Covered Fish Species-Level Biological Goals and Objectives

The following summarizes BDCP species-level goals and objectives for covered fish species. These goals and objectives are currently being refined in accordance with science advisor recommendations, as described below.

Background information is provided on the following:

1. purpose of biological goals and objectives, within the context of BDCP;
2. logic chain approach;
3. framework for structuring the species-level goals and objectives;
4. relation to landscape and natural community goals and objectives;
5. use of conceptual models in articulating goals and objectives for each species;
6. relation to adaptive management; and
7. role of the science advisors.

Following the background information, species level goals and objectives for each fish species are presented, along with the rationale for the goals and objectives. Information is also provided on the conservation strategy and it's linkage to the goals and objectives. Details on conceptual models and other supporting information are provided as attachments.

Background

Preliminary BDCP biological goals and objectives (BGOs) for covered fish species were developed in 2007. These BGOs were refined in 2010 in accordance with the Logic Chain approach through extensive Logic Chain workgroup meetings, two independent science review panel reviews and a two-day workshop in October 2010. An incomplete set of revised draft BGOs reflecting this work were presented in the November 18, 2010, BDCP Working Draft. In April 2011, a group of science advisors was convened to help in completing BGOs for covered fish species. The advisors produced draft recommendations for three species (Sacramento splittail, winter-run Chinook salmon, and Delta smelt) in June 2011. Based on the science advisor's recommendations, refined BGOs have been developed for all 11 covered fish species. A similar but independent process is occurring to refine the BGOs for the non-fish covered species (sometimes referred to as the "terrestrial species BGOs").

The Role of Biological Goals and Objectives

The purpose of BGOs for the BDCP is to express the intended biological outcomes of the Plan and serve as benchmarks for evaluating BDCP performance. The BGOs are intended to be measurable, attainable and relate directly to the BDCP conservation measures. Biological goals serve to guide development of the conservation strategy and describe the desired future conditions of the Plan Area. The conservation measures may also help shape the goals and objectives. When possible, biological objectives are quantitative and state a timeframe.

Biological objectives guide the development of metrics to measure progress in meeting goals and help inform the monitoring and adaptive management program. During plan implementation, if monitoring data or other scientific information suggests that progress is not being made towards the biological objectives, decisions will be made whether and how to either refine the monitoring program, refine conservation measures, refine conceptual models (including hypotheses on the models are based),

refine the biological objectives, or a combination of these outcomes, in the context of the BDCP adaptive management and monitoring programs.

The Logic Chain

The species-level BGOs presented herein reflect the Logic Chain approach developed for BDCP and reviewed by two independent science panels. Under the Logic Chain approach, BDCP goals and objectives are informed by global goals and objectives (as provided by the resource agencies), but are framed to reflect what is achievable within the context of BDCP. The Logic Chain approach explicitly focuses on select stressors that the BDCP intends to address and outlines the scientific understanding behind why the conservation strategy (and associated conservation measures) is expected to achieve the BGOs.

Framework for Species-Level Goals and Objectives

In the context of the BDCP, biological goals are framed as measures of species response that are conceptually linked to more specific objectives and conservation measures. However, due to the complexities of biological responses and limitations in our current scientific understanding, ability to determine causation, or ability to monitor effects, it is difficult in many cases to directly link conservation measures to species response and hence to biological goals.

Biological objectives are intended to be quantifiable and measurable targets that relate directly to conservation measures. Examples include acres of floodplain habitat restored, decreases in entrainment and increases in food sources for covered fish species, such as zooplankton. Based on the available scientific information, changes in the environment measured by the habitat objectives are expected to lead to an improved biological response from the target species. These expectations reflect conceptual and quantitative models of the relationship between environmental conditions and species response that are incorporated in the effects analysis. These models will be tested and refined through experimentation and adaptive management over the life of the BDCP.

Landscape and Natural Community Goals and Objectives

While the focus here is at the species level, the BDCP planning framework also includes landscape- and natural community-level goals and objectives that are important components of the overall conservation strategy. Landscape- and natural community-level goals and objectives are intended to operate at the higher spatial scale and to benefit multiple covered species. Although, landscape- and natural community-level goals and objectives are not addressed herein, they were reviewed and considered when developing the species-level goals and objectives to ensure that goals and objectives are consistent at all levels. Landscape- and natural community-level goals and objectives are described within Chapter 3 of the Plan, the same chapter where the BGOs will be presented.

Conceptual Models and Adaptive Management

Many environmental variables (temperature, salinity, dissolved oxygen, etc.) have the potential to affect a specific species' response (growth, abundance, distribution, etc.). The BGOs presented herein reflect the best available science for predicting a species' response to a given environmental variable. However, our understanding of species' requirements, life history, and environmental response is in

many cases limited and continues to change. In order to provide the flexibility to incorporate new and changing information, a "conceptual model" reflecting our current state of knowledge is outlined for each species.

The conceptual model reflects a set of scientific theories, principles, and assumptions that describe how a species will likely respond to different environmental variables. For the BDCP, conceptual life history models developed as part of the Delta Regional Ecosystem Restoration Implementation Planning (DRERIP) process are used which provide life stage transition probability diagrams and supporting text that describe the assumptions behind each environmental variable/species response relationship. The conceptual models are used in a number of different ways. They provide the rationale for the species-specific BGOs and guide how the biological effects analysis is organized and displayed. They are also useful in determining which environmental and species response variables to monitor in order to track BDCP compliance and effectiveness. Perhaps, most importantly, the conceptual models will be used in the adaptive management process.

The conceptual models will be a very important part of the adaptive management program. The conceptual models will be used by BDCP to interpret monitoring data and make assumptions about the relative success of a BDCP action. If a conceptual model proves incorrect, it can be updated to reflect the best available science and as appropriate management actions can be adjusted to maintain permit compliance.

Role of Science Advisors

In refining the draft BGOs presented herein, we have consulted the science advisors and other technical experts for clarifications, review, and input. However, the work presented herein reflects that of the BDCP consulting team and does not represent a product of the science advisors.