2014 ANNUAL FISHWAY STATUS REPORT

THE DALLES DAM

Date: Jan, 2015

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INTRODUCTION

The Dalles Dam has specific requirements for Columbia River fish passage, which are specified in the annual Fish Passage Plan. The Dalles Dam has two fish ladders for upstream adult fish passage, and an ice trash sluiceway and spillway that are used for downstream juvenile fish passage. The following document is a summary of all fish related activities that occurred at The Dalles Dam in 2014. In addition Northern Wasco Co PUD has a turbine that supplies auxiliary water to the north fishway, which has a complete juvenile bypass system. Information on this systems operation can be acquired through Pacific States Marine Fish Commission.

FISHWAY OPERATING SCHEDULE

The following information includes fish passage system operation for calendar year 2014. Total length of time for annual fishway outages can be determined by referring to previous years' annual reports. These fishways were closed or dewatered for maintenance when they were not in operation.

East Fishway in operation; Jan 1 – Jan 31
East Fishway attraction water off half day for midseason ROV grating inspection Aug 4

North Fishway in operation, Jan 1- Feb 3 and Mar 1 – Dec 30
North Fishway attraction water off half day for midseason ROV grating inspection Aug 4

Ice Trash Sluiceway (6 sluicegates) open for juvenile passage Apr 1 – Dec 1
Ice Trash Sluiceway (4 sluicegates) open for juvenile passage Mar 1 – Mar 31 and Dec 1 – Dec 15

Spillway open for juvenile passage Apr 10 – Aug 31

DEWATERING FISH SALVAGE

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 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 any 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.

THE DALLES DAM FISH LADDER DEWATERING RESULTS

Key; adult=a, juvenile=j, carp=cp, catfish=ca, sculpin=sp, shad=sh, small mouth bass=smb, crappie=cr, pikeminnow=pm, whitefish=wf

Date	Event	Chinook	Steelhead	Sockeye	Coho	Lamprey	Shad	Sturgeon	Other	Comments	Morts
2/4/14	N. upper	5j	0	0	0	18	0	0	0	None	0
12/2/14	E. upper	20a	130a, 32j	0	0	27a	0	2j, 3a	0	1.)	below
12/4/14	E. lower	0	0	0	0	0	0	0	0	None	0
12/10/14	E. lower	2a	0	0	0	0	0	0	1wf	2.)	0

1.) 2 hatchery steelhead, 1 wild steelhead, 1 hatchery Chinook, 1 hatchery Coho, and 1 adult lamprey mortalities.

2.) 1 clipped steelhead, 1 hatchery steelhead, and 1 whitefish released to tailwater.

TURBINE DEWATERING PROCEDURES

Turbines are dewatered for routine overall maintenance or occasional forced outages. These usually entrap low numbers of fish, due in part to unit operational guidelines, which include running unit at full load and immediate tail log installation after unit shut down. If a turbine unit fails, dewatering guidelines cannot always be followed, which can result in higher numbers of fish entrapment. Fish removal from these areas has a greater fish stress risk due to handling. Procedures are continually analyzed to determine the best method for preventing fish stress or loss. Fish are removed from scroll case (sc) and draft tubes (dt) by fish bags. If numbers of fish require more than three bags, transport tanks are placed in the draft tube gallery for transport by crane. Fish are released to tailwater as soon as possible.

THE DALLES DAM TURBINE DEWATERING RESULTS

Key; adult=a, juvenile=j, scroll case=sc, draft tube=dt, catfish=ca, sculpin=sp, crappie=cr, small mouth bass=smb

Date	Event	Chinook	Steelhead	Sockeye	Coho	Lamprey	Shad	Sturgeon	Other	Comments	Mort's
1/21/14	MU4sc	0	0	0	0	0	0	0	0	none	0
1/21/14	MU4dt	0	0	0	0	0	0	0	0	none	0
3/25/14	MU22sc	0	0	0	0	0	0	1	6sp	none	0
3/25/14	MU22dt	0	0	0	0	2a	0	1	4sp	none	0
5/20/14	MU20sc	0	0	0	0	0	0	0	0	none	0
5/28/14	MU20sc	0	0	0	0	0	0	0	1 ca	none	0
7/22/14	MU14sc	0	0	0	0	0	9 dead	2 good	0	none	shad
7/22/14	MU14dt	0	0	0	0	0	0	1 good	4 ca	none	0

When a unit is taken out of service for maintenance, the cooling water strainers are sometimes disassembled. Due to the concern of juvenile lamprey entrainment and the threat of zebra/quagga mussels, this area is inspected. Fisheries staff was not always notified when these are disassembled. Therefore it has been put into the preventative maintenance program as a reminder to maintenance staff.

MAIN TURBINE UNITS THIRD FLOOR COOLING WATER STRAINERS

Date	MU	Lamprey	Quagga Mussels	Zebra Mussels	Comments
2/5/14	SS1	0	0	0	None
3/2/14	Navlock	0	0	0	1 steelhead
3/24/14	MU22	12juv	0	0	None
6/2/14	MU20	6	0	0	None
12/3/14	FU1	0	0	0	None

Dewatering Fish Salvage Discussion

Efforts are made to prevent any fish mortalities. When mortalities occur, procedures are analyzed to determine how to correct for future dewaterings.

2011 - 2014 FISHWAY INSPECTION COMPARISON

Two fishway inspections were conducted per day during the adult fish passage season (March 1 to November 30). One fishway inspection was conducted per day during the non- passage season. A status monitor was installed in the fisheries office showing real time and 24hour information of the operation of east entrances, east ladder and north ladder. This information is recorded as a third inspection. Equipment calibration, gatewell inspection and drawdown's are also part of the inspection program. Guidelines are provided by the COE Fish Passage Plan. Weekly fishway status reports are provided to fish managers throughout the year. Status information is also provided at monthly Fish Passage Operation and Maintenance meetings. Comparisons are made with prior 3 years to track how equipment has been performing.
Fishway inspection data:

Inspection Criteria Comparison Chart	2014		2013		2012		2011	
The Dalles Dam	Total #	% OOC	Total #	% OOC	Total #	% OOC	Total #	% OOC
Number of inspections	917		894		907		689	
NORTH FISHWAY								
Exit differential	0	0.0%	0	0.0%	0	0.0%	1	0.1%
Count station differential	0	0.0%	1	0.1%	0	0.0%	0	0.0%

Weir crest depth	4	0.4%	5	0.6%	1	0.1%	3	0.4%
Entrance differential	1	0.1%	1	0.1%	0	0.0%	2	0.3%
Entrance weir N1	1	0.1%	0	0.0%	0	0.0%	0	0.0%
Entrance weir N2	0	0.0%	0	0.0%	0	0.0%	0	0.0%
PUD Intake differential	0	0.0%	13	1.5%	2	0.2%	5	0.7%
EAST FISHWAY								
Exit differential	0	0.0%	1	0.1%	0	0.0%	0	0.0%
Removable weirs 154-157	10	1.1%	12	1.3%	5	0.6%	24	3.5%
Weir 158-159 differential	7	0.8%	1	0.1%	1	0.1%	5	0.7%
Count station differential	3	0.3%	1	0.1%	0	0.0%	4	0.6%
Weir crest depth	3	0.3%	5	0.6%	1	0.1%	5	0.7%
Junction pool weir JP6	2	0.2%	11	1.2%	13	1.4%	5	0.7%
East entrance differential	11	1.2%	8	0.9%	7	0.8%	12	1.7%
Entrance weir E1	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Entrance weir E2	3	0.3%	0	0.0%	0	0.0%	0	0.0%
Entrance weir E3	17	1.9%	0	0.0%	0	0.0%	1	0.1%
Collection channel velocity	0	0.0%	0	0.0%	0	0.0%	0	0.0%
West entrance differential	14	1.5%	12	1.3%	5	0.6%	5	0.7%
Entrance weir W1	21	2.3%	1	0.1%	0	0.0%	2	0.3%
Entrance weir W2	21	2.3%	2	0.2%	0	0.0%	2	0.3%
Entrance weir W3	0	0.0%	1	0.1%	0	0.0%	0	0.0%
South entrance differential	35	3.8%	11	1.2%	9	1.0%	3	0.4%
Entrance weir S1	30	3.3%	7	0.8%	2	0.2%	13	1.9%
Entrance weir S2	37	4.0%	9	1.0%	4	0.4%	4	0.6%
JUVENILE PASSAGE								
Sluicegate operation	25	2.7%	27	3.0%	70	7.7%	10	1.5%
Turbine trashrack drawdown	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Spill volume	63	6.9%	50	5.6%	144	15.9%	81	11.8%
Spill Pattern	1	0.1%	0	0.0%	0	0.0%	1	0.1%
Turbine Unit Priority	93	10.1%	58	6.5%	125	13.8%	20	2.9%
Turbine 1% Efficiency	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Inspection Discussion;

Areas with greater than 1% criteria violation are indicated in red. The following are details on these data;

-Removable weirs 154 – 157 was similar to last year, but still considerably less than prior years. Weir 156 was primary problem and was usually only out of sequence by 0.1'.

-East entrance and west entrance differentiasl were simlar to previous years and setpoints were adjusted as needed.

-East entrance E3 weir was sticking in guide and had to be set in manual. E1 was operated in auto to compensate.

-West entrance weirs were out more than previous years for several reasons; one fish unit operation in February for four weeks, August fish unit 1 was out of service due to leaking oil cooler, Fish unit 2 was forced out of service due to a lower guide bearing cooler leak. Entrance weirs and differentials for the east, west and south were affected by both fish units out of service.

-South entrance differential and entrance weirs were also out more than previous years due to one fish unit operation in February and fish unit 1 out of service and 2 forced out of service due to leaking oil cooler and lower guide bearing cooler leak respectivly.

-Sluicegate operation was similar to previous years.

-Spill volume and turbine prioirity were out similar to previous years.

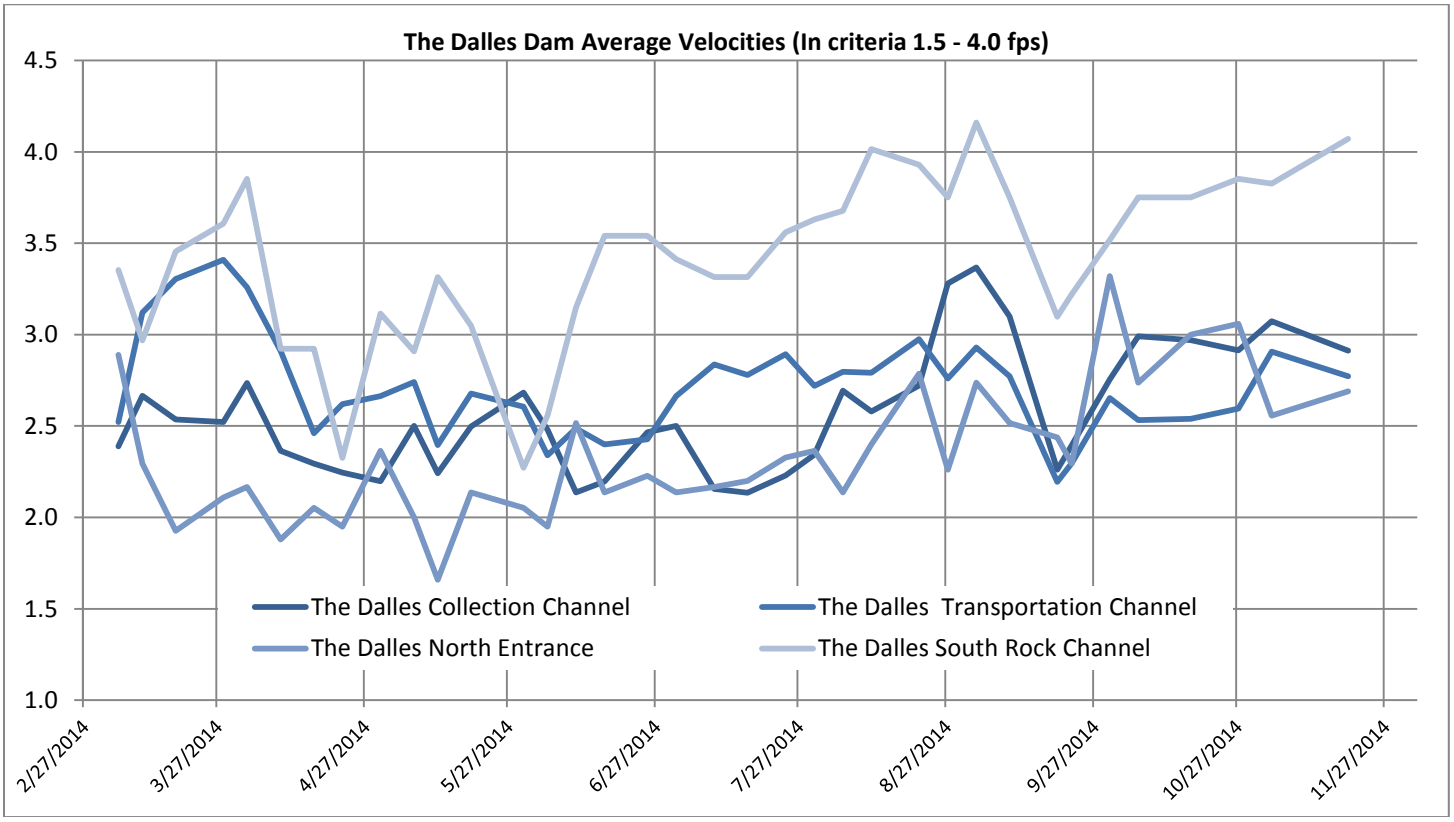
MAINTENANCE ACCOMPLISHMENTS AND PLANS

1) All entrance weirs, used diffusers and count station equipment has been inspection and had preventative maintenance as needed.

2) Additional securing strapping was installed during '13/'14 winter outage season due to concerns with brittle brass attachement studs.
3) Entrance weir W1 wheels were replaced with new plastic composite wheels to reduce stainless/mild steel corrosion. This will reduce the weir guide wear that has been noticed over the past several years. New wheels are also being installed on W2, E2 and E3 during winter '14/'15.
4) A new weir was constructed for 158 and installed during winter '14/'15. Design was modified from 3 leaves to 2 leaves and plastic wheels and skin plate was used.
5) Three of 6 collection channel dewatering pumps were pulled for rehab. Two others are stuck and cannot be removed.
6) Forebay deck leakage into gallery over electrical panel for east exit was partially repaired. Deck drains were flushed to decrease standing water. Expansion joints were re sealed.
7) East exit power source FCQ7 panel will be replace as funding allows. Preparatory gallery work was done winter of '14/'15.
8) Collection channel diffusers (58) are all closed and no longer needed. Long term plan is for permanent closure and valve assembly removal. This is low priority and will depend on funding. No planning of design have been made to date.
9) North fishway rock walls failing. This is both a fishway concern and a personnel safety concern. A district Product Development Team being formed for repair alternatives and planning.
10) North fishway vegetation grown into rock walls require removal each year to prevent more rock failure.

Calibration checks on all water level stillwells and weirs are done weekly to assure accuracy. Maintenance is notified when they found off by more than 0.3'. Human error and weather conditions is factored into the results. Overall, entrance weirs, channel stillwells and tailwater stillwells showed an improvement over last year.

Gatewell drawdowns to determine turbine intake trashrack debris loads are also checked weekly. As in previous years, all maintained well within the criteria limit. No gatewell drawdown measurements have been found out of criteria to date.



Water Velocity Discussion

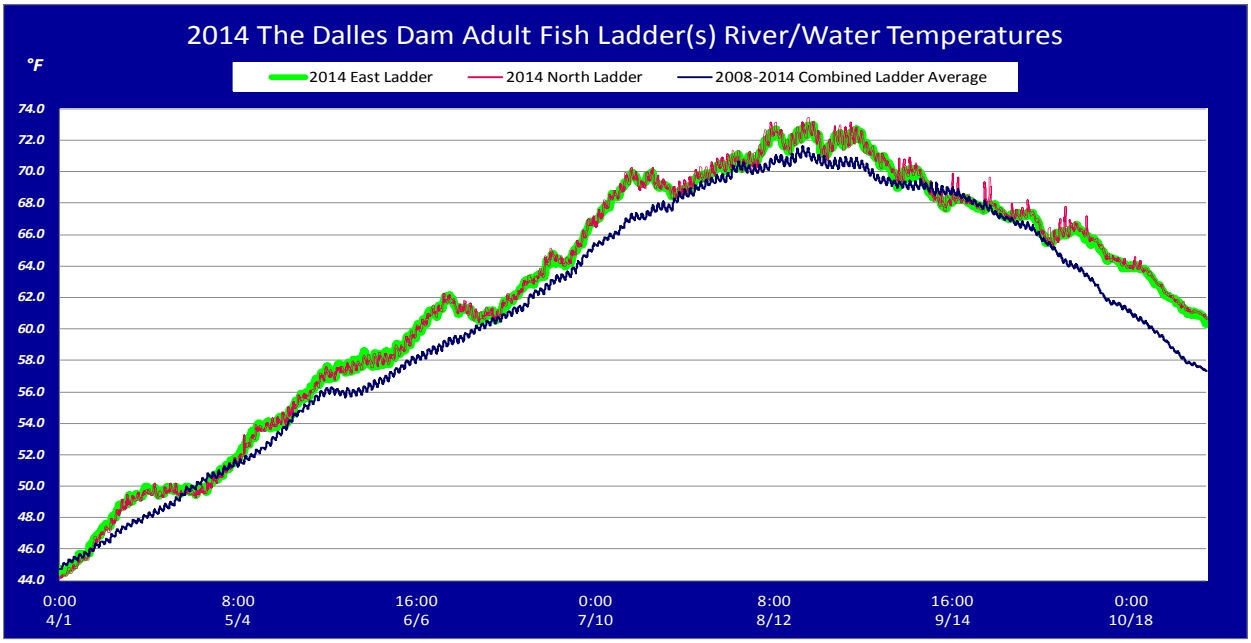
Fishway channel water velocities were measured three times weekly during Adult Fish Passage Season (Mar1 – Dec 1). Wood floats were timed through all fishway channels that are supplemented by auxiliary water and results were provided in the project weekly fishway status report. Criteria velocities of 1.5 to 4 fps were maintained throughout the fish passage season. Velocities were not always taken at unit 22 due to turbulence preventing float tracking. Velocity is generally slower from junction pool to unit 21. Past University of Idaho analysis did not reveal passage problems in this area.

FISH COUNTING

Visual fish counting was conducted 4/1/14 to 10/31/14 by Normandeau Environmental Consultants contract. Counts were loaded to the COE website. Video counting was performed during the off season. Refer to Corps of Engineers 'Annual Fish Passage Report' 2014 for fish count and comparison to previous years. A video counting test is being planned for the north count station in attempts to use latest video/computer technology for more efficient and accurate fish counting. This can result in substantial cost savings over the present program. Preparation for the test to occur winter of 2014/15. Test to occur March and November 2015 so there is no intereference with present visual counting.

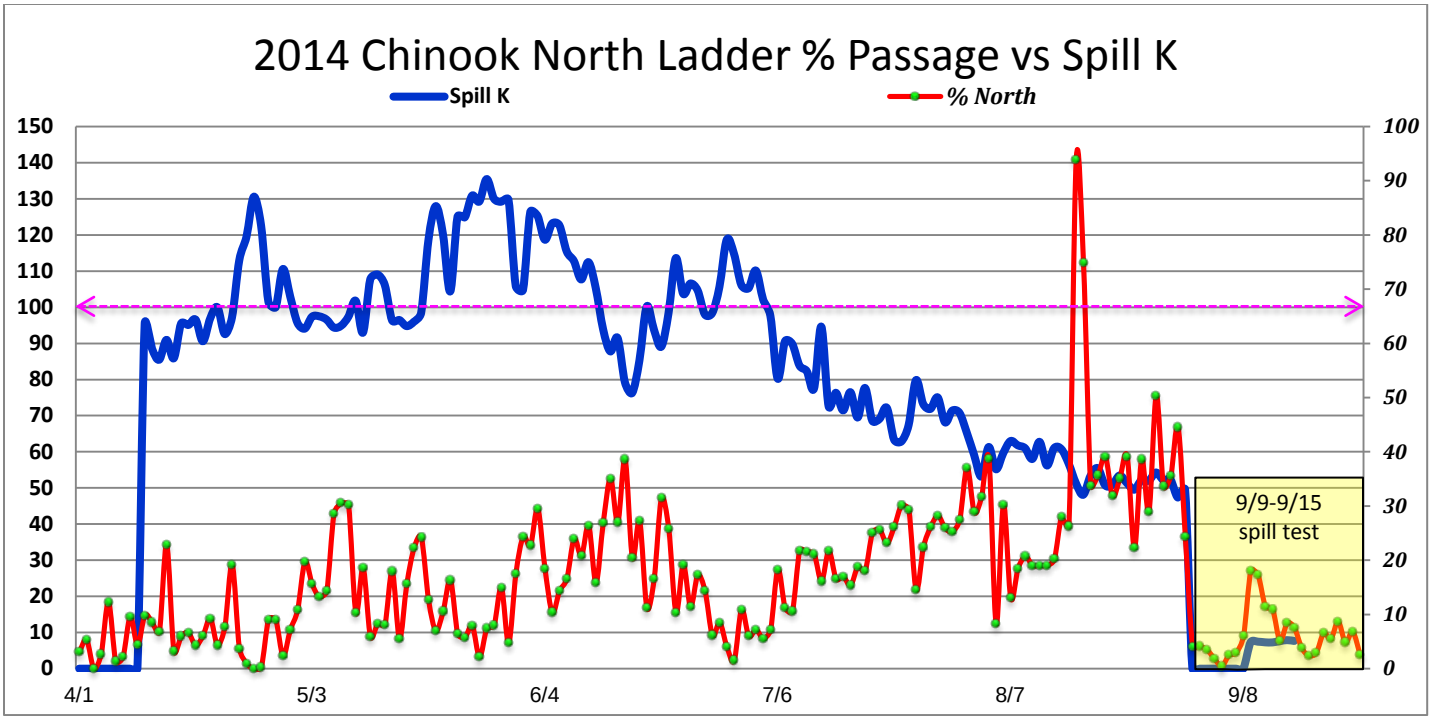
WATER QUALITY

Water clarity was read by secchi dish at the count stations. Water clarity data is not included in this report due to its questionable accuracy. This data was collected per regional request to maintain historical data base. Temperature monitoring with data loggers in each fishway is provided biweekly in the fishway status reports. The following graph is a compilation of weekly readings collected by data loggers in the east and north fishladders, immediately upstream of the count stations.



NORTH LADDER PASSAGE VS SPILL

Spill operation has been documented to affect north fishladder passage in the past several years. In previous years spill >110KCFS tended to block salmonids from entering the north ladder. There were 3 occurrances in 2014 that also revealed similar spill affect. It was again clearly demonstrated that with no spill, salmonids are not attracted to the north entrance area either; hence the drop in north passage immediately after spill stops. In addition there was a spill test in September to see if spill could be used to attract more fish passage to the north ladder during periods of high fish passage concentration in the east fish ladder. There was an obvious increase in north passage with <10kcfs spill. FPOM regional managers will decide when and how to use this spill attraction.

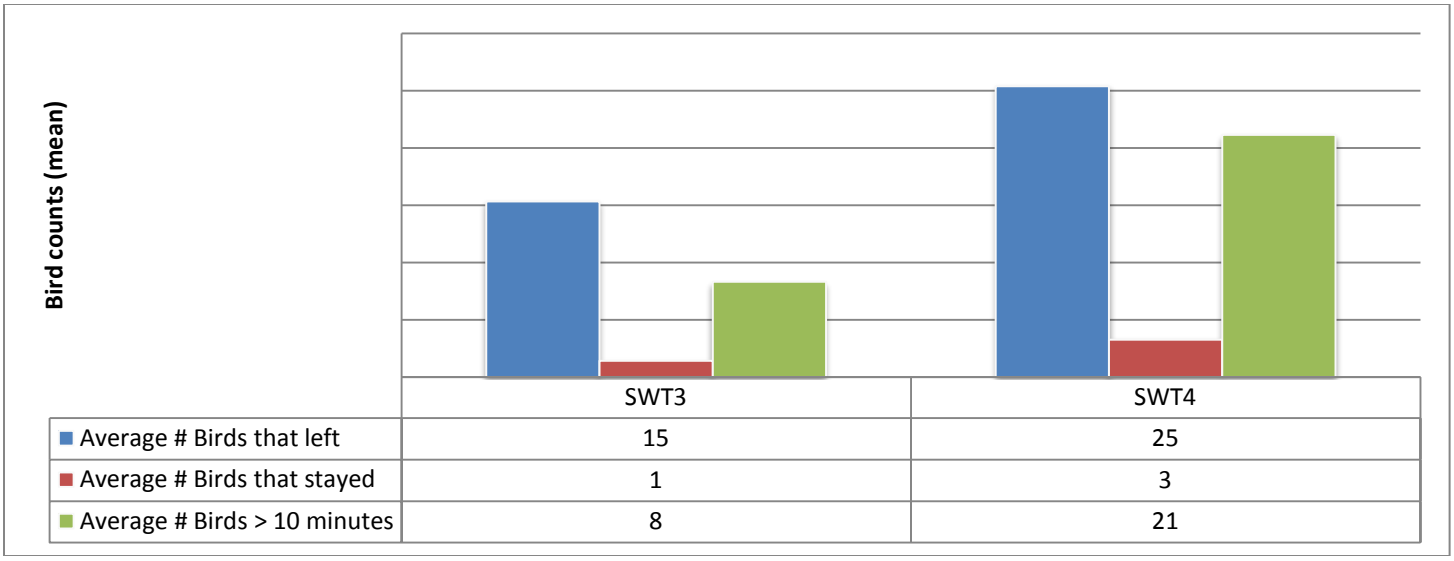


FISHLADDER OVERCROWDING CONCERN

With record numbers of fall chinook passage and very limited use of the north fish ladder during non spill season, there was concern that too many fish may congregate in the east fishway, potentially resulting in passage delay. This concern was raised at Fish Passage Operation and Maintenance committee forum. Possible solution was to use limited spill to attract more fish to use the north ladder. A trip to ERDC physical model provided insight to amount and best possible spill pattern. Desired patterns were established. However the amount of daily passage in the east fishladder that constitutes overcrowding is still up for discussion. In an attempt to answer possible behavior shifts when overcrowding may be occurring, we spent time observing normal over weir passage during low and peak passage periods. Most salmonids normally prefer orifice passage over weir passage. After mulitple hours observing it was determined that there was no statistically signifigant change in overflow use during peak passage. Therefore the dilemna of when to use spill to attract more fish to the north remains.

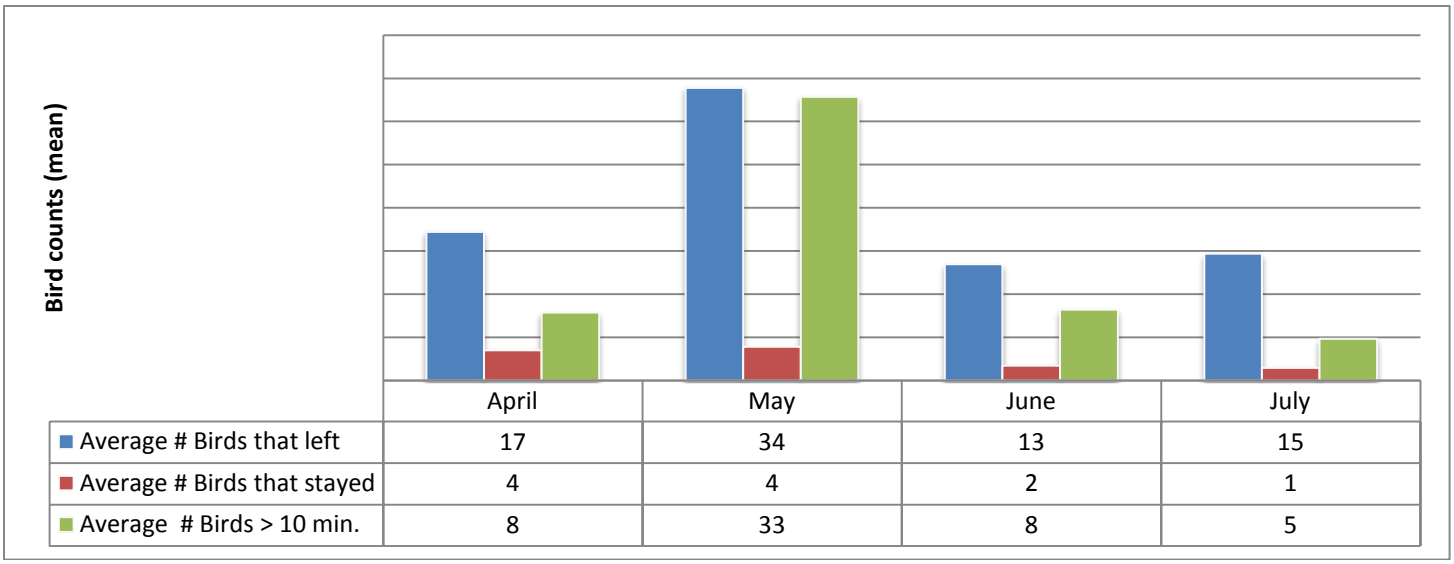
AVIAN PREDATOR ABATEMENT

The United States Department of Agriculture (USDA) was contracted to provide avian hazing abatement via pyrotechnics from mid Apr – July 31. Hazing commenced when there were a minumum of 12 birds present (Figures 1 and 2). Counts were tallied to see how many birds left after hazing , again for how many stayed in the zone, and a third time after a 10 minute time period to determine the effectiveness of the hazing . Figure 2 shows that the the gulls were most prevelant in May and that the vast majority returned after 10 minutes. Project fisheries staff provided daily avian counts for the entire year (Figures 3 and 4, the locations of the avian zones Figure 5). The highest bird counts were on the spillway side of the dam downstream of The Dalles US-197 bridge (SWT4). Gulls foraged heavily in this zone. The majority of resting birds were double crested cormorants in the forebay (FB1) often perched on the electrical transmission towers near the Washington shore. Other birds included grebes, pelicans, mergansers, and eagles.
Grebes were observed in the summer along with pelicans but the vast majority of grebes and mergansers were in the fall and winter months. Eagles were observed in the winter.



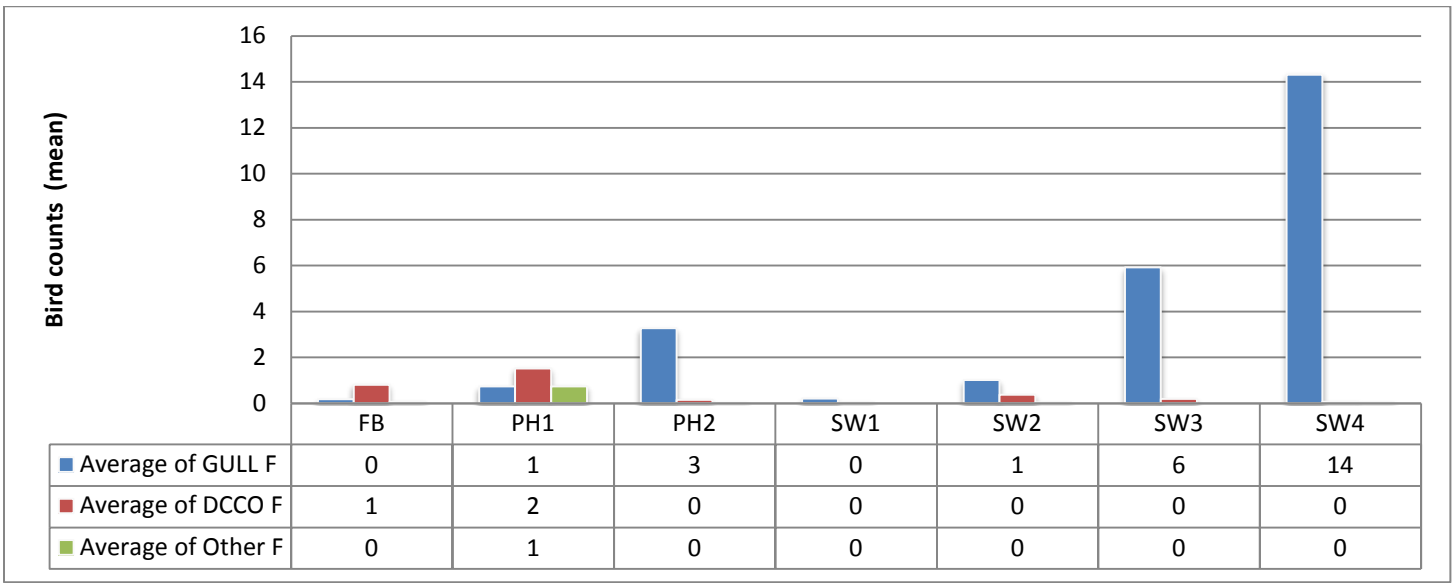
	SWT3	SWT4
Average # Birds that left	15	25
Average # Birds that stayed	1	3
Average # Birds > 10 minutes	8	21

Figure 1. USDA spacial distribution of daily bird counts by zone during the primary smolt outmigration.



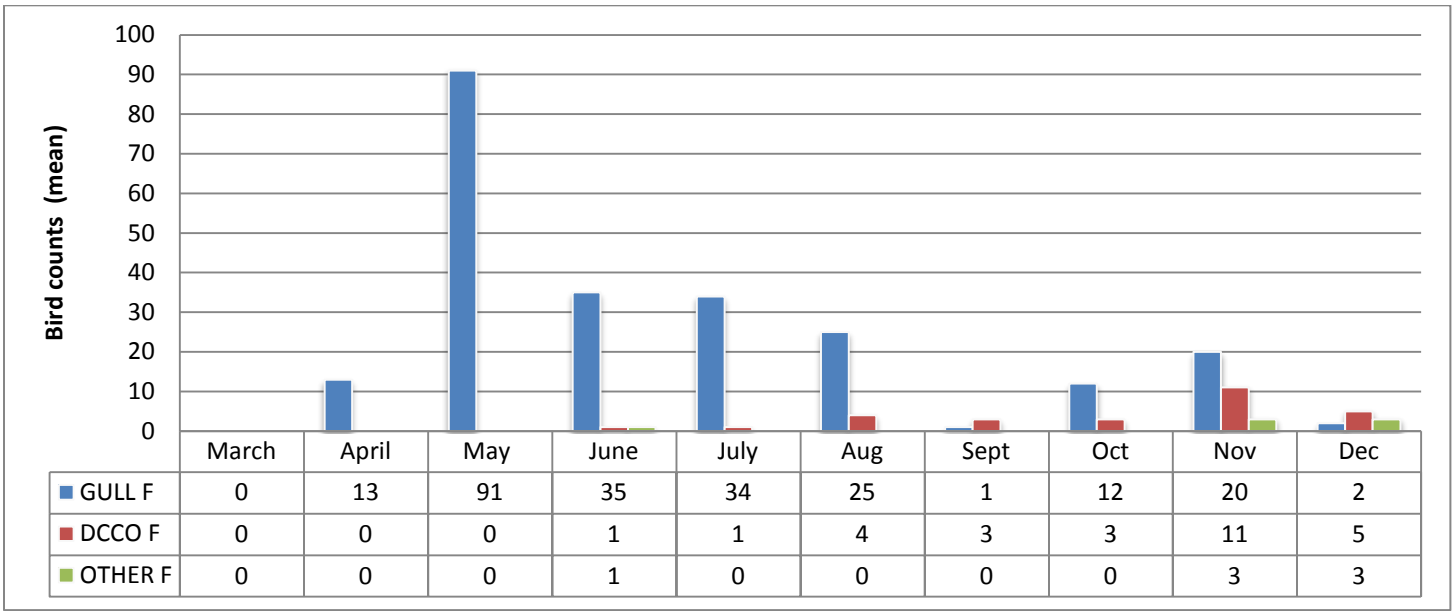
	April	May	June	July
Average # Birds that left	17	34	13	15
Average # Birds that stayed	4	4	2	1
Average # Birds > 10 min.	8	33	8	5

Figure 2. USDA mean daily bird counts by Month during smolt outmigration.



	FB	PH1	PH2	SW1	SW2	SW3	SW4
Average of GULL F	0	1	3	0	1	6	14
Average of DCCO F	1	2	0	0	0	0	0
Average of Other F	0	1	0	0	0	0	0

Figure 3. Project Fisheries spatial distribution of birds foraging by zone.



	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
GULL F	0	13	91	35	34	25	1	12	20	2
DCCO F	0	0	0	1	1	4	3	3	11	5
OTHER F	0	0	0	1	0	0	0	0	3	3

Figure 4. Project Fisheries mean daily birds foraging counts by month.

Avian zones in red, avian lines in yellow, river flow in blue.

Figure 5. The Dalles Dam Zones for Bird Counts

Avian Discussion

The bird count data was collected from fishway inspections twice daily and once daily from Dec. 1 to March 2014.

Most of the gull feeding activity occurred just up stream and down stream of The Dalles Bridge (SWT3 and SWT4). Due to the high cost of gull hazing by boat, shore hazing was selected for 2014. The high numbers of cormorant numbers is primarily roosting behavior. Cormorant near dam feeding behavior starts to occur in November and December when the shad juvenile outmigration peaks. The high numbers observed in the forebay are roosting in the power line towers and north side debris boom. There was a substantial gull number increase in May and Cormorant increase in August.

EAGLES

There have been high numbers of Bald Eagles overwintering in Westrick Park. They feed primarily on out migrating shad. Concerns have been raised on the potential impact with avian lines. Eagle observations are a continuation of Fisheries Field unit and project fisheries monitoring eagles to determine if avian lines interfere with this behavior. Results showed that eagles appear to avoid the present avian line array and feed primarily in the line free areas. It also appeared that eagles see the location of all the lines and there were no flinches or last second avoidance behavior while near the lines. Refer to Fisheries Field Unit "Evaluation of Interaction Between Overwintering Bald Eagles and the Avian Line Array at The Dalles Dam 2013" report for further details.

SEA LIONS

Sea lions sightings have become more common from The Dalles Dam. To date, two (2) different sea lions have been identified from the dam. No sightings have been made inside the fishways to date, but several have been in close proximity to an entrance. The following is a log of all the sea lion sightings in 2014. Note: California sea lion (CSL); for locations see Figure 5.

Date	Time	Species	Activity	Location and notes
1/3/14	915	CSL	swimming	Tailwater near west entrance
1/5/14	1215	CSL	swimming	Tailwater near east entrance - 2 sea lions
1/6/14	930	CSL	swimming	Tailwater near west entrance
1/16/14	730	CSL	swimming	Tailwater near east entrance
1/21/14	1300	CSL	swimming	Center of cul-de-sac
3/12/14	1330	CSL	swimming	South entrance - C014
4/5/14	1030	CSL	swimming	East entrance
4/7/14	930	CSL	swimming	Mid-powerhouse
4/8/14	1353	SL	swimming	Near west entrance
4/9/14	1520	SL	swimming	Near west entrance
4/18/14	900	SL	swimming	Near west entrance
4/20/14	1230	SL	Caught Chinook	Near west entrance
4/21/14	922	SL	Caught Chinook	Near west entrance
4/21/14	1242	SL	swimming	Near west entrance
4/23/14	948	SL	swimming	Near west entrance
4/24/14	906	CSL	Caught Chinook	Near west entrance - C014
4/28/14	811	SL	swimming	West entrance
4/30/14	814	SL	swimming	West entrance
6/11/14	650	SL	swimming	South entrance.
10/23/14	1600	SL	took fish	East entrance
11/11/14	1251	SL	swimming	South entrance
12/14/14	1400	SL	swimming	East entrance

PIKEMINNOW ABATEMENT

Washington Dept Fish and Wildlife gained access to The Dalles Dam and the Boat Restricted Zone (BRZ) for the purpose of hook and line dam-angling in support of the on-going BPA funded Columbia River Predator Control Program Dam angling occurred from May through Sept, in conjunction with ODFW and PSMFC.

ZEBRA/QUAGGA MUSSEL MONITORING

Zebra mussel veliger sampling was conducted from June to August (Three samples total) via plankton tow. Samples were sent to Portland State University's Center for Lakes and Reservoirs for analysis. No mussels found to date. Program will continue in 2015.

15 MILE CREEK STEELHEAD RETURNS

ODFW analyzed PIT data and determined extremely low steelhead survival from Bonneville to 15 mile creek. The recently installed PIT antenna in The Dalles fishladder revealed high numbers of 15 mile creek steelhead overshooting The Dalles. These fish need to pass back downstream sometime before March. However the ice trash sluiceway, a known preferred route for adult down stream migrants is closed Dec 15 – Mar 1. Investigation is underway to determine if extended sluiceway operation is merited.

RESEARCH

The following are a list of fish related research and contract personnel that were on site during the 2014 passage season.

University of Idaho – Conducted studies involving the monitoring of movements of adult salmonids outfitted with radio-tags and Pacific lamprey outfitted with half duplex (HDX) PIT tags in 2014. They also installed, downloaded and maintained recievers and antennas.

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.

Washington Department of Fish and Wildlife – Conducted hook and line removals of predatory northern pikeminnow from the forebay and tailrace decks.

Normandeau Environmental Consultants – Continued to perform fish counting at the north and east fishways via count stations.

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 - Participated in the Northern Pikeminnow Management Program (NPMP) dam angling fishery. Angling activities in support of study included hook and line capture, holding, PIT-tagging, examination, and gastric lavage.

U.S. Dept of Agriculture – Provided avian hazing of piscivorous birds to reduce avian predation on juvenile salmonids mid April to July 31 via pyrotechnics during juvenile passage season.

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

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

Confederated Tribes of the Umatilla Indian Reservation – Captured adult Pacific lamprey as part of the on-going project to restore lamprey to various tributaries. CTUIR worked with the Nez Perce and Yakama Nation help with lamprey collection efforts.

USACE - dive team and boat crew removed derelict equipment attached at the powerhouse main unit intakes.

McMillen, LLC – Minor fishway modifications for lamprey; installed plating upstream and downstream of overflow weir orifices.

USACE – multi beam hydro survey of flows in forebay near field where the dive work will be conducted for east fish ladder auxillary water system.

THE END

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