TUALATIN RIVER
FLOW MANAGEMENT
TECHNICAL COMMITTEE

2016
Annual Report

prepared by
Bernie Bonn for

Clean Water Services

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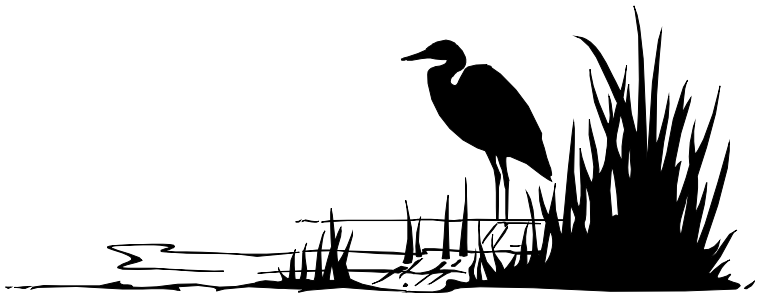
2016 Annual Report



Prepared by:

Bernie Bonn

For:

Clean Water Services

In cooperation with:

Oregon Water Resources Department, District 18 Watermaster

FLOW MANAGEMENT TECHNICAL COMMITTEE MEMBERS

Kristel Griffith, Chair	*City of Hillsboro Water Department*
John Goans	*Tualatin Valley Irrigation District*
Jake Constans	*Oregon Water Resources Department*
Jamie Hughes	*Clean Water Services*
Raj Kapur	*Clean Water Services*
Laura Porter	*Clean Water Services*
Scott Porter	*Washington County — Emergency Management System*
Mark Rosenkranz	*Lake Oswego Corporation*
Brian Dixon	*City of Forest Grove*
Todd Winter	*Washington County Parks — Hagg Lake*

ACRONYMS USED IN THIS REPORT

FULL NAME	ACRONYM
Facilities	
Spring Hill Pumping Plant	SHPP
Wastewater Treatment Facility	WWTF
Organization	
Barney Reservoir Joint Ownership Commission	BRJOC
Clean Water Services	CWS
Joint Water Commission	JWC
Lake Oswego Corporation	LOC
Oregon Department of Environmental Quality	ODEQ
Oregon Department of Fish and Wildlife	ODFW
Oregon Department of Forestry	ODF
Oregon Water Resources Department	OWRD
National Marine Fisheries Service	NMFS
Tualatin Valley Irrigation District	TVID
Tualatin Valley Water District	TVWD
Bureau of Reclamation	BOR
U.S. Fish and Wildlife Service	USFWS
U.S. Geological Survey	USGS

FULL NAME	ACRONYM
Units of Measurement	
Acre-Feet	ac-ft
Cubic Feet per Second	cfs
Micrograms per liter	µg/L
Milligrams per Liter	mg/L
Million Gallons per Day	MGD
Pounds	lbs
River Mile	RM
Water Year	WY
Water Quality Parameters	
Biochemical Oxygen Demand	BOD
Dissolved Oxygen	DO
Sediment Oxygen Demand	SOD
Other	
Biological Opinion	BiOp
Total Maximum Daily Load	TMDL
Wasteload Allocation	WLA

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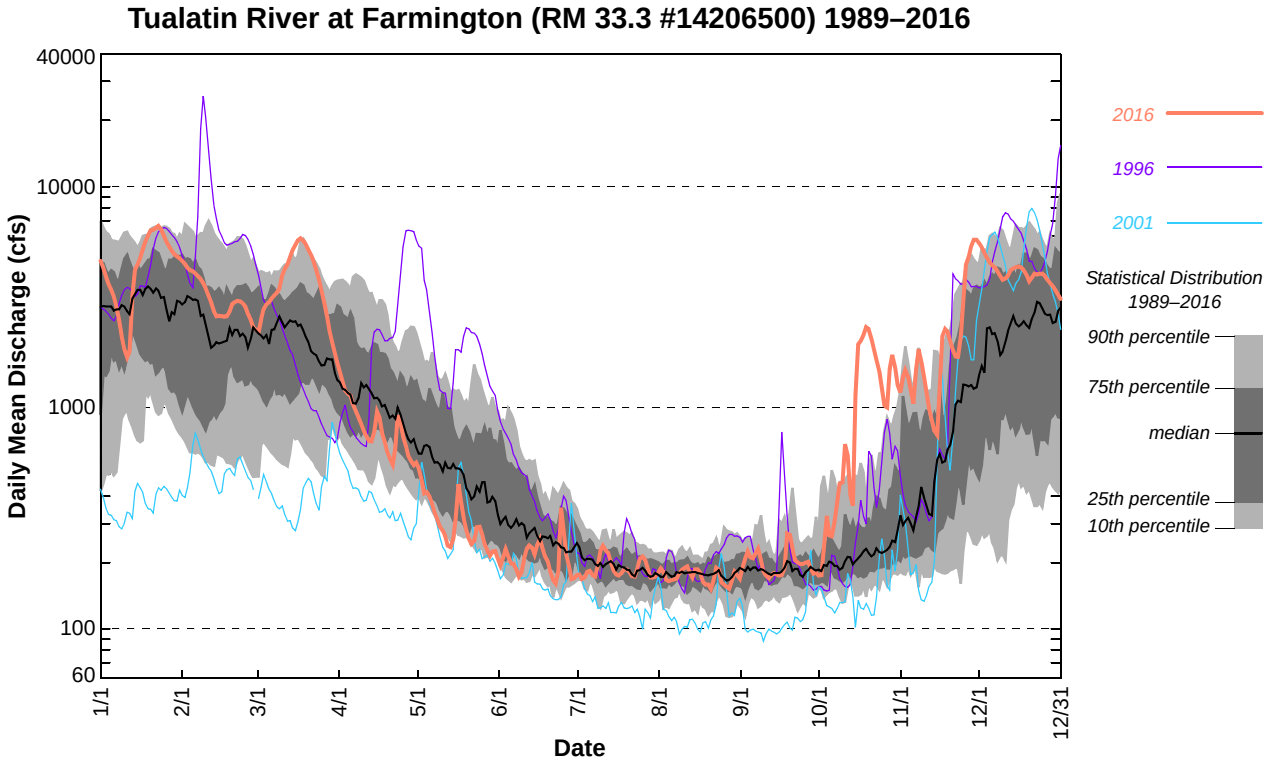
Appendices

2016 SUMMARY

This is the twenty-eighth year that the Tualatin River Flow Management Technical Committee has prepared an annual report documenting the flow management of the Tualatin River. Members of the committee include Clean Water Services (CWS), Tualatin Valley Irrigation District (TVID), Joint Water Commission (JWC), Lake Oswego Corporation (LOC) and Oregon Water Resources Department (OWRD).

Highlights

- Both Scoggins and Barney Reservoirs filled.
- Weather highlights:
  - June was particularly hot with several days of 90 ºF temperatures.
  - October was particularly wet. Only 2 days in October did not have measurable rainfall. Total rain for the month set all-time records at several sites.
- The primary pump used to drain Wapato Lake failed, but a concerted effort by several agencies brought in auxiliary pumps and the lake was drained on May 1, only one day past the deadline.
- Regulation of river water ended earlier than usual (October 12th) due to high flows caused by the rainy weather.



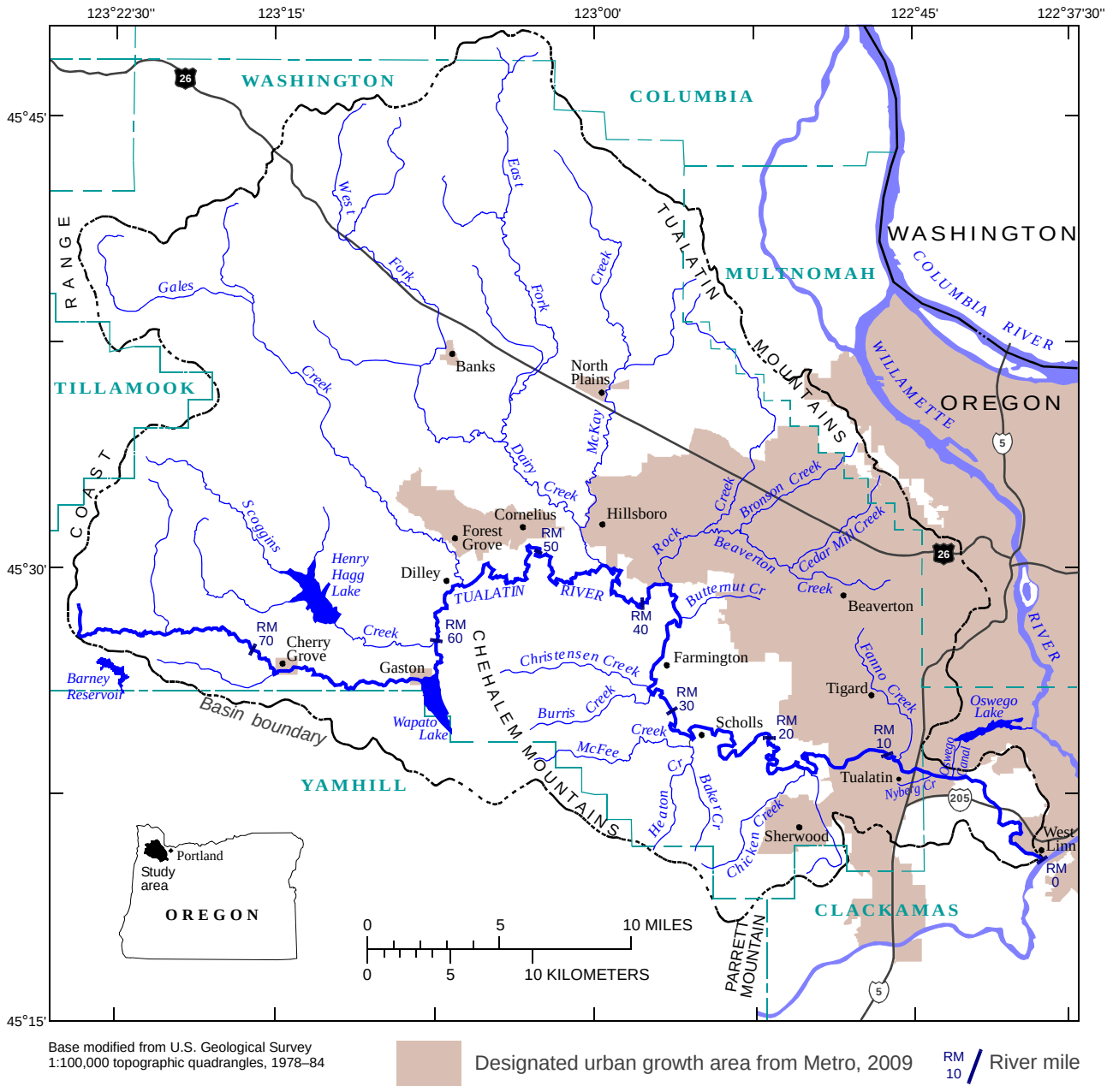
BACKGROUND

Basin Description

The Tualatin River Basin comprises an area of 712 square miles situated in the northwest corner of Oregon and is a subbasin of the Willamette River. The headwaters are in the Coast Range and flow in a generally easterly direction to the confluence with the Willamette River. The basin lies almost entirely in Washington County. (See map below)

The Tualatin River is about 80 miles long and changes dramatically from its headwaters to its mouth. The mountain or headwater reach (upstream of RM 55) is narrow (about 15 ft) and steep with an average slope of about 74 ft/mi. The meander reach (RM 55–33) is wider with an average slope of about 1.3 ft/mi. The reservoir reach (RM 33–3.4) is very wide (up to 150 ft) and has an estimated slope of only 0.08 ft/mi. It includes several deep pools. Travel times through this reach are very long. The slow movement of the water causes this reach to act much like a lake. In the riffle reach (RM 3.4–0), the Tualatin River flows through a short reservoir section and then drops into a narrow gorge near the City of West Linn before it enters the Willamette River just upstream of Willamette Falls. The average slope in this reach is 10 ft/mi .

Tualatin River Basin



Base modified from U.S. Geological Survey 1:100,000 topographic quadrangles, 1978–84

Designated urban growth area from Metro, 2009

RM 10 / River mile

Water sources to the Tualatin River

Precipitation: Seasonal rainfall accounts for most of the natural flow in the Tualatin Basin; streamflow from snowmelt is minimal. The amount of rainfall ranges from 110 inches on the eastern slopes of the Coast Range to 37 inches in the southeastern area of the drainage basin. Peak months for rainfall are November through February while the driest months are normally June through October. The peak streamflow month is usually February and the lowest streamflow month is August.

Barney Reservoir: Barney Reservoir is located behind Eldon Mills Dam on the Middle Fork of the North Fork of the Trask River (outside of the Tualatin Basin). A trans-basin aqueduct carries water over a low Coast Range divide to a pipeline that discharges into the Tualatin River at RM 78. Barney Reservoir has a capacity of 20,000 acre-feet and stores water for the Joint Water Commission (Cities of Hillsboro, Forest Grove and Beaverton, and the Tualatin Valley Water District) and Clean Water Services. The Barney Reservoir Joint Ownership Commission owns, operates and manages Barney Reservoir. Reservoir content is monitored through calibrated reservoir elevations; water releases are monitored using a stream gage located in the outlet flume. Water is released during the summer low-flow season to supplement shortages in natural flow. The water is used for municipal supply and for instream water quality. Storage in Barney Reservoir is also allocated to the Oregon Department of Fish and Wildlife. Those flows, to the Trask River, are measured using an instream weir.

Scoggins Reservoir: In the early 1970s the Bureau of Reclamation built an earthen dam on Scoggins Creek (RM 5.1). Releases from Scoggins Reservoir (Henry Hagg Lake) flow down Scoggins Creek and enter the Tualatin River at RM 60.0. Scoggins Reservoir has an active storage capacity of 53,323 acre-feet. It is a multipurpose facility with contracted water for irrigation, municipal and industrial, and water quality uses.

Scoggins Reservoir is operated and maintained by the Tualatin Valley Irrigation District under contract with the Bureau of Reclamation. Flow into Scoggins Creek (RM 4.8) is monitored by a Bureau of Reclamation stream gage; Oregon Water Resources Department maintains the rating curve for this site.

Clean Water Services: Clean Water Services provides sanitary and stormwater services to the urban areas of Washington County. A watershed-based NPDES permit allows Clean Water Services to discharge treated wastewater into the Tualatin River from four wastewater treatment facilities (WWTFs). In 2016, the Rock Creek WWTF discharged average of 40 cfs (22 MGD) at RM 38.1; the Durham WWTF discharges an average of 24 cfs (19 MGD) at RM 9.3. The Forest Grove and Hillsboro WWTFs (RM 55.2 and 43.8, respectively) are much smaller and do not discharge during the dry season (generally May — October). (River mile locations given here are based on USGS topographic maps and may be slightly different from those used in Clean Water Services watershed-based NPDES permit which were obtained from a different source.) WWTF flow rates are continuously monitored at each WWTF. Clean Water Services also releases storage water from Scoggins and Barney Reservoirs for flow augmentation during the summer and early fall to maintain minimum stream flows for the WWTFs; provide sustainable base flows in the upper Tualatin River; restore stream flows in Tualatin River tributaries; improve overall water quality in the Tualatin River; and to provide operational flexibility for their WWTFs.

Water sources to the tributaries

Clean Water Services: Clean Water Services has been using Tualatin Valley Irrigation District transmission lines to deliver water to several tributaries for flow restoration in the summer. About 1 to 2.5 cfs of water was added to McKay Creek since 2005. Similar measures were implemented for Gales Creek (2009), East Fork Dairy Creek (2010), and West Fork Dairy Creek (2011). The goal of the program is to improve water quality, specifically increasing the dissolved oxygen concentration and decreasing stream temperature. The flow augmentation water for the tributaries is from Clean Water Services' allocation in Scoggins Reservoir.

Water diversions from the Tualatin River

Cherry Grove Intake (RM 73.2): The City of Hillsboro diverts water for municipal and industrial uses at the Cherry Grove Intake. This water is delivered to the rural residents of the Dilley and Cherry Grove areas (served by the City of Hillsboro), as well as the City of Gaston and the LA Water Cooperative (as Hillsboro wholesale customers). The diversion is less than 3 cfs and is monitored via metered flows.

Spring Hill Pumping Plant (RM 56.3): The Spring Hill Pumping Plant is the largest diversion facility on the river. It is owned by the Bureau of Reclamation (BOR) and operated jointly by the Tualatin Valley Irrigation District (TVID) and the Joint Water Commission (JWC). TVID, with a pumping capacity of approximately 90 MGD (140 cfs), delivers water to about 12,000 acres of irrigated cropland via a pressure pipeline. JWC, with a pumping capacity of approximately 86 MGD (160 cfs), delivers water to the Cities of Hillsboro, Forest Grove and Beaverton, to the Tualatin Valley Water District, and to the wholesale customers of these entities. Both TVID and JWC have natural flow water rights that are used when natural flow is adequate; they release contracted stored water from Scoggins and Barney Reservoirs to augment low natural flow in the summer. Pumping rates are monitored by TVID and JWC using telemetry-equipped flow meters. Additional monitoring is provided by real-time stream gages on the Tualatin River located above and below the pumping plant and on Gales Creek.

Wapato Canal Diversion: The US Fish and Wildlife Service (USFWS) now owns most of the land within the levees surrounding the Wapato Lake area. The duties of the now defunct Wapato Improvement District have been split between USFWS (to maintain the dike and levee system), and TVID (to operate and maintain the irrigation water delivery system).

While USFWS develops a restoration plan, the area will remain in cooperative farming agreements. TVID diverts water from the Tualatin River at the Wapato Canal Diversion, near RM 62 as needed for irrigation of the historic lake bed and surrounding TVID customers. Water levels in Wapato Canal, which discharges from the lake bed into Wapato Creek, have been monitored by the USGS since September 2011.

Irrigation Withdrawals: Water is obtained directly from the Tualatin River for irrigation purposes by members of the TVID and by irrigators with natural flow water rights. About 5,000 acres of cropland served by TVID is irrigated with water obtained directly from the Tualatin River. Some of the discharge from the Rock Creek WWTF (RM 38.1) is contracted to TVID to be used by downstream irrigators.

Patton Valley Pump Plant: Tualatin Valley Irrigation District pumps water from Scoggins Creek (RM 1.71) into a low-pressure pipeline that serves customers along Patton Valley Road. Historically, this pipeline also diverted water into the upper Tualatin River (at RM 63.1 and RM 64.3) to supplement low flows in this reach, but this has not been needed in recent years due to releases from Barney Reservoir.

Oswego Lake Canal Diversion: The Lake Oswego Corporation (LOC) diverts a portion of the Tualatin flow into the Oswego Lake Canal at RM 6.7. A headwork structure regulates the flow into this mile long canal that feeds into Oswego Lake. The Lake Oswego Corporation has several natural flow water rights, including water rights for hydropower generation, irrigation, and lake level maintenance. At RM 3.4, a combination diversion dam/fish ladder structure is used during low flow periods to elevate the Tualatin River enough to divert the flow into the canal. During most of the year, river elevation is adequate to allow diversion of the LOC water right. Historically, flash boards were installed to increase the water level during the summer, but they have not been used since 2003. The dam plus several natural basalt sills cause the water to pool in the reservoir reach. Flow in Lake Oswego Canal was monitored during the summer by a gaging station operated by the Oregon Water Resources Department, but that site was discontinued partway through 2011.

Water diversions from the tributaries

Irrigation withdrawals: Water is obtained directly from some tributaries for irrigation by irrigators with natural flow water rights.

Tualatin River Water Management

Tualatin River Flow Management Technical Committee

The Tualatin River Flow Management Technical Committee provides a mechanism for the coordination and management of flow in the Tualatin River. The members of the committee are technical staff with detailed knowledge of the specific characteristics of flow in this river. The committee meets monthly from February through November. Meetings focus on the current status of the reservoirs. In addition, a variety of other water issues and any problems are discussed. Each member updates the committee on changes that could impact the flow management of the Tualatin. The communication, coordination and cooperation among the partner agencies has proven invaluable in managing the resource.

Data collection system

Water in the Tualatin Basin is monitored by gages on streams and flow meters on major diversions and wastewater treatment facility discharges. Stream gages are present along the mainstem Tualatin and all major tributaries that affect water distribution. Various water quality parameters are monitored at a several sites. Many of these monitors have telemetry, making the data available in real-time. Throughout the season, daily operations can be monitored by Clean Water Services (CWS), Joint Water Commission (JWC), Tualatin Valley Irrigation District (TVID), and the Lake Oswego Corporation (LOC). A map showing monitoring locations is shown on the next page. Selected data are shown in the appendices of this report.

A coordinated information system was developed to provide flow information to all members of the committee. Flow conditions and a summary of daily releases are reported via daily email by the superintendent of Scoggins Dam. The JWC provides a daily email containing information about the rate of intake at the Spring Hill Pump Plant, releases from Scoggins and Barney Reservoirs, and available natural flow. Because use or release of water by any one of the entities can impact the other users, coordination of flow information is an important aspect of the committee's work.

The monitoring effort makes it possible to proactively manage storage, instream flows, and diversions so that minimum instream flow requirements and general compliance with water rights and storage agreements are met. Flow data are also required to calculate pollutant loads, which are necessary for the Total Maximum Daily Load (TMDL) program. Monitoring includes temperature as well as flow at some sites. As water quality issues have come to the forefront, the monitoring system has provided information vital to understanding the Tualatin Basin, helped guide basin management, and been an excellent example of interagency cooperation. The members of the Flow Management Committee appreciate the efforts all those who provide data.

Some of the monitoring data for the Tualatin Basin can be accessed at the following web sites:

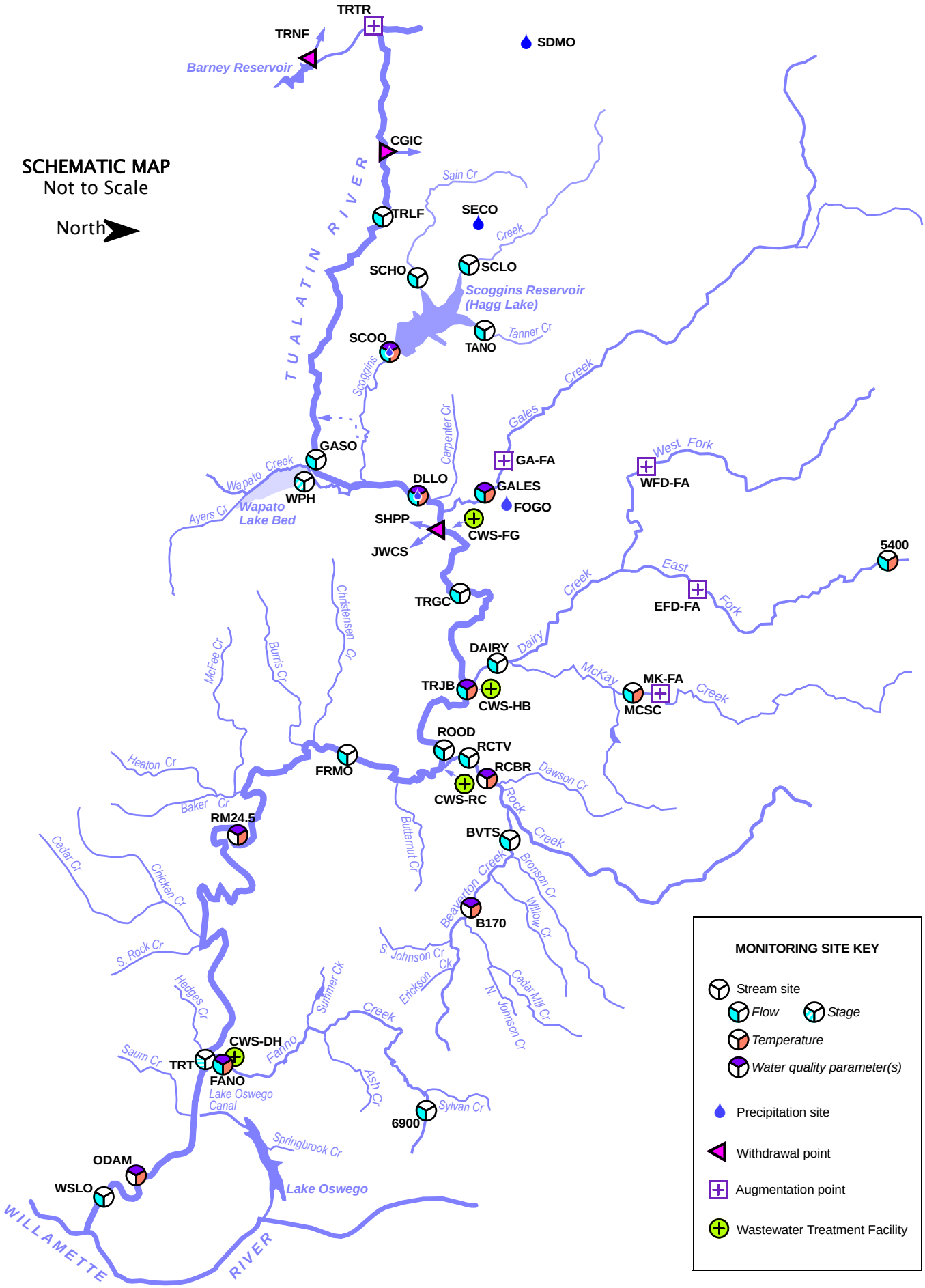
- Bureau of Reclamation data:
  https://www.usbr.gov/pn/hydromet/tuatea.html
- Jackson Bottom Wetlands Center data:
  https://or.water.usgs.gov/cgi-bin/grapher/graph_setup.pl?basin_id=tualatin&site_id=14206241
- Oregon Water Resources Department data:
  http://apps.wrd.state.or.us/apps/sw/hydro_near_real_time/
- USGS data:
  https://or.water.usgs.gov/tualatin/

Annual Tualatin Basin Flow Management Report

This report is published annually and describes water management, accounting, storage, stream gaging, diversions, and effluent discharge for the Tualatin Basin. Annual reports dating from 1992 are available at:

http://www.co.washington.or.us/Watermaster/SurfaceWater/tualatin-river-flow-technical-committee-annual-report.cfm

2016 MAP OF TUALATIN BASIN MONITORING SITES



2016 MONITORING SITES — ALPHABETICAL LISTING BY SITE CODE

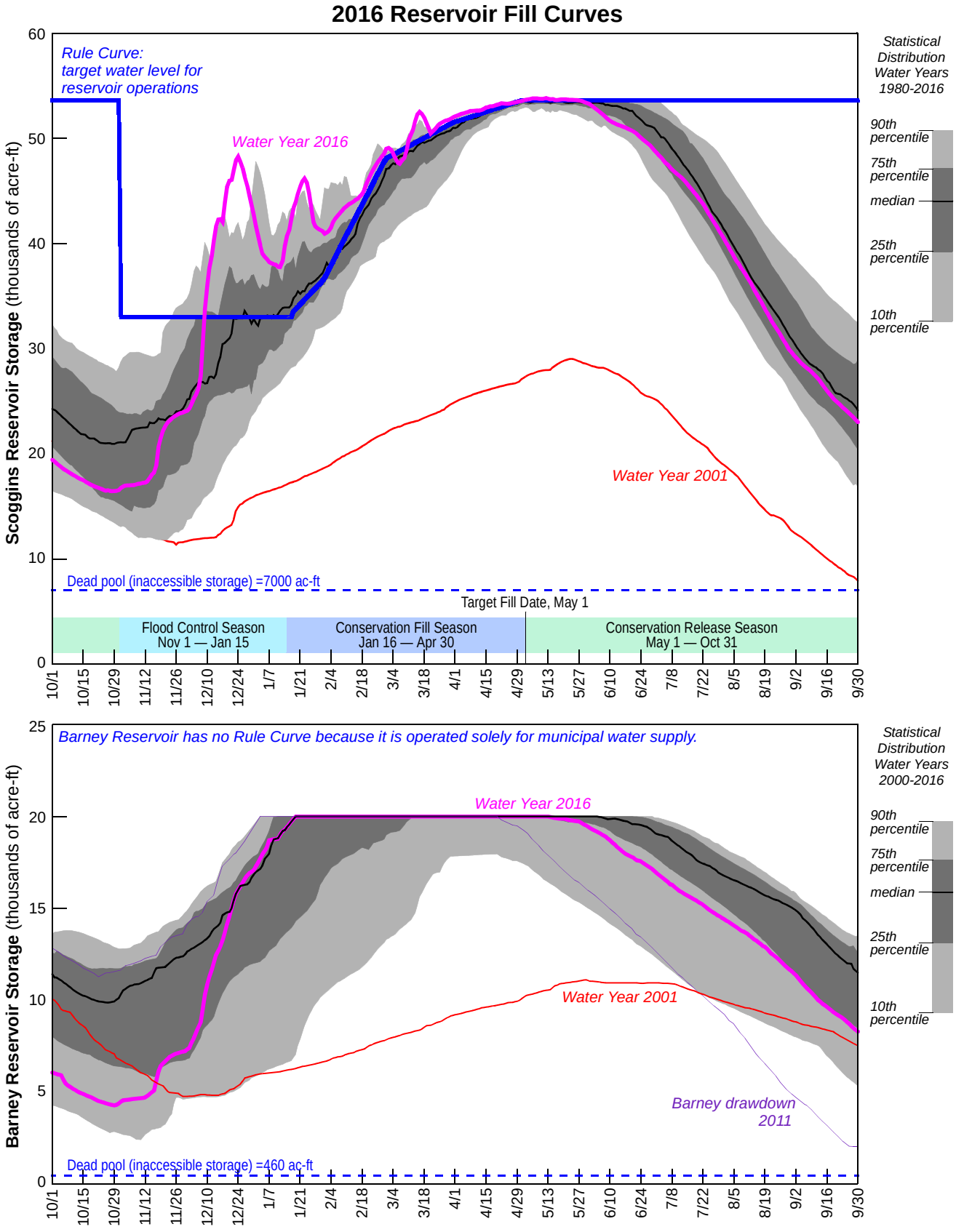
CODE	SITE NAME	FL	T	P	WQ	PARAMETERS	FLOW REPORT
Ambient monitoring sites							
5400	East Fork Dairy Creek near Meacham Corner, OR	●	●				App-A, F
6900	Fanno Creek at 56th Avenue	●					App-A
B170	Beaverton Creek at 170th Ave, Beaverton, OR		●		●	DO, pH, cond, turb	App-A, main
BVTS	Beaverton Creek at Cornelius Pass Road	●					App-A
DAIRY	Dairy Creek at Hwy 8 near Hillsboro, Oregon	●					App-A
DLLO	Tualatin River at Dilley, Oregon	●	●	●	●	pH, cond, turb, chlor-*a*, phyc, fDOM	App-A, F
FANO	Fanno Creek at Durham Road near Tigard, Oregon	●	●		●	DO, pH, cond, turb	App-A, F, main
FOGO	Forest Grove, Oregon AgriMet Weather Station (Verboort)			●			App-H
FRMO	Tualatin River at Farmington, Oregon	●					App-A
GALES	Gales Creek at Old Hwy 47 near Forest Grove, Oregon	●	●		●	DO, pH, cond, turb	App-A,F, main
GASO	Tualatin River at Gaston, Oregon	●					App-A
MCSC	McKay Creek at Scotch Church Rd above Waible Ck near North Plains, OR	●	●				App-A, F
ODAM	Tualatin River at Oswego Dam near West Linn, Oregon		●		●	DO, pH, cond, turb, chlor-*a*, phyc, bar press, air T	App-F, main
RCBR	Rock Creek at Brookwood Avenue, Hillsboro, Oregon		●		●	DO, pH, cond, turb	App-F, main
RCTV	Rock Creek at Hwy 8 near Hillsboro, Oregon	●					App-A
RM24.5	Tualatin River at RM 24.5 near Scholls, Oregon		●		●	DO, pH, cond, turb	App-F, main
ROOD	Tualatin River at Rood Bridge Road near Hillsboro, Oregon	●					App-A
SCHO	Sain Creek above Henry Hagg Lake near Gaston, Oregon	●					App-A
SCLO	Scoggins Creek above Henry Hagg Lake near Gaston, Oregon	●					App-A
SCOO	Scoggins Creek below Henry Hagg Lake near Gaston, Oregon	●	●	●	●	DO, pH, cond, turb	App-A, F, H, main
SDMO	Saddle Mountain Precipitation Station (SNOTEL #726)			●			App-H
SECO	Sain Creek Precipitation Station (SNOTEL #743)			●			App-H
TANO	Tanner Creek above Henry Hagg Lake near Gaston, Oregon	●					App-A
TRGC	Tualatin River at Golf Course Road near Cornelius, Oregon	●					App-A
TRJB	Tualatin River at Hwy 219 Bridge	●	●		●	DO, pH, cond, turb	App-A, F
TRLF	Tualatin River below Lee Falls near Cherry Grove, Oregon	●					App-A
TRT	Tualatin River at Tualatin, Oregon	Stg					App-A
WPH	Wapato Canal at Pumphouse at Gaston, Oregon	Stg					App-A
WSLO	Tualatin River at West Linn	●					App-A
Monitored withdrawals and releases							
CGIC	City of Hillsboro Withdrawal at Cherry Grove	●					App-B
CWS-DH	CWS Durham WWTF Release	●					App-B
CWS-FG	CWS Forest Grove WWTF Release	●					App-B
CWS-HB	CWS Hillsboro WWTF Release	●					App-B
CWS-RC	CWS Rock Creek WWTF Release	●					App-B
EFD-FA	CWS East Fork Dairy Flow Augmentation with TVID	●					App-B
GA-FA	CWS Gales Creek Flow Augmentation with TVID	●					App-B
JWCS	Joint Water Commission Withdrawal at Spring Hill Pump Plant	●					App-B
MK-FA1	CWS McKay Creek Flow Augmentation with TVID	●					App-B
SHPP	TVID–Withdrawal at Spring Hill Pump Plant	●					App-B
TRNF	Barney Reservoir Measured Flow to North Fork Trask River	●					App-B
TRTR	Barney Reservoir Release to Tualatin River	●					App-B
WFD-FA	CWS West Fork Dairy Flow Augmentation with TVID	●					App-B

Abbreviations: FL=flow, T=water temperature, P=precipitation, WQ=water quality, App=Appendix, Stg=stage

Water quality abbreviations (underlined & bold indicates data shown in Flow Report): DO=dissolved oxygen, cond=conductance, turb=turbidity, chlor-*a*=chlorophyll-*a*, phyc=phycocyanin, fDOM=fluorescent dissolved organic matter

RESERVOIR STATUS

Barney Reservoir filled on January 18, 2016. Scoggins Reservoir at that time was being managed for flood control. Scoggins Reservoir peaked on May 7th at 53,267 ac-ft. The reservoir levels for 2016 and the reservoir filling histories are shown below.



CLEAN WATER SERVICES

BY RAJ KAPUR AND JAMIE HUGHES, CLEAN WATER SERVICES

Introduction

Clean Water Services (the District) provides wastewater treatment, stormwater management, and watershed management to more than 570,000 customers primarily in the urban areas of Washington County. This District has twelve member cities, and owns and operates four wastewater treatment facilities (WWTFs) at sites in Forest Grove, Hillsboro, and Tigard. The Rock Creek and Durham Facilities are the District's two largest WWTFs.

Rock Creek Wastewater Treatment Facility

Durham Wastewater Treatment Facility

Clean Water Services also implements the municipal separate storm sewer system (MS4) program in the urban parts of the Tualatin River watershed. The four WWTFs and the MS4 program are permitted by the Oregon Department of Environmental Quality (DEQ) under a watershed-based National Pollutant Discharge Elimination System (NPDES) permit.

Flow augmentation program

During the summer low-flow season, Clean Water Services releases stored water to the mainstem Tualatin River and several tributaries. The District has rights to 24% of the water in Scoggins Reservoir, which equates to 12,618 ac-ft of stored water. The District also owns 10% of the water Barney Reservoir, which equates to 1,654 ac-ft after accounting for dead pool and required ODFW releases to the Trask River. In all, the District has 14,272 ac-ft of stored water at its disposal. The stored water releases serve multiple purposes that include the following:

Maintain minimum stream flows: One of the purposes of the stored water releases is to maintain stream flows in the Tualatin River to ensure that the minimum dilutions are met at the WWTFs during summer and fall low flow conditions.

Offset thermal load from the District's WWTFs: The watershed-based permit provides Clean Water Services with a mechanism to offset a portion of the thermal load discharged from the Rock Creek and Durham WWTFs by releasing stored water from Scoggins and Barney Reservoirs. Stored water releases in July and August form the basis of the flow augmentation credit. In the future, stored water releases will also offset some of the thermal load from the Forest Grove WWTF and natural treatment system. The District offsets the remainder of its thermal load by planting riparian areas in the Tualatin River basin to increase shading of the stream channel.

Provide sustainable base flows in the upper Tualatin River: During the dry season, Clean Water Services' releases from Hagg Lake and Barney Reservoir can account for more than half of the flow in the Tualatin River in the 20-mile stretch between the Springhill Pump Plant (where water is withdrawn for municipal and irrigation uses) and the Rock Creek WWTF (where highly treated water discharged from the Rock Creek WWTF enters the river). The stored water releases provide sustainable base flows that provide habitat for aquatic life and result in cooler river temperatures and higher dissolved oxygen levels.

Improve dissolved oxygen levels and enhance overall water quality in the lower Tualatin River: During the low flow season (summer and early fall) oxygen levels in the lower Tualatin River are heavily influenced by the oxygen consumed by decaying substances in river sediment (sediment oxygen demand). When days are long and sunny, photosynthetic production of oxygen by algae tends to offset the oxygen consumed by sediment oxygen demand. However, when days grow short (September-October), or when it is cloudy, photosynthetic production of oxygen does not keep up with consumption of oxygen by sediment oxygen demand causing oxygen levels to decrease. Clean Water Services releases additional stored water from Scoggins and Barney Reservoirs to lessen the effect of sediment oxygen demand and maintain higher dissolved oxygen levels in the lower Tualatin River during the late summer/early fall period when photosynthetic oxygen production wanes.

Maintaining adequate dissolved oxygen is important for aquatic life and the general health of the river. In addition, dissolved oxygen levels measured downstream of the WWTFs are used to calculate the ammonia limits specified in the watershed-based NPDES permit.

Restore stream flows in Tualatin River tributaries: Clean Water Services uses the Tualatin Valley Irrigation District transmission line to deliver stored water to select tributaries to restore flow and improve water quality. In 2016, Clean Water Services released stored water into Gales Creek, West Fork Dairy Creek, East Fork Dairy Creek, and McKay Creek.

2016 Water Releases

Clean Water Services released flow augmentation water for 116 days in 2016. The total average daily release (for days with releases) was 47.5 cfs. In all, 10,942 acre-feet were released—9,692 ac-ft from Scoggins Reservoir and 1,250 ac-ft from Barney Reservoir. This is 77% of the District's allocation. The amount of water available to and released by Clean Water Services during 2016 is summarized below.

CLEAN WATER SERVICES WATER AVAILABILITY AND USE — 2016

Reservoir		Maximum Available (acre-ft)	Available (acre-ft)	Total CWS Release (acre-ft)
Scoggins Reservoir	Storage	12,618	12,618	9,692
	Natural flow credit	4,282	0	—
Barney Reservoir	Storage	2,000	1,654	1,250
	Summer storage*	—	0	—
Total		**18,900**	**14,272**	**10,942**
Percent of available				**76.7%**

*Summer storage is water from rain that is stored in Barney Reservoir after releases have begun for the season. Summer storage (when it occurs) is allocated among the members of the Barney Partnership.

Details by month and reservoir: Stored water releases from Scoggins Reservoir water for Clean Water Services began with 10 cfs on June 21. By the end of June, the release had increased to 30 cfs. Average daily releases were 49.6 cfs (July/August period) and 41.7 cfs (September). The District released water from Barney Reservoir at a rate of 14 cfs beginning on August 31. Releases from Barney Reservoir continued at that rate until they were discontinued. For both reservoirs, the last release day was October 13. Details of releases by month are shown in the table below.

CLEAN WATER SERVICES WATER RELEASE SUMMARY — 2016

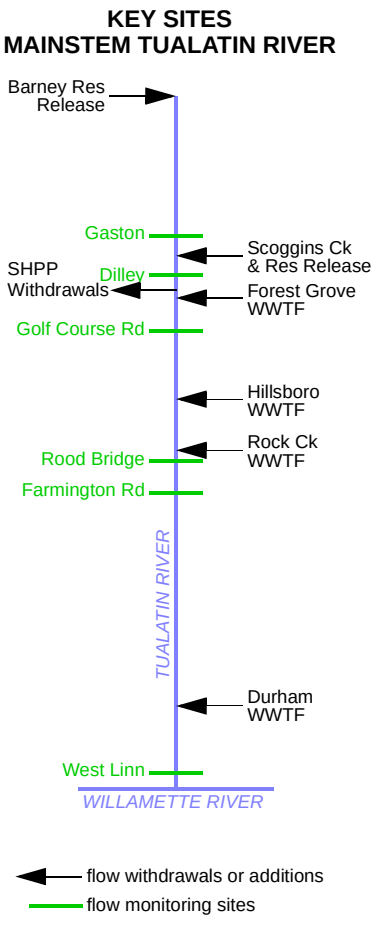
	Units	May	June	July	Aug	Sept	Oct	Nov 1-18	Total
Scoggins Release	acre-ft	0	298	2,728	3,373	2,240	813	0	9,692
	days	0	10	31	31	30	13	0	115
Barney Release	acre-ft	0	0	0	28	833	389	0	1,250
	days	0	0	0	1	30	14	0	45
Total Release	acre-ft	0	298	2,728	3,401	3,313	1,202	0	10,942
Daily Average Release (for days with releases)	cfs	0	15	44	55	56	43	0	47.5
Measured Flows for Tualatin River at Farmington (RM 33.3) – based on daily average									
Measured minimum	cfs	208	161	168	152	170	176	1,200	—
Measured mean	cfs	306	210	189	173	200	1,109	1,363	—
Measured maximum	cfs	534	354	238	192	271	2,330	1,490	—

Flow augmentation effects on Tualatin River flow— 2016

Flow targets in the Tualatin River have evolved as the understanding of the river has changed and new objectives were added. The District began managing stored water releases in 1987 with a goal of preventing the large nuisance algal blooms that were then common during the summer. In the early 1990s, work by the US Geological Survey showed that releasing water in the late fall could improve low oxygen conditions by lessening the expression of sediment oxygen demand and the District increased late season flow targets. Flow targets changed again in 2004 when stored water releases were allowed to offset some of the thermal loads from the WWTFs. New mixing zone studies have also affected flow targets as have effluent load limits which are calculated from river flows. The District's current targets for flow at Farmington are: 150 cfs from June through August, and 180 cfs in September and October.

Clean Water Services monitors flow in the upper, middle and lower reaches of the river to inform the management of its stored water releases. The figure at the right illustrates the locations of several significant additions and withdrawals along with several key monitoring sites. The graphs on pages 16–18 illustrate the importance of the District's stored water releases plus the discharges from the Rock Creek and Durham treatment facilities at three of the monitoring sites.

With its stored water releases and the discharge from the WWTFs, the District was able to maintain minimum stream flows, offset thermal loads from the WWTFs, provide sustainable base flows in the upper Tualatin River and key tributaries and improve overall water quality. Flow management will continue to be vital as the population increases.



Upper Tualatin River — Golf Course Road site: The graph on page 16 shows flow at the Golf Course Rd site (RM 51.5). This site is an important monitoring site for the Flow Committee because it occurs downstream of the major withdrawals by JWC and TVID at the Springhill Pump Plant (RM 56.3). Flow at this site includes releases from Barney Reservoir and Hagg Lake as well as flow from the Tualatin River headwaters and Gales Creek. The site is unaffected by discharges from Clean Water Services' two large WWTFs (they are downstream). Although the Forest Grove WWTF (RM 55.2) is upstream, it does not currently operate during the summer low flow season; in the future it will discharge during the summer.

During the dry periods between June and October, the District's stored water releases accounted for about 50% of the total flow in the upper Tualatin River. Without these releases, flow in the upper Tualatin would have dropped below 50 cfs, making the river considerably slower and warmer.

Note that flow at this site shows a wavy pattern with high flows and low flows repeating approximately every week. This pattern is due to decreased withdrawals by TVID from the SHPP that occur on Sundays, when the demand for irrigation water is generally lower than other days. Releases from Hagg Lake and Barney Reservoir are mostly influenced by weather conditions and do not exhibit a weekly cycle.

Middle Tualatin River — Farmington Road site: The graph on page 17 shows flows at the Farmington Road site (RM 33.3). This site is just downstream of the Rock Creek WWTF (RM 38.08) and includes flows from Dairy and Rock Creeks and their tributaries. Flow at this site is a particularly important factor affecting water quality in the middle and lower parts of the river. Keeping Farmington flow from becoming very low (below 120 cfs) can mostly prevent the large scale algal blooms that were a recurring problem in lower river in the 1990s.

Stream flow measurements at this site are also important because they are used to define ammonia limits at the treatment facilities. In addition, flow at this site is used to define dry and wet season limits at the District's treatment facilities.

During the summer low flow period, the District's stored water releases plus the Rock Creek WWTF discharge accounted for 50-60% of the flow at the Farmington Road site. Without this additional water, flow in the Tualatin River at this site would average less than 100 cfs during the July-August period and drop to as low as 55-60 cfs on some days. Flows this low would be almost certainly be associated with significant water quality problems down river, such as those that were common in the 1990s and before.

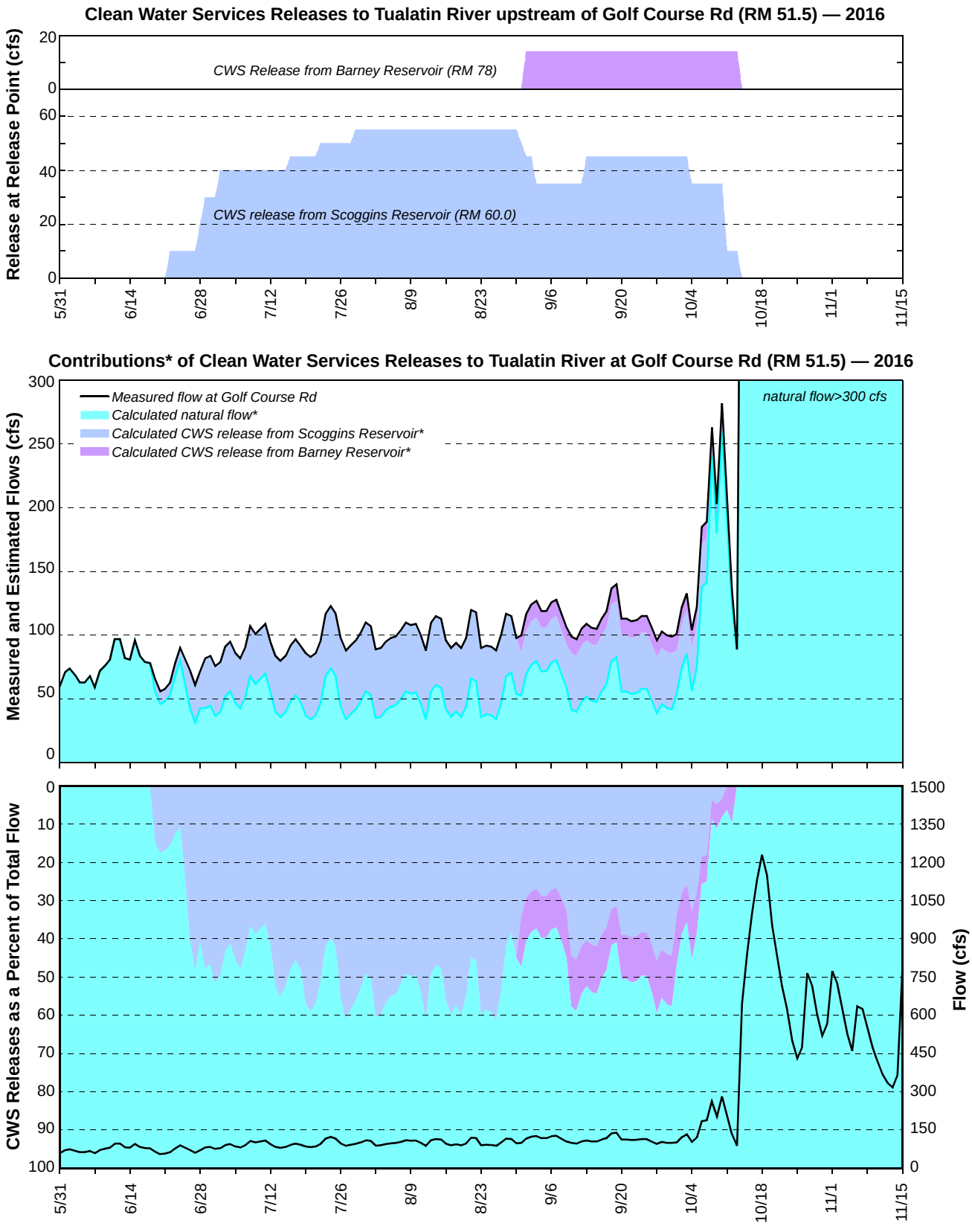
Note that the weekly cyclical signature of decreased irrigation withdrawals on Sundays is still clearly evident at this site.

Lower Tualatin River — West Linn site: Flows at the West Linn site (RM 1.75) are shown on page 18. Between this site and the Farmington Road site, the river receives water from the Durham WWTF (RM 9.33) plus a number of small tributaries and the flow increases by 50-60 cfs during the low flow period. Slightly less than half of this increase is discharge from the Durham WWTF.

The District's stored water releases account for 15–20% of the flow during the low flow season. When stored water and discharges from the WWTFs are combined, Clean Water Services' releases account for 50-60% of the flow. Without this additional water, at times flows at the West Linn site would drop below 100 cfs during the summer. Flows this low would be associated with significant water quality problems such as:

- high temperatures,
- severe algal blooms that would likely increase the pH to levels that exceed the criteria for aquatic health, and
- very low dissolved oxygen concentrations caused by an increased expression of sediment oxygen demand, especially during cloudy days when photosynthetic production of oxygen is decreased.

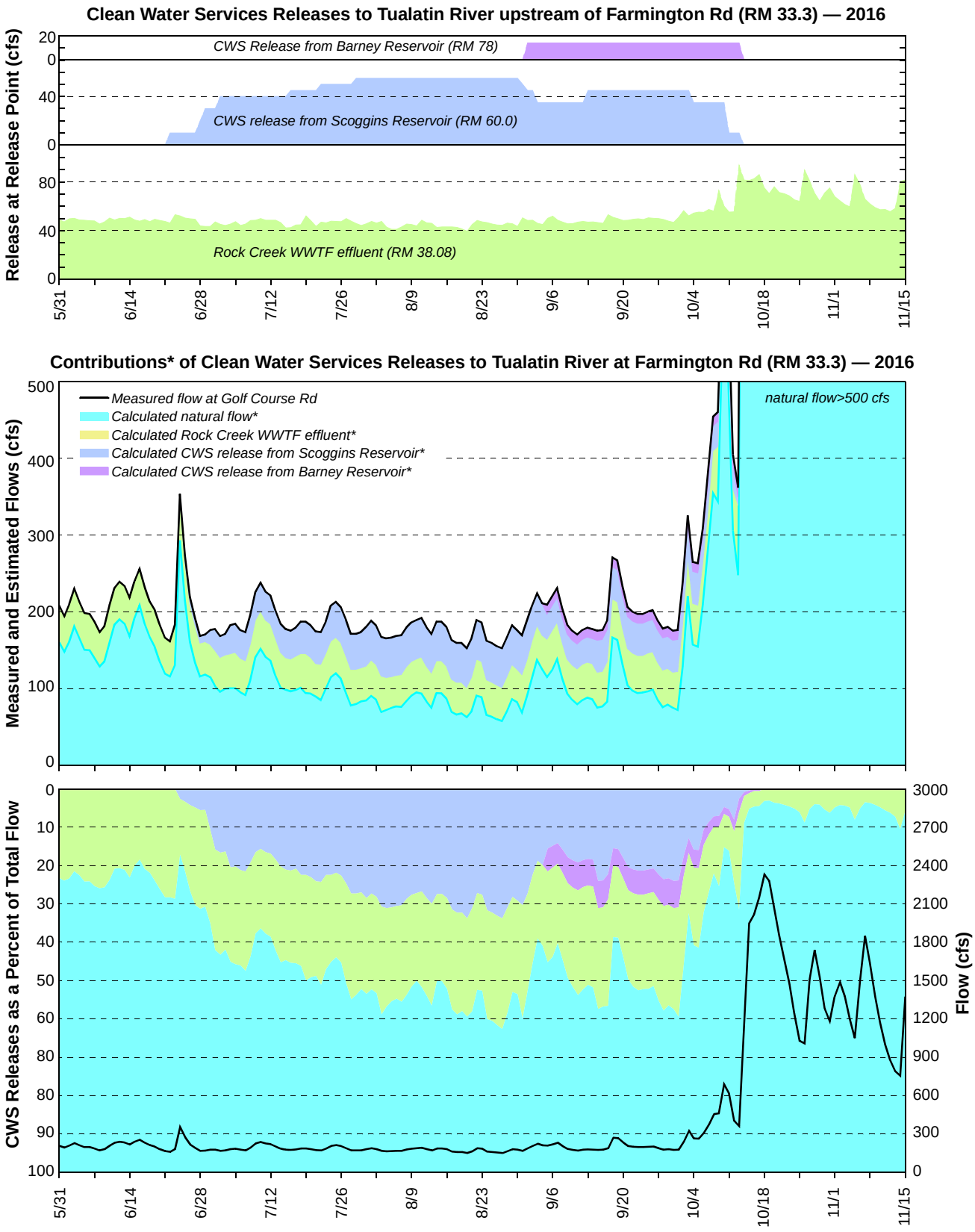
Note that the weekly cyclical signature of decreased irrigation withdrawals on Sundays is still clearly evident even this far down river from the SHPP.



*Natural flow and contributions of CWS releases were calculated as follows. Constant travel times and a uniform evaporative loss of 0.25% per mile were assumed.

Natural Flow at Golf Course Rd without CWS releases =

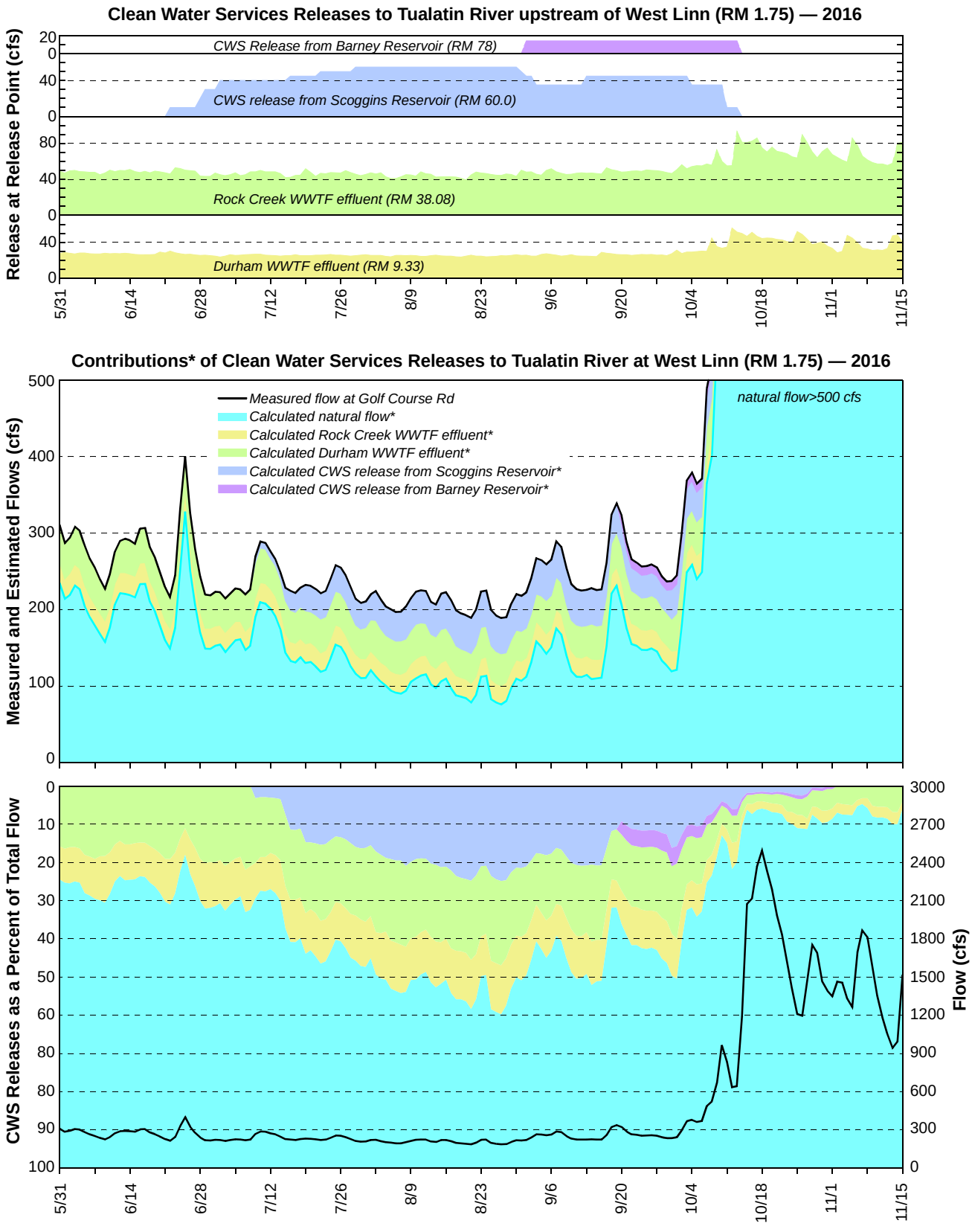
+ Measured flow at Golf Course Rd (OWRD data)
– Calculated Scoggins release contribution (= 0.979 x Scoggins Release for CWS from the same day)
– Calculated Barney release contribution (= 0.934 x Barney Release for CWS from the same day)



*Natural flow and contributions of CWS releases were calculated as follows. Constant travel times and a uniform evaporative loss of 0.25% per mile were assumed.

Natural flow at Farmington Rd without CWS releases =

+ Measured flow at Farmington (OWRD data)
– Calculated RC-WWTF effluent contribution (= 0.988 x Rock Ck WWTF flow from the same day)
– Calculated Scoggins release contribution (=0.933 x Scoggins Release for CWS from 2 days before)
– Calculated Barney release contribution(= 0.888 x Barney Release for CWS from 4 days before)



*Natural flows and contributions of CWS releases were calculated as follows. (Constant travel times and a uniform evaporative loss of 0.25% per mile were assumed.)

Natural Flow at West Linn without CWS releases =

+ Measured flow at West Linn (USGS data)
– Calculated Durham WWTF effluent contribution (= 0.981 x Durham WWTF flow from 3 days before)
– Calculated Rock Creek WWTF effluent contribution (= 0.909 x Rock Ck WWTF flow from 14 days before)
– Calculated Scoggins release for CWS (= 0.854 x CWS Scoggins Release from 17 days before)
– Calculated Barney release for CWS (= 0.809 x CWS Barney Release from 19 days before)

Historical record of stored water releases

Scoggins Reservoir: Water releases from Scoggins Reservoir usually began in June or July and continued until the high natural flow resumed. During the low-flow period, release rates were adjusted as needed to meet the flow targets at that time. Clean Water Services' allocation is 12,618 ac-ft at full pool.

CLEAN WATER SERVICES — SCOGGINS RESERVOIR RELEASES

Year	Start Date	End Date	Total Release Days	Total Release (acre-ft)	Average per Release Day (cfs)	Comments
1987	6/9	11/30	175	*16,722	48.2	*Bureau of Reclamation allowed Clean Water Services to release its entire allocation (stored and natural flow).
1988	7/2	11/4	126	*15,071	60.3	
1989	6/27	11/15	141	*16,586	59.3	
1990	7/12	11/1	113	11,889	53.0	
1991	7/12	11/4	116	13,024	56.6	
1992	6/5	11/19	168	12,730	38.2	
1993	7/3	12/1	150	11,486	38.6	
1994	6/21	10/27	129	10,917	42.7	
1995	6/24	11/8	138	9,824	35.9	
1996	7/27	11/10	114	10,952	48.4	
1997	7/4	10/2	91	6,716	37.2	
1998	8/12	11/7	87	9,407	54.5	
1999	7/27	11/12	109	12,001	55.5	
2000	7/21	11/27	130	15,275	59.2	CWS purchased additional water because low flow conditions persisted until late November
2001	9/25	11/14	50	2,403	24.0	Allocations were severely decreased because Scoggins Reservoir did not fill in 2001
2002	6/12	11/9	151	12,618	42.0	
2003	7/11	11/17	130	11,765	52.4	
2004	7/1	11/2	125	8,650	34.9	
2005	7/8	10/31	116	9,918	43.1	
2006	7/1	11/3	126	9,634	38.5	
2007	7/3	11/13	119	10,134	42.9	
2008	7/1	11/4	127	11,896	47.2	
2009	7/1	10/27	119	10,614	45.0	
2010	7/24	10/25	94	8,392	45.0	
2011	7/23	11/18	119	10,464	44.3	
2012	7/7	10/22	106	10,950	52.1	
2013	7/2	11/4	103	6,884	33.7	
2014	7/1	10/22	114	9,037	40.0	
2015	6/9	11/5	150	12,307	41.4	CWS purchased an additional 600 ac-ft from TVID, but it was not released
2016	6/21	10/13	115	9,692	47.5	

Barney Reservoir: Water usually is released from Barney Reservoir at a constant rate during the late summer. Accounting for dead pool volume and the 15% allocation to Oregon Department of Fish and Wildlife, Clean Water Services has 1,654 ac-ft available at full pool.

CLEAN WATER SERVICES — BARNEY RESERVOIR RELEASES

Year	Start Date	End Date	Total Release Days	Total Release (acre-ft)	*Daily Release Rate (cfs)	Comment
1998	7/12	8/27	47	2,779	24.6	extra water released to draw down reservoir
1999	9/1	10/19	49	1,025	10	10 cfs also released 6/4–6/10
2000	9/8	10/23	46	1,461	18	—
2001	9/18	10/29	42	1,416	17	1000 acre-ft purchased in addition to allocation; reservoir did not fill; 4,000 acre-ft held in reserve
2002	8/26	10/24	60	1,667	14	—
2003	8/15	10/14	61	1,742	14	—
2004	9/1	11/2	63	1,777	14	—
2005	9/1	11/8	69	1,874	14	miscommunication about end date; extra water released
2006	9/1	11/3	64	1,638	14	—
2007	9/1	10/30	60	1,667	14	—
2008	9/4	10/31	58	1,611	14	—
2009	9/1	10/30	60	1,667	14	—
2010	9/1	10/30	58	1,653	14	7 cfs on 9/1/2010 only, all other days 14 cfs
2011	7/1	8/30	61	1,089	9	Barney Reservoir was drawn down for maintenance which resulted in a reduced allocation
2012	8/31	10/29	60	1,667	14	—
2013	8/30	11/5	58	1,611	14	release suspended 9/30/2013 – 10/9/2013
2014	9/2	10/23	52	1,438	14	—
2015	8/14	10/28	76	1,569	10.4	14 cfs (8/14–8/22), 10 cfs (8/23–10/27), 5 cfs (10/28)
2016	8/31	10/14	45	1,250	14	

*Daily release rate was constant throughout the entire release period unless otherwise noted.

Natural flow credit

When Scoggins Dam was constructed, Clean Water Services was granted a natural flow credit of up to 4,282 acre-ft. The credit applies only in May, June, October and November, and only if the monthly mean daily natural flow in the Tualatin River measured at West Linn is less than the flow targets specified for each month. Natural flow is calculated as the monthly mean daily flow measured at West Linn minus Clean Water Services' mean daily release of stored water. Clean Water Services was not entitled to a natural flow credit in 2016 because the natural flow exceeded the target flow for months in question (see table below). Clean Water Services last received a natural flow credit in 1994.

BUREAU OF RECLAMATION NATURAL FLOW CREDIT 2016

Month	Mean Daily Measured Flow at West Linn (cfs)	Mean Daily CWS Release (cfs)	Calculated Natural Flow at West Linn (cfs)	Target Natural Flow at West Linn (cfs)	Maximum Possible CWS Natural Flow Credit (cfs)	*[acre-ft]*	CWS Natural Flow Credit (cfs)
May	474	0	474	85	13	*[798]*	0
June	276	15	261	140	21	*[1250]*	0
October	1245	43	1202	95	16	*[984]*	0
November	2580	0	2580	110	21	*[1250]*	0

JOINT WATER COMMISSION

BY KRISTEL GRIFFITH, WATER RESOURCES PROGRAM COORDINATOR,
JOINT WATER COMMISSION/CITY OF HILLSBORO

Introduction

Over 365,000 people in Washington County receive at least a portion of their drinking water from the Joint Water Commission (JWC). The JWC provides water to its member agencies: the Cities of Hillsboro (the managing and operating agency), Forest Grove, Beaverton, and the Tualatin Valley Water District. JWC also provides wholesale service directly to the City of North Plains, and to Cornelius, Gaston, and the LA Water Cooperative as wholesale customers of Hillsboro.

JWC's water treatment plant (WTP) is supplied with water from the nearby Tualatin River. An intake facility at Spring Hill constructed by the Bureau of Reclamation, and shared with the Tualatin Valley Irrigation District (TVID), pumps river water to the JWC WTP.

Flows in the Tualatin River are supplemented during the summer with water from two impoundments—Hagg Lake and Barney Reservoir. Hagg Lake is located on Scoggins Creek behind Scoggins Dam. Scoggins Dam is owned by the Bureau of Reclamation (BOR) and operated by TVID under contract to the BOR. Barney Reservoir is located on the upper Trask River behind the Eldon S. Mills Dam. The reservoir and dam are owned and operated by the Barney Reservoir Joint Ownership Commission (BRJOC). The BRJOC includes the cities of Hillsboro (the managing and operating agency), Forest Grove, and Beaverton, the Tualatin Valley Water District, and Clean Water Services.

The JWC WTP uses conventional dual media filtration plus disinfection to produce high quality potable water. Treated water is pumped from the plant to the member agencies either directly through finished water pipelines or via the Fern Hill Reservoirs. The Fern Hill Reservoirs are located about one-third mile to the east of the treatment plant and can store up to 40 million gallons of finished water (in two 20 million gallon covered concrete tanks). The JWC finished water pipelines include flow meters and pressure reducing stations at the connection points to the member agencies.

2016 Operations

Production and demands: Compared to 2015, when a number of production records were set, 2016 was a more average water year. In 2016 the JWC WTP produced an average of 32.98 million gallons per day (MGD) of finished water. A maximum day production of 57.32 MG occurred on August 18th, which is slightly less than the 2015 maximum day production of 65.0 MG. A minimum day production of 13.00 MG occurred on October 20th.

2016 Stored water releases: The amount of stored water released by JWC for 2016 is summarized in the tables below. In all, 60% of the total allocation was released (55% for Scoggins Reservoir and 64% for Barney Reservoir).

STORED WATER RELEASE FROM EACH RESERVOIR — 2016

Description	Beginning Balance (acre-ft)	Amount Released (acre-ft)	Ending Balance (acre-ft)	Average Release	
				(acre-ft/day)	**cfs**
Barney (M&I)	13,500	7,476	6,024	62	31
Scoggins	14,886	9,465	5,421	50	25
Total	**28,386**	**16,941**	**11,445**	**111**	56

Regulation of natural flow began on May 12th after an unseasonably warm and dry weather in April. Releases from the reservoirs began the day before. After being suspended for 2 days in May, regulation resumed and continued until being lifted on October 12th, the second earliest date in the past 10 years.

COMPARISON OF STORED WATER RELEASES— 10-YEAR RECORD

Year	Regulated Use			Stored Water Release (acre-ft)			Average Release (acre-ft/day)
	First Day	Last Day	Days*	Barney	Scoggins	Total	
2016	5/11	10/12	153	7,476	9,465	16,941	111
2015	5/8	10/29	173	11,730	9,904	21,633	124
2014	6/5	10/24	142	6,548	9,090	15,638	110
2013	5/4	10/1	141	6,387	7,490	13,877	98
2012	6/23	10/30	129	6,557	7,016	13,573	105
2011	6/28	11/7	132	8,848	3,945	12,794	97
2010	6/30	10/22	114	5,647	5,171	10,818	95
2009	6/14	10/26	134	4,723	9,203	13,926	104
2008	6/18	10/31	135	4,407	10,163	14,571	108
2007	5/25	11/13	155	5,544	10,372	15,916	103
10-yr average	**6/4**	**10/25**	**141**	**6,787**	**8,182**	**14,969**	**105**

*Days of Regulated Use does not equal the elapsed days between the start and end dates for regulation when regulation was temporarily suspended during the period.

STORED WATER RELEASE TO EACH AGENCY — 2016

Description	Beginning Storage (acre-ft)	Amount Released (acre-ft)			Ending Balance* (acre-ft)	Average Release (acre-ft/day)
		from Barney	from Scoggins	Total		
Hillsboro	10,127	2,950	4,034	6,984	3,143	46
Forest Grove	4,914	21	1,068	1,090	3,824	7
Beaverton	7,556	1,656	2,374	4,030	3,526	26
TVWD	5,789	4,838	0	4,838	951	32
Total	**28,386**	**9,465**	**7,746**	**16,941**	**11,445**	**111**

North Plains— 161 acre-ft released; average daily release 1.07 acre-ft/day (usage is reflected in the values for JWC partners)
No internal leases between JWC partner agencies occurred in 2016.

Efficiency: JWC maximizes the capture of released waters through coordination of finished water storage at Fern Hill Reservoirs and careful tracking of individual JWC member use of their stored water and system demands. During the peak season, the JWC and Cherry Grove pump station (at the City of Hillsboro's slow sand filter plant) recovered an average of 101% of the water available for municipal use from natural flow rights and releases from impounded supplies.

ESTIMATED WATER CAPTURE RATES – 2016

Water Available		Raw Water Pumped		Finished Water Produced			
				Total		Average Daily	Peak Day
Source	(acre-ft)	(acre-ft)	(MG)	(acre-ft)	(MG)	(MGD)	(MGD)
		*JWC WTP (Springhill)***					
Reservoir release*	16,941	18,923	6,166	20,295	6,613	43.5	60.7
		Slow Sand Filter Plant (Cherry Grove)					
Natural flow	3,426	246	80	244	80	0.5	1.1
Total:	**220,367**	**19,168**	6,246	**20,540**	**6,693**		
Capture rate:		**94%**		**101%**			

*The JWC no longer accounts for a water loss rate from stored water of 0.25% per river mile.
**Raw water pumped and finished water produced at SHPP do not match because of metering issues. The values shown here were measured and reported by JWC.

Regulatory matters

Water management and conservation plan: In August 2015, Oregon Water Resources Department (OWRD) approved JWC's Progress Report for the 2010 Water Management and Conservation Plan (WMCP). Completion of WMCPs and Progress Reports is required in order for the JWC to have access to Permit S-54373 for 75 cubic feet per second (cfs) of Tualatin River water from October 1st to May 31st. The JWC's WMCPs document the progressive and comprehensive water management and conservation efforts performed in recent years by the JWC and its member agencies. OWRD uses Progress Reports to determine if water conservation benchmarks established in the WMCP are being met. The JWC must submit a new WMCP in 2020.

Aquifer storage and recovery limited license: In September 2016, OWRD approved the JWC's application for renewal to Limited License (LL) #019 for Aquifer Storage and Recovery (ASR). Limited License #019 permits the JWC to construct up to 14 ASR wells in the vicinity of Cooper Mountain. The operational limits for all wells combined includes:

- a maximum diversion/injection rate of 8,100 gallons per minute (18 cfs);
- underground storage up to 2.1 billion gallons (6,445 ac-ft);
- and a maximum recovery rate of 28,000 gallons per minute (62 cfs).

Since the JWC obtained LL #019 in 2011, the JWC has drilled and constructed two test wells and two production wells. The production wells have not been put into service because pilot testing has yet to be completed. Permit extensions are granted by OWRD in 5-year increments so the next renewal will be required in 2021.

Expansion plans

In order to meet increasing water demand, the JWC is expanding its WTP to increase peak capacity from 75 MGD to 85 MGD. A Facility Plan was developed to minimize creation of stranded assets and to plan for future expansions. The Facility Plan documents assumptions about future WTP build-out capacity, processes, and site layout, as well as phasing of future improvements and expansion. The Facility Plan assumptions are guiding the design and location of the new structures and facilities for the near-term WTP expansion project.

Design and construction will be executed in two packages, with project completion scheduled for June 2019. Design of Package 1 is complete and construction will begin in February 2017. Package 1 construction activities, valued at almost $5M, include several maintenance projects, seismic life safety improvements, minor modifications to existing structures, and procurement of long-lead equipment in anticipation of Package 2. Package 2 design is underway and construction is anticipated to begin in November 2017. Package 2 construction, estimated to cost $24M, includes the construction of two new filters, a new surge basin, two new solids drying beds, associated yard piping, and upsizing existing pumps. The construction of the new facilities and improvements to existing infrastructure will result in a sustainable capacity of 85 MGD.

2016 Maintenance

Filter media replacement begins: JWC staff replaced the filter media (a combination of sand and anthracite) in Filter #13 in April 2016 and Filter #14 in November 2016. The existing media had been installed in 1995 and was nearing the end of its expected time of usage. The new filter media profile has more sand and less anthracite compared to the old media profile. Specifically, the media profile will change from 6 inches of sand and 50 inches of anthracite to 10 inches of sand and 46 inches of anthracite. This change is expected to improve the filters' effectiveness and increase the amount of time between backwash cleanings. The media in the remaining twelve filters will be changed during Package 1 of the WTP expansion project.

Filter media being replaced.

Finished water pump being replaced.

Finished water pump replacement: Finished water pumps #3 and #5 were replaced in June 2016, because the pumps and motors were nearing the end of their life expectancy and not performing at the rated flow capacity. The new motor for pump #3 was upgraded to a variable frequency drive, which provides greater operational flexibility.

Meter replacements began: In October 2016 the two raw water meters were replaced. Two new insertion magnetic meters were installed to replace the old ultrasonic meters. The ultrasonic meters were expected to be under-reporting flow by an estimated 6%. The new meters have resulted in the expected increase in raw water flow reporting. The WTP's finished water meters will be replaced with similar meters in early 2017.

Back-up power project complete: As described in the 2014 & 2015 Flow Management Reports, a seismic resiliency study identified that one of the greatest vulnerabilities at the JWC's WTP is loss of power. In February 2016, the installation of two 2.5 megawatt generators was completed. The Spring Hill Pumping Plant (SHPP) Intake received a new transformer and the power service to the JWC's portion of the intake was modified so that the backup power generators can also serve the JWC's raw water pumps during a power outage.

Acknowledgements

The Joint Water Commission appreciates the efforts of the Watermaster and our partners on the Flow Management Committee, and we extend our thanks for all of their involvement and cooperation. The communication and coordination that comes from this committee among the various Tualatin River users is invaluable.

MILLS DAM/BARNEY RESERVOIR

BY KRISTEL GRIFFITH, WATER RESOURCES PROGRAM COORDINATOR,
JOINT WATER COMMISSION/CITY OF HILLSBORO

Overview

Mills Dam/Barney Reservoir is a rock and earth impoundment on the Middle Fork of the North Fork of the Trask River. When Trask Dam was built in 1970 by the Cities of Hillsboro and Forest Grove, the reservoir held 4,000 ac-ft of water. In 1999, the dam height was raised to accommodate 20,000 ac-ft of storage and was renamed the Mills Dam. Barney Reservoir is named for J.W. Barney and Mills Dam is named for Eldon S. Mills, both former Hillsboro City Managers and key leaders in the original dam construction and its later expansion.

Water stored in Barney Reservoir is released to both the Trask and Tualatin Rivers. Flows to the Trask River include all storage overflows and 15% of the stored water, which is allocated to Oregon Department of Fish and Wildlife (ODFW). A gravity flow diversion pipeline conveys water from the Trask River to the headwaters of the Tualatin River. The additional flow in the Tualatin River is used for municipal purposes and flow augmentation to improve water quality.

Release from Barney Reservoir to the Trask River through a Howell-Bunger Valve

The current owners of Barney Reservoir are the Cities of Hillsboro, Forest Grove, Beaverton, the Tualatin Valley Water District (the same entities that form the Joint Water Commission) and Clean Water Services. Collectively they form the Barney Reservoir Joint Ownership Commission (BRJOC). As with the Joint Water Commission, the City of Hillsboro serves as the managing and operating agency for the BRJOC.

RESERVOIR OWNERSHIP AND WATER ALLOCATION FOR BARNEY RESERVOIR

		Water Allocation (percent)	Storage at Full Capacity (acre-ft)	Reservoir Ownership (percent)
Reserved	Dead pool	2.3%	460	—
	Oregon Department of Fish and Wildlife (ODFW)	15.0%	3,000	0.0%
BRJOC Partners	Clean Water Services	8.3%	1,654	10.0%
	JWC Partners	74.4%	14,886	90.0%
	City of Hillsboro	*25.6%*	*5,127*	*31.0%*
	City of Forest Grove	*2.1%*	*414*	*2.5%*
	City of Beaverton	*17.8%*	*3,556*	*21.5%*
	Tualatin Valley Water District (TVWD)	*28.9%*	*5,789*	*35.0%*
	TOTAL	100.0%	20,000	100.0%

Dam Inspection

Oregon Water Resources Department (OWRD) inspected Mills Dam on April 7, 2016 to assess the dam's exterior surfaces and identify conditions that may affect the safety of the dam. Mills Dam is classified as a high-hazard dam based on the downstream risk to people and property. OWRD did not identify any major issues or concerns and reported that the dam is very well maintained and operated. The crest and embankment show no signs of settlement, instability or internal erosion. OWRD intends to inspect the dam again in 2017.

2016 Operations

Barney Reservoir filled on January 18, 2016. By the end of the release season, 68% of the total allocated water was released.

Releases to the Tualatin River: The majority of the JWC's natural flow rights were regulated off on May 12, 2016, and releases from Barney Reservoir to the Tualatin River began on the same day. Natural flow rights were restored on May 18, 2016 and then regulated off once again on May 20, 2016. Releases continued through October 12th, bringing the total release days to 153. Clean Water Services used 72% of their allotment and the JWC partners used 63%.

Releases to the Trask River: Releases from Barney Reservoir to the Trask River for ODFW began on May 13, 2016 and continued through December 4, 2016 for a total of 206 release days. All of the stored water for ODFW was released to the Trask River.

STORED WATER ALLOCATION AND RELEASES FOR BARNEY RESERVOIR — 2016

			BRJOC Partners					
					JWC Partners			
	Total Storage	Oregon Dept of Fish and Wildlife	Clean Water Services	*JWC Total*	*City of Hillsboro*	*City of Forest Grove*	*City of Beaverton*	*TVWD*
Water Allocation (acre-ft)	20,000	3,000	1,654	14,886	*5,127*	*414*	*3,556*	*5,789*
Water Released (acre-ft)	13,925	*3,210	1,250	9,465	*2,950*	*21*	*1,656*	*4,838*
Percent Allocation Used	70%	107%	76%	64%	*58%*	*5%*	*47%*	*84%*
Release Start Date		May-13	Aug-31	May-11				
Release End Date		Dec-4	Oct-14	Oct-12				
Number of Days with Releases		206	45	153				
Average Daily Release (cfs)		7.9	14	31				

An extra 210 acre-ft was erroneously released for ODFW due to inconsistency between planned and operational releases. The extra release will not affect ODFW's beginning balance for storage for the 2017 release season.

LAKE OSWEGO CORPORATION

BY MARK ROSENKRANZ, WATER RESOURCE SPECIALIST, LAKE OSWEGO CORPORATION

Introduction

The Lake Oswego Corporation (LOC), a non-profit organization, owns and manages Oswego Lake, a 163-hectare (403 acre) reservoir located 10 miles south of Portland, Oregon. LOC was formed in 1942 when the Oregon Iron and Steel Company, then owner of the land around the Lake, deeded to LOC the land, three dam structures, and all water rights. The original dam was constructed in 1871 and later upgraded in 1921. Oswego Lake is a private water body whose primary water right is hydropower generation. Secondary uses include irrigation, aesthetic viewing, contact recreation, fishing, and boating.

Oswego Lake and Watershed Morphology

The original natural lake, called Waluga, was formed 10,000 years ago by the Missoula glacial floods which altered the old Tualatin River channel. Today, the Lake has three basins: West Bay, the Main Lake, and Lakewood Bay. There are also two shallow, man-made canals, Blue Heron Canal and Oswego Canal. Oswego Canal is the 2.4-km conduit from the Tualatin River (RM 6.7). Total lake surface area and volume is 1.63 km^2 (403 acres) and 12.7 x 10^6 m^3 (10,300 acre-feet). Shoreline length, including bays and canals, is 18.62 km (11.56 mi). Oswego Lake has a 5.08-km (3.15-mi) fetch and a narrow 0.56-km width (0.34-mi). The hydraulic residence time is 390 days.

Oswego Lake's two watersheds include the natural, 7.5-mi^2 urban basin around the Lake (10:1 watershed to lake-area ratio) and the larger 700-mi^2 Tualatin River basin (1,000:1 ratio) when the LOC Headgate is open. Major inflows from the watershed include Springbrook Creek, Lostdog Creek, Blue Heron Creek, and 70-plus storm drains from the City of Lake Oswego.

Aerial view of the West Bay of Oswego Lake looking to the East

LOC Water Rights and Contracts

Hydropower Generation: The primary hydropower water right is 57.5 cubic feet per second (cfs) obtained in 1906 that allows year-round diversion. To guarantee this flow during the dry season, LOC owns and operates a diversion dam located downstream of the Oswego Canal (RM 3.4). Flaps are erected on an “as needed” basis. No flaps have been used since 2004.

Irrigation: A contract between LOC and the Bureau of Reclamation (Oct 20, 1972) provides for up to 500 acre-feet from Scoggins Reservoir for irrigation use during March through November. The largest irrigator on the Lake is the Lake Oswego Country Club (approximately 175 acre-feet).

Maintenance/Evaporation: LOC also has a maintenance/evaporation water right of 3.36 cfs dating from 1985. This water can be diverted between September 16th and July 30th.

Oswego Lake Watershed Management Plan

Water quality improvements and safety are the top priorities for LOC. For many years, Oswego Lake has had issues with overgrowth of cyanobacteria that can impair lake aesthetics. Under extreme conditions cyanobacteria also can be harmful to health. The goal of the annual LOC Water Quality Management Plan is to reduce cyanobacteria productivity and maximize the aesthetic value of the Lake. In order to accomplish this goal and provide long-term water quality solutions, LOC conducts a variety of watershed activities as part of the management plan.

Role of phosphorus: Algae require sunlight and nutrients in order to grow. To limit the growth of algae (especially cyanobacteria) in the Oswego Lake, LOC has focused its efforts on reducing the availability of one particular nutrient—phosphorus. The LOC has targeted 20 µg/L as the maximum phosphorus concentration in the lake that would substantially limit cyanobacteria growth. In order to reach this goal, LOC is trying to curb additional phosphorus loading to the lake as well as pursue methods to reduce the bioavailability of the phosphorus that is already present in the lake.

Management of phosphorus: Oswego Lake is fed by rainwater, creeks draining the surrounding watershed, likely groundwater inflow, stormwater inputs, and water from the Tualatin River that is conveyed via the Oswego Canal. In recent years, LOC has tried to minimize or eliminate flow from the Tualatin River into the lake because the river has a much higher phosphorus concentration than the target level for the lake. Flow into the lake from the Oswego Canal is regulated by a headgate.

Two methods have been used in Oswego Lake to reduce the amount of phosphorus that is available to algae: hypolimnetic aeration to prevent phosphorus release from the sediments and alum addition to bind dissolved phosphorus making it biologically unavailable. Both methods have been successful in decreasing phosphorus concentrations in the lake, although not always to the target level of 20 µg/L.

Effects of lake temperature on water quality: Warm temperatures increase the rate of oxygen consumption by biological activity— biochemical oxygen demand in the water and sediment oxygen demand at the sediment/water interface. The result is a rapid loss of oxygen in the hypolimnion and subsequent release of phosphorus from the sediment. Hypolimnetic aeration helps to counter this effect, but is not able to prevent phosphorus release entirely if the dissolved oxygen concentration becomes very low.

Cyanobacteria: Compared to typical fresh water algae, cyanobacteria grow better at higher temperatures. Increased cyanobacteria productivity in the epilimnion fueled by warm water and available phosphorus reinforces a feedback loop that leads to further oxygen depletion in the hypolimnion. Cyanobacteria are present in Oswego Lake every year but warm water and nutrient abundance allow them to proliferate.

2016 Lake Management

Tualatin River flows: As usual, minimal Tualatin River flows were used for keeping the lake full. In 2016 the average annual concentration of phosphorus in the Tualatin River at Stafford was 126 µg/L; the average during the summer was 84 µg/L. These values are several times greater than the average of Oswego Lake and influences the decision to restrict river use as much as possible (see

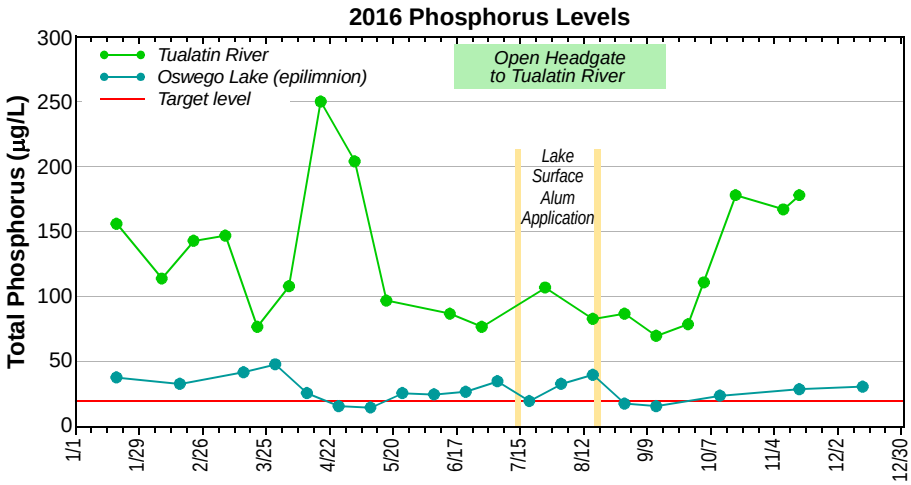
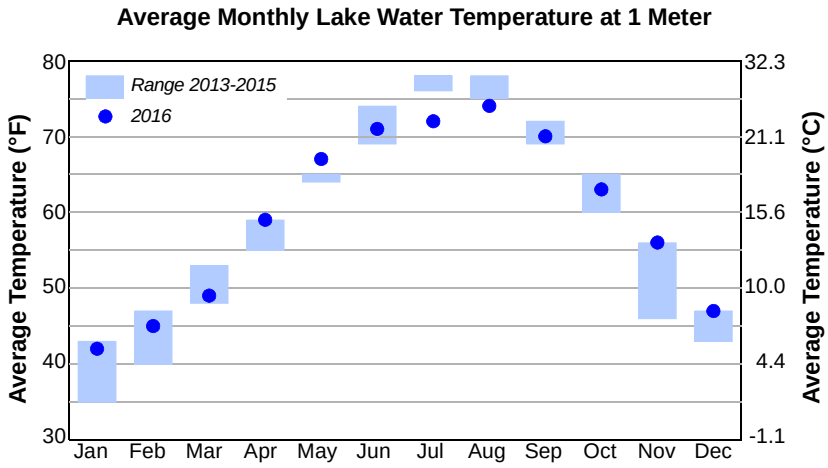
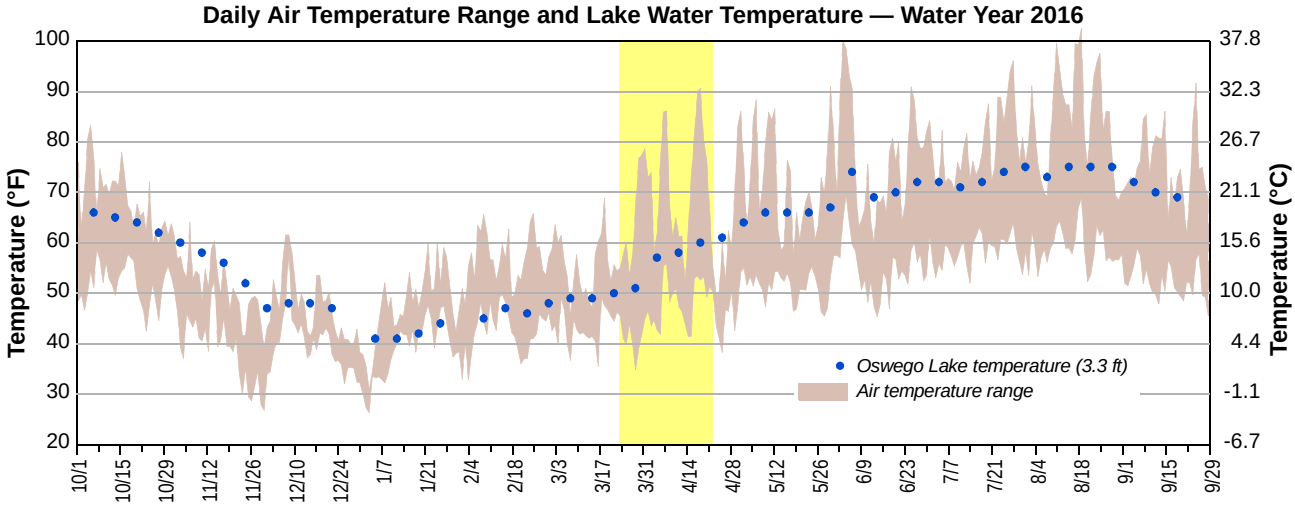


figure at the right). LOC opened the headgate on June 16 and closed it on September 17.

Cyanobacteria: The summer of 2016 was not as warm as the past two years, so the lake did not warm as much in July and August as it has recently (see figure at right). Nonetheless, early 2016 was in an el Niño pattern and spring was warm. Unseasonable daytime air temperature highs near 80°F occurred at the end of March, and mid-April had temperatures in the 90°s. Higher than normal solar insolation and longwave radiant energy inputs associated with the warm weather resulted in early season warming of the lake and created conditions that promoted cyanobacteria growth. The figure below shows how quickly the lake temperature rose—about 10°F— between mid-March and mid-April.





Water year 2016 was wet, with the lake receiving over 16 inches rain in December-2015. The highest daily rainfall, more than 2.6 inches, occurred on December 7th. Such high daily rain amounts cause the most problems for Oswego Lake. Sixty percent of the city of Lake Oswego drains into Oswego Lake. Because about 30% of the watershed is impervious surface, during periods of heavy rain a lot of water rushes out of stormwater pipes and into open streams and creeks. This results in considerable erosion and scour that transport sediment to the lake. This newly imported sediment can release phosphorus into the water and contribute to algae and cyanobacteria growth.

The combination of sediment transported from watershed to the lake in the previous December with high water temperatures in spring resulted in conditions that favored cyanobacteria over other algae. Cyanobacteria thrive in warm water and can quickly out-compete beneficial algae for nutrients. Consequently, even though it was a milder summer than the two previous years, LOC still had to surface-apply alum to keep phosphorus levels low enough to limit cyanobacteria growth.

Water quality parameters: Data for nutrient concentrations in the lake and lake clarity are shown in the table below.

2016 OSWEGO LAKE WATER QUALITY SUMMARY AVERAGES

	Location	Chlorophyll-a* (µg/L)	Total P (µg/L)	SRP (µg/L)	Total N (µg/L)	Secchi (m)	Turbidity (NTU)
Annual	Lakewood Bay (depth 3.2 m)	—	34	1	572	1.4	5.0
	Main Lake (depth 16 m)	—	29	2	914	2.0	5.0
	West Bay (depth 1.4 m)	—	106	9	1863	0.6	16
	Oswego Canal (depth 1.2 m)	—	104	30	4570	0.8	4.1
	Blue Heron Canal (depth 1.3 m)	—	80	7	1184	0.9	6.9
	Outlet (depth 6 m)	—	31	2	872	2.0	4.7
Summer	Lakewood Bay (depth 3.2 m)	—	48	1	542	0.9	7.4
	Main Lake (depth 16 m)	—	27	1	579	1.5	7.4
	West Bay (depth 1.4 m)	—	113	1	937	0.4	22
	Oswego Canal (depth 1.2 m)	—	89	7	1184	0.9	9.3
	Blue Heron Canal (depth 1.3 m)	—	74	1	972	0.9	6.9
	Outlet (depth 6 m)	—	28	1	595	1.5	7.0

*Chlorophyll-a concentrations were not considered reliable in 2016.
Boxed cell = highest average during the summer; Shaded cell = lowest average during the summer; Summer=June–September
Abbreviations: Total P = Total Phosphorus, SRP = Soluble Reactive Phosphorus, Total N = Total Nitrogen, Secchi = Secchi depth, ug/L = micrograms per liter, m = meters, NTU = nephelometric turbidity units

Intern project: LOC will have a new intern beginning in summer-2017. She will be the first Ph.D. candidate who has interned for LOC; previous interns have been masters students. Her project, which will be more comprehensive than those by previous interns, will examine nutrient sources to Oswego Lake and their role in cyanobacteria blooms.

Sunset across Oswego Lake

OREGON WATER RESOURCES DEPARTMENT

BY JAKE CONSTANS, WATERMASTER, DISTRICT 18

Introduction

The District 18 Watermaster's Office is a field office of the Oregon Water Resources Department (OWRD) (www.wrd.state.or.us) in cooperation with Washington County (www.co.washington.or.us/index.htm), and is responsible for water distribution management within the Tualatin, Oswego Lake, and Lower Willamette Drainage Basins in northwestern Oregon. District 18 covers approximately 1,111 square miles and serves the majority of the population in Washington and Columbia counties, as well as parts of Clackamas, Multnomah, and Yamhill counties. There are 2,806 total surface water rights in the district which cover 58,602 acres of land. As part of the surface water rights within the Tualatin River Basin there the following streams have instream water rights: Tualatin River, Gales Creek, Scoggins Creek, Rock Creek, West Fork Dairy Creek, and Fanno Creek. To assist in monitoring surface water in the basin we currently utilize 17 total gaging stations, 10 of which are on real time data.

WATERMASTER DISTRICT 18 GAGING STATIONS FOR 2016

Station Number	Stream	Stream Mile	Latitude	Longitude	Type
14206200	Dairy Creek at Hwy 8 near Hillsboro, OR	2.06	45°30'38"N	123°06'56"W	*Logger
14205480	E. Fk. Dairy Creek at Dairy Creek Rd near Mountaindale, OR	12.33	45°40'32"N	123°03'54"W	Staff
14205000	W. Fk. Dairy Creek @ Banks, OR	7.7	45°37'26"N	123°06'59"W	Staff
14205160	W. Fk. Dairy Creek @ Evers Rd near Roy, OR	1.96	45°34'34"N	123°05'34"W	Staff
14204530	Gales Creek @ Old Hwy 47 near Forest Grove, OR	2.36	45°30'39"N	123°06'56"W	*Logger
14204540	Gales Creek @ Clapshaw Hill Rd near Gales Creek, OR	12.36	45°35'39"N	123°12'38"W	Staff
14202920	Sain Creek above Hagg Lake near Gaston, OR	1.6	45°28'50"N	123°14'40"W	*Logger
14202850	Scoggins Creek above Hagg Lake near Gaston, OR	8.0	45°30'06"N	123°15'06"W	Logger
14202980	Scoggins Creek below Hagg Lake near Gaston, OR	4.8	45°28'10"N	123°11'56"W	*Logger
14202860	Tanner Creek above Hagg Lake near Gaston, OR	1.6	45°30'21"N	123°13'10"W	Staff
14206500	Tualatin River @ Farmington, OR	33.3	45°26'58"N	122°57'02"W	*Logger
14202510	Tualatin River @ Gaston, OR	62.3	45°26'21"N	123°07'85"W	*Logger
14204800	Tualatin River @ Golf Course Rd near Cornelius, OR	51.5	45°30'08"N	123°03'22"W	*Logger
14202450	Tualatin River below Lee Falls near Cherry Grove, OR	70.7	45°30'21"N	123°13'06"W	*Logger
14206295	Tualatin River @ Rood Bridge Rd near Hillsboro, OR	38.4	45°29'24"N	122°57'06"W	*Logger
14206956	Tualatin River @ Tualatin (station number formerly 14206960) (stage only)	8.9	45°23'14"N	122°45'46"W	*Logger
WAPO	Wapato Canal near Gaston, OR (from Tualatin River)	61.9	45°26'29"N	123°07'17"W	Staff

*Telemetry

Water Rights

All water in Oregon, by law, is publicly owned. With a few exceptions, a person or organization (such as a city, business, or other entity) must obtain a authorization from the state before they are allowed to divert water from its natural source, whether that water is from a stream, a lake or underground. This authorization is called a water right and they have been required for surface water since 1909. The Oregon Water Resources Department (OWRD) is responsible for issuing and managing water rights in Oregon.

Water right characteristics:

- Every water right establishes the following conditions:
  - the location where the water is being diverted,
  - how much water is being diverted,
  - where the water will be used,
  - and what the water will be used for.

  The use must be considered "beneficial" by the State and the water must be used in a way that is not considered wasteful. Changing any of these conditions requires legally changing the water right.
- Every water right has a "priority date" which is the date when it was issued.
- Water rights are usually associated with the land cited in the water right and when that land is sold, the water right usually goes with it. This is called "appurtenancy" which is a legal term for rights or restrictions that go with a property (an easement is a common example). It is possible, however, to sell or transfer a water right independent of the land. In such a case, a water right transfer must applied for and granted by OWRD. Note that mere ownership of land does confer the right to the water adjacent to or under that land; the land owner must own a water right.
- An instream water right is designed to retain a specified amount of flow in the stream for fish and wildlife, water quality or recreation. The Departments of Fish and Wildlife, Environmental Quality and Parks and Recreation may apply for instream water rights. An instream water right has a priority date and is not treated differently than other water rights.
- A water right remains in perpetuity as long as it is used at least once every 5 years. If it has not been used for 5 years, it may be forfeited or cancelled, but this is not automatic.

Prior Appropriation: In Oregon and throughout the western U.S., water is managed by a a system called "Prior Appropriation." Prior Appropriation is most simply explained as first come, first served, where "first" to "last" is in order of priority date.

A water source may not always be adequate to meet all of the water rights that have been issued for it. Because summers in western U.S. are typically dry, surface water shortages in the summer are not uncommon. If a water source cannot meet all of the water rights associated with it, the entity with the oldest (most senior) priority date is entitled to all of the water documented in their water right. If water is still available after that water right has been fulfilled, then the entity with the next oldest priority date is entitled to water. This process continues on in order of priority date. The entities with more recent (junior) priority dates may exercise their water rights only after the more senior rights have been met.

The Oregon Water Resources Department monitors the availability of water throughout the season. Based upon flow, location and priority date, OWRD determines which, if any, water rights holders in the basin will be restricted from exercising their water rights. Note that the eventual use of the water (for example, irrigation, municipal supply, etc.) is taken into consideration only if two water rights have the same priority date or if a drought has been officially declared by the Governor.

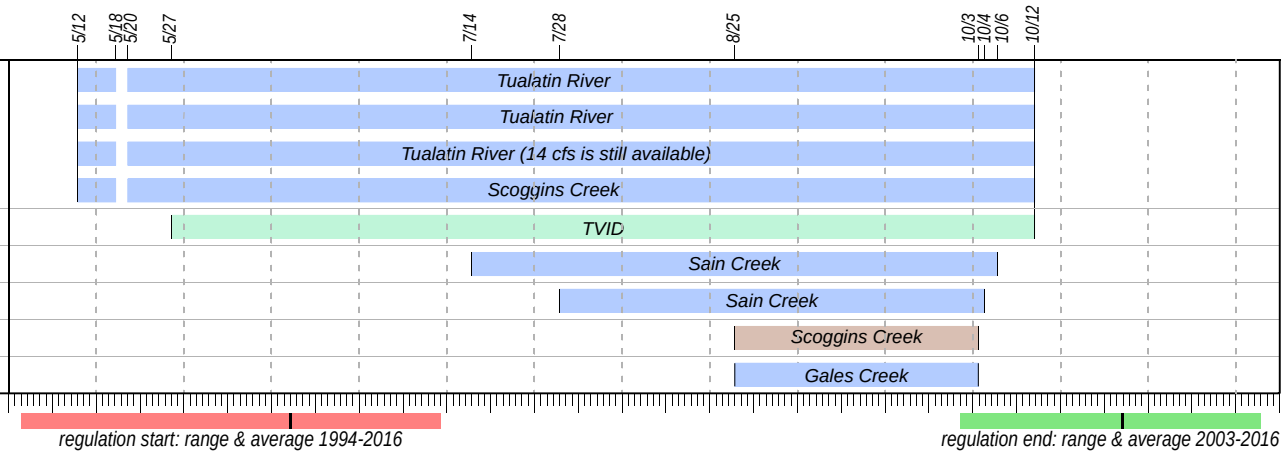
Regulatory Overview 2016

Regulation in 2016 began on May 12, a relatively early start and ended on October 12. Details of the regulation season are shown on the next page.

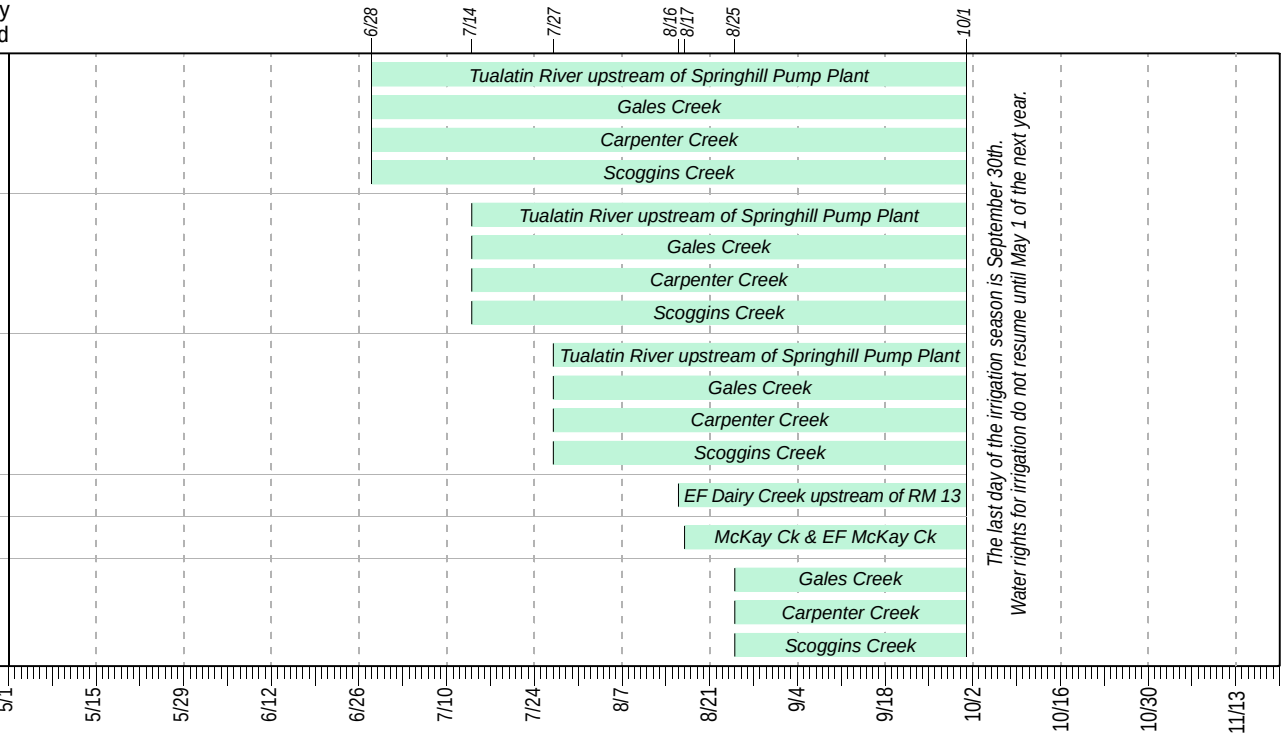
REGULATION OF WATER RIGHTS IN THE TUALATIN BASIN — 2016

Bars show period when water right is suspended

Entity	WR Certificate#	Priority Date
City of Beaverton	P-45455	7/15/1980
City of Forest Grove	P-40615	4/28/1976
City of Hillsboro	P-46423	2/6/1974
City of Hillsboro	P-50879	6/9/1988
TVID	P-35792	2/20/1963
City of Hillsboro	P-2443	5/1/2015
City of Hillsboro	P-1136	1/22/2012
Stimson Lumber Co	P-10633	4/1/1932
City of Forest Grove	P-12034	4/16/1935



Location of Irrigation WRs	# of WRs regulated off	Earliest Priority Date Regulated
Tualatin R and tributaries upstream of SHPP	11	2/20/1963
	62	9/24/1963
	4	7/10/1967
	3	7/28/1975
Tualatin R and tributaries upstream of SHPP	18	4/14/1949
	38	4/18/1949
	5	8/22/1949
	5	4/15/1955
Tualatin R and tributaries upstream of SHPP	23	3/18/1936
	26	6/25/1935
	6	12/14/1936
	7	7/24/1939
EF Dairy Ck & tribs abv RM 13	12	3/6/1967
McKay Ck & tribs abv Northrup Rd	8	8/8/1966
Tualatin R and tributaries upstream of SHPP	3	7/28/1975
	11	2/20/1963
	62	9/24/1963



Water Use

Municipal | Industrial/manufacturing | Irrigation

SCOGGINS DAM/HENRY HAGG LAKE

BY WALLY OTTO, RETIRED, TVID,
JOHN GOANS, RESERVOIR SUPERINTENDENT, TVID,
BERNIE BONN,
AND TOM VANDERPLAAT, CLEAN WATER SERVICES

Scoggins Dam

Scoggins Dam/Henry Hagg Lake is located on Scoggins Creek in the upper part of the Tualatin Basin. Scoggins Dam is an earthfill dam constructed during 1972–75 to store water during the winter for summer and fall use. The Dam is owned by the Bureau of Reclamation (BOR) and managed by the Tualatin Valley Irrigation District (TVID). Stored water from Hagg Lake is used for irrigation, municipal and industrial use, and flow augmentation in the Tualatin Basin to support water quality and protect fish and wildlife.

Three tributaries flow into Hagg Lake—Sain, Scoggins and Tanner Creeks. Flows in Sain and Scoggins Creeks are monitored by Oregon Water Resources Department gages; flow in Tanner Creek is monitored by daily readings of a staff plate by TVID personnel. Outflow is measured by a BOR stream gage in Scoggins Creek at RM 4.8. Oregon Water Resources Department maintains the rating curves for Tanner Creek, Sain Creek, and for Scoggins Creek at RM 4.8.

Scoggins Dam stores 53,323 acre-feet of water in Henry Hagg Lake as active storage—the amount of water that can be moved in or out of the reservoir between the intake structure and the top of the spillway gates. Another 7,000 acre-feet of stored water that is not engineered to be removed exists below the intake structure. It is reserved for the protection of fish if the lake were to be drafted down completely to the intake structure.

ALLOCATION OF WATER FROM SCOGGINS RESERVOIR

Contracted To	Water Use	Available Volume	
		ac-ft	as percent
Tualatin Valley Irrigation District	Irrigation (up to 17,000 acres)	26,705	50%
Joint Water Commission	Municipal and industrial	13,500	25%
City of Beaverton		*4,000*	
City of Forest Grove		*4,500*	
City of Hillsboro		*5,000*	
Clean Water Services	Instream water quality	12,618	24%
Lake Oswego Corporation	Irrigation	500	1%
Total		***53,323**	**100%**

The active storage in Scoggins Reservoir was revised in 2011

Scoggins Dam is authorized by the U.S. Congress to provide flood control for communities located downstream, including Gaston, Cornelius and Forest Grove. The dam controls runoff from a 39 square mile watershed (about 5% of the Tualatin Basin). From November 1st to January 15th, 20,000 acre-feet are designated for flood control storage. The dam does not generate electricity.

During the summer months, recreation is a major activity at Hagg Lake and the surrounding area. Washington County maintains and operates the 2,851 acre Scoggins Valley Park/Henry Hagg Lake recreational facility. In addition to the 1,100 acre lake, the park includes picnic areas, hiking trails, two boat launching facilities, and observation decks for bird and wildlife watching. The lake is stocked for fishing. Most of the park's facilities were designed to be accessible for disabled visitors. The park is open year round and is for day-use only.

http://www.co.washington.or.us/Support_Services/Facilities/Parks/Hagglake/index.cfm

2016 Water Use

Water year 2016 marks the 42nd year since Scoggins Dam began storing and releasing water for downstream beneficial use. A total of 37,158 acre-feet were delivered in 2016 bringing the total delivery from the Project to more than 1.3 million acre-feet.

2016 flow regulation began on May 15th for the Joint Water Commission and May 28th for TVID. With the exception of TVID's extended season irrigators, all users were permitted to return to natural flow use in the Tualatin River on October 23, 2016. As usual, TVID continued to deliver a small amount of storage water primarily to nurseries and greenhouses beginning in March and continuing until the end of November as permitted by the Oregon Water Resources Department.

2016 WATER DELIVERIES FROM SCOGGINS RESERVOIR

Delivered to	Volume (ac-ft)
Tualatin Valley Irrigation District	18,343
Clean Water Services	9,689
Municipal Use (Cities of Beaverton, Forest Grove and Hillsboro)	7,475
Lake Oswego Corporation	500
Other (includes two golf courses, from TVID allocation)	1,151
Total	**37,158**

Events in 2016

Recreation: In 2016 there were 800,000 users recorded at Scoggins Valley Park/Henry Hagg Lake. In addition to the usual recreational uses, numerous races were held including triathlons.

Coho Salmon: Seven Coho were spotted in Scoggins Creek below the dam on October 27th.

Lake Fish Habitat: Over the previous years, the Oregon Panfish Club anchored a total of 220 fish habitat structures (8' diameter) in the upper reaches of Henry Hagg Lake. These have caused no problems in terms of operation and maintenance of Scoggins Dam. They have remained in place weighted down with concrete anchors.

Elk Mitigation: Roughly 50% of the fir trees planted in February 2012 remain standing and continue to form a visual barrier for the elk along the side of the Control House entry road. The field remains off limits to all trespassers including dogs. On numerous occasions, elk were observed grazing in the pasture.

Endangered species: As part of the consultation, BOR committed to avoid or minimize impacts to Fender's Blue Butterfly (FBB) and Kincaid's lupine. The Master Trail that traversed prairie patches containing FBB and Kincaid's lupine was relocated and trail maintenance practices modified to support Kincaid's lupine or FBB. Reclamation has also committed to work with partner agencies to study and control invasive weeds.

Scoggins Dam Security

Department of Homeland Security Alert Levels: The Project follows the Department of Homeland Security (DHS) alert levels as required by BOR. No incidences of heightened security level occurred at Scoggins Dam in 2016 due to any specific terrorist alerts.

Scoggins Dam Safety

At Scoggins Dam, earthquake activity, weather including temperature and precipitation, river stage levels, and water surface elevation are reported and recorded electronically. In addition, key dam behavioral instruments report electronically over BOR's Hydromet system. The data is collected, stored and transmitted via satellite to BOR's Pacific Northwest Regional office in Boise. It is available on the Internet through both secure and non-secure channels. Many of these electronic reporting stations have alarms to alert operators if sudden or unusual conditions develop including earthquakes and flooding. While operators are not on site 24/7, the Project is monitored 24/7, both by BOR and TVID personnel.

Spills and Water Quality: No spills or accidents that jeopardized the water quality in Henry Hagg Lake occurred in 2016 and the BOR on-site Response Trailer was not needed for emergency response. No containment booms were deployed to contain any contaminant spills during 2016.

Drownings: No drownings were reported for the year 2016, thankfully!

Earthquakes: There were no earthquakes reported in 2016 that were near enough to the Dam that inspection of the facility was required.

Future of the Project

Tualatin Basin Water Supply: In 2001, the water resource agencies in the Tualatin Basin (except TVID) began to explore and compare alternatives for providing the additional water needed to meet future needs. TVID was not part of this group because it is limited to serving 17,000 acres of irrigated land and the current supply is adequate. After studying many different options as well as seismic issues, the municipal and industrial water providers decided to focus on the Willamette River for future water supply.

Clean Water Services is continuing to collaborate with BOR on the Tualatin Basin Water Supply Project. The goals include developing alternatives that strengthen the dam to reduce risk from a Cascadia Subduction Zone earthquake and ensuring that future water supply needs are met for the maintenance and improvement of water quality in the Tualatin River.

The 2016 Federal Energy and Water Appropriations Bill contained provisions to raise the funding cap for necessary safety upgrades to Scoggins Dam. The bill also contained language that granted BOR the statutory authority to pursue conservation storage (and other benefits). Congress passed the bill in May of 2016. It earmarked $2 million updates to Scoggins Dam.

Two alternatives that are under consideration for upgrading Scoggins Dam. They are: A) strengthening and raising Scoggins Dam in its current location, and B) replacing the existing dam with a new dam located downstream at a narrow gap in the valley. Geotechnical investigations will begin in 2017 to help assess the two alternatives.

More information about the Tualatin Basin Water Supply Project and updates can be found at:
http://www.tualatinbasinwatersupply.org

TUALATIN VALLEY IRRIGATION DISTRICT

BY WALLY OTTO, RETIRED, TVID
UPDATED BY JOHN GOANS, RESERVOIR SUPERINTENDENT, TVID

Tualatin Valley Irrigation District Overview

The Tualatin Valley Irrigation District (TVID), located in Forest Grove, Oregon, is the agricultural water service agency in the Tualatin Basin. In the early twentieth century, relatively little agricultural land was irrigated in Washington County: about 15 acres in 1915 and about 130 acres in 1933. By 1951, however, 18,455 acres had water rights registered in the county. When the TVID was formed in 1962, the total had grown to 33,885 acres. TVID was formed to assist in the delivery of irrigation water to about half of those acres (17,000) in the Tualatin Basin. The water was supplied from natural flow and return flows, and was extremely limited due to early summer withdrawals from the Tualatin River and increasing demands for water for irrigation and municipal use and for maintaining instream water quality and fish. The only storage at this time was Barney Reservoir which stored 4000 acre-feet for municipal use. Beginning in 1975, additional stored water became available behind the newly completed Bureau of Reclamation Project, Scoggins Dam. Approximately half of the water stored in Scoggins Reservoir (Henry Hagg Lake) is allocated to TVID.

Most of the water supplied by TVID is pumped from the Tualatin River at the Spring Hill Pump Plant and delivered to TVID patrons via approximately 120 miles of pressurized pipeline. Additionally, water in both Scoggins Creek and the Tualatin River is withdrawn by irrigators for use on land abutting the river. They are known as “river users” and pay for their own pumping costs because they are not associated with the pressure pipeline or the Spring Hill Pumping Plant. When natural flow no longer meets demand, the District 18 Watermaster begins regulating water users with “junior” (or more recent) water rights off, starting with users with the most recent water right. The TVID storage right is dated 1963, so TVID patrons with water rights after that date must stop withdrawing natural and return flow water, and all water withdrawals must be supplied from storage. Storage water is discharged from Scoggins Reservoir to either augment the river flow or supply the entire need of the TVID patrons, both the pump plant/pressure pipeline users and the river users. Water for some of the TVID members on the lower Tualatin River is supplied by water discharged from Clean Water Services’ Rock Creek Wastewater Treatment Facility. Crops irrigated with District water range from row crops including blueberries, blackcaps, corn, pumpkins and other vegetables to nursery stock.

TVID is allowed to use storage water early and late in the year because of an extended season for irrigation made possible by an agreement with the Oregon Water Resources Department. The early season begins March 1 and the extended season ends November 30. All water used outside the normal irrigation season (May through September) must come from TVID's annual contracted storage allotment of 27,022 acre-feet. TVID's total contracted amount with Reclamation is 37,000 acre-feet with the additional coming from natural and return flows in the Tualatin River and its tributaries.

The extension of the irrigation season for the Tualatin Valley Irrigation District has made growing specialty crops within the District much more appealing. During the extended spring season, the water is used primarily for berries and nurseries; during the extended fall season, water is primarily used for the nurseries. A more diverse nursery stock is now possible, including flowers which are raised well into November when protected by greenhouses. Water availability and moderate temperatures make the Tualatin Valley Irrigation District home to many small specialty nurseries along with several large operations.

2016 TVID Water Use

For the 2016 irrigation season (March through the end of November), TVID took delivery of 18,343 acre-feet of water from storage in Henry Hagg Lake—down 7,509 ac-ft from 2015 The least amount was 8,333 ac-ft in 1993; the largest seasonal delivery was 25,852 ac-ft in 2015. TVID 2016 peak use from storage was 105 cfs on August 14th.

WEATHER STATISTICS AT SCOGGINS DAM 2016

Month	Description	Precipitation		Average Temperature		Other
		2016	[average 1970-2015]	Low	High	
January	wet	10.36"	[7.9"]	37 ºF	46 ºF	2.65" precip on 1/31/16
February	average	4.97"	[6.12"]	40 ºF	53 ºF	3 days 60 ºF or higher
March	wet	9.21"	[5.72"]	40 ºF	54 ºF	1.29" precip on 3/10/16
April	dry, warm	2.39"	[3.42"]	43 ºF	67 ºF	5 days 80 ºF or higher
May	dry, warm	0.72"	[2.18"]	47 ºF	70 ºF	6 days 80 ºF or higher
June	dry, warm	0.97"	[1.48"]	50 ºF	75 ºF	4 days 90 ºF or higher
July	dry	0.29"	[0.43"]	53 ºF	77 ºF	2 days 90 ºF or higher
August	average	0.29"	[0.66"]	52 ºF	84 ºF	8 days 90 ºF or higher
September	warm	0.71"	[1.52"]	47 ºF	73 ºF	6 days 80 ºF or higher
October	extremely wet	13.19" Rec	[3.71"]	48 ºF	60 ºF	2.60" precip on 10/14/16
November	wet	10.43"	[7.83"]	45 ºF	55 ºF	3.26" precip on 11/25/16
December	average	7.82"	[9.34"]	31 ºF	41 ºF	1 day 50 ºF or higher

*Rec= October rainfall was the highest on record.

2016 TVID Operation and Maintenance

The year was uneventful from an operations standpoint. A "moratorium" remains in place regarding new turn-out deliveries. No new deliveries were added to the delivery system during 2016.

Pipeline Maintenance: TVID delivers irrigation water by high pressure pipeline to customers from Gaston to North Plains and from west of Forest Grove to Highway 219 south of Hillsboro. The water is withdrawn from the Tualatin River at the Spring Hill Pump Plant and lifted by pumps to a water regulating tank off Winter's Road. From there it flows under gravity pressure to all points of delivery through 120 miles of pipeline. Preventative maintenance continues to keep service delivery as dependable as possible. Several minor disruptions of service occurred during the year, but were quickly isolated and repaired. Service was restored in minutes in some cases or in up to a day if conditions did not allow quick access. There were no long term disruptions of service to District patrons.

Tributary Flow Restoration Projects: TVID and Clean Water Services continue their cooperative effort using the TVID water distribution network to supply water to West Fork Dairy Creek, Gales Creek, East Fork Dairy Creek, Blackjack Creek and McKay Creek. Each site consists of a metered pipeline with a diffuser at the outlet. All sites are located near delivery lines for the Irrigation District. Flow augmentation occurs during the summer and fall. The water not only adds to streamflow, but it cools the stream as well. The partnership between the Tualatin Valley Irrigation District and Clean Water Services is a novel way to improve the water quality of these streams at minimal cost.

WAPATO LAKE

BY KRISTEL GRIFFITH, WATER RESOURCES PROGRAM COORDINATOR, JWC
UPDATED BY JOHN GOANS, RESERVOIR SUPERINTENDENT, TVID

The former Wapato Lake bed, located south-east of Gaston, Oregon, is a 780 acre wetland. During the 1930s a levee and pump system was constructed by the Wapato Improvement District (WID) to drain the lake bed during spring in preparation for summer farming. The levee protects the former lake bed from severe flooding during the winter, thereby allowing easier drainage.

In 2011, the United State Fish and Wildlife Service (USFWS) became the majority land-owner and the WID was dissolved. In 2013 Wapato Lake was established as a National Wildlife Refuge (NWR) as part of the Tualatin River NWR Complex.

A levee failure in December 2007 resulted in flooding. A substantial population of algae and zooplankton had grown in the lake by spring. When the impounded water was discharged in June 2008, it created substantial water quality problems which affected drinking water treatment, agricultural irrigation, fish and wildlife, and recreational use. The State of Oregon issued a Public Health Advisory for recreational contact with the Tualatin River due to high levels of toxic algae. Detailed descriptions of these events8 can be found in USGS Report 2015-5178, "Upstream Factors Affecting Tualatin River Algae- Tracking the 2008 Anabaena Algae Bloom to Wapato Lake, Oregon." In 2010 the primary pump failed and Clean Water Services lead a collaborative effort to acquire temporary pumps to ensure that a repeat of the 2008 water quality did not occur. See the Tualatin River Flow Management Technical Committee's 2010 report for details.

Pump Failure in 2016

As in 2010, mechanical and electrical failures caused the primary pump to be non-operational in February 2016. Under the 2014 Total Maximum Daily Load (TMDL) Implementation Plan, USFWS must limit pumping from the lake by April 30 each year to protect water quality in the Tualatin River. Pump repairs could not have been completed soon enough to drain the lake bed by that date. This created a distinct threat of a repeat of the 2008 water quality problems. The water and natural resource managers in the Tualatin Basin, including CWS, USGS, JWC and USFWS, worked together to provide a coordinated, collaborative response to this threat.

USFWS lead an effort to repair the primary pump and acquire three auxiliary pumps (see table at the right). The permanent secondary pump continued to function. The lake was pumped out May 1st, only 1 day late.

WAPATO LAKE DRAINAGE 2016
PUMPING CAPACITY AND DATES OF OPERATION

Pump	Capacity (gpm)	Operation Period
USFWS Secondary	~3,000	2/23 – 6/29
Auxiliary 1	~3,000	3/23 – 4/16
Auxiliary 2	~3,000	3/23 – 4/21
Auxiliary 3	~3,000	3/23 – 4/21
USFWS Primary	~10,000	4/13 – 4/30

Costs for pump rental and repairs are shown in the table at the right. The majority of the costs for temporary pumping and repairs of the primary pumps were incurred by USFWS. Additional funds obtained by USFWS were not enough to cover all associated expenses. The JWC provided $10,000 and the Friends of the Tualatin River National Wildlife Refuge, a nonprofit organization, provided $5,000 in support. Additional costs were incurred by USFWS for underwater repair work of the outlet piping and sluice gates at the pump house. Using electrical pumps was considered because they are less expensive to operate, but this option was not feasible because the electrical supply at the site was not sufficient.

COST OF AUXILIARY PUMP RENTAL AND PRIMARY PUMP REPAIR

Agency	Cost
USFWS	$41,503
JWC	$10,000
Friends of the Refuge	$5,000
TOTAL	**$56,503**

WATER QUALITY
BY BERNIE BONN

Concern about water quality in the Tualatin River is longstanding. Until the formation of Clean Water Services (formerly the Unified Sewerage Agency of Washington County), numerous small towns and cities discharged minimally treated sewage into the river and its tributaries. Water use by agricultural activities in the basin depleted river flow in the summer and contributed nutrients and sediment. By the 1960s, the local newspaper documented the poor water quality in the Tualatin River. In 1984, the Oregon Department of Environmental Quality (ODEQ) included sections of the Tualatin River on the 303d list as being water quality limited. Water quality issues in the Tualatin Basin have included elevated pH and nuisance algae, low dissolved oxygen, high temperatures, and excess bacteria. Many groups have worked to improve water quality in the Tualatin Basin, including Clean Water Services, the Tualatin River Watershed Council, the Tualatin Riverkeepers and others. Part of the reason for the formation of the Flow Committee is to manage river flow to improve and preserve water quality.

Algal growth and pH

Background: In the reservoir section (about RM 3.4-30), the Tualatin River is wide and slow moving. Because the river is so broad, streamside vegetation cannot adequately shade the full width and consequently much of the water surface is in exposed to the sun. Nutrients, both naturally occurring and anthropogenic, are ample. These conditions—slow movement, sunlight, and ample nutrients— are ideal for algal growth during summer. Most of the algae in the Tualatin River are phytoplankton that float in the upper few feet of the water. During the day, photosynthesis by algae converts carbon dioxide dissolved in the water into biomass. As the concentration of dissolved carbon dioxide decreases, the pH of the water increases. High pH values can negatively affect aquatic resources.

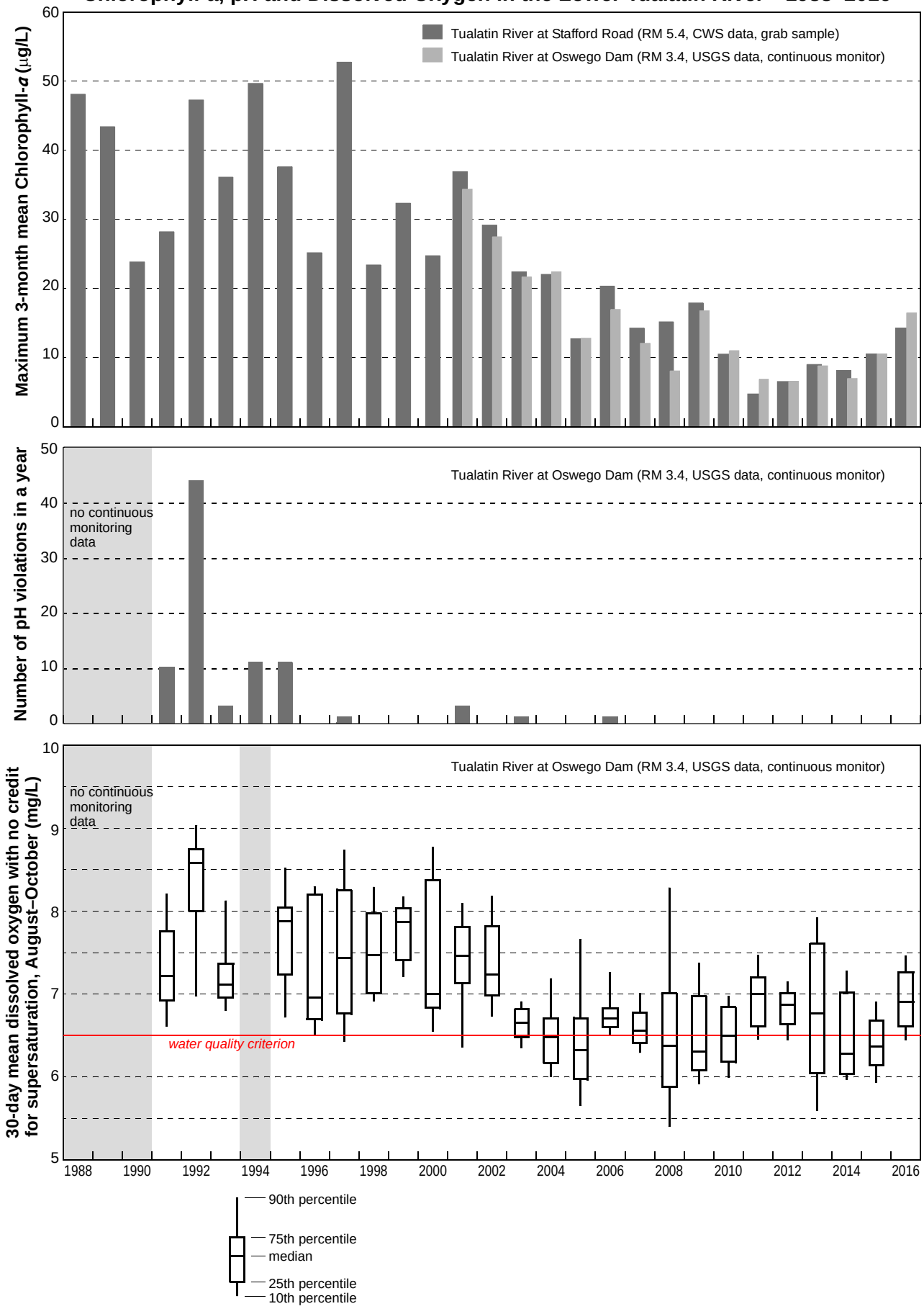
In the 1980s the lower section of the Tualatin River was listed by the ODEQ for elevated pH (>8.5) and degraded aesthetics due to nuisance algal growth. To address these water quality problems, the ODEQ developed a TMDL for phosphorus to limit nutrient availability. Since then, advanced wastewater treatment by Clean Water Services has dramatically decreased phosphorus concentrations in the river. In addition, summertime flows in the Tualatin River have increased due to Clean Water Services' releases of stored water from Scoggins and Barney Reservoirs as well as increased discharge from the wastewater treatment facilities.

Chlorophyll-*a* concentrations are an indicator of the amount of algae in the river. Clean Water Services measures chlorophyll-*a* in water samples at several sites and since 2001, chlorophyll-*a* is measured hourly at the Oswego Dam (RM 3.4) by the USGS as part of a cooperative agreement with Clean Water Services. Chlorophyll-*a* levels have decreased substantially since the 1990s (see the figure on page 41).

2016: The average chlorophyll-*a* levels in 2016 were higher than the past 5 years. A large bloom began in late-June and lasted into mid-July. Unlike many years, smaller recurring blooms persisted through July and August. The maximum 3-month average chlorophyll-*a* concentration in 2016 was 16.4 μg/L and occurred for June-August.

Because the algal population has declined, high pH values have become rare. The pH is monitored hourly at RM 3.4 (Oswego Dam, year-round) and at RM 24.5 (summer only). No pH values at either site exceeded 8.5 in 2016. Even though the algal activity in 2016 was greater than in the past few years, the maximum pH at the Oswego Dam was only 7.5. In addition to the data from the continuous monitors, Clean Water Services takes weekly pH measurements at several sites during the summer, including at Stafford Rd which is prone to algal blooms. The highest pH measured at the Stafford Rd site in 2016 was 7.4. Low pH values (<6.5) are not a problem in the Tualatin River system.

Chlorophyll-a, pH and Dissolved Oxygen in the Lower Tualatin River 1988–2016



Dissolved oxygen

Background: The amount of oxygen dissolved in water is the net result of processes that contribute oxygen and processes that consume oxygen. In the lower Tualatin River the primary sources of oxygen are photosynthesis by algae in the daytime and inflow of oxygen rich water. The processes that consume oxygen are biochemical oxygen demand and sediment oxygen demand (from substances that decompose in the water and at the sediment water interface, respectively) and respiration by algae. Because the lower section of the river moves slowly and is not turbulent, oxygen exchange with the atmosphere is slow. Consequently, if dissolved oxygen becomes depleted, it cannot be quickly replenished from the air. Similarly, if dissolved oxygen is in excess, the river water stays supersaturated for a prolonged period of time.

In the 1980s the lower section of the Tualatin River was listed by the ODEQ for low dissolved oxygen that could impair fish health. The water quality criteria for this section of the river, which is considered 'Cool Water Habitat,' are:

- Grab samples: dissolved oxygen > 6.5 mg/L
- Continuous Monitoring:
  - 30-day average of daily mean dissolved oxygen > 6.5 mg/L (no credit for supersaturation)
  - 7-day average of daily minimum dissolved oxygen > 5.0 mg/L (no credit for supersaturation)
  - Daily minimum dissolved oxygen > 4.0 mg/L

ODEQ also developed a TMDL for ammonia which consumes oxygen as it decomposes into nitrate. Since then, Clean Water Services has dramatically decreased the amount of ammonia discharged to the river from its WWTFs.

Streamflow in the Tualatin River during the summer has increased since the TMDLs were instituted in 1988. Increased river flow affects two different processes with opposite effects on oxygen. Faster river flow decreases the amount of time water is in contact with sediment, thereby decreasing the extent to which sediment oxygen demand can be exerted and the resultant amount of oxygen depleted. Faster river flow also decreases the time available for algal populations to grow, which in turn decreases photosynthetic oxygen production. The net effect of decreased oxygen production plus decreased oxygen consumption is variable and not well predicted. In general, low dissolved oxygen is still an issue in the lower Tualatin River periodically during the late summer through fall (see the figure on page 41). Chlorophyll-*a* levels have decreased substantially since the 1990s (see the figure on page 41).

2016: Dissolved oxygen conditions in the Tualatin River in 2016 met criteria during most of the low-flow season (see table below). The 30-day criteria (30-day mean with no credit for supersaturation) was not met from September 20th to October 3rd at the Oswego Dam. The lowest values of the 30-day statistic at that site was 6.39. All other criteria for dissolved oxygen were met at Lake Oswego Dam. All criteria for DO were met throughout the dry season at RM 24.5

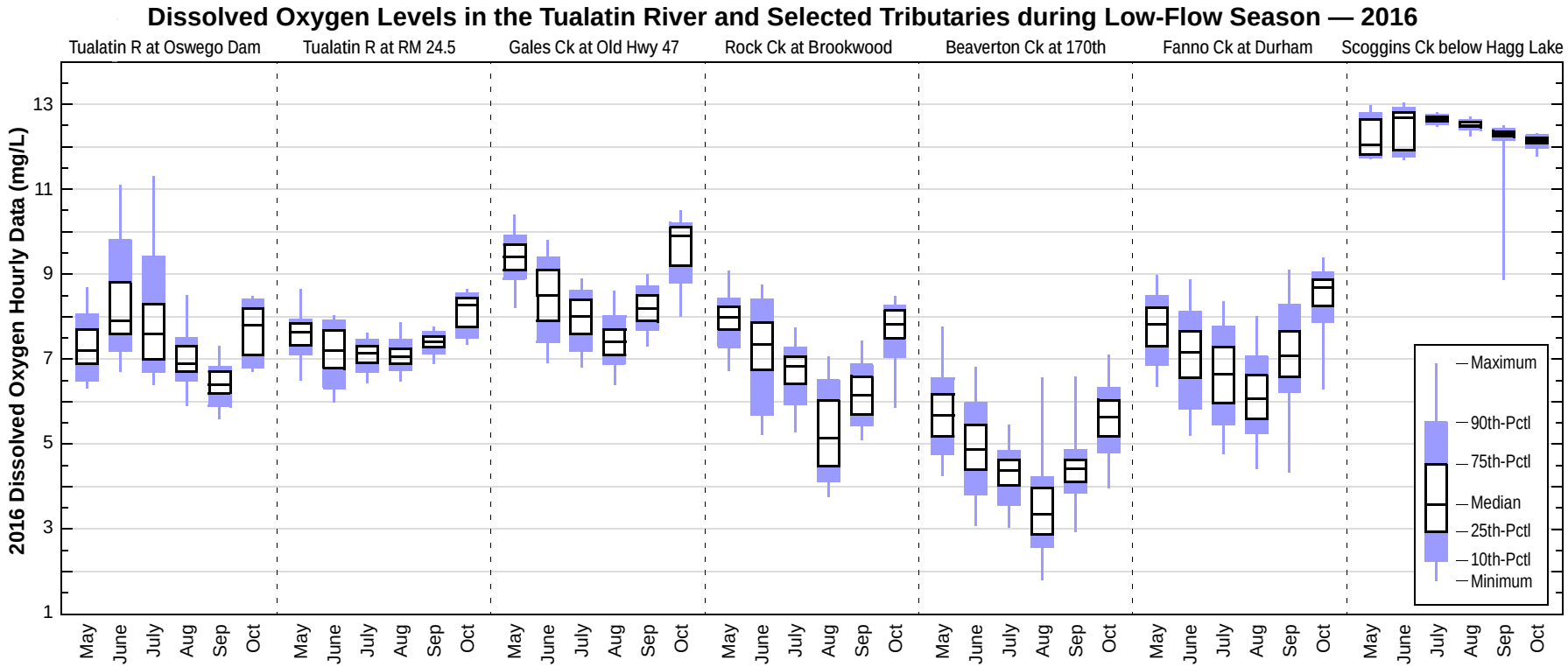
NUMBER OF DAYS THAT DID NOT MEET DISSOLVED OXYGEN CRITERIA IN 2016

Criterion	May	June	July	Aug	Sept	Oct	May–October Percentage
Tualatin River at RM 24.5							
30 day	0	0	0	0	0	0	0%
7 day	0	0	0	0	0	0	0%
Daily	0	0	0	0	0	0	0%
Tualatin River at Oswego Dam (RM 3.4)							
30 day	0	0	0	0	11	3	8%
7 day	0	0	0	0	0	0	0%
Daily	0	0	0	0	0	0	0%

Continuous monitoring of dissolved oxygen

As previously discussed, low dissolved oxygen (DO) concentrations have been an ongoing problem in the lower Tualatin River. Some of the tributaries in the Tualatin Basin also have had low DO levels. In general, the slow moving valley bottom streams are more likely to have low DO than faster moving headwaters streams. It is thought that sediment oxygen demand is largely responsible for the low DO levels in the tributaries. Transport of material from the landscape and re-suspension of sediment are also thought be important sources of biochemical oxygen demands to the tributaries. Continuous monitoring can provide insight into the processes that affect DO concentrations.

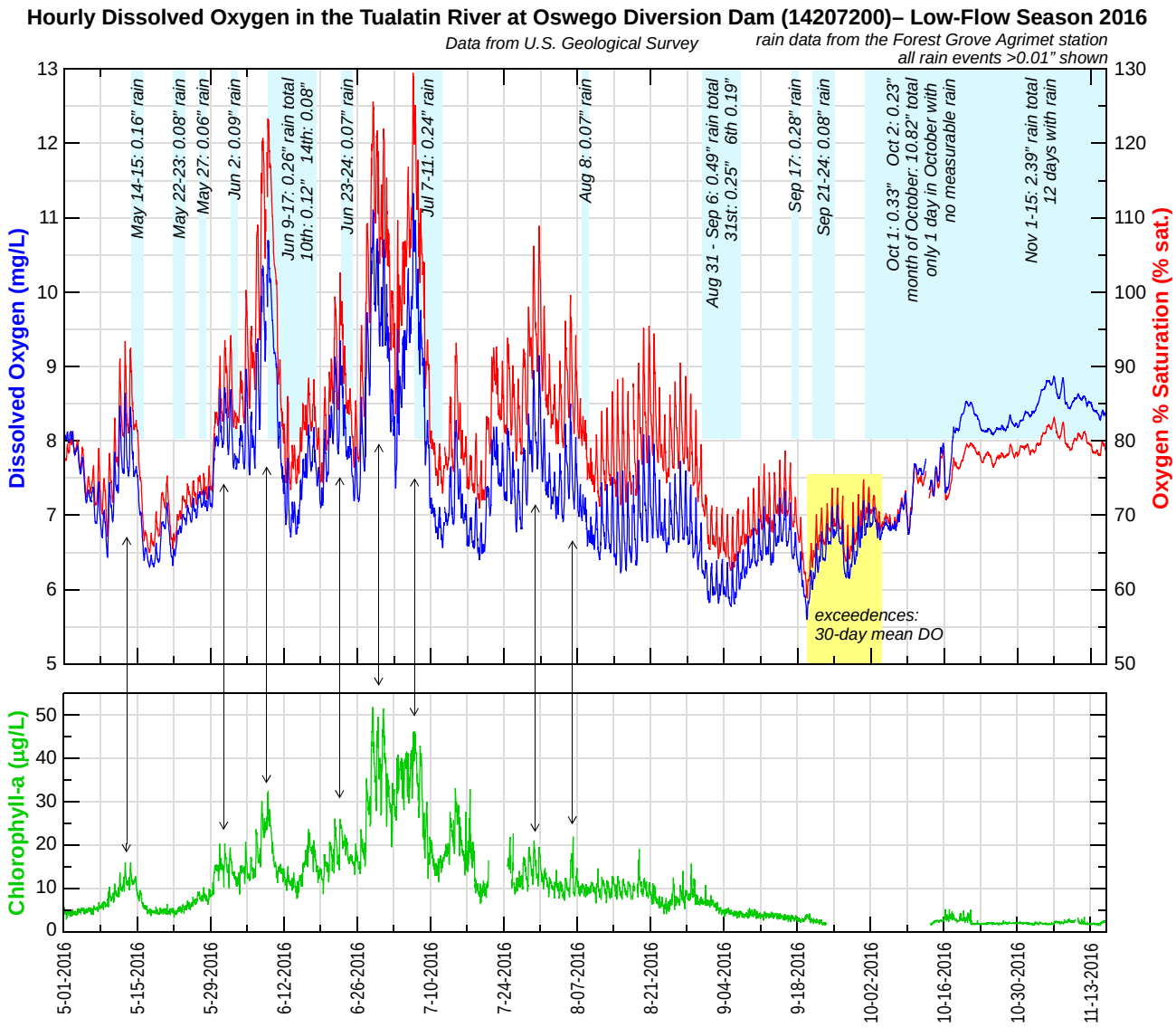
Continuous monitors are deployed at 2 locations in the reservoir section of the river and 5 tributary sites. Measurements are taken every 30 minutes. A statistical summary of the data is shown below. More detailed descriptions for each site are provided on the following pages. Data are available at: https://or.water.usgs.gov/cgi-bin/grapher/table_setup.pl?basin_id=tualatin



- At most sites, DO concentrations decrease from spring through summer and then increase. In late summer, higher temperatures and lower flows increase the rate and effect of sediment oxygen demand.
- The lowest DO concentrations occurred in Beaverton and Rock Creeks, both of which are slow-moving valley bottom streams that trap sediment.
- DO concentrations in a month can span a range of more than 4 mg/L at some sites.
- Because of cold-water releases from Hagg Lake, Compared to the other sites, DO concentrations in Scoggins Creek are greater and show a different pattern. This site is different because of cold-water releases from Hagg Lake during the low-flow season.

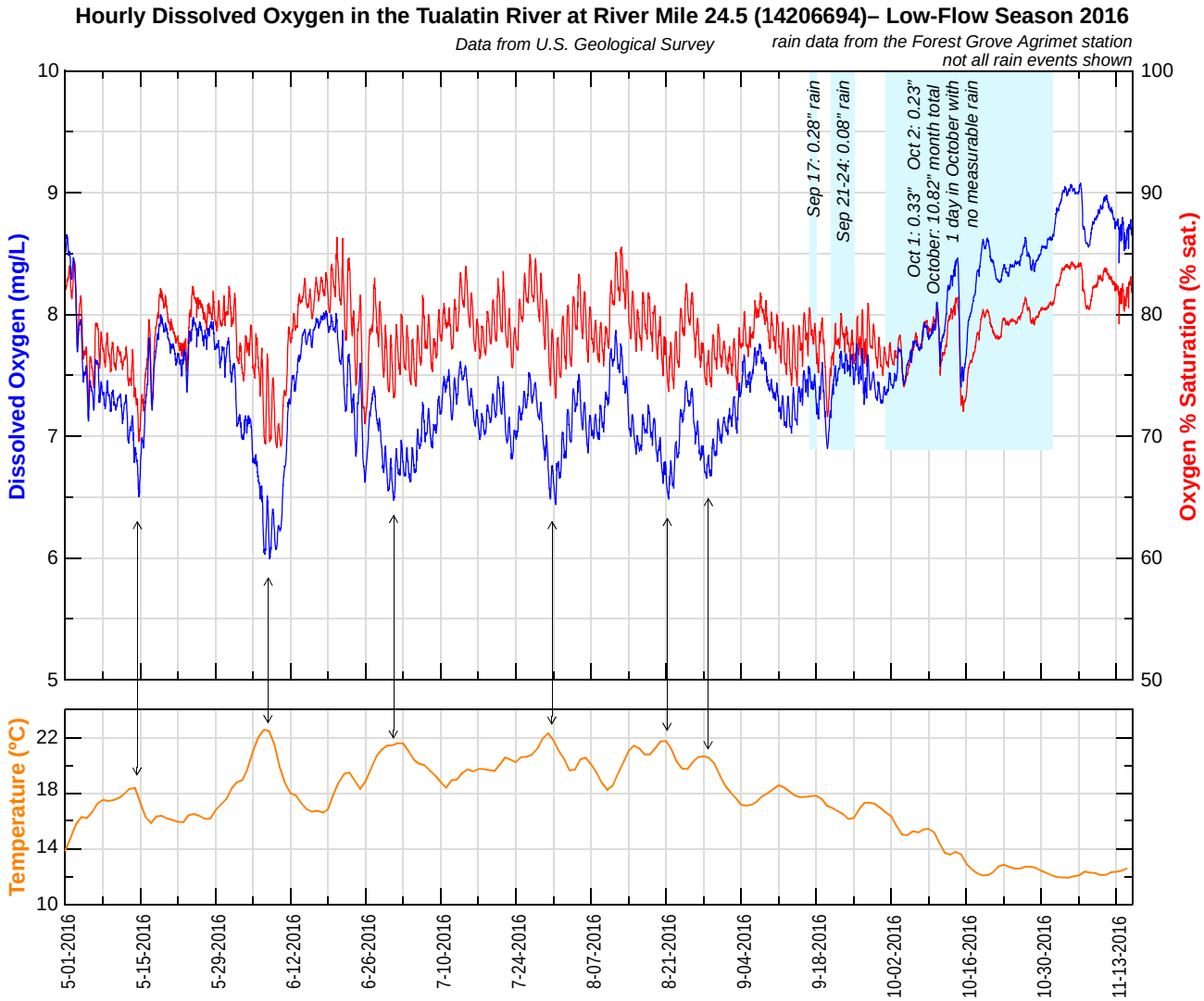
Tualatin River – Oswego Dam:

- Algal blooms at the Oswego Dam site (denoted by the double arrows on the graph below) are important. The daily DO range is large, exceeding 4 mg/L, and peak DO concentrations frequently exceed 100%. The largest algal blooms occurred in June as might be expected because of the long days at that time of year. Even modest algal activity, such as that in early August, was enough to provide about 1 mg/L oxygen during the day. During this time, the river was warm (22 ºC). The algal productivity was able to maintain DO in the 80%-saturation range even though the rate of oxygen demand was higher because of the warmer temperatures.
- Summer rainstorms often result in decreased DO. Most of the decrease is due to less sunshine limiting algal productivity but the possible transport of oxygen demanding substances to the river cannot be ruled out, especially for storms with significant total rainfall that occurred after prolonged dry weather. An influx of oxygen demand from the rainstorm on September 17 likely contributed to the sharp DO decrease.
- The succession of days with lower DO levels led to 14 days (September 20 – October 2) that were just below the 30-day dissolved oxygen criterion.
- More than a half an inch of rain fell on October 1-2 followed by more days of lighter rainfall. October 13 had more than 2 inches of rain. By mid-October flows were over 1000 cfs at West Linn, algal productive was almost non-existent and DO concentrations were typical of the high flow season.



Tualatin River – RM 2.45:

- DO concentrations at RM 24.5 were about 80% saturation, which is typical for this site in the dry season.
- The daily DO range at this site is small (<0.5 mg/L) compared to DO ranges at the Oswego Dam site (> 2 mg/L). Significant algal blooms are rare here, so daytime photosynthesis and nighttime respiration have only a small effect.
- Decreases in DO occur intermittently and are correlated with water temperature (marked by double arrows on the graph). Oxygen is less soluble at higher temperatures, so a decrease would be expected. Note, however, that DO saturation also decreases, especially when the water temperature exceeds 20 ºC. This indicates that the rate of oxygen demand has increased due to the higher temperature.
- The decrease in DO on the October 15 was probably caused by the heavy rainfall on October 13-14 (more than 3" rain) which in turn led to an increase in oxygen demanding substances—resuspension of sediment in the Tualatin River and in Rock Creek plus stormwater inflows.
- By mid-October, the heavy rain had ended the summer low-flow period.

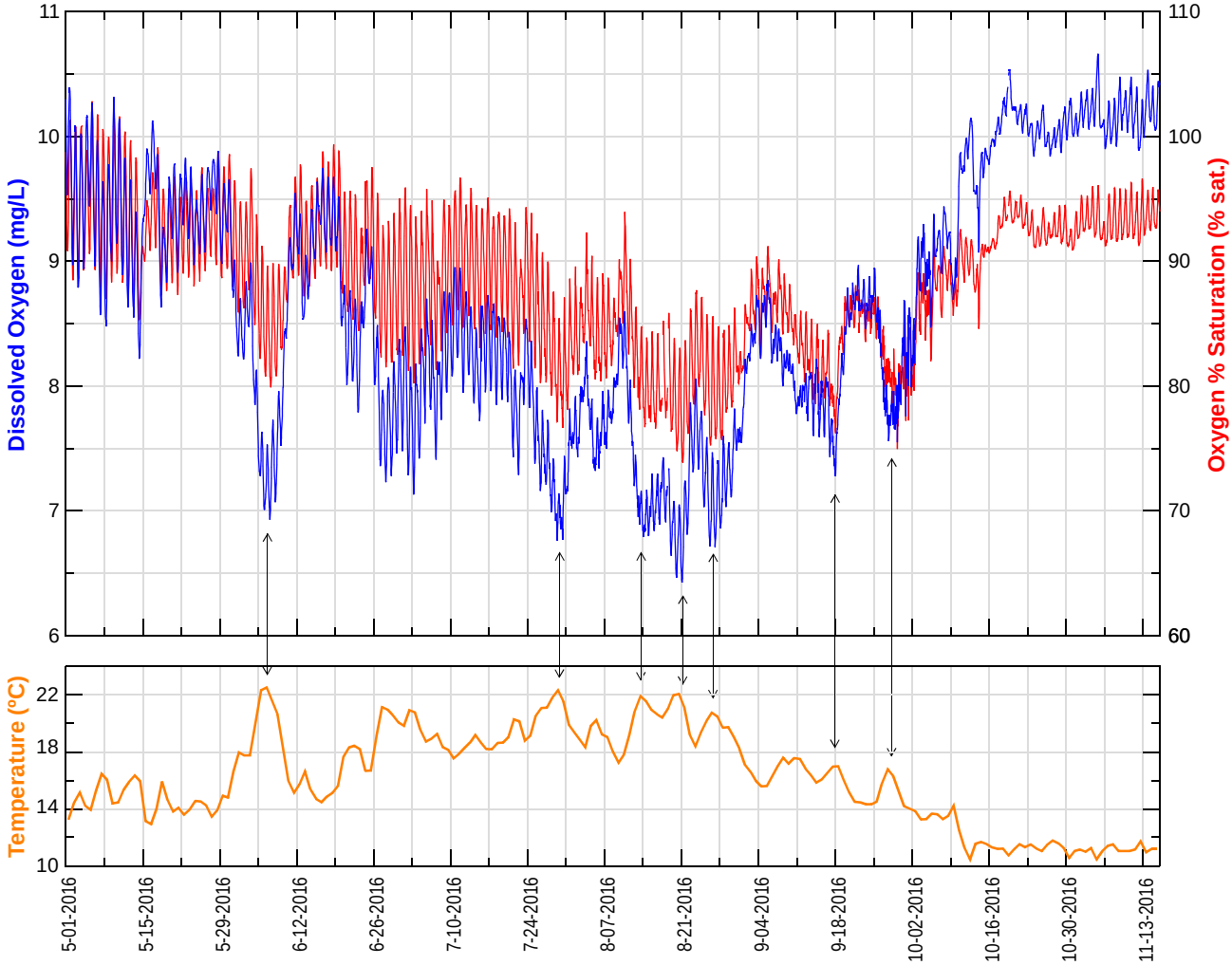


Gales Creek at Old Hwy 47:

- Algal activity at Gales Ck is moderate— more than at RM 24.5 on the mainstem Tualatin, but less than at Oswego Dam. Daily DO range was about 0.5-1 mg/L.
- With a few exceptions, DO levels at Gales Ck were about 90% saturation until late July. The substrate of Gales Ck is mostly gravel and it has higher flow than many of the valley bottom streams. These conditions lead to less sediment oxygen demand and more reaeration than at valley bottom streams.
- DO levels fell below 90% saturation when the water temperature exceeded 22 ºC and the rate of oxygen demand increased. The effects of high temperature are denoted by the double arrows on the graph.
- Beginning in late July and continuing through August, DO saturation dropped to 80-85%. By this time, flows had dropped from 25 cfs at the beginning of July down to 10 cfs in early August. Low flows exacerbate oxygen loss from sediment oxygen demand because they increase the time water is in contact with the sediment.

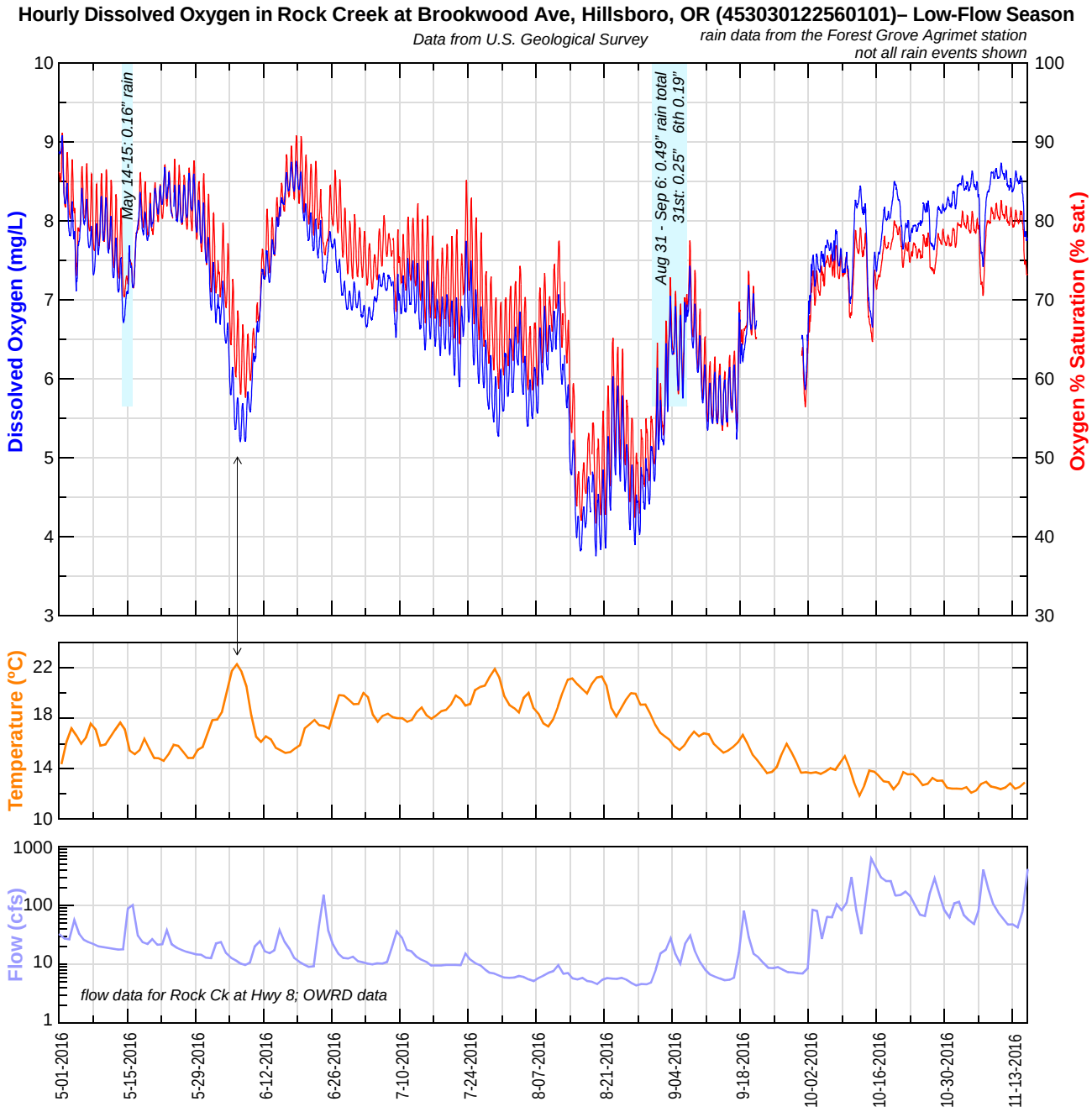
Hourly Dissolved Oxygen in Gales Creek at Old Hwy 47, Forest Grove, OR (453040123065201)– Low-Flow Season 2016

Data from U.S. Geological Survey



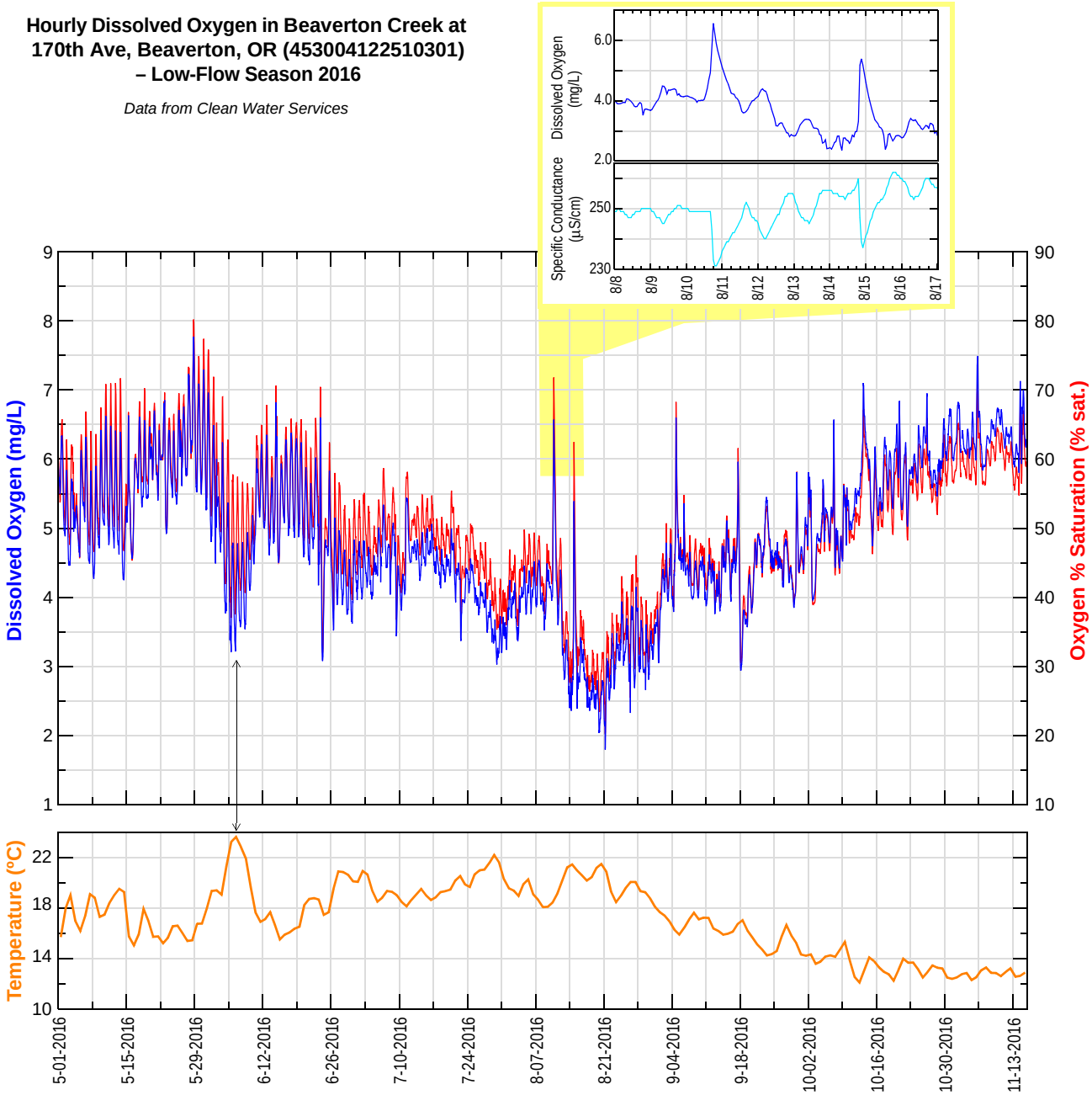
Rock Creek at Brookwood:

- Dissolved oxygen levels at Rock Ck were lower than those at Gales Ck.
- Like Gales Ck, a clear DO decrease in early June was coincident with high stream temperatures. The decrease at Rock Ck was much more pronounced than at Gales Ck, especially for percent saturation. The stream bottom at Rock Ck is much more silty than Gales Ck and would be expected to have a greater sediment oxygen demand. With greater sediment oxygen demand it is not surprising that Rock Ck is more affected by increased rates of oxygen demand at higher temperatures.
- Algal activity at the Rock Ck site generally was low through the end of June. Increased DO ranges show that increased algal productivity began in July and persisted into early September.
- Rainfall may increase oxygen demand, either by resuspension of sediment or transport from the land-scape. This may have occurred in mid-May and in the first part of September.
- The lowest DO levels at Rock Ck occurred in mid-August (6 days with minimum DO<4 mg/L and 45% saturation) when temperatures exceeded 21ºC and flows were less than 6 cfs.



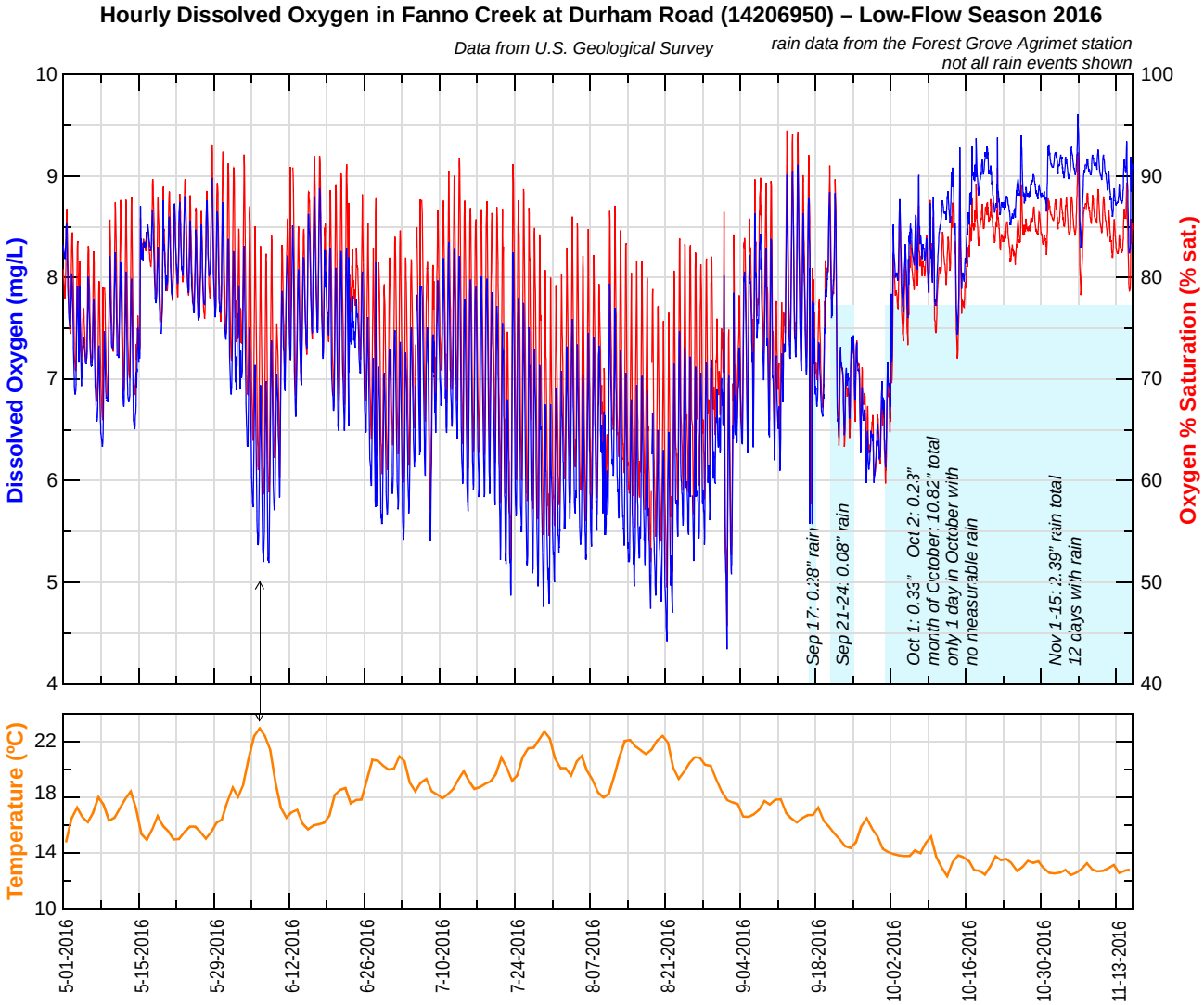
Beaverton Creek at 170th:

- Dissolved oxygen levels at Beaverton Ck were lower than at any other sites. The organic-rich and silty bottom and low flow of Beaverton Ck result in high sediment oxygen demand and little reaeration.
- As at the other sites, both absolute and percent-saturated DO decreased in early June with high stream temperatures, likely due to increased rates of sediment oxygen demand at higher temperature. Percent saturation was only about 50% at this time.
- Algal activity was present, but not large (1-1.5 mg/L daily range).
- The lowest DO levels occurred in mid-August (<3 mg/L and 30% saturation) when temperatures exceeded 21ºC and flows were expected to be low. (The closest flow monitoring site on Beaverton Ck is more than 4 miles downstream and not an accurate estimate of flow at this site.)
- Unusual and short-lived spikes in DO occurred throughout the low flow season. The close-up inset at the top shows DO and specific conductance for 2 of these spikes (Aug 10 and 14). The spikes always coincided with decreases in specific conductance suggesting an influx of well-oxygenated, low-conductance water from an unknown source. Flow data were not available to support this hypothesis.



Fanno Creek at Durham:

- As at other sites, a marked decrease in DO and DO saturation in early June coincided with high temperatures (marked by double arrow). This indicates an increase in the rate of oxygen demand. Most of the variability in DO through August correlates inversely with temperature.
- Algal activity in Fanno Ck is more than at other valley bottom sites, but not as much as at the mainstem Tualatin River at Oswego Dam site. Through most of the summer the daily range of DO was about 1.5 mg/L.
- Rainstorms in mid-late September largely curtailed algal activity as evidenced by a sharp decrease in the daily DO range. Without algal productivity, DO decreased. It is likely that these storms also contributed additional oxygen demand either by resuspension of sediment in the stream or transport of oxygen demand from stormwater inflow.
- Heavy rain in October ended the low flow season. At higher flow sediment oxygen demand is less important and algal growth is minimal.

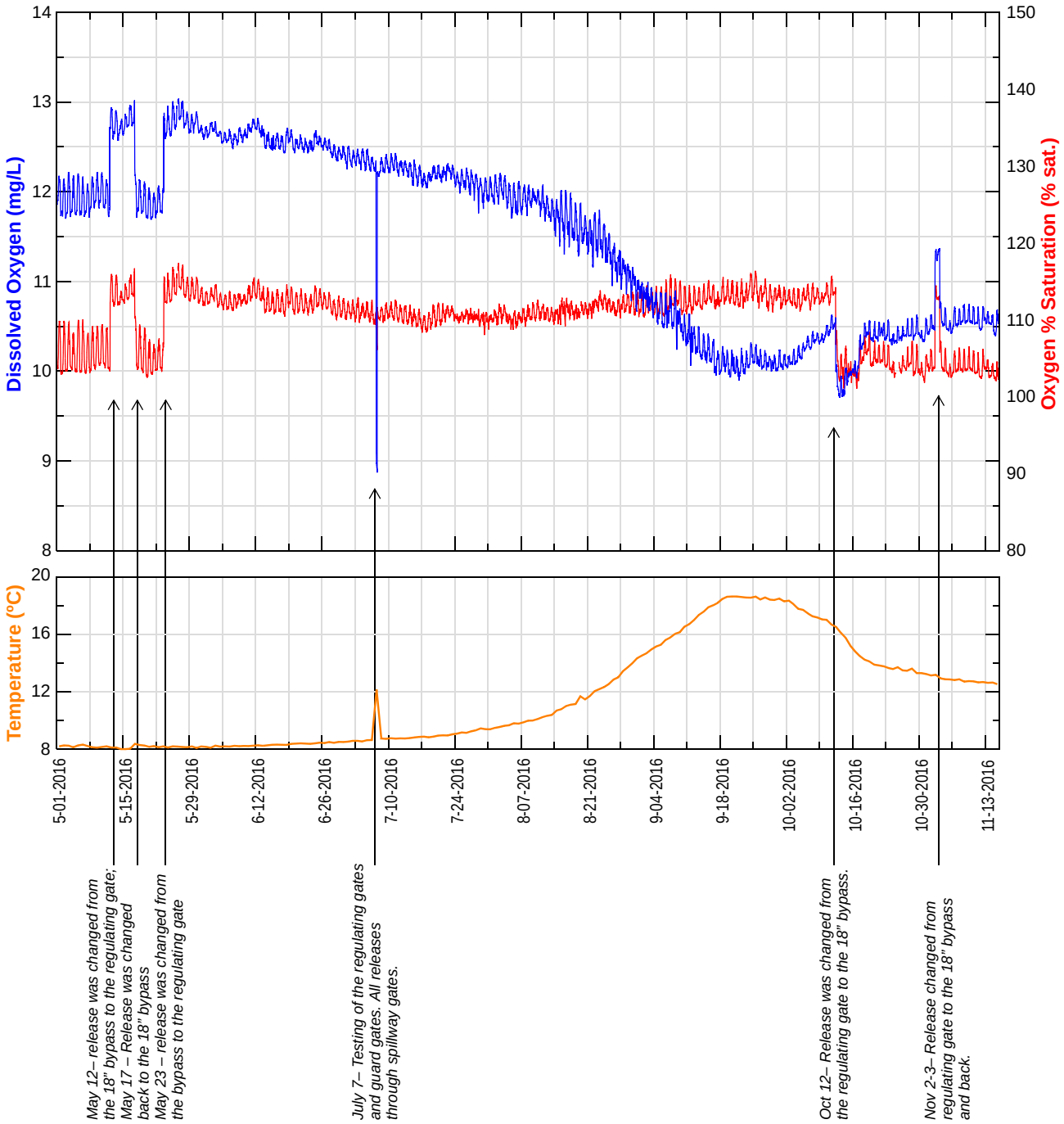


Scoggins Creek below Hagg Lake:

- The DO pattern through the low flow season at Scoggins Creek is very different from the other sites because of releases from Scoggins Dam—colder in summer and warming through fall.
- Abrupt changes in DO are caused by changes in dam operation (denoted by arrows on graph).
- DO saturation is consistently about 100% when water is diverted through the bypass. Due to entrainment of air, DO saturation is greater (about 110%) when water is released through the regulating gate.
- Algal activity is minimal (daily DO range is about 0.25 mg/L).
- As the reservoir is drawn down, more of the warmer water from the upper layers is released. Percent saturation is maintained, but the absolute concentration is lower because oxygen solubility is less.

Hourly Dissolved Oxygen in Scoggins Creek below Henry Hagg Lake near Gaston, OR (14202980) – Low-Flow Season 2016

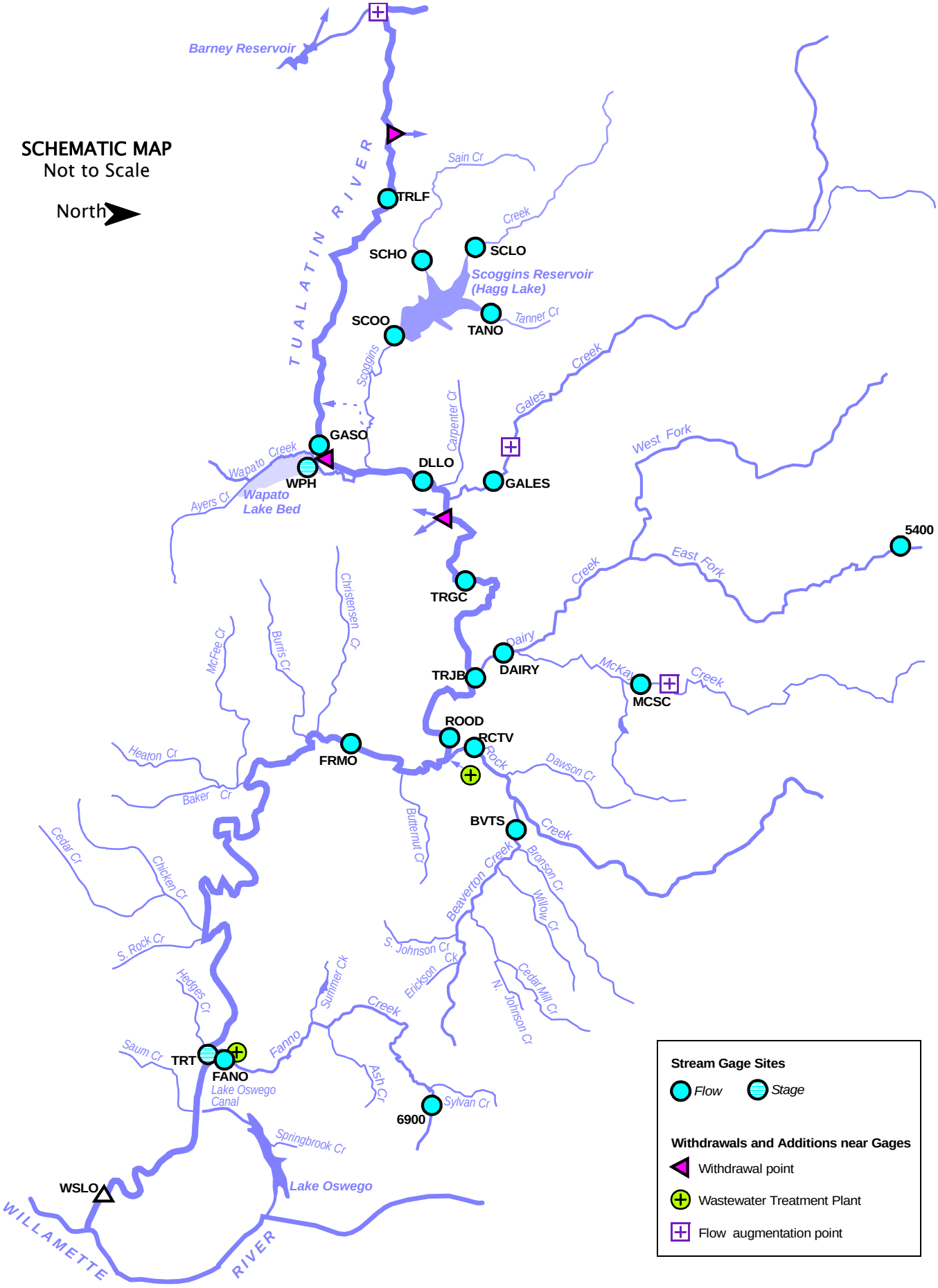
Data from U.S. Geological Survey



Appendix A

Stream Gage Records

MAP OF STREAM GAGE SITES



STREAM GAGE SITES — ALPHABETICAL LISTING BY SITE CODE

SITE CODE	SITE NAME	RIVER MILE	STATION ID	PAGE
5400	East Fork Dairy Creek near Meacham Corner, OR	12.4	14205400	A-14
6900	Fanno Creek at 56th Avenue	11.9	14206900	A-22
BVTS	Beaverton Creek at Cornelius Pass Road	1.2	14206435	A-19
DAIRY	Dairy Creek at Hwy 8 near Hillsboro, Oregon	2.06	14206200	A-16
DLLO	Tualatin River at Dilley, Oregon	58.8	14203500	A-11
FANO	Fanno Creek at Durham Road near Tigard, Oregon	1.2	14206950	A-23
FRMO	Tualatin River at Farmington, Oregon	33.3	14206500	A-21
GALES	Gales Creek at Old Hwy 47 near Forest Grove, Oregon	2.36	14204530	A-12
GASO	Tualatin River at Gaston, Oregon	62.3	14202510	A-5
MCSC	McKay Creek at Scotch Church Rd above Waible Ck near North Plains, Oregon	6.3	14206070	A-15
RCTV	Rock Creek at Hwy 8 near Hillsboro, Oregon	1.2	14206451	A-20
ROOD	Tualatin River at Rood Bridge Road near Hillsboro, Oregon	38.4	14206295	A-18
SCHO	Sain Creek above Henry Hagg Lake near Gaston, Oregon	1.6	14202920	A-8
SCLO	Scoggins Creek above Henry Hagg Lake near Gaston, Oregon	9.3	14202850	A-7
SCOO	Scoggins Creek below Henry Hagg Lake near Gaston, Oregon	4.80	14202980	A-10
TANO	Tanner Creek above Henry Hagg Lake near Gaston, Oregon	1.6	14202860	A-9
TRGC	Tualatin River at Golf Course Road near Cornelius, Oregon	51.5	14204800	A-13
TRJB	Tualatin River at Hwy 219 Bridge	44.4	14206241	A-17
TRLF	Tualatin River below Lee Falls near Cherry Grove, Oregon	70.7	14202450	A-4
TRT	Tualatin River at Tualatin, Oregon	8.9	14206956	A-24
WPH	Wapato Canal at Pumphouse at Gaston, Oregon	—	14202630	A-6
WSLO	Tualatin River at West Linn	1.75	14207500	A-25

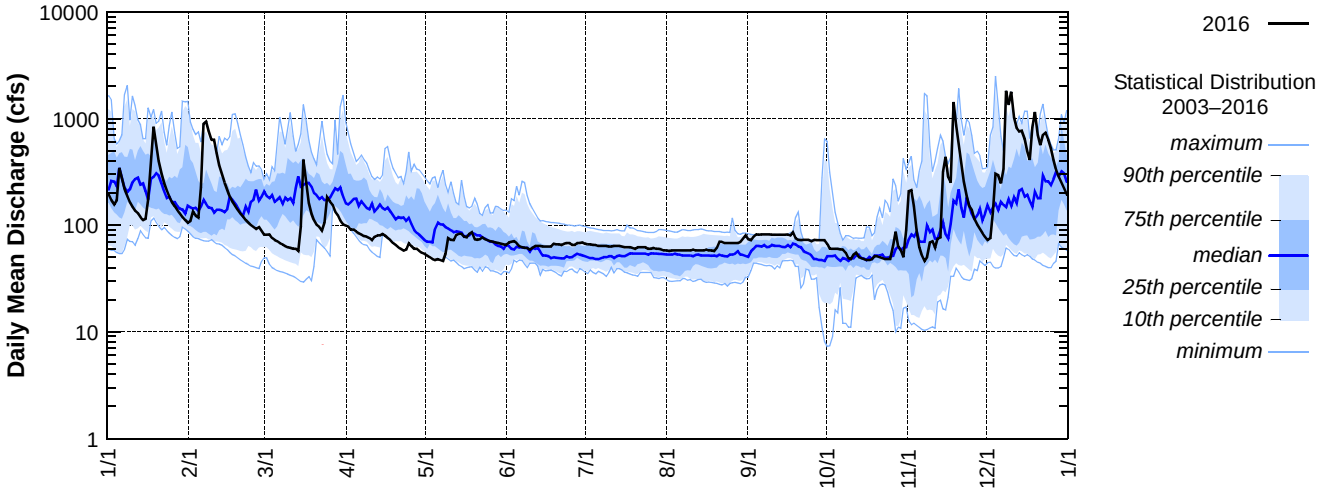
TRLF – 14202450 – TUALATIN RIVER BELOW LEE FALLS NEAR CHERRY GROVE, OREGON [RM 70.7]

Latitude: 45 30 21 Longitude: 123 13 06 Source Agency: District 18 Watermaster

Day	2016 Daily Mean Discharge in Cubic Feet per Second†											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	157	315	316	137	58	68	68	47	79	56	267	334
2	145	268	337	128	57	68	70	47	79	64	202	295
3	137	263	326	120	55	66	69	48	78	58	165	274
4	135	506	285	121	54	64	69	47	78	64	145	420
5	132	475	277	110	52	64	69	46	77	89	158	377
6	124	382	369	106	50	63	68	46	78	69	184	301
7	118	312	522	99	48	62	69	47	72	137	166	245
8	115	264	447	94	47	62	71	49	64	85	146	217
9	117	227	486	90	47	64	70	49	65	108	132	232
10	116	196	727	86	46	73	72	47	64	125	121	389
11	124	181	550	83	48	81	66	46	64	79	113	508
12	259	177	480	83	66	76	56	48	64	60	115	470
13	784	189	632	84	65	75	55	50	64	223	107	372
14	573	358	651	109	71	82	54	50	64	506	249	304
15	480	324	577	96	69	74	53	49	65	478	375	257
16	622	268	495	86	67	67	53	49	65	526	382	218
17	671	230	419	81	65	66	53	52	69	612	306	188
18	558	244	350	76	54	64	53	55	68	392	235	170
19	527	370	297	72	40	63	53	54	59	251	198	207
20	704	409	275	69	44	62	52	53	53	248	184	868
21	603	349	268	67	63	61	51	52	54	231	182	494
22	574	305	262	88	63	60	51	52	54	206	178	362
23	467	265	238	75	64	65	51	53	57	180	236	319
24	374	226	243	74	62	64	50	53	57	156	983	268
25	310	195	241	70	61	62	50	52	53	142	1150	233
26	267	178	220	68	59	61	48	54	54	223	613	206
27	235	181	215	67	59	66	47	58	54	232	454	299
28	368	170	200	65	61	73	48	58	53	182	466	289
29	426	179	180	63	70	71	47	57	51	153	387	246
30	455	—	162	61	69	69	47	59	52	143	365	218
31	383	—	148	—	67	—	47	68	—	275	—	194
TOTAL	11060	8006	11195	2628	1801	2016	1780	1595	1908	6353	8964	9774
MEAN	357	276	361	87.6	58.1	67.2	57.4	51.5	63.6	205	299	315
MAX	784	506	727	137	71	82	72	68	79	612	1150	868
MIN	115	170	148	61	40	60	47	46	51	56	107	170
AC-FT	21937	15880	22205	5213	3572	3999	3531	3164	3784	12601	17780	19386

† All 2016 data are provisional–subject to revision

TRLF — 14202450 — Tualatin River below Lee Falls near Cherry Grove, Oregon [RM 70.7]



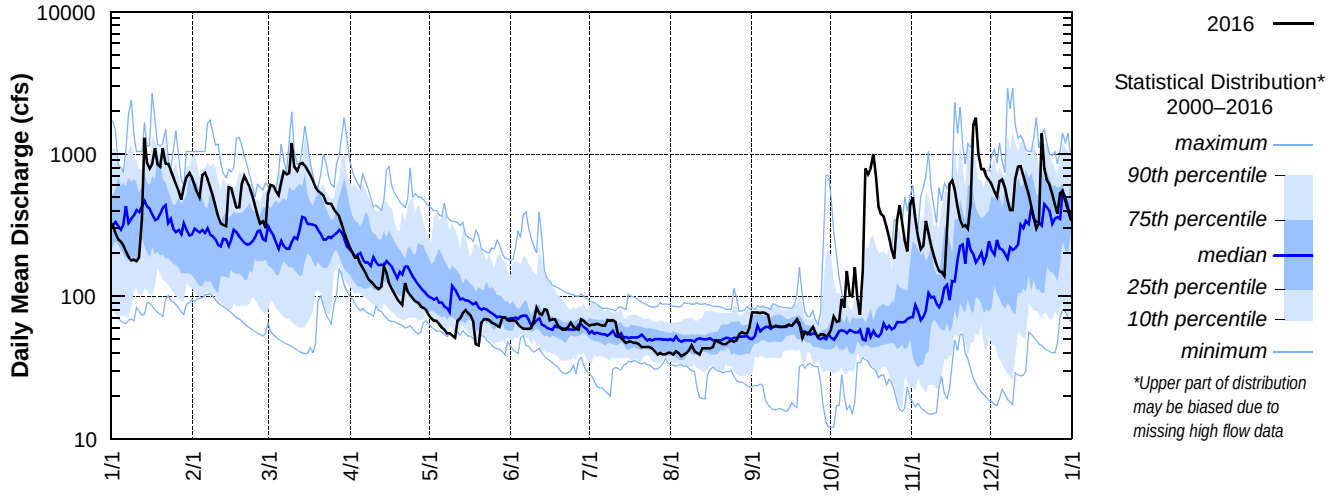
GASO – 14202510 – TUALATIN RIVER AT GASTON, OREGON [RM 62.3]

Latitude: 45 26 21 Longitude: 123 07 85 Source Agency: District 18 Watermaster

Day	2016 Daily Mean Discharge in Cubic Feet per Second†											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	317	609	523	222	74	67	62	40	77	59	496	610
2	279	535	605	203	70	68	63	39	77	72	348	542
3	251	493	595	186	67	67	63	41	77	66	265	500
4	241	712	544	189	67	63	64	40	76	67	214	647
5	227	738	512	169	64	61	63	38	77	96	227	663
6	206	666	629	157	60	59	62	39	76	83	339	580
7	189	583	752	146	58	59	62	40	74	151	279	473
8	179	505	719	134	55	59	68	42	61	102	228	404
9	181	429	736	127	55	60	67	45	61	100	192	403
10	177	364	1200e	122	53	67	68	41	62	160	167	666
11	187	326	818	116	51	83	66	40	61	96	150	817
12	348	318	764	112	67	76	54	39	61	74	148	820
13	1300e	312	852	117	70	74	51	43	61	153	139	708
14	863	587	867	161	76	81	49	43	62	792	305	610
15	792	577	829	146	80	80	47	43	63	719	618	523
16	849	491	770	123	76	68	48	43	62	793	654	431
17	1100e	420	709	113	73	69	48	44	65	1000e	566	355
18	843	422	650	103	66	69	47	49	69	699	422	300
19	811	618	583	96	46	63	47	48	64	428	344	329
20	1100e	699	547	91	45	60	46	47	51	377	309	1400e
21	854	638	530	87	65	58	44	46	56	363	316	789
22	850	581	510	124	69	58	44	46	54	306	298	654
23	772	512	457	108	69	61	44	48	57	259	456	608
24	689	435	448	102	68	65	44	49	61	212	1600e	519
25	615	371	445	97	65	61	43	48	55	184	1800e	441
26	545	325	408	92	64	59	41	49	52	344	1000e	381
27	479	337	387	90	62	58	39	54	54	438	783	528
28	587	301	364	85	61	69	40	56	54	327	784	550
29	686	311	322	83	71	67	39	55	52	245	696	463
30	737	—	280	80	71	64	39	55	54	207	655	404
31	683	—	247	—	68	—	40	61	—	443	—	349
TOTAL	17937	14215	18602	3781	2006	1973	1602	1411	1886	9415	14798	17467
MEAN	579	490	600	126	64.7	65.8	51.7	45.5	62.9	304	493	563
MAX	1300	738	1200	222	80.0	83.0	68.0	61.0	77.0	1000	1800	1400
MIN	177	301	247	80.0	45.0	58.0	39.0	38.0	51.0	59.0	139	300
AC-FT	35578	28195	36897	7500	3979	3913	3178	2799	3741	18674	29351	34645

† All 2016 data are provisional–subject to revision; e=estimated value

GASO — 14202510 — Tualatin River at Gaston, Oregon [RM 62.3]



UNITED STATES DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY – OREGON WATER SCIENCE CENTER

STATION NUMBER: 14202630 WAPATO CANAL AT PUMPHOUSE AT GASTON, OREG.

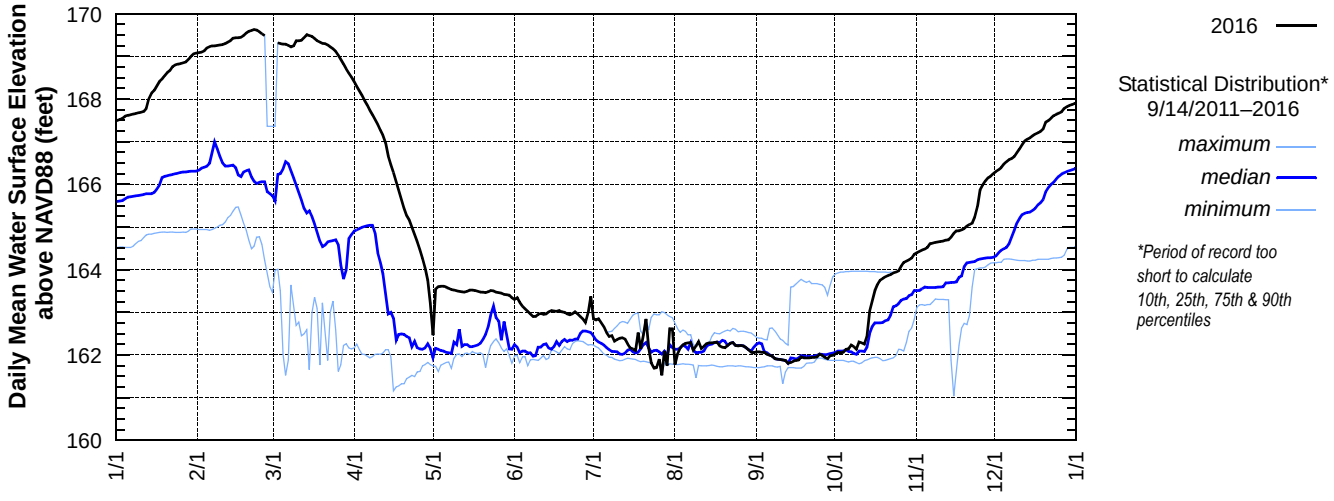
LATITUDE: 452625 LONGITUDE: 1230731

Water Surface Elevation above NAVD88, in feet, Calendar Year January to December 2016 Daily Mean Values

Day	JAN	FEB*	MAR*	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC†
1	167.50	169.09		168.41	162.46	163.30	162.84	161.77	162.07	162.02	164.40	166.30
2	167.52	169.10		168.30	163.54	163.34	162.82	162.03	162.07	162.06	164.43	166.34
3	167.55	169.13	169.32	168.19	163.60	163.23	162.85	162.16	162.06	162.05	164.46	166.39
4	167.60	169.20	169.30	168.09	163.61	163.14	162.75	162.23	162.06	162.06	164.48	166.47
5	167.62	169.23	169.29	167.97	163.61	163.08	162.66	162.27	162.01	162.13	164.52	166.53
6	167.63	169.25	169.29	167.86	163.59	163.02	162.52	162.28	161.99	162.14	164.61	166.58
7	167.65	169.25	169.26	167.74	163.56	162.96	162.43	162.29	161.97	162.23	164.62	166.60
8	167.66	169.26	169.22	167.63	163.53	162.90	162.45	162.11	161.91	162.19	164.64	166.65
9	167.68	169.27	169.25	167.52	163.52	162.90	162.32	162.21	161.90	162.13	164.65	166.74
10	167.69	169.28	169.37	167.40	163.50	162.95	162.36	162.31	161.89	162.30	164.66	166.83
11	167.71	169.30	169.37	167.27	163.49	162.97	162.39	162.15	161.88	162.28	164.67	166.93
12	167.78	169.34	169.38	167.15	163.48	162.95	162.40	162.20	161.87	162.25	164.69	167.02
13	168.01	169.37	169.44	166.97	163.47	162.96	162.37	162.26	161.80	162.43	164.70	167.06
14	168.14	169.43	169.51	166.67	163.49	163.01	162.26	162.28	161.82	163.02	164.76	167.09
15	168.20	169.44	169.49	166.46	163.52	163.04	162.16	162.28	161.85	163.25	164.85	167.14
16	168.31	169.44	169.47	166.28	163.52	163.03	162.14	162.29	161.87	163.51	164.91	167.18
17	168.41	169.45	169.42	166.07	163.51	163.02	162.10	162.30	161.88	163.65	164.91	167.21
18	168.47	169.49	169.37	165.87	163.49	163.04	162.52	162.21	161.95	163.75	164.93	167.24
19	168.55	169.55	169.34	165.65	163.47	163.01	162.14	162.18	161.93	163.79	164.96	167.30
20	168.62	169.59	169.31	165.44	163.47	163.00	162.47	162.17	161.93	163.83	165.02	167.46
21	168.67	169.61	169.30	165.27	163.46	162.96	162.84	162.22	161.93	163.86	165.06	167.50
22	168.76	169.63	169.27	165.16	163.48	162.94	162.16	162.27	161.94	163.88	165.09	167.55
23	168.80	169.62	169.22	164.99	163.51	162.96	161.81	162.29	161.94	163.92	165.23	167.61
24	168.82	169.58	169.18	164.82	163.50	163.01	161.69	162.22	161.95	163.94	165.48	167.64
25	168.83	169.53	169.12	164.66	163.47	162.96	161.70	162.21	162.02	163.97	165.87	167.67
26	168.85	169.49	169.03	164.47	163.46	162.90	161.90	162.22	161.99	164.08	165.99	167.70
27	168.87		168.93	164.27	163.45	162.84	161.52	162.21	161.94	164.17	166.08	167.78
28	168.93		168.82	164.05	163.42	162.76	162.09	162.17	161.91	164.20	166.15	167.82
29	169.00		168.71	163.75	163.41	162.99	161.75	162.12	161.98	164.23	166.19	167.85
30	169.06	—	168.61	163.21	163.40	163.37	162.61	162.06	161.99	164.27	166.25	167.87
31	169.08	—	168.52	—	163.34	—	162.61	162.05	—	164.36	—	167.90
MEAN	168.26	169.38	169.21	166.25	163.46	163.02	162.31	162.19	161.94	163.16	165.04	167.16
MAX	169.08	169.63	169.51	168.41	163.61	163.37	162.85	162.31	162.07	164.36	166.25	167.90
MIN	167.50	169.09	168.52	163.21	162.46	162.76	161.52	161.77	161.80	162.02	164.40	166.30

†Provisional data (12/21–12/31)–subject to revision; *incomplete record (monthly totals were computed when at least 80% of the record was complete for the month)

14202630 — Wapato Canal Pumphouse at Gaston, Oregon



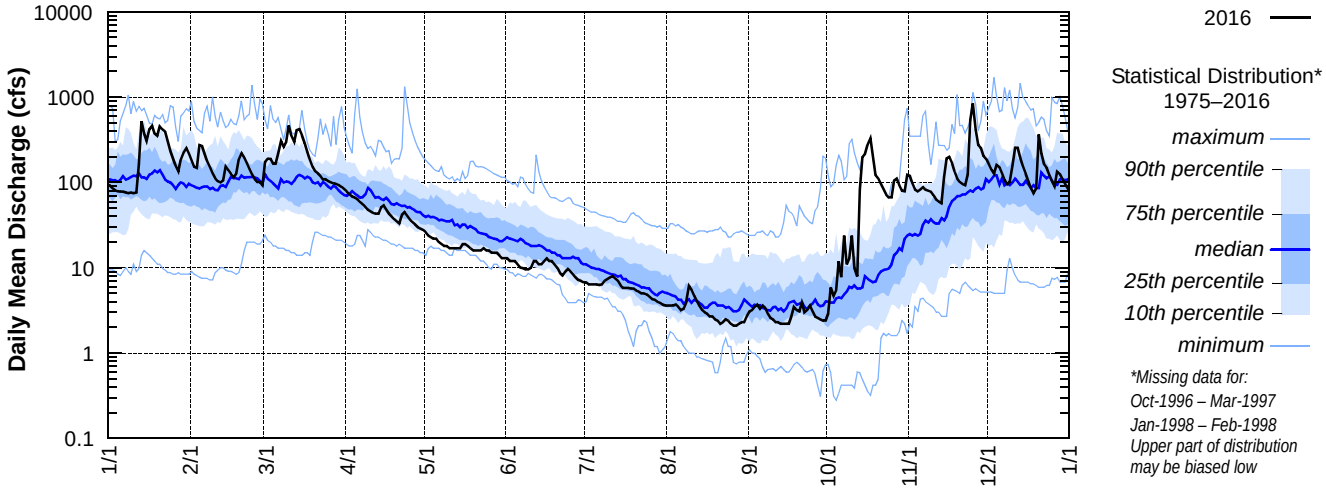
SCLO – 14202850 – SCOGGINS CREEK ABOVE HENRY HAGG LAKE NEAR GASTON, OREGON [RM 9.3]

Latitude: 45 30 06 Longitude: 123 15 06 Source Agency: District 18 Watermaster

Day	2016 Daily Mean Discharge in Cubic Feet per Second†											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	93	183	175	79e	26	13	6.7	3.6	3.1	2.9	120	162
2	85	153	190	73	24	12	6.4	3.6	3.2	5.9	98	141
3	81	148	189	68	23	12	6.4	3.6	3.5	4.7	83	127
4	79	275	166	67	22	12	6.4	3.7	3.7	5.5	79	160
5	78	268	165	64	22	11	6.4	3.5	3.3	12	83	150
6	78	218	218	59	20	10	6.3	3.2	3.6	7.8	88	128
7	76	178	305	56	19	9.9	6.4	3.3	3.4	24	82	107
8	75	150	261	52	18	9.6	7.1	3.9	2.9	11	80	95
9	76	128	300	48	18	9.6	7.4	6.1	2.6	13	78	101
10	75	112	466	46	17	10	7.7	5.5	2.5	24	71	160
11	76	104	353	44	17	12	8.0	4.7	2.3	10	63	255
12	166	100	298	43	17	12	7.5	4.1	2.3	7.9	60	254
13	521	106	412	43	17	11	7.0	3.6	2.2	82	57	195
14	378	154	425	51	17	11	6.3	3.2	2.2	199	115	156
15	309	141	359	54	19	12	5.8	3.0	2.2	216	192	127
16	426	127	288	48	19	13	5.8	2.9	2.2	286	200	104
17	464	115	228	43	18	12	5.8	2.7	2.7	333	169	86
18	374	128	184	40	17	12	5.7	2.7	3.5	206	133	75
19	350	189	153	37	16	11	5.7	2.5	3.2	122	111	86
20	453	220	136	35	16	10	5.4	2.4	3.1	112	101	367
21	418	195	128	33	16	8.7	5.3	2.2	3.9	95	96	220
22	391	169	119	42	16	8.1	5.0	2.3	3.0	83	93	166
23	303	144	108	45	17	8.9	5.0	2.5	3.2	72	123	150
24	235	125	109	41	16	9.7	4.9	2.4	3.6	67	541	121
25	189	110	104	37	16	9.1	4.6	2.2	3.1	67	850	103
26	156	101	100	34	15	8.4	4.3	2.1	2.7	106	412	90
27	135	101	98	32	15	7.7	4.2	2.1	2.6	111	276	133
28	188	93	96	30	15	7.2	4.0	2.2	2.5	93	256	124
29	224	96	94e	29	14	7.0	3.9	2.3	2.4	80	205	108
30	252	—	89e	28	13	6.8	3.7	2.3	2.4	79	190	96
31	218	—	84e	—	13	—	3.6	2.7	—	123	—	85
TOTAL	7022	4331	6400	1401	548	307	179	97	87	2661	5105	4432
MEAN	227	149	206	47	18	10	5.8	3.1	2.9	86	170	143
MAX	521	275	466	79	26	13	8.0	6.1	3.9	333	850	367
MIN	75	93	84	28	13	6.8	3.6	2.1	2.2	2.9	57	75
AC-FT	13928	8590	12694	2779	1087	608	354	193	173	5277	10126	8791

† All 2016 data are provisional data–subject to revision; e=estimated value

SCLO — 14202850 — Scoggins Creek above Henry Hagg Lake near Gaston, Oregon [RM 9.3]



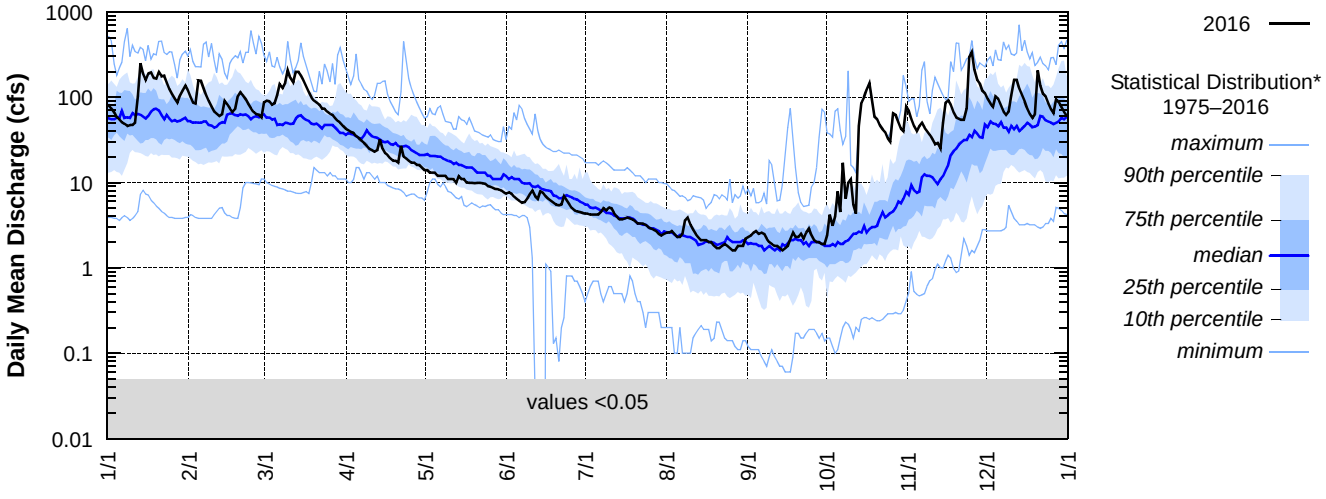
SCHO – 14202920 – SAIN CREEK ABOVE HENRY HAGG LAKE NEAR GASTON, OREGON [RM 1.6]

Latitude: 45 28 50 Longitude: 123 14 40 Source Agency: District 18 Watermaster

Day	2016 Daily Mean Discharge in Cubic Feet per Second†											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	80	101e	87	43	14	7.4	4.3	2.6	2.3	2.4	69	96
2	74	86e	91	41	14	7.7	4.3	2.6	2.4	4.2	55	84
3	66	84e	89	39	13	7.4	4.2	2.7	2.6	3.1	46	77
4	58	157e	82	38	13	6.8	4.2	2.5	2.7	4.0	40	102
5	55	155e	85	35	13	6.4	4.2	2.3	2.5	7.9	46	96
6	51	128e	105	33	12	6.1	4.2	2.3	2.6	4.5	50	80
7	49	105e	143	31	12	5.8	4.5	2.5	2.5	17	44	68
8	46	90e	128	29	12	5.9	5.0	3.6	2.2	6.5	40	62
9	47	77e	147	27	12	6.5	4.7	3.9	2.0	10	36	68
10	47	68e	206	25	11	7.3	5.1	3.2	1.9	11	32	104
11	50	64e	168	24	11	8.0	5.0	2.8	1.8	5.5	28	159
12	103	60	149	23	11	6.9	4.4	2.5	1.8	4.3	29	160
13	249	63	198	24	10	6.4	4.0	2.3	1.7	46	25	126
14	188	91	197	32	12	7.9	3.7	2.1	1.6	86	50	107
15	160	83	178	25	11	7.6	3.7	2.1	1.7	100	86	89
16	189	74	156	22	11	6.9	3.8	2.1	1.8	123	92	73
17	194	67	132	21	10	6.4	3.9	2.0	2.2	148	81	63
18	168	73	114	19	9.9	6.1	3.8	2.0	2.6	92	66	57
19	165	103	99	18	9.9	5.8	3.7	1.8	2.3	59	58	63
20	198	115	91	18	9.8	5.5	3.5	1.7	2.3	55	56	207
21	176	105	86	17	9.9	5.4	3.3	1.7	2.5	47	54	137
22	178	94	81	27	9.9	5.5	3.3	1.8	2.2	42	54	110
23	148	83	73	20	9.8	6.9	3.3	1.9	2.6	39	74	103
24	124	74	73	19	9.6	6.2	3.2	1.8	2.9	33	298	84
25	109	67	68	18	9.1	5.5	3.0	1.7	2.4	30	340	72
26	96	63	64	17	8.9	5.0	2.9	1.6	2.1	65	211	65
27	86	62	62	17	8.7	4.7	2.8	1.6	2.0	62	159	94
28	104	58	57	16	8.4	4.6	2.7	1.8	2.0	51	145	88
29	119e	58	53	16	8.3	4.5	2.5	1.8	1.9	43	119	76
30	137e	—	50	15	8.1	4.4	2.4	1.8	1.9	40	111	67
31	120e	—	46	—	7.7	—	2.5	2.2	—	77	—	61
TOTAL	3634	2508	3358	749	330	188	116	69	66	1318	2594	2898
MEAN	117	86	108	25	11	6.3	3.7	2.2	2.2	43	86	93
MAX	249	157	206	43	14	8.0	5.1	3.9	2.9	148	340	207
MIN	46	58	46	15	7.7	4.4	2.4	1.6	1.6	2.4	25	57
AC-FT	7208	4975	6660	1486	655	372	230	137	131	2615	5145	5748

† All 2016 data are provisional–subject to revision; e=estimated value

SCHO — 14202920 — Sain Creek above Henry Hagg Lake near Gaston, Oregon [RM 1.6]



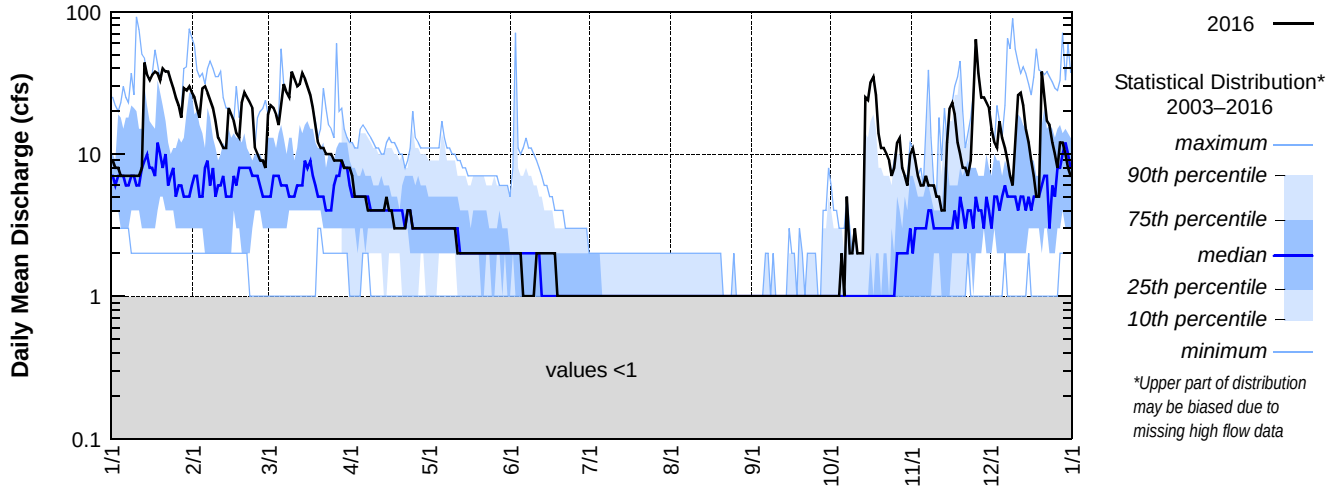
TANO – 14202860 – TANNER CREEK ABOVE HENRY HAGG LAKE NEAR GASTON, OREGON [RM 1.6]

Latitude: 45 30 21 Longitude: 123 13 10 Source Agency: Tualatin Valley Irrigation District

Day	2016 Daily Mean Discharge in Cubic Feet per Second[a]											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	9	25	19	8	3	2	1	1	1	1	11	15
2	8	21	22	7	3	2	1	1	1	1	9	12
3	8	18	21	5	3	2	1	1	1	1	7	11
4	7	29	19	5	3	2	1	1	1	1	6	17
5	7	30	16	5	3	2	1	1	1	2	6	13
6	7	27	22	5	3	1	1	1	1	1	7	11
7	7	24	31	5	3	1	1	1	1	5	6	9
8	7	21	27	4	3	1	1	1	1	2	6	7
9	7	17	25	4	3	1	1	1	1	2	6	6
10	7	13	38	4	3	1	1	1	1	3	5	12
11	7	12	34	4	3	2	1	1	1	2	5	26
12	8	11	30	4	2	2	1	1	1	2	4	27
13	44	11	31	4	2	2	1	1	1	2	4	22
14	36	21	37	4	2	2	1	1	1	25	12	15
15	33	19	34	5	2	2	1	1	1	24	21	12
16	36	17	30	4	2	2	1	1	1	32	23	9
17	38	14	26	4	2	2	1	1	1	35	19	7
18	37	13	21	3	2	2	1	1	1	26	12	5
19	33	23	16	3	2	1	1	1	1	14	10	5
20	40	27	12	3	2	1	1	1	1	11	8	38
21	38	25	11	3	2	1	1	1	1	11	8	25
22	38	23	11	3	2	1	1	1	1	10	7	17
23	33	21	10	4	2	1	1	1	1	9	9	16
24	29	11	10	4	2	1	1	1	1	7	26	12
25	25	10	10	3	2	1	1	1	1	8	64	10
26	22	9	9	3	2	1	1	1	1	12	37	8
27	18	9	9	3	2	1	1	1	1	13	25	12
28	29	8	9	3	2	1	1	1	1	8	25	12
29	28	8	9	3	2	1	1	1	1	7	23	10
30	30	—	8	3	2	1	1	1	1	6	21	8
31	27	—	8	—	2	—	1	1	—	10	—	7
TOTAL	703	517	615	122	73	43	31	31	30	293	432	416
AC-FT	1394	1025	1220	242	145	85	61	61	60	581	857	825

[a]Values are read from a staff plate. Values may be daily readings taken at about 0800 or averages over several days

TANO — 14202860 — Tanner Creek above Henry Hagg Lake near Gaston, Oregon [RM 1.6]

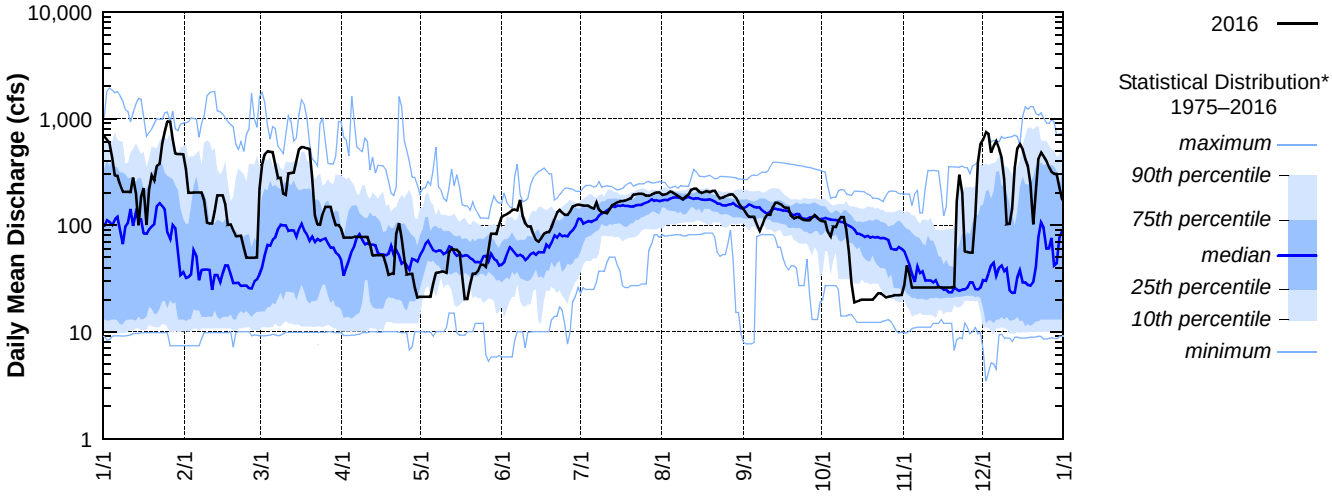


SCOO – 14202980 – SCOGGINS CREEK BELOW HENRY HAGG LAKE NEAR GASTON, OREGON [RM 4.8]

Latitude: 45 28 10 Longitude: 123 11 56 Source Agency: Bureau of Reclamation & District 18 Watermaster

Day	2016 Daily Mean Discharge in Cubic Feet per Second											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	682	336	220	91.8	21.2	118	154	192	141	109	27.3	635
2	636	201	368	76.2	21.3	124	152	193	127	108	42.0	745
3	592	201	460	76.2	21.3	128	152	198	120	86.3	34.9	715
4	426	202	491	76.2	21.3	132	152	206	120	78.0	26.0	480
5	292	202	487	76.2	21.3	138	146	203	120	96.8	26.0	556
6	290	202	483	77.8	27.9	140	143	195	102	96.1	26.0	616
7	240	202	368	77.6	35.8	137	164	188	88.5	110	26.0	521
8	205	172	275	77.2	35.9	172	140	182	101	119	25.9	429
9	205	106	277	77.3	36.6	122	132	174	117	119	25.9	272
10	205	103	198	77.3	36.6	104	131	186	125	90.2	25.9	102
11	204	103	192	77.3	35.7	97.0	129	195	125	56.4	26.0	103
12	280	136	305	65.9	55.9	97.0	140	215	147	28.9	25.9	143
13	199	190	309	51.8	60.3	82.6	153	220	163	18.9	26.0	343
14	99.8	190	311	52.2	58.6	72.5	159	220	162	19.3	26.1	524
15	183	190	401	52.1	58.6	70.0	164	207	158	19.7	26.0	574
16	223	157	511	52.1	55.2	74.8	168	201	149	20.0	26.0	510
17	101	101	540	52.1	34.0	83.0	167	205	146	20.0	26.0	417
18	216	102	536	42.7	20.2	85.9	170	207	145	20.0	26.0	358
19	292	88.8	527	34.2	20.3	85.8	175	204	122	20.0	26.0	245
20	262	78.7	519	34.9	27.9	95.9	178	209	115	20.0	26.3	102
21	359	79.3	290	34.9	34.9	114	192	209	119	21.2	167	206
22	377	79.4	123	83.2	34.9	131	194	191	119	23.0	298	423
23	581	61.1	101	104	37.2	138	197	179	115	23.0	202	478
24	753	49.3	101	75.2	42.5	131	196	181	112	22.0	56.3	442
25	935	49.3	129	49.2	42.3	125	196	188	111	21.0	56.0	397
26	934	49.4	149	34.5	40.5	125	189	191	111	21.3	55.0	349
27	635	49.4	148	34.8	57.2	134	188	194	117	21.5	55.2	314
28	467	49.9	148	34.9	82.8	151	193	194	124	22.0	123	301
29	464	104	120	26.0	82.7	154	199	181	118	22.0	388	301
30	464	—	99.9	21.0	82.6	155	202	162	111	22.0	579	222
31	461	—	99.9	—	99.8	—	202	150	—	22.2	—	175
TOTAL	12264	3835	9287	1797	1343	3516	5219	6022	3750	1495	2527	11999
MEAN	396	132	300	59.9	43.3	117	168	194	125	48.2	84.2	387
MAX	935	336	540	104	99.8	172	202	220	163	119	579	745
MIN	99.8	49.3	99.9	21.0	20.2	70.0	129	150	88.5	18.9	25.9	102
AC-FT	24324	7606	18421	3565	2664	6974	10352	11944	7438	2966	5011	23800

SCOO — 14202980 — Scoggins Creek below Henry Hagg Lake near Gaston, Oregon [RM 4.8]



UNITED STATES DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY – OREGON WATER SCIENCE CENTER

STATION NUMBER: 14203500 TUALATIN RIVER NEAR DILLEY, OREG.

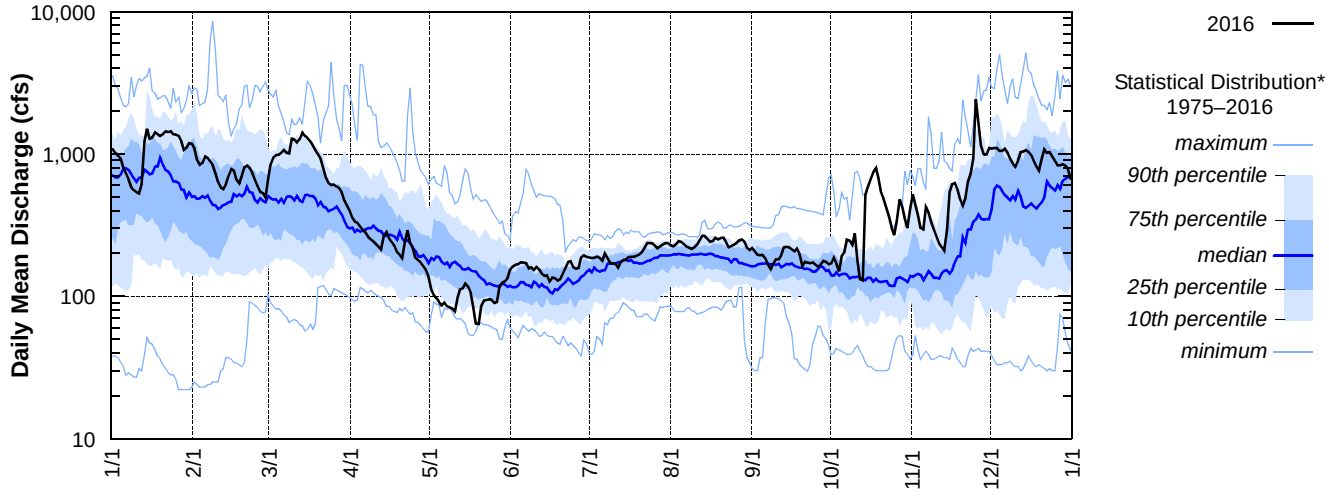
LATITUDE: 452830 LONGITUDE: 1230723 DRAINAGE AREA: 125.00 DATUM: 147.57

Discharge, Cubic Feet per Second, Calendar Year January to December 2016 Daily Mean Values

Day	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT†	NOV†	DEC†
1	1080	1090	660	398	138	154	187	227	219	171	520	1090
2	1020	908	850	357	111	162	185	224	207	187	443	1100
3	977	842	944	334	101	166	186	232	195	171	373	1100
4	930	869	985	329	97.0	168	190	244	194	150	304	1050
5	801	963	986	310	91.2	173	186	241	195	192	295	1050
6	730	945	1020	293	86.2	172	178	232	185	204	422	1090
7	666	891	1070	281	90.3	171	199	223	165	249	388	1020
8	582	838	1020	262	85.4	157	185	220	155	245	336	924
9	555	727	1010	251	83.8	160	171	216	169	229	293	860
10	538	634	1280	243	82.2	153	171	221	182	277	262	817
11	529	583	1270	233	78.4	160	169	231	182	180	235	905
12	612	569	1210	223	97.7	154	159	248	194	132	222	1030
13	1220	609	1280	213	112	144	173	266	221	129	209	1040
14	1500	709	1420	268	114	139	180	265	222	518	292	1070
15	1280	787	1340	283	123	140	181	253	221	593	539	1040
16	1310	765	1300	256	117	127	188	241	213	667	615	984
17	1420	663	1230	241	106	135	189	244	207	743	626	889
18	1380	623	1140	225	83.7	134	189	258	217	800	559	816
19	1340	701	1060	204	64.2	129	193	252	198	672	479	762
20	1380	807	996	196	63.6	132	196	257	164	536	433	927
21	1440	829	931	185	85.5	145	204	258	174	482	487	1080
22	1430	801	782	238	93.0	159	218	242	172	413	635	1020
23	1450	736	676	291	93.9	174	237	221	171	361	730	1030
24	1380	655	622	235	95.6	176	236	226	173	305	931	964
25	1370	594	605	219	93.9	160	235	231	166	269	2440	893
26	1340	545	609	186	89.9	156	227	237	161	338	1650	835
27	1230	532	591	179	91.0	158	218	247	167	480	1140	833
28	1070	494	575	172	117	187	224	251	177	426	990	852
29	1110	504	540	163	125	194	232	242	174	352	994	827
30	1190	—	472	152	128	189	237	219	168	302	1100	776
31	1180	—	430	—	134	—	237	211	—	414	—	673
TOTAL	34040	21213	28904	7420	3073	4728	6160	7380	5608	11187	18942	29347
MEAN	1098	731	932	247	99.1	158	199	238	187	361	631	947
MAX	1500	1090	1420	398	138	194	237	266	222	800	2440	1100
MIN	529	494	430	152	63.6	127	159	211	155	129	209	673
AC-FT	67517	42075	57330	14717	6094	9378	12218	14638	11123	22189	37571	58209

†Provisional data (10/31–12/31)–subject to revision

DLLO — 14203500 — Tualatin River near Dilley, Oregon [RM 58.8]



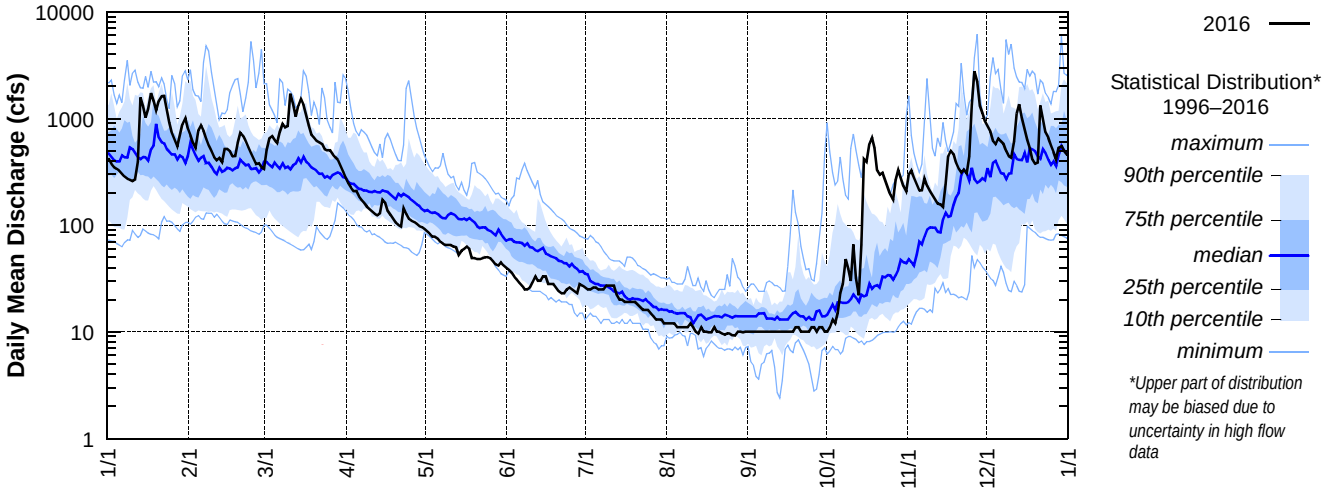
GALES – 14204530 – GALES CREEK AT OLD HWY 47 NEAR FOREST GROVE, OREGON [RM 2.36]

Latitude: 45 30 39 Longitude: 123 06 56 Source Agency: District 18 Watermaster

Day	2016 Daily Mean Discharge in Cubic Feet per Second†											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	414	697	504	247e	87e	38e	25e	12e	10e	11e	325	753
2	377	591	656	226e	83e	36e	25e	12e	10e	13e	277	618
3	350	530	683	208e	78e	33e	26e	12e	10e	12e	241	577
4	338	778	629	209e	78e	31e	26e	11e	10e	15e	211	649
5	324	863	590	188e	75e	29e	25e	11e	10e	23e	212	610
6	303	768	746	174e	70e	27e	25e	11e	10e	28	275	578
7	285	647	891	163e	67e	25e	25e	11e	10e	48	234	498
8	272	559	830	149e	65e	25e	27e	11e	10e	39	208	446
9	266	493	851	141e	65e	26e	27e	12e	10e	30	190	429
10	260	436	1710	135e	65	29e	27e	11e	10e	66	174	612
11	269	405	1360	128e	63	33e	27e	10e	10e	32	159	1110
12	396	426	1040	124e	62	30e	22e	9.6e	10e	22	157	1360
13	1570	390	1320	129e	53	30e	20e	11e	10e	65	148	1020
14	1310	517	1530	174e	58	33e	20e	10e	10e	419	241	788
15	1020	519	1350	163e	60	33e	19e	10e	10e	392	445	633
16	1230	494	1070	136e	63	28e	19e	9.9e	10e	581	500	530
17	1730	442	856	125e	60	28e	19e	9.9e	10e	663	462	411
18	1470	446	705	115e	49	28e	19e	11e	11e	530	381	376
19	1190	594	664e	106e	49e	26e	19e	10e	11e	325	337	386
20	1460	738	620e	101e	48	24e	18e	10e	10e	297	310	1320
21	1620	690	600e	97e	48	23e	17e	9.7e	10e	310	332	992
22	1630	612	579e	144e	49	23e	16e	9.4e	10e	266	307	741
23	1230	537	519e	127e	50	25e	16e	9.7e	10e	228	442	659
24	918	474	505e	115e	50	26e	16e	9.6e	11e	194	1340e	558
25	732	420	504e	110e	49e	25e	15e	9.3e	11e	173	2770e	488
26	626	373	462e	107e	46e	24e	14e	9.2e	10e	264	2210	414
27	547	379	436e	103e	43e	23e	13e	10e	11e	329	1320	532
28	701	350	412e	98e	42e	28e	13e	10e	11e	276	1130	551
29	884	338	363e	96e	45e	27e	13e	9.9e	10e	233	935	497
30	1010	—	316e	92e	42e	26e	12e	10e	10e	207	848	464
31	808	—	277e	—	40e	—	12e	10e	—	299	—	427
TOTAL	25540	15506	23578	4230	1802	842	617	322	306	6390	17121	20027
MEAN	824	535	761	141	58.1	28.1	19.9	10.4	10.2	206	571	646
MAX	1730	863	1710	247	87	38	27	12	11	663	2770	1360
MIN	260	338	277	92	40	23	12	9.2	10	11	148	376
AC-FT	50658	30756	46766	8390	3574	1670	1224	639	607	12674	33959	39723

† All 2016 data are provisional–subject to revision; e=estimated value

GALES — 14204530 — Gales Creek at Old Hwy 47 near Forest Grove, Oregon [RM 2.36]



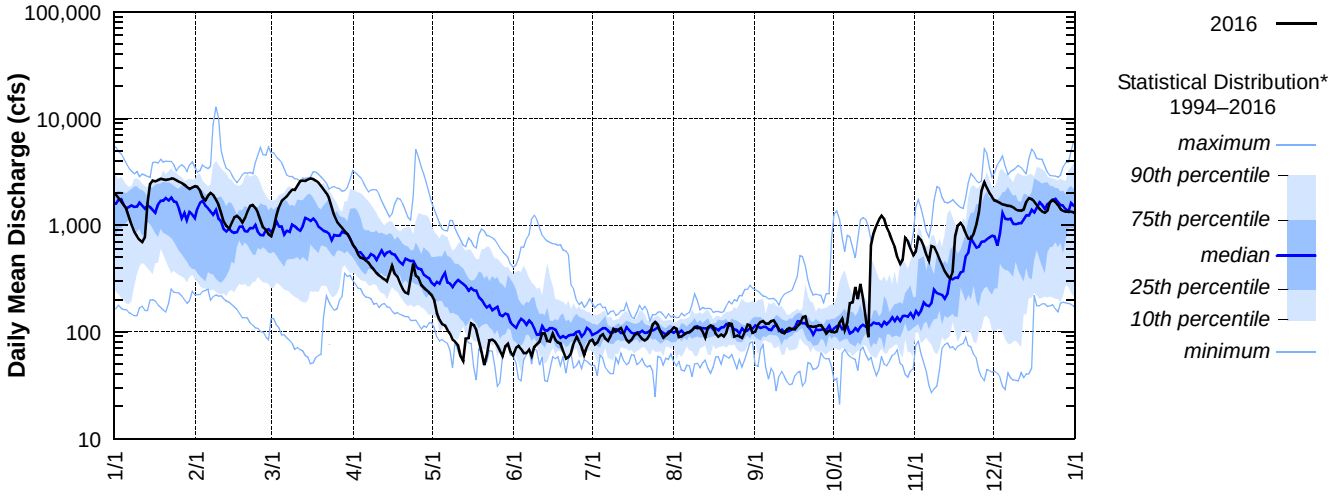
TRGC – 14204800 – TUALATIN RIVER AT GOLF COURSE ROAD NEAR CORNELIUS, OREGON [RM 51.5]

Latitude: 45 30 08 Longitude: 123 03 22 Source Agency: District 18 Watermaster

Day	2016 Daily Mean Discharge in Cubic Feet per Second[†]											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1940	2290	926	612	196	71	76	107	117e	101	774	1670
2	1810	2120	1240	538	151	74	79	89	124e	122	725	1620
3	1670	1820	1490	494	129	69	91	90	127e	133	631	1570
4	1550	1710	1690	487	118	63	95	95	119e	104	525	1540
5	1410	1890	1770	464	115	63	86	98	119e	122	461	1510
6	1200	2000	1860	444	104	68	82	99	126e	185	636	1510
7	1010	1910	2020	411	96	59	91	104	128e	189	625	1470
8	861	1730	2150	385	84	72	107	110	117e	263	549	1400
9	783	1540	2140	357	81	76	101	108	106e	203	476	1370
10	727	1300	2340	338	75	81	105	109	99e	282	422	1360
11	693	1080	2600	324	59	97	109	100	97e	209	369	1400
12	775	981	2620	312	53	97	95	88	105e	135	335	1650
13	1600	934	2590	296	86	82	84	110	109e	89	317	1790
14	2430	1060	2680	351	87	81	80	115	106	645	367	1750
15	2620	1190	2750	415	120	96	84	113	105	838	787	1670
16	2580	1220	2710	352	116	84	92	96	113	1000	989	1550
17	2640	1160	2620	328	104	79	97	90	119	1130	1050	1410
18	2720	1060	2500	284	82	78	92	94	137	1230	972	1350
19	2680	1160	2340	253	64	66	86	90	140	1150	835	1310
20	2650	1350	2160	234	49	56	83	98	113	950	745	1360
21	2680	1510	2000	228	60	58	86	120	113	834	750	1630
22	2740	1540	1790	319	83	63	96	118	111	715	834	1720
23	2720	1450	1490	437	84	78	117	90	112	625	1010	1650
24	2640	1300	1240	336	81	90	123	92	115	501	1310	1550
25	2560	1120	1080	321	74	81	117	91	115	432	2080	1410
26	2490	955	1010	274	66	72	98	88	106	475	2520	1360
27	2410	899	944	260	59	61	88	101	96	766	2230	1340
28	2270	816	881	246	73	72	92	117	103	714	2000	1340
29	2180	784	831	235	77	82	96	115	100	602	1830	1340
30	2260	—	745	221	65	84	102	98	99	521	1700	1320
31	2330	—	662	—	60	—	110	100	—	568	—	1240
TOTAL	61629	39879	55869	10556	2751	2253	2940	3133	3396	15833	28854	46160
MEAN	1988	1375	1802	352	88.7	75.1	94.8	101	113	511	962	1489
MAX	2740	2290	2750	612	196	97.0	123	120	140	1230	2520	1790
MIN	693	784	662	221	49.0	56.0	76.0	88.0	96.0	89.0	317	1240
AC-FT	122239	79099	110814	20938	5457	4469	5831	6214	6736	31404	57231	91557

[†] All 2016 data are provisional–subject to revision; e=estimated value

TRGC — 14204800 — Tualatin River at Golf Course Road near Cornelius, Oregon [RM 51.5]



UNITED STATES DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY – OREGON WATER SCIENCE CENTER

STATION NUMBER: 14205400 EAST FORK DAIRY CREEK NEAR MEACHAM CORNER, OR

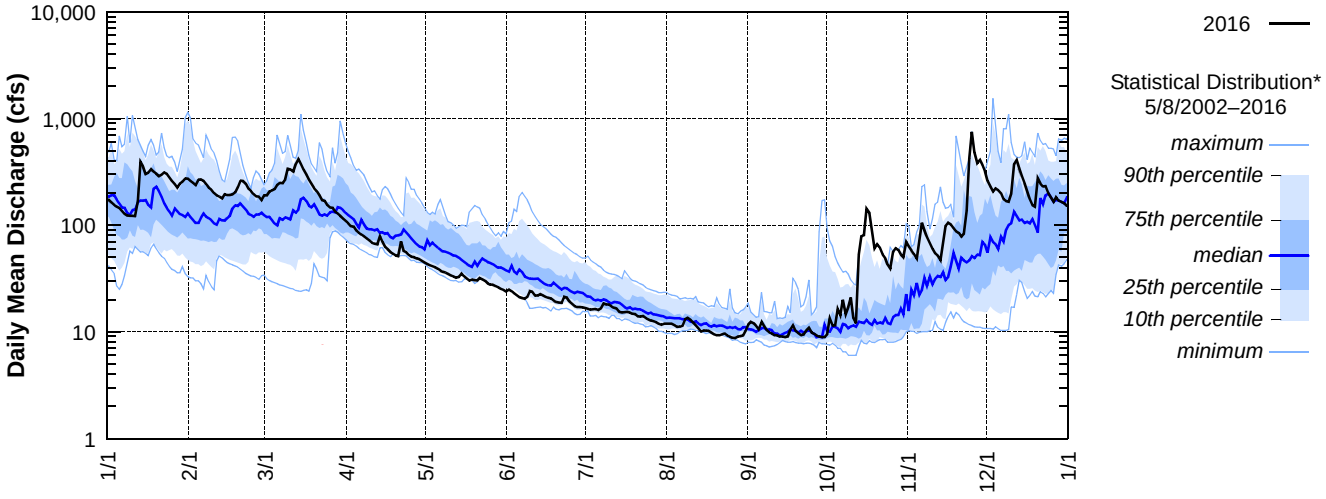
LATITUDE: 454051 LONGITUDE: 1230412 DRAINAGE AREA: 32.92 DATUM: 290

Discharge, Cubic Feet per Second, Calendar Year January to December 2016 Daily Mean Values

Day	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV†	DEC†*
1	172	260	190	109	44.7	23.9	16.7	11.9	11.7	9.51	63.1	260
2	163	248	190	104	43.4	24.9	16.5	11.9	12.4	13.4	58.0	229
3	155	237	208	97.9	42.1	24.1	16.1	11.9	12.1	11.4	53.8	207
4	149	266	212	96.5	41.2	22.9	16.2	11.6	11.4	11.5	48.5	222
5	145	268	218	89.1	40.4	22.0	16.4	11.1	10.6	16.4	72.0	213
6	136	261	238	84.8	39.0	21.1	16.0	11.2	12.4	14.2	106	199
7	128	243	248	81.6	37.5	20.7	16.6	11.4	11.3	20.0	89.3	175
8	123	225	247	78.3	36.4	20.4	18.4	13.1	10.4	14.6	76.8	168
9	122	213	268	74.8	35.9	21.3	18.0	13.6	9.86	17.1	67.6	166
10	122	200	337	71.8	35.0	24.1	18.0	13.0	9.70	21.0	59.8	197
11	121	190	333	68.6	33.8	23.8	17.3	12.2	9.33	13.4	54.5	375
12	169	186	317	67.0	33.0	21.9	16.8	11.6	9.32	12.0	51.9	410
13	390	179	374	66.0	32.2	21.8	16.5	10.9	9.03	53.3	46.7	342
14	354	196	414	78.3	32.6	22.6	15.4	10.1	8.98	78.8	69.4	289
15	301	192	375	69.3	35.3	22.0	15.2	10.3	8.92	80.5	98.3	246
16	310	192	333	62.6	33.2	21.3	15.3	10.2	9.04	142	106	207
17	335	194	297	59.5	31.6	20.9	15.4	10.2	10.5	130	102	175
18	316	203	267	56.0	30.3	20.5	15.2	9.87	11.5	88.7	94.1	154
19	303	227	244	54.0	30.8	19.7	14.7	9.45	10.2	60.8	87.9	149
20	288	262	223	52.0	30.5	19.1	14.6	9.26	9.66	66.6	84.7	275
21	297	260	209	51.0	30.2	18.8	14.0	9.26	9.32	62.0	78.2	246
22	313	243	190	70.1	31.9	18.6	13.9	9.50	9.35	53.3	83.2	231
23	305	220	171	57.6	31.0	21.2	14.1	9.59	10.2	49.4	137	232
24	282	210	169	55.9	30.0	21.0	13.5	9.22	10.9	42.3	422	198
25	262	196	154	52.6	28.4	19.2	13.1	9.03	9.88	39.0	752	181
26	243	186	146	50.6	27.6	18.3	12.8	8.83	9.56	56.3	483	166
27	226	185	145	50.2	27.7	17.4	12.6	8.69	9.16	60.9	383	183
28	245	173	134	48.8	26.9	17.0	12.3	9.01	9.02	58.6	408	170
29	255	167	128	48.1	26.2	17.0	11.9	9.08	8.88	52.9	366	166
30	275	—	122	46.3	25.3	16.9	11.7	9.15	8.87	50.2	320	161
31	273	—	115	—	24.7	—	11.9	10.2	—	69.4	—	152
TOTAL	7278	6282	7216	2052	1029	624	467	326	303	1470	4923	6744
MEAN	235	217	233	68.4	33.2	20.8	15.1	10.5	10.1	47.4	164	218
MAX	390	268	414	109	44.7	24.9	18.4	13.6	12.4	142	752	410
MIN	121	167	115	46.3	24.7	16.9	11.7	8.69	8.87	9.51	46.7	149
AC-FT	14436	12460	14313	4071	2041	1238	926	647	602	2915	9764	13377

†Provisional data (11/7–12/31)–subject to revision

5400 — 14205400 — East Fork Dairy Creek near Meacham Corner, Oregon [RM 12.4]



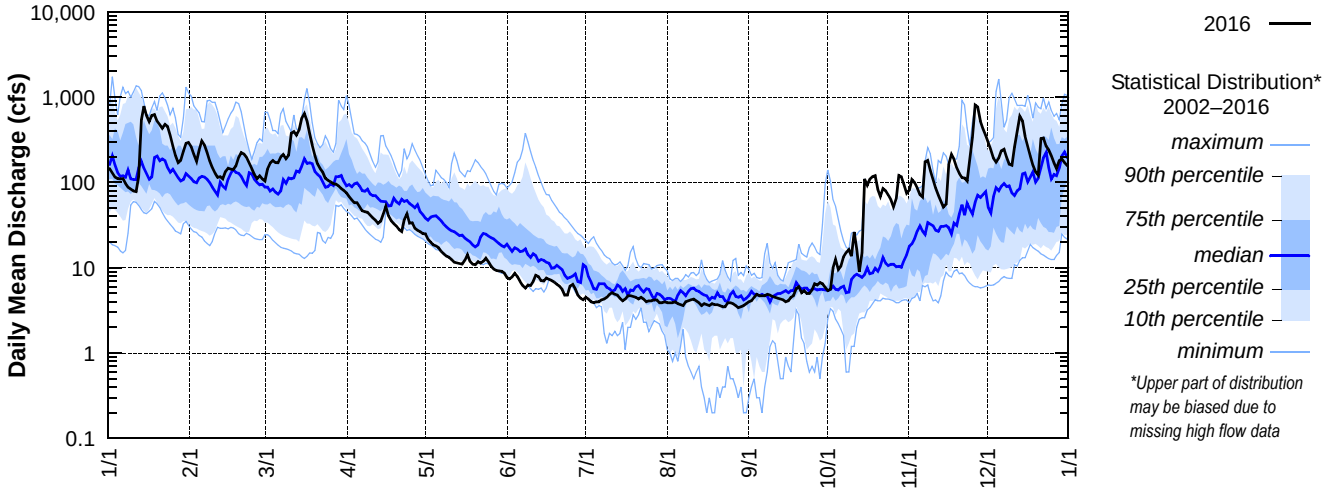
MCSC – 14206070 – McKAY CREEK AT SCOTCH CHURCH RD ABOVE WAIBLE CREEK NEAR NORTH PLAINS, OREGON [RM 6.3]

Latitude: 45 57 21 Longitude: 122 99 18 Source Agency: WEST Consultants for Clean Water Services

Day	2016 Daily Mean Discharge in Cubic Feet per Second											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	145	262	145	68.5	21.7	7.41e	4.31e	3.89e	4.10e	5.56e	108	243
2	129	214	169	62.6	20.0	7.76e	3.98e	3.93e	4.45e	9.99e	99.5	192
3	116	177	181	57.9	18.6	8.56e	3.94e	3.97e	4.90e	12.6	86.5	173
4	111	240	171	58.0	18.0	7.85e	4.00e	3.82e	4.72e	9.51	72.1	194
5	110	307	170	52.1	17.3	6.88e	4.00e	3.69e	4.70e	10.4	67.5	235
6	111	276	199	46.6	15.6	6.16e	4.23e	3.64e	4.72e	13.5	175	246
7	97.1	224	213	45.4	14.6	5.82e	4.27e	3.99e	4.89e	15.1	182	197
8	87.9	179	190	44.8	13.7	6.31e	4.47e	4.12e	4.83e	16.4	139	164
9	83.6	150	208	41.5	13.3	6.20e	4.87e	4.24e	4.59e	13.7	108	159
10	79.6	129	378	38.6	12.5	6.89e	5.10e	4.26e	4.50e	26.2	86.5	261
11	78.4	115	395	36.1	11.6	8.22e	4.94e	4.13e	4.40e	16.5	71.3	402
12	118	117	360	33.2	11.4	7.89e	4.78e	3.90e	4.30e	9.01	60.3	599
13	544	110	414	35.1	11.2	7.08e	4.44e	3.63e	4.23e	15.0	51.6	525
14	785	135	566	42.5	11.0	6.97e	4.12e	3.75e	3.98e	110	55.6	349
15	615	147	644	52.7	12.3	7.57e	4.31e	3.69e	4.08e	93.2	162	266
16	518	143	531	40.5	14.3	7.33e	4.69e	3.63e	4.50e	109	213	204
17	608	142	371	35.6	11.9	7.13e	4.73e	3.81e	4.69e	117	187	160
18	624	156	274	32.8	11.0	6.78e	4.61e	3.69e	5.73e	120	149	133
19	523	196	207	30.8	10.9	6.37e	4.54e	3.65e	5.96e	82.9	128	122
20	476	224	165	28.0	11.8	6.12e	4.28e	3.57e	5.11e	68.4	114	327
21	431	216	146	26.6	11.3	5.57e	4.45e	3.46e	5.39e	84.9	113	333
22	479	197	132	36.8	11.9	4.79e	4.25e	3.53e	5.04e	80.0	104	267
23	453	169	112	43.2	13.0	4.78e	4.04e	3.91e	5.03e	71.4	193	242
24	360	146	106	33.4	11.7	6.09e	4.13e	3.91e	5.47e	62.4	339	207
25	268	125	102	33.7	10.4	6.37e	4.11e	3.77e	6.49e	51.8	808	170
26	208	111	96.8	29.1	9.65	5.67e	4.17e	3.56e	6.33e	64.6	767	146
27	171	120	95.7	27.5	9.32	4.81e	4.15e	3.43e	6.65e	121	523	180
28	182	110	91.2	26.6	9.18	4.38e	3.86e	3.48e	6.45e	117	428	189
29	232	104	84.9	25.1	9.13	4.18e	3.90e	3.57e	5.94e	93.9	357	171
30	287	—	80.6	25.0	8.65	4.52e	4.00e	3.81e	5.39e	75.1	295	158
31	295	—	75.5	—	7.74	—	3.94e	4.01e	—	81.7	—	141
TOTAL	9326	4941	7074	1190	395	192	134	117	152	1778	6243	7355
MEAN	301	170	228	39.7	12.7	6.42	4.31	3.79	5.05	57.3	208	237
MAX	785	307	644	68.5	21.7	8.56	5.10	4.26	6.65	121	808	599
MIN	78.4	104	75.5	25.0	7.74	4.18	3.86	3.43	3.98	5.56	51.6	122
AC-FT	18497	9800	14030	2361	783	382	265	233	301	3526	12383	14588

e=estimated value

MCSC — 14206070 — McKay Creek at Scotch Church Road above Waible Creek near North Plains, Oregon [RM 6.3]



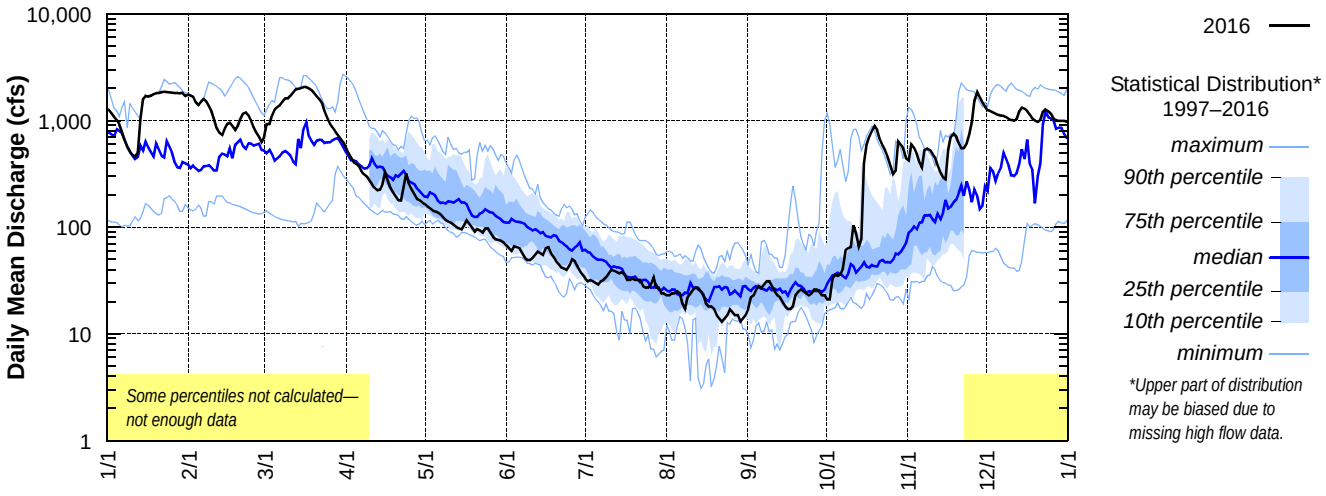
DAIRY – 14206200 – DAIRY CREEK AT HWY 8 NEAR HILLSBORO, OREGON [RM 2.06]

Latitude: 45 30 38 Longitude: 123 06 56 Source Agency: District 18 Watermaster

Day	2016 Daily Mean Discharge in Cubic Feet per Second†											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1260e	1720e	695e	496	157	64	31	23	22	21	598e	1230e
2	1180e	1670e	927e	451	150	60	32	24	23	33	559e	1190e
3	1080e	1490e	1120e	407	144	66	31	24	26	36	485	1160e
4	1010e	1400e	1270e	396	140	65	30	25	28	35	406	1130e
5	919e	1500e	1330e	374	137	64	29	24	27	36	362	1110e
6	783e	1580e	1390e	334	133	57	31	19	29	41	530e	1110e
7	653e	1510e	1510e	312	125	52	32	17	31	61	546e	1080e
8	561e	1370e	1620e	297	117	49	34	22	31	64	528e	1030e
9	511e	1210e	1610e	274	113	49	37	24	28	65	487e	1010e
10	477e	1020e	1700e	253	110	51	40	26	25	104	450	1000e
11	456e	845e	1830e	234	105	55	39	27	23	88	378	1030e
12	507e	769e	1960e	221	101	59	38	27	22	66	324	1220e
13	1040e	733e	1980e	224	98	57	37	25	20	78	292	1320e
14	1580e	837e	2020e	254	95	55	38	23	18	398e	279	1290e
15	1700e	931e	2060e	324	105	64	36	19	17	591e	530e	1230e
16	1680e	955e	2060e	276	116	65	32	18	17	715e	700e	1140e
17	1710e	893e	2010e	232	108	57	32	18	18	808e	750e	1040e
18	1770e	816e	1940e	211	99	53	33	17	23	884e	712e	998e
19	1810e	893e	1820e	194	91	48	32	15	25	815e	612e	968e
20	1810e	1040e	1700e	179	96	45	32	14	26	667e	546e	1010e
21	1840e	1160e	1580e	177	93	42	32	13	25	584e	550e	1210e
22	1860e	1190e	1470e	236	89	41	28	14	24	521e	612e	1270e
23	1840e	1120e	1220e	319	97	40	27	15	23	453	741e	1220e
24	1830e	1000e	1060e	255	97	44	27	17	24	381	961e	1150e
25	1820e	862e	928e	227	89	50	29	16	26	314	1530e	1040e
26	1810e	775e	865e	204	81	48	34	15	26	340	1850e	1010e
27	1810e	700e	793e	185	77	43	27	15	25	636e	1640e	993e
28	1790e	626e	737e	180	76	39	27	13	23	595e	1470e	993e
29	1820e	612e	681e	171	75	36	24	14	23	542e	1340e	993e
30	1700e	—	626e	166	72	33	24	15	21	439	1250e	979e
31	1750e	—	561e	—	68	—	23	17	—	421	—	920e
TOTAL	42367	31227	43073	8063	3254	1551	978	595	719	10832	22018	34074
MEAN	1367	1077	1389	269	105	51.7	31.5	19.2	24.0	349	734	1099
MAX	1860	1720	2060	496	157	66.0	40.0	27.0	31.0	884	1850	1320
MIN	456	612	561	166	68.0	33.0	23.0	13.0	17.0	21.0	279	920
AC-FT	84034	61938	85434	15993	6454	3076	1940	1180	1426	21485	43672	67585

†All 2016 data are provisional–subject to revision; e=estimated value

DAIRY — 14206200 — Dairy Creek at Hwy 8 near Hillsboro, Oregon [RM 2.06]



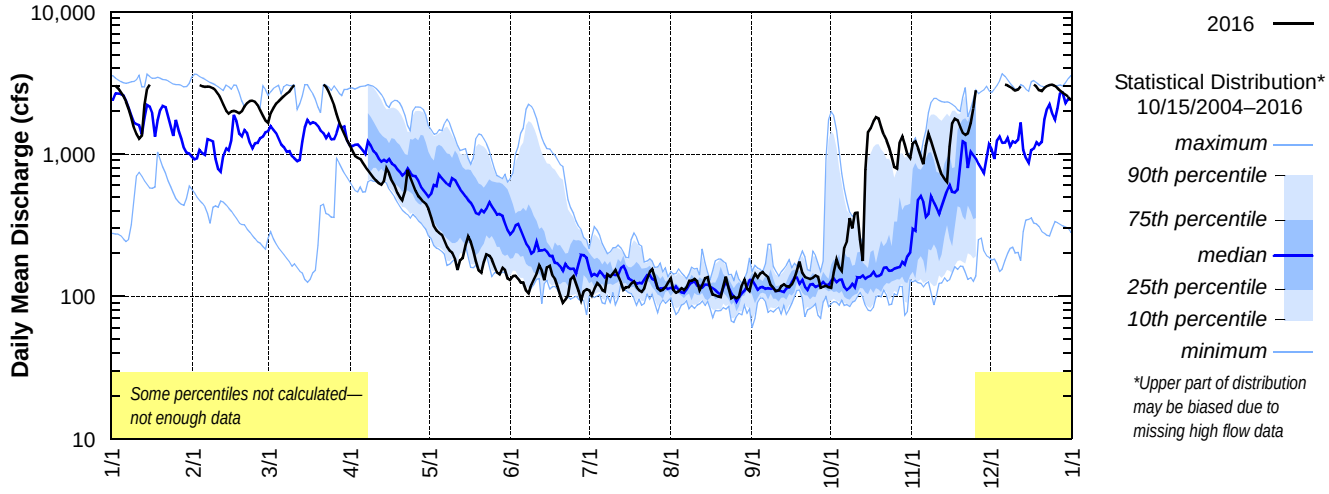
TRJB – 14206241 – TUALATIN RIVER AT HWY 219 BRIDGE [RM 44.4]

Latitude: 45 30 01 Longitude: 122 59 24 Source Agency: Jackson Bottom Wetland Education Center

Day	2016 Daily Mean Discharge in Cubic Feet per Second†											
	JAN*	FEB*	MAR*	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV*	DEC*
1			1655	1148	412	130	110	134	130	115	1189	
2	3032		1936	1055	356	139	101	111	144	146	1231	
3	2890	3060	2121	972	310	140	113	106	135	182	1110	
4	2719	2993	2262	942	289	133	124	108	145	159	962	
5	2545	2964	2354	924	279	124	119	114	149	151	849	
6	2348	2980	2441	863	270	125	110	111	141	222	1134	3079
7	2094	2968	2549	812	245	110	108	116	136	244	1390	3043
8	1790	2907	2653	772	223	105	143	129	120	355	1237	2966
9	1531	2803	2743	725	209	121	138	128	115	300	1061	2869
10	1376	2652	2916	683	202	131	144	132	109	384	927	2802
11	1278	2443	3055	651	183	145	153	128	110	387	810	2849
12	1350	2228		626	153	165	140	110	118	251	719	3003
13	2222	2015		611	180	152	126	121	121	177	668	
14	2867	1928		647	185	130	111	134	117	776	637	
15	3073	1994		793	228	160	116	137	116	1428	1132	
16		2010		734	262	164	116	115	121	1523	1649	
17		1990		648	241	141	123	103	132	1699	1778	3074
18		1937		597	210	133	127	102	151	1822	1726	2985
19		2000		536	177	118	117	100	175	1786	1554	2812
20		2157		499	151	103	110	99	145	1555	1406	2768
21		2280		475	146	90	107	118	136	1372	1360	2913
22		2358	3074	551	174	95	113	137	135	1249	1397	3018
23		2377	2968	776	198	102	133	113	132	1115	1649	3062
24		2334	2750	683	193	132	149	97	135	958	2095	3066
25		2216	2492	612	182	139	154	100	140	812	2817	3010
26		2027	2202	554	162	123	136	97	138	792		2905
27		1847	1909	506	147	109	113	99	115	1217		2783
28		1716	1675	487	142	94	109	120	117	1335		2696
29		1590	1510	463	159	108	111	131	119	1165		2622
30		—	1374	446	153	112	116	114	116	998		2528
31		—	1242	—	134	—	125	109	—	936	—	2408
TOTAL		62775		20792	6556	3771	3812	3568	3914	25612	32489	
MEAN		2325		693	211	126	123	115	130	826	1300	
MAX		3060		1148	412	165	154	137	175	1822	2817	
MIN		1590		446	134	90	101	97	109	115	637	
AC-FT		124513		41240	13004	7480	7562	7078	7763	50801	64441	

†All 2016 data are provisional–subject to revision; *Incomplete record (monthly totals were computed when at least 80% of the record was complete for the month).

TRJB — 14206241 —Tualatin River at Hwy 219 Bridge [RM 44.4]



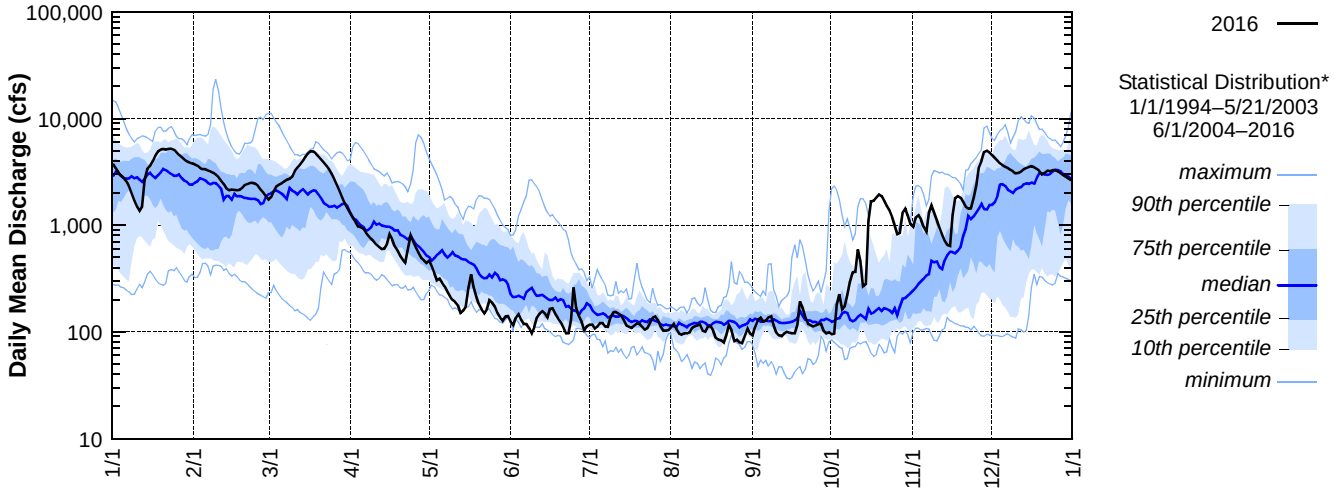
ROOD – 14206295 – TUALATIN RIVER AT ROOD BRIDGE ROAD NEAR HILLSBORO, OREGON [RM 38.4]

Latitude: 45 29 24 Longitude: 122 57 06 Source Agency: District 18 Watermaster

Day	2016 Daily Mean Discharge in Cubic Feet per Second†											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	3680	3710	1830	1180	415	116	117	119	112	96	1180	4280
2	3390	3610	2080	1070	355	135	107	106	130	179	1240	4040
3	3130	3450	2310	975	305	146	112	97	136	225	1130	3790
4	2930	3360	2400	961	315	129	121	94	125	163	968	3630
5	2760	3340	2470	934	288	118	121	97	127	174	867	3540
6	2570	3260	2570	852	267	118	112	97	137	221	1310	3440
7	2300	3190	2660	795	236	108	111	99	141	293	1530	3300
8	1990	3110	2730	750	214	97	136	109	115	363	1320	3170
9	1690	2980	2860	702	198	110	153	113	99	365	1110	3060
10	1490	2810	3230	658	191	136	154	115	93	593	941	3090
11	1360	2620	3460	623	176	147	148	117	91	457	810	3180
12	1490	2440	3690	595	151	156	142	102	97	268	714	3350
13	2640	2210	4020	599	158	148	129	100	100	281	652	3440
14	3390	2120	4380	667	172	136	114	112	98	1090	637	3520
15	3620	2150	4700	820	253	164	112	113	97	1670	1250	3560
16	3990	2140	4920	739	345	166	109	102	97	1690	1800	3500
17	4480	2120	4890	634	259	146	114	88	116	1810	1880	3380
18	4930	2140	4700	577	214	134	120	84	193	1940	1810	3210
19	5110	2240	4430	514	182	124	118	83	169	1870	1640	3000
20	5170	2390	4160	475	161	111	112	79	137	1690	1480	3100
21	5120	2440	3890	445	150	97	105	93	119	1510	1420	3240
22	5180	2490	3620	588	162	97	108	115	116	1360	1430	3220
23	5220	2480	3320	801	197	129	122	104	113	1190	1810	3270
24	5090	2440	3020	699	188	262	136	82	115	988	2360	3280
25	4850	2340	2710	616	172	168	140	84	118	821	3520	3200
26	4580	2170	2390	550	150	139	129	80	119	848	4000	3070
27	4320	2030	2080	489	137	124	113	78	102	1320	4850	2960
28	4130	1880	1810	466	128	104	102	93	97	1430	5000	2860
29	3980	1740	1600	441	140	113	102	107	99	1230	4820	2740
30	3880	—	1440	464	141	117	104	96	95	1030	4550	2640
31	3800	—	1290	—	125	—	110	92	—	964	—	2520
TOTAL	112260	75400	95660	20679	6545	3995	3733	3050	3503	28129	58029	101580
MEAN	3621	2600	3086	689	211	133	120	98.4	117	907	1934	3277
MAX	5220	3710	4920	1180	415	262	154	119	193	1940	5000	4280
MIN	1360	1740	1290	441	125	97.0	102	78.0	91.0	96.0	637	2520
AC-FT	222664	149554	189739	41016	12982	7924	7404	6050	6948	55793	115099	201481

† All 2016 data are provisional–subject to revision

ROOD — 14206295 — Tualatin River at Rood Bridge Road near Hillsboro, Oregon [RM 38.4]



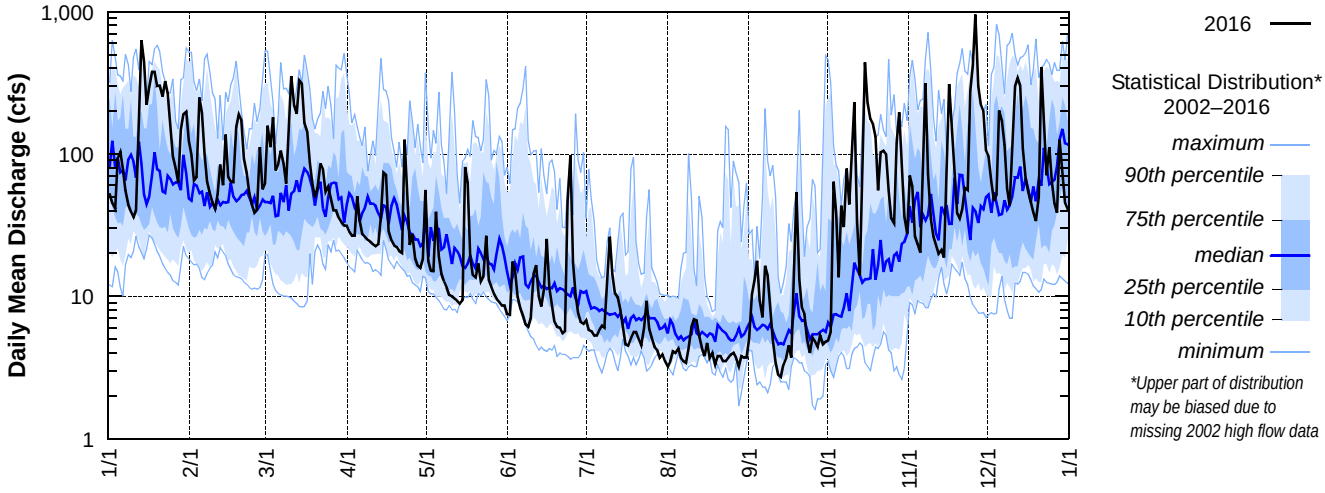
BVTS – 14206435 – BEAVERTON CREEK AT CORNELIUS PASS ROAD [RM 1.2]

Latitude: 45 31 15 Longitude: 122 53 59 Source Agency: WEST Consultants for Clean Water Services

Day	2016 Daily Mean Discharge in Cubic Feet per Second											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	52.1	99.2	158	28.3	17.7	7.37	5.81	3.47	10.3	5.58	58.9	63.2
2	44.9	65.3	112	26.6	15.1	17.5	5.65	4.05	13.0	64.0	26.5	46.8
3	41.1	68.8	181	26.6	15.0	15.2	5.28	3.98	17.8	38.8	23.2	51.9
4	94.3	250	76.6	50.7	39.3	9.87	5.33	4.27	9.37	13.6	20.2	202
5	104	195	85.2	33.7	19.0	8.30	5.75	3.69	7.07	43.4	59.4	170
6	78.6	101	106	27.2	14.4	7.34	6.18	3.46	16.4	30.7	316	116
7	55.3	64.1	85.6	26.2	12.7	6.28	5.97	3.36	14.0	79.3	72.9	57.3
8	44.0	52.4	61.9	24.9	11.6	6.07	12.3	4.25	8.60	44.2	34.8	43.7
9	39.3	45.5	150	24.1	10.2	7.04	26.3	6.11	4.98	98.1	26.3	116
10	35.9	41.2	353	23.2	9.95	14.4	14.2	6.90	3.35	231	22.8	301
11	40.4	52.4	220	22.5	9.58	16.5	10.5	6.75	2.82	35.2	19.9	342
12	167	84.7	192	23.3	9.25	9.98	9.83	5.34	2.72	14.0	21.2	303
13	631	60.3	330	36.7	8.94	8.48	7.95	4.26	3.25	132	18.7	111
14	448	137	314	74.1	9.36	11.1	6.02	3.81e	3.68	442	68.7	67.5
15	222	68.9	165	71.3	81.1	25.3	4.57	4.70e	4.52	231	311	54.6
16	293	63.6	143	28.7	63.1	11.6	4.51	3.73e	3.70	176	160	45.8
17	379	63.3	87.2	24.7	18.8	8.70	5.14	3.97e	18.5	162	67.9	38.9
18	378	154	61.8	22.8	14.1	6.55	5.60	3.30e	53.8	132	38.0	33.8
19	301	190	49.7	22.2	13.5	6.06	5.55	3.81e	13.2	55.5	35.1	50.1
20	303	173	58.1	20.8	17.1	6.04	4.96	3.81e	8.33	103	40.9	409
21	254	93.1	86.0	20.1	12.8	5.49	4.47	3.48e	7.45	106	57.6	190
22	326	73.2	77.7	126	13.8	5.70	6.04	3.50e	4.96	100	55.7	71.0
23	267	53.1	54.5	54.0	26.7	46.2	9.34	3.70e	4.02	55.6	277	112
24	154	44.0	59.2	22.9	13.1	98.4	5.87	3.87e	5.09	35.3	422	63.5
25	96.7	38.7	47.9	27.4	11.6	17.4	5.09	3.95e	4.77	32.5	954	44.9
26	79.3	40.8	40.2	18.4	10.4	10.4	4.42	3.72e	4.35	120	301	38.7
27	63.0	112	40.2	16.4	9.63	7.56	4.21	3.19e	5.26	197	222	126
28	149	56.4	35.7	15.8	9.07	6.62	3.72	3.79e	4.61	73.4	199	74.7
29	191	62.5	33.3	18.3	8.62	6.35	3.88	3.66e	4.80	36.6	106	45.2
30	199	—	31.4	55.9	8.56	6.79	3.45	3.70e	4.86	27.6	96.2	40.9
31	124	—	31.3	—	7.50	—	3.18	4.96e	—	70.6	—	34.9
TOTAL	5655	2604	3528	1014	542	421	211	129	270	2986	4133	3465
MEAN	182	89.8	114	33.8	17.5	14.0	6.81	4.15	8.99	96.3	138	112
MAX	631	250	353	126	81.1	98.4	26.3	6.90	53.8	442	954	409
MIN	35.9	38.7	31.3	15.8	7.50	5.49	3.18	3.19	2.72	5.58	18.7	33.8
AC-FT	11216	5164	6997	2011	1074	834	419	255	535	5923	8197	6874

e=estimated value

BVTS — 14206435 — Beaverton Creek at Cornelius Pass Road [RM 1.2]



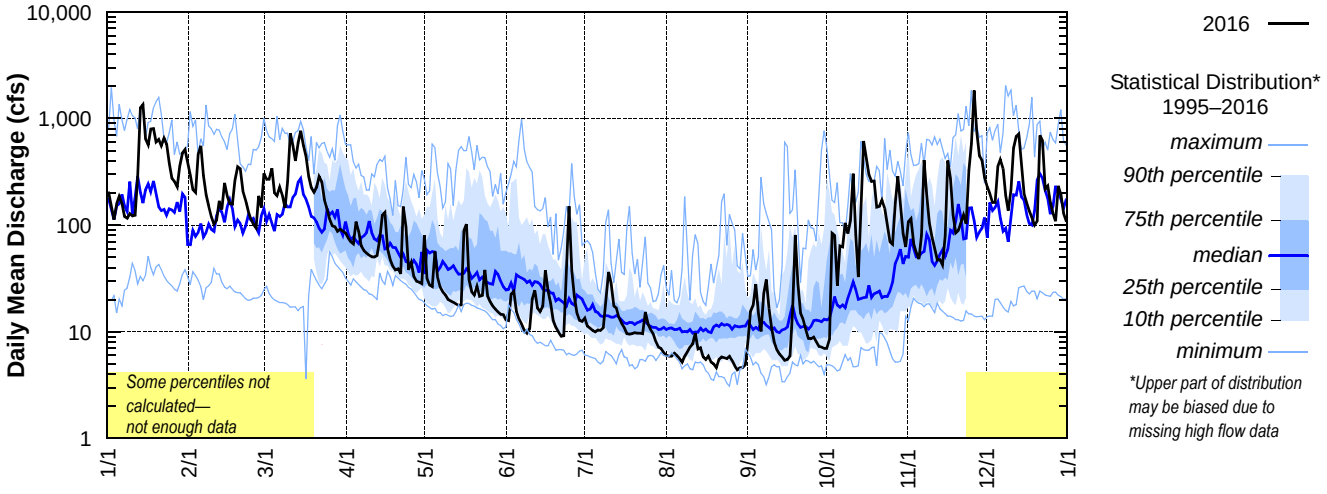
RCTV – 14206451** – ROCK CREEK AT HWY 8 NEAR HILLSBORO, OREGON [RM 1.2]

Latitude: 45 30 08 Longitude: 122 56 52 Source Agency: WEST Consultants for Clean Water Services

Day	2016 Daily Mean Discharge in Cubic Feet per Second											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	201	294	306	76.0	31.8e	12.7e	11.3	5.91	15.5	8.52	115	199e
2	149	216	269	69.7	27.4e	22.5e	10.8	5.92	17.8	84.0	67.7	163e
3	113	202	341	66.8	26.4e	23.9e	10.3	6.32	27.9	80.2	55.7	163e
4	159	460	201	108	56.5e	15.6e	9.95	6.04	14.8	27.1	48.1	354
5	186	554	189	88.4	32.8e	13.1e	10.4	5.55	10.1	63.7	80.7	412
6	160	292	228	64.0	26.2e	11.8e	10.3	5.20	22.9	62.6	408	339
7	120	192	192	57.8	23.7e	10.3e	10.9	5.90	30.9	105	188	191
8	116	151	145	54.8	22.1e	9.74e	19.4	6.46	16.4	83.6	105	137
9	128	121	255	52.3	20.1e	10.7e	36.3	7.20	10.9	111	76.7	212
10	122	102	728	50.5	19.5e	20.2e	28.5	7.65	8.14	304	60.6	527
11	124	111	559	50.3	18.9e	24.5e	17.5	9.65	6.77	81.5	47.1	678
12	287	169	401	51.9	18.3e	16.7e	16.7	6.87	6.18	32.7	47.6	717
13	1260	140	593	73.7	17.7e	15.5e	13.6	7.14	5.77	147	42.3	363
14	1350	249	768	124	17.9e	17.4	12.0	5.77	5.36	616	79.2	198
15	647	190	559	132	88.7e	37.9	11.0	5.50	5.45	432	403	162
16	569	159	443	59.7	102e	24.2	9.57	5.87	5.92	300	273	136
17	798	157	286	47.7	30.8e	18.5	9.49	5.18	15.6	258	125	118
18	804	264	225	41.2	23.7e	12.8	9.58	5.03	80.9	259	84.3	100
19	601	353	204	38.0	22.1e	11.0	9.80	4.60	28.7	147	88.8	109
20	637	338	226	39.0	26.8e	9.95	9.70	5.49	15.0	150	106	694
21	554	209	286	35.0e	21.5e	9.05	9.70	5.80	13.1	172	125	622
22	654	173	254	149e	21.9e	9.24	9.64	5.68	10.5	144	103	219e
23	576	136	174	95.9e	38.0e	42.7	15.3	5.62	8.66	99.8	325	234e
24	385	115	141	38.2e	21.8e	151	12.0	5.89	8.58	69.7	580	164e
25	275	102	114	44.5e	19.2e	37.9	10.5	5.44	8.93	66.2	1830	129e
26	257	94.3	98.2	33.0e	17.5e	21.5	9.64	4.83	8.09	160	757e	109e
27	228	188	96.7	29.7e	16.3e	15.1	8.12	4.39	7.32	288	446e	234
28	357	146	87.5	29.2e	15.4e	12.8	7.15	4.61	7.24	152	405e	196
29	475	154	91.4	28.3e	14.6e	12.5	6.95	4.59	7.00	83.4	281e	129
30	510	—	87.9	80.8e	14.5e	13.5	6.40	4.92	6.97	62.5	230e	110
31	391	—	84.5	—	12.9e	—	5.97	8.13	—	108	—	93.8
TOTAL	13193	6031	8633	1909	867	664	378	183	437	4759	7584	8212
MEAN	426	208	278	63.6	28.0	22.1	12.2	5.91	14.6	154	253	265
MAX	1350	554	768	149	102	151	36.3	9.65	80.9	616	1830	717
MIN	113	94.3	84.5	28.3	12.9	9.05	5.97	4.39	5.36	8.52	42.3	93.8
AC-FT	26168	11963	17124	3787	1720	1318	751	363	868	9438	15042	16288

**Site moved 120 feet downstream in 2012, previous ID was 14205450; e=estimated value

RCTV — 14206451 — Rock Creek at Hwy 8 near Hillsboro, Oregon [RM 1.2]



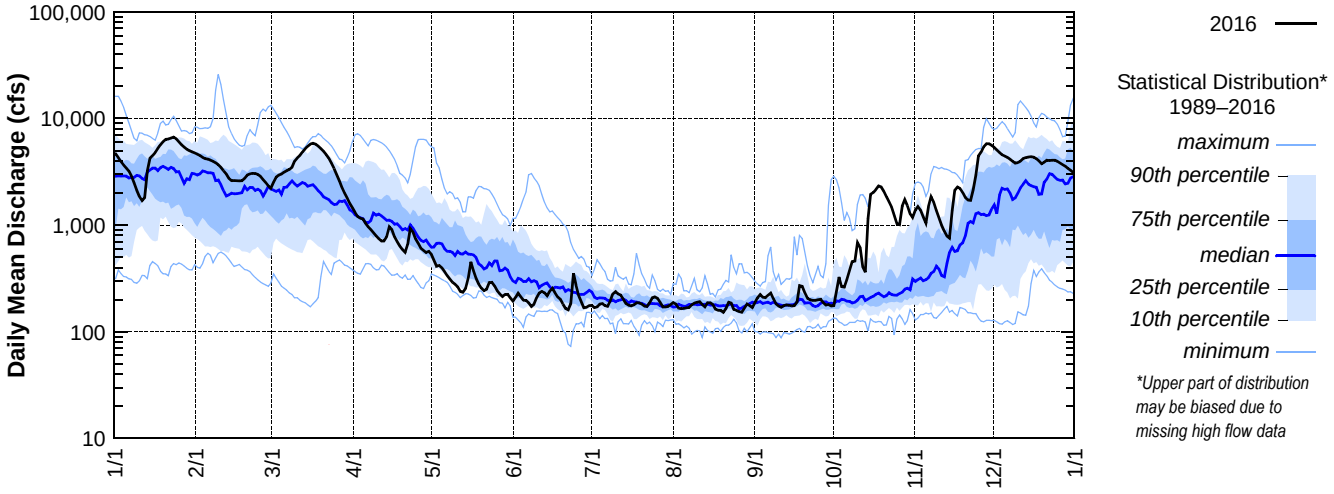
FRMO – 14206500 – TUALATIN RIVER AT FARMINGTON, OREGON [RM 33.3]

Latitude: 45 26 58 Longitude: 122 57 02 Source Agency: District 18 Watermaster

Day	2016 Daily Mean Discharge in Cubic Feet per Second[†]											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	4660	4640	2220	1450	534	194	177	188	188	176	1380	5350
2	4290	4500	2530	1320	470	210	168	182	208	239	1490	5070
3	3940	4320	2820	1200	412	230	171	167	224	326	1380	4790
4	3650	4200	2950	1160	418	213	182	165	211	265	1200	4570
5	3430	4170	3010	1140	397	198	184	166	209	263	1050	4450
6	3200	4070	3140	1040	369	197	176	168	220	309	1500	4330
7	2880	3960	3250	967	337	187	173	169	231	376	1850	4150
8	2500	3850	3330	908	313	173	195e	179	205	455	1640	3970
9	2120	3690	3490	849	291	181	226	186	183	461	1380	3820
10	1860	3480	3980	792	279	209	238	189	175	687	1170	3860
11	1700	3230	4270	748	264	231	226	192	170	615	1000	3980
12	1810	3020	4490	711	238	239	221	180	176	406	876	4200
13	3250	2750	4840	709	234	233	202	171	179	362	791	4300
14	4240	2610	5200	779	255	218	184	187	177	1150	756	4350
15	4470	2620	5480	966	316	241	177	187	175	1950	1370	4390
16	4790	2610	5760	910	453	256	175	180	176	2020	2120	4340
17	5230	2600	5870	775	376	232	179	163	189	2150	2280	4210
18	5680	2610	5740	700	320	213	187	159	271	2330	2210	4010
19	6060	2750	5510	636	280	202	187	159	267	2280	2020	3760
20	6390	2950	5220	591	257	182	182	152	233	2070	1820	3880
21	6420	3020	4930	556	243	166	174	165	206	1850	1720	4070
22	6550	3060	4600	661	250	161	173	189	200	1660	1710	4030
23	6680	3050	4230	930	289	183	187	186	197	1470	2140	4060
24	6460	2990	3820	862	291	354	208	162	197	1240	2950	4070
25	6040	2880	3400	746	269	274	213	159	200	1030	4450	3970
26	5690	2680	2990	674	243	219	206	155	202	1010	4850	3820
27	5400	2510	2610	608	227	192	189	152	188	1510	5430	3690
28	5160	2330	2260	579	214	168	171	166	178	1740	5800	3570
29	4990	2150	1990	553	224	170	171	182	180	1530	5800	3410
30	4870	—	1790	567	225	176	173	176	175	1280	5600	3270
31	4760	—	1600	—	208	—	180	169	—	1180	—	3120
TOTAL	139170	93300	117320	25087	9496	6302	5855	5350	5990	34390	69733	126860
MEAN	4489	3217	3785	836	306	210	189	173	200	1109	2324	4092
MAX	6680	4640	5870	1450	534	354	238	192	271	2330	5800	5350
MIN	1700	2150	1600	553	208	161	168	152	170	176	756	3120
AC-FT	276040	185058	232701	49759	18835	12500	11613	10612	11881	68212	138313	251623

[†] All 2016 data are provisional–subject to revision

FRMO — 14206500 — Tualatin River at Farmington, Oregon [RM 33.3]



UNITED STATES DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY – OREGON WATER SCIENCE CENTER

STATION NUMBER 14206900 FANNO CREEK AT 56TH AVENUE

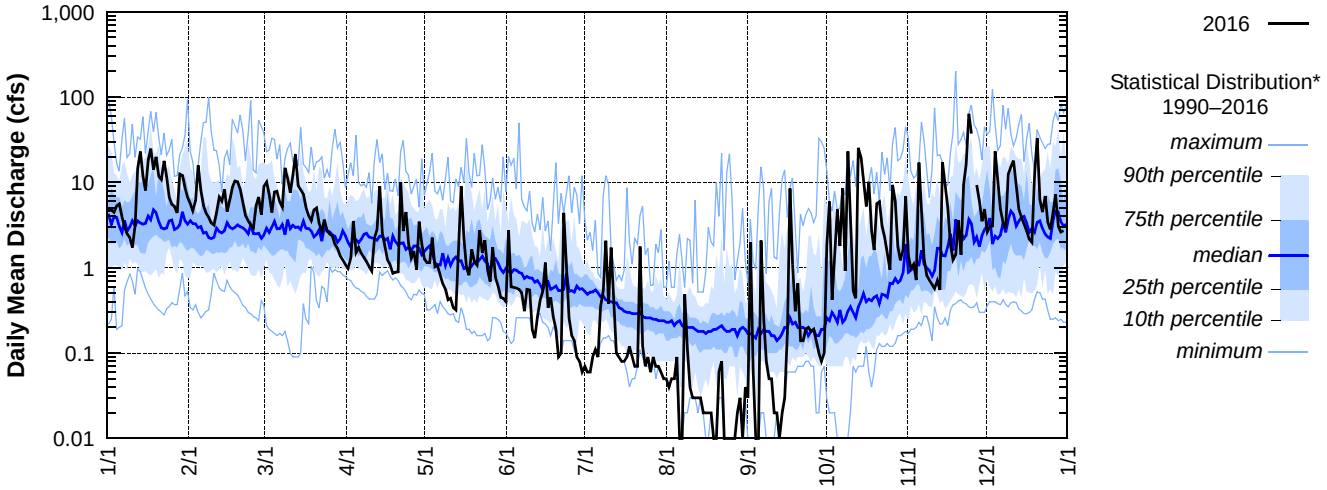
LATITUDE: 452917 LONGITUDE: 1224401 DRAINAGE AREA: 2.37

Discharge, Cubic Feet per Second, Calendar Year January to December 2016 Daily Mean Values

Day	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT†	NOV†	DEC†*
1	4.68	5.66	8.99	1.09	1.27	0.40	0.07	0.05	0.03	1.83	1.38	2.64
2	4.77	4.64	10.1	0.98	1.15	2.77	0.06	0.04	1.99	6.00	0.98	3.06
3	4.46	6.09	7.26	1.29	1.15	0.60	0.06	0.05	0.06	0.42	1.10	3.09
4	5.30	15.8	4.44	3.53	2.26	0.59	0.09	0.05	0.01	1.40	0.72	23.1
5	5.60	8.09	7.72	1.51	1.03	0.58	0.11	0.09	0.01	4.82	17.1	10.3
6	3.97	5.39	7.91	1.74	1.07	0.56	0.09	0.01	2.09	1.80	4.88	4.88
7	3.05	4.37	5.90	1.49	0.83	0.51	0.35	0.01	0.25	8.61	1.28	3.37
8	2.50	3.93	5.16	1.33	0.65	0.31	0.54	0.49	0.08	0.92	0.81	2.90
9	2.27	3.36	14.8	1.18	0.56	0.56	2.08	0.11	0.05	23.1	0.72	12.4
10	1.73	3.18	11.3	1.03	0.42	0.55	0.38	0.04	0.05	3.26	0.64	15.2
11	3.15	4.44	7.60	0.92	0.44	0.19	1.73	0.03	0.02	0.54	0.57	18.0
12	14.6	6.77	12.1	2.23	0.34	0.15	0.32	0.03	0.02	0.44	0.71	8.91
13	23.0	6.05	21.3	2.79	0.32	0.27	0.10	0.03	0.01	25.4	0.55	4.94
14	11.9	8.28	9.21	9.06	2.04	0.41	0.09	0.03	0.02	19.9	17.3	3.90
15	8.06	4.56	8.23	2.56	9.01	0.53	0.08	0.02	0.03	9.88	9.18	3.27
16	18.3	6.26	7.28	1.81	2.20	1.15	0.08	0.02	0.18	5.23	5.11	2.68
17	24.9	8.75	5.12	1.23	1.01	0.34	0.09	0.02	8.50	10.2	1.87	2.16
18	14.1	10.4	4.07	1.09	0.82	0.45	0.12	0.02	1.10	2.71	1.24	1.99
19	20.0	10.2	3.55	0.86	1.64	0.27	0.09	0.01	0.31	1.61	1.43	12.8
20	11.8	8.36	4.76	0.89	1.19	0.19	0.07	0.01	0.66	5.61	3.62	33.3
21	10.8	5.76	5.02	0.90	1.08	0.09	0.07	0.06	0.14	5.93	1.42	6.26
22	17.9	4.10	3.35	10.1	2.76	0.10	1.77	0.08	0.14	3.12	9.43	4.50
23	11.7	3.55	2.70	2.70	1.49	4.41	0.12	0.01	0.19	2.26	16.3	6.94
24	6.76	3.18	3.67	4.50	2.11	1.04	0.07	0.01	0.20	1.52	63.9	3.46
25	5.54	2.91	2.75	1.94	0.94	0.26	0.09	0.01	0.18	0.95	37.4	2.82
26	5.26	5.29	2.49	1.30	0.69	0.16	0.06	0.01	0.19	9.37	M	4.43
27	4.41	6.77	2.36	1.57	1.74	0.14	0.09	0.01	0.14	6.02	9.33	7.23
28	12.6	4.21	1.89	0.95	0.78	0.09	0.07	0.02	0.10	1.79	6.01	3.08
29	12.1	5.55	1.70	3.47	0.62	0.08	0.07	0.03	0.08	1.22	3.51	2.62
30	8.73	—	1.38	1.89	0.45	0.06	0.06	0.01	0.10	1.62	4.87	2.73
31	6.74	—	1.24	—	0.44	—	0.05	0.04	—	6.91	—	
TOTAL	291	176	195	67.9	42.5	17.8	9.12	1.45	16.9	174	223	217
MEAN	9.38	6.07	6.30	2.26	1.37	0.59	0.29	0.05	0.56	5.63	7.70	7.23
MAX	24.9	15.8	21.3	10.1	9.01	4.41	2.08	0.49	8.50	25.4	63.9	33.3
MIN	1.73	2.91	1.24	0.86	0.32	0.06	0.05	0.01	0.01	0.42	0.55	1.99
AC-FT	577	349	387	135	84.3	35.3	18.1	2.88	33.6	346	443	430

†Provisional data (10/26–12/31)–subject to revision; *incomplete record (monthly totals were computed when at least 80% of the record was complete for the month)

6900 — 14206900 — Fanno Creek at 56th Avenue [RM 11.9]



UNITED STATES DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY – OREGON WATER SCIENCE CENTER

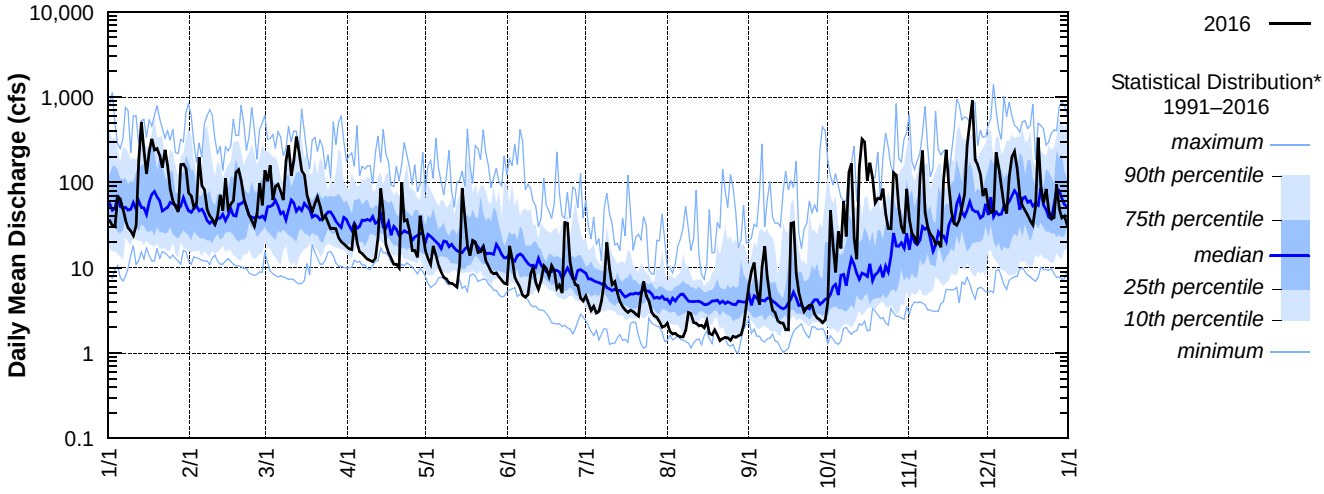
STATION NUMBER 14206950 FANNO CREEK AT DURHAM

LATITUDE: 452413 LONGITUDE: 1224513 DRAINAGE AREA: 31.50

Day	Discharge, Cubic Feet per Second, Calendar Year January to December 2016 Daily Mean Values											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT†	NOV†	DEC†
1	35.6	69.3	139	17.8	16.0e	6.42	4.69	2.25	6.25	3.94	36.9	53.9
2	31.1	51.0	103	16.7	13.0e	18.1	3.89	1.80	9.13	47.4	25.3	44.7
3	30.3	56.9	159	16.3	11.0e	12.8	3.17	1.68	11.5	18.0	22.9	45.5
4	67.8	197	62.2	33.4	18.0e	7.72	3.54	1.71	5.64	8.85	18.9	225
5	64.5	91.8	90.1	20.0	14.1	6.71	2.95	1.60	3.70	26.7	112	148
6	49.0	82.7	95.6	15.4	10.8	5.84	3.08	1.55	10.1	16.9	236	89.1
7	36.3	48.5	78.3	14.7	8.92	4.76	4.12	1.55	17.9	60.6	45.0	52.9
8	29.4	40.9	62.3	13.5	7.75	4.50	6.98	1.84	7.66	23.4	29.9	43.3
9	27.1	37.2	180	12.6	7.40	4.82	19.8	3.00	4.51	131	24.8	117
10	23.8	32.5	272	12.2	6.66	8.39	9.87	2.90	3.18	167	22.7	201
11	31.0	40.5	120	11.8	6.58	10.2	6.33	2.28	2.98	22.0	19.0	231
12	175	71.6	184	13.0	6.28	6.73	6.85	2.24	2.39	12.6	19.9	144
13	513	46.9	344	22.8	5.94	5.57	5.12	2.09	2.26	149	17.4	70.5
14	236	112	223	85.1	10.9	7.02	4.02	2.12	2.25	323	103	53.0
15	126	49.2	138	44.5	85.5	10.6	3.49	1.98	1.89	299	242	46.9
28	232	55.6	123	19.1	38.6	9.85	3.21	2.39	1.88	104	95.6	41.1
17	324	61.0	72.0	15.0e	18.0	7.91	3.00	1.70	33.0	170	45.0	35.5
18	241	131	55.5	13.0	13.9	10.6	3.18	1.64	33.9	113	33.2	31.9
19	250	141	45.4	11.0e	21.0	9.22	3.07	1.87	8.49	57.8	31.5	53.1
20	207	105	56.6	11.0e	20.2	5.71	2.87	1.63	5.18	65.2	36.4	336
21	149	65.4	67.3	10.0e	15.1	6.30	2.71	1.40	3.86	63.8	51.2	87.9
22	242	51.0	53.4	100e	15.4	5.06	4.78	1.48	3.07	84.5	72.8	57.4
23	157	40.9	37.3	35.3	17.6	33.9	6.91	1.53	3.40	42.8	274	83.9
24	84.0	35.6	40.7	36.5	12.0	33.1	4.67	1.51	3.65	29.0	504	47.1
25	60.5	30.8	33.8	27.1	10.4	11.8	4.10	1.41	3.63	28.8	912	37.7
26	52.6	43.3	28.7	16.0e	8.97	7.90	3.03	1.57	2.86	130	185	38.6
27	45.2	98.4	29.1	16.0e	8.52	6.36	2.75	1.53	2.58	122	161	95.2
28	162	53.9	28.7	13.3	8.70	6.18	2.63	1.59	2.45	50.7	126	49.6
29	164	51.7	22.6	40.7	7.82	4.41	2.35	1.64	2.27	30.4	69.4	38.4
30	145	—	20.3	25.2e	7.13	4.09	2.01	2.10	2.44	25.2	85.3	40.4
31	75.7	—	19.1	—	6.59	—	2.07	3.78	—	84.2	—	31.9
TOTAL	4067	1993	2984	739	459	283	141	59.4	204	2511	3658	2672
MEAN	131	68.7	96.3	24.6	14.8	9.42	4.56	1.91	6.80	81.0	122	86.2
MAX	513	197	344	100	85.5	33.9	19.8	3.78	33.9	323	912	336
MIN	23.8	30.8	19.1	10.0	5.94	4.09	2.01	1.40	1.88	3.94	17.4	31.9
AC-FT	8067	3952	5919	1466	910	560	280	118	405	4980	7256	5299

†Provisional data (10/26–12/31)–subject to revision; e=estimated value

FANO — 14206950 — Fanno Creek at Durham Road near Tigard, Oregon [RM 1.2]



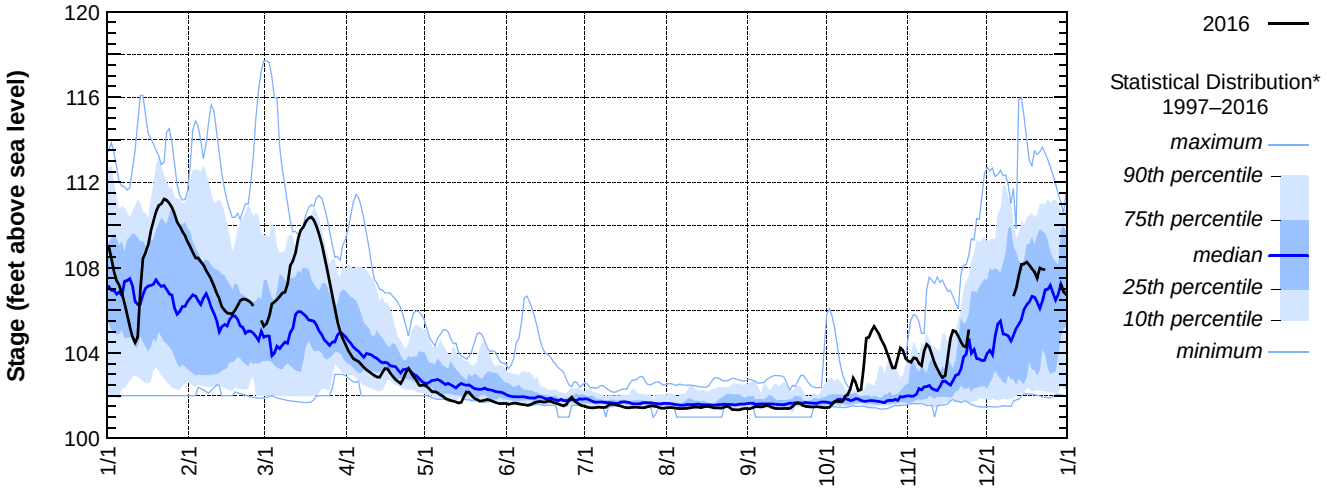
TRT – 14206956 (formerly 14206960) – TUALATIN RIVER AT TUALATIN, OREGON [RM 8.9]

Latitude: 45 23 14 Longitude: 122 45 46 Source Agency: District 18 Watermaster

Day	2016 Daily Mean Discharge in Cubic Feet per Second†											
	JAN	FEB*	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV*	DEC*
1	109.01	108.98	105.38	104.14	102.43	101.60	101.46	101.45	101.40	101.46	103.57	
2	108.43	108.72	105.72	103.94	102.31	101.63	101.45	101.45	101.45	101.59	103.78	
3	107.84	108.46	106.30	103.74	102.18	101.66	101.43	101.43	101.50	101.74	103.75	
4	107.39	108.46	106.39	103.67	102.19	101.65	101.45	101.41	101.49	101.75	103.52	
5	107.18	108.28	106.51	103.61	102.14	101.62	101.47	101.40	101.48	101.72	103.41	
6	106.81	108.14	106.66	103.47	102.05	101.60	101.46	101.40	101.50	101.74	104.09	
7	106.34	107.88	106.81	103.33	101.99	101.58	101.45	101.40	101.55	101.99	104.40	
8	105.80	107.68	106.86	103.22	101.87	101.55	101.46	101.42	101.53	102.06	104.29	
9	105.25	107.45	107.23	103.13	101.82	101.57	101.57	101.44	101.46	102.34	103.91	
10	104.79	107.16	108.11	103.04	101.78	101.62	101.61	101.46	101.42	102.83	103.55	106.67
11	104.50	106.83	108.32	102.95	101.75	101.69	101.60	101.47	101.40	102.62	103.26	107.04
12	104.75	106.56	108.68	102.88	101.71	101.72	101.57	101.47	101.40	102.24	103.03	107.63
13	106.99	106.18	109.36	102.87	101.66	101.73	101.54	101.44	101.40	102.28	102.85	108.16
14	108.45	106.01	109.75	103.08	101.69	101.71	101.50	101.47	101.41	103.30	102.94	108.18
15	108.70	105.88	109.92	103.27	101.96	101.70	101.46	101.50	101.40	104.70	103.80	108.27
16	109.08	105.86	110.18	103.27	102.18	101.75	101.44	101.50	101.41	104.73	104.69	108.13
17	109.71	105.84	110.33	103.07	102.17	101.74	101.44	101.47	101.49	105.04	105.06	107.96
18	110.17	106.00	110.38	102.90	102.01	101.69	101.46	101.43	101.62	105.26	105.01	107.80
19	110.63	106.23	110.23	102.77	101.88	101.65	101.46	101.43	101.66	105.07	104.79	107.51
20	110.92	106.46	109.95	102.66	101.82	101.61	101.46	101.43	101.62	104.85	104.52	108.00
21	111.00	106.54	109.58	102.57	101.75	101.56	101.45	101.42	101.54	104.56	104.33	107.93
22	111.22	106.53	109.11	102.79	101.76	101.52	101.44	101.46	101.50	104.33	104.28	107.92
23	111.17	106.47	108.53	103.10	101.79	101.60	101.45	101.52	101.49	104.00	105.11	
24	111.04	106.38	107.93	103.28	101.83	101.81	101.49	101.46	101.48	103.65		
25	110.84	106.21	107.26	103.07	101.79	101.93	101.52	101.36	101.48	103.31		
26	110.55		106.61	102.88	101.74	101.77	101.52	101.35	101.49	103.31		
27	110.15		106.03	102.72	101.69	101.67	101.50	101.34	101.48	103.79		
28	109.96	105.54	105.48	102.49	101.65	101.59	101.46	101.34	101.46	104.24		107.23
29	109.70	105.26	105.02	102.48	101.63	101.53	101.42	101.39	101.44	104.12		106.89
30	109.52	—	104.68	102.51	101.64	101.52	101.42	101.41	101.44	103.75		106.75
31	109.22	—	104.40	—	101.64	—	101.43	101.39	—	103.62	—	106.52
MEAN	108.62	106.89	107.67	103.10	101.89	101.65	101.48	101.43	101.48	103.29		
MAX	111.22	108.98	110.38	104.14	102.43	101.93	101.61	101.52	101.66	105.26		
MIN	104.50	105.26	104.40	102.48	101.63	101.52	101.42	101.34	101.40	101.46		

† All 2016 data are preliminary–subject to revision; *Incomplete record (monthly totals were computed when at least 80% of the record was complete for the month)

TRT — 14206956 (formerly 14206960) — Tualatin River at Tualatin, Oregon [RM 8.9]



UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY - OREGON WATER SCIENCE CENTER

STATION NUMBER: 14207500 TUALATIN RIVER AT WEST LINN, OREG.

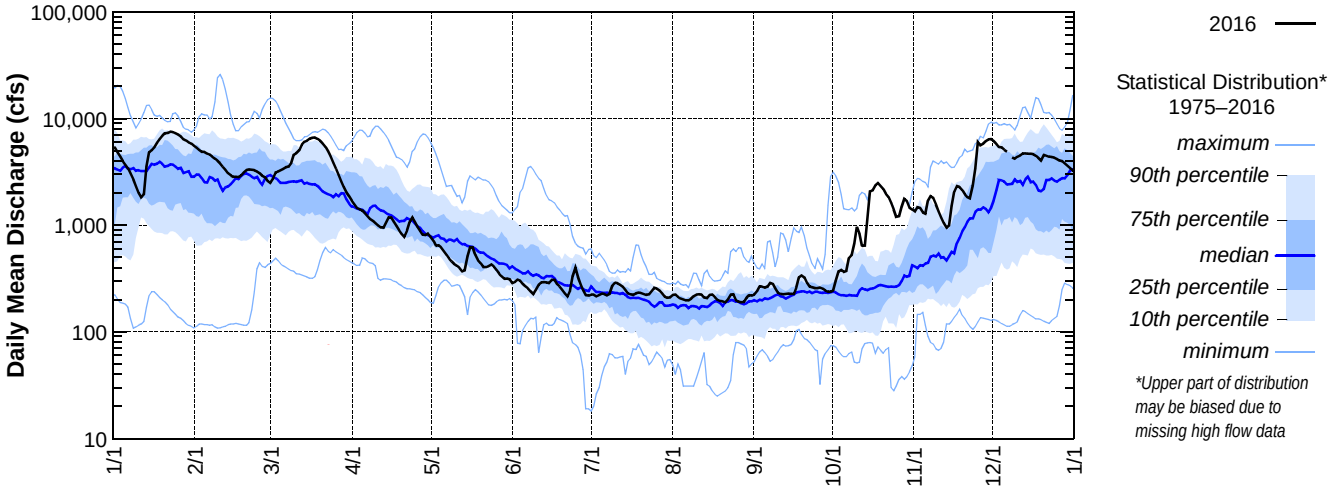
LATITUDE: 452103 LONGITUDE: 1224030 DRAINAGE AREA: 706.00 DATUM: 85.61

Discharge, Cubic Feet per Second, Calendar Year January to December 2016 Daily Mean Values

Day	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT†	NOV†	DEC†
1	5330	5320	2480	1700	782	287	223	221	223	245	1350	6150
2	4840	5080	2700	1580	718	294	223	224	241	301	1470	5780
3	4370	4860	3130	1450	644	308	215	213	267	369	1450	5400
4	3990	4870	3200	1410	647	303	221	205	265	380	1320	5360
5	3700	4710	3280	1370	619	283	228	201	259	365	1280	5110
6	3420	4590	3380	1300	571	267	226	197	265	371	1700	4890
7	3070	4370	3490	1220	531	254	220	197	289	490	1870	
8	2690	4200	3540	1150	487	240	226	204	282	526	1810	4310
9	2310	4010	3820	1100	458	227	270	215	254	671	1570	4200
10	2010	3790	4560	1040	433	247	289	223	233	967	1350	4380
11	1820	3530	4730	996	416	276	287	225	227	835	1180	4520
12	1960	3330	5050	952	395	290	276	224	225	637	1050	4710
13	3560	3060	5690	948	369	293	266	210	226	643	944	4690
14	4820	2930	6060	1060	377	291	248	207	228	1190	995	4660
15	5020	2840	6200	1180	513	286	229	221	226	2080	1510	4670
16	5350	2830	6440	1180	620	306	225	223	226	2120	2060	4620
17	5950	2810	6580	1080	619	307	222	212	261	2370	2320	4480
18	6400	2930	6620	976	527	281	229	200	325	2490	2280	4270
19	6860	3120	6470	897	470	267	232	195	339	2340	2140	4030
20	7240	3270	6200	831	440	249	231	193	324	2190	1960	4560
21	7290	3320	5850	782	403	229	227	189	289	1980	1830	4480
22	7530	3310	5430	898	403	216	222	201	266	1830	1790	4380
23	7460	3270	4920	1070	412	245	225	224	262	1620	2340	4350
24	7310	3200	4420	1180	427	332	241	225	256	1400	3400	4300
25	7100	3080	3880	1070	409	400	258	199	257	1200	6040	4190
26	6800	2910	3380	963	382	327	255	192	259	1210	5640	4030
27	6400	2820	2950	876	352	279	245	189	255	1490	5810	3990
28	6230	2600	2570	814	331	244	229	190	244	1760	6170	3800
29	5980	2420	2270	809	314	220	214	208	237	1680	6370	3590
30	5830	—	2040	833	316	219	209	220	237	1460	6400	3420
31	5530	—	1860	—	311	—	210	218	—	1400	—	3250
TOTAL	158170	103380	133190	32715	14696	8267	7321	6465	7747	38610	77399	134570
MEAN	5102	3565	4296	1091	474	276	236	209	258	1245	2580	4486
MAX	7530	5320	6620	1700	782	400	289	225	339	2490	6400	6150
MIN	1820	2420	1860	782	311	216	209	189	223	245	944	3250
AC-FT	313725	205051	264178	64889	29149	16397	14521	12823	15366	76582	153519	266916

†Provisional data (10/24–12/31)–subject to revision

WSLO — 14207500 —Tualatin River at West Linn, Oregon [RM 1.75]



Sources of data for statistical distributions

Data for the statistical distributions were obtained from several sources. If more than one source had a value for the same date, the values were compared and the one deemed the best quality was used. In some cases, quality could not be determined and none were used. Because data collection changed (for example, different agencies, new rating curves), the true distributions may not have been constant over the period of record.

DATA SOURCES FOR STATISTICAL DISTRIBUTIONS

SITEID	SITE NAME	START DATE	SOURCES OF DATA FOR DISTRIBUTION
14202450	Tualatin River below Lee Falls near Cherry Grove, Oregon	1/1/2003	previous Flow Reports: 2003–2007 OWRD database: 2008–present
14202510	Tualatin River at Gaston, Oregon	1/1/2000	CWS data warehouse: 2000–2007 (origin: OWRD Dist 18) OWRD database: 2008–present
14202630	Wapato Canal at Pumphouse at Gaston, Oregon	9/14/2011	USGS database: all
14202850	Scoggins Creek above Henry Hagg Lake near Gaston, Oregon	1/1/1975	OWRD database: all
14202920	Sain Creek above Henry Hagg Lake near Gaston, Oregon	1/1/1975	OWRD database: all
14202860	Tanner Creek above Henry Hagg Lake near Gaston, Oregon	1/12003	Wally Otto, TVID, pers. comm.: 2003 previous Flow Reports: 2004–present (origin: Scoggins Dam Ops tables)
14202980	Scoggins Creek below Henry Hagg Lake near Gaston, Oregon	1/1/1975	USGS database: 1975–WY2006 BOR WY2007–present; (BOR has data back to 1941)
14203500	Tualatin River at Dilley, Oregon	1/1/1975	USGS database: 1975–present (USGS has data back to 1939)
14204530	Gales Creek at Old Hwy 47 near Forest Grove, Oregon	1/1/1996	CWS data warehouse: 1996–2007 (origin: ORWD Dist 18) OWRD database: 2008–present
14204800	Tualatin River at Golf Course Road near Cornelius, Oregon	1/1/1994	previous Flow Report: 1994 CWS data warehouse: 1995–2007 (origin: ORWD Dist 18) OWRD database: 2008–present
14205400	East Fork Dairy Creek near Meacham Corner, OR	5/8/2002	USGS database: all
14206070	McKay Creek at Scotch Church Rd above Waible Ck near North Plains, Oregon	1/1/2002	previous Flow Reports: all
14206200	Dairy Creek at Hwy 8 near Hillsboro, Oregon	1/1/1997	CWS data warehouse: 1997–2007 (origin: OWRD Dist 18) OWRD database: 2008–present
14206241	Tualatin River at Hwy 219 Bridge	10/15/2004	Stewart Rounds, USGS pers. comm.: all (origin Jackson Bottom Wetland Education Center)
14206295 (old id= 14206440)	Tualatin River at Rood Bridge Road near Hillsboro, Oregon (new siteid in 2002)	1/1/1994	previous Flow Report: 1994 CWS data warehouse: 1995–2007 (origin: OWRD Dist 18) OWRD database: 2008–present
14206435	Beaverton Creek at NE Guston Court near Orenco, Oregon	1/1/2002	previous Flow Reports: all
14206450 14206451	Rock Creek at Hwy 8 near Hillsboro, Oregon (site moved 120 ft downstream in 2002)	1/1/1995	CWS data warehouse: 1995–2007 previous Flow Reports: 2008–present
14206500	Tualatin River at Farmington, Oregon	1/1/1989	CWS data warehouse: 1989–2002 (origin: OWRD Dist 18) previous Flow Reports: 2003—WY2005 OWRD database: WY2006–present
14206900	Fanno Creek at 56th Avenue	10/1/1990	USGS database
14206950	Fanno Creek at Durham Road near Tigard, Oregon	1/1/1991	Stewart Rounds, USGS pers. comm.: 1991-WY1993, 2/4/1996-WY2000 USGS database: WY1994-2/5/1996, WY2001–present
14206956	Tualatin River at Tualatin, Oregon	10/22/1997	previous Flow Reports: 1997-2005 (no data for 2000) OWRD database: 2006–present
14207500	Tualatin River at West Linn	1/1/1975	USGS database: all (USGS has data back to 1928)

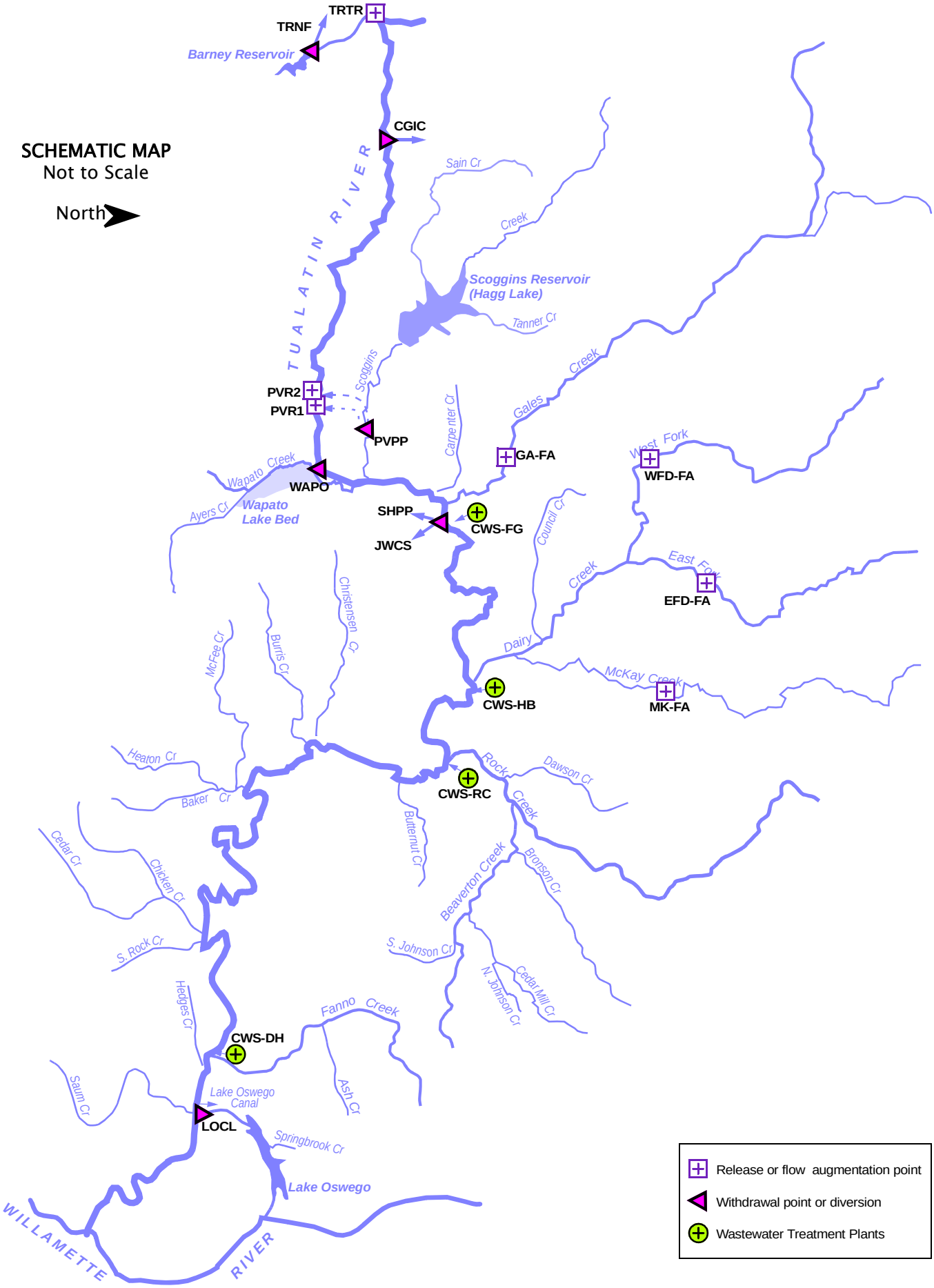
Abbreviations: BOR=Bureau of Reclamation; CWS=Clean Water Services; OWRD=Oregon Water Resources Division; TVID=Tuallatin Valley Irrigation District; USGS=United States Geological Survey; WY=water year

Appendix B

Selected Releases and Withdrawals

The following information is for selected water releases to and withdrawals from the Tualatin River and its tributaries. It is not a comprehensive listing of releases and withdrawals. Some of the data represent daily mean flows and some represent instantaneous measurements. All streamflow measurements are in Appendix A.

MAP OF SELECTED RELEASES AND WITHDRAWALS



SELECTED RELEASE AND WITHDRAWAL SITES — ALPHABETICAL LISTING BY SITE CODE

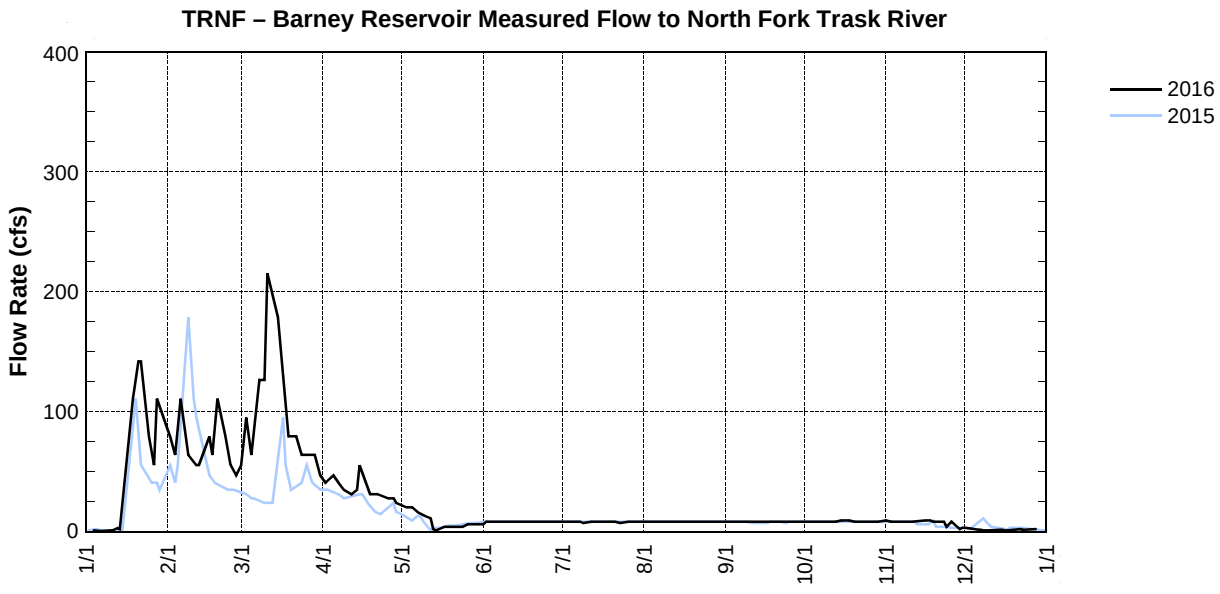
SITE CODE	SITE NAME	RIVER MILE	PAGE
CGIC	City of Hillsboro Withdrawal at Cherry Grove	73.3	B-6
CWS-DH	CWS Durham WWTF Release	9.33	B-12
CWS-FG	CWS Forest Grove WWTF Release	55.2	B-9
CWS-HB	CWS Hillsboro WWTF Release	43.8	B-10
CWS-RC	CWS Rock Creek WWTF Release	38.08	B-11
EFD-FA	CWS East Fork Dairy Flow Augmentation with TVID	4.9	B-13
GA-FA	CWS Gales Creek Flow Augmentation with TVID	5.0	B-13
JWCS	Joint Water Commission Withdrawal at Spring Hill Pump Plant	56.1	B-8
LOCL	Lake Oswego Corp. Canal Diversion	6.7	*
MK-FA	CWS McKay Creek Flow Augmentation with TVID	7.0	B-13
PVPP	TVID Withdrawal at Patton Valley Pump Plant	1.71	**
PVR1	TVID—Patton Valley River Turnout #1 Release	63.13	**
PVR2	TVID—Patton Valley River Turnout #2 Release	64.26	**
SHPP	TVID–Withdrawal at Spring Hill Pump Plant	56.1	B-7
TRNF	Barney Reservoir Measured Flow to North Fork Trask River	—	B-4
TRTR	Barney Reservoir Release to Tualatin River	78.0	B-5
WAPO	Wapato Canal Diversion	62.0	**
WFD-FA	CWS West Fork Dairy Flow Augmentation with TVID	5.2	B-13

*Monitoring of the Lake Oswego Canal Diversion was discontinued 8/23/2012.
**Withdrawals and releases at Patton Valley Pump Plant, Patton Valley River turnouts and Wapato Canal Diversion were not measured in 2016.

TRNF – BARNEY RESERVOIR MEASURED FLOW TO NORTH FORK TRASK RIVER

Source Agency: Barney Reservoir Joint Ownership Commission

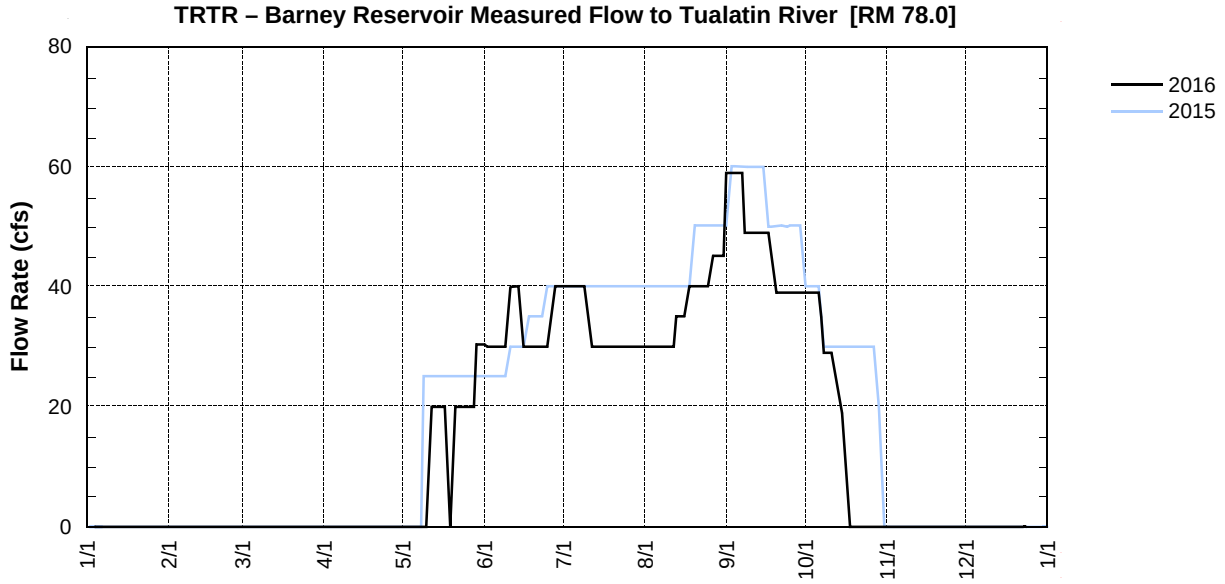
Day	2016 — Instantaneous Measured Flow Rate in Cubic Feet per Second											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				41		8.4	8.4	8.4				
2		79.6	95.2		20.2				8.4		8.4	2.8
3						8.4		8.4		8.4		
4	1.1	64	64	47	20.2						8.4	
5							8.4			8.4		1.7
6	0.5	110.8		41	16.5	8.4	8.4		8.4	8.4		1.7
7	0.5		126.4				8.4		8.4	8.4	8.4	1.1
8				35		8.4	7.3	8.4				
9		64	126.4		13				8.4		8.4	1.1
10			215.1			8.4		8.4		8.4	8.4	
11	1.1			31.3	11.3		8.4	8.4				
12		55.5			2.3			8.4	8.4	8.4		
13	3.4	55.5		35	1.1	8.4	8.4					
14	2.3		178.6	55.5			8.4		8.4	9.5		1.7
15						8.4		8.4			9.5	1.1
16			126.4		4				8.4			1.1
17		79.6				8.4		8.4		9.5	9.5	
18		64	79.6	31.3	4		8.4	8.4			8.4	
19	110.8							8.4	8.4	8.4		1.7
20		110.8		31.3	4	8.4	8.4			8.4		
21	142		79.6	31.3					8.4		8.4	2.3
22	142					8.4	7.3	8.4			8.4	1.7
23		79.6	64		4				8.4		4	1.7
24						8.4		8.4		8.4		
25	79.6	55.5	64	27.6	6.2		8.4				8.4	
26								8.4	8.4	8.4		
27	55.5	47		27.6	6.2	8.4	8.4					2.3
28	110.8		64	23.9			8.4		8.4	8.4	2.3	2.8
29		55.5				8.4		8.4	8.4		3.4	
30		—	47					8.4			3.4	1.7
31		—		—	6.2	—		8.4	—	9.5	—	



TRTR — BARNEY RESERVOIR MEASURED FLOW TO TUALATIN RIVER [RM 78.0]

Source Agency: Barney Reservoir Joint Ownership Commission

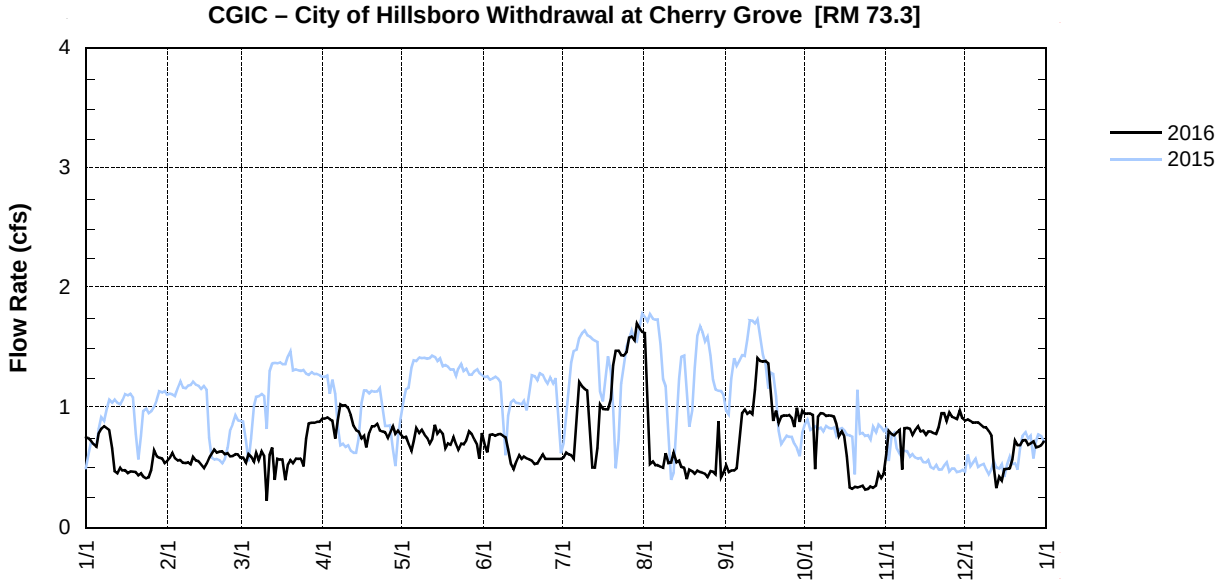
Day	2016 — Instantaneous Measured Flow Rate in Cubic Feet per Second											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				0.0		30.0	40.1	30.0				
2		0.0	0.0		0.0				59.0		0.0	0.0
3						30.0		30.0		39.0		
4	0.0	0.0	0.0	0.0	0.0						0.0	
5							40.1			39.0		0.0
6	0.0	0.0		0.0	0.0	30.0	40.1		59.0	35.0		0.0
7	0.0		0.0				40.1		49.0	29.0	0.0	0.0
8				0.0		30.0	40.1	30.0				
9		0.0	0.0		0.0				49.0		0.0	0.0
10			0.0			40.0		30.0		29.0	0.0	
11	0.0			0.0	20.0		30.0	30.0				
12		0.0			20.0			35.1	49.0	24.0		
13	0.0	0.0		0.0	20.0	40.1	30.0					
14	0.0		0.0	0.0			30.0		49.0	19.0		0.0
15						30.0		35.1			0.0	0.0
16			0.0		20.0				49.0			0.0
17		0.0				30.0		40.1		0.0	0.0	
18		0.0	0.0	0.0	0.0		30.0	40.1			0.0	
19	0.0							40.1	39.0	0.0		0.0
20		0.0		0.0	20.0	30.0	30.0			0.0		
21	0.0		0.0	0.0					39.0		0.0	0.0
22	0.0					30.0	30.0	40.1			0.0	0.0
23		0.0	0.0		20.0				39.0		0.0	0.0
24						30.0		40.1		0.0		
25	0.0	0.0	0.0	0.0	20.0		30.0				0.0	
26								45.2	39.0	0.0		
27	0.0	0.0		0.0	20.0	40.1	30.0					0.0
28	0.0		0.0	0.0	30.4		30.0		39.0	0.0	0.0	0.0
29		0.0				40.1		45.2	39.0		0.0	
30		—	0.0					45.2			0.0	0.0
31		—		—	30.4	—		59.0	—	0.0	—	



CGIC — CITY OF HILLSBORO WITHDRAWAL AT CHERRY GROVE [RM 73.3]

Source Agency: Barney Reservoir Joint Ownership Commission

Day	2016 — Calculated Average Flow Rate in Cubic Feet per Second											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.75	0.56	0.59	0.91	0.75	0.69	0.59	1.62	0.52	0.95	0.61	0.89
2	0.75	0.59	0.54	0.92	0.76	0.63	0.63	1.07	0.47	0.95	0.81	0.90
3	0.73	0.63	0.61	0.90	0.70	0.78	0.61	0.53	0.48	0.95	0.78	0.89
4	0.70	0.58	0.59	0.89	0.64	0.78	0.60	0.55	0.48	0.94	0.77	0.88
5	0.67	0.56	0.55	0.74	0.72	0.77	0.58	0.52	0.50	0.49	0.80	0.88
6	0.79	0.57	0.63	0.90	0.83	0.78	0.91	0.52	0.72	0.93	0.82	0.88
7	0.83	0.54	0.56	1.03	0.79	0.78	1.21	0.51	0.96	0.95	0.49	0.86
8	0.85	0.54	0.64	1.02	0.82	0.76	1.18	0.50	0.98	0.95	0.83	0.84
9	0.83	0.55	0.60	1.02	0.78	0.76	1.16	0.62	0.95	0.93	0.83	0.84
10	0.81	0.53	0.22	1.00	0.75	0.65	1.14	0.54	0.97	0.94	0.82	0.81
11	0.67	0.59	0.61	0.94	0.70	0.53	0.86	0.55	0.95	0.93	0.78	0.77
12	0.47	0.56	0.67	0.85	0.74	0.49	0.50	0.63	1.15	0.93	0.82	0.51
13	0.45	0.56	0.40	0.82	0.86	0.55	0.50	0.55	1.42	0.87	0.85	0.33
14	0.50	0.53	0.58	0.80	0.78	0.60	0.67	0.56	1.39	0.76	0.80	0.42
15	0.48	0.50	0.57	0.75	0.82	0.57	1.03	0.51	1.39	0.80	0.81	0.39
16	0.48	0.54	0.57	0.77	0.78	0.60	0.99	0.50	1.39	0.76	0.78	0.49
17	0.46	0.59	0.40	0.67	0.67	0.58	0.99	0.41	1.37	0.60	0.80	0.49
18	0.47	0.62	0.53	0.80	0.71	0.57	0.99	0.49	1.15	0.34	0.80	0.49
19	0.47	0.65	0.56	0.85	0.70	0.56	1.07	0.48	0.89	0.33	0.79	0.57
20	0.47	0.63	0.54	0.85	0.76	0.53	1.36	0.45	0.98	0.34	0.78	0.72
21	0.44	0.64	0.58	0.87	0.70	0.54	1.47	0.48	0.88	0.34	0.84	0.69
22	0.45	0.64	0.57	0.81	0.65	0.57	1.48	0.46	0.93	0.35	0.96	0.69
23	0.43	0.62	0.58	0.80	0.70	0.61	1.44	0.46	0.94	0.35	0.96	0.73
24	0.41	0.62	0.51	0.80	0.70	0.57	1.44	0.45	0.93	0.32	0.89	0.73
25	0.42	0.60	0.74	0.75	0.73	0.57	1.46	0.43	0.94	0.32	0.96	0.69
26	0.48	0.60	0.87	0.79	0.80	0.57	1.59	0.47	0.92	0.35	0.93	0.71
27	0.65	0.62	0.87	0.85	0.78	0.57	1.59	0.47	0.84	0.33	0.92	0.72
28	0.60	0.61	0.88	0.78	0.74	0.57	1.56	0.45	1.00	0.35	0.91	0.67
29	0.59	0.6	0.89	0.81	0.69	0.57	1.70	0.89	0.88	0.45	0.98	0.68
30	0.58	—	0.88	0.78	0.58	0.57	1.66	0.42	0.98	0.41	0.91	0.69
31	0.54	—	0.91	—	0.79	—	1.63	0.46	—	0.45	—	0.72

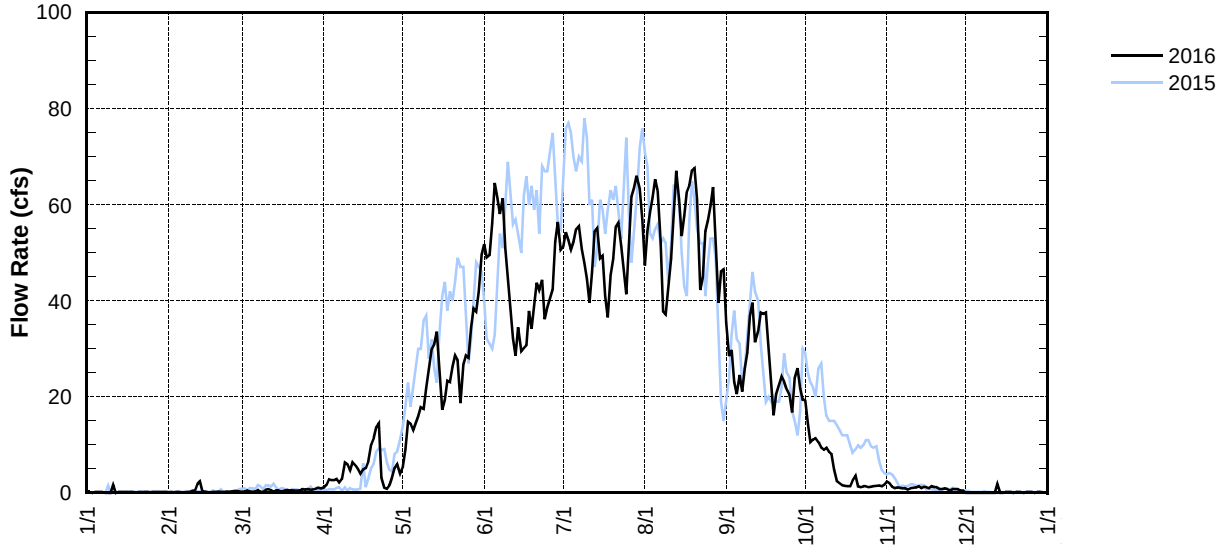


SHPP – TVID WITHDRAWAL AT SPRING HILL PUMP PLANT [RM 56.1]

Source Agency: US Geological Survey, Oregon Water Science Center

Day	2016 — Mean Daily Water Withdrawal in Cubic Feet per Second											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.2	0.2	0.3	1.6	9.0	49.1	54.3	54.7	28.5	14.6	2.1	0.0
2	0.2	0.2	0.5	2.9	14.8	49.6	52.6	58.5	29.8	10.6	1.3	0.0
3	0.0	0.2	0.3	2.7	14.4	56.1	50.7	61.5	23.1	11.1	1.0	0.0
4	0.2	0.2	0.3	2.6	13.1	64.6	52.3	65.3	20.6	11.4	1.1	0.0
5	0.2	0.2	0.3	2.9	14.5	61.6	54.9	62.9	24.6	10.6	1.1	0.0
6	0.2	0.2	0.6	2.2	16.0	58.1	55.6	52.7	21.1	9.4	1.0	0.0
7	0.2	0.2	0.2	3.0	17.9	61.4	50.8	37.8	25.9	9.0	1.0	0.0
8	0.0	0.2	0.2	6.3	17.5	51.0	47.9	37.2	29.3	9.4	0.7	0.0
9	0.0	0.2	0.6	6.0	21.9		44.6	42.6	36.9	8.5	1.0	0.0
10	0.0	0.4	0.8	4.7	25.6		39.7	48.9	39.7	8.1	1.1	0.0
11	1.7	0.4	0.6	6.4	30.0	32.2	46.0	59.0	31.4	4.9	1.1	0.0
12	0.0	1.9	0.3	5.8	31.0	28.6	54.5	67.1	33.7	2.4	1.4	1.9
13	0.2	2.4	0.5	5.0	33.6	34.5	55.2	61.0	37.6	2.0	1.0	0.0
14	0.2	0.3	0.5	4.0	25.6	29.5	48.9	53.5	37.3	1.6	1.3	0.0
15	0.2	0.3	0.3	4.9	17.3	30.2	49.4	57.7	37.6	1.5	1.2	0.2
16	0.2	0.1	0.5	5.2	19.3	30.8	41.0	62.8	31.1	1.4	1.0	0.2
17	0.2	0.1	0.6	6.6	23.4	37.9	36.6	64.2	23.0	1.4	1.4	0.2
18	0.2	0.2	0.5	10.1	23.1	34.2	45.4	67.2	16.2	2.7	1.2	0.0
19	0.2	0.2	0.5	11.5	26.3	38.9	48.7	67.6	20.6	3.6	1.2	0.2
20	0.2	0.3	0.5	13.7	28.6	43.8	55.4	61.2	22.5	1.3	0.8	0.2
21	0.2	0.2	0.5	14.5	27.6	42.3	56.3	42.2	24.2	1.2	0.8	0.2
22	0.2	0.2	0.5	3.1	18.7	44.4	51.5	44.9	23.1	1.4	1.0	0.0
23	0.2	0.3	0.8	1.1	26.7	36.2	46.3	54.5	21.5	1.4	0.8	0.2
24	0.2	0.3	0.7	0.9	28.6	38.6	41.4	56.8	20.3	1.2	0.5	0.2
25	0.2	0.3	0.9	1.6	28.1	40.6	53.1	59.8	16.8	1.3	0.8	0.2
26	0.2	0.4	0.6	3.2	34.4	42.4	61.7	63.7	23.9	1.4	0.8	0.0
27	0.2	0.4	0.7	5.2	38.4	52.4	63.5	51.3	26.0	1.4	0.8	0.2
28	0.2	0.3	1.0	6.0	37.8	56.4	66.1	39.6	21.8	1.5	0.4	0.2
29	0.2	0.3	1.1	4.1	41.9	50.6	63.3	46.2	19.4	1.4	0.4	0.1
30	0.2	—	1.0	5.5	49.6	51.3	57.0	46.6	19.3	1.8	0.0	0.1
31	0.2	—	1.2	—	51.8	—	47.4	35.5	—	2.4	—	0.1

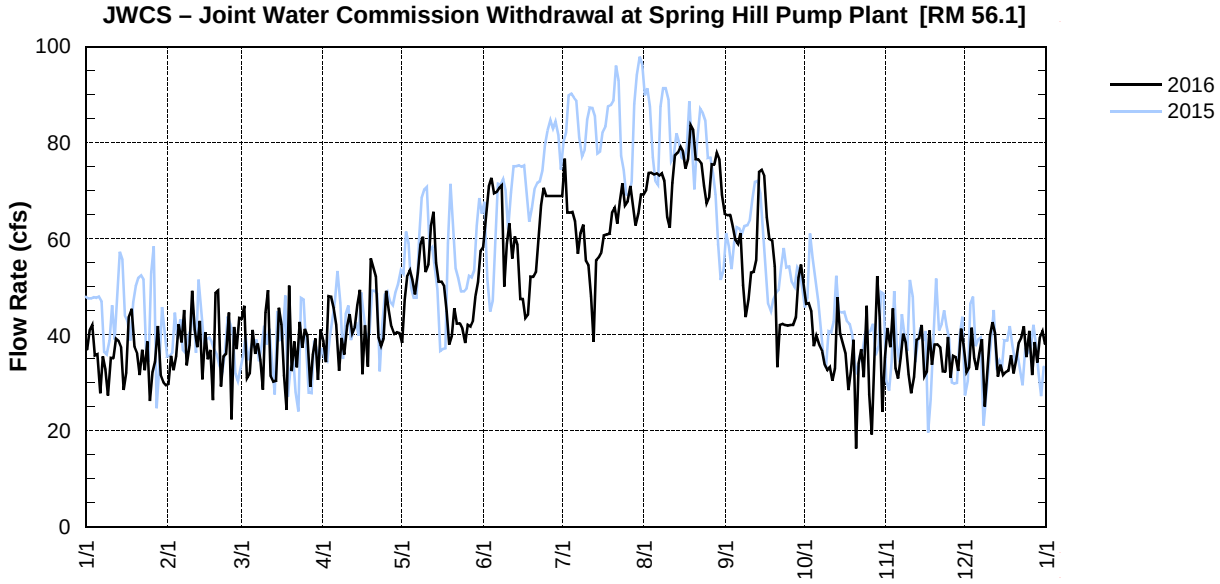
SHPP – Tualatin Valley Irrigation District Withdrawal at Spring Hill Pump Plant [RM 56.1]



JWCS – JOINT WATER COMMISSION WITHDRAWAL AT SPRING HILL PUMP PLANT [RM 56.1]

Source Agency: Joint Water Commission

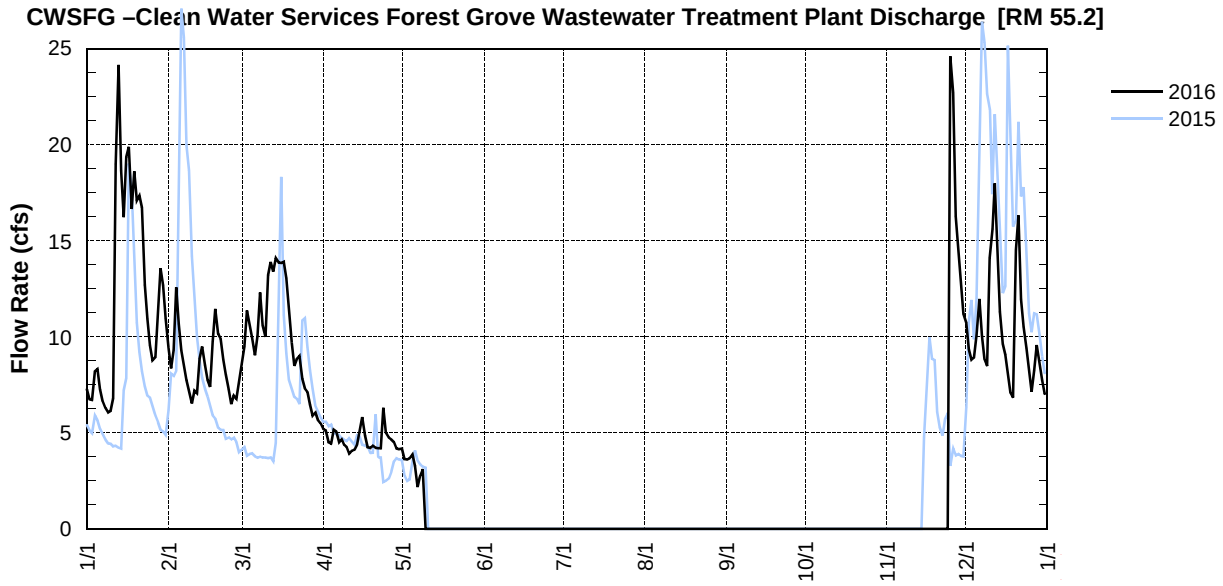
Day	2016 — Calculated Average Flow Rate in Cubic Feet per Second											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	40.0	32.9	49.1	37.4	50.4	66.7	79.7	73.3	68.0	49.5	44.5	35.3
2	44.2	38.8	34.1	51.1	55.5	74.0	68.5	76.8	68.1	49.7	40.5	36.3
3	45.2	35.8	35.1	51.0	56.6	75.8	68.6	76.9	65.6	48.0	48.6	44.6
4	38.8	38.7	44.2	48.6	54.5	72.6	68.7	76.6	62.8	40.8	36.2	38.2
5	39.0	45.4	39.1	45.2	51.6	72.8	66.7	76.7	62.0	42.9	34.0	35.8
6	30.9	41.5	41.3	35.6	56.0	73.7	59.9	76.3	64.3	40.8	38.2	39.3
7	38.6	48.3	37.9	42.5	61.9	74.2	64.3	76.7	53.5	39.6	43.3	42.2
8	35.9	36.8	31.7	39.0	63.5	53.1	66.1	75.2	46.8	36.8	41.5	28.1
9	30.5	41.0	47.7	44.9	56.2	62.1	58.5	67.6	50.6	35.8	34.9	34.7
10	38.2	52.2	52.4	47.4	57.8	66.3	57.5	65.4	56.1	36.4	31.0	42.8
11	38.2	44.2	34.5	43.5	65.9	58.9	51.2	74.7	56.2	33.6	34.3	45.7
12	42.3	40.5	33.3	44.7	68.7	63.6	41.6	80.4	58.6	36.1	42.0	43.4
13	41.8	46.0	33.5	49.3	58.1	61.8	58.7	81.1	77.1	51.0	42.4	34.4
14	40.5	33.8	48.7	52.5	54.1	50.5	59.3	82.3	77.4	43.4	45.2	36.9
15	31.6	43.7	45.3	34.9	54.1	50.5	60.3	81.3	76.2	41.2	34.5	34.8
16	35.2	38.0	34.7	45.1	53.2	46.6	63.8	77.7	67.6	39.2	35.4	35.3
17	46.9	39.9	27.5	36.5	48.0	47.4	64.0	79.6	63.1	31.6	44.0	35.7
18	48.5	29.4	53.3	59.0	41.1	55.2	64.1	86.7	62.7	35.7	36.9	38.8
19	40.5	51.8	35.6	57.1	42.8	55.1	68.7	85.7	57.4	42.1	41.1	35.1
20	39.3	52.3	41.7	55.2	48.7	56.3	69.6	79.7	36.3	19.5	41.1	37.9
21	34.8	32.4	36.3	42.6	45.4	63.0	66.3	79.6	45.2	37.2	40.5	41.5
22	40.0	38.6	45.9	40.8	45.4	70.1	70.9	78.8	45.4	40.2	35.4	42.5
23	35.7	39.1	40.4	42.3	44.4	73.7	74.7	74.2	45.2	34.3	35.4	44.8
24	41.7	47.7	44.3	52.3	41.4	72.0	70.1	70.6	45.0	49.1	42.7	38.5
25	29.3	25.5	42.8	48.2	45.2	72.0	70.9	71.9	45.1	30.7	34.2	43.9
26	35.3	44.7	32.3	44.9	44.9	72.0	74.1	78.6	45.1	22.4	38.7	34.7
27	37.5	40.2	39.0	43.3	46.1	72.0	70.0	78.5	46.8	36.6	38.5	41.6
28	45.0	46.6	42.4	43.6	51.2	72.0	65.9	81.0	55.0	55.4	35.6	37.3
29	34.7	46.5	33.7	43.4	54.1	72.0	68.4	79.6	57.7	46.4	44.4	42.6
30	33.2	—	44.2	41.4	60.6	72.0	72.4	72.3	53.5	27.1	40.9	43.9
31	32.7	—	41.7	—	61.4	—	72.3	68.2	—	38.3	—	41.2



CWSFG – CLEAN WATER SERVICES FOREST GROVE WASTEWATER TREATMENT FACILITY DISCHARGE [RM 55.2]

Source Agency: Clean Water Services

Day	2016 — Mean Daily Water Discharge in Cubic Feet per Second											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	7.3	9.4	9.5	5.1	3.6	0.0	0.0	0.0	0.0	0.0	0.0	10.7
2	6.7	8.4	11.4	4.5	3.6	0.0	0.0	0.0	0.0	0.0	0.0	9.3
3	6.7	9.3	10.7	4.5	3.7	0.0	0.0	0.0	0.0	0.0	0.0	8.8
4	8.2	12.6	10.0	5.2	3.9	0.0	0.0	0.0	0.0	0.0	0.0	8.9
5	8.3	10.7	9.0	5.1	3.3	0.0	0.0	0.0	0.0	0.0	0.0	10.1
6	7.3	9.3	10.1	4.5	2.2	0.0	0.0	0.0	0.0	0.0	0.0	12.0
7	6.7	8.5	12.3	4.7	2.8	0.0	0.0	0.0	0.0	0.0	0.0	10.0
8	6.3	7.8	10.6	4.4	3.1	0.0	0.0	0.0	0.0	0.0	0.0	8.8
9	6.1	7.2	10.0	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
10	6.2	6.5	13.2	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.1
11	6.8	7.2	13.9	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.6
12	19.0	7.1	13.4	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.0
13	24.2	8.9	14.1	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.1
14	18.7	9.5	13.9	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.3
15	16.2	8.5	13.8	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.6
16	19.4	7.8	13.9	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1
17	19.9	7.4	13.1	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.1
18	16.7	9.8	11.6	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1
19	18.6	11.5	9.7	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8
20	17.1	10.1	8.5	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.5
21	17.4	9.9	8.9	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.3
22	16.7	8.8	9.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0
23	12.7	8.0	7.8	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5
24	11.0	7.3	7.3	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4
25	9.6	6.5	7.1	4.7	0.0	0.0	0.0	0.0	0.0	0.0	24.6	8.2
26	8.8	6.9	6.5	4.6	0.0	0.0	0.0	0.0	0.0	0.0	22.7	7.1
27	9.0	6.8	5.9	4.5	0.0	0.0	0.0	0.0	0.0	0.0	16.3	8.2
28	11.0	7.6	6.1	4.2	0.0	0.0	0.0	0.0	0.0	0.0	14.7	9.6
29	13.6	—	5.7	4.1	0.0	0.0	0.0	0.0	0.0	0.0	12.8	8.6
30	12.7	—	5.5	4.2	0.0	0.0	0.0	0.0	0.0	0.0	11.2	7.8
31	11.0	—	5.2	—	0.0	—	0.0	0.0	—	0.0	—	7.0

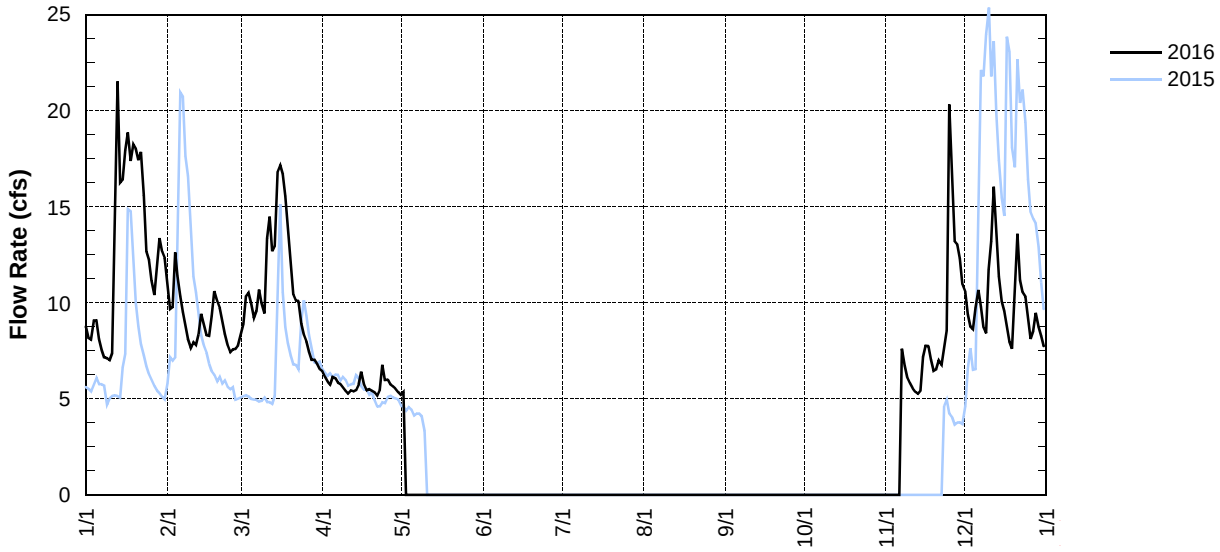


CWSHB – CLEAN WATER SERVICES HILLSBORO WASTEWATER TREATMENT FACILITY DISCHARGE [RM 43.8]

Source Agency: Clean Water Services

Day	2016 — Mean Daily Water Discharge in Cubic Feet per Second											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	8.8	10.9	8.9	6.2	5.4	0.0	0.0	0.0	0.0	0.0	0.0	10.6
2	8.2	9.7	10.3	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4
3	8.1	9.8	10.5	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8
4	9.1	12.6	10.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6
5	9.1	11.4	9.2	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7
6	8.1	10.3	9.6	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.7
7	7.6	9.5	10.7	5.8	0.0	0.0	0.0	0.0	0.0	0.0	7.6	9.8
8	7.2	8.8	10.0	5.6	0.0	0.0	0.0	0.0	0.0	0.0	6.7	8.7
9	7.1	8.1	9.5	5.4	0.0	0.0	0.0	0.0	0.0	0.0	6.1	8.4
10	7.0	7.7	13.4	5.3	0.0	0.0	0.0	0.0	0.0	0.0	5.8	11.7
11	7.4	8.0	14.5	5.4	0.0	0.0	0.0	0.0	0.0	0.0	5.6	13.2
12	15.2	7.8	12.7	5.4	0.0	0.0	0.0	0.0	0.0	0.0	5.4	16.1
13	21.5	8.4	13.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0	5.3	13.5
14	16.3	9.4	16.8	5.7	0.0	0.0	0.0	0.0	0.0	0.0	5.4	11.4
15	16.4	8.8	17.2	6.4	0.0	0.0	0.0	0.0	0.0	0.0	7.2	10.1
16	17.9	8.3	16.7	5.7	0.0	0.0	0.0	0.0	0.0	0.0	7.8	9.6
17	18.9	8.3	15.6	5.4	0.0	0.0	0.0	0.0	0.0	0.0	7.8	8.8
18	17.4	9.3	13.8	5.5	0.0	0.0	0.0	0.0	0.0	0.0	7.0	8.0
19	18.2	10.6	11.9	5.4	0.0	0.0	0.0	0.0	0.0	0.0	6.5	7.6
20	18.0	10.1	10.4	5.3	0.0	0.0	0.0	0.0	0.0	0.0	6.5	11.2
21	17.4	9.7	10.1	5.2	0.0	0.0	0.0	0.0	0.0	0.0	7.0	13.6
22	17.9	9.0	10.1	5.5	0.0	0.0	0.0	0.0	0.0	0.0	6.8	11.2
23	15.6	8.4	8.9	6.8	0.0	0.0	0.0	0.0	0.0	0.0	7.6	10.5
24	12.7	7.8	8.3	6.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	10.3
25	12.3	7.4	8.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	20.3	9.3
26	11.2	7.6	7.4	5.8	0.0	0.0	0.0	0.0	0.0	0.0	16.6	8.1
27	10.4	7.6	7.0	5.6	0.0	0.0	0.0	0.0	0.0	0.0	13.2	8.5
28	11.8	7.8	7.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0	13.0	9.5
29	13.4	—	6.8	5.4	0.0	0.0	0.0	0.0	0.0	0.0	12.3	8.8
30	12.7	—	6.5	5.2	0.0	0.0	0.0	0.0	0.0	0.0	11.0	8.3
31	12.3	—	6.5	—	0.0	—	0.0	0.0	—	0.0	—	7.8

CWSHB – Clean Water Services Hillsboro Wastewater Treatment Plant Discharge [RM 43.8]

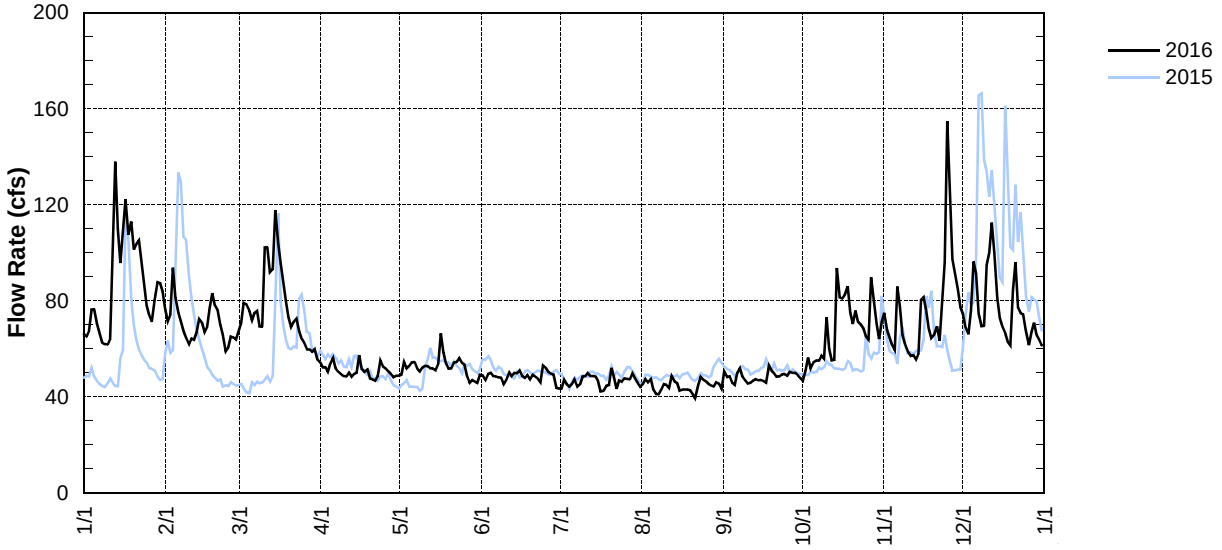


CWSRC – CLEAN WATER SERVICES ROCK CREEK WASTEWATER TREATMENT FACILITY DISCHARGE [RM 38.08]

Source Agency: Clean Water Services

Day	2016 — Mean Daily Water Discharge in Cubic Feet per Second											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	66.2	76.4	70.6	52.2	49.3	48.9	43.5	45.5	50.4	46.7	75.0	74.5
2	65.2	71.6	79.2	52.4	54.5	47.1	47.1	47.5	48.3	50.8	67.9	68.9
3	67.6	74.4	78.6	50.3	51.9	49.7	45.2	46.1	48.5	56.5	64.6	66.1
4	76.3	93.7	75.9	54.1	52.9	50.1	44.3	47.5	45.9	52.0	61.5	76.0
5	76.4	81.3	72.0	56.4	54.4	48.6	45.3	42.8	44.9	54.3	59.5	96.4
6	70.4	75.3	74.9	52.0	54.5	48.5	47.4	41.1	50.0	55.2	86.0	91.3
7	66.6	71.3	75.8	50.3	51.8	48.1	44.3	41.0	51.9	55.0	77.8	74.6
8	62.7	67.5	69.3	49.4	50.7	48.0	45.4	43.0	48.5	57.3	65.9	69.5
9	62.0	64.7	69.1	48.6	52.2	45.4	48.4	45.4	47.0	55.9	61.8	69.6
10	61.9	62.0	102.3	48.5	53.0	47.1	48.5	45.1	45.7	73.1	58.8	95.0
11	64.2	64.4	102.3	50.1	52.8	50.2	50.0	43.8	45.8	60.1	57.1	100.0
12	102.9	63.9	92.0	48.3	51.8	48.8	48.6	48.6	46.9	55.1	57.3	112.6
13	138.0	67.0	93.3	49.6	51.9	50.0	48.6	46.4	47.5	55.4	55.6	100.0
14	110.0	72.5	117.9	50.1	51.3	49.8	48.5	45.9	47.0	93.6	58.1	81.6
15	95.9	70.9	104.0	57.5	54.0	51.1	46.5	42.6	47.2	81.4	80.4	72.9
16	110.0	67.0	95.4	51.6	66.5	48.8	42.2	43.0	46.6	81.0	81.4	69.2
17	122.4	69.3	88.1	50.5	58.6	47.8	42.5	43.1	46.0	82.6	76.2	66.5
18	107.6	77.2	80.0	51.5	53.9	49.1	44.6	43.0	53.1	86.0	68.5	62.9
19	113.1	83.2	73.2	47.6	51.7	47.3	44.9	42.7	51.0	75.1	64.5	61.5
20	101.4	78.1	69.2	47.3	51.8	49.3	52.0	41.3	49.8	70.4	66.1	84.1
21	103.9	75.9	71.2	46.8	54.2	48.4	47.9	39.4	48.3	76.0	69.4	96.2
22	105.4	70.2	72.6	48.9	54.5	47.5	43.4	44.9	48.5	71.2	63.4	77.1
23	96.3	65.9	67.5	55.2	56.1	46.1	47.0	48.3	49.4	70.3	78.4	74.8
24	87.7	59.0	64.3	52.6	54.1	53.1	46.4	47.2	49.6	68.5	96.1	74.3
25	78.1	60.7	62.5	52.0	53.3	52.1	47.8	46.5	49.0	65.1	154.9	67.8
26	74.0	65.1	59.6	50.8	48.5	50.3	47.5	45.5	50.5	63.9	121.5	61.6
27	71.3	64.8	59.7	49.6	45.8	49.8	47.3	44.7	50.0	89.8	97.5	66.9
28	80.3	63.9	58.8	48.3	47.1	49.4	49.8	44.4	49.9	80.8	91.4	70.9
29	87.9	—	59.7	48.8	46.5	43.7	47.7	46.1	49.1	70.7	85.0	65.6
30	87.5	—	55.7	48.8	45.8	43.5	45.8	45.6	47.8	64.1	77.4	63.7
31	83.8	—	54.5	—	49.2	—	44.2	43.4	—	70.9	—	61.4

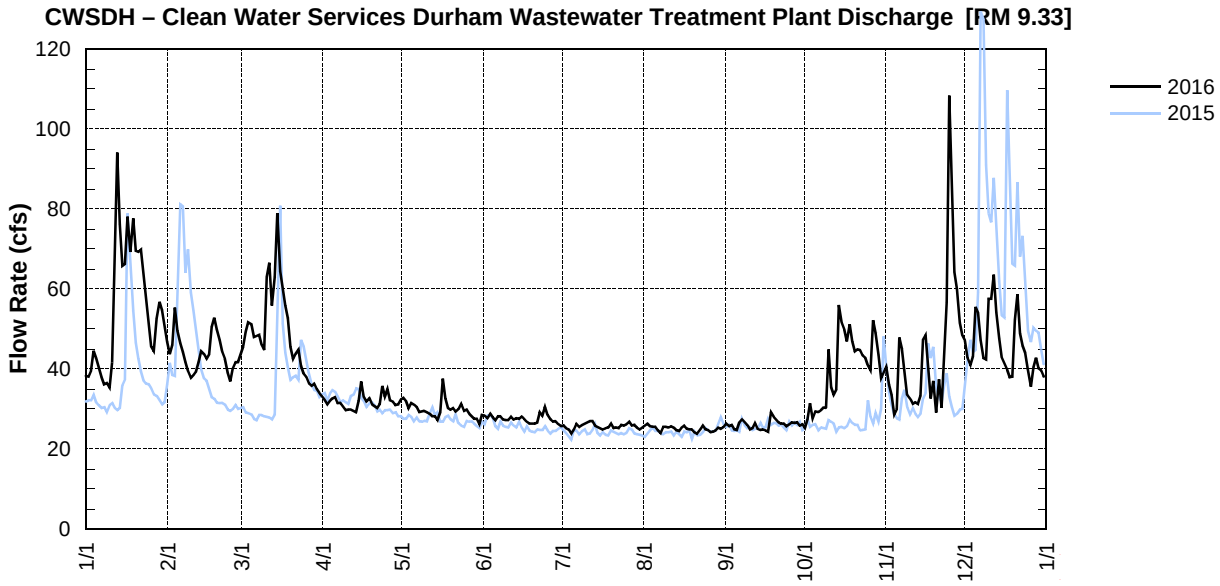
CWSRC – Clean Water Services Rock Creek Wastewater Treatment Plant Discharge [RM 38.08]



CWSDH – CLEAN WATER SERVICES DURHAM WASTEWATER TREATMENT FACILITY DISCHARGE [RM 9.33]

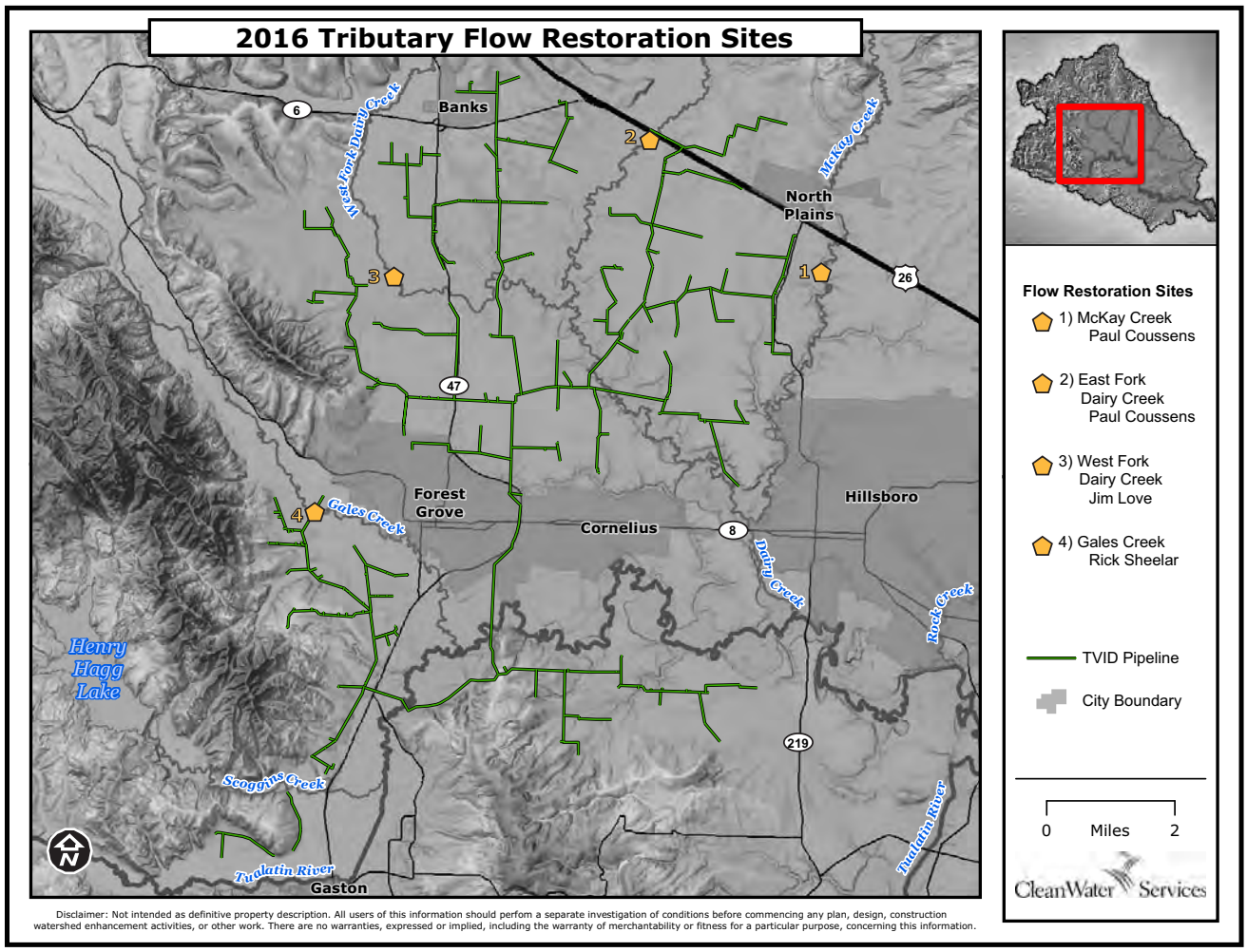
Source Agency: Clean Water Services

Day	2016 — Mean Daily Water Discharge in Cubic Feet per Second											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	38.2	46.7	45.5	32.2	32.8	28.3	25.8	25.8	26.3	25.2	40.7	47.0
2	38.1	43.6	49.2	31.1	32.0	27.7	25.2	26.3	25.7	27.4	36.0	42.7
3	39.6	45.9	51.7	32.0	30.2	28.8	24.9	25.7	26.0	31.4	33.4	41.0
4	44.6	55.4	51.2	32.6	31.6	27.8	23.8	25.5	24.9	27.7	28.6	43.2
5	42.7	49.5	48.0	33.0	31.1	27.2	24.9	25.5	24.8	29.4	30.0	55.5
6	40.4	46.4	48.3	31.4	30.5	28.2	26.3	24.6	26.6	29.2	47.8	54.0
7	37.9	44.2	48.6	31.6	29.2	28.2	25.5	24.0	27.4	29.7	45.0	47.2
8	36.2	41.6	45.9	30.6	29.4	27.4	26.0	25.5	26.8	30.3	39.6	42.7
9	36.5	39.4	44.7	29.7	29.5	27.2	26.3	25.5	26.0	30.2	33.6	42.4
10	35.3	37.7	63.0	29.9	29.2	27.2	26.6	25.4	24.9	44.9	32.6	57.5
11	41.6	38.5	66.5	29.9	28.8	28.0	26.9	25.7	25.2	35.4	31.2	57.5
12	70.2	39.3	55.8	29.5	28.2	27.4	26.9	25.4	26.5	33.6	31.7	63.6
13	94.1	41.6	63.0	29.2	28.2	27.7	25.8	24.6	25.1	34.8	31.2	54.1
14	76.1	44.4	78.9	32.0	27.2	27.5	25.5	24.4	24.8	56.0	33.3	47.6
15	65.7	43.6	64.5	36.8	29.2	28.0	25.2	25.4	24.9	51.5	47.3	42.9
16	66.2	42.5	60.2	33.0	37.6	27.5	24.9	25.8	24.6	49.8	48.4	41.3
17	78.1	43.6	55.8	31.9	32.6	26.8	25.2	25.1	24.3	46.9	40.4	39.8
18	69.3	50.4	52.6	32.6	30.2	26.3	25.4	24.9	29.1	51.2	32.6	37.9
19	77.7	52.8	45.5	31.1	29.9	26.3	26.3	24.9	28.0	46.9	37.0	38.1
20	69.5	49.8	42.5	30.6	30.2	26.3	25.2	24.1	27.4	44.4	29.1	52.3
21	69.3	47.2	43.8	30.2	29.4	26.6	25.4	23.8	26.6	44.9	37.4	58.6
22	69.8	44.2	44.9	31.2	30.0	29.2	25.2	24.9	26.3	44.7	30.3	48.9
23	63.7	42.5	40.8	35.7	31.2	28.3	26.0	25.8	26.3	43.3	43.8	45.8
24	57.9	39.0	38.8	33.1	29.5	30.5	25.8	24.9	25.7	42.7	56.6	44.1
25	51.2	36.8	38.1	35.0	29.9	28.5	26.1	24.8	26.1	40.8	108.3	40.1
26	45.5	40.2	36.4	32.2	28.8	27.4	26.8	24.1	26.6	39.6	85.2	35.6
27	44.4	41.6	35.7	31.9	28.2	26.8	25.8	24.3	26.5	52.1	64.2	40.4
28	52.6	41.6	36.4	30.9	27.5	26.9	26.0	24.6	26.6	48.9	60.0	42.9
29	56.8	—	35.0	31.1	27.5	26.1	25.4	25.4	25.8	43.5	51.5	40.1
30	54.6	—	34.0	32.3	26.1	25.7	24.9	25.1	26.1	37.7	48.3	39.6
31	50.9	—	33.1	—	28.5	—	25.4	25.5	—	39.1	—	38.1



RELEASES FOR CLEAN WATER SERVICES TRIBUTARY FLOW AUGMENTATION AT TVID RELEASE POINTS

Map #	Site Name	River Mile	Start Date	End Date	Average Flow (cfs)	Average Daily Release (ac-ft)	Total Release (ac-ft)
1	McKay Creek	7.0	7/16/2016	10/13/2016	1.95	3.9	348
2	East Fork Dairy Creek	4.9	7/14/2016	10/13/2016	1.50	3.0	274
3	West Fork Dairy Creek	5.2	7/13/2016	10/13/2016	0.66	1.3	122
4	Gales Creek	5.0	7/14/2016	10/13/2016	1.66	3.3	303



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Appendix C

Scoggins Reservoir Operations Monthly Records

The information presented here regarding water allocations is provisional. Final allocations for municipal use can be found in the Appendix E of this report.

SCOGGINS DAM -- RESERVOIR OPERATIONS

January 2016

[See Appendix E for breakdown of municipal use by water provider.]

Source: Tualatin Valley Irrigation District

	INFLOW				HENRY HAGG LAKE						TUALATIN RIVER						WEATHER			WATER DELIVERIES				
DAY	SCHO (cfs) [1]	SCLO (cfs) [2]	TANO (cfs) [3]	TOT INFLO (cfs) [4]	W.S. ELEV (ft) [5]	STOR CONT (ac-ft) [6]	CHNG STOR (ac-ft) [7]	CHNG STOR (cfs) [8]	REL (cfs) [9]	COMP INFLO (cfs) [10]	GASO (cfs) [11]	DLLO (cfs) [12]	GOLF (cfs) [13]	ROOD (cfs) [14]	FRMO (cfs) [15]	WSLO (cfs) [16]	PRECIP (inches) [17]	TEMP MAX (°F) [18]	TEMP MIN (°F) [19]	TVID (cfs) [20]	CWS (cfs) [21]	LO (cfs) [22]	MUNI (cfs) [23]	OTHR (cfs) [24]
1	90	108	9	207	290.93	40084	-1104	-557	689	132	369	964	1970	3720	4720	5470	0.00	39	30	0	0	0	0	0
2		100	8	108	289.88	39050	-1034	-521	644	123	329	930	1840	3430	na	4930	0.00	37	27	0	0	0	0	0
3		92	8	100	288.86	38055	-995	-502	599	97	293	892	1690	3170	4010	4430	0.00	35	23	0	0	0	0	0
4	61	90	7	158	287.99	37214	-841	-424	556	132	285	865	1580	2940	3680	4030	0.48	32	26	0	0	0	0	0
5	53	90	7	150	287.63	36868	-346	-174	292	118	266	745	1460	2780	3470	3740	0.11	36	33	0	0	0	0	0
6	48	108	7	163	287.40	36648	-220	-111	290	179	251	679	1240	2610	3250	3480	0.02	38	32	0	0	0	0	0
7	44	106	7	157	287.11	36371	-277	-140	289	149	230	634	1040	2350	2940	3120	0.00	44	33	0	0	0	0	0
8	42	106	7	155	286.96	36228	-143	-72	206	134	217	546	884	2040	2560	2740	0.00	44	31	0	0	0	0	0
9	44	106	7	157	286.85	36123	-105	-53	205	152	215	518	797	1720	2170	2350	0.16	45	33	0	0	0	0	0
10	44	104	7	155	286.79	36066	-57	-29	205	176	214	503	745	1510	1890	2040	0.00	43	33	0	0	0	0	0
11	42	104	7	153	286.59	35876	-190	-96	205	109	208	483	704	1360	1710	1820	0.06	49	33	0	0	0	0	0
12	52	111	8	171	286.56	35848	-28	-14	204	190	238	511	738	1360	1680	1780	0.28	42	38	0	0	0	0	0
13	285	585	44	914	287.20	36457	609	307	378	685	na	922	1420	2390	2900	3000	2.65	50	41	0	0	0	0	0
14	197	417	36	650	288.76	37958	1501	757	100	857	na	1320	2400	3370	4200	4680	0.24	48	38	0	0	0	0	0
15	183	354	33	570	289.80	38971	1013	511	100	611	na	1140	2640	3570	4440	4930	0.36	44	40	0	0	0	0	0
16	190	422	36	648	290.47	39629	658	332	295	627	na	1120	2590	3890	4690	5140	0.75	47	42	0	0	0	0	0
17	223	455	38	716	291.63	40779	1150	580	102	682	na	1220	2630	4370	5130	5560	0.73	50	42	0	0	0	0	0
18	176	435	37	648	292.81	41962	1183	596	101	697	na	1220	2740	4890	5620	6160	0.26	48	44	0	0	0	0	0
19	159	354	33	546	293.36	42518	556	280	297	577	na	1180	2700	5070	5980	6380	0.43	49	44	0	0	0	0	0
20	212	497	40	749	294.20	43373	855	431	206	637	na	1190	2640	5180	6370	6880	0.74	47	41	0	0	0	0	0
21	188	463	38	689	294.95	44143	770	388	298	686	na	1240	2670	5130	6410	6930	0.43	46	43	0	0	0	0	0
22	197	454	38	689	295.50	44711	568	286	302	588	na	1240	2740	5160	6480	7170	0.79	51	45	0	0	0	0	0
23	165	354	33	552	295.77	44991	280	141	525	666	na	1260	2730	5220	6660	7040	0.07	56	44	0	0	0	0	0
24	134	286	29	449	295.32	44525	-466	-235	670	435	na	1220	2660	5120	6520	6950	0.02	52	35	0	0	0	0	0
25	121	237	25	383	294.33	43506	-1019	-514	843	329	na	1200	2570	4890	6100	6800	0.05	46	36	0	0	0	0	0
26	101	203	22	326	292.84	41992	-1514	-763	950	187	584	1200	2510	4620	5730	6550	0.01	56	43	0	0	0	0	0
27	87	177	18	282	291.39	40540	-1452	-732	866	134	506	1140	2420	4350	5450	6230	0.03	51	47	0	0	0	0	0
28	130	282	29	441	290.85	40005	-535	-270	469	199	517	941	2300	4140	5180	6040	0.55	57	50	0	0	0	0	0
29	134	275	28	437	290.65	39807	-198	-100	466	366	na	968	2180	4000	5010	5800	0.50	55	42	0	0	0	0	0
30	139	300	30	469	290.53	39689	-118	-59	465	406	na	1040	2240	3890	4890	5740	0.52	51	37	0	0	0	0	0
31	133	263	27	423	290.39	39551	-138	-70	462	392	na	1050	2330	3810	4780	5460	0.12	45	33	0	0	0	0	0
TOTALS																	10.36 inches							
cfs	3674	8038	703	12415				-825	12279	11454	4722	30081	61798	112050	134620	153370	MAX	57	50	0	0	0	0	0
ac-ft	7287	15943	1394	24625			-1637	-1637	24355	22718	9366	59666	122576	222251	267019	304209	MIN	32	23	0	0	0	0	0

Water storage elevation ± to fill curve:	**3.48**
Water storage in ac-ft ± to fill curve:	**3367**
Percentage of full reservoir:	**74.2%**

SNOTEL Summary for Water Year 2016

Updated: January 31, 2016

SECO W/Y pc:	56.0"	sno depth/water content	0
SDMO W/Y pc:	78.3"	sno depth/water content	0

Minimum Required Discharges

Dec-Sept: 10 cfs Oct-Nov: 20 cfs

RESERVOIR DELIVERY STATUS		USED	REMAINING
These allocations, amounts used and	TVID	0	
remaining are provisional and subject	CWS	0	12615
to daily changes as the WS elevation	LO	0	500
rises and falls. These numbers are for	MUNI	0	13500
planning purposes only	Other	0	

SCOGGINS DAM -- RESERVOIR OPERATIONS

February 2016

[See Appendix E for breakdown of municipal use by water provider.]

Source: Tualatin Valley Irrigation District

DAY	INFLOW				HENRY HAGG LAKE						TUALATIN RIVER						WEATHER			WATER DELIVERIES				
	SCHO	SCLO	TANO	TOT INFLO	W.S. ELEV	STOR CONT	CHNG STOR	CHNG STOR	REL	COMP INFLO	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PRECIP	TEMP MAX	TEMP MIN	TVID	CWS	LO	MUNI	OTHR
	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ac-ft)	(ac-ft)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(inches)	(°F)	(°F)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
1	115	231	25	371	290.11	39275	-276	-139	457	318	na	995	2300	3730	4660	5260	0.03	39	33	0	0	0	0	0
2	110	200	21	331	290.23	39393	118	59	201	260	573	843	2170	4530	4530	5010	0.00	43	34	0	0	0	0	0
3	100	174	18	292	290.43	39590	197	99	201	300	491	778	1870	3480	4350	4770	0.00	46	35	0	0	0	0	0
4	185	275	29	489	290.76	39916	326	164	203	367	na	778	1670	3340	4180	4730	0.73	46	41	0	0	0	0	0
5	185	307	30	522	291.33	40480	564	284	202	486	na	875	1870	3360	4190	4620	0.06	52	38	0	0	0	0	0
6	150	264	27	441	291.77	40919	439	221	202	423	na	865	2010	3260	4090	4540	0.19	50	38	0	0	0	0	0
7	116	224	24	364	292.03	41178	259	131	202	333	na	826	1940	3200	3980	4290	0.00	51	39	0	0	0	0	0
8	101	194	21	316	292.27	41419	241	122	202	324	541	778	1770	3130	3880	4120	0.00	62	40	0	0	0	0	0
9	88	169	17	274	292.51	41660	241	122	110	232	452	681	1570	3000	3730	3930	0.00	65	37	0	0	0	0	0
10	71	151	13	235	292.80	41952	292	147	103	250	377	598	1350	2840	3520	3730	0.00	61	40	0	0	0	0	0
11	64	136	12	212	292.99	42144	192	97	103	200	319	546	1100	2650	3270	3440	0.00	55	42	0	0	0	0	0
12	81	128	11	220	293.19	42346	202	102	103	205	299	523	998	2470	3060	3210	0.27	53	49	0	0	0	0	0
13	78	126	11	215	293.27	42427	81	41	190	231	302	566	934	2250	2800	2980	0.25	56	40	0	0	0	0	0
14	127	194	21	342	293.45	42609	182	92	190	282	623	631	1040	2100	2600	2850	0.70	50	43	0	0	0	0	0
15	117	183	19	319	293.63	42792	183	92	190	282	na	718	1090	2140	2630	2710	0.02	58	50	0	0	0	0	0
16	107	169	17	293	293.76	42924	132	67	190	257	522	710	1220	2130	2610	2700	0.00	58	47	0	0	0	0	0
17	96	153	14	263	294.01	43179	255	129	102	231	437	602	1190	2130	2610	2670	0.00	52	47	0	0	0	0	0
18	88	146	13	247	294.19	43364	185	93	101	194	371	555	1040	2130	2610	2770	0.13	56	42	0	0	0	0	0
19	107	218	23	348	294.64	43824	460	232	102	334	626	609	1130	2220	2720	2980	0.88	48	43	0	0	0	0	0
20	125	268	27	420	295.24	44442	618	312	78	390	na	703	1320	2370	2940	3120	0.54	48	39	0	0	0	0	0
21	110	234	25	369	295.74	44960	518	261	78	339	na	736	1500	2430	3020	3190	0.00	50	33	0	0	0	0	0
22	108	218	23	349	296.27	45512	552	278	80	358	634	710	1550	2490	3060	3190	0.32	48	34	0	0	0	0	0
23	94	188	21	303	296.66	45919	407	205	80	285	544	664	1470	2490	3060	3160	0.00	49	33	0	0	0	0	0
24	83	131	11	225	297.04	46318	399	201	49	250	457	597	1340	2450	3010	3090	0.00	58	38	0	0	0	0	0
25	74	115	10	199	297.37	46666	348	175	49	224	382	546	1140	2360	2900	3000	0.00	61	37	0	0	0	0	0
26	63	102	9	174	297.65	46961	295	149	49	198	325	494	971	2200	2720	2820	0.00	63	39	0	0	0	0	0
27	64	106	9	179	297.97	47300	339	171	49	220	387	486	911	2040	2520	2740	0.42	55	43	0	0	0	0	0
28	59	94	8	161	298.21	47555	255	129	50	179	321	443	823	1900	2360	2500	0.03	56	44	0	0	0	0	0
29	59	100	8	167	298.45	47811	256	129	50	179	321	425	770	1750	2170	2310	0.40	53	39	0	0	0	0	0
TOTALS																	4.97 inches							
cfs	2925	5198	517	8640				4164	3966	8130	9304	19281	40057	76570	93780	100430	MAX	65	50	0	0	0	0	0
ac-ft	5802	10310	1025	17137			8260	8260	7867	16127	18454	38244	79453	151877	186013	199203	MIN	39	33	0	0	0	0	0

Water storage elevation ± to fill curve:	**0.10**
Water storage in ac-ft ± to fill curve:	**106.092**
Percentage of full reservoir:	**89.7%**

SNOTEL Summary for Water Year 2016

Updated: February 29, 2016

SECO W/Y pc:	89.8"	sno depth/water content	0
SDMO W/Y pc:	63.9"	sno depth/water content	0

Minimum Required Discharges

Dec-Sept: 10 cfs Oct-Nov: 20 cfs

RESERVOIR DELIVERY STATUS

These allocations, amounts used and remaining are provisional and subject to daily changes as the WS elevation rises and falls. These numbers are for planning purposes only.

	USED	REMAINING
TVID	0	
CWS	0	12615
LO	0	500
MUNI	0	13500
Other	0	

SCOGGINS DAM -- RESERVOIR OPERATIONS

March 2016

[See Appendix E for breakdown of municipal use by water provider.]

Source: Tualatin Valley Irrigation District

	INFLOW				HENRY HAGG LAKE						TUALATIN RIVER						WEATHER			WATER DELIVERIES				
DAY	SCHO	SCLO	TANO	TOT INFLO	W.S. ELEV	STOR CONT	CHNG STOR	CHNG STOR	REL	COMP INFLO	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PRECIP	TEMP MAX	TEMP MIN	TVID	CWS	LO	MUNI	OTHR
	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ac-ft)	(ac-ft)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(inches)	(°F)	(°F)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
1	83	175	19	277	298.69	48067	256	129	151	280	543	557	847	1770	2160	2350	0.60	48	42	0	0	0	0	0
2	89	193	22	304	298.77	48152	85	43	309	352	na	734	1190	2060	2500	2520	0.36	56	41	0	0	0	0	0
3	88	190	21	299	298.61	47981	-171	-86	405	319	na	821	1440	2280	2790	3010	0.31	52	42	1	0	0	0	0
4	81	175	19	275	298.20	47545	-436	-220	493	273	591	867	1660	2390	2940	3080	0.11	60	38	0	0	0	0	0
5	79	163	16	258	297.74	47057	-488	-246	488	242	557	862	1760	2450	2990	3160	0.21	55	41	0	0	0	0	0
6	96	203	22	321	297.37	46666	-391	-197	483	286	na	884	1830	2560	3120	3240	0.52	59	46	0	0	0	0	0
7	146	326	31	503	297.23	46518	-148	-75	485	410	na	918	1980	2650	3240	3370	0.70	51	40	1	0	0	0	0
8	127	269	27	423	297.53	46835	317	160	275	435	na	884	2140	2710	3310	3400	0.00	50	34	0	0	0	0	0
9	116	238	25	379	297.77	47088	253	128	277	405	na	865	2120	2800	3420	3530	0.47	46	39	0	0	0	0	0
10	205	465	38	708	298.49	47853	765	386	283	669	na	1050	2270	3180	3930	4470	1.29	55	45	1	0	0	0	0
11	174	371	34	579	299.53	48968	1115	562	106	668	na	1090	2570	3430	4240	4610	0.35	54	39	0	0	0	0	0
12	149	297	30	476	300.07	49550	582	293	305	598	na	1010	2630	3640	4440	4810	0.39	51	41	1	0	0	0	0
13	168	335	31	534	300.50	50017	467	235	307	542	na	1010	2570	3910	4740	5210	0.89	44	41	0	0	0	0	0
14	202	434	37	673	301.30	50889	872	440	310	750	na	1200	2630	3320	5150	5740	0.83	50	40	1	0	0	0	0
15	181	375	34	590	301.99	51647	758	382	310	692	na	1120	2750	4630	5420	5820	0.73	47	39	0	0	0	0	0
16	162	305	30	497	302.18	51857	210	106	478	584	na	1120	2710	4910	5710	6070	0.32	46	40	1	0	0	0	0
17	136	242	26	404	302.00	51658	-199	-100	527	427	na	1050	2630	4930	5890	6200	0.00	58	31	0	0	0	0	0
18	118	197	21	336	301.65	51273	-385	-194	538	344	na	995	2520	4760	5790	6280	0.00	59	31	1	0	0	0	0
19	103	163	16	282	301.19	50769	-504	-254	528	274	na	941	2360	4500	5570	6160	0.00	62	46	0	0	0	0	0
20	92	141	12	245	300.69	50223	-546	-275	520	245	579	895	2180	4210	5290	5920	0.08	63	47	1	0	0	0	0
21	86	131	11	228	300.15	49637	-586	-295	513	218	557	878	2010	3950	4990	5630	0.37	59	45	0	0	0	0	0
22	84	126	11	221	300.36	49865	228	115	151	266	527	734	1850	3680	4680	5300	0.29	50	41	1	0	0	0	0
23	76	113	10	199	300.60	50126	261	132	101	233	465	636	1540	3390	4320	4860	0.00	54	42	0	0	0	0	0
24	74	113	10	197	300.85	50398	272	137	101	238	442	586	1270	3080	3910	4400	0.13	53	42	1	0	0	0	0
25	73	111	10	194	301.07	50638	240	121	101	222	446	566	1110	2770	3490	3860	0.15	51	37	0	0	0	0	0
26	69	104	9	182	301.20	50780	142	72	149	221	415	579	1020	2460	3070	3340	0.02	52	38	1	0	0	0	0
27	66	104	9	179	301.30	50889	109	55	148	203	378	563	959	2140	2690	2890	0.07	56	39	0	0	0	0	0
28	62	102	9	173	301.40	50999	110	55	148	203	371	551	893	1850	2320	2500	0.02	50	32	1	0	0	0	0
29	59	102	9	170	301.44	51043	44	22	149	171	328	529	839	1640	2040	2190	0.00	57	34	0	0	0	0	0
30	55	100	8	163	301.55	51163	120	61	100	161	285	460	769	1470	1840	1950	0.00	65	37	1	0	0	0	0
31	52	100	8	160	301.67	51295	132	67	100	167	250	416	670	1320	1650	1760	0.00	73	39	1	0	0	0	0
TOTALS																	9.21 inches							
cfs	3351	6463	615	10429				1757	9339	11096	6734	25371	55717	94840	117640	127630	MAX	73	47	14	0	0	0	0
ac-ft	6647	12819	1220	20686			3484	3484	18524	22008	13357	50323	110515	188115	233339	253154	MIN	44	31	28	0	0	0	0

Water storage elevation ± to fill curve:	**0.04**
Water storage in ac-ft ± to fill curve:	**47.2731**
Percentage of full reservoir:	**96.2%**

SNOTEL Summary for Water Year 2016

Updated: March 31, 2016

SECO W/Y pc:	76.0"	sno depth/water content	0
SDMO W/Y pc:	105.8"	sno depth/water content	0

Minimum Required Discharges

Dec-Sept: 10 cfs Oct-Nov: 20 cfs

RESERVOIR DELIVERY STATUS		USED	REMAINING
These allocations, amounts used and	TVID	28	
remaining are provisional and subject	CWS	0	12615
to daily changes as the WS elevation	LO	0	500
rises and falls. These numbers are for	MUNI	0	13500
planning purposes only.	Other	0	

SCOGGINS DAM -- RESERVOIR OPERATIONS

April 2016

[See Appendix E for breakdown of municipal use by water provider.]

Source: Tualatin Valley Irrigation District

	INFLOW				HENRY HAGG LAKE						TUALATIN RIVER						WEATHER			WATER DELIVERIES				
DAY	SCHO	SCLO	TANO	TOT INFLO	W.S. ELEV	STOR CONT	CHNG STOR	CHNG STOR	REL	COMP INFLO	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PRECIP	TEMP MAX	TEMP MIN	TVID	CWS	LO	MUNI	OTHR
	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ac-ft)	(ac-ft)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(inches)	(°F)	(°F)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
1	50	98	8	156	301.74	51372	77	39	100	139	223	389	623	1190	1490	1600	0.00	73	41	1	0	0	0	0
2	47	80	7	134	301.84	51482	110	55	76	131	203	347	547	1090	1370	1480	0.00	74	42	1	0	0	0	0
3	45	75	5	125	301.93	51581	99	50	76	126	185	324	499	986	1250	1360	0.00	69	41	3	0	0	0	0
4	45	73	5	123	302.01	51669	88	44	76	120	182	319	484	948	1180	1310	0.25	69	41	2	0	0	0	0
5	42	70	5	117	302.08	51746	77	39	76	115	168	305	471	953	1190	1260	0.08	56	42	2	0	0	0	0
6	40	66	5	111	302.14	51813	67	34	77	111	155	286	447	857	1090	1200	0.00	58	37	2	0	0	0	0
7	39	61	5	105	302.20	51879	66	33	77	110	147	278	415	799	1010	1120	0.00	75	40	2	0	0	0	0
8	38	58	4	100	302.27	51956	77	39	77	116	132	263	393	751	952	1050	0.00	85	48	3	0	0	0	0
9	36	55	4	95	302.29	51978	22	11	77	88	125	293	364	704	895	1000	0.00	84	43	6	0	0	0	0
10	34	52	4	90	302.30	51989	11	6	77	83	120	287	342	658	835	955	0.00	66	45	5	0	0	0	0
11	33	50	4	87	302.34	52033	44	22	77	99	114	278	328	624	791	899	0.00	62	49	4	0	0	0	0
12	31	48	4	83	302.32	52011	-22	-11	77	66	110	272	318	594	749	863	0.00	61	49	4	0	0	0	0
13	31	49	4	84	302.36	52056	45	23	52	75	118	259	294	592	739	943	0.12	56	43	5	0	0	0	0
14	39	52	4	95	302.45	52155	99	50	52	102	135	293	320	622	773	981	0.63	57	42	5	0	0	0	0
15	26	63	5	94	302.59	52310	155	78	52	130	147	331	434	818	981	1160	0.18	54	36	4	0	0	0	0
16	22	55	4	81	302.63	52354	44	22	52	74	122	302	366	761	972	1190	0.00	59	39	5	0	0	0	0
17	21	50	4	75	302.71	52443	89	45	52	97	112	286	334	639	826	1090	0.00	69	43	5	0	0	0	0
18	20	46	3	69	302.72	52454	11	6	52	58	103	274	295	589	748	981	0.00	80	52	6	0	0	0	0
19	19	44	3	66	302.79	52532	78	39	34	73	95	246	259	520	671	899	0.00	87	48	10	0	0	0	0
20	18	41	3	62	302.86	52610	78	39	35	74	89	239	243	478	624	834	0.00	84	49	11	0	0	0	0
21	18	39	3	60	302.91	52665	55	28	35	63	85	224	233	441	556	782	0.00	77	45	13	0	0	0	0
22	30	44	3	77	303.00	52765	100	50	35	85	111	252	259	493	576	845	0.84	74	49	15	0	0	0	1
23	21	53	4	78	302.97	52732	-33	-17	144	127	107	361	446	802	918	1020	0.16	63	43	3	0	0	0	1
24	19	48	4	71	302.96	52721	-11	-6	75	69	99	277	232	730	898	1200	0.01	60	42	1	0	0	0	1
25	18	45	3	66	302.95	52710	-11	-6	75	69	96	276	313	615	752	1080	0.04	55	34	1	0	0	0	1
26	17	41	3	61	302.99	52754	44	22	35	57	90	225	259	565	690	974	0.00	59	34	2	0	0	0	1
27	17	40	3	60	303.04	52810	56	28	35	63	88	181	240	495	614	881	0.03	57	39	3	0	0	0	1
28	17	37	3	57	303.07	52843	33	17	35	52	84	174	231	470	581	816	0.00	56	41	5	0	0	0	1
29	16	36	3	55	303.12	52899	56	28	35	63	80	168	215	442	555	776	0.00	61	47	6	0	0	0	1
30	15	35	3	53	303.17	52954	55	28	21	49	79	154	207	462	554	845	0.05	61	36	4	0	0	0	1
TOTALS																	2.39 inches							
cfs	864	1604	122	2590				836	1849	2685	3704	8163	10411	20688	25830	31394	MAX	87	52	139	0	0	0	9
ac-ft	1714	3182	242	5137			1659	1659	3667	5327	7347	16191	20650	41035	51234	62270	MIN	54	34	276	0	0	0	18

Water storage elevation ± to fill curve:	**-0.29**
Water storage in ac-ft ± to fill curve:	**-324.56**
Percentage of full reservoir:	**99.3%**

SNOTEL Summary for Water Year 2016

Updated: April 30, 2016

SECO W/Y pc:	78.4"	sno depth/water content	0
SDMO W/Y pc:	109.1"	sno depth/water content	0

Minimum Required Discharges

Dec-Sept: 10 cfs Oct-Nov: 20 cfs

RESERVOIR DELIVERY STATUS		USED	REMAINING
These allocations, amounts used and	TVID	303	
remaining are provisional and subject	CWS	0	12615
to daily changes as the WS elevation	LO	0	500
rises and falls. These numbers are for	MUNI	0	13500
planning purposes only.	Other	18	

SCOGGINS DAM -- RESERVOIR OPERATIONS

May 2016

[See Appendix E for breakdown of municipal use by water provider.]

Source: Tualatin Valley Irrigation District

	INFLOW				HENRY HAGG LAKE						TUALATIN RIVER						WEATHER			WATER DELIVERIES				
DAY	SCHO	SCLO	TANO	TOT INFLO	W.S. ELEV	STOR CONT	CHNG STOR	CHNG STOR	REL	COMP INFLO	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PRECIP	TEMP MAX	TEMP MIN	TVID	CWS	LO	MUNI	OTHR
	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ac-ft)	(ac-ft)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(inches)	(°F)	(°F)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
1	15	34	3	52	303.22	53010	56	28	21	49	73	144	187	423	546	787	0.00	68	43	0	0	0	0	1
2	15	31	3	49	303.28	53077	67	34	21	55	69	113	142	369	480	726	0.00	80	50	0	0	0	0	1
3	14	29	3	46	303.33	53133	56	28	21	49	65	103	118	304	415	646	0.01	83	51	0	0	0	0	1
4	14	28	3	45	303.36	53166	33	17	21	38	65	98	104	312	406	651	0.02	72	48	0	0	0	0	1
5	14	28	3	45	303.40	53211	45	23	21	44	63	94	98	288	402	620	0.00	62	49	0	0	0	0	1
6	13	27	3	43	303.44	53256	45	23	21	44	59	86	96	267	373	568	0.00	70	49	0	0	0	0	7
7	13	25	3	41	303.45	53267	11	6	36	42	56	91	87	235	342	527	0.00	82	52	0	0	0	0	7
8	13	24	3	40	303.44	53256	-11	-6	36	30	54	85	72	207	317	478	0.00	85	51	0	0	0	0	7
9	12	24	3	39	303.43	53244	-12	-6	36	30	54	85	69	193	291	454	0.00	65	39	0	0	0	0	7
10	12	23	3	38	303.43	53244	0	0	37	37	52	83	68	185	278	423	0.00	70	40	0	0	0	0	7
11	12	23	3	38	303.43	53244	0	0	37	37	49	79	55	173	268	405	0.00	77	43	0	0	0	0	7
12	12	20	2	34	303.46	53278	34	17	37	54	67	87	53	148	243	388	0.00	84	43	0	0	0	0	7
13	12	20	2	34	303.41	53222	-56	-28	63	35	68	114	97	141	224	360	0.00	79	46	0	0	0	30.01	3
14	11	20	2	33	303.36	53166	-56	-28	59	31	67	110	86	164	253	356	0.32	82	53	0	0	0	25	3
15	12	22	2	36	303.39	53200	34	17	59	76	78	125	122	189	265	436	0.25	55	53	0	0	0	25	3
16	12	22	2	36	303.31	53110	-90	-45	59	14	75	120	121	370	467	600	0.03	59	50	0	0	0	25	3
17	12	18	2	32	303.30	53099	-11	-6	53	47	72	113	111	270	389	630	0.00	59	48	0	0	0	20	3
18	11	17	2	30	303.33	53133	34	17	20	37	67	85	89	223	327	537	0.00	76	47	0	0	0	0	3
19	11	16	2	29	303.35	53155	22	11	20	31	44	64	76	179	280	468	0.00	72	45	0	0	0	0	3
20	11	16	2	29	303.35	53155	0	0	21	21	45	63	55	157	258	454	0.00	58	43	0	0	0	0	2
21	11	16	2	29	303.35	53155	0	0	35	35	67	85	56	151	244	405	0.01	66	48	0	0	0	12.99	2
22	11	15	2	28	303.34	53144	-11	-6	35	29	68	92	85	149	238	410	0.01	59	47	0	0	0	15	2
23	11	16	2	29	303.34	53144	0	0	35	35	68	94	93	184	273	414	0.07	61	50	0	0	0	15	2
24	11	16	2	29	303.33	53133	-11	-6	41	35	69	97	86	192	296	441	0.00	65	48	0	0	0	10	2
25	10	15	2	27	303.31	53110	-23	-12	45	33	67	96	81	173	269	432	0.00	66	47	0	0	0	15	2
26	10	14	2	26	303.30	53099	-11	-6	41	35	64	92	74	143	245	401	0.00	66	50	0	0	0	14.99	2
27	10	13	2	25	303.28	53077	-22	-11	41	30	63	89	67	125	227	372	0.00	60	46	0	0	0	15.01	3
28	10	14	2	26	303.20	52988	-89	-45	83	38	62	118	78	113	213	356	0.00	62	42	18	0	0	22	3
29	10	13	2	25	303.14	52921	-67	-34	83	49	72	126	78	127	220	333	0.00	71	46	33	0	0	22	3
30	10	13	2	25	303.05	52821	-100	-50	83	33	72	126	72	130	224	340	0.00	67	40	33	0	0	22	3
31	9	13	2	24	302.98	52743	-78	-39	83	44	70	123	70	110	211	336	0.00	77	46	34	0	0	22	3
TOTALS																	0.72 inches							
cfs	364	625	73	1062				-106	1304	1198	1984	3080	2746	6394	9484	14754	MAX	85	53	118	0	0	311	104
ac-ft	722	1240	145	2106			-211	-211	2586	2375	3935	6109	5447	12682	18812	29265	MIN	55	39	234	0	0	617	206

Water storage elevation ± to fill curve:	**-0.52**
Water storage in ac-ft ± to fill curve:	**-580**
Percentage of full reservoir:	**98.9%**

SNOTEL Summary for Water Year 2016

Updated: May 31, 2016

SECO W/Y pc:	79.3"	sno depth/water content	0
SDMO W/Y pc:	109.8"	sno depth/water content	0

Minimum Required Discharges

Dec-Sept: 10 cfs Oct-Nov: 20 cfs

RESERVOIR DELIVERY STATUS

These allocations, amounts used and remaining are provisional and subject to daily changes as the WS elevation rises and falls. These numbers are for planning purposes only.

	USED	REMAINING
TVID	538	
CWS	0	12615
LO	0	500
MUNI	617	12883
Other	224	

SCOGGINS DAM -- RESERVOIR OPERATIONS

June 2016

[See Appendix E for breakdown of municipal use by water provider.]

Source: Tualatin Valley Irrigation District

	INFLOW				HENRY HAGG LAKE						TUALATIN RIVER						WEATHER			WATER DELIVERIES				
DAY	SCHO	SCLO	TANO	TOT INFLO	W.S. ELEV	STOR CONT	CHNG STOR	CHNG STOR	REL	COMP INFLO	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PRECIP	TEMP MAX	TEMP MIN	TVID	CWS	LO	MUNI	OTHR
	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ac-ft)	(ac-ft)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(inches)	(°F)	(°F)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
1	9	12	2	23	302.88	52632	-111	-56	114	58	67	145	75	99	195	314	0.00	86	52	58	0	0	27	3
2	9	11	2	22	302.72	52454	-178	-90	121	31	68	152	81	113	202	321	0.05	80	57	61	0	0	35	3
3	9	12	2	23	302.58	52299	-155	-78	126	48	68	159	76	134	230	340	0.00	68	51	59	0	0	40	4
4	9	11	2	22	302.41	52111	-188	-95	131	36	64	159	74	115	217	340	0.00	88	58	68	0	0	35	4
5	8	11	2	21	302.26	51945	-166	-84	138	54	62	164	71	100	201	321	0.00	96	59	74	0	0	35	4
6	8	10	1	19	302.09	51757	-188	-95	138	43	59	161	82	102	201	303	0.00	96	56	80	0	0	35	4
7	7	10	1	18	301.89	51537	-220	-111	143	32	58	162	66	93	190	292	0.00	91	50	81	0	0	40	4
8	7	9	1	17	301.70	51328	-209	-105	127	22	58	146	71	79	174	275	0.00	90	54	88	0	0	20	4
9	8	9	1	18	301.52	51130	-198	-100	131	31	60	151	71	89	173	265	0.00	72	52	79	0	0	29.99	4
10	8	10	1	19	301.34	50933	-197	-99	117	18	66	150	81	111	198	278	0.03	61	45	65	0	0	30	3
11	9	11	2	22	301.23	50813	-120	-61	97	36	88	151	94	125	227	317	0.09	61	47	57	0	0	15	3
12	9	11	2	22	301.12	50692	-121	-61	97	36	78	145	97	136	234	333	0.01	65	42	57	0	0	15	3
13	8	11	2	21	301.01	50572	-120	-61	97	36	75	141	88	131	231	336	0.00	75	46	58	0	0	14.99	3
14	9	10	2	21	300.93	50485	-87	-44	74	30	77	126	75	115	220	333	0.16	61	47	50	0	0	0	3
15	9	11	2	22	300.86	50409	-76	-38	70	32	83	132	99	138	219	333	0.17	59	44	45	0	0	0	3
16	9	12	2	23	300.79	50332	-77	-39	70	31	70	117	86	153	255	352	0.28	59	42	44	0	0	0	3
17	8	11	2	21	300.72	50256	-76	-38	78	40	72	123	81	127	230	360	0.01	63	47	49	0	0	5	3
18	8	11	2	21	300.61	50136	-120	-61	86	25	74	126	82	109	210	329	0.00	67	46	47	0	0	15	3
19	7	10	1	18	300.50	50017	-119	-60	86	26	65	120	69	101	202	314	0.00	63	42	50	0	0	15	3
20	7	10	1	18	300.40	49908	-109	-55	103	48	60	118	63	85	181	292	0.00	75	51	59	0	0	15	3
21	6	9	1	16	300.28	49778	-130	-66	121	55	58	129	61	71	165	268	0.00	77	50	62	10	0	22	3
22	6	8	1	15	300.11	49594	-184	-93	138	45	58	145	72	68	158	255	0.00	73	47	75	10	0	30	3
23	6	8	1	15	299.91	49377	-217	-109	138	29	59	161	80	74	165	272	0.09	76	54	75	10	0	35	3
24	6	10	1	17	299.72	49172	-205	-103	126	23	66	171	101	276	353	352	0.08	65	49	70	10	0	35	4
25	6	9	1	16	299.55	48989	-183	-92	125	33	61	151	91	157	287	473	0.00	66	45	70	10	0	24.99	4
26	5	8	1	14	299.38	48806	-183	-92	125	33	60	147	77	116	223	384	0.00	77	56	72	10	0	25	4
27	5	8	1	14	299.22	48634	-172	-87	125	38	57	142	77	96	194	329	0.00	88	56	72	10	0	25	4
28	5	7	1	13	299.01	48409	-225	-113	143	30	69	173	81	76	173	292	0.00	86	48	81	20	0	25.01	4
29	5	7	1	13	298.76	48142	-267	-135	156	21	68	183	88	79	166	258	0.00	79	48	84	30	0	25	4
30	5	7	1	13	298.52	47885	-257	-130	150	20	65	176	89	85	176	252	0.00	80	46	78	30	0	25	4
TOTALS																	0.97 inches							
cfs	220	294	43	557				-2449	3491	1042	1993	4426	2399	3353	6250	9483	MAX	96	59	1968	150	0	694	104
ac-ft	436	583	85	1105			-4858	-4858	6924	2066	3953	8779	4758	6651	12397	18810	MIN	59	42	3904	298	0	1377	206

Water storage elevation ± to fill curve:	**-4.98**
Water storage in ac-ft ± to fill curve:	**-5438**
Percentage of full reservoir:	**89.8%**

SNOTEL Summary for Water Year 2016

Updated: June 30, 2016

SECO W/Y pc:	80.8"	sno depth/water content	0
SDMO W/Y pc:	112.4"	sno depth/water content	0

Minimum Required Discharges

Dec-Sept: 10 cfs Oct-Nov: 20 cfs

RESERVOIR DELIVERY STATUS		USED	REMAINING
These allocations, amounts used and	TVID	4441	
remaining are provisional and subject	CWS	298	12317
to daily changes as the WS elevation	LO	0	500
rises and falls. These numbers are for	MUNI	1993	11507
planning purposes only.	Other	430	

SCOGGINS DAM -- RESERVOIR OPERATIONS

[See Appendix E for breakdown of municipal use by water provider.]

July 2016

Source: Tualatin Valley Irrigation District

	INFLOW				HENRY HAGG LAKE						TUALATIN RIVER						WEATHER			WATER DELIVERIES				
DAY	SCHO	SCLO	TANO	TOT INFLO	W.S. ELEV	STOR CONT	CHNG STOR	CHNG STOR	REL	COMP INFLO	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PRECIP	TEMP MAX	TEMP MIN	TVID	CWS	LO	MUNI	OTHR
	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ac-ft)	(ac-ft)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(inches)	(°F)	(°F)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
1	4	7	1	12	298.28	47630	-255	-129	158	29	62	178	88	82	174	262	0.00	78	47	78	30	0	34.99	3
2	4	7	1	12	298.05	47385	-245	-124	152	28	62	173	85	75	169	262	0.00	81	55	77	40	0	20.01	3
3	4	7	1	12	297.82	47141	-244	-123	152	29	63	173	95	76	na	252	0.00	84	51	77	40	0	20	3
4	4	7	1	12	297.57	46877	-264	-133	152	19	64	178	104	88	na	258	0.00	75	48	77	40	0	20	3
5	4	7	1	12	297.32	46613	-264	-133	152	19	64	179	95	92	na	268	0.00	69	47	77	40	0	20	3
6	4	7	1	12	297.12	46402	-211	-106	144	38	63	169	90	83	na	265	0.00	71	49	79	40	0	10	3
7	4	7	1	12	296.89	46161	-241	-122	144	22	61	165	87	80	na	210	0.00	76	55	74	40	0	15	3
8	5	7	1	13	296.65	45909	-252	-127	149	22	68	178	109	94	na	215	0.15	67	58	73	40	0	20	4
9	5	8	1	14	296.46	45710	-199	-100	132	32	67	161	105	122	215	255	0.10	70	53	64	40	0	10	4
10	5	8	1	14	296.27	45512	-198	-100	132	32	66	158	108	133	237	278	0.04	69	56	64	40	0	10	4
11	5	8	1	14	296.09	45324	-188	-95	132	37	69	161	120	123	220	282	0.00	69	50	64	40	0	9.99	4
12	5	8	1	14	295.91	45137	-187	-94	127	33	54	154	98	124	219	268	0.00	73	54	66	40	3	0	4
13	4	5	1	10	295.69	44908	-229	-115	150	35	51	174	97	105	201	262	0.00	70	53	70	40	3	20	4
14	4	7	1	12	295.43	44639	-269	-136	159	23	49	180	84	89	184	239	0.00	76	49	80	40	3	19.99	4
15	4	6	1	11	295.17	44370	-269	-136	159	23	46	180	91	84	173	221	0.00	79	46	81	40	3	19.99	4
16	4	6	1	11	294.90	44092	-278	-140	168	28	48	190	98	78	170	215	0.00	71	50	78	45	3	27	4
17	4	6	1	11	294.64	43824	-268	-135	168	33	48	190	102	84	171	213	0.00	72	53	78	45	3	26.99	4
18	4	6	1	11	294.37	43547	-277	-140	167	27	47	189	102	94	179	218	0.00	73	60	77	45	3	26.99	4
19	4	6	1	11	294.10	43271	-276	-139	172	33	49	194	94	90	180	224	0.00	72	57	77	45	3	32	4
20	4	6	1	11	293.80	42965	-306	-154	176	22	46	198	95	86	179	218	0.00	73	53	78	45	3	35	4
21	3	6	1	10	293.51	42670	-295	-149	187	38	45	202	94	79	173	215	0.00	82	54	93	45	3	30	4
22	3	6	1	10	293.17	42326	-344	-173	198	25	43	210	98	78	164	213	0.00	84	60	96	50	3	35	4
23	3	6	1	10	292.79	41942	-384	-194	197	3	44	240	120	89	174	213	0.00	71	53	90	50	3	40	4
24	3	6	1	10	292.41	41559	-383	-193	197	4	43	238	125	111	201	227	0.00	74	51	90	50	3	40	4
25	3	6	1	10	292.05	41198	-361	-182	196	14	42	238	132	116	204	246	0.00	86	55	89	50	3	40	4
26	3	5	1	9	291.67	40819	-379	-191	196	5	41	235	110	106	201	246	0.00	87	53	90	50	3	40	4
27	3	5	1	9	291.31	40461	-358	-180	185	5	38	218	98	91	187	236	0.00	83	53	84	50	3	35	4
28	3	5	1	9	290.94	40094	-367	-185	191	6	39	224	104	75	166	221	0.00	88	56	90	50	3	35	4
29	3	5	1	9	290.56	39718	-376	-190	195	5	39	231	107	76	165	204	0.00	93	58	88	55	3	35	5
30	2	5	1	8	290.14	39305	-413	-208	202	-6	38	240	108	79	166	199	0.00	93	51	91	55	3	40	5
31	2	5	1	8	289.73	38903	-402	-203	202	-1	39	239	112	83	170	201	0.00	80	48	91	55	3	40.01	5
TOTALS																	0.29 inches							
cfs	116	196	31	343				-4528	5191	663	1598	6037	3155	2865	4642	7306	MAX	93	60	2481	1375	60	808	120
ac-ft	230	389	61	680			-8982	-8982	10296	1314	3170	11974	6258	5683	9207	14491	MIN	67	46	4921	2727	119	1603	238

Water storage elevation ± to fill curve: **-13.77**

Water storage in ac-ft ± to fill curve: **-14420**

Percentage of full reservoir: **73.0%**

Minimum Required Discharges

Dec-Sept: 10 cfs Oct-Nov: 20 cfs

SNOTEL Summary for Water Year 2016

Updated: January 00, 1900

SECO W/Y pc: 81.6" sno depth/water content 0

SDMO W/Y pc: 113.3" sno depth/water content 0

RESERVOIR DELIVERY STATUS

These allocations, amounts used and remaining are provisional and subject to daily changes as the WS elevation rises and falls. These numbers are for planning purposes only.

	USED	REMAINING
TVID	9362	
CWS	3025	9590
LO	119	381
MUNI	3596	9904
Other	668	

SCOGGINS DAM -- RESERVOIR OPERATIONS

August 2016

[See Appendix E for breakdown of municipal use by water provider.]

Source: Tualatin Valley Irrigation District

DAY	INFLOW				HENRY HAGG LAKE						TUALATIN RIVER						WEATHER			WATER DELIVERIES				
	SCHO	SCLO	TANO	TOT INFLO	W.S. ELEV	STOR CONT	CHNG STOR	CHNG STOR	REL	COMP INFLO	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PRECIP	TEMP MAX	TEMP MIN	TVID	CWS	LO	MUNI	OTHR
	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ac-ft)	(ac-ft)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(inches)	(°F)	(°F)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
1	3	5	1	9	289.31	38493	-410	-207	202	-5	39	240	121	94	179	210	0.00	77	46	90	55	3	40	5
2	3	5	1	9	288.94	38133	-360	-182	192	10	39	241	89	92	179	215	0.00	81	49	75	55	3	45	5
3	3	5	1	9	288.52	37726	-407	-205	195	-10	40	249	89	77	161	207	0.00	71	47	78	55	3	44.99	5
4	3	5	1	9	288.11	37330	-396	-200	203	3	40	265	96	77	160	196	0.00	79	55	86	55	3	45	5
5	2	5	1	8	287.68	36916	-414	-209	206	-3	38	267	99	79	160	190	0.00	90	52	90	55	3	45	5
6	2	5	1	8	287.27	36524	-392	-198	203	5	38	256	94	81	163	188	0.00	79	46	87	55	3	45	5
7	2	5	1	8	286.88	36152	-372	-188	190	2	39	239	101	79	160	190	0.00	75	51	74	55	3	45	5
8	3	5	1	9	286.47	35763	-389	-196	187	-9	41	237	112	86	166	193	0.01	68	51	70	55	3	45	5
9	4	7	1	12	286.14	35450	-313	-158	179	21	46	237	106	96	180	204	0.23	64	53	69	55	3	35	5
10	3	7	1	11	285.81	35139	-311	-157	175	18	42	232	109	100	189	215	0.00	68	57	70	55	3	30	5
11	3	6	1	10	285.41	34763	-376	-190	189	-1	39	244	106	100	184	215	0.00	78	53	76	55	3	40	5
12	3	5	1	9	285.02	34398	-365	-184	197	13	37	248	84	89	176	215	0.00	88	56	76	55	3	50	4
13	2	5	1	8	284.58	33988	-410	-207	221	14	43	269	111	76	160	207	0.00	96	59	104	55	3	46.99	4
14	2	5	1	8	284.11	33552	-436	-220	220	0	42	267	119	95	179	196	0.00	94	54	105	55	3	45	4
15	2	5	1	8	283.62	33099	-453	-228	220	-8	42	269	126	91	176	210	0.00	89	54	105	55	3	45.01	4
16	2	5	1	8	283.18	32695	-404	-204	204	0	42	258	105	89	179	215	0.00	87	52	94	55	3	40	4
17	2	4	1	7	282.75	32301	-394	-199	199	0	43	252	98	73	160	207	0.00	87	49	88	55	3	42.01	4
18	2	4	1	7	282.29	31883	-418	-211	209	-2	49	275	103	69	158	193	0.00	84	54	90	55	3	50	4
19	2	4	1	7	281.85	31484	-399	-201	206	5	48	267	96	72	160	188	0.00	100	59	92	55	3	44.99	4
20	2	4	1	7	281.41	31087	-397	-200	200	0	46	260	103	63	152	188	0.00	98	58	94	55	3	37	4
21	2	4	1	7	280.95	30674	-413	-208	209	1	47	261	117	71	158	180	0.00	99	49	103	55	3	36.99	4
22	2	4	1	7	280.46	30236	-438	-221	209	-12	46	258	127	95	181	188	0.00	82	45	103	55	3	37.01	4
23	2	4	1	7	280.04	29863	-373	-188	181	-7	47	224	99	96	190	210	0.00	73	47	80	55	3	32	4
24	2	4	1	7	279.66	29527	-336	-169	181	12	48	228	100	66	165	213	0.00	83	52	85	55	3	27	4
25	2	2	1	5	279.26	29174	-353	-178	181	3	49	229	97	71	160	193	0.00	90	55	87	55	3	27	4
26	2	2	1	5	278.82	28789	-385	-194	192	-2	49	241	95	64	155	185	0.00	93	56	88	55	3	36.01	5
27	2	2	1	5	278.42	28440	-349	-176	194	18	54	249	101	62	150	182	0.00	95	54	93	55	3	33	5
28	2	2	1	5	277.96	28040	-400	-202	194	-8	56	253	116	72	160	180	0.00	82	50	93	55	3	33	5
29	2	2	1	5	277.52	27660	-380	-192	194	2	56	254	121	89	178	196	0.00	83	52	93	55	3	33	5
30	2	2	1	5	277.12	27317	-343	-173	173	0	55	224	101	85	178	210	0.00	83	50	80	55	3	25	5
31	2	3	1	6	276.76	27009	-308	-155	157	2	58	213	99	73	163	207	0.05	73	55	73	50	3	19.99	5
TOTALS																	0.29 inches							
cfs	72	132	31	235				-5997	6062	65	1398	7706	3240	2522	5219	6186	MAX	100	59	2691	1700	93	1201	141
ac-ft	143	262	61	466			-11894	-11894	12024	130	2773	15285	6427	5002	10352	12270	MIN	64	45	5338	3372	184	2382	280

Water storage elevation ± to fill curve:	**-26.74**
Water storage in ac-ft ± to fill curve:	**-26314**
Percentage of full reservoir:	**50.7%**

SNOTEL Summary for Water Year 2016

Updated: 8.31.16

SECO W/Y pc:	82.2"	sno depth/water content	0
SDMO W/Y pc:	113.8"	sno depth/water content	0

Minimum Required Discharges

Dec-Sept: 10 cfs Oct-Nov: 20 cfs

RESERVOIR DELIVERY STATUS

These allocations, amounts used and remaining are provisional and subject to daily changes as the WS elevation rises and falls. These numbers are for planning purposes only.

	USED	REMAINING
TVID	14700	
CWS	6397	6218
LO	303	197
MUNI	5978	7522
Other	948	

SCOGGINS DAM -- RESERVOIR OPERATIONS

September 2016

[See Appendix E for breakdown of municipal use by water provider.]

Source: Tualatin Valley Irrigation District

	INFLOW				HENRY HAGG LAKE						TUALATIN RIVER						WEATHER			WATER DELIVERIES				
DAY	SCHO	SCLO	TANO	TOT INFLO	W.S. ELEV	STOR CONT	CHNG STOR	CHNG STOR	REL	COMP INFLO	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PRECIP	TEMP MAX	TEMP MIN	TVID	CWS	LO	MUNI	OTHR
	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ac-ft)	(ac-ft)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(inches)	(°F)	(°F)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
1	2	3	1	6	276.41	26710	-299	-151	146	-5	78	223	115	94	183	213	0.08	68	50	67	45	3	20	5
2	2	3	1	6	276.11	26456	-254	-128	137	9	78	214	na	109	201	227	0.02	67	52	59	45	3	20	4
3	2	4	1	7	275.84	26227	-229	-115	120	5	78	195	na	124	225	258	0.01	68	45	51	35	3	20	4
4	3	4	1	8	275.56	25991	-236	-119	120	1	76	193	na	107	207	262	0.11	68	44	50	35	3	20	4
5	2	4	1	7	275.29	25765	-226	-114	120	6	78	195	na	109	204	252	0.01	68	44	51	35	3	20	4
6	2	4	1	7	275.03	25547	-218	-110	120	10	76	194	na	121	211	255	0.07	71	48	51	35	3	20	4
7	2	4	1	7	274.82	25372	-175	-88	92	4	77	169	na	136	235	278	0.00	72	52	38	35	3	5	4
8	2	3	1	6	274.63	25213	-159	-80	86	6	62	148	na	107	207	278	0.00	75	52	38	35	3	0	4
9	2	3	1	6	274.36	24989	-224	-113	109	-4	61	165	na	85	184	249	0.00	74	46	52	35	3	10	3
10	2	3	1	6	274.09	24766	-223	-112	125	13	62	183	na	80	176	227	0.00	83	48	60	35	3	17	3
11	2	3	1	6	273.81	24535	-231	-116	125	9	61	182	na	75	169	221	0.00	86	46	60	35	3	17	3
12	2	3	1	6	273.51	24288	-247	-125	125	0	62	180	na	82	174	218	0.00	71	45	60	35	3	17	3
13	2	3	1	6	273.11	23961	-327	-165	163	-2	61	220	na	85	178	218	0.00	77	44	65	45	3	39	3
14	2	2	1	5	272.73	23652	-309	-156	162	6	62	222	115	86	179	221	0.00	79	44	65	45	3	40	3
15	2	2	1	5	272.33	23328	-324	-163	162	-1	63	222	111	84	174	218	0.00	79	44	65	45	3	40	3
16	2	2	1	5	271.95	23021	-307	-155	156	1	63	216	122	86	175	215	0.00	82	46	65	45	3	35	3
17	2	2	1	5	271.59	22732	-289	-146	145	-1	62	203	125	91	178	218	0.00	83	53	64	45	3	25	3
18	3	4	1	8	271.29	22493	-239	-120	145	25	71	218	139	184	257	321	0.27	62	57	61	45	3	25	3
19	2	4	1	7	270.94	22214	-279	-141	144	3	66	212	155	158	269	333	0.00	72	46	61	45	3	25	3
20	2	3	1	6	270.66	21991	-223	-112	109	-3	51	159	119	134	242	321	0.00	67	42	47	45	3	5	3
21	2	5	1	8	270.40	21785	-206	-104	119	15	57	176	118	109	203	285	0.05	69	44	45	45	3	15	3
22	2	4	1	7	270.13	21571	-214	-108	119	11	54	172	117	105	199	258	0.00	72	46	46	45	3	15	3
23	2	4	1	7	269.83	21334	-237	-119	119	0	55	173	118	103	193	255	0.03	68	46	48	45	3	15	3
24	3	5	1	9	269.59	21144	-190	-96	112	16	63	175	119	101	194	252	0.06	59	43	38	45	3	15	1
25	2	4	1	7	269.31	20924	-220	-111	112	1	57	168	122	103	197	249	0.00	69	44	41	45	3	15	1
26	2	3	1	6	269.04	20713	-211	-106	111	5	53	161	117	109	202	252	0.00	84	48	41	45	3	15	1
27	2	3	1	6	268.79	20517	-196	-99	111	12	54	165	101	95	189	249	0.00	90	52	41	45	3	15	1
28	2	3	1	6	268.49	20284	-233	-117	120	3	55	176	110	86	176	236	0.00	74	47	40	45	3	25	1
29	2	3	1	6	268.18	20043	-241	-122	126	4	51	175	107	89	179	230	0.00	75	42	41	45	3	30	1
30	2	3	1	6	267.86	19795	-248	-125	114	-11	54	169	108	84	174	227	0.00	70	38	34	45	3	25	2
TOTALS																	0.71 inches							
cfs	63	100	30	193				-3637	3774	137	1901	5623	2138	3121	5934	7496	MAX	90	57	1545	1250	90	605	86
ac-ft	125	198	60	383			-7214	-7214	7486	272	3771	11153	4241	6191	11770	14868	MIN	59	38	3065	2479	179	1200	171

Water storage elevation ± to fill curve:	**-35.64**
Water storage in ac-ft ± to fill curve:	**-33528**
Percentage of full reservoir:	**37.1%**

SNOTEL Summary for Water Year 2016

Updated: September 06, 2016

SECO W/Y pc:	83.9"	sno depth/water content	0
SDMO W/Y pc:	116.3"	sno depth/water content	0

Minimum Required Discharges

Dec-Sept: 10 cfs Oct-Nov: 20 cfs

RESERVOIR DELIVERY STATUS		USED	REMAINING
These allocations, amounts used and	TVID	17764	
remaining are provisional and subject	CWS	8876	3739
to daily changes as the WS elevation	LO	482	18
rises and falls. These numbers are for	MUNI	7178	6322
planning purposes only.	Other	1119	

SCOGGINS DAM -- RESERVOIR OPERATIONS

October 2016

[See Appendix E for breakdown of municipal use by water provider.]

Source: Tualatin Valley Irrigation District

	INFLOW				HENRY HAGG LAKE						TUALATIN RIVER						WEATHER			WATER DELIVERIES				
DAY	SCHO	SCLO	TANO	TOT INFLO	W.S. ELEV	STOR CONT	CHNG STOR	CHNG STOR	REL	COMP INFLO	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PRECIP	TEMP MAX	TEMP MIN	TVID	CWS	LO	MUNI	OTHR
	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ac-ft)	(ac-ft)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(inches)	(°F)	(°F)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
1	2	3	1	6	267.58	19579	-216	-109	107	-2	57	167	107	82	174	236	0.08	67	39	30	45	3	20	2
2	4	10	1	15	267.35	19403	-176	-89	107	18	74	184	123	123	199	258	0.38	59	49	21	45	3	20	2
3	3	6	1	10	267.11	19219	-184	-93	107	14	67	184	142	232	338	344	0.07	59	48	26	45	3	20	2
4	3	8	1	12	266.92	19073	-146	-74	73	-1	64	147	110	159	274	380	0.07	55	48	15	35	0	10	1
5	8	18	2	28	266.78	18966	-107	-54	82	28	81	173	118	154	243	352	0.49	62	52	8	35	0	10	1
6	4	12	1	17	266.58	18814	-152	-77	107	30	87	214	203	197	299	360	0.10	61	50	44	35	0	10	1
7	34	65	5	104	266.50	18753	-61	-31	85	54	103	182	154	264	348	487	0.74	60	52	10	35	0	10	1
8	7	20	2	29	266.28	18586	-167	-84	119	35	109	250	285	347	437	512	0.19	61	54	10	35	0	10	1
9	7	16	2	25	266.06	18420	-166	-84	119	35	84	214	207	318	445	600	0.16	65	56	10	35	0	10	1
10	12	41	3	56	265.93	18322	-98	-49	118	69	201	308	258	577	667	1010	0.66	59	41	10	35	0	10	1
11	6	18	2	26	265.80	18224	-98	-49	72	23	102	192	224	501	668	857	0.00	62	39	10	10	0	10	1
12	4	12	2	18	265.69	18141	-83	-42	48	6	77	140	148	281	432	667	0.00	65	39	10	10	0	10	1
13	7	20	2	29	265.79	18156	15	8	18	26	66	103	90	186	311	522	0.53	62	40	2	10	0	0	1
14	70	250	25	345	266.50	18753	597	301	19	320	831	523	670	822	912	1100	2.60	60	53	2	0	0	0	0
15	86	222	24	332	267.24	19318	565	285	20	305	613	583	877	1680	1930	2040	1.03	61	51	2	0	0	0	0
16	120	328	32	480	268.22	20074	756	381	20	401	780	652	1070	1660	2010	2120	1.04	58	51	2	0	0	0	0
17	170	409	35	614	269.32	20932	858	433	20	453	840	727	1220	1750	2090	2260	1.05	54	50	2	0	0	0	0
18	93	257	26	376	270.35	21745	813	410	20	430	757	811	1370	1930	2320	2530	0.46	62	49	2	0	0	0	0
19	59	157	14	230	270.90	22182	437	220	20	240	470	706	1310	1900	2320	2360	0.09	58	44	3	0	0	0	0
20	50	130	11	191	271.32	22517	335	169	20	189	363	547	1060	1720	2120	2220	0.35	55	47	4	0	0	0	0
21	46	125	11	182	271.70	22821	304	153	20	173	390	499	934	1540	1900	2010	0.19	63	52	2	0	0	0	0
22	42	113	10	165	272.03	23086	265	134	23	157	332	426	783	1370	1690	1890	0.31	61	48	1	0	0	0	0
23	38	101	9	148	272.30	23303	217	109	23	132	278	370	693	1210	1510	1650	0.18	59	49	1	0	0	0	0
24	33	86	7	126	272.53	23489	186	94	23	117	215	312	567	1020	1280	1440	0.00	59	50	1	0	0	0	0
25	31	94	8	133	272.75	23668	179	90	21	111	186	272	487	836	1060	1240	0.12	55	49	1	0	0	0	0
26	67	132	12	211	272.98	23855	187	94	22	116	192	257	451	758	930	1150	0.86	58	49	1	0	0	0	0
27	62	146	13	221	273.49	24272	417	210	21	231	467	486	835	1220	1380	1430	0.40	60	53	1	0	0	0	0
28	50	96	8	154	273.88	24592	320	161	22	183	347	439	793	1460	1770	1740	0.10	57	49	1	0	0	0	0
29	42	80	7	129	274.19	24848	256	129	22	151	255	362	669	1270	1590	1720	0.02	64	49	2	0	0	0	0
30	37	78	6	121	274.43	25047	199	100	22	122	200	304	586	1040	1320	1500	0.00	61	45	1	0	0	0	0
31	68	119	10	197	274.78	25338	291	147	22	169	310	345	559	921	1160	1410	0.92	55	49	2	0	0	0	0
TOTALS																	13.19 inches							
cfs	1265	3172	293	4730				2795	1542	4337	8998	11079	17103	27528	34127	38395	MAX	67	56	237	410	9	150	16
ac-ft	2509	6292	581	9382			5543	5543	3059	8602	17848	21975	33924	54602	67691	76156	MIN	54	39	470	813	18	298	32

Water storage elevation ± to fill curve:	**-28.72**
Water storage in ac-ft ± to fill curve:	**-27985**
Percentage of full reservoir:	**47.5%**

SNOTEL Summary for Water Year 2017

Updated: October 31, 2016

SECO W/Y pc:	19.1"	sno depth/water content	0
SDMO W/Y pc:	26"	sno depth/water content	0

Minimum Required Discharges

Dec-Sept: 10 cfs Oct-Nov: 20 cfs

RESERVOIR DELIVERY STATUS		USED	REMAINING
These allocations, amounts used and	TVID	18234	
remaining are provisional and subject	CWS	9689	2926
to daily changes as the WS elevation	LO	500	0
rises and falls. These numbers are for	MUNI	7476	6024
planning purposes only.	Other	1150	

SCOGGINS DAM -- RESERVOIR OPERATIONS

November 2016

[See Appendix E for breakdown of municipal use by water provider.]

Source: Tualatin Valley Irrigation District

	INFLOW				HENRY HAGG LAKE						TUALATIN RIVER						WEATHER			WATER DELIVERIES				
DAY	SCHO	SCLO	TANO	TOT INFLO	W.S. ELEV	STOR CONT	CHNG STOR	CHNG STOR	REL	COMP INFLO	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PRECIP	TEMP MAX	TEMP MIN	TVID	CWS	LO	MUNI	OTHR
	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ac-ft)	(ac-ft)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(inches)	(°F)	(°F)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
1	68	127	11	206	275.28	25756	418	211	22	233	532	532	844	1130	1320	1330	0.13	54	49	2	0	0	0	0
2	55	101	9	165	275.67	26084	328	165	28	193	365	452	808	1250	1500	1450	0.01	60	48	2	0	0	0	0
3	45	83	7	135	275.98	26345	261	132	50	182	277	397	718	1140	1410	1470	0.04	60	49	25	0	0	0	0
4	39	78	6	123	276.24	26566	221	111	26	137	219	312	592	987	1240	1350	0.00	64	42	1	0	0	0	0
5	37	74	6	117	276.49	26778	212	107	26	133	187	271	507	840	1050	1180	0.16	61	43	1	0	0	0	0
6	50	89	7	146	276.89	27120	342	172	26	198	350	433	657	1130	1380	1700	0.83	55	50	1	0	0	0	0
7	43	80	6	129	277.20	27385	265	134	26	160	287	397	691	1560	1890	1840	0.03	59	50	1	0	0	0	0
8	39	78	6	123	277.46	27609	224	113	26	139	232	343	614	1350	1690	1840	0.00	62	44	1	0	0	0	0
9	36	76	6	118	277.68	27798	189	95	26	121	193	297	533	1130	1420	1610	0.02	66	47	1	0	0	0	0
10	34	70	5	109	277.90	27988	190	96	26	122	173	268	479	952	1200	1380	0.01	61	45	1	0	0	0	0
11	30	61	5	96	278.06	28127	139	70	26	96	155	238	422	815	1030	1200	0.00	68	47	1	0	0	0	0
12	31	58	4	93	278.25	28292	165	83	26	109	148	219	382	709	889	1060	0.13	59	50	1	0	0	0	0
13	27	56	4	87	278.42	28440	148	75	26	101	142	210	374	643	797	943	0.01	60	46	1	0	0	0	0
14	52	140	12	204	278.63	28623	183	92	26	118	166	212	338	595	734	924	0.48	55	48	1	0	0	0	0
15	82	193	21	296	279.17	29095	472	238	26	264	626	532	794	1100	1200	1420	0.80	57	51	1	0	0	0	0
16	89	210	23	322	279.79	29641	546	275	26	301	660	609	1070	1770	2080	1980	0.45	55	43	1	0	0	0	0
17	82	176	19	277	280.41	30191	550	277	26	303	593	638	1170	1880	2280	2300	0.23	48	40	1	0	0	0	0
18	69	139	12	220	280.89	30620	429	216	26	242	441	572	1100	1830	2240	2290	0.00	48	38	2	0	0	0	0
19	59	114	10	183	281.28	30970	350	176	26	202	351	486	927	1660	2050	2170	0.16	50	43	1	0	0	0	0
20	56	96	8	160	281.68	31330	360	182	27	209	306	429	814	1490	1840	1960	0.38	53	44	2	0	0	0	0
21	56	96	8	160	282.06	31674	344	173	26	199	326	442	816	1400	1720	1850	0.22	53	47	1	0	0	0	0
22	49	85	7	141	281.87	31502	-172	-87	264	177	277	626	892	1400	1690	1740	0.03	56	39	1	0	0	0	0
23	67	109	9	185	281.77	31411	-91	-46	299	253	402	718	1080	1700	2010	2220	0.83	48	43	1	0	0	0	0
24	160	250	26	436	282.23	31828	417	210	112	322	714	761	1330	2150	2640	2700	1.05	47	44	0	0	0	0	0
25	371	944	64	1379	286.05	35365	3537	1783	56	1839	1070	2620	2370	3450	4380	6290	3.26	48	45	1	0	0	0	0
26	219	453	37	709	287.99	37214	1849	932	55	987	951	1760	3300	3790	4760	5600	0.11	49	45	0	0	0	0	0
27	160	279	25	464	289.13	38317	1103	556	55	611	801	1180	2950	4790	5350	5760	0.22	50	41	1	0	0	0	0
28	156	275	25	456	290.05	39216	899	453	55	508	804	991	2690	4990	5790	6130	0.57	46	39	0	0	0	0	0
29	120	210	23	353	290.64	39797	581	293	167	460	720	975	2500	4850	5840	6350	0.00	53	39	1	0	0	0	0
30	113	193	21	327	290.27	39433	-364	-184	509	325	676	1100	2330	4580	5650	6430	0.27	48	41	0	0	0	0	0
TOTALS																	10.43 inches							
cfs	2494	4993	432	7919				7106	2141	9247	13144	19020	34092	57061	69070	76467	MAX	68	51	54	0	0	0	0
ac-ft	4947	9904	857	15707			14095	14095	4247	18342	26071	37726	67621	113180	137000	151672	MIN	46	38	107	0	0	0	0

Water storage elevation ± to fill curve:	**6.77**
Water storage in ac-ft ± to fill curve:	**6444**
Percentage of full reservoir:	**74.0%**

Minimum Required Discharges
Dec-Sept: 10 cfs Oct-Nov: 20 cfs

SNOTEL Summary for Water Year 2017

Updated: November 01, 3016

SECO W/Y pc:	32"	sno depth/water content	0
SDMO W/Y pc:	43"	sno depth/water content	0

RESERVOIR DELIVERY STATUS		USED	REMAINING
These allocations, amounts used and	TVID	18341	
remaining are provisional and subject	CWS	9689	2926
to daily changes as the WS elevation	LO	500	0
rises and falls. These numbers are for	MUNI	7476	6024
planning purposes only.	Other	1150	

SCOGGINS DAM -- RESERVOIR OPERATIONS

December 2016

[See Appendix E for breakdown of municipal use by water provider.]

Source: Tualatin Valley Irrigation District

DAY	INFLOW				HENRY HAGG LAKE						TUALATIN RIVER						WEATHER			WATER DELIVERIES				
	SCHO	SCLO	TANO	TOT INFLO	W.S. ELEV	STOR CONT	CHNG STOR	CHNG STOR	REL	COMP INFLO	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PRECIP	TEMP MAX	TEMP MIN	TVID	CWS	LO	MUNI	OTHR
	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ac-ft)	(ac-ft)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(inches)	(°F)	(°F)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
1	98	164	15	277	289.77	38942	-491	-248	564	316	630	1090	2300	4310	5410	6200	0.10	48	36	0	0	0	0	0
2	84	138	12	234	288.88	38074	-868	-438	666	228	556	1110	2240	4070	5130	5850	0.04	45	37	0	0	0	0	0
3	79	124	11	214	287.73	36964	-1110	-560	774	214	518	1130	2190	3820	4840	5460	0.10	45	42	0	0	0	0	0
4	109	173	17	299	286.98	36247	-717	-361	623	262	651	1030	2160	3620	4580	5430	0.56	49	42	0	0	0	0	0
5	98	149	13	260	286.63	35914	-333	-168	463	295	666	1020	2110	3540	4470	5050	0.18	47	33	0	0	0	0	0
6	80	127	11	218	285.94	35261	-653	-329	606	277	605	1100	2110	3450	4360	4950	0.48	35	33	0	0	0	0	0
7	67	104	9	180	285.07	34445	-816	-411	602	191	498	1060	2090	3310	4180	4620	0.00	40	27	0	0	0	0	0
8	62	87	7	156	284.43	33848	-597	-301	481	180	413	926	1960	3180	4000	4340	0.01	38	28	0	0	0	0	0
9	56	76	6	138	284.03	33478	-370	-187	408	221	370	875	1770	3050	3840	4160	0.54	34	29	0	0	0	0	0
10	94	138	12	244	284.33	33756	278	140	170	310	673	811	1680	3080	3870	4410	0.74	35	32	0	0	0	0	0
11	156	250	26	432	285.01	34389	633	319	102	421	812	875	1810	3130	3930	4430	0.96	42	34	0	0	0	0	0
12	167	262	27	456	286.00	35318	929	468	103	571	859	1020	2210	3320	4180	4710	0.73	47	34	0	0	0	0	0
13	131	196	22	349	286.61	35895	577	291	160	451	737	1030	2430	3420	4300	4680	0.00	44	34	0	0	0	0	0
14	113	161	15	289	286.44	35734	-161	-81	433	352	630	1050	2400	3500	4350	4670	0.00	39	32	0	0	0	0	0
15	98	132	12	242	285.92	35243	-491	-248	546	298	549	1050	2310	3500	4400	4670	0.16	34	27	0	0	0	0	0
16	79	106	9	194	285.13	34501	-742	-374	577	203	455	991	2180	3510	4370	4630	0.00	32	22	0	0	0	0	0
17	69	87	7	163	284.52	33932	-569	-287	428	141	373	895	1990	3390	4250	4510	0.00	37	23	0	0	0	0	0
18	62	72	5	139	284.17	33607	-325	-164	366	202	315	823	1710	3230	4050	4310	0.00	31	28	0	0	0	0	0
19	59	72	5	136	283.77	33238	-369	-186	342	156	285	768	1470	3020	3800	4040	0.15	38	29	0	0	0	0	0
20	242	458	38	738	284.49	33904	666	336	126	462	1050	838	1590	3050	3850	4560	1.68	47	34	0	0	0	0	0
21	148	235	25	408	285.44	34791	887	447	102	549	828	1100	2220	3240	4080	4470	0.00	50	30	0	0	0	0	0
22	116	173	17	306	285.67	35007	216	109	278	387	684	1020	2360	3200	4030	4390	0.01	43	28	0	0	0	0	0
23	109	161	16	286	285.30	34660	-347	-175	484	309	649	1040	2280	3250	4050	4340	0.37	40	29	0	0	0	0	0
24	90	132	12	234	284.91	34295	-365	-184	449	265	548	975	2190	3270	4080	4300	0.00	44	31	0	0	0	0	0
25	77	111	10	198	284.49	33904	-391	-197	406	209	465	900	1990	3200	4000	4210	0.01	36	32	0	0	0	0	0
26	69	94	8	171	284.17	33609	-295	-149	356	207	402	836	1750	3080	3850	4050	0.00	42	30	0	0	0	0	0
27	94	138	12	244	283.99	33441	-168	-85	330	245	515	823	1580	2960	3700	4040	0.69	40	31	0	0	0	0	0
28	94	135	12	241	283.94	33394	-47	-24	301	277	582	857	1610	2870	3600	3840	0.28	44	33	0	0	0	0	0
29	82	111	10	203	283.80	33265	-129	-65	301	236	490	836	1600	2740	3430	3620	0.01	38	33	0	0	0	0	0
30	72	99	8	179	283.67	33145	-120	-61	300	239	430	801	1510	2640	3290	3440	0.02	38	34	0	0	0	0	0
31	64	88	7	159	283.73	33201	56	28	175	203	372	683	1370	2530	3150	3270	0.00	47	29	0	0	0	0	0
TOTALS																	7.82 inches							
cfs	3018	4553	416	7987				-3142	12022	8880	17610	29363	61170	101480	127420	139650	MAX	50	42	0	0	0	0	0
ac-ft	5986	9031	825	15842			-6232	-6232	23846	17614	34929	58242	121331	201286	252738	276996	MIN	31	22	0	0	0	0	0

Water storage elevation ± to fill curve: **0.23**
Water storage in ac-ft ± to fill curve: **212**
Percentage of full reservoir: **62.3%**

Minimum Required Discharges
Dec-Sept: 10 cfs Oct-Nov: 20 cfs

SNOTEL Summary for Water Year 2017
Updated: December 31, 2016

SECO W/Y pc:	42.2"	sno depth/water content	4"/ 1.7"
SDMO W/Y pc:	58.3"	sno depth/water content	22"/ 7.1"

RESERVOIR DELIVERY STATUS

These allocations, amounts used and remaining are provisional and subject to daily changes as the WS elevation rises and falls. These numbers are for planning purposes only.

	USED	REMAINING
TVID	18341	
CWS	9689	2926
LO	500	0
MUNI	7476	6024
Other	1150	

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Appendix D

Barney Reservoir Operations Monthly Records

Breakdown of allocations for municipal use by water provider can be found in Appendix E of this report.

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF JANUARY 2016

[See Appendix E for breakdown of municipal use by water provider.] Source: Barney Reservoir Joint Ownership Commission

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	RAIN @ BARNEY	TEMP @ BARNEY		MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		STORAGE RELEASED TO TUALATIN			
					Min	Max	TRASK	TUALATIN			CWS		MUNICIPAL	
	feet	ac-ft	ac-ft	in.	°F	°F	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1									0	0	0	0	0	0
2									0	0	0	0	0	0
3									0	0	0	0	0	0
4	1634.4	17400	337	0.48	12	41	1.1	0.0	0	0	0	0	0	0
5									0	0	0	0	0	0
6	1634.7	17513	113	0.15	22	41	0.5	0.0	0	0	0	0	0	0
7	1634.9	17588	75	0.03	23	41	0.5	0.0	0	0	0	0	0	0
8									0	0	0	0	0	0
9									0	0	0	0	0	0
10									0	0	0	0	0	0
11	1635.5	17813	225	0.69	24	44	1.1	0.0	0	0	0	0	0	0
12									0	0	0	0	0	0
13	1637.0	18500	687	3.22	26	49	3.4	0.0	0	0	0	0	0	0
14	1637.9	18950	450	0.66	24	46	2.3	0.0	0	0	0	0	0	0
15									0	0	0	0	0	0
16									0	0	0	0	0	0
17									0	0	0	0	0	0
18									0	0	0	0	0	0
19	1640.9	20000	1050	3.57	36	52	110.8	0.0	0	0	0	0	0	0
20									0	0	0	0	0	0
21	1640.9	20000	0	1.99	27	50	142.0	0.0	0	0	0	0	0	0
22	1641.1	20000	0	0.88	38	51	142.0	0.0	0	0	0	0	0	0
23									0	0	0	0	0	0
24									0	0	0	0	0	0
25	1640.8	20000	0	0.36	24	53	79.6	0.0	0	0	0	0	0	0
26									0	0	0	0	0	0
27	1640.7	20000	0	0.09	42	52	55.5	0.0	0	0	0	0	0	0
28	1640.9	20000	0	1.44	43	56	110.8	0.0	0	0	0	0	0	0
29									0	0	0	0	0	0
30									0	0	0	0	0	0
31									0	0	0	0	0	0
Monthly Totals			2,937	13.56						0		0		0
Year to Date Totals			2,937	13.56						0		0		0

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF FEBRUARY 2016

[See Appendix E for breakdown of municipal use by water provider.] Source: Barney Reservoir Joint Ownership Commission

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	RAIN @ BARNEY	TEMP @ BARNEY		MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		STORAGE RELEASED TO TUALATIN			
					Min	Max	TRASK	TUALATIN			CWS		MUNICIPAL	
	feet	ac-ft	ac-ft	in.	ºF	ºF	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1									0	0	0	0	0	0
2	1640.8	20000	0	1.91	23	52	79.6	0.0	0	0	0	0	0	0
3									0	0	0	0	0	0
4	1640.8	20000	0	0.17	23	45	64.0	0.0	0	0	0	0	0	0
5									0	0	0	0	0	0
6	1641.0	20000	0	3.35	30	51	110.8	0.0	0	0	0	0	0	0
7									0	0	0	0	0	0
8									0	0	0	0	0	0
9	1640.7	20000	0	0.53	25	57	64.0	0.0	0	0	0	0	0	0
10									0	0	0	0	0	0
11									0	0	0	0	0	0
12	1640.7	20000	0	0.04	32	59	55.5	0.0	0	0	0	0	0	0
13	1640.7	20000	0	0.60	42	53	55.5	0.0	0	0	0	0	0	0
14									0	0	0	0	0	0
15									0	0	0	0	0	0
16									0	0	0	0	0	0
17	1640.8	20000	0	2.46	33	55	79.6	0.0	0	0	0	0	0	0
18	1640.7	20000	0	0.01	34	53	64.0	0.0	0	0	0	0	0	0
19									0	0	0	0	0	0
20	1641.0	20000	0	1.81	33	52	110.8	0.0	0	0	0	0	0	0
21									0	0	0	0	0	0
22									0	0	0	0	0	0
23	1640.8	20000	0	1.42	24	48	79.6	0.0	0	0	0	0	0	0
24									0	0	0	0	0	0
25	1640.7	20000	0	0.02	22	52	55.5	0.0	0	0	0	0	0	0
26									0	0	0	0	0	0
27	1640.7	20000	0	0.02	28	56	47.0	0.0	0	0	0	0	0	0
28									0	0	0	0	0	0
Monthly Totals			0	12.34						0		0		0
Year to Date Totals			2,937	25.90						0		0		0

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF MARCH 2016

[See Appendix E for breakdown of municipal use by water provider.] Source: Barney Reservoir Joint Ownership Commission

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	RAIN @ BARNEY	TEMP @ BARNEY		MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		STORAGE RELEASED TO TUALATIN			
					Min	Max	TRASK	TUALATIN			CWS		MUNICIPAL	
	feet	ac-ft	ac-ft	in.	°F	°F	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1									0	0	0	0	0	0
2	1640.8	20000	0	0.59	29	50	95.2	0.0	0	0	0	0	0	0
3									0	0	0	0	0	0
4	1640.7	20000	0	0.00	29	53	64.0	0.0	0	0	0	0	0	0
5				0.00					0	0	0	0	0	0
6									0	0	0	0	0	0
7	1640.9	20000	0		24	56	126.4	0.0	0	0	0	0	0	0
8									0	0	0	0	0	0
9	1640.9	20000	0	0.00	24	47	126.4	0.0	0	0	0	0	0	0
10	1641.0	20000	0		31	52	215.1	0.0	0	0	0	0	0	0
11				0.02					0	0	0	0	0	0
12				0.21					0	0	0	0	0	0
13									0	0	0	0	0	0
14	1641.0	20000	0		24	51	178.6	0.0	0	0	0	0	0	0
15									0	0	0	0	0	0
16	1641.0	20000	0	3.97	26	48	126.4	0.0	0	0	0	0	0	0
17				0.00					0	0	0	0	0	0
18	1640.8	20000	0		25	44	79.6	0.0	0	0	0	0	0	0
19				0.02					0	0	0	0	0	0
20									0	0	0	0	0	0
21	1640.9	20000	0		32	58	79.6	0.0	0	0	0	0	0	0
22									0	0	0	0	0	0
23	1640.9	20000	0	0.97	33	51	64.0	0.0	0	0	0	0	0	0
24									0	0	0	0	0	0
25	1640.9	20000	0	1.59	28	50	64.0	0.0	0	0	0	0	0	0
26									0	0	0	0	0	0
27				0.05					0	0	0	0	0	0
28	1640.7	20000	0		24	52	64.0	0.0	0	0	0	0	0	0
29									0	0	0	0	0	0
30	1640.7	20000	0	0.26	24	60	47.0	0.0	0	0	0	0	0	0
31									0	0	0	0	0	0
Monthly Totals			0	7.68						0		0		0
Year to Date Totals			2,937	33.58						0		0		0

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF APRIL 2016

[See Appendix E for breakdown of municipal use by water provider.] Source: Barney Reservoir Joint Ownership Commission

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	RAIN @ BARNEY	TEMP @ BARNEY		MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		STORAGE RELEASED TO TUALATIN			
					Min	Max	TRASK	TUALATIN			CWS		MUNICIPAL	
	feet	ac-ft	ac-ft	in.	ºF	ºF	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1	1640.8	20000	0	0.00	32	65	41.00	0.0	0	0	0	0	0	0
2									0	0	0	0	0	0
3									0	0	0	0	0	0
4	1640.7	20000	0	0.54	30	67	47.0	0.0	0	0	0	0	0	0
5									0	0	0	0	0	0
6	1640.7	20000	0	0.09	30	61	41.0	0.0	0	0	0	0	0	0
7									0	0	0	0	0	0
8	1640.7	20000	0	0.00	40	75	35.0	0.0	0	0	0	0	0	0
9									0	0	0	0	0	0
10									0	0	0	0	0	0
11	1640.6	20000	0	0.00	33	79	31.3	0.0	0	0	0	0	0	0
12									0	0	0	0	0	0
13	1640.7	20000	0	0.37	31	57	35.0	0.0	0	0	0	0	0	0
14	1640.7	20000	0	1.27	27	52	55.5	0.0	0	0	0	0	0	0
15									0	0	0	0	0	0
16									0	0	0	0	0	0
17									0	0	0	0	0	0
18	1640.7	20000	0	0.10	59	73	31.3	0.0	0	0	0	0	0	0
19									0	0	0	0	0	0
20	1640.7	20000	0	0.00	41	78	31.3	0.0	0	0	0	0	0	0
21	1640.7	20000	0	0.00	36	73	31.3	0.0	0	0	0	0	0	0
22									0	0	0	0	0	0
23									0	0	0	0	0	0
24									0	0	0	0	0	0
25	1640.6	20000	0	1.01	28	67	27.6	0.0	0	0	0	0	0	0
26									0	0	0	0	0	0
27	1640.6	20000	0	0.07	24	54	27.6	0.0	0	0	0	0	0	0
28	1640.6	20000	0	0.00	34	56	23.9	0.0	0	0	0	0	0	0
29									0	0	0	0	0	0
30			0	3.45					0	0	0	0	0	0
Monthly Totals			2,937	37.03						0		0		0
Year to Date Totals										0		0		0

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF MAY 2016

[See Appendix E for breakdown of municipal use by water provider.] Source: Barney Reservoir Joint Ownership Commission

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	RAIN @ BARNEY	TEMP @ BARNEY		MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		STORAGE RELEASED TO TUALATIN			
					Min	Max	TRASK	TUALATIN			CWS		MUNICIPAL*	
	feet	ac-ft	ac-ft	in.	°F	°F	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1									0	0	0	0	0	0
2	1640.7	20000	0	0.00	39	74	20.2	0.0	0	0	0	0	0	0
3									0	0	0	0	0	0
4	1640.6	20000	0	0.04	40	74	20.2	0.0	0	0	0	0	0	0
5									0	0	0	0	0	0
6	1640.6	20000	0	0.00	39	72	16.5	0.0	0	0	0	0	0	0
7									0	0	0	0	0	0
8									0	0	0	0	0	0
9	1640.6	20000	0	0.00	33	59	13.0	0.0	0	0	0	0	0	0
10									0	0	0	0	0	0
11	FIRST DAY OF STORED WATER RELEASE FOR MUNICIPAL USE													
	1640.6	20000	0	0.00	34	67	11.3	20.0	0	0	0	0	20	40
12	1640.5	20000	0	0.00	38	67	2.3	20.0	0	0	0	0	20	40
13	1640.0	20000	0	0.00	36	53	1.1	20.0	4	8	0	0	20	40
14									4	8	0	0	20	40
15									4	8	0	0	20	40
16	1640.3	19920	-80	0.72	37	75	4.0	20.0	4	8	0	0	20	40
17									4	8	0	0	20	40
18	1640.2	19880	-40	0.00	34	67	4.0	0.0	4	8	0	0	0	0
19									4	8	0	0	0	0
20	1640.2	19880	0	0.09	32	66	4.0	20.0	4	8	0	0	17	34
21									4	8	0	0	20	40
22									4	8	0	0	20	40
23	1640.0	19800	-80	0.09	34	58	4.0	20.0	4	8	0	0	20	40
24									4	8	0	0	20	40
25	1639.9	19760	-40	0.26	37	60	6.2	20.0	6	12	0	0	20	40
26									6	12	0	0	20	40
27	1639.8	19720	-40	0.06	38	60	6.2	20.0	6	12	0	0	20	40
28								30.4	6	12	0	0	30	60
29									6	12	0	0	30	59
30									6	12	0	0	30	59
31	1639.1	19440	-280	0.00	69	74	6.2	30.4	6	12	0	0	30	60
Monthly Totals			-560	1.26						181		0		827
Year to Date Totals			2,377	38.29						181		0		827

*In this table (Reservoir Operations), the amount of water released is recorded on the day it was released from the reservoir. In the Municipal Use tables (Appendix E), the released water is recorded on the day that it was available for use which one day later.

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF JUNE 2016

[See Appendix E for breakdown of municipal use by water provider.] Source: Barney Reservoir Joint Ownership Commission

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	RAIN @ BARNEY	TEMP @ BARNEY		MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		STORAGE RELEASED TO TUALATIN			
					Min	Max	TRASK	TUALATIN			CWS		MUNICIPAL*	
	feet	ac-ft	ac-ft	in.	ºF	ºF	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1	1638.9	19360	-80	0.00	41	85	8.40	30.0	8	17	0	0	30	59
2									8	17	0	0	30	59
3	1638.6	19240	-120	0.10	43	72	8.4	30.0	8	17	0	0	30	59
4									8	17	0	0	30	59
5									8	17	0	0	30	59
6	1638.1	19040	-200	0.00	48	87	8.4	30.0	8	17	0	0	30	59
7									8	17	0	0	30	59
8	1637.8	18900	-140	0.00	44	82	8.4	30.0	8	17	0	0	30	59
9									8	17	0	0	30	59
10	1637.4	18700	-200	0.14	38	51	8.4	40.0	8	17	0	0	40	79
11									8	17	0	0	40	79
12									8	17	0	0	40	79
13	1636.7	18350	-350	0.44	37	67	8.4	40.1	8	17	0	0	40	79
14									8	17	0	0	40	79
15	1636.3	18150	-200	0.72	32	58	8.4	30.0	8	17	0	0	30	59
16									8	17	0	0	30	59
17	1635.9	17963	-187	0.34	34	57	8.4	30.0	8	17	0	0	30	59
18									8	17	0	0	30	59
19									8	17	0	0	30	59
20	1635.4	17775	-188	0.06	33	67	8.4	30.0	8	17	0	0	30	59
21									8	17	0	0	30	59
22	1635.0	17625	-150	0.00	41	67	8.4	30.0	8	17	0	0	30	59
23									8	17	0	0	30	59
24	1634.8	17550	-75	0.54	40	65	8.4	30.0	8	17	0	0	30	59
25									8	17	0	0	30	59
26									8	17	0	0	30	59
27	1634.1	17288	-262	0.01	37	76	8.4	40.1	8	17	0	0	40	79
28									8	17	0	0	40	79
29	1633.7	17138	-150	0.00	41	74	8.4	40.1	8	17	0	0	40	79
30									8	17	0	0	40	79
Monthly Totals			-2,302	2.35						499		0		1,961
Year to Date Totals			75	40.64						680		0		2,788

*In this table (Reservoir Operations), the amount of water released is recorded on the day it was released from the reservoir. In the Municipal Use tables (Appendix E), the released water is recorded on the day that it was available for use which one day later.

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF JULY 2016

[See Appendix E for breakdown of municipal use by water provider.] Source: Barney Reservoir Joint Ownership Commission

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	RAIN @ BARNEY	TEMP @ BARNEY		MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		STORAGE RELEASED TO TUALATIN			
					Min	Max	TRASK	TUALATIN			CWS		MUNICIPAL*	
	feet	ac-ft	ac-ft	in.	ºF	ºF	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1	1633.1	16913	-225	0.00	40	74	8.40	40.1	8	17	0	0	40	79
2									8	17	0	0	40	79
3									8	17	0	0	40	79
4									8	17	0	0	40	79
5	1632.1	16538	-375	0.00	40	74	8.4	40.1	8	17	0	0	40	79
6	1631.8	16425	-113	0.00	40	66	8.4	40.1	8	17	0	0	40	79
7	1631.5	16313	-112	0.00	38	67	8.4	40.1	8	17	0	0	40	79
8	1631.4	16275	-38	0.27	46	62	7.3	40.1	7	14	0	0	40	79
9									7	14	0	0	40	79
10									7	14	0	0	40	79
11	1630.6	15975	-300	0.39	40	66	8.4	30.0	8	17	0	0	30	59
12									8	17	0	0	30	59
13	1630.2	15825	-150	0.00	38	64	8.4	30.0	8	17	0	0	30	59
14	1630.0	15750	-75	0.00	40	68	8.4	30.0	8	17	0	0	30	59
15									8	17	0	0	30	59
16									8	17	0	0	30	59
17									8	17	0	0	30	59
18	1629.3	15489	-261	0.00	40	70	8.4	30.0	8	17	0	0	30	59
19									8	17	0	0	30	59
20	1628.9	15338	-151	0.00	40	64	8.4	30.0	8	17	0	0	30	59
21									8	17	0	0	30	59
22	1628.5	15188	-150	0.00	46	72	7.3	30.0	7	14	0	0	30	59
23									7	14	0	0	30	59
24									7	14	0	0	30	59
25	1627.7	14888	-300	0.00	42	75	8.4	30.0	8	17	0	0	30	59
26									8	17	0	0	30	59
27	1627.3	14738	-150	0.00	36	78	8.4	30.0	8	17	0	0	30	59
28	1627.1	14663	-75	0.00	38	80	8.4	30.0	8	17	0	0	30	59
29									8	17	0	0	30	59
30									8	17	0	0	30	59
31									8	17	0	0	30	59
Monthly Totals			-2,475	0.66						503		0		2,041
Year to Date Totals			-2,400	41.30						1,182		0		4,829

*In this table (Reservoir Operations), the amount of water released is recorded on the day it was released from the reservoir. In the Municipal Use tables (Appendix E), the released water is recorded on the day that it was available for use which one day later.

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF AUGUST 2016

[See Appendix E for breakdown of municipal use by water provider.] Source: Barney Reservoir Joint Ownership Commission

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	RAIN @ BARNEY	TEMP @ BARNEY		MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		STORAGE RELEASED TO TUALATIN			
					Min	Max	TRASK	TUALATIN			CWS		MUNICIPAL*	
	feet	ac-ft	ac-ft	in.	ºF	ºF	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1	1626.3	14363	-300	0.00	40	85	8.40	30.0	8	17	0	0	30	59
2									8	17	0	0	30	59
3	1625.9	14213	-150	0.00	40	73	8.4	30.0	8	17	0	0	30	59
4									8	17	0	0	30	59
5									8	17	0	0	30	59
6									8	17	0	0	30	59
7									8	17	0	0	30	59
8	1624.8	13800	-413	0.03	41	80	8.4	30.0	8	17	0	0	30	59
9									8	17	0	0	30	59
10	1624.5	13688	-112	0.13	46	66	8.4	30.0	8	17	0	0	30	59
11	1624.3	13613	-75	0.00	45	68	8.4	30.0	8	17	0	0	30	59
12	1624.0	13500	-113	0.00	51	74	8.4	35.1	8	17	0	0	35	69
13									8	17	0	0	35	69
14									8	17	0	0	35	69
15	1623.3	13238	-262	0.00	46	82	8.4	35.1	8	17	0	0	35	69
16									8	17	0	0	35	69
17	1622.8	13050	-188	0.00	43	79	8.4	40.1	8	17	0	0	40	79
18	1622.5	12938	-112	0.00	48	74	8.4	40.1	8	17	0	0	40	79
19	1622.4	12900	-38	0.00	52	86	8.4	40.1	8	17	0	0	40	79
20									8	17	0	0	40	79
21									8	17	0	0	40	79
22	1621.4	12525	-375	0.00	41	87	8.4	40.1	8	17	0	0	40	79
23									8	17	0	0	40	79
24	1620.9	12338	-187	0.00	41	73	8.4	40.1	8	17	0	0	40	79
25									8	17	0	0	40	79
26	1620.3	12113	-225	0.00	53	83	8.4	45.2	8	17	0	0	45	89
27									8	17	0	0	45	89
28									8	17	0	0	45	89
29	1619.3	11766	-347	0.00	43	82	8.4	45.2	8	17	0	0	45	89
30	1619.0	11666	-100	0.00	41	73	8.4	45.2	8	17	0	0	45	89
31	1618.7	11566	-100	0.04	45	66	8.4	59.0	8	17	14	28	45	89
Monthly Totals			-3,097	0.20						516		28		2,252
Year to Date Totals			-5,497	41.50						1,698		28		7,081

*In this table (Reservoir Operations), the amount of water released is recorded on the day it was released from the reservoir. In the Municipal Use tables (Appendix E), the released water is recorded on the day that it was available for use which one day later.

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF SEPTEMBER 2016

[See Appendix E for breakdown of municipal use by water provider.] Source: Barney Reservoir Joint Ownership Commission

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	RAIN @ BARNEY	TEMP @ BARNEY		MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		STORAGE RELEASED TO TUALATIN			
					Min	Max	TRASK	TUALATIN			CWS		MUNICIPAL*	
	feet	ac-ft	ac-ft	in.	°F	°F	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1									8	17	14	28	45	89
2	1618.0	11333	-233	0.13	44	65	8.4	59.0	8	17	14	28	45	89
3									8	17	14	28	45	89
4									8	17	14	28	45	89
5									8	17	14	28	45	89
6	1616.3	10766	-567	0.84	35	61	8.4	59.0	8	17	14	28	45	89
7	1615.9	10633	-133	0.02	42	64	8.4	49.0	8	17	14	28	35	69
8									8	17	14	28	35	69
9	1615.2	10400	-233	0.00	38	66	8.4	49.0	8	17	14	28	35	69
10									8	17	14	28	35	69
11									8	17	14	28	35	69
12	1614.0	10000	-400	0.00	40	75	8.4	49.0	8	17	14	28	35	69
13									8	17	14	28	35	69
14	1613.2	9800	-200	0.00	42	73	8.4	49.0	8	17	14	28	35	69
15									8	17	14	28	35	69
16	1612.5	9625	-175	0.00	40	70	8.4	49.0	8	17	14	28	35	69
17									8	17	14	28	35	69
18									8	17	14	28	35	69
19	1611.3	9325	-300	0.70	41	72	8.4	39.0	8	17	14	28	25	50
20									8	17	14	28	25	50
21	1610.7	9175	-150	0.02	34	60	8.4	39.0	8	17	14	28	25	50
22									8	17	14	28	25	50
23	1610.1	9025	-150	0.09	38	61	8.4	39.0	8	17	14	28	25	50
24									8	17	14	28	25	50
25									8	17	14	28	25	50
26	1609.1	8700	-325	0.38	35	66	8.4	39.0	8	17	14	28	25	50
27									8	17	14	28	25	50
28	1608.4	8466	-234	0.00	26	60	8.4	39.0	8	17	14	28	25	50
29	1608.1	8366	-100	0.00	35	65	8.4	39.0	8	17	14	28	25	50
30									8	17	14	28	25	50
Monthly Totals			-3,200	2.18						499		833		1,960
Year to Date Totals			-8,697	43.68						2,197		861		9,042

*In this table (Reservoir Operations), the amount of water released is recorded on the day it was released from the reservoir. In the Municipal Use tables (Appendix E), the released water is recorded on the day that it was available for use which one day later.

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF OCTOBER 2016

[See Appendix E for breakdown of municipal use by water provider.] Source: Barney Reservoir Joint Ownership Commission

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	RAIN @ BARNEY	TEMP @ BARNEY		MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		STORAGE RELEASED TO TUALATIN			
					Min	Max	TRASK	TUALATIN			CWS		MUNICIPAL*	
	feet	ac-ft	ac-ft	in.	ºF	ºF	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1									8	17	14	28	25	50
2									8	17	14	28	25	50
3	1607.0	8000	-366	1.12	36	62	8.4	39.0	8	17	14	28	25	50
4									8	17	14	28	25	50
5	1606.6	7866	-134	2.09	36	56	8.4	39.0	8	17	14	28	20	40
6	1606.4	7800	-66	0.25	38	56	8.4	35.0	8	17	14	28	20	40
7	1606.3	7766	-34	1.37	40	56	8.4	29.0	8	17	14	28	15	30
8									8	17	14	28	15	30
9									8	17	14	28	15	30
10	1605.9	7633	-133	1.76	32	58	8.4	29.0	8	17	14	28	10	20
11									8	17	14	28	10	20
12	1605.6	7533	-100	0.04	32	52	8.4	24.0	8	17	14	28	5	10
	LAST DAY OF STORED WATER RELEASE FOR MUNICIPAL USE													
13									8	17	14	28	0	0
14	1606.6	7866	333	3.65	36	58	9.5	19.0	10	19	14	28	0	0
15									10	19	0	0	0	0
16									10	19	0	0	0	0
17	1609.8	8900	1034	5.93	37	53	9.5	0.0	10	19	0	0	0	0
18									10	19	0	0	0	0
19	1611.1	9275	375	0.81	32	53	8.4	0.0	10	19	0	0	0	0
20	1611.5	9375	100	0.90	37	59	8.4	0.0	8	17	0	0	0	0
21									8	17	0	0	0	0
22									8	17	0	0	0	0
23									8	17	0	0	0	0
24	1612.5	9625	250	0.98	34	59	8.4	0.0	8	17	0	0	0	0
25									8	17	0	0	0	0
26	1613.0	9750	125	1.32	37	57	8.4	0.0	8	17	0	0	0	0
27									8	17	0	0	0	0
28	1613.7	9925	175	0.54	41	58	8.4	0.0	8	17	0	0	0	0
29									8	17	0	0	0	0
30									8	17	0	0	0	0
31	1614.4	10133	208	1.79	37	57	9.5	0.0	10	19	0	0	0	0
Monthly Totals			1,767	22.55						531		389		416
Year to Date Totals			-6,930	66.23						2,728		1,250		9,457

*In this table (Reservoir Operations), the amount of water released is recorded on the day it was released from the reservoir. In the Municipal Use tables (Appendix E), the released water is recorded on the day that it was available for use which one day later.

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF NOVEMBER 2016

[See Appendix E for breakdown of municipal use by water provider.] Source: Barney Reservoir Joint Ownership Commission

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	RAIN @ BARNEY	TEMP @ BARNEY		MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		STORAGE RELEASED TO TUALATIN			
					Min	Max	TRASK	TUALATIN			CWS		MUNICIPAL	
	feet	ac-ft	ac-ft	in.	°F	°F	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1									10	19	0	0	0	0
2	1615.1	10366	233	0.41	38	52	8.4	0.0	8	17	0	0	0	0
3									8	17	0	0	0	0
4	1615.6	10533	167	0.07	38	56	8.4	0.0	8	17	0	0	0	0
5									8	17	0	0	0	0
6									8	17	0	0	0	0
7	1616.2	10733	200	1.19	38	58	8.4	0.0	8	16	0	0	0	0
8									8	17	0	0	0	0
9	1616.6	10833	100	0.10	39	56	8.4	0.0	8	17	0	0	0	0
10	1616.6	10866	33	0.02	40	58	8.4	0.0	8	17	0	0	0	0
11									8	17	0	0	0	0
12									8	16	0	0	0	0
13									8	17	0	0	0	0
14									8	17	0	0	0	0
15	1617.5	11166	300	2.54	36	59	9.5	0.0	10	19	0	0	0	0
16									10	19	0	0	0	0
17	1618.4	11466	300	1.29	26	50	9.5	0.0	10	19	0	0	0	0
18	1618.6	11533	67	0.01	31	45	8.4	0.0	8	17	0	0	0	0
19									8	17	0	0	0	0
20									8	17	0	0	0	0
21	1619.2	11733	200	1.03	32	51	8.4	0.0	8	17	0	0	0	0
22	1619.4	11800	67	0.04	31	47	8.4	0.0	8	17	0	0	0	0
23	1619.7	11900	100	1.26	30	46	4.0	0.0	4	8	0	0	0	0
24									4	8	0	0	0	0
25	1622.7	13013	1113	5.73	32	44	8.4	0.0	8	17	0	0	0	0
26									8	17	0	0	0	0
27									8	17	0	0	0	0
28	1625.1	13913	900	1.85	48	50	2.3	0.0	3	7	0	0	0	0
29	1625.6	14100	187	0.16	32	46	3.4	0.0	3	7	0	0	0	0
30	1626.1	14288	188	0.77	29	44	3.4	0.0	3	7	0	0	0	0
Monthly Totals			4,155	16.47						459		0		0
Year to Date Totals			-2,775	82.70						3,187		1,250		9,457

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF DECEMBER 2016

[See Appendix E for breakdown of municipal use by water provider.] Source: Barney Reservoir Joint Ownership Commission

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	RAIN @ BARNEY	TEMP @ BARNEY		MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		STORAGE RELEASED TO TUALATIN			
					Min	Max	TRASK	TUALATIN			CWS		MUNICIPAL	
	feet	ac-ft	ac-ft	in.	ºF	ºF	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1									3	6	0	0	0	0
2	1627.1	14663	375	0.41	26	44	2.8	0.0	2	4	0	0	0	0
3									2	4	0	0	0	0
4									2	4	0	0	0	0
5	1628.4	15150	487	2.37	24	45	1.7	0.0	2	4	0	0	0	0
6	1628.8	15300	150	0.55	19	36	1.7	0.0	2	4	0	0	0	0
7	1629.1	15413	113	0.00	17	36	1.1	0.0	2	4	0	0	0	0
8									2	4	0	0	0	0
9	1629.8	15675	262	0.58	18	36	1.1	0.0	2	4	0	0	0	0
10									0	0	0	0	0	0
11									0	0	0	0	0	0
12									0	0	0	0	0	0
13									0	0	0	0	0	0
14	1632.3	16613	938	4.05	21	42	1.7	0.0	0	0	0	0	0	0
15	1632.5	16688	75	0.24	16	31	1.1	0.0	0	0	0	0	0	0
16	1632.8	16800	112	0.00	16	36	1.1	0.0	0	0	0	0	0	0
17									0	0	0	0	0	0
18									0	0	0	0	0	0
19	1633.5	17063	263	0.72	14	43	1.7	0.0	0	0	0	0	0	0
20									0	0	0	0	0	0
21	1635.0	17625	562	2.31	23	44	2.3	0.0	0	0	0	0	0	0
22	1635.4	17775	150	0.00	24	42	1.7	0.0	0	0	0	0	0	0
23	1636.0	18000	225	0.54	24	38	1.7	0.0	0	0	0	0	0	0
24									0	0	0	0	0	0
25									0	0	0	0	0	0
26									0	0	0	0	0	0
27	1637.1	18550	550	1.20	22	38	2.3	0.0	0	0	0	0	0	0
28	1637.5	18750	200	0.46	24	38	2.8	0.0	0	0	0	0	0	0
29									0	0	0	0	0	0
30	1638.0	19000	250	0.12	28	41	1.7	0.0	0	0	0	0	0	0
31									0	0	0	0	0	0
Monthly Totals			4,712	13.55						23		0		0
Year to Date Totals			1937	96.25						3,210		1,250		9,457

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Appendix E

Municipal Water Use Allocations
Monthly Records

MONTHLY SUMMARIES OF MUNICIPAL ALLOCATIONS

MUNICIPAL ALLOCATIONS FOR THE MONTH OF MAY 2016

Source: Joint Water Commission

DAY	TOTAL MUNICIPAL USE	MUNICIPAL USE BY RESERVOIR		BREAKDOWN OF MUNCIPAL USE BY WATER PROVIDER†						
				HILLSBORO		FOREST GROVE		BEAVERTON		TVWD
		Barney	Scoggins	Barney	Scoggins	Barney	Scoggins	Barney	Scoggins	Barney
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11	FIRST DAY OF STORED WATER RELEASE FOR MUNICIPAL USE: MAY 11, 2016 from Barney Reservoir									
12	20	20	0	10	0.0	0.9	0.0	4.7	0.0	4.5
13	50	20	30	3.8	18	0.0	0.5	2.3	11	14
14	45	20	25	3.6	14	0.0	0.6	2.6	10	14
15	45	20	25	2.9	13	0.0	0.6	2.4	11	15
16	45	20	25	3.6	13	0.0	1.1	3.0	11	13
17	40	20	20	6.5	12	0.0	0.3	4.5	8.1	9.0
18	20	20	0	12	0.0	0.1	0.0	4.8	0.0	3.5
19	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	30	17	13	5.0	6.6	0.0	0.3	4.6	6.1	7.5
22	35	20	15	6.4	7.9	0.0	0.3	5.6	6.8	8.0
23	35	20	15	6.8	8.5	0.0	0.2	5.0	6.3	8.3
24	30	20	10	5.9	4.8	0.0	0.3	6.1	4.9	8.0
25	35	20	15	5.8	7.7	0.0	0.3	5.3	7.1	8.9
26	35	20	15	6.0	7.9	0.0	0.3	5.2	6.8	8.8
27	35	20	15	6.8	8.5	0.0	0.5	4.8	6.0	8.4
28	42	20	22	2.4	11	0.0	0.2	2.2	10	15
29	52	30	22	6.6	12	0.0	0.2	5.1	9.5	18
30	52	30	22	7.6	13	0.0	0.2	5.1	8.8	17
31	52	30	20	8.4	13	0.0	0.9	5.0	8.0	17
Monthly Summary (beginning on the first day of stored water use, May 12, 2016)										
Mean daily cfs	35	19	16	5.5	8.6	0.0	0.3	3.9	6.6	9.9
Total ac-ft	1,384	768	617	217	341	1.9	13	156	263	393
Stored Water Use Summary to Date (May 12 – May 31)										
Mean daily cfs	35	19	16	5.5	8.6	0.0	0.3	3.9	6.6	9.9
Total ac-ft	1,384	768	617	217	341	1.9	13	156	263	393

†In this table (Municipal Use), the amount of water allocated to each provider is recorded on the day that it was available. In the Barney Reservoir Operations table (Appendix D), the amount of water released is recorded on the day it was released from the reservoir, which is one day earlier than its availability.

MUNICIPAL ALLOCATIONS FOR THE MONTH OF JUNE 2016

Source: Joint Water Commission

DAY	TOTAL MUNICIPAL USE	MUNICIPAL USE BY RESERVOIR		BREAKDOWN OF MUNCIPAL USE BY WATER PROVIDER†						
				HILLSBORO		FOREST GROVE		BEAVERTON		TVWD
		Barney	Scoggins	Barney	Scoggins	Barney	Scoggins	Barney	Scoggins	Barney
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1	57	30	27	7.5	17	0.0	1.3	3.7	8.5	19
2	65	30	35	4.3	21	0.0	0.9	2.7	13	23
3	70	30	40	5.3	27	0.0	0.8	2.3	12	22
4	65	30	35	4.4	21	0.0	1.4	2.7	13	23
5	65	30	35	4.7	21	0.0	1.3	2.8	12	23
6	65	30	35	3.3	20	0.0	1.3	2.3	14	24
7	70	30	40	4.3	25	0.0	1.4	2.4	14	23
8	50	30	20	7.4	11	0.0	1.1	5.0	7.7	18
9	60	30	30	3.3	15	0.0	1.0	2.9	14	24
10	60	30	30	7.4	19	0.0	0.6	4.2	11	19
11	55	40	15	15	9.2	0.0	0.7	8.3	5.2	17
12	55	40	15	16	9.2	0.0	1.2	8.1	4.7	16
13	55	40	15	16	9.4	0.0	0.7	8.3	5.0	16
14	40	40	0	14	0.0	0.7	0.0	13	0.0	13
15	40	40	0	14	0.0	0.7	0.0	12	0.0	13
16	30	30	0	11	0.0	0.5	0.0	9.0	0.0	9.7
17	35	30	5	9.9	2.2	0.0	0.7	9.1	2.1	11
18	45	30	15	8.8	7.7	0.0	1.0	7.3	6.4	14
19	45	30	15	9.3	7.9	0.0	0.9	7.3	6.2	14
20	45	30	15	10	8.5	0.0	1.0	6.7	5.5	13
21	52	30	22	6.8	12	0.0	1.2	4.9	8.8	18
22	60	30	30	6.9	18	0.0	1.2	4.2	11	19
23	65	30	35	4.9	21	0.0	0.9	3.2	14	22
24	65	30	35	6.3	23	0.0	1.0	3.0	11	21
25	55	30	25	6.7	15	0.0	1.0	4.3	9.4	19
26	55	30	25	7.0	15	0.0	0.9	4.4	9.2	19
27	55	30	25	6.2	14	0.0	1.0	4.3	9.9	20
28	65	40	25	9.3	14	0.0	1.0	6.6	10	24
29	65	40	25	9.7	15	0.0	1.0	6.0	9.2	24
30	65	40	25	10	15	0.0	1.0	6.2	9.1	24
Monthly Summary (June)										
Mean daily cfs	56	33	23	8.3	14	0.1	0.9	5.6	8.5	19
Total ac-ft	3,320	1,944	1,377	494	818	3.8	54	331	504	1115
Stored Water Use Summary to Date (May 12–June 30)										
Mean daily cfs	48	27	20	7.2	12	0.1	0.7	4.9	7.7	15
Total ac-ft	4,705	2,711	1,993	711	1,159	5.7	68	487	767	1,508

†In this table (Municipal Use), the amount of water allocated to each provider is recorded on the day that it was available. In the Barney Reservoir Operations table (Appendix D), the amount of water released is recorded on the day it was released from the reservoir, which is one day earlier than its availability.

MUNICIPAL ALLOCATIONS FOR THE MONTH OF JULY 2016

Source: Joint Water Commission

DAY	TOTAL MUNICIPAL USE	MUNICIPAL USE BY RESERVOIR		BREAKDOWN OF MUNCIPAL USE BY WATER PROVIDER†						
				HILLSBORO		FOREST GROVE		BEAVERTON		TVWD
		Barney	Scoggins	Barney	Scoggins	Barney	Scoggins	Barney	Scoggins	Barney
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1	75	40	35	12	17	0.0	8.5	6.5	9.5	22
2	60	40	20	15	11	0.0	4.1	7.6	5.4	18
3	60	40	20	14	11	0.0	3.2	7.5	5.8	18
4	60	40	20	13	9.8	0.0	4.4	7.9	5.8	19
5	60	40	20	14	9.6	0.0	4.8	8.0	5.7	19
6	50	40	10	14	3.0	0.0	4.7	11	2.4	15
7	55	40	15	13	5.2	0.0	5.9	10	3.9	16
8	60	40	20	18	11	0.0	4.1	8.0	5.0	15
9	50	40	10	21	4.8	0.0	3.0	9.8	2.2	9.3
10	50	40	10	20	4.1	0.0	3.7	11	2.2	8.9
11	50	40	10	19	4.2	0.0	3.4	11	2.4	10.0
12	30	30	0	11	0.0	3.4	0.0	8.9	0.0	6.9
13	50	30	20	12	8.9	0.0	5.8	7.4	5.3	10
14	50	30	20	8.5	8.1	0.0	5.3	7.0	6.6	15
15	50	30	20	8.4	9.2	0.0	4.6	5.8	6.3	16
16	57	30	27	8.7	15	0.0	4.5	4.3	7.5	17
17	57	30	27	8.7	15	0.0	4.5	4.3	7.5	17
18	57	30	27	7.6	14	0.0	4.9	4.4	8.1	18
19	62	30	32	9.6	19	0.0	4.6	4.1	8.2	16
20	65	30	35	8.6	22	0.0	4.7	3.6	8.9	18
21	60	30	30	9.9	18	0.0	4.4	4.1	7.5	16
22	65	30	35	9.4	18	0.0	7.0	5.3	10	15
23	70	30	40	6.9	22	0.0	6.2	3.7	12	19
24	70	30	40	9.7	24	0.0	5.3	4.2	11	16
25	70	30	40	9.8	24	0.0	5.5	4.3	11	16
26	70	30	40	6.1	22	0.0	6.2	3.3	12	21
27	65	30	35	6.9	18	0.0	5.9	4.0	11	19
28	65	30	35	6.2	17	0.0	6.4	4.0	11	20
29	65	30	35	7.0	18	0.0	6.4	4.4	11	19
30	70	30	40	8.5	23	0.0	6.1	4.2	11	17
31	70	30	40	8.0	23	0.0	5.6	4.1	12	18
Monthly Summary (July)										
Mean daily cfs	60	34	26	11	14	0.1	5.0	6.2	7.3	16
Total ac-ft	3,666	2,063	1,603	682	849	6.6	304	383	450	991
Stored Water Use Summary to Date (May 12–July 31)										
Mean daily cfs	52	30	22	8.7	13	0.1	2.3	5.4	7.6	16
Total ac-ft	8,370	4,774	3,596	1,393	2,008	12.3	372	870	1,216	2,499

†In this table (Municipal Use), the amount of water allocated to each provider is recorded on the day that it was available. In the Barney Reservoir Operations table (Appendix D), the amount of water released is recorded on the day it was released from the reservoir, which is one day earlier than its availability.

MUNICIPAL ALLOCATIONS FOR THE MONTH OF AUGUST 2016

Source: Joint Water Commission

DAY	TOTAL MUNICIPAL USE	MUNICIPAL USE BY RESERVOIR		BREAKDOWN OF MUNCIPAL USE BY WATER PROVIDER†						
				HILLSBORO		FOREST GROVE		BEAVERTON		TVWD
		Barney	Scoggins	Barney	Scoggins	Barney	Scoggins	Barney	Scoggins	Barney
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1	70	30	40	8.0	24	0.0	5.0	3.9	11	18
2	75	30	45	5.4	26	0.0	6.3	2.7	13	22
3	75	30	45	5.2	27	0.0	6.8	2.2	11	23
4	75	30	45	5.7	26	0.0	6.5	2.7	12	22
5	75	30	45	5.0	25	0.0	6.7	2.5	13	23
6	75	30	45	5.6	27	0.0	6.1	2.6	12	22
7	75	30	45	5.5	27	0.0	5.9	2.6	13	22
8	75	30	45	5.0	27	0.0	5.0	2.5	13	23
9	65	30	35	6.5	18	0.0	4.8	4.2	12	19
10	60	30	30	8.8	15	0.0	5.6	5.3	9.2	16
11	70	30	40	8.7	23	0.0	6.6	4.0	11	17
12	80	30	50	4.7	30	0.0	6.7	2.2	14	23
13	82	35	47	7.8	27	0.0	6.5	3.9	14	23
14	80	35	45	6.8	24	0.0	6.6	3.9	14	24
15	80	35	45	8.5	26	0.0	6.2	4.1	13	22
16	75	35	40	10	23	0.0	6.1	4.6	11	20
17	77	35	42	8.4	23	0.0	6.4	4.3	12	22
18	90	40	50	9.5	29	0.0	7.6	4.4	13	26
19	85	40	45	12	27	0.0	7.3	5.0	11	23
20	77	40	37	12	20	0.0	6.6	6.1	10	22
21	77	40	37	12	21	0.0	6.2	6.0	10	22
22	77	40	37	12	21	0.0	4.7	6.0	11	23
23	72	40	32	15	17	0.0	6.4	7.7	8.8	18
24	67	40	27	16	14	0.0	5.2	8.1	7.5	16
25	67	40	27	15	14	0.0	5.9	8.2	7.6	17
26	76	40	36	13	20	0.0	6.5	6.6	9.9	20
27	78	45	33	15	17	0.0	6.5	8.1	9.3	22
28	78	45	33	16	18	0.0	5.6	7.9	9.2	22
29	78	45	33	16	19	0.0	5.8	7.6	8.8	21
30	70	45	25	16	12	0.0	6.8	7.9	5.9	21
31	65	45	20	18	9.6	0.0	5.4	9.4	5.1	18
Monthly Summary (August)										
Mean daily cfs	75	36	39	10	22	0.0	6.1	5.1	11	21
Total ac-ft	4,604	2,222	2,382	618	1341	0.0	377	311	665	1293
Stored Water Use Summary to Date (May 12–August 31)										
Mean daily cfs	59	32	27	9.1	15	0.1	3.4	5.3	8.5	17
Total ac-ft	12,974	6,996	5,978	2,011	3,348	12.3	749	1,182	1,881	3,791

†In this table (Municipal Use), the amount of water allocated to each provider is recorded on the day that it was available. In the Barney Reservoir Operations table (Appendix D), the amount of water released is recorded on the day it was released from the reservoir, which is one day earlier than its availability.

MUNICIPAL ALLOCATIONS FOR THE MONTH OF SEPTEMBER 2016

Source: Joint Water Commission

DAY	TOTAL MUNICIPAL USE	MUNICIPAL USE BY RESERVOIR		BREAKDOWN OF MUNCIPAL USE BY WATER PROVIDER†						
				HILLSBORO		FOREST GROVE		BEAVERTON		TVWD
		Barney	Scoggins	Barney	Scoggins	Barney	Scoggins	Barney	Scoggins	Barney
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1	65	45	20	18	10	0.0	4.9	9.1	5.1	18
2	65	45	20	16	8.8	0.0	5.9	9.5	5.3	20
3	65	45	20	16	9.7	0.0	5.2	8.9	5.2	20
4	65	45	20	15	9.8	0.0	4.4	8.9	5.8	21
5	65	45	20	16	10	0.0	4.0	8.8	5.6	20
6	65	45	20	16	9.5	0.0	5.1	9.3	5.5	20
7	50	45	5	17	0.0	0.2	5.0	13	0.0	15
8	35	35	0	11	0.0	3.9	0.0	9.9	0.0	9.9
9	45	35	10	15	3.6	0.0	4.4	8.6	2.0	11
10	52	35	17	11	8.1	0.0	4.2	6.5	4.7	17
11	52	35	17	12	7.2	0.0	5.8	6.7	4.0	16
12	52	35	17	14	5.6	0.0	3.8	3.6	7.6	17
13	74	35	39	11	22	0.0	5.7	2.7	12	22
14	75	35	40	11	23	0.0	5.9	2.7	11	22
15	75	35	40	9.7	23	0.0	5.7	2.4	12	23
16	70	35	35	11	20	0.0	5.4	2.9	9.9	21
17	60	35	25	13	13	0.0	3.9	3.3	8.7	19
18	60	35	25	13	12	0.0	3.7	3.2	8.9	19
19	60	35	25	14	9.5	0.0	4.2	3.5	11	18
20	30	25	5	8.1	0.7	0.0	3.5	10	0.8	6.6
21	40	25	15	14	1.1	0.0	5.3	3.5	8.6	7.6
22	40	25	15	14	2.8	0.0	3.9	3.4	8.3	8.0
23	40	25	15	15	3.9	0.0	3.7	3.7	7.5	6.4
24	40	25	15	15	3.4	0.0	3.7	3.7	7.9	6.5
25	40	25	15	15	4.4	0.0	3.3	3.7	7.3	6.3
26	40	25	15	12	7.1	0.0	3.7	6.8	4.2	6.5
27	40	25	15	11	7.8	0.0	3.2	5.7	4.0	8.2
28	50	25	25	9.2	13	0.0	4.6	5.3	7.5	10
29	55	25	30	7.3	16	0.0	5.1	3.9	8.7	14
30	50	25	25	8.0	14	0.0	3.9	4.3	7.4	13
Monthly Summary (September)										
Mean daily cfs	54	34	20	13	9.3	0.1	4.4	5.9	6.5	15
Total ac-ft	3,203	2,003	1200	771	552	8.2	260	351	388	872
Stored Water Use Summary to Date (May 12–September 30)										
Mean daily cfs	58	32	26	10	14	0.1	3.6	5.5	8.1	17
Total ac-ft	16,177	8,999	7,178	2,782	3,900	21	1,008	1,533	2,270	4,664

†In this table (Municipal Use), the amount of water allocated to each provider is recorded on the day that it was available. In the Barney Reservoir Operations table (Appendix D), the amount of water released is recorded on the day it was released from the reservoir, which is one day earlier than its availability.

MUNICIPAL ALLOCATIONS FOR THE MONTH OF OCTOBER 2016

Source: Joint Water Commission

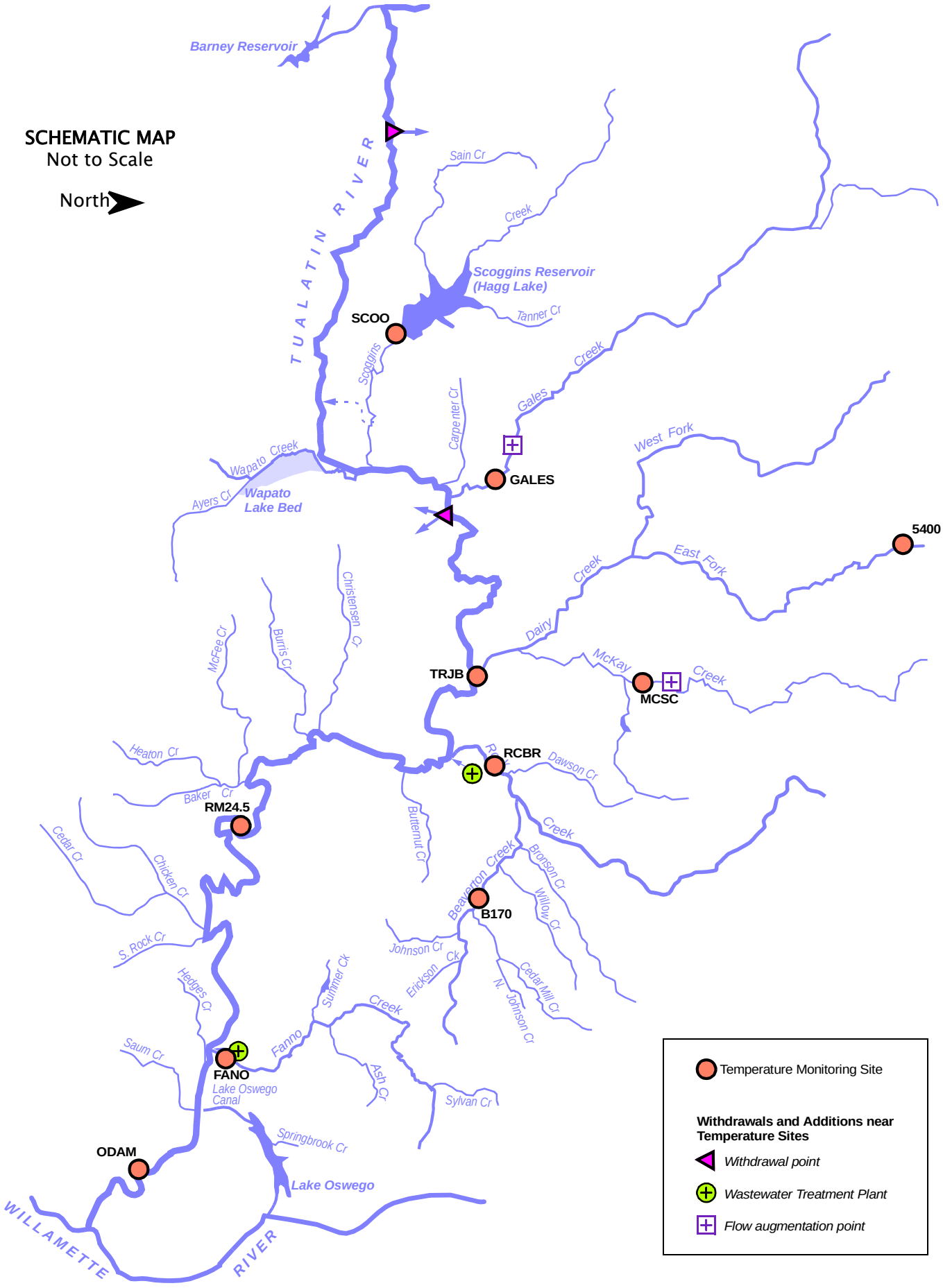
DAY	TOTAL MUNICIPAL USE	MUNICIPAL USE BY RESERVOIR		BREAKDOWN OF MUNCIPAL USE BY WATER PROVIDER†						
				HILLSBORO		FOREST GROVE		BEAVERTON		TVWD
		Barney	Scoggins	Barney	Scoggins	Barney	Scoggins	Barney	Scoggins	Barney
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1	45	25	20	9.1	11	0.0	3.7	4.9	5.8	11
2	45	25	20	8.9	11	0.0	3.7	4.8	5.8	11
3	45	25	20	9.2	11	0.0	3.1	4.9	5.9	11
4	35	25	10	12	4.6	0.0	2.8	7.0	2.6	5.9
5	35	25	10	11	4.6	0.0	2.5	7.0	2.9	6.6
6	30	20	10	8.0	4.4	0.0	2.4	6.1	3.3	5.9
7	30	20	10	6.5	3.4	0.0	3.1	6.6	3.5	6.9
8	25	15	10	4.3	3.7	0.0	2.4	4.7	4.0	6.1
9	25	15	10	4.6	4.1	0.0	1.9	4.5	4.0	5.9
10	25	15	10	4.2	3.9	0.0	1.6	4.8	4.5	6.0
11	20	10	10	1.9	3.5	0.0	1.3	2.8	5.2	5.3
12	20	10	10	1.7	2.9	0.0	2.0	3.0	5.1	5.3
13	5	5	0	3.0	0.0	0.4	0.0	1.0	0.0	0.7
14	LAST DAY OF STORED WATER RELEASE FOR MUNICIPAL USE									
15	October 12, 2016 from Barney & Scoggins Reservoirs									
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
Monthly Summary										
Mean daily cfs	30	18	12	6.5	5.2	0.0	2.3	4.8	4.0	6.8
Total ac-ft	764	466	298	168	133	0.7	60	123	104	174
Stored Water Use Summary 2016 (May 12–October 13)										
Mean daily cfs	55	31	24	10	13	0.1	3.5	5.4	7.7	16
Total ac-ft	16,941	9,465	7,476	2,950	4,034	21	1,068	1,656	2,374	4,838

†In this table (Municipal Use), the amount of water allocated to each provider is recorded on the day that it was available. In the Barney Reservoir Operations table (Appendix D), the amount of water released is recorded on the day it was released from the reservoir, which is one day earlier than its availability.

Appendix F

Stream Temperature Records

MAP OF STREAM TEMPERATURE MONITORING SITES



STREAM TEMPERATURE SITES — ALPHABETICAL LISTING BY SITE CODE

SITE CODE	SITE NAME	RIVER MILE	STATION ID	PAGE
5400	East Fork Dairy Creek near Meacham Corner, OR	12.4	14205400	F-6
B170	Beaverton Creek at 170th Ave, Beaverton, Oregon	4.9	—	F-9
FANO	Fanno Creek at Durham Road near Tigard, Oregon	1.2	14206950	F-12
GALES	Gales Creek at Old Hwy 47 near Forest Grove, Oregon	2.36	14204530	F-5
MCSC	McKay Creek at Scotch Church Road above Waible Ck near North Plains, Oregon	6.3	14206070	F-7
ODAM	Tualatin River at Oswego Dam near West Linn, Oregon	3.4	14207200	F-13
RCBR	Rock Creek at Brookwood Avenue, Hillsboro, Oregon	2.4	—	F-10
RM24.5	Tualatin River at RM 24.5 near Scholls, Oregon	24.5	14206694	F-11
SCOO	Scoggins Creek below Henry Hagg Lake near Gaston, Oregon	4.80	14202980	F-4
TRJB	Tualatin River at Hwy 219 Bridge	44.4	14206241	F-8

UNITED STATES DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY — OREGON WATER SCIENCE CENTER

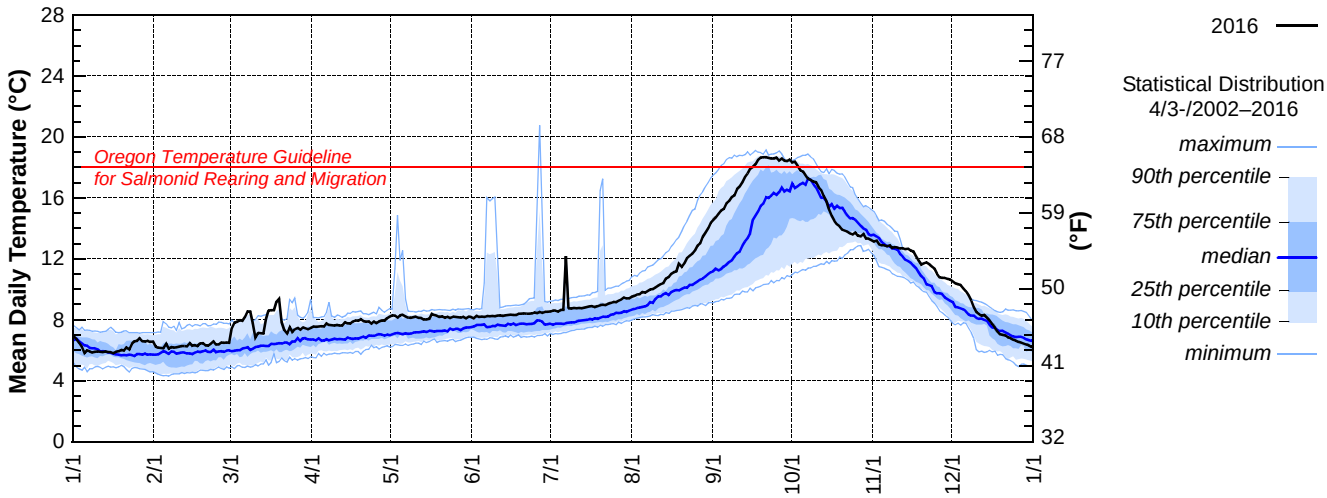
STATION NUMBER 14202980 SCOGGINS CK BLW HENRY HAGG LAKE, NR GASTON, OR

LATITUDE: 452810 LONGITUDE: 12311561

Day	2016 Mean Daily Water Temperature in Degrees Celsius											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT†	NOV†	DEC†
1	6.93	6.26	6.49	7.48	8.21	8.18	8.54	9.50	14.54	18.32	13.15	10.52
2	6.73	6.16	7.44	7.55	8.28	8.11	8.60	9.56	14.71	18.37	13.20	10.38
3	6.51	6.14	7.81	7.54	8.26	8.26	8.60	9.65	14.97	18.12	12.95	10.33
4	6.20	6.13	7.87	7.56	8.14	8.19	8.55	9.68	15.17	17.80	12.89	10.28
5	5.81	6.41	7.98	7.57	8.28	8.21	8.64	9.82	15.29	17.73	12.88	10.07
6	5.98	6.11	7.93	7.56	8.33	8.19	8.65	9.79	15.63	17.48	12.83	9.88
7	5.94	6.20	8.19	7.76	8.23	8.25	12.18	9.88	15.80	17.28	12.89	9.60
8	5.85	6.16	8.55	7.66	8.15	8.22	8.76	10.00	16.06	17.20	12.72	9.26
9	5.89	6.18	8.54	7.63	8.12	8.24	8.73	10.01	16.17	17.06	12.76	8.82
10	5.91	6.24	7.76	7.62	8.17	8.23	8.78	10.11	16.56	17.03	12.74	8.50
11	5.89	6.28	6.85	7.66	8.21	8.26	8.75	10.24	16.73	16.71	12.67	8.37
12	5.88	6.28	7.14	7.62	8.13	8.29	8.77	10.34	17.02	16.53	12.70	8.27
13	5.91	6.26	7.12	7.61	8.13	8.25	8.76	10.40	17.36	16.12	12.64	8.30
14	5.88	6.46	7.09	7.85	8.02	8.29	8.79	10.71	17.59	15.77	12.66	8.14
15	5.88	6.30	8.04	7.77	8.02	8.32	8.83	10.80	17.90	15.23	12.54	7.98
16	5.81	6.34	8.60	7.75	8.05	8.33	8.87	11.02	18.04	14.83	12.49	7.73
17	5.89	6.28	8.63	7.89	8.39	8.32	8.89	11.12	18.21	14.50	12.18	7.48
18	5.93	6.44	8.62	7.95	8.30	8.31	8.84	11.16	18.49	14.25	11.90	7.23
19	6.03	6.46	9.20	7.93	8.27	8.39	8.89	11.70	18.64	14.13	11.63	7.04
20	5.97	6.31	9.38	8.03	8.18	8.40	8.96	11.48	18.66	13.91	11.71	7.01
21	6.18	6.30	7.85	7.91	8.23	8.42	8.98	11.71	18.66	13.86	11.77	6.97
22	6.06	6.42	7.34	7.86	8.15	8.40	8.97	12.05	18.62	13.79	11.66	6.83
23	6.42	6.58	7.12	7.89	8.21	8.39	9.05	12.19	18.59	13.67	11.50	6.79
24	6.58	6.38	7.51	7.74	8.13	8.42	9.10	12.34	18.58	13.60	11.36	6.69
25	6.61	6.38	7.20	7.89	8.21	8.47	9.18	12.55	18.65	13.73	11.01	6.63
26	6.79	6.50	7.38	7.79	8.19	8.44	9.15	12.86	18.45	13.51	10.79	6.55
27	6.59	6.49	7.48	7.89	8.17	8.51	9.26	13.02	18.59	13.48	10.75	6.50
28	6.56	6.50	7.35	7.95	8.15	8.46	9.34	13.45	18.44	13.63	10.75	6.45
29	6.63	6.57	7.50	7.94	8.20	8.52	9.46	13.72	18.41	13.32	10.69	6.37
30	6.55	—	7.45	8.09	8.09	8.51	9.41	14.01	18.51	13.32	10.64	6.31
31	6.56	—	7.39	—	8.20	—	9.40	14.36	—	13.25	—	6.20
MEAN	6.20	6.33	7.77	7.76	8.19	8.33	9.02	11.27	17.30	15.40	12.10	7.98
MAX	6.93	6.58	9.38	8.09	8.39	8.52	12.18	14.36	18.66	18.37	13.20	10.52
MIN	5.81	6.11	6.49	7.48	8.02	8.11	8.54	9.50	14.54	13.25	10.64	6.20

† Provisional data beginning 10/25/2016–subject to revision

SCOO – 14202980 – Scoggins Creek below Henry Hagg Lake near Gaston, Oregon [RM 4.80]



UNITED STATES DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY — OREGON WATER SCIENCE CENTER

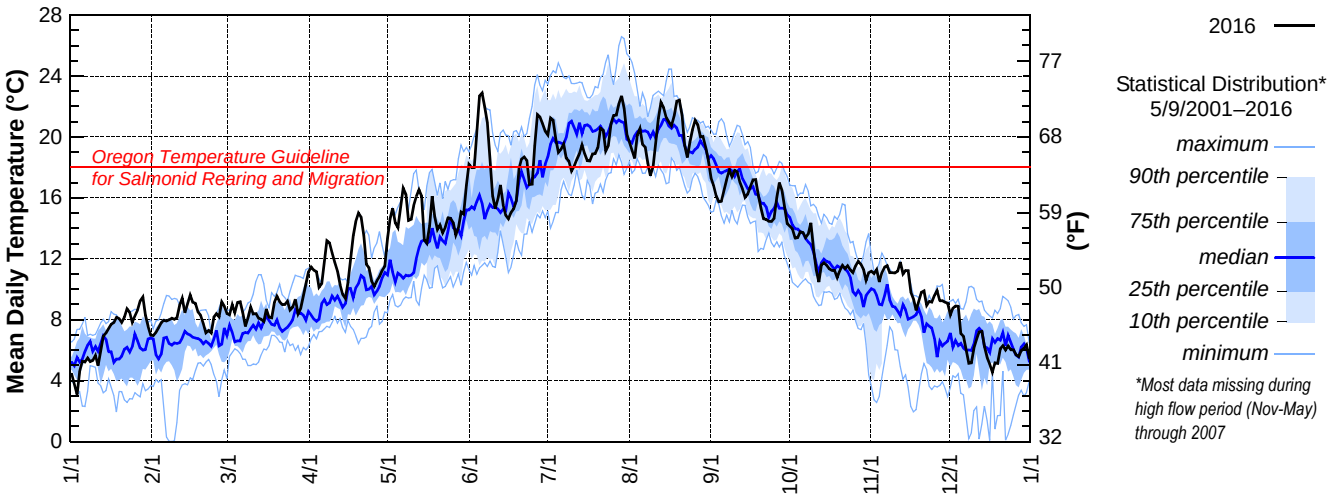
STATION NUMBER 453040123065201 GALES CREEK AT OLD HWY 47, FOREST GROVE, OR**

LATITUDE: 453039.75 LONGITUDE: 1230652.0

Day	2016 Mean Daily Water Temperature in Degrees Celsius											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT†	NOV†	DEC†
1	4.42	6.97	8.42	11.13	13.33	18.20	20.13	19.65	17.32	14.14	11.19	8.31
2	3.77	7.18	8.32	11.46	14.62	17.98	21.25	19.13	16.83	13.97	11.03	8.76
3	3.09	7.47	8.99	11.26	15.31	17.99	21.10	18.59	16.15	13.36	11.29	8.91
4	4.60	7.81	8.46	11.16	14.35	20.52	19.84	20.11	15.75	13.39	10.48	8.89
5	5.28	7.96	9.14	10.13	14.04	22.70	18.99	20.54	15.78	13.77	11.09	7.10
6	5.22	7.92	9.18	10.37	15.46	22.89	19.20	19.52	16.49	13.73	11.46	6.91
7	5.50	8.00	8.48	11.75	16.65	21.94	19.54	19.33	17.22	13.38	11.56	6.02
8	5.25	8.10	7.56	13.19	16.24	20.94	18.61	18.28	17.84	13.63	11.09	5.15
9	5.33	8.03	8.11	13.05	14.52	18.53	18.41	17.46	17.39	14.36	11.09	5.17
10	5.66	8.13	8.84	12.39	14.59	16.12	17.76	18.06	17.80	12.60	11.07	6.13
11	4.99	8.95	8.38	11.77	15.50	15.28	18.09	19.48	17.72	11.30	11.19	6.71
12	5.99	9.40	8.41	11.22	16.08	15.91	18.51	21.23	17.05	10.47	11.79	7.21
13	6.93	8.46	8.10	10.29	16.53	16.85	18.91	22.27	16.59	11.61	11.00	7.24
14	7.14	9.01	8.04	9.67	16.13	15.54	19.48	21.92	16.04	11.74	11.23	6.24
15	7.43	9.62	7.89	9.40	13.25	14.86	18.92	21.28	16.26	11.58	11.23	5.52
16	7.70	9.15	8.71	10.46	13.03	14.62	18.44	20.97	16.72	11.34	9.81	5.10
17	7.82	9.08	8.16	11.87	14.16	15.03	18.42	20.73	17.18	11.24	9.38	4.55
18	8.16	8.51	8.12	13.52	16.11	15.28	18.89	21.34	17.20	11.25	8.62	5.17
19	8.08	8.30	9.13	14.45	14.77	15.80	18.91	22.34	16.22	10.77	9.17	5.13
20	7.83	7.75	9.54	15.01	13.92	17.90	19.31	22.41	15.32	11.22	9.80	6.10
21	8.17	7.14	9.18	14.75	14.22	18.55	20.57	21.42	14.63	11.58	9.90	6.30
22	8.72	7.30	8.99	13.51	13.71	18.69	20.44	19.46	14.59	11.36	8.94	6.01
23	8.49	7.13	9.00	11.64	14.06	18.45	19.07	18.65	14.46	11.56	9.20	6.28
24	7.83	8.17	9.22	11.42	14.69	16.88	19.42	19.66	14.45	11.27	9.15	6.03
25	8.25	8.39	8.64	10.53	14.66	16.90	20.87	20.47	14.65	11.09	9.60	6.03
26	8.64	8.20	8.83	10.19	14.38	19.42	21.41	21.09	16.03	11.54	9.92	5.71
27	9.22	9.17	9.35	10.57	13.55	21.47	21.44	20.81	17.01	11.84	9.24	5.58
28	9.49	8.89	8.38	10.83	14.02	21.31	22.16	19.99	16.52	11.64	9.26	5.98
29	8.30	8.13	8.73	11.24	15.07	20.88	22.70	20.03	15.44	11.30	9.15	6.12
30	7.56	—	9.57	11.50	14.94	20.38	21.87	19.33	14.32	10.58	9.09	6.35
31	7.00	—	10.37	—	16.83	—	20.20	18.47	—	11.09	—	5.50
MEAN	6.83	8.22	8.72	11.66	14.80	18.26	19.77	20.13	16.23	12.05	10.27	6.33
MAX	9.49	9.62	10.37	15.01	16.83	22.89	22.70	22.41	17.84	14.36	11.79	8.91
MIN	3.09	6.97	7.56	9.40	13.03	14.62	17.76	17.46	14.32	10.47	8.62	4.55

† Provisional data beginning 10/19/2016–subject to revision

GALES – 453040123065201 – Gales Creek at Old Hwy 47 near Forest Grove, Oregon [RM 2.36]**



**USGS #453040123065201 is equivalent to OWRD #14204530.

UNITED STATES DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY — OREGON WATER SCIENCE CENTER

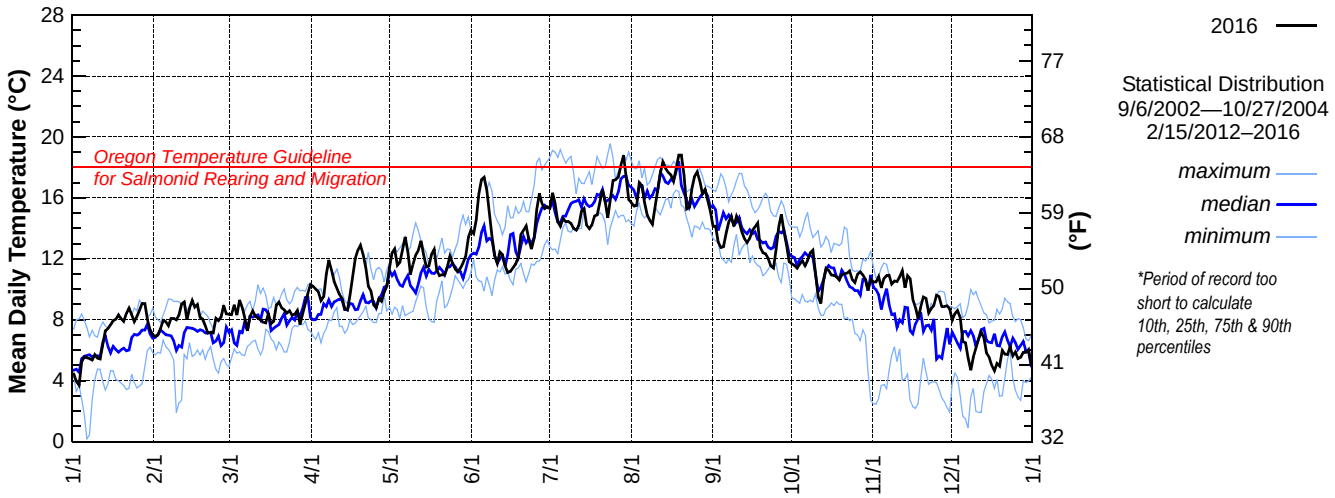
STATION NUMBER: 14205400 EAST FORK DAIRY CREEK NEAR MEACHAM CORNER, OR

LATITUDE: 454051 LONGITUDE: 1230412 DRAINAGE AREA: 32.92 DATUM: 290

Day	2016 Mean Daily Water Temperature in Degrees Celsius											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV†	DEC†
1	4.45	6.91	8.36	10.31	11.43	13.88	15.32	15.68	14.14	11.67	10.47	7.96
2	3.96	6.99	8.33	10.19	12.39	13.66	16.33	15.46	14.15	11.57	10.48	8.40
3	3.71	7.42	8.98	10.01	12.65	14.56	15.62	15.50	13.11	11.39	10.83	8.61
4	5.23	7.96	8.31	9.83	11.58	16.25	14.42	17.00	12.74	11.65	10.10	8.15
5	5.57	7.88	9.30	9.26	11.78	17.20	14.13	16.79	12.78	11.87	10.70	6.58
6	5.50	7.61	8.83	9.52	12.65	17.35	14.63	15.69	13.69	11.54	10.90	6.49
7	5.45	8.09	8.14	11.00	13.44	16.52	14.44	14.85	14.40	11.88	10.93	5.51
8	5.36	8.09	7.28	11.92	12.43	15.09	14.45	14.53	14.80	12.40	10.35	4.69
9	5.72	8.00	8.22	11.25	10.97	13.41	14.33	14.27	14.13	12.56	10.55	5.55
10	5.48	8.31	8.58	10.52	11.63	12.23	13.99	15.39	14.80	10.98	10.51	6.11
11	5.42	9.03	8.25	10.07	12.25	11.71	13.88	16.47	14.40	9.52	10.82	6.74
12	6.40	9.16	8.11	9.68	12.55	12.45	14.18	17.66	13.78	9.07	11.21	7.18
13	7.28	8.01	7.99	9.40	13.18	12.26	15.13	18.36	13.32	10.52	10.11	6.82
14	7.43	8.74	7.84	8.72	12.27	11.52	15.29	17.94	13.07	11.38	10.89	5.83
15	7.67	9.27	7.79	8.64	11.46	11.10	14.20	17.68	13.35	11.24	10.69	5.55
16	7.95	8.83	8.40	9.61	11.53	11.17	13.97	17.51	13.86	10.94	9.34	5.01
17	8.04	8.99	7.75	10.78	12.30	11.41	14.21	17.10	14.10	10.93	8.83	4.65
18	8.31	8.15	7.90	12.02	12.62	11.66	14.81	17.89	14.35	10.83	8.07	5.13
19	8.07	8.05	8.97	12.55	11.27	12.09	14.87	18.81	12.75	10.61	8.82	4.96
20	7.89	7.62	9.16	12.90	10.89	13.59	15.73	18.81	12.39	10.95	9.50	6.00
21	8.43	7.12	8.78	12.30	10.96	13.88	16.54	17.47	12.33	11.01	9.41	5.75
22	8.77	7.18	8.66	11.41	10.94	14.16	15.74	15.26	12.02	11.06	8.46	5.72
23	8.33	7.13	8.44	10.19	11.45	13.27	14.70	15.38	11.54	11.21	8.74	6.23
24	7.88	8.10	8.59	9.89	12.19	12.64	15.81	16.61	11.40	10.63	8.92	5.63
25	8.21	7.94	8.29	8.97	11.71	13.37	17.14	17.39	12.60	10.44	9.61	5.88
26	8.63	8.16	8.36	8.78	11.32	15.23	17.18	17.71	14.12	11.00	9.53	5.45
27	9.07	8.95	8.61	9.38	11.15	16.30	17.36	17.14	14.93	11.15	8.86	5.54
28	9.07	8.39	7.69	9.21	11.38	15.64	18.11	16.27	13.81	10.94	8.87	5.86
29	8.03	7.91	8.34	9.80	11.73	15.29	18.79	16.55	12.88	10.63	8.92	5.86
30	7.33	—	9.05	10.20	12.15	15.42	17.38	15.82	11.82	9.92	8.73	6.05
31	7.01	—	9.74	—	13.40	—	15.89	15.15	—	10.63	—	5.06
MEAN	6.96	8.07	8.42	10.28	11.92	13.81	15.44	16.59	13.39	11.04	9.81	6.10
MAX	9.07	9.27	9.74	12.90	13.44	17.35	18.79	18.81	14.93	12.56	11.21	8.61
MIN	3.71	6.91	7.28	8.64	10.89	11.10	13.88	14.27	11.40	9.07	8.07	4.65

† Provisional data beginning 11/7/2016–subject to revision

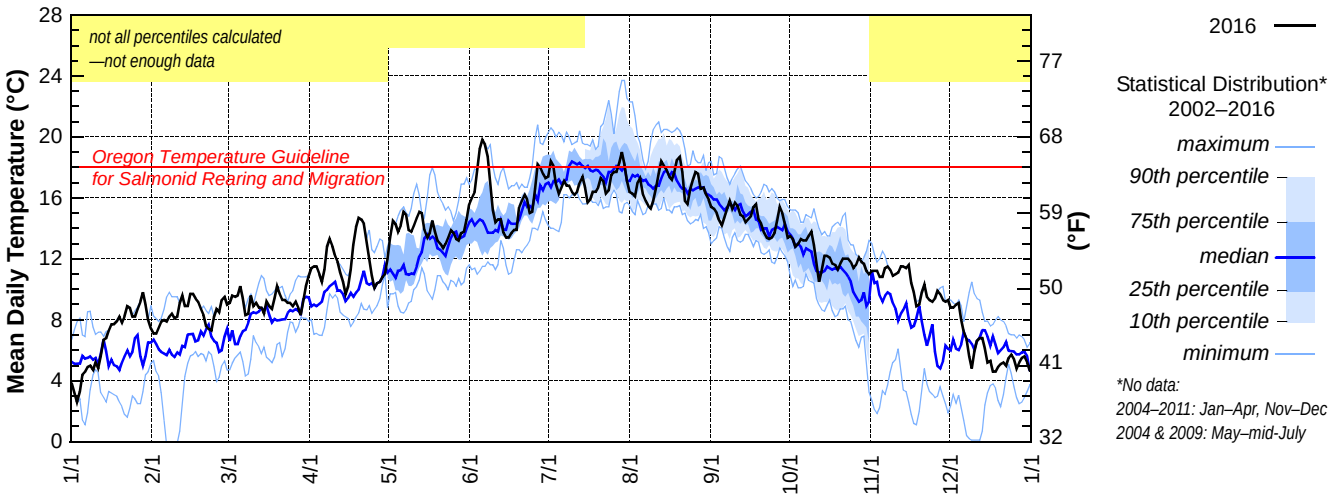
5400 — 14205400 — East Fork Dairy Creek near Meacham Corner, Oregon [RM 12.4]



MCSC – 14206070 – MCKAY CREEK AT SCOTCH CHURCH ROAD ABOVE WAIBLE CREEK NEAR NORTH PLAINS, OREGON [RM 6.3]
Latitude: 45 57 21 Longitude: 122 99 18 Source Agency: WEST Consultants for Clean Water Services

Day	2016 Mean Daily Water Temperature in Degrees Celsius											
	JAN*	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	3.8	7.1	9.0	10.9	12.0	15.6	17.4	16.4	15.4	13.5	11.2	8.8
2	3.2	7.1	9.1	11.4	13.4	16.0	18.4	16.3	15.3	13.3	11.2	8.8
3	2.6	7.5	9.6	11.5	14.5	16.4	18.1	16.1	15.0	12.8	11.2	9.0
4	3.3	7.9	9.5	11.5	14.3	17.8	16.9	17.0	14.5	13.0	10.8	9.1
5	4.4	8.0	9.6	11.0	13.8	19.2	16.3	17.3	14.2	13.3	10.8	8.0
6	4.6	7.9	10.2	10.5	14.2	19.8	16.7	16.2	14.7	13.2	11.4	7.2
7	4.9	8.2	9.4	11.3	15.1	19.5	17.1	15.8	15.3	13.2	11.5	6.7
8	5.0	8.4	8.3	12.8	14.9	18.7	16.8	15.5	15.8	13.5	11.3	5.6
9	4.7	8.1	8.4	13.3	13.9	16.8	16.8	15.3	15.3	13.8	10.9	4.8
10	5.2	8.2	9.6	12.8	13.8	15.2	16.4	15.8	15.7	12.9	11.0	5.9
11	4.8	9.1	8.9	12.2	14.2	14.4	16.2	16.7	15.5	11.7	11.1	6.6
12	5.6	9.6	9.1	11.8	14.7	14.6	16.4	17.6	14.9	10.5	11.5	6.8
13	6.7	8.9	8.8	11.1	15.1	14.6	17.0	18.4	14.8	11.2	11.5	6.8
14	6.8	8.9	8.8	10.5	15.0	13.7	17.4	18.1	14.4	12.2	11.4	6.1
15	7.3	9.7	8.4	9.7	13.9	13.4	16.7	17.8	14.6	12.2	11.6	5.2
16	7.7	9.7	9.2	10.2	13.4	13.4	15.7	17.4	14.8	12.1	10.4	5.3
17	7.7	9.4	8.9	11.3	13.7	13.7	15.9	17.2	15.4	11.7	9.8	4.6
18	7.9	9.2	8.7	12.9	14.5	13.9	16.4	17.7	15.6	11.6	8.9	4.6
19	8.2	8.7	9.4	14.1	13.8	13.9	16.4	18.5	14.6	11.3	9.0	4.9
20	7.8	8.3	10.2	14.7	13.2	15.4	16.7	18.7	14.3	11.7	9.8	5.1
21	8.2	7.6	9.7	14.6	13.0	15.8	17.3	17.7	13.7	12.0	10.3	5.2
22	8.9	7.4	9.3	14.3	12.7	16.2	17.1	15.8	13.4	12.0	9.5	5.0
23	8.8	7.3	9.3	13.0	13.0	15.9	16.3	15.6	13.3	12.0	9.3	5.5
24	8.2	8.2	9.1	11.9	13.4	15.0	16.5	16.6	13.4	11.8	9.2	5.7
25	8.2	8.7	9.1	10.9	13.9	15.1	17.5	17.2	13.7	11.4	9.4	5.4
26	8.7	8.5	8.9	10.1	13.7	16.6	17.7	17.7	14.5	11.6	9.9	4.8
27	9.2	9.3	9.2	10.4	13.3	18.2	17.7	17.6	15.4	12.1	9.7	5.2
28	9.8	9.5	8.8	10.5	13.2	18.0	18.3	16.6	15.0	11.8	9.3	5.5
29	9.0	8.9	8.3	10.8	13.7	17.6	19.0	16.7	14.3	11.7	9.2	5.6
30	8.0	—	9.3	11.0	13.8	17.3	18.2	16.2	13.4	11.2	9.3	5.2
31	7.4	—	10.2	—	14.6	—	17.1	15.9	—	11.0	—	4.7
MEAN	6.7	8.5	9.2	11.8	13.9	16.1	17.0	16.9	14.7	12.2	10.4	6.1
MAX	9.8	9.7	10.2	14.7	15.1	19.8	19.0	18.7	15.8	13.8	11.6	9.1
MIN	2.6	7.1	8.3	9.7	12.0	13.4	15.7	15.3	13.3	10.5	8.9	4.6

MCSC – 14206070 – McKay Creek at Scotch Church Road above Waible Creek near North Plains, Oregon [RM 6.3]

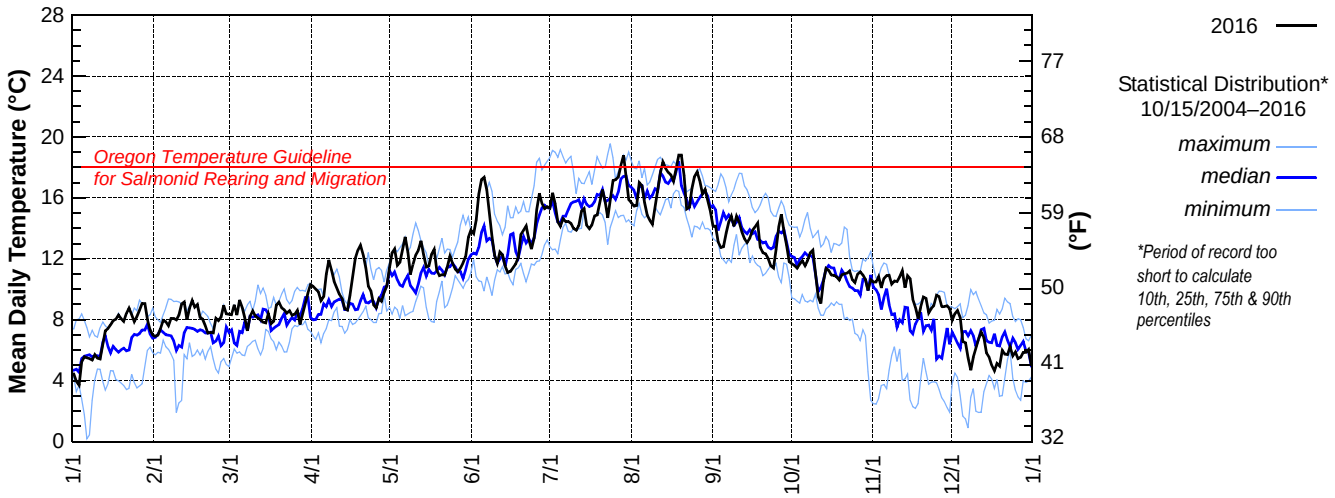


TRJB – 14206241 – TUALATIN RIVER AT HWY 219 BRIDGE [RM 44.4]

Latitude: 45 30 01 Longitude: 122 59 24 Source Agency: Jackson Bottom Wetland Education Center

Day	2016 Mean Daily Water Temperature in Degrees Celsius											
	JAN	FEB	MAR	APR	MAY*	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	4.08	7.09	8.74	11.58	12.95	16.41	17.04	15.29	15.48	14.77	11.40	8.66
2	3.38	6.94	8.70	12.19	14.46	16.35	17.69	15.28	15.31	14.60	11.41	8.43
3	2.96	7.12	9.01	12.35	15.35	16.42	17.37	15.18	15.13	14.31	11.51	8.64
4	3.10	7.38	9.61	12.26	15.19	17.84	16.22	16.04	15.01	14.30	11.44	8.92
5	4.06	7.84	9.35	11.79	14.83	19.36	15.54	16.43	14.98	14.33	11.11	8.23
6	4.35	7.78	9.85	11.26	15.11	20.14	15.91	15.64	15.46	14.48	11.58	6.88
7	4.71	7.95	9.59	11.85	16.25	19.89	16.13	14.90	15.97	14.34	11.91	6.24
8	4.99	8.31	8.86	13.10	16.41	19.10	14.98	14.36	16.69	14.53	11.80	5.13
9	5.02	8.39	8.23	13.83	15.49	16.98	16.43	13.85	16.47	14.77	11.55	4.33
10	5.31	8.40	8.99	13.45	15.31	15.23	15.37	14.45	16.60	14.22	11.47	4.93
11	5.28	8.68	9.26	12.95	15.43	14.43	15.15	15.51	16.67	13.00	11.59	5.79
12	5.47	9.25	8.99	12.37	15.89	14.51	15.34	16.69	16.29	11.91	11.76	6.30
13	6.44	9.20	8.72	11.71	16.47	14.71	15.94	16.99	15.95	12.07	11.83	6.37
14	6.91	8.69	8.58	11.06	15.93	14.39	16.77	16.62	15.79	12.64	11.63	5.63
15	6.98	9.43	8.36	10.50	14.55	13.95	16.38	16.38	16.01	12.18	11.64	4.43
16	7.31	9.78	8.72	10.72	13.62	13.69	15.77	16.49	16.31	12.02	11.04	4.09
17	7.45	9.48	9.33	11.91	13.79	13.90	15.38	16.69	16.69	11.70	9.99	3.92
18	7.53	9.25	9.42	13.39	14.71	14.34	15.33	16.91	16.93	11.72	9.27	3.98
19	7.79	8.62	9.84	14.73	14.62	14.76	15.76	17.29	16.45	11.65	8.94	4.33
20	7.68	8.24	10.64	15.69	14.32	15.92	16.04	17.55	15.87	11.61	9.51	4.93
21	7.70	7.74	10.45	15.99	14.24	16.52	16.85	16.83	15.35	12.09	10.09	5.44
22	8.09	7.33	10.10	15.58	14.02	16.98	16.52	15.64	15.28	12.19	9.87	5.15
23	8.51	7.36	10.22	14.08	13.91	16.52	15.25	15.46	15.14	12.13	9.60	5.06
24	8.31	7.77	9.98	12.63	14.20	14.97	15.20	16.27	15.08	12.16	9.37	5.30
25	8.04	8.75	10.02	11.96	14.57	15.00	15.94	16.77	15.17	11.76	9.22	5.18
26	8.34	8.87	9.76	11.35	14.28	16.56	16.64	17.11	15.98	11.72	9.32	5.15
27	8.65	9.04	9.93	11.30	14.07	18.09	17.01	17.12	16.86	12.08	9.33	5.14
28	9.26	9.61	9.82	11.57	13.99	18.49	17.54	16.56	16.64	12.14	9.10	5.28
29	9.32	9.18	9.33	11.85	14.37	17.96	17.73	16.54	16.07	12.09	8.96	5.44
30	8.39	—	10.03	12.17	14.54	17.20	17.19	16.40	15.11	11.71	8.89	5.55
31	7.58	—	10.84	—	15.48	—	15.98	15.96	—	11.30	—	5.40
MEAN	6.55	8.40	9.46	12.57	14.79	16.35	16.21	16.10	15.89	12.79	10.54	5.75
MAX	9.32	9.78	10.84	15.99	16.47	20.14	17.73	17.55	16.93	14.77	11.91	8.92
MIN	2.96	6.94	8.23	10.50	12.95	13.69	14.98	13.85	14.98	11.30	8.89	3.92

TRJB – 14206241 – Tualatin River at Hwy 219 Bridge [RM 44.4]



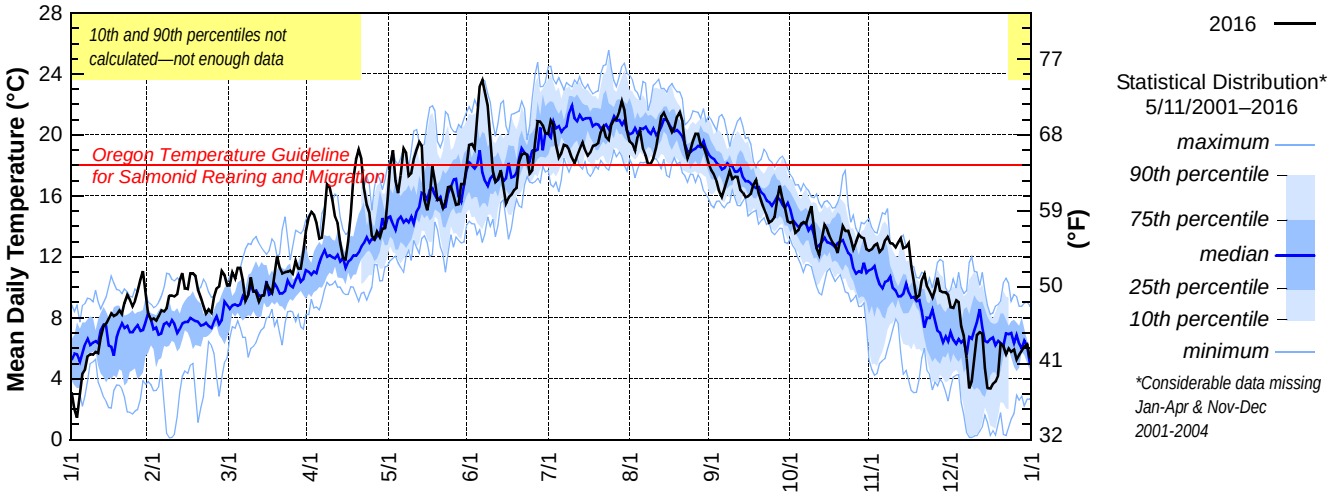
UNITED STATES DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY — OREGON WATER SCIENCE CENTER

STATION NUMBER 453004122510301 BEAVERTON CREEK AT 170TH AVE, BEAVERTON, OR.

LATITUDE: 453004 LONGITUDE: 1225103

Day	2016 Mean Daily Water Temperature in Degrees Celsius											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	3.04	7.96	10.11	14.61	15.71	19.36	20.08	19.57	17.68	14.23	12.52	8.68
2	1.99	7.81	10.11	14.96	17.97	19.41	20.93	19.39	17.41	14.34	12.77	8.64
3	1.45	8.12	10.98	14.77	19.01	19.07	20.65	18.96	16.94	13.59	12.87	9.14
4	2.99	8.48	10.56	14.23	16.98	21.29	19.36	19.89	16.29	13.76	12.32	9.03
5	4.35	8.41	11.27	13.20	16.19	23.23	18.51	20.27	15.91	14.16	12.54	7.44
6	4.61	8.63	11.27	13.26	17.36	23.63	18.82	19.09	16.44	14.27	13.08	6.81
7	5.47	9.44	10.46	14.80	19.10	22.83	19.36	18.66	17.09	14.15	13.31	5.33
8	5.61	9.47	9.13	16.77	18.82	21.93	19.29	18.08	17.63	14.72	12.88	3.38
9	5.57	9.41	9.52	16.58	17.31	19.66	19.03	18.11	17.11	15.33	12.87	3.85
10	5.76	9.55	10.67	15.70	17.48	17.64	18.48	18.45	17.25	13.89	12.63	5.39
11	5.68	10.45	9.73	14.64	18.42	16.92	18.14	19.16	17.23	12.55	12.95	6.86
12	6.69	10.94	9.70	14.22	19.04	17.13	18.65	20.21	16.40	12.11	13.23	7.04
13	7.45	9.92	9.06	12.93	19.53	17.67	19.08	21.23	16.20	13.09	12.58	6.96
14	7.61	9.88	9.45	11.95	19.27	16.65	19.52	21.45	15.91	14.09	12.65	4.71
15	7.95	10.92	9.47	11.83	15.76	15.52	19.01	20.99	15.98	13.81	12.90	3.38
16	8.31	10.92	10.22	13.02	15.05	15.90	18.64	20.60	16.14	13.33	11.42	3.35
17	8.13	10.74	9.92	14.75	15.92	16.08	18.85	20.18	16.75	12.97	10.42	3.67
18	8.23	9.84	9.63	17.07	17.95	16.37	19.27	20.44	17.05	12.77	9.28	3.82
19	8.48	9.32	10.91	18.41	16.99	16.52	19.34	21.19	16.21	12.26	9.47	4.22
20	8.23	8.78	12.04	19.04	15.74	18.25	19.46	21.50	15.68	13.10	10.50	6.29
21	8.97	8.28	11.29	18.46	15.77	18.73	20.19	20.91	15.13	14.00	10.90	6.12
22	9.49	8.56	10.91	16.54	15.22	18.79	20.54	19.30	14.73	13.68	10.05	5.63
23	9.17	8.33	11.00	15.44	15.66	18.67	19.88	18.47	14.25	13.70	9.74	6.00
24	8.76	9.36	11.02	14.92	16.57	17.47	19.67	18.97	14.36	13.18	9.32	5.76
25	9.10	9.92	11.10	13.40	16.62	17.67	20.68	19.60	14.61	12.52	9.83	5.91
26	9.71	10.05	10.90	13.17	16.03	19.52	21.00	20.07	15.73	12.96	10.63	5.26
27	10.50	11.07	11.73	13.65	15.41	20.90	21.05	20.07	16.66	13.47	9.79	5.57
28	11.06	10.79	11.21	13.27	15.46	20.86	21.57	19.35	15.84	13.29	9.67	5.86
29	9.62	10.15	11.24	13.84	16.77	20.63	22.21	19.26	15.27	13.23	9.67	6.10
30	8.29	—	12.33	13.88	16.78	20.12	21.62	18.77	14.33	12.51	9.50	6.25
31	7.87	—	13.69	—	17.97	—	20.29	18.11	—	12.40	—	5.40
MEAN	7.10	9.50	10.67	14.78	17.03	18.95	19.78	19.69	16.14	13.47	11.41	5.87
MAX	11.06	11.07	13.69	19.04	19.53	23.63	22.21	21.50	17.68	15.33	13.31	9.14
MIN	1.45	7.81	9.06	11.83	15.05	15.52	18.14	18.08	14.25	12.11	9.28	3.35

B170 – Beaverton Creek at 170th Ave, Beaverton, Oregon [RM 4.9]



UNITED STATES DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY — OREGON WATER SCIENCE CENTER

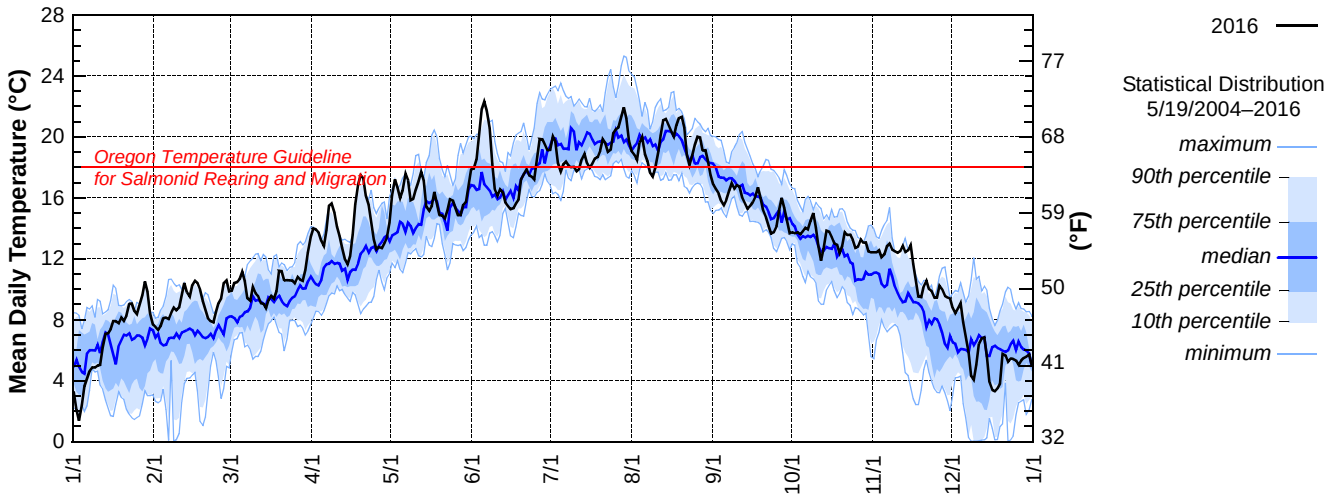
STATION NUMBER 453030122560101 ROCK CREEK AT BROOKWOOD AVENUE, HILLSBORO, OR.

LATITUDE: 453029.5 LONGITUDE: 1225600.6

Day	2016 Mean Daily Water Temperature in Degrees Celsius											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT†	NOV†	DEC†
1	3.23	7.53	9.86	13.43	14.38	17.88	19.15	19.09	16.87	13.74	12.43	8.77
2	2.11	7.35	9.90	13.99	16.17	17.91	20.03	18.84	16.58	13.68	12.42	8.44
3	1.38	7.60	10.40	13.94	17.22	18.53	19.70	18.48	16.30	13.74	12.57	8.78
4	2.41	8.11	10.48	13.75	16.66	20.18	18.31	19.64	15.79	13.60	12.12	9.10
5	3.65	8.15	10.68	13.16	16.00	21.81	17.75	20.03	15.51	13.81	12.30	7.85
6	4.15	8.05	11.14	12.82	16.50	22.32	18.21	18.87	15.87	14.05	12.82	6.91
7	4.63	8.48	10.54	13.87	17.60	21.70	18.38	18.41	16.49	13.93	12.99	5.85
8	4.86	8.81	9.41	15.49	17.16	20.57	18.11	17.64	16.97	14.48	12.61	4.30
9	4.86	8.62	9.24	15.63	15.84	18.27	18.02	17.38	16.60	15.02	12.51	4.05
10	5.00	8.81	10.16	15.03	15.94	16.55	18.03	17.94	16.83	14.05	12.40	5.06
11	5.04	9.62	9.75	14.10	16.54	16.14	17.75	18.94	16.75	12.81	12.51	6.43
12	6.16	10.42	9.58	13.50	17.12	16.59	17.89	20.11	16.00	11.87	12.86	6.80
13	7.08	9.80	9.08	12.73	17.69	16.37	18.52	21.09	15.63	12.67	12.44	6.86
14	7.11	9.51	9.04	11.95	17.13	15.70	18.89	21.18	15.29	13.86	12.58	5.62
15	7.38	10.28	8.76	11.62	15.44	15.48	18.27	20.74	15.47	13.79	12.93	3.91
16	7.92	10.55	9.29	12.18	15.16	15.27	17.98	20.36	15.74	13.44	11.66	3.40
17	7.92	10.40	9.58	13.59	15.48	15.33	18.24	20.00	16.11	13.02	10.57	3.31
18	7.78	9.99	9.39	15.57	16.40	15.64	18.59	20.76	16.70	12.94	9.53	3.50
19	8.16	9.21	9.88	16.88	15.61	15.90	18.69	21.24	16.00	12.39	9.48	3.82
20	7.93	8.65	11.21	17.48	14.86	17.24	19.11	21.34	15.17	12.84	10.23	5.77
21	8.26	8.11	11.18	17.30	14.85	17.55	19.84	20.59	14.71	13.75	10.58	5.66
22	9.05	7.91	10.57	16.15	14.65	17.89	19.59	18.81	14.18	13.56	10.02	5.24
23	9.07	7.82	10.60	15.53	15.17	17.48	19.02	18.15	13.67	13.59	9.89	5.46
24	8.58	8.52	10.57	14.47	15.92	17.41	19.16	18.82	13.76	13.25	9.44	5.44
25	8.37	9.11	10.58	13.26	15.82	17.21	20.26	19.51	14.14	12.72	9.45	5.32
26	8.93	9.41	10.41	12.61	15.35	18.53	20.51	20.01	15.19	12.81	10.25	5.03
27	9.62	10.38	10.82	12.78	14.86	19.86	20.62	19.97	15.99	13.29	10.02	5.33
28	10.51	10.58	10.65	12.71	14.86	19.83	21.31	19.10	15.34	13.06	9.57	5.49
29	9.84	9.95	10.55	13.03	15.54	19.50	21.94	19.12	14.56	13.08	9.46	5.58
30	8.42	—	11.26	13.44	15.75	19.13	21.20	18.39	13.69	12.49	9.40	5.72
31	7.68	—	12.43	—	16.80	—	19.75	17.49	—	12.43	—	5.03
MEAN	6.68	9.03	10.23	14.07	15.95	17.99	19.12	19.42	15.60	13.35	11.27	5.74
MAX	10.51	10.58	12.43	17.48	17.69	22.32	21.94	21.34	16.97	15.02	12.99	9.10
MIN	1.38	7.35	8.76	11.62	14.38	15.27	17.75	17.38	13.67	11.87	9.40	3.31

† Provisional data beginning 10/18/2016–subject to revision

RCBR – Rock Creek at Brookwood Avenue, Hillsboro, Oregon [RM 2.4]



UNITED STATES DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY — OREGON WATER SCIENCE CENTER

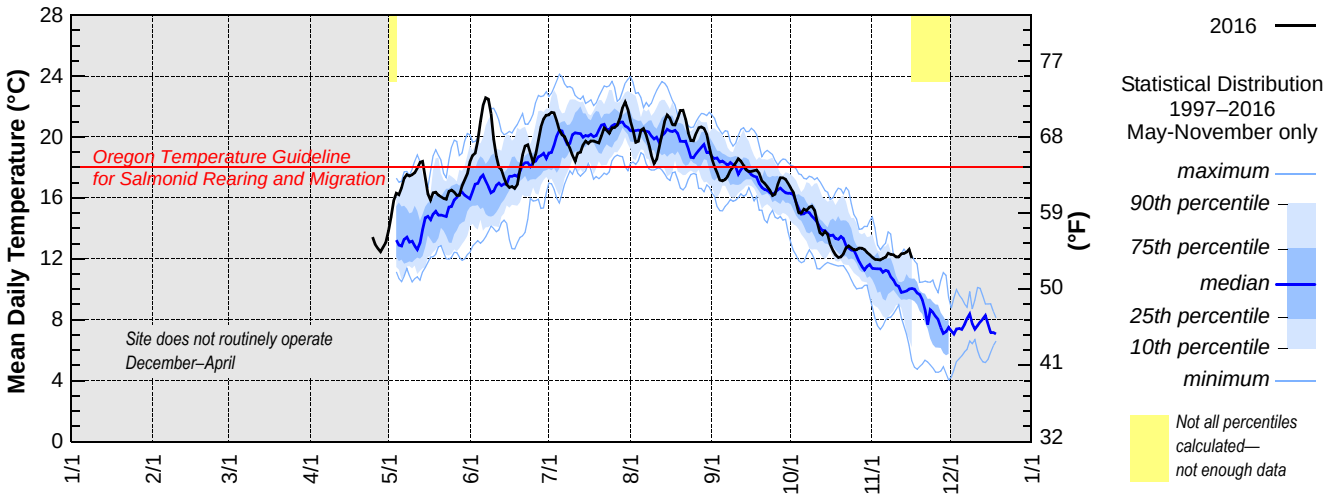
STATION NUMBER 14206694 TUALATIN RIVER AT RIVER MILE 24.5, NR SCHOLLS, OR

LATITUDE: 452406 LONGITUDE: 1225338

Day	2016 Mean Daily Water Temperature in Degrees Celsius											
	JAN	FEB	MAR	APR*	MAY	JUN	JUL	AUG	SEP	OCT	NOV*	DEC*
1					13.83	18.35	21.45	21.06	18.56	16.63	12.10	
2					14.75	18.79	21.61	20.47	18.06	16.36	11.96	
3					15.79	18.94	21.58	19.64	17.66	15.66	11.95	
4					16.30	19.76	21.05	19.70	17.16	15.01	11.92	
5					16.20	21.03	20.44	20.44	17.11	15.00	12.03	
6					16.66	22.06	20.13	20.55	17.20	15.26	12.10	
7					17.28	22.57	20.02	20.11	17.42	15.18	12.37	
8					17.53	22.49	19.62	19.54	17.81	15.39	12.29	
9					17.44	21.52	19.25	18.79	18.02	15.45	12.27	
10					17.52	19.87	18.79	18.25	18.29	15.19	12.12	
11					17.65	18.73	18.40	18.53	18.57	14.41	12.13	
12					17.95	18.01	18.94	19.41	18.42	13.72	12.33	
13					18.33	17.86	18.99	20.21	18.14	13.58	12.35	
14					18.39	17.30	19.47	21.02	17.86	13.79	12.44	
15					17.29	16.87	19.73	21.44	17.72	13.60	12.63	
16					16.28	16.68	19.57	21.24	17.74	12.93	12.05	
17					15.86	16.74	19.74	20.80	17.78	12.54		
18					16.33	16.62	19.74	20.79	17.84	12.26		
19					16.38	16.87	19.66	21.24	17.61	12.09		
20					16.18	17.92	19.60	21.73	17.11	12.12		
21					16.07	18.82	20.06	21.75	16.96	12.32		
22					15.95	19.41	20.59	21.18	16.74	12.72		
23					15.90	19.49	20.43	20.26	16.51	12.85		
24					16.43	18.92	20.24	19.77	16.15	12.71		
25				13.42	16.51	18.33	20.60	19.75	16.24	12.59		
26				12.95	16.37	18.85	20.62	20.25	16.87	12.59		
27				12.68	16.16	19.79	20.78	20.60	17.32	12.71		
28				12.47	16.17	20.66	21.21	20.66	17.32	12.70		
29				12.77	16.78	21.16	21.93	20.57	17.23	12.62		
30		—		13.07	17.17	21.43	22.30	20.18	16.95	12.42		
31		—		—	17.58	—	21.81	19.34	—	12.27	—	
MEAN					16.61	19.19	20.27	20.30	17.48	13.70		
MAX					18.39	22.57	22.30	21.75	18.57	16.63		
MIN					13.83	16.62	18.40	18.25	16.15	12.09		

* Incomplete record (monthly statistics computed when at least 80% of the record was complete for the month)

RM24.5 – 14206694 – Tualatin River at River Mile 24.5 near Scholls, OR [RM 24.5]



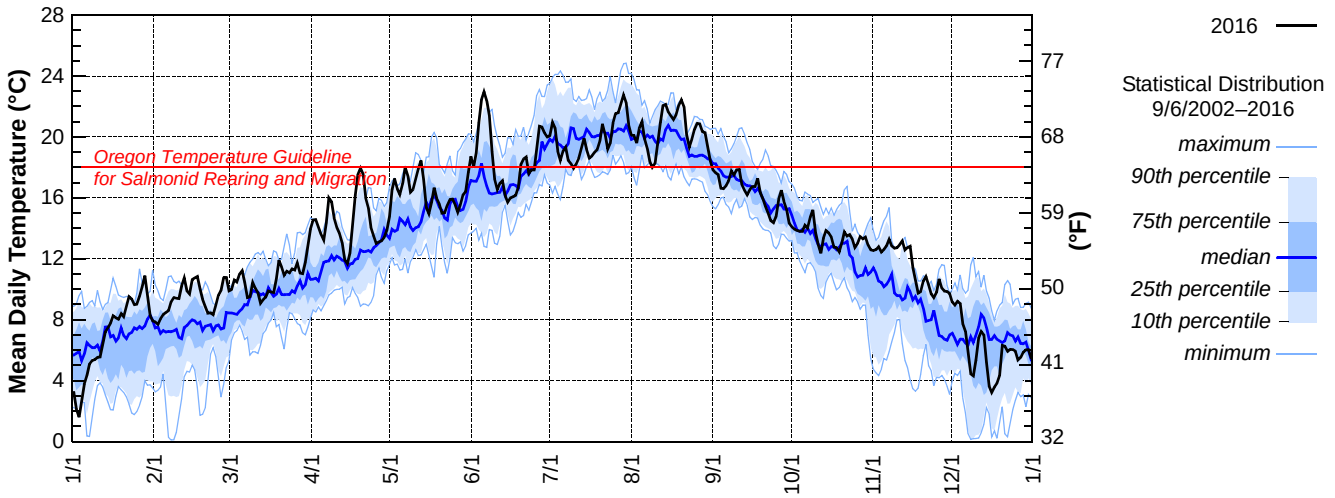
UNITED STATES DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY — OREGON WATER SCIENCE CENTER

STATION NUMBER 14206950 FANNO CREEK AT DURHAM, OR

LATITUDE: 452413 LONGITUDE: 1224513

Day	2016 Mean Daily Water Temperature in Degrees Celsius											
	JAN	FEB	MAR	APR*	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	3.23	7.86	9.90	13.95	14.78	18.73	20.08	20.11	17.83	14.10	12.54	9.17
2	2.15	7.70	9.98	14.55	16.53	18.04	20.96	20.10	17.65	13.95	12.60	8.96
3	1.61	8.07	10.61	14.58	17.27	18.96	20.59	19.60	17.53	13.85	12.79	9.21
4	2.64	8.34	10.47	14.09	16.60	20.90	19.05	20.57	16.64	13.80	12.44	9.07
5	3.80	8.47	10.99	13.61	16.22	22.44	18.45	21.00	16.61	13.80	12.60	7.74
6	4.34	8.59	11.21	13.23	16.91	22.97	19.07	19.90	16.81	14.20	12.86	7.24
7	5.10	9.17	10.45	14.36	18.02	22.38	19.33	19.26	17.13	14.01	13.28	5.96
8	5.33	9.46	9.46	16.01	17.46	21.40	18.46	18.39	17.77	14.73	12.85	4.45
9	5.38	9.41	9.51	15.75	16.36	19.02	18.24	18.00	17.51	15.21	12.70	4.32
10	5.54	9.39	10.45	14.68	16.54	17.24	17.94	18.28	17.84	13.71	12.73	5.35
11	5.56	10.22	10.07	14.07	17.23	16.54	18.23	19.52	17.87	12.95	12.93	6.79
12	6.38	10.74	9.76	13.69	17.89	16.95	18.60	20.94	16.88	12.36	13.17	7.23
13	7.21	9.90	9.08	13.08	18.45	17.12	19.29	22.06	16.49	13.35	12.58	7.00
14	7.48	9.70	9.31	11.94	17.22	16.15	19.90	22.14	16.20	13.85	12.74	5.20
15	7.79	10.63	9.50	11.68	15.38	15.71	19.18	21.66	16.53	13.71	12.83	3.64
16	8.26	10.75	9.89	12.39	14.97	16.00	18.61	21.38	16.75	13.45	11.43	3.23
17	8.13	10.84	9.82	14.06	15.71	16.07	18.75	21.14	16.74	12.77	10.62	3.58
18	8.04	10.02	9.78	16.16	16.67	16.18	18.99	21.45	17.28	12.74	9.75	3.84
19	8.40	9.34	10.70	17.51	15.97	16.69	19.16	22.08	16.36	12.46	9.84	4.33
20	8.19	8.86	11.91	17.95	15.59	18.19	19.73	22.43	15.94	13.04	10.56	6.32
21	8.89	8.44	11.46	17.57	15.00	18.55	20.86	21.97	15.44	13.77	10.84	6.26
22	9.52	8.46	10.93	15.97	15.02	18.68	20.16	20.13	14.99	13.50	10.28	5.93
23	9.36	8.33	11.19	15.35	15.51	17.59	19.20	19.33	14.51	13.59	9.70	6.06
24	8.99	8.96	11.08	14.06	15.90	17.83	19.60	19.85	14.37	13.29	9.45	6.04
25	9.02	9.61	11.34	13.51	15.92	17.84	20.91	20.48	14.77	12.74	9.80	5.94
26	9.54	9.93	11.26	13.01	15.53	19.33	21.53	20.89	15.93	13.02	10.68	5.36
27	10.15	10.79	11.73	13.11	15.05	20.70	21.58	20.86	16.50	13.46	10.08	5.53
28	10.89	10.78	11.06	13.17	15.53	20.65	22.14	20.34	15.78	13.31	9.89	5.87
29	9.59	10.11	11.02	13.40	16.21	20.27	22.76	20.28	15.24	13.42	9.85	6.03
30	8.28	—	11.78	13.84	16.42	20.00	22.27	19.31	14.33	12.91	9.73	6.04
31	7.92	—	12.91	—	17.70	—	20.80	18.43	—	12.58	—	5.50
MEAN	6.99	9.41	10.60	14.34	16.31	18.64	19.82	20.38	16.41	13.47	11.47	6.04
MAX	10.89	10.84	12.91	17.95	18.45	22.97	22.76	22.43	17.87	15.21	13.28	9.21
MIN	1.61	7.70	9.08	11.68	14.78	15.71	17.94	18.00	14.33	12.36	9.45	3.23

FANO – 14206950 – Fanno Creek at Durham Road near Tigard, Oregon [RM 1.2]



UNITED STATES DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY — OREGON WATER SCIENCE CENTER

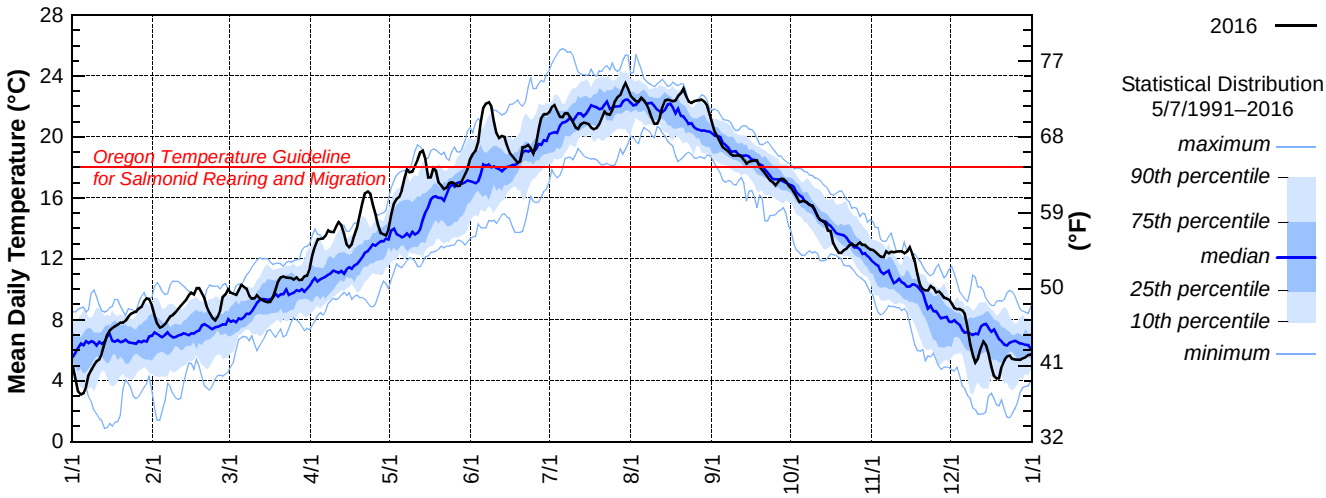
STATION NUMBER 14207200 TUALATIN RIVER AT OSWEGO DAM, NEAR WEST LINN, OR.

LATITUDE: 452124 LONGITUDE: 1224102

Day	2016 Mean Daily Water Temperature in Degrees Celsius											
	JAN	FEB	MAR	APR*	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC*
1	4.93	8.29	10.01	11.40	13.97	18.55	21.63	22.72	20.90	16.63	12.57	9.07
2	4.09	7.74	9.79	12.24	14.87	18.87	21.97	22.51	20.32	16.36	12.45	8.78
3	3.32	7.50	9.71	12.83	15.65	19.11	22.09	22.33	19.96	16.09	12.28	8.68
4	3.10	7.55	9.64	13.27	15.94	19.65	21.74	22.32	19.63	15.72	12.13	8.70
5	3.19	7.72	9.94	13.30	16.05	20.98	21.31	22.57	19.31	15.79	12.12	8.62
6	3.61	7.97	10.29	13.33	16.47	21.91	21.28	22.39	19.19	15.78	12.49	8.37
7	4.38	8.22	10.15	13.52	17.29	22.19	21.57	22.14	19.07	15.72	12.37	7.48
8	4.70	8.32	10.05	13.88	17.87	22.27	21.54	21.76	18.87	15.53	12.47	6.39
9	5.03	8.48	9.56	13.78	17.67	22.00	21.29	21.25	18.76	15.50	12.42	5.70
10	5.28	8.70	9.39	13.74	17.71	21.02	20.95	20.85	18.76	15.19	12.47	5.20
11	5.40	8.92	9.40	14.12	18.09	20.23	20.62	20.86	18.78	14.79	12.50	5.46
12	5.79	9.11	9.62	14.42	18.54	19.92	20.53	21.24	18.73	14.57	12.50	6.17
13	6.47	9.29	9.41	14.23	18.99	20.07	20.82	21.97	18.49	14.51	12.36	6.59
14	7.01	9.61	9.30	13.65	19.10	20.00	20.93	22.39	18.24	14.31	12.48	6.35
15	7.31	9.77	9.22	12.95	18.55	19.43	20.92	22.44	18.38	13.86	12.76	5.78
16	7.45	9.67	9.14	12.76	17.34	18.98	20.84	22.41	18.42	13.81	12.33	4.93
17	7.58	10.08	9.18	12.96	17.34	18.75	20.62	22.33	18.47	13.01	11.84	4.32
18	7.69	10.08	9.49	13.54	17.96	18.54	20.51	22.38	18.45	12.66	11.00	4.15
19	7.80	9.71	9.97	14.09	17.79	18.32	20.60	22.67	18.03	12.38	10.25	4.15
20	7.81	9.40	10.51	14.88	17.02	18.39	20.84	22.87	17.85	12.39	10.01	4.92
21	7.94	8.80	10.79	15.63	16.81	19.32	21.24	23.19	17.61	12.57	9.92	5.37
22	8.21	8.44	10.86	16.29	16.58	19.35	21.67	22.69	17.39	12.65	9.93	5.60
23	8.39	8.09	10.77	16.42	16.66	19.49	21.50	22.33	17.16	12.89	10.22	5.66
24	8.47	7.95	10.74	16.26	16.96	19.27	21.45	22.23	17.05	12.99	10.09	5.44
25	8.53	8.21	10.75	15.55	17.02	18.90	21.78	22.33	16.84	12.85	9.81	5.39
26	8.73	8.63	10.64	14.95	16.96	19.54	22.33	22.38	17.05	12.92	9.87	5.36
27	8.85	9.48	10.79	14.24	16.77	20.49	22.61	22.40	17.26	13.07	9.72	5.37
28	9.22	9.67	10.59	13.68	16.79	21.25	22.75	22.45	17.23	12.92	9.45	5.48
29	9.41	9.73	10.61	13.63	17.18	21.51	23.20	22.30	17.09	12.92	9.40	5.53
30	9.35	—	10.86	13.54	17.58	21.48	23.53	22.05	16.79	12.75	9.32	5.68
31	8.92	—	10.89	—	17.91	—	23.16	21.51	—	12.61	—	5.70
MEAN	6.71	8.80	10.07	13.97	17.14	19.99	21.54	22.20	18.34	14.06	11.32	6.14
MAX	9.41	10.08	10.89	16.42	19.10	22.27	23.53	23.19	20.90	16.63	12.76	9.07
MIN	3.10	7.50	9.14	11.40	13.97	18.32	20.51	20.85	16.79	12.38	9.32	4.15

† Provisional data beginning 10/12/2015–subject to revision

ODAM – 14207200 – Tualatin River at Oswego Dam near West Linn, Oregon [RM 3.4]



Sources of data for statistical distributions

Data for the statistical distributions were obtained from the USGS database and from previous Tualatin River Flow Management Reports. For some sites, the data were collected by different organizations over the period of record; it is not known if these data are fully comparable with one another.

DATA SOURCES FOR STATISTICAL DISTRIBUTIONS

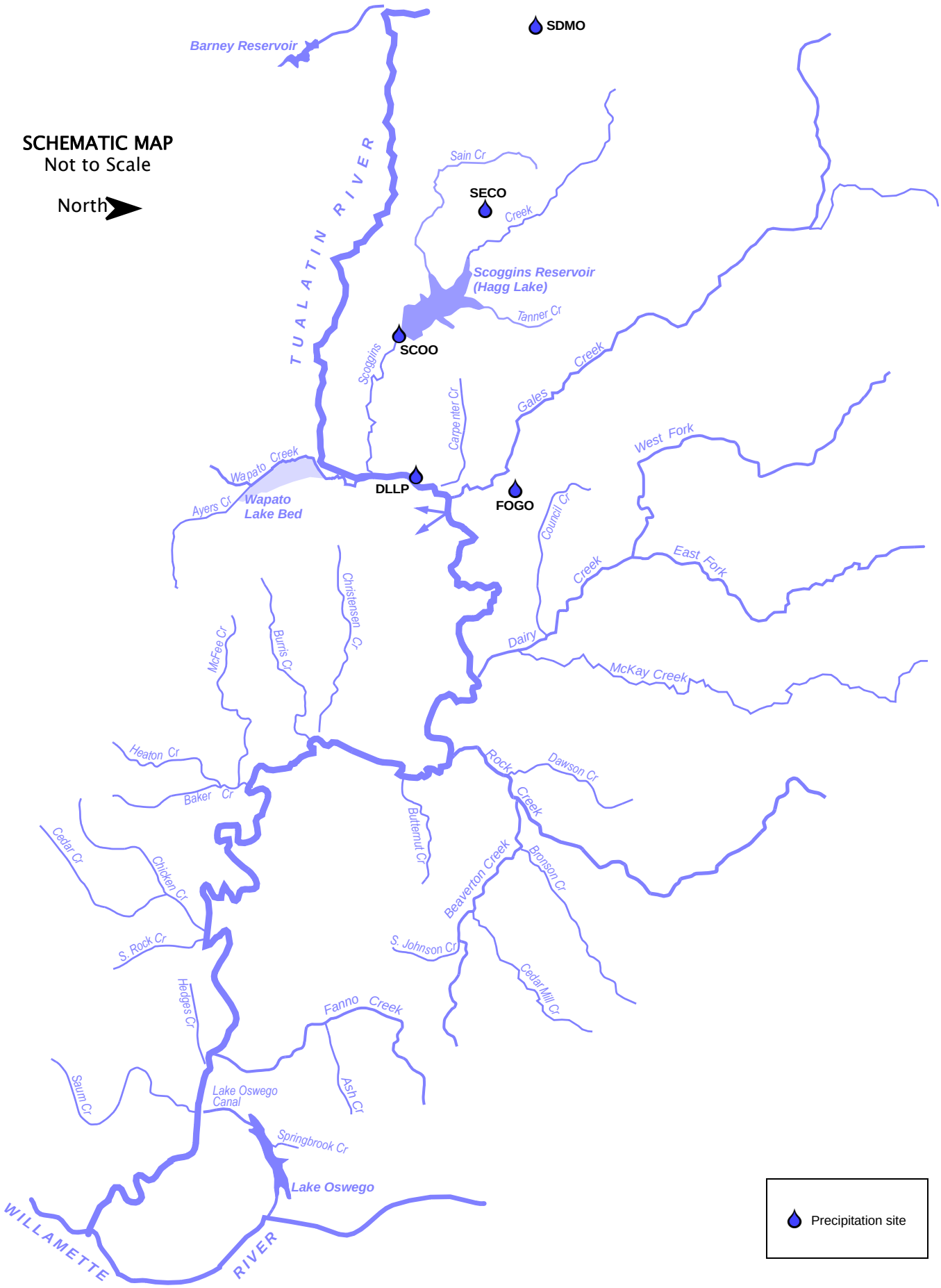
SITEID	SITE NAME	START DATE	SOURCES OF DATA FOR DISTRIBUTION
14202980	Scoggins Creek below Henry Hagg Lake near Gaston, Oregon	4/30/2002	USGS database: all (data collected by USGS)
453040123065201 OWRD# 14204530	Gales Creek at Old Hwy 47 near Forest Grove, Oregon	5/9/2001	USGS database: all (data collected by USGS)
14205400	East Fork Dairy Creek near Meacham Corner, OR	9/6/2002	USGS database: all (data collected by USGS) (no data from 10/28/2004–2/15/20012)
14206070	McKay Creek at Scotch Church Rd above Waible Ck near North Plains, Oregon	1/1/2002	previous Flow Reports: all (data collected by: OWRD 2002—2007, consultant 2008–present)
14206241	Tualatin River at Hwy 219 Bridge	10/15/2004	Stewart Rounds, USGS pers. comm.: all (data collected by Jackson Bottom Wetland Education Center)
453004122510301	Beaverton Creek at 170th, Beaverton, Oregon	5/11/2001	USGS database: all (data collected by: USGS 2001–WY2015, CWS WY2016–present)
453030122560101	Rock Creek at Brookwood Ave, Hillsboro, Oregon	5/19/2004	USGS database: all (data collected by USGS)
14206500	Tualatin River at RM 24.5 near Scholls, Oregon	5/23/1997	USGS database: all (data collected by USGS; no data collection in winter)
14206950	Fanno Creek at Durham Road near Tigard, Oregon	9/6/2002	USGS database: all (data collected by USGS)
14207500	Tualatin River at Oswego Dam near West Linn, Oregon	5/7/1991	USGS database: all (data collected by USGS)

Abbreviations: CWS=Clean Water Services; OWRD=Oregon Water Resources Division; USGS=United States Geological Survey

Appendix H

Precipitation Data

PRECIPITATION MONITORING STATIONS — LOCATIONS



PRECIPITATION SITES — ALPHABETICAL LISTING BY SITE CODE

SITE CODE	SITE NAME	Elevation (ft)	PAGE
DLLP	Dilley Precipitation Station	170	H-10
FOGO	Forest Grove, Oregon AgriMet Weather Station (Verboort)	180	H-12
SCOO	Scoggins Creek below Henry Hagg Lake	215	H-8
SDMO	South Saddle Mountain Precipitation Station (SNOTEL #726)	3250	H-4
SECO	Sain Creek Precipitation Station (SNOTEL #743)	2000	H-6

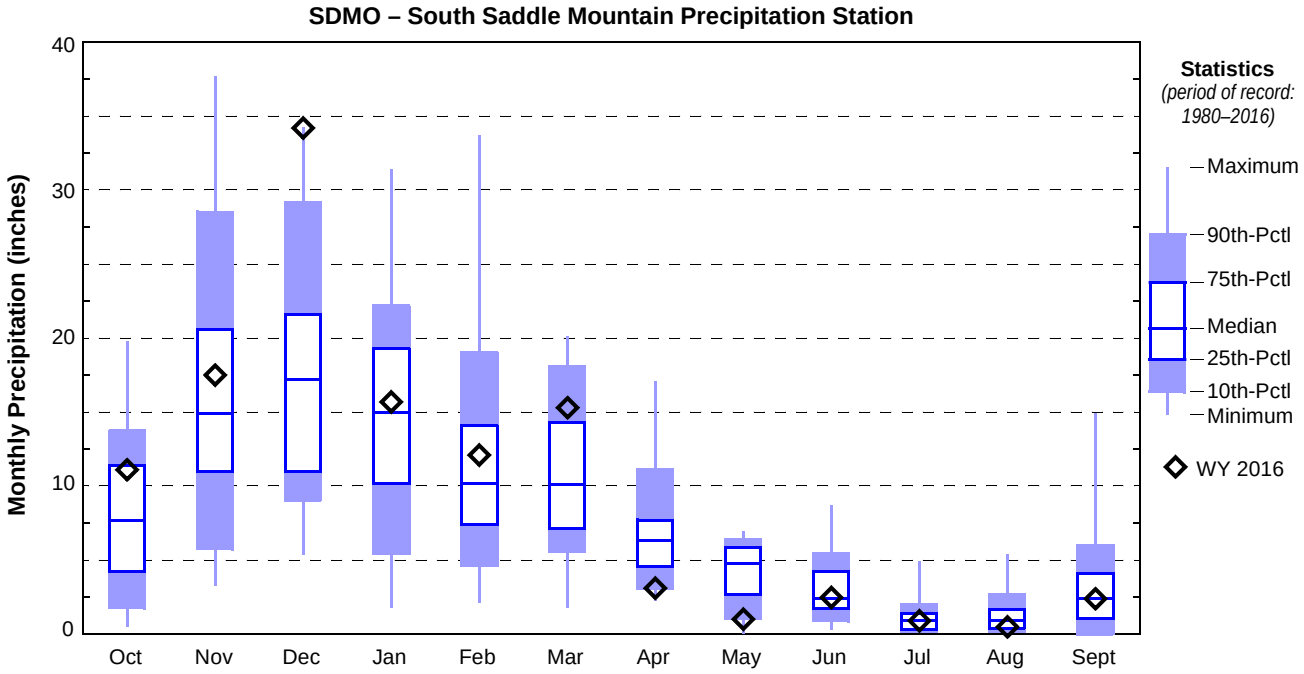
SDMO – SOUTH SADDLE MOUNTAIN PRECIPITATION STATION

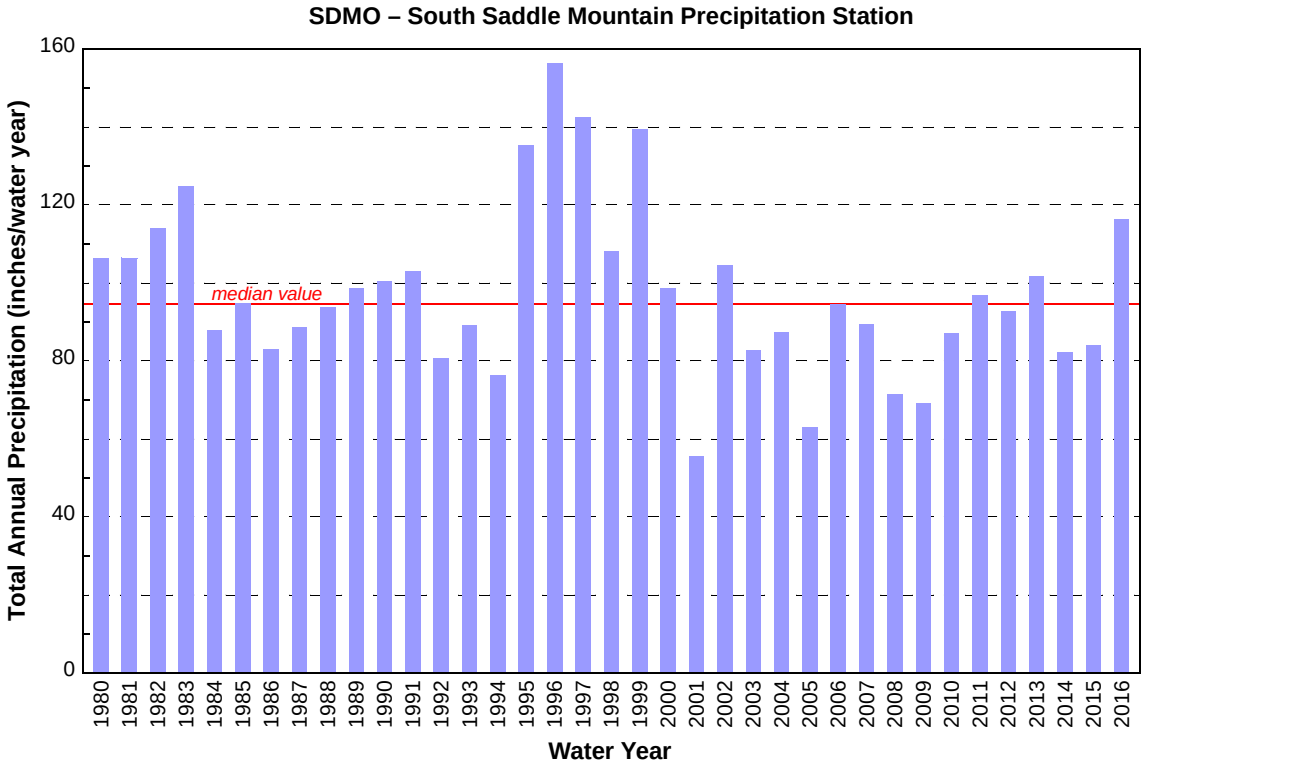
Elevation: 3250 ft
Latitude: 45 31 48 Longitude: 123 22 12

Source Agency: Natural Resources Conservation Service
https://wcc.sc.egov.usda.gov/nwcc/rgrpt?report=precsnotelmon&state=OR

Water Year*	Total Monthly Precipitation (inches)											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1980	10.8	7.5	19.2	19.3	11.2	10.1	6.5	6.4	8.7	1.0	0.6	4.9
1981	4.2	19.3	26.8	5.2	18.6	7.5	7.9	4.1	7.2	0.4	0.7	4.4
1982	13.0	14.9	26.6	19.3	17.2	7.5	7.2	0.0	2.0	1.1	1.9	3.3
1983	13.4	16.7	21.5	17.3	15.2	11.5	7.1	4.3	4.7	4.9	3.4	4.7
1984	1.7	23.3	11.8	8.3	12.6	8.1	6.3	6.4	3.8	0.6	1.1	3.8
1985	11.4	28.6	12.9	1.8	10.2	11.8	4.8	1.5	4.3	0.2	1.4	5.9
1986	12.2	11.1	5.4	15.8	13.4	7.2	5.7	3.2	1.1	1.4	0.2	6.2
1987	5.3	20.2	11.1	17.1	7.7	16.0	2.3	4.9	1.1	1.7	0.2	0.9
1988	0.7	10.8	22.2	14.1	9.6	15.0	7.8	6.1	2.4	2.0	0.3	2.7
1989	2.5	28.5	11.4	14.9	10.2	17.4	5.3	2.8	1.7	1.9	2.0	0.0
1990	5.8	9.6	8.6	31.4	20.8	7.0	6.4	3.3	4.9	0.4	0.8	1.5
1991	11.4	18.7	10.0	12.7	12.7	12.1	15.3	4.4	2.7	1.0	1.2	0.6
1992	2.8	14.4	11.8	19.1	8.8	1.8	10.5	2.4	1.2	1.4	1.1	5.3
1993	6.8	13.8	16.2	10.8	3.3	12.4	13.7	6.4	3.2	1.6	0.9	0.0
1994	2.7	3.3	18.8	11.0	15.2	9.3	5.5	3.6	4.2	0.9	0.5	1.2
1995	14.7	20.9	31.0	19.7	13.5	14.8	6.8	1.5	4.3	3.0	1.3	3.7
1996	8.5	34.8	21.7	21.2	32.6	6.0	17.1	6.4	2.0	1.2	1.0	3.7
1997	11.6	16.9	34.3	17.2	7.3	20.1	8.3	5.9	5.3	2.1	2.6	10.7
1998	19.8	15.3	9.3	24.2	14.7	10.4	3.3	6.1	1.6	0.2	0.4	2.7
1999	7.7	25.9	28.7	20.3	33.7	12.9	2.8	5.0	0.9	0.2	1.3	0.0
2000	6.1	23.6	18.6	17.7	10.1	6.3	2.9	4.9	6.0	0.1	0.6	1.6
2001	4.3	5.6	9.2	5.5	4.8	6.2	6.1	5.2	3.3	1.4	3.1	0.7
2002	6.6	23.0	20.3	21.7	7.5	10.7	7.6	2.9	3.6	0.2	0.3	0.1
2003	0.5	5.8	17.2	21.5	5.4	19.5	7.5	2.3	0.3	0.3	0.4	1.9
2004	9.4	12.1	13.5	15.0	8.7	5.4	4.4	4.9	2.7	0.1	5.4	5.7
2005	7.4	5.0	10.9	9.3	2.1	11.0	6.5	5.8	2.2	1.0	0.4	1.4
2006	9.4	12.4	18.2	29.8	6.1	7.3	3.5	3.0	2.0	0.7	0.0	2.1
2007	1.9	37.7	15.1	9.0	10.3	4.9	3.7	0.5	2.0	0.9	1.1	2.1
2008	7.7	9.5	21.9	11.5	4.7	7.6	4.9	1.1	2.3	0.3	2.4	0.0
2009	6.6	11.9	10.7	11.5	4.4	7.1	4.8	7.0	0.8	0.5	1.3	2.4
2010	7.8	15.5	9.2	14.5	8.5	9.7	7.2	4.8	5.0	0.5	0.5	3.8
2011	9.1	14.1	19.1	12.3	8.2	13.8	10.0	5.1	1.7	1.3	0.1	1.8
2012	5.8	14.6	12.2	17.3	9.6	18.0	5.9	5.0	3.7	0.2	0.0	0.3
2013	14.8	19.4	19.4	4.8	5.9	5.6	6.1	6.5	2.0	0.3	1.9	14.9
2014	1.8	9.9	6.6	9.5	15.3	18.5	9.1	5.5	1.8	0.8	0.8	2.5
2015	13.5	12.1	18.4	8.8	11.4	8.3	3.7	2.5	0.6	0.2	2.0	2.4
2016	11.1	17.5	34.2	15.7	12.1	15.3	3.1	1.0	2.5	0.9	0.5	2.4
MIN	0.5	3.3	5.4	1.8	2.1	1.8	2.3	0.0	0.3	0.1	0.0	0.0
MAX	19.8	37.7	34.3	31.4	33.7	20.1	17.1	7.0	8.7	4.9	5.4	14.9
MEDIAN	7.7	14.9	17.2	15.0	10.2	10.1	6.3	4.8	2.4	0.9	0.9	2.4
MEAN	7.86	16.33	17.14	15.03	11.45	10.65	6.69	4.13	2.97	1.00	1.18	3.04

*Water Year (WY) begins October 1st of the previous calendar year and ends September 30th of current year.


SDMO – South Saddle Mountain Precipitation Station
Monthly Precipitation (inches)
0
10
20
30
40
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Statistics
(period of record: 1980–2016)
Maximum
90th-Pctl
75th-Pctl
Median
25th-Pctl
10th-Pctl
Minimum
WY 2016


SDMO – South Saddle Mountain Precipitation Station
Total Annual Precipitation (inches/water year)
0
40
80
120
160
median value
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Water Year

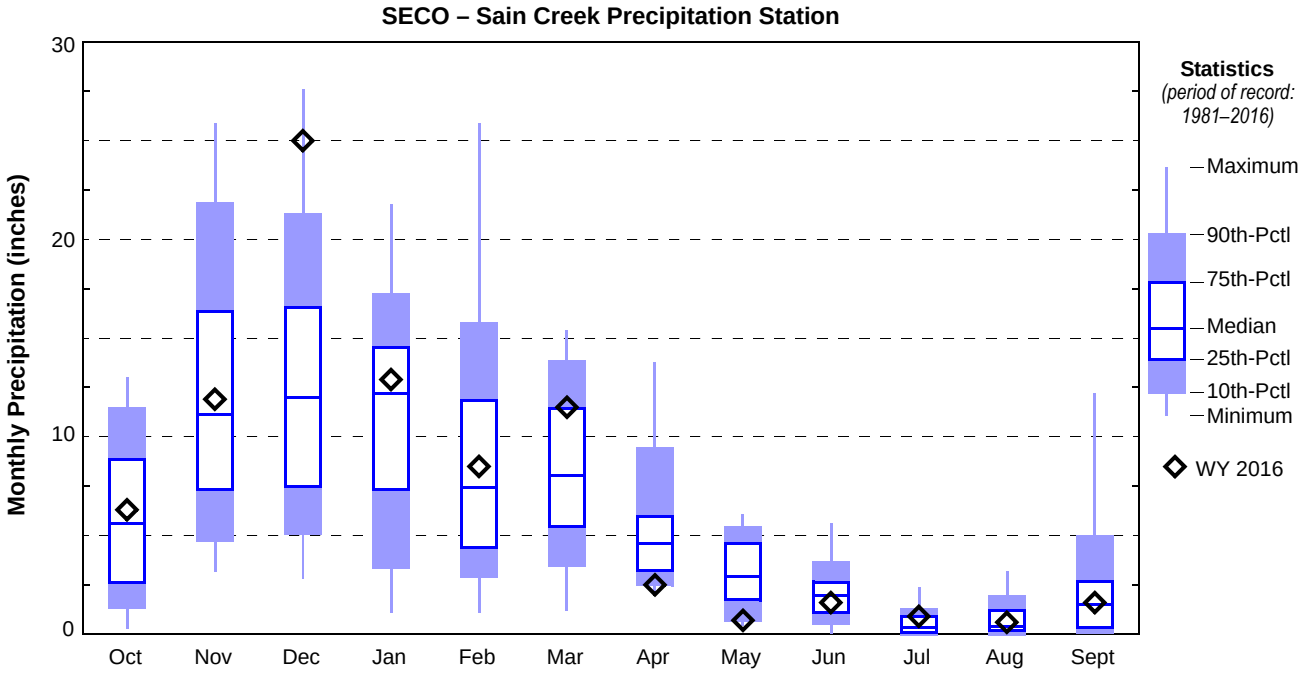
SECO – SAIN CREEK PRECIPITATION STATION

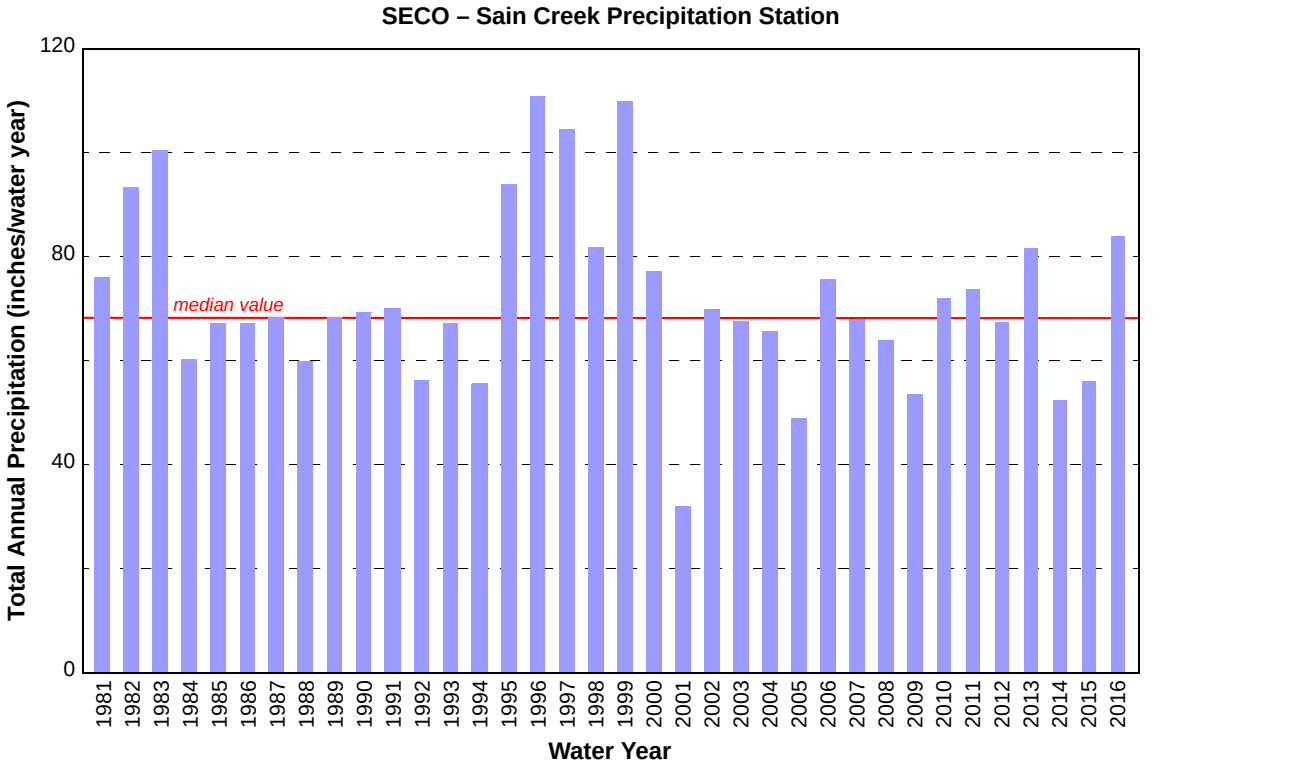
Elevation: 2000 ft
Latitude: 45 31 12 Longitude: 123 16 48

Source Agency: Natural Resources Conservation Service
https://wcc.sc.egov.usda.gov/nwcc/rgrpt?report=precsnotelmon&state=OR

Water Year*	Total Monthly Precipitation (inches)											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1981	2.3	13.5	17.8	5.8	12.8	5.3	6.0	3.6	5.6	0.0	0.2	3.0
1982	10.3	11.8	20.8	13.2	14.9	7.9	6.4	0.7	2.0	1.1	1.9	2.4
1983	11.1	11.4	17.0	15.5	17.3	14.5	6.3	2.5	3.1	1.6	0.0	0.1
1984	1.4	16.7	3.5	3.5	12.1	9.1	2.5	5.3	3.3	0.0	0.0	2.8
1985	10.4	22.6	7.0	1.1	4.0	7.9	4.3	1.4	3.5	0.1	1.6	3.2
1986	9.3	4.9	2.8	13.2	15.1	2.9	5.2	6.1	0.2	1.0	0.2	6.3
1987	4.5	15.3	8.4	12.4	6.4	12.3	3.6	3.3	0.4	1.2	0.2	0.3
1988	0.7	6.8	15.8	12.2	2.8	9.1	4.4	4.0	2.0	0.7	0.0	1.4
1989	1.3	21.5	7.4	9.1	7.3	11.6	3.7	1.7	1.9	0.9	1.7	0.1
1990	4.5	6.2	5.8	21.8	14.5	6.4	3.2	2.6	2.5	0.3	0.7	0.8
1991	8.4	10.9	6.1	7.4	9.1	8.3	12.9	2.8	2.1	0.8	0.8	0.5
1992	2.5	9.7	8.4	12.2	6.7	1.2	9.2	1.1	1.1	0.6	0.4	3.1
1993	5.0	9.3	11.9	8.9	2.0	8.8	9.9	5.7	2.7	2.4	0.5	0.0
1994	1.7	4.5	12.7	8.5	10.7	5.9	4.2	3.1	2.4	0.1	0.2	1.6
1995	13.0	13.4	16.6	16.0	9.3	11.2	5.2	1.9	2.9	1.1	0.8	2.5
1996	6.6	24.6	15.7	15.3	21.9	3.4	13.8	4.8	1.4	0.4	0.4	2.6
1997	8.4	12.7	27.6	13.3	4.7	13.7	5.6	4.8	3.4	0.4	1.9	8.1
1998	13.0	12.0	6.4	19.8	12.0	8.5	2.5	5.1	0.8	0.0	0.2	1.5
1999	5.6	20.5	22.3	16.1	25.9	11.1	2.0	4.0	1.0	0.2	1.2	0.0
2000	4.6	18.3	15.4	13.5	8.5	5.3	2.6	3.8	4.0	0.0	0.2	0.9
2001	2.9	3.7	6.4	3.2	3.1	3.7	3.7	2.4	1.1	0.3	1.2	0.2
2002	3.8	16.7	13.3	14.9	5.1	6.6	5.1	2.0	2.0	0.1	0.0	0.3
2003	0.3	7.8	16.5	15.8	4.3	14.1	5.9	1.4	0.0	0.0	0.0	1.5
2004	5.8	7.3	12.0	12.2	7.6	3.9	4.7	2.3	2.0	0.2	3.2	4.4
2005	5.6	3.2	8.3	8.4	1.1	8.5	4.9	5.3	2.5	0.4	0.2	0.6
2006	9.1	10.4	14.7	21.8	3.7	6.9	3.3	3.1	1.5	0.2	0.0	0.9
2007	1.8	25.9	12.0	6.1	9.5	4.0	3.2	0.4	1.1	1.2	0.9	1.9
2008	4.7	7.5	20.0	11.2	5.0	7.5	4.5	0.5	0.6	0.6	1.9	0.0
2009	5.8	7.4	11.3	7.9	3.0	5.9	2.9	5.3	0.8	0.0	1.3	2.0
2010	6.2	12.5	7.7	13.0	7.2	8.2	6.7	3.3	4.1	0.1	0.2	2.7
2011	7.0	10.1	16.1	7.3	6.6	12.3	7.7	2.6	1.4	1.4	0.0	1.3
2012	4.8	10.2	7.7	13.4	6.5	15.4	4.0	2.7	2.0	0.1	0.3	0.3
2013	12.3	16.8	16.6	2.1	4.0	3.5	5.3	5.9	1.2	0.2	1.5	12.2
2014	1.4	6.1	2.9	4.7	11.4	13.0	5.8	3.1	1.4	0.6	0.4	1.6
2015	9.0	7.1	11.7	6.0	8.9	6.3	2.1	1.3	0.9	0.2	1.1	1.5
2016	6.3	11.9	25.0	12.9	8.5	11.5	2.5	0.7	1.6	0.9	0.6	1.6
MIN	0.3	3.2	2.8	1.1	1.1	1.2	2.0	0.4	0.0	0.0	0.0	0.0
MAX	13.0	25.9	27.6	21.8	25.9	15.4	13.8	6.1	5.6	2.4	3.2	12.2
MEDIAN	5.6	11.2	12.0	12.2	7.5	8.1	4.6	3.0	2.0	0.4	0.4	1.5
MEAN	5.87	11.98	12.54	11.10	8.71	8.21	5.16	3.07	1.96	0.54	0.72	2.06

*Water Year (WY) begins October 1st of the previous calendar year and ends September 30th of current year.


SECO – Sain Creek Precipitation Station
Monthly Precipitation (inches)
30
20
10
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Statistics
(period of record:
1981–2016)
Maximum
90th-Pctl
75th-Pctl
Median
25th-Pctl
10th-Pctl
Minimum
WY 2016


SECO – Sain Creek Precipitation Station
Total Annual Precipitation (inches/water year)
120
80
40
0
median value
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
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2010
2011
2012
2013
2014
2015
2016
Water Year

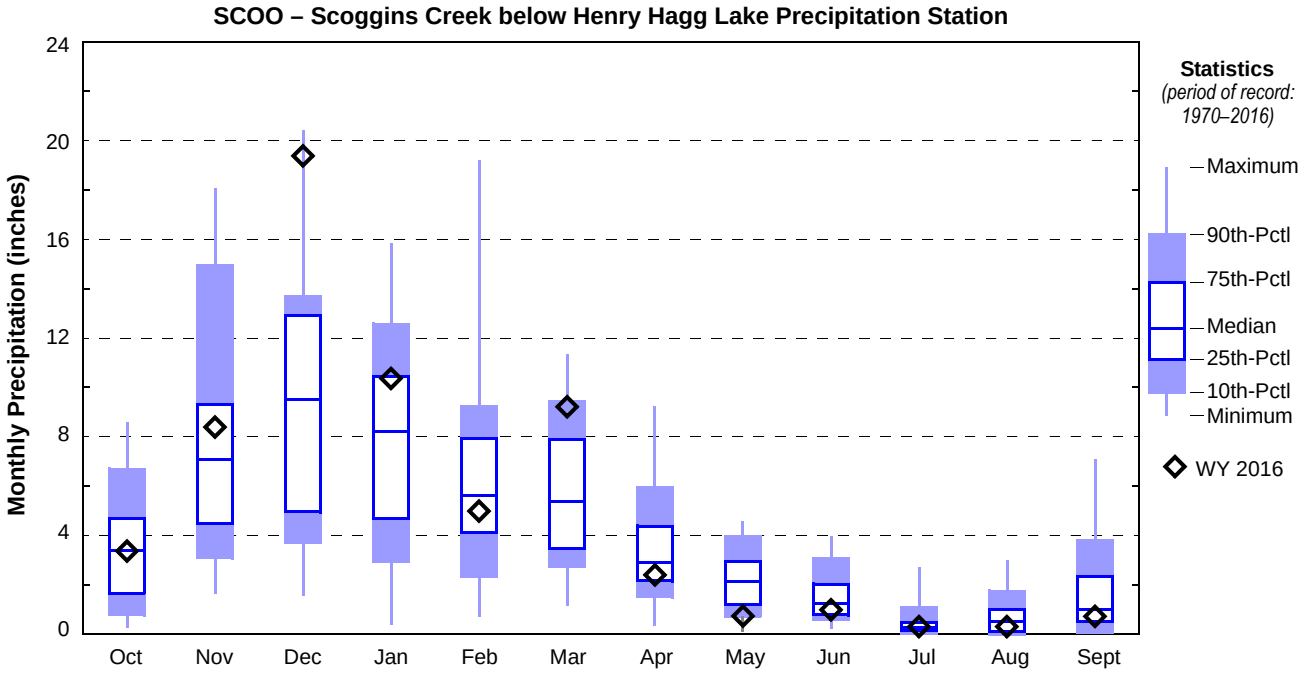
SCOO – SCOGGINS CREEK BELOW HENRY HAGG LAKE PRECIPITATION STATION

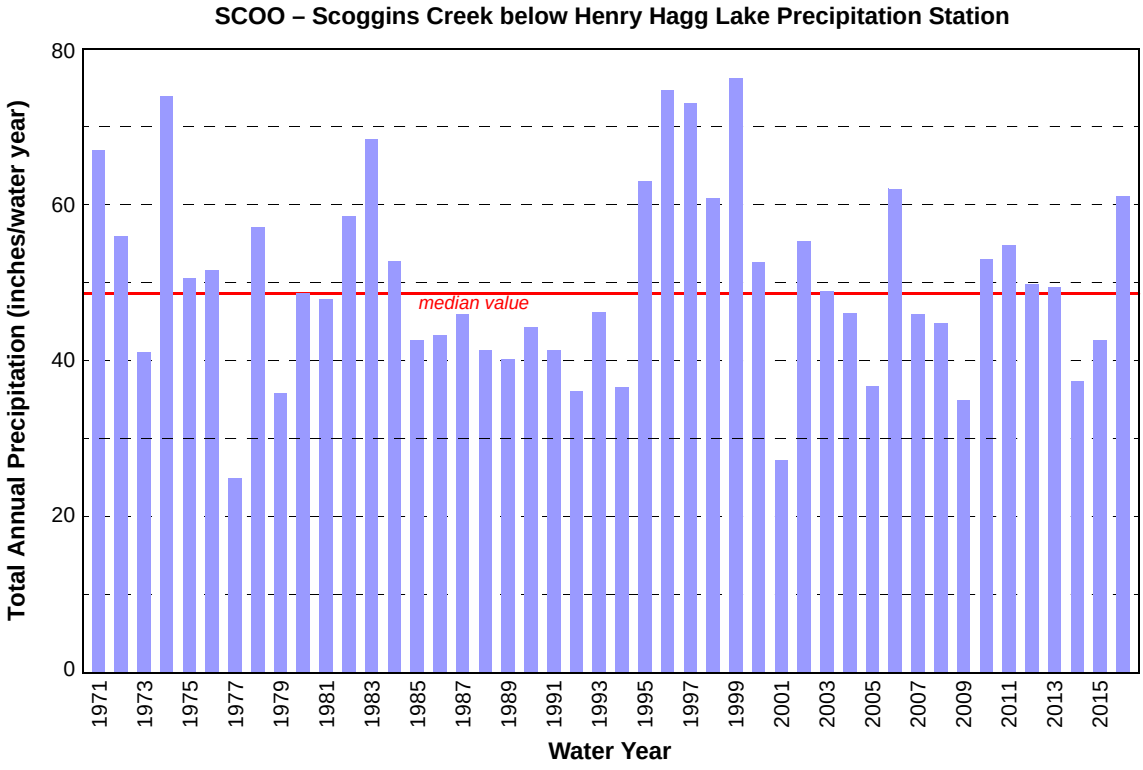
Elevation: 187.5 ft
Latitude: 45 28 10 Longitude: 123 11 56

Source Agency: Tualatin Valley Irrigation District
data not available online

Water Year*	Total Monthly Precipitation (inches)											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1970			8.53	15.85	6.30	3.47	3.49	1.27	0.77	0.01	0.00	1.10
1971	4.40	6.86	16.85	10.82	5.60	10.30	3.96	1.54	2.03	0.14	0.52	3.92
1972	4.02	8.68	12.12	10.20	5.05	6.79	3.92	0.92	0.58	0.28	0.25	3.12
1973	0.72	6.31	12.28	6.44	2.36	3.75	2.15	1.19	1.37	0.04	0.86	3.54
1974	3.82	18.05	14.64	12.46	7.92	9.31	3.98	1.31	0.86	1.38	0.02	0.06
1975	1.33	8.02	9.94	10.45	8.11	5.71	2.00	2.12	0.67	0.47	1.72	0.03
1976	6.69	6.38	9.50	7.68	8.25	5.98	1.81	1.63	0.48	0.70	1.80	0.69
1977	1.26	1.65	1.54	1.05	3.37	5.33	0.32	2.50	1.11	0.41	2.99	3.42
1978	2.76	8.11	13.47	7.92	6.66	2.47	5.04	2.95	1.00	0.65	2.11	3.94
1979	0.81	4.29	3.77	3.16	9.75	3.30	2.83	2.99	0.68	0.15	1.71	2.42
1980	6.69	4.25	9.21	8.30	7.13	4.09	4.38	1.10	1.81	0.22	0.05	1.37
1981	1.76	8.71	11.80	3.60	6.07	3.22	2.88	2.67	3.14	0.08	0.06	3.77
1982	5.55	6.77	13.00	7.21	8.43	4.85	6.45	0.51	1.41	0.37	1.46	2.49
1983	5.82	6.90	13.00	8.13	13.46	9.93	2.88	1.54	2.10	2.73	1.19	0.67
1984	1.34	15.16	7.91	3.09	7.92	4.81	4.05	3.95	3.34	0.00	0.00	1.13
1985	5.16	14.86	4.88	0.37	4.03	5.22	1.50	0.73	2.58	0.41	0.68	2.17
1986	4.48	4.55	2.93	9.23	8.42	4.13	2.57	2.65	0.59	1.07	0.00	2.60
1987	3.43	7.85	5.96	8.19	6.67	8.51	1.80	2.10	0.31	0.79	0.11	0.23
1988	0.23	3.09	12.51	9.46	1.67	4.50	3.32	2.78	2.59	0.15	0.09	0.89
1989	0.27	12.19	4.64	4.61	4.59	8.21	1.26	1.63	0.89	0.48	0.83	0.55
1990	2.74	4.39	3.52	13.00	8.87	2.60	2.20	3.01	2.02	0.26	1.18	0.49
1991	4.35	4.49	3.87	4.69	4.72	5.38	9.03	2.29	1.44	0.22	0.54	0.23
1992	1.80	6.31	5.74	7.72	4.66	1.16	5.63	0.09	0.71	0.42	0.35	1.47
1993	2.84	5.94	8.85	6.25	1.21	5.40	6.71	3.95	2.26	2.59	0.17	0.04
1994	1.21	1.92	9.97	6.47	7.71	3.41	2.49	0.96	1.30	0.00	0.13	0.98
1995	4.94	9.30	11.54	12.00	5.36	7.88	4.53	1.47	2.44	0.58	1.01	1.89
1996	3.70	12.24	12.17	11.53	13.61	2.81	9.23	4.49	1.59	0.58	0.34	2.32
1997	5.44	8.73	20.40	10.71	2.98	9.22	3.38	2.68	3.34	0.29	1.28	4.52
1998	8.57	9.32	4.41	14.18	9.08	6.26	2.31	4.56	0.96	0.24	0.00	0.91
1999	4.51	15.20	13.27	11.84	19.20	6.25	1.77	2.15	0.93	0.08	0.96	0.06
2000	3.13	12.68	9.50	9.02	6.51	4.08	1.40	2.94	2.26	0.03	0.19	0.81
2001	3.24	3.08	5.11	2.30	2.36	3.05	2.19	2.20	1.79	0.23	1.12	0.52
2002	3.28	12.10	11.86	11.36	4.11	5.84	2.79	1.58	1.46	0.13	0.19	0.57
2003	0.73	4.37	13.26	9.33	4.20	9.29	5.17	0.86	0.20	0.01	0.62	0.86
2004	3.34	5.26	9.92	8.84	5.96	3.11	3.12	1.63	0.90	0.00	2.01	2.00
2005	4.60	2.75	4.95	4.92	0.70	7.73	3.34	4.52	1.99	0.38	0.39	0.38
2006	5.54	8.57	12.92	15.72	4.10	6.13	3.63	2.96	1.53	0.15	0.00	0.75
2007	0.83	17.64	7.76	4.37	6.42	2.79	2.15	0.90	0.76	0.69	0.58	0.99
2008	3.91	4.68	13.42	8.69	3.30	5.03	2.50	0.92	1.25	0.02	0.98	0.09
2009	2.89	6.29	4.58	6.36	2.20	4.13	1.99	3.95	0.76	0.21	0.66	0.82
2010	3.73	8.95	5.11	10.29	5.16	5.72	5.79	3.20	3.04	0.36	0.05	1.54
2011	4.53	7.24	12.96	4.99	4.78	9.67	5.35	2.96	0.78	1.11	0.00	0.35
2012	2.29	8.12	3.93	9.33	4.53	11.32	2.99	2.94	3.98	0.25	0.02	0.04
2013	6.95	9.95	11.78	1.19	2.35	2.61	1.93	3.79	0.94	0.00	0.79	7.10
2014	1.04	3.33	2.06	3.28	8.96	9.39	4.56	2.01	0.94	0.33	0.10	1.37
2015	7.15	3.75	9.16	4.36	7.79	5.42	1.49	0.54	0.65	0.23	0.77	1.33
2016	3.35	8.38	19.38	10.36	4.97	9.21	2.39	0.72	0.97	0.29	0.29	0.71
MIN	0.23	1.65	1.54	0.37	0.70	1.16	0.32	0.09	0.20	0.00	0.00	0.03
MAX	8.57	18.05	20.40	15.85	19.20	11.32	9.23	4.56	3.98	2.73	2.99	7.10
MEDIAN	3.39	7.07	9.50	8.19	5.60	5.38	2.88	2.12	1.25	0.26	0.52	0.98
MEAN	3.50	7.78	9.36	7.90	6.12	5.72	3.42	2.18	1.48	0.43	0.66	1.52

*Water Year (WY) begins October 1st of the previous calendar year and ends September 30th of current year.


SCOO – Scoggins Creek below Henry Hagg Lake Precipitation Station
Monthly Precipitation (inches)
24
20
16
12
8
4
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Statistics
(period of record:
1970–2016)
Maximum
90th-Pctl
75th-Pctl
Median
25th-Pctl
10th-Pctl
Minimum
WY 2016


SCOO – Scoggins Creek below Henry Hagg Lake Precipitation Station
Total Annual Precipitation (inches/water year)
80
60
40
20
0
median value
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
Water Year

DLLP – DILLEY PRECIPITATION STATION (ID# 352325)

Elevation: 170 ft
Latitude: 45 29 Longitude: 123 07

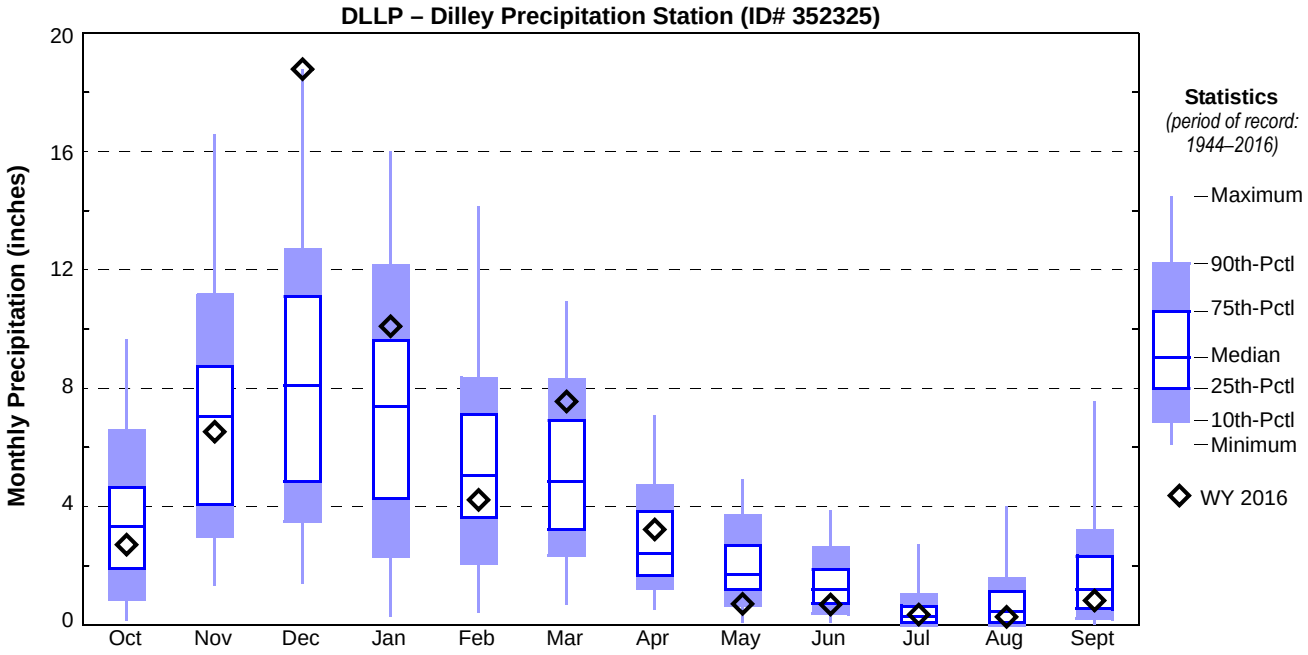
Source Agency: Western Climatic Data Center
www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?or2325

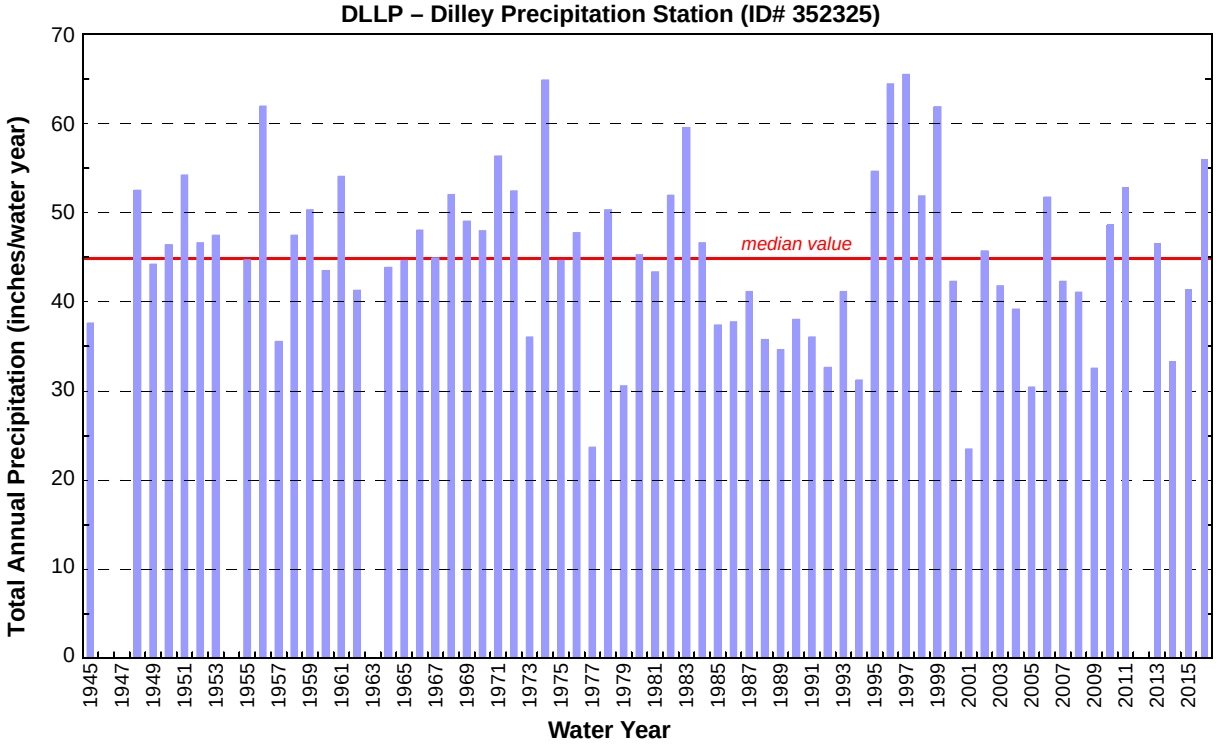
Water Year*	Total Monthly Precipitation (inches)											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1944			4.08	5.12	3.98	3.22	3.93	0.94	0.74	1.06	0.20	2.80
1945	1.56	5.5	2.74	4.13	6.99	7.18	2.09	3.71	0.22	0.20	0.13	3.17
1946	1.45	11.82	7.56	7.21	7.61	6.09	1.41	1.51	1.74			
1947		10.27	5.38	5.47	4.46	4.69	1.30	0.09	3.12	0.86	0.50	1.28
1948	9.68	4.08	4.99	7.28	7.52	4.55	3.97	4.92	0.90	0.59	1.35	2.72
1949	2.52	8.69	10.59	2.06	11.83	2.99	0.55	2.98	0.55	0.82	0.03	0.58
1950	2.48	7.55	5.93	10.43	6.58	6.77	1.46	0.48	2.19	0.54	0.84	1.13
1951	9.62	9.55	8.93	11.03	5.01	4.74	0.88	1.67	0.15	0.11	0.15	2.38
1952	6.96	7.89	9.70	7.08	5.65	4.20	1.35	0.77	2.62	0.00	0.03	0.38
1953	0.61	2.29	9.28	14.98	4.86	5.36	2.74	2.87	1.25	0.10	1.51	1.60
1954	3.55	7.37	7.48	13.80	7.32	2.95	3.26	1.33	2.06	0.56		1.97
1955	3.92	7.61	7.66	4.41	4.36	5.55	4.56	0.77	1.78	1.41	0.00	2.65
1956	6.97	10.49	12.90	13.36	4.43	7.27	0.64	1.42	1.29	0.03	1.32	1.84
1957	4.83	1.98	4.69	3.02	5.77	7.09	2.09	3.03	1.52	0.27	0.47	0.75
1958	3.55	3.77	10.90	9.29	8.50	2.62	4.24	1.05	2.96	0.02	0.00	0.59
1959	2.34	8.74	6.09	12.18	5.10	4.42	1.76	2.55	2.57	0.92	0.08	2.75
1960	2.71	4.44	4.86	6.56	6.94	7.27	4.65	4.37	0.43	0.00	0.74	0.53
1961	4.24	10.95	3.64	7.05	11.15	10.02	2.94	2.36	0.24	0.48	0.52	0.46
1962	5.98	4.95	7.67	1.61	4.14	5.78	4.79	2.43	0.44	0.00	1.43	2.08
1963		11.23	3.48	1.91	5.39	6.65	4.03	2.82	1.94	1.01	1.64	1.42
1964	3.68	7.10	5.24	16.01	1.47	5.23	1.34	0.85	1.53	0.66	0.54	0.23
1965	1.87	9.80	14.38	9.04	2.72	0.69	2.21	1.14	0.91	1.02	0.87	0.00
1966	1.92	8.73	9.87	9.62	2.67	8.47	0.66	1.28	1.84	1.10	0.46	1.39
1967	3.62	6.98	11.57	10.14	1.83	6.07	2.63	0.64	0.76	0.00	0.00	0.65
1968	6.35	3.28	7.17	7.94	9.00	5.53	1.41	3.01	2.10	0.11	4.01	2.08
1969	5.45	7.48	12.91	9.61	4.33	1.21	2.19	1.72	2.01	0.02	0.00	2.14
1970	4.64	3.26	11.18	14.21	5.81	3.12	2.64	1.26	0.57	0.01	0.00	1.26
1971	4.01	5.89	14.28	8.96	4.74	8.29	3.68	1.22	1.61	0.13	0.36	3.19
1972	3.21	8.35	10.45	8.19	4.90	7.32	4.41	1.39	0.56	0.28	0.25	3.12
1973	0.61	4.78	11.33	5.37	2.18	3.40	1.57	1.40	1.27	0.05	0.76	3.30
1974	3.36	16.59	12.01	11.25	6.75	8.51	2.96	1.46	0.65	1.25	0.00	0.07
1975	1.32	7.50	8.64	8.99	7.00	4.86	1.75	1.94	0.62	0.44	1.60	0.00
1976	6.42	5.16	8.59	6.85	7.20	5.54	2.31	1.30	0.39	0.82	2.41	0.79
1977	1.30	1.32	1.60	1.05	2.98	4.46	0.51	2.50	1.12	0.60	3.07	3.18
1978	2.94	7.21	11.39	7.37	5.92	2.27	3.70	2.67	0.99	0.99	1.65	3.23
1979	0.71	3.85	3.77	3.06	8.00	2.49	2.41	2.07	0.58	0.13	0.94	2.54
1980	6.67	3.93	7.50	8.14	6.25	4.02	3.70	1.21	2.24	0.22	0.06	1.36
1981	1.63	8.35	11.43	2.65	5.17	2.98	2.17	1.96	3.00	0.15	0.05	3.83
1982	5.90	5.89	12.15	5.82	7.75	3.89	4.83	0.44	1.31	0.36	1.24	2.40
1983	4.87	5.36	11.31	7.40	12.20	8.23	2.49	1.40	1.65	2.74	1.38	0.54
1984	1.32	13.07	6.87	2.70	5.95	4.29	3.95	3.36	3.88	0.00	0.00	1.21
1985	4.63	12.83	3.87	0.27	3.18	4.56	1.20	0.36	2.94	0.45	1.45	1.63
1986	3.97	3.95	2.77	8.38	7.35	3.81	1.59	1.99	0.37	0.85	0.00	2.74
1987	3.31	6.52	5.47	8.25	5.18	7.47	1.72	1.85	0.19	0.85	0.15	0.20
1988	0.20	3.66	10.41	8.14	1.16	3.67	2.6	2.23	2.27	0.07	0.17	1.16
1989	0.14	10.98	3.81	4.14	3.51	7.05	0.81	1.62	0.78	0.36	0.93	0.51
1990	2.47	4.02	3.47	10.42	7.14	2.08	1.71	2.98	1.82	0.27	0.93	0.72
1991	4.14	4.15	3.36	3.97	4.46	5.07	6.36	2.19	1.39	0.29	0.39	0.24
1992	1.91	6.26	4.91	6.62	3.97	1.19	4.79	0.07	0.80	0.31	0.51	1.28
1993	2.79	5.44	7.42	5.39	0.78	5.00	6.76	3.79	1.95	1.76	0.08	0.00
1994	1.26	1.49	9.12	5.67	6.45	3.14	1.41	0.89	0.95	0.00	0.24	0.58
1995	4.64	8.12	10.29	10.56	5.02	6.53	3.74	1.29	1.76	0.45	0.49	1.74
1996	3.41	9.78	10.09	9.69	12.68	2.46	7.09	4.84	1.12	0.60	0.26	2.43
1997	5.37	8.05	18.46	9.63	2.51	8.29	2.98	2.65	2.38	0.47	1.38	3.33
1998	6.58	8.36	3.54	12.10	7.66	5.20	1.76	4.82	1.05	0.09	0.00	0.73
1999	3.24	13.00	10.81	10.29	14.15	4.85	1.90	1.71	0.76	0.02	1.14	0.04
2000	2.55	10.10	7.10	7.81	5.46	3.25	1.52	2.15	1.21	0.00	0.22	0.89
2001	3.09	2.46	4.20	2.17	1.98	2.25	1.72	1.60	1.84	0.32	1.27	0.54
2002	2.91	10.26	10.66	9.00	3.61	4.04	1.93	1.14	1.32	0.19	0.07	0.57
2003	0.59	3.35	12.22	8.61	3.69	7.41	4.24	0.46	0.07	0.01	0.32	0.79
2004	2.87	4.10	9.01	7.70	5.21	2.32	2.24	1.25	1.21	0.00	1.66	1.56
2005	3.80	2.53	3.89	4.25	0.41	5.97	2.79	4.26	1.84	0.29	0.13	0.24
2006	4.16	7.58	11.79	14.09	3.38	4.21	2.58	2.26	0.92	0.17	0.00	0.63
2007	1.01	15.05	8.03	4.03	4.62	2.48	2.32	1.22	0.83	0.82	0.63	1.21
2008	3.80	4.35	10.41	7.03	2.93	4.66	2.91	2.72	0.97	0.00	0.96	0.32
2009	2.42	6.01	4.85	5.53	2.04	3.43	1.72	3.53	0.23	0.17	1.29	1.32
2010	3.67	8.41	4.48	8.95	4.91	5.26	4.82	3.36	3.03	0.16	0.08	1.50

DLLP – DILLEY PRECIPITATION STATION (ID# 352325) – CONTINUED

Water Year*	Total Monthly Precipitation (inches)											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
2011	4.00	7.00	13.55	5.63	4.36	8.93	4.62	2.47	0.84	0.98	0.07	0.42
2012	2.56	8.00				10.95	2.54	2.3	2.48	0.41	0.07	0.04
2013	5.85	8.87	11.15	1.49	2.17	2.38	1.66	3.66	1.17	0.00	0.54	7.57
2014	0.85	2.92	1.37	2.87	7.64	8.69	3.98	1.80	1.05	0.37	0.54	1.23
2015	7.66	3.21	8.18	3.91	7.9	4.87	1.96	0.87	0.59	0.43	0.66	1.09
2016	2.71	6.52	18.77	10.09	4.22	7.54	3.22	0.71	0.69	0.35	0.27	0.82
MIN	0.14	1.32	1.37	0.27	0.41	0.69	0.51	0.07	0.07	0.00	0.00	0.00
MAX	9.68	16.59	18.77	16.01	14.15	10.95	7.09	4.92	3.88	2.74	4.01	7.57
MEDIAN	3.34	7.05	8.11	7.39	5.06	4.85	2.41	1.72	1.21	0.30	0.47	1.22
MEAN	3.53	6.95	8.20	7.35	5.45	5.06	2.73	1.99	1.36	0.44	0.67	1.47

*Water Year (WY) begins October 1st of the previous calendar year and ends September 30th of current year.





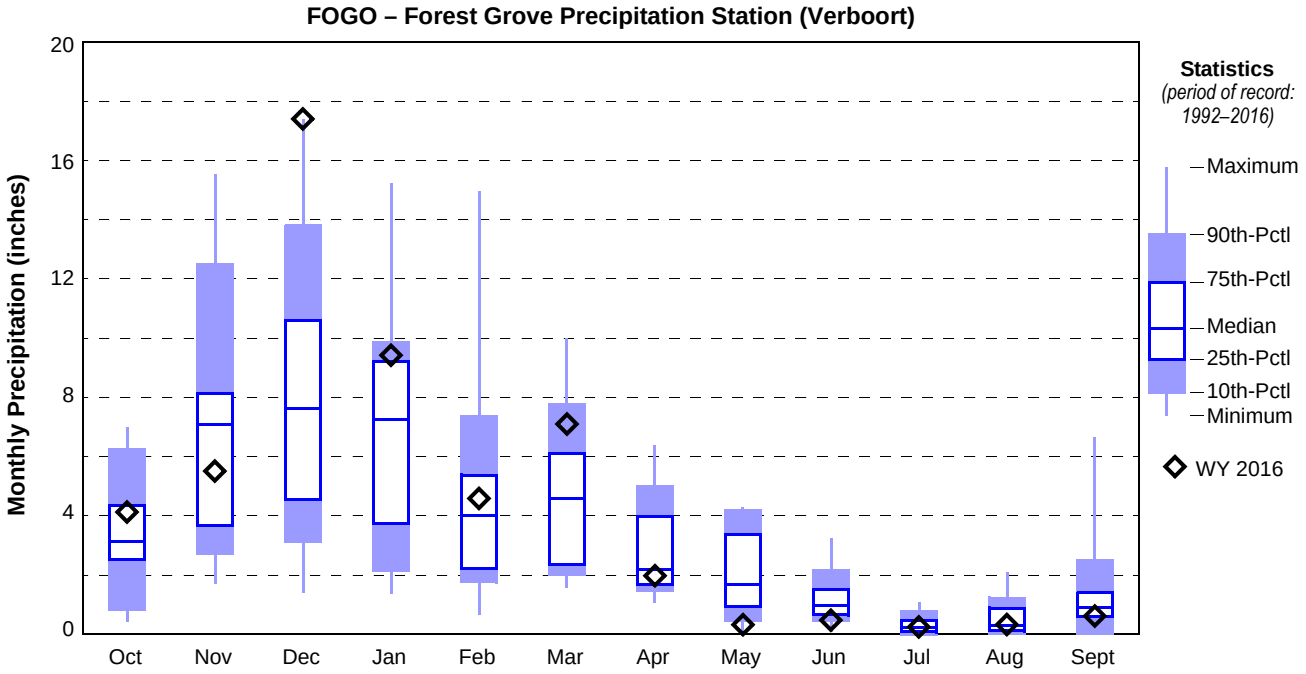
FOGO – FOREST GROVE PRECIPITATION STATION (VERBOORT)

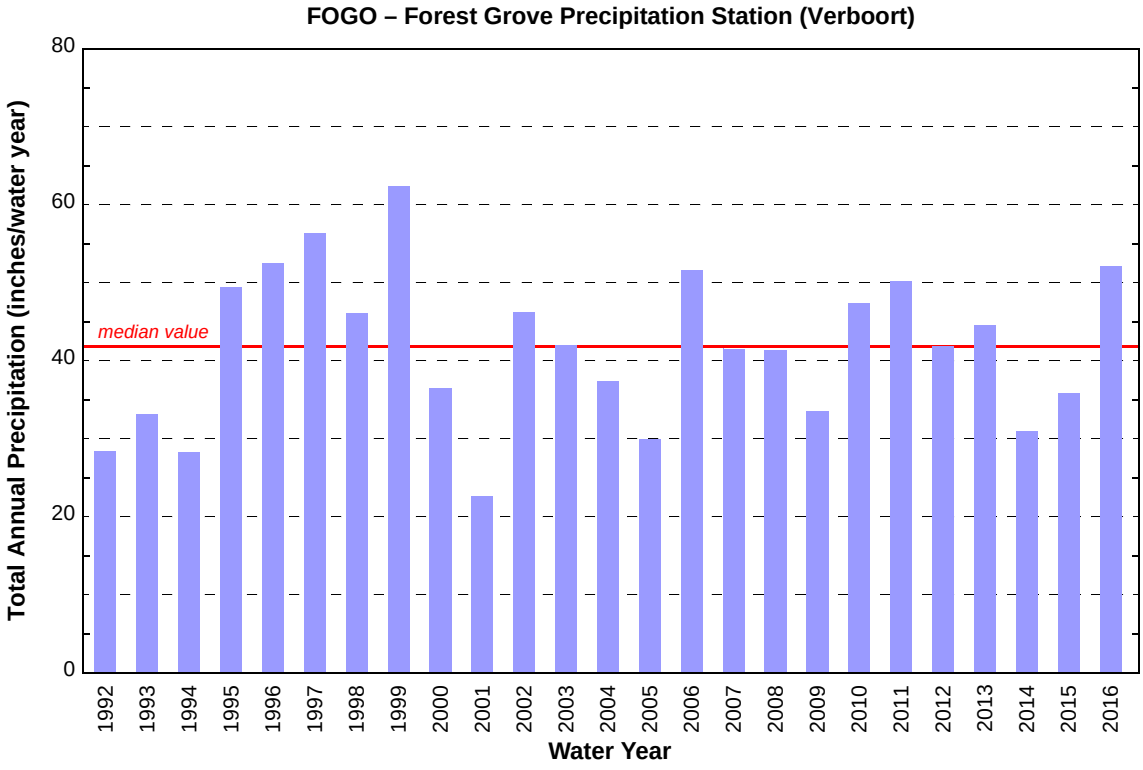
Elevation: 180 ft
Latitude: 45 33 11 Longitude: 123 05 01

Source Agency: US Bureau of Reclamation – Agrimet
https://www.usbr.gov/pn/agrimet/webarcread.html

Water Year*	Total Monthly Precipitation (inches)											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1992	1.50	5.10	3.68	5.93	3.56	1.56	4.35	0.10	0.94	0.26	0.28	1.08
1993	2.41	4.17	6.00	3.20	2.22	4.15	4.88	4.22	0.57	1.09	0.14	0.00
1994	1.08	1.68	7.61	4.95	5.75	2.34	1.49	1.31	1.04	0.02	0.23	0.77
1995	6.26	7.51	7.56	9.72	4.05	5.78	3.09	1.57	1.23	0.53	0.50	1.62
1996	3.08	11.72	8.55	9.06	3.63	2.33	6.37	4.14	0.85	0.48	0.26	1.99
1997	4.53	7.99	14.96	7.64	1.78	7.76	3.27	1.83	1.80	0.18	1.32	3.25
1998	6.99	7.08	3.47	9.12	7.20	4.57	1.44	4.28	1.06	0.07	0.00	0.80
1999	3.44	13.67	9.83	9.65	14.97	5.39	1.69	1.68	0.98	0.35	0.66	0.02
2000	2.78	7.84	5.89	7.72	3.99	2.37	1.05	2.06	1.58	0.09	0.13	0.92
2001	3.08	2.63	4.30	1.66	1.74	2.13	1.68	1.07	2.11	0.44	1.15	0.63
2002	2.79	11.22	9.74	9.30	3.45	4.60	1.61	1.16	1.20	0.20	0.03	0.90
2003	0.43	3.02	12.24	10.06	3.18	6.19	5.13	0.55	0.07	0.00	0.35	0.73
2004	3.49	4.62	7.87	6.09	5.23	1.93	2.55	1.10	0.81	0.00	2.08	1.50
2005	3.80	2.78	4.38	2.47	0.67	6.00	2.60	4.08	1.56	0.21	0.11	1.28
2006	4.32	7.44	11.35	15.24	2.15	4.38	2.19	2.91	0.69	0.20	0.07	0.58
2007	0.95	15.55	8.57	3.88	4.24	2.45	2.12	0.78	0.59	0.57	0.50	1.32
2008	3.14	4.51	13.01	8.81	2.70	4.13	2.46	0.71	0.78	0.01	0.97	0.11
2009	2.66	5.69	4.73	6.06	1.91	3.69	1.77	3.43	1.17	0.13	1.06	1.28
2010	3.78	7.70	5.34	7.44	4.78	5.28	4.24	3.37	3.23	0.51	0.23	1.46
2011	4.39	7.42	11.53	5.08	5.52	7.35	4.38	2.37	0.62	1.05	0.00	0.48
2012	2.75	8.28	2.66	7.25	4.17	10.00	2.16	2.15	2.22	0.08	0.08	0.02
2013	6.25	9.20	9.56	1.36	2.24	2.08	1.67	3.36	1.44	0.00	0.78	6.63
2014	0.68	2.96	1.39	2.98	7.57	7.73	3.70	1.30	0.87	0.29	0.10	1.30
2015	6.13	3.19	7.45	3.61	5.90	4.67	1.48	0.80	0.44	0.28	1.02	0.79
2016	4.12	5.50	17.40	9.42	4.58	7.09	1.97	0.31	0.46	0.24	0.32	0.61
MIN	0.43	1.68	1.39	1.36	0.67	1.56	1.05	0.10	0.07	0.00	0.00	0.00
MAX	6.99	15.55	17.40	15.24	14.97	10.00	6.37	4.28	3.23	1.09	2.08	6.63
MEDIAN	3.14	7.08	7.61	7.25	3.99	4.57	2.19	1.68	0.98	0.21	0.28	0.90
MEAN	3.39	6.74	7.96	6.71	4.29	4.64	2.77	2.03	1.13	0.29	0.49	1.20

*Water Year (WY) begins October 1st of the previous calendar year and ends September 30th of current year.


FOGO – Forest Grove Precipitation Station (Verboort)
Monthly Precipitation (inches)
20
16
12
8
4
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Statistics
(period of record:
1992–2016)
Maximum
90th-Pctl
75th-Pctl
Median
25th-Pctl
10th-Pctl
Minimum
WY 2016


FOGO – Forest Grove Precipitation Station (Verboort)
Total Annual Precipitation (inches/water year)
80
60
40
20
0
median value
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Water Year

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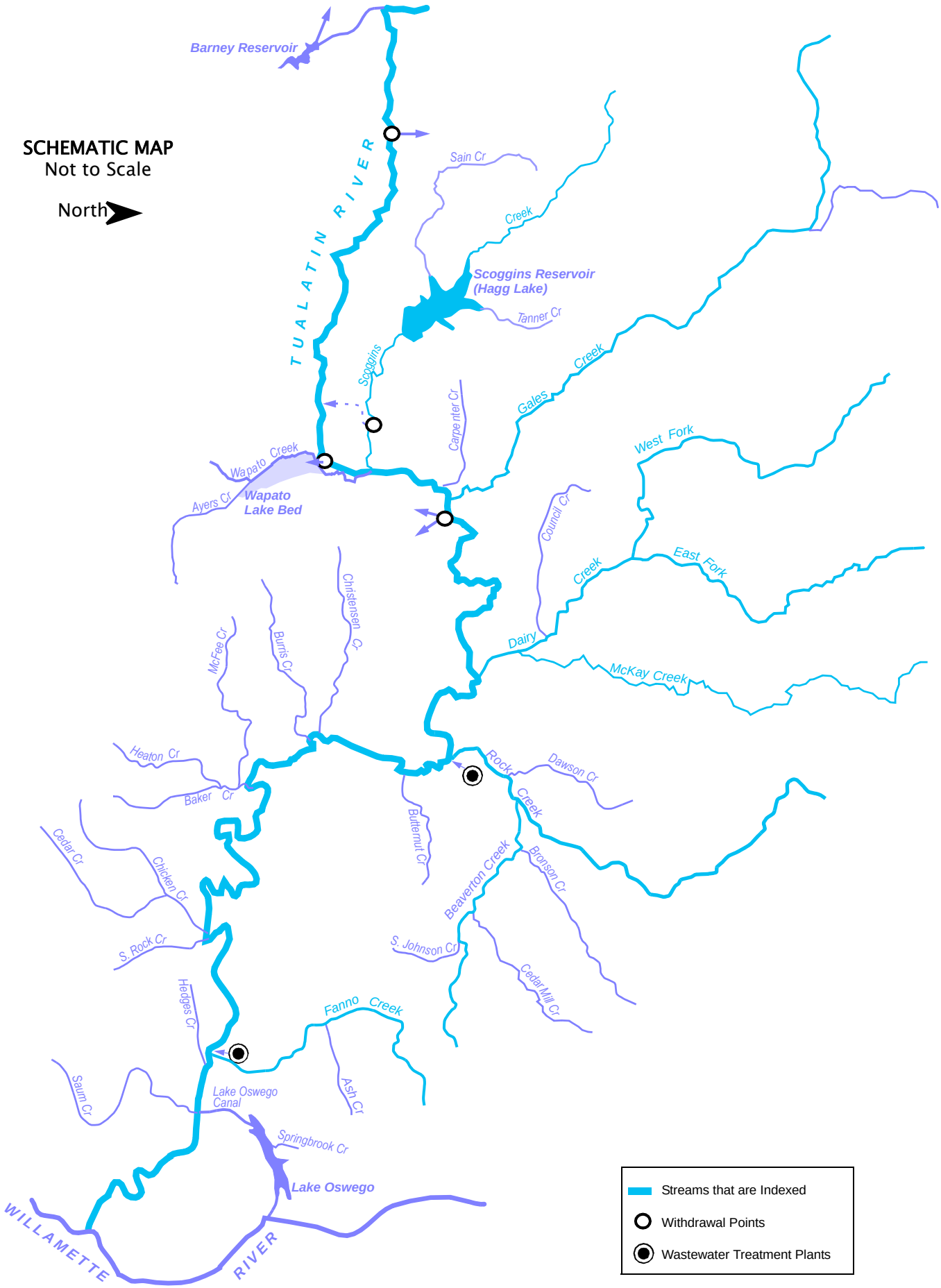
Appendix I

River Mile Indices

STREAMS INDEXED



STREAMS INDEXED

TUALATIN RIVER — RIVER MILE INDEX

HUC: 211400300

[Elevation measured relative to 0.00 gage datum; Abbreviations: RB= right bank, LB= left bank, HUC= Hydrologic Unit Code]

River Mile	Bank	Description	Drainage Area (square miles)	Elevation (feet)
0.00		Mouth of Tualatin River at Willamette River (LB of Willamette River @ River Mile 28.5)	712	
0.20		Weiss Bridge – Petes Mtn Rd.		
1.60	RB	Fields Creek (HUC: 02114003000010)		
1.69		State Hwy 212 Bridge (Fields Bridge)		
1.75	LB	West Linn Stream Gage Station – USGS #14207500	706	85.61
2.40	LB	Tate Creek (HUC: 02114003000020)		
3.45		Lake Oswego Corp. Diversion Dam		
4.25		Interstate 205 Bridge		
4.56	LB	Wilson Creek (HUC: 02114003000080)		
5.34	LB	Boat Launch		
5.36	LB	Shipley Creek (HUC: 02114003000100)		
5.38		Shipley Bridge– Stafford Rd. NWS Wire Weight Gage		
5.62	LB	Pecan Creek (HUC: 02114003000120)		
6.02	RB	Athey Creek (HUC: 02114003000123)		
6.70	RB	Saum Creek (HUC: 02114003000130)		
6.70	LB	Oswego Canal Diversion River Elevation Recording Gage #14206990, Headgate, and Canal Recording Gage #14207000		
7.36	LB	Boat Launch – Dogwood Drive		
7.67	RB	Browns Ferry Park Canoe Launch		
7.83		Clackamas County – Washington County Boundary (Underground Cable Crossing Sign)		
8.18		Interstate 5 Bridge		
8.60		Boones Ferry Road Bridge		
8.64	RB	Hedges Creek (HUC: 02114003000150)		
8.90	RB	Tualatin Park Boat Launch		
8.91	RB	Southern Pacific RR Bridge Tualatin River at Tualatin Elevation Recording Station #14206956 (formerly #14206960)		
9.32	LB	Fanno Creek (HUC: 02114003000180) *[Index on page I-13]*	26.8	
9.33	LB	Durham Wastewater Treatment Plant Outfall (9.2 on NPDES permit)		
9.34		Oregon Electric RR Bridge		
9.80	LB	Cook Park Boat Launch		
11.50	LB	US Hwy. 99W Bridge (Pacific Highway) Canoe Launch(access from southeast of bridge)		
12.68		Overhead BPA Transmission Line; Vancouver–Eugene		
12.80	LB	Rivermeade Boat Launch (Private)		
15.20	RB	Rock Creek–South (HUC: 02114003000250)	13.7	
15.50	RB	Chicken Creek (HUC: 02114003000270)		
16.09	RB	Chicken Creek Drainage Ditch		
16.22	RB	Shamberg Bridge (Elsner Road) Rated Staff Gage for Stream Flow		

TUALATIN RIVER — RIVER MILE INDEX

HUC: 211400300

[Elevation measured relative to 0.00 gage datum; Abbreviations: RB= right bank, LB= left bank, HUC= Hydrologic Unit Code]

River Mile	Bank	Description	Drainage Area (square miles)	Elevation (feet)
21.12		Overhead BPA Transmission Line; Big Eddy–Keeler		
26.90		State Hwy. 210 bridge (Scholls)		
28.20	RB	McFee Creek (HUC: 02114003000310)		
30.76	LB	Unnamed Stream (HUC: 02114003000320) (Jacktown)		
31.62	RB	Burris Creek (HUC: 02114003000330)		
31.92	RB	Christensen Creek (HUC: 02114003000350)		
33.30		Harris Bridge (State Highway 208)	568	100.42
	LB	Farmington Recording Stream Gage #14206500		
35.68	LB	Butternut Creek (HUC: 02114003000380)		
37.38	LB	Gordon Creek (HUC: 02114003000400)		
38.08	LB	Rock Creek Wastewater Treatment Plant Outfall (37.7 on NPDES permit)		
38.09	LB	Rock Creek (HUC: 02114003000420	74.6	
		Beaverton Creek (HUC:02114003000420060)	36	
38.44	LB	Rood Bridge Small Watercraft Launch Rood Bridge Road Bridge		
	LB	Recording Stream Gage #14206295		105.16
40.44	RB	Davis Creek (HUC: 02114003000430)		
41.64		Minter Bridge Road Bridge		
43.88	LB	Jackson Slough Jackson Bottom Wetlands		
	LB	Hillsboro Wastewater Treatment Plant Effluent Outfall (42.9 and 43.3 on NPDES permit)		
44.40		State Highway 219 Bridge		
	RB	Recording Stream Gage #14206241		
44.73	LB	Dairy Creek (HUC: 02114003000480) *[Index on page I-9]*	226	
		McKay Creek (LB) (HUC: 02114003000480020) *[Index on page I-10]*	63.4	
		East Fork Dairy Creek (HUC: 02114003000480080) *[Index on page I-11]*		
		West Fork Dairy Creek (HUC: 02114003000480090) *[Index on page I-12]*		
51.54		Golf Course Road Bridge		
	RB	Golf Course Recording Stream Gage #14204800		
53.74		LaFollett Road (Bridge removed)		
55.24	LB	Forest Grove Wastewater Treatment Plant Outfall (53.8 on NPDES permit) Fern Hill Wetlands		
55.32		Fernhill Road Bridge		
56.10		Springhill Pump Plant Intake		
56.80	LB	Gales Creek (HUC: 02114003000560) *[Index on page I-8]*	78.6	
57.38	LB	Carpenter Creek (HUC: 02114003000580)		
57.84	LB	Dilley Creek (HUC: 02114003000600)		
58.04	LB	Johnson Creek (HUC: 02114003000602)		
58.82		Springhill Road Bridge	125	147.57
	LB	Tualatin River at Dilley Stream Gage; USGS #14203500		
59.02	LB	O'Neil Creek (HUC: 02114003000620)		
60.00	LB	Scoggins Creek (HUC: 02114003000640) *[Index on page I-7]*		
60.80	RB	Wapato Creek (HUC: –02114003000670) Wapato Creek Improvement District Return Flow		

TUALATIN RIVER — RIVER MILE INDEX

HUC: 211400300

[Elevation measured relative to 0.00 gage datum; Abbreviations: RB= right bank, LB= left bank, HUC= Hydrologic Unit Code]

River Mile	Bank	Description	Drainage Area (square miles)	Elevation (feet)
62.00	RB	Wapato Improvement District Headgate)		
62.24		Southern Pacific RR Bridge		
62.25		State Highway 47 Bridge (Gaston) New Tualatin River at Gaston Recording Stream Gage #14202510		
62.30		Bates Road Bridge		
62.80	LB	Black Jack Creek (HUC: 02114003000700)		
62.90		Overhead BPA Transmission Line; Forest Grove–McMinnville		
63.13		TVID Patten Valley Pump Station Outfall #1		
63.87	RB	Discontinued Tualatin River at Gaston Recording Stream Gage	48.5	
64.26		TVID Patten Valley Pump Station Outfall #2		
65.34	RB	Williams Canyon (HUC: 02114003000730)		
65.90		Mt. Richmond Road Bridge		
67.30	LB	Hering Creek (HUC: 02114003000760)		
67.83		South Road Bridge (Cherry Grove)		
68.44	RB	Roaring Creek (HUC: 02114003000790)		
69.42		Little Lee Falls		
70.70	LB	Raines Bridge– Tualatin River below Lee Falls Rated Staff Gage for Stream Flow		
71.07		Lee Falls		
73.28		Haines Falls		
73.30	LB	City of Hillsboro Haines Falls Intake		
74.00	LB	Lee Creek (LB–02114003000860)		
74.05	RB	Patten Creek (HUC: 02114003000870)		
75.70	LB	Sunday Creek (HUC: 02114003000900)		
76.60	LB	Maple Creek (HUC: –02114003000940)		
76.95		Ki–A–Cut Falls		
78.00	RB	Barney Reservoir Aqueduct Outfall		
79.3+		Headwaters of Tualatin River		

FANNO CREEK — STREAM MILE INDEX

HUC: 2114003000180

[Abbreviations: RB= right bank, LB= left bank, HUC= Hydrologic Unit Code, ISWR= Instream Water Right]

River Mile	Bank	Description
0.00		Confluence with the Tualatin River (HUC: 02114003000) at River Mile 9.32
0.86		Oregon Electric RR Bridge
1.19		Durham Road Bridge USGS Gage #14206950
2.00	LB	Ball Creek (HUC: 02114003000180020)
2.12		Bonita Street Bridge – Rated Staff Gage
3.28		SW Hall Blvd Bridge
3.95		SW Ash Avenue Bridge
4.28		SW Main St Bridge
4.30		State Hwy 99W Bridge
4.49		SW Grant Ave Bridge
5.07		SW Tiederman Ave. Bridge
5.08	RB	Summer Creek (HUC: 02114003000180070) Rated Staff Gage at Fowler School
5.32		SW Tigard Ave Bridge
5.53		SW North Dakota St Bridge
5.54	LB	Ash Creek (HUC: 02114003000180080) Rated Staff Gage at Greenburg Road
6.38		Scholls Ferry Road Bridge
7.30		Tuckerwood – Rated Staff Gage
7.66		SW Hall Blvd Bridge
8.40		SW Denny Rd Bridge
8.60		Oregon Electric RR Bridge
8.70		State Hwy 217 Bridge
9.42		Scholls Ferry Road Bridge Rated Staff Gage
9.66		SW 92nd Ave Bridge
9.90		SW Bohmann Parkway Bridge
10.16		SW 86th Ave Bridge
10.78		SW Nicol Road Bridge
11.76		Olson Road Bridge
11.96	RB	Sylvan Creek (HUC: 02114003000180190)
11.98		SW Beaverton–Hillsdale Hwy (State Hwy 10)
12.10		Washington County – Multnomah County Line
12.58		SW 56th Ave Bridge USGS Gage #14206900
12.81		SW Shattuck Road Bridge
13.22		SW 45th Ave Bridge
13.23	RB	Ivey Creek (HUC: 02114003000180250)
13.32		SW 43rd Ave Bridge
13.38		SW 42nd Ave Bridge
13.48		SW 39th Ave Bridge
13.98		SW Beaverton–Hillsdale Hwy (State Hwy 10)
14.10		SW 30th Ave Bridge

ROCK CREEK — STREAM MILE INDEX

HUC: 2114003000420
[Abbreviations: RB= right bank, LB= left bank, HUC= Hydrologic Unit Code]

River Mile	Bank	Description
0.8		River Road Bridge
1.2		Southern Pacific RR Bridge
1.2+		State Highway 8 Bridge – Rated Staff Gage for Stream Flow
2.4		SW Brookwood Avenue Bridge
3.1	RB	Dawson Creek
4.4	LB	Beaverton Creek
4.5		Baseline Road Bridge
4.9		NW Quatama Road Bridge – Rated Staff Gage for Stream Flow
5.5		Oregon Electric RR Bridge
5.7		NW 216th Avenue Bridge
6.7		NW Cornell Road Bridge
7.8		US Highway 26 Bridge
9.0		West Union Road Bridge – Rated Staff Gage for Stream Flow
9.3	RB	Holcomb Creek
10.0		NW 185th Avenue Bridge
10.9	LB	Abbey Creek
11.0		Germantown Road Bridge
11.9		Cornelius Pass Road Bridge
13.0		Old Cornelius Pass Road Bridge
14.1		Burlington Northern RR Bridge
15.1		Rated Staff Gage for Stream Flow
16.4		Rock Creek Road Bridge
16.5		Van Raden Reservoir
19.1		Headwaters

BEAVERTON CREEK — STREAM MILE INDEX

HUC: 2114003000420060
[Abbreviations: RB= right bank, LB= left bank, HUC= Hydrologic Unit Code]

River Mile	Bank	Description
0.00		Confluence with Rock Creek (LB, HUC: 02114003000480080260) @ River Mile 4.3
0.40		Southwest Baseline Road
1.16		Southwest 216th Avenue Road Bridge– Rated Staff Gage for Stream Flow
2.20	RB	Bronson Creek (HUC: 02114003000420060010)
3.32	RB	Willow Creek (HUC: 02114003000420060050)
4.90		Southwest 170th Avenue Road Bridge– Rated Staff Gage for Stream Flow
5.47	LB	Unnamed Stream (HUC: 02114003000420060096)
6.06	LB	Johnson Creek (HUC: 02114003000420060100)
6.30	LB	Unnamed Stream (HUC: 02114003000420060120)
6.66		Oregon Electric Railroad
7.45		Cedar Hills Boulevard
7.90	RB	Reasoners Creek (HUC: 02114003000420060130)
8.75+		Headwaters

DAIRY CREEK — STREAM MILE INDEX

HUC: 02114003000480
[Abbreviations: RB= right bank, LB= left bank, HUC= Hydrologic Unit Code]

River Mile	Bank	Description
0.00		Confluence with Tualatin River (HUC: 0211400300) @ River Mile 44.73
1.65		Southern Pacific RR Bridge
2.06		State Highway 8 Bridge Dairy Creek at TV Hwy Recording Stream Gage #14206200
2.20		Oregon Electric RR Bridge
2.26	LB	McKay Creek (HUC: 02114003000480020)
3.53	RB	Council Creek (HUC: 02114003000480040)
6.02		Susbauer Road Bridge (County Road 196)
7.39		BPA Power Line Crossing
8.51		Cornelius–Schefflin Road Bridge (County Road 2161) Rated Staff Gage for Stream Flow
10.55		Confluence of East Fork Dairy Ck (HUC: 02114003000480080) & West Fork Dairy Ck (02114003000480090)

McKAY CREEK — STREAM MILE INDEX

HUC: 2114003000480020
[Abbreviations: RB= right bank, LB= left bank, HUC= Hydrologic Unit Code]

River Mile	Bank	Description
0.00		Confluence with Dairy Creek (HUC: 02114003000480) @ River Mile 2.26
1.31		Padgett Road Bridge (County Road 2245)
2.25		Hornecker Road Bridge (County Road 2393) Rated Staff Gage for Stream Flow
2.30		Southern Pacific RR Crossing
4.32		Glencoe Road Bridge (County Road A–146½) Rated Staff Gage for Stream Flow
4.46		BPA Transmission Line Crossing
5.34	LB	Waible Creek (HUC: 02114003000480020040)
6.30		NW Old Scotch Church Road Bridge (County Road A–66)
8.00		US Hwy 26 Bridge – Sunset Highway
9.36		NW West Union Road Bridge (County Road 2496) City of North Plains to West
9.38		Southern Pacific RR Crossing
10.94	LB	Jackson Creek (HUC: 02114003000480020100)
12.80		NW Shadybrook Road Bridge (County Road A–110)
15.56		NW Collins Road Bridge (County Road 1889) Rated Staff Gage for Stream Flow
16.56	RB	Brunswick Canyon (HUC: 02114003000480020179)
16.66	LB	East Fork McKay Creek (HUC: 02114003000480020180)
24.0+		Headwaters

EAST FORK DAIRY CREEK — STREAM MILE INDEX

HUC: 2114003000480080

[Abbreviations: RB= right bank, LB= left bank, HUC= Hydrologic Unit Code, ISWR= Instream Water Right]

River Mile	Bank	Description
0.00		Confluence with West Fork Dairy Creek (HUC: 02114003000480090) @ River Mile 10.56 of Dairy Creek (HUC: 02114003000480)
1.24		Roy Road Bridge (County Road A–159) Rated Staff Gage for Stream Flow
2.34		Port of Tillamook Bay RR Bridge
3.04	RB	Bledsoe Creek (HUC: 02114003000480080030)
3.20		Harrington Road Bridge (County Road 1989)
4.80		SP&S RR Bridge
5.56		US Highway 26 Bridges
6.91		Mountaindale Road Bridge (County Road 12)
6.97	LB	Baker Creek (HUC: 02114003000480080080)
8.44		Dairy Creek Road Bridge (County Road 2067) Rated Staff Gage for Stream Flow
8.55		East Fork Dairy Creek at Mountaindale, OR – Former USGS Gage #14205500 (10/40–9/51) Drainage Area = 43.0 square miles
9.62		NW Uebel Road Bridge (County Road 304)
12.50		Murphy Lane Bridge (Private) Rated Staff Gage for Stream Flow
12.82	RB	Big Canyon (HUC: 02114003000480080150)
13.00		***ISWR:*** C–59525 5/25/66
13.95	RB	Murtaugh Creek (HUC: 02114003000480080170)
14.04	LB	Meadow Brook Creek (HUC: 02114003000480080180)
14.17		Meacham Road Bridge (County Road 742)
15.55	LB	Plentywater Creek (HUC: 02114003000480080200) ***ISWR:*** C–59527 5/25/66
16.52	RB	Denny Creek (HUC: 02114003000480080210) ***ISWR:*** C–59526 5/25/66
16.56		Bacona Road Bridge (County Road 422) Snooseville Corner
17.21		Greener Road Bridge (County Road 1990)
17.34	LB	Rock Creek (HUC: 02114003000480080260)
17.50		Little Bend Park
17.60		Fern Flat Road Crossing (County Road 241)
18.15	LB	Panther Creek (HUC: 02114003000480080280)
18.31		Fern Flat Road Crossing (County Road 241)
18.84	RB	Roundy Creek (HUC: 02114003000480080290)
19.10	RB	Campbell Creek (HUC: 02114003000480080310)
21.30		Washington County – Columbia County Boundary
21.48		BPA Power Line Crossing
22.0+		Headwaters

WEST FORK DAIRY CREEK — STREAM MILE INDEX

HUC: 2114003000480090
[Abbreviations: RB= right bank, LB= left bank, HUC= Hydrologic Unit Code]

River Mile	Bank	Description
0.00		Confluence with East Fork Dairy Creek (HUC: 02114003000480080) @ River Mile 10.56 of Dairy Creek (HUC: 02114003000480)
1.96		Evers Road Bridge (County Road A–187) Rated Staff Gage for Stream Flow
2.09	RB	Lousignant Canal (HUC: 02114003000480090010)
2.82		State Highway 47 Bridge
5.28		Greenville Road Bridge (County Road A–159)
6.20		State Highway 6 Bridge
6.22	RB	Cedar Canyon Creek (HUC: 02114003000480090110)
7.53		Cedar Canyon Road Bridge (County Road 1938) City of Banks to SE
7.70		State Hwy 47 Bridge – Rated Staff Gage for Stream Flow West Fork Dairy Creek at Banks, OR –Former USGS Gage #14205000 (10/40 – 9/43) Drainage Area = 47.5 square miles
7.72		Port of Tillamook Bay RR Bridge
9.30		US Highway 26 Bridge
10.60		NW Green Mountain Road Bridge (County Road 127)
11.02	LB	Garrigus Creek (HUC: 02114003000480090180)
12.19		NW Turk Road Bridge (County Road 233)
12.36	RB	Kuder Creek (HUC: 02114003000480090190)
12.90		NW Pihl Road Bridge (County Road 1045) Community of Manning
13.33		Port of Tillamook Bay RR Bridge
13.48		Port of Tillamook Bay RR Bridge
13.58	LB	Witcher Creek (HUC: 02114003000480090200)
14.37		Port of Tillamook Bay RR Bridge
14.50		US Highway 26 Bridge
15.00		NW Fisher Road Bridge (County Road 394)
15.11	LB	Mendenhall Creek (HUC: 02114003000480090220)
15.58	RB	Burgholzer Creek (HUC: 02114003000480090230)
15.60		US Highway 26 Bridge
16.00		Community of Buxton – ½ mile east
17.02	LB	Williams Creek (HUC: 02114003000480090240)
17.98	RB	Cummings Creek (HUC: 02114003000480090250)
18.10		State Highway 47 Bridge
18.85		Port of Tillamook Bay RR Bridge
22+		Headwaters

GALES CREEK — STREAM MILE INDEX

HUC: 2114003000560

[Abbreviations: RB= right bank, LB= left bank, HUC= Hydrologic Unit Code, ISWR= Instream Water Right]

River Mile	RB	Description
0.00		Confluence with Tualatin River (HUC: 0211400300) @ River Mile 56.80 ***ISWR*: C–59523 5/25/66**
1.63		Southern Pacific RR Bridge
1.75		Forest Grove Bypass Bridge – State Highway 47 to State Highway 8
2.36		State Highway 47 Bridge Gales Creek Recording Stream Gage #14204530
3.66		Ritchey Road Bridge (County Road 461)
6.53	RB	Prickett Creek (HUC: 02114003000560090)
6.98		Stringtown Road Bridge (County Road A–176)
7.70	RB	Roderick Creek (HUC: 02114003000560110)
8.56		Roderick Road Bridge (County Road 395) Gales Creek near Forest Grove Oregon – Former USGS Gage #14204500 (10/40–9/56 & 10/70–9/81)
8.94	RB	Godfrey Creek (HUC: 02114003000560130)
9.22	LB	Kelly Creek (HUC: 02114003000560120)
10.68	RB	Clear Creek (HUC: 02114003000560150)
11.44	RB	Iler Creek (HUC: 02114003000560170)
11.46		NW Gales Creek Road (County Road 1312) Community of Gales Creek
11.47	RB	Fir Creek (HUC: 02114003000560190)
12.00		***ISWR:* C–59509 5/25/66 above this point**
12.36		Clapshaw Hill Road Bridge (County Road 2037) Rated Staff Gage for Stream Flow
12.40	LB	Little Beaver Creek (HUC: 02114003000560200)
		***ISWR:* C–59512 5/25/66**
12.92		Parson Road Bridge
14.44	RB	White Creek (HUC: 02114003000560210)
14.68		NW Wilson River Highway Bridge (State Highway 6)
15.74	RB	Lyda Creek (HUC: 02114003000560230)
16.26	RB	Bateman Creek (HUC: 02114003000560250)
17.50		Gales Creek near Gales Creek, OR – Former USGS Gage #1420400 (10/35–9/45 & 10/639/70)
18.00	LB	Beaver Creek (HUC: 02114003000560280) Community of Glenwood ***ISWR:* C–59524 5/25/66**
18.45		NW Timber Road Bridge (County Road 374)
18.65		Wilson River Highway Bridge (State Highway 6)
19.70		Wilson River Highway Bridge (State Highway 6)
19.88	LB	Coffee Creek (HUC: 02114003000560300)
20.07	LB	Finger Creek (HUC: 02114003000560305)
20.70	RB	South Fork Gales Creek (HUC: 02114003000560310) ***ISWR:* C–59514 5/25/66**
21.60	LB	North Fork Gales Creek (HUC: 02114003000560320) ***ISWR:* C–59513 5/25/66**
22.76	RB	Low Divide Creek (HUC: 02114003000560330)
		Gales Creek Forest Park
23.20		Gales Creek near Glenwood, OR – USGS Gage #14203750 (7/94 – present)

SCOGGINS CREEK — STREAM MILE INDEX

HUC: 2114003000640
[Abbreviations: RB= right bank, LB= left bank, HUC= Hydrologic Unit Code]

River Mile	Bank	Description
0.00		Confluence with Tualatin River (HUC: 0211400300) @ River Mile 60.00
0.94		RR Bridge
1.00		State Highway 47 Bridge
1.70		Old State Highway 47 Bridge
1.71		Scoggins Creek near Gaston, OR – Former USGS Gage #14203000 (10/1940 – 9/1974) Drainage Area = 43.3 square miles
4.80		Scoggins Creek below Henry Hagg Lake, near Gaston, OR – USGS Gage #14202980 (1/1975 –present) Drainage Area = 38.8 square miles
5.10		Scoggins Dam
7.00	RB	Sain Creek (HUC: 02114003000640170)
7.62	LB	Tanner Creek (HUC: 02114003000640200)
8.40	LB	Wall Creek (HUC: 02114003000640220)
9.00		Lake Loop Road Bridge
9.30		Scoggins Creek above Henry Hagg, near Gaston, OR – Gage #14202850 (10/1972 – present) Drainage Area = 15.9 square miles
10.52	LB	Parson Creek (HUC: 02114003000640240)
15.50	LB	Fisher Creek (HUC: 02114003000640300)