

# Attachment 1

## Presentation by Steve Hemstrom on Rocky Reach Reservoir Operations

### Rocky Reach Reservoir Operations

Evaluation of Operating Characteristics and Potential  
Influence on Migration of Adult Lamprey to Wells Dam

## Back Ground and Issue Identification

- Adult Lamprey Passage Counts Have Been “Low” at Wells Dam
- Adult Lamprey Passage Counts Have Been “High” at Rocky Reach Dam
- RR Reservoir Hypothesized as Migratory Barrier in Approach to Wells Dam
- Mechanism(s) of this Hypothesized Condition Not Known or Described
- RR Reservoir Past and Present Operations Described in this Presentation

## Rock Reach Reservoir Has:

- Licensed Min and Max Forebay Elevations of 703.0 and 707.0 ft msl
- 4 Feet of Licensed Vertical Operating Range (measured in forebay)
- Useable Storage Volume of 36,000 Acre-Feet (one 18,100 cfs-day)
- Daily and Weekly Use of Available Stored Water
- Active, Flow-through Hydraulics and Short Water Retention Times
- Control of Forebay Elevations
- Consistent Forebay Operating Ranges July - October

## Rocky Reach Reservoir Does Not Have:

- Seasonal Water Storage Capability
- Fall Draft Period
- Spring Run-Off Refill Period or Flood Control
- Long Duration Reservoir Draft
- Control of Surface Elevations in Upper Reservoir
- Operating Ranges in excess of 4 feet

Table 1. Columbia River Hydroelectric Project Reservoir elevations and useable storage volumes.

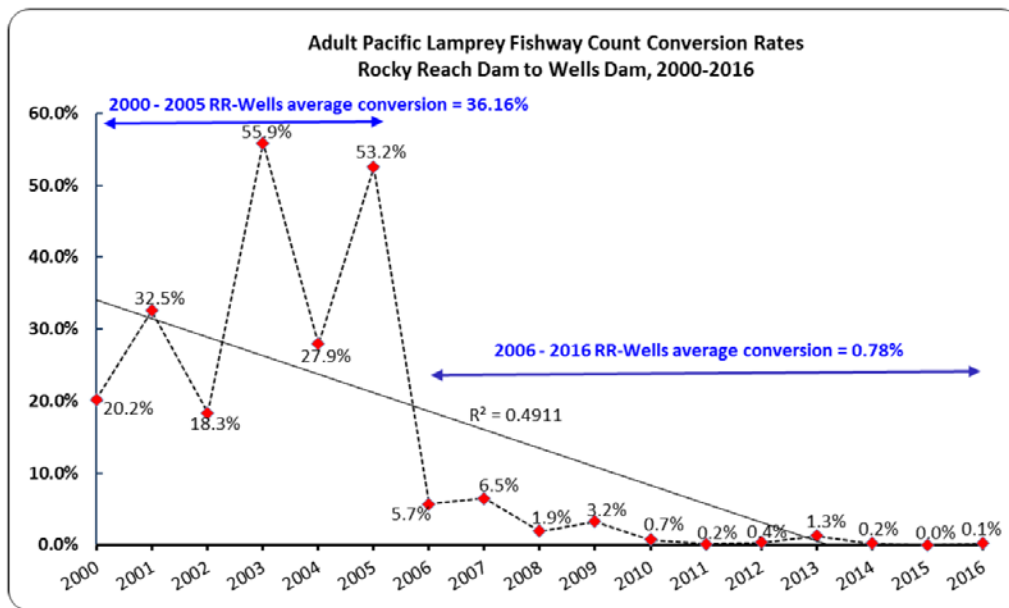
Project	Max Resv Elev (ft msl)	Min Resv Elev (ft msl)	Max Vertical Draft (ft)	Useable Storage (thousand acre-ft*)	Useable Storage (thousand cfs-day**)
Grand Coulee	1290.0	1208.5	81.5	5,185.0	2,613.0
Chief Joe	956.0	930.0	26.0	116.0	58.5
Wells	781.0	771.0	10.0	74.0	37.3
Rocky Reach	707.0	703.0	4.0	36.0	18.1
Rock Island	613.0	609.0	4.0	9.5	4.8
Wanapum	571.5	560.0	11.5	161.0	81.1
Priest Rapids	488.0	481.5	6.5	44.0	22.6
Ice Harbor	440.0	437.0	3.0	25.0	12.6
McNary	340.0	335.0	5.0	185.0	12.6
John Day	268.0	257.0	11.0	534.0	269.1
The Dalles	160.0	155.6	4.4	53.0	26.7
Bonneville	77.0	70.0	7.0	138.0	69.5

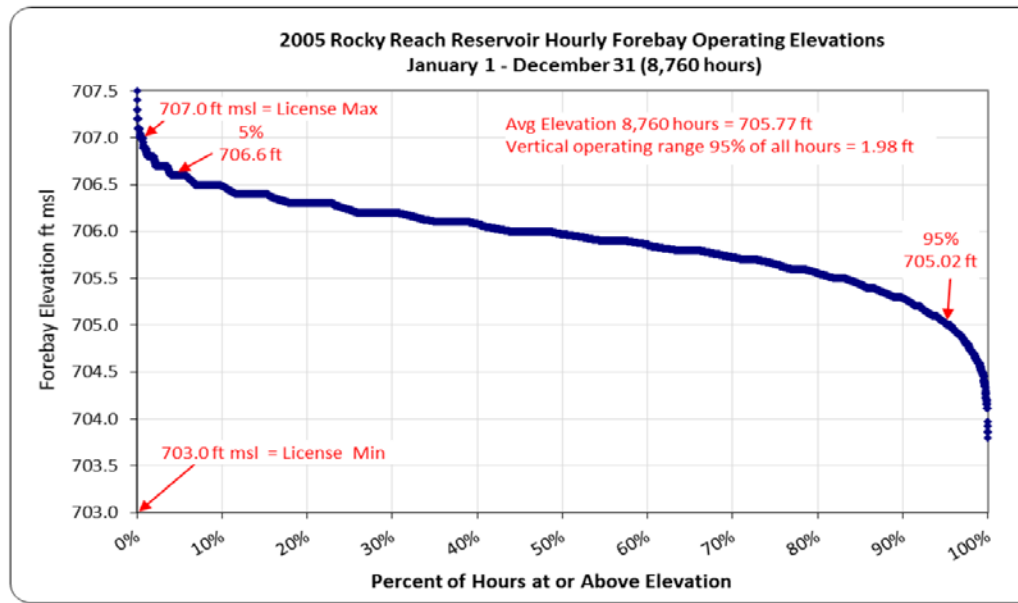
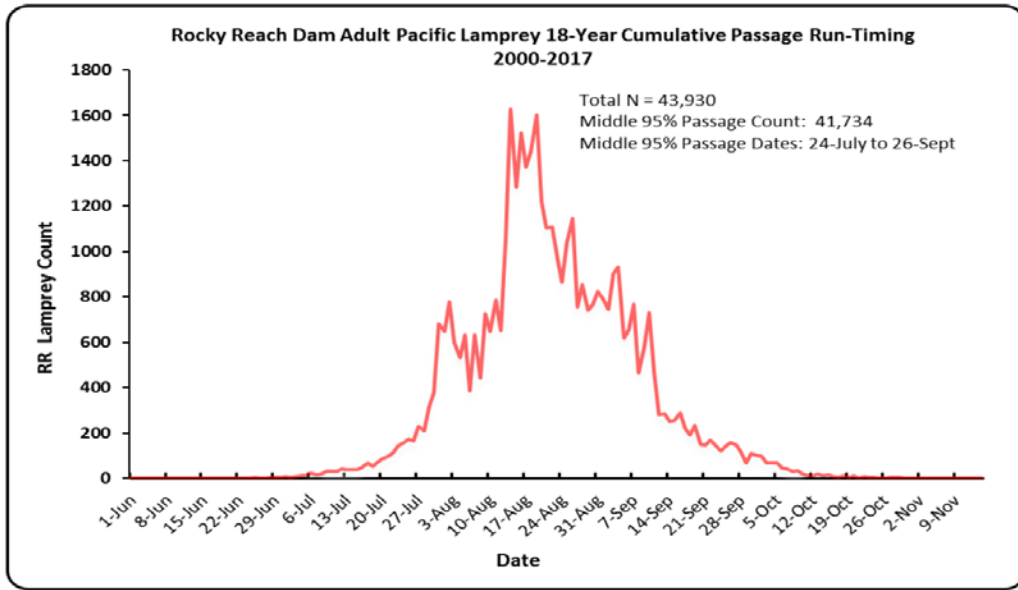
\* One acre-foot of water equals 43,560 cubic feet of water

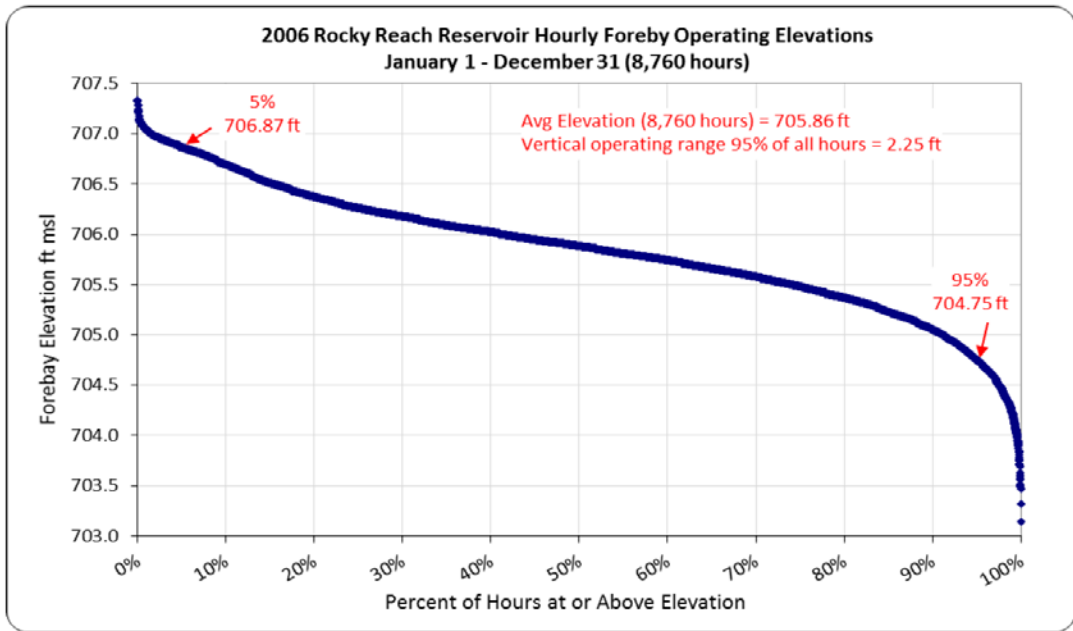
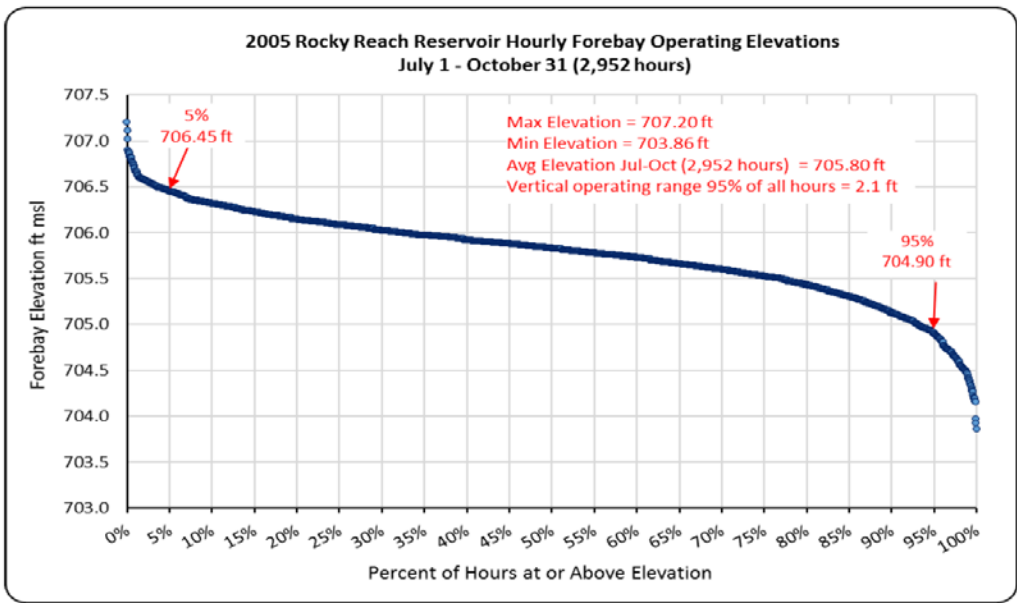
\*\* cfs-day is a water volume equal to a water flow rate in cubic feet per second each second of one day.

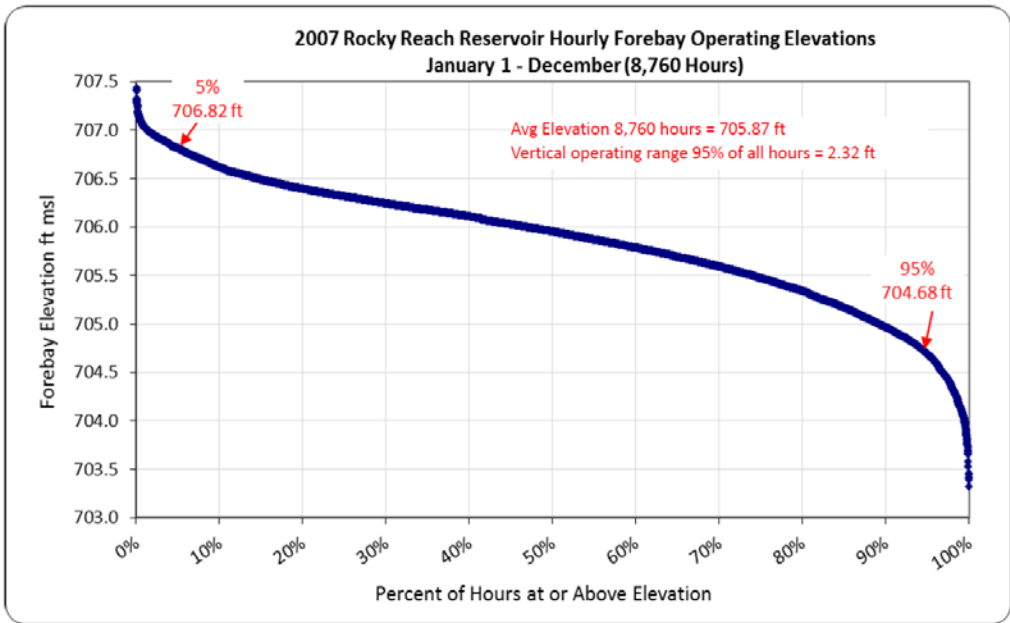
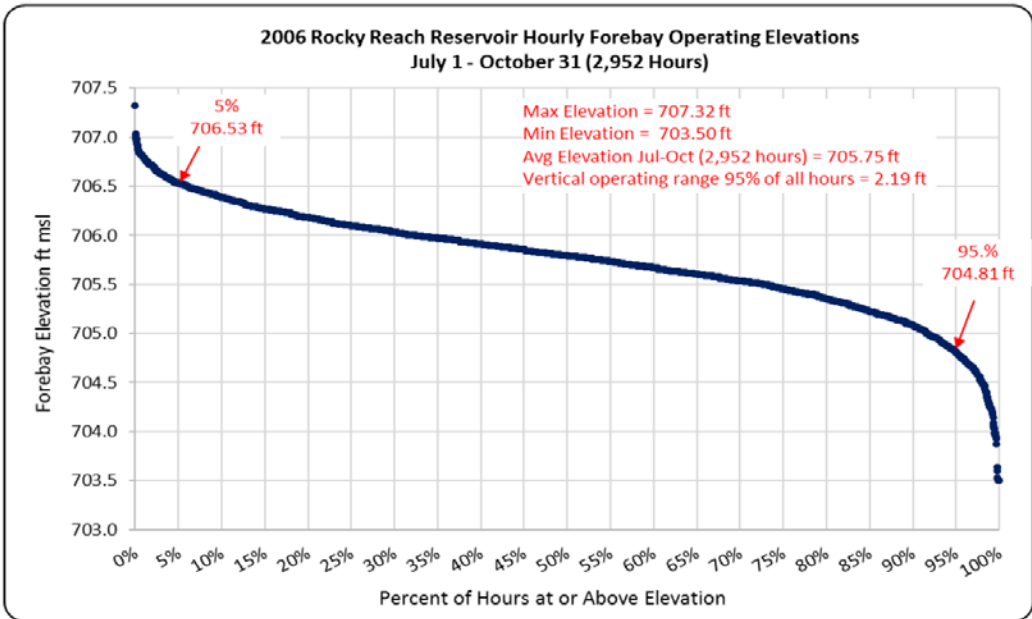
Table 2. Counts of adult Pacific lamprey at Rocky Reach Dam and Wells Dam, 2000-2017, and the average count- conversion percent between the two dams (\*2017 count as of 9/30, still in progress).

YEAR	ROCKY REACH LAMPREY COUNT	WELLS LAMPREY COUNT	AVG COUNT CONVERSION %
2000	767	155	20.21
2001	805	262	32.55
2002	1842	338	18.35
2003	2521	1408	55.85
2004	1043	291	27.90
2005	404	215	53.22
2006	370	21	5.68
2007	541	35	6.47
2008	368	7	1.90
2009	278	9	3.24
2010	268	2	0.75
2011	618	1	0.16
2012	805	3	0.37
2013	1625	21	1.29
2014	3799	7	0.18
2015	2133	0	0.00
2016	3595	5	0.14
2017*	23,652	275	1.16
Total 2000-2005	7,382	2,669	36.16
Total 2006-2016	14,400	111	0.77
Total All Years	45,434	3,049	6.72









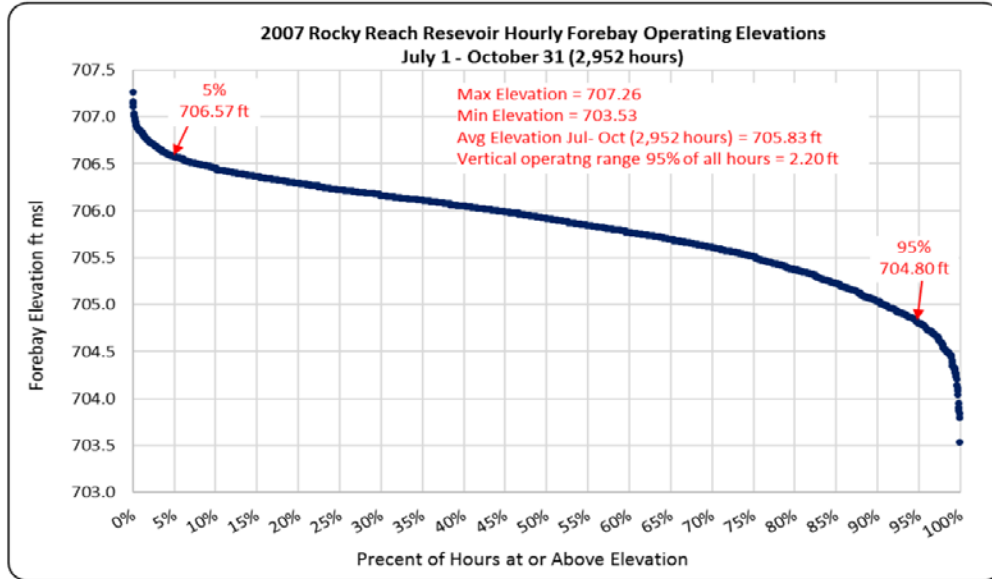


Table 4. Wells Dam single day maximum average discharges, corresponding maximum Rocky Reach forebay to Wells tailwater elevation differences, and the corresponding Rocky Reach day-average forebay elevations.

Year	Wells Day-Avg Maximum Q (cfs)	Day of Occurrence	RR FB-Wells TW Maximum Day-Avg Elevation Diff (ft)	Day of Occurrence	RR Forebay Day-Avg Operating Elevation (ft msl)	Day of Occurrence
2016	205,880	Apr 17	12.21	Apr 17	706.58	Apr 17
2015	170,180	Feb 23	10.34	Feb 23	706.77	Feb 23
2014	216,270	Jun 1	13.18	Jun 1	706.08	Jun 1
2007	197,720	May 8	12.14	May 8	706.38	May 8
2006	250,270	May 28	14.51	May 28	706.79	May 28
2005	177,070	May 27	10.89	May 27	705.64	May 27



