

TO: Committee on Sustainable Water and Environmental Management in the California Bay-Delta

FROM: Robert Thornton
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DATE: January 15, 2010

RE: Legal and Scientific Issues Associated with the Development of a Report Focusing on Scientific Questions, Assumptions, and Conclusions Underlying Water-Management Alternatives in the Biological Opinions Issued by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service for Continued Operation of the Central Valley Project and State Water Project

We are writing to you on behalf of the Coalition for a Sustainable Delta (Coalition), which is made up of persons and entities who rely on agriculture in the Central Valley for their livelihood or who have a demonstrated interest in agriculture in the Central Valley. The Coalition undertakes and supports efforts to protect the Delta and is committed to promoting a strategy to ensure its sustainability. As you may be aware, the Coalition has for some time advocated for the establishment of this committee to, *inter alia*, review and evaluate the scientific information referenced in the U.S. Fish and Wildlife (FWS) Biological Opinion on Coordinated Operations of the Central Valley Project and State Water Project (Dec. 15, 2008) and the National Marine Fisheries Service's (NMFS) Biological Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan (June 4, 2009) (Biological Opinions), the interpretation of that information in the agencies' effects analyses, and the extent to which the agencies' effects analyses supports their jeopardy and adverse modification determinations, and reasonable and prudent alternatives. We are pleased that Congress advocated for this independent scientific review and that the Executive Branch ultimately supported the review.

As described by the National Research Council, the committee's first task is to:

issue a report focusing on scientific questions, assumptions, and conclusions underlying water-management alternatives in the U.S. Fish and Wildlife Service's (FWS) Biological Opinion on Coordinated Operations of the Central Valley Project and State Water Project (Dec. 15, 2008) and the National Marine Fisheries Service's (NMFS) Biological Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan (June 4, 2009)

Among the questions that the committee is instructed to consider is:

Are there any "reasonable and prudent alternatives" (RPAs), including but not limited to alternatives considered but not adopted by FWS (e.g., potential

entrainment index and the delta smelt behavioral model) and NMFS (e.g., bubble-curtain technology and engineering solutions to reduce diversion of emigrating juvenile salmonids to the interior and southern Delta instead of towards the sea), that, based on the best available scientific data and analysis, (1) would have lesser impacts to other water uses as compared to those adopted in the biological opinions, and (2) would provide equal or greater protection for the relevant fish species and their designated critical habitat given the uncertainties involved?

While the principal charge to the committee is to review and evaluate the science underlying the biological opinions and RPAs, the committee cannot complete its task without a clear understanding of the legal framework within which these opinions and alternatives were devised -- that is, an understanding of the standards in section 7 of the Endangered Species Act (ESA) for undertaking and completing biological opinions and RPAs. This memo provides context to the committee as it evaluates documents that are both scientific and legal in character. It also serves to clarify terms of art that have a legal significance or meaning distinct from their scientific or layperson's meanings.

In particular, an understanding of the distinction between the "environmental baseline," that is, the human and natural factors that have contributed to the current status of the species and its habitat, and the "effects of the action," that is, the effects of the proposed action or project on the species and its habitat that will be added to the environmental baseline will aid the Committee in its evaluation of the underlying scientific questions, assumptions, and conclusions in the Biological Opinions, and its selection of alternative RPAs that avoid harm attributable to the effects of the action.

The biological opinions and RPAs were developed pursuant to section 7(a)(2) and (b)(4)(A) of the ESA. Section 7(a)(2) requires each Federal agency, in consultation with and with the assistance of the FWS or NMFS, to insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of critical habitat of such species. Section 7(b)(3)(A) of the ESA states that if jeopardy or adverse modification is found, FWS or NMFS shall suggest those RPAs that it believes would not violate subsection (a)(2), and can be taken by the Federal agency or applicant in implementing the agency action.

The process of developing a biological opinion and, when necessary, RPAs, is referred to as the consultation process, because the action agency consults with the relevant wildlife agency (either FWS or NMFS). The wildlife agencies have adopted joint consultation regulations, 50 C.F.R. pt. 402, that have the force of law and implement the consultation process. Additionally, they developed the *Endangered Species Consultation Handbook*, which provides guidance to both action agencies and wildlife agencies respecting the consultation process.

At the heart of the consultation process is the "effects analysis." In the effects analysis, the wildlife agency must first evaluate and describe the status of the species and environmental baseline. It then evaluates and describes the effects of the proposed action and issues a jeopardy and adverse modification determination. Distinguishing between the environmental baseline and

the effects of the proposed action is critical for both the jeopardy and adverse modification determinations, and the crafting of any subsequent RPA measures. The core components of the effects analysis are described in section 1, below. Section 2 includes a description of the process for developing RPAs. Section 3 includes a description of the scientific standards that the wildlife agencies must employ when completing an effects analysis and developing RPAs.

1. ESSENTIAL COMPONENTS OF THE EFFECTS ANALYSIS

A. Evaluate and describe status of species and environmental baseline

The first component of the effects analysis is the evaluation and description of the status of the species and the environmental baseline. The joint consultation regulations provide that one of the responsibilities of the Service during consultation is to “[e]valuate the current status of the listed species or critical habitat...” 50 C.F.R. § 402.14(g)(2). The Endangered Species Consultation Handbook describes the status of the species as a “section” of the biological opinion that “presents the biological or ecological information relevant to formulating the biological opinion [including] information on the species' life history, its habitat and distribution, and other data on factors necessary to its survival...” *Endangered Species Consultation Handbook* at p. 4-19. It goes on to state that “[t]his analysis documents the effects of all past human and natural activities or events that have led to the current status of the species.” *Id.*

The joint consultation regulations define the environmental baseline to include “the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process.” 50 C.F.R. § 402.02. The Endangered Species Consultation Handbook describes the environmental baseline as a “section” of the biological opinion that “is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat (including designated critical habitat), and ecosystem, within the action area.” *Endangered Species Consultation Handbook* at p. 4-22. The Handbook goes on to state that the environmental baseline “does not include the effects of the action under review in the consultation.” *Id.* In other words, the status of the species and environmental baseline describe the condition of the species and its habitat in the absence of the proposed action. Generally, the status or condition of the species and its habitat is degraded, and often highly degraded, even absent the proposed action; otherwise, the species would not be listed.

B. Evaluate and describe effects of the action

The second component of the effects analysis is the evaluation and description of the effects of the action. The joint consultation regulations define the effects of the action as “the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline.” 50 C.F.R. § 402.02. If an effect would occur whether or not the action takes place, it is not an effect of the action. *Endangered Species Consultation Handbook* at p. 4-

27. *Accord* 51 Fed. Reg. 19,926, 19,932 (June 3, 1986) (preamble to final rule establishing the joint consultation regulations). In other words, the only harm to the species that can be characterized properly as an effect of a proposed action is harm that is caused by that action.

Effects of the action are described in the joint consultation regulations to include (1) direct effects, (2) indirect effects, (3) effects of interrelated actions, and (4) effects of interdependent actions. Direct effects are the “direct or immediate effects of the project on the species or its habitat.” *Endangered Species Consultation Handbook* at p. 4-25. Indirect effects are “those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.” 50 C.F.R. § 402.02. “Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.” *Id.* To determine whether effects on the species or its habitat are effects of the action (*i.e.*, direct or indirect effects, or effects of interrelated or interdependent actions), the wildlife agency must apply a “but for” test. *Endangered Species Consultation Handbook* at p. 4-26. As the Consultation Handbook explains, the biologist should ask whether the activity in question (and resulting effects) would occur “but for” the proposed action. *Id.* This is an alternative way of asking whether the harm to the species is caused by the proposed action.

C. Make jeopardy and adverse modification determinations by analyzing the effects of the action in the context of the environmental baseline

A third component of the effects analysis includes two subparts: an analysis and determination of jeopardy, and an analysis and determination of adverse modification. For both of these, the wildlife agency must consider the effects of the action in the context of other existing human activities that impact the listed species. *National Wildlife Federation v. State of Idaho*, 524 F.3d 917, 930 (9th Cir. 2008).

1. *Jeopardy analysis and determination*

To determine whether an action is likely to jeopardize the continued existence of a species, the wildlife agency must consider the effects of the action in light of the environmental baseline and cumulative effects of other anticipated actions. Pursuant to the joint consultation regulations, an action is likely to jeopardize the continued existence of a species if it “reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.” 50 C.F.R. § 402.02.

The United States Court of Appeals for the Ninth Circuit has interpreted the requirement to conduct a jeopardy analysis leading to a jeopardy determination:

To “jeopardize” -- the action ESA prohibits -- means to “expose to loss or injury” or to “imperil.” Either of these implies causation, and thus some new risk of harm. Likewise, the suffix “-ize” in “jeopardize” indicates some active change of

status.... Agency action can only “jeopardize” a species’ existence if that agency action causes some deterioration in the species’ pre-action condition.

* * *

[A]n agency only “jeopardize[s]” a species if it causes some new jeopardy. An agency may still take action that removes a species from jeopardy entirely, or that lessens the degree of jeopardy. However, an agency may not take action that will tip a species from a state of precarious survival into a state of likely extinction. Likewise, even where baseline conditions already jeopardize a species, an agency may not take action that deepens the jeopardy by causing additional harm.

National Wildlife Federation, 524 F.3d at 930. The jeopardy determination is made in light of the status of the species and environmental baseline. But even if the status of the species is highly degraded, an action that affects the species will not automatically result in jeopardy. Instead, in such circumstances, a jeopardy determination is only appropriate if the action itself causes appreciable, additional harm to the species.

Appreciable, additional harm to a species encompasses harm that would reduce the likelihood of survival or recovery of the species. *See* 50 C.F.R. § 402.02 (definition of “jeopardize the continued existence of”). The wildlife agency cannot avoid consideration of impacts to recovery of the species when evaluating the proposed action. *National Wildlife Federation*, 524 F.3d at 932. Instead, the wildlife agency must determine that the chances of recovery are not appreciably diminished. *Salmon Spawning & Recovery Alliance v. Nat’l Marine Fisheries Serv.*, 2009 WL 2487917 (9th Cir. Aug. 14, 2009) (“Ultimately, the [proposed action] need not boost the [listed species’] chances of recovery; NMFS must only determine those chances are not ‘appreciably’ diminished by [that action].”). That said, ***the harm must be to the chances of survival or recovery of the species as a whole***. In some cases harm to individual members of a species may constitute appreciable, additional harm; in other cases, it may not. But the harm must have discernible population-level effects to be considered appreciable.

2. *Adverse modification analysis and determination*

As with the jeopardy analysis and determination, to determine whether an action is likely to result in destruction or adverse modification of critical habitat, the wildlife agency must consider the effects of the action in light of the environmental baseline and cumulative effects of other anticipated actions. Pursuant to the joint consultation regulations, destruction or adverse modification means “a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.” 50 C.F.R. § 402.02.

The focus of the adverse modification analysis is on the effects of the action on “those physical and biological features essential to the conservation of listed species that may require special management considerations or protection.” *Endangered Species Consultation Handbook* at p. 4-

39. The threshold for an affirmative adverse modification determination is whether the action would “appreciably diminish the value of constituent elements [(i.e., physical and biological features)] essential to the species’ conservation...” *Id.* The phrase “result in” in section 7(a)(2) clarifies that an adverse modification determination can only be made if the proposed action causes appreciable additional harm to or deterioration of critical habitat by diminishing the value of constituent elements essential to the conservation of the species.

Appreciable diminishment of the value of constituent elements of habitat encompasses diminishment that would reduce the likelihood of survival or recovery of the species. *See Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, 378 F.3d 1059, 1070 (9th Cir. 2004), amended by 387 F.3d 968 (9th Cir. 2004) (“Congress said that ‘destruction or adverse modification’ could occur when sufficient critical habitat is lost so as to threaten a species’ recovery even if there remains sufficient critical habitat for the species’ survival.”). The harm to habitat must affect the likelihood of survival or recovery of the species as a whole.

2. IDENTIFICATION AND DEVELOPMENT OF RPAS

If a wildlife agency makes a jeopardy/adverse modification determination, it then has an obligation to identify reasonable and prudent alternatives that would not violate section 7(a)(2), unless no such alternatives exist. 16 U.S.C. § 1536(b)(3)(A). The Joint Consultation Regulations define reasonable and prudent alternatives as:

- alternatives that the Director believes would avoid the likelihood of jeopardy or adverse modification of critical habitat;
- alternatives that can be implemented in a manner consistent with the intended purpose of the action;
- alternatives that can be implemented consistent with the scope of the action agency’s legal authority and jurisdiction; and
- alternatives that are economically and technologically feasible.

50 C.F.R. § 402.02.

The purpose of RPAs is to allow the proposed action to proceed and to avoid the likelihood of jeopardy or adverse modification of critical habitat, which would violate section 7(a)(2). To avoid jeopardy or adverse modification, the wildlife agency must only lessen the harm attributable to the proposed action. It is not required to avoid the likelihood of jeopardy or adverse modification attributable to the species’ baseline. Thus, ***in order to identify RPAs, the wildlife agency must be able to clearly distinguish between the effects of the proposed action and all other effects, including effects attributable to the environmental baseline.*** Measures that address harm that would occur (even) in the absence of the proposed project are not required under the ESA.

When choosing among multiple RPAs that would not violate section 7(a)(2), the wildlife agency has broad discretion. *Southwest Center for Biological Diversity v. United States Bureau of Reclamation*, 143 F.3d 515, 523 (9th Cir. 1998). The agency need not choose the most

protective reasonable and prudent alternatives. *Id.* (The Service is “not even required to pick the best alternative or the one that would most effectively protect the [listed species] from jeopardy.”). Instead, the criteria that the wildlife agency must meet are those set forth in the ESA and the joint consultation regulations. In other words, the key criterion is whether the wildlife agency believes that the RPAs will not violate section 7(a)(2) of the ESA. Nonetheless, the Service must act consistent with the Administrative Procedure Act, which forbids agency action that is “arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.” 5 U.S.C. § 706(2)(A). In light of the APA, if the Service selects RPAs that fulfill the key criterion, but do so at a cost that is substantially higher than an alternative that also fulfills that criterion, such conduct would run afoul of the APA.

3. SCIENTIFIC STANDARDS DURING CONSULTATION

Section 7(a)(2) states that “[i]n fulfilling the requirements of this paragraph each agency shall use the best scientific and commercial data available.” 16 U.S.C. 1536(a)(2). The purpose of this requirement “is to ensure that the ESA not be implemented haphazardly, on the basis of speculation or surmise.” *Bennett v. Spear*, 520 U.S. 154, 176 (1997). The best scientific and commercial data available standard was first enacted into law in 1969 with the passage of a predecessor to the ESA, namely, the Endangered Species Conservation Act. Pub. L. No. 91-135, 83 Stat. 275 (1969) (repealed 1981). The Endangered Species Conservation Act applied the standard to listing decisions. Unfortunately, there is no legislative history that explains Congress’ intent when it inserted the standard. Since then, Congress has applied the standard to other decisions under the ESA, including those respecting interagency consultation.

The wildlife agencies issued a joint policy statement in 1994 “to provide criteria, establish procedures, and provide guidance to ensure that decisions made by the Services under the authority of the [ESA] represent the best scientific and commercial data available.” 59 Fed. Reg. 34,271 (July 1, 1994). The statement provides that it is the policy of the wildlife agencies to:

evaluate all scientific and other information that will be used... to prepare biological opinions, incidental take statements, and biological assessments[.]

* * *

ensure that any information used by the Services to implement the Act is reliable, credible, and represents the best scientific and commercial data available[.]

* * *

gather and impartially evaluate biological, ecological, and other information that disputes official positions, decisions, and actions proposed or taken by the Services during their implementation of the Act[, and]

* * *

require biologists to document their evaluation of information that supports or does not support a position being proposed as an official agency position on a[n]... interagency consultation...

Id. The scientific standard set forth in the ESA, as interpreted by the wildlife agencies, requires those agencies to both gather and evaluate relevant data and analyses. The process of gathering data and analyses must be comprehensive so that relevant information is actually available for consideration. And, the process of evaluating data and analyses must be rigorous. But, the term science as used in the statute and referenced in the Fish and Wildlife Service's section 7 handbook is not synonymous with the definition that scientists use. Scientists recognize science as a process, not a product or an outcome, as is suggested by the use of the term in agency regulations and guidance. Rather than referring to the process of data gathering and communication of methods, analyses, and results, science -- in the view of the agency personnel who implement the ESA -- often is technical information itself, or the professional judgment of scientists using that information. The wildlife agencies have no explicit protocol that they use to either identify the best scientific data or analyses, or to differentiate between information that may have superior value to other data or analyses in addressing the effects of an action or determining an environmental baseline.

It is clear, however, that simply citing, acknowledging, or referencing available technical information does not satisfy the obligation to use the "best available data." The wildlife agencies, in the *Endangered Species Consultation Handbook*, direct themselves to carry out "a detailed discussion of the effects of the action on listed species or critical habitat" -- an effects analysis -- which provides the basis for the identification and specification of RPAs. That directive acknowledges the need to interpret and apply pertinent data and analyses that are available from the published scientific literature and other reliable sources. To meet the best available data requirement, the translation and application of information from primary sources should involve the judgment of professional scientists who are best able to review and synthesize analyses of existing data then translate their work into the resource management context.

Despite the lack of explicit guidance to or by the wildlife agencies in carrying out effects analyses, it is important to note that the complex process of analyzing the effects of the action is itself a scientific undertaking, directly analogous to risk assessment -- described in the work of a prior NRC committee as providing the "primary scientific rationale for informing regulations that will have national and global impact" and, which should address "issues of costs, benefits, and risk-risk trade offs." *Science and Decisions: Advancing Risk Assessment* p. 3 (National Academies Press 2009). Like risk assessment, effects analysis requires the agencies to address a series of salient questions that scientific data can help to inform -- what is the nature and magnitude of risk associated with existing conditions, what benefits are associated with alternative management response options, what significant uncertainties accompany the current understanding of the environmental baseline and the effects of the action, and what are the attendant benefits and costs that accompany potential RPAs? Often times, biological opinions fail to explicitly address these questions, and, as a result, interested stakeholders cannot determine whether such questions were even considered.

In cases where a biological opinion is transparent in presenting the scientific basis for its RPAs, whether and to what extent they are supported by existing science can be assessed. In a prior report, the NRC suggests that the criteria for assessing the scientific basis of a management response to a species in decline should include:

- The extent of data available.
- Whether the available data had been generated according to standard scientific methods that included, where feasible, empirical testing.
- Whether those methods were sufficiently documented to allow others to repeat them and whether and to what extent they had been replicated.
- Whether either the data or the methods used had been published in documents made freely available to other researchers and the public to facilitate criticism or correction and whether they had been peer reviewed.
- Whether the data were consistent with accepted understanding of how the ecosystem(s) function and whether they were explained by a coherent theory or model of the system.
- Whether the management decisions were publicly explained with clear reference to supporting data, models, and theories so that the rationale for the decisions was apparent and open to challenge by stakeholders.

Endangered and Threatened Species of the Platte River p. 98 (National Academies Press 2005). The criteria articulated by the NRC are consistent with the joint policy statement of the wildlife agencies and provide an appropriate set of benchmarks against which biological opinions should be measured.

4. CONCLUSION

We appreciate the willingness of the Committee to take on a difficult task in a compressed time frame in a charged environment with so much at stake. We urge you to be mindful of the legal/regulatory environment within which the wildlife agencies are operating both as you assess their actions to date and as you endeavor to formulate alternative actions. We would be pleased to provide you with further input in the event you believe it would prove helpful.