BUREAU OF RECLAMATION

American River Group Notes

Conference Line: +1 (321) 209-6143; Access Code: 985 598 947#
Webinar: Join Microsoft Teams Meeting
Thursday, October 24, 2024

Action Items

USBR

1. Provide a formal response to the power bypass proposal that addresses temperature, Dissolved Oxygen (DO), and off ramping.
2. Consider additional spill to improve DO, using the updated DO data from Water Forum.

Water Forum / Cramer Fish Sciences

1. Download and distribute most recent DO data to the ARG.

Introductions

1. USBR: Brian Mahardja, Josh Israel, Liz Kiteck, Spencer Marshall, Thomas Patton, Thuy Washburn, Todd Plain, Travis Apgar, Wes Harrison, Zarela Guerrero
2. NMFS: Rachael Alcala, Robert Sheffer, Sam Pyros
3. USFWS: n/a
4. CDFW: Crystal Rigby, Emily Fisher, Jason Julienne, Molly Shea, Nick Bauer, Tracy Grimes
5. SWRCB: Nathalie Niepagen
6. BKS Law Firm: n/a
7. California State Parks: n/a
8. CBEC Engineering: Chris Hammersmark
9. City of Folsom: n/a
10. City of Roseville: n/a
11. City of Sacramento: n/a
12. Cramer Fish Sciences: Mollie Ogaz

13. CSUS: n/a
14. DWR: John Ford
15. EBMUD: I-Pei Hsiu
16. Environmental Council of Sacramento: n/a
17. PCWA: n/a
18. PSMFC: Hunter Morris, Logan Day
19. Regional Water Authority (RWA): n/a
20. Shingle Springs Band of Miwok Indians: n/a
21. SMUD: Megan Peers
22. USACE: n/a
23. WAPA: n/a
24. Water Districts: Greg Zlotnick, Paul Helliker
25. Water Forum: Ashlee Casey, Erica Bishop, Jessica Law
26. Other: Rod Hall

Dissolved Oxygen (DO) Update

Cramer Fish Sciences

1. Cramer downloaded the most recent data on 10/22/2024. The power bypass began on or around 10/19/2024. [CDFW clarified post-meeting that the official start date for the power bypass was 10/18/2024, with a release of approximately 60 cfs. On 10/20/2024, releases increased to 250 cfs.]
    a. Flows out of the Fair Oaks Gage are relatively stable.
    b. The powerhouse discharge (1,000 cfs) and the spill through the radial gates (500 cfs) at Lake Natoma are both stable.
    c. Graphs shared by Cramer show DO fluctuating with releases as the water continues to cool down.
    d. When spill is not occurring, DO drops below the 7 mg/L threshold. In the basin, powerhouse outflow is still below 7 mg/L.
    e. DO levels are at 9-10 mg/L where the gates are spilling.

Water Forum

1. The Water Forum shared some comparison data from last year's power bypass.
    a. During last year's bypass, flows were at a steady 500 cfs beginning on 11/1/2023.
    b. DO increased to a high of 11 mg/L.
    c. Even with the diurnal fluctuations, DO did not drop below 6.5 or 7 mg/L.
    d. This year's smaller bypass is not producing the larger increase in DO that was seen in 2023.

Questions and Comments

1. USBR asked how long water takes to get from Folsom Lake to Lake Natoma. Last year, it took about six days to see DO improvements at Nimbus Dam with the power bypass.
    a. CDFW responded that it might have been 10 or more days before a significant increase in DO levels was seen at the hatchery. That increase would be the best indicator of that water moving through Lake Natoma and reaching Nimbus Dam.
    b. The Water Forum added that the 250 bypass has been occurring for a few days, and there has been a slight increase in DO, but DO doesn't tend to improve much. DO levels at the logger right below Folsom Dam generally track closely to what is seen at the Nimbus powerhouse tailwaters. The level we're seeing now may be indicative of what we may continue to see with the 250 cfs flows.
    c. cbec added that based on previous hydrodynamic analyses, a flow of 1,500 cfs would require 3-4 days of water travel time.
2. CDFW reported a slight improvement in DO at the hatchery, although this could be attributed to the natural cooling that is occurring. Currently, DO is averaging around 6 mg/L at the hatchery. A level of 7 mg/L is recommended for bringing adult Chinook salmon onto the fish ladder. DO does increase as water moves down the ladder, but there is a concern around having a high density of adult fish at the top of the ladder where DO is on the lower side.
3. CDFW noted that the power bypass volume this year is less than half of what was used last year.

4. Kleinschmidt Group asked if there is a temperature or DO profile in the reservoir? Is there reason to believe that a low-level outlet would release water with better DO levels?

    a. USBR responded that DO is reading lower as the elevation of the reservoir is lower. The water coming out of the bypass is lower in DO, but by the time the water hits the bottom of the dam, DO increases. In the profiles that USBR has received, the lower down in the reservoir the water is, the lower the DO level is.

    b. USBR offered to examine the vertical DO profile in Folsom compared with last year's data to determine if the DO at the bypass outlet is greater or less than last year at this time. This could be a factor in the DO levels we are currently seeing in addition to the difference in bypass volume between this year and last year.

Temperature Modeling

Kleinschmidt Group

1. As discussed in previous meetings, Kleinschmidt Group modeled five scenarios.
2. Scenarios using 2017 (cool year) data

    a. Kleinschmidt Group first compared two scenarios where releases remain at 250 cfs throughout but one scenario extends at least a week longer. The longer bypass results in a lower temperature by 1°F near mid-November.

    b. When comparing the scenario that starts at 250 cfs and increases to 500 cfs before 11/1, a temperature benefit of about a degree and a half is seen with the higher-volume bypass.

3. Scenarios using 2020 (warm year) data

    a. Kleinschmidt Group reminded the ARG that in 2020, October air temperatures were warmer than in 2017, but November temperatures were actually cooler than that of 2017. These nuances will vary from year to year.

    b. Temperature differences between the 2020 runs are slightly smaller than those using 2017 data.

4. Current, proposed scenario

    a. Kleinschmidt Group shared modeling of the currently proposed bypass scenario of 250 cfs where the temperatures at Watt and Hazel Avenues are becoming very similar.

Questions and Comments

1. USBR noted that later in the season, temperature results are better with the no-bypass option in the 2020 scenario modeling.
    a. Kleinschmidt Group explained that if the cold water wasn't pulled for a power bypass from the bottom of the reservoir, it would results in a very slightly cooler condition available at the power penstock elevation (i.e., the lowest elevation that can be pulled from in the powerhouse).
    b. CDFW emphasized that the primary rationale behind the power bypass proposal was to improve early-season conditions for rearing adult Chinook salmon, eggs deposited in gravel, and Nimbus Fish Hatchery operations. CDFW also mentioned that ARG discussed this rationale in the meetings prior to the power bypass proposal being sent to USBR.
2. CDFW asked if this seasons meteorology is tracking closer to 2017 or 2020 meteorological data.
    a. Kleinschmidt Group said it's not really possible to determine because it's considered a future condition. They cannot predict what November will look like this year.
    b. The previous month of 2024 tracked much warmer than the 2017 data, but that's no indication of what it will be in November.
    c. The temperature chart shows the November outlook to be leaning over 33-40% Above Normal.

Egg Mortality Modeling

CDFW

1. CDFW modeled the same five scenarios with the temperature profiles discussed above.
2. Looking at the transition from October to November, the modeling shows earlier egg survival with the four bypass options when compared to the no-bypass option. This is true with both the 2017 and 2020 meteorology data.
3. The scenarios that increase the power bypass from 250 cfs to 500 cfs show a near double increase in survival during the last week of October and first week of November.

Questions/Comments

1. USBR asked for confirmation that the bulk of the fish population in the American River would be spawning during mid-November. Would this lead to lower fry production overall if this is happening mid-to-late November?
    a. CDFW provided the following replies:
        i. The hatchery is scheduled to begin spawning on 10/31, however the fish cannot spawn in DO that is less than 7 mg/L.
        ii. Higher temperatures also lead to female fish that are not mature enough (i.e., ripened) for spawning, so the hatchery must wait until the females have ripened to begin spawning.
        iii. These potential spawning delays lead to a chain reaction in delays, where juvenile outmigration happens later than the optimal time frame, meaning they could experience too-warm temperatures once they reach the fry stage. They need to reach the ocean before Delta conditions become dire, and they need to reach adequate size to accomplish this life stage.
        iv. Early-season spawning also helps with genetic diversity.
        v. Peak spawning now occurs in early November, but it used to occur in early October. Climate change and warmer temperatures are pushing the spawn timing to later into the year.
        vi. In summation, purposefully limiting cold water (e.g., a lack of a bypass or a low-volume bypass) is going to have a lot of compounded effects.

Temperature Forecast

USBR

1. USBR compared 2024 forecast data with 2023 temperature data. The 2024 forecast extends to 11/3, or 10 days from 10/24/2024.
2. Early October 2024 was warmer than October 2023, but at this point in the month, we've shifted to cooler weather.
3. USBR is performing daily temperature monitoring.
4. USBR shared rationale for their current power bypass plan.
    a. Ambient air temperature is typically warmer in October and cooler in November.
    b. Spawning rates are lower in earlier fall and higher by mid-November.

c. USBR considers conducting a power bypass to be high risk because the water is used up and not reserved for later months.

d. USBR anticipates that ending the power bypass early is lower risk.

e. In addition to saving cold water, the intention is also to protect the largest number of fish possible.

f. Each year seems to get warmer and warmer, so by trying to protect the early fish, the cold water is used up earlier.

Questions and Comments

1. CDFW asked for clarification on the choice of a constant 250 cfs bypass versus one that increases to 500 cfs.

    a. USBR responded that there doesn't appear to be a big change in egg mortality across all scenarios starting in November. November 6 is around the time that USBR would discontinue the bypass because by that point, there doesn't appear to be a meaningful distinction between scenarios for egg survival outcomes.

    b. CDFW countered that it's hard to say if the differences between scenarios are or are not significant without running modeling to confirm. Also, comparing the power bypass flow levels rather than the power bypass end date is what seems to indicate a factor for survival. The biggest difference in the scenarios occurred in the first couple weeks of the initial power bypass proposal which would have had beneficial effects to early adult spawners. This was discussed in the power bypass proposal and at the ARG meetings prior to the power bypass proposal being implemented.

2. CDFW asked if new egg survival models were run before USBR made the decision about the bypass?

    a. USBR responded that they used the data provided with the proposal.

    b. CDFW commented post-meeting that the power bypass plan developed and adopted by USBR was not modeled.

3. NMFS requested a formal response from USBR to the power bypass proposal. This should include the reasoning behind USBR's choice of bypass, as well as data on the lethal levels on temperature and DO if the bypass is ended on 11/9. NMFS would like this response before 11/9.

4. CDFW noted that after 11/6/24, the modeling doesn't show much difference between scenarios. But between the 250 cfs vs 500 cfs bypass options, there seems to be a distinct increase in egg survival compared to no bypass and the current, constant 250 cfs bypass. Although modeling wasn't run to provide statistical significance, CDFW noted that changes in survival from 0.13 to 0.3 and 0.17 to 0.36 seem significant. Those survival changes may lead to a decent egg survival in the river and also benefit the hatchery.

5. Kearns & West asked if there are ARG members who feel strongly about extending the bypass to 11/15/2024 or if the issue is more about the increase in cfs from 250 to 500, ending on 11/9/2024.

    a. CDFW expressed concern about stopping on 11/9/2024 unless there is a clause in place that accounts for the presence of lethal water temperatures. While the modeling shows results converging, there is still much uncertainty about future weather conditions.

6. CDFW said DO needs to be kept in consideration with this decision. Changes in DO will impact the fish in the ladder. Is 11/6/2024 the date proposed for offramping the power bypass?

    a. USBR responded that they planned to ramp down between 11/5/2024 – 11/8/2024. This will entail monitoring temperatures and DO. The target temperatures and DO level will require additional discussion. USBR asked about recent carcass numbers.

    b. CDFW said the carcass numbers are low as of 10/24/2024 (23 in the previous two weeks); most look like they have not spawned. Some look diseased or partially-spawned, but most carcasses appeared to be pre-spawn mortalities.

7. CDFW said that Nimbus Fish Hatchery is maintaining DO levels solely through the aerators in the raceways and they need assurances that DO will be above 7 mg/L through the fall noting that they can't bring fish to the ladder if there is potential for another DO drop to occur.

8. CDFW added that later in November, the temperature modeling is showing improvements in temperature; this is largely driven by daytime temperatures. They reiterated that the intention of this power bypass was to improve early adult holding, reduce pre-spawn mortalities which are already being seen, improve egg survival for the early spawning fish, improve hatchery conditions, and support spawning operations that are scheduled to be starting in a week. The power bypass proposal was targeted to reduce some of these concerns in late October and early November.

9. USBR noted that last year the first DO profile wasn't taken until 10/31/2023, whereas the most recent 2024 profile taken is from 10/15/2024. USBR will take another profile on 10/31/2024 for further comparison.

10. The Water Forum expressed concerns about the power bypass ending on 11/9/2024.

11. CDFW shared a concern that the current power bypass being implemented of 250 cfs was not one of the modeled options.

Discussion

1. USFWS noted that despite the lack of a Drought water type year in 2024, the Central Valley experienced record-high temperatures with 45 days over 100°F. This factor should be considered in the decision about implementing a power bypass.
2. CDFW noted that the closing of the commercial fishery for salmon constitutes an emergency that could warrant the adoption of a power bypass.
3. CDFW asked if the 250-500 cfs bypass scenario that was modeled is implemented, how long would the 500 cfs flow be sustained before access to the cold-water pool is lost?
    a. Kleinschmidt Group responded that this option, if abruptly ended after reaching 500 cfs, could result in a significant temperature increase. If the power bypass is maintained, you may not see much of a temperature impact but would be obligated to continue the power bypass for a longer duration. This is true when modeling both cool year and warm year data.
    b. If the power bypass is continued longer, the scenarios all converge around 11/16/2024 or so.
    c. The point of convergence is when the cold-water pool has been depleted. At that point, the ambient air temperature becomes responsible for cooling the water as it moves downstream.
4. USBR reiterated that they prefer the 250 cfs power bypass volume in order to save the water for the bulk of spawners.
    a. CDFW asked if this means the power bypass would be carried into November to support the fish later in the season.
        i. USBR replied that it's a higher risk to carry the 250 cfs bypass into November. They are trying to balance helping the early fish with reducing risk to the peak of the spawning run.
        ii. USBR noted that a provision was included to consider restarting the bypass depending on rising air temperatures and environmental conditions.
        iii. CDFW commented post-meeting that [the action taken by USBR] is not supportive of the life history diversity of fall-run Chinook salmon in the LAR and also contributes to temperature barriers to migration into the LAR and pre-spawn mortality of fall-run Chinook in the LAR.

5. Kleinschmidt Group noted that it seems like there's not enough power bypass volume to get DO over 7 mg/L. That seems like a definitive target.
    a. The Water Forum added that more attention could be given to DO at Nimbus Dam. Increasing spill and decreasing water through the powerhouse could help with DO here. This would be a potential solution that is altogether separate from the bypass, and it was an action that helped bring up DO levels in 2023.
    b. USBR shared that Gate 18 is closed as of 10/22/2024 and more water is spilling through the first two gates. They will monitor to see if that makes a positive difference.
    c. Rod Hall noted that the ARG has not yet agreed on the main objective for this effort: protecting early spawners versus maximizing total production. CDFW seems to be more in support for the former, and USBR for the latter.
6. USBR stated that they will not be changing the power bypass volume or timeframe and suggested that ARG members elevate the issue to WOMT.
    a. ARG members agreed that staying above 7 mg/L should be a target threshold.
    b. CDFW noted that conditions warrant using one of the power bypass scenarios that were actually modeled (e.g., the 250-500 cfs bypass option) to improve egg survival and allow for moving adult Chinook salmon to the fish ladder.
    c. Water Forum supports a power bypass that increases to 500 cfs will be the most beneficial for DO levels.

Next Steps

WOMT Elevation

Participants will need to alert their WOMT representatives.

Next Meeting

The next regularly scheduled ARG meeting is on Thursday, November 21. The meeting will be virtual.