

Consideration of a Proposed Resolution to Approve the Draft Final Initial Biological Goals

*for the Lower San Joaquin River Flow Objectives
Bay-Delta Plan Implementation*



Division of Water Rights, September 6, 2023, Item #6

Agenda

- Introduction
- Staff Presentation
 - Background
 - Principles for the Development of Biological Goals
 - Biological Goals
- Public Comments
- Closing

Background

- Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta (Bay-Delta Plan)
- 2018 Update – Lower San Joaquin River (LSJR) Flows
 - **February–June:** narrative & numeric objectives
 - **Tributary Flows:** 40 percent of unimpaired flow, adaptive range of 30–50 percent, from each of the Stanislaus, Tuolumne, and Merced Rivers
 - **Minimum Base Flow:** 1,000 cfs, adaptive range of 800–1,200 cfs on LSJR at Vernalis
- Program of Implementation for LSJR flows
 - Stanislaus, Tuolumne, and Merced Working Group
 - Biological Goals

Background

- 2018 Bay-Delta Plan requires biological goals for LSJR salmonids
- Biological Goals
 - Quantitative metrics to assess progress toward achieving fish narrative objectives, including complementary activities in the watershed, e.g., hatchery reforms, habitat restoration, or predator reduction
 - Used to inform: adaptive methods, San Joaquin River Monitoring and Evaluation Program, evaluation of effectiveness of program of implementation, and future changes to Bay-Delta Plan
 - Biological Goals not intended to assess water right holders' compliance with the Bay-Delta Plan
- Stanislaus, Tuolumne, and Merced (STM) Working Group
 - STM Working Group established to assist with the implementation, monitoring, and effectiveness assessment of LSJR flows
 - Board will seek recommendations on biological goals from STM and others
 - Four STM Working Group meetings from November 2022–April 2023

Background – STM Working Group

- California Department of Fish & Wildlife
- Central Sierra Environmental Resource Center
- Department of the Interior, US Bureau of Reclamation
- Merced Irrigation District
- Merced River Conservation Committee
- Modesto Irrigation District
- National Marine Fisheries Service
- Oakdale Irrigation District
- San Francisco Baykeeper
- San Francisco Public Utilities Commission
- Santa Rosa Rancheria Tachi Yokut Tribe
- South San Joaquin Irrigation District
- Stanford University
- State Water Board
- Stockton East Water District
- The Nature Conservancy
- Tuolumne County Water Agency
- Tuolumne Utilities District
- Turlock Irrigation District
- US Fish & Wildlife Service
- Unaffiliated – William Martin
- Unaffiliated – Richard Morat
- Valley Water

Background – Public Participation

- 2019 – Independent Science Advisory Panel
- 2019 – Draft Biological Goals released for public comment
- 2022 – Revised Draft Initial Biological Goals released for public comment
 - August 2022 Technical Workshop
 - November 2022 STM Working Group Meeting
 - December 2022 STM Working Group Meeting
 - March 2023 STM Working Group Meeting
- April 2023 – 2nd Revised Draft Initial Biological Goals released for public comment
 - April 2023 STM Working Group Meeting
 - May 2023 Board Workshop
- August 2023 – Draft Final Initial Biological Goals released for public review

Principles for the Development of Biological Goals

- Science-based
- Existing legal requirements (Central Valley Project Improvement Act, Fish and Game Code, and Bay-Delta Plan salmon protection objective)
- **S**pecific, **M**easurable, **A**chievable, **Q**uantitative, **R**esult-focused, **T**ime-bound (SMART)
- Goals were developed to assess Viable Salmonid Population (VSP) parameters
- Goals were specifically developed for LSJR salmon as an indicator of watershed health

Principles for the Development of Biological Goals

- 2019 Delta Science Program Independent Science Advisory Panel (ISAP) Report
- Other efforts to develop biological goals (Scientific Evaluation Process, Bay-Delta Conservation Plan efforts, Collaborative Science and Adaptive Management Program efforts)
- Goals will be reassessed as additional information is collected using an adaptive management approach, at least every 5 years

Initial Biological Goals for Fall-run Chinook Salmon

- VSP Parameters: Key indicators of salmon population viability
 - Abundance: Escapement
 - Productivity: Cohort Replacement Rates, Juvenile Survival, Juvenile Production
 - Diversity: Proportion of Hatchery Origin Spawners, Emigration Timing, Emigration Size Classes
 - Spatial Structure: Population Distribution

Major Changes to the 2nd Revised Report

- Response to Comments Section
- Freshwater Juvenile Survival changed to 2.2%
 - Reduced the timeline for attaining goals
 - Reconciles disparity between tributaries to attain goals
 - Increased to a level more indicative of Pacific Coast Chinook salmon populations
 - Results in subsequent changes to goals that are quantitatively linked
- Baseline juvenile survival table
- “Purposes and Roles” section modified to provide more clarity
- Biological Goals Monitoring and Assessment Section

Role of Biological Goals

Table 1-1. Role and Use of Biological Goals

| Biological Goal/Goal Component | Role of Biological Goal |
|---|---|
| <ul style="list-style-type: none"> Juvenile egg to confluence survival Juvenile emigration timing at tributary confluence Juvenile size class migration at tributary confluence Juvenile production at tributary confluence | <p>Determine whether adaptive adjustments are allowable pursuant to criterion 2 identified in the Bay-Delta Plan (footnote below), for the following allowable adaptive adjustments:</p> <ul style="list-style-type: none"> Change in required percent of unimpaired flow within the range of 30– 50% Alternative flow schedule based on total 5-month volume equal to the required percent of unimpaired flow (flow budget) Shift some of the flow budget to July–January |
| <ul style="list-style-type: none"> Juvenile LSJR survival at Mossdale Juvenile survival Mossdale to Chipps Island Juvenile egg to confluence survival | <p>Inform potential water diversion, water right, water quality, or other actions in the mainstem San Joaquin River and Delta to protect flows and habitat provided by LSJR flows or actions by other entities in furtherance of achieving the LSJR narrative flow or Salmon Protection Objectives</p> |
| <ul style="list-style-type: none"> All biological goals | <p>Inform Board or Executive Director potential action on adaptive methods to the extent that current achievement or furtherance of achieving goals is related to adaptive methods</p> <hr/> <p>Evaluate effectiveness of program of implementation</p> <hr/> <p>Evaluate effectiveness of SJRMEP</p> <hr/> <p>Inform future changes to the Bay-Delta Plan</p> |

There are two “approval criteria” that must be met to allow the Executive Director or Board to approve proposals for adaptive implementation adjustments. Bay-Delta Plan (2018), page 26, “The State Water Board may approve adaptive adjustments to the flow requirements ... if information produced through the monitoring and review processes described in this program of implementation, or other best available scientific information, indicates that the change for the period at issue will satisfy the following criteria for adaptive adjustments: (1) it will be sufficient to support and maintain the natural production of viable native San Joaquin River watershed fish populations migrating through the Delta; and (2) it will meet any existing biological goals approved by the State Water Board.” Satisfying the approval criteria relies on best available science indicating existing achievement, furtherance of achievement, or future achievement of the approval criteria.

Productivity

- The population growth rate of a species and an indicator of how well the population replaces itself
- Full life cycle
 - Cohort Replacement Rate (CRR)
- Juvenile productivity
 - Juvenile survival
 - Juvenile production

Productivity Goal

Table 3-2. LSJR Fall-Run Chinook Salmon Full Life Cycle Productivity Goals

| Productivity Metric | Goal, measured as a 5-year geometric mean | Progress Assessment/Attainment Target |
|---------------------|---|---|
| CRR Trend | Positive generational trend until a CRR > 1 is met | Assessed annually/when numeric productivity goals are met |
| Pre-Fishing CRR | Pre-Fishing CRR > 1 and > post-fishing CRR until abundance goals met and then sustained | Assessed annually/Year 10, achieve the goal |
| Post-Fishing CRR | Post-Fishing CRR > 1 until abundance goals met and then sustained CRR > 1 | Assessed annually/Year 10, achieve the goal |

Productivity Goal

Table 3-3. LSJR Fall-Run Chinook Salmon Juvenile Survival Goals

| Productivity Metric | Goal, measured as a 5-year geometric mean | Progress Assessment/ Attainment Target |
|---|--|---|
| Juvenile Productivity Trend | Positive trend in juvenile survival until abundance goal is met, measured as a 5-year geometric mean | Until numeric abundance goals are met (Year 15) |
| Freshwater Juvenile Survival (egg to Chipps Island) | $\geq 2.2\%$ | Assessed annually/Year 5, achieve the goal |
| LSJR at Mossdale to Chipps Island (Through-Delta) Survival (SJDS) | $\geq 24\%$ | Assessed annually/Year 5, achieve the goal |
| Egg to tributary confluence with LSJR | $\geq 12\%$ | Assessed annually/Year 5, achieve the goal |

Productivity Goal

Table 3-5. LSJR Fall-Run Chinook Salmon Juvenile Production Goals

| Productivity Metric | Goal Per cohort year | Progress Assessment/ Attainment Target |
|---|-------------------------|---|
| Stanislaus River | | |
| Confluence Juvenile Production | 2,200,000 | Assessed annually on an ongoing basis |
| Delta exit (Chippis Island) Juvenile Production | 400,000 | Assessed annually on an ongoing basis |
| Tuolumne River | | |
| Confluence Juvenile Production | 3,800,000 | Assessed annually on an ongoing basis |
| Delta exit (Chippis Island) Juvenile Production | 700,000 | Assessed annually on an ongoing basis |
| Merced River | | |
| Confluence Juvenile Production | 1,800,000 | Assessed annually on an ongoing basis |
| Delta exit (Chippis Island) Juvenile Production | 300,000 | Assessed annually on an ongoing basis |

Baseline LSJR Salmonid Survival Rates

Table 3-4. Estimated Baseline Salmonid Survival Rates for Juvenile Life Stages in the LSJR Tributaries and Delta

| Freshwater Juvenile Survival (egg to Chipps Island) | | | | |
|---|-----------------|----------------|-----------|-----------|
| | Arithmetic Mean | Geometric Mean | Range | Years |
| Stanislaus River | 0.5% | 0.3% | 0.02–1.1% | 2007–2016 |
| Tuolumne River | 1.4% | 0.6% | 0.1–4.2% | 2007–2016 |
| Merced River | 0.8% | 0.5% | 0.2–2.8% | 2007–2016 |
| Through Delta Survival from the LSJR | | | | |
| Buchanan et al. 2018 | 3.8% | 3.0% | 0–8% | 2010–2015 |
| Buchanan et al. 2021 (steelhead) | 32.3% | 26.6% | 14–54% | 2011–2016 |
| Pre-Vamp/VAMP | 22.8% | 14.9% | 2.6–79% | 1994–2006 |
| Egg to Tributary Confluence Survival | | | | |
| Stanislaus River | 3.2% | 1.0% | 0.08–21% | 1997–2017 |
| Tuolumne River | 3.6% | 0.73% | 0.03–17% | 2006–2013 |

Abundance

- Population abundance is an important determinant of risk, and large populations have lower risk of extinction and are more resilient
- Based on escapement numbers (i.e., fish that return to reproduce)
- Escapement goals are quantitatively linked to the productivity goals and the salmon protection objective
- Only includes contributions of natural origin spawner escapement

Abundance Goal

Table 3-1. LSJR Fall-Run Chinook Salmon Escapement Goals

| River | Escapement Goal, measured as a 5-Year Running Average | Progress Assessment/Attainment Target |
|------------------|--|--|
| All | Positive generational trend in escapement, measured as a 5-year geometric mean | Assessed annually/when numeric abundance goals are met |
| Stanislaus River | 5,300 | Assessed annually/Year 15 achieve the goal |
| Tuolumne River | 10,500 | Assessed annually/Year 15 achieve the goal |
| Merced River | 5,000 | Assessed annually/Year 15 achieve the goal |

Diversity

- The variations in a population that help ensure its survival by contributing to its stability, resilience, and persistence
- More diverse populations are at less risk of extinction, for example from habitat and climate changes
- Initial biological goals include two types:
 - Genetic Diversity
 - Life History Diversity

Genetic Diversity Goal

Table 3-9. LSJR Fall-Run Chinook Salmon pHOS Genetic Diversity Goals for the LSJR Basin

| Genetic Diversity Metric | Goal, measured as a 5-year running average | Progress Assessment/Attainment Target |
|--------------------------|---|---|
| pHOS | Decreasing trend, as a 5-year running average | Assessed annually/when the genetic diversity goal is met |
| pHOS | ≤ 15% | Assessed annually/Year 12 after beginning of implementation |
| pHOS | ≤ 10% | Assessed annually/Year 21 after beginning of implementation |

Life-History Diversity Goal

Table 3-10. LSJR Fall-Run Chinook Salmon Juvenile Emigration Timing Goals

| Juvenile Size Class* (Phenotype) | Positive Detection Each Week near Mouth of Each Tributary | Progress Assessment/ Attainment Target |
|-------------------------------------|---|---|
| Fry | Last week of January to second week of April | Assessed annually/Year 10, achieve the goal |
| Parr | First week of February to last week of May | Assessed annually/Year 10, achieve the goal |
| Smolt | Third week of February to first week of June | Assessed annually/Year 10, achieve the goal |

*Size classes are defined as fry <55 millimeters (mm); parr 55–75 mm; smolt >75 mm

Life-History Diversity Goal

Table 3-11. LSJR Fall-Run Chinook Salmon Minimum Percentage for Different Size Classes at Migration Goals for different Water Year (WY) Types.

| Wet and Above Normal WYs | Below Normal, Dry, and Critical WYs | Progress Assessment/ Attainment Target |
|--------------------------|-------------------------------------|---|
| Fry \geq 20% | Fry \geq 20% | Assessed annually/Year 12, achieve the goal |
| Parr \geq 20% | Parr \geq 30% | Assessed annually/Year 12, achieve the goal |
| Smolt \geq 10% | Smolt \geq 20% | Assessed annually/Year 12, achieve the goal |

Notes: Size classes are defined as fry <55 mm; parr 55–75 mm; smolt >75 mm. Percentages are measured as 3-year running averages at the mouth of each tributary.

Spatial Structure

- Broad geographic distribution of populations or individuals in a population
- Reduces chance of catastrophic loss, facilitates recolonization, and buffers population from future environmental change
- Decreases extinction risk

The initial spatial structure biological goal in the LSJR is to achieve the abundance, productivity, and diversity goals on all three LSJR tributaries, the Stanislaus, Tuolumne, and Merced Rivers

Draft Resolution

- Approves the Draft Final Initial Biological Goals
- Directs Board staff to review the biological goals at least every 5 years
- Directs Board staff to continue coordinating with the STM Working Group
- Directs Board staff to coordinate with state and federal fisheries agencies to evaluate hatchery impacts and potential hatchery reform actions

Timely Comments Received

- Tuolumne River Parties
 - Turlock Irrigation District
 - Modesto Irrigation District
 - San Francisco Public Utilities Commission
- San Joaquin Tributaries Authority
- Merced Irrigation District

Technical Comments

- Various comments regarding the relationship between flows and fish
- Biological goals are unattainable
- Hatchery spawners should be counted toward the escapement goal
- The assessment of biological goals requires a robust monitoring and analytical framework

Other Comments

- Legal comments
- Recommended changes to resolution language

Proposed Changes to Resolution

Proposed Change #1

On page 3, insert a new WHEREAS #10 as follows:

- 10. The State Water Board recognizes that voluntary agreements can help inform and expedite implementation of the water quality objectives and can provide durable solutions in the Delta watershed. The implementation of flow or other commitments and the evaluation of the effectiveness of voluntary agreements would be subject to the specific provisions or terms of any voluntary agreement as may be approved in any future updates to the Bay-Delta Plan.**

Proposed Change #2

On page 3, delete the following text in RESOLVED #1 as follows:

- Approves the Final Initial Biological Goals for the Lower San Joaquin River for abundance, productivity, diversity, and spatial structure as identified in ~~Chapter 3 of~~ the Final Initial Biological Goals for the Lower San Joaquin River Report and in Tables 3-1, 3-2, 3-3, 3-5, 3-9, 3-10, and 3-11 and Section 3.4.

Staff Recommendation

- Staff recommends that the Board adopt the Resolution with the 2 proposed changes approving the Initial Biological Goals for the Lower San Joaquin River

- Questions

Public Comments

Closing

To stay informed on the biological goals, STM Working Group, and other Bay-Delta Plan implementation see the LSJR Activities webpage:

https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/implementation-activities-lower-san-joaquin-river.html