



News & Operations Blog

Flow Standard
Implementing the
Right Flow Standard
for the Lower
American River

Water Forum's News & Operations Blog Posts: *March 18, 2015 – April 27, 2015*

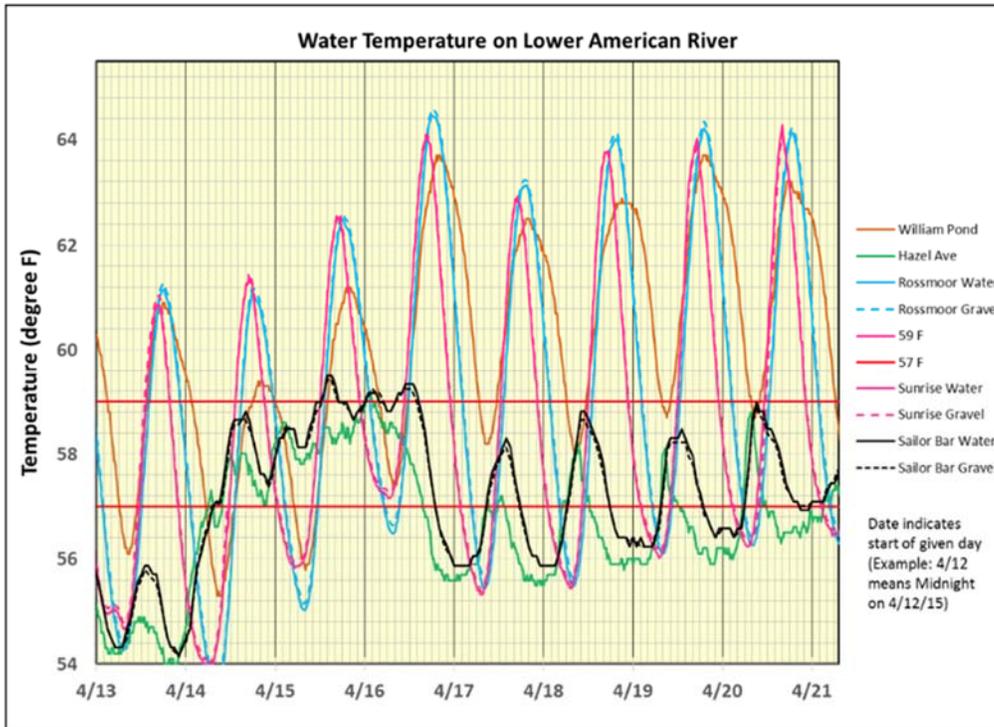
<http://waterforum.org/resources/lar-blog/>

Exhibit ARWA - 503

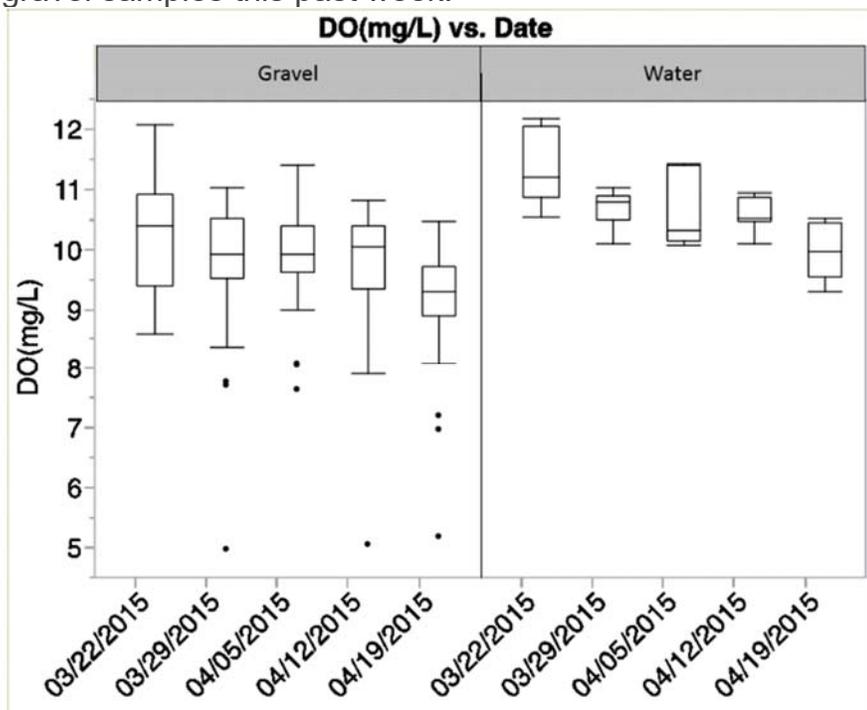
Warming Trend Continues – Water Quality Holding

Posted on Monday, April 27th, 2015

Water temperatures in the LAR have continued to rise over the past weeks. The graph below shows that gravel temperatures are exceeding 63 degree F every day. The literature indicates that Steelhead eggs and alevin cannot survive long at these high temperatures.



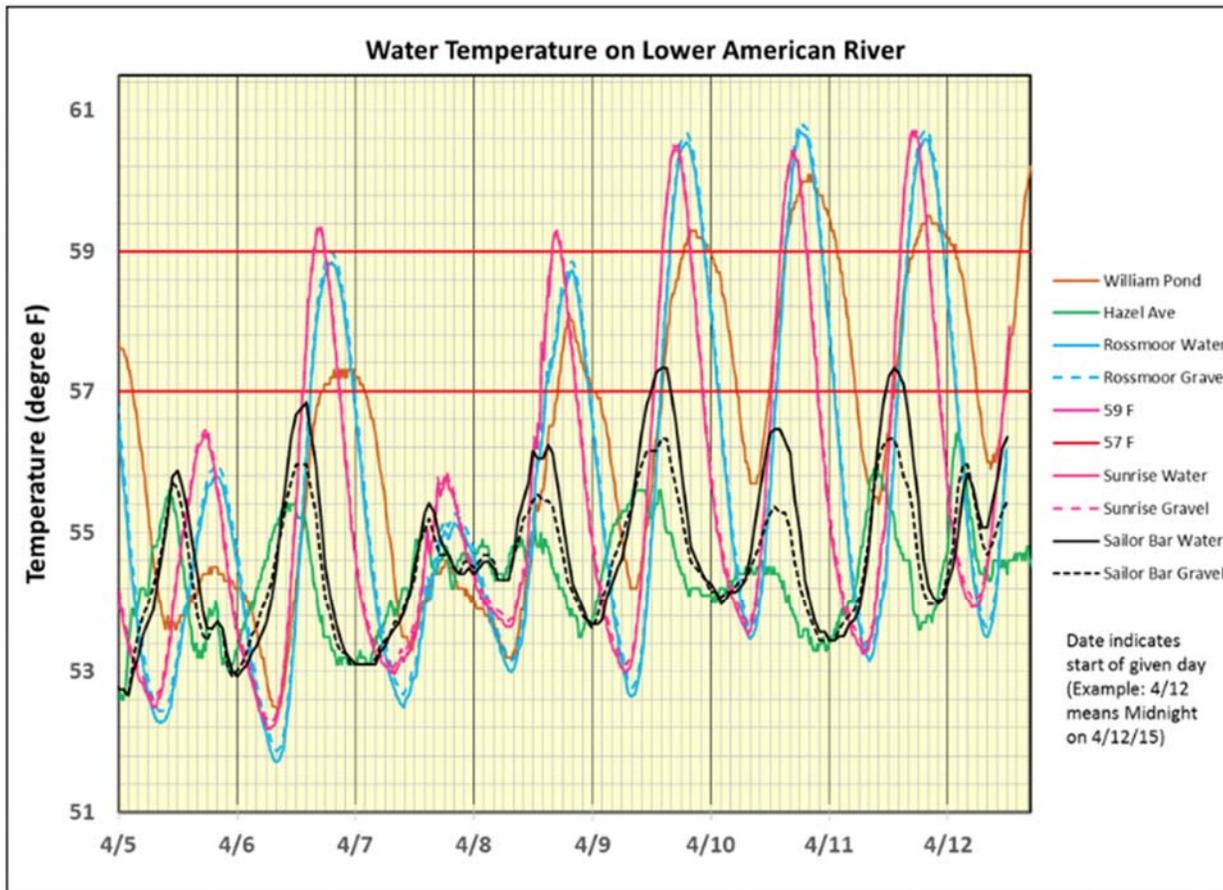
However, this figure shows that overall, the dissolved oxygen level continues to be mostly healthy. Although DO is trending down, only 2.5% of samples demonstrated unhealthy DO within gravel samples this past week.



Water is Warming Up

Posted on Tuesday, April 14th, 2015

We have been posting temperature updates over the last few weeks to gauge how incubating Steelhead may be fairing in the lower American River. Our most recent data show that water temperature is trending up. The graph below shows that the daily high temperature at our monitoring Rossmoor Bar and Sunrise sites is actually getting warmer than the William Pond thermometer (a cdec gauge). However, the lows at Rossmoor and Sunrise are lower than at William Pond. We think this is due to sunlight exposure of the river bottom and gravel.



Updated: Steelhead Emergence Forecast

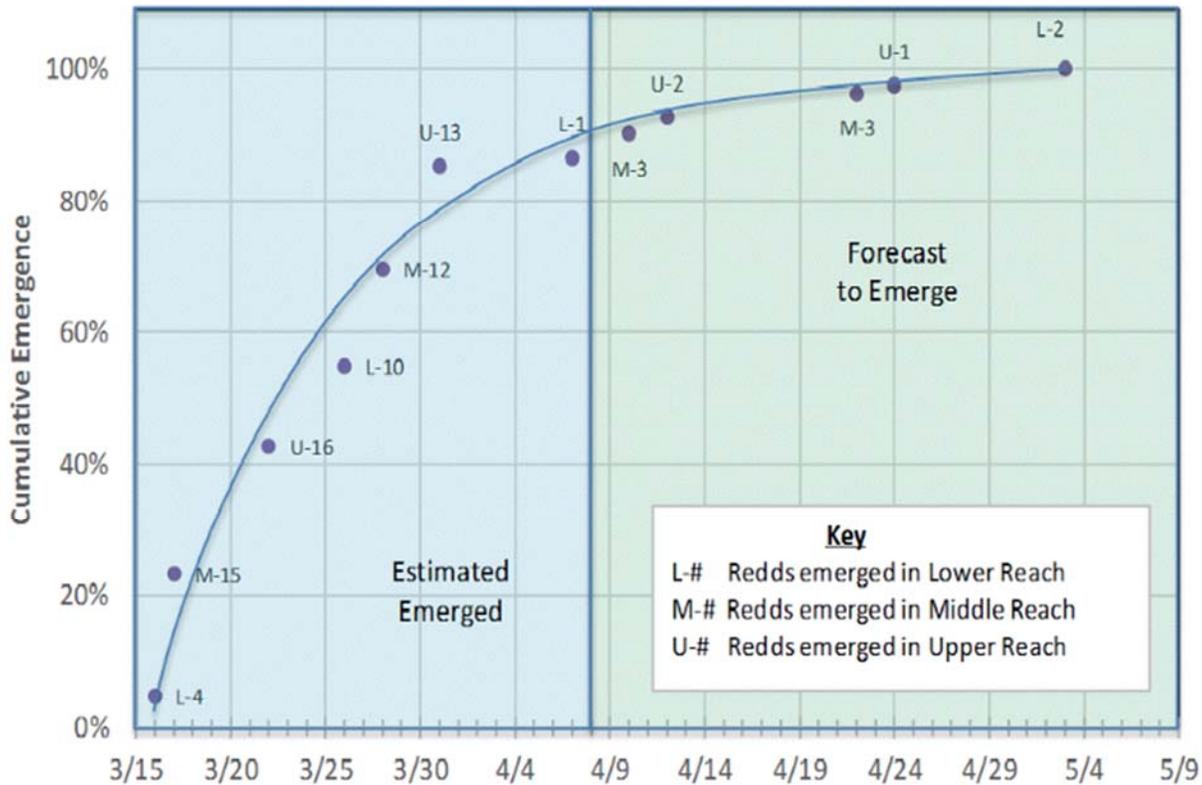
Posted on Sunday, April 12th, 2015

Using temperature data that we collected at several locations, we have estimated the amount of Steelhead that have already emerged from the gravel AND we have forecasted when the rest of this year's brood will emerge. While in the gravel, the Steelhead eggs and Alevin are very sensitive to temperatures. Once they emerge, they are both less sensitive and able to seek cooler water.

This graph shows that as of 4-8-15, we estimate that about 88% of the Steelhead have emerged. This emergence rate is a bit slower than when last estimated (about a week ago)

because water temperatures have been cooler. However, the cooler water temperatures also means that the survival rate of the emerging Steelhead will be higher. We estimate that we should hit about 90% emergence on Monday 4-13-15 and 99% around April 22nd.

Estimated and Projected Steelhead Emergence - American River, 2015



Additional notes: We have estimated and forecasted emergence using measured water temperatures and redd surveys at three different river reaches:

- Lower (L): Between Watt Ave and William Pond
- Middle (M): Around Roosmoor Bar
- Upper (H): Around Sunrise

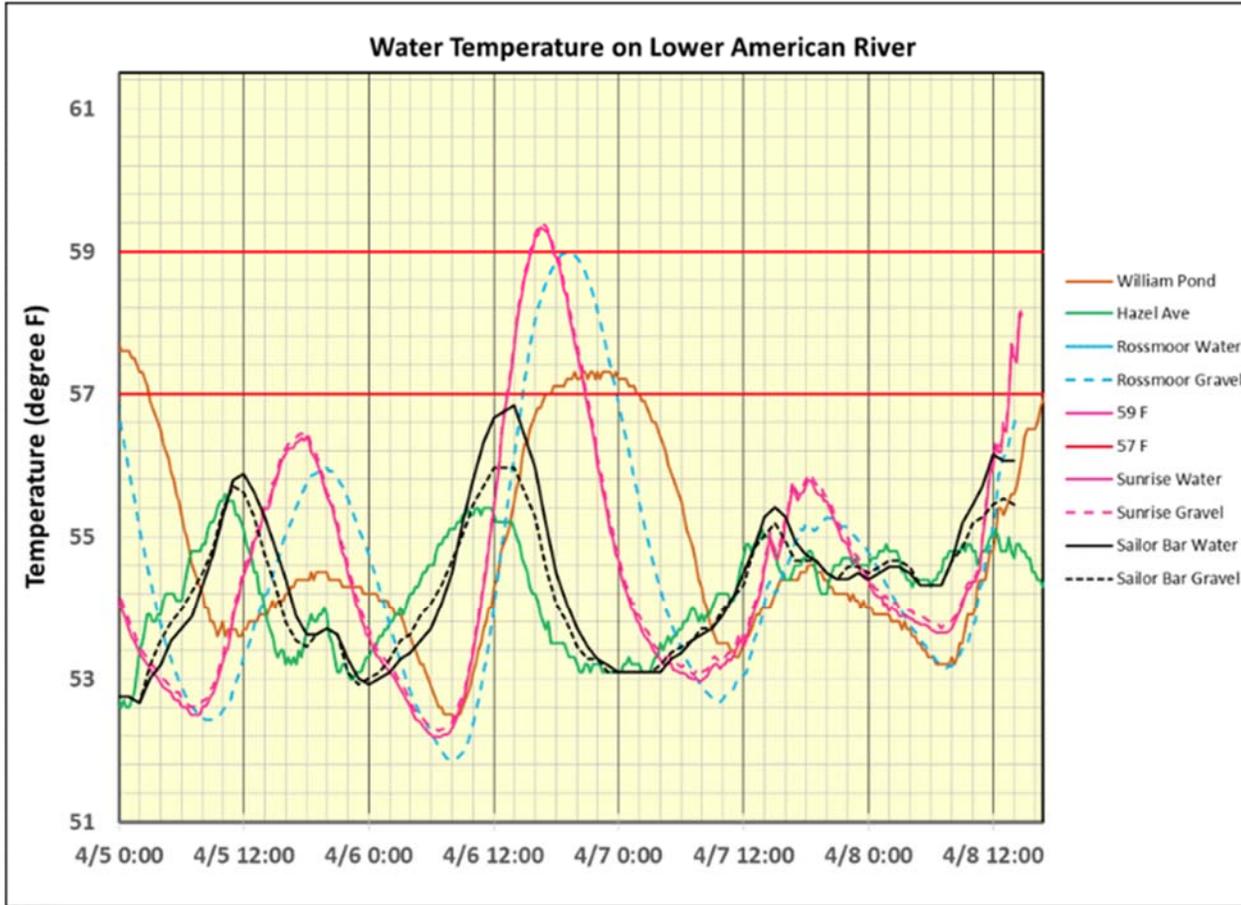
Each point on the graph represents a group of redds that emerge at the given date. The code next to each point tells the location (river reach) and number of those emerging redds.

Steelhead: Water Temp and Quality Mostly Healthy as of 4-8-15

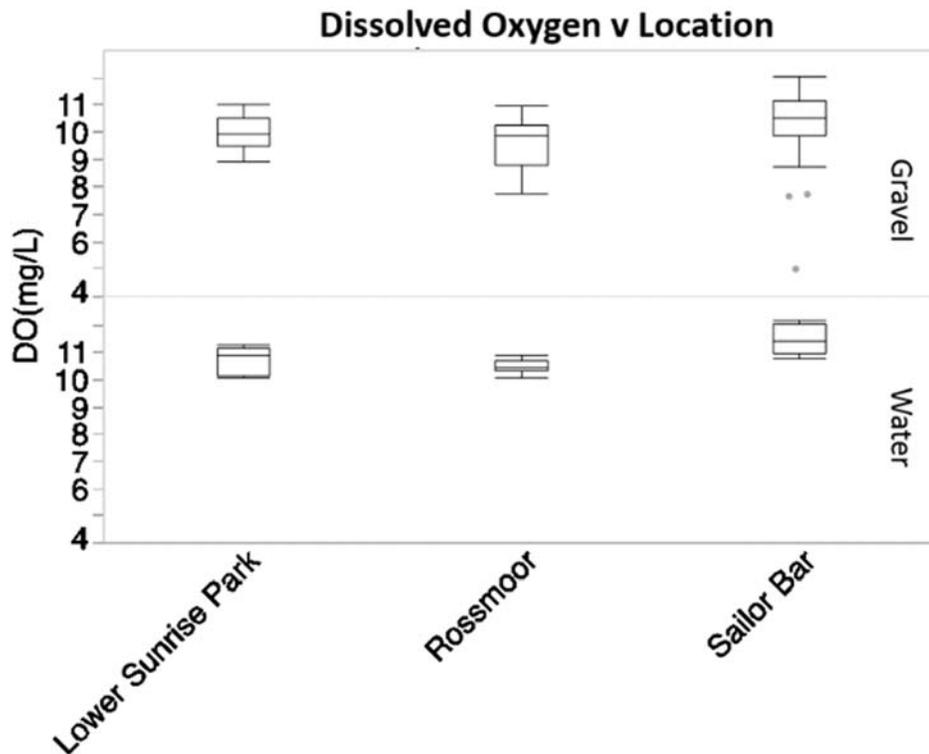
Posted on Sunday, April 12th, 2015

HI folks. I'm sorry that we're posting this data when it's already 4-5 days old. We're trying to be timely, but other priorities sometimes take over. The plots below shows that inter-gravel temperature and water quality has been mostly healthy for incubating Steelhead. That's thanks to cooler days last week and Reclamation's temperature management actions (see previous posts).

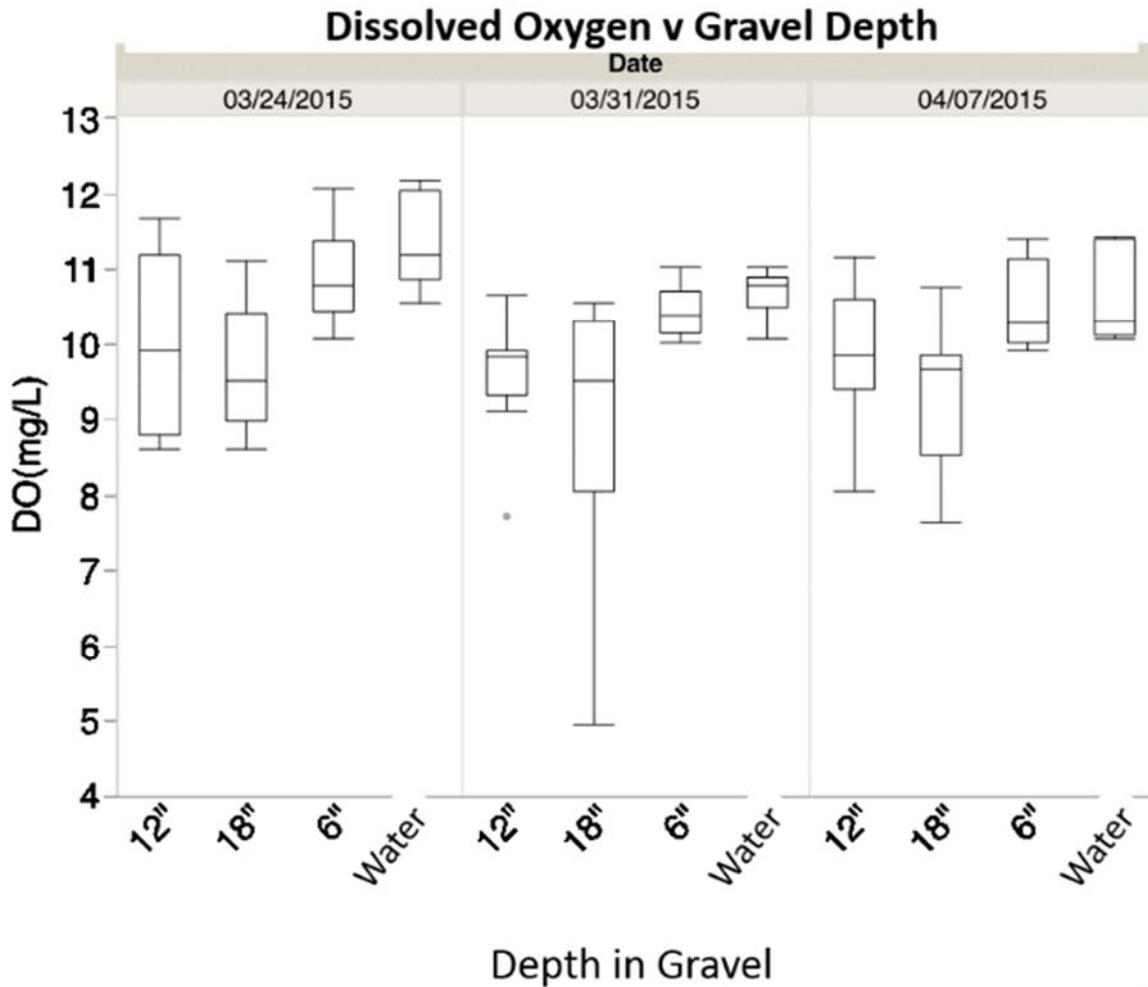
This graph shows that temperatures have been (mostly) cool enough for healthy incubation. I hope to update these on Monday or Tuesday:



This graph (courtesy of Cramer Fish Sciences) shows dissolved oxygen has also been in a healthy range (above 8 mg/L) at our three monitoring sites:



And finally, this graph shows that DO levels have been (mostly) healthy over time:



Chinook Embryo Impacts from 2013-14

Posted on Monday, April 6th, 2015

Hi, a stakeholder requested this report recently so we thought we'd post it here. This is the final report from Cramer Fish Sciences (sponsored by the Water Forum) on impacts of reduced LAR flows on last winter's emerging Chinook Salmon. As always, please don't hesitate contact one of us if you have questions or concerns.

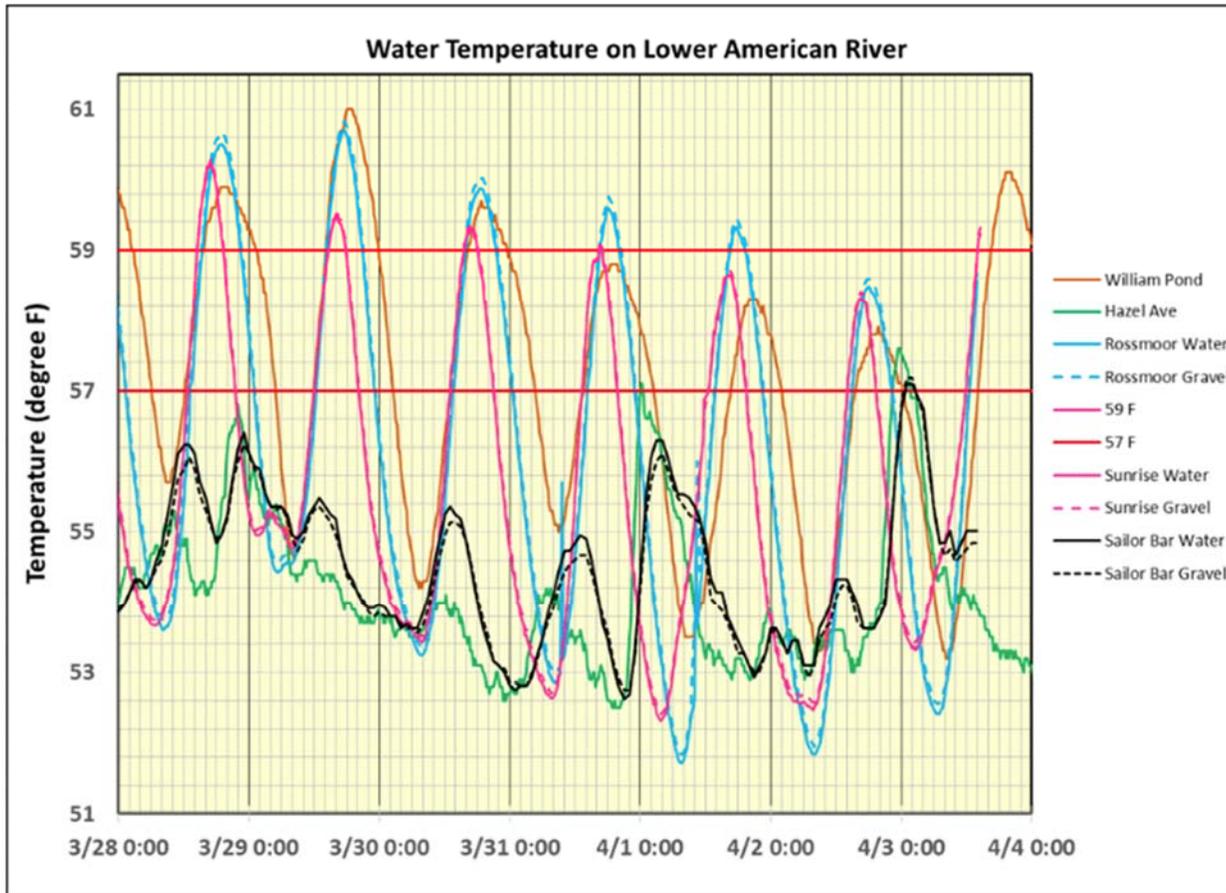
<http://www.waterforum.org/wp-content/uploads/2015/04/Final-embryo-impacts-CramerFishSciences-12Feb2014.pdf>

February, 2014

Cooler Days = Cooler River

Posted on Sunday, April 5th, 2015

Nature has been a friend to the Steelhead these past few days. The cooler air temperatures (coupled with Reclamation's power bypass) have resulted in healthier conditions for incubating Steelhead.



Steelhead Incubation: “We Dodged a Bullet”

Posted on Thursday, April 2nd, 2015

The results of recent field work indicate that the recent hot spell has NOT been lethal to the incubating Steelhead in the lower American River. Actions by Reclamation to keep water temperatures and reduced daytime air temperatures are responsible for this favorable outcome.

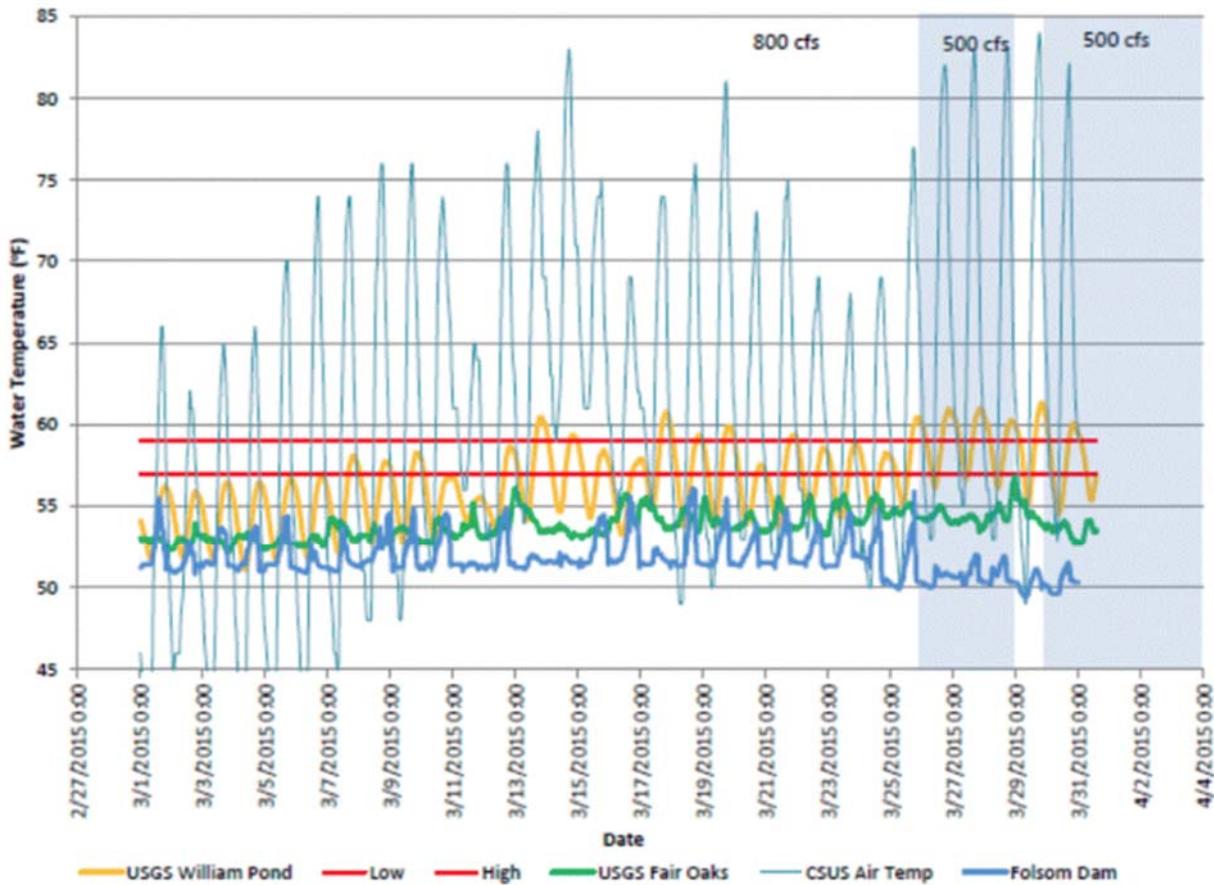
Water Forum staff and consultants have estimates that 85% of the 2015 brood of have Steelhead emerged at this point.

Given this positive news and predictions of cooler weather ahead, Reclamation told stakeholders in a special session of the American River Group today that they will continue releasing 500 cfs from Folsom for the foreseeable future and will continue the power bypass until middle of next week.

After that, the chunk of cold water accessible to the bypass will be mostly used up and Reclamation will end it.

Here is a graph showing that air and water temperatures declining yesterday.

March 2015 American River Temperatures

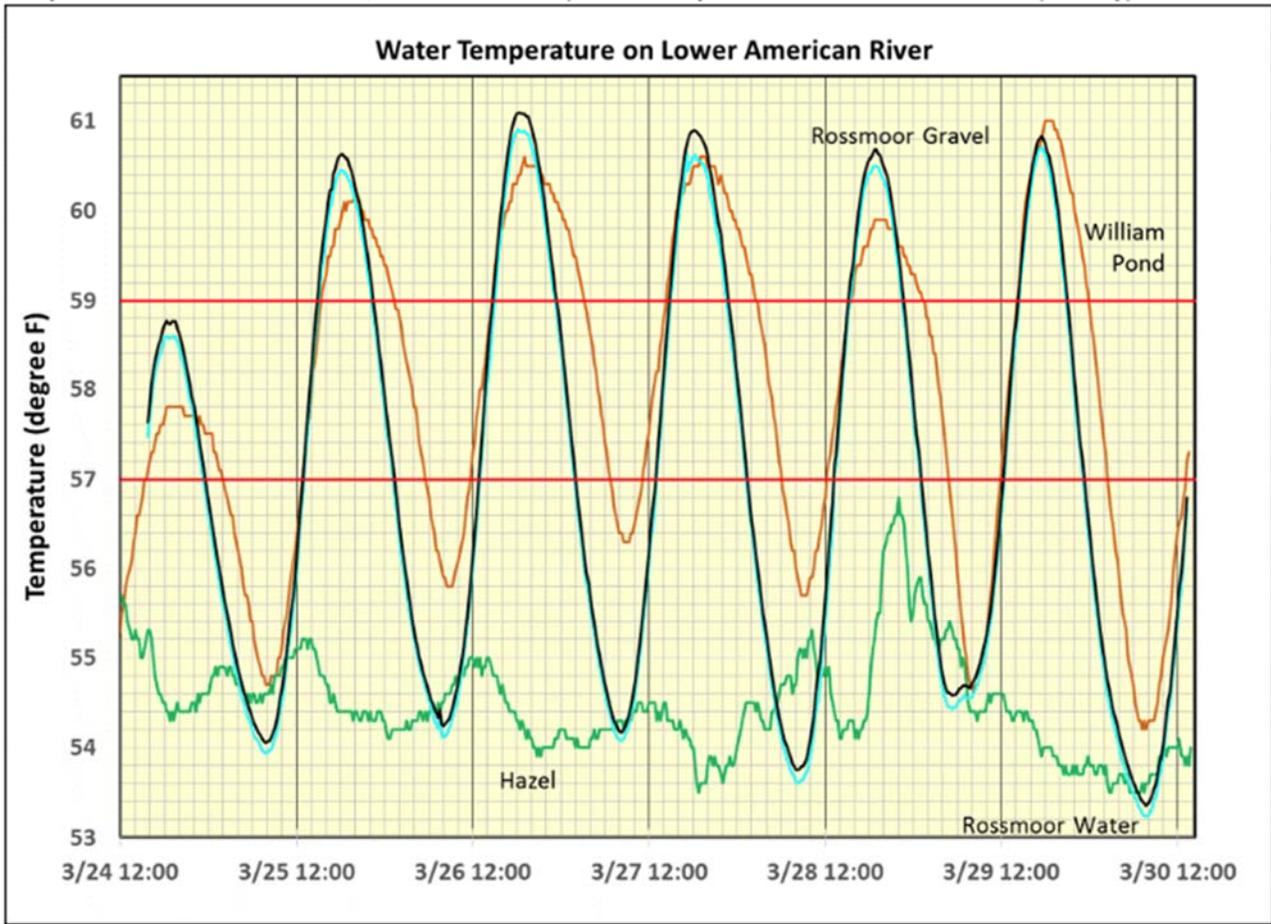


River Temperature Still High – Monday 3-30

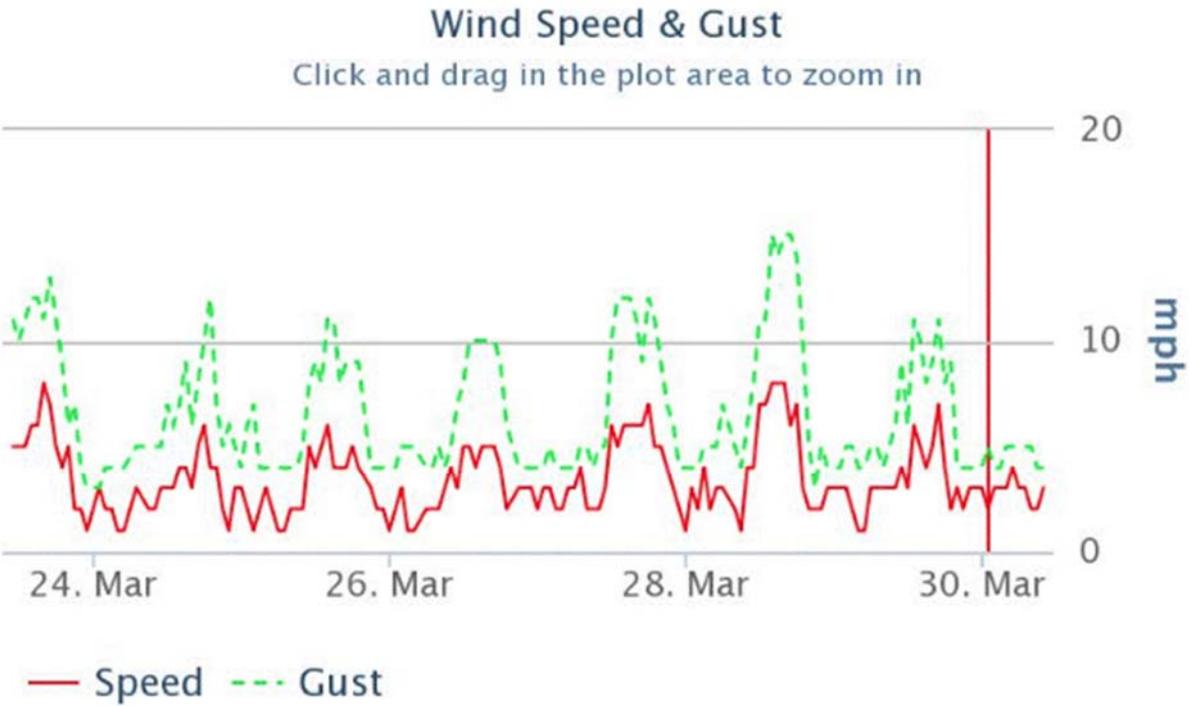
Posted on Monday, March 30th, 2015

River temperatures on Sunday remained high. This is due to record warm daily temperatures and windy conditions. The wind apparently stirred up Lake Natoma and resulted in warmer water being released from Nimbus (see the Hazel temperature spike below). As reclamation operator said, “wind is not our friend.”

Today we had some decent cloud cover, and tomorrow we expect cooler days and the cooler water from Folsom power bypass will show up.



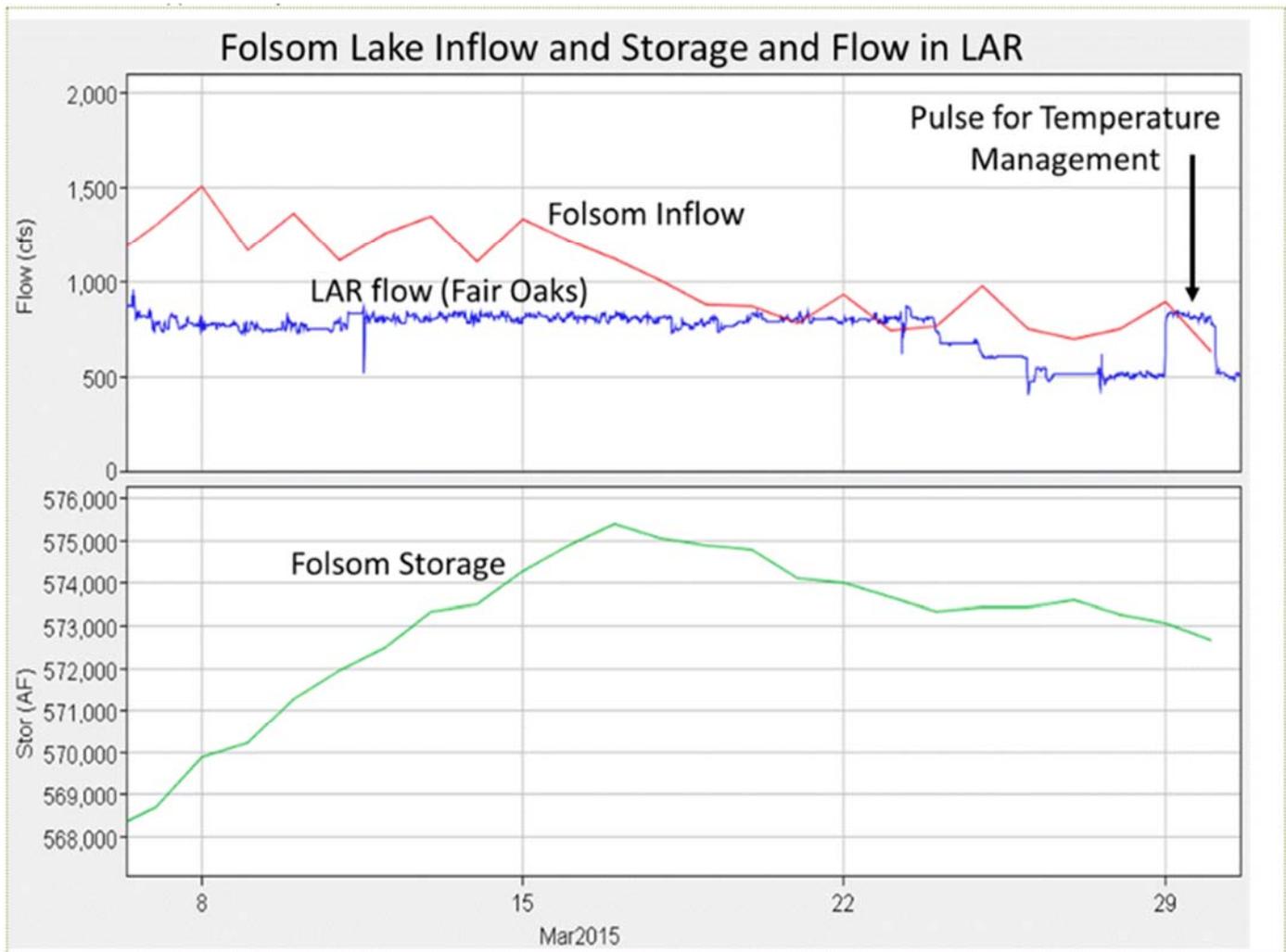
You can see the wind gust on Saturday in in this graph:



Folsom Storage Continues to Drop

Posted on Monday, March 30th, 2015

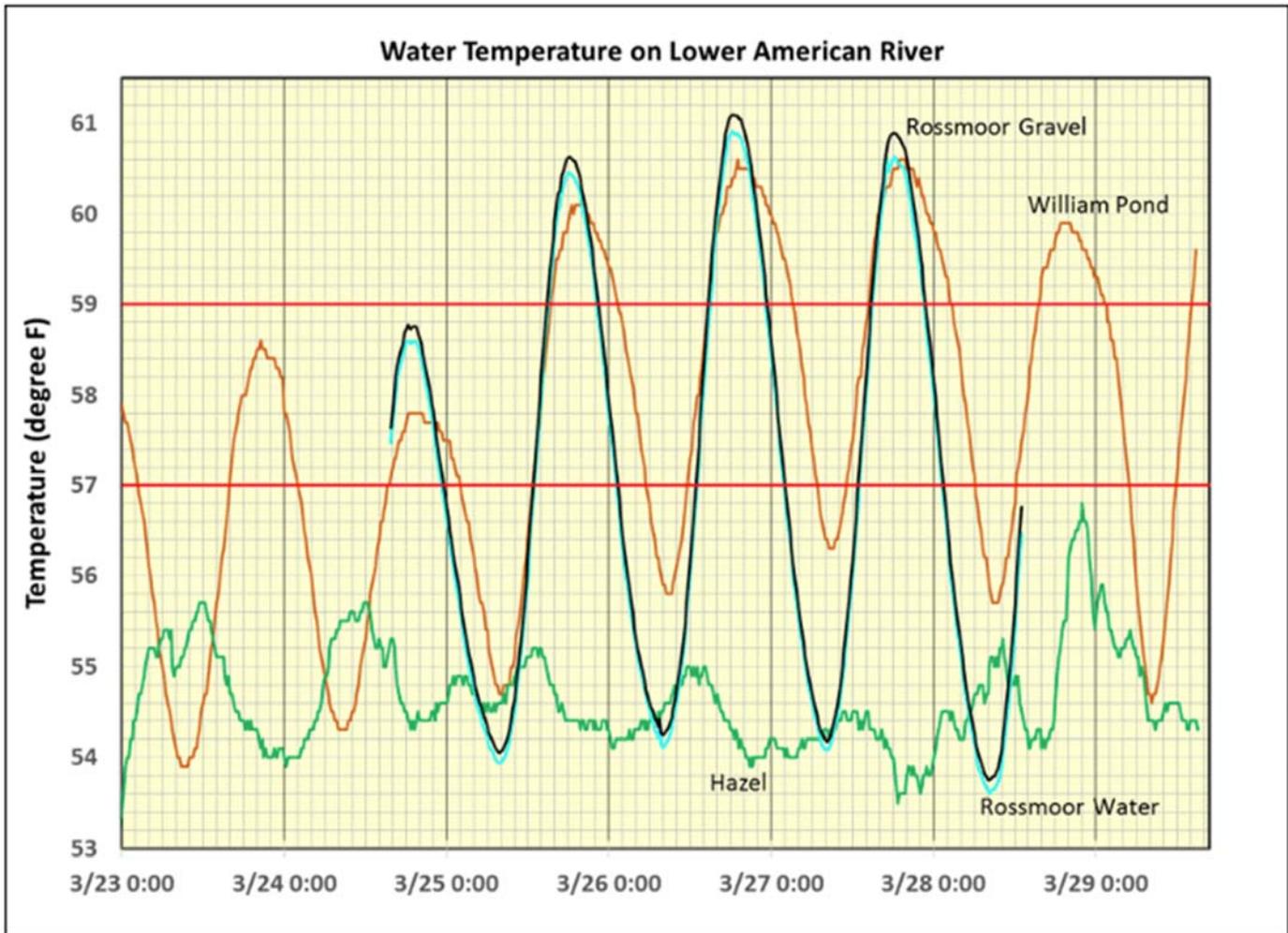
Folsom Lake Storage is dropping slowly as inflow continues to diminish. Note that the 24-hour pulse flow (for temperature management) resulted in the release of approximately 600 AF.



Latest Temperature Data

Posted on Sunday, March 29th, 2015

Our field folks gathered temperature data at Rossmoor on Saturday 3-28-15. You can see that conditions continued to be warm on Saturday 3-28, but not as warm as Friday 3-27. We don't have the Sunday Rossmoor temps yet, but the William Pond temperatures indicate that we had some cooling on Sunday 3-29. I can't explain why Hazel temps jumped on Sunday.

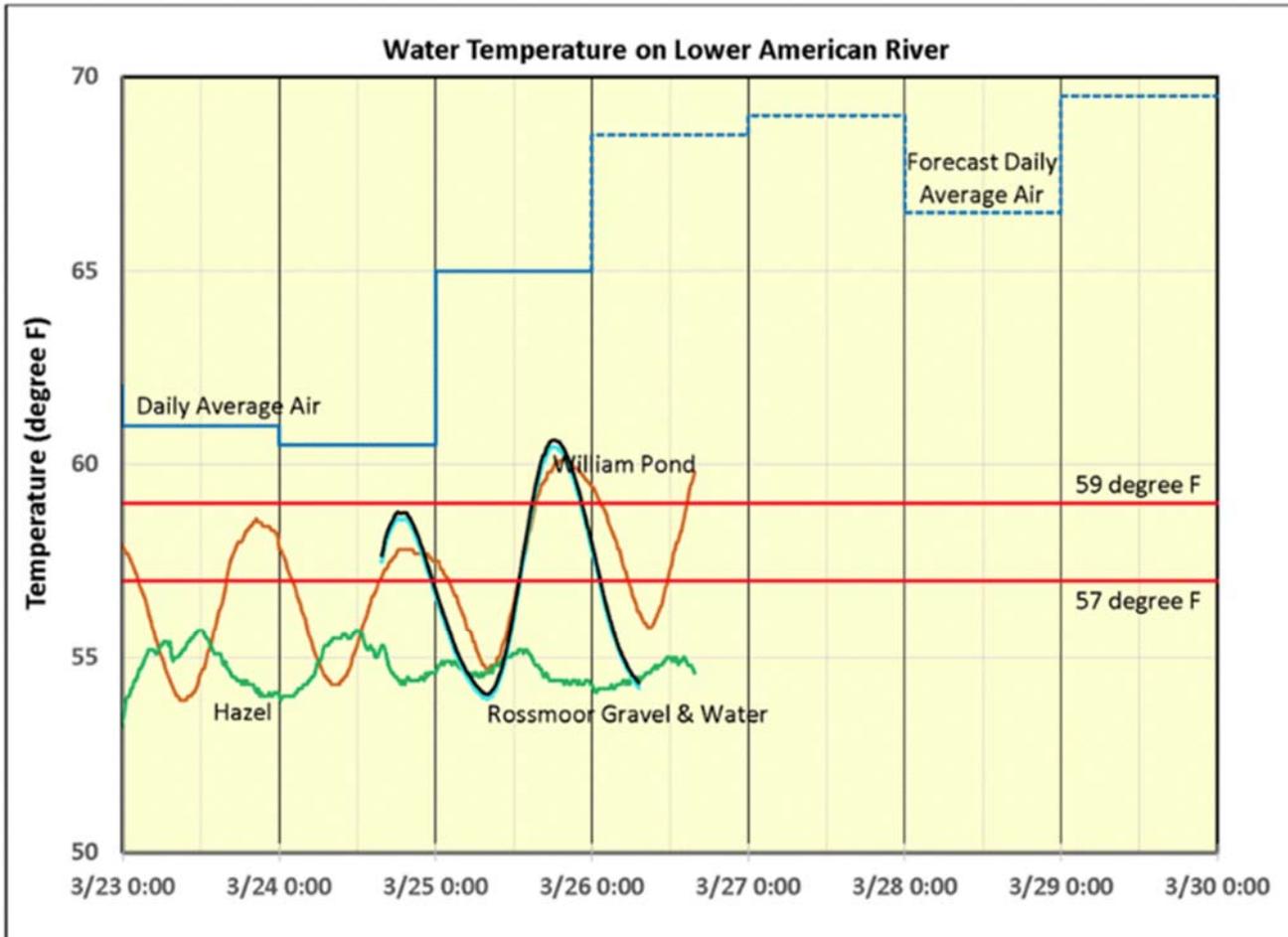


Reclamation Acts to Address Temperature

Posted on Sunday, March 29th, 2015

Reclamation operators solicited opinions from State and Federal biologists and Water Forum stakeholders during a special session of the American River Group (ARG) on Friday March 27. Meeting participants advocated for a range of possible actions: from keeping flows at 500 cfs to increasing flows to 800 cfs for a number of days.

One of the key items of discussion was the observed river temperatures at Rossmoor Bar and foretasted warm days over the weekend. This graphic (complements of the Water Forum) was presented to illustrate the relatively high river temperatures and the warm weather forecast:



After discussion and data sharing, Reclamation chose to initiate a power bypass (lower river outlets) to send colder water downstream AND send an 800 cfs pulse of water for 24 hours. NMFS staff concurred with the plan. The intent of the pulse is to reduce the travel time through Lake Natoma and get the colder water down to the gravel as quickly as possible. This is especially important given the predicted warm weather over the weekend.

The Sac Bee had an article about the issue today:

<http://www.sacbee.com/news/local/environment/article16705838.html>



Lily Allen, left, holds a temperature gauge in place while Rafael Gonzalez shovels gravel to hold it into place in the American River at Sailor Bar on Friday in Fair Oaks. The gauges will allow the biologists to monitor effects on steelhead and salmon from declining flows caused by drought **Brian Nguyen** - bnguyen@sacbee.com

ENVIRONMENT

Drought threatens American River fish



BY MATT WEISER

mweiser@sacbee.com

BY MATT WEISER

mweiser@sacbee.com

MARCH 28, 2015 05:19 PM

UPDATED MARCH 31, 2015 08:06 AM

Endangered steelhead about to hatch in the American River could soon be killed by low flows and warm temperatures caused by the drought, a sign of the ongoing struggle over scarce water supplies.

The fish, which are protected by the Endangered Species Act, are beginning to hatch from eggs in riverbed gravel. They require water cooler than 57 degrees to survive. Temperatures are already warmer than that due to record-breaking heat this month and low river flows caused by a fourth year of drought in California.

As hatchlings – also known as alevins – the fish have not yet matured into fully formed fish and are unable to swim.

“It’s the most sensitive life stage. They can’t go elsewhere and they’re highly sensitive to flows,” said Tom Gohring, executive director of the Sacramento Water Forum, a coalition of Sacramento water agencies and environmental groups that monitors the river. “If things continue to be bad ... they will perish in the gravel.”

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The problem is a shortage of water in Folsom Reservoir caused by the drought. Although the reservoir now holds more water than at this time last year, it is expected to be in worse shape by the end of summer.

That’s because the Sierra Nevada snowpack is at its lowest level in recorded history – just 8 percent of average as of Thursday. As a result, it will provide little runoff to refill the reservoir in the months ahead. Weather patterns diverted storms away from California most of the winter, leaving January and March as the driest in more than 100 years of record keeping.

The U.S. Bureau of Reclamation, which operates Folsom and Nimbus dams on the American River, dropped water flows in the river to 500 cubic feet per second on Thursday. That falls below a flow standard negotiated with the Water Forum to protect the river environment, but it is allowed in cases of severe drought, Gohring said.

“That was primarily an effort to help conserve water based on the persistent drought conditions,” said Reclamation spokesman Louis Moore. “Everything is being done to make sure the water supply we have is being used to the best of our ability, and we’re working with others to stretch it.”

Water stored in Folsom Reservoir serves a number of urban water suppliers in the Sacramento region, as well as farm irrigation districts in the San Joaquin Valley.

Reclamation has a limited ability to monitor temperatures in the river on its own. So the Sacramento Water Forum, which is funded mainly by local water agencies, hired a consultant to install temperature probes at strategic locations in the river. Those revealed that water temperatures have already exceeded 57 degrees, Gohring said.

The problem has been aggravated by record-breaking heat in the Sacramento area last week. On Friday, Sacramento Executive Airport saw a high of 83 degrees, breaking the previous record of 79 degrees set in 1986. Downtown reached 85 degrees, which tied the record from 1923.

Reclamation responded by boosting water releases from Folsom Dam. The water is being released from gates in the face of the dam – a rare occurrence – in order to access cold water deeper in the reservoir. That cooler water is expected to reach the lower American River, where steelhead spawn, starting Sunday morning.

The additional water flows will be temporary, lasting only into the afternoon on Monday. But officials hope it will be enough to help the emerging steelhead. Sacramento temperatures are expected to cool down to a more seasonable 70-degree range on Tuesday.

“If water temperatures become a detriment to fish, they will make an adjustment to try and cool the water a bit,” Moore said. “We are conserving as much as we can, and every little bit counts.”

The tight scheduling of water flows indicates how precious supplies have become.

If Reclamation lets too much water out of Folsom Reservoir to help steelhead, it could mean Sacramento’s urban areas won’t have enough when demand peaks this summer and fall. Reclamation projected last week that the reservoir will fall below 200,000 acre-feet by October, based on current water demands. At that level, Sacramento’s urban water suppliers

get concerned about accessing water stored behind the dam, because their intakes are not much lower.

In case that happens, Reclamation has a contractor on standby to install temporary pumps to lift water into the intakes if necessary.

Avoiding that kind of problem will require area residents to continue working hard on water conservation, said Shauna Lorange, general manager of San Juan Water District, one of the agencies that could be affected if the lake level falls too low.

“Without the snowpack, we have less water for fish, we have less refill of the reservoir,” Lorange said. “It’s going to be more difficult this year.”

The conflicts are expected to intensify this summer, when winter-run Chinook salmon – also an endangered species – begin migrating downstream on the Sacramento River. An estimated 95 percent of the run perished last year because there wasn’t enough cold water to protect the fish.

Officials hope to avoid a repeat this year, so Reclamation is under pressure to preserve even more cold water in Shasta Reservoir. In the interim, this may mean it will use even more water from Folsom Reservoir to meet demands, which include its customers downstream and to satisfy state water quality rules that regulate salinity in the Sacramento-San Joaquin Delta.

Reclamation and the California Department of Water Resources have asked for an exemption to those water quality rules. That request is now being considered by the State Water Resources Control Board. Depending on how the request is granted, it could cause Folsom Reservoir to be drawn down much faster.

“Folsom could go dangerously low this year – potentially much worse than last year,” Gohring said.

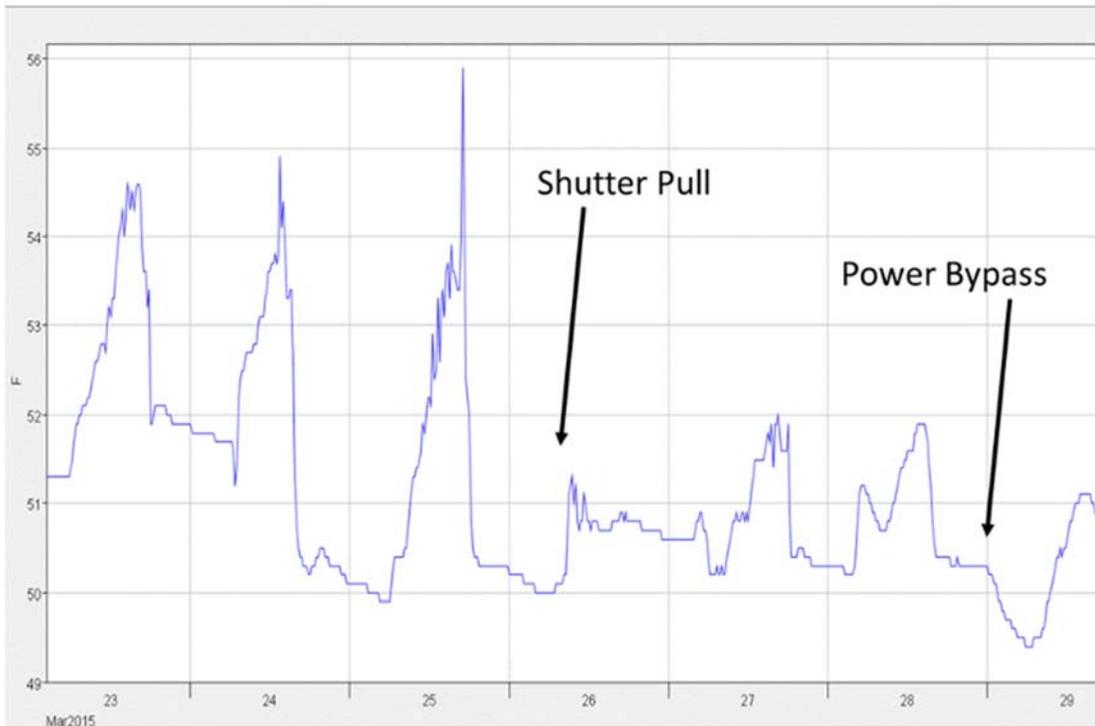
Call The Bee’s Matt Weiser at (916) 321-1264. Follow him on Twitter @matt_weiser.



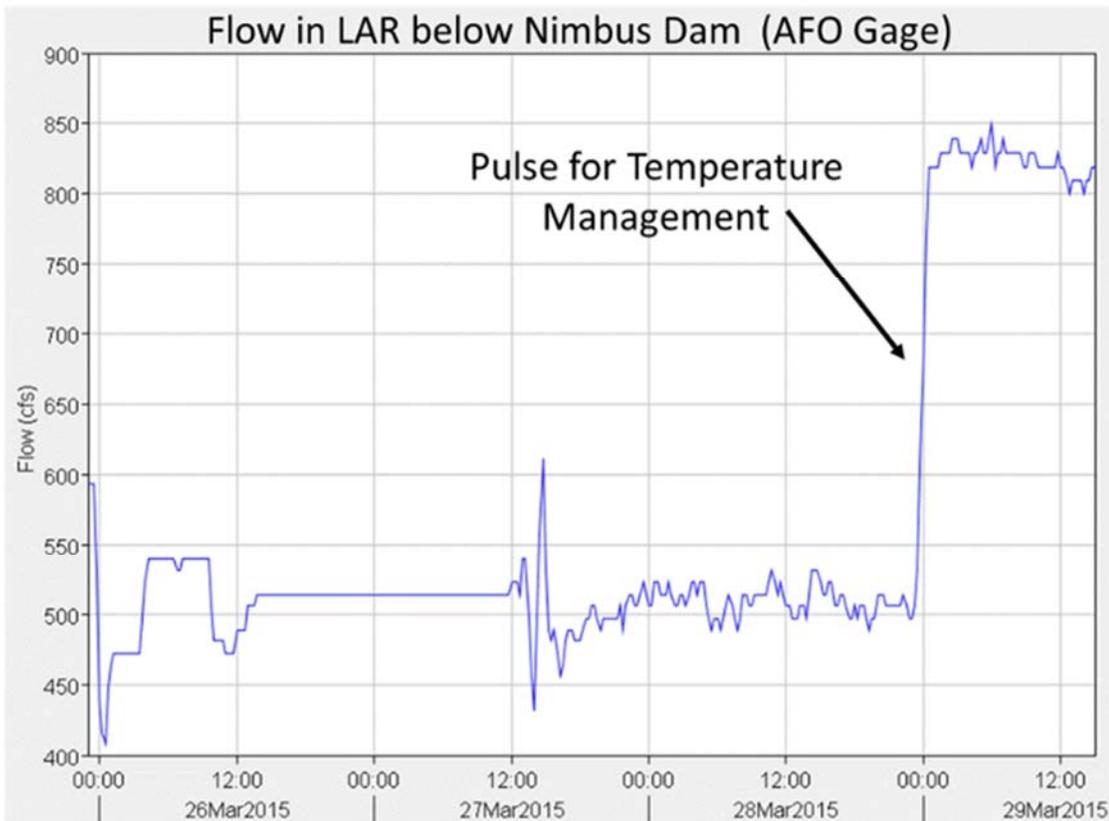
An installed temperature gauge in the American River at Sailor Bar will allow the biologists to monitor effects on steelhead and salmon from declining flows caused by drought **Brian Nguyen** - bnguyen@sacbee.com

You can see the lower release temperatures in this graph:

Temperature in LAR below Folsom Dam (AFD Gage)



This graph shows the start of the pulse flow:



Temperature and Steelhead Incubation

Posted on Thursday, March 26th, 2015

Several people let me know that I had a typo in the temperature thresholds given in a previous post. Here is a correct – and more comprehensive – list of temperatures and their effects on incubating Steelhead:

<http://www.waterforum.org/wp-content/uploads/2015/03/Temperature-and-Steelhead-Incubation.bmp>

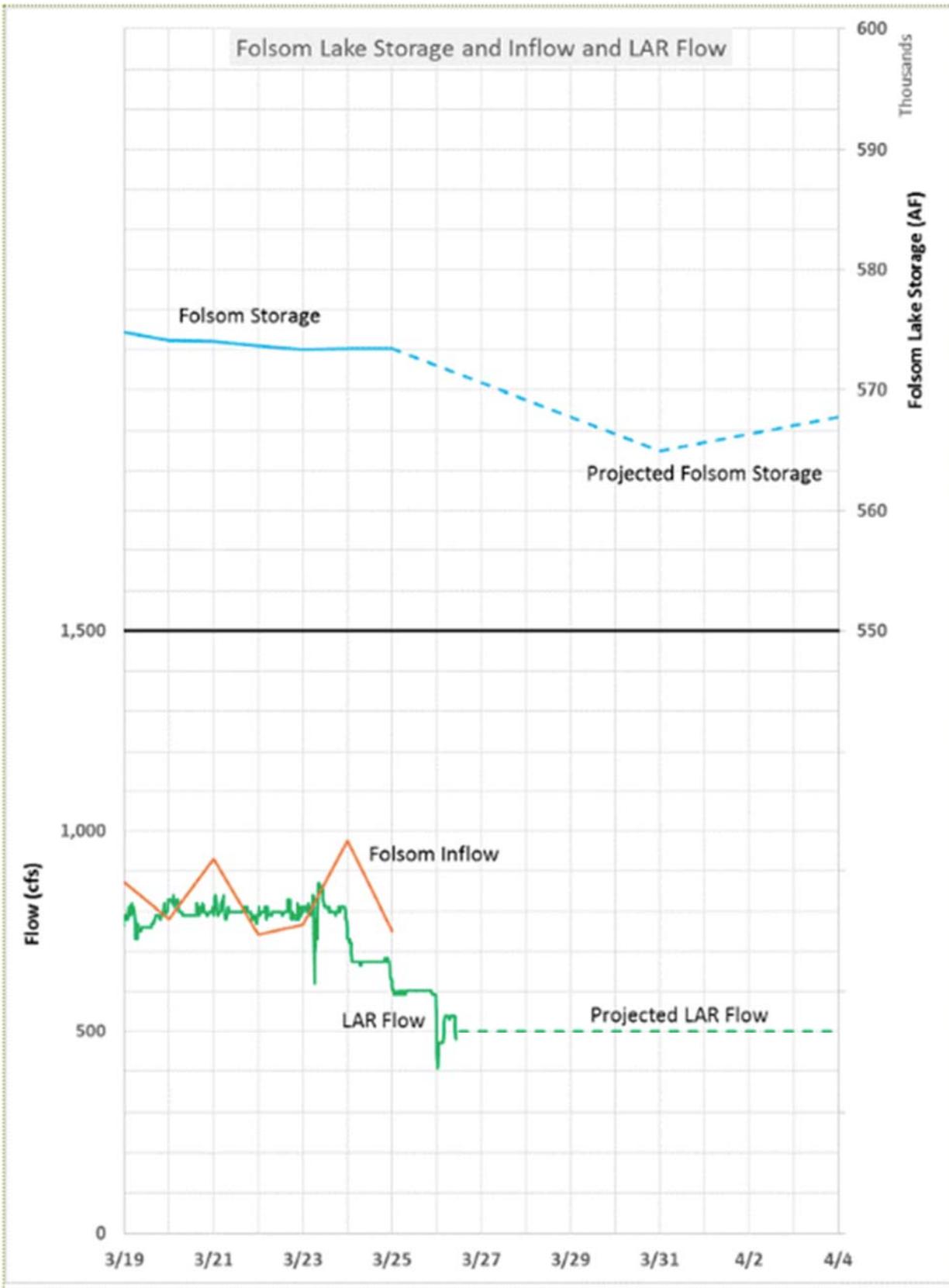
Folsom Storage and LAR Flow Projections

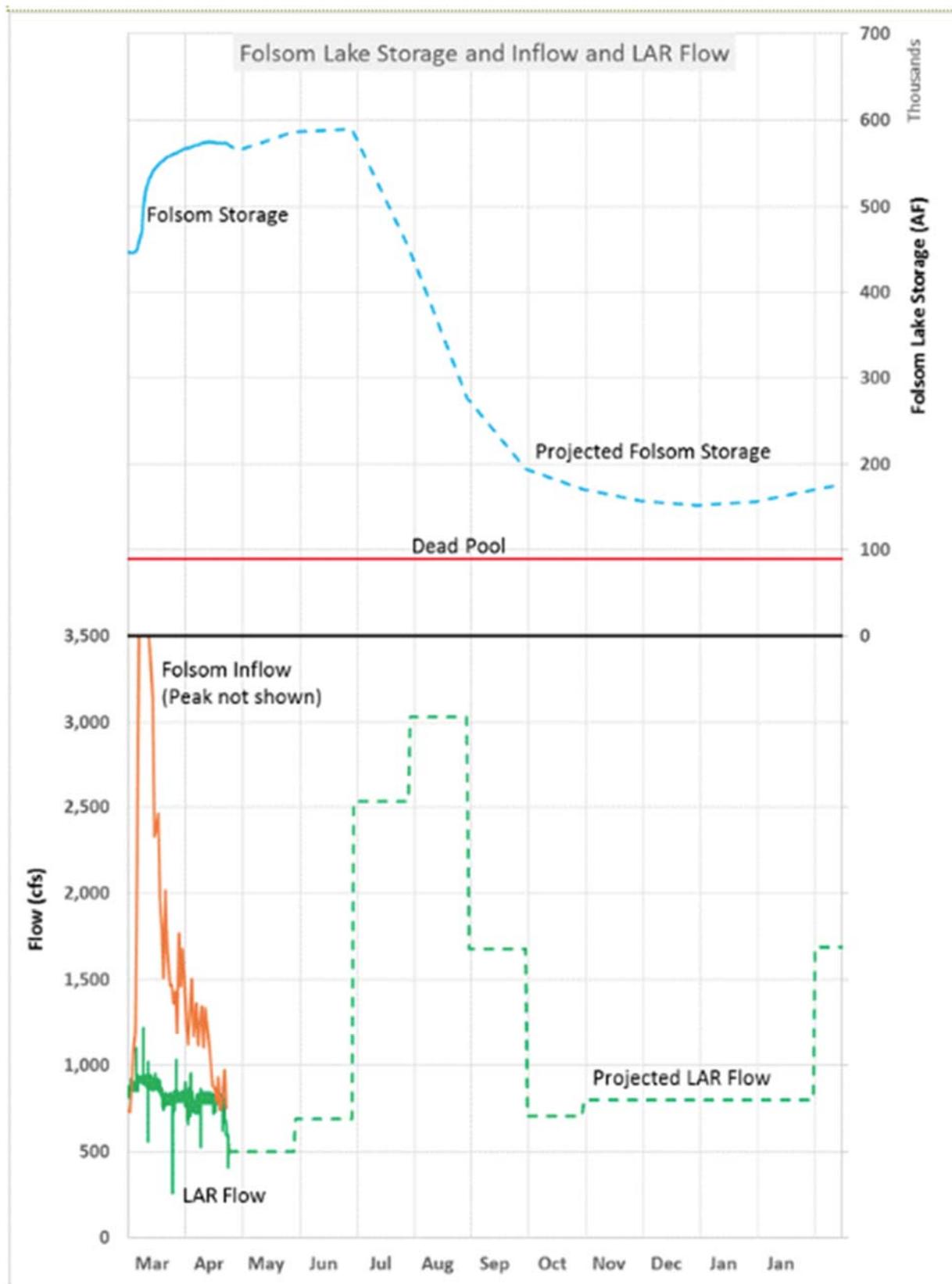
Posted on Thursday, March 26th, 2015

Following are two graphs that illustrate projected Folsom Lake storage and LAR Flow.

Observations:

- Folsom storage peaked 575.4 TAF on March 16.
- Reservoir inflow had been declining rapidly since around Feb 9.
- With the LAR flow cuts (100 cfs drop each day on 3-24 thru 3-26) the the reservoir outflow comes pretty close to matching the inflow.
- However, Reclamation projects that inflow will continue to wane and storage will drop through the end of March.
- Storage will peak again at under 600 TAF by the end of May.
- Storage may drop as low as 150 TAF by the end of November.





Notes: These graphs are based on the information distributed by Reclamation on 3/19/15 (see post below from that date). We have “discounted” the Folsom storage by 35 TAF to correct for the actual LAR flows during the first part of March (Reclamation scenario was based on March flow at 500 cfs all month; actual flow was 800 cfs through the 21st).

Water Temperature: Above Healthy

Posted on Thursday, March 26th, 2015

Here are the latest water temperature data. Note that we were above the healthy zone (above 57 deg F) and into the lethal zone (above 59 deg F) for several hours yesterday at Rossmoor Bar and at William Pond. Temperatures upstream are expected to be cooler.

Note also: the gravel and water gauges at Rossmoor are measuring warmer than the cdec gauge at William Pond. We assume this is because the Rossmoor gauges are more affected by direct sunlight.

<http://www.waterforum.org/wp-content/uploads/2015/03/Water-and-Gravel-temps-3-26-15.png>

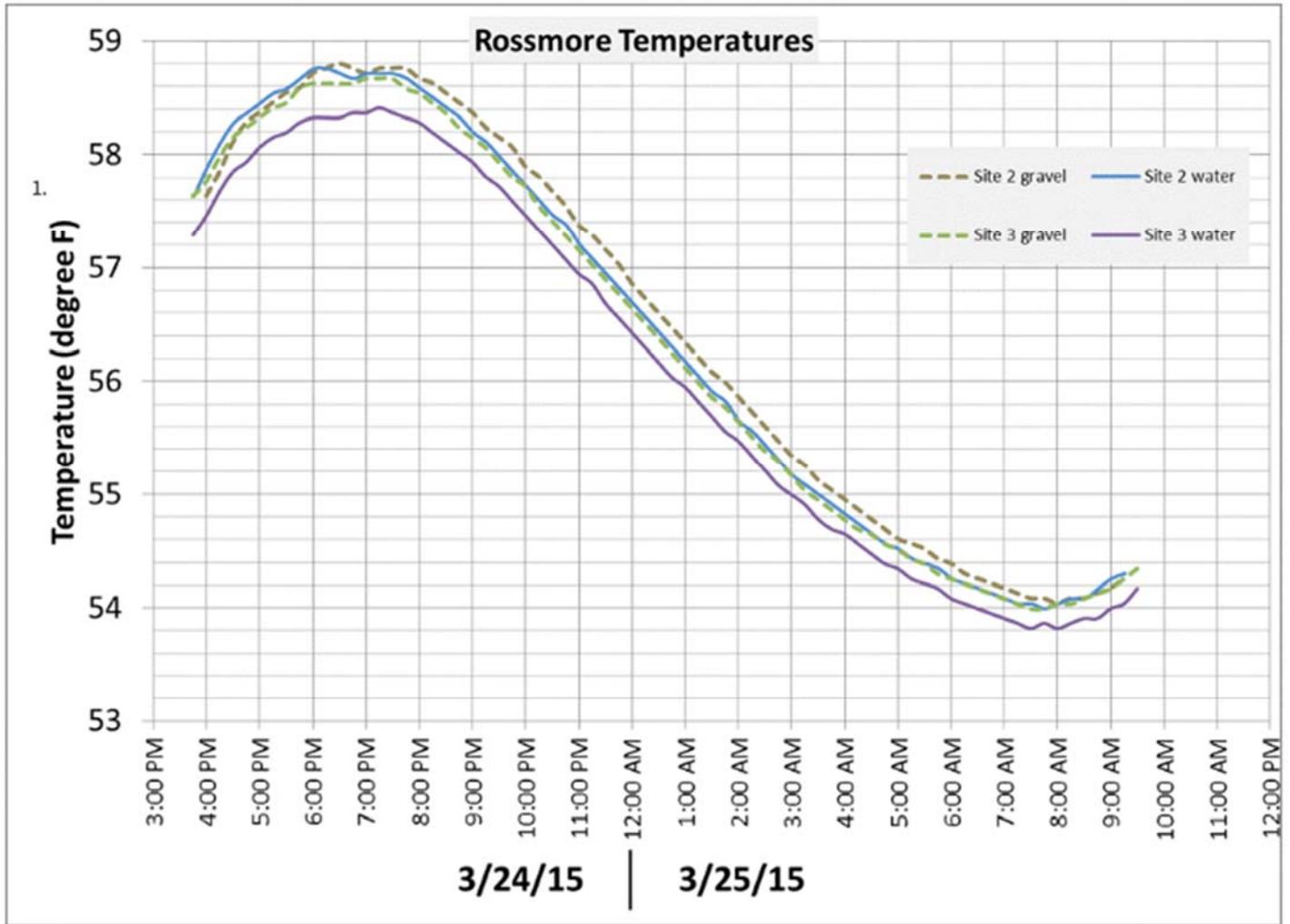
Additional Notes:

- Hazel: AHZ cdec gauge.
 - William Pond: AWP cdec gauge.
 - Rossmoor Water: Water Forum temporary gauge – average of three sites; each gauge is installed in white, slotted PVC pipe at gravel surface.
 - Rossmoor Gravel: Water Forum temporary gauge – average of three sites; each gauge is installed in white, slotted PVC pipe at about 12 inches deep in the gravel.
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Temperatures at Rossmoor (Update 3/25/15)

Posted on Wednesday, March 25th, 2015

Our field team pulled temperature readings at the Rossmoor Bar:



1. Please keep in mind that water and gravel temperatures are expected to be cooler as you move upstream.
2. The incubating Steelhead start feeling unhealthy above 57 deg F and can't survive long above 59 deg F

Latest Temperature: Rossmoor Bar

Posted on Tuesday, March 24th, 2015

From field crews (around 10:30 am on 3/24/15):

Temperature in degree F:

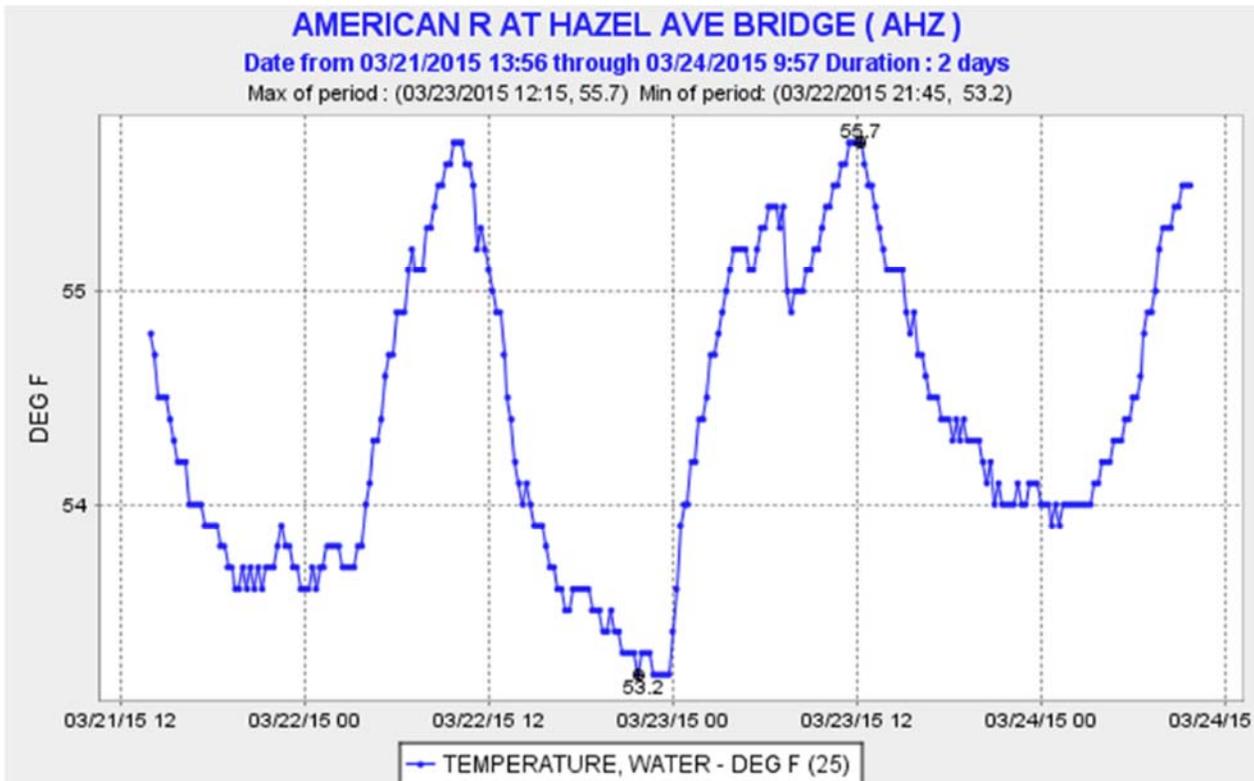
Location	Site 1	Site 2	Site 3	Avg
Water	54.5	54.3	54.9	54.6
Gravel				
6 inches	54.3	54.9	54.9	54.7
12 inches	56.8	55.4	55.0	55.8
18 inches	55.6	54.9	55.4	55.3

Latest Temperature: William Pond and Hazel Ave (downstream of Nimbus Dam)

Posted on Tuesday, March 24th, 2015

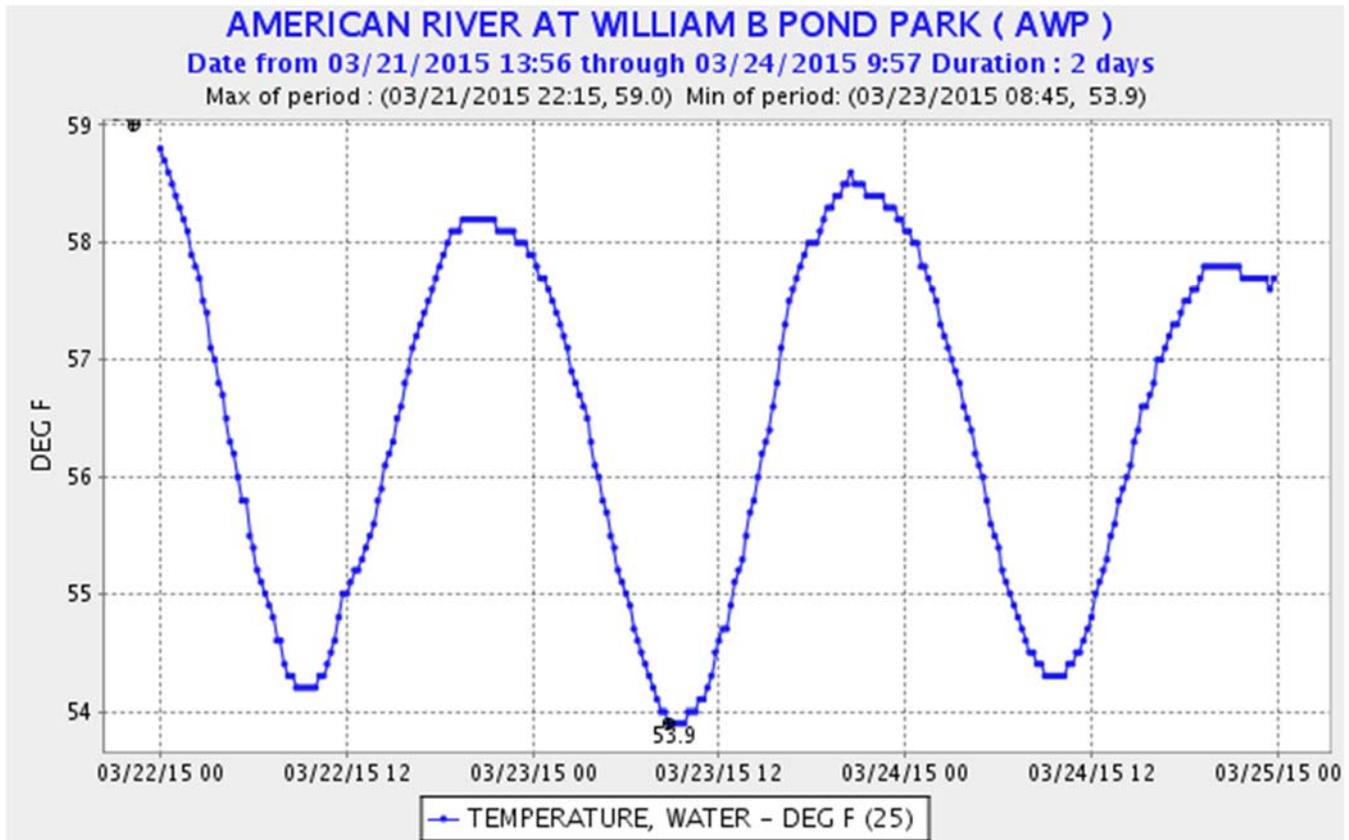
From CDEC:

http://cdec.water.ca.gov/histPlot/DataPlotter.jsp?staid=ahz&sensor_no=25&duration=E&start=03%2F21%2F2015+13%3A56&end=03%2F24%2F2015+9%3A57&geom=Small



From CDEC:

http://cdec.water.ca.gov/histPlot/DataPlotter.jsp?staid=AWP&sensor_no=25&duration=E&start=03%2F21%2F2015+13%3A56&end=03%2F24%2F2015+9%3A57&geom=Small



The Lower American River

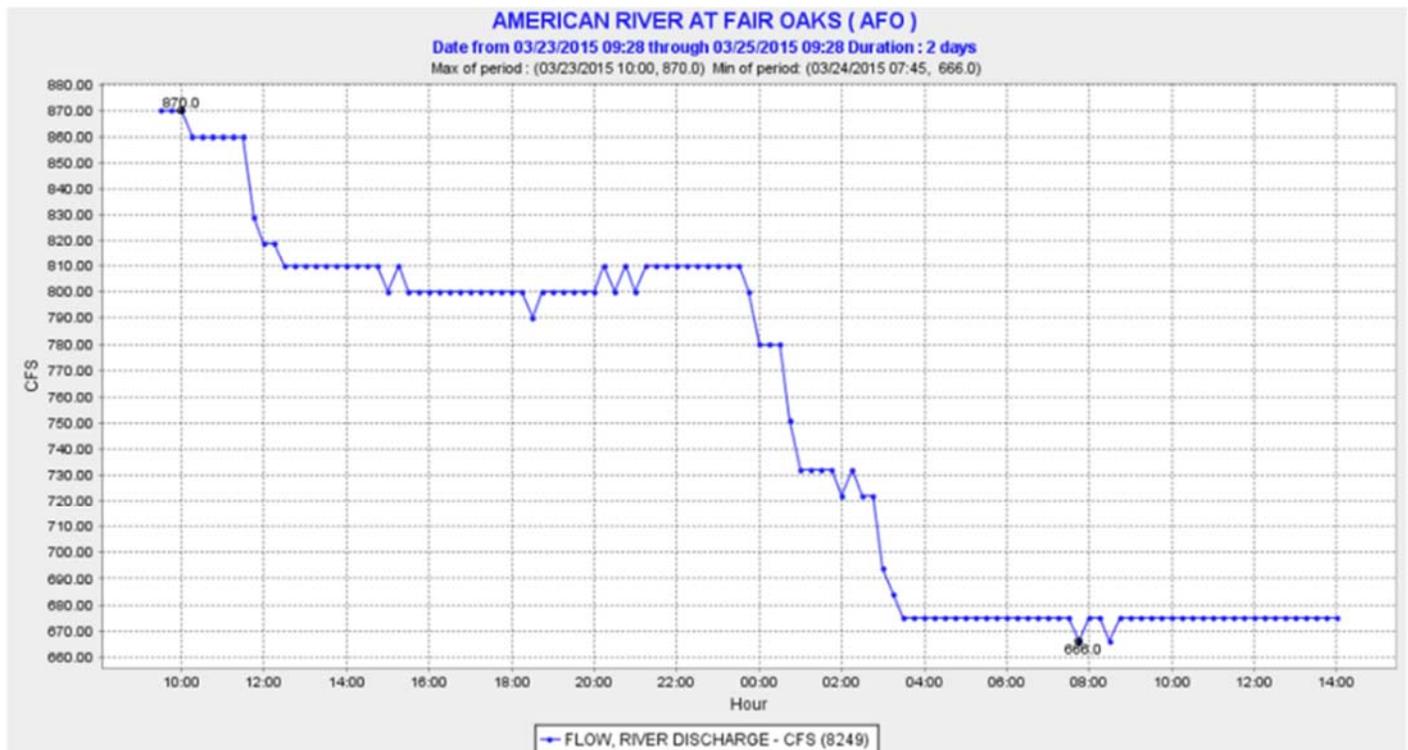


LAR Flow Reduced from 800 to 700 cfs

Posted on Tuesday, March 24th, 2015

Flow change:

http://cdec.water.ca.gov/jspplot/jspPlotServlet.jsp?sensor_no=8249&end=03%2F25%2F2015+09%3A28&geom=huge&interval=1&cookies=CDEC02



Nimbus Dam – Change Order

Posted on Friday, March 20th, 2015

Project: Nimbus Dam

Please make the following release changes to the American River:

Date	Time	From (cfs)	To (cfs)
03/24/2015	0100	800	700
03/25/2015	0100	700	600
03/26/2015	0100	600	500

Comment: Storage Conservation

Issued by: Randi Field



ARG Meeting Outcome

Posted on Thursday, March 19th, 2015

From American River Group Meeting March 19, 2015.

Reclamation update on hydrology and weather:

- Rain: low.
- Folsom storage: not bad at the moment.
- Snow pack: really bad.

Conclusion: 2015 may be a worse water year for AR basin than 2014. The reservoir is higher now (than last year) because, “we got our paycheck early,” in the form of wet, early-season precip. However, “we don’t know when we will get paid again.”

Reclamations flow and storage projection:

DRAFT March 2015

90%-Runoff Exceedance Outlook:

Federal End of the Month Storage/Elevation (TAF/Feet)

		Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Folsom	564	600	621	625	488	313	230	207	193	188	192	206	217
	Elev.	428	431	431	415	389	374	369	365	364	365	368	371

Monthly River Releases (cfs)

American		500	500	687	2535	3028	1681	706	800	800	800	800	1692
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Please note:

CVP actual operations do not follow any forecasted operation or outlook; actual operations are based on real-time conditions.

CVP operational forecasts or outlooks consider general system-wide dynamics and do not necessarily address specific watershed/tributary details.

CVP releases represent monthly averages.

CVP operations are updated monthly as new hydrology information is made available December through May.

Additional notes from Reclamation:

- Low Storage point on chart is 188 TAF end of Nov.
- That value is probably close to 153 TAF when you consider that the flows for most of March were actually 800 cfs (it represents about 35 TAF of unaccounted outflow).
- These numbers could be worst given the recent weather forecasts.
- This projection assumes minimal CVP export pumping (health and safety of M&I only).
- This projection assumes some of the TUCP actions that have yet to be approved.
- The biggest “swing” in the data is assumptions of Sac Valley “depletion” and Delta Water Quality requirements (which are subject to future TUCPs).

Fishery Concerns:

- The biggest fishery concern over the next 4 to 6 weeks is incubating Steelhead: eggs and alevin in the gravel.
- If temperatures in the gravel get above 47 degree Fahrenheit (47 dF), then the incubating Steelhead get stressed and some may die.
- If the gravel temp gets above 59 dF the Steelhead eggs and alevin that are maturing there are likely to die.
- This is bad since they are a listed (Theatened) species.
- Keeping temperatures in the river low now is more important than saving cold water for later because of the high sensitivity of egg & alevin.
- We want to keep temps below these thresholders while there are still Steelhead in the gravel. This means at least through the first week in April and preferably through the end of April.
- Biologist have estimate when the Steelhead will emerge (leave the gravel): see chart below.
- The 2014 brood of Fall Run Chinook is believed to be fully emerged (out of the gravel) and are out-migrating now. They are less sensitive to flow and temperatures that Steelhead right now.

Estimated cumulative proportion and number of fry to emerge by date for observed Lower American River Steelhead redds through 20 March 2015:

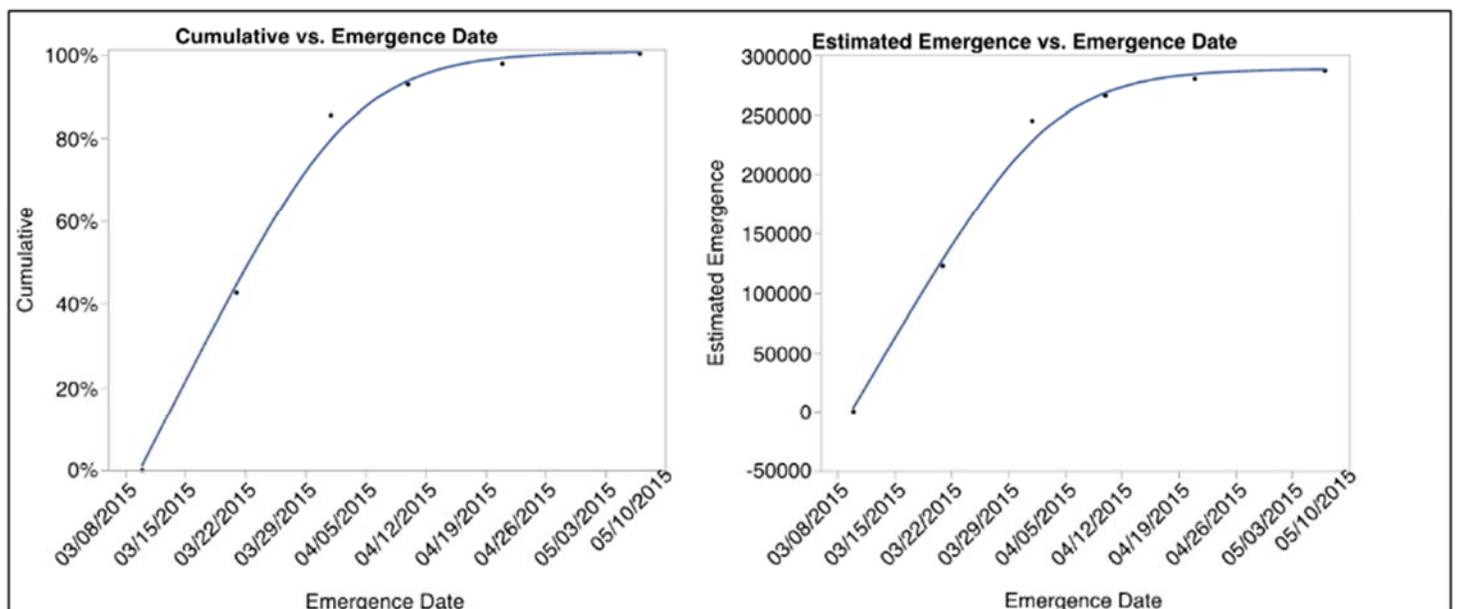
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Conclusion after group discussion:

- Reclamation will reduce flows to 500 cfs, starting at 1 am on Tues 3/24/15.
 - Flows will be dropped 100 cfs each day.
 - Drops will be made in the middle of the night to reduce fish stranding.
 - Reclamation will “do their best” to keep water temperature at Rossmoor Bar below 57 dF though the first week in April.
 - Temperature management available to Reclamation: use of lower river outlets (power bypass), shutter pull, flow change.
 - There is not a permanent temperature gage at Rossmoor Bar.
 - Reclamation will continue stranding surveys over the next several weeks.
 - Water Forum (at Reclamation’s request) will conduct temperature and water quality monitoring.
 - Water Forum (at Reclamation’s request) will make our Rossmoor Bar temperature data available to Reclamation (we’ve had a non-permanent temp gage there for a few years).
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Purpose and Contact Information

Posted on Wednesday, March 18th, 2015

Dear Water Forum Stakeholder,

The purpose of this web site is to provide a quick one-stop-shop for information about water and river conditions here in the American River Basin. Conditions are changing quickly, and it seemed important to have a mechanism for getting info out quickly and reliably to water managers, fishery managers, and concerned citizens.

Please contact one of us if you have additions or corrections to this information or if you have additional questions or data request.

Best Regards, Tom Gohring

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