2019 ANNUAL FISHWAYS STATUS REPORT

JOHN DAY DAM

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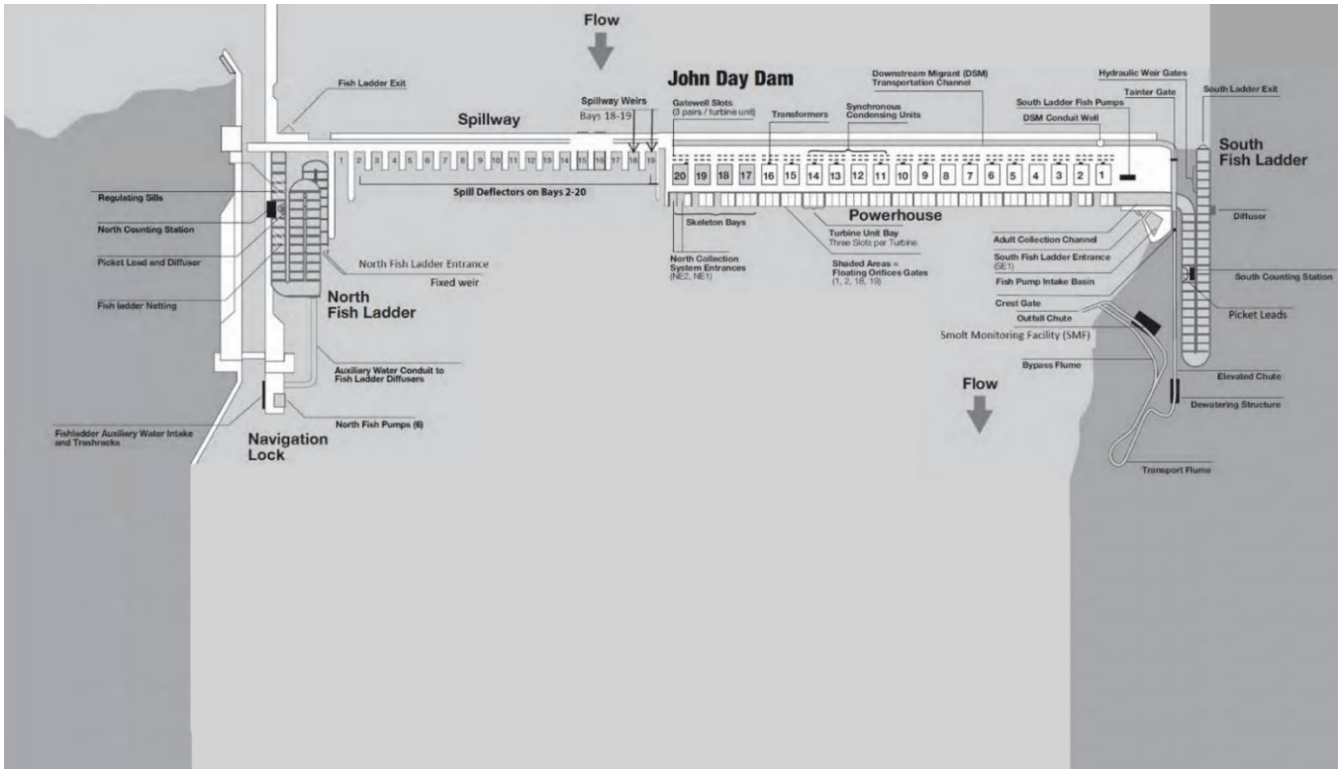

Figure 1: John Day Dam Layout

2019 JOHN DAY FISHWAYS' OPERATING SCHEDULE	
PERFORMANCE STATUS	TIME
NORTH ADULT FISHWAY	
REGULAR OPERATION W/ AWS	January 17th - November 30th
AWS OFF HALF DAY FOR ROV INSP.	N/A
ON ORIFICE FLOW - NO AWS OPERATION	November 30th - December 3rd
DEWATERED FOR MAINTENANCE	December 3rd - December 31st
SOUTH ADULT FISHWAY	
REGULAR OPERATION W/AWS	[January 1st - January 18th] [February 26th - December 31st]
AWS OFF HALF DAY FOR ROV INSP.	August 14th
DEWATERED FOR MAINTENANCE	January 22nd - February 26th
SMOLT MONITORING FACILITY	
DEWATERED FOR MAINTENANCE	[January 1st - March 13th], [December 5th - December 31st]
LIMITED SAMPLING; WATER TEMP > 70F	July 25th - September 15th
REGULAR SAMPLING MODE (every other day)	March 1st - July 24th
BYPASS FOR PIT DETECTIONS	September 16th-December 5th
JUVENILE BYPASS SYSTEM	
REGULAR OPERATION WITH ALL STSs DEPLOYED	March 1st - December 15th (kelt protection)
SPILLWAY WITH 2 TSWs (at bay 18 &19)	
ON SEAL	January 1st - April 9th
FISH SPILL PER FPP SCHEDULE	April 10th - August 31st
1.5 KCFS, BAY 2 ONLY FOR NFL ATTRACTION	September 1st - November 29th
EARLY TSW SPILL (due to HIGH FLOWS)	N/A
ON SEAL	November 30th - December 31st

Table 1: Operating Schedule for John Day Fishways in 2019.

Fishway Inspections' Summary

Adult Fishways and the Juvenile Bypass (JBS) were inspected twice per day during the adult fish passage season (March 1st - November 31st), and once per day during the winter maintenance season ([January 1st – February 29th] and [December 1st- February 28th]). The John Day Dam (JDA) Smolt Monitoring Facility (SMF) inspections were conducted every two hours, 24/7 throughout the juvenile sampling season (March 1st - Sept 15th)

Totals For:	2019		2018		2017		2016		2015	
	Total #	% OOC	Total #	% OOC	Total #	% OOC	Total #	% OOC	Total #	% OOC
JOHN DAY DAM										
Number of Inspections	618		639		640		641		613	
NORTH FISHWAY										
Exit Differential	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Exit regulating weirs position	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Count station differential	0	0.0%	0	0.0%	2	0.3%	0	0.0%	0	0.0%
Weir crest depth	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Entrance differential	2	0.3%	0	0.0%	0	0.0%	0	0.0%	1	0.2%
SOUTH FISHWAY										
Exit differential	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Exit regulating weirs position	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Count station differential	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Weir crest depth	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
South entrance differential	5	0.8%	1	0.2%	6	0.9%	12	1.9%	0	0.0%
Entrance weir SE-1	38	6.1%	3	0.5%	4	0.6%	7	1.1%	0	0.0%
Collection channel velocity	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Bay 1 differential	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
N. Entrance PH (Bay 19) differential	12	1.9%	1	0.2%	3	0.5%	2	0.3%	0	0.0%
Entrance weir NE-1	31	5.0%	2	0.3%	0	0.0%	9	1.4%	5	0.8%
Entrance weir NE-2	9	1.5%	2	0.3%	0	0.0%	5	0.8%	5	0.8%
JUVENILE PASSAGE										
Forebay/bypass conduit differential	0	0.0%	0	0.0%	10	1.6%	0	0.0%	0	0.0%
Submersible traveling screens	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Turbine trash rack drawdown	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vertical barrier screen drawdown	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Spill volume	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Spill pattern	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Turbine unit priority	0	0.0%	7	1.1%	0	0.0%	0	0.0%	0	0.0%
Turbine 1% efficiency	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Table 2: John Day FPP Criteria Discrepancies 2015-2019

Fish Salvage Procedures

Fishway Dewatering Procedures

During fishway dewaterings, bulkheads were installed and drain valves were opened. After the areas were dewatered, fisheries personnel entered and salvaged any stranded fish (see table 3). Salvaged fish were transported to either the forebay or tailwater (depending on circumstances such as fish species, dewatering location, age class, or stress levels). Follow up inspections were performed to account for any overlooked fish. Efforts were made to provide continual water supplies throughout the operation, to minimize fish stress. Minimal fish handling practices were utilized throughout the process. Only 1 adult steelhead (JBS CC dewatering) and 5 juvenile lamprey mortalities (SMF dewatering) occurred during all fishways dewaterings in 2019.

Turbine Dewatering Procedures

When following operational guidelines, turbine dewatering requires minimal fish handling. If a turbine unit is in failed status, the operational guidelines cannot always be followed, which may result in stranded fish. Procedures are continually evaluated to determine the best methods to reduce fish stress and mortality. Typically, fish are removed from scroll cases and draft tubes and transported with fish bags. Prior to fish salvage, transport tanks are prepared for fish transport. If fish numbers are higher than the two bags can safely handle, the transport tanks are used. The fish are then released with a help of portable crane.

2019 John Day Fish Salvage Report											
Key; adult=a, juvenile=j, carp=cp, catfish=ct, sculpin=sp, small mouth bass=smb, crappie=cr, whitefish=wf, perch=pr, bluegill=bg, walleye=we, Sturgeon=st, shad-sh, Chinook-Ch, steelhead-STH, coho-co, sockeye-so, lamprey-la Released In Good Conditon=RIGC											
Date	**Event**	**CH**	**STH**	**SO**	**CO**	**LA**	**Shad**	**Other**	**Comments**	**Mort**	**Cause**
1/22	SFL-Upper Dewater	0	4J	0	0	26A	0	0	RIGC north forebay: Lamprey 18-28", TW: STH 4J ~12"	0	N/A
1/30	JBS CC and conduit	0	3 Adult	0	0	0	0	0	1 Adult Mort, 2 Adult RIGC into FB.	1STH	No O2
4/16	MU-3 Scroll Case	0	0	0	0	0	0	0	No Fish	0	N/A
11/5	MU1 Scroll Case	0	0	0	0	0	0	0	No Fish	0	N/A
11/5	MU1Draft Tube	0	0	0	0	0	0	10 cats	10 cats bagged and RIGC into TW	0	N/A
12/2	NFL-Upper	0	1-A, 2-J	0	0	0	10	1-pr	RIGC: STH (15", 2x5") PR: 4"	0	N/A
12/5	SMF	15	2Adult	0	0	3A	10	8 ct, 1 cp, 3 pr	~ 100 macrophalmia + 1 Adult sturgeon ~ 15", ~45sculpin	5 j LA	Unk
12/10	NFL-Lower	0	1-J	0	0	0	16	2 smb, 1 cr	RIGC	0	N/A

Table 3: John Day Dam's 2019 fish salvage results

Fish Counting

Fish counts (visual and/or video) were conducted April 1st – October 31st during the 2019 adult fish passage season, and all fish count data was posted to an online database. Due to unforeseen setbacks, Four Peaks Environmental Science & Data Solutions were unable to start counting until May 6th. As a result, video counts were handled by Corps employees from April 1st until that time. Prior to the 2013 adult fish passage season, the vast majority of fish passage occurred at the South Fishway (~ 95 %.) The improvements to the NFL Entrance (2010-2012) resulted in a more balanced fish passage distribution (20-40% use the NFL annually since modifications) (See figure 2.)

FISH COUNTING SCHEDULE
Apr 1 – Oct 31 Visual counting daily 0500-2100 (PST)
June15 – Sept 30 Night video counts 2000-0400 (PST)

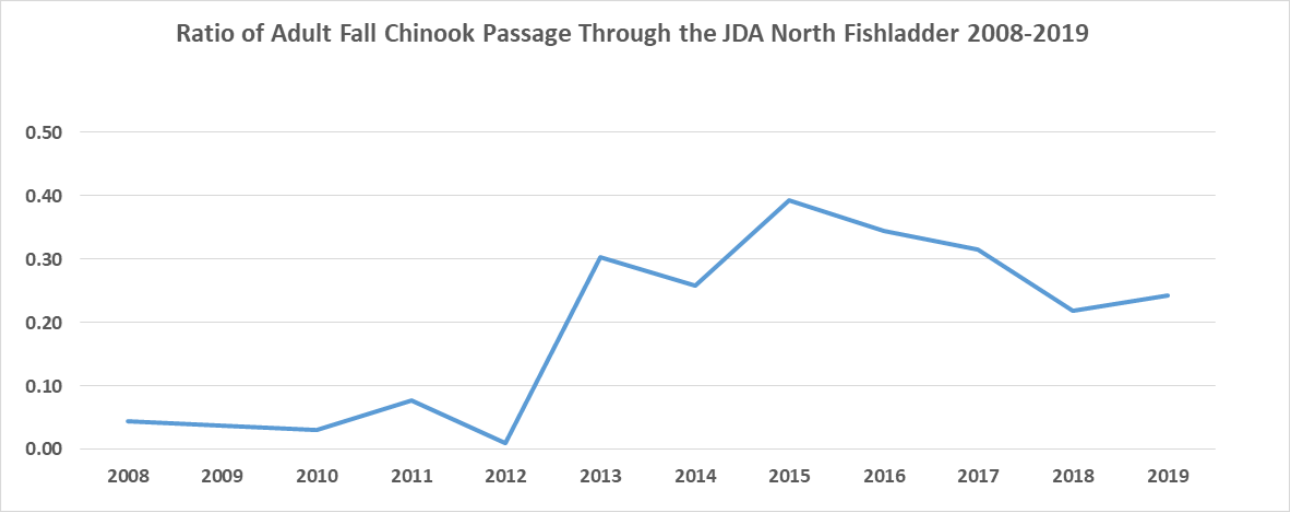

Figure 2: Ratio of adult fall Chinook salmon that migrated through the JDA North Fishway versus South Fishway 2008-2019 (September 1st through November 1st).

Lamprey Collection Data

Adult lamprey collections were conducted at JDA from May 22nd until September 13th during the 2019 passage season. Permanent LPS water supply pumps were designed and installed in 2019. Unfortunately, they quickly broke down and the old, temporary pumps were reinstalled by JD Project. For unknown reasons, the LPS performance was unsuccessful with only 3 lamprey collected during the entire 2019 season (See Table 4).

JDA Lamprey Collection Data (5/22/19 - 9/13/19)			
SFL Trap	272	Trap Mort	1
NFL LPS	3	Tank Mort	6
NFL PVC Trap #1	33	Trap Reject	56
NFL PVC Trap #2	0	Tank Reject	1
NFL PVC Trap #3	183	Release	10
		Recap Release	7
Total Handled	491	Total Kept	410

Table 4: Lamprey collection data for JDA (5/22/19 – 9/13/19)

Northern Pikeminnow Abatement

Northern Pikeminnow (NPM) angling from the John Day powerhouse tailrace was performed by Washington Department of Fish and Wildlife crew, May 3rd through September 25th. 1,894 NPM caught in 2019 was the lowest harvest in recent history: 2018 (3,089), 2017 (3,472), 2016 (3,002), 2015 (3,127), 2014 (4,250), 2013 (2,370), 2012 (2,217).

Avian Predator Abatement

Bypassing smolts through spill and TSWs has become a critical part of JDA fish passage operations since 2006. Unfortunately, the piscivorous bird predation on smolts in the Tailrace Boat Restricted Zone (BRZ), had increased significantly as well. In response, a comprehensive grid of 125 avian lines was designed and installed at the JDA tailrace BRZ in 2010 (Figure 3) In addition to the avian lines, supplemental boat hazing by U.S. Department of Agriculture (USDA-APHIS), has occurred annually since 2010, April 15th – July 31st.

125 avian lines (newly re-installed for 2018 passage season,) combined with the USDA boat hazing were effective in deterring gull predation on smolts at JD in 2019 (Figure 5.) It needs to be emphasized that only gulls are a significant and proven avian predator impacting the smolts around JD.

Per JD Fisheries observations, the numbers of White Pelicans in the JD tailrace have been steadily increasing since 2012. It should be noted that 5 pelicans have been observed around the Priest Rapids Island (see Figure 3 – Red circled zone) in late December 2019 and they appear to be overwintering here the first time ever.

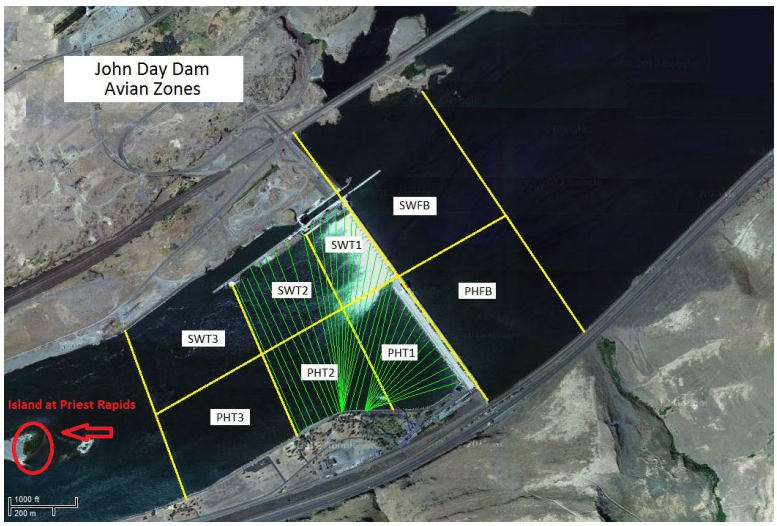

Figure 3: Avian array at JDA Tailrace BRZ installed in 2010 (Powerhouse Forebay-PHFB, Spillway Forebay-SWFB, Spillway Tailrace zones 1-3 [SWT1-SWT3], Powerhouse Tailrace zones 1-3 [PHT1-PHT3]). Red Circle shows island where pelicans are spotted.

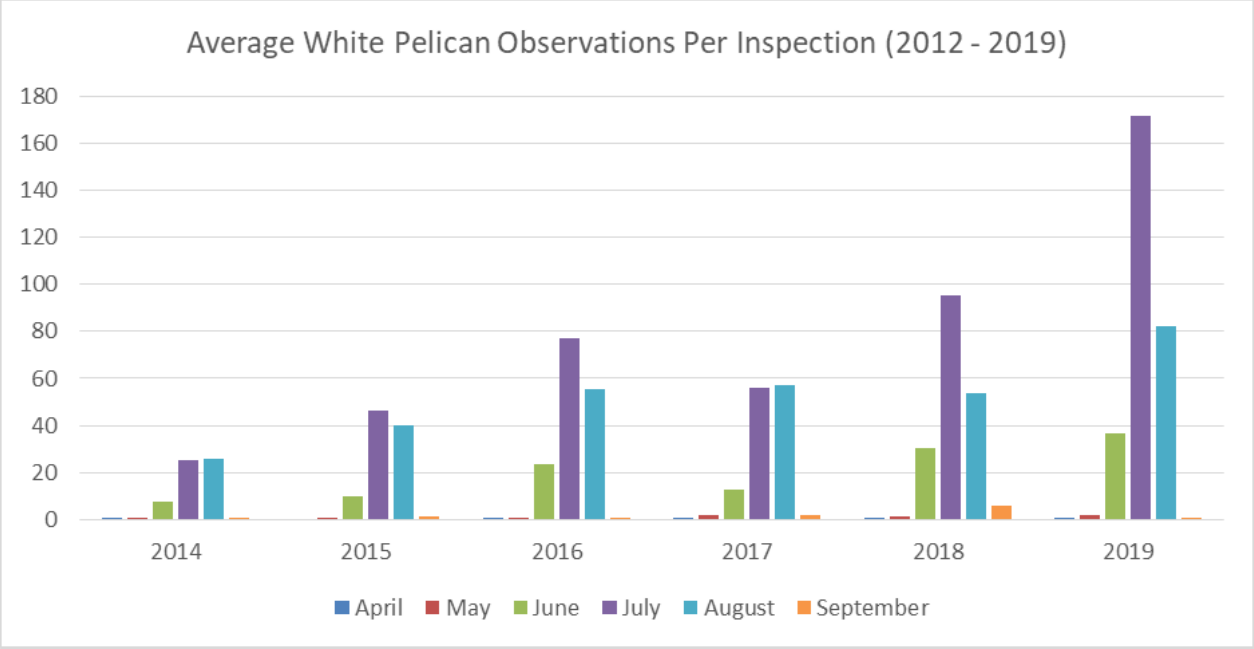

Figure 4: Monthly White Pelican Observations (2014 – 2019) shown as average observations per inspection.

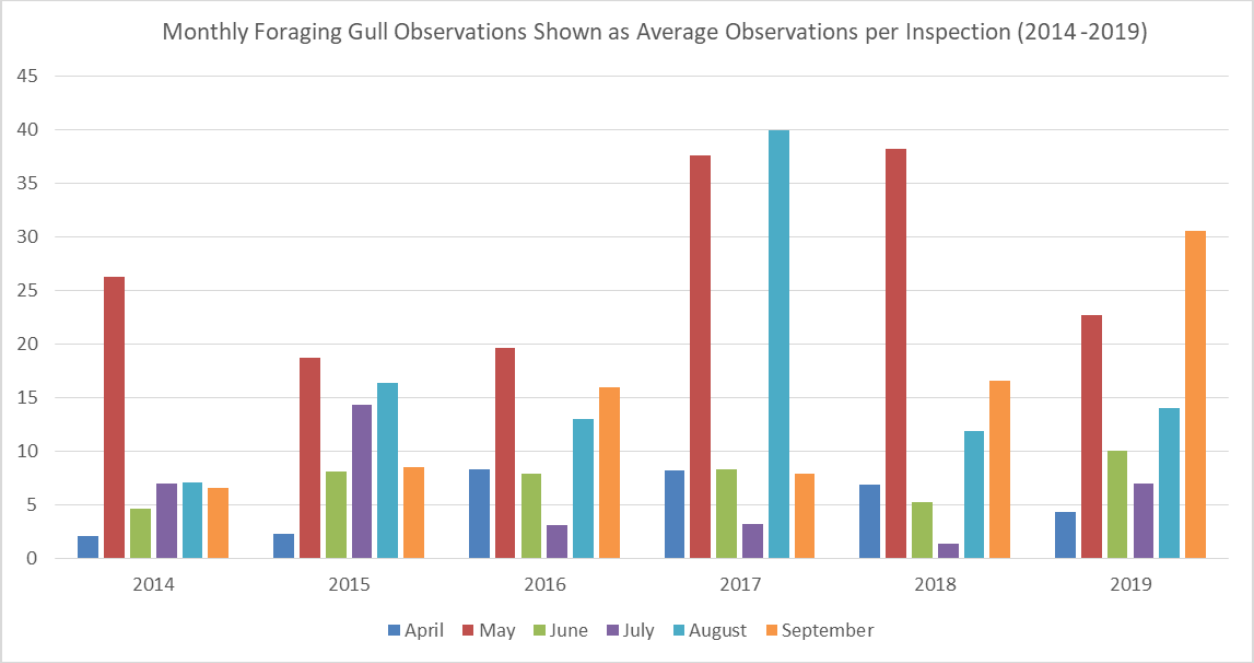

Figure 5: Monthly foraging gull observations shown as "Average Observations per Inspection" (2014-2019) at JDA. [AP=April, MY=May, JN=June, JL=July, AG=August, SE=September].

Water Quality

JDA river temperatures were obtained from the United States Geological Survey's (USGS) sensor, located in the Forebay at the tip of the upstream navigation lock's guide wall (Figure 6). Additionally, water temperatures were collected by JDA Fisheries at the entrances and exits of both fish ladders using HOBO data loggers (April 1st – Nov. 30th), and sent to the Fish Passage Center (FPC). Water clarities were measured by Secchi disc at the North Fish Ladder counting station daily, throughout the 2019 passage season.

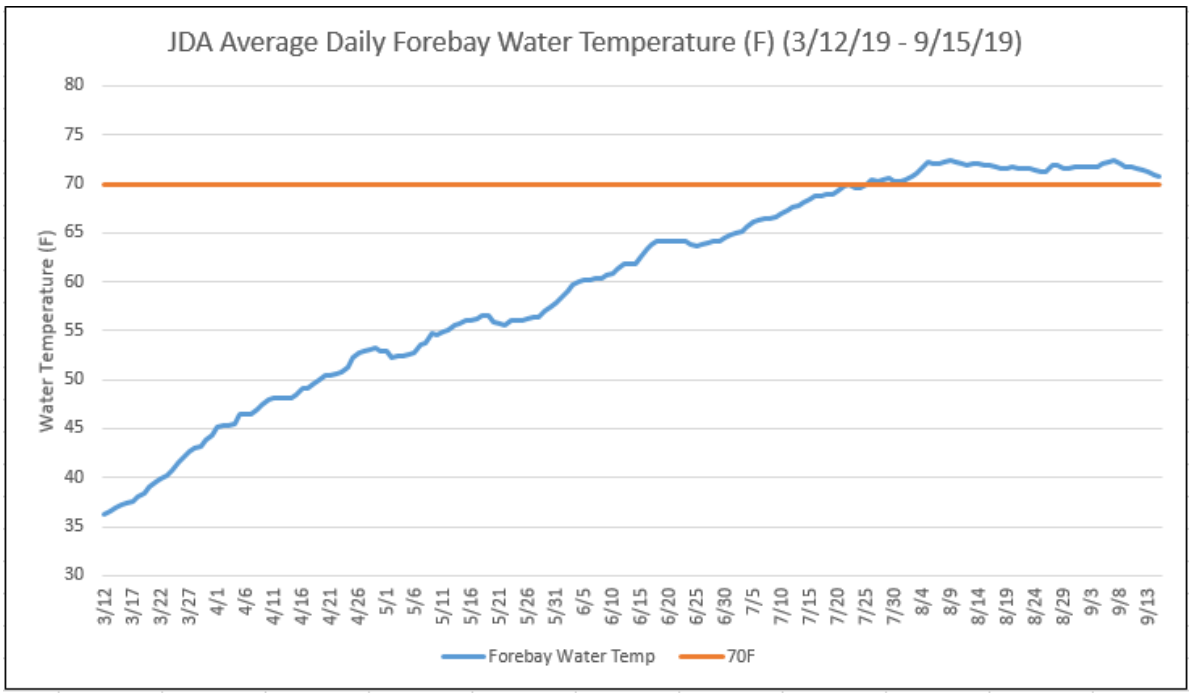

Figure 6: John Day Dam average daily forebay water temperatures for 2019. The orange line represents the 70 degree threshold for juvenile sampling.

Fishway Velocities – Collection Channel

On April 9th 2019, SFL Fish Turbine #1 was taken OOS due to a broken "anti-ratchet gear". It was returned to service on April 25th 2019. During this time the SFL collection channel fell below the FPP criteria of 1.5-4.0 feet per second (See Figure 7), the velocities were within criteria for the remainder of the season.

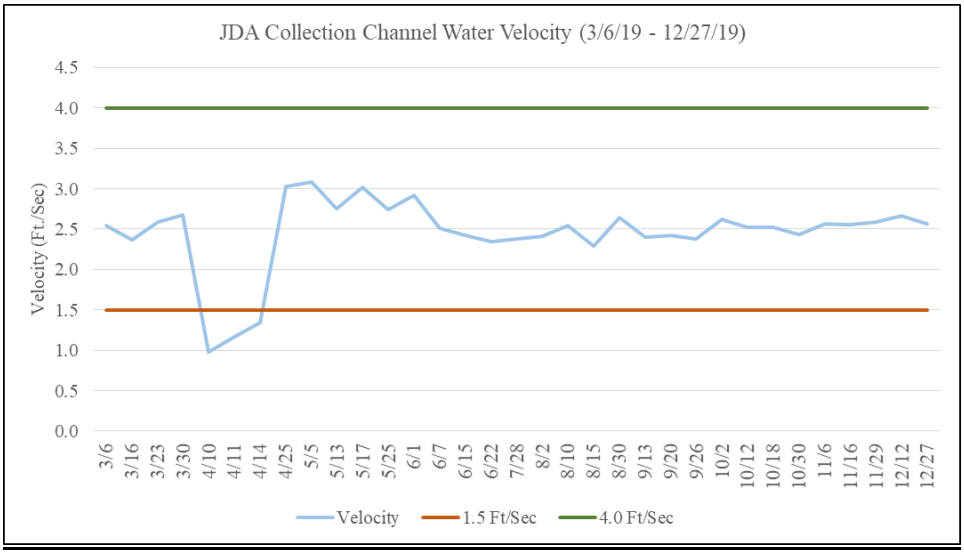

Figure 7: JDA SFL collection channel velocities during the 2019 Adult Fish Passage Season (Mar. 1st – Dec. 1st). Green and Orange lines represent FPP criteria range.

Discussion

The following are the highlights of 2019 JD Fish Passage Season:
- South AWS Turbine 3 experienced a failed thrust bearing on its startup in late February and was OOS for the entire 2019 season while the replacement bearing was being procured. It was replaced by Turbine 1 which performed without any failures during the entire 2019 season. Turbine 3 will be repaired for 2020 season and Turbine 1 will be a backup awaiting funding for a major overhaul.

- South AWS turbine 2 operated without any issues for the fourth year after its lower bearing/shaft were repaired in 2016.
- JD South Fishway had a significant increase of OOC at SE only a few minor OOCs related to the SE1 Tailwater Sensor's location in an outdated still well. SE 1 Weir was in Manual mode requiring its frequent oversight and adjustments by the diligent JD Fisheries personnel. JD Project plans to relocate the SE1 sensor in February 2020.
- North Fishway performed flawlessly, without any OOCs in 2019 despite having 2 pump failures.
- JBS orifice 2B was found plugged up on 20 April, 2019 resulting in 37 juvenile chinook and juvenile steelhead mortalities recovered from the Gatewell (see 19JDA07MFR for details.) This was the only issue with JBS during 2019 passage season.
- There were no failures or issues at SMF in 2019 in spite of the ageing/ outdated SCADA which is planned to be updated by JD Electrical & JD Engineering crews for the 2020 fish passage season.
- The

Kudos to all JDA Maintenance, Operations, and Fisheries personnel for their dedication and hard work on improving the fish passage at John Day Dam!

Research

Oregon Dept. of Fish and Wildlife – Ongoing BPA funded research associated with the Northern Pikeminnow Management Program. The fish stomachs' sampler collected the diet and other biological data from NPMs caught by the PSMFC dam anglers.

Oregon Department of Fish and Wildlife/ Fish Passage Center- Continued to perform the monthly, FPOM-directed inspections of all JD adult and juvenile fishways (see the FPC's annual report.)

CRITFC- Collected adult Pacific lamprey for the tribal restocking projects. The Umatilla, Nez Perce, Warm Springs, and Yakama tribes were all involved in 2019.

Pacific States Marine Fish Commission – sampled juvenile salmonids at JD SMF 1 March through 15 September. Please see the FPC report for results and details.

Approved by: Ron Twiner, John Day/ Willow Creek Operations Manager (Acting)