January 17, 2025

Chris Wilkinson
Environmental Program Director
California Natural Resources Agency
California Department of Water Resources
Division of Integrated Science and Engineering
3500 Industrial Boulevard
West Sacramento, California 95691

Electronic transmittal only

Dear Mr. Wilkinson:

This letter provides the California Department of Water Resources (DWR) with the estimated number of juvenile Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*) from brood year (BY) 2024 expected to enter the Sacramento-San Joaquin Delta (Delta) during water year (WY) 2025. The annual Juvenile Production Estimates (JPEs) are used to calculate loss thresholds for the long-term operation of the State Water Project (SWP) pursuant to the California Department of Fish and Wildlife's (CDFW) Incidental Take Permit (ITP), No. 2081-2023-054-00 (CDFW 2024), and for long-term operation of the Central Valley Project (CVP) and the SWP, as described in the U.S. Bureau of Reclamation's Record of Decision (Reclamation 2024) and the National Marine Fisheries Service (NMFS) Biological Opinion, No. WCRO-2024-02917 (NMFS 2024). In addition to being used to calculate loss thresholds for Old and Middle River flow management, the JPEs are used to determine the authorized level of incidental take for winter-run Chinook salmon under Section 7 of the Endangered Species Act (ESA), while operating the CVP and SWP Delta pumping facilities (NMFS 2024).

Brood Year 2024 JPEs

The JPE Subteam of the Shasta Operations Team, consisting of technical representatives from CDFW, DWR, NMFS, Reclamation, and U.S. Fish and Wildlife Service, met and provided a JPE memorandum to NMFS and CDFW (Enclosure 1) on January 10, 2025. The methods used by the JPE Subteam to calculate the BY 2024 JPEs for natural-origin and hatchery-origin winter-run Chinook salmon are detailed in Enclosure 1 and were adopted without modification by CDFW and NMFS.

BY 2024 JPEs:

- Natural-origin winter-run Chinook salmon: **98,893**
- Hatchery-origin winter-run Chinook salmon released into Sacramento River: **135,342**
- Hatchery-origin winter-run Chinook salmon released into Battle Creek: **2,868**

CDFW and NMFS will continue to monitor loss of winter-run Chinook salmon and other species listed under the California Endangered Species Act and ESA at the CVP and SWP Delta pumping facilities through participation in the Salmonid Monitoring Team and the Water Operations Management Team.

In closing, we look forward to continuing to work with DWR and other State and Federal agencies to manage water resources in WY 2025 in a way that supports both water supply and fish and wildlife resources. If you have any questions regarding this correspondence, please contact Paige Uttley (CDFW) at (916) 698-1140, or via email at Paige.Uttley@wildlife.ca.gov, or Garwin Yip (NMFS) at (916) 930-3611, or via email at Garwin.Yip@noaa.gov.

Sincerely,

DocuSigned by:
Brooke Jacobs
63D88D861032425...

Brooke Jacobs
Chief, Water Branch
California Department of Fish and Wildlife

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Cathy Marcinkevage
Assistant Regional Administrator
California Central Valley Office
National Marine Fisheries Service

Enclosure 1: Winter-Run JPE Subteam Memorandum, dated January 10, 2025

cc: Copy to NMFS file: ARN 151422SWR2006SA00268

Electronic copy only:

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References Cited

California Department of Fish and Wildlife (CDFW). 2024. California Endangered Species Act Incidental Take Permit No. 2081-2023-054-00 Long-Term Operation of the State Water Project in the Sacramento-San Joaquin Delta.

National Marine Fisheries Service (NMFS). 2024. Biological Opinion for the Reinitiation of Consultation on the Long-Term Operation of the Central Valley Project and State Water Project. December 6, 2024. Available at: https://www.fisheries.noaa.gov/resource/document/endangered-species-act-section-7a2-programmatic-biological-opinion-reinitiation

U.S. Bureau of Reclamation (Reclamation). 2024. Record of Decision: Long-Term Operation of the Central Valley Project and State Water Project. December 19, 2024. Available at: https://www.usbr.gov/mp/nepa/includes/documentShow.php?Doc_ID=55600

Memorandum

Date: January 10, 2025

To: Mr. Garwin Yip
National Marine Fisheries Service
California Central Valley Office
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Dr. Brooke Jacobs
California Department of Fish and Wildlife
Chief, Water Branch
P.O. Box 944209
Sacramento, CA 94244-2090

Shasta Operations Team

From: Winter-run JPE Subteam

Subject: Winter-run Chinook Salmon Juvenile Production Estimate

Summary
The annual Juvenile Production Estimate (JPE) is used to calculate loss thresholds for Long-Term Operation of the Central Valley Project and the State Water Project, as described in the U.S. Bureau of Reclamation's Record of Decision (USBR 2024) and the National Marine Fisheries Service (NMFS) Biological Opinion, No. WCRO-2024-02917 (NMFS 2024), and required by the California Department of Fish and Wildlife (CDFW) Incidental Take Permit (ITP) No. 2081-2023-054-00 (CDFW 2024). The JPE Subteam, consisting of technical representatives from the U.S. Bureau of Reclamation, California Department of Water Resources, NMFS, U.S. Fish and Wildlife Service, and CDFW met two times in December 2024 to review and update the factors used to calculate the brood year (BY) 2024 JPE, and to develop a recommended winter-run JPE for BY 2024. Guidance on how to apply the JPE to winter-run Chinook salmon management measures under the 2024 State Water Project ITP and 2024 NMFS Biological Opinion has been provided by CDFW and NMFS as Attachment 1.

The JPE Subteam used "Method 2" as described in O'Farrell et al. (2018) to calculate the JPE for BY 2024 and includes data through December 31, 2024, which results in the following estimates for BY 2024 natural-origin and hatchery-origin JPE:

$JPE_{Natural}$ = **98,893**

$JPE_{Hatchery}$ = **135,342**

$JPE_{BCJumpstart}$ = **2,868**

Winter-Run JPE Methods and Data for BY 2024

Natural-origin JPE - The JPE Subteam continued to calculate the natural-origin winter-run JPE using the "Method 2" approach used for the BY 2019 to BY 2023 JPEs as described in O'Farrell et al. (2018). The data inputs for the calculations include estimates of the following

parameters for calculating the JPE for natural-origin BY 2024 winter-run Chinook Salmon ($JPE_{Natural}$) (Figure 1):

1) Number of winter-run fry equivalents passing Red Bluff Diversion Dam (RBDD)(JPI_{Fry})
2) Survival rate of natural-origin fry to smolts ($Survival_{Fry\text{-}to\text{-}Smolt}$)
3) Survival rate of smolts from RBDD to Delta entry ($Survival_{Smolt}$)

Hatchery-origin JPE - We used the number of winter-run hatchery smolts expected to be released from Livingston Stone National Fish Hatchery (LSNFH) in February 2025 ($N_{Hatchery}$) and their predicted survival rate ($Survival_{HatcherySmolt}$) to estimate a JPE of hatchery-origin winter-run juveniles entering the Delta ($JPE_{Hatchery}$) (Figure 1). We present the data inputs used in the calculations in Table 1 and describe each in the sections below.

For the fifth year in a row, we also include estimates of hatchery-origin winter-run smolts released in Battle Creek as part of the "Jumpstart" reintroduction ($N_{BCJumpstart}$), their survival ($Survival_{BCJumpstart}$), and a forecast of the number entering the Delta ($JPE_{BCJumpstart}$). Although there was some natural spawning in Battle Creek in 2024, we do not differentiate naturally-produced juveniles from Battle Creek from Sacramento River juveniles, and both are included in the JPI_{Fry}. Similarly, approximately 4,647 unmarked juveniles from the McCloud River were transported and released below Keswick Dam and would have been sampled and estimated along with the naturally-produced juveniles (JPI_{Fry}). The JPE Subteam recognizes that, as these new populations become established, differentiating production sources will become more relevant. At this time, these new populations represent a very small (estimated <1%) fraction of total production.

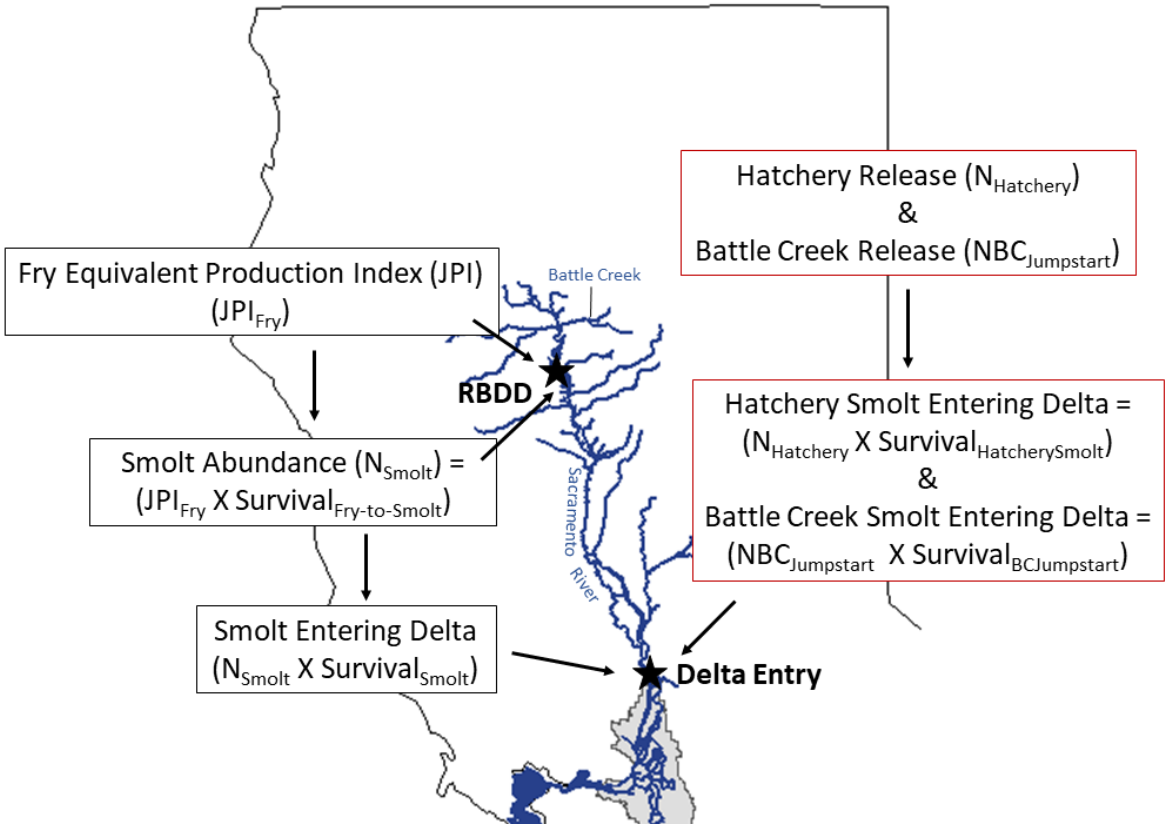

Figure 1. Location and formulas used in the JPE for the natural-origin (black boxes) and hatchery-origin (red boxes) components of the winter-run population estimated for BY 2024. Separate hatchery JPEs are estimated for hatchery releases from LSNFH into the Sacramento River ($N_{Hatchery}$) and for the Battle Creek Jumpstart hatchery releases into Battle Creek.

Juvenile Production Index - For the BY 2024 JPE, the JPE Subteam continued to use the Juvenile Production Index (JPI_{Fry} or JPI), which is based on an estimate of fry equivalents at RBDD. The JPI has been used in the calculation since 2014 and better represents the response of fish to annual environmental conditions during spawning, egg incubation, and outmigration, as compared to the long-term average egg-to-fry survival rate used in the JPE prior to 2014. The JPI approach at least partially accounts for impacts to egg-to-fry survival in naturally spawned winter-run Chinook Salmon that may occur upstream of RBDD.

In July 2024, similar to prior years, the USFWS updated the least-squares regression model used to estimate trap efficiency and expand rotary screw trap (RST) catch to estimate the JPI. The updated 44-trial model incorporated efficiency trials conducted in the fall of 2023 (n=2; winter-run) to the previous year's model fitted to data from 2023 using the current trap configuration (four 5-foot and one 8-foot diameter RST). Additionally, trials (n=13) from 2018 and 2019 conducted with the prior four 8-foot trap configuration using winter-run Chinook Salmon were included in this model. This dataset is considered the best available to estimate winter-run production from catch.

Fry-to-Smolt Survival - The JPE Subteam continued to include a fry-to-smolt survival factor ($Survival_{Fry\text{-}to\text{-}Smolt}$). This is necessary because the available survival estimates between RBDD and the Delta are based on releases of acoustically-telemetered smolts, which have a higher survival rate than fry. Without this factor, the survival rate from fry to smolts is assumed to be 1.00, which is unrealistic. The same factor is used to adjust juvenile passage at RBDD to fry equivalents, based on the peak of fry catch at RBDD (generally in October) and the smolt life-stage at RBDD for naturally produced winter-run Chinook Salmon.

The JPE Subteam used the fry-to-smolt survival rate forecasting method developed by O'Farrell et al. (2018), which uses recent winter-run Chinook Salmon survival data and is updated with new survival data annually. Incorporating updated survival rate estimates, this method results in a winter-run Chinook Salmon fry-to-smolt survival rate of 0.5149 for BY 2024. The team used this forecasting method to estimate fry-to-smolt survival in calculations of JPE and updating the fry equivalent multiplier to 1.942 (the factor 1.942 is the inverse of 0.5149). It is the opinion of the JPE Subteam that these updated values, which are based on peer-reviewed methodologies and more recent winter-run Chinook Salmon data, improve the JPE forecast compared to values used prior to 2019.

Fry Production - The JPI seasonal estimate of fry equivalents using the 0.5149 fry-to-smolt survival rate was 568,847 as of December 31, 2024 (week 52; B. Poytress, USFWS, pers. comm.). The value through December 31 accounts for approximately 96.88 percent of annual winter-run passage at RBDD based on mean passage from 2002 to 2023. Including an interpolation of the remaining 3.12 percent to account for the remainder of BY 2024, the total BY 2024 estimate is 587,167 fry equivalents (Table 1). This value accounts for in-season winter-run genetic corrections. With this estimate of fry production at RBDD, the estimated egg-to-fry survival is calculated to be 0.2884 (Table 1). This JPI fry value differs from the cumulative biweekly winter-run passage past RBDD through December 15, 2024 (414,399 for BY 2024) used to calculate the interim JPE in that it includes the following three items: adjustments to the length-at-date assignments based on genetic subsampling, full conversion to fry-equivalents, and estimation of the tail end of outmigration past December 31. Because all of the adjustments tend to increase the JPI fry value relative to the mid-December biweekly winter-run passage at RBDD, and the other terms in the JPE equation remain the same, the final natural-origin JPE is, as expected, larger than the interim natural-origin JPE.

Natural-origin Smolt Survival - To estimate survival of natural-origin winter-run smolts from RBDD (i.e., Salt Creek) to the Delta (defined as Sacramento, since survival estimates are based on detections of acoustic-tagged fish at or below the Tower Bridge and I-80/I-50 Bridge) ($Survival_{Smolt}$), the JPE Subteam used the variance-weighted mean of survival estimates from acoustically tagged LSNFH smolts released in 2013–2024, as described in O'Farrell et al. (2018). This calculation is updated each year to incorporate survival and variance estimates from the previous year and uses the Cormack-Jolly-Seber model, which accounts for variation in detection probabilities. This model accounts for fish which are missed at Sacramento but detected at locations below Sacramento, including fish that use the Yolo Bypass to enter the Delta, in those years where river flow is high enough to spill over the Fremont Weir. The estimated annual survival rate using this method is 0.3271. The filtering algorithm used to process receiver detection data is described in Danner and Ammann (2022).

Hatchery Smolt Survival – To estimate survival of hatchery-produced winter-run Chinook Salmon released in the Sacramento River near Redding ($Survival_{HatcherySmolt}$), we used the variance-weighted mean of 2013–2024 survival rates from the LSNFH release point to the Delta (defined as described above for natural-origin smolt survival). This survival rate is 0.2628. For hatchery-produced winter-run released in North Fork Battle Creek ($Survival_{BCJumpstart}$), we used the same variance-weighted mean of 2019–2023 survival rates from the Battle Creek release point to the Delta (excluding the May 2020 release), since no new estimates were obtained in 2024. This survival rate is 0.0239. Because both release points of hatchery fish are upstream of RBDD, the overall survival to the Delta is lower compared to the survival applied to natural-origin smolts. As for natural-origin smolt survival, these estimates of hatchery smolt survival are updated annually to incorporate survival and variance estimates from the previous year and use the same filtering algorithm as described above for natural-origin smolts.

JPE Subteam Estimates of the JPEs for BY 2024

The JPE Subteam used the previously described inputs and the following equations for estimating the BY 2024 natural-origin (Equation 2) and hatchery-origin (Equations 3 and 4) JPEs:

Equation 2:

$$JPE_{Natural} = JPI_{Fry} \times Survival_{Fry-to-Smolt} \times Survival_{Smolt}$$

$$= 587{,}167 \times 0.5149 \times 0.3271 = 98{,}893$$

Equation 3:

$$JPE_{Hatchery} = N_{Hatchery} \times Survival_{HatcherySmolt}$$

$$= 515{,}000 \times 0.2628 = 135{,}342$$

Equation 4:

$$JPE_{BCJumpstart} = N_{BCJumpstart} \times Survival_{BCJumpstartSmolt}$$

$$= 120{,}000 \times 0.0239 = 2{,}868$$

The JPE Subteam utilized the best information currently available from which to derive a JPE and the best method for arriving at estimates. We conclude that this analysis from the JPE Subteam establishes the most accurate forecast of JPEs for use in the 2025 water year at the Central Valley Project and State Water Project export facilities.

Table 1. Reported population estimates and survival factors for brood year 2024. Factors used in the JPE calculations and the resulting JPEs are shown in bold.

Component	Natural	Hatchery
Total Sacramento River escapement[1]	1,024	
Adult female estimate (AFE)[2]	392	
AFE minus pre-spawn mortality[3] (4.26%) ($N_{Spawners}$)	375	
Average fecundity[4] (AF)	5,430	
Total eggs	2,036,250	
Estimated egg-to-fry survival rate based on JPI at RBDD/Total eggs[5]	0.2884	
Fry equivalents of juvenile production at RBDD (JPI or JPI_{Fry})[6]	**587,167**	
Fry-to-smolt survival ($Survival_{Fry\text{-}to\text{-}Smolt}$)[7]	**0.5149**	
Number of smolts at RBDD	302,332	
Estimated smolt survival term: RBDD to Delta ($Survival_{Smolt}$)[8]	**0.3271**	
Total natural production entering the Delta (JPE)	**98,893**	
LSNFH Hatchery release ($N_{Hatchery}$)[9]		**515,000**
Survival rate from release to Sacramento ($Survival_{HatcherySmolt}$)[10]		**0.2628**
Total LSNFH production entering the Delta (JPE)		**135,342**
Battle Creek Hatchery release ($N_{BCJumpstart}$)[11]		**120,000**
Survival rate from release to Sacramento ($Survival_{BCJumpstart}$)[12]		**0.0239**
Total Jumpstart production entering the Delta (JPE)		**2,868**

1/ Total Sacramento River in-river escapement from CDFW Cormack-Jolly Seber (CJS) model includes natural- and hatchery-origin winter-run Chinook Salmon, but not hatchery fish retained for brood stock at LSNFH.

2/ The number of adult females is derived from carcass surveys on the Sacramento River. Naturally spawning winter-run Chinook Salmon in Battle Creek are not included.

3/ Pre-spawn mortality was estimated from carcass surveys of females (Doug Killam, CDFW, pers. comm.).

4/ Preliminary (subject to change) average number of eggs per female from fish spawned (n=120) at LSNFH (Kaitlin Dunham, USFWS pers. comm.).

5/ Back calculated estimated survival between eggs laid in-river and fry production estimates at RBDD based on numbers of fry equivalents (JPI) using the 0.5149 fry-to-smolt survival rate estimate based on method described in O'Farrell et al. (2018).

6/ Preliminary number of fry equivalents estimated on December 31, 2024 plus 3.12% interpolation to account for remainder of estimated passage for the 2024 brood year at RBDD; using 0.5149 fry-to-smolt survival rate estimate (Bill Poytress, USFWS, pers. comm.). This estimate includes and does not differentiate the number of fry equivalents outmigrating from the McCloud River, Battle Creek, and the Sacramento River.

7/ Estimate of fry-to-smolt survival rate based on O'Farrell et al. (2018), updated using data from BY 1998-2017.

8/ Variance-weighted mean survival rate of acoustically tagged hatchery winter-run Chinook Salmon from 2013 to 2024 between RBDD and at or below I-80/Tower Bridge in Sacramento (based on O'Farrell et al. 2018). Survival is estimated from the Salt Creek receiver site, located 3 miles downstream of RBDD, to estimate survival from RBDD for natural-origin smolts.

9/ Estimated LSNFH production release as of January 7, 2025 (100% tagged and adipose clipped).

10/ Variance-weighted mean survival rate of acoustically tagged hatchery winter-run Chinook Salmon from 2013 to 2024 between release location and at or below I-80/Tower Bridge in Sacramento (based on O'Farrell et al. 2018).

11/ Estimated Battle Creek Jumpstart release as of January 6, 2025 (100% tagged and marked).

12/ Variance-weighted mean survival rate of acoustically tagged hatchery winter-run Chinook Salmon from 2019 to 2023 between release location in North Fork Battle Creek and at or below I-80/Tower Bridge in Sacramento (based on O'Farrell et al. 2018). The survival rate of 64 fish released on May 18, 2020 was not included in this calculation because fish size and environmental conditions did not represent expected conditions during the BY 2024 winter release.

References

CDFW (California Department of Fish and Wildlife). 2024. California Endangered Species Act Incidental Take Permit No. 2081-2023-054-00 Long-Term Operation of the State Water Project in the Sacramento-San Joaquin Delta.

Danner, E., and A. J. Ammann. 2022. Annual technical report for enhanced acoustic tagging, analysis, and real-time monitoring of wild and hatchery salmonids in the Sacramento River Valley. Report from NOAA Southwest Fisheries Science Center to U.S. Bureau of Reclamation, Sacramento, CA.

NMFS (National Marine Fisheries Service). 2024. Biological Opinion for the Reinitiation of Consultation on the Long-Term Operation of the Central Valley Project and State Water Project.

O'Farrell M. R., W. H. Satterthwaite, A. N. Hendrix, and M. S. Mohr. 2018. Alternative Juvenile Production Estimate (JPE) forecast approaches for Sacramento River winter-run Chinook Salmon. San Francisco Estuary & Watershed Science 16(4):4.

USBR (U.S. Bureau of Reclamation). 2024. Record of Decision: Long-Term Operation of the Central Valley Project and State Water Project. https://www.usbr.gov/mp/nepa/includes/documentShow.php?Doc_ID=55600

ec: Water Operations Management Team

JPE Subteam members:

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United States Bureau of Reclamation

Tyler McCraney
United States Fish and Wildlife Service

Elissa Buttermore
United States Bureau of Reclamation

Attachment 1
January 10, 2025
California Department of Fish and Wildlife, Water Branch

To the Winter-run JPE Subteam:

The California Department of Fish and Wildlife (CDFW) issued Incidental Take Permit No. 2081-2023-054-00 to the California Department of Water Resources (DWR) on November 4, 2024 for Long-term Operation of the State Water Project (SWP) in the Sacramento-San Joaquin Delta (2024 SWP ITP). Pursuant to the 2024 SWP ITP, the Winter-run JPE Subteam will calculate the Juvenile Production Estimate (JPE) for natural- and hatchery-origin winter-run Chinook Salmon annually and transmit a recommendation to the National Marine Fisheries Service (NMFS) and CDFW. This letter serves as a companion document to the JPE Subteam memorandum and provides guidance on how to apply the natural-origin and hatchery-origin JPEs to winter-run Chinook Salmon management measures included in the 2024 SWP ITP.

Application of the Winter-run Chinook Salmon JPEs in Old and Middle River Flow Management under the 2024 SWP ITP

Condition of Approval 8.4.3 – Winter-run Chinook Salmon Annual Loss Thresholds: DWR and the United States Bureau of Reclamation (Reclamation) will adjust south Delta exports to manage the Old and Middle river (OMR) index[1] to avoid exceeding the following annual loss thresholds:

- Natural-origin winter-run Chinook Salmon Annual Loss Threshold: 0.5% of JPE
- Hatchery-origin winter-run Chinook Salmon Annual Loss Threshold: 0.12% of JPE

Condition of Approval 8.4.4 – Natural-origin Winter-run Chinook Salmon Weekly Distributed Loss Thresholds: DWR and Reclamation will manage the OMR index based on a natural-origin winter-run Chinook Salmon weekly distributed loss threshold. The natural-origin winter-run Chinook Salmon weekly loss threshold is a product of the weekly percentage of natural-origin winter-run Chinook Salmon present in the Delta (scaled to 100%; see Table 4 of 2024 SWP ITP) and 50% of the natural-origin winter-run Chinook Salmon annual loss threshold (Condition of Approval 8.4.3).

Brood Year 2024 Winter-run Chinook Salmon JPEs

The brood year 2024 natural-origin winter-run Chinook Salmon JPE is **98,893**.

The brood year 2024 Sacramento River hatchery-origin winter-run Chinook Salmon JPE is **135,342**.

The brood year 2024 Battle Creek hatchery-origin winter-run Chinook Salmon JPE is **2,868**.

[1] An Old and Middle River flow index will be used to determine export limitations and will be calculated using the equation provided by Hutton (2008).

Brood Year 2024 Winter-run Chinook Salmon Annual Loss Thresholds (Condition of Approval 8.4.3): As provided in the 2024 SWP ITP Condition of Approval 8.4.3, the brood year 2024 natural-origin and hatchery-origin winter-run Chinook Salmon annual loss thresholds will be calculated as follows:

Natural-origin winter-run Chinook Salmon: 0.005 x 98,893 = **494.47**

Sacramento River hatchery-origin winter-run Chinook Salmon: 0.0012 x 135,342 = **162.41**

Battle Creek hatchery-origin winter-run Chinook Salmon: 0.0012 x 2,868 = **3.44**

Brood Year 2024 Natural-origin Winter-run Chinook Salmon Weekly Distributed Loss Thresholds (Condition of Approval 8.4.4): As provided in the 2024 SWP ITP Condition of Approval 8.4.4 (see Table 4 of 2024 SWP ITP), the natural-origin winter-run Chinook Salmon weekly distributed loss thresholds for OMR Management will be calculated as follows:

Week 1[2] (1/1-1/7): 0.0032 x 0.5 x 348.98 = **0.56**

Week 2[3] (1/8-1/9): 0.0032 x 0.5 x 348.98 = **0.56**
(1/10-1/14): 0.0032 x 0.5 x 494.47 = **0.79**

Week 3 (1/15-1/21): 0.0130 x 0.5 x 494.47 = **3.21**

Week 4 (1/22-1/28): 0.0130 x 0.5 x 494.47 = **3.21**

Week 5 (1/29-2/4): 0.0691 x 0.5 x 494.47 = **17.08**

Week 6 (2/5-2/11): 0.1313 x 0.5 x 494.47 = **32.46**

Week 7 (2/12-2/18): 0.1486 x 0.5 x 494.47 = **36.74**

Week 8 (2/19-2/25): 0.1459 x 0.5 x 494.47 = **36.07**

Week 9 (2/26-3/4): 0.1280 x 0.5 x 494.47 = **31.65**

Week 10 (3/5-3/11): 0.0977 x 0.5 x 494.47 = **24.16**

Week 11 (3/12-3/18): 0.1549 x 0.5 x 494.47 = **38.30**

Week 12 (3/19-3/25): 0.0802 x 0.5 x 494.47 = **19.83**

Week 13 (3/26-4/1): 0.0147 x 0.5 x 494.47 = **3.63**

Week 14 (4/2-4/8): 0.0000 x 0.5 x 494.47 = **0.00**

Week 15 through end of OMR Management (4/9-6/30): 0.0000 x 0.5 x 494.47 = **0.00**

[2] The Week 1 calculation is based on the interim natural-origin winter-run Chinook Salmon JPE of 69,795.
[3] Two values were calculated for Week 2 due to the natural-origin winter-run Chinook Salmon JPE becoming available on January 10, 2025. The first calculation (1/8-1/9) uses the interim natural-origin winter-run Chinook Salmon JPE of 69,795, whereas the second calculation (1/10-1/14) is based on the natural-origin winter-run Chinook Salmon JPE as described in the Winter-run JPE Subteam memorandum issued on January 10, 2025.

The winter-run Chinook Salmon annual loss thresholds and weekly distributed loss thresholds calculated using the natural-origin and hatchery-origin winter-run Chinook Salmon JPE values provided in this letter will go into effect with the transmission of the Winter-run JPE Subteam memorandum to CDFW and NMFS and remain in effect until the end of OMR Management for salmonids.

Sincerely,

California Department of Fish and Wildlife, Water Branch

References

Hutton, P. 2008. A model to estimate combined Old & Middle river flows; Final version. Metropolitan Water District of Southern California. April 2008.

O'Farrell M. R., W. H. Satterthwaite, A. N. Hendrix, and M. S. Mohr. 2018. Alternative Juvenile Production Estimate (JPE) forecast approaches for Sacramento River winter-run Chinook Salmon. San Francisco Estuary & Watershed Science 16(4):4.

Date: January 10, 2025

To: WR JPE Subteam of the Shasta Operations Team

From: NOAA Fisheries, California Central Valley Office, Water Operations and Delta Consultations Branch

RE: Key thresholds under the federal ESA Consultation

NMFS issued the ESA Section 7 biological opinion on the long-term operations of the Central Valley Project and State Water Project (2024 LTO BiOp) on December 6, 2024, and Reclamation issued the associated Record of Decision on December 19, 2024.

Final Operational Loss Thresholds for Winter-run Chinook Salmon in WY 2025
NMFS analyzed a proposed action which included Old and Middle River (OMR) flow management based on annual and weekly distributed loss thresholds for natural-origin winter-run Chinook salmon. Because that element of the proposed action was the same as analyzed in the ITP, those operational loss thresholds are the same as provided in the attachment from CDFW

Final Incidental Take Limits for Winter-run Chinook Salmon in WY 2025

The Incidental Take Limits (ITLs) were set in Table 184 on p. 899 of the 2024 LTO BiOp, excerpted below.

Species	Measurement	Maximum Anticipated Annual Amount and Extent of Take	Rationale
Sacramento River (SR) winter-run Chinook salmon	Loss of natural genetic SR winter-run Chinook salmon	0.56% of the natural winter-run juvenile production estimate (JPE) in any single year or 0.36% on a 3-year rolling average of the JPE.	Data period is Water Years (WY) 2010-2022, since quality-controlled genetic data from WY 2023-2024 is not available.[1]
SR winter-run Chinook salmon	Loss of hatchery SR winter-run Chinook salmon - Sacramento River	1.0% of the estimated hatchery JPE (fish surviving to the Delta) from Livingston Stone National Fish Hatchery released into the Upper Sacramento River in a single year or 0.8% of the JPE on a 3-year rolling average.	Upper limit of anticipated amount and extent of take based on the JPE.

SR winter-run Chinook salmon	Loss of hatchery SR winter-run Chinook salmon - Battle Creek	1.0% of the estimated hatchery JPE (fish surviving to the Delta) from Livingston Stone National Fish Hatchery released into Battle Creek in a single year or 0.8% of the JPE on a 3-year rolling average.	Upper limit of anticipated amount and extent of take based on the JPE.

[1] The 1-year incidental take limit is based on the maximum single-year loss observed within the specified historical dataset. The 3-year incidental take limit is based on the maximum three-consecutive-year average loss observed within the specified historical dataset. For genetic Sacramento River winter-run Chinook salmon, maximum loss is based on a percentage of the juvenile production estimate, where in NMFS' 2019 Opinion, we used length at date.

Based on the final estimate of the WR JPE for BY 2024, the single-year ITLs applicable to WY 2025 are:

	Single-year ITLs for WY 2025
Natural genetic SR winter-run Chinook salmon	98,893 * 0.56% = **554**
Hatchery SR winter-run Chinook salmon - Sacramento River	135,342 * 1.0% = **1,353**
Hatchery SR winter-run Chinook salmon - Battle Creek	2,868 * 1.0% = **29**

The single-year ITL for natural-origin genetic winter-run Chinook salmon is based on the final estimate of the natural-origin WR JPE for BY 2024. Hatchery winter-run Chinook salmon single-year ITLs are based on final estimates for hatchery-origin WR JPEs based on the release group size estimates in early January.

The 3-year ITLs are not applicable during WY 2025 and WY 2026. Because there were changes to the ITLs compared to those in the 2019 LTO BiOp and operations during WY 2023 and WY 2024 were not implemented considering the current ITLs, the 3-year average of observed loss will not be assessed against the 3-year ITL until WY 2027. Reclamation and DWR should still be operating during WY 2025 and WY 2026 in consideration of the 3-year ITL, since the observed loss during those water years will contribute to the 3-year average of observed loss that will be assessed against the 3-year ITL calculated for WY 2027.