Analytical Steps	Jeopardy Considerations	Adverse Modification Considerations
(1) Status	Discuss the entire listed species in terms of life history, habitat, and distribution.	Discuss the entire designated critical habitat area in terms of 5th-field HUCs and PCEs essential for conservation of the species.
	Describe the conservation status of the species in terms of populations and larger-scale groupings.	Describe the conservation status of individual 5th- field HUCs identified as containing PCEs and designated as critical habitat.
	Identify the current condition of the listed species in terms of VSP criteria and the factors responsible for that condition, especially key limiting population attributes to the extent known. Consider the beneficial and adverse effects of actions already consulted on.	Identify the current condition of critical habitat in terms of 5th- field HUCs, PCEs, and the factors responsible for that condition, especially key limiting factors to the extent known. Consider the beneficial and adverse effects of actions already consulted on.

	Explain the survival and recovery needs of the listed species, and the role of populations and larger-scale groupings with respect to meeting those needs.	Explain the conservation function of critical habitat, and the role of 5th-field HUCs and PCEs with respect to maintaining or achieving that function.
(2) **Environmental Baseline**	Describe the geographic area likely to be affected, directly or indirectly, by the proposed action using a 5th-field HUC, recognized landmarks, and river-mile notation.	
	Discuss the current condition of any population or larger-scale population grouping of the listed species in the action area in terms of VSP criteria. Consider only Federal actions that have already undergone a Section 7 analysis and were found to avoid jeopardy.	Discuss the current condition of PCEs and any 5th- field HUC in the action area in terms of conservation value. Include future Federal actions that have already undergone a Section 7 analysis and were found not to adversely modify critical habitat.
	Identify the factors responsible for current condition of any population and larger-scale grouping in the action area, especially key limiting population attributes. Consider the beneficial and adverse effects of any actions already consulted on in the action area.	Identify the key limiting factors responsible for current condition of PCEs in the action area, especially key limiting factors. Consider the beneficial and adverse effects of any actions already consulted on in the action area.

	Explain the relationship of individual fish in the action area to the discrete population and larger-scale population grouping to which they belong, and the relationship of that population and larger-scale grouping to the survival and recovery of the listed species as a whole.	Explain the conservation value of affected watersheds in the action area relative to the entire designated critical habitat.
(3) **Effects of the Action**	Analyse the adverse and beneficial effects of the action on individual fish and on environmental conditions in the Action Area in relation to the biological requirements of individual fish.	Analyse the adverse and beneficial effects of the action on environmental conditions in the Action Area in relation to individual PCEs in the Action Area.
	Identify how individual fish respond to those effects by life history stage. Consider development, bioenergetics, growth, behavior or other effect resulting in injury or death.	Identify how individual PCEs respond to those effects. Consider how the effects relate to the biological requirements of individual fish exposed, as addressed by that PCE.
	Explain how the effects of the action on individual fish influence population viability criteria discussed above. How "important" are those effects to the viability of the affected population or larger-scale population grouping?	Explain how the effects of the action on individual PCEs influence the function and conservation role of critical habitat in the affected watersheds. How "important" are those effects at the watershed scale? Only consider conservation and mitigation actions within critical habitat; not outside.

(4) **Cumulative Effects**	Identify any beneficial and adverse effects of future state and private actions that are reasonably certain to occur on individual fish in the Action Area.	Identify any beneficial and adverse effects of future state and private actions that are reasonably certain to occur on individual PCEs in the Action Area.
	Describe how cumulative effects will influence population viability criteria discussed above. How "important" are those effects to the viability of the population or larger-scale population grouping? Consider the relationship of the effect to key limiting population attributes.	Describe how cumulative effects on individual PCEs will influence the function and conservation role of critical habitat in the affected watersheds. How "important" are those effects at the watershed scale? Consider the relationship of the effect to key limiting factors in the watershed.
(5) **Conclusion**	Based on the analysis of information under steps (1) through (4) above, determine whether, with completion of the proposed Federal action, the likelihood of the survival and recovery of the species will be appreciably reduced.	Based on the analysis of information under steps (1) through (4) above, determine whether the proposed Federal action, critical habitats will remain functional, or retain the current ability to become functionally established, to serve the intended conservation role for the species

Information Sources Useful for Completing Analytical Steps for Pacific Salmon and Steelhead

Status of Species and Critical Habitat

- Factors for decline and risks to Viable Salmonid Population (VSP) factors
- Factors for decline and risk to Primary Constituent Elements (PCEs)
- Biological Review Team (BRT) findings
- Critical Habitat Analytical Review Team (CHART) findings
- Technical Recovery Team (TRT) work products
- Proposed and final determinations in the Federal Register (FR)
- Applicable scientific literature and reports

- Section 2 Additional Ecosystem Tools for Watershed Analysis, Don Knowles, 1996.

Environmental Baseline

- Biological Assessment
- Reliable information about actions that may have a positive or negative effect within the action area (*e.g.*, a completed consultation within the action area; an interim or final recovery plan approved by NMFS).
- Matrix of Pathways and Indicators (MPI) products/Level 1 team information
- BRT, TRT, and CHART work products
- GIS products
- Subbasin plans
- Local watershed analysis
- State 303(d) list of Water Quality Limited Streams
- Oregon Department of Fish and Wildlife's Draft Oregon Native Fish Status Report
- Personal observations or communicatio