

ROC on LTO
Action Uncertainties for Adaptive Management
DRAFT March 20, 2019

1. Shasta Cold Water Temperature Management
 - a. Development of temperature dependent mortality objectives for differing hydrology that show a positive trend in the life cycle model.
 - b. Cold Water Management Tools: Testing alternatives for for building storage, seasonal forecasting of hydrology and temperatures, and application of Deas and SWFSC models to seasonal decision making
 - c. Tier 2 and Tier 2 Management: Application of the Anderson Model
 - d. Tier 4: Intervention Strategies
 - i. Expanded use of the Livingston Stone
 - ii. Adult and Juvenile trap and haul
 - iii. Development and testing of dynamic fish allocation strategy for different years (eg. Battle Creek vs, mainstem, versus hatchery)
 - e. See draft Shasta Science plan Sawyer and Israel for more specific management questions and objectives

2. Operations with Shasta Dam Raise
 - a. Flow changes that could affect the location, frequency, duration and magnitude of floodplain inundation and Delta inflow and outflow
 - b. How the future operations may affect 4 tiers of Cold Water Pool Management
 - c. CVP/SWP Reoperations in the Delta due to increased upstream storage.

3. Per CAMT SST report and related efforts on south delta hydrodynamics: Continued development of hydrodynamics, behavior response models through ePTM, acoustic tagging, and synthesis reports (e.g. completion of the 6 year steelhead report). Completion of CAMT science plan and funding of priority science related to project operations. Focus on mechanisms and development of decision support tools (e.g. alternative metrics) to optimize juvenile survival in South Delta and emigration from the San Joaquin River.

4. OMR and other real-time operations in Delta:
 - a. Development and use of population-based triggers for steelhead and spring-run
 - b. Effects of WIIN storm flexible operations on listed fish
 - c. Continued development of alternatives or supplemental to length at date criteria, and integration of genetics
 - d. SAIL implementation
 - e. Completion of ITAG/acoustic array and supplementation of real-time acoustic receivers in Central and South delta
 - f.

5. Bay-Delta Habitat Restoration, Effectiveness and Biological Response

6. Effectiveness of alternative approaches to predator management in south Delta at hot spots, or during specific times of migration
7. Fall X2 integration with salmonid survival and behavior in Delta and upstream storage
8. Operations of Tracy and Skinner Fish Facilities: No defined operational procedures
9. Continued development of SWFSC life cycle model for support of structured decision making and scenario planning
10. DCC, HORB and Georgiana Slough: Continued research into optimal gate operations and integration of experimental Georgiana Slough barrier with flexible south Delta operations.
11. Nimbus: Adaptive management around brood stock selection, release locations and other hatchery practices, per HGMP.