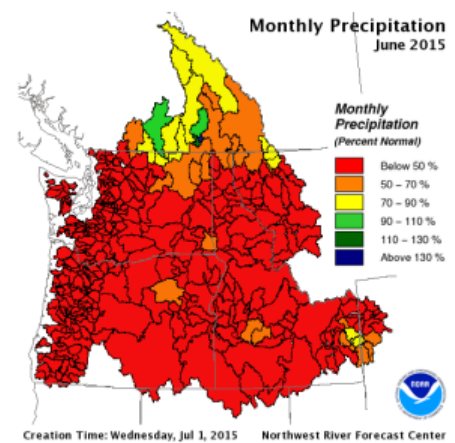
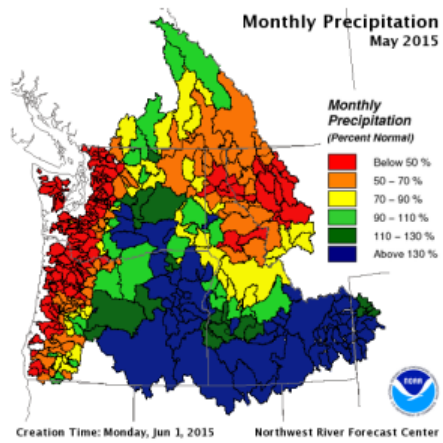
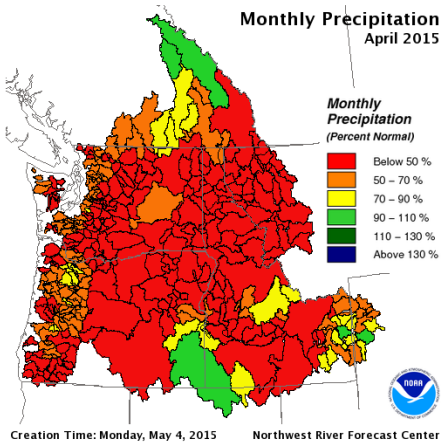
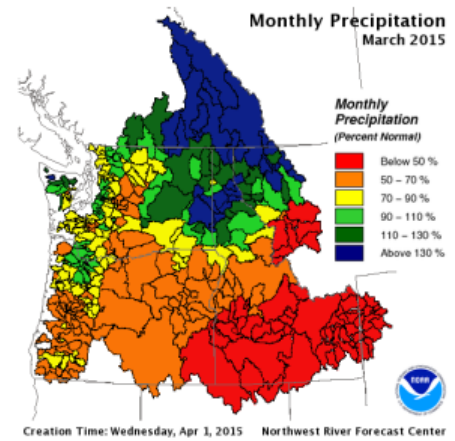
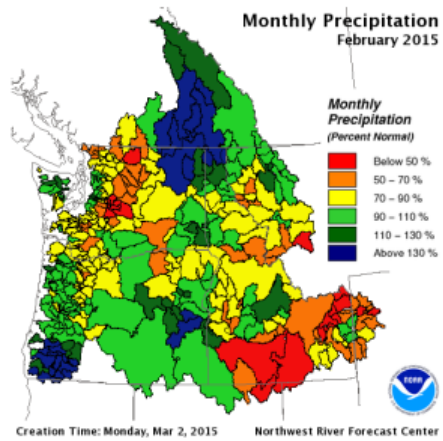
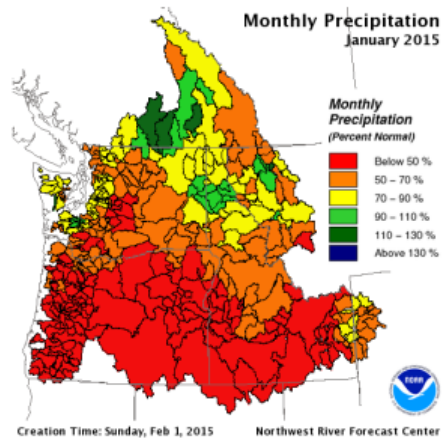


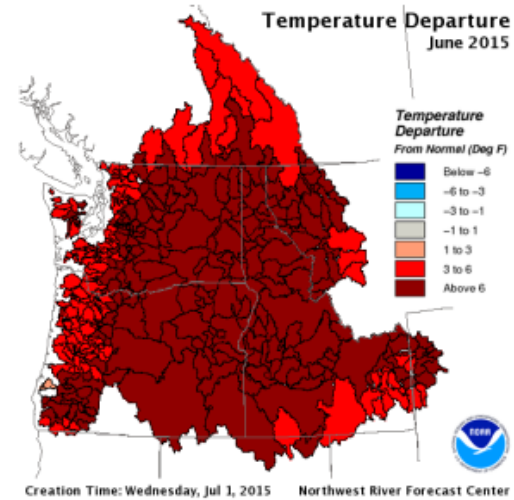
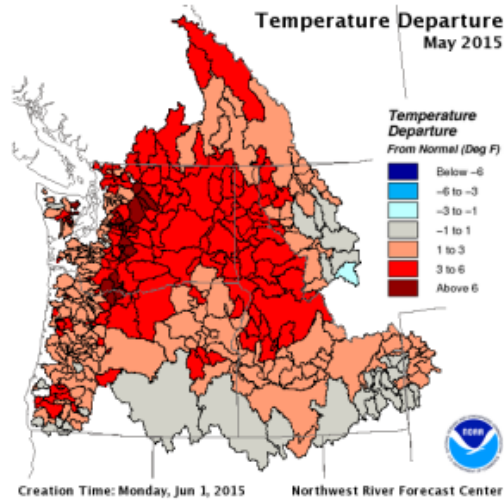
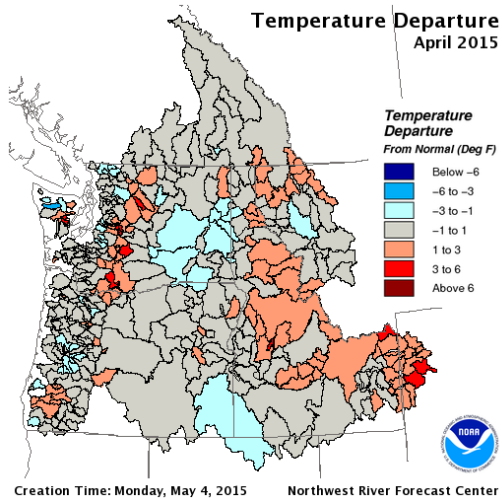
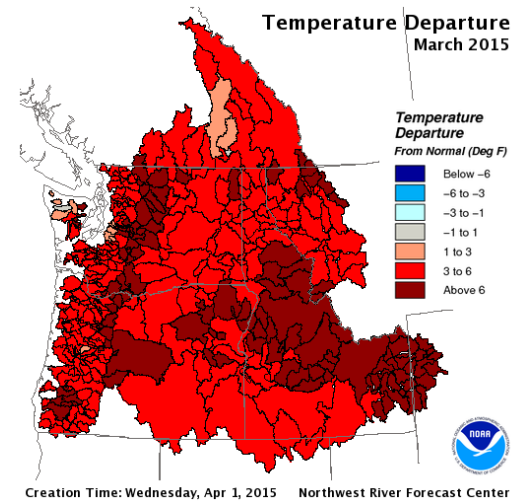
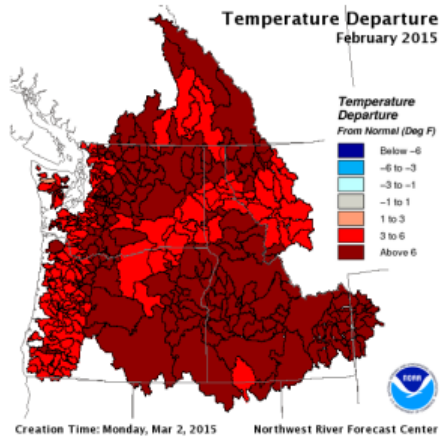
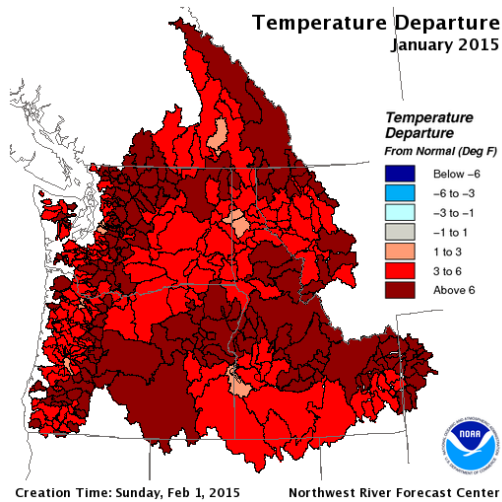
NOAA
FISHERIES
West Coast
Region

Summary of Adult Sockeye Migration Conditions, 2015

- River flows far below average, snow melt to the streams far below average as well.
- Basin temperatures well above average
- Combination of below average runoff and well above average temperatures created perilous passage conditions for fish
- A very low percentage of fish survived to spawn



NOAA FISHERIES





Summary of Basin Conditions

- Precipitation below average for much of the basin during snow accumulation season
- Temperatures well above average during snow accumulation season
- Result was little snow and warm water temperatures throughout the Basin.



NOAA FISHERIES

The Sunday Oregonian
 ALWAYS ON OREGONLIVE.COM
 July 12, 2015 • \$2.00

HOMES & GARDENS
 Want to add pot to your plot? We give you a 10-step guide on how to grow your own

SPORTS
 LaMarcus Aldridge was lured to San Antonio with a simple pitch **CI**

EARLY EDITION
 Saturday's news and sports with Sunday's features and comics
\$421 in coupons inside for Portland metro market
 Maximize savings at oregonlive.com/smartsaver

2016: The year of the ballot initiative

Mapes
 A bumper crop of initiatives and economic effects appears in next year's Oregon ballot. In the wake of the just-finished session, a cent-right group is looking to raise the kind of money and other services that can be used in the legislative budget. A group of liberal activists to raise the minimum wage an hour after the issue fizzled in the Legislature. Business interests, meanwhile, are rolling back the clean fuels that critics charge will raise gas prices. And some conservatives are ratcheting down the ability of employee unions to collect from workers who don't want to join a union. There are going to be a lot of measures from all sides," says Rep. Val Hoyle, D-Eugene, just stepped down as House majority leader. "There's a lot of up demand there." Oregon, legislators can always second-guess or just ignore by individuals and using the initiative system. It seems to be particularly the case as the state heads toward the election. "I think it's going to be a formative year," says Ben Harbo, executive director of Our Oregon, which is working on the initiatives. "It will change the way the state works." Migration critics, emboldened by their success in 2014, have filed

Deschutes salmon deaths add to biologists' heat battle

Steve Pribyl of the Deschutes River Alliance holds a sockeye salmon in the Deschutes River. Pribyl found hundreds of the migratory fish dying of a bacterial infection that spreads in warm waters.

50s
 Water temperature preferred by salmon

78
 Temperature in the lower Willamette

10%
 Die-off of juvenile salmon coming down the Columbia River at John Day (normal is 1 to 2 percent)

By Tara Kulash
The Oregonian/OregonLive

Northwest salmon are continuing to die from heat exposure, most recently on Oregon's Deschutes River, and responses that biologists previously called "last-ditch efforts" not yet needed to save the fish are quickly becoming front-line strategies.

Regional fish managers said in June they weren't overly concerned for the migratory fish because the temperatures at the time would normally arrive later in the summer anyway.

But only a couple of weeks into July, the lower Willamette River is exceeding 78 degrees and the North Umpqua River at Winchester Dam reached 81.2 last week — the highest ever recorded at the dam. Salmon prefer water in the 50s. They become stressed and prone to disease as temperatures rise past 60 degrees, at which point dissolved oxygen declines.

As a result, scores of dead salmon are washing ashore along the Deschutes and Willamette rivers. And mortality rates are rapidly rising for juvenile fish near John Day Dam on the Columbia River.

Now in its second year of drought, Oregon experienced another warm winter that left the mountains with little snowpack. Normally the snow would melt throughout the summer, its cool waters refreshing the rivers. Instead, the mountains are nearly bare, and unusually high June and July temperatures throughout the region are heating the waters quickly.

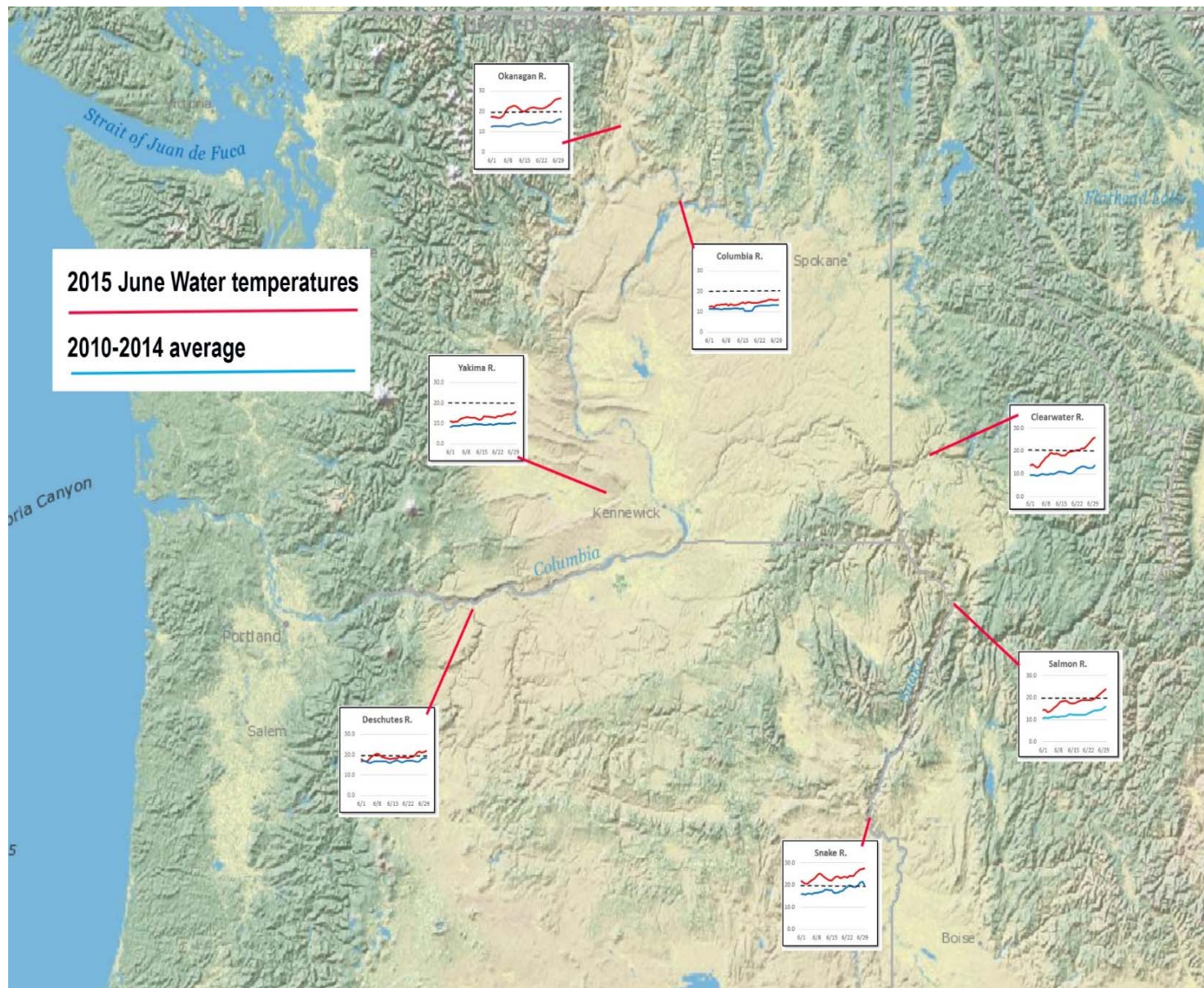
That has area biologists scrambling to prevent more casualties.

Last weekend a Deschutes River Alliance director found 13 dead sockeye

See Fish, A6



Temperatures well above average throughout the Basin

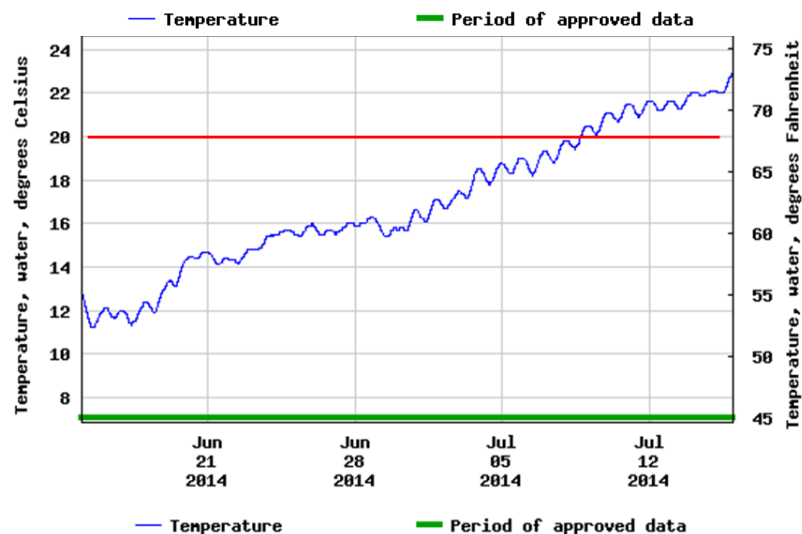
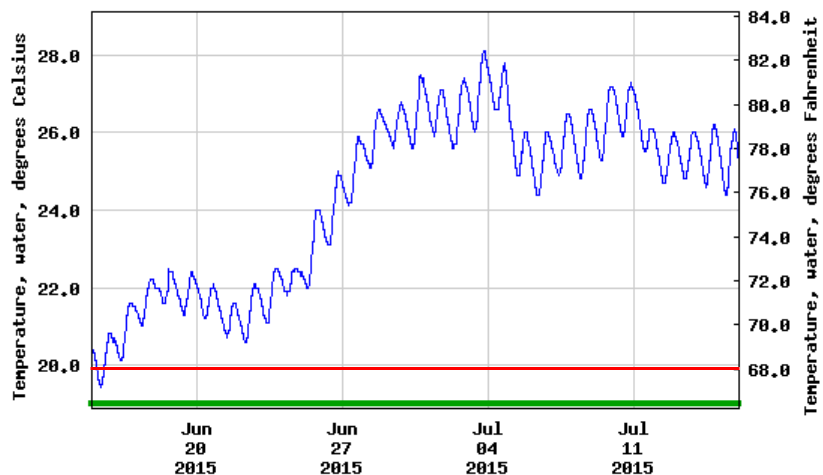




Temperature in the Okanogan River June 15 - July 15, 2014 and 2015

On June 15, 2015 the temperature in the Okanogan River at Malott, WA was 8C warmer than reported on June 15, 2014.

USGS 12447200 OKANOGAN RIVER AT MALOTT, WA

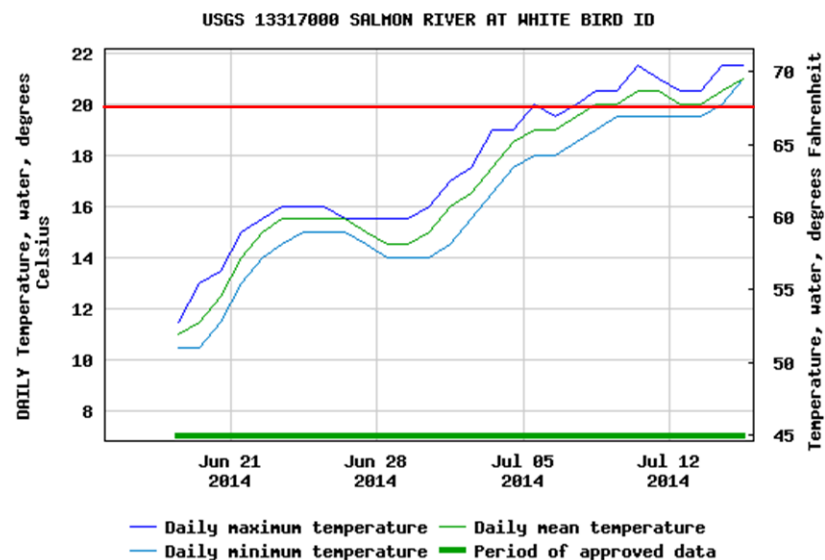
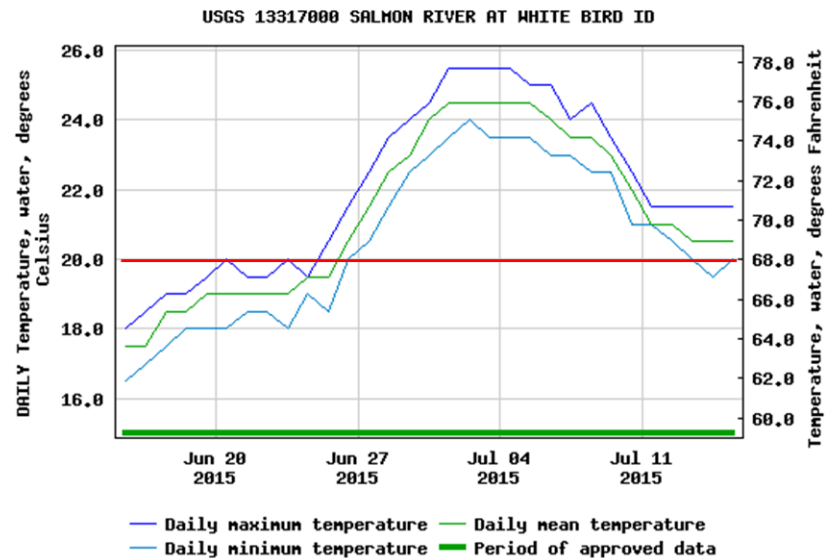


NOAA FISHERIES



Temperature in the Salmon River June 15 - July 15, 2014 and 2015

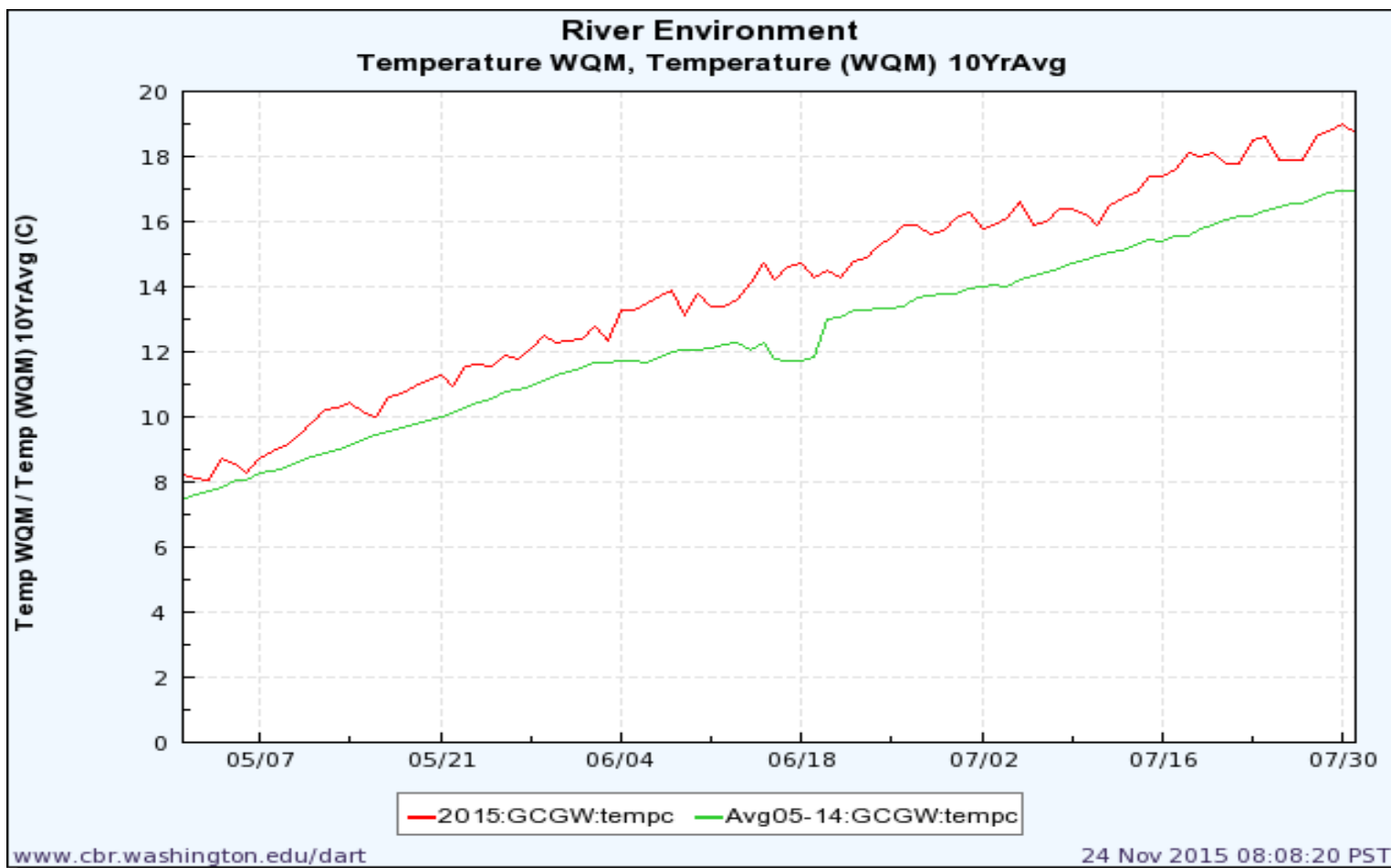
Temperature in the Salmon River was 5C warmer in 2015 than recorded in 2014, which was an average flow year in the Snake River Basin.



NOAA FISHERIES



Temperature below Grand Coulee for the Months of May – July 2015



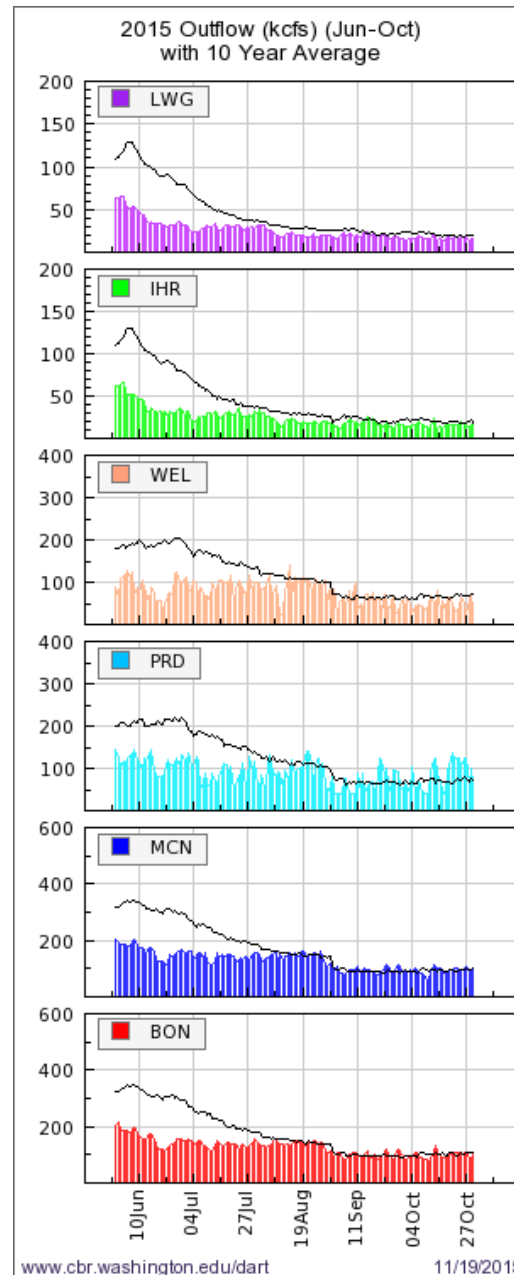


Grand Coulee temperature June average
Inflow temp 16.5 Outflow 14.7





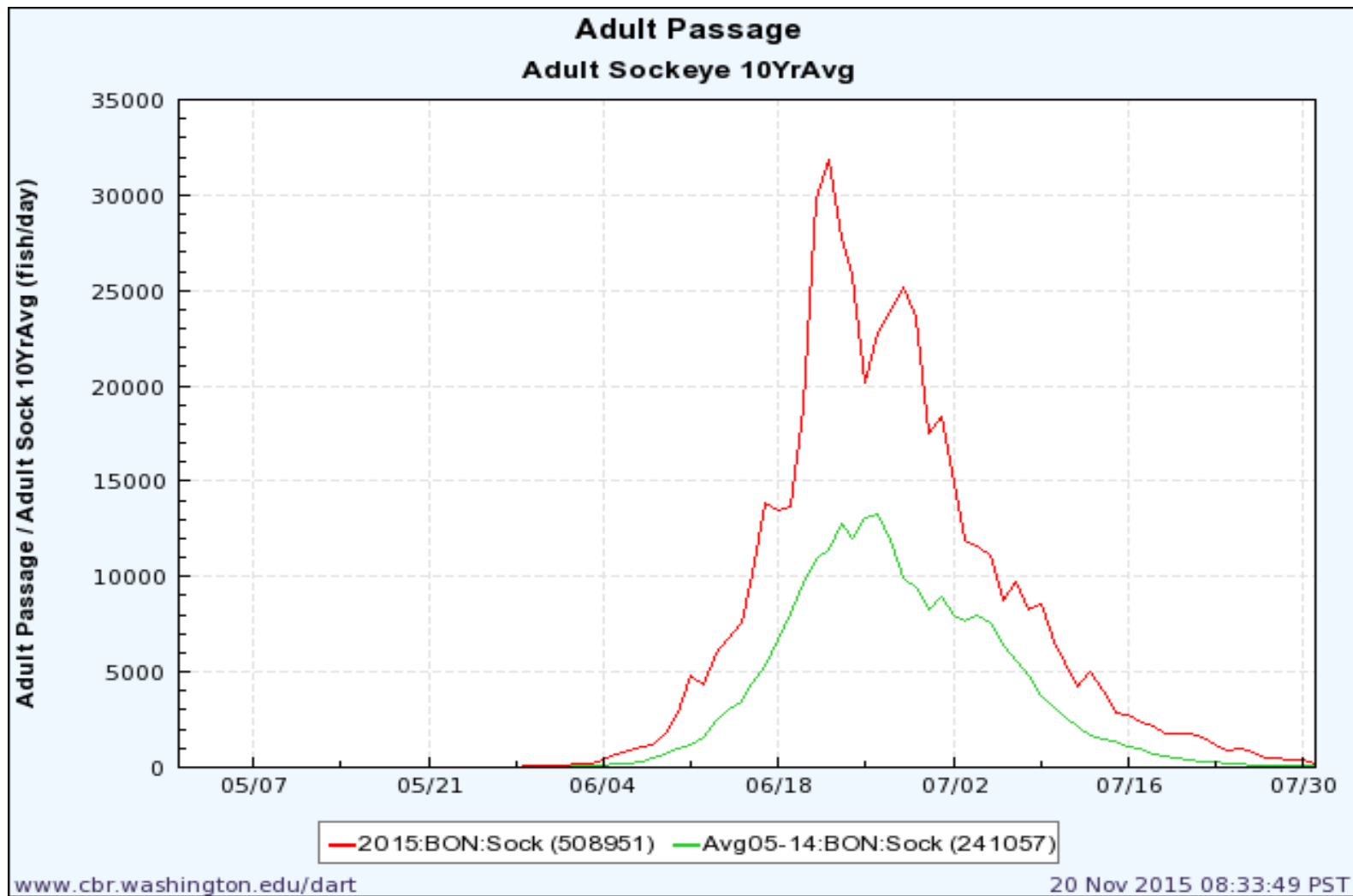
Flow relative to the 10-year average at mainstem dams



NOAA FISHERIES

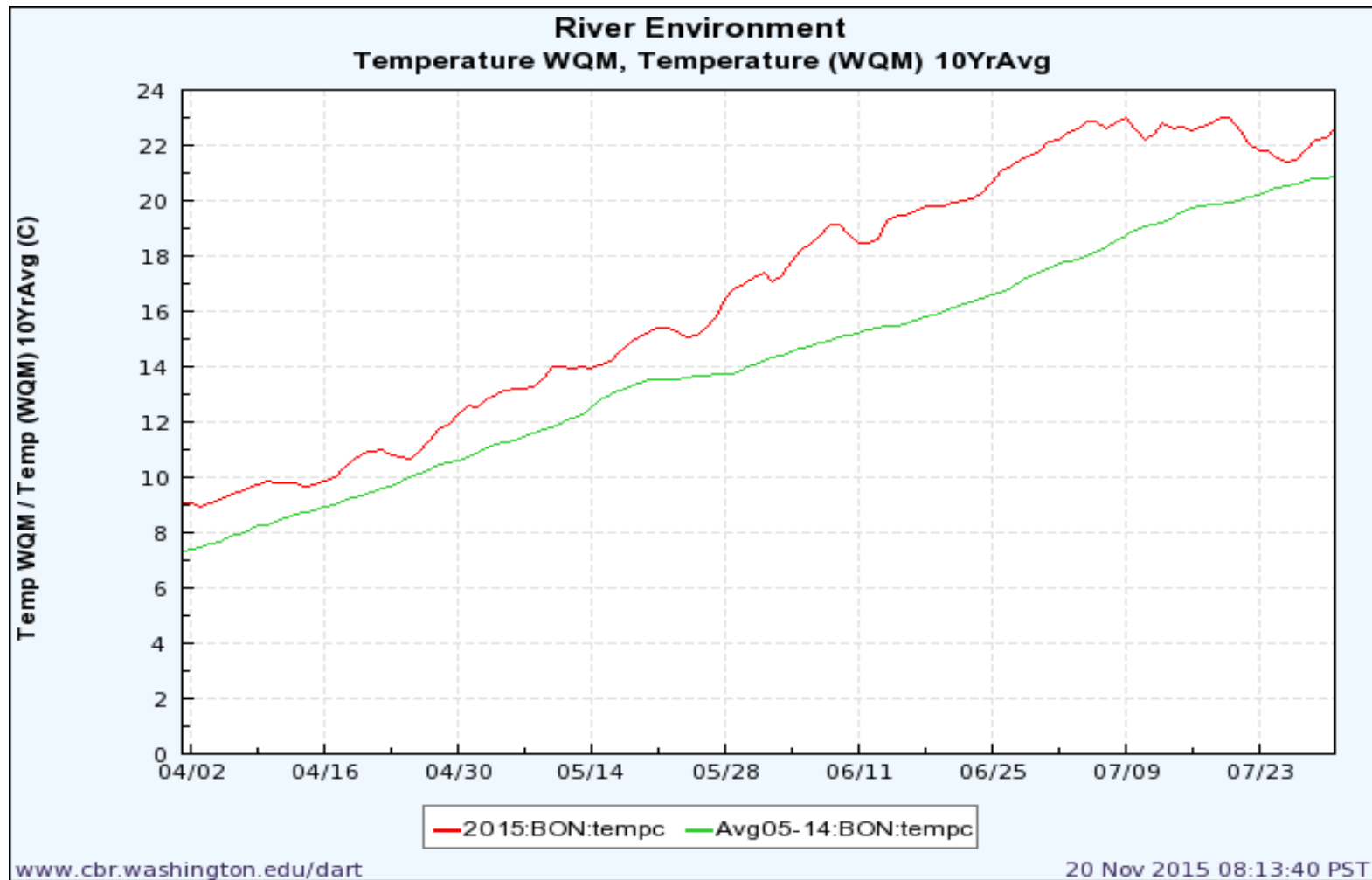


Sockeye passage timing at Bonneville Dam

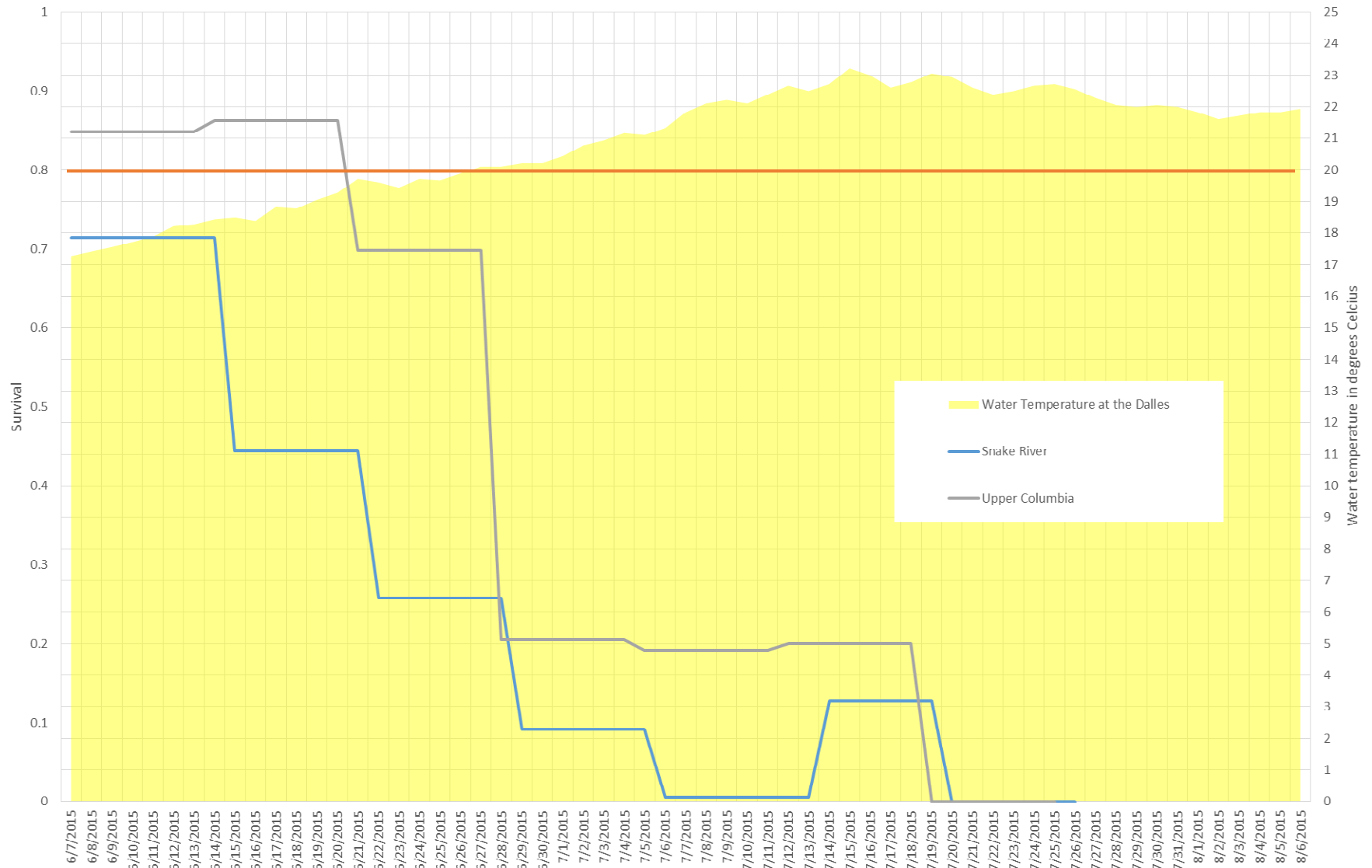




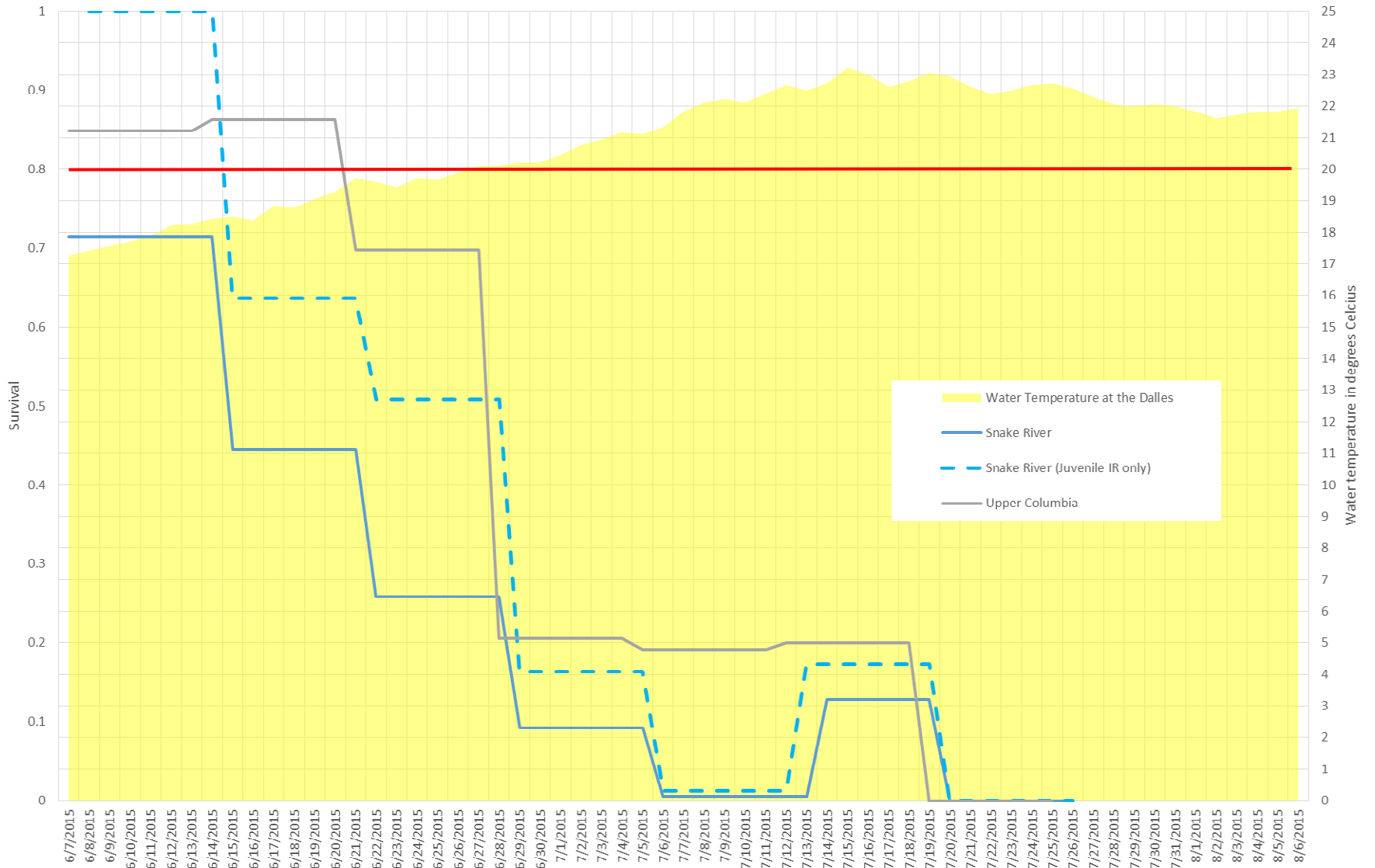
Temperature at Bonneville Dam exceeded 20C by mid-June, which is up to 4C above 10 year average



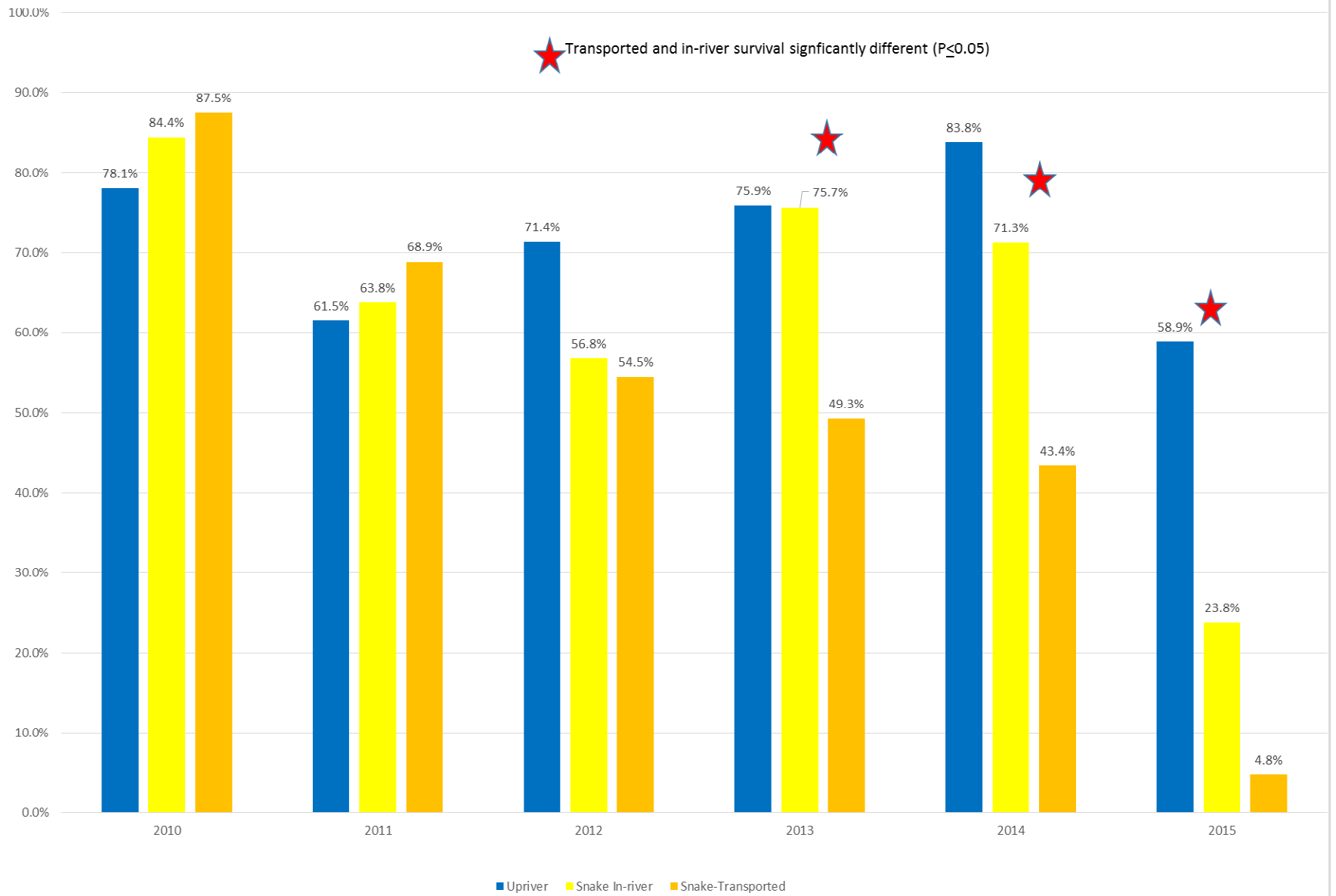
Bonneville to McNary survival by week of arrival at Bonneville for Snake River and Upper Columbia Sockeye with water temperature at the Dalles in 2015



Bonneville to McNary survival by week of arrival at Bonneville for Snake River Sockeye with water temperature at the Dalles in 2015

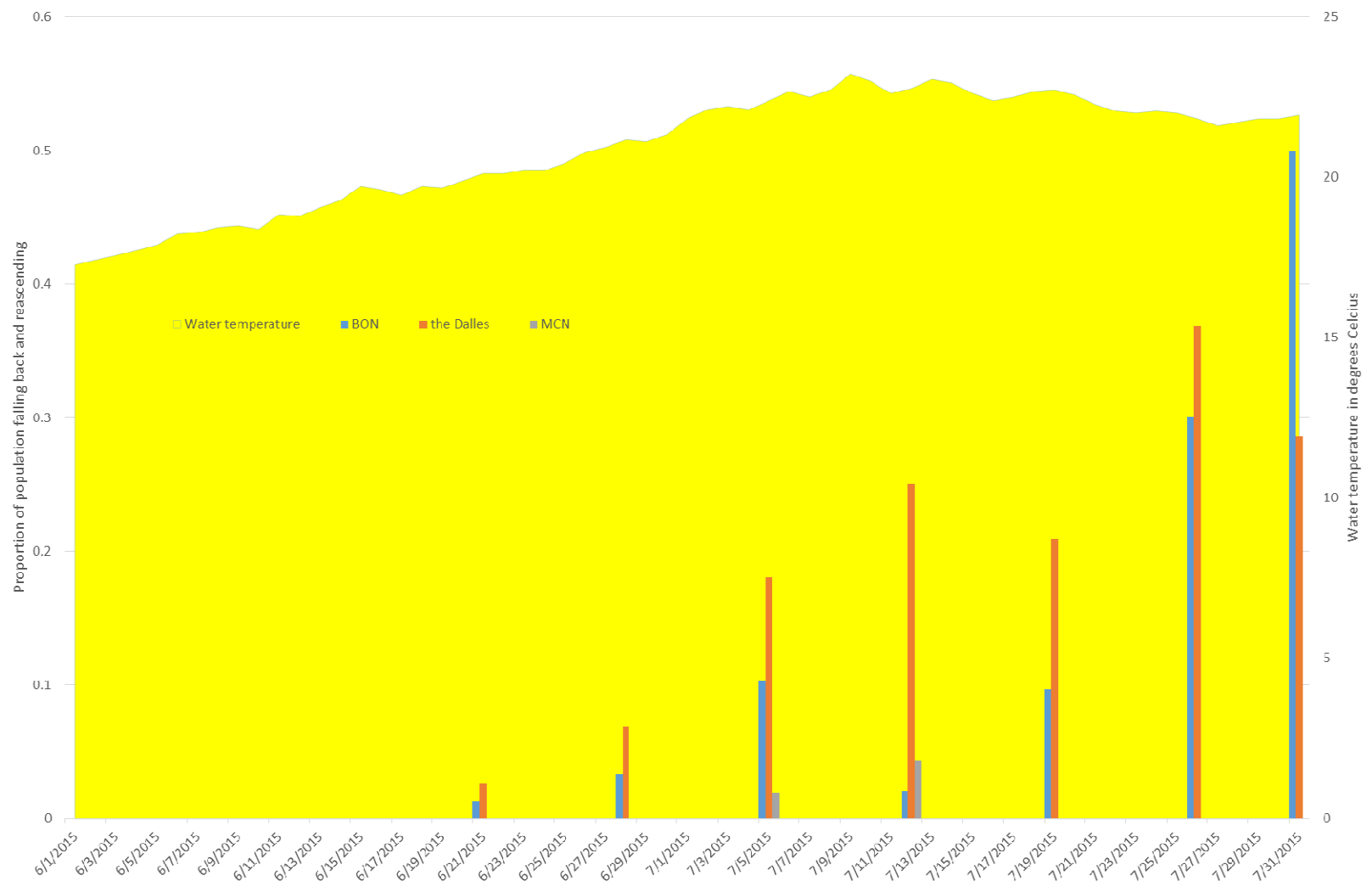


Comparison of Bonneville to McNary Survival for Upper Columbia sockeye and Snake River sockeye which were transported or migrated in river as juveniles



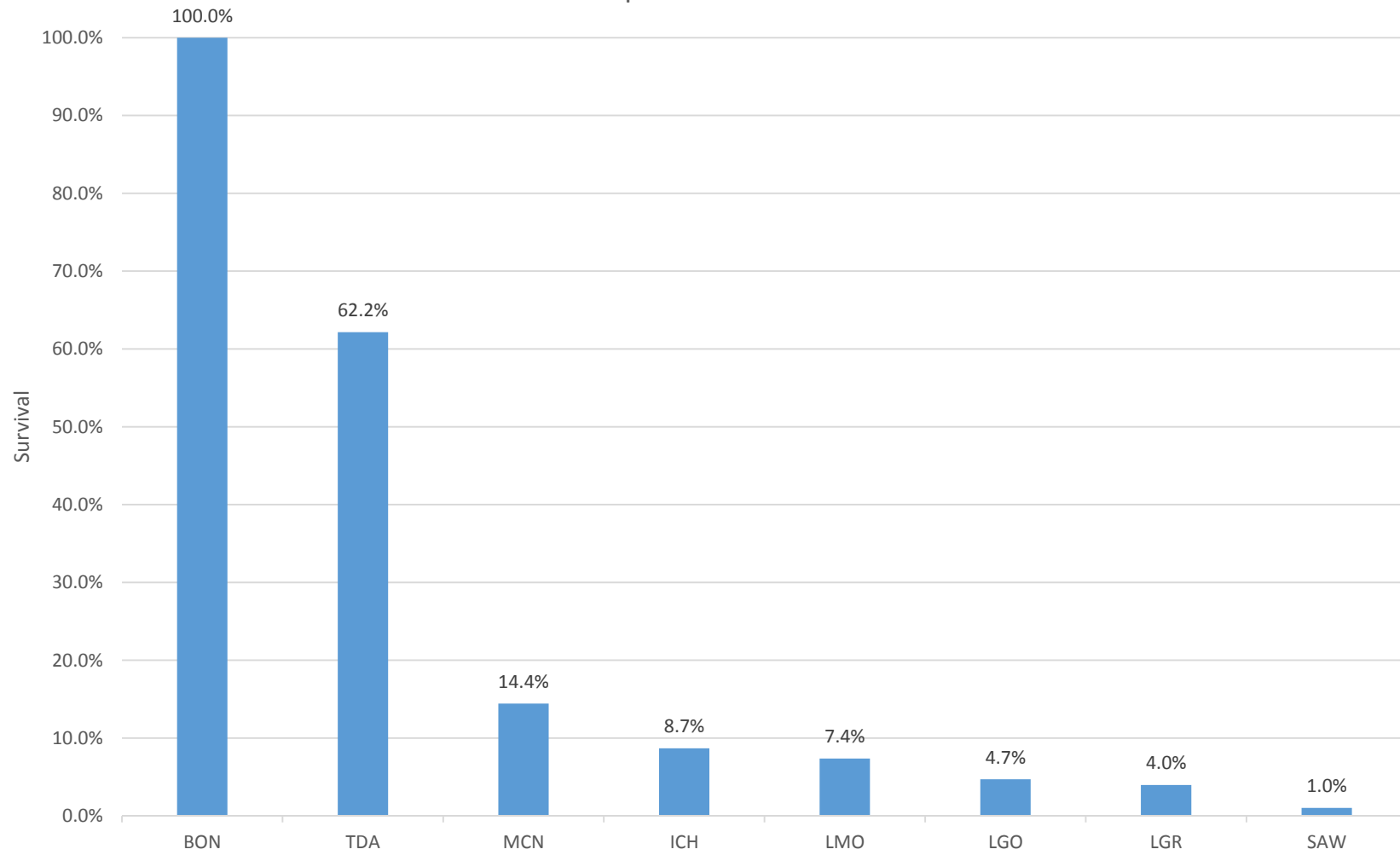


Weekly pooled fallback and reacension rates (from DART website) for Sockeye Salmon and water temperature at The Dalles in 2015





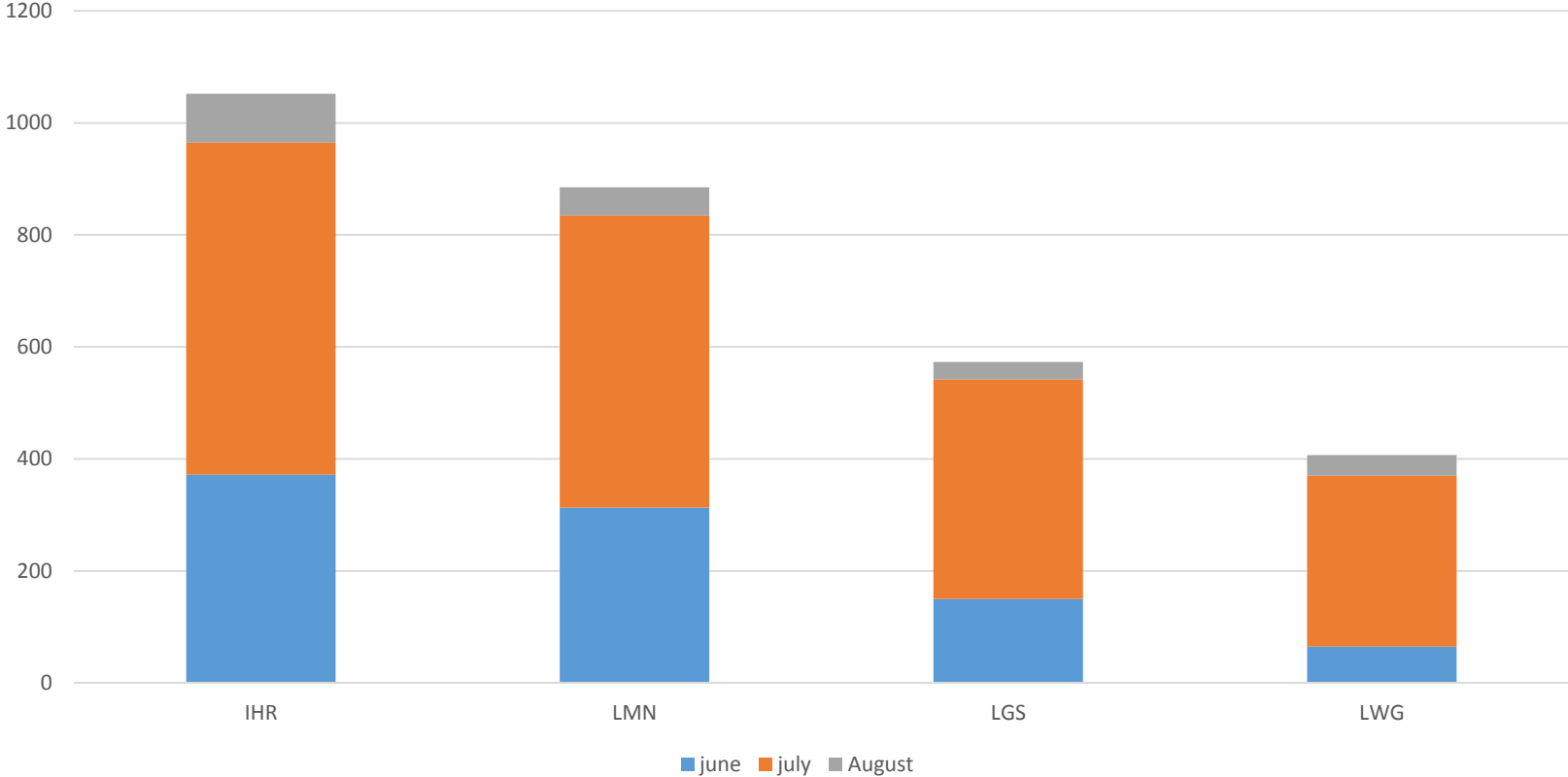
Proportion of total PIT tagged Snake River adult Sockeye surviving at each detection point in 2015





Lack of adult passage at Snake River projects noted in July

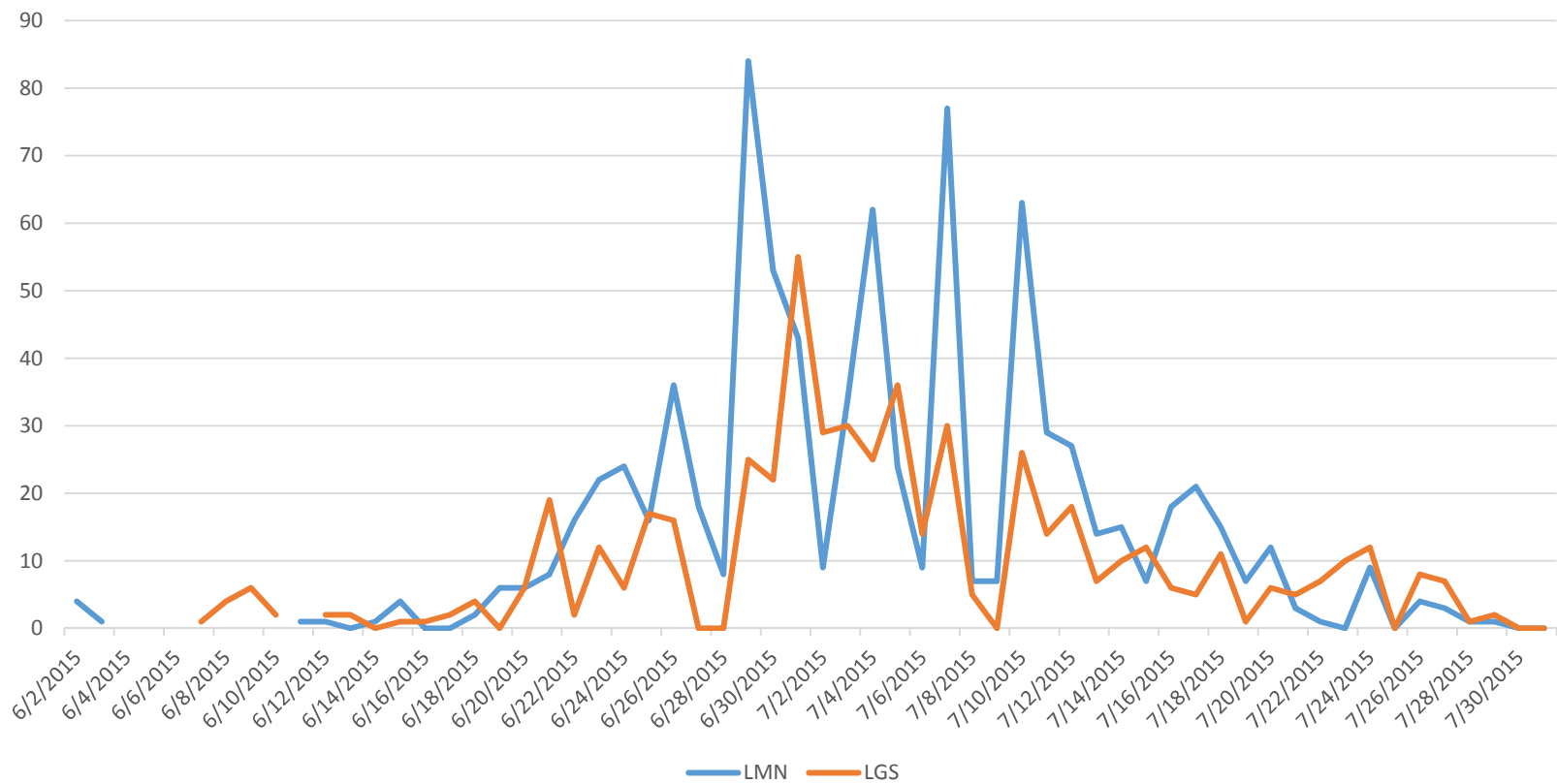
Cummulative Adult Passage at Snake River Projects: June - August 2015





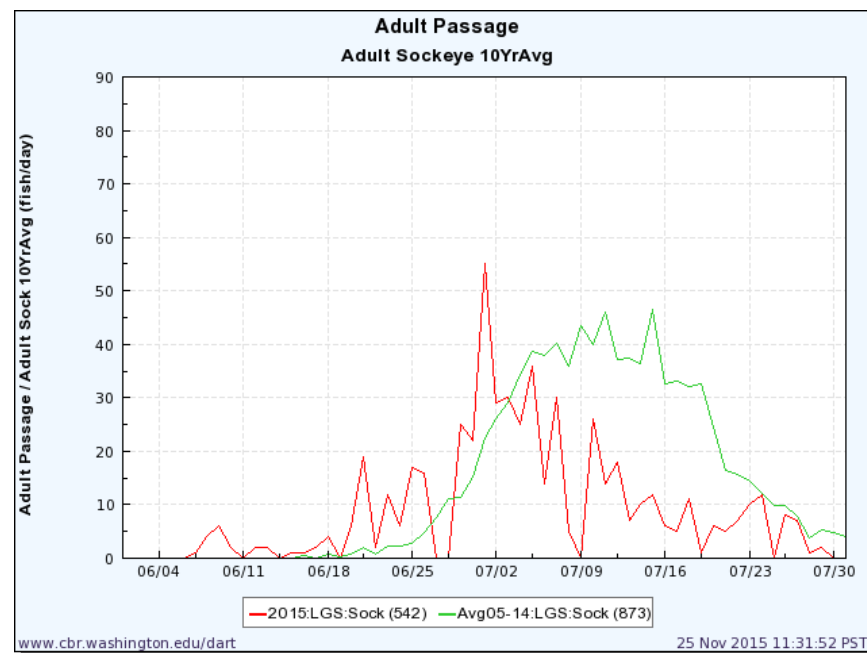
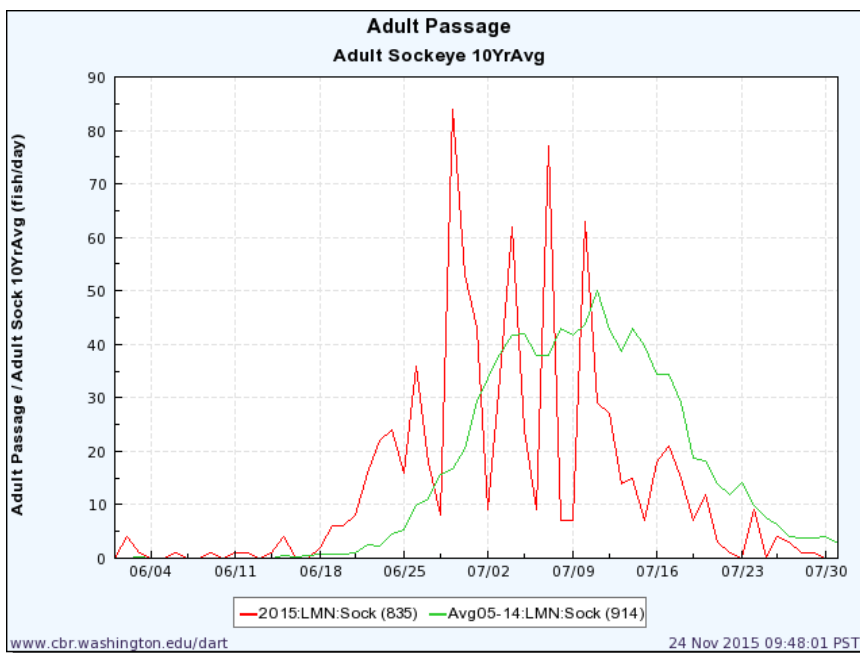
Daily adult passage at LMN and LGS dams June – July

Passage at LMN and LGS





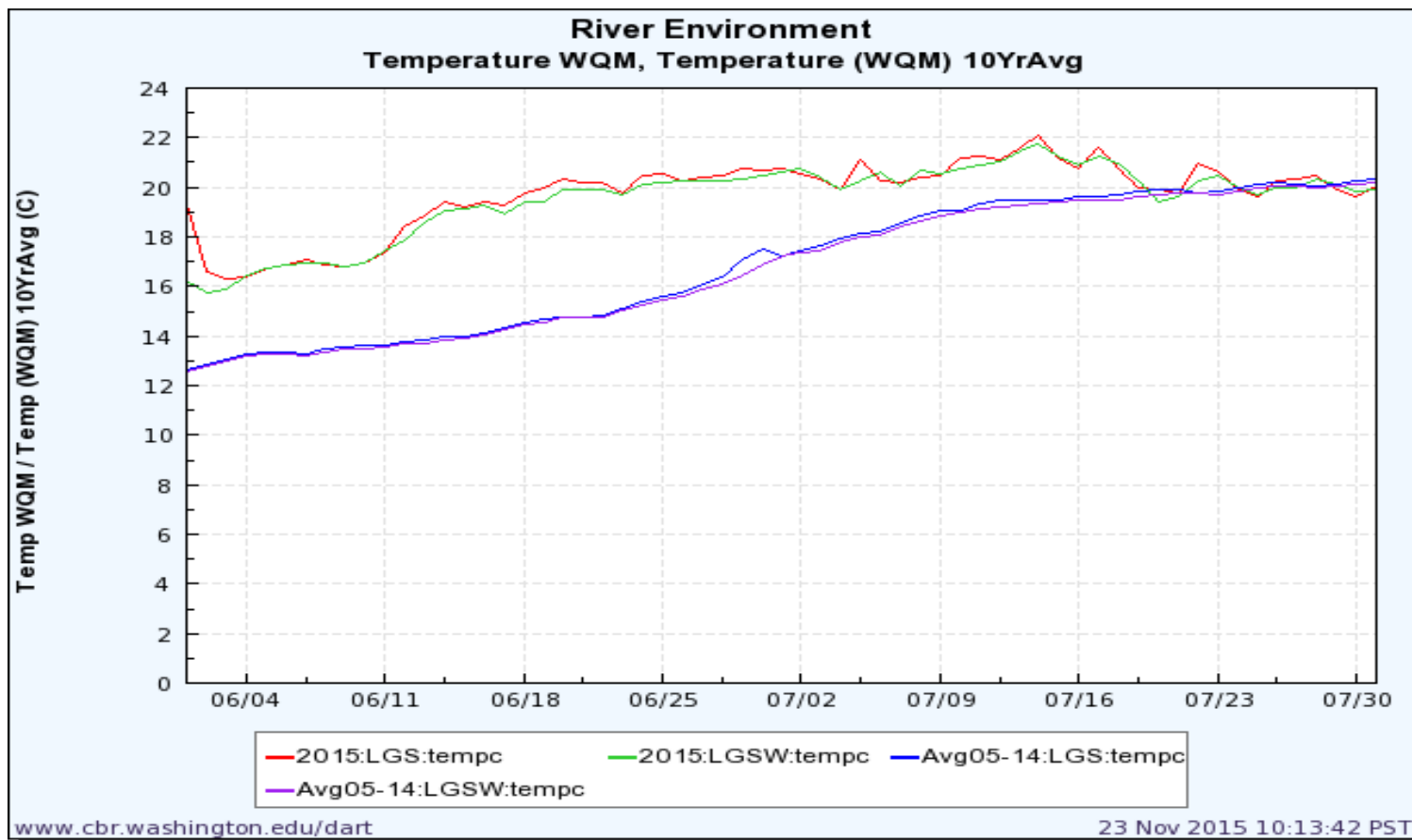
Daily adult passage at LMN and LGS dams relative to the 10-year average June – July



NOAA FISHERIES



Snake River temperatures @ LGS in June and July





Temperature string data from Little Goose Dam July 9, 2015

<u>Date</u>	<u>Time</u>	<u>0.5m</u>	<u>1.5m</u>	<u>3m</u>	<u>5m</u>	<u>10m</u>	<u>15m</u>	<u>20m</u>	<u>25m</u>	<u>30m</u>	<u>35m</u>
7/9/2015	0:00	26.54	26.44	25.16	23.98	21.98	20.31	19.88	19.63	19.31	19.07
	1:00	26.63	26.64	24.84	23.83	21.86	20.39	19.97	19.67	19.36	19.1
	2:00	26.32	25.87	24.79	23.79	21.91	20.34	19.97	19.54	19.35	19.13
	3:00	26.33	26.05	24.79	24.1	20.91	20.3	19.97	19.65	19.38	19.16
	4:00	26.19	26.18	24.99	24.04	20.91	20.27	19.91	19.56	19.36	19.17
	5:00	25.95	25.95	24.8	24.27	21.4	20.42	19.98	19.59	19.37	19.18
	6:00	26.08	26.11	25.62	24.48	21.6	20.31	19.85	19.61	19.42	19.2
	7:00	26.19	26.13	26.03	24.88	21.69	20.38	19.85	19.65	19.4	19.16
	8:00	26.33	26.35	26.25	25.06	22.14	20.33	19.99	19.73	19.43	19.15
	9:00	26.38	26.4	26.15	25.35	22.37	20.39	19.97	19.59	19.44	19.16
	10:00	26.46	26.43	26.11	25.54	22.48	20.44	19.95	19.56	19.36	19.16
	11:00	26.68	26.34	26.03	25.69	22.71	20.51	19.94	19.66	19.3	19.16
	12:00	26.77	26.32	26.14	25.71	22.9	20.53	19.94	19.66	19.38	19.18
	13:00	26.76	26.52	26.25	25.76	22.71	20.57	20.01	19.65	19.42	19.18
	14:00	26.83	26.67	26.47	25.78	22.18	20.53	19.95	19.61	19.42	19.19
	15:00	26.92	26.74	26.38	25.92	22.75	20.55	19.9	19.72	19.31	19.18
	16:00	27.37	27.02	26.28	25.68	22.76	20.46	20	19.69	19.46	19.18
	17:00	28.04	26.78	26.28	25.65	22.75	20.55	19.99	19.58	19.43	19.17
	18:00	27.72	26.51	26.31	25.66	22.23	20.46	19.91	19.59	19.31	19.16
	19:00	27.02	26.59	26.05	25.36	21.89	20.5	19.88	19.59	19.25	19.17
	20:00	26.78	26.52	26	25.38	21.53	20.37	19.85	19.57	19.45	19.18
	21:00	26.38	26.39	25.75	24.8	21.02	20.39	19.83	19.64	19.5	19.18
	22:00	26.08	26.08	25.88	24.61	20.93	20.35	19.81	19.67	19.5	19.18
	23:00	25.96	25.97	25.94	24.83	20.95	20.19	19.9	19.66	19.54	19.11



NOAA FISHERIES



Potential causes of low Snake River project passage

- A. Adults were exhausted and dying from cumulative stress and disease due to prolonged exposure to high water temperature
- B. Rejection of fish ladder due to temperature differential. The temperature of the fish ladder was higher than that of the tailrace because the ladder draws from a shallow depth in the forebay, which had at times exceeded 25C.
- C. Difficulty finding the entrance to fish ladder because of tailrace hydraulic conditions
- D. All of the above



NOAA FISHERIES



Turbine unit 1 was operated at Lower Granite July 23 – 28, 2015 to improve tailrace conditions



Figure 1. Tailrace conditions at Lower Granite Dam July 2013 with upstream flow during FPP operation (left) and downstream flow during Unit 1 operation (right). Photo courtesy of Darren Ogden 2013.

	Unit 1	Unit 2 FPP spill	
Counted Up	2021	260	
Counted Down	1337	232	
Total Net Count	684	28	
Hours Operated	239	88	
Total Fish per Hour	2.862	0.318	

Table 1. Adult Chinook counts at Lower Granite Dam from July 25th until August 10th, 2013 observed during the period when emergency pumps were in operation and Unit 1 operation alternated with Unit 2 and TDG gas cap spill operation.



Temperature string data from Little Goose Dam July 23, 2015

Date	Time	0.5m	1.5m	3m	5m	10m	15m	20m	25m	30m	35m
7/23/2015	0:00	21.54	21.56	21.56	21.52	21.52	21.11	20.33	19.39	19.06	18.72
	1:00	21.54	21.56	21.56	21.53	21.53	21.19	20.71	19.46	19.05	18.72
	2:00	21.53	21.55	21.55	21.52	21.53	21.32	20.89	19.51	19.15	18.72
	3:00	21.54	21.56	21.56	21.52	21.55	21.31	20.95	19.62	19.1	18.73
	4:00	21.54	21.57	21.57	21.52	21.56	21.36	20.94	19.63	19.16	18.74
	5:00	21.51	21.53	21.54	21.52	21.54	21.38	21	19.74	19.13	18.74
	6:00	21.53	21.55	21.55	21.52	21.51	21.41	21.1	19.92	19.12	18.79
	7:00	21.54	21.56	21.55	21.52	21.55	21.39	21.17	20.05	19.1	18.78
	8:00	21.56	21.57	21.56	21.52	21.54	21.45	21.22	20.25	19.14	18.78
	9:00	21.59	21.61	21.59	21.54	21.56	21.43	21.24	20.11	19.11	18.76
	10:00	21.63	21.65	21.61	21.54	21.57	21.47	21.31	20.04	19.27	18.72
	11:00	21.74	21.74	21.72	21.63	21.56	21.44	21.35	20.08	19.22	18.75
	12:00	21.84	21.83	21.79	21.64	21.56	21.45	21.34	19.99	19.19	18.74
	13:00	21.89	21.87	21.82	21.67	21.6	21.5	21.22	20.16	19.31	18.74
	14:00	21.89	21.9	21.87	21.82	21.61	21.44	21.16	20.11	19.23	18.73
	15:00	21.95	21.96	21.95	21.87	21.63	21.45	21.2	20.14	19.16	18.75
	16:00	21.94	21.96	21.95	21.91	21.65	21.44	21.18	19.85	19.05	18.75
	17:00	21.91	21.93	21.92	21.87	21.61	21.42	21.05	19.66	19.26	18.77
	18:00	21.82	21.83	21.82	21.79	21.72	21.42	20.62	19.6	19.27	18.79
	19:00	21.78	21.8	21.79	21.75	21.73	21.41	20.53	19.63	19.22	18.74
	20:00	21.72	21.75	21.74	21.71	21.67	21.2	20.47	19.75	19.19	18.79
	21:00	21.7	21.72	21.72	21.7	21.6	21.18	20.54	19.67	19.18	18.81
	22:00	21.67	21.69	21.71	21.67	21.48	20.98	20.25	19.64	19.14	18.83
	23:00	21.66	21.68	21.69	21.65	21.48	20.85	20.11	19.67	19.18	18.83



NOAA FISHERIES



Efforts made to increase adult passage at LGS

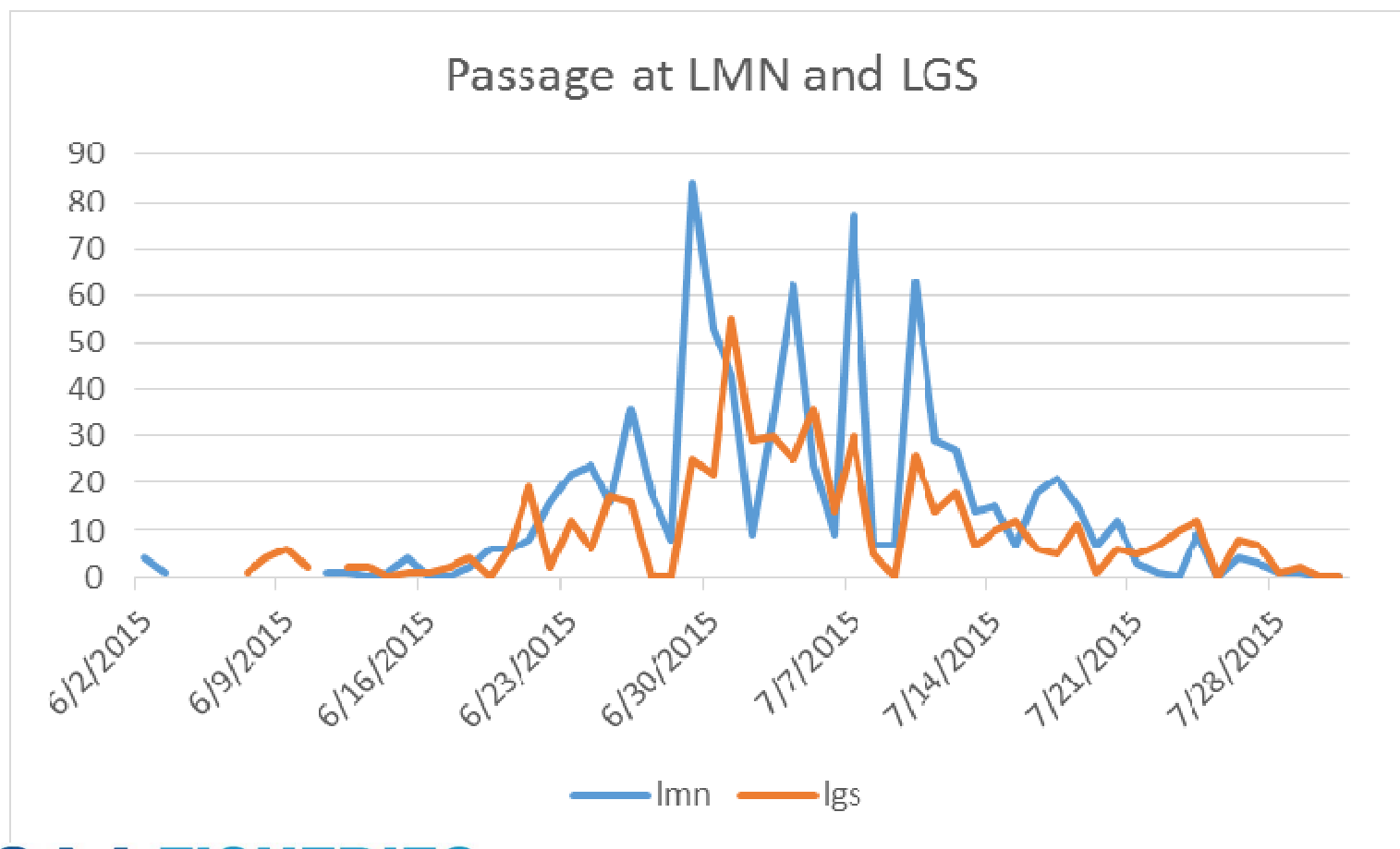
- Spill was not provided during daytime hours at LGS on July 23, 24, 27, 28.
- Rationale was to improve tailrace conditions and potentially reduce temperature in the tailrace.

Date	test	Lower Monumental passage	Little Goose passage
7/20/2015		12	6
7/21/2015		3	5
7/22/2015		1	7
7/23/2015	x	0	10
7/24/2015	x	9	12
7/25/2015		0	0
7/26/2015		4	8
7/27/2015	x	3	7
7/28/2015	x	1	1
7/29/2015		1	2
7/30/2015		0	0
7/31/2015		0	0





Daily adult passage at LMN and LGS dams June – July





Other issues of note

- The percentage of juvenile sockeye transported annually is being determined.
- 494 adult sockeye from the captive brood rearing program were released into Redfish Lake this year and 98 were released into Pettit Lake for natural reproduction.



NOAA FISHERIES