

Remaining uncertainties in the ROConLTO BA

Key categories of uncertainty:

1. **Modeling of PA that is inconsistent with narrative of PA** makes effects analyses difficult.

Example: Difficult to analyze effects of the PA when modeled flows and temperatures do not incorporate Shasta Dam Raise or the recently-modified Fall X2 PA component. Relative to modeled results in the PA scenario, NMFS predicts that actual operations under the PA would result in the following qualitative changes, which could affect species responses to the PA:

- Lower winter and spring flows (due to greater Shasta capacity with Shasta Dam Raise)
 - Cooler temperatures in summer and early fall (due to potential for larger cold water pool with greater Shasta capacity with Shasta Dam Raise; depends on operations and TCD modifications on the raised dam); may be offset after Above Normal and Wet years because of recently-modified Fall X2 PA component.
 - Higher fall flows in the Sacramento River, Feather River, and/or American River (depending on source of reservoir releases) and Delta in Above Normal and Wet years (due to recently-modified Fall X2 PA component)
 - Lower storages in Shasta, Oroville and/or Folsom reservoirs (depending on source of reservoir releases) in years following Above Normal and Wet years (due to recently-modified Fall X2 PA component); may be offset for Shasta Reservoir because of Shasta Dam Raise component.
2. **Site-specific PA components that are poorly defined** makes it difficult to conduct an effects analysis, let alone assign take or include those PA components in any meaningful way in our jeopardy analysis.

Example that is easy to resolve:

- a. Bay-Delta – San Joaquin Basin Steelhead Telemetry Study: While the BA describes this with a single sentence, can be addressed programmatically by assuming that the study design will be similar to previous studies.

Examples that are hardest to resolve:

- a. Bay-Delta – Tracy Fish Collection Facility and Bay-Delta – Skinner Fish Facility: The operations of these massive sampling facilities are described in less than a page on p. 4-55 of the PA, with minimally more information in Appendix A (see p. A-107 for Skinner and p. A-109 to A-110 for Tracy). NMFS has been shown standard operating procedures for the salvaging process, yet Reclamation and

DWR refuse to officially provide those procedures. NMFS does note that excellent information on take at both facilities is available.

3. **Programmatic PA components (most are conservation measures) that are poorly defined and lack a clear adaptive management process.** This uncertainty makes it difficult to conduct an effects analysis, which makes it difficult to include those PA components in any meaningful way in our jeopardy analysis.

Examples that are easiest to resolve:

- a. Upper Sacramento – Spawning and Rearing Habitat Restoration: Can be addressed programmatically by assuming that the projects will be implemented according to the completed consultations on the Upper Sacramento River Anadromous Fish Habitat Restoration Programmatic (WCR-2015-2725) or NOAA Restoration Center’s Program to Facilitate Implementation of Restoration Projects in the Central Valley of California (WCR-2017-8532).
- b. American River – Spawning and Rearing Habitat Restoration and Stanislaus – Spawning and Rearing Habitat Restoration: Can be addressed programmatically by assuming that the projects will be implemented according to the completed consultation on NOAA Restoration Center’s Program to Facilitate Implementation of Restoration Projects in the Central Valley of California (WCR-2017-8532).
- c. Bay-Delta – Tidal Habitat Restoration: Can be addressed programmatically by assuming that the projects will be implemented according to the completed consultation on
- d. Bay-Delta – Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project: Can be addressed programmatically by assuming that the projects will be implemented according to the completed consultation on

Examples that are hardest to resolve:

These PA components either have no or limited precedent, or have so many precedents that there are no obvious assumptions to be made.

- a. Upper Sacramento – Cold Water Management Tools
- b. Upper Sacramento – Winter-run Conservation Hatchery Production
- c. Upper Sacramento – Adult Rescue
- d. Upper Sacramento – Juvenile Trap and Haul
- e. Many of the Bay-Delta conservation measures