

VIA ELECTRONIC FILING

January 17, 2017

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
Mail Code: DHAC, PJ-12
888 First Street, N.E.
Washington, D.C. 20426

**RE: Priest Rapids Hydroelectric Project No.2114-164
License Compliance Filing – Article 401(a)(10) and (25) – 2016 Bull Trout Monitoring and
Evaluation Plan Annual Report**

Dear Ms. Bose,

Please find enclosed the 2016 Bull Trout Monitoring and Evaluation Annual Report consistent with the Requirements of Article 401(a)(10) and Article 401(a)(25) of the Priest Rapids Hydroelectric Project License, Washington Department of Ecology's (WDOE's) 401 Water Quality Certification Condition 6.2(5)(b), and U.S. Fish and Wildlife Service's (USFWS) Incidental Take Statement Term and Condition 2.

On June 4, 2009, the Federal Energy Regulatory Commission (FERC) issued an Order modifying and approving Public Utility District No. 2 of Grant County, Washington's (Grant PUD's) Bull Trout Monitoring and Evaluation Plan (BTMEP). Under this Order, Grant PUD is required to file annually with FERC by February 1, beginning 2010 and concluding 2014, an Annual Bull Trout Monitoring and Evaluation Report. On September 19, 2009, Grant PUD filed its Bull Trout Hydrologic and Water Quality Study Plan requesting that due to the similarities of Bull Trout Hydrologic and Water Quality Study Plan and the BTMEP that FERC consider Grant PUD combining the objectives of the Bull Trout Hydrologic Water Quality Study Plan with the approved Bull Trout Monitoring Plan. On February 17, 2010, FERC issued an Order modifying and approving Grant PUD's Bull Trout Hydrologic and Water Quality Study Plan. Under this Order, Grant PUD is required to include the water quality monitoring results with the Bull Trout Monitoring and Evaluation Annual Report. On April 10, 2014, Grant PUD submitted its updated BTMEP and on October 23, 2014, FERC issued an Order modifying and approving Grant PUD's updated BTMEP. Under this Order, Grant PUD is required to file annually with FERC by February 1, beginning 2015 and concluding 2019, an Annual Bull Trout Monitoring and Evaluation Report.

This report includes monitoring results from the previous year including the number of bull trout observed or incidentally taken. On December 9, 2017 Grant PUD distributed this draft annual report for review and comment to the Priest Rapids Fish Forum including the WDOE, U.S. Fish & Wildlife Service (USFWS), Washington Department of Fish & Wildlife (WDFW), the Wanapum Indians, Colville Confederated Tribes, Yakama Nation, the Columbia River Inter-Tribal Fish Commission, Bureau of Indian Affairs, and the Confederated Tribes of the Umatilla Indian Reservation. No comments were received after a 30 day comment and review period.

FERC staff with any questions should contact Tom Dresser at 509-754-5088, ext. 2312.

Respectfully,



Ross Hendrick
License & Environmental Compliance Manager

Enclosures: 2016 Bull Trout Monitoring and Evaluation Plan Annual Report

Cc WDOE Breean Zimmerman
USFWS permitsRIES@fws.gov
USFWS permitsWFWO@fws.gov

**2016 Bull Trout Monitoring and Evaluation Report for the Priest
Rapids Project**

By
Public Utility District No. 2 of Grant County, Washington
Priest Rapids Hydroelectric Project
FERC Project Number 2114

January 2017

Executive Summary

The Public Utility District No. 2 of Grant County, Washington (Grant PUD) owns and operates Wanapum and Priest Rapids dams on the Columbia River, known collectively as the Priest Rapids Hydroelectric Project (Project), operated under the terms and conditions of the Federal Energy Regulatory Commission (FERC) Hydroelectric Project License No. 2114. The following is a report on Grant PUD's bull trout monitoring and evaluation program, in accordance with the Bull Trout Monitoring and Evaluation Plan (BTMEP) and the Bull Trout Hydrologic and Water Quality Study Plan (BTWQP). Consistent with previous years, the reporting requirements for these two plans have been combined into one report. The goal of the BTMEP and BTWQP is to, on a yearly basis, monitor and evaluate bull trout (*Salvelinus confluentus*) presence in the Project and collect hydrologic and water quality data related to Project operations and acclimation activities. This information and these data are collected in order to evaluate the potential Project-related impacts on bull trout and to specify the basis for identifying measures Grant PUD will implement to address any Project-related impacts to bull trout.

The following summarizes results from 2016 efforts, followed by details in the main body of the document.

Bull Trout Observations

In 2016, three bull trout were observed passing the Priest Rapids Dam fish ladder count station and six bull trout were observed passing the Wanapum fish ladder count stations between April 15 and November 15. While a total of three bull trout were observed ascending the fish ladders at Priest Rapids dam, no PIT-tagged bull trout were detected in 2016 at full duplex PIT tag detectors located in Priest Rapids Dam fish ladders. During spring juvenile salmonid survival studies, one bull trout was collected via gatewell dipping operations at Priest Rapids Dam on April 29. It was released unharmed upstream of Wanapum Dam after a PIT tag number and length were recorded. No other bull trout were observed during any other phase of juvenile bypass activities, turbine maintenance activities, fishway maintenance activities, White Sturgeon Program activities, Hanford Reach Fall Chinook Protection Program, hatchery activities, or any other activities in the Project. During screw trap operations in 2016, five bull trout were collected in the White River and one bull trout was collected in Nason Creek.

Hydrologic and Water Quality Monitoring

Grant PUD, in coordination with the Priest Rapids Fish Forum (PRFF) and U.S. Fish and Wildlife Service (USFWS) agreed to monitor and report daily averages of Project elevation (feet), discharge (thousand cubic feet per second (kcfs)), temperature (°Celsius) and total dissolved gas (TDG; percent saturation (%SAT)). Project operations/water quality daily averages are reported in Appendix A of this report.

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1.0 Introduction

The Public Utility District No. 2 of Grant County, Washington (Grant PUD) owns and operates two hydroelectric dams on the Columbia River; Wanapum and Priest Rapids, known collectively as the Priest Rapids Hydroelectric Project (Project), operated under the terms and conditions of the Federal Energy Regulatory Commission (FERC) Hydroelectric Project License No. P-2114.

Grant PUD operates the Project through the coordinated operation of a seven-dam system and other Columbia Basin entities with current operational agreements with the fishery agencies and other operators to provide protection and enhancement for a range of fisheries and other resources within and downstream of the project. These agreements include the Hanford Reach Fall Chinook Protection Program Agreement, the Hourly Coordination Agreement, and the Priest Rapids Project Salmon and Steelhead Settlement Agreement. The Project is also subject to the provisions of the FERC license and related laws and regulations, as well as to the requirements (incorporated by reference in the license) of the Biological Opinion for the Priest Rapids Project issued by the National Marine Fisheries Service (NMFS) for its effects on anadromous salmon, the Clean Water Act Section 401 Water Quality Certification (WQC) issued by the Washington Department of Ecology (WDOE), and the Biological Opinion for the Project issued by the United States Fish and Wildlife Service (USFWS; 2007) regarding the effects of the Project on bull trout (*Salvelinus confluentus*).

A 401 WQC was issued by the WDOE on April 3, 2007, and amended March 6, 2008, for the operation of the Project. A new license for the Project was issued by FERC on April 17, 2008 (FERC 2008). Under FERC License Article 401(a)(10) and the 401 WQC (Section 6.2 (5)(b)), Grant PUD was required, in consultation with the Priest Rapids Fish Forum (PRFF), to develop and submit for approval a Bull Trout Monitoring and Evaluation Plan (BTMEP) within one year of issuance of the license. The BTMEP was implemented upon FERC approval on June 4, 2009. In accordance with the BTMEP, Grant PUD monitored for bull trout during all Project related activities where bull trout could potentially be seen or encountered in 2016. In addition, in accordance with FERC License Article 401(a) (25) and Reasonable and Prudent Measure 2 of the USFWS Bull Trout Biological Opinion for the Project (USFWS 2007), Grant PUD, in consultation with the Priest Rapids Fish Forum (PRFF), developed the Bull Trout Hydrologic and Water Quality Study Plan (BTWQP). The BTWQP was implemented upon FERC approval on February 17, 2010. The goal of the BTMEP and BTWQP is to, on a yearly basis, monitor and evaluate bull trout presence in the Project and collect hydrologic and water quality data related to Project operations. This information and these data are collected in order to evaluate the potential Project-related impacts on bull trout and to specify the basis for identifying measures Grant PUD will implement to address any Project-related impacts to bull trout.

The following sections present a summary of the results from Grant PUD's 2016 monitoring efforts under the BTMEP and BTWQP (note that FERC approved the combination of both reporting requirements into a single report with approval of the BTWQP on February 17, 2010).

2.0 Bull Trout Observations at the Priest Rapids Project

Monitoring for bull trout at the Priest Rapids Project occurs annually through: video fish count system monitoring at each dam, juvenile fish bypass activities, fish collected as a result of fishway and turbine maintenance, gatewell dipping, Hanford Reach Fall Chinook Protection Program implementation, Off-Ladder Adult Fish Trap (OLAFT) operations, and Northern

Pikeminnow predator control program. Semi-annual programs like the resident fish monitoring and White Sturgeon Program may also provide an opportunity to collect information on incidentally collected bull trout during years those programs are implemented.

The primary means Grant PUD uses to monitor bull trout at the Project is through video fish count systems at fish ladders. Grant PUD monitors fish passage 24 hours a day using videotape imagery of passage in each ladder at Priest Rapids and Wanapum Dams between April 15 and November 15 of every year. Staff records and reports passage of: Chinook salmon (*Oncorhynchus tshawytscha*), Coho salmon (*Oncorhynchus kisutch*), Sockeye salmon (*Oncorhynchus nerka*), steelhead (*Oncorhynchus mykiss*), American Shad (*Alosa sapidissima*), White Sturgeon (*Acipenser transmontanus*), Pacific Lamprey (*Entosphenus tridentatus*) and bull trout. Observations made at the Priest Rapids count stations (Table 1) and Wanapum Dam count stations (Table 2) in 2016 show all bull trout passage through the ladders that occurred between April 15 and November 15. Three bull trout were observed passing the Priest Rapids Dam fish ladder count station and six bull trout were observed passing the Wanapum fish ladder count station.

Table 1 Bull trout observations at Priest Rapids Dam Fish Count Station in 2016.

Date	Time	Ladder	Number	Estimated Total Length (inches)
5/14/2016	7:59	Left	1	25
5/24/2016	16:52	Left	1	26
6/5/2016	8:52	Left	1	16

Table 2 Bull trout observations at Wanapum Dam Fish Count Station in 2016.

Date	Time	Ladder	Number	Estimated Total Length (inches)
5/15/16	10:05	Left	1	24
5/16/2016	9:05	Left	1	19
5/16/2016	9:57	Left	1	20
5/16/2016	15:04	Left	1	17
6/13/2016	5:58	Left	1	21
6/17/2016	14:07	Left	1	17

Table 3 Number of bull trout Passing Priest Rapids and Wanapum Dam’s Fish Count Station’s from 2007 through 2016.

Year	Priest Rapids Dam		Wanapum Dam	
	Left Bank	Right Bank	Left Bank	Right Bank
2007	0	1	1	0
2008	2	3	0	0
2009	5	1	3	0
2010	5	2	5	2
2011	5	3	9	3
2012	4	1	2	1
2013	9	1	10	1
2014	1	2	Unknown*	Unknown*
2015	1	3	6	0
2016	3	0	6	0

Note:* The fish count station at Wanapum Dam was inoperable.

On April 29, 2016 Grant PUD’s juvenile salmonid gateway dipping crew collected a sub-adult bull trout at Priest Rapids Dam. Grant PUD and Blue Leaf Environmental staff collected the appropriate biological data in accordance with the BTMEP prior to its release up-stream of Wanapum Dam that consisted of a fork length of 270mm, an age classification of sub-adult and a PIT tag number 3DD.00776D72CC. Figure 1 is a picture of the bull trout prior to release.

Figure 1 Bull trout collected on April 29, 2016 during gateway dipping operations.



No other bull trout were observed during any phase of juvenile salmonid bypass activities, gateway dipping, fishway and turbine maintenance activities, OLAFT operation, Northern Pikeminnow predator control activities, White Sturgeon Program activities, Hanford Reach Fall Chinook Protection Program, hatchery activities, or any other activities in the Project in 2016.

Figure 2 through Figure 10 provide photographs, location and date of each bull trout observed passing Priest Rapids and Wanapum Dam's fish count stations. No PIT-tagged bull trout were detected at the Priest Rapids Dam fish count stations in 2016.

Daily fish passage through Priest Rapids and Wanapum dams can be viewed at the following link: <http://www.grantpud.org/environment/fish-wildlife/fish-counts>



Figure 2 A bull trout with an estimated length of 25 inches passing Priest Rapids left bank count station on May 14, 2016 at 7:59.

B11132027002 1:Wan Green (left) May 15, 2016 10:05:59 AM PDT

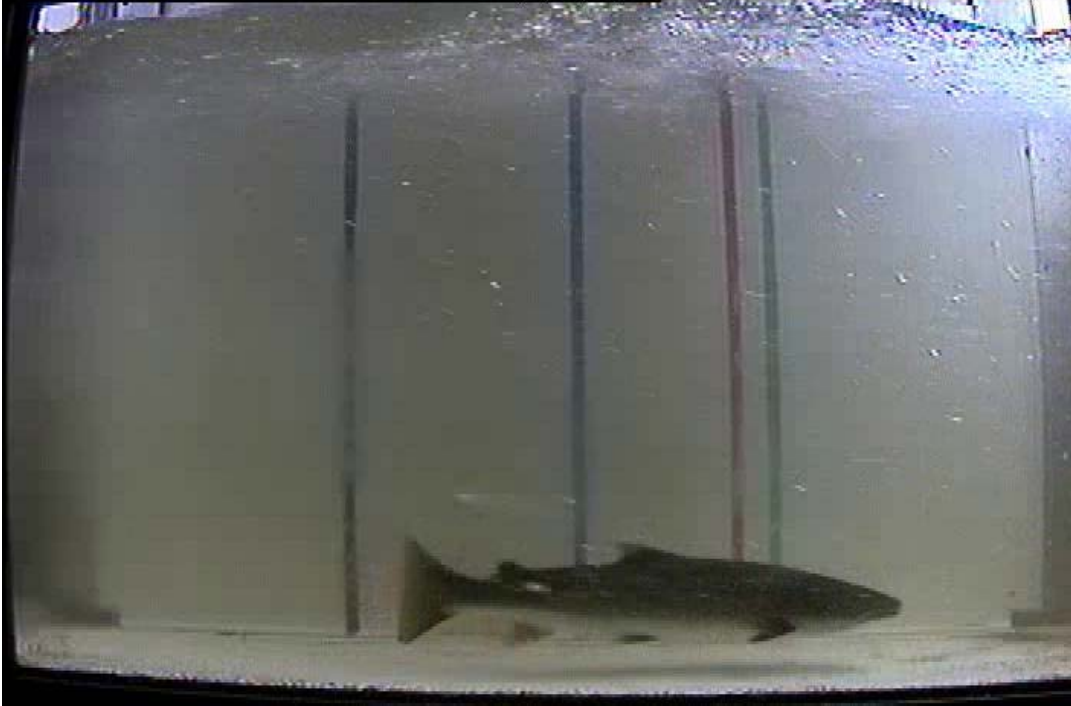


Figure 3 A bull trout with an estimated length of 24 inches passing Wanapum left bank count station on May 15, 2016 at 10:05.

B11132027002 1:Wan Green (left) May 16, 2016 9:05:36 AM PDT



Figure 4 A bull trout with an estimated length of 21 inches passing Wanapum left bank count station on May 16, 2016 at 9:05.

B11132027002 1:Wan Green (left) May 16, 2016 9:57:57 AM PDT

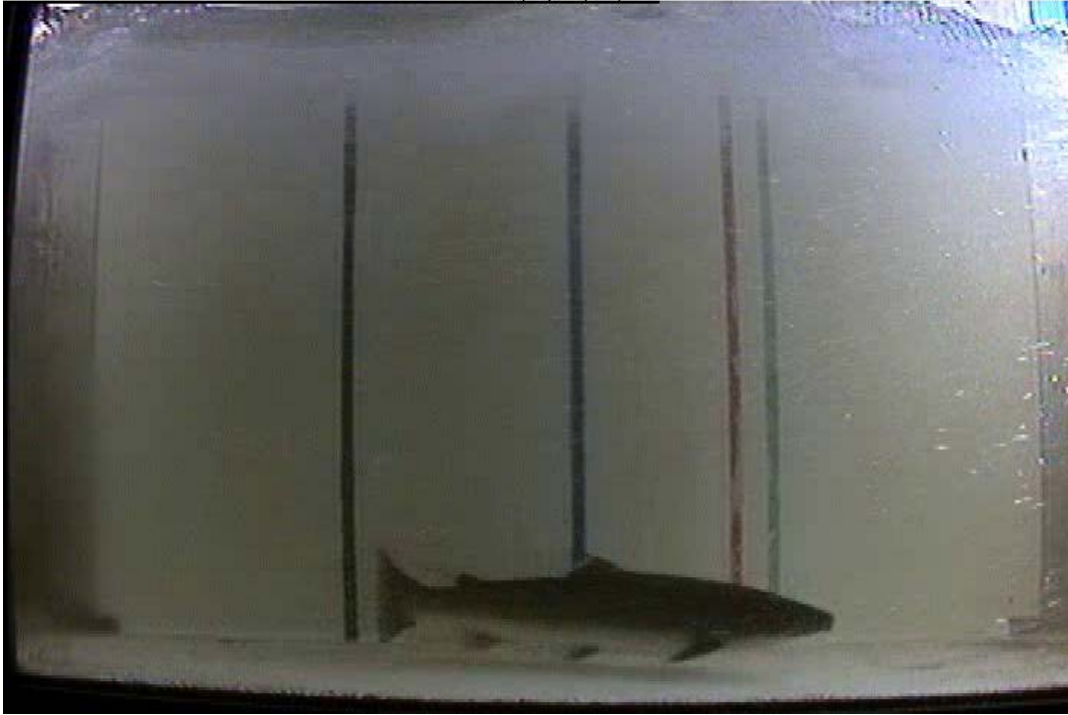


Figure 5 A bull trout with an estimated length of 20 inches passing Wanapum left bank count station on May 16, 2016 at 9:57.

B11132027002 1:Wan Green (left) May 16, 2016 3:04:50 PM PDT

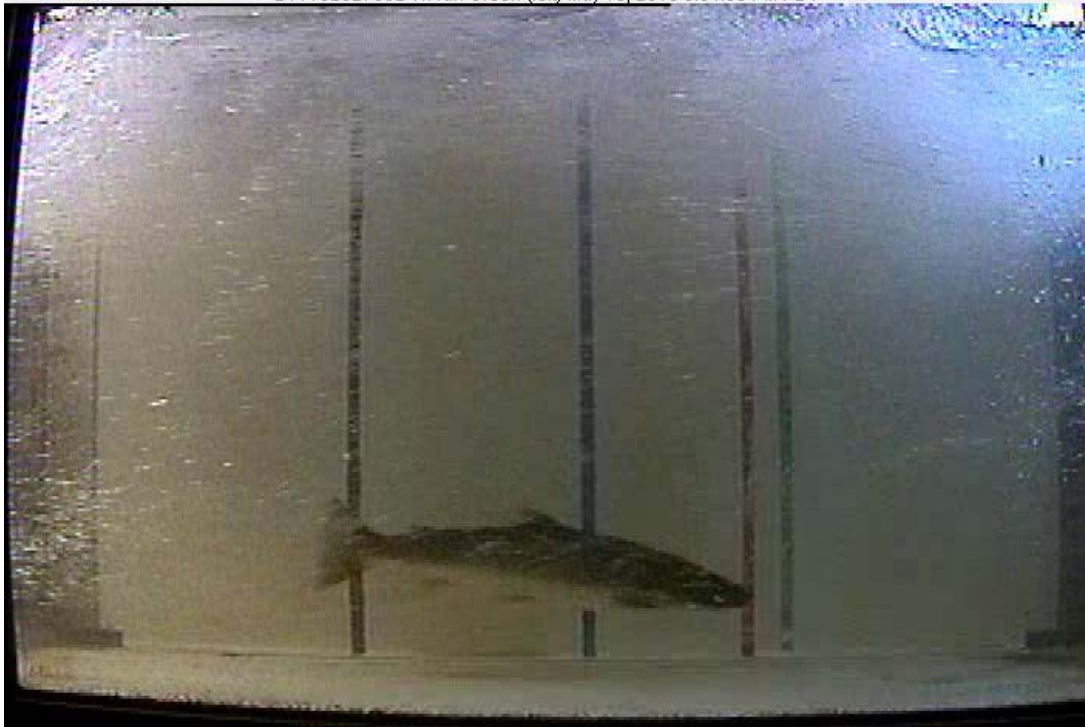


Figure 6 A bull trout with an estimated length of 19 inches passing Wanapum left bank count station on May 16, 2016 at 15:04.

B11123026003 2:PR Green Left May 24, 2016 4:52:22 PM PDT

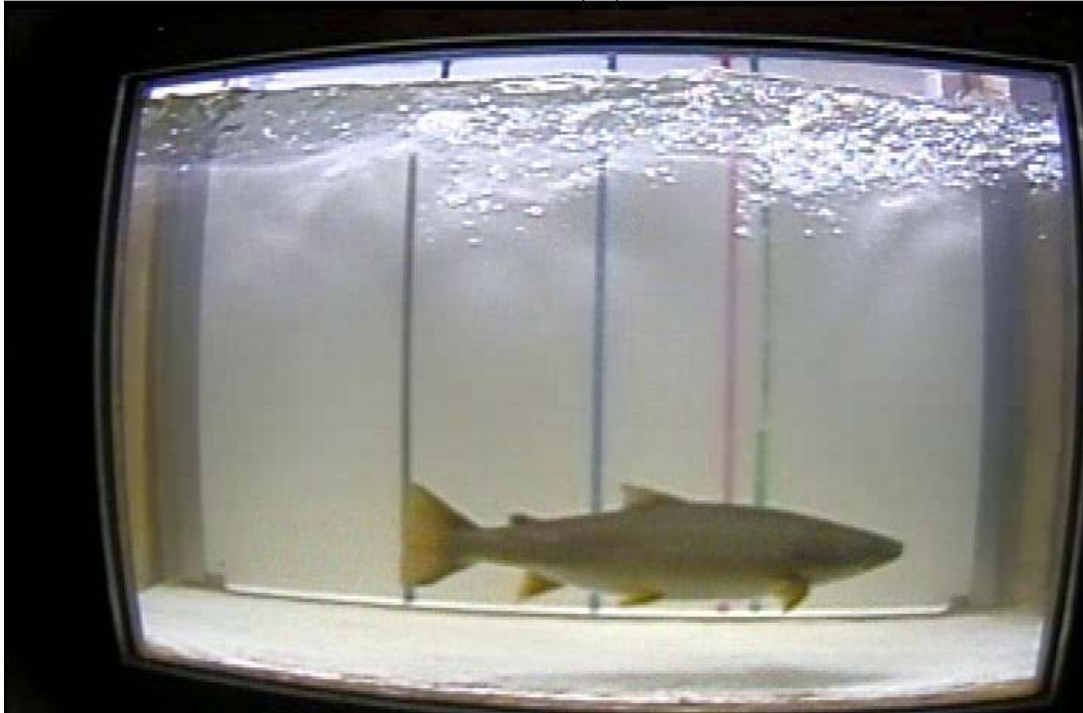


Figure 7 A bull trout with an estimated length of 26 inches passing Priest Rapids left bank count station on May 24, 2016 at 16:52.

B11123026003 2:PR Green Left Jun 5, 2016 8:52:31 AM PDT

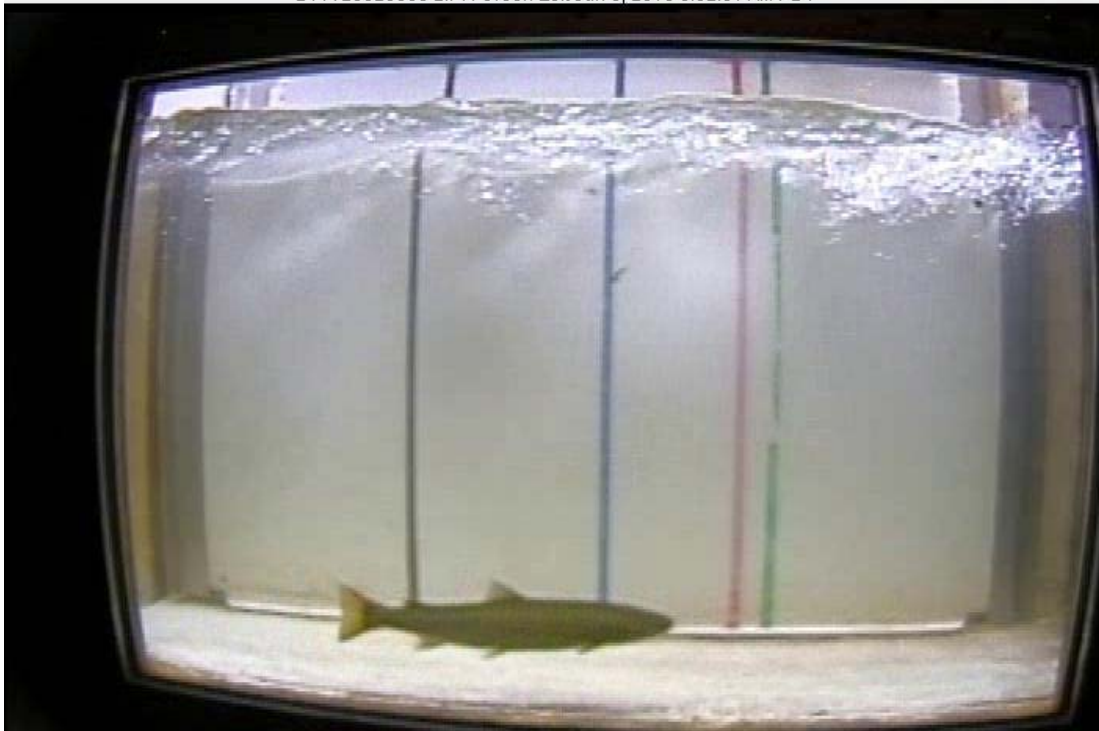


Figure 8 A bull trout with an estimated length of 16 inches passing Priest Rapids left bank count station on June 5, 2016 at 8:52.

B11132027002 1:Wan Green (left) Jun 13, 2016 5:58:21 PM PDT

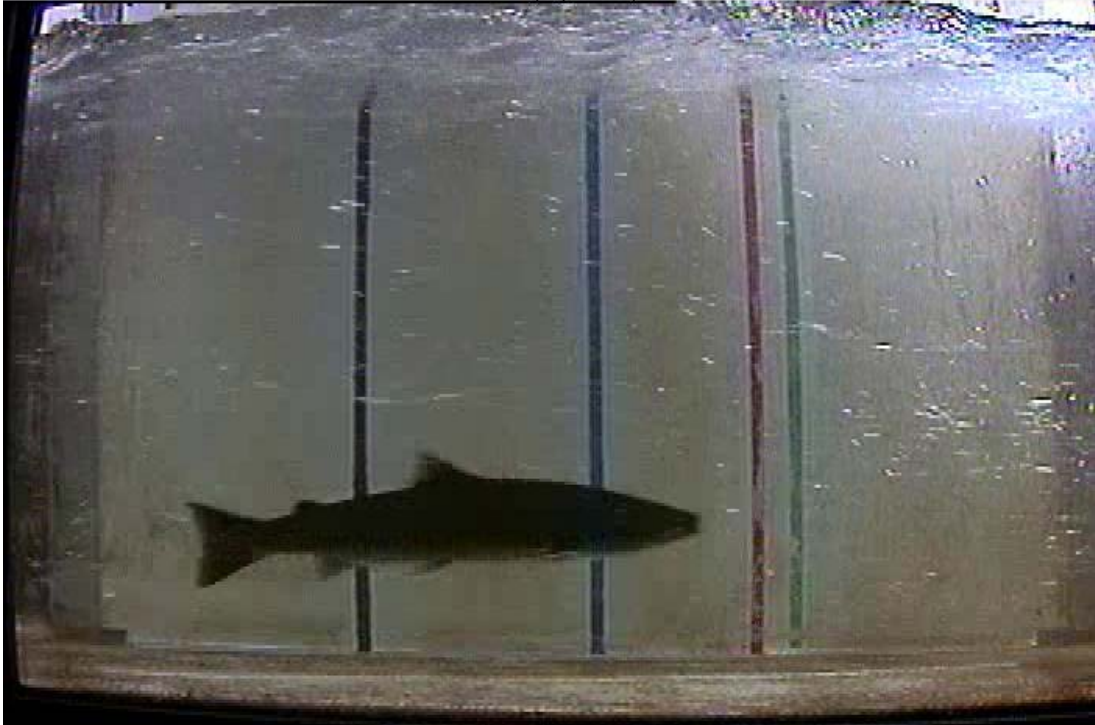


Figure 9 A bull trout with an estimated length of 21 inches passing Wanapum left bank count station on June 13, 2016 at 17:58.

B11132027002 1:Wan Green (left) Jun 17, 2016 2:07:54 PM PDT

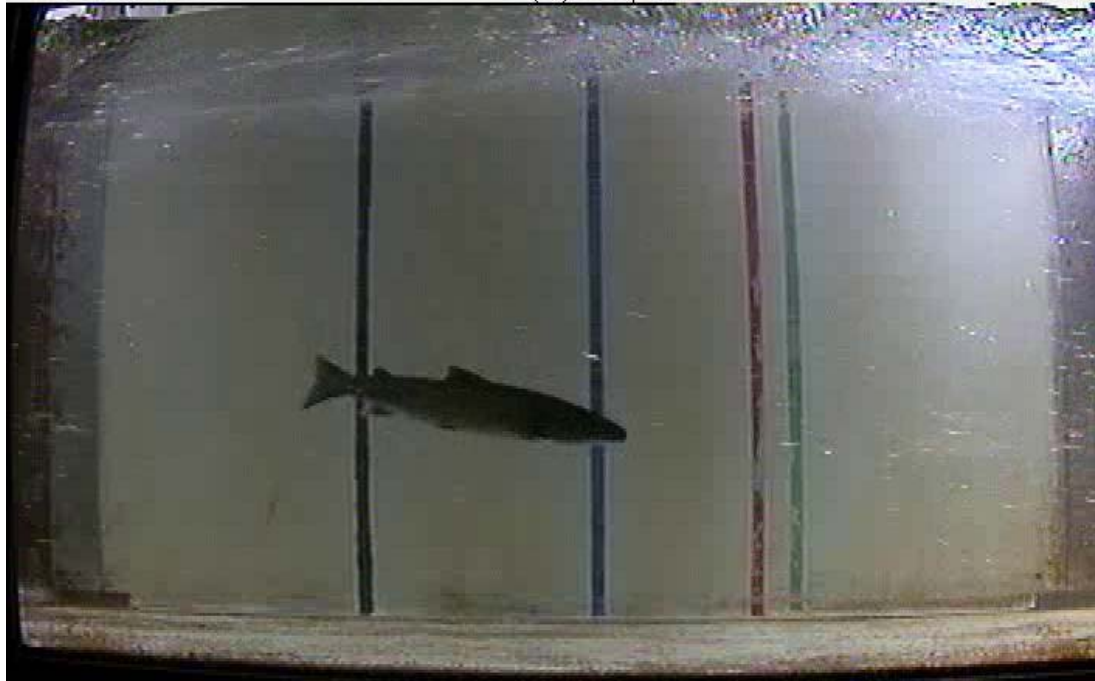


Figure 10 A bull trout with an estimated length of 17 inches passing Wanapum left bank count station on June 17, 2016 at 14:07.

3.0 Bull Trout Observations and Handling on Nason Creek and White River

Grant PUD monitors the White River and Nason Creek, through the Yakama Nation (YN) operation of screw traps, as part of Grant PUD’s spring Chinook hatchery supplementation program. A map showing the location of the screw traps is provided in Figure 11 below. The YN operates screw traps for spring Chinook salmon and records incidental trapping of bull trout in the White River and Nason Creek. During screw trap operations in 2016, The YN identified one bull trout collected from Nason Creek and five collected from the White River (see Table 4 for more details). Fork length and life stage was recorded for each fish captured.

Table 4 Bull trout data from Nason Creek and White River screw traps.

Nason Creek	Date	Species	Fork Length (mm)	Stage
	11/7/2016	Bull Trout	199	SA
White River	Date	Species	Fork Length (mm)	Stage
	6/13/2016	Bull Trout	132	SA
	7/18/2016	Bull Trout	420	A
	8/26/2016	Bull Trout	685	A
	10/3/2016	Bull Trout	275	SA
	10/4/2016	Bull Trout	193	SA
Note: An “A” is used in this table to indicate adult life stages. “SA” is used to denote the sub-adult life stage, consistent with previous Grant PUD reports for fish between 127 and 330 mm.				

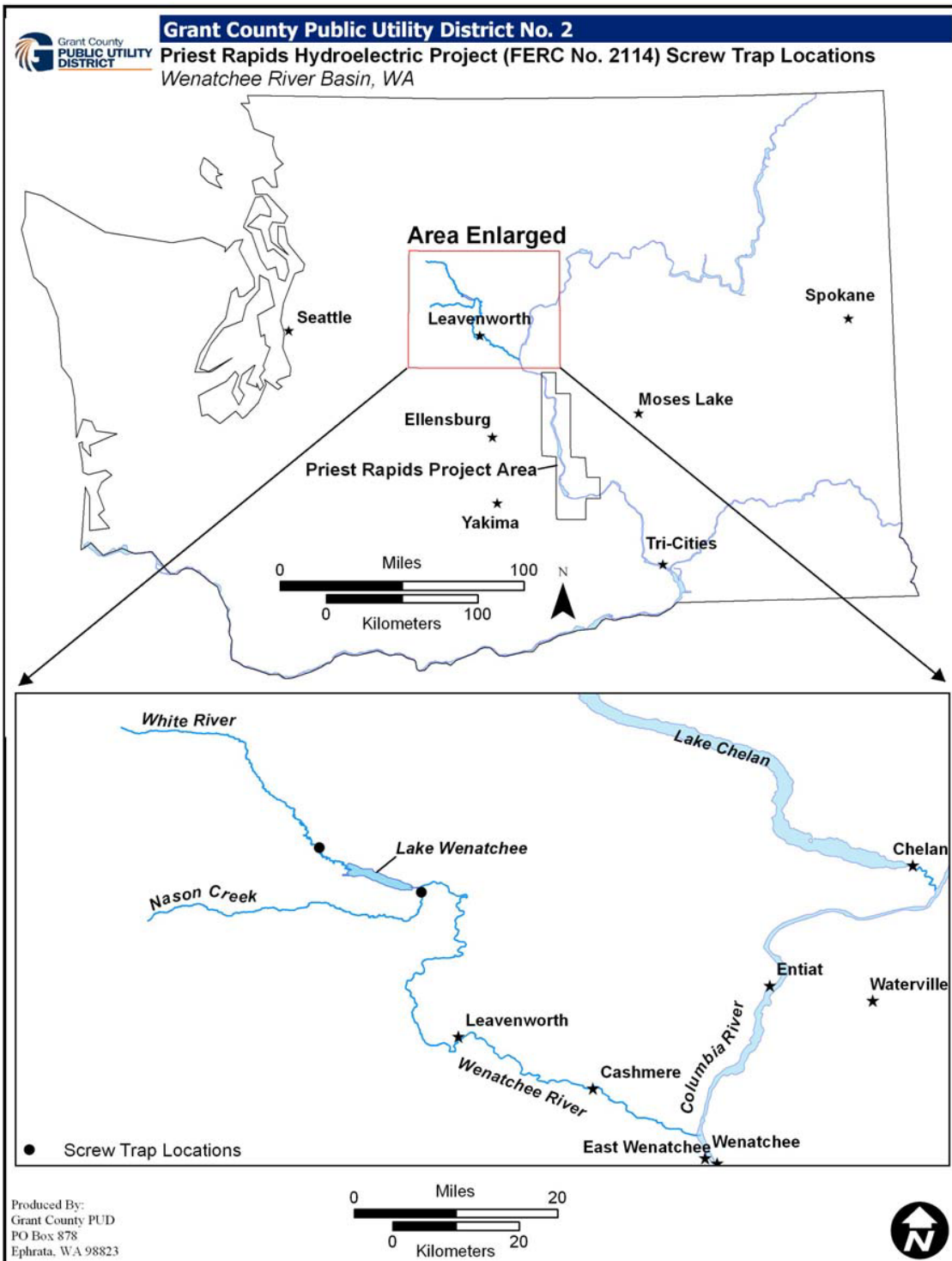


Figure 11 Screw Trap Locations on the White River and Nason Creek.

4.0 Hydrologic and Water Quality Monitoring

In the 2014 5-year Bull Trout Monitoring and Evaluation Plan, Grant PUD, in coordination with USFWS, agreed to monitor changes in Project elevation, discharge, temperature and total dissolved gas and report daily average values. Appendix A contains a listing of daily averages as recorded throughout the Project (Keeler 2016).

5.0 Summary

In 2016, bull trout monitoring occurred throughout all Grant PUD programs in accordance with the BTMEP, BTWQP, and Bull Trout Biological Opinion for the Project (USFWS 2007). Based on the number of bull trout encountered, Grant PUD did not exceed the total annual “take” limits based on the Biological Opinion for the Project (USFWS 2007), and no lethal take was documented as a result of Grant PUD’s 2016 operations. Table 5 below provides a summary of bull trout “take” in 2016 as defined by the Biological Opinion (USFWS 2007).

Table 5 Summary of 2016 reporting period take on bull trout.

Project Element	Type of Take	Lethal Take		Non-lethal Take	
		Adult	Juvenile/Sub-Adult	Adult	Juvenile/Sub-Adult
Turbine Operations	Harm or Harass	0	0	0	0
Juvenile Fish Bypass	Harm or Harass	0	0	0	1
Spill Operations	Harm or Harass	0	0	0	0
Adult Fishways	Harass	0	0	9	0
Hydrograph Variation	Harm or Harass	0	0	0	0
Predator Control	Harm or Harass	0	0	0	0
Nason Creek Smolt Trap	Harm or Harass	0	0	0	1
White River Smolt Trap	Harm or Harass	0	0	2	3
	TOTAL	0	0	11	5

List of Literature

Federal Energy Regulatory Commission, Order Issuing New License for Public Utility District No. 2 of Grant County, Docket Number P-2114-116 (April 17, 2008).

Keeler, C. 2016. Summary of 2016 Annual Fish-Spill Season and Total Dissolved Gas Monitoring. Prepared for Public Utility District No. 2 of Grant County, Washington. October, 2016.

National Marine Fisheries Service (NMFS). 2008. Endangered Species Act – Section 7 Consultation Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Consultation for the New License for the Priest Rapids Hydroelectric Project, FERC Project No. 2114. Portland, Oregon.

United States Department of Interior Fish and Wildlife Service (USFWS). 2007. USFWS Biological Opinion on the Effects of the Priest Rapids Hydroelectric Project Relicensing on Bull Trout (FERC No. 2114). Spokane, Washington. USFWS Reference: 13260- 2006 -P-0008, 13 260-2001-F-0062.

Appendix A
Project Operations/Water Quality Daily Average Data.

Table A-1 Wanapum Daily Averages.

Date	Wanapum Forebay			Wanapum Tailrace			
	Elevation (ft)	TDG (%SAT)	Temp (°C)	Elevation (ft)	Discharge (kcfs)	TDG (%SAT)	Temp (°C)
4/16/2015	571.42	111.2	8.8	495.21	209.0	115.0	8.3
4/17/2015	571.42	114.0	8.8	495.35	218.9	118.1	8.2
4/18/2015	571.42	116.9	9.0	495.63	208.2	118.5	8.3
4/19/2015	571.42	119.3	9.1	495.29	194.6	117.3	8.5
4/20/2015	571.38	120.4	9.5	494.77	199.1	117.7	8.9
4/21/2015	571.14	119.1	9.6	495.09	195.3	120.3	9.2
4/22/2015	571.3	116.2	9.7	494.63	233.5	122.6	9.5
4/23/2015	571.24	114.0	9.8	496.09	195.3	119.1	9.7
4/24/2015	571.28	113.7	9.9	494.44	204.0	120.3	9.8
4/25/2015	571.18	113.0	9.8	494.9	192.3	119.1	9.7
4/26/2015	571.25	112.8	10.0	494.61	188.8	114.6	9.7
4/27/2015	571.35	112.8	10.2	494.55	192.5	115.1	9.9
4/28/2015	571.33	113.7	10.5	494.69	196.1	116.6	10.0
4/29/2015	571.24	113.0	10.2	494.7	175.8	114.5	10.1
4/30/2015	571.29	112.6	10.7	494.17	158.2	113.5	10.2
5/1/2015	570.99	113.0	11.0	492.93	168.2	113.1	10.6
5/2/2015	570.1	112.1	11.5	492.7	151.6	112.6	10.9
5/3/2015	571.22	112.1	11.7	493.23	168.2	112.4	11.2
5/4/2015	571.23	111.8	11.7	493.66	160.1	112.7	11.4
5/5/2015	570.94	111.2	11.8	493.2	178.0	113.2	11.6
5/6/2015	571.28	111.0	12.0	494	171.6	112.5	11.7
5/7/2015	571.28	112.8	12.3	493.84	164.4	113.3	11.9
5/8/2015	571.04	109.9	12.3	493.52	148.5	112.8	12.2
5/9/2015	571.25	107.6	12.4	492.5	157.1	110.3	12.2
5/10/2015	571.13	108.4	12.7	493.12	176.5	110.0	12.2
5/11/2015	571.22	109.4	12.9	493.95	172.0	110.9	12.3
5/12/2015	571.15	111.8	12.9	493.85	180.2	112.3	12.5
5/13/2015	571.22	110.8	13.1	494.2	176.0	111.7	12.6
5/14/2015	571.19	111.0	12.8	494.03	155.0	112.2	12.6
5/15/2015	570.82	110.2	12.8	492.85	151.6	111.6	12.5
5/16/2015	569.81	110.0	12.7	492.69	151.1	110.9	12.2
5/17/2015	569.08	108.8	12.8	492.55	151.0	110.2	12.4
5/18/2015	569.47	109.4	13.2	492.58	152.3	111.0	12.9
5/19/2015	570.56	107.9	13.1	492.77	137.9	110.1	13.0
5/20/2015	568.99	108.7	13.3	491.97	137.0	110.3	13.0

5/21/2015	567.33	109.1	13.6	491.61	116.7	110.6	13.2
5/22/2015	566.7	106.6	13.4	490.85	94.9	109.7	13.3
5/23/2015	565.73	105.7	13.4	489.05	123.2	109.2	13.3
5/24/2015	566.55	107.4	13.9	490.53	147.9	109.3	13.4
5/25/2015	568.9	107.4	13.7	492.33	152.4	109.5	13.5
5/26/2015	568.98	106.2	13.8	492.69	136.7	108.8	13.7
5/27/2015	568.12	105.5	13.8	491.7	128.4	108.4	13.7
5/28/2015	569.17	106.3	13.9	491.39	148.5	N/D	N/D
5/29/2015	571.13	107.4	13.9	492.74	143.1	N/D	N/D
5/30/2015	570.55	107.4	14.4	492.53	131.7	N/D	N/D
5/31/2015	568.74	109.4	14.7	491.57	143.4	110.3	14.0
6/1/2015	568.22	112.4	15.1	492.16	150.5	112.3	14.3
6/2/2015	568.59	110.7	14.8	492.48	135.5	112.0	14.6
6/3/2015	568.5	111.1	15.7	491.8	143.2	111.5	14.8
6/4/2015	569.07	112.7	15.8	492.21	157.6	112.5	15.0
6/5/2015	570.31	114.9	16.1	492.94	156.9	113.6	15.1
6/6/2015	569.99	115.2	16.3	492.93	154.3	113.9	15.4
6/7/2015	570.34	113.9	16.4	492.77	155.2	113.7	15.6
6/8/2015	570.28	112.7	16.1	492.83	142.2	113.5	15.9
6/9/2015	569.62	110.7	16.2	492.18	134.0	111.9	15.9
6/10/2015	568.89	110.4	16.1	491.78	135.0	112.0	15.8
6/11/2015	569.22	108.4	15.9	491.9	129.2	110.7	15.7
6/12/2015	568.86	107.9	16.1	491.55	136.3	110.0	15.8
6/13/2015	569.09	109.3	16.1	491.94	143.1	111.3	15.9
6/14/2015	569.5	108.8	15.9	492.3	119.9	111.3	15.7
6/15/2015	569.02	108.9	15.8	491.1	142.6	111.1	15.5
6/16/2015	570.53	108.4	15.5	492.41	142.2	110.8	15.3
6/17/2015	570.27	109.5	15.7	492.38	149.3	110.9	15.2
6/18/2015	569.3	108.6	15.2	492.53	107.0	111.0	15.1
6/19/2015	567.34	108.0	15.3	490.17	95.4	111.1	15.0
6/20/2015	568.99	109.5	15.8	489.77	137.1	111.0	15.2
6/21/2015	569.82	108.3	15.7	491.57	139.3	110.3	15.4
6/22/2015	569.08	110.0	15.9	491.95	148.7	111.6	15.5
6/23/2015	570.29	110.4	15.9	492.1	157.9	111.5	15.6
6/24/2015	569.34	108.0	15.7	492.82	147.8	109.9	15.6
6/25/2015	568.5	108.5	16.3	492.41	156.6	109.1	15.9
6/26/2015	568.65	110.6	16.6	492.78	156.8	110.7	16.2
6/27/2015	568.26	111.9	17.2	492.76	155.0	112.8	16.8
6/28/2015	568.08	112.4	17.3	492.63	146.5	112.8	17.2

6/29/2015	568.51	112.3	17.5	492.28	144.5	112.3	17.1
6/30/2015	568.49	110.5	17.5	492.27	140.1	112.1	17.3
7/1/2015	569.97	109.9	17.8	492.32	148.7	111.5	17.5
7/2/2015	570.45	110.2	17.9	492.76	136.7	112.0	17.7
7/3/2015	569.79	109.1	17.8	492.01	118.8	111.8	17.7
7/4/2015	570.5	107.4	17.8	491.29	133.6	110.4	17.7
7/5/2015	570.53	107.5	17.9	492.06	129.7	110.4	17.7
7/6/2015	570.06	108.3	17.9	491.7	143.6	110.3	17.6
7/7/2015	569.65	110.0	18.1	492.36	140.0	111.6	17.5
7/8/2015	570.11	110.7	17.9	492.28	147.9	111.8	17.6
7/9/2015	568.77	110.4	17.9	492.53	105.4	112.1	17.7
7/10/2015	567.78	109.0	17.7	490.21	84.4	112.3	17.6
7/11/2015	568.58	107.9	17.8	489.13	116.6	111.3	17.5
7/12/2015	570.05	108.6	17.7	491.09	111.1	111.5	17.4
7/13/2015	570.13	107.9	17.6	490.82	116.5	110.7	17.4
7/14/2015	569.69	108.9	17.9	491.09	118.4	N/A	N/A
7/15/2015	570.6	108.0	17.8	491.3	125.2	N/A	N/A
7/16/2015	571.01	108.9	18.1	491.6	128.2	N/A	N/A
7/17/2015	570.87	109.0	18.4	491.88	118.4	N/A	N/A
7/18/2015	570.94	109.1	18.1	491.39	132.1	N/A	N/A
7/19/2015	570.2	109.5	18.1	491.99	114.9	111.8	17.7
7/20/2015	569.8	109.7	18.7	491.03	124.3	111.1	17.7
7/21/2015	570.11	110.5	18.8	491.52	123.7	111.0	17.9
7/22/2015	569.49	107.7	18.2	491.21	103.6	111.5	18.1
7/23/2015	569.98	106.8	18.5	490.4	98.7	111.1	18.1
7/24/2015	570.51	109.0	19.0	490.34	101.7	112.7	18.3
7/25/2015	570.78	111.9	18.8	490.57	114.3	112.5	18.4
7/26/2015	570.89	109.5	19.3	491.3	113.4	111.8	18.7
7/27/2015	570.53	111.0	19.8	491.13	127.3	112.3	19.0
7/28/2015	570.43	110.2	20.1	491.79	136.3	113.5	19.3
7/29/2015	570.53	110.1	20.0	491.38	133.9	112.2	19.4
7/30/2015	570.2	107.9	19.8	492.03	115.9	111.8	19.6
7/31/2015	570.57	105.8	19.8	491.09	113.7	110.3	19.5
8/1/2015	569.57	106.5	20.1	490.96	132.5	109.9	19.3
8/2/2015	568.17	105.5	19.3	491.75	101.0	110.6	19.2
8/3/2015	568.8	103.3	19.3	490.04	114.4	109.4	19.0
8/4/2015	569.75	106.8	20.1	490.81	116.6	110.4	19.5
8/5/2015	569.29	109.0	20.3	491.05	114.6	111.8	19.7
8/6/2015	570.23	106.7	19.9	491.1	110.2	111.0	19.6

8/7/2015	570.51	106.3	19.9	491	95.7	111.7	19.7
8/8/2015	570.77	105.2	19.6	490.43	102.7	110.6	19.4
8/9/2015	570.11	104.3	19.5	490.44	108.5	110.4	19.2
8/10/2015	570.1	106.4	19.6	490.69	119.3	110.0	19.1
8/11/2015	569.14	107.0	19.8	490.87	117.6	109.8	19.1
8/12/2015	567.66	108.5	20.2	490.78	115.3	110.6	19.3
8/13/2015	567.66	108.9	20.2	490.57	109.8	110.5	19.4
8/14/2015	566.5	107.7	20.2	490.12	84.9	111.1	19.6
8/15/2015	566.9	106.5	20.2	488.86	101.2	109.4	19.7
8/16/2015	568.17	105.7	20.3	489.96	95.2	105.8	19.9
8/17/2015	568.89	105.9	20.4	490.06	98.0	105.5	19.9
8/18/2015	570.02	107.0	20.4	490.4	111.6	106.3	20.1
8/19/2015	570.81	105.5	20.4	491.29	127.4	106.7	20.2
8/20/2015	570.08	104.8	20.5	491.89	111.2	105.0	20.2
8/21/2015	568.1	104.0	20.6	490.91	71.4	104.8	20.3
8/22/2015	568.51	102.7	20.2	488.7	114.5	103.8	20.0
8/23/2015	569.39	102.3	20.4	491.03	111.3	102.8	19.9
8/24/2015	568.07	102.6	20.5	490.76	96.5	102.8	20.0
8/25/2015	567.6	103.4	20.6	489.71	96.8	103.2	20.0
8/26/2015	568.1	104.1	20.5	489.94	114.9	103.6	20.0
8/27/2015	567.78	101.2	20.1	490.85	76.7	102.8	19.9
8/28/2015	568.37	100.3	20.0	489.04	91.0	101.3	19.7
8/29/2015	569.47	101.7	20.2	489.87	109.0	102.0	19.7
8/30/2015	567.27	101.7	20.0	490.61	93.1	102.1	19.7
8/31/2015	566.8	100.4	19.8	489.59	63.8	102.0	19.6
9/1/2015	567.65	99.6	19.5	488.26	75.4	101.8	19.4
9/2/2015	569.15	98.9	19.3	489.16	72.0	101.9	19.1
9/3/2015	569.58	99.1	19.3	489.19	80.6	101.6	18.9
9/4/2015	570.07	99.3	19.2	489.65	70.3	101.9	18.8
9/5/2015	569.64	98.9	18.9	489.02	63.6	101.4	18.6
9/6/2015	569.41	99.9	18.8	488.65	82.1	101.1	18.6
9/7/2015	568.04	99.8	18.8	489.24	57.4	100.7	18.6
9/8/2015	566.79	98.1	18.6	487.58	50.3	100.3	18.5
9/9/2015	568.09	98.1	18.6	487.17	87.2	99.6	18.3
9/10/2015	569.33	99.7	18.5	489.78	76.9	101.0	18.3
9/11/2015	569.06	98.5	18.7	489.33	59.7	101.0	18.3
9/12/2015	568.79	99.5	18.5	488.39	67.3	100.6	18.3
9/13/2015	568.08	98.8	18.7	488.38	69.1	100.9	18.2
9/14/2015	567.93	100.8	18.5	488.25	69.1	101.2	18.2

9/15/2015	568.21	100.1	18.6	488.6	74.1	101.0	18.3
9/16/2015	568.74	100.6	18.6	488.78	74.6	101.4	18.3
9/17/2015	568.93	97.5	18.5	489.12	49.3	101.9	18.3
9/18/2015	570.07	98.9	18.4	488.08	67.8	101.6	18.2
9/19/2015	570.85	99.9	18.2	489.43	73.5	101.1	18.1
9/20/2015	570.42	100.3	18.3	489.56	87.0	100.9	18.0
9/21/2015	569.59	100.5	18.4	489.8	84.9	101.5	18.1
9/22/2015	569.51	99.6	18.5	489.63	66.0	101.3	18.2
9/23/2015	570	98.6	18.2	489.03	66.8	101.0	18.0
9/24/2015	570.38	98.6	18.0	489.08	88.4	99.5	17.8
9/25/2015	570.75	97.8	18.0	490.3	70.8	99.6	17.8
9/26/2015	569.85	100.6	18.5	488.95	90.9	100.4	17.8
9/27/2015	568.34	99.2	18.2	490.08	66.1	100.6	18.0
9/28/2015	567.94	100.5	18.7	488.21	75.4	100.6	18.1
9/29/2015	568.58	99.0	18.6	488.95	74.3	101.1	18.3
9/30/2015	570.03	99.8	18.5	488.82	73.0	101.0	18.2
10/1/2015	570.39	98.7	18.3	488.78	66.1	100.9	18.1
10/2/2015	570.6	100.1	18.1	488.62	83.0	100.9	18.0
10/3/2015	570.81	99.9	18.0	489.8	78.4	100.7	17.8
10/4/2015	570.39	99.5	18.0	489.47	79.4	100.2	17.8
10/5/2015	570.07	97.5	17.9	489.48	73.5	99.4	17.7
10/6/2015	569.23	97.2	17.8	488.91	62.1	99.0	17.6
10/7/2015	569.08	98.0	17.6	488.12	65.4	99.1	17.5
10/8/2015	568.97	98.3	17.7	488.64	74.3	99.2	17.5
10/9/2015	570	98.3	17.5	489.3	70.1	99.4	17.4
10/10/2015	570	98.2	17.3	489.12	77.4	98.8	17.2
10/11/2015	569.58	97.5	17.1	488.93	82.6	97.9	16.9
10/12/2015	570.37	97.5	16.9	488.31	93.9	97.8	16.7
10/13/2015	569.45	98.9	16.7	490.26	86.3	98.8	16.5
10/14/2015	568.48	98.7	16.4	489.86	75.8	99.3	16.2
10/15/2015	569.55	98.5	16.1	488.69	90.3	102.8	16.0
10/16/2015	569.88	98.4	15.9	488.92	75.8	100.2	15.8
10/17/2015	570.19	N/A	N/A	489.01	85.4	99.2	15.6
10/18/2015	569.88	N/A	N/A	489.03	88.2	96.9	15.4
10/19/2015	569.73	N/A	N/A	489.18	95.2	96.1	15.3
10/20/2015	569.68	N/A	N/A	489.94	93.5	96.7	15.3
10/21/2015	569.71	N/A	N/A	489.72	91.2	97.0	15.2
10/22/2015	568.17	N/A	N/A	489.7	90.1	97.6	15.2
10/23/2015	567.28	N/A	N/A	489.19	74.2	98.1	15.1

10/24/2015	566.9	N/A	N/A	488.46	74.1	98.0	15.1
10/25/2015	568.08	97.9	15.0	488.23	89.6	98.2	15.0
10/26/2015	569.14	97.9	14.9	489.24	111.3	102.9	14.9
10/27/2015	569.72	98.0	15.0	490.75	106.7	100.9	15.0
10/28/2015	568.46	97.3	15.0	490.39	93.2	97.4	14.9
10/29/2015	568.36	97.3	14.9	489.6	93.4	97.4	14.9
10/30/2015	569.49	98.8	14.9	489.67	97.0	98.9	14.9
10/31/2015	570.09	98.4	14.8	489.88	116.4	103.9	14.8
11/1/2015	570.28	97.6	14.8	490.54	130.0	105.8	14.8
11/2/2015	569.08	96.7	14.7	491.76	107.1	97.5	14.7
11/3/2015	567.3	96.3	14.7	490.26	104.6	97.4	14.7
11/4/2015	568.44	96.8	14.7	489.74	114.1	97.5	14.6
11/5/2015	568.34	97.5	14.5	490.26	112.5	99.5	14.5
11/6/2015	568.6	97.4	14.4	490.24	98.8	99.7	14.4
11/7/2015	568.57	96.6	14.4	489.48	111.8	98.2	14.3
11/8/2015	568.5	96.9	14.3	490.32	118.7	100.2	14.3
11/9/2015	568.11	96.9	14.3	490.98	116.4	101.4	14.3
11/10/2015	568.5	97.2	14.2	490.69	122.5	101.3	14.2
11/11/2015	569.02	98.6	14.1	491.11	120.4	100.7	14.1
11/12/2015	568.55	98.7	14.0	490.67	94.7	101.0	14.0
11/13/2015	567.98	98.1	13.9	488.98	113.8	100.4	13.9
11/14/2015	568.96	97.9	13.7	490.15	113.7	99.9	13.7
11/15/2015	567.69	98.2	13.6	490.32	106.3	100.1	13.6

Table A-2 Priest Rapids Daily Averages.

Date	Priest Rapids Forebay			Priest Rapids Tailrace			
	Elevation (ft)	TDG (%SAT)	Temp (°C)	Elevation (ft)	Discharge (kcfs)	TDG (%SAT)	Temp (°C)
4/16/2015	487.5	112.9	8.6	413.95	212.4	117.2	8.6
4/17/2015	487.5	114.2	8.5	413.95	220.3	118.7	8.5
4/18/2015	487.65	117.7	8.5	414.38	213.0	120.2	8.6
4/19/2015	487.67	116.7	8.7	414.79	197.0	119.0	8.7
4/20/2015	487.71	117.2	9.0	414.47	205.7	119.9	9.0
4/21/2015	487.54	117.5	9.4	413.65	193.2	118.8	9.4
4/22/2015	487.71	120.2	9.7	413.89	237.6	120.9	9.6
4/23/2015	487.64	115.0	9.9	413.14	199.3	118.4	9.8
4/24/2015	487.8	116.7	10.0	415.94	210.4	119.2	10.0
4/25/2015	487.35	114.1	9.9	413.38	195.3	117.1	9.9
4/26/2015	487.09	112.3	9.9	414.24	190.1	116.7	9.9
4/27/2015	487.55	113.1	10.0	413.57	193.8	117.1	10.0
4/28/2015	487.37	113.5	10.1	413.25	196.5	117.7	10.1
4/29/2015	487.57	112.1	10.2	413.41	175.5	114.8	10.2
4/30/2015	487.58	110.7	10.4	413.58	172.0	111.5	10.3
5/1/2015	487.69	112.7	10.7	412.58	171.8	113.6	10.7
5/2/2015	485.88	112.6	11.0	412.73	135.0	113.3	11.0
5/3/2015	483.17	112.2	11.3	412.73	167.2	114.1	11.3
5/4/2015	485.15	111.7	11.7	411.38	159.3	113.5	11.6
5/5/2015	487.33	111.6	11.8	411.92	174.7	114.0	11.7
5/6/2015	487.01	112.8	12.0	411.56	171.2	114.3	11.9
5/7/2015	487.33	112.9	12.2	412.47	164.0	114.5	12.2
5/8/2015	487.42	111.1	12.4	412.33	148.3	113.5	12.3
5/9/2015	487.45	107.5	12.4	411.73	159.3	111.2	12.2
5/10/2015	487.25	108.5	12.4	410.37	174.1	112.2	12.4
5/11/2015	487.26	110.2	12.6	411.33	171.8	113.7	12.5
5/12/2015	487.13	111.0	12.7	412.21	178.6	114.3	12.7
5/13/2015	487.19	111.0	12.8	412.27	175.8	114.6	12.8
5/14/2015	487.52	111.0	12.8	412.54	156.0	112.0	12.7
5/15/2015	487.41	110.4	12.7	412.39	148.6	111.5	12.6
5/16/2015	486.53	110.0	12.6	411.4	153.2	111.2	12.6
5/17/2015	486.53	109.9	12.7	410.79	142.2	111.2	12.6
5/18/2015	486.16	110.2	13.0	411.16	150.3	111.7	12.9
5/19/2015	486.45	109.1	13.2	410.32	138.1	111.0	13.1
5/20/2015	486.83	108.3	13.2	410.85	137.3	110.0	13.1

5/21/2015	486.52	109.1	13.3	410	117.8	110.9	13.2
5/22/2015	485.52	108.2	13.5	410.1	92.8	110.6	13.4
5/23/2015	486.25	107.8	13.6	408.48	121.3	110.3	13.4
5/24/2015	484.97	107.1	13.6	406.38	139.5	110.0	13.5
5/25/2015	484.61	107.9	13.8	408.78	150.2	109.8	13.7
5/26/2015	486.29	107.5	13.9	410.08	135.9	109.9	13.8
5/27/2015	486.6	106.0	13.9	411.03	122.9	109.4	13.8
5/28/2015	486.04	106.9	13.9	409.91	141.0	110.1	13.7
5/29/2015	486.34	108.3	13.9	408.85	149.8	111.1	13.8
5/30/2015	487.36	107.5	14.0	410.18	128.9	110.1	13.9
5/31/2015	487.37	108.8	14.2	410.81	139.2	111.0	14.1
6/1/2015	486.1	110.9	14.5	409.33	145.9	112.1	14.4
6/2/2015	486.2	110.4	14.9	410.13	133.5	111.8	14.7
6/3/2015	486.23	110.0	15.1	410.63	138.7	111.7	15.0
6/4/2015	486.33	111.2	15.3	409.64	153.5	112.6	15.3
6/5/2015	486.46	112.6	15.5	410.03	154.3	113.4	15.4
6/6/2015	486.56	113.3	15.8	411.15	150.8	113.9	15.6
6/7/2015	486.57	112.4	15.9	411.24	152.3	113.1	15.8
6/8/2015	486.6	111.8	16.0	410.99	140.6	112.7	15.9
6/9/2015	486.53	110.0	16.1	411.1	131.6	111.5	15.9
6/10/2015	486.52	110.2	16.2	410.22	131.4	111.7	16.0
6/11/2015	486.42	108.8	16.0	409.53	127.7	110.9	15.8
6/12/2015	486.56	108.7	16.0	409.57	132.1	111.1	15.9
6/13/2015	486.52	109.3	16.1	409.21	141.1	111.5	16.0
6/14/2015	486.62	109.1	16.1	409.53	115.9	111.4	15.9
6/15/2015	486.69	109.0	15.8	410.21	139.0	111.3	15.6
6/16/2015	486.58	108.6	15.6	408.28	138.9	111.1	15.5
6/17/2015	487.16	109.1	15.4	409.97	148.4	111.2	15.3
6/18/2015	487.04	109.4	15.4	410	109.8	111.4	15.2
6/19/2015	486.45	108.1	15.3	410.79	90.8	112.9	15.2
6/20/2015	485.81	111.1	15.5	407.8	132.2	111.5	15.3
6/21/2015	486.48	109.5	15.6	405.87	136.0	111.3	15.5
6/22/2015	485.47	109.9	15.8	409.82	150.0	111.2	15.7
6/23/2015	486.49	110.9	16.1	409.77	150.5	112.1	15.9
6/24/2015	485.3	108.6	16.1	410.97	145.2	111.1	15.9
6/25/2015	485.95	108.1	16.3	411.04	152.0	110.7	16.0
6/26/2015	486.33	109.4	16.6	410.59	154.7	111.4	16.4
6/27/2015	486.2	111.1	17.1	411.07	154.4	112.6	16.8
6/28/2015	486.03	111.6	17.5	411.33	139.9	112.4	17.2

6/29/2015	485.74	111.7	17.6	411.36	141.9	112.4	17.4
6/30/2015	486.14	110.7	17.7	410.28	135.3	112.4	17.5
7/1/2015	486.19	110.4	17.9	410.49	144.2	112.4	17.7
7/2/2015	487.1	110.0	18.1	409.7	135.1	112.2	17.8
7/3/2015	487.17	109.3	18.2	410.43	114.0	112.3	18.0
7/4/2015	486.73	108.2	18.1	409.76	132.5	111.5	17.9
7/5/2015	487.27	108.0	18.1	407.96	127.0	111.1	17.9
7/6/2015	487.33	108.2	18.1	409.48	139.2	111.1	17.9
7/7/2015	486.79	109.7	18.1	409.14	139.9	112.2	17.9
7/8/2015	486.84	110.1	18.1	410.07	144.9	112.3	17.9
7/9/2015	486.88	109.8	18.1	410.13	103.0	112.4	17.9
7/10/2015	486.36	109.4	18.2	410.59	83.8	112.9	17.9
7/11/2015	485.95	107.9	18.0	407.25	110.7	112.7	17.8
7/12/2015	486.13	109.0	18.0	405.42	109.4	111.8	17.8
7/13/2015	486.96	108.6	18.0	407.61	114.8	111.2	17.8
7/14/2015	486.89	109.2	18.0	407.82	112.0	112.3	17.8
7/15/2015	486.87	109.1	18.0	408.24	120.3	111.6	17.8
7/16/2015	487.28	110.2	18.0	407.96	127.3	112.8	17.8
7/17/2015	487.42	110.8	18.4	408.6	115.5	113.6	18.2
7/18/2015	487.46	110.4	18.4	409.19	130.6	112.3	18.2
7/19/2015	487.42	109.8	18.4	408.09	113.3	112.3	18.2
7/20/2015	487.09	109.8	18.4	409.45	122.2	112.5	18.3
7/21/2015	486.86	110.2	18.5	408.04	118.2	113.2	18.3
7/22/2015	486.96	109.4	18.6	408.72	99.9	112.6	18.4
7/23/2015	486.74	108.9	18.7	408.31	93.7	113.0	18.5
7/24/2015	487.02	110.0	18.8	406.74	99.4	113.2	18.6
7/25/2015	487.2	112.2	19.1	406.23	111.5	114.0	18.9
7/26/2015	487.41	111.1	19.3	406.8	111.5	113.1	19.1
7/27/2015	487.48	110.7	19.4	407.79	127.1	112.8	19.3
7/28/2015	487.27	112.2	19.8	407.82	133.0	113.6	19.6
7/29/2015	487.17	112.8	19.9	409.06	131.9	113.6	19.8
7/30/2015	487.25	111.9	20.1	409.44	110.2	112.8	19.9
7/31/2015	486.98	109.7	20.0	409.47	113.6	111.2	19.8
8/1/2015	487.13	109.2	19.9	407.69	133.7	110.7	19.7
8/2/2015	486.82	109.0	19.9	408.06	97.0	112.3	19.7
8/3/2015	486.25	108.2	19.6	409.67	107.2	112.1	19.3
8/4/2015	486.25	109.0	19.7	406.45	113.4	112.1	19.5
8/5/2015	486.46	110.6	20.1	407.28	109.4	113.5	19.9
8/6/2015	486.7	110.0	20.1	408.14	104.8	112.6	19.9

8/7/2015	487.08	109.8	20.1	407.72	94.9	113.1	19.8
8/8/2015	487.24	109.3	19.9	407.33	98.2	112.1	19.7
8/9/2015	487.39	109.1	19.7	406.48	106.7	112.0	19.5
8/10/2015	486.99	109.0	19.7	406.82	117.6	111.2	19.4
8/11/2015	486.95	109.1	19.7	407.57	115.6	111.5	19.5
8/12/2015	486.05	109.7	19.8	408.51	110.9	112.2	19.6
8/13/2015	485.88	110.4	20.0	408.37	108.1	112.0	19.8
8/14/2015	485.69	110.2	20.1	407.85	82.2	113.2	19.9
8/15/2015	485.26	109.4	20.2	407.76	94.0	112.5	19.9
8/16/2015	485.5	109.3	20.3	405.24	90.9	112.1	20.1
8/17/2015	485.96	108.0	20.4	406.25	93.3	107.0	20.3
8/18/2015	486.42	107.5	20.5	406.14	106.5	105.5	20.4
8/19/2015	487	107.5	20.7	406.9	125.8	106.6	20.5
8/20/2015	487.42	108.6	20.7	408.3	112.5	106.9	20.5
8/21/2015	487.2	106.4	20.9	409.91	71.1	105.7	20.6
8/22/2015	486.52	105.0	20.5	408.86	107.9	103.3	20.3
8/23/2015	486.09	103.6	20.3	405.06	111.8	102.5	20.0
8/24/2015	486.62	103.5	20.4	408.25	92.3	103.2	20.2
8/25/2015	486.24	103.8	20.5	408.55	92.8	103.8	20.3
8/26/2015	485.59	104.4	20.5	406.88	113.2	104.4	20.3
8/27/2015	486.1	104.7	20.4	406.94	74.7	104.2	20.2
8/28/2015	485.99	103.2	20.2	408.81	85.1	102.4	20.1
8/29/2015	486.27	102.9	20.1	405.47	109.6	102.3	20.0
8/30/2015	486.59	102.3	20.2	405.91	92.1	102.4	19.9
8/31/2015	486.15	101.4	20.0	408.54	60.3	102.5	19.8
9/1/2015	485.67	100.6	19.8	406.99	72.2	101.9	19.7
9/2/2015	486	100.6	19.6	403.91	70.7	101.8	19.4
9/3/2015	486.63	100.9	19.3	405.07	80.3	101.8	19.2
9/4/2015	486.82	101.3	19.2	404.88	68.5	102.1	19.0
9/5/2015	486.93	100.9	19.0	405.61	61.3	101.6	18.8
9/6/2015	486.84	100.8	18.9	404.78	86.3	101.4	18.7
9/7/2015	486.65	100.5	18.9	404.03	60.0	101.3	18.7
9/8/2015	485.96	100.2	18.9	406.27	42.6	101.2	18.7
9/9/2015	485.37	99.4	18.7	403.93	83.4	100.3	18.5
9/10/2015	485.42	100.4	18.8	401.9	75.4	101.5	18.5
9/11/2015	486.48	100.0	18.6	406.05	60.0	101.5	18.5
9/12/2015	486.77	99.3	18.6	405.52	72.1	101.0	18.4
9/13/2015	486.57	99.3	18.5	403.89	64.1	101.6	18.3
9/14/2015	485.81	99.4	18.4	405.14	67.3	101.9	18.3

9/15/2015	485.54	99.3	18.5	404.29	71.7	101.9	18.4
9/16/2015	486.17	100.8	18.7	404.69	73.6	102.3	18.5
9/17/2015	485.97	101.0	18.6	405.04	43.8	102.4	18.5
9/18/2015	486.55	100.5	18.6	405.29	65.3	102.0	18.4
9/19/2015	486.54	100.3	18.4	402.07	74.4	101.4	18.2
9/20/2015	487.4	100.2	18.2	404.31	85.9	101.1	18.0
9/21/2015	487.42	100.7	18.2	405.32	82.3	101.7	17.9
9/22/2015	486.83	100.7	18.2	406.53	64.4	101.8	18.0
9/23/2015	486.71	100.4	18.2	406.14	63.8	101.4	17.9
9/24/2015	486.94	99.2	18.1	404.39	86.2	100.4	17.8
9/25/2015	487.05	99.4	18.1	404.29	73.0	100.6	17.9
9/26/2015	487.45	100.2	18.1	406.27	87.8	102.5	17.9
9/27/2015	486.48	100.7	18.3	405.22	67.6	101.7	18.0
9/28/2015	486.91	100.6	18.3	406.63	73.3	101.6	18.1
9/29/2015	485.67	100.9	18.4	404.81	72.8	101.8	18.2
9/30/2015	485.99	100.8	18.3	405.3	72.6	101.6	18.2
10/1/2015	485.88	100.3	18.2	405.19	60.0	101.2	18.0
10/2/2015	485.96	100.4	18.1	405.23	81.7	101.2	17.9
10/3/2015	486.34	100.4	17.9	403.9	73.6	101.2	17.7
10/4/2015	487.15	100.2	18.0	406.26	80.2	100.9	17.7
10/5/2015	486.92	99.5	17.8	405.39	74.1	100.3	17.6
10/6/2015	486.82	98.9	17.8	406.13	59.3	100.0	17.5
10/7/2015	486.24	99.1	17.7	405.37	65.4	100.1	17.4
10/8/2015	485.88	99.0	17.5	403.85	69.7	100.4	17.4
10/9/2015	486.44	99.0	17.5	404.56	69.9	100.1	17.3
10/10/2015	486.97	98.4	17.4	404.81	88.0	98.9	17.2
10/11/2015	486.86	97.6	17.2	404.88	66.1	98.6	16.9
10/12/2015	486.02	98.0	16.9	406.73	93.6	99.0	16.7
10/13/2015	484.73	99.1	16.7	404.47	84.0	99.8	16.5
10/14/2015	487.01	99.2	16.4	407.33	84.2	99.8	16.3
10/15/2015	486.88	98.9	16.2	406.42	84.5	100.9	16.0
10/16/2015	485.45	99.0	15.9	406.33	73.9	101.7	15.7
10/17/2015	484.56	98.9	15.6	405.86	85.3	102.5	15.4
10/18/2015	486.02	97.7	15.6	405.42	83.1	99.2	15.4
10/19/2015	485.24	96.5	15.5	406.36	95.5	97.3	15.3
10/20/2015	485.29	97.1	15.4	406.17	90.7	98.0	15.3
10/21/2015	485.98	97.1	15.3	407.12	93.3	97.9	15.2
10/22/2015	485.61	97.1	15.3	406.81	87.0	98.0	15.1
10/23/2015	485.77	97.2	15.3	406.95	76.2	98.5	15.1

10/24/2015	485.1	97.9	15.2	406.48	70.8	99.3	15.0
10/25/2015	485.09	97.3	15.2	405.39	87.0	98.5	15.0
10/26/2015	484.9	97.5	15.1	405.07	102.9	99.5	14.9
10/27/2015	485.44	102.5	15.0	406.37	104.9	104.5	14.8
10/28/2015	486.49	101.0	14.9	407.57	97.9	102.3	14.8
10/29/2015	486.19	98.5	14.9	407.71	91.8	98.1	14.7
10/30/2015	485.67	99.3	14.8	407.29	93.9	98.6	14.7
10/31/2015	485.63	99.5	14.8	406.78	112.7	102.0	14.6
11/1/2015	485.72	106.1	14.8	407.03	132.7	109.5	14.6
11/2/2015	485.46	106.8	14.8	408.03	113.5	107.3	14.6
11/3/2015	485.79	100.0	14.8	409.73	101.5	100.4	14.6
11/4/2015	485.48	99.3	14.7	408.24	112.1	100.7	14.6
11/5/2015	484.14	99.4	14.7	407.49	108.1	100.3	14.5
11/6/2015	484.85	98.9	14.5	408.25	99.7	101.4	14.4
11/7/2015	484.85	99.9	14.4	408.03	109.9	101.8	14.3
11/8/2015	484.79	99.8	14.4	407.43	116.7	102.2	14.3
11/9/2015	485.17	100.0	14.3	408.02	112.6	103.0	14.2
11/10/2015	485.8	102.2	14.3	408.46	123.1	105.5	14.2
11/11/2015	485.54	101.9	14.2	408.3	120.5	104.2	14.1
11/12/2015	485.65	101.1	14.1	408.96	93.9	101.7	14.0
11/13/2015	484.86	100.4	14.0	408.85	109.4	100.8	13.9
11/14/2015	484.12	100.7	13.9	407.26	111.2	102.7	13.8
11/15/2015	484.59	101.0	13.8	408.05	101.8	102.9	13.7