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

4. **Assumed changes to regulations or agreements not within Reclamation's discretion.** This category includes assumptions about regulatory requirements that are not reasonably certain to occur. In general, NMFS will analyze the effects as proposed but will note the

speculativeness of these PA components and the potential for reinitiation if eventual regulatory requirements lead to effects outside the range of effects analyzed..

Examples:

a. Vernalis flows in D-1641: Modeling for the COS scenario assumes only the February through June "base flow" requirements at Vernalis, and does not implement the October and spring pulse flows at Vernalis in D-1641. Modeling for the PA scenario does not assume any Vernalis flow standard at any time of the year; Vernalis flows are simply the results of upstream contributions, including the New Melones Stepped Release Plan proposed for Stanislaus River Operations.

   Because of the SWRCB's efforts to update the Bay Delta Water Quality Control Plan, there is uncertainty about what Vernalis flow requirements will be come January 2020. NMFS will analyze the effects as modeled, but will note that the assumptions in the COS scenario are based on Reclamation's legal position re: Vernalis flows and will note that assumption in the PA that there is no Vernalis flow requirement is speculative with regard to the SWRCB proceeding. Reinitiation may be warranted if eventual Vernalis or San Joaquin River flow requirements lead to effects outside the range of effects analyzed.

b. Vernalis Electrical Conductivity (EC) in D-1641: Modeling for the COS assumes the Vernalis EC standards in D-1641. Modeling for the PA scenario does not assume any Vernalis EC standard; Vernalis EC is simply the result of upstream contributions, including the New Melones Stepped Release Plan proposed for Stanislaus River Operations.

   Because of the SWRCB's efforts to update the Bay Delta Water Quality Control Plan, there is uncertainty about what Vernalis EC requirements will be come January 2020. NMFS will analyze the effects as modeled, but will note that the assumption in the PA that there is no Vernalis EC requirement is speculative with regard to the SWRCB proceeding. Reinitiation may be warranted if eventual Vernalis EC requirements lead to effects outside the range of effects analyzed.

c. Ripon Dissolved Oxygen (DO) standard in D-1422: Modeling for the COS and PA do not differ, but one component of the PA is to shift the compliance location for the DO Standard (in D-1422) about 30 river miles upstream (from Ripon to Orange Blossom Bridge) during the summer.

d. "1987 Agreement" between Reclamation and (then) California Department of Fish and Game: Modeling assumptions include the "1987 Agreement" as a factor in the COS scenario (though the modeling assumes that the Appendix 2-E flows from the 2009 BiOp satisfy the "1987 Agreement"). In the PA scenario, it is

assumed that the New Melones Stepped Release Plan supersedes the “1987 Agreement”.