From: Barbara Byrne - NOAA Federal <barbara.byrne@noaa.gov>
Sent: Tuesday, June 11, 2019 1:16 PM
To: Amanda Cranford
Cc: J. Stuart; Garwin Yip - NOAA Federal
Subject: SJ steelhead discussion

Amanda, I learned from Dave Mooney this morning that you would be having a discussion this afternoon with Mike Beakes and Alison Collins about some ideas for monitoring SJ steelhead.

FYI, here are some relevant excerpts from the BA and draft BiOp re: an already-proposed conservation measure related to SJ steelhead:

From p. 4-63 of the 4/30/19 revised PA chapter of the BA with tracked changes: "*San Joaquin Basin Steelhead Telemetry Study:* Continuation of the 6-Year Steelhead telemetry study for the migration and survival of San Joaquin Origin Central Valley Steelhead." No further description provided in the PA chapter.

From p. 132-134 of V15 Master Delta effects section in our draft BiOp (ignore section numbering, which updated upon pasting):

"**1.1.1.1.1.1.1 San Joaquin Basin Steelhead Telemetry Study**

1.1.1.1.1.1.1.1 Physical Description of the San Joaquin Basin Steelhead Telemetry Study

Salmonids in the San Joaquin River basin were once abundant and widely distributed, but currently face numerous limiting factors. The NMFS Central Valley Recovery Plan identified that 'Very High' stressors for juvenile CCV steelhead outmigration on the San Joaquin River include habitat availability, changes in hydrology, water temperature, reverse flow conditions, contaminants, habitat degradation, and entrainment (National Marine Fisheries Service 2014). The impacts of these stressors can be studied using acoustic telemetry, and an updated conceptual model, developed by the South Delta Salmonid Research Collaborative (SDSRC) demonstrates how experimental variables of interest to the 6-Year Study (i.e. Delta water operations, tributary water operations, and habitat) are influential in survival and behavior of emigrating smolts. This conceptual model has guided specific hypotheses and investigations of the 6-Year Study.

Reclamation conducted a 6-year steelhead telemetry study on the Stanislaus River (2011-2016) and is proposing to continue an acoustic tagging study on the San Joaquin River to determine entrainment of San Joaquin River origin CCV steelhead into the Tracy and Jones Pumping Plants. The Stanislaus River Research and Monitoring Program is the most comprehensive and longest running salmon and steelhead monitoring programs in California's San Joaquin Basin, although data are not publicly available. Initiated by FISHBIO personnel in 1993 for the Oakdale and South San Joaquin irrigation districts and Tri-Dam Project, the program's suite of ongoing monitoring activities tracks the abundance, distribution, migration characteristics, and habitat use of salmon and steelhead.

1.1.1.1.1.1.1.2 Deconstruct the Action - San Joaquin Basin Steelhead Telemetry Study

Reclamation proposes to continue the 6-year steelhead telemetry study for the migration and survival of San Joaquin origin CCV steelhead. The PA component incorporates information from the Salmonid Scoping Team and the 6-year steelhead telemetry study to update protections for San Joaquin origin CCV steelhead, continuing the telemetry studies to further refine measures for protecting CCV steelhead. Details of the environmental

parameters to be manipulated during the proposed study have not been provided. NMFS assumes that they will be determined during the study development and that the study will be designed to fit within the proposed operations.

NMFS assumes that hatchery steelhead would be used for the San Joaquin steelhead telemetry study under the PA, which was not specified in the description for this PA component. Reclamation proposes to insert acoustic tags into juvenile (assumed to be hatchery) steelhead to track them as they move through the south Delta. Acoustic arrays would monitor their presence. This study would help fill a gap in knowledge related to the survival of CCV steelhead originating in the San Joaquin River basin. If Reclamation uses hatchery juvenile steelhead for its acoustic telemetry study and export operations do not differ from the proposed PA, this study will be covered for incidental take under this consultation.

However, the details of the acoustic telemetry study were not provided in the PA description. If natural origin CCV steelhead are proposed to be used for the study fish, or if operations of the exports differ from what has been proposed for the PA, then this PA component will be considered as a programmatic consultation.

1.1.1.1.1.1.1.3 Assess Species Exposure and Response to the San Joaquin Basin Steelhead Telemetry Study

Wild CCV steelhead and fish species may be affected by hatchery releases, as they would compete for food resources and rearing habitat. However, it is expected that the number of tagged fish would be low compared to the number of wild fish present in the system. Furthermore, the overall survival of tagged fish returning from the ocean as adults to spawn is considered to be very low, thus minimizing the effects of hatchery steelhead straying into the system as a result of the study implementation. The specifics of the proposed telemetry study, including the number of acoustic tagged fish and release timing were not provided in the ROC on LTO BA.

1.1.1.1.1.1.1.4 Risk to CCV steelhead

NMFS assumes that attributes of the proposed 6-year study would be similar to the previous study, including sample size, source of tagged hatchery fish, tagging methods, transport, and release timing. The continuation of the steelhead telemetry study will provide important information about the response of fish migration to flows, exports, and other stressors in the San Joaquin River corridor. NMFS also assumes that the study would continue to assess the relationship of exports to flow, route selection at channel bifurcations in the South Delta and mainstem San Joaquin River, survival in the different channels reaches of the South Delta, and ultimately, survival through the Delta to Chipps Island as a whole.

An important aspect of the analysis for CCV steelhead concerns the status of the Southern Sierra Nevada Diversity Group, which is critical to preserving spatial structure of the CCV steelhead DPS. This diversity group, consisting of extant populations in the Calaveras, Stanislaus, Tuolumne, Merced and upper mainstem San Joaquin rivers, is very unstable due to the poor status of each population. This status is due to both project-related and non-project related stressors.

The steelhead telemetry experiment should improve our knowledge base for future consultations. The long-term viability of the Southern Sierra Nevada Diversity Group is expected to depend not only on the continued implementation of the terms and conditions contained within this consultation, but also on actions outside this consultation, most significantly increasing flows in the Tuolumne and Merced rivers.

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