2022 ANNUAL FISHWAY STATUS REPORT

THE DALLES DAM

January 2023
The Dalles fisheries
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INTRODUCTION

The Dalles Dam has specific requirements for Columbia River fish passage included in the annual Fish Passage Plan. The Dalles Dam has two fish ladders for upstream adult fish passage, as well as an ice trash sluiceway and spillway used for juvenile fish and downstream steelhead kelt passage. The following document is a summary of all fish passage system operation that occurred at The Dalles Dam in 2022 In addition Northern Wasco Co PUD owns and operates a small turbine that supplies auxiliary water to the north fishway, which has a complete juvenile bypass system. Information on this system can be acquired through Pacific States Marine Fish Commission weekly and annual monitoring reports.

The following are dates fish passage systems were in service during 2022;

East Adult Fishway – In service 1/9/22 thru 12/5/22

North Adult Fishway – In service 2/17/22 thru 1/8/23

Ice/Trash Sluiceway – Open for fish passage 3/1/22 thru 12/15/22

Spillway - Open for fish passage 4/10/22 thru 8/30/22

FISHWAY DEWATERING PROCEDURES

Dewatering fishways provides the best opportunity for maintenance and inspection. To dewater the fishladders, exit bulkheads are installed and the ladder is allowed to drain. Entrance bulkheads are installed and dewatering pumps operated to dewater all areas of fishways below tailwater elevation. Fisheries personnel enter these areas to salvage trapped fish when water levels allow safe entry. Fish are pushed toward tailwater or captured. Captured fish are transported to forebay or tailwater, depending on location, fish species, age class and stress levels. A follow up inspection is made to capture missed fish. Efforts are made to provide continual water supply during the entire operation to reduce fish stranding and stress. Fishway areas that cannot be dewatered are inspected by ROV underwater camera.

Dewatering Fish Salvage Results

Navlock Dewatering 2/6/22 – Seven very old steelhead mortalities found on navlock floor.

North Fishladder 1/11/22 – 1 adult steelhead, 14 lamprey and 3 sturgeon removed and released to river

North fishladder entrance 1/12/22 – no fish found

East Fishladder 12/6/22 – 1 adult/5 juvenile steelhead, 10 sturgeon and 300 northern pikeminnow removed and released to river. Approximately 500 northern pikeminnow mortalities due to stranding atop grating.

East Lower Channels – Not dewatered

MAINTENANCE ACCOMPLISHMENTS AND PLANS

-East exit control weir 155 removed for failure damage repairs.
-East exit weirs 155 and 154 lamprey orifices (1.5”x12”)cut into bottom corners of weirs per PDT direction
-Removal of JP2 and JP4 weirs and gearboxes due to lack of need. Investigating need for JP6.
-North fishway rock wall reinforcement repair awaiting budget approval.
-Annual vegetation removal north fish ladder postponed. Looking into hiring contractor.
-New fishway entrance and exit weir automation replacement completion target Feb 2023.
-East exit oil boom reinstalled with upgraded attachment slide rails.
-Engineer evaluation of east fishway diffuser valves to determine future rehab plan.

-Fish units now getting aquatic vegetation buildup. Required shutdown mid summer. Resurrecting old fish unit rake system for future anticipated need.

Historical Overview of Fishway Modifications

~1985 -East fishladder count station and weir modifications
~1985 – North fishladder exit and weir modifications
~1990 – N Wasco PUD turbin installed for generation from attraction flow
~1997 – North AWS plunge pool rock reinforcement mining straps
~1997 – South and north unused side entrances poured concrete wall
~2000 – Occlusion plates installed on sluicegates FU1-MU3 (failed passage improvement)
2000 – Fishway automation PLC installation
~2000 – Sluiceway surface collector tested
2000 – Closure of all powerhouse floating orifice gates
2001 – Grating replacement north fishway entrance
~2002 – spillway vortex supression device tested
2000 - East Fishway Dewatering Improvements (added pumps, new dewater bulkheads, new entrance weirs)
~2003 – J frame modification to occlusion plates (failed passage improvement again, removed several years later)
~2005 – Entrance weir extensions to prevent continued cable failures
2006 – Spillway 1-9 new wire ropes and gearboxes
~2007 – Spillwall 7/8
2010 - Spillwall 8/9
2010/11 – Grating replacement east fishway Junction pool, east entrance, west entrance, south entrance
2010 – Count stations pickets raised 1.5" (lamprey improvement)
~2012 – East exit weir 159 weir rehabilitation
2012 – Floor ramps for lamprey installed in floor of 2 east ladder weir steps
2013 – East exit weir 158 replaced with 2 leaf design
2014 – Floor plating over grating for lamprey improvement installed in orifices of lower east ladder weirs
2015 – East fishway Auxiliary Water System backup system
2017 – East ladder exit FCQ7 power supply replacement
2017 – Entrance weir rounded caps for lamprey improvement
2019 – East exit derelict guides plated for lamprey improvement
2020/23 – Fishway automation PLC and level sensor replacement
2022/23 – Exit weir 154-157 lamprey orifices added

Inspection Discussion

The following inspection results show relative steady state for most fishway areas. Notable changes to fishway operation include;
-East count station pickets weed buildup likely from missing exit floating oil boom. Reinstalled this winter.
-North PUD intake differential considerable less from last year due to PUD doing more frequent rake operation.
-East fishway exit weir 155 hoist damaged due to limit failure. Forebay restriction helped maintain criteria .

Inspection Criteria Comparison Chart								
	2022		2021		2020		2019	
The Dalles Dam	Total #	%	Total #	%	Total #	%	Total #	%
Number of inspections	641	100%	691	100%	933	100%	882	100%
NORTH FISHWAY	out of criteria		out of criteria		out of criteria		out of criteria	
Exit differential	0	0	0	0.00%	0	0.0%	0	0%
Count station differential	0	0	0	0.00%	0	0.0%	12	1.4%
Weir crest depth	0	0	0	0.00%	0	0.0%	2	0.2%
Entrance differential	0	0	0	0.00%	0	0.0%	0	0.0%
Entrance weir N1	0	0	0	0.00%	0	0.0%	0	0.0%
Entrance weir N2	0	0	0	0.00%	0	0.0%	0	0.0%
PUD Intake differential	31	4.8%	100	14%	56	6.0%	17	1.9%
EAST FISHWAY								
Exit differential	NA	NA	1	0.10%	0	0.0%	0	0.0%
Removable weirs 154-157	2	0.3%	9	1.30%	7	0.8%	39	4.4%
Weir 158-159 differential	15	2.3%	16	2.30%	19	2.0%	11	1.3%
Count station differential	38	5.9%	0	0.00%	0	0.0%	0	0.0%
Weir crest depth	17	2.7%	10	1.40%	8	0.9%	8	0.9%
Junction pool weir JP6	0	0	0	0.00%	0	0.0%	0	0.0%
East entrance differential	8	1.2%	6	0.80%	10	1.1%	81	9.2%
Entrance weir E1	0	0	0	0.00%	0	0.0%	7	0.8%
Entrance weir E2	7	1.1%	18	2.60%	0	0.0%	65	7.4%
Entrance weir E3	5	0.7%	14	2.00%	0	0.0%	59	6.7%
Collection channel velocity	16	2.4%	2	0.30%	0	0.0%	1	0.1%
West entrance differential	0	0	10	1.50%	9	1.0%	119	13.5%
Entrance weir W1	5	0.8%	12	1.70%	0	0.0%	113	12.8%
Entrance weir W2	2	0.3%	10	1.50%	0	0.0%	114	12.9%
Entrance weir W3	0	0	0	0.00%	0	0.0%	0	0.0%
South entrance differential	9	1.4%	8	1.10%	9	1.0%	114	12.2%
Entrance weir S1	17	2.6%	20	3.00%	0	0.0%	118	13.4%
Entrance weir S2	26	4.0%	22	3.10%	6	0.6%	117	13.3%
JUVENILE PASSAGE					0			
Sluicegate operation	0	0	0	0.00%	13	1.4%	7	0.8%
Turbine trashrack drawdown	0	0	0	0.00%	0	0.0%	0	0.0%
Spill volume	NA	NA	NA	NA	0	0.0%	0	0.0%
Spill Pattern	NA	NA	NA	NA	1	0.1%	0	0.0%
Turbine Unit Priority	NA	NA	NA	NA	215	23.0%	187	21.2%
Turbine 1% Efficiency	NA	NA	NA	NA	0	0.0%		0.1%

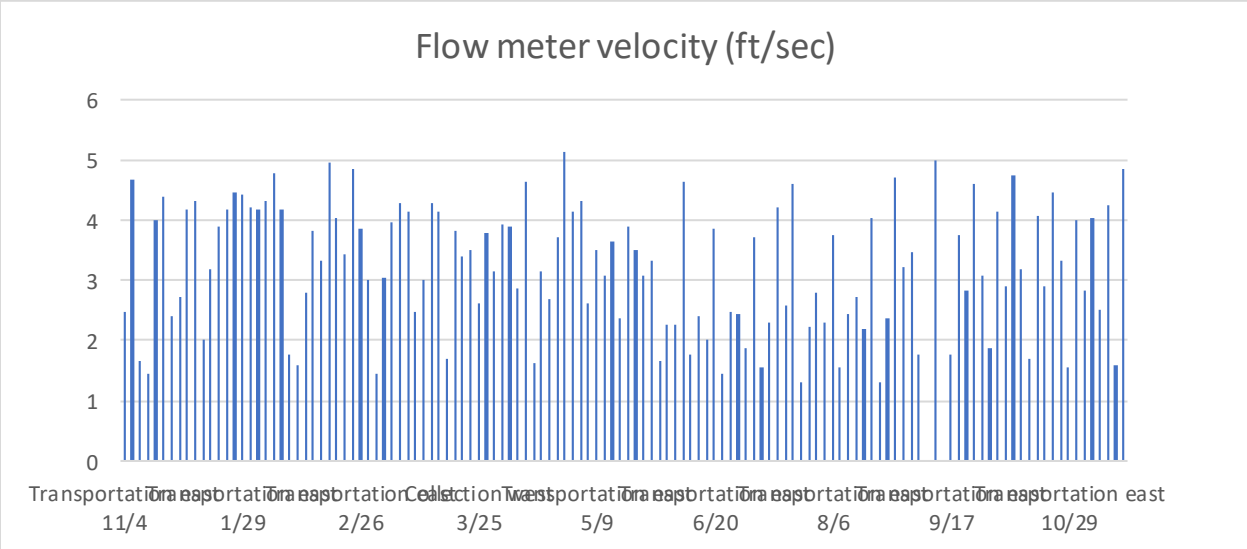
AQUATIC VEGETATION CONCERN

In mid July the fish units stopped providing sufficient flow. Fish units were shutdown overnight to clear suspected debris resulting in return to normal operation. More frequent gatewell differential monitoring started. An ROV inspection of the intake trashrack was made in August revealing high level of aquatic vegetation coverage. A follow up ROV inspection was made in Janruary to see if coverage persisted, but all trashracks were clear. Plans to resurrect the derelict fish unit trashrack rake in case a similar problem occurs next season.

This incident is the only recorded time of fish unit trashrack plugging. We suspect there is a change in aquatic vegetation volume and/or species resulting in higher intake loading.

WATER VELOCITY

Velocity measurements taken with new flow meter at multiple locations. South entrance channel had consistently higher than 4 fps. All other areas were mostly within criteria range.



GATEWELL/INTAKE TRASH RACK DEBRIS MONITORING

Gatewell drawdowns are a frequent measurement of water level between forebay and gatewell used to determine turbine intake trashrack debris loads. As in previous years, all maintained well within the criteria limit (+ or – 0.5'). The Dalles dam is unique to other dams in that gatewell drawdown measurements have not been found out of criteria, nor has gatewell debris been a problem. No juvenile salmonid mortilities were recorded during passage season in 2022. Gatewell orifices are being permanently closed due to the absence of screens and conservation of water. This is done as units become available and workload allows. Forty two of 70 orifices have been closed.

Intakes at the AWS and the Fish Units (FU) experienced problems with aquatic weed debris plugging. Regular monitoring was intiatiated to account for preventive maintenace due to plugging of these intakes. No raking was available at these locations, so periodic shutdown of FU and AWS was used to flush weed debris from intake screens.

WATER QUALITY

Temperature monitoring with data loggers in each fishway is provided weekly in the fishway status reports. Additional monitoring will be done to determine differences from upper to lower ladder as anlyized by FPC. The following graph is a compilation of weekly readings collected by data loggers in the east and north fishladders. Readings are taken immediately upstream of the count stations and the lower entrance area of each ladder Please refer to link using The Dalles as destination. [The Dalles Ladder Temperatures]

CALIBRATION

Calibration (comparing digital display and staff gauge readings vs tape measure or laser) checks on all water levels and movable weirs/gates done weekly to assure accuracy. Maintenance is notified when they are found off by more than + or -0.3'. Human error and weather conditions are factored into the results and sometimes leave voids in data table below (mechanical problems in yellow, spill related problems in blue).

	1/2/2022	1/3/2022	1/20/2023	1/26/2023	29-Jan	8-Feb	15-Feb	26-Feb	8-Mar	14-Mar	23-Mar	29-Mar	4-Apr	11-Apr	23-Apr	3-May	9-May	18-May	23-May	1-Jun	10-Jun	15-Jun	17-Jun	29-Jun	5-Jul	19-Jul	27-Jul	10-Aug	23-Aug	31-Aug	27-Sep	5-Oct	19-Oct	13-Nov
1 no crite	no data	0.59	0.59	no data	0.65	0.82		0.71	0.78	0.81	0.81	no data	0.77	0.88	0.57	0.21	0.15	0.15	0.24	0.26	0.16	no data	0.2	0.36	0.4		0.3	1	0.19	0.18	0.26	0.59		0.9
E2	no data	0.35	0.35	no data	0.39	0.6		0.45	0.43	0.51	0.55	no data	0.6	0.65	0.47	-0.16	-0.28	-0.56	-0.46	-0.72	-1.3	no data	-0.76	-0.88	no data		-0.42	-0.26	-0.36	-0.14	-0.14	0.07		0.5
E3	no data	0.86	0.86	no data	0.89	0.78		0.89	1	0.86	0.81	no data	0.82	0.85	0.59	0.07	0.1	0.06	0.19	0.08	0.03	no data	0.1	0.11	no data		0.03	0.36	0.04	0.17	0.17	0.28		1
W1	no data	no data	no data	0.22	0	0.02		0.34	0.1	0.01	0.28	no data	0.24	0.1	-0.02	-0.12	-0.31	-0.03	-0.27	0.19	-0.17	no data	-0.29	-0.18	-0.29		-0.03	0.05	-0.16	-0.25	0.12	-0.11	0.13	0.22
W2	no data	no data	no data	0.8	0.4	0.4		0.49	0.55	0.43	0.38	no data	0.45	0.4	-0.32	0.17	0.09	0.17	-0.29	0.22	0.15	no data	-0.04	0.1	0.24		0.19	0.21	0.32	0.23	0	0.43	0.67	0.72
3 no crite	no data	no data	no data	-0.06	0.03	0.15		0.09	0.12	0.12	0.12	no data	0.21	0.28	0.19	-0.11	-0.25	0.07	0.07	-0.09	-0.09	no data	-0.14	-0.09	-0.22		-0.12	-0.12	-0.09	-0.12	-0.12	0.28	0.18	0.52
S1	no data	0.13	0.13	no data	0.28	0.19		0.19	0.37	0.15	0.34	no data	0.22	0.24	0.1	-0.15	no data	-0.21	-0.18	-0.3	no data	no data	-0.21	-0.14	-0.2		no data	-0.32	-0.41	-0.49	0.33	-0.08	0.56	0.3
S2	no data	0.32	0.32	no data	0.44	0.4		0.46	0.68	0.48	0.44	no data	0.77	0.48	0.42	0.25	no data	0.27	0.39	0.36	no data	no data	0.18	0.51	0.33		no data	0.27	0.4	0.2	-0.33	0.54	0.69	1
N1	no data	0	0	no data		0.1	0.1	0.17	0.31	0.47	0.37	0.12	0.12	0.57	0.09	-0.07	0.04	0.05	0.06	-0.03	no data	no data	-0.18	-0.08	0.08		no data	-0.03	0.08	-0.11	-0.04	0.29	0.29	0.3
W159	no data	no data	no data	0.3	0.3	0	0	0	0.6	0.4	0.4	0.5	0.3	0.3	0.2	0.3	0.4	0.4	0.1	0.1	0.1	no data	0.1	0	0	0.2	0.2	-0.1	0.1	-0.12	0.1	0.1	0.1	0.1
158	no data	no data	no data	0.3	0.3	no data	no data	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.3	0.3	0.2	0.3	0	-0.1	-0.1	no data	0		0.1	0	0	0	0	0.01	0	0	0	0
E Chan	no data	no data	no data	no data	0	no data	no data	-0.14	-0.05	0	-0.08	no data	-0.09	-0.06	-0.2	0.01	-0.2	-0.12	0.63	0.26	-0.02	no data	0.07	-0.08	0.01		-0.1	-0.2	-0.42	-0.08	-0.17	0.02	no data	0.4
E TW	no data	no data	no data	no data	0.04	no data	no data	-0.1	0.32	-0.06	-0.03	no data	0	0.05	-0.09	-0.02	-0.02	-0.14	-0.23	-0.72	-0.11	no data	-0.01	-0.02	-0.18		-0.09	0	-0.1	0.05	-0.18	0.04	no data	0.5
W Chan	no data	0.01	0.01	0.2	-0.11	no data	no data	0.23	0.11	-0.06	-0.03	no data	-0.13	-0.07	-0.08	-0.04	-0.21	-0.07	0.57	0.08	-0.17	no data	0.03	-0.26	-0.03		-0.06	-0.1	-0.09	-0.12	-0.16	-0.1	-0.03	-0.2
W TW	no data	0.04	0.04	no data	0.05	no data	no data	0.11	-0.12	0.06	-0.14	no data	0.01	-0.1	0.04	0.01	-0.08	-0.04	0.97	0.19	-0.39	no data	0.05	-0.23	-0.03		-0.09	0	0.06	-0.03	-0.15	-0.1	-0.1	0
S Chan	no data	-0.2	-0.2	no data	-0.1	no data	no data	-0.16	-0.27	-0.19	-0.29	no data	-0.36	-0.17	-0.23	-0.4		-0.04	-0.31	0.22	no data	no data	no data	-0.17	-0.15		no data	-0.3	-0.27	-0.26	-0.18	-0.3	-0.14	no data	
S TW	no data	-0.4	-0.4	no data	-0.24	no data	no data	-0.21	-0.23	-0.27	-0.38	no data	-0.38	-0.02	-0.74	-0.96		-0.89	-0.3	-0.09	no data	no data	no data	-0.6	-0.5		no data	-0.3	-0.14	-0.29	-0.45	-0.41	-0.39	-0.3	
N Chan	0.1	no data	no data	no data	no data	no data	no data	-0.19	-0.01	0.13	-0.08	no data	0.03	0.03	-0.08	-0.12	-0.26	0.24	-0.27	-0.3	no data	no data	-0.25	-0.41	0.02		no data	0	-0.3	-0.24	-0.23	-0.2	-0.19	-0.2
N TW	0	no data	no data	no data	no data	no data	no data	0.14	0.09	0.14	0.26	no data	0.2	0.23	-0.07	0.15	0.11	0.5	-0.38	0.36	no data	no data	-0.82	0.4	-0.33		no data	0.3	0.28	0.5	0.07	0.1	0.14	-0.3
																				-0.03														
E FB	no data	no data	no data	0	0	0	no data	-0.1	0	-0.1	-0.1	no data	-0.1	0	0	-0.2	0.2	-0.3	0.4	0.1	0	no data	0.2	0	-0.1	0.3	-0.3	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
N FB	-0.11	no data	no data	no data	no data	no data	no data	0.5	-0.1	-0.1	0	no data	0.1	0	-0.2	-0.1	-0.2	0	0.1	0	0	no data	0.2	0	0	no data	no data	0	no data	0	0.1	0.1	no data	no data

Calibration Discussion

Out of calibration readings that require maintenance are indicated by highlight. Out of calibration that was likely the result of high tailwater, wind or other environmental factor was highlighted. Season 2022 had 94 out of calibration recorded due to inability to adjust moving gates at east entrance (no events out of criteria). Repairs were done in December 2022 dewater period that should greatly improve the reliability of these gates. Prior seasons totals include; 2021 = 58, 2020 = 16, 2019 = 46, 2018 = 63, 2017 = 127, 2016 = 32, 2015 = 24, 2014 = 22 and 2013 = 28.

Installation of new automation system scheduled for early 2023.

AVIAN PREDATION

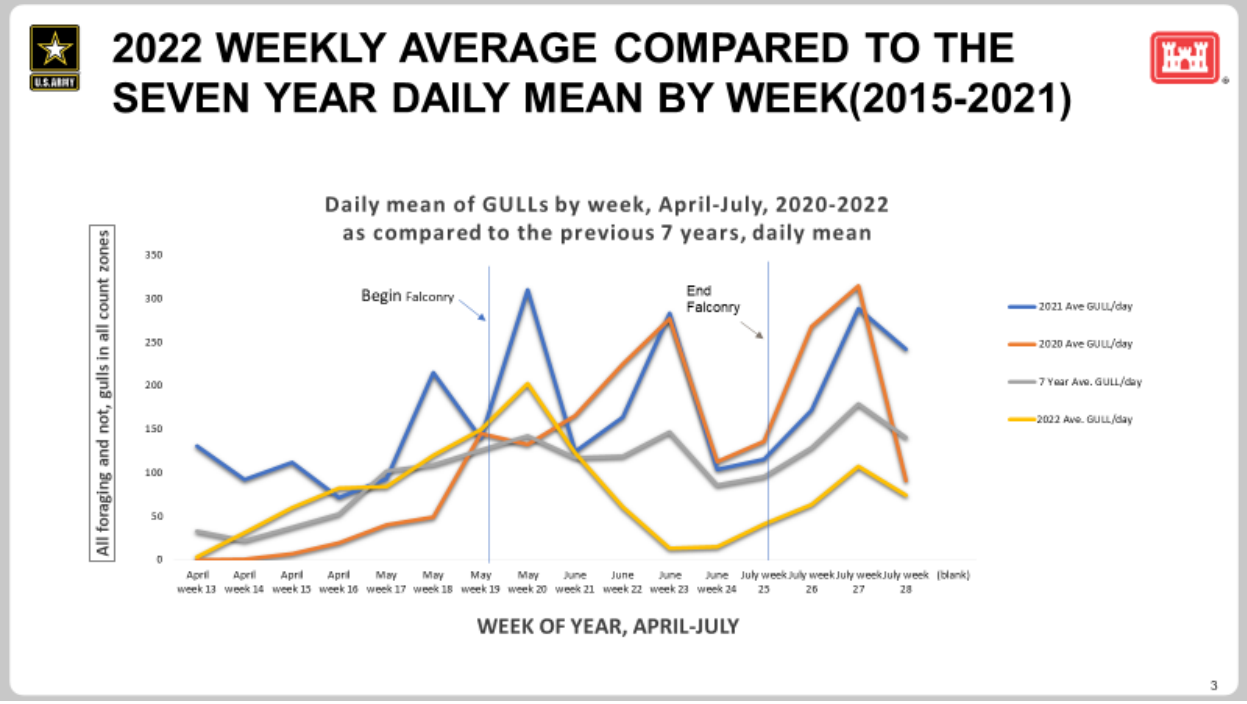
The three main piscivorous birds observed at The Dalles during juvenile salmonid migration are California gulls, double crested cormorants and American white pelicans. The United States Department of Agriculture (USDA) was contracted to provide avian hazing abatement via pyrotechnics from April 16 – July 31 for gulls and cormorants only. Hazers were present during all daylight hours. Generally, hazing by boat occurred the first half of the day (8hrs), then hazing continued from the peninsula downstream of the Dalles bridge (SW4, 6 hrs). There were periods of time that hazers could not use pyrotechniques due to barges and/or heavy wind days. High spill volumes in 2022 may have effected avian predation. USDA did not target pelicans due to lack of authorization.

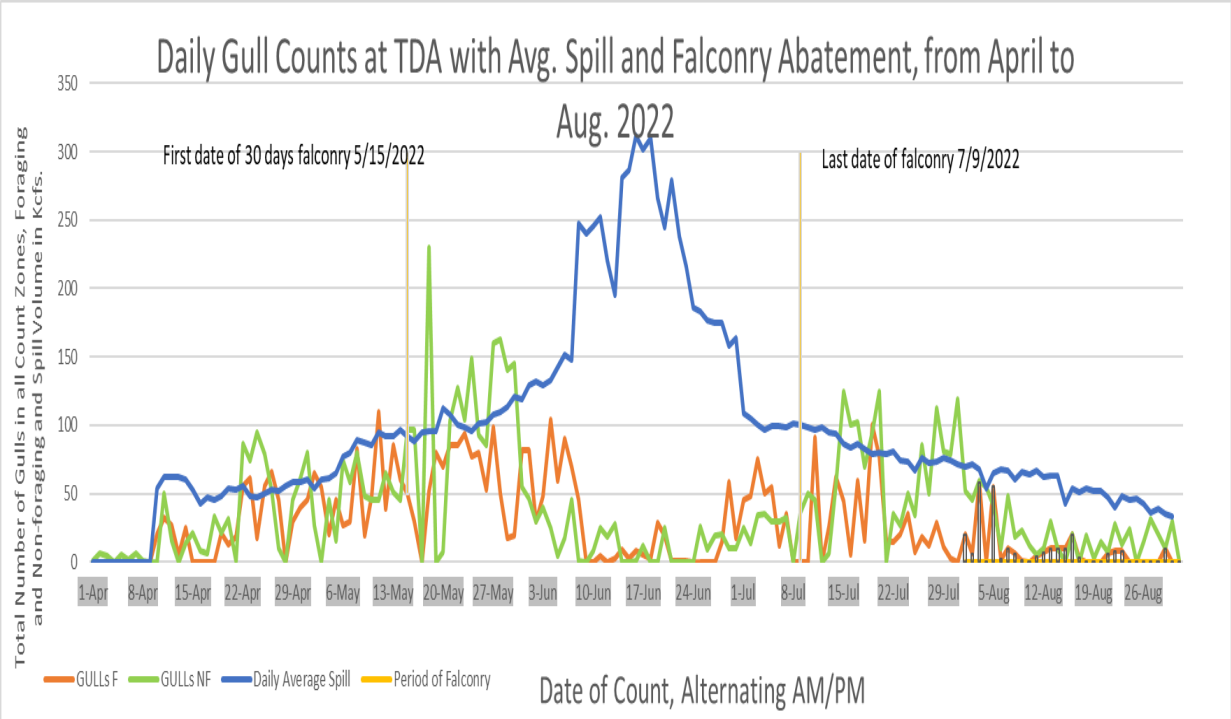
USDA hazers concentrated deterrents in zones upstream and downstream of the US-197 bridge but made frequent visits to east ladder entrances, 180 bend and east exit to use pyrotechnics to deter great blue herons and cormorants. Shortages of ammunition, staff and vessel breakdowns limited hazing efforts at times.

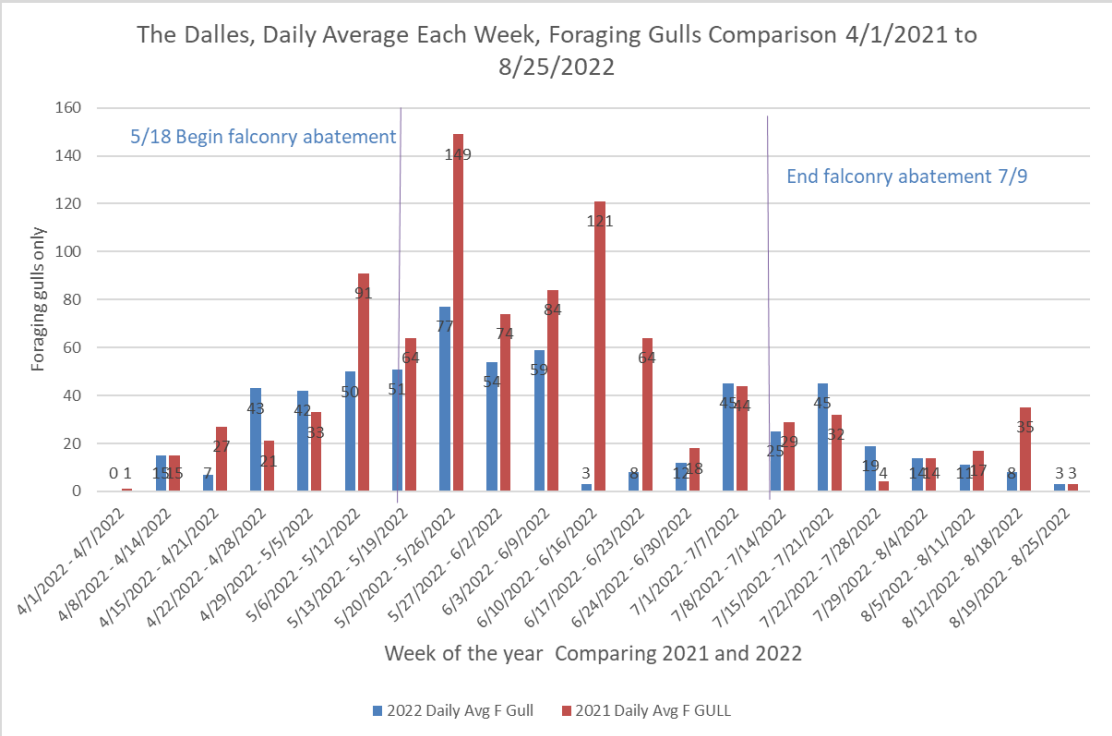
BRING ON THE FALCONS

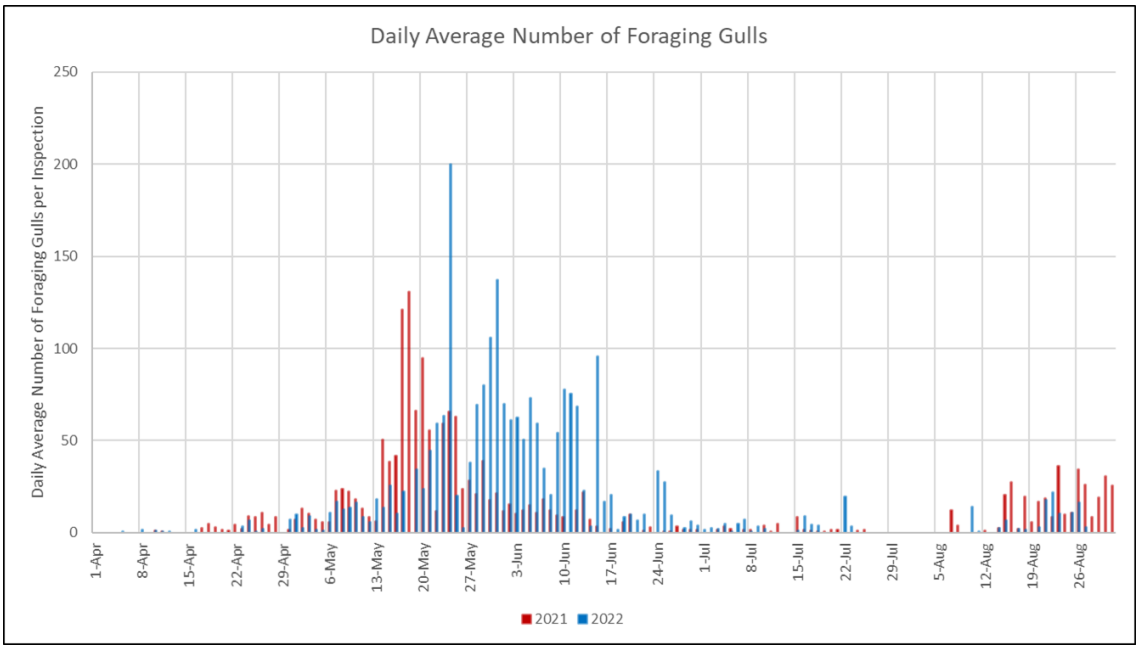
Contract process began Sept. 2021 to hire falconer to provide service in early April, 2022. Contracting delays led to the beginning of falconry abatement on project not starting until May 18th, 2022 and lasted 30 days.. Contractor Sky Guardian arrived to find gull numbers were around 100 or more actively feeding and many non-foraging on project. The following graphs show possible affect of falcon abatement, However understanding there are numerous other variables, we intend to start falconry in early April 2023 for a second year (60 days) of testing. USDA pyrotechnics boat crews coordinated closely with falconry contractor to assist with boat transport onto lone pine island west to deter gulls from non-foraging areas. Effort was concentrated into 3-5 days continuous falconry abatement, with intervals of 2-3 days of no falconry to allow for falcons/hawks recovery. This is normal practice in falconry abatement and should be further coordinated with USDA periods of activity and restrictions due to weather or maintenance issues.

This falconry abatement effort coincided with significant declines in foraging and non-foraging gulls at The Dalles project in 2022. Pelicans were not targetted for abatement until July by falconer when thay began to enter the east exit and upper weirs of the east ladder. Results indicated that falconry abatement was effective on pelicans when targeted.




Daily Gull Counts at TDA with Avg. Spill and Falconry Abatement, from April to Aug. 2022
First date of 30 days falconry 5/15/2022
Last date of falconry 7/9/2022
Total Number of Gulls in all Count Zones, Foraging and Non-foraging and Spill Volume in Kcfs.
350
300
250
200
150
100
50
0
1-Apr
8-Apr
15-Apr
22-Apr
29-Apr
6-May
13-May
20-May
27-May
3-Jun
10-Jun
17-Jun
24-Jun
1-Jul
8-Jul
15-Jul
22-Jul
29-Jul
5-Aug
12-Aug
19-Aug
26-Aug
GULLs F
GULLs NF
Daily Average Spill
Period of Falconry
Date of Count, Alternating AM/PM

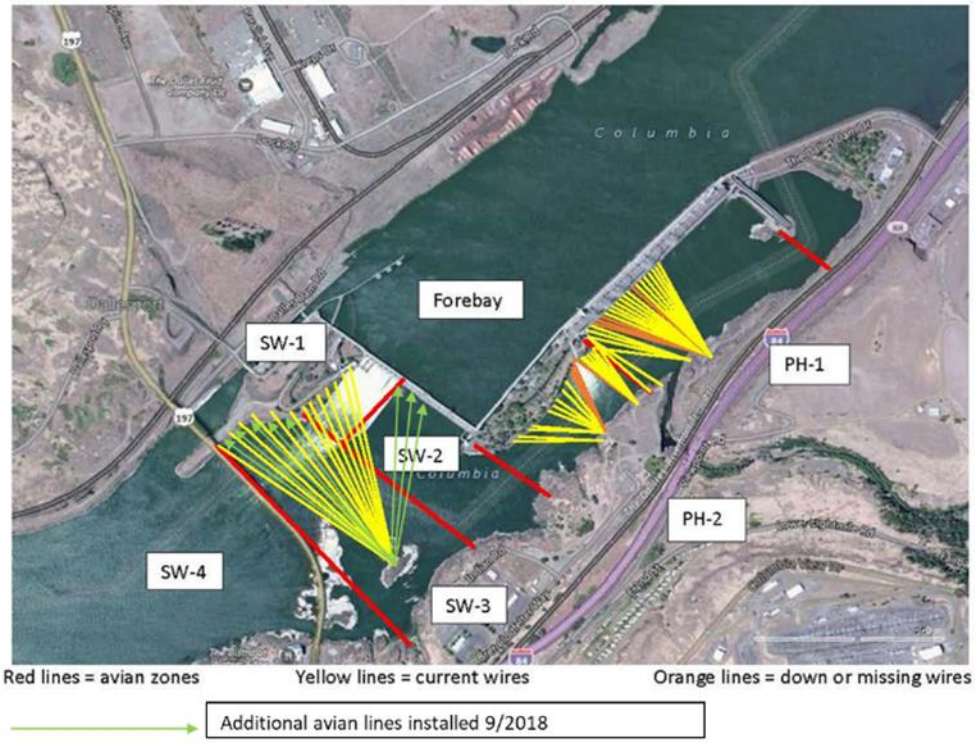

The Dalles, Daily Average Each Week, Foraging Gulls Comparison 4/1/2021 to 8/25/2022
5/18 Begin falconry abatement
End falconry abatement 7/9
Foraging gulls only
160
140
120
100
80
60
40
20
0
0 1
15 15
7 27
43 21
42 33
50 91
51 64
77 149
54 74
59 84
3 121
9 64
12 18
45 44
25 29
45 32
19 4
14 14
11 17
9 35
3 3
4/1/2022 - 4/7/2022
4/8/2022 - 4/14/2022
4/15/2022 - 4/21/2022
4/22/2022 - 4/28/2022
4/29/2022 - 5/5/2022
5/6/2022 - 5/12/2022
5/13/2022 - 5/19/2022
5/20/2022 - 5/26/2022
5/27/2022 - 6/2/2022
6/3/2022 - 6/9/2022
6/10/2022 - 6/16/2022
6/17/2022 - 6/23/2022
6/24/2022 - 6/30/2022
7/1/2022 - 7/7/2022
7/8/2022 - 7/14/2022
7/15/2022 - 7/21/2022
7/22/2022 - 7/28/2022
7/29/2022 - 8/4/2022
8/5/2022 - 8/11/2022
8/12/2022 - 8/18/2022
8/19/2022 - 8/25/2022
Week of the year Comparing 2021 and 2022
2022 Daily Avg F Gull
2021 Daily Avg F GULL



Comparison of foraging gull counts at The Dalles and John Day projects in 2021 with no falconry abatement, and 2022 with falconry abatement 30 day trial at The Dalles only. Both projects have california and ring-bill gulls that are likely nesting on Miller Rocks located between the projects. Daily counts at The Dalles during the 2022 falconry abatement show a significant reduction in foraging gulls within 1 week of beginning. The table below shows this annual comparison, while the following table shows the same time periods at John Day project with significantly higher foraging gull counts in 2022, than in the previous year 2021. Its possible that the increase in abatement, along with other factors, at The Dalles or John Day relocated those foraging gulls to the John Day project in 2022.

Avian lines

Existing lines only show some deterrent effect on some Gull species. Lines do NOT deter pelicans, cormorants, mergansers, eagles, grebes and bonaparte's gull. While lines may move Gulls away from feeding hotspots, this may only serve to enable pelicans and cormorants to dominate in hotspot feeding areas. Avian lines are also installed and maintained as needed, though mylar or other streamers cannot be maintained due to cost and maintenance issues. See figure for avian line locations. Lines were added (in green) in 2018 for more effectiveness through variable spill ranges but no monitoring of has been done and incidental monitor and daily counts do not show regular deterrence of Gulls. Partial netting was effectively applied over east fishladder weirs downstream of the 180 bend to deter up to 15 great blue herons. Monitoring was increased, that included daily counts by shore hazing staff as well as routine pyrotechnic hazing and falconry abatement on the east ladder.

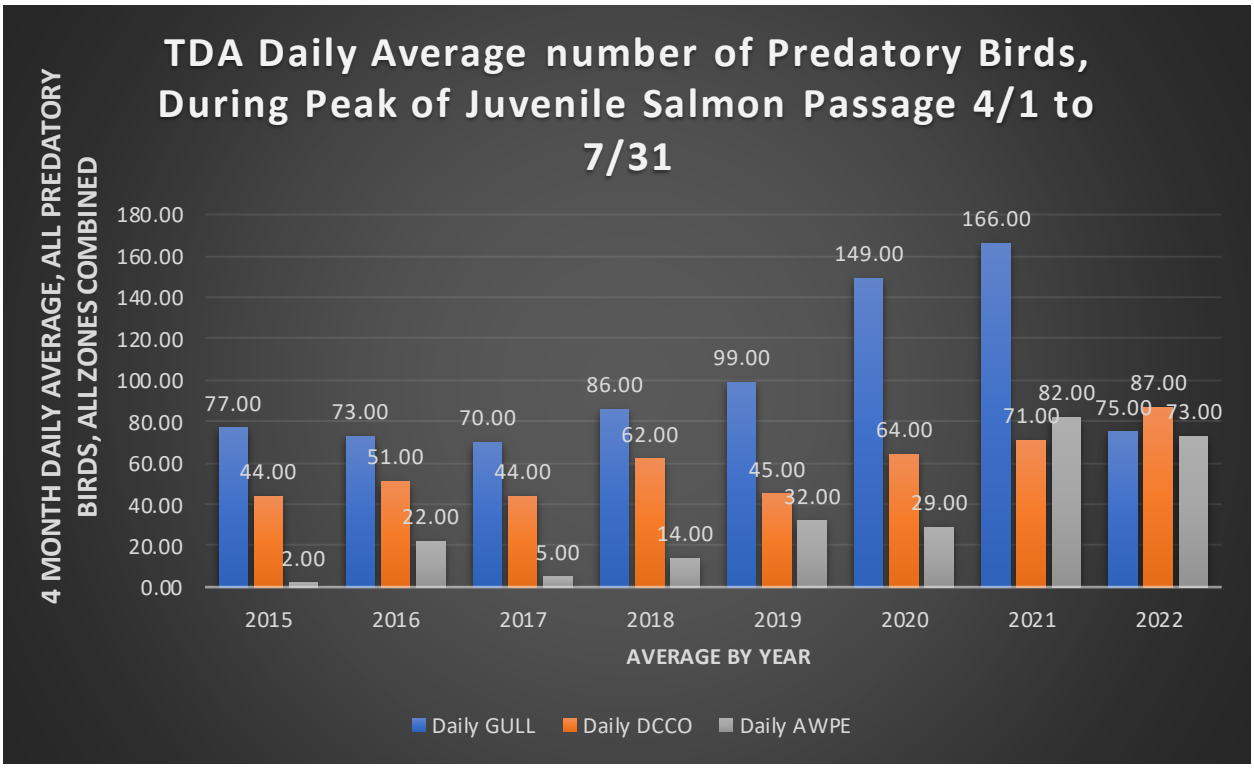


Laser

Agrilaser (handheld laser) use was used infrequently, again in October, 2022, and limited to targeting cormorants. Agrilaser use continued during the winter months 2021/2022 to deter breeding cormorants from nesting on forebay powerline towers. After April 2021 the green laser was ineffective at deterrence and nesting continued, increasing to 65 attempts. After June 2022, nests on BPA towers appeared to fledge young.

AVIAN TRENDS

Daily counts were performed once daily by USACE fisheries staff alternating morning and afternoon observations. In addition USDA staff performed counts once a day, and generally found more cormorants in certain areas. Inconsistencies in training and methodology limit their use in this analysis. The graph below shows the reversal in the GULL counts trend in June 2022 during falconry abatement trial of 30 days



This table above compares the average number of the three key salmon predator birds at the Dalles counted daily in zones alternating morning and afternoon counts. While cormorants increased slightly, in the last couple of years the numbers of gulls (california and ring-billed) were reduced significantly compared to previous years while numbers of pelicans were reduced slightly compared to 2021. Cormorants continued to increase largely due to the breeding colony on BPA towers on project and their ability to avoid most abatement efforts.

PIT Tag Recovery / Data Upload

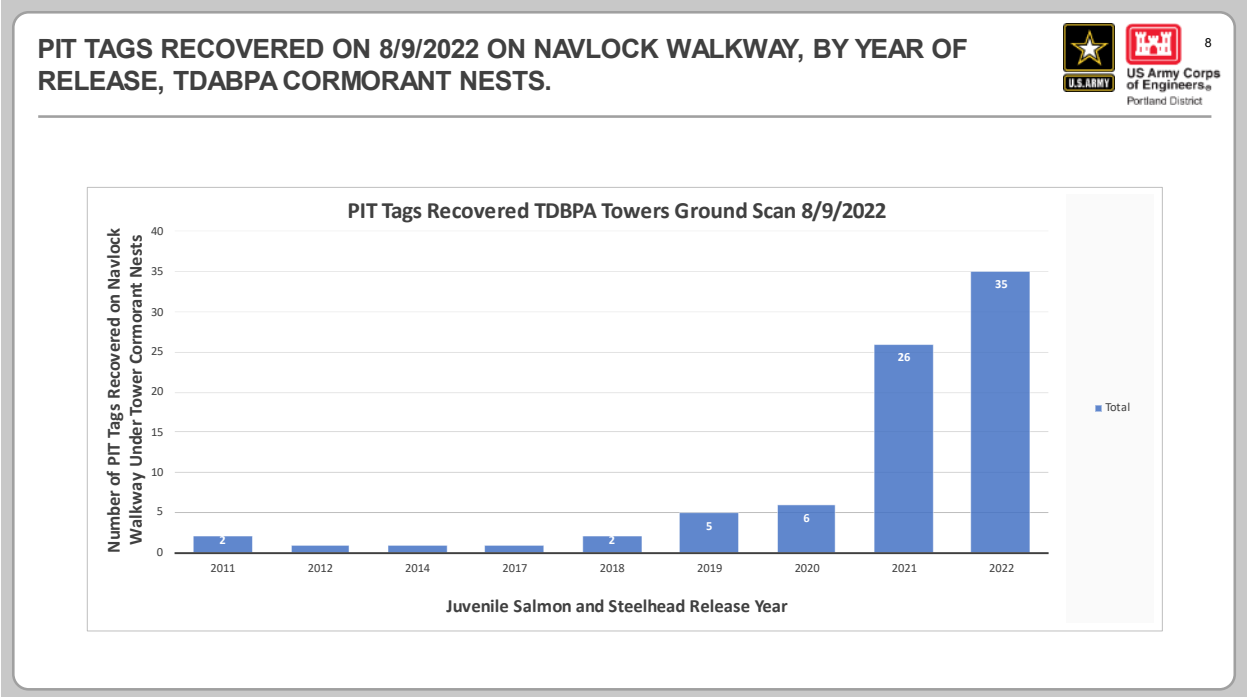
In order to study the impact of predatory birds on juvenile salmon a biomark PIT tag scanner was used to search areas in SW4, PH1 and within the east fish ladder while de-watered. Areas known to have tags deposited in previous years were searched and few new tags were detected, or recovered in 2022. Shoreline areas with resting pelicans and cormorants appeared to have fewer gulls present and in general there were fewer gulls in daily counts in 2022.

Further analysis of the tag histories and locations are underway. Ground scans were conducted in late 2020-2022 during east ladder dewatering and in January/February of 2021 on islands near dam. Scanners were again used to search common avian predator resting areas adjacent to feeding areas with sand and rock substrates in July 2022. Tags found on downstream islands are most abundant at known avian predator resting locations and were all salmon and steelhead.

Two avian colony sites were created with the help of PTAGIS staff and Real Time Research. Sites created are (TDALP-Lone Pine island) and (TDATMI-Three Mile Islands). Tag recoveries from east ladder will be uploaded to existing site TDAMRT that has records of tags associated with the pikeminnow dam angling program recoveries including tags recovered from small mouthed bass. Only one new PIT tag was recovered during east ladder dewater in Dec. 2022. PIT tags recovery from the udstream Heron colony 2021 have not been uploaded to ptagis.org.

PIT tags were recovered in March 2022 along the walkway leading out to the BPA towers a long the north upriver guidewall to the navigation lock. This is a known cormorant breeding colony with in excess of 65 nests attempted in 2022 from April to July. The area was scanned again in April, May, August and December 2022. A total of 79

recoveries were found on the walkway, peaking in late July, after cormorants breeding, had left the nests on BPA towers unattended. A new site breeding colony was created at PTAGIS.org called TDBPAT. The walkway is only 8' wide and is bounded by a curb on the south side. The vast majority of area under the towers if over water and not scannable.



Avian Discussion 2022

Project fisheries staff provided daily avian counts for the entire year. The highest bird counts were on the spillway side of the dam downstream of The Dalles US-197 bridge (SW4). The majority of resting birds were cormorants in the forebay (FB) often perched on the forebay transmission towers near the Washington shore and pelicans perched on the rock islands upstream of the bridge (SW4). Daily counts were highly variable, but compared to the 2015 daily average observed during fish passage season (4/1-8/31), mean gull numbers reversed the trend in recent years and were close to the normal range of 76 total gulls per day in 2015. California and ring-bill gulls did not return to project to feed on immature shad in Nov./Dec. Daily mean number of cormorants increased from 71 in 2021 to 87 in 2022. We are hoping BPA install physical barriers to nesting on their towers. We will employ falconry abatement in March of 2023 at comorant nest sites.

Pelicans daily mean numbers declined from 82 in 2021 to 73 in 2022. Other fish eating birds in small numbers included: great blue herons, grebes, mergansers, osprey and bald eagles. Great blue herons may have some salmonid predation as PIT tag recoveries at nearby Brown's (Rabbit island) show salmonids taken from nearby tirbutaries near The Dalles Dam. Grebes were observed in the summer along with pelicans but the vast majority of grebes and mergansers were in the fall and winter months during the juvenile shad outmigration. There continues to be high numbers of bald eagles overwintering in Westrick Park, feeding primarily on post-spawn adult shad. Previous studies have shown no impact with avian lines.report. Monitoring in 2023 intends to evaluate interactions of gull lines and gulls as well as falconry abatement and pyrotechnic deterrence. Efforts are being made to increase the avian abatement success within agency guidelines. Avian lines were maintained, hazing schedule is scrutinized and other means, such as falconry abatement are being persued. The use of lethal removal at the dam has been requested by project since 2015 when the evidence of alarming PIT tag numbers was found on Miller rocks gull colony. This action is still working through NEPA Environmental Assessment in hopes of spring 2023 approval.

NEARBY GULL BREEDING COLONY

Little Miller Island, Columbia River, RKM 331 is a well known nesting colony of 5-6000 breeding California gulls and to lesser extent ring-bill gulls located east of Miller Island upstream of the mouth of the Deschutes river. Daily counts of gulls at The Dalles and John Day likely reflect increased feed requirement of those breeding adults from April to June each year. Since 2015, PIT recovery efforts from the island has revealed substantial predation on ESA listed salmonid species, a proportion of which come form below The Dalles and John Day Dams. Tribal efforts were made to reduce the number of breeding birds on Miller rocks in March/April 2022 but were not likely fully successful. Initiative is underway to repeat this effort in 2023 with the possible addition of lethal removal.

Zebra/Quagga Mussel Monitoring

Six mussel samples were collected in 2022. No *Dreissena* mussels were detected during USACE and PSU early detection monitoring throughout the Columbia River Basin in 2022. Monitoring was focused on water bodies with a high to medium likelihood of *Dreissena* mussel introduction and/or establishment during the period of expected peak mussel spawning based on water temperature (July – September). Sampling also occurred in June and October to account for the uncertainty associated with predicting mussel spawning and water temperatures. The Dalles staff contributed 6 of the basin wide samples in 2022.
2022 Final Report, Steve Wells, Aquaticus LLC Rich Miller, Catherine de Rivera, and Mark Sytsma
Portland State University

SEA LIONS

-No sightings in tailrace during 2022

RESEARCH

The following are a list of fish related research and contract personnel that were on site during the 2021 passage season;

Sky Guardian – Falconry contractor conducted 30 day trial of avian abatement.

4 Peaks – Fish counting contractors performed fish counts at the north and east fishways via count stations.

Washington Dept of Fish and Wildlife – Conducted Pikeminnow dam angling primarily from powerhouse tailrace deck. Total 650 pikeminnow removed. Bass and Walleye continue to be released.

Oregon Dept of Fish and Wildlife –Captured, tagged, and collected biological data from northern pikeminnow as part of an evaluation of the Northern Pikeminnow Management Program.

Oregon Department of Fish and Wildlife and Fish Passage Center – Continued to provide once monthly fishway inspections of adult and juvenile systems.

Pacific States Marine Fish Commission – FERC required sampling at the Northern Wasco County PUD intake structure as per the Coorperative Agreement between Pacific States Marine Fisheries Commission and Wasco County PUD.

Pacific States Marine Fisheries Commission PTAGIS Information System – monitored Thin Wall PIT Tag detection system in The Dalles east and north count stations.

U.S. Dept of Agriculture – Provided avian hazing of piscivorous birds to reduce avian predation on juvenile salmonids May to August via pyrotechnics during juvenile passage season.

U. S. Geological Survey – Total Dissolved Gas (TDG) and water temperature monitoring.

CTUIR - Captured adult Pacific lamprey as part of the on-going project to restore lamprey to various tributaries.

END OF REPORT

Approved by; Ron Twiner, Operations Project Manager, The Dalles Dam