



— BUREAU OF —
RECLAMATION

Stanislaus Watershed Team

Meeting Summary 4/15/2020

1. Action Items

- J.D. Wikert:
 - Send SWT the link to the California-Nevada Chapter of the American Fisheries Society (Cal-Nev AFS) virtual meeting (DONE)
 - Send SWT the link to the FISHBIO paper on trap efficiency (DONE)
 - Send Central Valley Project Improvement Act (CVPIA) document (DONE)
- Zarela Guerrero:
 - Share the Stepped Release Plan Guidance document (DONE)
- Barb Byrne:
 - Elevate within NMFS the issue of the exceedance level to be used for SRP flows; report back to SWT.
 - Send draft 508 compliant template materials to Reclamation and K&W for further refinement
 - Coordinate with Erin Foresman, J.D. Wikert and Susan Manugian to create a 1-2 page write up on the temperature suitability criteria for steelhead and Chinook for the meeting handout; consider adding reference lines to the temperature figures.
- K&W
 - Change agenda order to Operations and Updates and Forecasts, Hydrology and Temperature Updates and Flow Planning
 - Add agenda item for tracking documents online
 - Coordinate with Reclamation to post 508 compliant meeting materials

2. Introductions

- USBR: Matt Di Loreto, Zarela Guerrero, Levi Johnson, Liz Kiteck, Suzanne Manugian, Sarah Perrin & Thuy Washburn
- NMFS: Barbara Byrne
- USFWS: J.D. Wikert

- CDFW: Duane Linander, Ryan Kok, Jonathon Williams & Paige Uttley
- SWRCB: Chris Carr, Erin Foresman, Michael George & Yongxuan Gao
- DWR: Bryant Giorgi, Matthew Meyers
- Kearns & West: Rafael Silberblatt, Kai Walcott

3. Announcements

- The California Nevada-Chapter of the American Fisheries Society (Cal-Nev AFS) is hosting a virtual meeting.
- J.D. Wikert will be giving a presentation and will circulate the link to the meeting once the date has been finalized.
 - Link here: <https://fisheries.org/events-page/virtual-spring-conference/>

4. Hydrology and Temperature Updates

- There are no storms expected based on the seven-day model. The last two storms triggered snow melt.
- Air temperature is expected to increase to 80 °F over the next few days, and this warmer temperature is anticipated to continue.
- Water temperatures:
 - Goodwin Canyon: Water temperatures remain cool.
 - Orange Blossom: Daily maximum water temperature was ~59 °F, which is suitable for fish (temperatures in the mid-60s and above are poor conditions for rearing and migration). The SacPAS heat map shows that temperatures here tend to be suitable through April but warm to low-to mid-60s °F in May creating poorer conditions.
 - Ripon: Maximum water temperature was ~63 °F, an increase of three to four degrees from Orange Blossom. Data from the SacPAS heat map at Ripon show that warming usually occurs earlier in the year than at Orange Blossom.
 - Vernalis: Maximum water temperatures have already hit 65 °F and are anticipated to continue being higher at this location on the mainstem San Joaquin River than in the Stanislaus River. The SacPAS heat map data shows that Vernalis tends to have hotter temperatures overall.
 - On the Stanislaus River, within-day variation in water temperature has increased as air temperatures warm and flows change (see details in handouts).
 - Warm summer water temperatures are expected this year, but not as warm as observed in 2015.
 - There was a request to include reference lines indicating temperature suitability on the temperature graphs. Because suitability depends on life-stage and species, it was proposed that a subgroup would work to develop a one-page narrative on temperature suitability for steelhead and Chinook that can be included in the handout to provide context to the temperature figures.

5. Operations Update and Forecasts

- Recent and Upcoming Operations
 - Reservoir Conditions: New Melones is at 1.908 MAF storage.
 - Flow:
 - New Melones: Inflows are at 1,900 cfs, due to snow melt and warm weather, and are expected to stay within 1,200- 1,700 through April and then taper down.
 - Goodwin Dam: Demands are beginning to increase from the Joint Main and South Main.
 - Releases from Goodwin Dam are following the reshaped spring pulse flow; two of the six peaks in the pulse schedule have been implemented to date.
 - The Joint Main delivery for April is typical (850 cfs) and is expected to increase to 800-1000 going forward.
 - South Main delivery dipped in the beginning of April, due to the rain events, but is expected to increase by next week to the typical April value of 200 cfs.
 - Vernalis requirements under D-1641
 - The projected EC (Electrical Conductivity) at Vernalis is expected to be at 0.7 or lower at the end of April.
 - The San Joaquin Basin “60-20-20” water year type is classified as Critical based on the April 75% and 90% exceedance forecasts
 - The SRP Guidance Document shared by Reclamation with SWT reports that the 60-20-20 water year type will be based on the 90% exceedance forecast,
 - Barb Byrne expressed concern that the 60-20-20 water year type would not be calculated using the 75% exceedance forecast as implemented for D-1641 standards and will elevate the issue to NMFS management. schedules.
 - Zarela Guerrero will recirculate the Stepped Release Plan Guidance Document to the SWT.

6. Stanislaus River Forum (SRF) Call Review

- Stanislaus River Forum was held via conference call on April 14, 2020. Zarela Guerrero (USBR), Karna Harrigfeld (Stockton East) Levi Johnson (USBR), Ryan Kok (CDFW), Sarah Perrin (USBR) and Thuy Washburn (USBR) were in attendance. Operations, handouts and fish data were review; no public comments or feedback were received.

7. Fish Monitoring and Studies

- FISHBIO resumed sampling for their Native Fish Study on April 3 at the Oakdale Rotary Screw Trap (RST). There was an uptick in catches as a result of the pulse flows starting.

- At Mossdale Trawl, USFWS postponed sampling in mid-March and it has not been resumed by either USFWS or CDFW (who conducts the Mossdale Trawl during the late spring) as a result of COVID-19 precautions.
- No steelhead have been caught at the Mossdale Trawl this water year, though four Chinook were caught. Overall salmonid catch at this sampling location is very low when compared to previous years.
- J.D. Wikert will send the FISHBIO paper about trap efficiency on the Stanislaus River to the SWT.
 - Link here: <https://escholarship.org/uc/item/2z38p12t>

8. Restoration Project Updates

- Work has slowed as a result of COVID-19. There are no updates available.
- Central Valley Project Improvement Act (CVPIA) has released their annual Fiscal Year 2020 Obligation Plan for CVPIA Authorities (formerly known as the Annual Work Plan).
- J.D. Wikert will distribute the CVPIA Plan link to the SWT.
 - Link here: https://drive.google.com/file/d/1vID_aMH8xjT-7FiyYgNHHINjv_DWOfCA/view

9. Progress Toward BiOp Requirements (Proposed Action Elements)

- No updates available.

10. Flow Planning

- Alternative 5, developed after last month's meeting, was approved for the flow schedule (see details in handouts). Note that this was relabeled as Alternative 4 in the final operations plan for convenience.

11. Other Discussion Items

- COVID-19
 - Fish monitoring has resumed at Caswell RST and Oakdale RST.
 - Facilitation housekeeping
 - 508 compliance:
 - Only documents posted to Reclamation's website need to be 508 compliant.
 - Barb Byrne will send the draft 508 compliant template materials to Reclamation and K&W for further refinement.
 - Editing meeting notes:
 - Draft meeting notes will continue being edited by participants separately and then combined by K&W before distribution.
 - Text template for data:

- The “alternative text” in the 508 compliant version can be used to pull summary information on the hydrology, temperature, and operations update.
- BiOp tracking and document library
 - The discussion on BiOp tracking and the related online document library will be added to next month’s agenda.

Next Meeting

- Wednesday, May 20, 2020 (10am-12pm)



— BUREAU OF —
RECLAMATION

Stanislaus Watershed Team

10:00 AM – 12:00 PM

Conference Line: 1 (773) 231-9226; Meeting ID: 148 869 4090

WebEx: <https://meetings.ringcentral.com/j/1488694090>

Wednesday, April 15, 2020

Agenda

1. Introductions
2. Announcements
3. Hydrology and Temperature Updates
4. Operations Update and Forecasts
5. Stanislaus River Forum (SRF) Call Review
6. Fish Monitoring and Studies
7. Restoration Project Updates
8. Progress Toward BiOp Requirements (Proposed Action Elements)
9. Flow Planning
10. Other Discussion Items
 - a. COVID-19 discussion
 - b. Facilitation housekeeping
11. Review Action Items
12. Next Meeting
 - a. Wednesday, May 20, 2020 (10am-12pm)

UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. BUREAU OF RECLAMATION-CENTRAL VALLEY PROJECT-CALIFORNIA

APRIL 2020

NEW MELONES LAKE DAILY OPERATIONS

RUN DATE: April 13, 2020

DAY	ELEV	STORAGE		COMPUTED* INFLOW C.F.S.	RELEASE - C.F.S.			EVAPORATION		PRECIP INCHES
		1000 ACRE-FEET IN LAKE	CHANGE		POWER	SPILL	OUTLET	C.F.S.	INCHES	
		1,892.3								
1	1,042.34	1,892.0	-0.3	1,123	1,230	0	0	55	.16	.00
2	1,042.39	1,892.5	+0.5	1,188	859	0	0	59	.17	.00
3	1,042.41	1,892.7	+0.2	1,147	963	0	0	76	.22	.00
4	1,042.41	1,892.7	+0.0	1,074	1,019	0	0	55	.16	.00
5	1,042.65	1,895.3	+2.6	2,566	1,256	0	0	14	.04	.12
6	1,042.99	1,898.9	+3.6	2,859	1,017	0	0	7	.02	1.98
7	1,043.17	1,900.8	+1.9	1,746	761	0	0	10	.03	.40
8	1,043.35	1,902.8	+1.9	1,692	668	0	0	49	.14	.01
9	1,043.46	1,904.0	+1.2	1,882	1,241	0	0	45	.13	.05
10	1,043.52	1,904.6	+0.6	1,665	1,309	0	0	31	.09	.05
11	1,043.63	1,905.8	+1.2	1,559	921	0	0	42	.12	.00
12	1,043.79	1,907.5	+1.7	1,926	1,003	0	0	56	.16	.00
TOTALS			+15.1	20,427	12,247	0	0	499	1.44	2.61
ACRE-FEET			+15,100	40,517	24,292	0	0	990		

COMMENTS:

* COMPUTED INFLOW IS THE SUM OF CHANGE IN STORAGE, RELEASES AND EVAPORATION.

SUMMARY

	RELEASE (ACRE-FEET)			PRECIPITATION	
POWER	24,292	OUTLET	0	THIS MONTH =	2.61
SPILL	0	TOTAL	24,292	JULY 1, 2019 TO DATE =	21.44
				OCT 1, 2019 TO DATE =	21.20

OAKDALE IRRIGATION DISTRICT
 SOUTH SAN JOAQUIN IRRIGATION DISTRICT
 TRI DAMS PROJECT-CALIFORNIA

APRIL 2020

GOODWIN RESERVOIR DAILY OPERATIONS

RUN DATE: April 13, 2020

DAY	ELEV	STORAGE		TULLOCH	RIVER		RELEASE - C.F.S.	
		ACRE-FEET	CHANGE		RELEASE	OUTLET	SPILL	JOINT MAIN
		521						
1	359.77	521	+0	1,092	0	200	697	135
2	359.77	521	+0	1,103	0	204	704	135
3	359.77	521	+0	1,123	0	205	729	137
4	359.77	521	+0	1,103	0	202	695	153
5	359.89	529	+8	999	0	218	662	81
6	359.77	521	-8	836	0	241	579	0
7	359.77	521	+0	822	0	230	585	0
8	360.39	564	+43	1,581	0	973	583	0
9	360.14	547	-17	2,281	0	800	571	41
10	359.95	534	-13	1,182	0	529	606	40
11	359.89	529	-5	1,074	0	404	614	30
12	359.89	529	+0	1,103	0	402	615	29
TOTALS			+8	14,299	0	4,608	7,640	781
ACRE-FEET			+8	28,362	0	9,140	15,154	1,549

JOINT MAIN OPERATED BY SSJID AND OID.

SUMMARY
 RELEASE (ACRE-FEET)

JOINT MAIN CANAL	15,154	OUTLET	0
SOUTH MAIN CANAL	1,549	SPILL	9,140
		TOTAL	25,843

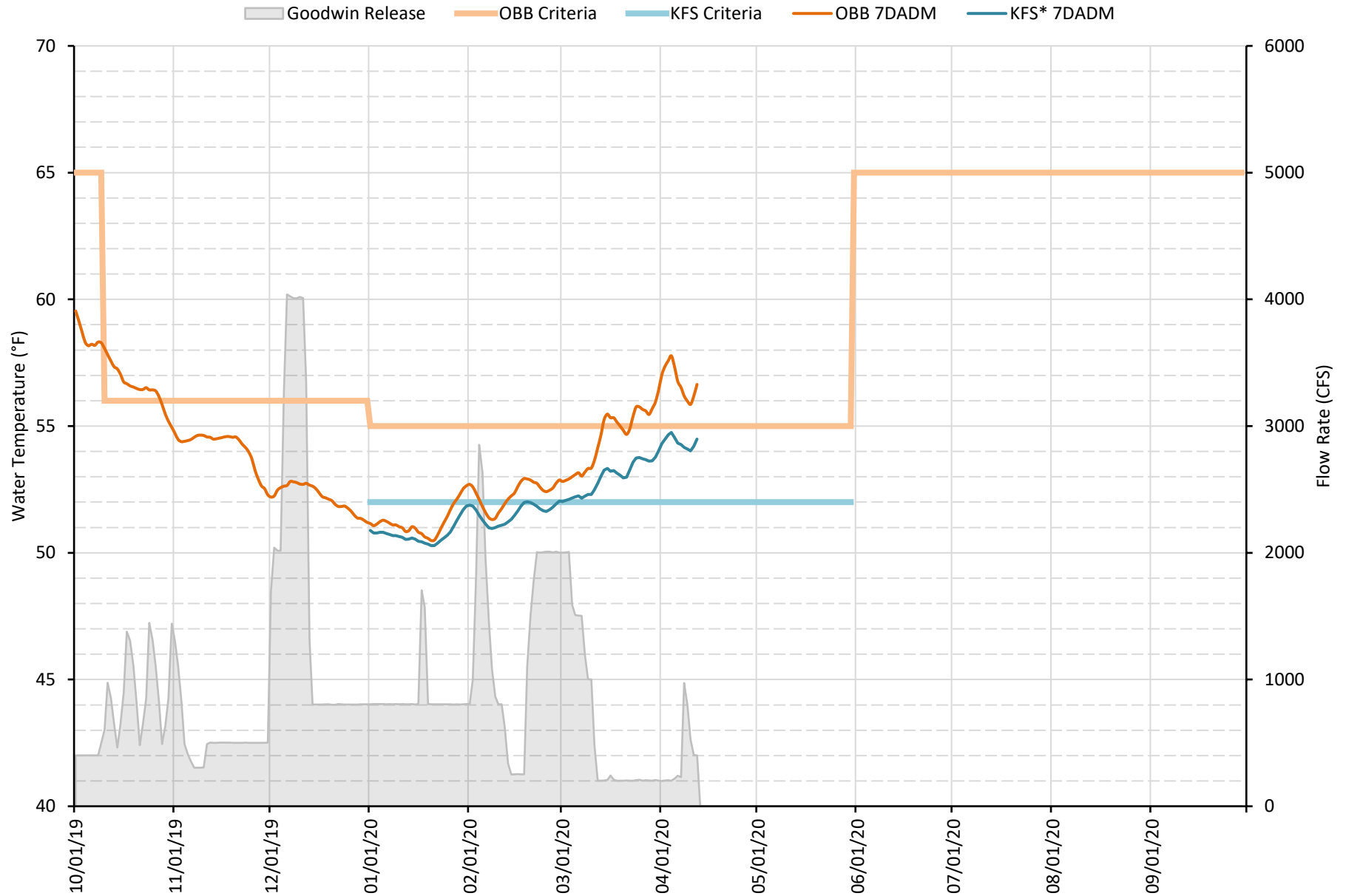
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New Melones - Stanislaus River Basin



- Outflow
- Inflow
- Top of Con (Early Refill Diagram)
- Top of Con (Late Refill Diagram)
- Reservoir Storage
- Precipitation

WY 2020 Stanislaus River Releases and Temperatures



*KFS Daily Maximum = (0.293 x OBB) + (0.708 x USGS) where OBB and USGS are the Daily Maximums in Fahrenheit at DWR's OBB and USGS's 11302000 monitoring sites. Coefficients were calculated using data from DWR's OBB, USGS's 11302000 and DFG's KFS monitoring site collected from Jan 1 to May 31 in 2007 and 2009.

April 2020 Stanislaus River Update

Water Year Type

San Joaquin Basin “60-20-20” water year type (based on the April 75% exceedance forecast):
Critical

No change in water year type since March forecast, though index of 2.1 is right on the edge of the Dry year range of >2.1 and ≤ 2.5 . With the rain we had during early April, possible that the year type based on the May forecast might tip into Dry.

Flows

The New Melones Stepped Release Plan minimum flow schedule for the Critical year type requires minimum instream base flows of 200 cfs in March and in April prior to the spring pulse flow and 150 cfs after the spring pulse flow. Goodwin releases since mid-March are shown in Figure 1.

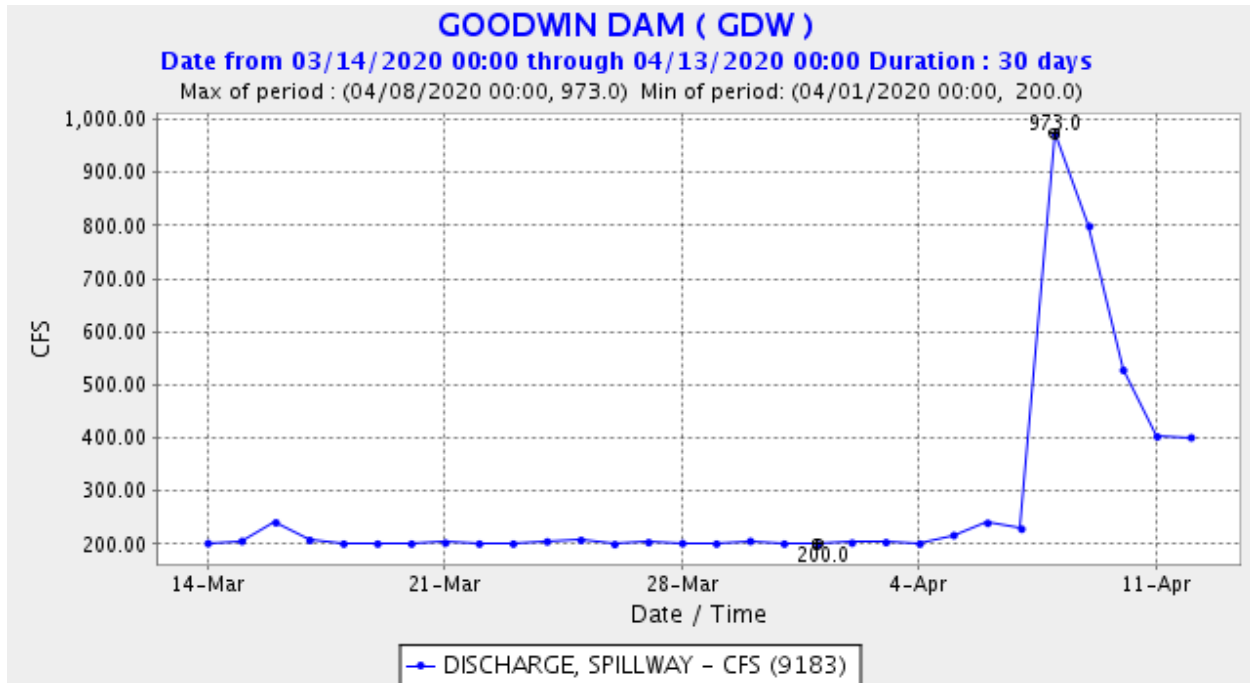


Figure 1. Goodwin (daily) releases to the Stanislaus River since March 14, 2020. Data from GDW station on CDEC.

The Critical year type spring pulse flow has a total volume of 67,240 AF, including base flows, for the March 16-June 30 period. After input from the SWT, Reclamation’s final plan was to implement the “Alternative-Critical 4” schedule (Figure 2).

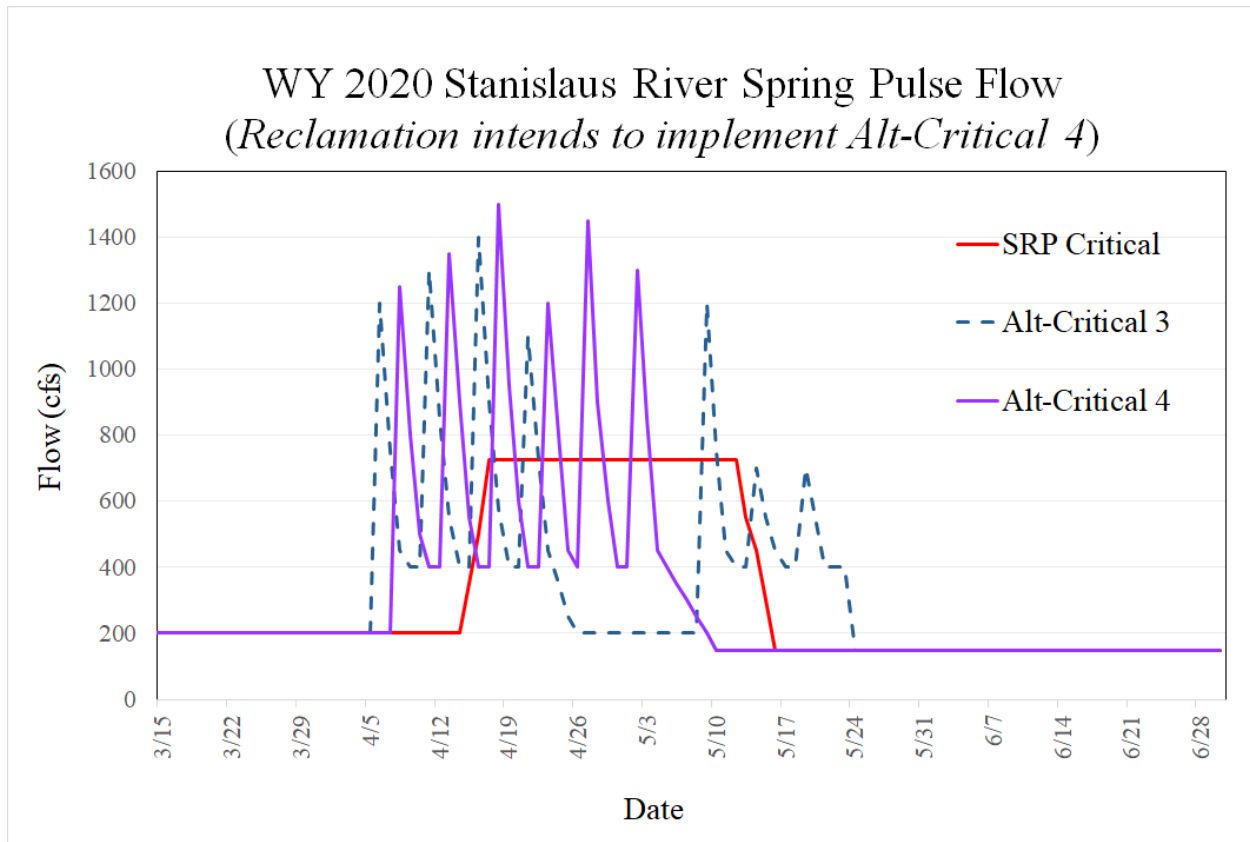


Figure 2. Daily flows from mid-March through June 2020 in the default SRP-Critical schedule and Alternative-Critical 3 and Alternative-Critical 4 schedules.

Water Temperature

Water temperatures in the Stanislaus River since January 2020 are shown below at Goodwin Canyon (Figure 3), Orange Blossom Bridge (Figure 4), and at Ripon (Figure 5). Water temperatures in the San Joaquin River since January 2020 are shown below at Vernalis (Figure 6). Current-year water temperatures are put in historical context for Orange Blossom Bridge (Figure 7), Ripon (Figure 8), and Vernalis (Figure 9).

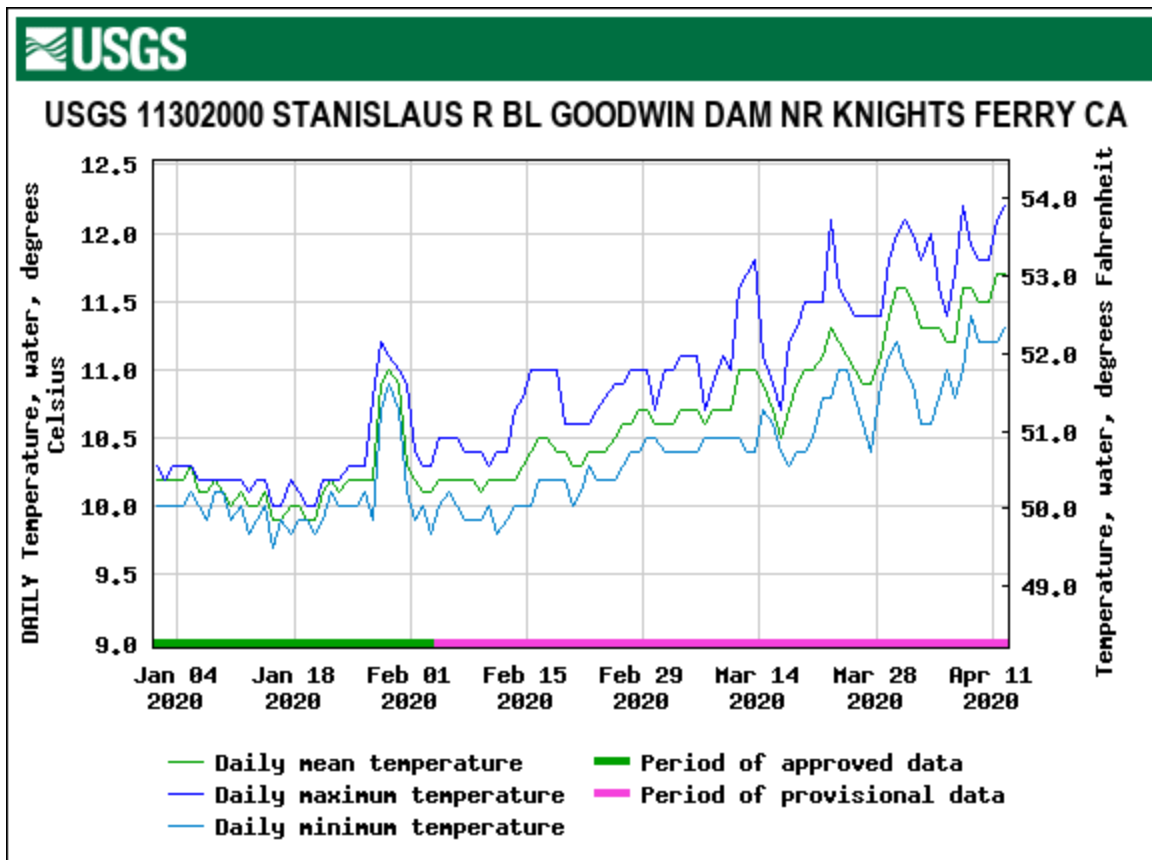


Figure 3. Daily water temperatures on the Stanislaus River upstream of Knights Ferry since October 1, 2019. Data from USGS gage 11302000 on NWIS.

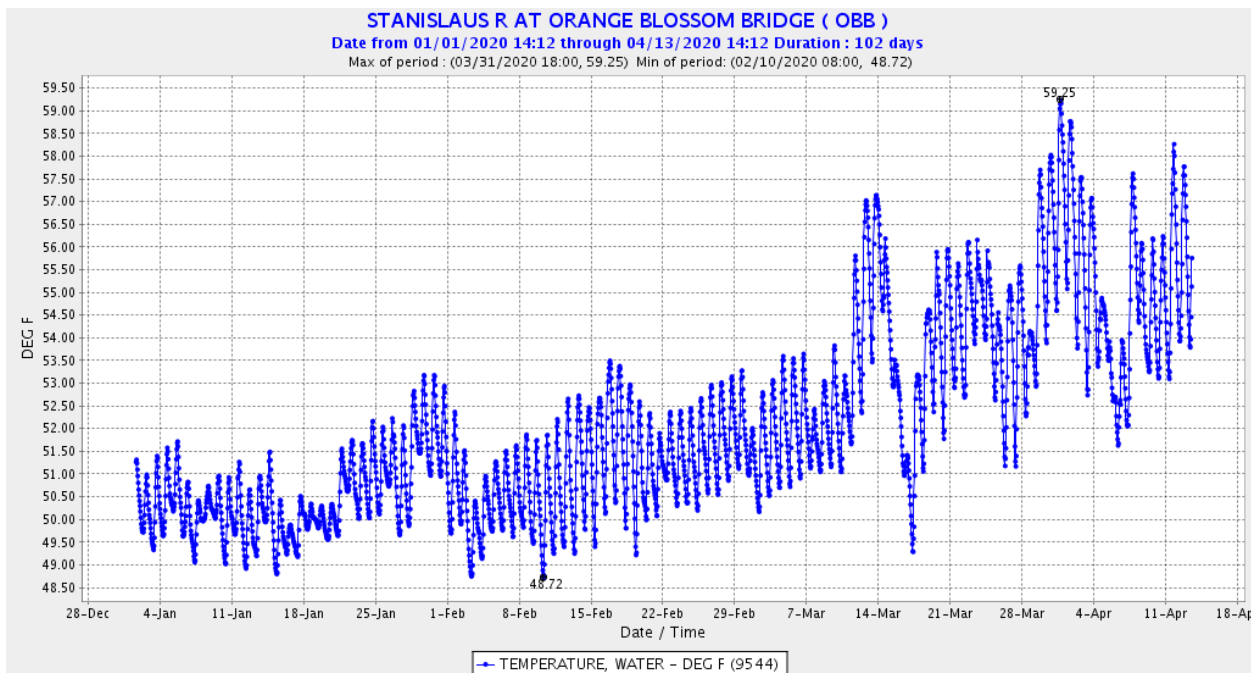


Figure 4. Stanislaus (hourly) water temperatures at Orange Blossom Bridge since January 1, 2020. Data from OBB station on CDEC.

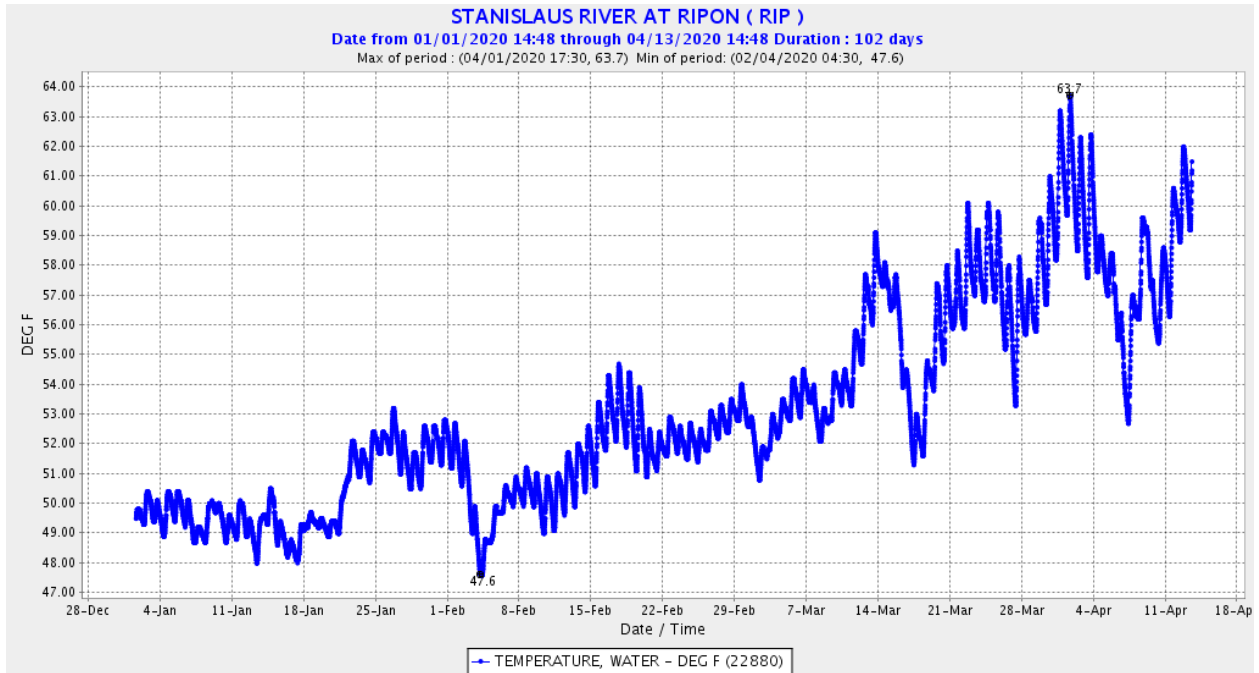


Figure 5. Stanislaus (15-minute) water temperatures at Ripon since January 1, 2020. Data from RIP station on CDEC.

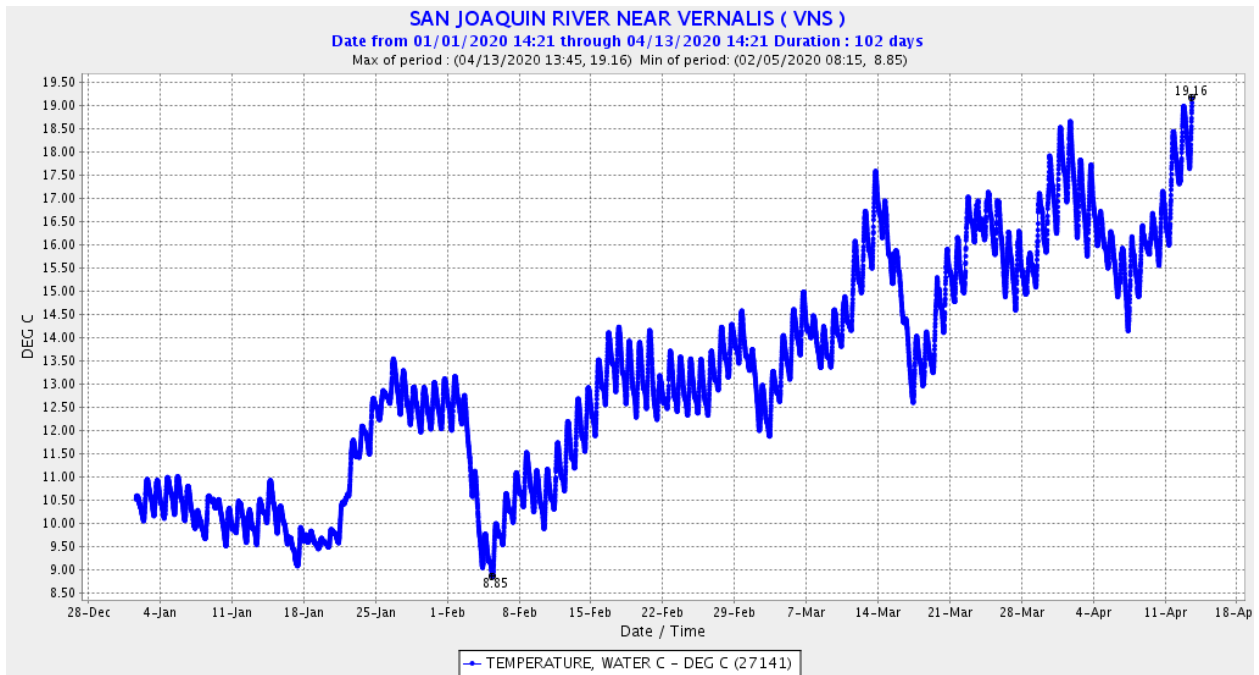


Figure 6. San Joaquin River (15-minute) water temperatures at Vernalis since January 1, 2020. Data from VNS station on CDEC. Note that, unlike in the previous figures, temperature is reported in degrees Celsius. 10°C=50°F; 12°C=53.6°F; 14°C=57.2°F; 16°C=60.8°F; 18°C=64.4°F.

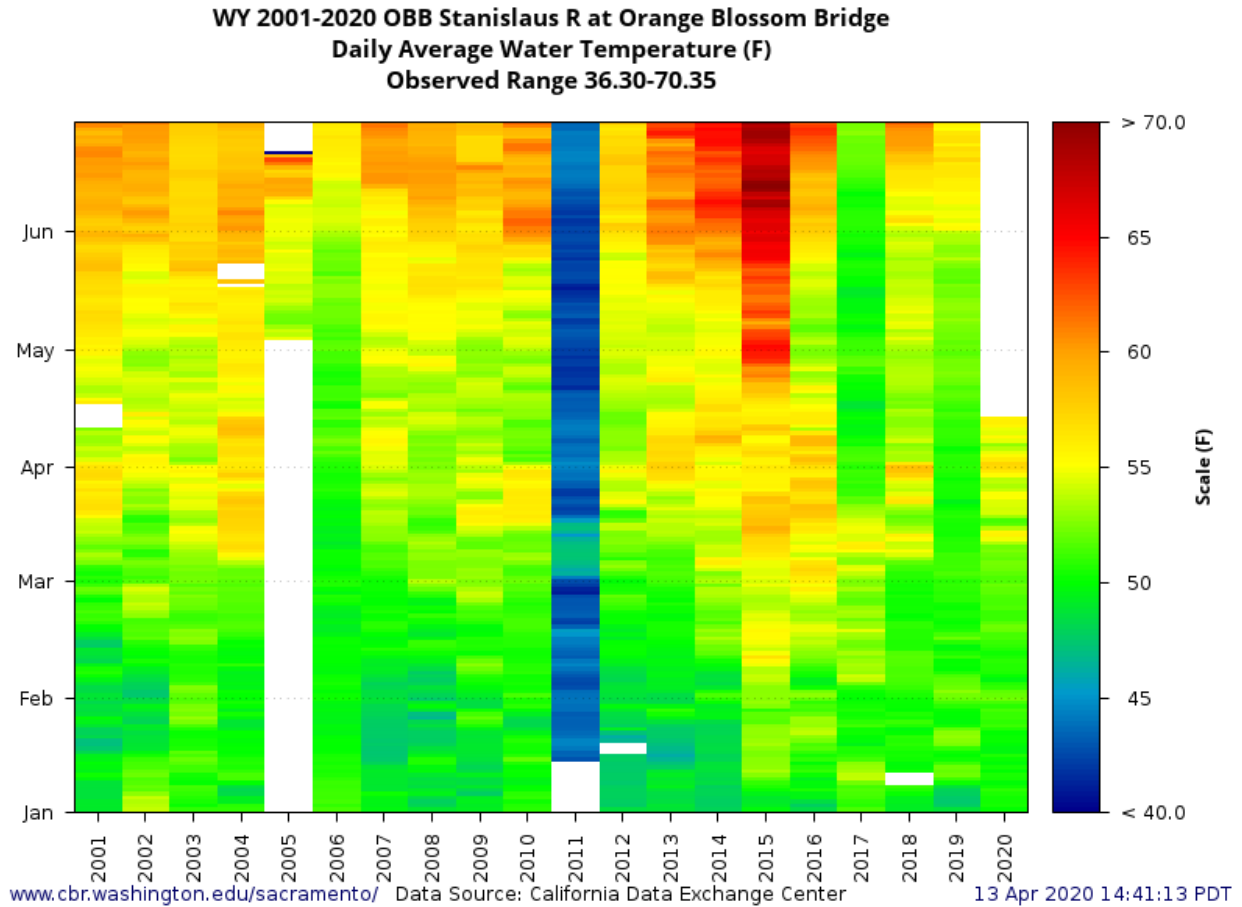


Figure 7. Stanislaus River water temperatures at Orange Blossom Bridge for January through June from 2001 to present. Data from SacPAS.

WY 2012-2020 RIP Stanislaus R at Ripon (USGS)
Daily Average Water Temperature (F)
Observed Range 43.04-81.63

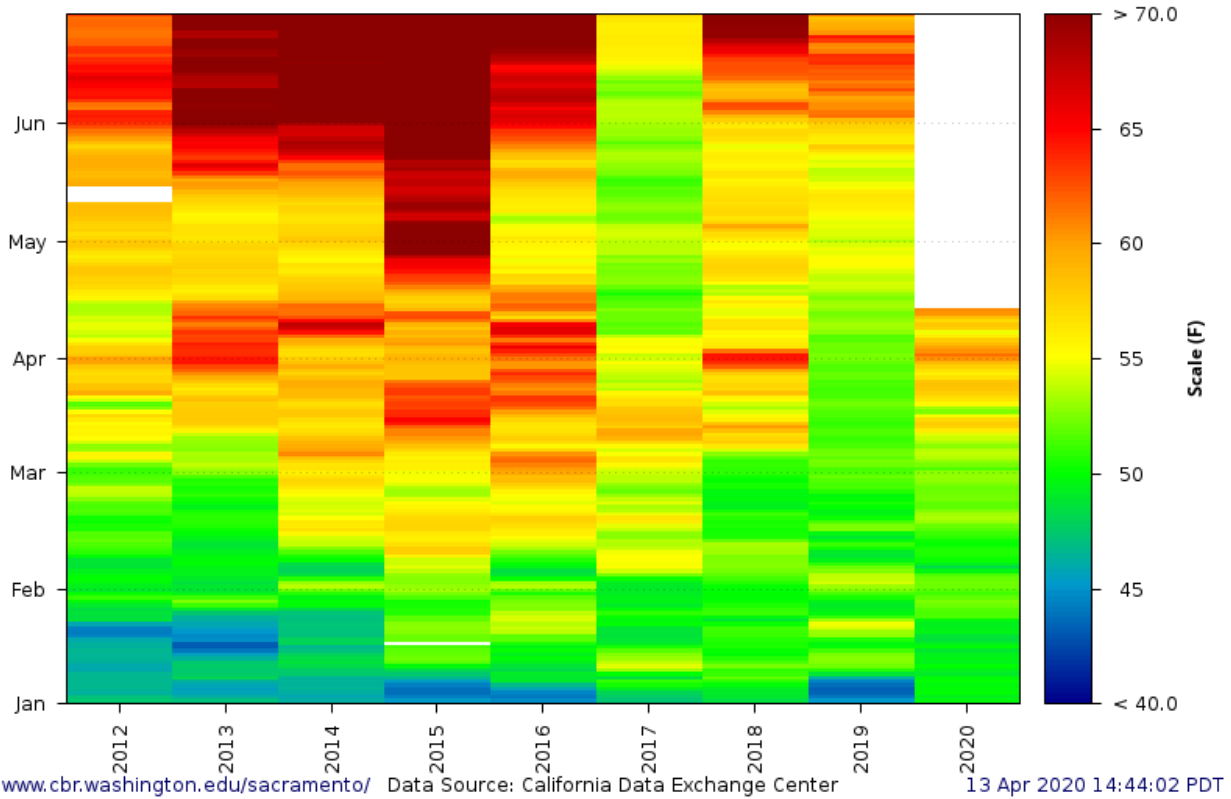


Figure 8. Stanislaus River water temperatures at Ripon for January through June from 2012 to present. Data from SacPAS.

WY 2015-2020 VNS San Joaquin R near Vernalis
 Daily Average Water Temperature (F)
 Observed Range 44.20-82.18

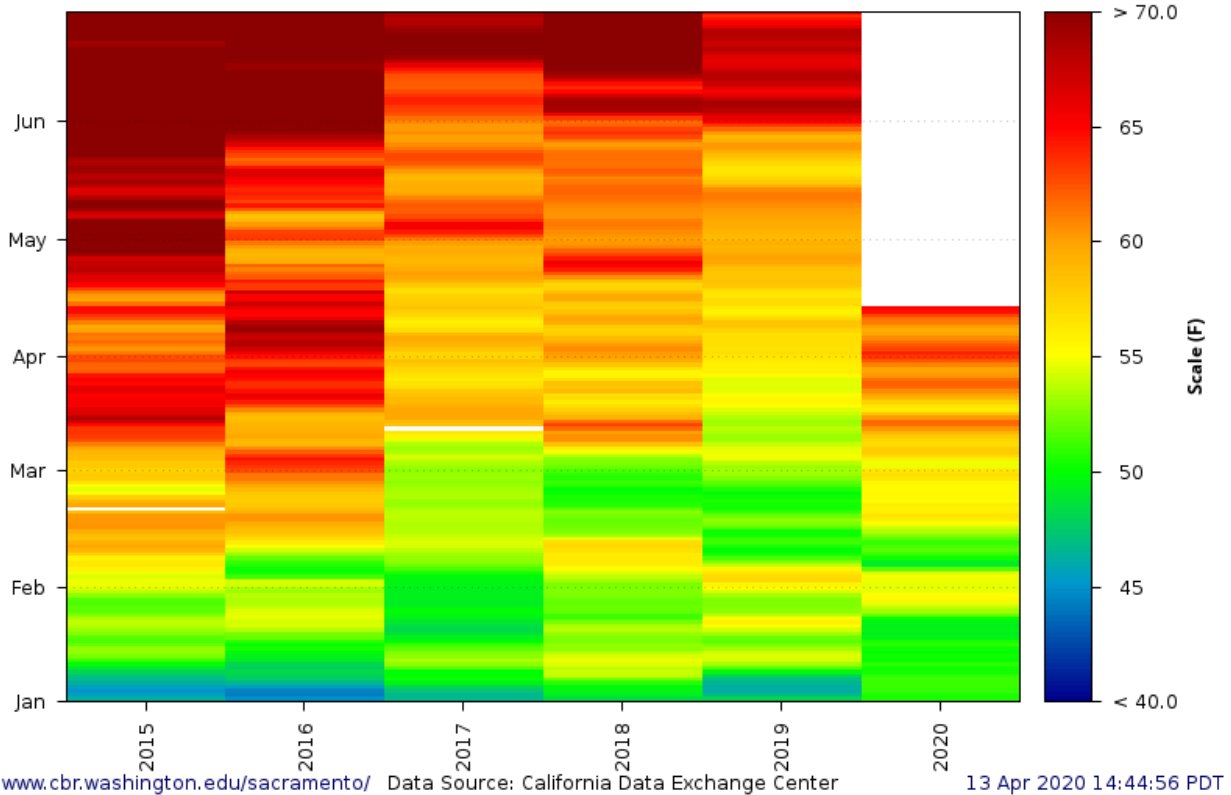


Figure 9. San Joaquin River water temperatures at Vernalis for January through June from 2015 to present. Data from SacPAS.

Update on Fish Monitoring

Rotary screw trapping at Oakdale (conducted by FISHBIO) and Caswell [conducted by the Pacific States Marine Fisheries Commission (PSMFC)] for the 2019/2020 outmigration season (for monitoring of outmigrating juvenile salmonids) began in late December (at Oakdale) and early January (at Caswell). FISHBIO suspended sampling at Oakdale as of March 17, 2020, due to COVID-19 concerns, but resumed sampling on April 20, 2020 (but no data received since mid-March). PSMFC also suspended sampling, but resumed sampling in late March. Chinook catch at each location is summarized in Figure 10 (Oakdale) and Figure 11 (Caswell).

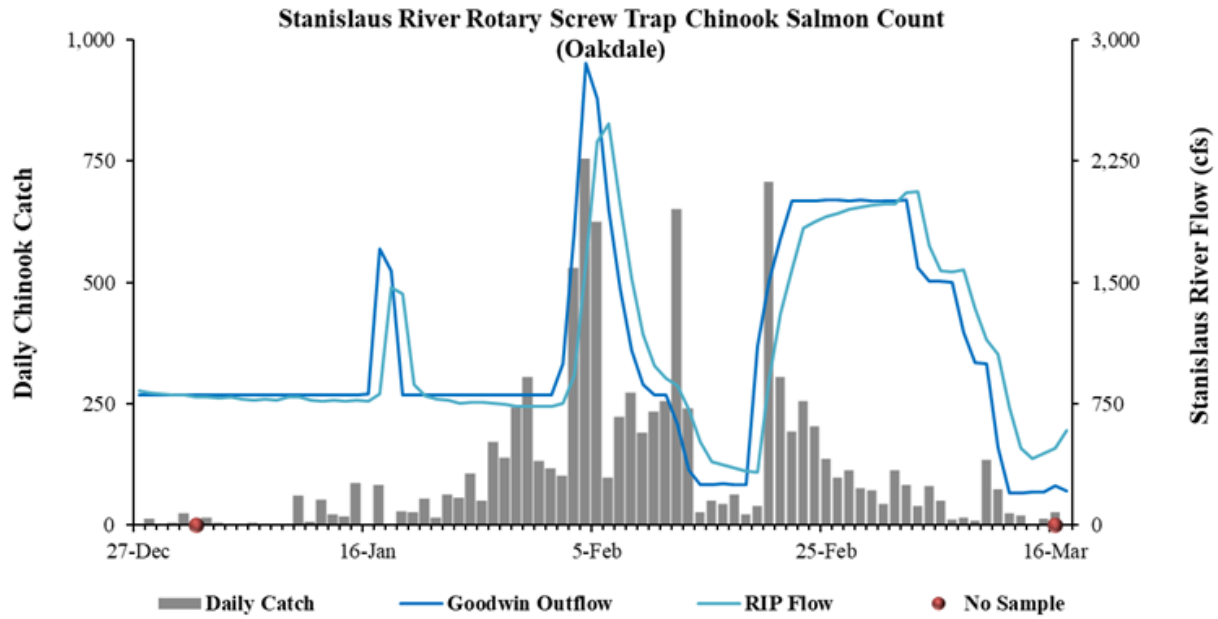


Figure 10. Juvenile Chinook catch through March 17, 2020, at the rotary crew trap near Oakdale. Figure provided by FISHBIO in their 3/18/20 San Joaquin Basin Update.

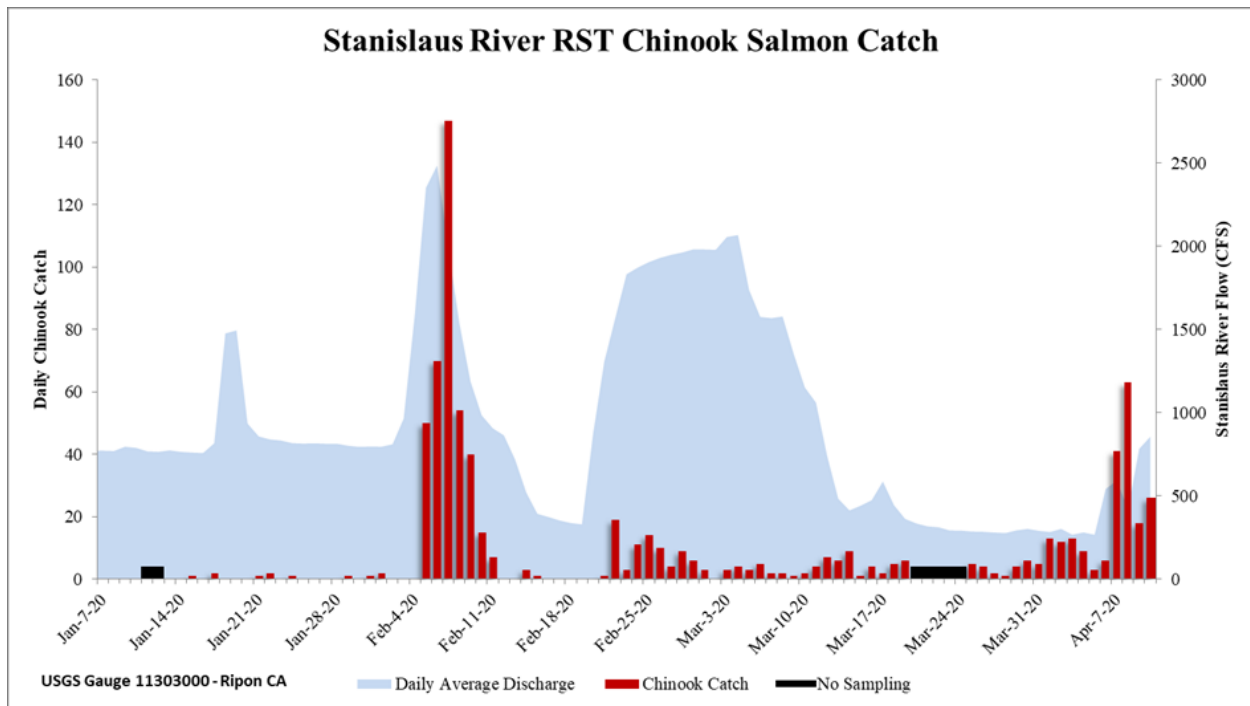


Figure 11. Juvenile Chinook catch through April 10, 2020, at the rotary crew trap near Caswell State Park. Data courtesy of PSMFC.

USFWS conducts the Mossdale Trawl on the mainstem San Joaquin River for much of the year. Since the start of the water year (October 1, 2019) through March 20, 2020, four Chinook salmon (one ad-clipped) and no *O. mykiss* have been reported at that monitoring location (based on data from Bay Delta Live: <https://www.baydeltalive.com/fish/djfm-highlights>). USFWS suspended sampling at Mossdale in late March due to COVID-19 concerns. CDFW, which normally takes over the Mossdale Trawl in April, is not sampling due to COVID-19 concerns.



— BUREAU OF —
RECLAMATION

Stanislaus Stepped Release Plan – Water Year 2020

Spring Pulse Flow

Final Operations Plan
April 1, 2020

This Stanislaus Stepped Release Plan (SRP) – Water Year (WY) 2020 Final Operations Plan details Reclamation’s plan for operating the Stanislaus River to meet WY 2020 spring pulse flow requirements. The Final Operations Plan incorporates feedback from the Stanislaus Watershed Team (SWT) who convened March 18, 2020 to discuss a spring pulse flow Draft Operations Plan.

Background

A spring pulse flow is one component of the daily flow schedule in the Stanislaus River Stepped Release Plan (SRP) pursuant to Section 4.10.6.1 of the U.S. Bureau of Reclamation’s (Reclamation) and California Department of Water Resources’ (DWR) Proposed Action for the coordinated long term operation (LTO) of the Central Valley Project (CVP) and the State Water Project (SWP), dated October 2019 (Proposed Action, PA), and the corresponding Biological Opinion (BiOp) issued pursuant to section 7 of the federal Endangered Species Act (ESA) by NOAA’s National Marine Fisheries Service (NMFS), dated October 21, 2019.. As noted on page 4-81 of the Biological Assessment, “the New Melones SRP will be implemented similarly to current operations under the 2009 biological opinion with a default daily hydrograph, and the ability to shape monthly and seasonal flow volumes to meet specific biological objectives.” On page 4-82 of the Biological Assessment, it is further described that “The Stanislaus Watershed Team will also provide input on the shaping and timing of monthly or seasonal flow volumes to optimize biological benefits.”

Water Volume Accounting for WY

Reclamation intends to use the water accounting framework (which accommodates water year type changes in the winter and spring) used by the Stanislaus Operations Group (precursor to the SWT) to implement the SRP. Because the water year type is generally updated mid-month based on the snow surveys completed early in the month, the framework calculates the total required instream flow volume for the spring pulse flow period based on the default flow schedule in the SRP from the 16th of Month A to the 15th of Month B, based on the water year type determined by the Month A forecast.

The 60-20-20 San Joaquin Index (the index used to determine the water year type for SRP implementation) was “Critical” based on the March 2020 forecast. Assuming the water year type does not change based on future forecasts, the total required instream flow volume pursuant to the SRP for the March 16-June 30, 2020 period is detailed below:

Date range	Water Year Type (Month of forecast)	Total water volume in default schedule in SRP (acre-feet)
3/16/20-4/15/20	Critical (March)	12,595
4/16/20-5/15/20	Critical* (April)	40,959
5/16/20-6/15/20	Critical* (May)	9,223
6/16/20-6/30/20	Critical* (May)	4,463
Total		67,240

**Assumes the water year type does not change based on future forecasts. If the water year type per the 60-20-20 San Joaquin Index changes from Critical based on the April or May forecasts, Reclamation will recalculate the volume requirement and seek input from the SWT on an updated flow schedule if needed.*

Reshaped SRP flows

For WY 2020, Reclamation intends to implement a reshaped spring pulse flow according to the flow schedule described in Alt-Critical 4 (see details in Attachment 1).

At the March 18, 2020 SWT meeting, the technical team discussed various alternatives for the spring pulse flow schedule, given the change in water year type from Dry to Critical based on the March forecast. In the meeting handouts, Reclamation presented a Draft Operations Plan that offered two options (Alt-Critical 1 and Alt-Critical 2) for WY 2020 spring pulse flows (see Attachment 1). Based on discussion, and in order to (a) move a higher volume of water into the default April 15-May 15 Vernalis pulse flow period, and (b) accommodate flows needed for important predation studies¹ on the Stanislaus River in May 2002, the SWT provided feedback on these options. SWT discussions led to the design of Alt-Critical 3. Upon further analysis of Alt-Critical 3, Reclamation determined that the proposed Alt-Critical 3 recommended pulse flow volumes do not ideally align with a 31-day Vernalis pulse flow period. Reclamation, and the SWT, then designed Alt-Critical 4 (see flow schedule alternatives, including the default schedule in the SRP, in the figure in Attachment 2).

The Alt-Critical 4 schedule has the same total volume (67,240 AF, including base flows) for the March 16-June 30 period as the default SRP Critical schedule, as described in Section I of this plan. Reclamation, and the SWT, believe that the Alt-Critical 4 reshaping optimizes biological benefits by providing a spring pulse flow that may cue anadromy and improve migratory habitat in both the Stanislaus River and in the mainstem San Joaquin River and southern delta. In the Stanislaus River, higher flows are expected to reduce water temperature (or at least buffer daily maximum water temperature) and inundate some shallow water habitat which may provide juvenile salmonids with short-term growth benefits as well as potential refuge from predation. In the mainstem San Joaquin River and south delta, higher flows from the Stanislaus River (and other San Joaquin tributaries) are expected to convey out-migrating salmonids more rapidly along their migratory pathway, which may improve outmigration success.

¹ The predation studies have since been cancelled because of COVID-19 considerations but SWT still supports this flow schedule.

Some key features of the Alt-Critical 4 spring pulse include:

- As in the default schedule, **higher spring flows** (compared to winter base flows) are intended to cue outmigration and improve migratory habitat downstream.
- Reshaping the single pulse identified in the default SRP schedule into **an extended six-peaks pulse period increases flow variability within the season**. This variability is expected to provide opportunities for a broader range of salmonid outmigration timing since outmigration may be cued by variability as well as flow magnitude (Zeug et al. 2014).
- The **time frame** of the Alt-Critical 4 pulse (which is similar in duration, though a bit earlier in timing, compared to the default SRP schedule) is expected to provide some inundation of shallow-water habitat and temperature buffering from April through early-May; the extent of such benefits will vary with flow throughout the spring pulse period. The timing of Alt-Critical 4 puts most of the pulse volume in a 31-day window which aligns better with Vernalis pulse flow period.
- **Shifting much of the pulse volume into an earlier release** in early April is to address concerns about relatively low Stanislaus and San Joaquin flows (due to Critical water year type and limited pulse flow volumes under the SRP as well as relatively low expected pulse flow volumes for other San Joaquin River tributaries) and the potential for progressively more unsuitable water temperatures for migration later in spring.
- Other considerations for in-basin interests:
 - No flows >1,500 cfs are scheduled in consideration of concerns regarding agricultural seepage².

References

Zeug, S.C., Sellheim, K., Watry, C., Wikert, J.D. and Merz, J. (2014), Response of juvenile Chinook salmon to managed flow: lessons learned from a population at the southern extent of their range in North America. *Fish Manag Ecol*, 21: 155-168. doi:[10.1111/fme.12063](https://doi.org/10.1111/fme.12063)

² Note that in wetter years, flows >1,500 cfs cannot be avoided entirely, but may be limited in duration.

Attachment 1

Reshaped alternatives 1 and 2 for the WY 2020 spring pulse flow schedule for March 16 – June 30, 2020.

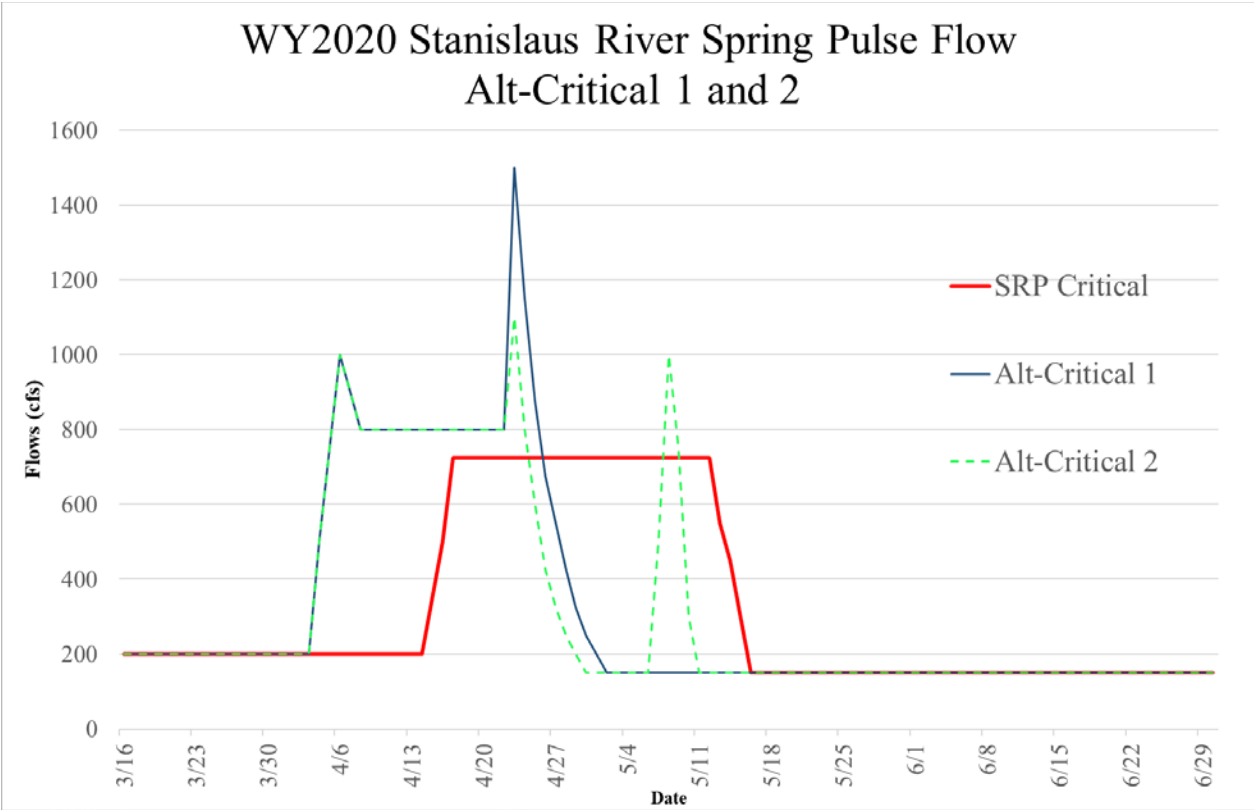


Figure 1. Figure showing daily flows from March 10 to June 10 in both the default SRP-Critical schedule and three Alternative-Critical 1 and 2 schedules.

Table 1. Daily Flows under the SRP Critical and alternatives 1 and 2 for March - June 2020

Schedules		SRP Critical	Alt Critical 1	Alt Critical 2
Day	Date	Daily flow (cfs)	Daily flow (cfs)	Daily flow (cfs)
S	3/16	200	200	200
M	3/17	200	200	200
T	3/18	200	200	200
W	3/19	200	200	200
T	3/20	200	200	200
F	3/21	200	200	200
S	3/22	200	200	200
S	3/23	200	200	200
M	3/24	200	200	200
T	3/25	200	200	200
W	3/26	200	200	200
T	3/27	200	200	200
F	3/28	200	200	200
S	3/29	200	200	200
S	3/30	200	200	200
M	3/31	200	200	200
T	4/1	200	200	200
W	4/2	200	200	200
T	4/3	200	200	200
F	4/4	200	500	500
S	4/5	200	750	750
S	4/6	200	1000	1000
M	4/7	200	900	900
T	4/8	200	800	800
W	4/9	200	800	800
T	4/10	200	800	800
F	4/11	200	800	800
S	4/12	200	800	800
S	4/13	200	800	800
M	4/14	200	800	800
T	4/15	350	800	800
W	4/16	500	800	800
T	4/17	725	800	800
F	4/18	725	800	800
S	4/19	725	800	800
S	4/20	725	800	800
M	4/21	725	800	800
T	4/22	725	800	800
W	4/23	725	1500	1100
T	4/24	725	1150	800
F	4/25	725	875	600
S	4/26	725	675	425
S	4/27	725	550	325

Schedules		SRP Critical	Alt Critical 1	Alt Critical 2
Day	Date	Daily flow (cfs)	Daily flow (cfs)	Daily flow (cfs)
M	4/28	725	425	250
T	4/29	725	325	200
W	4/30	725	250	150
T	5/1	725	200	150
F	5/2	725	150	150
S	5/3	725	150	150
S	5/4	725	150	150
M	5/5	725	150	150
T	5/6	725	150	150
W	5/7	725	150	500
T	5/8	725	150	1000
F	5/9	725	150	750
S	5/10	725	150	300
S	5/11	725	150	150
M	5/12	725	150	150
T	5/13	550	150	150
W	5/14	450	150	150
T	5/15	300	150	150
F	5/16	150	150	150
S	5/17	150	150	150
S	5/18	150	150	150
M	5/19	150	150	150
T	5/20	150	150	150
W	5/21	150	150	150
T	5/22	150	150	150
F	5/23	150	150	150
S	5/24	150	150	150
S	5/25	150	150	150
M	5/26	150	150	150
T	5/27	150	150	150
W	5/28	150	150	150
T	5/29	150	150	150
F	5/30	150	150	150
S	5/31	150	150	150
S	6/1	150	150	150
M	6/2	150	150	150
T	6/3	150	150	150
W	6/4	150	150	150
T	6/5	150	150	150
F	6/6	150	150	150
S	6/7	150	150	150
S	6/8	150	150	150
M	6/9	150	150	150
T	6/10	150	150	150
W	6/11	150	150	150
T	6/12	150	150	150

Schedules		SRP Critical	Alt Critical 1	Alt Critical 2
Day	Date	Daily flow (cfs)	Daily flow (cfs)	Daily flow (cfs)
F	6/13	150	150	150
S	6/14	150	150	150
S	6/15	150	150	150
M	6/16	150	150	150
T	6/17	150	150	150
W	6/18	150	150	150
T	6/19	150	150	150
F	6/20	150	150	150
S	6/21	150	150	150
S	6/22	150	150	150
M	6/23	150	150	150
T	6/24	150	150	150
W	6/25	150	150	150
T	6/26	150	150	150
F	6/27	150	150	150
S	6/28	150	150	150
S	6/29	150	150	150
M	6/30	150	150	150

Table 2. Comparison of water volumes and flows between SRP Critical, Alt-Critical 1 and Alt-Critical 2 from March 16 and June 30

Schedules	SRP Critical	Alt-Critical 1	Alt-Critical 2
Total cfs (Mar 16 - June 30)	33,900	33,900	33,900
Total acre-feet (Mar 16 - June 30)	67,240	67,240	67,240

Attachment 2

Reshaped alternatives 3 and 4 for the WY 2020 spring pulse
flow schedule for March 16 – June 30, 2020.

WY2020 Stanislaus River Spring Pulse Flow (Reclamation intends to implement Alt-Critical 4)

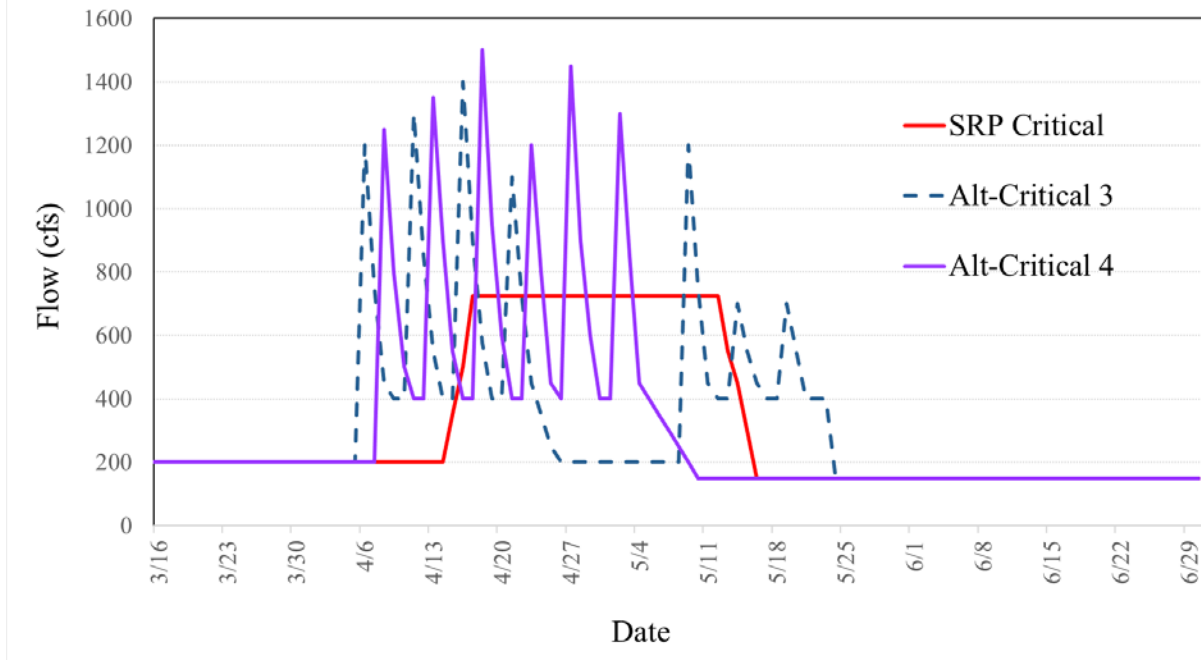


Figure 2. Daily flows from March 10 to June 10 in both the default SRP-Critical schedule and Alternative-Critical 3 and 4 schedules.

Table 3. Daily Flows under the SRP Critical and alternatives 3 and 4 for March - June 2020

Schedules		SRP Critical	Alt Critical 3	Alt Critical 4
Day	Date	Daily flow (cfs)	Daily flow (cfs)	Daily flow (cfs)
S	3/16	200	200	200
M	3/17	200	200	200
T	3/18	200	200	200
W	3/19	200	200	200
T	3/20	200	200	200
F	3/21	200	200	200
S	3/22	200	200	200
S	3/23	200	200	200
M	3/24	200	200	200
T	3/25	200	200	200
W	3/26	200	200	200
T	3/27	200	200	200
F	3/28	200	200	200
S	3/29	200	200	200
S	3/30	200	200	200
M	3/31	200	200	200
T	4/1	200	200	200
W	4/2	200	200	200
T	4/3	200	200	200
F	4/4	200	200	200
S	4/5	200	200	200
S	4/6	200	1200	200
M	4/7	200	750	200
T	4/8	200	450	1250
W	4/9	200	400	800
T	4/10	200	400	500
F	4/11	200	1300	400
S	4/12	200	850	400
S	4/13	200	550	1350
M	4/14	200	400	900
T	4/15	350	400	550
W	4/16	500	1400	400
T	4/17	725	900	400
F	4/18	725	575	1500
S	4/19	725	400	950
S	4/20	725	400	600

Schedules		SRP Critical	Alt Critical 3	Alt Critical 4
Day	Date	Daily flow (cfs)	Daily flow (cfs)	Daily flow (cfs)
M	4/21	725	1100	400
T	4/22	725	725	400
W	4/23	725	450	1200
T	4/24	725	350	800
F	4/25	725	250	450
S	4/26	725	200	400
S	4/27	725	200	1450
M	4/28	725	200	900
T	4/29	725	200	600
W	4/30	725	200	400
T	5/1	725	200	400
F	5/2	725	200	1300
S	5/3	725	200	850
S	5/4	725	200	450
M	5/5	725	200	400
T	5/6	725	200	350
W	5/7	725	200	300
T	5/8	725	200	250
F	5/9	725	1200	200
S	5/10	725	750	150
S	5/11	725	450	150
M	5/12	725	400	150
T	5/13	550	400	150
W	5/14	450	700	150
T	5/15	300	550	150
F	5/16	150	450	150
S	5/17	150	400	150
S	5/18	150	400	150
M	5/19	150	700	150
T	5/20	150	550	150
W	5/21	150	400	150
T	5/22	150	400	150
F	5/23	150	400	150
S	5/24	150	150	150
S	5/25	150	150	150
M	5/26	150	150	150
T	5/27	150	150	150
W	5/28	150	150	150
T	5/29	150	150	150

Schedules		SRP Critical	Alt Critical 3	Alt Critical 4
Day	Date	Daily flow (cfs)	Daily flow (cfs)	Daily flow (cfs)
F	5/30	150	150	150
S	5/31	150	150	150
S	6/1	150	150	150
M	6/2	150	150	150
T	6/3	150	150	150
W	6/4	150	150	150
T	6/5	150	150	150
F	6/6	150	150	150
S	6/7	150	150	150
S	6/8	150	150	150
M	6/9	150	150	150
T	6/10	150	150	150
W	6/11	150	150	150
T	6/12	150	150	150
F	6/13	150	150	150
S	6/14	150	150	150
S	6/15	150	150	150
M	6/16	150	150	150
T	6/17	150	150	150
W	6/18	150	150	150
T	6/19	150	150	150
F	6/20	150	150	150
S	6/21	150	150	150
S	6/22	150	150	150
M	6/23	150	150	150
T	6/24	150	150	150
W	6/25	150	150	150
T	6/26	150	150	150
F	6/27	150	150	150
S	6/28	150	150	150
S	6/29	150	150	150
M	6/30	150	150	150

Table 4. Comparison of water volumes and flows between SRP Critical, Alt-Critical 3 and Alt-Critical 4 from March 16 and June 30

Schedules	Period	SRP Critical	Alt-Critical 3	Alt-Critical 4
Total cfs	March 16 – June 30	33,900	33,900	33,900
Total acre-feet	March 16 – June 30	67,240	67,240	67,240