

Rapid Genetic Protocol

Region: Delta **Type of Idea:** Operational (salvage triggers)

Timeframe: January through June

Species and Lifestage: young-of-year Winter-Run Chinook salmon

Current Requirement – Action IV.2.3 uses wild fish loss or CNFH hatchery surrogate loss thresholds to reduce ESA-listed fish entrainment between January 1 and June 15, by managing Old and Middle River flows to -5,000 cfs (14-day average). When a loss-based trigger is exceeded OMR flows are required to be managed less negative than the most negative allowed under RPA Action IV.2.3 (see tables below).

Idea – Establish rapid genetic analysis protocol as a long-term requirement. Implementation of rapid genetic protocol is currently determined on an annual basis.

Past Implementation – This procedure was used as a pilot effort in 2015 and has been implemented on an annual basis during 2016-2018. NMFS supported the use of this protocol during the last two water years, with the two additional conditions that all unclipped Chinook salmon have tissue samples collected for subsequent analysis, and that the annual incidental take limit was set at 1% of natural winter-run.

Reclamation and the Department of Water Resources, in consultation with the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and NMFS, developed this procedure to genetically identify ESA-listed fish species that fit within the older juvenile size-at-date criteria at the fish salvage facilities. Standard operating procedures have been developed to describe a timeline for preliminary and final loss estimation based on updated genetic information to achieve salmonid protection and water reliability during periods when ESA-listed species are present in the Sacramento-San Joaquin Delta.

Current Science – Genetic identification aids in a more accurate estimation of loss at the CVP and SWP fish salvage facilities for Sacramento River winter-run Chinook salmon. Rapid genetic analysis allows for timely discrimination of different races of Chinook salmon that may overlap within the older juvenile size-at-date criteria used at the fish salvage facilities, some of which are listed under the ESA (e.g. winter-run and spring-run Chinook salmon) and some of which are non-listed races under the ESA (e.g., fall-run and late fall-run Chinook salmon).

Date	Action Triggers per 2009 RPA with 2011 Amendment	Action Triggers Applying Rapid Genetic Analysis	Action Responses
January 1 – June 15 First Stage Trigger (increasing level of concern)	<p>(1) Daily SWP/CVP older juvenile Chinook salmon¹ loss density (fish per taf) is greater than incidental take limit divided by 2000 (2 percent WR JPE ÷ 2000), with a minimum value of 2.5 fish per taf, or</p> <p>(2) daily SWP/CVP older juvenile Chinook salmon loss is greater than 8 fish/taf multiplied by volume exported (in taf) or</p> <p>(3) CNFH CWT LFR or LSNFH CWT WR cumulative loss greater than 0.5% for each surrogate release group, or</p> <p>(4) daily loss of wild steelhead (intact adipose fin) is greater than 8 fish/taf multiplied by volume exported (in taf)</p>	<p>(1) Daily SWP/CVP genetic winter-run² loss density (fish per taf) is greater than incidental take limit divided by 2000 (1 percent WR JPE ÷ 2000), with a minimum value of 2.5 fish per taf, or</p> <p>(2) daily SWP/CVP genetic winter-run loss is greater than 8 fish/taf multiplied by volume exported (in taf) or</p> <p>(3) CNFH CWT LFR or LSNFH CWT WR cumulative loss greater than 0.5% for each surrogate release group, or</p> <p>(4) daily loss of wild steelhead (intact adipose fin) is greater than 12 fish/taf multiplied by volume exported (in taf)</p>	<p>Reduce exports to achieve an average net OMR flow of (minus) -3,500 cfs for a minimum of 5 consecutive days. The five day running average OMR flows shall be no more than 25 percent more negative than the targeted flow level at any time during the 5-day running average period (e.g., -4,375 cfs average over five days). Resumption of (minus) -5,000 cfs flows is allowed when average daily fish density is less than trigger density for the last 3 days of export reduction. Reductions are required when any one criterion is met.</p>

¹ "Older juvenile Chinook salmon" is defined as any Chinook salmon that is above the minimum length for winter-run Chinook salmon, according to the "Delta Model" length-at-date table used to assign individuals to race.

² Genetic winter-run within the older juvenile Chinook salmon length-at-date category

January 1 - June 15 Second Stage Trigger (analogous to high concern level)	<p>(1) Daily SWP/CVP older juvenile Chinook salmon loss density (fish per taf) is greater than incidental take limit (2 percent of WR JPE) divided by 1000 (2 percent of WR JPE ÷ 1000), with a minimum value of 5.0³ fish per taf, or</p> <p>(2) daily SWP/CVP older juvenile Chinook salmon loss is greater than 12 fish/taf multiplied by volume exported (in taf), or</p> <p>(3) daily loss of wild steelhead (intact adipose fin) is greater than 12 fish/taf multiplied by volume exported (in taf)</p>	<p>(1) Daily SWP/CVP genetic winter-run loss density (fish per taf) is greater than incidental take limit (1 percent of WR JPE) divided by 1000 (1 percent of WR JPE ÷ 1000), with a minimum value of 5.0 fish per taf, or</p> <p>(2) daily SWP/CVP genetic winter-run loss is greater than 12 fish/taf multiplied by volume exported (in taf), or</p> <p>(3) daily loss of wild steelhead (intact adipose fin) is greater than 12 fish/taf multiplied by volume exported (in taf)</p>	<p>Reduce exports to achieve an average net OMR flow of (minus) -2,500 cfs for a minimum 5 consecutive days. Resumption of (minus) -5,000 cfs flows is allowed when average daily fish density is less than trigger density for the last 3 days of export reduction. Reductions are required when any one criterion is met.</p>
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