2017 ANNUAL FISHWAYS STATUS REPORT

JOHN DAY DAM

From: Miroslaw Zyndol, Jim Dillon, Pete Rankin, Eric Grosvenor & Michael Lotspeich

Date: January, 2018

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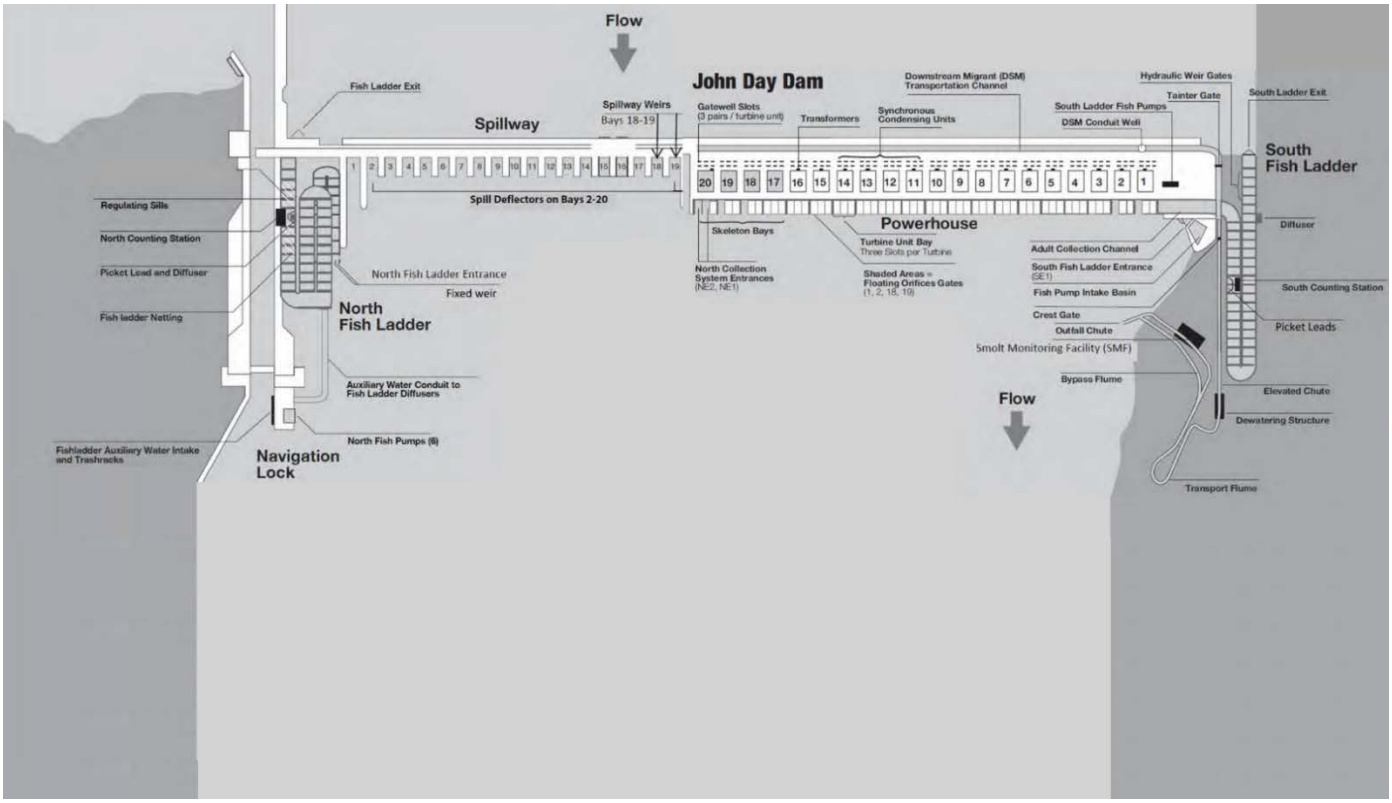


Figure 1: John Day Dam Layout

2017 JOHN DAY FISHWAYS' OPERATING SCHEDULE	
PERFORMANCE STATUS	TIME
NORTH ADULT FISHWAY	
REGULAR OPERATION W/ AWS	January 19th - December 3rd
AWS OFF HALF DAY FOR ROV INSP.	August 2nd
DEWATERED FOR MAINTENANCE	[January 1st - January 18th], [December 4th - December 31st]
SOUTH ADULT FISHWAY	
REGULAR OPERATION W/AWS	[January 1st - January 23rd] [March 3rd - December 31st]
AWS OFF HALF DAY FOR ROV INSP.	August 2nd
DEWATERED FOR MAINTENANCE	January 24th - March 2nd
SMOLT MONITORING FACILITY	
DEWATERED FOR MAINTENANCE	[January 1st - March 27th], [November 30th - December 31st]
LIMITED SAMPLING; WATER TEMP > 70F	July 23rd-September 15th
REGULAR SAMPLING MODE (every other day)	March 31st - July 22nd
BYPASS FOR PIT DETECTIONS	September 16th-November 29th
JUVENILE BYPASS SYSTEM	
1/3 GATEWELL ORIFICES OPEN, ROTATE 2X/WK	January 1st - March 27th
REGULAR OPERATION WITH ALL STSs DEPLOYED	April 1st - December 15th (kelt protection)
SPILLWAY WITH 2 TSWs (at bay 18 &19)	
ON SEAL	January 1st - March 14th
FISH SPILL PER FPP SCHEDULE	April 10th - August 31st
1.5 KCFS, BAY 2 ONLY FOR NFL ATTRACTION	September 1st - November 30th
EARLY TSW SPILL (due to HIGH FLOWS)	March 15th - April 9th
ON SEAL	December 1st - December 31st

Table 1: Operating Schedule for John Day Fishways in 2017.

Fishway Inspections' Summary

Adult Fishways and 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 (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 (April 1st - Sept 15th)

TOTALS FOR :	2017		2016		2015		2014		2013	
	Total #	% OOC	Total #	% OOC	Total #	% OOC	Total #	% OOC	Total #	% OOC
John Day Dam										
Number of inspections	640		641		613		634		634	
NORTH FISHWAY										
Exit differential	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Exit regulating weirs position	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Count station differential	**2**	**0.31%**	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Weir crest depth	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Entrance differential	0	0.00%	0	0.00%	**1**	**0.16%**	**1**	**0.16%**	**3**	**0.50%**
SOUTH FISHWAY										
Exit differential	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Exit regulating weirs position	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Count station differential	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Weir crest depth	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
South entrance differential	**6**	**0.94%**	**12**	**1.87%**	0	0.00%	0	0.00%	**2**	0.30%
Entrance weir SE1	**4**	**0.63%**	**7**	**1.09%**	0	0.00%	**1**	0.16%	**2**	0.30%
Collection channel velocity	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Bay 1 differential	0	0.00%	0	0.00%	0	0.00%	0	0.00%	**1**	0.20%
N. Entrance PH(Bay 19)differential	**3**	**0.47%**	**2**	**0.31%**	0	0.00%	0	0.00%	**3**	0.50%
Entrance weir NE1	0	0.00%	**9**	**1.40%**	**5**	**0.82%**	**1**	0.16%	**5**	0.80%
Entrance weir NE2	0	0.00%	**5**	**0.78%**	**5**	**0.82%**	**1**	0.16%	**6**	0.90%
JUVENILE PASSAGE										
Forebay/bypass conduit differential	**10**	**1.56%**	0	0.00%	0	0.00%	0	0.00%	1	0.20%
Submersible traveling screens	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Turbine trash rack drawdown	0	0.00%	0	0.00%	0	0.00%	2	0.32%	0	0.00%
Vertical barrier screen drawdown	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Spill volume	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Spill pattern	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Turbine Unit Priority	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Turbine 1% Efficiency	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%

Table 2: John Day FPP Criteria Discrepancies 2013-2017

Fish Salvage Procedures

Fishway Dewatering Procedures

During a fishway dewatering, 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. Fishway areas not listed were inspected by a Remote Operated Vehicle (ROV). There were no mortalities encountered during any of the 2017 JD Fishway dewaterings.

Turbine Dewatering Procedures

When following operational guidelines, turbine dewatering requires minimal fish handling. If a turbine unit fails, operational guidelines cannot always be followed, which may result in stranded fish. Fish removed from these areas face higher health risks, due to increased handling. Procedures are continually evaluated to determine the best methods to reduce fish stress and mortality. Currently, fish are removed from scroll cases and draft tubes with fish bags. Prior to fish salvage, transport tanks are prepped for fish transport. If fish numbers are high than the two bags can safely handle, the transport tanks are used to remove fish from the draft tube gallery. The transport tanks are then lifted outside by a crane.

2017 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, Chinook-Ch, steelhead-STH, coho-co, shad-sh Released In Good Conditon=RIGC

Fishway Dewaterings

Date	Event	Chinook	Steelhead	Sockeye	Coho	Lamprey	Shad	Other	Comments	Morts	Cause
1/24	SFL-Upper Dewater	0	6J, 1A	0	0	101A	0	0	RIGC into adjacent tailrace	0	N/A
1/26	SFL- Adult Coll Chan	2A	11A, 12J	0	0	0	0	2ct	CH=~28", ST(A)=~18-26", ST(J)=10-13", CT=~13"	0	N/A
2/9	SFL-Adult Coll Chan	0	2A	0	0	0	0	0	ST = ~26"	0	N/A
2/10	SE-1 Pool	0	9A	0	0	0	0	2ct,3cp	ST = (x1) ~13" (x8) 23-30"; ct=9-14"; cp=16-20"	0	N/A
11/30	SMF Dewater	35A	30A	0	35A	100A	10A	20st,12cp, 24ct, 1 smb	ch(24"-37"), st(~24"-34"), co(26"), la(18"-24"), st(22"-54"), cp(18"-36"), ct(12"-24"), sh(18"), smb(14")	0	N/A
12/4	NFL Upper Dewater	0	3 J	0	0	1A	0	0	NA	0	N/A

Turbine Dewatering

Date	Event	Chinook	Steelhead	Sockeye	Coho	Lamprey	Shad	Other	Comments	Morts	Cause
1/27	mu 5 scroll case	0	0	0	0	0	0	0	NA	0	N/A
1/27	mu 5 draft tube	0	0	0	0	0	0	0	NA	0	N/A
2/28	mu 16 scroll case	0	0	0	0	0	0	0	NA	0	N/A
2/28	mu 16 draft tube	0	0	0	0	0	0	0	NA	0	N/A
4/10	mu 07 scroll case	0	0	0	0	0	0	0	unknown	1 sth yrlin.	see comment
4/11	mu 07 draft tube	0	0	0	0	0	0	0	NA	0	N/A
5/2	MU 12 scroll case	0	9 J	0	0	0	0	0		7 STH J	dewatering
5/3	MU 12 gatewell	232-J	3183-J	1-J	1-J	0	0	0	See MOC 17JDA005	3417	stranded
5/3	MU 12 draft tube	0	100 J	0	0	0	0	0	6 midsize (2 to 5 feet) sturgeon		
7/31	MU 02 scroll case	0	0	0	0	0	2	1 ct	adult, 15 inch	1 shad-A	N/A
8/1	MU 02 draft tube	0	0	0	0	0	0	2st, 35ct	ct ("8-18") st (13" and 40")	0	N/A
8/9	MU 6 scroll case	0	0	0	0	0	0	1 ct	ct (21")	0	N/A
8/10	MU 6 draft tube	0	0	0	0	0	0	8ct, 1st	ct (8-16") st (28")	0	N/A
12/26	mu 1 scroll case	0	0	0	0	0	0	0	NA	0	N/A
12/27	mu 1 draft tube	0	0	0	0	0	0	0	NA	0	N/A

Table 3: John Day Dam's 2017 fish salvage results

Fish Counting

Visual fish counting was conducted April 1st – October 31st during the 2017 adult fish passage season through a contract with Normandeau Associates Inc. and all fish count data was sent electronically to an online database. Prior to the 2013 adult fish passage

season, the vast majority of fish passage occurred through the South Fishway (> 95 %.) The improvements of North Fishway Entrance (2010-2012) resulted in the balanced fish passage distribution (> 30% passed at NFL in 2016) (See figure 2.)

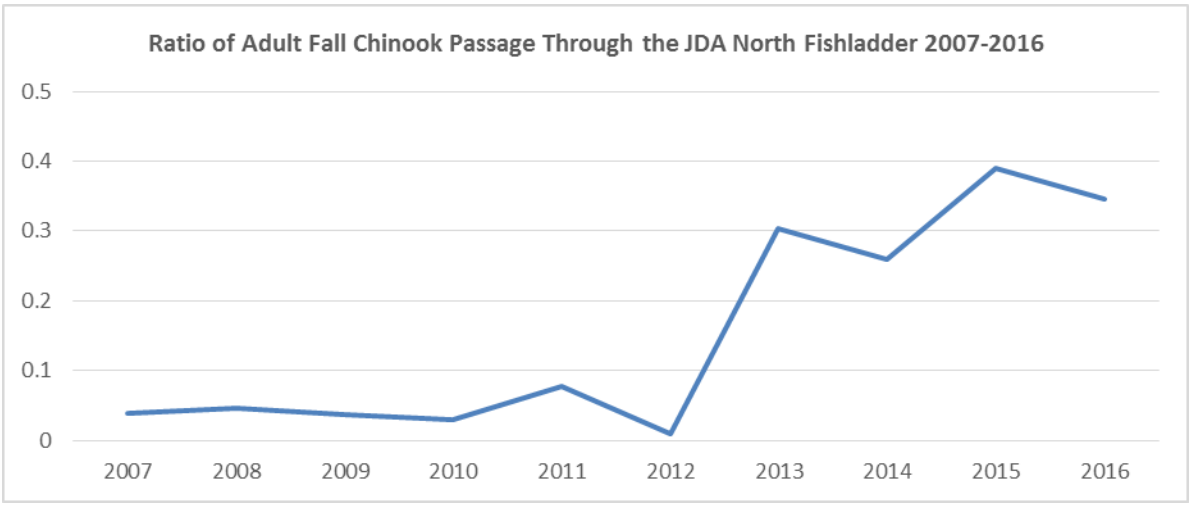


Figure 2: Ratio of adult fall Chinook salmon that migrated through the JDA North Fishway versus South Fishway 2007-2016 (September 1st through November 1st).

Pikeminnow Abatement

Northern Pikeminnow (NPM) angling at the John Day powerhouse tailrace was performed by the Washington Department of Fish and Wildlife crew under contract from Pacific States Marine Fisheries Commission. The 2017 total catch was 3,472. This was the highest catch total since 2014. Previous catch totals were as follows; 2016 (3,002), 2015 (3,127), 2014 (4,250), 2013 (2,370), 2012 (2,217). This year's angling effort began May 15th, and ended on October 8th.

Avian Predator Abatement

Bypassing smolts through spill has become a critical part of JDA fish passage operations since 2006. As a result, the piscivorous bird predation in the spillway Boat Restricted Zone (BRZ) has increased significantly and become a serious factor in total dam mortality on passing smolts. 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, a supplemental boat hazing by U.S. Department of Agriculture (USDA-APHIS) have occurred annually since 2010. In 2017, the hazing season was delayed and occurred May 15th – July 30th 2017.

Prior to the 2017 juvenile passage season, 21 avian lines were replaced, and 8 broken lines were not. Additionally, 12 older lines broke during the passage season. Despite missing lines, the remaining Avian Lines combined with the USDA boat hazing were effective in deterring gull predation on smolts at JD (Figure 5.) It appears that the high river flows in 2017 naturally protected smolts from the avian predators. It needs to be emphasized that only gulls are a significant and proven avian predator impacting the JD smolt passage.

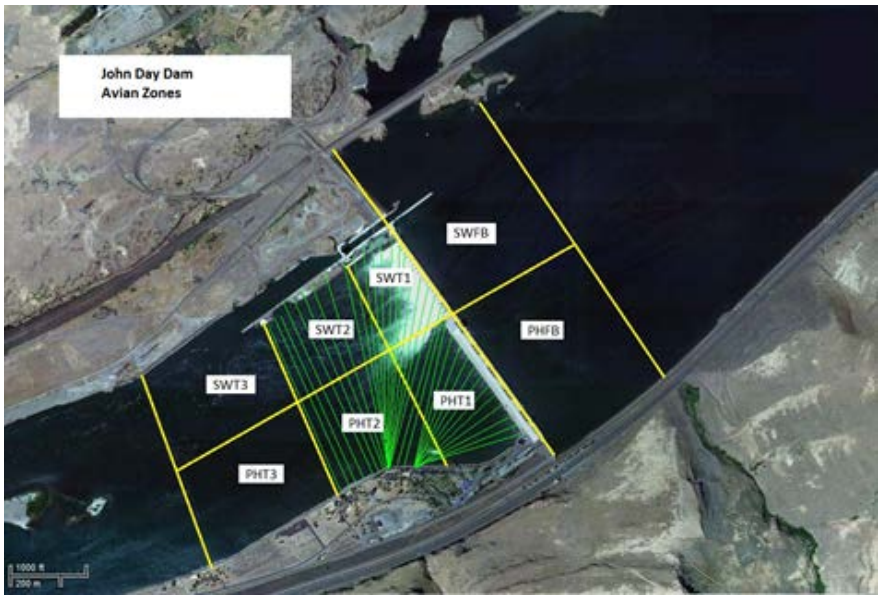


Figure 3: Avian array at JDA Tailrace BRZ installed in 2010 and re-tensioned for 2017 (Powerhouse Forebay-PHFB, Spillway Forebay-SWFB, Spillway Tailrace zones 1-3 [SWT1-SWT3], Powerhouse Tailrace zones 1-3 [PHT1-PHT3]).

2017				
Zone	Gulls			
	F(AM)	F(PM)	NF(AM)	NF(PM)
PHFB	58	19	231	169
SWFB	12	0	216	629
PH1	55	50	1	0
PH2	14	15	3	0
PH3	37	37	2	13
SW1	47	87	0	2
SW2	56	101	0	13
SW3	326	804	1	23
Total	605	1113	454	849
	3021			
Hazing was May 15th-July 30th				

2016				
Zone	Gulls			
	F(AM)	F(PM)	NF(AM)	NF(PM)
PHFB	50	42	305	307
SWFB	4	0	333	217
PH1	131	108	0	0
PH2	46	52	2	4
PH3	81	84	1	9
SW1	106	188	12	14
SW2	127	268	47	33
SW3	264	518	51	81
Total	809	1260	751	665
	3485			
Hazing was Apr. 29th-Aug. 11th				

2015				
Zone	Gulls			
	F(AM)	F(PM)	NF(AM)	NF(PM)
PHFB	42	84	79	90
SWFB	5	24	73	156
PH1	51	24	12	13
PH2	132	145	25	12
PH3	316	454	69	16
SW1	3	5	4	28
SW2	50	51	21	45
SW3	386	895	150	340
Total	985	1682	433	700
	3800			
Hazing was Apr. 15th-July 31st				

Table 4: Gull observations during 2015-2017bird hazing seasons. F=Foraging/Feeding, NF=Not Foraging/Feeding, AM= Morning Survey (During Hazing), FM=Afternoon Survey (No Hazing Being Conducted). Hazing is only performed in PH3, and SW3 zones.

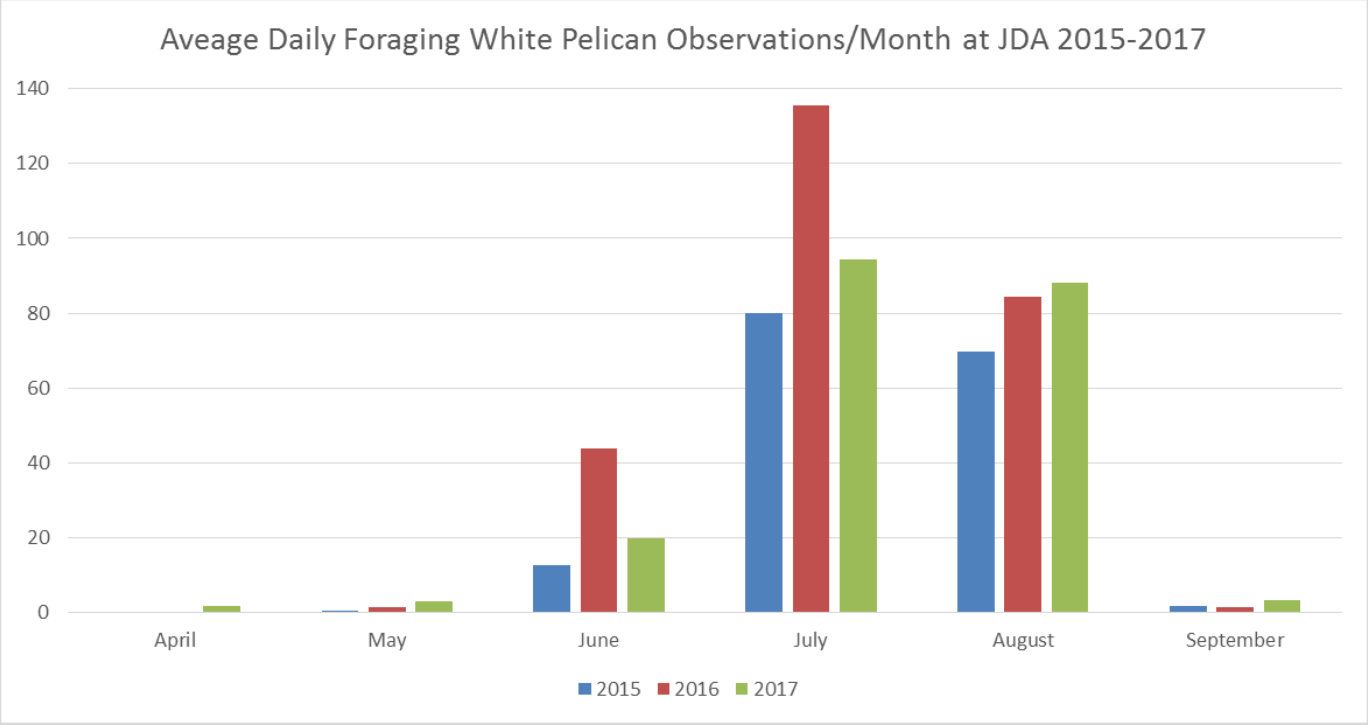


Figure 4: White Pelican average daily observations per month in 2015-2017.

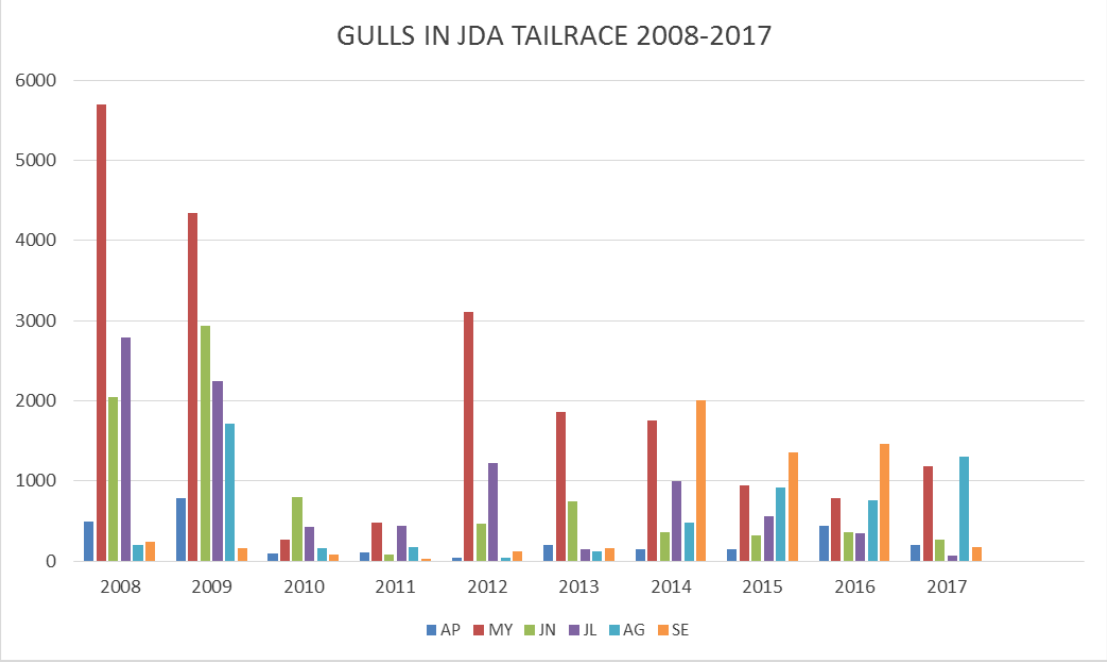
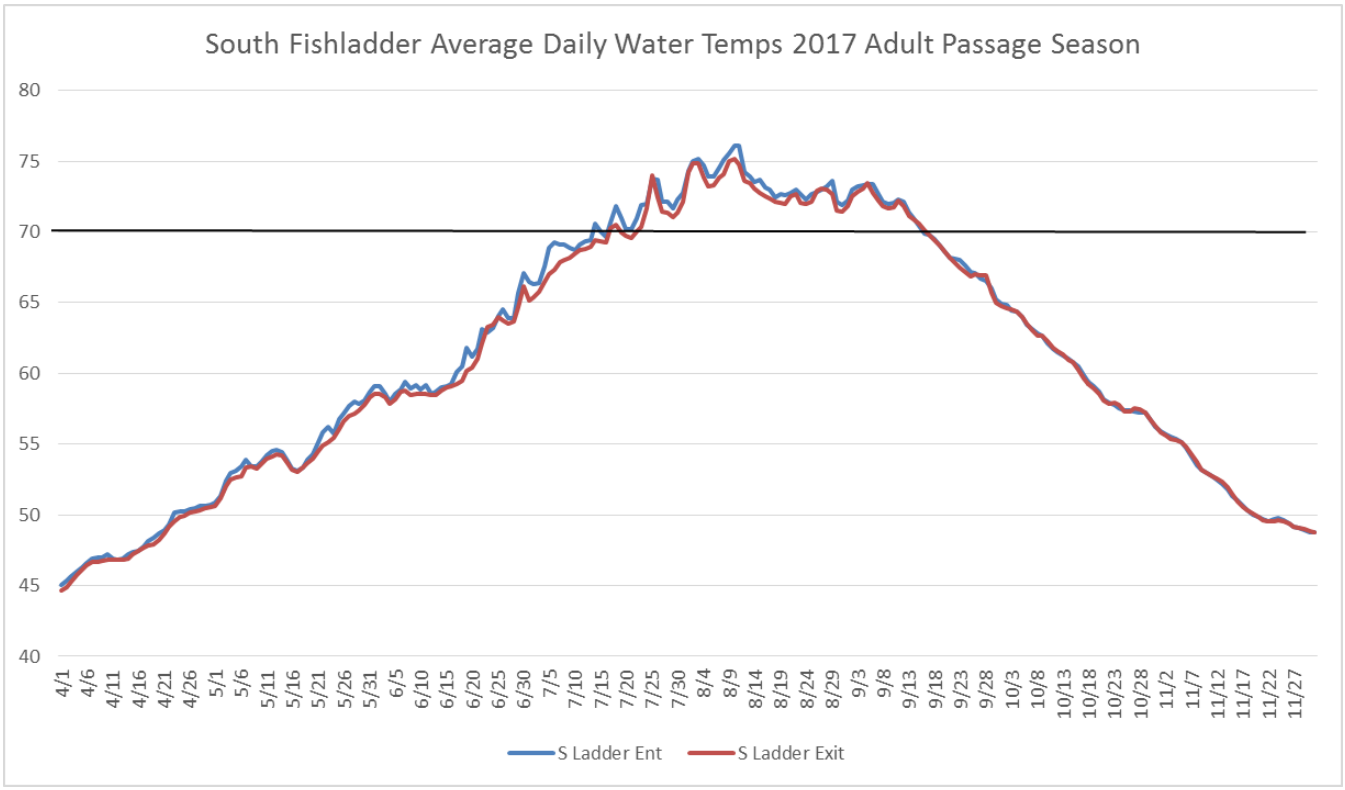


Figure 5: Gull foraging observations (2008-2017; April 1st – September 30th) at JDA. AP=April, MY=May, JN=June, JL=July, AG=August, SE=September.

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. 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) (see Figure 6). Water clarities were measured by Secchi disc at the North Fish Ladder counting station daily, throughout the 2017 passage season.



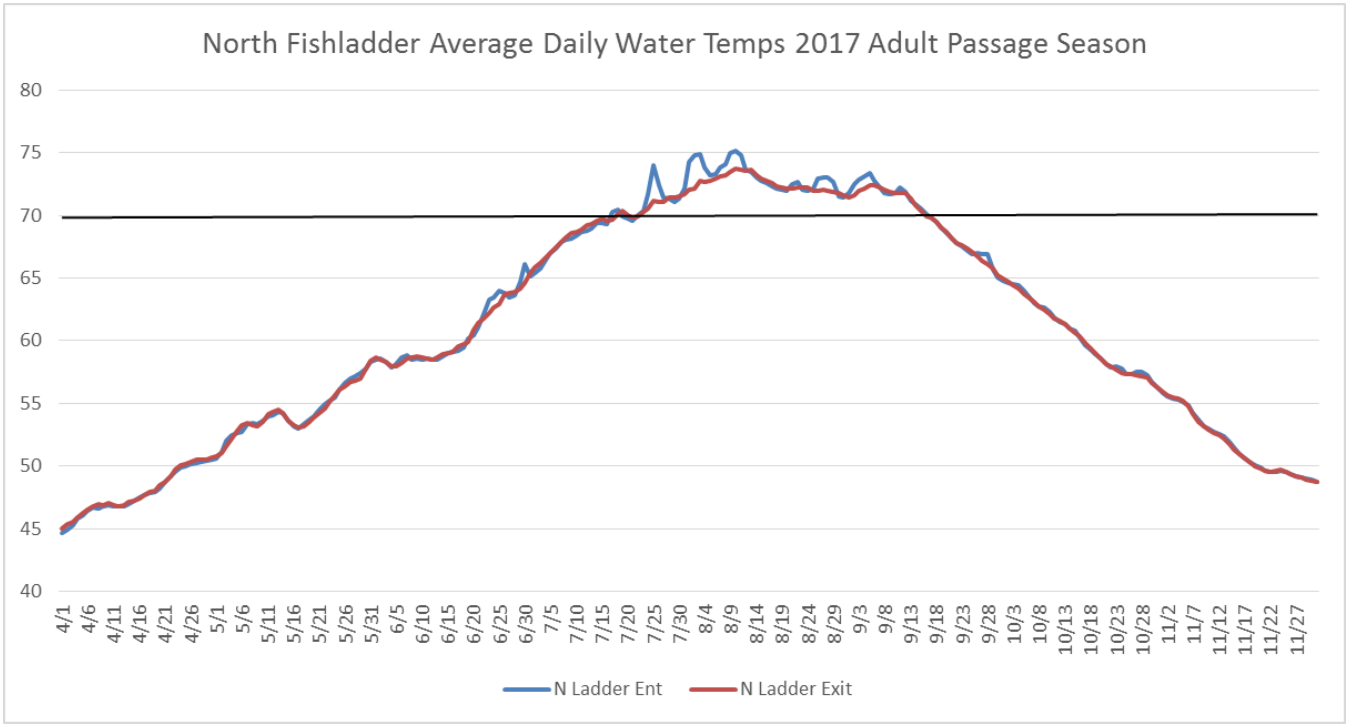


Figure 6: John Day Dam average daily fishladder water temperatures for 2017.

Fishway Velocities – Collection Channel

Similar to the previous years, the 2017 JDA SFL Collection Channel velocities were all within the Fish Passage Plan (FPP) criteria (1.5 - 4.0 feet per second) (See Figure 7). The velocities have been excellent in spite of the two AWS turbines operations and this suggests that the third turbine should become a regular backup to be used only when another pumps fails.

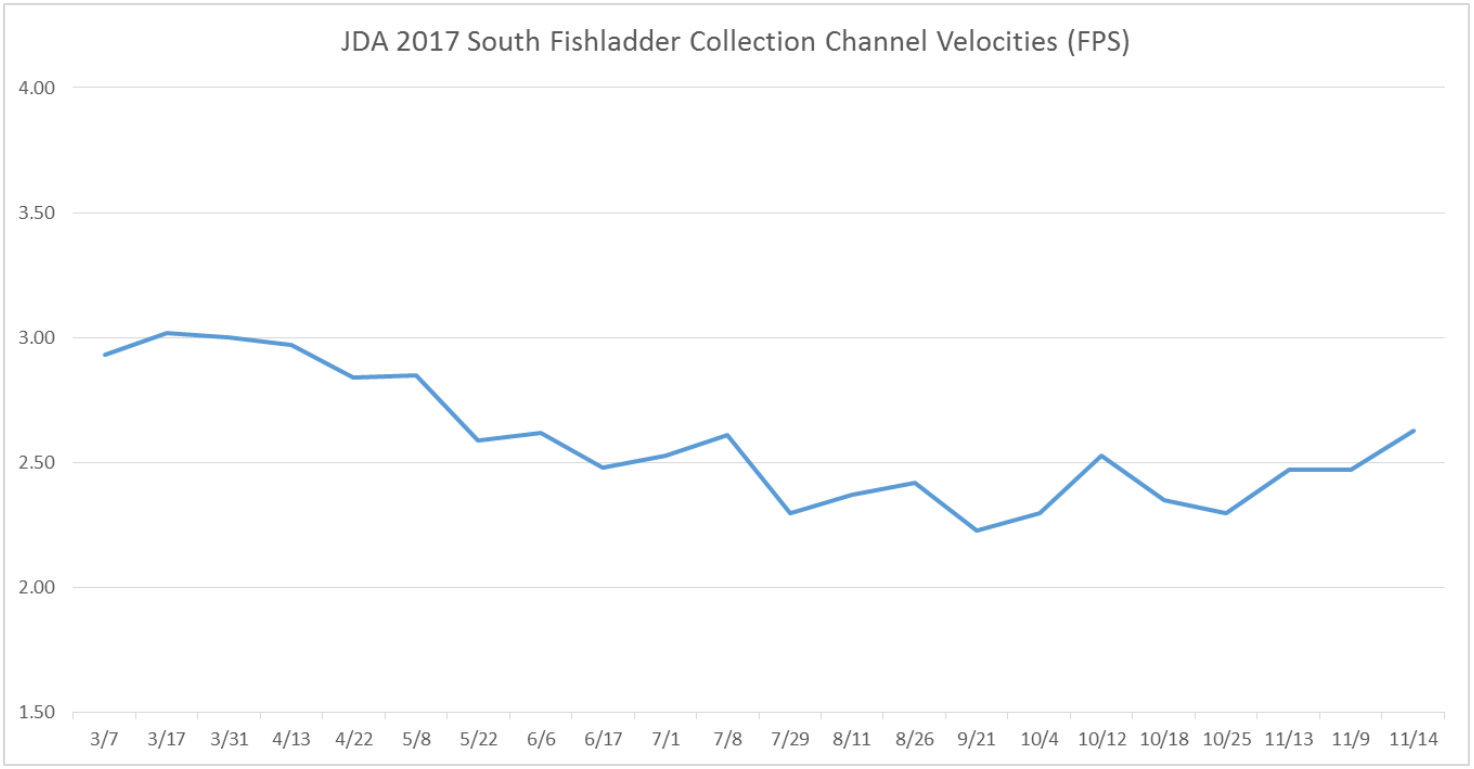


Figure 7: JDA South Fishway collection channel velocities during the 2017 Adult Fish Passage Season (Mar. 1st – Dec. 1st).

Discussion

2017 was a good year without any major JD fish passage equipment failure. The JD South AWS turbine 2 operated without any major issues the second year (its lower bearing/shaft were repaired in 2016.) JD South AWS turbine 1 was successfully repaired by JD Mechanical crew and became available for service in March 2017 but due to the remaining, unfixable damage it was kept OOS as a backup only. Despite of the two AWS turbines' operations (2 &3,) the JD South Fishway had only a few minor OOCs which were immediately corrected by JD Fisheries crew. SE1 channel sensor was relocated by JD Electrical crew during the last winters' maintenance season and performed flawlessly entire year. SE1 tailwater sensor is to be relocated this coming winter season and we expect that entrance to be in criteria 100 % in 2018.
JD North Fishway performed almost flawlessly in 2017 with only 2 very minor Counting Station Differential's OOCs.
JBS had 10 minor Differential OOCs due to Forebay sensor failure which took a while to identify.
There were no failures/ issues at SMF in 2017 in spite of the ageing/ outdated SCADA which is planned to be updated by JD Electrical & JD Engineering crews for the 2019 fish passage season.
Kudos to all JDA Maintenance, Operations, and Fisheries personnel for their dedication and hard work in 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 2017.

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

Approved by: Kevin Moynahan, John Day/ Willow Creek Operations Manager