2020 Annual Fishways Status Report

John Day Dam Project

One of many trees toppled by a windstorm at the John Day project on May 30, 2020. This tree fell across the south fish ladder. No structural damage to the ladder occurred and the tree was promptly removed.

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Date: January 2021

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Introduction

The John Day Dam is located at river mile 216 on the Columbia River and is the third dam upstream from the mouth of the Columbia. The project includes a powerhouse with 16 turbines and 4 skeleton bays (to house additional turbines), a spillway with 20 spill bays (includes 2 top spillway weirs [TSW] located in spill bays 18 and 19), a navigation lock, two fish ladders for upstream migration [North Fish Ladder (NFL), and South Fish Ladder (SFL)], and a complete juvenile bypass system (JBS) with a smolt monitoring facility (SMF) and lab (see figure 1). This document summarizes all fish related activities at John Day Dam in 2020, and all operations were conducted following protocols outlined in the Fish Passage Plan (see table 1).

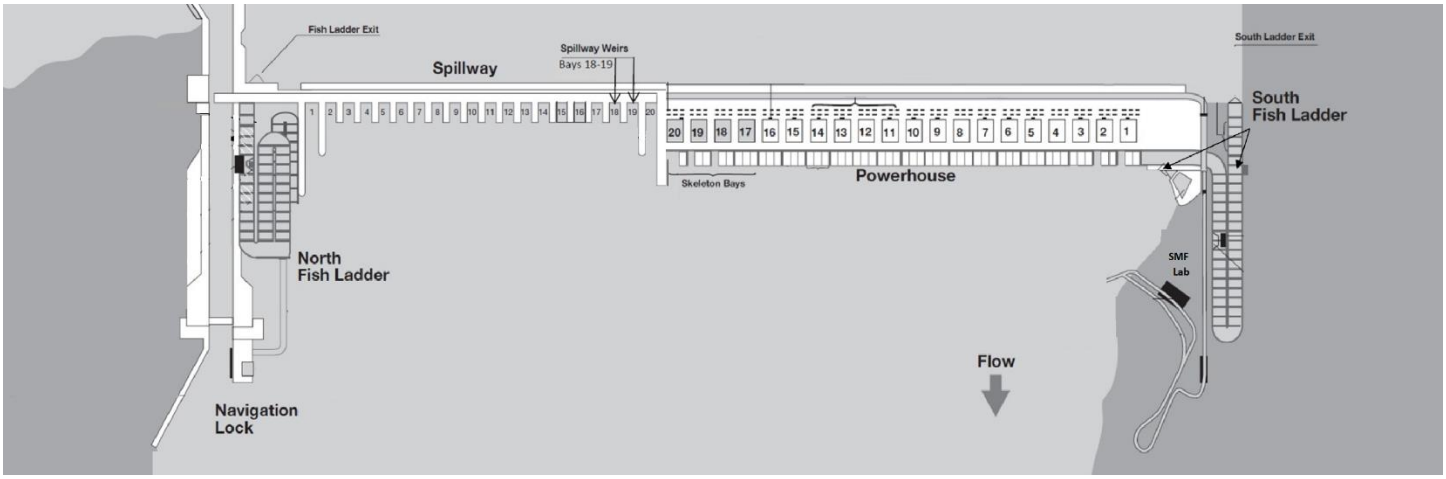


Figure 1: An illustration of the John Day project highlighting the location of several fish passage structures.

2020 JOHN DAY FISHWAYS' OPERATING SCHEDULE	
NORTH ADULT FISHWAY	
Regular Operation W/ AWS	January 23rd – December 7th
AWS Off Half Day for ROV Inspection	August 12th
On Orifice Flow - No AWS Operation	November 29th - December 6th
Dewatered for Maintenance	December 7th - December 31st
SOUTH ADULT FISHWAY	
Regular Operation With AWS	[January 1st - January 23rd] & [February 28th - December 31st]
AWS Off Half Day for ROV Inspection	August 12th
Dewatered for Maintenance	January 24th - February 28th
SMOLT MONITORING FACILITY	
Dewatered for Maintenance	[January 1st - March 23rd] & [December 1st - December 31st]
COVID Sampling (Every Other Day 7AM-1PM)	April 1st - July 29th
Limited Sampling (Water Temperature > 70F°)	July 30th - September 15th
Bypass for PIT Detections	September 16th - November 29th
JUVENILE BYPASS SYSTEM	
Normal Operation with STSs Deployed	[March 1st - March 31st units 1-4] & [April 1st - December 15th all units]
SPILLWAY WITH 2 TSWs (at bay 18 &19)	
On Seal	[January 1st - April 9th] & [December 1st - December 31st]
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: This table highlights key fishway operations at the John Day project in accordance with the Fish Passage Plan.

Fishway Inspection Procedures

The John Day project (JDA) adult fishways, and Juvenile Bypass System (JBS) were inspected twice daily during the adult fish passage season (April 1st - November 30th), and once per day during the winter maintenance season [(January 1st - February 28th) & (December 1st- December 31st)]. The JDA Smolt Monitoring Facility (SMF) inspections were conducted bihourly throughout the juvenile sampling season (April 1st - Sept 15th). Any out of criteria (OOC) observations were reported in the weekly status reports (see table 2).

	2020		2019		2018		2017		2016	
	Total #	% OOC	Total #	% OOC	Total #	% OOC	Total #	% OOC	Total #	% OOC
Number of Inspections	633	-	618	-	639	-	640	-	641	-
	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%	0	0.0%	2	0.3%	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%	2	0.3%	0	0.0%	0	0.0%	0	0.0%
	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	1	0.2%	5	0.8%	1	0.2%	6	0.9%	12	1.9%
Entrance weir SE-1	8	1.3%	38	6.1%	3	0.5%	4	0.6%	7	1.1%
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	0	0.0%	12	1.9%	1	0.2%	3	0.5%	2	0.3%
Entrance weir NE-1	4	0.6%	31	5.0%	2	0.3%	0	0.0%	9	1.4%
Entrance weir NE-2	5	0.8%	9	1.5%	2	0.3%	0	0.0%	5	0.8%
	JUVENILE PASSAGE									
Forebay/bypass conduit differential	6	0.9%	0	0.0%	0	0.0%	10	1.6%	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%	0	0.0%	7	1.1%	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 fishways and the number/percentage of out of criteria (OOC) observations (2016-2020).

Fish Salvage Procedures

Fishway Dewatering Procedures

Fishways are dewatered following standard operating procedures (SOPs). When fishways are dewatered, fisheries personnel enter and salvage stranded fish (see table 3). Salvaged fish are transported to either the forebay or tailrace (depending on circumstances such as: fish species, dewatering location, age-class, or stress levels). Efforts are made to reduce stress by providing a continual water supply and following minimal fish handling procedures. Follow-up inspections are performed to account for any overlooked fish. The combined fish salvage mortality for 2020 was 1-juvenile lamprey, salvaged from a strainer (fisheries personnel play no role in this process, the mortalities are reported by the JDA mechanical crew as part of a routine inspection).

Turbine Dewatering Procedures

When following operational guidelines, turbine dewaterings require minimal fish salvage. If a turbine fails, the operational guidelines cannot always be followed and may result in fish entrainment. Procedures are continually evaluated to determine the best methods to minimize fish stress and mortality. Prior to fish salvage all necessary equipment is staged (including transport tanks). Typically, fish are transported via fish bag. Transport tanks are only used if fish numbers are higher than the two bags can safely handle (tanked fish are released via crane). Additionally, JDA has a trailer mounted fish tank. This tank is primarily used to transport high volumes of lampreys (when applicable), making it easy to release lampreys well upstream of the dam (release site is approximately 2RM upstream), helping reduce fallback.

2020 John Day Fish Salvage Report

Key; adult = (A), juvenile = (J), bluegill = (big), Chinook = (Ch), coho = (co), carp = (cp), crappie = (cr), catfish = (ct), lamprey = (la), perch = (pr), shad = (sh), small mouth bass = (smb), sockeye = (so), sculpin = (sp), sturgeon = (st), steelhead = (sth) sucker = (su), whitefish = (wf), walleye = (we), Released In Good Conditon = (RIGC), Unknown (UNK)

Date	Event	CH	STH	SO	CO	LA	Shad	Other	Comments	Mort	Cause
1/9	Upper JBS Dewater	0	0	0	0	0	0	1-su	1-sucker (~10") - RIGC	0	N/A
1/9	Lower JBS Dewater	0	0	0	0	0	0	0	No Fish	N/A	N/A
1/28	South Fish Ladder	0	4 (J)	0	0	12(A)	0	4(smb), 1(sp)	RIGC	0	0
2/3	Strainer	0	0	0	0	2(J)	0	0	2x juvenile lamprey 1-mort 1-RIGC	1	UNK
3/4	Navigation Lock Tainter (V2)	0	0	0	0	0	0	0	No Fish	N/A	N/A
6/23	MU 10 Scroll Case	0	0	0	0	0	0	0	No Fish	0	N/A
6/24	MU 10 Draft Tube	0	0	0	0	0	0	8	8 ct	0	N/A
9/1	MU 9 Scroll Case	0	0	0	0	0	0	0	No Fish	0	N/A
9/2	MU 9 Draft Tube	0	0	0	0	0	0	24	20-ct, 1-bg, 3-cr	0	N/A
12/1	SMF Dewater	13(A)	27(A)	0	0	120(J),10(A)	0	5(cp),15(we),15(ct),10(smb),2(st)	both st ~38" no jacks observed, cp ranged up to 20"	0	N/A
12/7	North Ladder Upper	1(J)	2(J)	0	0	0	0	1(sp)	RIGC	0	N/A

Table 3: Results from fish salvage operations at the John Day project in 2020.

Fish Counting

JDA fish counting (visual and/or video) occurred April 1st – October 31st during the 2020 adult fish passage season, and all fish count data was posted to an online database. Fish counts were conducted at both the north fish ladder (NFL) and south fish ladder (SFL). Fish counts were conducted, under contract, by Four Peaks Environmental Science & Data Solutions.

FISH COUNTING SCHEDULE
April 1st – October 31st visual daily counts (0500 - 2100 PST)
June 15th – September 30th nighttime video counts (2000 - 0400 PST)

Present and historical count-data suggests adult salmonids are more attracted to the SFL, at JDA. In 2020 counts ranged from 29-49% at the NFL (see figure 2) and the 10-year averages (see figure 3) ranged from 27-45%. Sockeye appear to be the exception. Most years sockeye preferred the SFL, however there were years with slightly higher counts at the NFL (2011, 2014, and 2016). Lamprey, however, appear to consistently prefer the NFL over the SFL. Improvements were made to the NFL entrance between 2010 and 2012 to help improve fish ladder passage for salmonids and lamprey.

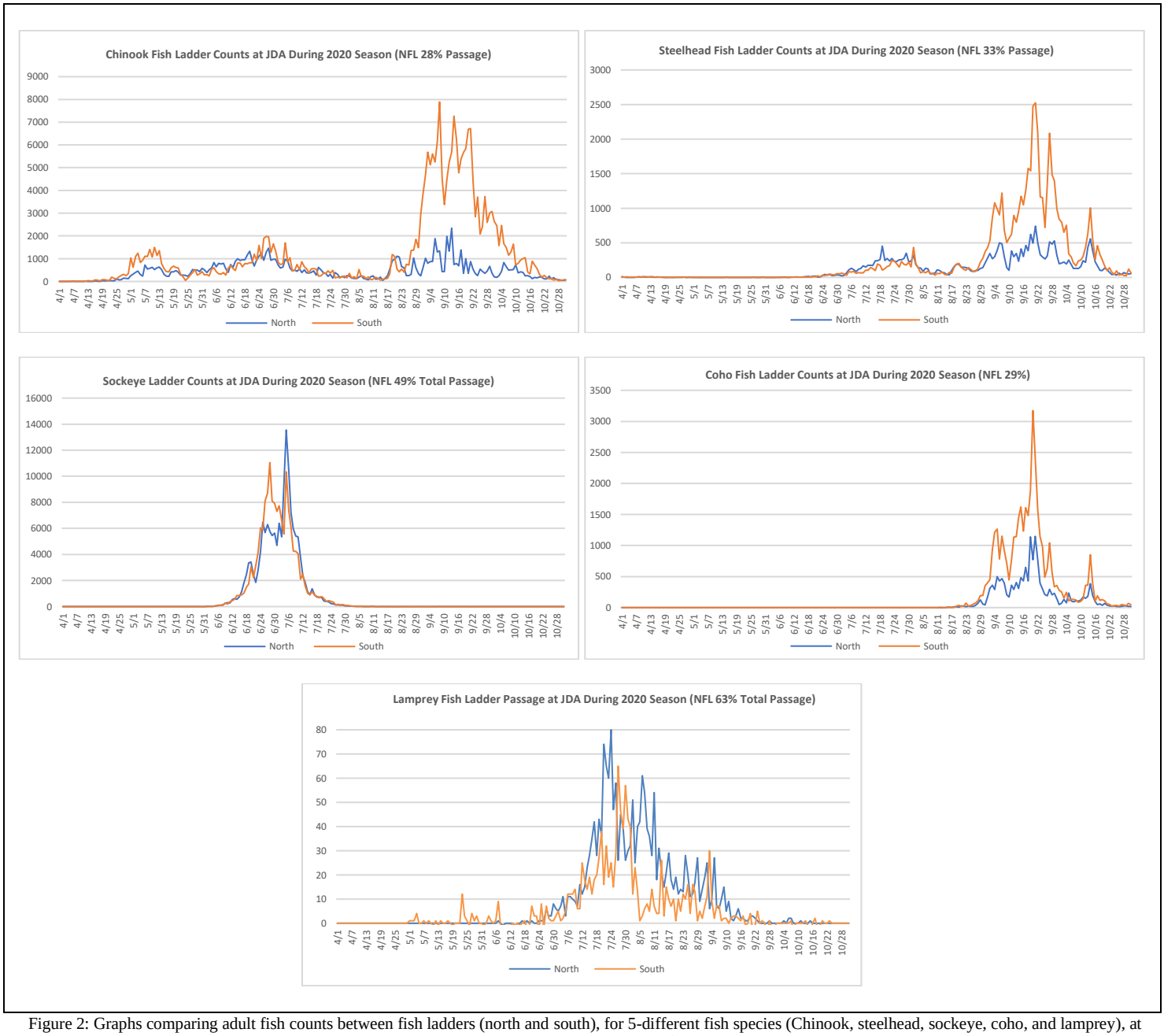


Figure 2: Graphs comparing adult fish counts between fish ladders (north and south), for 5-different fish species (Chinook, steelhead, sockeye, coho, and lamprey), at the John Day project during the 2020 adult fish count season.

Figure 3: Total fish ladder counts (north and south combined) over a 10-year span (2011-2020) for 5-different fish species (Chinook, steelhead, sockeye, coho, and lamprey), and the percentage that use the north fish ladder at John Day Dam.

Lamprey Collection

JDA has the ability to collect lampreys from both fish ladders (north and south). The two systems collect fish differently, and collection efficiency varies. The north fish ladder (NFL) has a ramp system that utilizes pumped water to attract lampreys. When lampreys climb the ramp, they drop into a holding tank. This NFL system is accessed by elevator.

The south fish ladder (SFL) utilizes a trap system. Lampreys navigate the ladder and enter the trap near the counting station. Once there, they swim under grating and are guided into a trap box. This box is lifted by a fixed jib crane for collection. An elevator is not required to access the SFL system.

North Fish Ladder (NFL) Lamprey Passage System (LPS)

The NFL LPS is located at the NFL entrance. When lamprey enter the ladder, they navigate a bollard field. This field is used to break up velocity and makes ladder entrance easier. On the north side of the NFL entrance is a ramp fed by pumped water. Lampreys must climb this ramp to reach the holding tank. A rest box is located halfway up the ramp (the box can be flushed pneumatically as needed) to give lampreys a chance to recover during their journey. Once lampreys climb the ramp, they enter an upwelling box. This is where pumped water enters the system. The water percolates through porosity plating, and either down the

ramp (for attraction) or into the holding tank (to circulate water in the holding tank). The lampreys travel through the upwelling box, however, porosity plating only allows access the upper portion of the box. Once lampreys navigate the upwelling box, they drop into the holding tank via irrigation piping. This is where personnel recover the lampreys (see figure 4)

Note The only methods to transport collected lampreys are by stairs, elevator, or winch. It is 100-foot climb to the intake deck (access area). It is difficult on personnel, and fish to transport them by stairs. The elevator is outdated, and unreliable. A winch system was created for backup, but it has not been tested. Access is the most limiting factor for this system.

Figure 4: Images of the north fish ladder (NFL) lamprey passage system (LPS) (*Note* the first picture is facing east, and the second picture is facing west): (A) bollard field (B) access ramp (C) resting box (D) ramp entering the upwelling box (E) upwelling box (F) holding tank (G) lamprey pumps (H)water supply line (I) pump location from the 2019 modification (J) pneumatic airlines to flush the rest box.

The pump deployment location is a concern for this system. Lamprey pumps were originally deployed in the 'queen pump' access area. This means mechanical crews must remove the LPS pumps, by crane, when dewatering the NFL. Therefore, a new pumping system was designed and implemented for the 2019 season.

Unfortunately, the new system failed before the 2019 season started (pump housing broke off in the auxiliary water supply). John Day personnel worked quickly to reinstall the old pumps (in the original location), but lamprey collection was almost nonexistent in 2019 (3-total at the NFL LPS). Several in-season modifications were attempted to improve passage efficiency, with little success. There was one modification that could not be implemented in 2019. Reinstalling a PVC water supply line from the lamprey pumps to the LPS. With limited time to get the system online in 2019, rubber hosing (same diameter as the PVC) was used in its place.

For the 2020 season JDF personnel installed a new PVC water supply line from the pumps to the LPS. It was, and still is, unknown if the supply line modification is the reason efficiency improved. However, there were significantly more lampreys collected in 2020 (162) than in 2019 (3). Without more research, any number of factors could have attributed to this improvement (run size, improved ladder conditions, attraction water flow, etc.).

A more permanent system is still needed for the NFL LPS. The LPS pumps were returned to their original location, so they will need to be removed before installing a queen pump. Also, the LPS pumps get connected to the NFL dewatering pump (pump #7) power supply. The previous LPS power supply was removed during the 2019 modifications and has not been replaced. Fortunately, pump 7, and the LPS pumps are unlikely to run at the same time, and the repair of pump #7 reduces the need for the queen pump (used as a backup).

South Fish Ladder (SFL) Lamprey Trapping System (LTS)

The SFL LTS is located near the SFL count station. Lampreys approach this area and enter the system below a grating structure on the deck. Once inside, they travel into a conduit which leads them up a small ramp, and into a trap box. This trap box can then be lifted, by a fixed jib crane, allowing personnel to collect the lampreys (see figure 5). This system generally operates flawlessly, however success is variable. One issue with this area is that lampreys tend to mill in the conduit/ramp area. The flows appear to be ideal in this area, and they may reside there for long periods of time (actual residing times unknown). Every year, during winter maintenance, several lampreys are observed exiting the conduit/ramp area [(2015: 75), (2016: 101), (2017: 180), (2018: 26), (2019: 12)].

Figure 5: Images of the south fish ladder (SFL) lamprey trap system (LTS): (A) entrance (B) diversion conduit (C) count station window/crowder (D) trap box guide (E) trap box (with access hatch removed) (F) lamprey entrance port (G) trap hoisting jib crane. *Note* when in operation picketed leads rest atop the LTS entrance (A), and upriver from the trap box guide (D). These picketed leads guide fish to the count station window (D).

Collected Lamprey Data

Adult lamprey collections were conducted at JDA from June 8th through September 3rd during the 2020 passage season. The Columbia River Inter-Tribal Fish Commission (CRITFC) operated all traps and collected the lampreys. Collected lampreys were translocated in accordance with the Tribal Pacific Lamprey Restoration Plan (TPLRP). In addition to the NFL LPS and SFL LTS, CRITFC utilized three PVC tube traps near the NFL count station (between the picketed leads). Following a down year in 2019, the NFL LPS was the most successful trapping method at JDA in 2020 (see table 4). Lamprey collection efficiency varied annually.

JDA Lamprey Collection Data [2016-2020]					
	2016	**2017**	**2018**	**2019**	**2020**
Total SFL Counts	4,229	11,615	4,200	1,799	1,109
Total NFL Counts	5,540	11,789	4,342	2,790	1,932
SFL Trap	467	125	325	272	140
NFL LPS	346	419	1,873	3	162
NFL PVC Trap #1	-	-	-	33	70
NFL PVC Trap #2	-	-	-	0	60
NFL PVC Trap #3	-	-	-	183	2
Not Specified	205	227	-	-	-
Total Handled	**1,018**	**771**	**2,198**	**491**	**434**

Table 4: Lamprey collection at John Day Dam (2016 – 2020), for each trapping location, and total ladder counts.

Northern Pikeminnow Dam Angling

The 2020 JDA northern pikeminnow (NPM) angling season took place May 25th through October 11th. Angling occurred at the JDA tailrace (powerhouse section) and was performed by a Washington Department of Fish and Wildlife (WDFW) crew. The WDFW crew collected gut contents and biological data from harvested NPM for analysis.

Since 2016 the NPM catch per effort-hour (NPM/H) has decreased annually at JDA (see table 5). In 2020 the average was 2.4 NPM/H, a decrease of 39% from 2016 (3.8 NPM/H). Currently, gut content and data analysis is limited by COVID-19 restrictions. The only available data, at the time of this report, is that 550-NPM gut samples were taken and fork lengths averaged 410mm.

Northern Pikeminnow Catches at JDA (2016 - 2020)			
Year	**NPM Caught**	**Hours**	**NPM/Hour**
2016	3,002	787.25	3.8
2017	3,472	1,042.50	3.3
2018	3,089	1,199.25	2.6
2019	1,894	760.50	2.5
2020	1,782	743.75	2.4
Average	**2,647.8**	**906.65**	**2.9**

Table 5: Northern Pikeminnow (NPM) catches at JDA (2016-2020), and NPM caught/hour

Avian Predator Abatement

Bypassing smolts through spill and TSWs has been a critical part of JDA fish passage operations since 2006. Unfortunately, piscivorous bird predation on smolts (in the tailrace's Boat Restricted Zone (BRZ)) has increased during this time. In response, a comprehensive grid of 125 avian lines was installed above the tailrace BRZ in 2010 (see figure 6). The avian-lines wore-out quicker than expected, and before replacement (in April 2018) 29-lines were missing (23% of the grid). The grid was updated from Plasma lines to Vectran™ lines to reduce breakage. The improved grid has held up well, however one avian line (#68 in the spillway) rubbed on a tree branch and snapped on September 15, 2020. John Day mechanical crew immediately spotted and removed the broken line without incident. John Day fisheries continues to monitor trees in the area.

In addition to avian-lines, supplemental boat hazing [by the U.S. Department of Agriculture (USDA)] has occurred annually since 2010 (April 15th – July 31st). The 125 avian-line grid, combined with the USDA boat hazing, has effectively deterred gull predation at JDA (see figure 7). Gull numbers increased in the fall after hazing ended and large numbers were seen resting on the wingwall in the forebay. Unfortunately, American White Pelican (AWPE) sightings have increased significantly since 2012 and JDF avian lines do not deter them (see figure 8). Additionally, USDA is not permitted to haze AWPE due to their protected status. AWPE numbers were highest June – August and most were gone by the fall, however, this was the second year AWPE (<10) overwintered in the area. Despite an influx of AWPE at JDA, predatory impacts on listed fish is not fully known.

Unlike AWPE, double-crested cormorant (DCCO) presence was at a minimum during the USDA hazing period (see figure 9). In the fall and winter DCCO numbers increased but were mainly seen exhibiting non foraging behavior on the riprap in zone SW2 (see figure 6). Grebe abundance (Western and Clark's) was mostly confined to zone PHFB and were therefore unaffected by USDA boat hazing. Grebes were seen foraging mainly during the spring and early summer (see figure 10) in zone PHFB (see figure 6). Over the late summer and fall grebe numbers decreased and they were completely dispersed by winter. Caspian terns are almost nonexistent at JDA (Only 2-observations on record: August 14th, 2018 and May 23rd, 2020, both terns were foraging in the forebay, and neither lingered). The main focus at JDA is gulls, as they are the largest known piscivorous threat to listed fish at JDA (see figure 7).

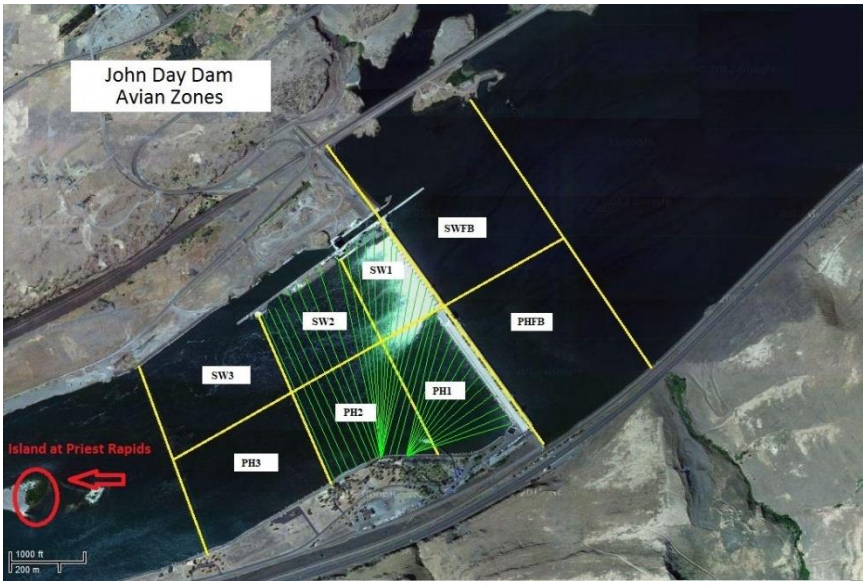
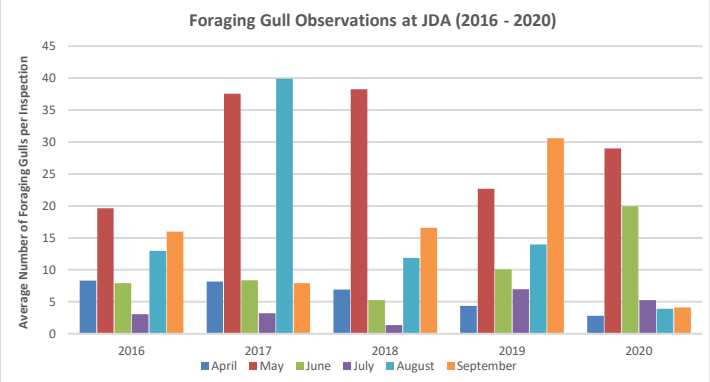


Figure 6: An overview of the 2010 avian-line grid at the JDA tailrace BRZ [powerhouse forebay=PHFB, spillway forebay=SWFB, spillway tailrace zones 1-3 (SWT1-SWT3), powerhouse tailrace zones 1-3 (PHT1-PHT3)]. Red circle indicates Preacher's island where American white pelicans loaf between feedings.



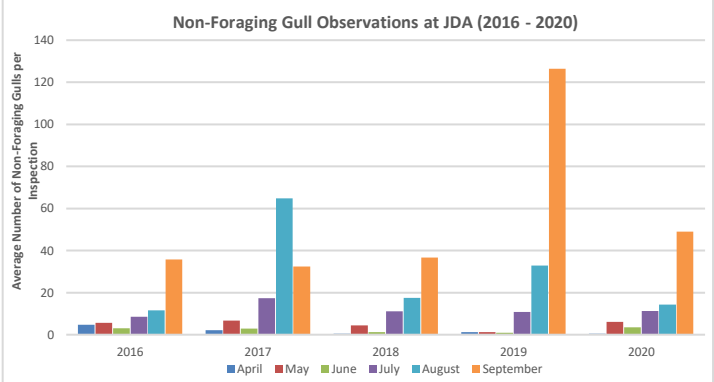
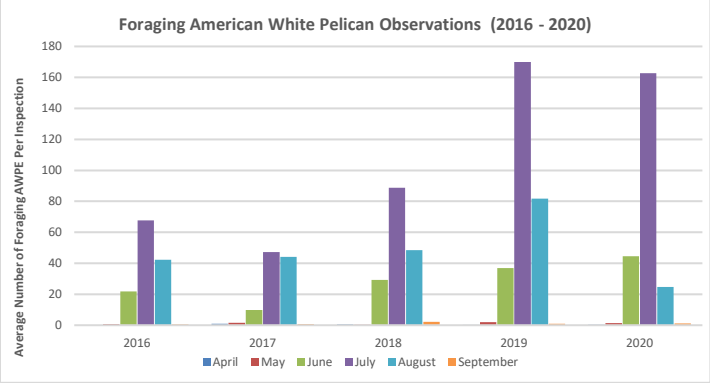


Figure 7: Monthly gull observations shown as average number of birds per inspection (2-inspections daily) over a five-year period (2016-2020). The left graph represents actively foraging gull observations, and the right chart represents non-foraging gull observations. Gulls are present year-round, however April – September correlates with smolt outmigration at JDA.



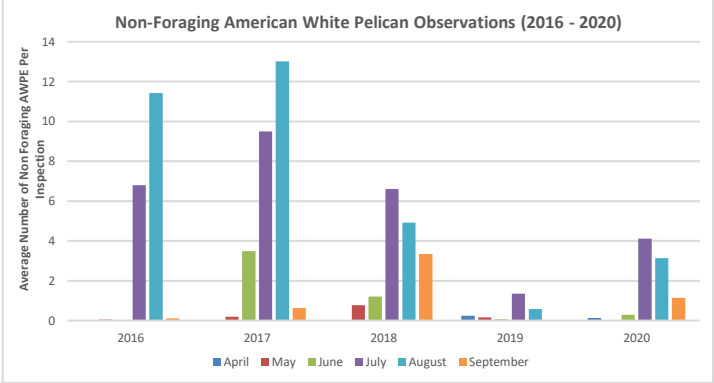


Figure 8: Monthly American white pelican (AWPE) observations shown as average number of birds per inspection (2-inspections daily) over a five-year period (2016-2020). The left graph represents actively foraging AWPE observations, and the right chart represents non-foraging AWPE observations. Pelicans linger in small numbers beyond September (fewer than 10) however, April – September correlates with smolt outmigration at JDA.

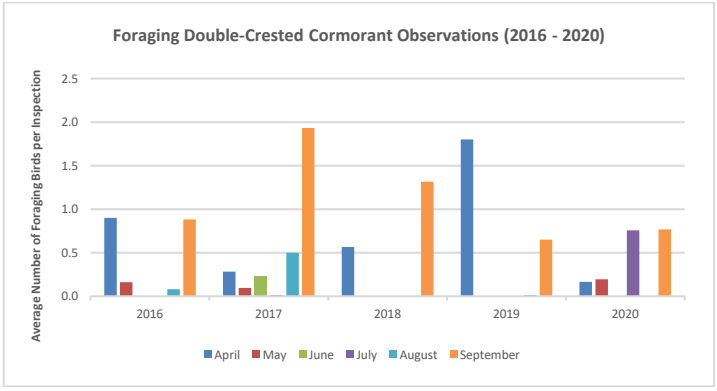


Figure 9: Monthly foraging Double-Crested Cormorant observations shown as average number of birds per inspection (2-inspections daily) over a five-year period (2016-2020).

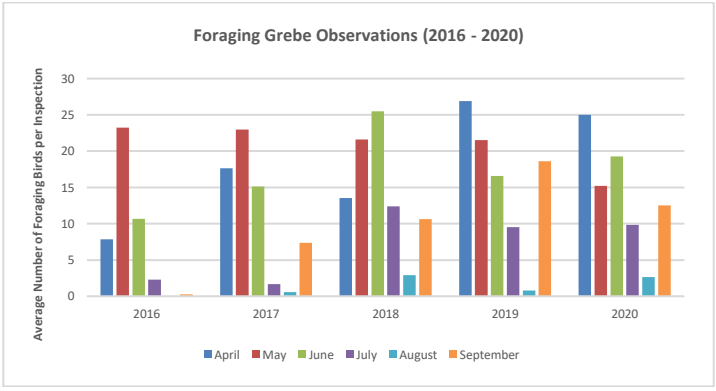


Figure 10: Monthly foraging Grebe observations shown as average number of birds per inspection (2-inspections daily) over a five-year period (2016-2020).

PIT Tag Detections from Preacher's Island

Preacher's island is a known loafing spot for American white pelicans (AWPE). Other piscivorous birds (such as gulls and double-crested cormorants) use the island, but much less frequently. To help better understand predation rates on smolts, fisheries personnel coordinated PIT tag scans on the island.

On September 22, 2020 the JDF crew scanned Preacher's Island for PIT tags using Biomark HPR Plus readers. This was the second annual island scan. In 2019 Real Time Research scanned a small section of Preacher's Island and found 136 unique PIT tags. In 2020 the JDF crew scanned a much larger area of the island, focusing on areas where birds are known to congregate, and recovered 545 unique PIT tags (see figure 11). Of the 545 unique PIT tags recovered: 320 were Chinook, 174 were Steelhead, 35 were Coho, and 13 were Sockeye (see figure 12). The PIT tag origin dates ranged widely. The earliest tag was from 1998, and the most recent was from 2020. The most observed origin year was 2019 (53-tags), and 1998 had the fewest (1-tag) (see figure 13).

Figure 11: An image of Preacher's Island with 6-years (2015-2020) of recovered PIT tag coordinates.
Note this is a satellite image from 2015 (best picture quality), and there is more vegetation on the island now.

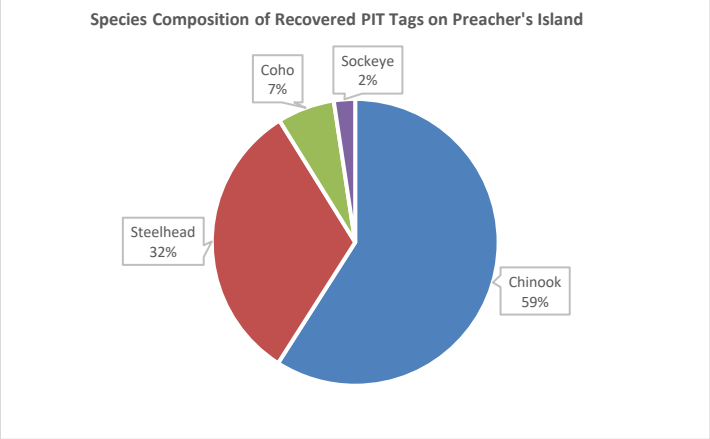


Figure 12: Species composition of recovered PIT tags on Preacher's Island from the 2020 tag scan survey

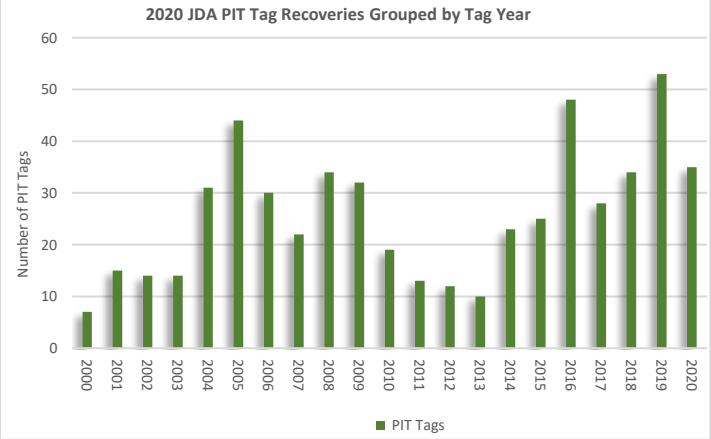


Figure 13: Number of PIT tags recovered on Preacher's Island by tag year (1998 had 1-tag present)

Water Quality

Forebay Water Temperatures

The JDA forebay water temperatures were obtained from a United States Geological Survey (USGS) temperature sensor (see figure 14). This sensor is located at the upstream end of the navigation lock guide-wall. When JDA forebay water temperatures reach 70°F, JDF switches into 70°F juvenile sampling mode. During this time, condition samples are only taken Mondays and Thursdays, from 7AM – 1PM. This helps reduce stress on outmigrating smolts.

Fish Ladder Water Temperatures

John Day fisheries personnel (JDF) records ladder temperatures at the entrance and exit of both fish ladders (north and south). The exit temperatures are recorded upstream of the diffusers, and just downstream of the control sections (modulating weirs). These temperatures are measured using Hobo® (P/N: U22-001) temperature loggers (see figure 15). The temperatures are offloaded weekly (or as time permits) and sent to the Fish Passage Center (FPC). These temperatures are also graphed and displayed in the weekly status reports (see figure 16).

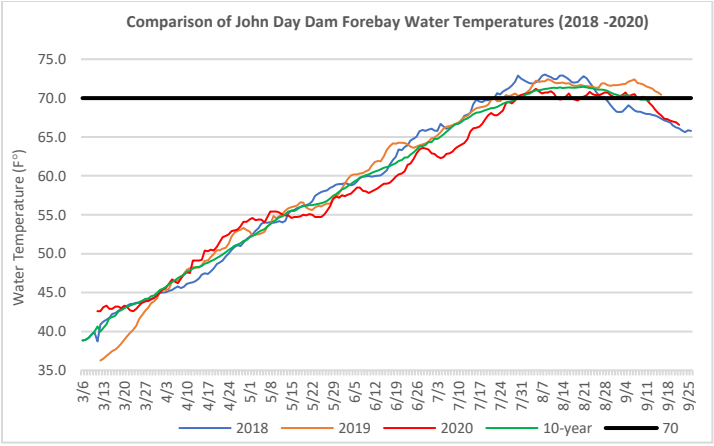


Figure 14: Average daily temperatures at JDA (2018 – 2020) measured by USDA temperature probes compared to the 10-year average. The black line represents the 70-degree threshold for juvenile sampling.

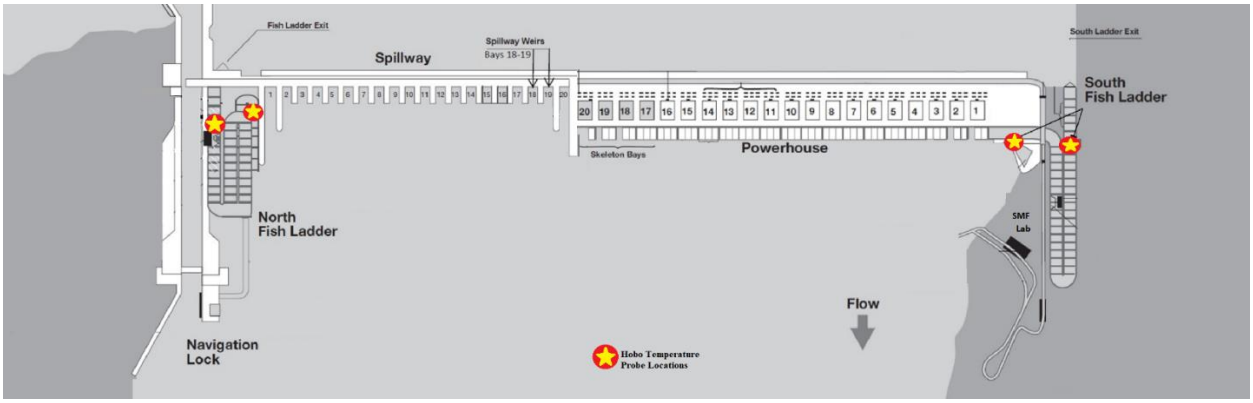
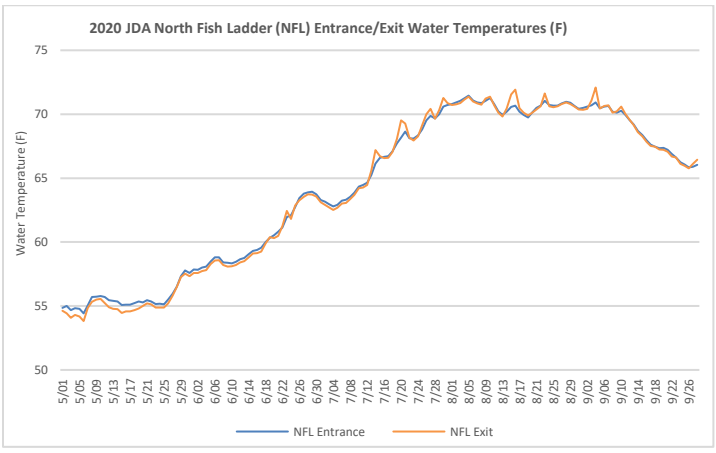


Figure 15: Water temperature probe locations at the John Day Dam project.



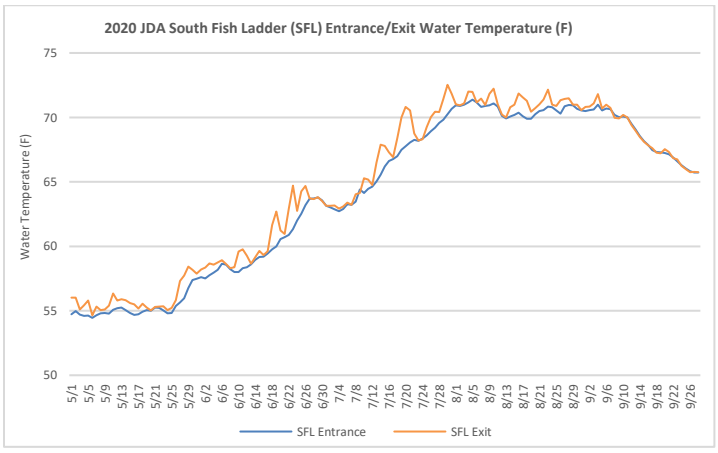


Figure 16: JDA Average Daily Water Temperatures at Both Fish Ladders (North and South), and for Both Entrances and Exits in 2020.

Water Clarity

A secchi disk was used to measure water clarity at the JDA north fish ladder (NFL) (just upstream from the count station) (see figure 17). Daily measurements are taken at the NFL for many reasons including ease of access, river conditions, and convenience. Unfortunately, due to water depth, the maximum obtainable measurement is 6-feet. The clarity is typically 6-feet except during the spring freshet when sediment washes out from upstream tributaries. Daily and average-weekly clarity readings are reported in the weekly status reports.

River Flow

Flow and spill data were obtained from the Fish Passage Center (FPC) (see figure 18 and 19 respectively). Total Dissolved Gas (TDG) data were obtained from USGS gauges located in the forebay and tailrace (see figure 20). Flow was mostly below the 10-

year average for the first part of the year until May when it more closely tracked the 10-year average until it peaked on June 2nd at 411.1 kilo cubic feet per second (kcfs). Spill for juvenile fish passage started April 10 and ended on August 31. Attraction spill for adults continued with spill bay 2 only (1.6 kcfs) through November. Spill was mostly higher than the 10-year average and coinciding with river flow, peaked on June 2nd at 209.7 kcfs. Similarly, tailwater TDG peaked on June 2nd at 125.

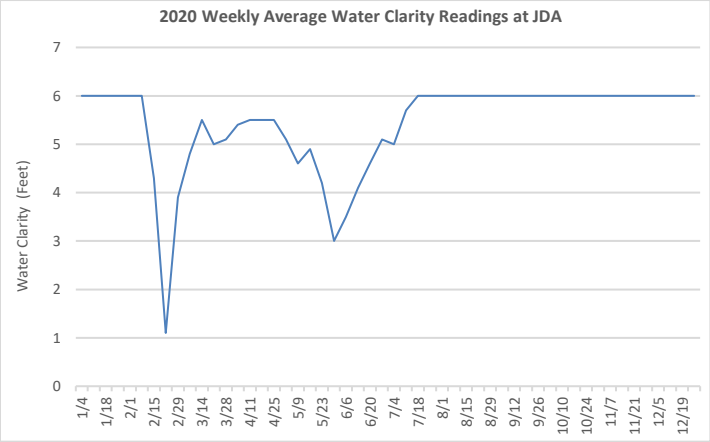


Figure 17: Average weekly water clarities taken from the John Day Dam north fish ladder (NFL) count station (south fish ladder when NFL is out of service for winter maintenance). The maximum obtainable measurement is 6-feet.

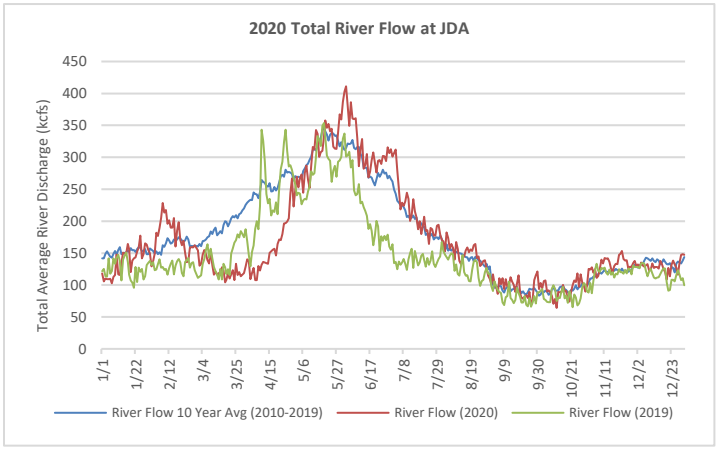


Figure 18: John Day Dam average daily total river discharge.

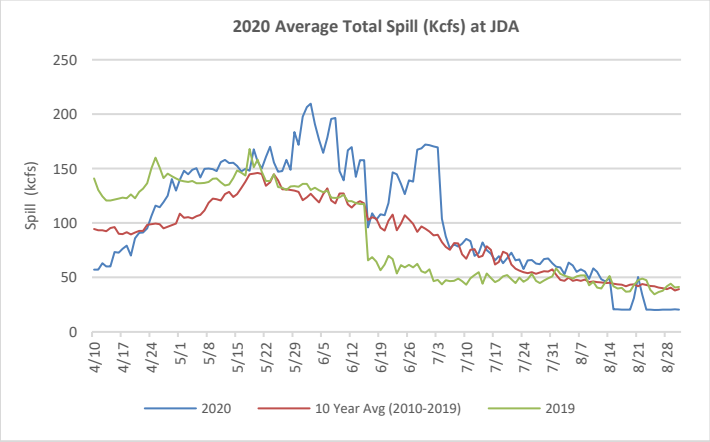


Figure 19: John Day Dam average daily total spill (kcfs) during the spring spill season.

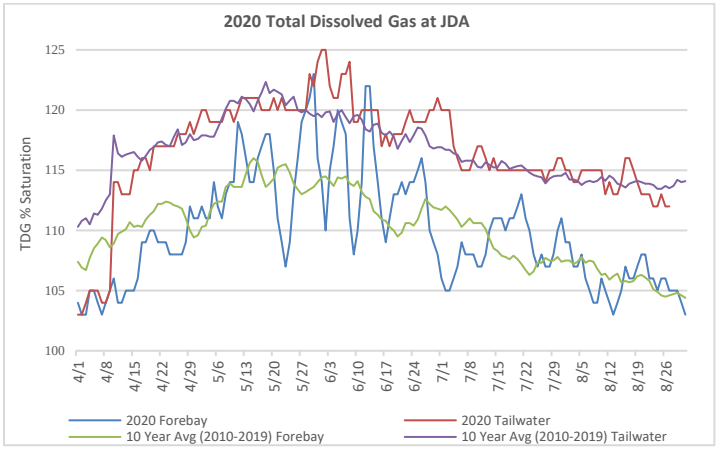


Figure 20: John Day Dam average daily total dissolved gas (TDG) during the spring spill season.

South Fish Ladder Collection Channel Velocities

JDF monitors water velocities from the SFL collection channel. Historically velocities were calculated by recording the travel time of floats down the length of the collection channel. The times were recorded at every 2nd monolith, and this revealed velocities along the entire channel. On July 7th, 2020 JDF began using a General Oceanics (model: 2030) velocity meter to obtain more accurate readings (see figure 21). Velocities are measured at 2-different locations, for at least 5-minutes, along the collection channel (Bays 4 & 12) (see figure 22). There were no time guidelines included with the meter, the times were established onsite.

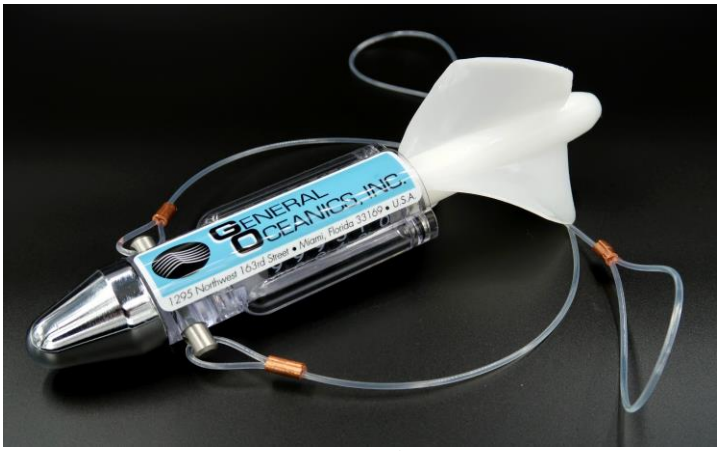


Figure 21: General Oceanics (model: 2030) flow meter used to measure the JDA south fish ladder collection channel velocities

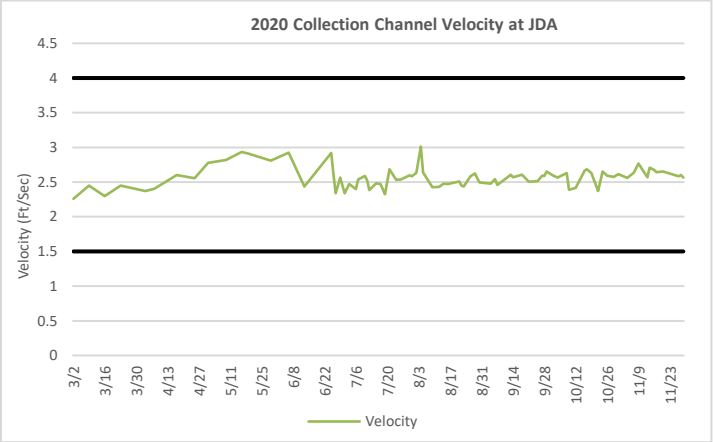


Figure 22: JDA SFL collection channel velocities during the 2020 adult fish passage season (Mar. 1st – Dec. 1st). Dark black lines represent the FPP criteria range of 1.5 - 4.0 feet per second (Ft/Sec)

COVID-19 Impacts

COVID-19 impacted John Day Fisheries during the 2020 fish passage season. Restrictions from the governors of Oregon and Washington and internal restrictions limited the number of staff present at the Smolt Monitoring Facility. During a typical year, condition sampling at the JDF occurs from April 1st (sometimes March 1st) until September 15th. During these time JDF personnel are present for 24-hours/day and 7-days/week while the facility is in "sample mode". Due to COVID-19 restrictions and reduced staffing at the SMF, the sampling strategy in 2020 was reduced to sampling fish every-other-day from the hours of 0700 to 1300 with a target of 300-500 fish per sample period. All other duties associated with the Fish Passage Plan (daily inspections) continued without interruption during the fish passage season. The 70° sampling procedures were unaffected.

Personnel from outside agencies also followed social distancing protocols. JDF halted sign-in procedures for guests to reduce exposures. Instead, guests called security when they were entering or leaving the project. All common areas were sanitized daily and between shift changes. All personnel wore facemasks when entering common areas. There was one case of an employee, from an outside agency, contracting COVID-19. Once discovered, all contacted surfaces were thoroughly disinfected by that agency and again by project personnel, and that person quarantined for two weeks. No other known cases occurred on site.

Discussion

The following are the highlights of 2020 JD Fish Passage Season:

- South AWS turbine 2 operated without any issues for the fifth year after its lower bearing/shaft were repaired in 2016. AWS turbine 1 remained as an emergency backup for either turbine 2 or 3 and was not needed for the 2020 fish passage season.
- JD South Fishway had fewer criteria violation in 2020 than in the 2019 passage season. The still well and aging tailrace sensor will be relocated to a more suitable location in the Spring of 2021. The fishway entrance weir (SE 1) was in Manual mode during the fish passage season requiring its frequent oversight and adjustment by JD Fisheries personnel.
- North Fishway performed exceedingly well, with only 2 minor OOCs in 2020 despite having 2 pump failures.
- Elevator 4, which access' the North fishway entrance deck and used for tribal translocation purposes, operated without any deficiencies following upgrades to its control switches in September of 2019.
- There were no failures of equipment at SMF in 2020. The SMF SCADA (supervisory control and data acquisition) system was replaced with new hardware components and a new in-house software system. The new system, at a cost of $500k, will be a much more reliable system to the outdated proprietary system.

Kudos to all John Day Maintenance, Operations, Natural Resources, and Fisheries personnel for their dedication and hard work on improving fish passage at John Day Dam during this difficult year. A special thank you goes to Michael Lotspeich and Laura Ricketts for putting this report together.

Research

Columbia River Inter-Tribal Fish Commission (CRITFC): Collected adult Pacific lamprey for the Tribal Pacific Lamprey Restoration Plan (TPLRP).

Confederated Tribes and Bands of the Yakama Nation: Collected juvenile Pacific lamprey for acoustic telemetry research.

Four Peaks Environmental Science & Data Solutions: Conducted fish ladder counts for the USACE Adult Fish Counting Program.

Oregon Department of Fish and Wildlife (ODFW): Ongoing BPA funded research associated with the northern pikeminnow (NPM) Management Program. Gut samples and biological data were collected from harvested NPMs for research purposes.

Oregon Department of Fish and Wildlife/ Fish Passage Center (FPC): Performed the monthly Fish Passage Operations and Maintenance (FPOM) directed inspections of all JDA adult and juvenile fishways (see the FPC's annual report.)

Pacific States Marine Fish Commission (PSMFC): Sampled juvenile salmonids, lamprey, and bycatch at the JDA SMF April 1st through September 15th. Additionally, PSMFC collected PIT tag readings from both fish ladders and the full-flow PIT tag detector.

Acronyms

AWPE: American White Pelican
AWS: Auxiliary Water Supply
FPP: Fish Passage Plan
JBS: Juvenile Bypass System
JDA: John Day Project
JDF: John Day Fisheries
LPS: Lamprey Passage System
LTS: Lamprey Trapping System
NFL: North Fish Ladder
OOC: Out of Criteria
SMF: Smolt Monitoring Facility
SCADA: Supervisory Control and Data Acquisition
SFL: South Fish Ladder
DCCO: Double-Crested Cormorant
BRZ: Boat Restricted Zone
TDG: Total Dissolved Gas
KCFS: Kilo Cubic Feet per Second
NPM: Northern Pikeminnow
PIT: Passive Integrated Transponder
TSW: Top Spillway Weir
USDA: United States Department of Agriculture

Approved by Brett Call, John Day/ Willow Creek Operations Manager