2012 ANNUAL FISHWAY STATUS REPORT
THE DALLES DAM

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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 2 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 2012. 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 2012. 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; Feb 1 – Dec 2, 2012
East Fishway attraction water off half day for midseason ROV grating inspection Aug 1
North Fishway in operation, Jan 1- Feb 1 and Feb 24 – Dec 30, 2012
North Fishway attraction water off half day for midseason ROV grating inspection Aug 1
Ice Trash Sluiceway (6 sluicegates) open for juvenile passage Mar 1 – Dec 15, 2012
Ice Trash Sluiceway (4 sluicegates) open for juvenile passage Mar 1 – Mar 31 and Dec 1 – Dec 15, 2012
Spillway open for juvenile passage Apr 10 – Aug 31, 2012

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 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. These 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	Mort's
2/1/12	N. upper	0	1a, 3j	0	0	5	0	0	0	1.)	0
12/3/12	E. upper	0	1a,1j	0	0	8a	230	4a	1cp,7wf,1pm	2.)	0
12/11/12	E. lower	0	1j	0	0	5	0	4j	2wf	None	0
12/12/12	E. Lower	0	4j	0	0	29a	0	1j	2wf	3.)	1lamprey

1.) Five adult lamprey, one adult steelhead was bagged and released to forebay. Three wild juvenile steelhead bagged and released to tailwater.

2.) Tally included: 230 adult shad, 1 carp, 7 whitefish, 1 pikeminnow, 1 steelhead, 1 rainbow trout, 3 juvenile salmonids captured and returned to tailwater. Four adult sturgeon were pushed to tailwater from section below the 180 bend. Eight adult lamprey captured for Nez Perce.

3.) 29 adult lamprey captured for Nez Perce to augment Pacific Lamprey production in the Lower Snake/Clearwater Basins; all other fish 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	Morts
1/9/12	MU13 sc	0	0	0	0	0	0	1	0	1.)	0
1/10/12	MU13 dt	0	0	0	0	0	0	0	0	None	0
2/22/12	MU11 sc	0	0	0	0	0	0	0	0	None	0
3/1/12	MU12 sc	0	0	0	0	0	0	0	0	None	0
3/1/12	MU12 dt	0	0	0	0	0	0	0	0	None	0
3/20/12	MU19 sc	0	0	0	0	0	0	0	0	None	0
3/20/12	MU19 dt	0	0	0	0	0	0	0	0	None	0
5/22/12	MU9 dt	5j	1j	0	0	0	0	2	0	2.)	5
7/30/12	MU11 sc	0	0	0	0	0	0	0	0	None	2j
7/30/12	MU11 dt	0	0	0	0	0	0	2	2ca	None	1ca
9/18/12	MU15 sc	0	0	0	0	0	0	0	0	None	0
10/2/12	MU2 sc	0	0	0	0	0	0	0	0	None	0
10/3/12	MU2 dt	0	0	0	0	0	0	3j	8	3.)	0
12/5/12	FU1sc	0	0	0	0	0	0	0	0	None	0

1.) Sturgeon ~2' in length released to tailwater.

2.) Two sturgeon and one CH1 successfully released. Three CH1 fresh mort, one CH1 old dead. 1 clipped SH fresh mort

3.) Eight (8) channel catfish and three (3) juvenile channel cat fish salvaged and released to tail water.

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
9/3/12	MU22	0	0	0	None

Dewatering Fish Salvage Discussion

All efforts are made to prevent fish mortalities. When mortalities occur, procedures are analyzed to determine how to correct for future dewaterings. One lamprey mortality from the east ladder lower dewatering occurred from being stepped on. Two juvenile salmonid mortalities in unit 11 were from unknown causes. Sufficient water was available.

2012 - 2009 FISHWAY INSPECTION COMPARISON

Two fishway inspections were conducted per day during the adult fish passage season (March 1 to November 31). 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.
Fishway inspection data:

TOTALS FOR 2012			2011		2010		2009	
	Total #	% OOC	Total #	% OOC	Total #	% OOC	Total #	% OOC
The Dalles Dam								
Number of inspections	907		689		760		634	
NORTH FISHWAY								
Exit differential	0	0	1	0	0	0	0	0
Count station differential	0	0	0	0	0	0	0	0
Weir crest depth	1	0	3	0	23	3	11	2
Entrance differential	0	0	2	0	3	0	3	1
Entrance weir N1	0	0	0	0	0	0	1	0
Entrance weir N2	0	0	0	0	0	0	0	0
PUD Intake differential	2	0	5	1	2	0	2	0
EAST FISHWAY								
Exit differential	0	0	0	0	0	0	0	0
Removable weirs 154-157	5	1	24	3	57	8	27	4
Weir 158-159 differential	1	0	5	1	19	0	20	3
Count station differential	0	0	4	1	1	0	0	0
Weir crest depth	1	0	5	1	2	0	14	2
Junction pool weir JP6	13	1	5	1	18	2	7	1
East entrance differential	7	1	12	2	5	1	3	1
Entrance weir E1	0	0	0	0	0	0	0	0
Entrance weir E2	0	0	0	0	0	0	0	0
Entrance weir E3	0	0	1	0	0	0	0	0
Collection channel velocity	0	0	0	0	0	0	0	0
West entrance differential	5	1	5	1	1	0	4	1
Entrance weir W1	0	0	2	0	1	0	6	1
Entrance weir W2	0	0	2	0	0	0	3	1
Entrance weir W3	0	0	0	0	0	0	0	0
South entrance differential	9	1	3	0	4	1	3	1
Entrance weir S1	2	0	13	2	6	1	12	2
Entrance weir S2	4	0	4	1	4	1	4	1
JUVENILE PASSAGE								
Sluicegate operation	70	8	10	1	82	1.1	8	1
Turbine trashrack drawdown	0	0	0	0	0	0	0	0
Spill volume	144	16	81	12	40	5	28	4
Spill Pattern	0	0	1	0	0	0	0	0
Turbine Unit Priority	125	14	20	3	180	2.4	77	12
Turbine 1% Efficiency	0	0	0	0	0	0	0	0

Percent values rounded to nearest whole percent.

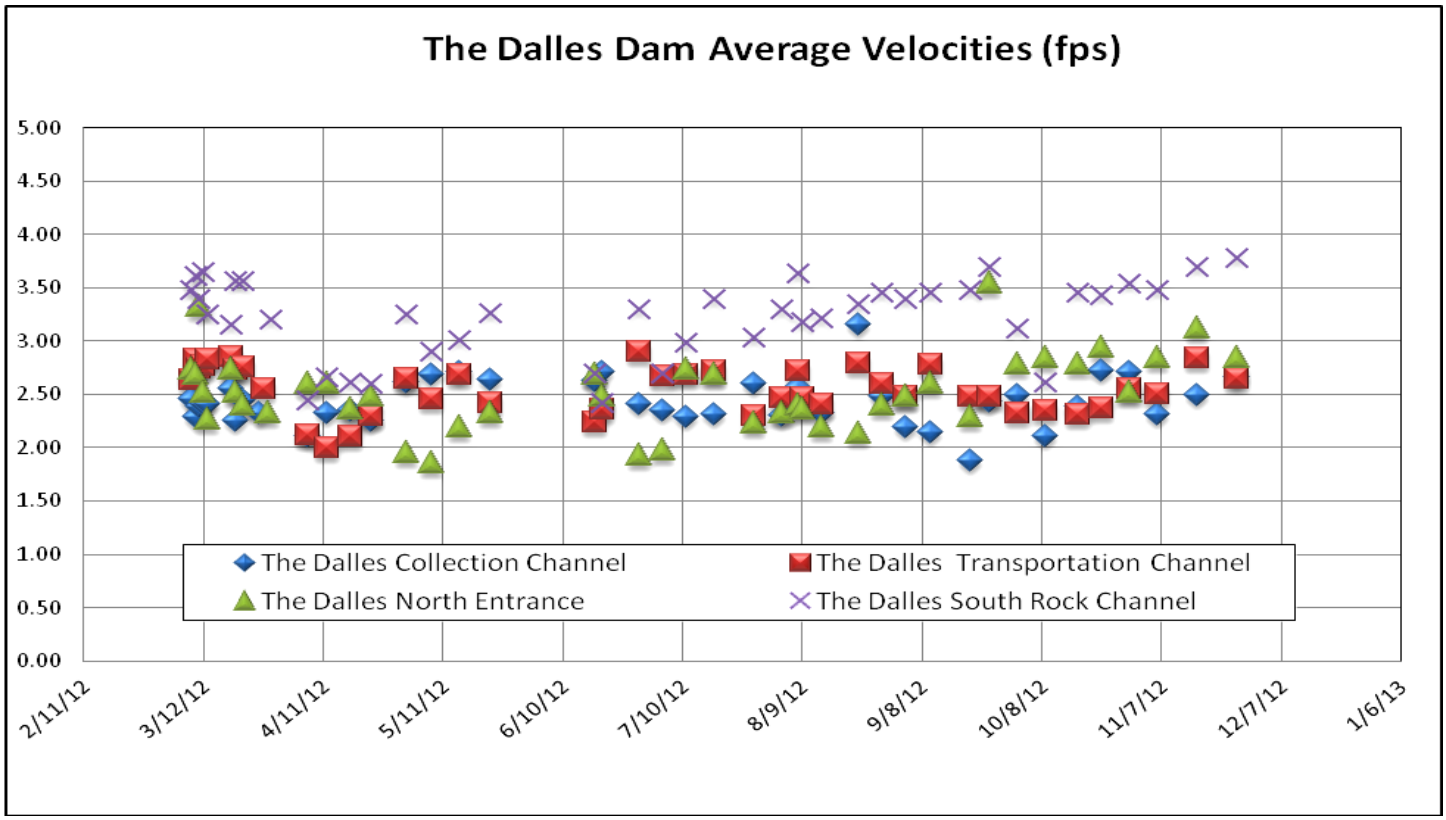
Inspection Discussion

Areas with greater than 1% criteria violation are indicated in red. Sluicegate operation and turbine unit priority were above 1% due to FJXO breaker failure in July and Line T1 overhaul in November. In both cases, MU1 and MU2 were out of service. Sluice gates above MU3 were opened and MU3 became a priority unit. The FJXO breaker failure occurred from 7/17-8/2/2012. The T1 line outage was coordinated through FPOM managers and occurred from 10/15-11/21/2012. Consultation with sluiceway passage researchers was made prior. Results were likely no impact to fish passage. Spill volume had an increase occurrence of criteria violation due to high flow conditions and gas cap issues.

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.

Weekly Water Velocity Measurements



Water Velocity Discussion
Fishway channel water velocities were measured three times weekly during Adult Fish Passage Season (Mar – 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

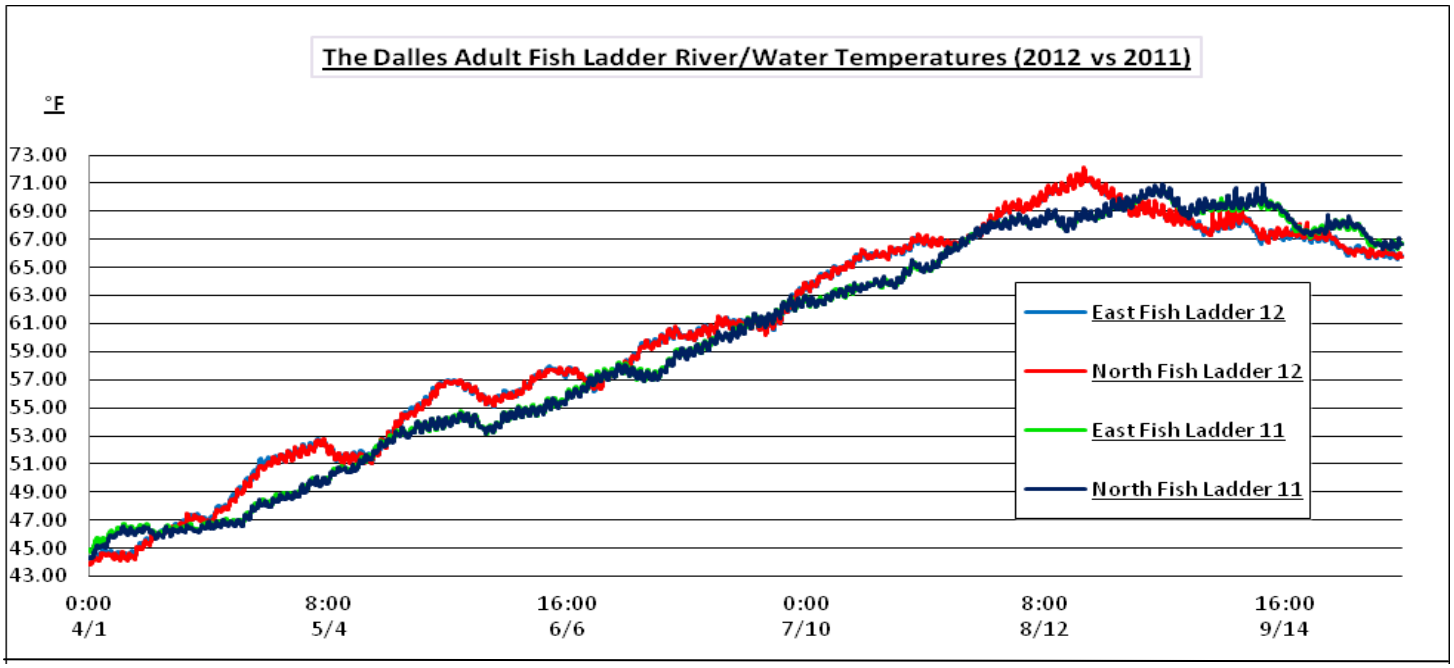
Visual fish counting was conducted 4/1/12 to 10/31/12 by Washington Dept of Fish and Wildlife contract. Counts were loaded to the COE website. Video counting was performed during the off season. Refer to Corps of Engineers 'Annual Fish Passage Report' 2012 for fish count and comparison to previous years.

TRIBAL SHAD FISHERY

Yakima tribal fishermen did not conduct a shad fishery for 2012. Alternative fishing methods were explored in other locations. There has been no indication of revisiting the east fishway exit as a fishing site again, mainly due to the documented fallback behavior of spring Chinook during the fishing activity.

WATER QUALITY

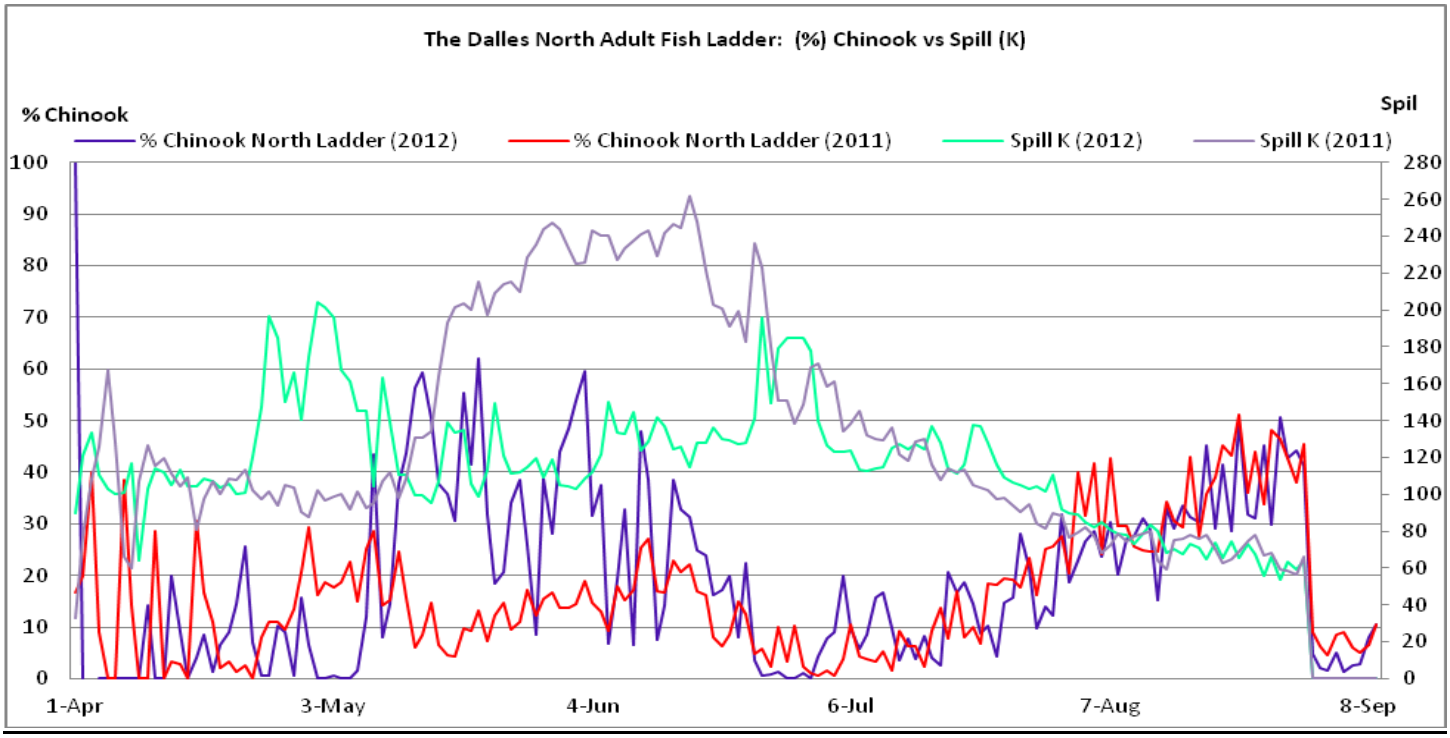
Water clarity was read by secchi dish at the count stations. Water clarity data is not included in this report. This data was collected per regional request to maintain historical data base. Temperature monitoring with data loggers in each fishway was provided biweekly in the fishway status reports. 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. The following graph shows a 2011/2012 comparison.



Temperatures for 2012 generally were several degrees F warmer than 2011 through most of the season and reached a maximum of over 71F.

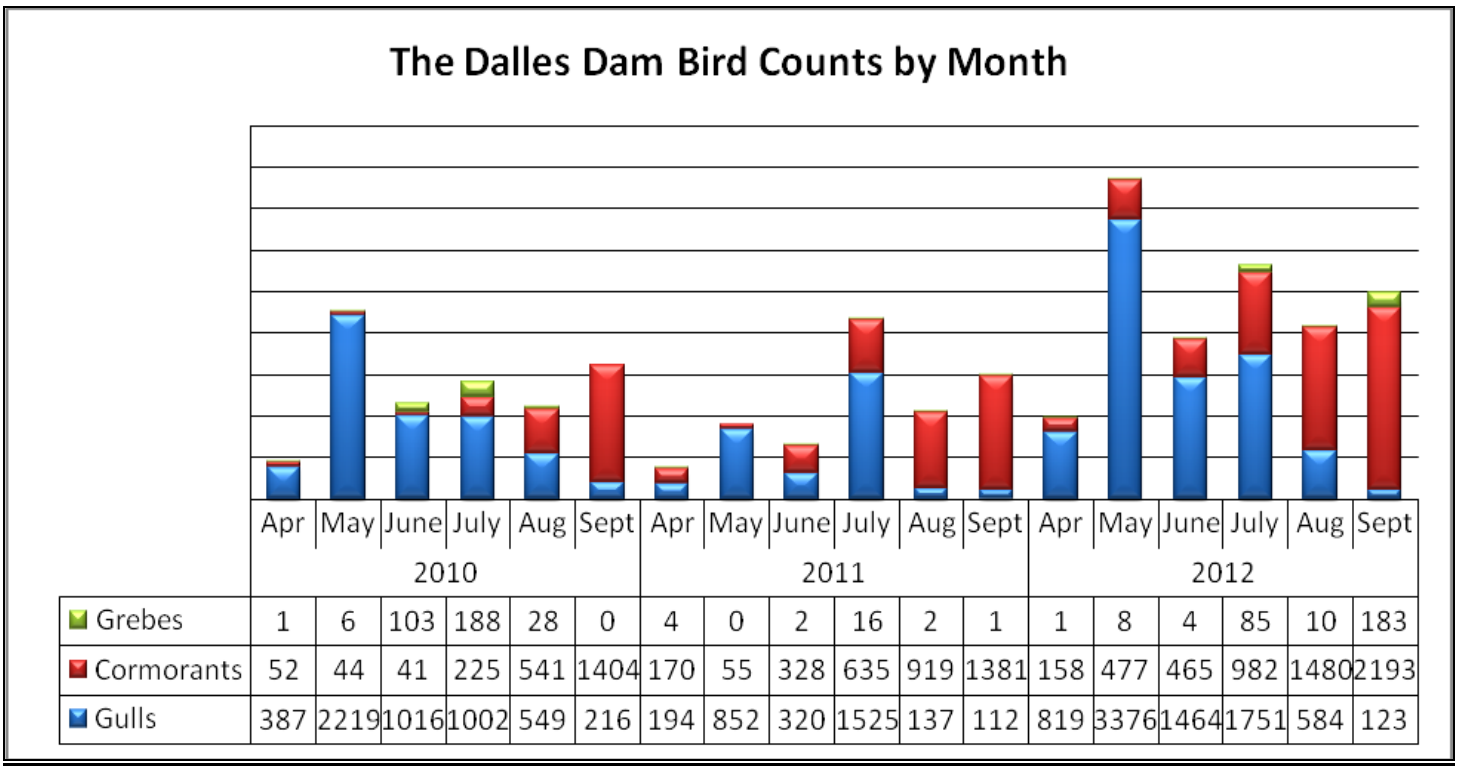
NORTH LADDER PASSAGE VS SPILL

Spill operation has been documented to affect north fishladder passage in the past several years. Spill >110KCFS tended to block salmonids from entering the north ladder. This was very apparent early May to early June 2012 when spill volume dropped below the 110KCFS and passage increased. In 2012, spill reached approached 200KCFS twice and passage remained low. It did not reach the 230KCFS mark as it did in 2011, so we did not see the return of passage after the ~220KCFS mark as we did in 2011. This was not evident for Chinook jacks or other salmonids. The theory remains that spill from ~110KCFS to ~220KCFS impedes north passage for adult Chinook. 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. Monitoring to north passage trends will continue.



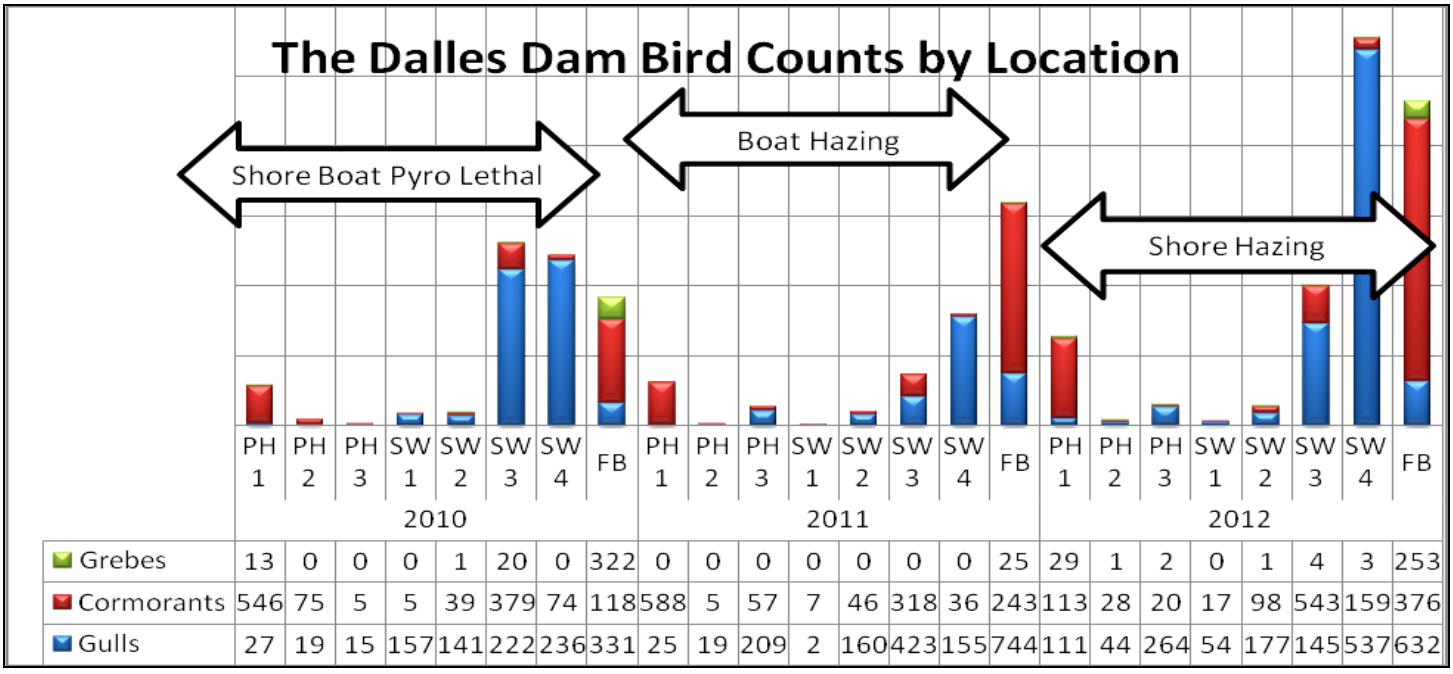
AVIAN PREDATOR ABATEMENT

United States Department of Agriculture (USDA) was contracted to provide avian hazing abatement via pyrotechnics, from mid Apr – July 31. Refer to Fish Field Unit's avian predation study 2011 for more detail gull predation information. The following graphs are summaries of birds observations recorded during the twice daily fishway inspections, showing a 2010 to 2012 monthly comparison and location comparison (Figure 1, and 2) , followed by a map indicating observation zones and locations of the avian lines (Figure 3).



	2010						2011						2012					
	Apr	May	June	July	Aug	Sept	Apr	May	June	July	Aug	Sept	Apr	May	June	July	Aug	Sept
Grebes	1	6	103	188	28	0	4	0	2	16	2	1	1	8	4	85	10	183
Cormorants	52	44	41	225	541	1404	170	55	328	635	919	1381	158	477	465	982	1480	2193
Gulls	387	2219	1016	1002	549	216	194	852	320	1525	137	112	819	3376	1464	1751	584	123

Figure 1. Bird Counts by Month



	2010								2011								2012							
	PH 1	PH 2	PH 3	SW 1	SW 2	SW 3	SW 4	FB	PH 1	PH 2	PH 3	SW 1	SW 2	SW 3	SW 4	FB	PH 1	PH 2	PH 3	SW 1	SW 2	SW 3	SW 4	FB
Grebes	13	0	0	0	1	20	0	322	0	0	0	0	0	0	0	25	29	1	2	0	1	4	3	253
Cormorants	546	75	5	5	39	379	74	118	588	5	57	7	46	318	36	243	113	28	20	17	98	543	159	376
Gulls	27	19	15	157	141	222	236	331	25	19	209	2	160	423	155	744	111	44	264	54	177	145	537	632

Figure 2. Bird Counts by Location

Figure 3. The Dalles Dam Zones for Bird Counts

Avian Discussion

The bird count data was collected from fishway inspections twice daily. On days when only one of the inspections contained bird observations, that was the value used. When bird observations were done twice daily, the mean for the two was used. For 2012, the hand held X-tablet uploading to the data base (Avian Consumption Study Data Portal) started mid-April.

Most of the gull feeding activity occurred just down stream of The Dalles Bridge (SW4). Due to the high cost of gull hazing by boat, shore hazing was selected for 2012. The high numbers of cormorant numbers is primarily roosting behavior. Cormorant 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 September.

EAGLES

There have been high numbers of Bald Eagles overwintering in Westrick Park. The highest number (49) were observed mid-January. They feed primarily on out migrating shad. Concerns have been raised on the potential impact with avian lines. From January through March 2012, Fisheries Field unit and project fisheries monitored the 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 final report for further details. A second season of observations will be conducted to confirm these results.

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 2012. Note: California sea lion (CSL); for locations see Figure 3.

Date	Time	Species	Activity	Location	Notes			
1/4/2012		CSL	took a fish	PH3				
1/5/2012		CSL	took a fish	SW tailrace SW2	fish bigger than Shad			
1/7/2012		CSL	swimming	PH3				
1/9/2012		CSL	swimming	PH3	swimming from powerhouse to south entrance 2X			
1/13/2012		CSL	swimming	PH3				
1/13/2012		CSL	took fish	PH3				
1/17/2012		CSL	swimming	PH3				

1/25/2012		CSL	active	PH3				
2/1/2012		CSL	swimming	PH3				
2/8/2012		CSL	swimming	PH3				
4/21/2012		CSL	swimming	S. entrance SW2				
5/25/2012		CSL	swimming	SW1				
6/21/2012		CSL	took fish	E. entrance PH1	FFU obs. C014 brand. 1 shad/1 lamprey			
6/28/2012	1330	CSL	took fish	PH1 and PH2				
8/4/2012	1500	CSL	swimming	E. entrance PH1				
10/18/2012	0934	CSL	swimming	PHT3				
10/23/2012	0755	CSL	swimming	PHT3				
10/31/2012	1540	CSL	swimming	PHT3, spotted from control room camera #12				
11/14/2012	1010	CSL	swimming	PHT3				
11/17/2012	AM	CSL	swimming	PHT3				
12/17/2012	0933	CSL	active	PHT3/PHT2/SWT2	Branded			
12/19/2012	1100	CSL	swimming	PHT3				
12/26/2012	AM	CSL	swimming	PHT3				
12/26/2012	1446	CSL	active	PHT3	near ice and trash			
12/27/2012	1420	CSL	swimming	SW2				
12/28/2012	PM	CSL	swimming	PH3 & SW2				
1/7/2013	1000	CSL	swimming	PH2				
1/11/2013	1012	CSL	swimming	SW3				
1/14/2013	0943	2X CSL	swimming	PH3				
1/17/2013	0830	CSL	took a fish	SW3	Eagles scavenging off sea lion's take.			

PIKEMINNOW ABATEMENT

Washington Dept Fish and Wildlife was contracted through Pacific States Marine Fish Commission in 2012 to conduct dam angling removal of Pikeminnow from The Dalles Dam. Most fishing activity occurred from powerhouse tailrace deck, with some also at sluiceway outfall and north shore. Consult Pacific States Marine Fish Commission for catch results.

Supplemental to the dam angling program, a consumption analysis was conducted on smallmouth bass via stomach samples by Oregon Dept Fish and Wildlife. A separate dam angling team was devoted to target smallmouth bass.

Consult Oregon and Washington states for full reports on these programs.

ZEBRA/QUAGGA MUSSEL MONITORING

Zebra mussel veliger sampling was conducted from June to August (five 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 2013.

RESEARCH

The following are a list of fish related research and contract personnel that were on site during the 2012 passage season.

Battelle (PNNL) - Conducted juvenile passage acoustic telemetry (JSAT) monitoring of powerhouse, spillway and sluiceway as part of the overall performance testing program for the spring but were unable to complete the summer testing due to flood conditions in 2011. Summer performance testing resumed for 2012.

University of Idaho – Study involved the monitoring of movements of adult Pacific lamprey outfitted with half-duplex PIT tags at The Dalles Dam.

Oregon Dept of Fish and Wildlife – Captured via electro-shocking and fishing directly into BRZ areas using hook and line, tagged, and collected biological data from northern pikeminnow, smallmouth bass, and walleye as part of the ODFW "Northern Pikeminnow Management Program".

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

Washington Department of Fish and Wildlife – Performed dam angling from various locations on the dam to remove northern pikeminnow.

Washington Department of Fish and Wildlife – Continued to perform fish counting at the north and east fishways via count stations.

Pacific States Marine Fish Commission – Sampled North Wasco PUD turbine juvenile bypass system per FERC requirement.

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 of encountered smallmouth bass.

Fisheries Field Unit – Provided over site and standardization to the piscivorous bird monitoring program at the project.

Fisheries Field Unit – Evaluation of interaction between overwintering American bald eagles and the avian array at The Dalles Dam.

U.S. Dept of Agriculture – Provided avian hazing April 15 to July via pyrotechnics and avian lines prior to juvenile passage season at Nav-lock peninsula.

U.S. Fish and Wildlife Service – Continued evaluation of adult lamprey passage and behavior using underwater video cameras and Dual Frequency Identification Sonar (DIDSON) camera to document adult lamprey as they negotiate the fish count station in the north and east fishways and the upper section of the north fishway at The Dalles Dam from 1 June through 30 October 2012.

Umatilla Tribe – Trapped lamprey between count stations picketed leads and areas of the fishway for restoring lamprey to the Umatilla Basin.

Confederated Tribes of the Umatilla Indian Reservation – Captured adult Pacific lamprey as part of the on-going project to restore lamprey to the "tribes ceded waters". CTUIR worked with the Nez Perce and Warm Springs tribes to help with lamprey collection efforts.

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