2016 ANNUAL FISHWAYS STATUS REPORT

JOHN DAY DAM

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Date: Jan, 2017

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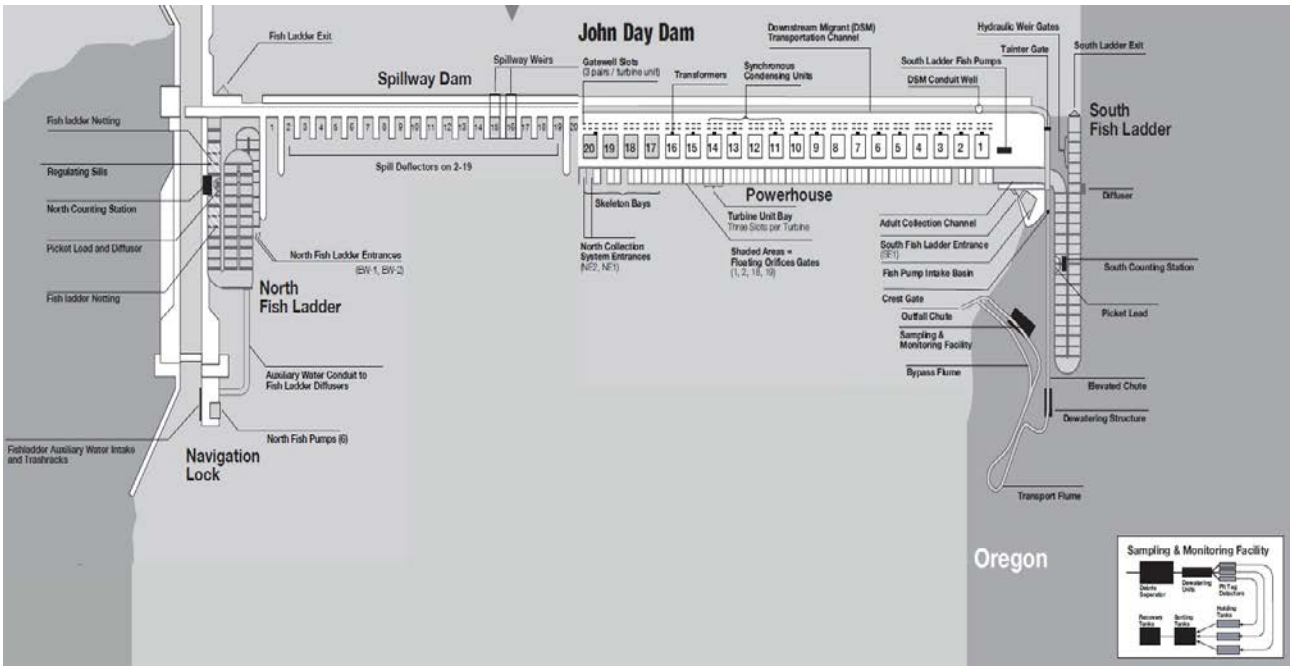

Figure 1: John Day Dam Layout

2016 JOHN DAY FISHWAYS' OPERATING SCHEDULE	
PERFORMANCE STATUS	TIME
NORTH ADULT FISHWAY	
REGULAR OPERATION W/ AWS	January 1st - November 30th
AWS OFF HALF DAY FOR ROV INSP.	August 2nd
DEWATERED FOR MAINTENANCE	December 5th - December 31st
SOUTH ADULT FISHWAY	
REGULAR OPERATION W/AWS	February 28th - December 31st
AWS OFF HALF DAY FOR ROV INSP.	August 2nd
DEWATERED FOR MAINTENANCE	January 7th - February 27th
SMOLT MONITORING FACILITY	
DEWATERED FOR MAINTENANCE	January 1st - March 24th, and November 28th - December 31st
LIMITED SAMPLING; WATER TEMP > 70F	July 27th-September 8th
REGULAR SAMPLING MODE (every other day)	March 31st - July 26th, and September 9th - September 15th
BYPASS FOR PIT DETECTIONS	September 16th-November 23rd
JUVENILE BYPASS SYSTEM	
1/3 GATEWELL ORIFICES OPEN, ROTATE 2X/WK	January 1st - March 24th
REGULAR OPERATION WITH ALL STSs DEPLOYED	April 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 30th
ON SEAL	December 1st - December 31st

Table 1: Operating Schedule for John Day Fishways in 2016.

Fishway Inspection

Adult fishway inspections were conducted twice daily, during the adult fish passage season (March 1st - November 31st), and once daily during the winter maintenance season (December 1 st- February 28 th.) Guidelines were provided by the United States Army Corps of Engineers (USACE) Fish Passage Plan (FPP), and fishway status reports were completed weekly throughout the year. The John Day Dam (JDA) Smolt Monitoring Facility (SMF) inspections were conducted every two hours, 24 hours per day, throughout the juvenile sampling season (April 1st - Sept 15th). SMF status reports were included in weekly fishway status reports. Any out of criteria (OOC) observations were recorded and monitored (See Table 2).

TOTALS FOR :	2016		2015		2014		2013	
	Total #	% OOC	Total #	% OOC	Total #	% OOC	Total #	% OOC
John Day Dam								
Number of inspections	641		613		634		634	
NORTH FISHWAY								
Exit differential	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%
Count station differential	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%
Entrance differential	0	0.00%	**1**	**0.16%**	**1**	**0.16%**	**3**	**0.50%**
Entrance weir EW1 (now fixed weir)	0	0.00%	0	0.00%	N/A	N/A	N/A	N/A
SOUTH FISHWAY								
Exit differential	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%
Count station differential	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%
South entrance differential	**12**	**1.87%**	0	0.00%	0	0.00%	**2**	**0.30%**
Entrance weir SE1	**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%
Bay 1 differential	0	0.00%	0	0.00%	0	0.00%	**1**	**0.20%**
N. Entrance PH(Bay 19)differential	**2**	**0.31%**	0	0.00%	0	0.00%	**3**	**0.50%**
Entrance weir NE1	**9**	**1.40%**	**5**	**0.82%**	**1**	**0.16%**	**5**	**0.80%**
Entrance weir NE2	**5**	**0.78%**	**5**	**0.82%**	**1**	**0.16%**	**6**	**0.90%**
JUVENILE PASSAGE								
Forebay/bypass conduit differential	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%
Turbine trash rack drawdown	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%
Spill volume	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%
Turbine Unit Priority	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%

Table 2: John Day FPP Criteria Discrepancies 2013-2016

Fish Salvage Procedures

Fishway Dewatering Procedures

During fishway dewaterings, bulkheads were installed and drain valves were opened. After the area was dewatered, fisheries personnel entered the area 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 found during any 2016 fish salvage.

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 or mortality. Currently, fish are removed from scroll case and draft tubes by fish bag. Prior to fish salvage, transport tanks are prepped for fish transport. If fish volumes are higher than two bags can safely handle, transport tanks are used to remove fish from the draft tube gallery. The transport tanks are then lifted out by crane. Fish caught within the turbines are released in the tailwater with either; a fish bag and rope, or by tank and crane. There were no mortalities found during any 2016 fish salvage.

2016 John Day Fish Salvage Report

Life stage: adult=A, juvenile=J
Fish: carp=CP, crappie =CR, catfish=CT, lamprey=LR, small mouth bass=SMB, Sturgeon=ST, sculpin=SP, perch=PR, Walleye = WE
Event Location: collection chamber=CC, diffuser chamber=DC, south fish ladder=SFL, north fish ladder =NFL, gatewell=GW
Comment: released in good condition=RIGC

Date	Event	Chinook	Steelhead	Lamprey	Shad	Other	Comments	Morts
Jan-16	SFL-Exit	0	21J	75A	0	3-sp	Lamprey found at trap	0
Jan-16	SFL CC	0	22J 3A	0	0	12-we	RIGC	0
Jan-16	SE1 Diff Pool	0	3A, 14J	0	0	2cp,8we,1ct	RIGC	0
Dec-16	NFL-Upper	0	1A	0	0	0	JDS>4 flushes. RIGC	0
Dec-16	NFL Enter	0	7A	7A	41A	1-st(A)	4-5' st 15-24" STH, RIGC	0
Dec-16	NFL Enter	0	0	15A	0	0	Origin unknown old weir guide plate?	0
Smolt Monitoring Facility/ Juvenile Bypass System 2016 Dewatering Results								
Date	**Event**	**Chinook**	**Steelhead**	**Lamprey**	**Shad**	**Other**	**Comments**	**Morts**
Jan-16	JBS Conduit	0	0	0	0	0	No Fish	0
Jan-16	JBS Outfall	0	0	0	0	0	No Fish	0
Nov-16	SMF	32A	28A	53A	4A	1st, 12ca, 1smb	st (~36"), ct (~18"), smb (~12")RIGC	0
Dec-16	SMF Trans Flume	0	0	7A	0	0	RIGC, ~ 1 mile upstream WA shore	0
Turbine 2016 Dewatering Results								
Date	**Event**	**Chinook**	**Steelhead**	**Lamprey**	**Shad**	**Other**	**Comments**	**Morts**
Apr-16	MU-8 scroll case	3J	0	0	0	0	3-smolts RIGC	0
Apr-16	MU-8 draft tube	0	0	0	0	3-st, 4-ct	st-(12"-30"), ct-(~18") RIGC	0
Apr-16	MU-16 scroll case	0	0	0	0	0	No Fish	0
May-16	MU-15 scroll case	12-J	0	0	0	0	RIGC 1A Sockeye	0
May-16	MU-15 draft tube	0	0	0	0	0	No Fish	0
May-16	MU 3 scroll case	0	0	0	0	0	No Fish	0
May-16	MU 3 draft tube	0	0	0	0	0	No Fish	0
Jun-16	MU 14 scroll case	0	0	0	0	1-smb	RIGC	0
Jun-16	MU 14 draft tube	0	1-J	0	0	7-st, 12-ct	RIGC	0
Jun-16	MU 11 scroll case	0	0	0	0	1 cat	RIGC	0
Jun-16	MU 11 draft tube	0	0	0	0	2-st, 8 ct	Small st, large ct RIGC	0
Jun-16	MU3 scroll case	0	0	0	0	0	No Fish	0
Jun-16	MU3 draft tube	0	0	0	0	0	No Fish	0
Jul-16	MU 11 Scroll Case	0	0	0	0	0	No Fish	0
Jul-16	MU 11 draft tube	0	0	0	0	1-stu,3 ct	3 foot st, 16" ct(s); RIGC	0
Aug-16	MU 10 scroll case	0	0	0	0	0	No Fish	0
Aug-16	MU 10 draft tube	0	0	0	0	2 ST, 15 ct	small st, midsize cats RIGC	0
Oct-16	MU 01 scroll case	0	0	0	0	0	No Fish	0
Oct-16	MU 01 draft tube	0	0	0	0	10 ct	16-24" RIGC	0

Table 3: John Day Dam's 2016 fish salvage results

Fish Counting

Visual fish counting was conducted April 1st – October 31st during the 2016 adult fish passage season. These counts were conducted 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 %.) Since modifying the North fishway Entrance (2010-2012), adult fish passage has become more balanced (> 30% passed at NFL in 2016) (See figure 2).

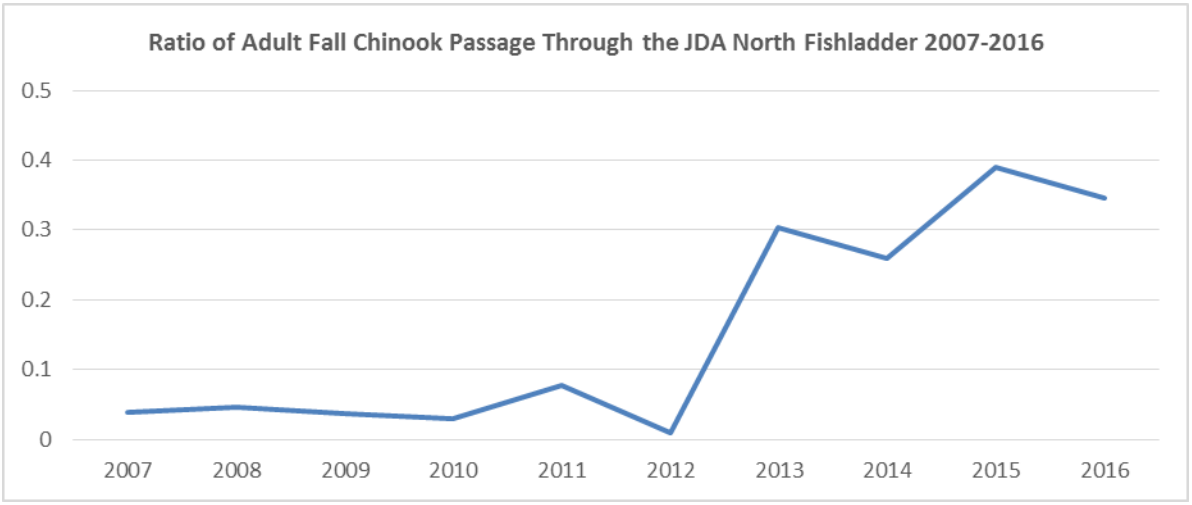

Figure 2: Ratio of adult fall Chinook salmon that migrated through the JDA North Fishway versus South Fishway 2007-2016 (September 1st through November 1st).

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 2016 total catch of 3,002 NPM is lower than the 2015 catch of 3,127, and the 2014 catch of 4,250, but significantly higher than 2013's 2,370 NPM, and 2012's 2,217 NPM. This year's angling effort was cut short due to funding and concluded September 4th rather than in October.

Avian Predator Abatement

Bypassing smolts through spill has become a critical part of JDA fish passage operations since 2006. As a result, 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, an intensive, supplemental boat hazing by U.S. Department of Agriculture (USDA-APHIS) is required for an optimal smolt protection and it has been deployed annually since 2010. This year's USDA boat hazing season ran from April 29th – August 11th 2016; it started later than regular April 15 and it was extended proportionately into August due to the contract's logistics.

Despite of 13 lines missing and not replaced by1 April 2016, the remaining 112 Avian Lines combined with the USDA boat hazing were effective in deterring gull predation on smolts at JD (Figure 5.) It needs to be emphasized that only gulls are a significant, proven avian predator impacting the JD smolt passage from their breeding colonies located in a close proximity to the dam.

However, the white pelicans' presence at the downstream islands and inside of JD Tailrace BRZ have been increasing rapidly over the last few years. In 2014 there were 1,443 observations, in 2015 there were 5,050 observations, and in 2016 there were 8,195 foraging white pelican observations. Furthermore, 2016 was the first year that the timing of the white pelican foraging inside of the JD Tailrace BRZ clearly overlapped with the peak spring and summer smolt passage, in May through June. Until this year, the white pelicans foraged inside of the JD Tailrace BRZ primarily in July through August (Figure 5.)

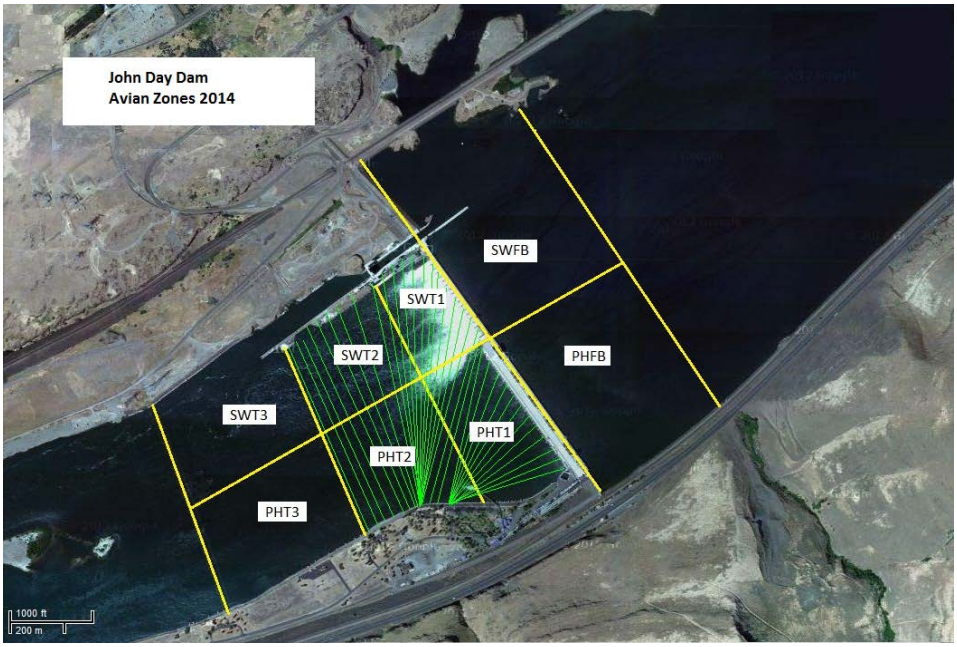

Figure 3: Avian array at JDA Tailrace BRZ installed in 2010 and re-tensioned for 2016 (Powerhouse Forebay-PHFB, Spillway Forebay-SWFB, Spillway Tailrace zones 1-3 [SWT1-SWT3], Powerhouse Tailrace zones 1-3 [PHT1-PHT3]).

2016

Zone	Gulls				Cormorant				White Pelican				Grebe				Total
	F(1)	F(2)	NF(1)	NF(2)	F(1)	F(2)	NF(1)	NF(2)	F(1)	F(2)	NF(1)	NF(2)	F(1)	F(2)	NF(1)	NF(2)	
PHFB	61	54	443	505	0	11	245	47	111	60	27	21	1397	1249	960	859	6050
SWFB	4	1	865	343	0	0	1	0	2	0	4	0	47	0	9	13	1289
PH1	162	240	1	8	17	10	6	1	617	356	0	6	0	0	0	0	1424
PH2	124	178	2	12	2	0	0	0	978	443	19	16	0	0	0	0	1774
PH3	405	246	15	18	0	11	35	39	683	350	489	132	0	0	0	0	2423
SW1	107	190	15	14	10	1	0	2	705	413	1	0	0	0	0	0	1458
SW2	170	311	60	39	0	21	61	51	1254	441	228	70	0	0	0	0	2706
SW3	633	709	144	113	1	5	0	0	1288	494	119	4	0	0	0	0	3510
Total	1666	1929	1545	1052	30	59	348	140	5638	2557	887	249	1444	1249	969	872	20634
	6192				577				9331				4534				

2015

Zone	Gulls				Cormorant				White Pelican				Grebe				Total
	F(1)	F(2)	NF(1)	NF(2)	F(1)	F(2)	NF(1)	NF(2)	F(1)	F(2)	NF(1)	NF(2)	F(1)	F(2)	NF(1)	NF(2)	
PHFB	43	104	464	420	0	8	20	18	19	4	17	3	897	728	2352	1890	6987
SWFB	41	24	328	394	0	0	3	0	0	0	3	0	5	44	54	52	948
PH1	67	86	17	28	15	8	3	3	166	88	3	4	0	0	0	0	488
PH2	156	175	25	14	2	0	0	0	468	189	27	30	0	0	0	0	1086
PH3	594	607	82	16	0	0	35	3	764	428	123	100	0	0	0	0	2752
SW1	6	5	14	28	11	5	1	2	12	11	0	4	0	0	0	0	99
SW2	55	54	21	61	2	2	7	26	472	231	32	3	0	0	0	0	966
SW3	783	1209	381	356	0	0	75	58	1425	773	246	179	0	0	0	2	5487
Total	1745	2264	1332	1317	30	23	144	110	3326	1724	451	323	902	772	2406	1944	18813
	6658				307				5824				6024				

F(1): Foraging during morning survey (with hazing), F(2): Foraging during afternoon survey (no hazing)
NF(1): Non-Foraging during morning survey (with hazing), NF(2): Non-Foraging during afternoon survey (no hazing)
Note: Hazing only occurred April 29th – August 11th 2016

Table 4: Foraging Piscivorous bird observations at JDA for 2016 and 2015 juvenile passage season (April 1st – September 15th).

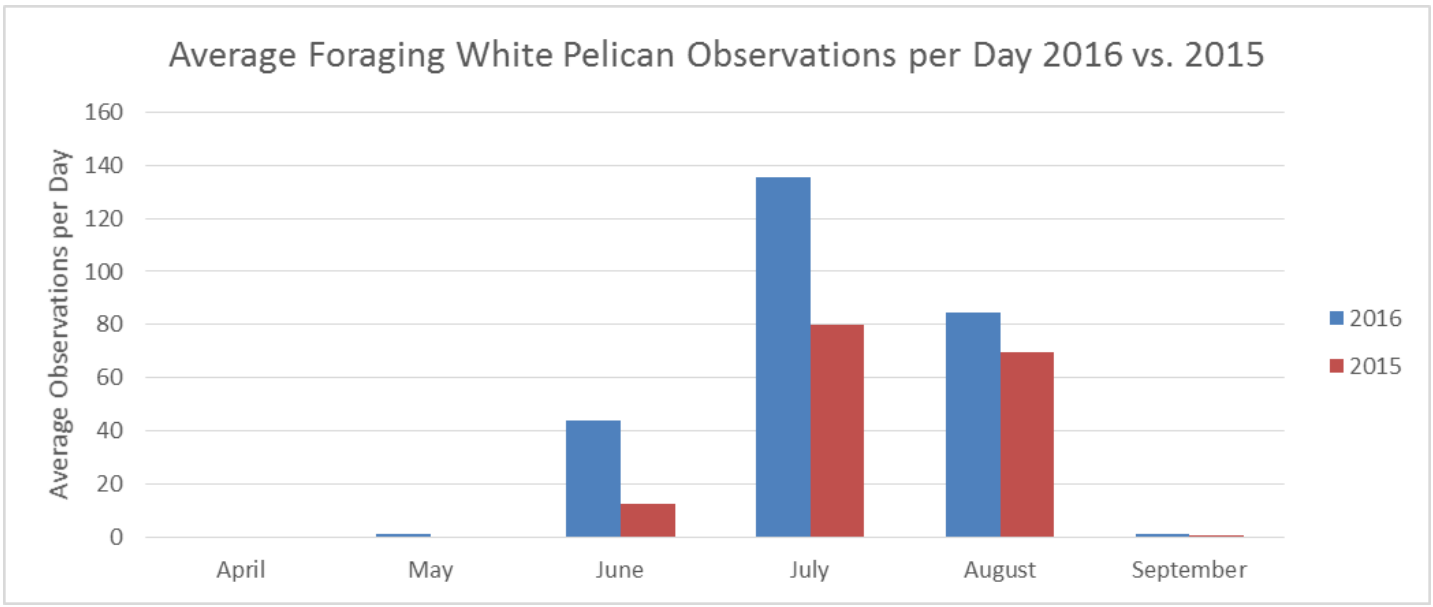

Figure 4: White Pelican average daily observations per month in 2016 compared to 2015.

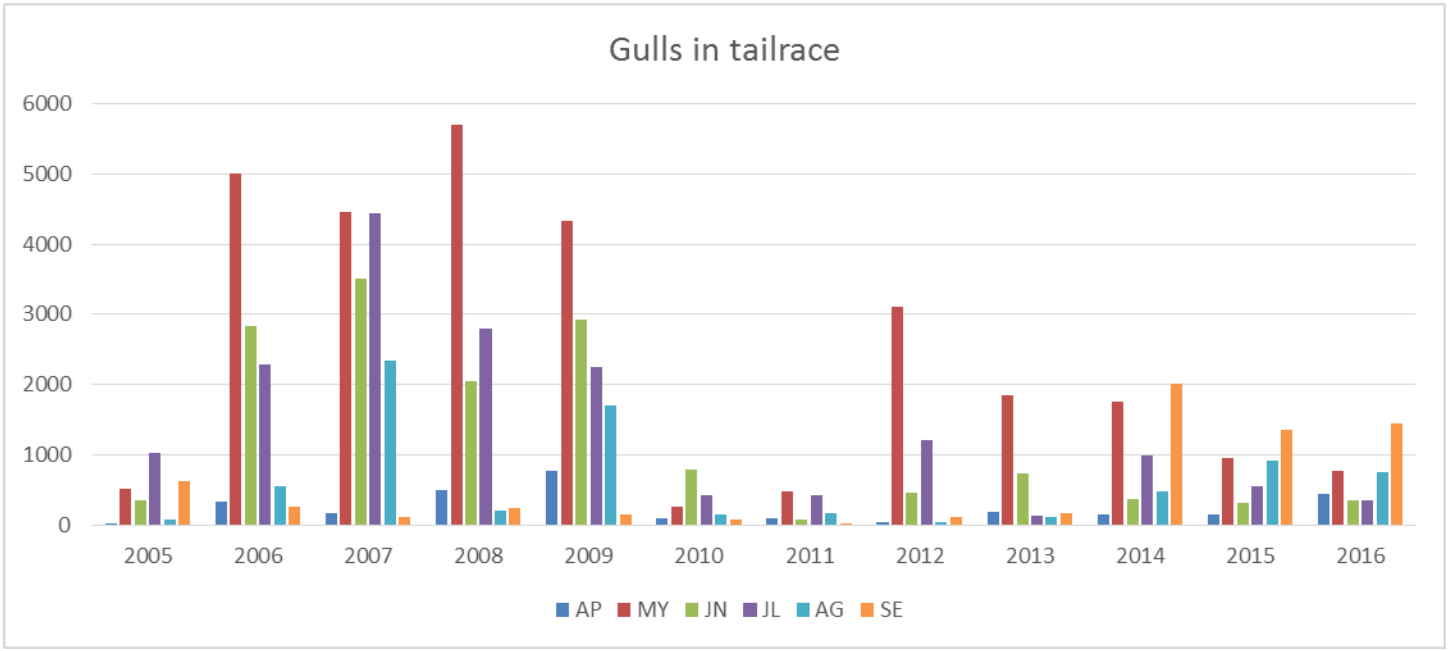

Figure 5: Gull foraging observations (2002-2016; April 1st – September 30th) at JDA. AP=April, MY=May, JN=June, JL=July, AG=August, SE=September.

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 personnel at the entrance and exit 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 during daily fishway inspections.

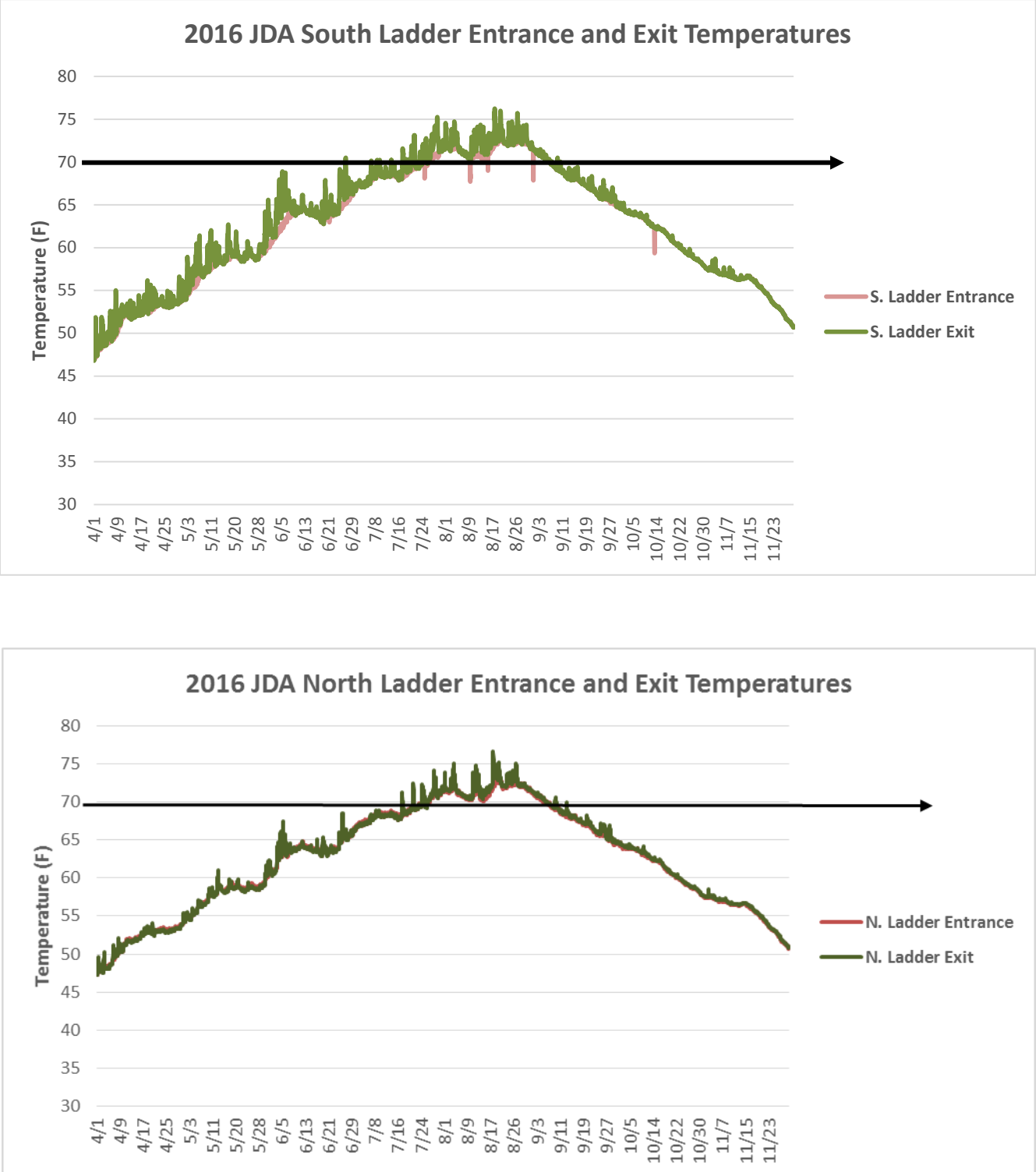

Figure 6: John Day Dam Fishladders' water temperatures for 2016.

Fishway Velocities – Collection Channel

In March 2016, the John Day south fishway collection channel was operating with 1 of 3 Auxiliary Water Supply (AWS) pumps (two pumps were in failed status). During this time, the FISH crew performed near daily velocity inspections. All inspections showed the channel was in criteria. When a second pump was brought online, the FISH crew began performing velocity checks on a near weekly basis throughout the remainder of the adult fish passage season (March 1st – December 1st). Inspections were performed by dropping wood floats at the head of the adult collection channel and recording travel times through each monolith section. Velocities at these sections were verified to be within criteria, and the average channel velocity was calculated (see figure 7). These calculations were reported in weekly status reports throughout the year. The 2016 JDA South Fishway collection channel velocities were all within the Fish Passage Plan (FPP) criteria of 1.5 to 4.0 feet per second (FPS) (See Figure 7).

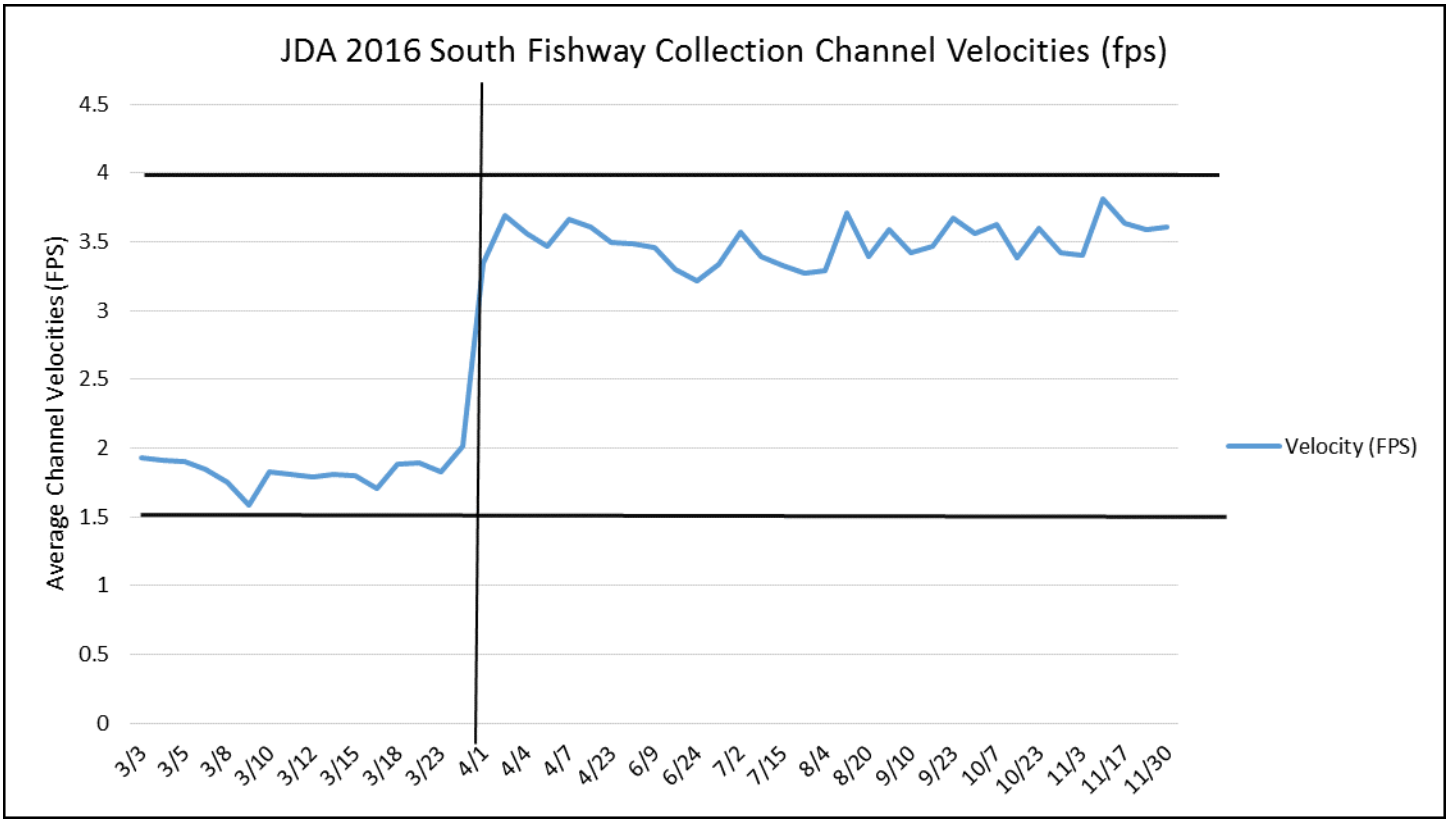

Figure 7: JDA South Fishway collection channel velocities during the 2016 Adult Fish Passage Season (Mar. 1st – Dec. 1st). Horizontal lines represent FPP criteria. Vertical line represents the break between 1 pump and 2 pump operation.

Discussion

The most important event for the JD Fish Passage, in 2016 was the failure of Pumps 1 & 2's bearings (parts of JD South AWS Turbines 1 & 2) discovered during the winter maintenance, in January'16. JD Mechanics were able to repair Pump 2 which returned to service in late March, and then it continued working well during the entire 2016 passage season. Pump 1 was permanently OOS/ unavailable in 2016 and two out of four JD FOGs had to be closed to provide sufficient flows for the JD South entrances. Despite of a small and insignificant increase in the OOCs at JD South Adult Fishway (19 OOC at SE and 16 at NE entrances) as compared with the past few years (see Table 1,) the JD South Fishway operated mostly in or near FPP criteria during the entire 2016 passage season. Additionally, some of the JD South's OOCs were due to issues with its water level sensors/ automation; the channel sensor at SE is slated to be relocated during this winters' maintenance as an improvement measure.

JD North Adult Fishway, JBS and SMF operated according to the FPP criteria at all times and without a single OOC in 2016. However, the JD STS crane's failure in late October 2016 resulted in some challenges and difficulties with the turbines' operations. The crane was fixed by a contractor, in mid- January 2017 but it continues to be outdated / wore out, and it needs a new replacement soon to prevent more failures in the future.

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 2016.