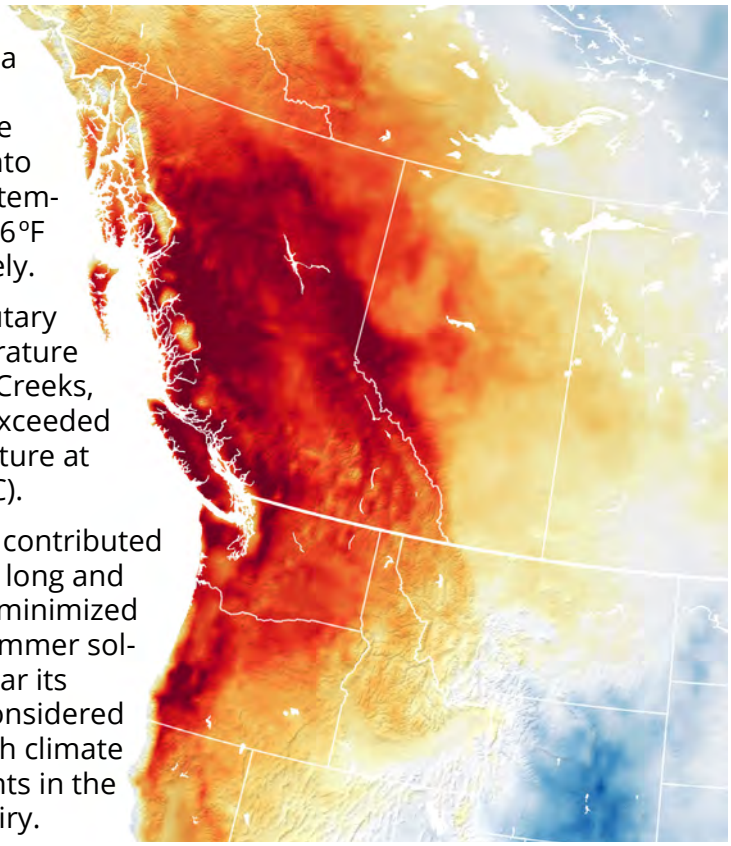
TUALATIN RIVER FLOW MANAGEMENT TECHNICAL COMMITTEE

June Heat Dome

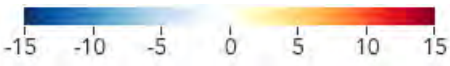
In late June 2021, a strong high pressure area set up over the Gulf of Alaska near British Columbia. This "heat dome" blocked onshore wind and prevented heat from dissipating into the atmosphere. Throughout the area, new temperature records were set—108, 112 and 116°F in Portland on June 26, 27 and 28, respectively.

Record temperatures were set at every tributary in the Tualatin River with continuous temperature monitoring. At Gales, Beaverton and Fanno Creeks, the *average* water temperature on June 28 exceeded 80°F (26.7°C). The maximum water temperature at Beaverton Creek that day was 86.2°F (30.1°C).

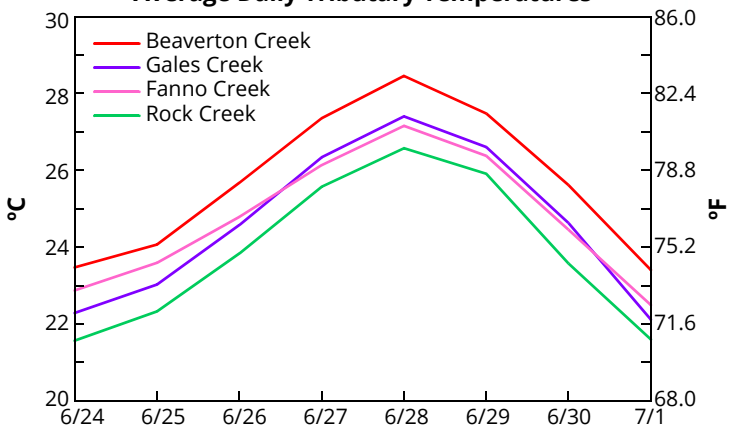
Climate change is one of several factors that contributed to the severity of this event. The abnormally long and dry spring had dried out the landscape and minimized evaporative cooling. The proximity to the summer solstice meant that daily solar radiation was near its annual maximum. The 2021 heat dome is considered an extremely rare event. The degree to which climate change increases the likelihood of such events in the future is currently a matter of scientific inquiry.



Map of air temperature differences in degrees Celsius compared to the 2014–2020 average on June 27, 2021



Average Daily Tributary Temperatures



2021 Annual Report

prepared by Bernie Bonn for

Clean Water Services

Cover map: NASA (public domain)

https://earthobservatory.nasa.gov/images/148506/exceptional-heat-hits-pacific-northwest

Data for Graph:

USGS: Average daily temperature at Gales Creek at Hwy 47, Beaverton Creek at 170th, Rock Creek at Brookwood, and Fanno Creek at Durham

Tualatin River Flow Management Technical Committee

2021 Annual Report

Prepared by: Bernie Bonn *For:* Clean Water Services

FLOW MANAGEMENT TECHNICAL COMMITTEE MEMBERS

Jake Constans, chair	*Oregon Water Resources Department*
Simon Christensen	*City of Hillsboro Water Department*
Todd Evers	*City of Hillsboro Water Department*
John Goans (retired in 2022)	*Tualatin Valley Irrigation District*
Nick Gent (replaced John Goans in 2022)	*Tualatin Valley Irrigation District*
Bobby Nuvolini	*Tualatin Valley Irrigation District*
Raj Kapur	*Clean Water Services*
Laura Porter	*Clean Water Services*
Mark Rosenkranz	*Lake Oswego Corporation*
Andrew Sewall	*City of Forest Grove*

ACRONYMS USED IN THIS REPORT

Full Name	Acronym
Facilities	
Spring Hill Pump 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

Disclaimer

This report and the data presented herein are provided without any warranty, explicit or implied. The data presented in this report were supplied by the members of the committee. Although every effort was made to faithfully reproduce the data as provided, the data are not warranted to be accurate, appropriate for interpretation, merchantable, or suitable for any particular purpose.

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A. Streamflow—Tables and hydrographs of daily data plus historical record and trends

B. Selected Releases & Withdrawals—Tables and graphs of daily data plus historical record and trends

C. Scoggins Dam Operations (Henry Hagg Lake)—Monthly data reports

D. Barney Reservoir Operations—Monthly data reports

E. Municipal Water Use Allocations—Monthly data tables

F. Temperature Records—Tables and graphs of daily data plus historical record and trends

G. Precipitation Records— Tables and graphs of monthly data plus historical record

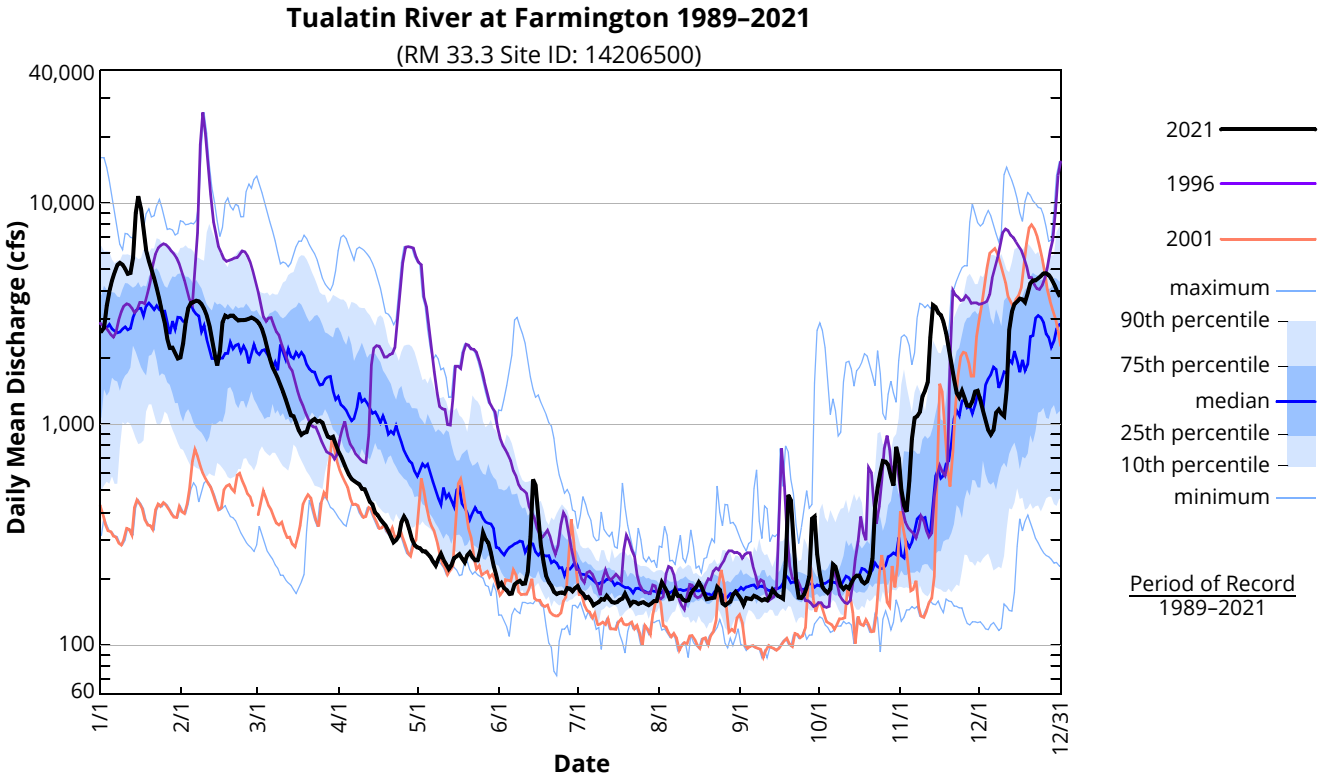
H. River Mile Indices—River mile locations for the Tualatin River and its major tributaries

2021 SUMMARY

This is the thirty first 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).

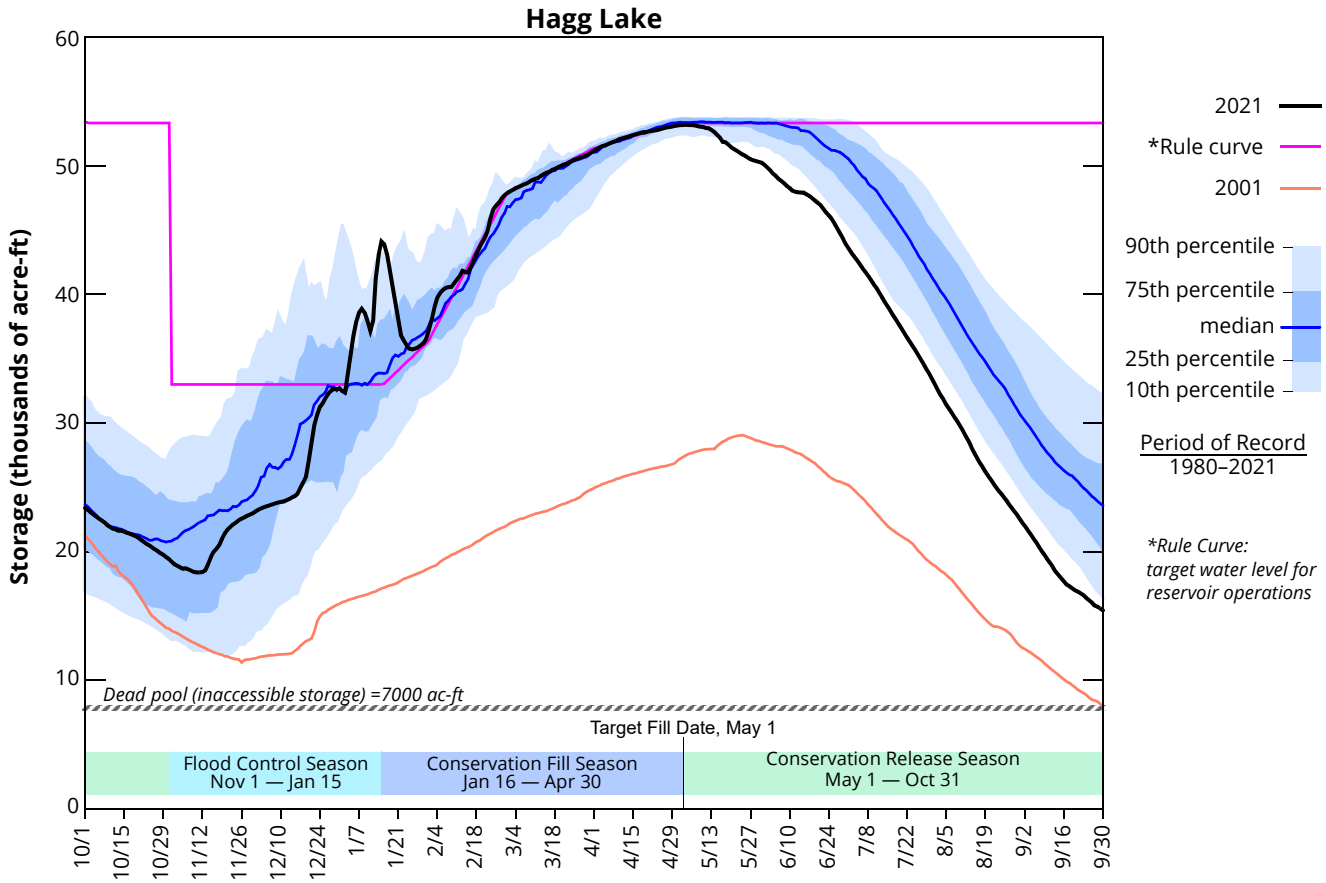
HIGHLIGHTS

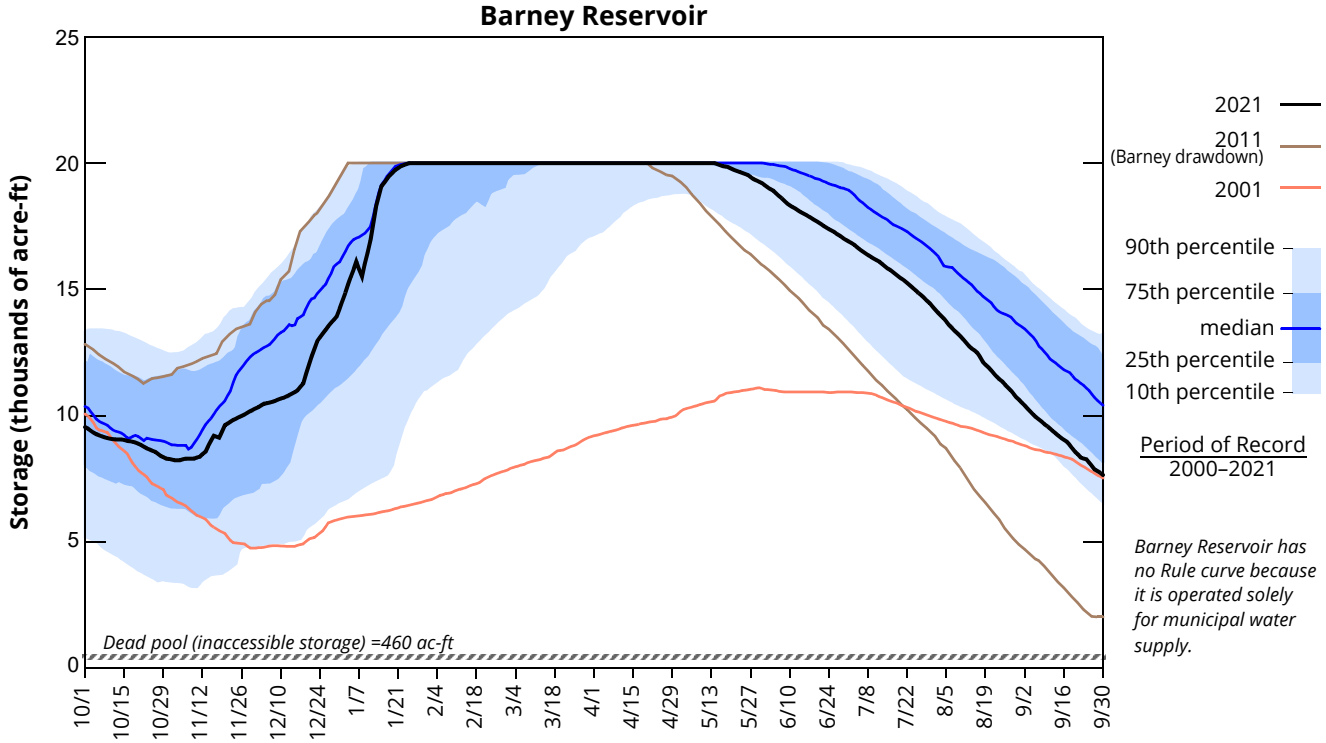
- Hagg Lake reached 99.8% full pool. Barney Reservoir filled. The fill curves are on the following page.
- Regulation of river water began on May 7 and continued through October 25, for a total of 172 days.
- Clean Water Services continued to test a new biological method of phosphorus removal that reduces aluminum levels in discharge, but results in higher concentrations of phosphorus in the Tualatin River. A few small algal blooms occurred but chlorophyll-*a* remained below the action level and the pH standard was never exceeded. Higher phosphorus concentrations in the Tualatin River may be a concern for Oswego Lake which receives water diverted from the Tualatin River.
- Weather highlights and their effects in the Tualatin Basin:
  - —Beginning in March, rainfall was scarce and remained so until mid-September. Records for low monthly rainfall were set at most sites in April. Total rainfall for March–August was far less than the period of record median at every site, ranging from 5.4" less at Hillsboro Airport to 11.6" less at Saddle Mountain.
  - —Most Tualatin River and tributary sites set records for low flow in April and early May.
  - —Overall TVID withdrawals at SHPP in April–May were greater than in any previous year (1991–2020).
  - —The dry sunny weather in early spring led to a large algal bloom in the lower Tualatin River in April. An algal bloom had not occurred in April during 30 years of continuous monitoring at Oswego Dam
  - —A heat dome centered near British Columbia in June caused record heat throughout the region. Daily maximum air temperatures at the Hillsboro Airport were 105º, 109º and 116ºF at on June 26–28.
  - —For the first time, the 7dADM stream temperature standard was exceeded at every monitored site.
  - —The June heat wave increased stream temperatures to record levels in the tributaries and caused dissolved oxygen concentrations to decrease.



Reservoir Status

Hagg Lake reached 53,200 ac-ft (99.8% of full pool) on May 4, 2021. Barney Reservoir reached full pool on January 24, 2021. The reservoir levels for WY 2021 and the filling histories are shown below.





BACKGROUND

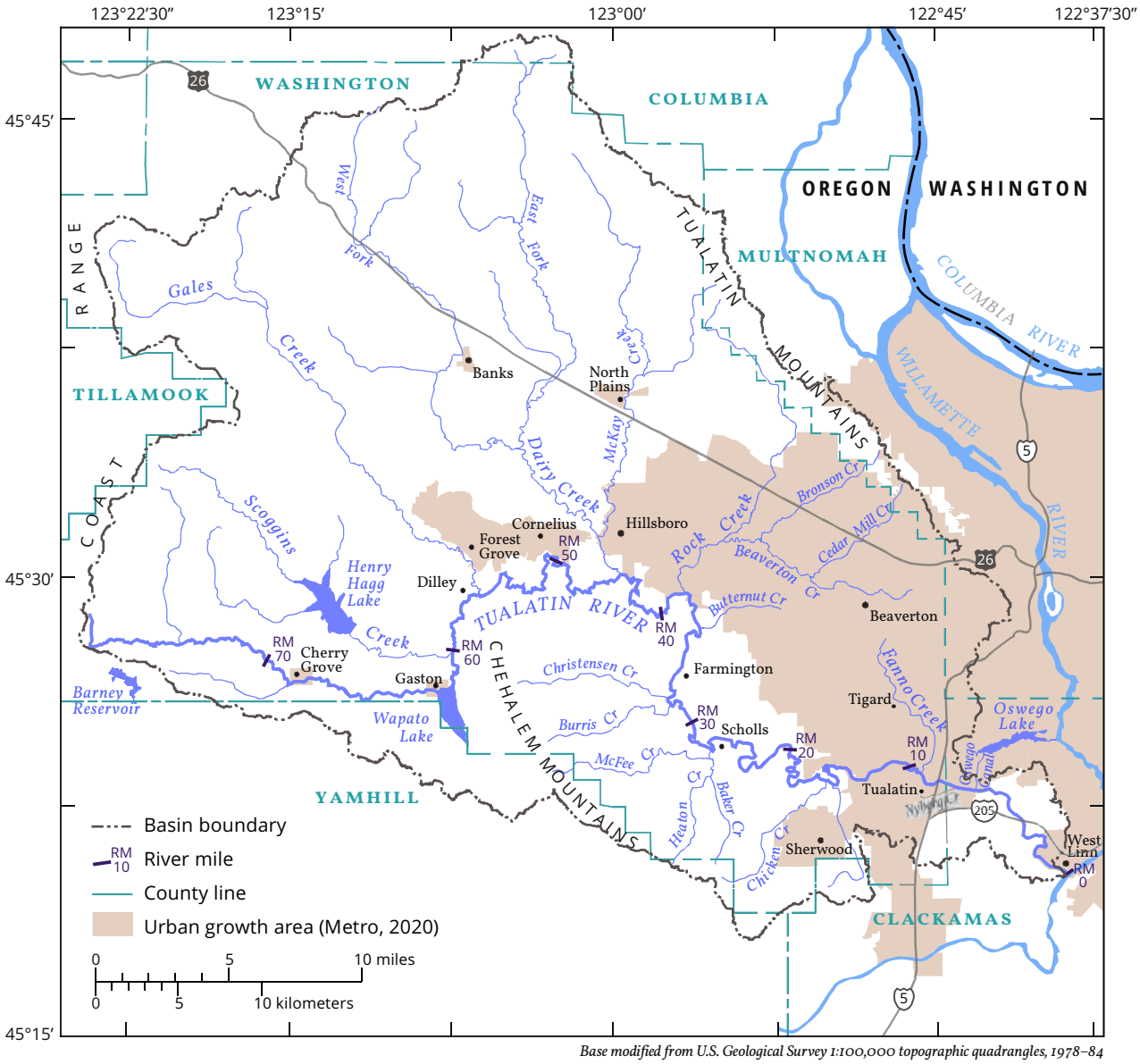
Basin Description

The Tualatin River Basin consists of 712 square miles in the northwest corner of Oregon and is a subbasin of the Willamette River. The basin lies almost entirely in Washington County. (See map below.)

The Tualatin River flows in a generally easterly direction from its headwaters in the Coast Range to its confluence with the Willamette River just upstream of Willamette Falls near West Linn. It can be divided into 4 different reaches.

Reach	Location	Width	Average Slope	Characteristics
Headwater	> RM 55	about 15 ft	74 ft/mi	fast moving, steep terrain
Meander	RM 55–33	about 20–50 ft	1.3 ft/mi	slow moving, meandering on valley bottom
Reservoir	RM 33–3.4	wide, up to 150 ft	0.08 ft/mi	slow moving, lake-like with deep pools
Riffle	RM 3.4–0	variable	10 ft/mi	short reservoir section to a narrow gorge

Tualatin River Basin



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

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. Precipitation records can be found in Appendix G.

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. Reports on Barney Reservoir operation can be found in Appendix D.

Hagg Lake: In the early 1970s the Bureau of Reclamation built an earthen dam on Scoggins Creek (RM 5.1). Releases from Henry Hagg Lake (the reservoir behind Scoggins Dam) flow down Scoggins Creek and enter the Tualatin River at RM 60.0. Hagg Lake has an active storage capacity of 53,323 acre-feet. Its water is used for irrigation, municipal and industrial supply, and water quality enhancement.

Scoggins Dam 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. Reports on Scoggins Dam operation can be found in Appendix C.

Clean Water Services: Clean Water Services provides wastewater treatment, stormwater management, and watershed management services primarily in 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). The Rock Creek and Durham WWTFs (RM 38.1 and 9.3, respectively) are the largest. The Forest Grove and Hillsboro WWTFs (RM 55.2 and 43.8, respectively) are much smaller and historically did not discharge during the dry season (generally May–October). In 2017, Clean Water Services began treating wastewater from the Forest Grove and Hillsboro service areas during the dry season at the Forest Grove WWTF and then directing it through a 95-acre natural treatment system (NTS) at Forest Grove prior to discharge into the Tualatin River at RM 55.2. WWTF flow rates are continuously monitored at each WWTF. Clean Water Services also releases storage water from Hagg Lake and Barney Reservoir for flow augmentation during the summer and early fall. (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 are from a different source.)

Water sources to the tributaries

Clean Water Services: Clean Water Services partners with the Tualatin Valley Irrigation District to deliver water to several tributaries for flow restoration in the summer. Approximately 1 to 2.5 cfs of water has been added to McKay Creek every year since 2005. Similar measures have been implemented for Gales Creek (2009), East Fork Dairy Creek (2010), and West Fork Dairy Creek (2011). The goal of the program is to increase base flows in the tributaries, thereby improving 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 Hagg Lake and is delivered by TVID transmission lines.

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 Pump Plant (RM 56.3): The Spring Hill Pump 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 (133 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. When natural flow is not adequate, the Washington County Watermaster (part of the Oregon Water Resources Department) curtails some water rights. At that time, TVID and JWC release contracted stored water from Hagg Lake and Barney Reservoir to augment the low natural flow. 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: Historically, TVID diverted water from the Tualatin River at the Wapato Canal Diversion (near RM 62), to the Wapato Improvement District and to surrounding TVID customers. The Wapato Improvement District drained Wapato Lake each year and its members farmed the lake bed. From 2007–2013, ownership of Wapato Lake transitioned to the US Fish and Wildlife Service who now manages it as the Wapato Lake National Wildlife Refuge. 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). At this time flow in the Wapato Canal Diversion is not monitored.

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 are 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 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 2004. The dam plus several natural basalt sills cause the water to pool in the reservoir reach. Flow in Oswego Lake 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 and is not currently monitored.

Water diversions from the tributaries

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

Forest Grove withdrawal: The City of Forest Grove owns part of the Clear Creek watershed in the Gales Creek Basin. The city diverts water for municipal use at several locations in that watershed.

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 April 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 in the Tualatin Basin. 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 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 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 Barney Reservoir and Hagg Lake, 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 of all those who provide data.

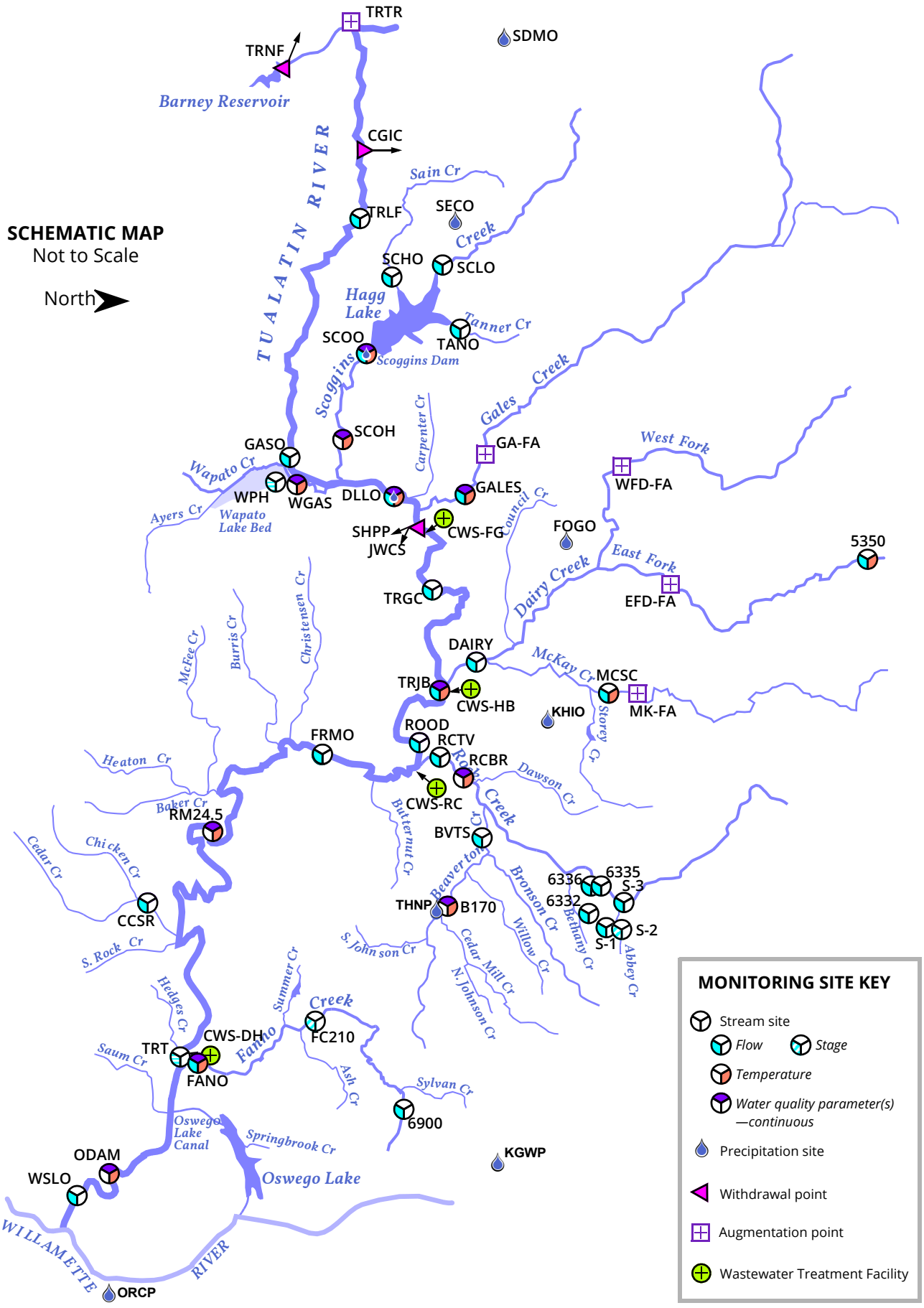
Some of the monitoring data for the Tualatin Basin can be accessed at the following web sites:

- Bureau of Reclamation data:
  `https://www.usbr.gov/pn/hydromet/tuatea.html`
- Oregon Water Resources Department data:
  `https://apps.wrd.state.or.us/apps/sw/hydro_near_real_time/`
- USGS data:
  `https://or.water.usgs.gov/tualatin/monitors/`

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:

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

Tualatin Basin Monitoring Sites



2021 MONITORING SITES — ALPHABETICAL LISTING BY SITE CODE

Location in Report

Main: Water Quality | Appendix A | Appendix B | Appendix F | Appendix G | Monitored, but not in report

Code	Site Name	Flow	Precipitation	Continuous Monitors: Temp	DO	pH	Cond	Turb	Chl-*a*	fDOM
Stream monitoring sites										
5350	EF Dairy Creek above Murtaugh Creek near Meacham Corner, OR									
6332	Bethany Creek at NW Springville Rd at Bethany, OR									
6335	Rock Creek at NW 185th Ave near Hillsboro, OR									
6336	Rock Creek Ditch at NW 185th Ave near Hillsboro, OR									
6900	Fanno Creek at 56th Avenue									
B170	Beaverton Creek at 170th Ave, Beaverton, OR									
BVTS	Beaverton Creek at Cornelius Pass Road (near Orenco)									
CCSR	Chicken Creek at Roy Rogers Rd near Sherwood, OR									
DAIRY	Dairy Creek at Hwy 8 near Hillsboro, Oregon									
DLLO	Tualatin River at Dilley, Oregon									
FANO	Fanno Creek at Durham Road near Tigard, Oregon									
FC210	Fanno Creek at Hwy 210 at Beaverton, OR	Stage								
FOGO	Forest Grove, Oregon AgriMet Weather Station (Verboort)									
FRMO	Tualatin River at Farmington, Oregon									
GALES	Gales Creek at Old Hwy 47 near Forest Grove, Oregon									
GASO	Tualatin River at Gaston, Oregon									
KGWP	KGW-TV Weather Station									
KHIO	Hillsboro Airport Weather Station									
MCSC	McKay Ck at Scotch Church Rd abv Waible Ck nr North Plains									
ODAM	Tualatin River at Oswego Dam near West Linn, Oregon									
ORCP	Oregon City Precipitation Station									
RCBR	Rock Creek at Brookwood Avenue, Hillsboro, Oregon									
RCTV	Rock Creek at Hwy 8 near Hillsboro, Oregon									
RM24.5	Tualatin River at RM 24.5 near Scholls, Oregon									
ROOD	Tualatin River at Rood Bridge Road near Hillsboro, Oregon									
SCHO	Sain Creek above Henry Hagg Lake near Gaston, Oregon									
S-2	Rock Creek at NW Germantown Rd at Bethany, OR									
S-3	Abbey Creek at NW Kaiser Rd at Bethany	Stage								
SCLO	Scoggins Creek above Henry Hagg Lake near Gaston, Oregon									
SCOH	Scoggins Creek near Old Hwy 47 near Gaston, Oregon									
SCOO	Scoggins Creek below Henry Hagg Lake near Gaston, Oregon									
SDMO	Saddle Mountain Precipitation Station (SNOTEL #726)									
SECO	Sain Creek Precipitation Station (SNOTEL #743)									
TANO	Tanner Creek above Henry Hagg Lake near Gaston, Oregon									
THNP	Tualatin Hills Nature Park Precipitation Station									
TRGC	Tualatin River at Golf Course Road near Cornelius, Oregon									
TRJB	Tualatin River at Hwy 219 Bridge (2021 discharge data unavailable)									
TRLF	Tualatin River below Lee Falls near Cherry Grove, Oregon									
TRT	Tualatin River at Tualatin, Oregon	Stage								
WGAS	Wapato Creek at Gaston Road at Gaston, Oregon									
WPH	Wapato Canal at Pumphouse at Gaston, Oregon	Stage								
WSLO	Tualatin River at West Linn									
Monitored withdrawals and releases										
CGIC	City of Hillsboro Withdrawal at Cherry Grove									
CWS-DH	CWS Durham WWTF Discharge									
CWS-FG	CWS Forest Grove WWTF Discharge (with Fernhill NTS)									
CWS-HB	CWS Hillsboro WWTF Discharge									
CWS-RC	CWS Rock Creek WWTF Discharge									
EFD-FA	CWS East Fork Dairy Flow Augmentation with TVID									
GA-FA	CWS Gales Creek Flow Augmentation with TVID									
JWCS	Joint Water Commission Withdrawal at Spring Hill Pump Plant									
MK-FA	CWS McKay Creek Flow Augmentation with TVID									
SHPP	TVID–Withdrawal at Spring Hill Pump Plant									
TRNF	Barney Reservoir Measured Flow to North Fork Trask River									
TRTR	Barney Reservoir (Trask River) Release to Tualatin River									
WFD-FA	CWS West Fork Dairy Flow Augmentation with TVID									

Abbreviations: Temp=water temperature, DO=dissolved oxygen, Cond=conductance, Turb=turbidity, chl-*a*= =chlorophyll-*a*, fDOM=fluorescent dissolved organic matter;

CLEAN WATER SERVICES

by Raj Kapur, Water Resources Program Manager, Clean Water Services

Introduction

Clean Water Services (the District) provides wastewater treatment, stormwater management, and watershed management services to more than 600,000 customers primarily in the urban areas of Washington County. The District implements these programs in cooperation with twelve cities (Banks, Beaverton, Cornelius, Durham, Forest Grove, Gaston, Hillsboro, King City, North Plains, Sherwood, Tigard, and Tualatin) and Washington County.

Wastewater treatment: The District owns and operates four wastewater treatment facilities (WWTFs) at sites in Forest Grove, Hillsboro, and Tigard. The Rock Creek and Durham WWTFs are the larger facilities and discharge directly to the Tualatin River year-round.

Rock Creek Wastewater Treatment Facility

The Forest Grove and Hillsboro WWTFs are considerably smaller facilities. During the dry season, wastewater from the Forest Grove and Hillsboro service areas is treated at the Forest Grove WWTF and then directed to a 95-acre natural treatment system before discharge to the Tualatin River. During the wet season, the Forest Grove and Hillsboro WWTFs treat wastewater from their service area and discharge to the Tualatin River through their respective outfalls.

Durham Wastewater Treatment Facility

Stormwater management: Clean Water Services also implements the municipal separate storm sewer system (MS4) program in the urban parts of the Tualatin River watershed.

Watershed management: Activities occur across the entire Tualatin watershed and include streamflow enhancement in the mainstem Tualatin River and tributaries, and riparian and stream restoration.

Permits: The four WWTFs and the MS4 program are permitted by the Oregon Department of Environmental Quality (ODEQ) 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 Tualatin River and several tributaries. The District has rights to 24% of the water in Hagg Lake, which equates to 12,618 ac-ft. The District also owns 10% of the water in Barney Reservoir, which equates to 1,654 ac-ft after accounting for dead pool and the required Oregon Department of Fish and Wildlife (ODFW) releases to the Trask River. In all, the District has 14,272 ac-ft of stored water available for use. The stored water releases serve multiple purposes including the following:

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, Durham and Forest Grove facilities by releasing stored water from Hagg Lake and Barney Reservoir. Stored water releases in July and August form the basis of the flow augmentation credit. 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.

Maintain minimum stream flows: The District's NPDES Permit is based on maintaining minimum stream flows in the Tualatin River above each WWTF. The District uses its stored water releases to maintain minimum stream flows during the summer and fall low-flow period.

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 15-mile stretch between the Spring Hill Pump Plant (where water is withdrawn for municipal and irrigation uses) and Highway 219, where Dairy Creek enters the Tualatin River. The stored water releases provide sustainable base flows that support 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 sediment oxygen demand. Sediment oxygen demand is the consumption of oxygen by decaying substances in river sediment. 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' stored water releases from Hagg Lake and Barney Reservoir decrease the effect of sediment oxygen demand, thereby limiting the decrease in dissolved oxygen levels in the lower Tualatin River that usually occur 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.

Enhance stream flows in Tualatin River tributaries: Clean Water Services uses Tualatin Valley Irrigation District transmission lines to deliver stored water to select tributaries to enhance flow and improve water quality. In 2021, Clean Water Services released stored water into Gales Creek, West Fork Dairy Creek, East Fork Dairy Creek, and McKay Creek. Details are in Appendix B.

2021 Wastewater discharges

A watershed-based NPDES permit allows Clean Water Services to discharge treated wastewater into the Tualatin River from its WWTFs. A summary of the discharges is shown below. Details are in Appendix B.

WASTEWATER TREATMENT FACILITY DISCHARGES 2021

Rock Creek WWTF annual average	Durham WWTF annual average	Forest Grove WWTF and NTS* annual average	Hillsboro WWTF wet season average**
53.2 cfs [34.4 MGD]	34.9 cfs [22.6 MGD]	6.65 cfs [4.30 MGD]	8.37 cfs [5.41 MGD]

*The Forest Grove WWTF discharges to the Tualatin River through the NTS during the dry season and directly to the Tualatin River during the wet season.

**Wet season is generally January–April plus November and December; dry season is generally May–October.

2021 Water releases for flow augmentation

Clean Water Services released flow augmentation water for 156 days in 2021. The total average daily release (for days with releases) was 38.4 cfs. In all, 11,886 acre-feet were released. This is 83% of the District's allocation. The amount of water available to and released by Clean Water Services during 2021 is summarized below.

CLEAN WATER SERVICES WATER AVAILABILITY AND USE — 2021

Reservoir		Maximum Available (acre-ft)	Available (acre-ft)	Total CWS Release (acre-ft)
Hagg Lake	Storage	12,618	12,618	10,386
	Natural flow credit	4,282	0	—
Barney Reservoir	Storage	2,000	1,654	1,500
	Summer storage*	—	0	—
Total		**18,900**	**14,272**	**11,886**
Percent of available				**83.3%**

*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: The District released stored water from Hagg Lake during May 4–13 to maintain minimum stream flows in the Tualatin River. Thereafter, stored water was continuously released from Hagg Lake from June 1 to October 22. The District initiated stored water releases from Barney Reservoir on September 1 and ended on October 24. Details of releases by month are shown below.

CLEAN WATER SERVICES WATER RELEASE SUMMARY — 2021

	Units	May	June	July	Aug	Sept	Oct	Nov	Total
Hagg Lake Release	acre-ft	198	913	2,704	2,946	2,365	1,240	0	10,386
	days	10	30	31	31	30	22	0	154
Barney Release	acre-ft	0	0	0	0	833	667	0	1,500
	days	0	0	0	0	30	24	0	54
Total Release	acre-ft	198	913	2,704	2,946	3,198	1,926	0	11,886
Daily Average Release (for days with releases)	cfs	10.0	15.3	44.0	47.9	53.7	40.5	0	38.4

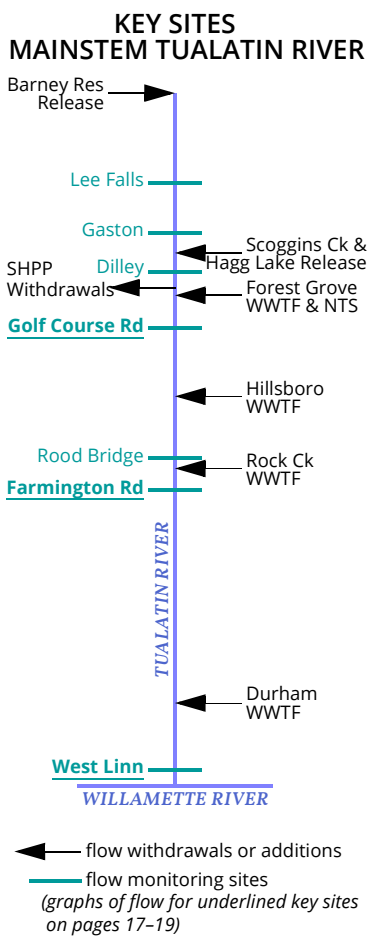
Instream water right leases: In 2020, the District began leasing water rights from the U.S. Fish and Wildlife Service that were associated with the Wapato Lake Wildlife Refuge. Although these water rights were originally for irrigation use, they were changed to an instream water right for the duration of the lease (3 years). These water rights are relatively senior (1928), originate in the upper Tualatin River, and are protected through the entire downstream length of the Tualatin River from May 1 to September 30. If natural flow water rights are regulated off by the OWRD Watermaster, these water rights include access to supplemental water from the Tualatin Valley Irrigation District (TVID).

From May 1 to July 28, 2021, the instream lease of 5.4 cfs was based on natural flow in the Tualatin River. On July 29, 2021, the 1928 priority date for the Wapato instream lease was regulated off of natural flow and supplemental water from TVID was used at a rate of 5.2 cfs until September 16 when the Wapato instream lease was regulated back on natural flow until the end date for the lease on September 30.

Flow augmentation effects on Tualatin River flow— 2021

Flow is monitored in the upper, middle and lower reaches of the river and informs the management of stored water releases. The figure at the right illustrates the locations of several significant additions and withdrawals along with several key monitoring sites.

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 summer 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. Mixing zone studies have also affected flow targets as have effluent load limits which are calculated from river flows. The current flow targets are used at three key sites and are applied for the entire dry season (May–October).



FLOW TARGETS AND MEASURED FLOWS AT KEY SITES — 2021

	Golf Course Rd	Rood Bridge Rd	Farmington Rd
Flow target	60 cfs	110 cfs	160 cfs
Daily mean flow (May–October)			
minimum	64 cfs	88 cfs	152 cfs
average	108 cfs	147 cfs	226 cfs

Low flow period: For the purposes of discharges from the WWTFs, the low flow period is defined as beginning on the first day after April 30 when the 7-day consecutive median flow in the Tualatin River at Farmington is less than 250 cfs or July 1, whichever is earlier. Similarly, the low flow period ends on the first day after September 30 when the 7-day consecutive median flow in the Tualatin River at Farmington is at least 350 cfs or November 15, whichever is earlier. The low flow period for the WWTFs was from May 12 through October 26 in 2021.

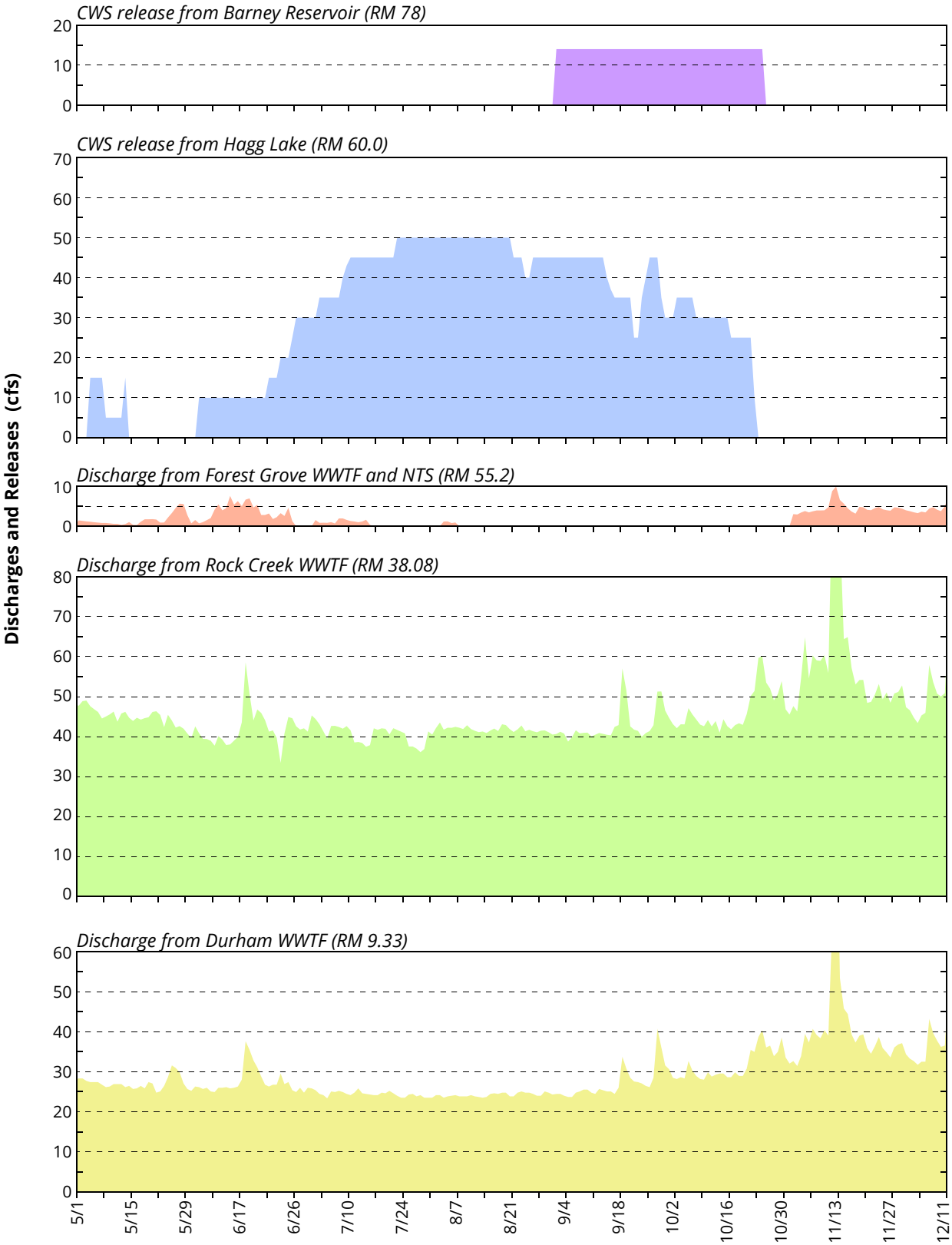
The last day of releases from Hagg Lake was October 21 when 0.65" of rain was measured at Forest Grove. Rainfall was sufficient to sustain higher flows through the entire remainder of 2021.

In 2021, the dry season minimum streamflow targets at Rood Bridge Road and Farmington Road were not met. The abnormally hot and dry conditions in 2021 required close management and conservation of water releases to insure continued water availability through a potentially long dry season. In addition, the rating curves at these two gaging stations were updated based on new field measurements. As a result of the new rating curve, flows were retroactively reduced by 10 cfs at Rood Bridge Rd and by 12 cfs at Farmington Rd. Nonetheless, the District's releases helped to offset thermal loads from the WWTFs, provide sustainable base flows in the upper Tualatin River and key tributaries and improve overall water quality.

Releases and discharges: The graph on the following page shows Clean Water Services' flow augmentation from Barney Reservoir and Hagg Lake, and discharges from the WWTFs and NTS for May through November 2021. Graphs on pages 17, 18 and 19 illustrate the importance of the District's contributions to total flow at three key sites:

- Golf Course Road (RM 51.5) is located downstream of major withdrawals by JWC and TVID at the Spring Hill Pump Plant (RM 56.3) and small discharges from the Fernhill NTS and Forest Grove WWTF (RM 55.2).
- Farmington Road (RM 33.3) is located downstream of the Rock Creek WWTF (RM 38.08) and includes flows from Dairy and Rock Creeks and their tributaries.
- West Linn (RM 1.75) is located downstream of the Durham WWTF (RM 9.33). Several small tributaries also enter the Tualatin River between Farmington and West Linn.

Clean Water Services Releases and Discharges to Tualatin River — 2021



In addition to the releases and discharges shown above, Clean Water Services leases an instream water right from U.S. Fish and Wildlife Service. In 2021, that water right supplied the following protected flow:

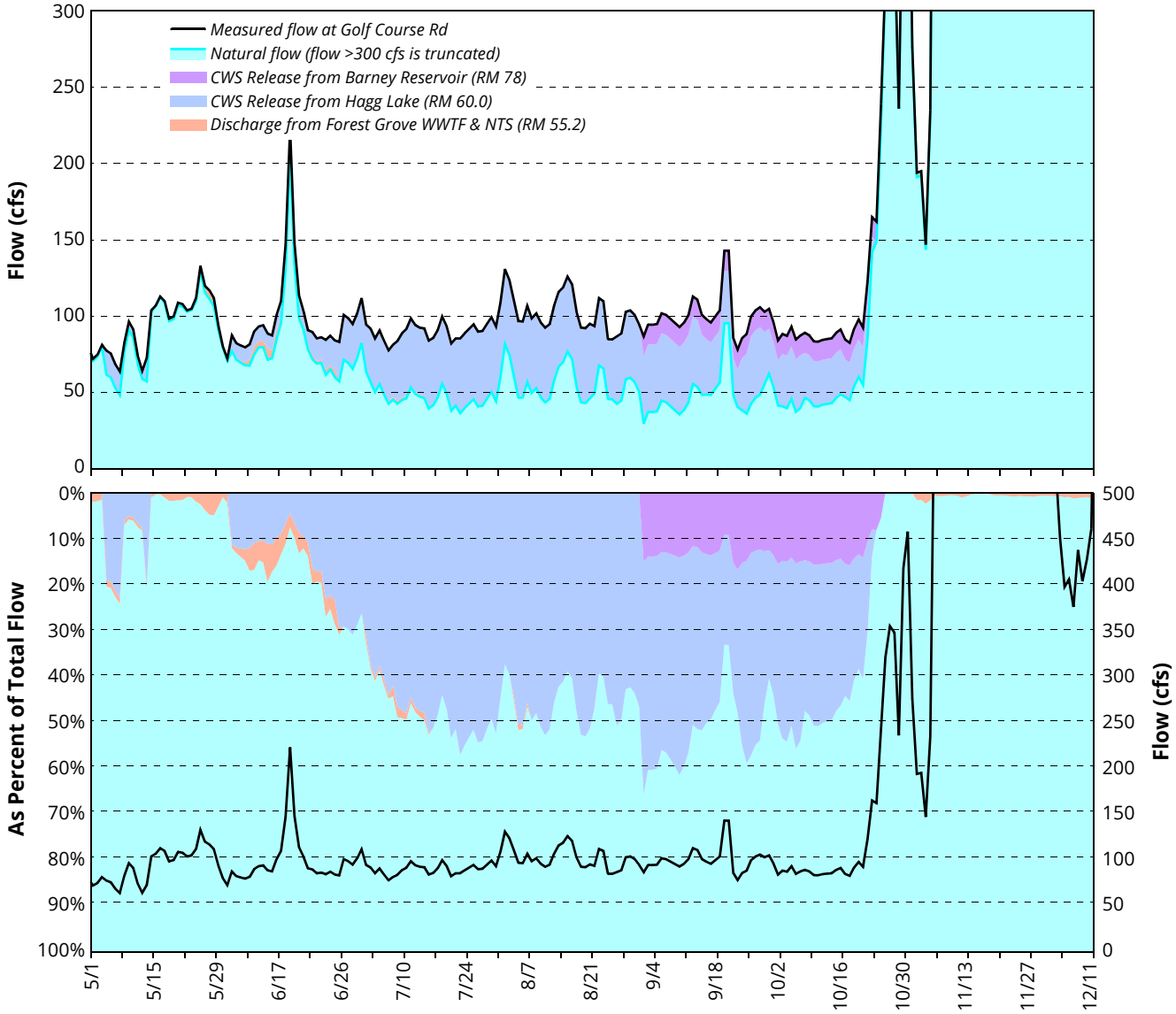
5.4 cfs natural flow (May1–July 28); 5.2 cfs Hagg Lake release (July 29–September 16); 5.4 cfs natural flow (September 17–30)

Upper Tualatin River — Golf Course Road site: The graph below shows flow at the Golf Course Rd site (RM 51.5). Flow at this site includes natural flow from the Tualatin River headwaters and Gales Creek plus storage water from Barney Reservoir and Hagg Lake that was not withdrawn at SHPP. The Forest Grove WWTF and NTS (both RM 55.2) are upstream of this site. In 2021, the NTS discharged periodically from May 1 through October 31. The District tries to maintain a minimum stream flow target of 60 cfs at this site. The site is unaffected by discharges from the District's two large WWTFs (they are downstream).

During the dry periods between July 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 downstream of SHPP 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.

Calculated* Clean Water Services Releases in Tualatin River at Golf Course Rd (RM 51.5) — 2021



*The following formula was used to calculate flows in this figure, assuming constant travel time and a uniform evaporative loss (0.25% per mile).

Natural Flow at Golf Course w/o CWS releases =
+ Measured flow at Golf Course (OWRD data)
– Calculated flow from Fernhill NTS or Forest Grove WWTF (= 0.978 x discharge from the same day)
– Calculated flow from Hagg Lake (= 0.979 x CWS Hagg Lake release from the same day)
– Calculated flow from Barney Reservoir (= 0.934 x CWS Barney Reservoir release from the same day)

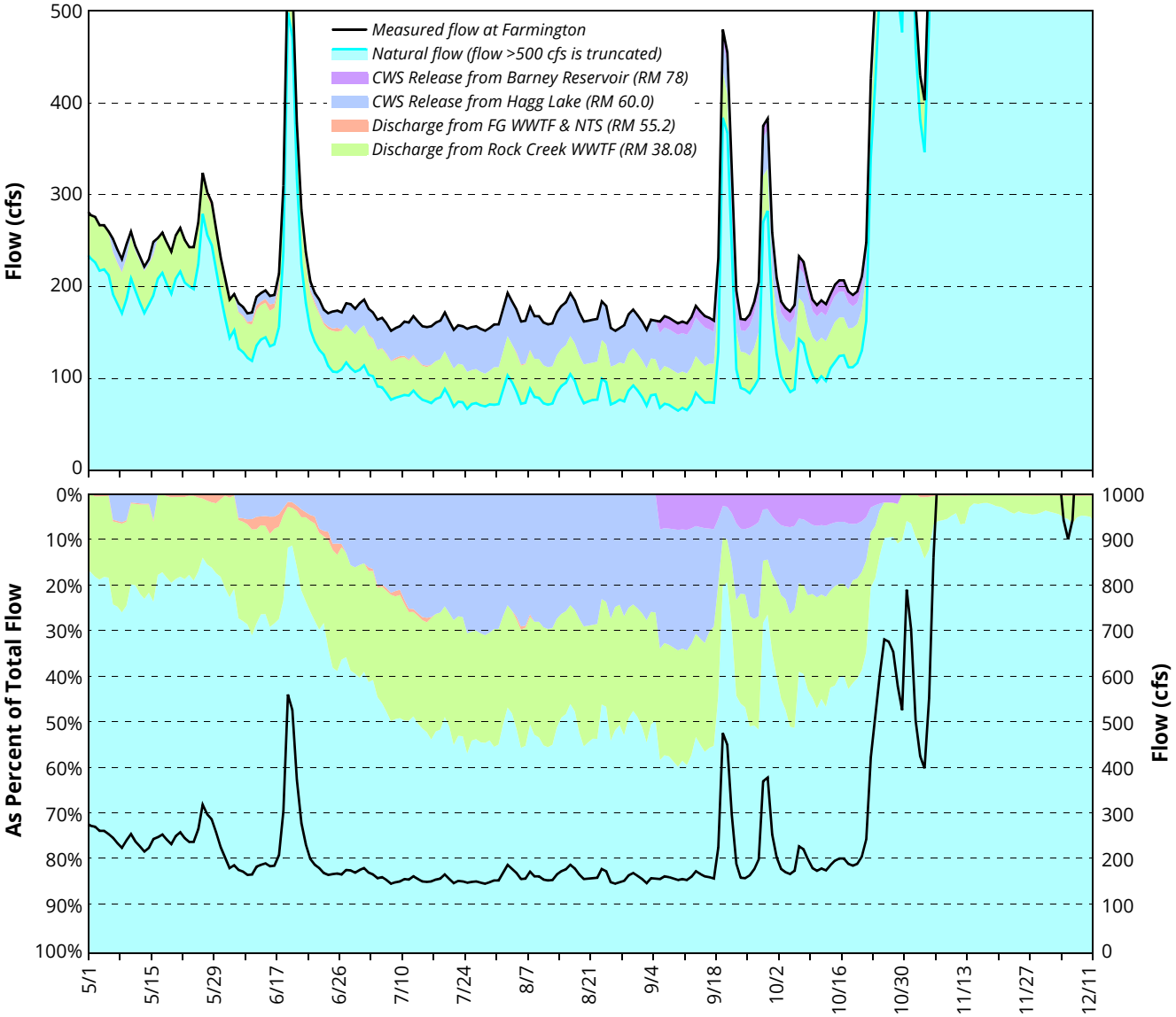
Middle Tualatin River — Farmington Road site: The graph below shows flows at the Farmington Road site (RM 33.3). Flow at this site affects water quality in the middle and lower parts of the river. Keeping Farmington flow from becoming very low (below 120 cfs) can mostly prevent the large scale algal blooms that were a recurring problem in the lower river in the 1990s.

Stream flow measurements at this site are also used to define ammonia limits at the treatment facilities, as well as when dry and wet season limits apply 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 about 50–60% of the flow at the Farmington Road site. Without this additional water, flow in the Tualatin River at this site would have been less than 100 cfs for all but 2 days from July 4–September 17, and less than 70 cfs on 8 days. Flows this low would 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.

Calculated* Clean Water Services Releases in Tualatin River at Farmington Rd (RM 33.3) — 2021



*The following formula was used to calculate flows in this figure, assuming constant travel time and a uniform evaporative loss (0.25% per mile).

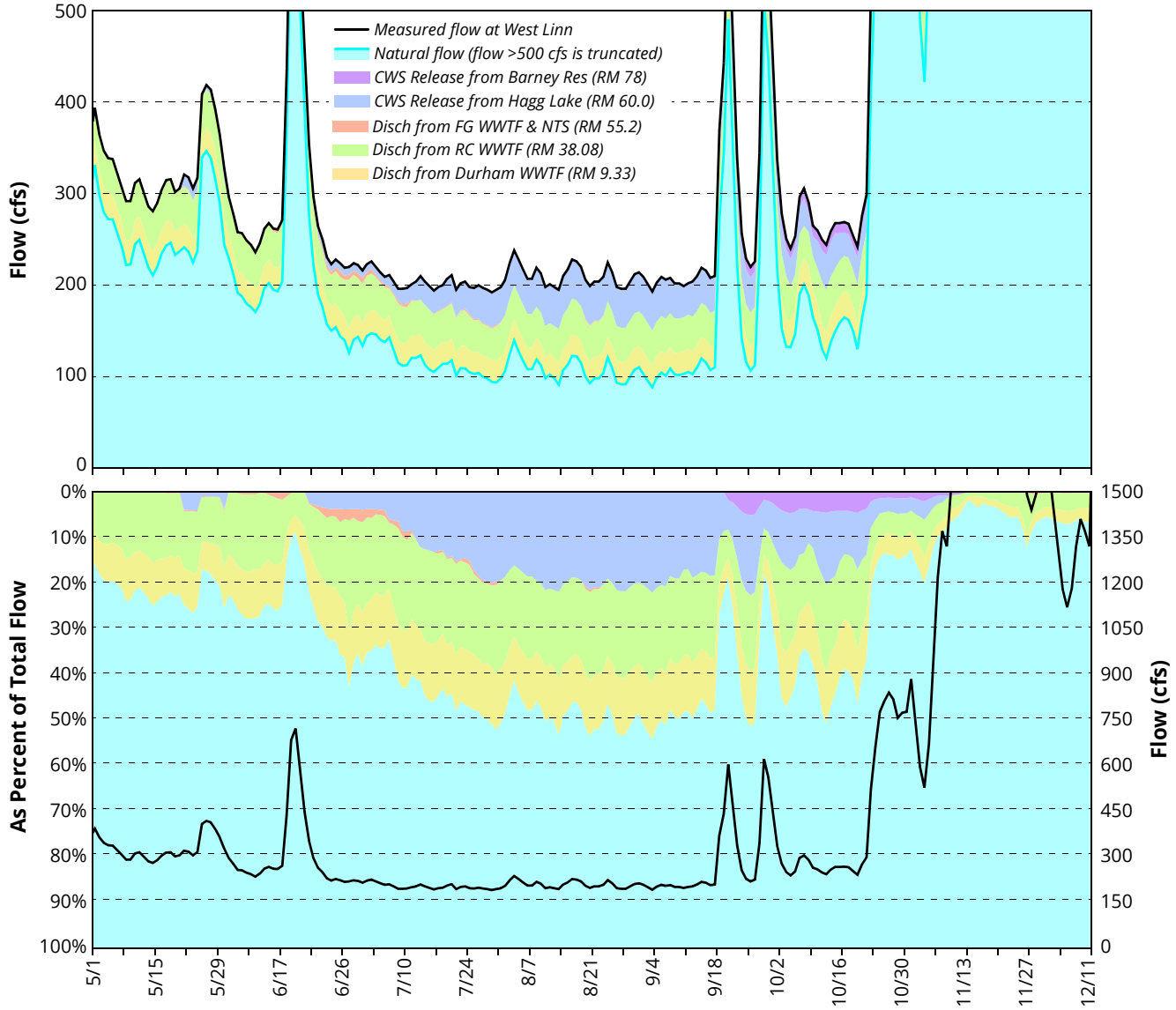
Natural Flow at Farmington w/o CWS releases =
+ Measured flow at Farmington (OWRD data)
– Calculated flow from Rock Creek WWTF (= 0.988 x Rock Creek WWTF discharge from the same day)
– Calculated flow from Fernhill NTS and Forest Grove WWTF (= 0.933 x discharge from 1 day before)
– Calculated flow from Hagg Lake (= 0.933 x CWS Hagg Lake release from 2 days before)
– Calculated flow from Barney Reservoir (= 0.888 x CWS Barney Reservoir release from 4 days before)

Lower Tualatin River — West Linn site: Flows at the West Linn site (RM 1.75) are shown below. Flow at this site during July–August averaged about 40 cfs higher than those at Farmington; about 60% of that increase is discharge from the Durham WWTF.

The District's stored water releases account for more than 20% of the flow during the low flow season. When discharges from the WWTFs are included, Clean Water Services' contributions account for 40-50% of the flow. Without this additional water, at times flows at the West Linn site would drop to 100 cfs or less 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 criterion 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.

Calculated* Clean Water Services Releases in Tualatin River at West Linn (RM 1.75) — 2021



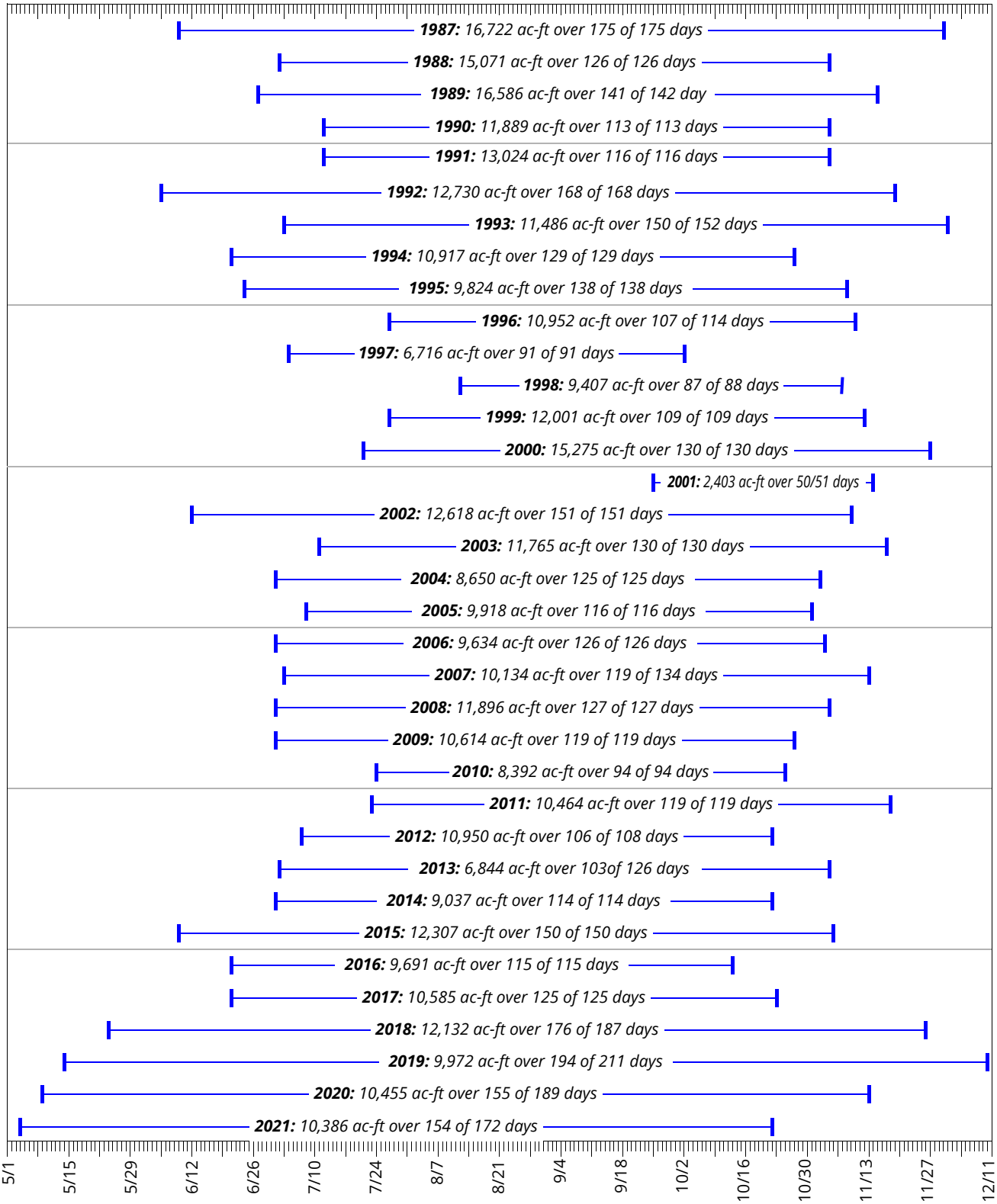
*The following formula was used to calculate flows in this figure, assuming constant travel time and a uniform evaporative loss (0.25% per mile).

Natural Flow at West Linn without CWS releases =
+ Measured flow at West Linn (USGS data)
– Calculated flow from Durham WWTF (= 0.981 x Durham WWTF discharge from 3 days before)
– Calculated flow from Rock Creek WWTF (= 0.909 x Rock Creek WWTF discharge from 14 days before)
– Calculated flow from Fernhill NTS and Forest Grove WWTF (= 0.854 x discharge from 16 days before)
– Calculated flow from Hagg Lake (= 0.854 x CWS Hagg Lake release from 17 days before)
– Calculated flow from Barney Reservoir (= 0.809 x CWS Barney Reservoir release from 19 days before)

Historical record of stored water releases

Hagg Lake: Water releases from Hagg Lake begin when natural flow decreases in late spring and continue until high natural flow resumes. Release rates are adjusted as needed to meet the applicable flow targets. In recent years, releases have begun earlier in the season

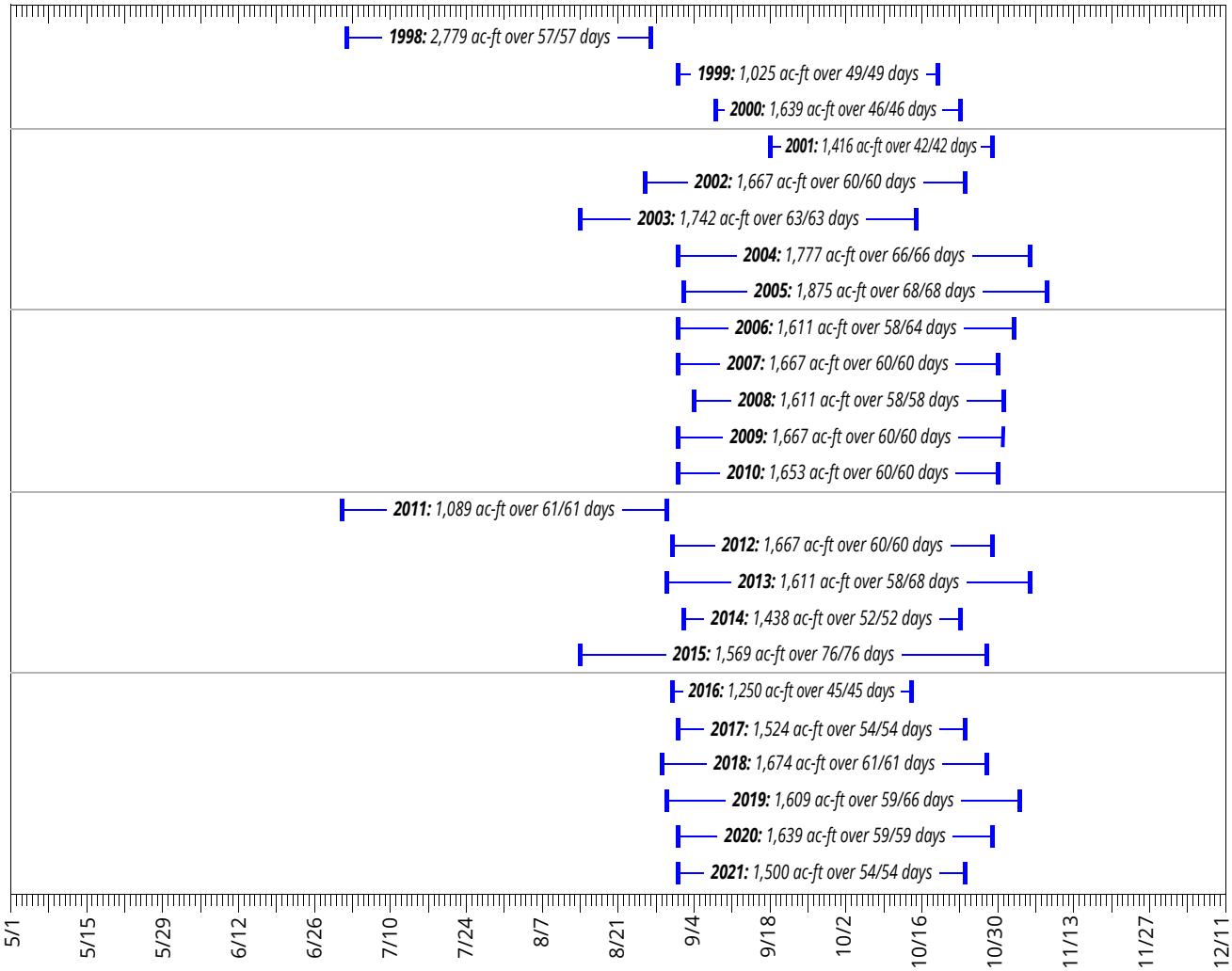
HISTORY OF CLEAN WATER SERVICES RELEASES OF WATER FROM HAGG LAKE



Water allocation depends on whether Hagg Lake filled. When Hagg Lake reaches full pool, Clean Water Services allocation is 12,618 ac-ft. In 1987–1989, Bureau of Reclamation allowed Clean Water Services to release its stored allocation plus natural flow. In 2000, Clean Water Services purchased additional water because low flow conditions persisted until late November. In 2001 allocations were severely decreased because Hagg Lake did not fill.

Barney Reservoir: Water usually is released from Barney Reservoir during the late summer. Accounting for dead pool volume and the 15% allocation to the Oregon Department of Fish and Wildlife, Clean Water Services has 1,654 ac-ft available at full pool. The allocation is adjusted if the reservoir does not fill.

HISTORY OF CLEAN WATER SERVICES RELEASES OF WATER FROM BARNEY RESERVOIR



In 2001, the allocation was much reduced because the reservoir did not fill; Clean Water Services purchased 1000 ac-ft more water than its allocation that year. Reservoir drawdown in 2011 led to a reduced allocation. With minor variations, releases from Barney Reservoir are on the order of 14 cfs. Once begun, suspension of releases is infrequent.

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 2021 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 2021

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	329	10	319	85	13		0
June	305	15.3	290	140	21	*[1,250]*	0
October	429	40	389	95	16	*[984]*	0
November	1997	27	1997	110	21	*[1,250]*	0

JOINT WATER COMMISSION

by Simon Christensen, Joint Water Commission/City of Hillsboro

INTRODUCTION

Over 400,000 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.

2021 OPERATIONS

Production and demands: In 2021 the JWC WTP produced an average of 34.2 million gallons per day (MGD) of finished water. The maximum daily production in 2021 was 62.9 MG and occurred on June 29, at the end of a record-setting heat wave. This is greater and earlier than the 2020 maximum daily production of 57.7 MG which occurred on September 3. The minimum daily production in 2021 was 17.6 MG and occurred on April 13 due to a maintenance shutdown.

2021 Stored water usage: The amount of stored water used by JWC for 2021 is summarized in the tables below. In all, 75% of the total allocation was used. Typical average use is 40–60% of allocation, although higher usage has occurred in the recent past.

Municipal use of stored water began on May 8 and continued through October 25 for a total of 171 days.

STORED WATER RELEASE FROM EACH RESERVOIR — 2021

DESCRIPTION	BEGINNING BALANCE (acre-ft)	AMOUNT RELEASED (acre-ft)	ENDING BALANCE (acre-ft)	DAYS OF STORED WATER RELEASE	AVERAGE RELEASE	
					acre-ft/day	cfs
Barney (M&I) *released 5/7–10/24**	14,886	11,276	3,610	171	65.9	33.2
Scoggins *released 5/8–10/25* *3 days with zero release*	13,500	10,046	3,454	168	59.8	30.1
Total	**28,386**	**21,323**	**7,063**	**171**	**124.7**	**62.9**

*Water is released from Barney Reservoir a day before it is used to account for travel time between the Reservoir and the Spring Hill Pump Plant.

COMPARISON OF STORED WATER USE— 10-YEAR RECORD

Year	Dates of Stored Water Use			Stored Water Use (acre-ft)			Average Use (acre-ft/day)
	First Day*	Last Day*	Days**	Barney	Scoggins	Total	
2021	5/8	10/25	171	11,276	10,046	21,323	125
2020	5/20	11/16	175	9,638	8,501	18,139	104
2019	5/30	12/12	196	9,963	9,964	19,927	102
2018	5/26	11/28	187	12,159	9,513	21,672	116
2017	6/22	10/24	125	7,819	6,425	14,244	114
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
10-yr average	**5/24**	**11/1**	**159**	**8,955**	**8,741**	**17,697**	**111**

*First and last day of Stored Water Use may include days when regulation was not in effect. These dates may lag OWRD regulation dates by 1 day because releases are adjusted the day after OWRD imposed or lifted regulation.
**Days of Stored Water Use does not equal the elapsed days between the start and end dates for regulation if regulation was temporarily suspended during the period.

STORED WATER USE BY AGENCY — 2021

Description	Beginning Storage (acre-ft)	Amount Used (acre-ft)			Ending Balance (acre-ft)	Average Use (acre-ft/day)
		from Barney	from Scoggins	Total		
Hillsboro	11,127	5,109	4,908	10,018	1,109	58.6
Forest Grove	4,414	13	1,600	1,613	2,801	9.4
Beaverton	7,556	1,978	3,538	5,516	2,040	32.3
TVWD	5,289	4,176	—	4,176	1,113	24.4
Total	**28,386**	**11,276**	**10,046**	**21,323**	**7,063**	**124.7**

North Plains and Tigard: usage is reflected in the values for JWC partners.
Values in this table reflect internal leases between JWC partner agencies.

Efficiency: JWC maximizes the capture of released water by coordination with partner agencies to anticipate and track system demands, and by leveraging finished water storage at the Fern Hill Reservoirs. 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 93% of the water available for municipal use from natural flow rights and releases from impounded supplies.

ESTIMATED WATER CAPTURE RATES – 2021

Water Available		Raw Water Pumped			Finished Water Produced			
					Total		Average Daily	Peak Day
Source	(acre-ft)	Facility	(acre-ft)	(MG)	(acre-ft)	(MG)	(MGD)	(MGD)
Reservoir releases	21,323	JWC WTP* (Spring Hill)	23,230	7,570	22,274	7,258	42.4	62.9
Natural flow	2,967	Slow Sand Filter Plant* (Cherry Grove)	290	94	290	94	0.55	0.75
Total	24,290		23,520	7,664	22,564	7,353	43.0	63.7
		Capture rate	97%		93%			

*The values shown here were measured and reported by JWC.

Significant events

Loss of power: On January 12, 2021, there was a loss of utility power at the WTP caused by high winds associated with a storm. The WTP ran on Emergency Generator Power for 9.3 hours.

Emergency Water for the City of Tigard: In February 2021, an ice storm caused a power outage at the Lake Oswego WTP which affected the City of Tigard's ability to provide water. City of Tigard requested emergency water from the JWC via an intertie connection with the City of Beaverton to meet their demand of 7.9 MG of water over three days.

Chlorine shortage: A regional chlorine gas (Cl_2) shortage occurred during the summer of 2021. Cl_2 conservation measures included reducing finished water production at Hillsboro's Slow Sand Filter Plant and temporary operational changes at the JWC WTP. At the WTP, Cl_2 additions to the Rapid Mix basin (the first treatment step after intake) ceased on June 16. Additions of Cl_2 continued at other points during treatment, but the target chlorine residual in finished water leaving the plant was reduced. Frequent water quality testing ensured that water leaving the WTP and traveling through the JWC transmission system continued to meet public health standards, even with a slightly lower chlorine residual. On July 12, the WTP began feeding sodium hypochlorite (NaClO) into the Rapid Mix basin. On August 12, normal use of Cl_2 resumed.

2021 Facilities upgrades and maintenance

Raw water pumps: Four new vertical turbine pumps and motors were installed in 2019 to increase raw water pumping capacity to 85 MGD. In 2020, significant pump vibration was observed on raw water pumps #1 and #2. Pump #1 was removed in 2020, sent back to the manufacturer for repair, and reinstalled in May 2021. Pumps #2 and #3 were removed, inspected, repaired, and reinstalled in June and July 2021, respectively. Pump #4 will be removed in early 2022 to undergo the same treatment. At that time, an additional raw water pump motor will be installed to serve in the event of an emergency.

JWC staff re-installing raw water pump

Vortex suppressors: New pump station upgrades include the installation of vortex suppression structures that will be installed at the base of each pump to decrease underwater turbulence that could damage the pump station. These were fabricated in November 2021 and will be installed in 2022.

Finished water pumps: The replacement of the motor control center for finished water (FW) pumps # 7, 8 and 9 that began in late 2020 was completed in March 2021. FW pump #4 motor control center will be replaced in 2022. FW pumps #1, 2, and 6 were slated to be replaced in 2020, but are delayed until spring or fall of 2022.

On December 12, 2021, the motor for finished water pump #8 caught fire shortly after startup; the fire was quickly contained. The motor was installed during the 1996–1998 expansion. The pump is scheduled to be replaced in early 2022.

Other maintenance: In 2021, the JWC WTP completed the scheduled 4-year maintenance and service on our chlorine scrubber and completed repairs to the underdrain system for filter 15.


Finished water pump station at JWC WTP

Fish screening exemption agreement and Bateman Creek mitigation

Background: The JWC holds multiple water rights that require the use of a withdrawal facility meeting current ODFW fish screening standards. However, the Spring Hill Pump Plant (SHPP), which is the facility the JWC uses to make its withdrawals, is owned by the Bureau of Reclamation (BOR) and does not meet those current standards.

Compliance through infrastructure improvements would require replacing the intake screens and lowering the approach velocities to the screens. The JWC cannot directly make improvements because it does not own the SHPP facility, and BOR is not compelled to make the upgrades. Compliance with approach velocities would require significant redesign of the entire intake facility or channel, or construction of a new intake facility.

Because of the compliance and ownership issues, JWC began working towards ODFW approval of a fish screening exemption in 2016. Fish monitoring was completed and a report including fish entrainment estimates was completed in 2019. That report was used to inform the development of a mitigation project to offset detrimental impacts. The mitigation project and exemption applies to the four raw water pumps that the JWC operates at the Spring Hill Pump Plant. The nine pumps operated by TVID were not a part of the mitigation analysis or requested exemption.

Fish screening exemption agreement: JWC proposed to mitigate for fish screen and entrainment impacts by restoring fish passage at two road culverts on Bateman Creek, a tributary to Gales Creek. ODFW has also required a large woody debris habitat project at the site to be included as part of the mitigation. This site is an ODFW priority. The project is estimated to produce more than enough salmonid fry to meet JWC's mitigation requirement in order to receive the screening exemption.

On June 5, 2020, the Oregon Fish Screening Task Force recommended approval of a Fish Screening Exemption Agreement to the Oregon Fish Commission. The Oregon Fish Commission approved the agreement on August 7, 2020. The Joint Water Commission approved the agreement on October 9, 2020. The exemption includes the following:

- Identifies the two water rights (S-54737 and S-55219) and one pending application (S-88506) that require compliance with State of Oregon fish screening rules.
- Identifies the mitigation project that will provide a net benefit to the fish populations of the Tualatin River Basin. This includes replacing two failing roadway crossings and installing large wood instream.
- Identifies future monitoring, reporting, and maintenance requirements.
- Allows for the agreement to end if the JWC begins using an intake that fully complies with fish screening criteria.

Landowner agreement: The mitigation site is located on private, non-industrial timber property. A landowner agreement and permanent easement was necessary to protect JWC's compliance with the Fish Screening Exemption Agreement. This permanent easement was executed March 2021.

Top: **One of two culvert sites on Bateman Creek slated for fish passage restoration**

Bottom: **Large woody debris staged for instream habitat**

Design and construction: Twenty-five pieces of large woody debris were acquired for instream habitat in 2021. Construction is scheduled to begin summer 2022 and will bring JWC's use of the SHPP into compliance with Oregon requirements.

Regulatory matters

Water Right Activity: In 2018, the Joint Water Commission applied for a water right to withdraw 44.0 cfs at the Spring Hill Pump Plant (application S-88506). Withdrawal under the new permit will be in combination with the usage under permit S-54737, meaning the total combined usage will not exceed 75 cfs. Permit S-54737 is authorized for use between October 1 and May 31.

OWRD's initial review of application S-88506 indicated that water was not available for withdrawal in October, November, and May. In 2019, JWC modified the application to limit the requested time period of use to December 1 through April 30. The application was placed on hold in July 2020, when Oregon Department of Environmental Quality (DEQ) asked Oregon Water Resources Department (OWRD) to condition use of the permit in the month of April to when flow in the Tualatin River at the Farmington gage is greater than 904 cfs. JWC accepted this condition and the hold was removed on November 18, 2020.

OWRD issued a proposed final order (PFO) on April 27, 2021 which found that the proposed use would not impair or be detrimental to the public interest and recommended approval of the application. The application received one protest during the protest period and is under review.

Water Management and Conservation Plan (WMCP): A statewide rule on Conservation and Efficient Water Use requires major water users and suppliers to prepare a Water Management and Conservation Plan (WMCP) in order to access any undeveloped portions of their existing water right permits. These rules ensure the efficient use of the state's water resources, and facilitate water supply planning consistent with water provider capabilities.

WMCPs document available water rights, historical water demands, projections of future water needs, curtailment plans, and water conservation and efficiency efforts. They also establish conservation performance benchmarks to achieve over the next 10 years.

JWC submitted a final draft to OWRD on September 11, 2020. No comments were received in a 30-day public comment period. OWRD provided feedback on November 24, 2020, and JWC submitted revisions on January 19, 2021. After review, OWRD approved the plan on February 24, 2021 and allowed for an additional 18 cfs of greenlight water for a total of 44 cfs out of the permitted 75 cfs. JWC is required to submit a progress report no later than January 24, 2026, and an updated WMCP no later than August 24, 2030.

Acknowledgements

The Joint Water Commission appreciates the efforts of the Watermaster and our partners on the Tualatin River Flow Management Technical Committee. We extend our thanks for their involvement and cooperation. The communication and coordination among the committee members is invaluable.

MILLS DAM/BARNEY RESERVOIR

by Simon Christensen, 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. The original structure, known as the 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 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%

2021 Operations

Barney Reservoir filled on January 24, 2021. Storage volume at full pool is 20,000 ac-ft. By the end of the release season, 69% 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 7, 2021 and releases from Barney Reservoir to the Tualatin River began that day. JWC releases from Barney Reservoir continued uninterrupted for a for a total of 171 release days until natural flow rights were restored on October 25. The JWC partners used 76% of their allocation.

Releases to the Trask River: Releases from Barney Reservoir to the Trask River for ODFW began on May 12 and continued through December 5 for a total of 208 release days. Almost all of the stored water for ODFW was released to the Trask River.

STORED WATER ALLOCATION AND RELEASES FOR BARNEY RESERVOIR — 2021

	Total Storage	Oregon Dept of Fish and Wildlife	BRJOC Partners					
			Clean Water Services	JWC Total	JWC Partners			
					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)	15,769	2,993	1,500	11,276	*5,109*	*12.7*	*1,978*	*4,176*
Percent allocation used	79%	100%	91%	76%	*100%*	*3%*	*56%*	*72%*
First day of release		May-12	Sep-1	May-7				
Last day of release		Dec-5	Oct-24	Oct-24				
Number of Days with Releases		208	54	171				
Average Daily Release (cfs)		7.3	14.0	33.2				

Sluice gates exercise

On November 9, 2021, the BRJOC inspected and exercised the intake sluice gate and the sluice gate for the large diameter shaft spillway to the Trask River to verify operability and promote Mills Dam emergency readiness. The exercise was well planned with the coordination of a dive team, multiple work divisions, and state and local partners. Trask River flows were well below flood stage and Barney Reservoir's water level was low, which helped to limit hydraulic head. The sluice gate controlling flows to the Trask River was operated slowly to reduce risks of fish stranding.

Water from Barney Reservoir via emergency spillway to dissipation area above the Trask R.

Interagency communication consisted of working with the State of Oregon's Water Resources Department and the Department of Fish and Wildlife (ODFW). The State of Oregon Dam Inspector was on site for part of the exercise and District's 1 and 18 Watermasters were notified. The local Tillamook ODFW office was consulted for their recommendation on event timing.

The valve exercise and inspection confirmed Mills Dam is functioning as intended and capable of emergency dewatering to the Trask River.

Oregon Department of Forestry (ODF) Trask Flats timber sale

The logging of Trask Flats was completed without incident. BRJOC staff met with the logging foreman to answer questions regarding the location of the pipe and identified crossing locations for accessing timber. BRJOC staff monitored harvest activities within the Trask River Pipeline Easement and logging was successfully completed early 2022.

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 Oswego 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, Oswego 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, Lost-dog 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 Hagg Lake 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.

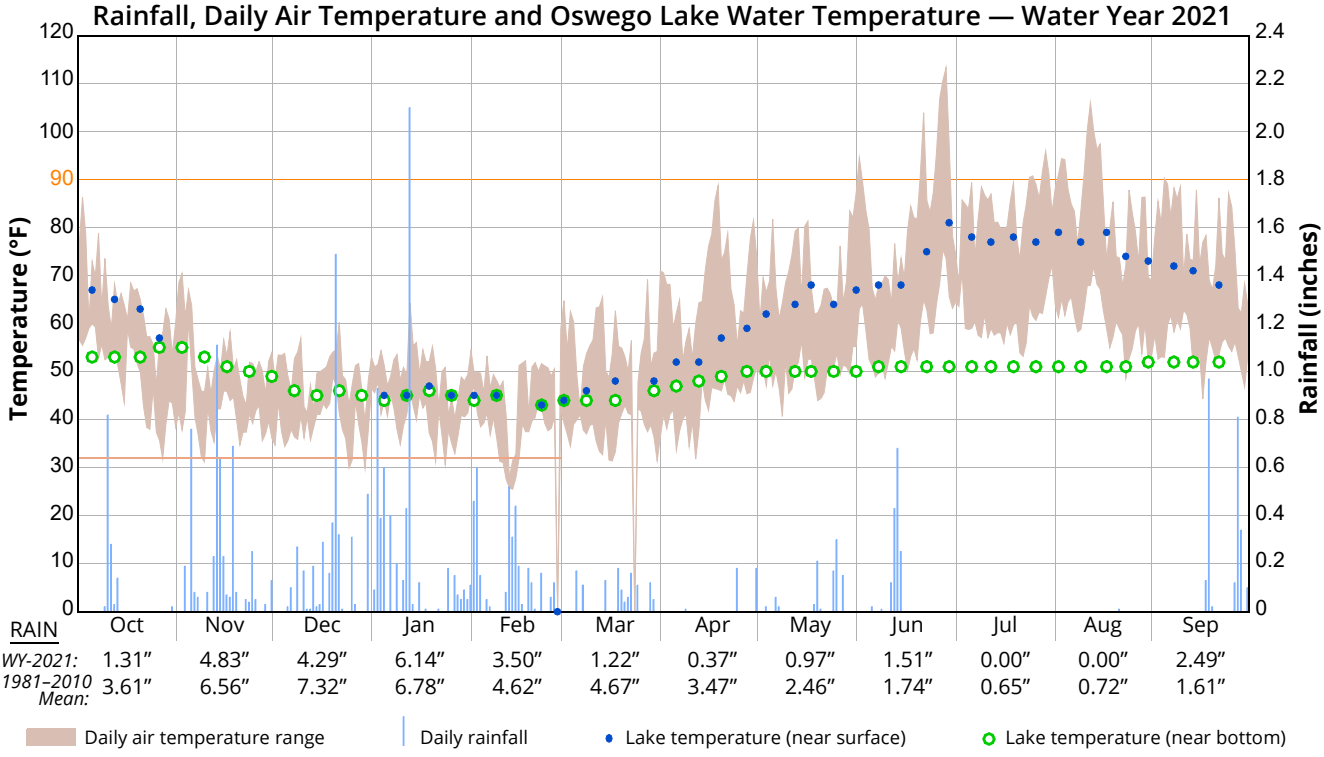
Oswego Lake watershed management

Water quality improvements and safety are the top priorities for LOC. The goal of the LOC Water Quality Management Plan is to reduce cyanobacteria productivity and maximize the aesthetic value of the lake. Controlling phosphorus loading to the lake limits the overgrowth of algae, particularly cyanobacteria. The goal is to keep the phosphorus level in Oswego Lake below 20 µg/L during the summer when long days and sunshine create conditions favorable to algal growth.

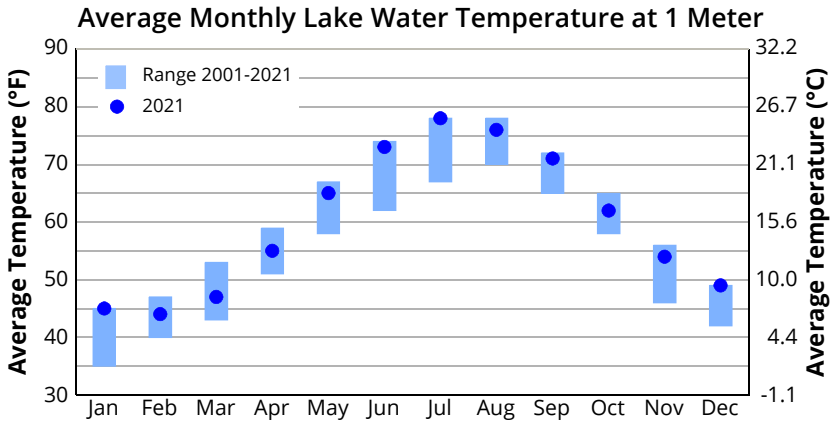
Conditions in 2021

Summer 2021 started with a brutally hot June, including two periods with triple digit temperatures. The first occurred on June 21 (104°F). After a three-day break, the temperature steadily rose to a high of 107°F on June 26, 111°F on June 27, and 113°F on June 28. The weather cooled to the mid-90s on June 29 and back to more typical highs in the 70s on the next day.

Rainfall at the lake was much lower than normal from March through August. June had rain on only a few days, and July and August had no measurable rainfall at all. The combination of low rainfall through spring and the abnormally high June temperatures exacerbated our long-running drought. Fortunately the hot dry conditions of the summer of 2021 did not produce the intense wildfires of summer 2020.



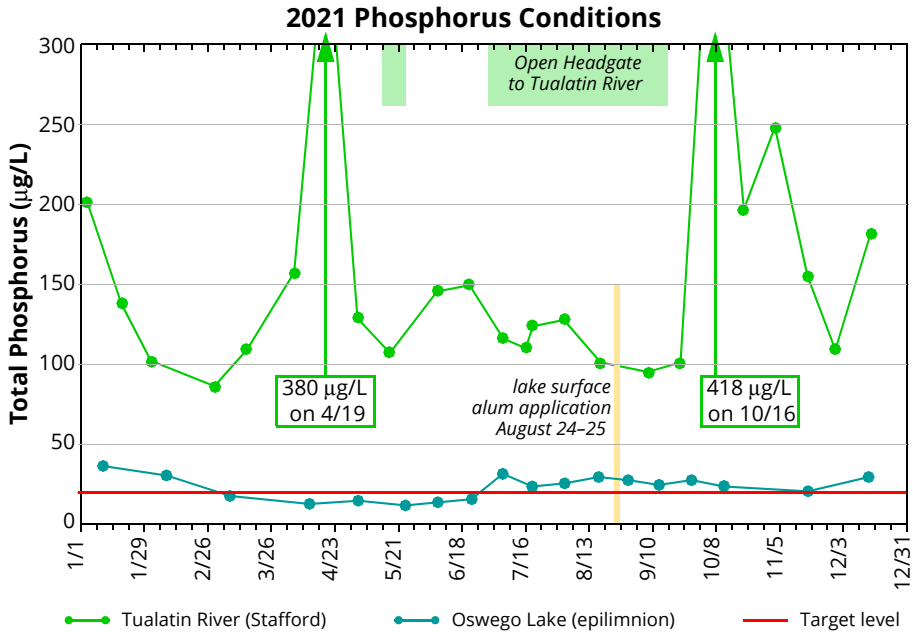
The unusually warm spring weather had a marked effect on the lake, as surface water absorbed heat from its surroundings. The highest water temperature of the year occurred in June, two months earlier than typical. May–September average lake water temperatures were in the upper end of the 2001–2021 range. March was the only month in 2021 in which the average lake temperature was below the 2001–2021 median.



2021 Lake Management

Inflow from the Tualatin River: Because no measurable rainfall occurred at the lake in July and August, more water than usual from the Tualatin river was required to keep the lake full, which led to us importing more phosphorus. Typically we would be able to treat river water to remove excess phosphorus, but we were working on a dredge project that took the river water treatment system offline.

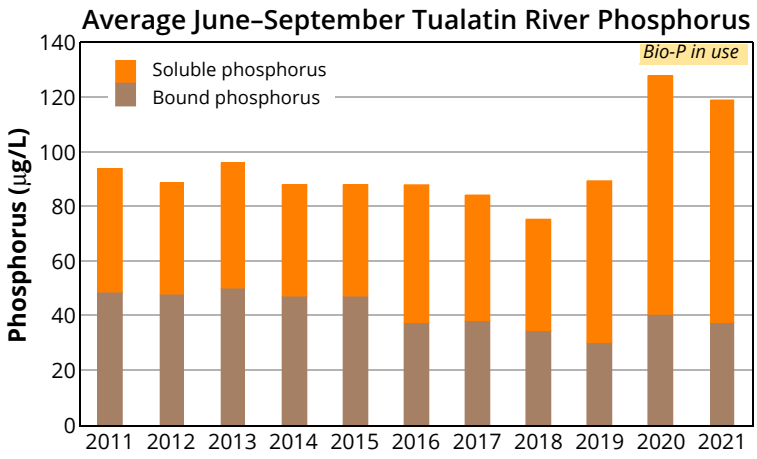
The figure at the right shows that the headgate was opened on May 14 and closed May 24. It was re-opened on June 30 and remained open through September 16. Phosphorus concentrations in the river were 120–150 µg/L when the headgate was open. River water use by LOC was book-ended by very high river phosphorus in April and October.



Alum treatment: Alum was applied August 24–25.

Phosphorus concentrations in the lake remained above the 20 µg/L target level from early July through the summer.

Phosphorus in Tualatin River: 2021 is the second summer that Clean Water Services has been testing a new biological treatment system (Bio-P) for phosphorus removal. The change in phosphorus treatment was necessitated by USEPA's recently promulgated water quality criteria for aluminum, which limit Clean Water Services' ability to continue to use alum (aluminum sulfate) in its tertiary process for phosphorus control. The graph at the right shows that total phosphorus concentrations in the river are higher since the new biological treatment was implemented. More specifically, soluble phosphorus concentrations increased. This is important because the soluble form of phosphorus is more biologically available to phytoplankton. Although the concentration of phosphorus in the river in 2021 was slightly lower than in 2020, the total phosphorus concentration was still six times higher than the target phosphorus concentration for the lake.

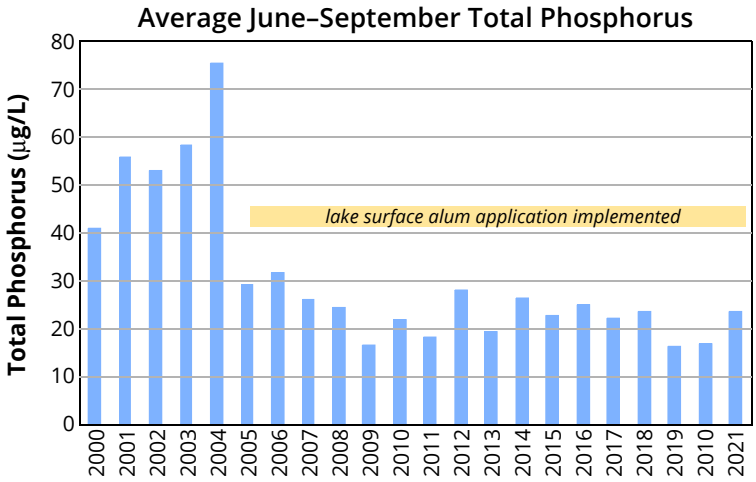


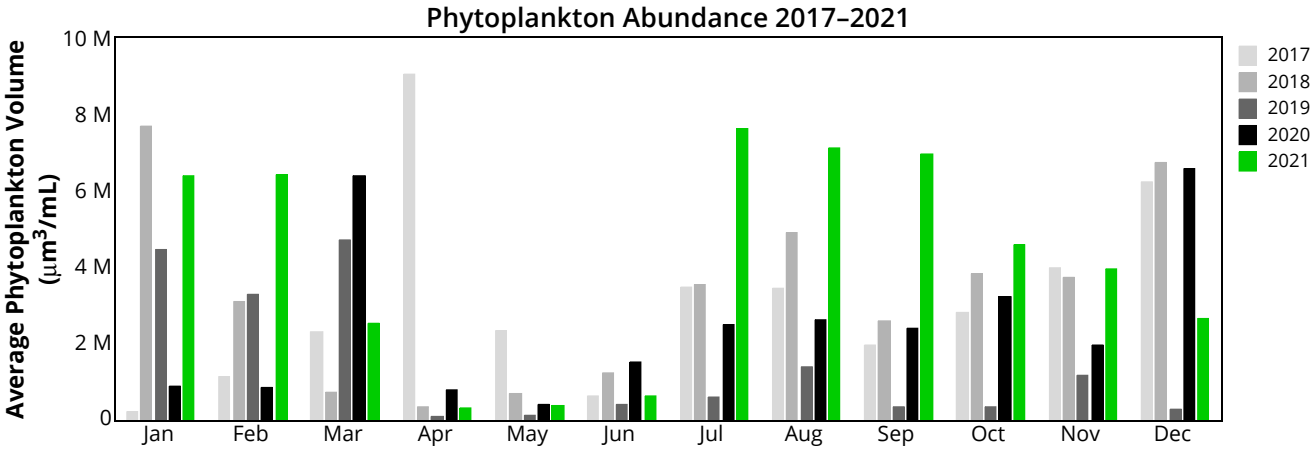
Fortunately we were able to work closely with Clean Water Services and coordinate our water use. They use biological treatment as long as possible in the fall, but once rain starts and their facilities sees higher flows, they do not have the capacity to continue biological treatment. Typically, this is not a problem because if it is raining we will not need to use river water to keep the lake full. However, with climate change, storm events become more intense and localized, meaning it may be raining in Hillsboro but dry in Lake Oswego. Occasions where biological treatment is not on line while we are still using the river may arise. Ways to modify our process to anticipate these events and temporarily close the headgate during high phosphorus conditions may be possible.

2021 Lake Water Quality

The summer average concentration of phosphorus in the lake was 24 µg/L in 2021, the same as in 2018 and greater than the target concentration of 20 µg/L. Phosphorus was much higher in the years before alum use was initiated in 2005.

Warm weather and intense sunlight in 2021 led to a longer growing season for algae and cyanobacteria, while ample phosphorus concentrations provided plenty of food for their growth. The graph below shows that concentrations of phytoplankton in July–September were much higher in 2021 than in the past five years. Of most concern was the prevalence of cyanobacteria which accounted for 80% of the total phytoplankton in August and September.





Data for nutrient concentrations in the lake and lake clarity are shown in the table below.

2021 OSWEGO LAKE WATER QUALITY — MEASUREMENT AVERAGES

	Location	Chlorophyll-*a* (µg/L)	Total P (µg/L)	SRP (µg/L)	Total N (µg/L)	Secchi (m)	Turbidity (NTU)
Summer	Lakewood Bay (depth 3.2 m)	12	67	1	736	0.69	11
	Main Lake (depth 16 m)	5.9	24	0	484	2.2	4.8
	West Bay (depth 1.4 m)	22	128	3	1073	0.40	25
	Oswego Canal (depth 1.2 m)	10	184	76	4690	0.81	2.7
	Blue Heron Canal (depth 1.3 m)	24	201	2	981	0.57	14
	Outlet (depth 6 m)	7.4	27	1	674	2.0	4.5
Annual	Lakewood Bay (depth 3.2 m)	10	50	1	646	1.5	6.3
	Main Lake (depth 16 m)	16	23	1	503	2.8	3.6
	West Bay (depth 1.4 m)	29	111	12	1494	0.67	17
	Oswego Canal (depth 1.2 m)	10	216	83	4610	0.79	3.3
	Blue Heron Canal (depth 1.3 m)	27	143	5	1030	0.80	9.9
	Outlet (depth 6 m)	14	25	1	658	2.7	3.5

Boxed cell = highest average during summer; Shaded cell = lowest average during summer; Summer=June–September
Abbreviations: Total P = Total Phosphorus, SRP = Soluble Reactive Phosphorus, Total N = Total Nitrogen, Secchi = Secchi depth, µg/L = micrograms per liter, m = meters, NTU = nephelometric turbidity units

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) (`https://www.oregon.gov/OWRD`) in cooperation with Washington County (`https://www.co.washington.or.us`), 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, 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 2021

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 (stage only) (station number formerly 14206960)	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

2021 Highlights

Tualatin River and HWY 219 Gage: A partnership gaging station between Clean Water Services, USGS and the District 18 Watermaster office was established in 2021. The site is located near the Jackson Bottom Wetlands Preserve at the intersection of highway OR-219 and the Tualatin River. The purposes for this additional gage on the mainstem of the Tualatin River are to provide streamflow and water quality data for Clean Water Services, as well as useful water stage data to the Jackson Bottom Wetland's Preserve for recreationalists accessing trails within the park. Funding is supported by Clean Water Services while operation and maintenance of the gage is performed in collaboration with the USGS and the District 18 Watermaster office. The site is equipped with telemetry, streamflow gaging equipment, and water quality instrumentation. Gage height data from this site has been available since July 2021, but a new rating curve to determine streamflow is still being developed.

Staffing Resources: In the recent 2019-2021 Oregon legislative session the Water Resources Department received additional resources to support groundwater basin studies, place-based planning efforts, as well as grants and loans to implement water projects among other priorities. Part of this support added more staffing to its Field Services Division and a new Regional Assistant Watermaster position was created to serve the NW Region. This position is located in District 18 and will help with local watershed needs, as well as provide assistance to other Watermaster Districts within the region

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 an 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.
- Every water right has a “priority date” which is the date when it was issued.
- Water rights are independent of land ownership. When land with a water right is sold, the water right often goes with the land, but could be sold or transferred independently if OWRD grants a transfer. Land ownership does not confer the right to the water adjacent to or under that land without a water right.
- An instream water right is designed to retain a specified amount of flow in a stream for fish and wildlife, water quality or recreation. An instream water right is treated the same as 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, as well as the western U.S., water is managed by a a system called “Prior Appropriation” which is essentially first come, first served, where “first” to “last” is in order of priority date.

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 Oregon Water Resources Department monitors the availability of water throughout the season and determines which, if any, water rights holders in the basin will be restricted from exercising their water rights.

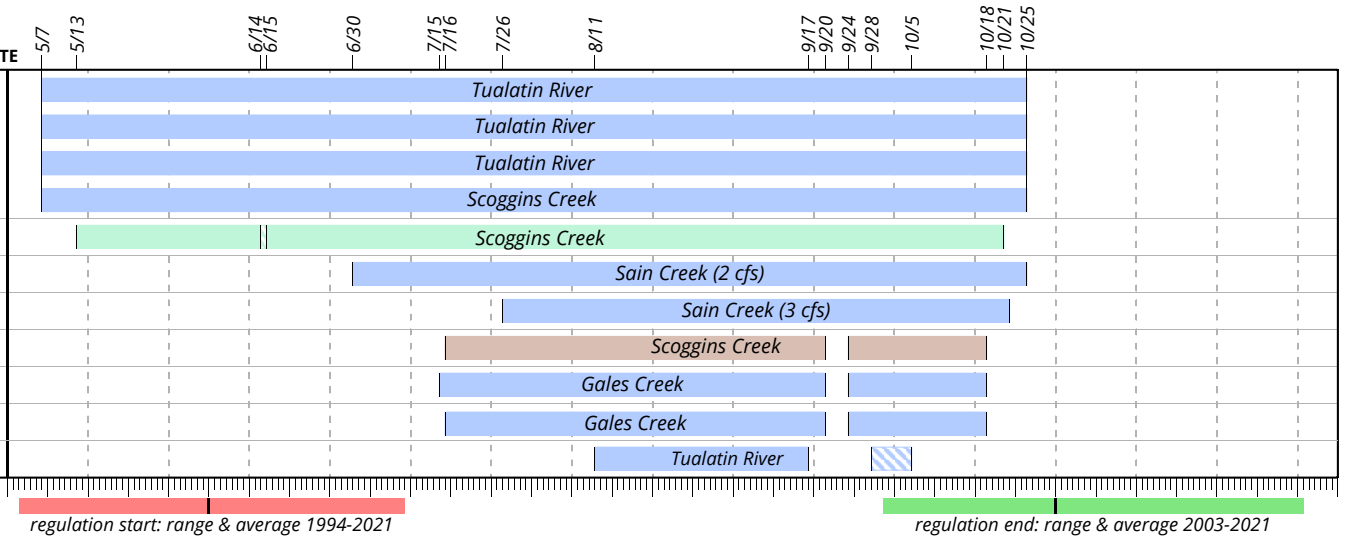
Regulatory Overview 2021

Regulation in 2021 began on May 7, one of the earliest years on record; only 2013 had an earlier start data (May 3). The last day was October 24 for a total of 172 days. Regulation was not suspended during the season for the main water users. The 2021 regulation season was similar to 2020 (173 days). The 2021 regulation season and the regulation history for non-irrigation use are on the following two pages.

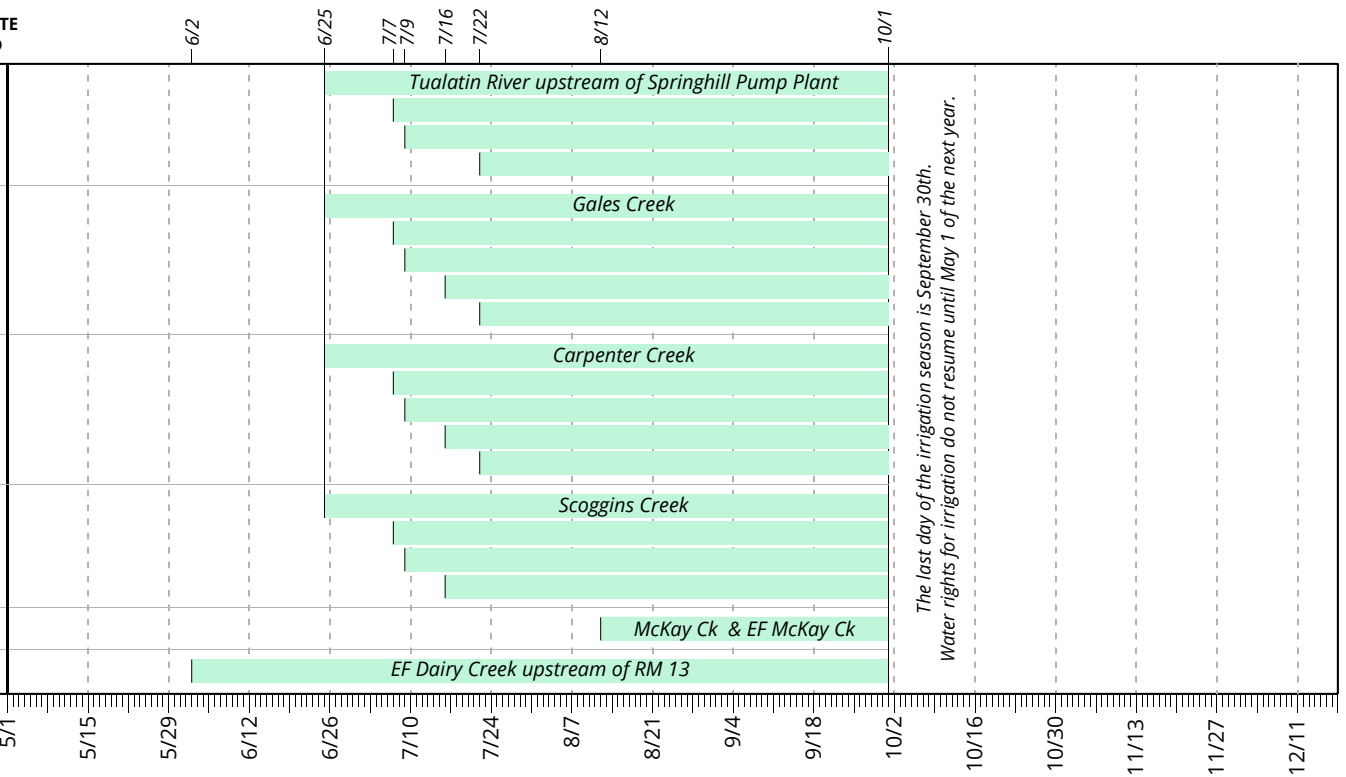
REGULATION OF WATER RIGHTS IN THE TUALATIN BASIN — 2021

Bars show period when water right was suspended

Entity	WR Permit	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	5-1-1915
City of Hillsboro	P-1136	1-22-1912
Stimson Lumber Co	P-10633	4-1-1932
City of Forest Grove	P-13944	7-27-1939
City of Forest Grove	P-12034	4-16-1935
City of Hillsboro	P-10408	1-22-1912



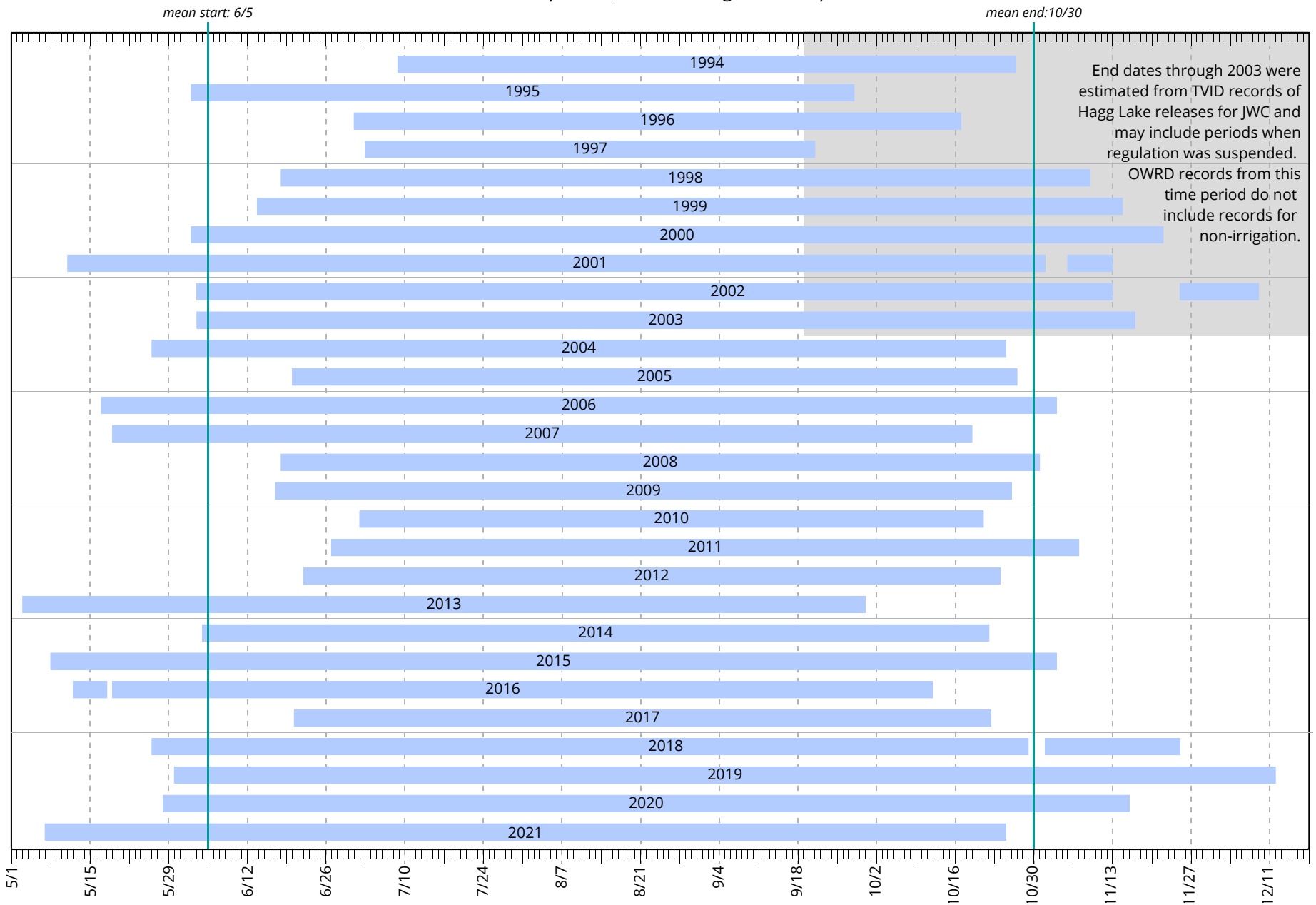
Location of Irrigation WRs	# of WRs Regulated Off	Earliest Priority Date Regulated
Tualatin R upstream of SHPP	11	2-20-1963
	18	4-14-1949
	23	3-18-1936
	3	8-26-1919
Gales Ck	62	9-24-1963
	38	4-18-1949
	26	6-25-1935
	5	9-6-1932
	7	1-23-1923
Carpenter Ck	4	7-10-1967
	5	8-22-1949
	6	12-14-1936
	1	3-25-1935
	1	10-21-1924
Scoggins Ck	3	7-28-1975
	5	4-15-1955
	7	4-24-1939
	1	4-1-1932
McKay Ck & tribs abv Northrup Rd	8	8-8-1966
EF Dairy Ck & tribs abv RM 13	12	3-6-1967



Water Use Municipal, Industrial-manufacturing, Irrigation, Partial regulation

HISTORY OF REGULATION OF WATER RIGHTS FOR NON-IRRIGATION USE IN THE TUALATIN BASIN

Bars show period when water right was suspended



SCOGGINS DAM/HENRY HAGG LAKE

By Nick Gent, Superintendent, TVID; Raj Kapur, Clean Water Services; Wally Otto, retired, TVID

INTRODUCTION

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.

Scoggins Dam and Hagg Lake

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 these sites.

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 HAGG LAKE

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 Hagg Lake was revised in 2011.

Scoggins Dam is authorized by the U.S. Congress to provide flood risk management 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 storage for flood risk management. The dam does not generate electricity.

During the summer, 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 all year for day-use only.

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

2021 Water Use

Water year 2021 marks the 47th year since Scoggins Dam began storing and releasing water for downstream beneficial use. A total of 43,587 acre-feet were delivered in 2021 (calendar year) bringing the total delivery from the Project to more than 1.3 million acre-feet.

2021 flow regulation began on May 8th for the Joint Water Commission and May 14th 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 26, 2021. Outside of the regulation period, water was released for Clean Water Services on May 4–13. As usual, TVID delivered small amounts 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.

2021 WATER DELIVERIES FROM HAGG LAKE

Delivered to	Volume (ac-ft)
Tualatin Valley Irrigation District	20,892
Clean Water Services	10,384
Municipal Use (Cities of Beaverton, Forest Grove and Hillsboro)	10,046
Lake Oswego Corporation	500
Other	1,726
Total	**43,587**

Events in 2021

Recreation: In 2021 there were 1,000,000 users recorded at Scoggins Valley Park/Henry Hagg Lake.

Coho Salmon: Five Coho were spotted in Scoggins Creek below the dam in November.

Lake Fish Habitat: Over the previous years, the Oregon Panfish Club anchored more than 350 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 these species. Reclamation has also committed to work with partner agencies to study and control invasive weeds.

Personnel: Nick Gent replaced John Goans as Reservoir Superintendent. John retired in 2021.

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 2021 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 are collected, stored and transmitted via satellite to BOR's Pacific Northwest Regional office in Boise, and are 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 2021 and the BOR on-site Response Trailer was not needed for emergency response. No containment booms were deployed to contain any contaminant spills during 2021.

Earthquakes: No earthquakes were recorded near the dam in 2021.

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 developing additional water resources 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 its current water supply is adequate. After studying many different options and seismic issues, the municipal and industrial water providers decided to focus on the Willamette River for their future water supply. Clean Water Services, however, continued to evaluate options at the Tualatin Project with BOR as additional water could help Clean Water Services meet its regulatory requirements and contribute to the long-term needs of the basin.

Three options were reviewed for the Tualatin Basin Dam Safety and Water Supply Joint Project:

- Modify the existing dam;
- Modify and raise the existing dam;
- Construct a new concrete dam downstream of Stimson Mill.

In February 2020, the Project Partners met to review feasibility designs for the three options. Estimated costs ranged from $750 million for dam modifications alone to $1.2 billion for a new downstream dam. All three options were deemed technically feasible, but their financial feasibility was questionable. Consequently, CWS and BOR did not select an option to move forward. Rather, they decided to pursue additional information about risks, alternatives, costs and other funding to advance the project.

Over the summer of 2021 CWS determined, through new analysis, that its regulatory requirements could be met more cost effectively by pursuing a suite of initiatives instead of new stored water at the Tualatin Project. These initiatives include expanding its recycled water program, increasing the scale of riparian-shade planting, pursuing access to existing water resources, optimizing water management practices and upgrading the wastewater treatment plants. In November 2021, Clean Water Services notified BOR that it will withdraw from the Joint Project citing cost and schedule as its primary reasons. Clean Water Services will no longer pursue an expansion of the storage capacity of Hagg Lake. Clean Water Services will continue to support BOR's Safety of Dams program to upgrade Scoggins dam making it seismically safe-along with all of the other contract holders. The Safety of Dams project schedule expects to construction to begin in 2027 and last for six years. The work will be conducted in a way that allows the existing facility to store and release water without curtailment or interruption.

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 4,000 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 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 Pump Plant. When natural flow no longer meets demand, the District 18 Watermaster begins regulating water users with “junior” (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 Hagg Lake 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 TVID 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 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.

2021 TVID Water Use

For the 2021 irrigation season (March through the end of November), TVID took delivery of 21,725 acre-feet of water from storage in Henry Hagg Lake—about 6,300 ac-ft more than in 2020. The least amount was 8,333 ac-ft in 1993; the largest seasonal delivery was 25,852 ac-ft in 2015. TVID 2021 peak use from storage was 122 cfs on August 12 and 13.

WEATHER STATISTICS AT SCOGGINS DAM 2021

Month	Description	Precipitation		Average Temperature		Other
		2021	[average]*	Low	High	
January	wet, mild	10.93″	[7.99″]	37°F	48°F	>2″ rain on 11th 12 days ≥50°F;
February	average	6.80″	[6.19″]	34°F	46°F	7 days with no precipitation
March	dry, warm	2.35″	[5.58″]	34°F	53°F	14 days with no precipitation 4 days ≥60°F
April	very dry, warm	0.83″	[3.43″]	37°F	65°F	only 7 days with precipitation 5 days ≥75°F
May	dry, warm	1.03″	[2.12″]	43°F	68°F	17 days with no precipitation 4 days ≥80°F
June	extremely hot ***record:*** 112°F on 29th	1.83″	[1.45″]	52°F	80°F	92% of total rain on 13–14th 9 days ≥90°F; 3 days ≥100°F
July	dry, hot	0.00″	[0.40″]	53°F	84°F	no measurable rain 23 days ≥80°F; 4 days ≥90°F
August	dry occasionally very hot	0.28″	[0.62″]	55°F	83°F	only 2 days with precipitation 9 days ≥90°F; 2 days ≥100°F
September	mostly dry; 2 wet periods	2.72″	[1.60″]	49°F	76°F	1.51″ 18th–19th; 1.11″ 27th–29th
October	wet, cool	5.74″	[3.80″]	44°F	59°F	22 days with precipitation 0.85″ on 22nd; 0.80″ on 26th
November	average	8.97″	[7.90″]	42°F	53°F	23 days with precipitation 1.90″ on 12th
December	average	10.71″	[9.28″]	35°F	44°F	23 days with precipitation 1.57″ on 11th; 1.09″ on 19th

*average based on 1970–current year

2021 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 2021.

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 TVID 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, 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.

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 was to manage river flow to improve and preserve water quality.

HISTORICAL WATER QUALITY CONCERNS

Algae and high pH: 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. Target levels for instream total phosphorus concentrations have been established for the Tualatin River at various locations.

Some Tualatin tributaries also have had problems with algal growth, usually periphyton.

Dissolved oxygen: 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 during the daytime when sunlight is ample, and
—inflow of oxygen rich water.

The processes that consume oxygen are:

—biochemical oxygen demand (including organic substances that decompose and ammonia),
—sediment oxygen demand (from substances at the river bottom that decompose), and
—respiration by algae at night or when it is very cloudy.

Because the lower section of the river moves slowly and is not turbulent, oxygen exchange with the atmosphere is slow. 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 reacts with oxygen to form nitrate.

Algae and pH — 2021 and the past 30 years

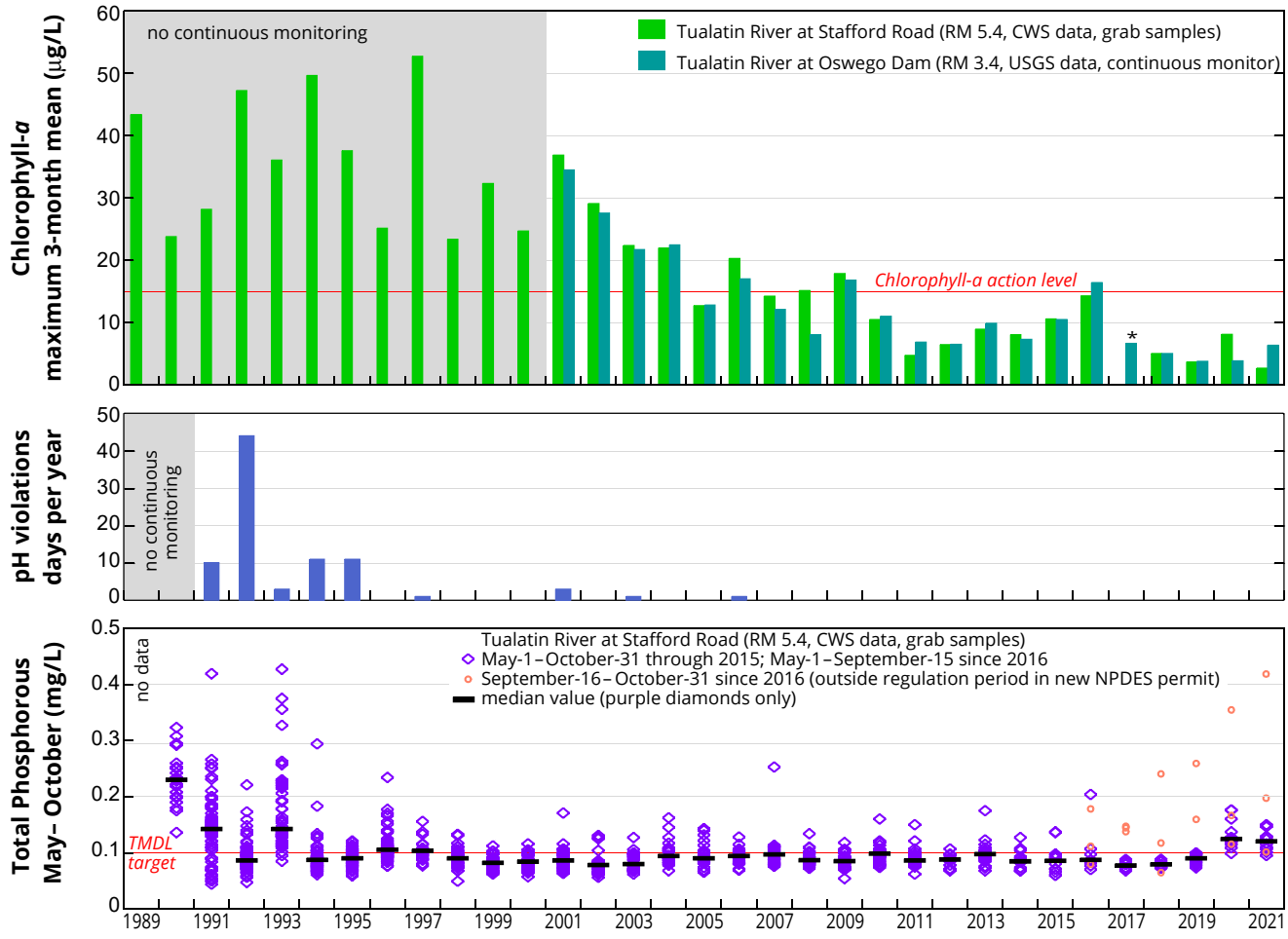
In 1988 when the first Tualatin TMDL was imposed, the primary strategy to prevent algal overgrowth and high pH was to strictly limit phosphorus. Limiting ammonia decreased the potential for toxicity at high pH. Clean Water Services implemented advanced wastewater treatment at its Rock Creek and Durham WWTFs which greatly decreased the amounts of these nutrients discharged to the river during summer low flow.

Since the TMDL: The TMDL limits had the intended effect. From 1998 through 2019, median total phosphorus concentrations during May through October in the Tualatin River at Stafford Road did not exceed the TMDL target level (0.10 mg/L). Algal populations as measured by chlorophyll-*a* concentrations decreased substantially since the 1990s and the high pH values in the lower Tualatin River that were problematic in the early 1990s no longer occur. (See the figure at the bottom of the page.)

2020–2021: The median phosphorus concentration in the Tualatin River at Stafford Road during the regulation period was 0.125 mg/L and 0.124 mg/L in 2020 and 2021, respectively. This recent increase in phosphorus concentration is the result of Clean Water Services reducing alum treatment for phosphorus and implementing biological phosphorus removal at the Rock Creek and Durham WWTFs. The change in process is in response to recently promulgated ambient water quality criteria for aluminum in freshwater that will make the alum method of phosphorus removal impractical. Clean Water Services entered into a Mutual Agreement and Order with DEQ to temporarily increase phosphorus limits from the WWTFs.

The moderate increase in phosphorus concentrations in recent years have not resulted a sustained large algal bloom in the lower river. In 2021, the maximum 3-month mean chlorophyll-*a* concentration was 6.9 µg/L (USGS continuous monitoring data) which is greater than in recent years, but also misleading. The elevated value was for the April–June period and driven by an algal bloom in April (see page 49). If the April data are omitted, the maximum 3-month mean chlorophyll-*a* concentration was only 4.2 µg/L. The maximum pH for May–October 2021 was 7.41, well below the 8.5 pH criterion.

CHLOROPHYLL-*a*, pH & PHOSPHORUS — LOWER TUALATIN RIVER — MAY–OCTOBER



Dissolved oxygen — 2021 and the past 30 years

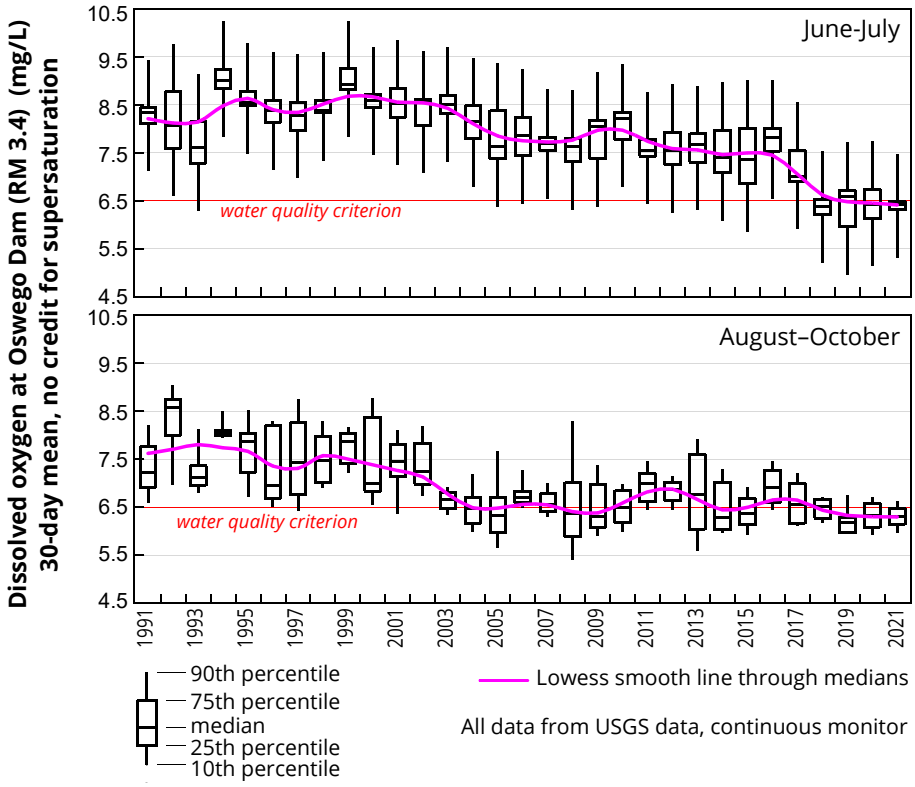
Since the TMDL: When the TMDL was implemented, episodes of low dissolved oxygen in the Tualatin River were thought to result from decomposition of ammonia (from the WWTFs) and of algae when a large algal bloom crashed. Very low streamflow exacerbated the oxygen losses.

Since that time, ammonia discharges are much decreased and large algal blooms are now rare. Streamflow in the Tualatin River during the summer has increased and very low flow occurs infrequently.

Despite these improvements, the graphs at the right show that low dissolved oxygen is an issue in the lower Tualatin River—in August–October (since 2004), and during early summer (since 2018). Studies in the past 30 years have shown that sediment oxygen demand (SOD) is an important and continual consumer of oxygen.

The figure at the lower right shows that not meeting the 30-day dissolved oxygen criterion is more frequent when chlorophyll-*a* concentrations are low (< 5 µg/L). This suggests that photosynthetic production of oxygen by algae is needed to offset oxygen consumption by sediment oxygen demand.

The changes over time may be related to Increased river flow which affects both SOD and algal population. Higher flow decreases contact time between river water and sediment which limits oxygen consumption. Higher flow also lessens the time that algal populations have to grow and fewer algae produce less oxygen. In addition, much of the increased flow originated from Hagg Lake, Barney Reservoir and WWTFs, source waters that have little indigenous algae.



Number of Days below 30-day DO Criterion and Chlorophyll-*a*

	June	July	August	September	October
1991	0	0	0	0	0
1992	0	0	0	0	1
1993	0	0	0	0	0
1994	0	0	0	0	0
1995	0	0	0	0	0
1996	0	0	0	9	0
1997	0	0	0	11	0
1998	0	0	0	0	0
1999	0	0	0	0	0
2000	0	0	0	0	6
2001	0	0	0	0	14
2002	0	0	0	0	0
2003	0	0	13	3	10
2004	0	0	13	26	8
2005	0	0	6	30	31
2006	0	0	2	0	7
2007	0	0	20	22	0
2008	0	0	4	30	19
2009	0	0	10	30	12
2010	0	0	0	21	25
2011	0	0	0	3	13
2012	0	0	0	14	0
2013	0	0	2	30	6
2014	0	0	0	24	29
2015	0	0	7	22	31
2016	0	0	0	11	3
2017	0	0	2	30	12
2018	25	17	15	28	0
2019	0	27	31	30	13
2020	3	31	31	7	28
2021	21	30	16	30	24

Chlorophyll-*a* monthly mean
- <5 µg/L
- 5 – <10 µg/L
- 10 – 20 µg/L
- > 20 µg/L

Days below 30-day DO criterion
- none
- <20%
- 20 – <50%
- 50 – <80%
- 80 – <100%
- all

Chlorophyll-*a* data
1991–2000:
CWS at Stafford Rd grab samples

2001–2021:
USGS at Oswego Dam continuous monitor

Dissolved oxygen data
1991–2021:
USGS at Oswego Dam continuous monitor

The table below shows the number of days per month when any applicable dissolved oxygen criteria were not met in the Tualatin River at Oswego Dam since the continuous DO monitor was installed. In general, August and September are the most critical months with respect to all three DO criteria.

The daily minimum and the 7-day mean of minimum daily DO criteria are usually met. When either of these criteria are not met, it is generally only for a few days. The rare occasions when several days in a month failed to meet the 7-day criterion can often be attributed to a specific event. In 2021, the 7-day criterion was not met September 26–October 1 and the daily minimum criterion was not September 25–26. In this case it appears that the low DO resulted from a heavy rainstorm that resuspended labile organic matter in the tributaries after a prolonged dry period. The resulting BOD plume from Rock Creek depleted the oxygen to very low levels by the time it reached Oswego Dam (see page 50). The number of days that fail to meet the daily or 7-day criteria does not appear to be changing over time.

The number of days when the 30-day mean criterion is not met has been increasing, especially since 2003. Not meeting the 30-day mean criterion has also been occurring earlier in the year (June and July) which was not the case before 2018. As described on the previous page, the increase in days not meeting the 30-day criterion is associated with a decrease in chlorophyll-*a* concentrations. Water temperature may also be a contributing factor. Water temperature in July through September at Oswego Dam has increased since 1991 (see Appendix F). Higher temperatures increase the rate of oxygen consumption by sediment oxygen demand and photosynthetic oxygen production by a small algal population cannot keep up.

NUMBER OF DAYS WHEN DISSOLVED OXYGEN CRITERIA WERE NOT MET AT OSWEGO DAM

	Daily Minimum Value (≤4 mg/L)						7-day* Mean of Minima (≤5 mg/L)						30-day* Mean no Credit for Super Sat (≤6.5 mg/L)					
	J	J	A	S	O	N	J	J	A	S	O	N	J	J	A	S	O	N
1991	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	1	0	3	0	0	0	2	0	0	0	0	1	28
1993	0	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	4	0	0	0	0	0	3	4	0	0	0	0	0	9	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	15
2001	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	14	4
2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	1	0	0	0	0	0	0	0	0	0	0	0	13	3	10	7
2004	0	0	0	0	0	0	0	0	1	0	0	0	0	0	13	26	8	0
2005	0	0	0	0	0	0	0	0	0	2	0	0	0	0	6	30	31	5
2006	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	7	0
2007	0	0	0	0	0	0	0	3	0	0	0	0	0	0	20	22	0	0
2008	0	0	2	0	0	0	0	0	12	3	0	0	0	0	4	30	19	0
2009	0	0	2	0	0	0	0	0	7	0	0	0	0	0	10	30	12	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	25	0
2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	13	0
2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0
2013	0	0	0	0	0	0	0	0	0	7	0	0	0	0	2	30	6	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	29	0
2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	22	31	9
2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	3	0
2017	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	30	12	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	25	17	15	28	0	11
2019	0	0	0	0	0	0	0	2	0	0	0	0	0	27	31	30	13	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	3	31	31	7	28	1
2021	0	0	0	2	0	0	0	0	0	5	1	0	21	30	16	30	24	0

*The 7-day and 30-day criteria are backward looking, meaning that they reflect conditions in the previous 6 or 29 days plus the date to which the statistic is assigned.

% Days below Criterion

- none
- <20%
- 20 – <50%
- 50 – <80%
- 80 – <100%
- all

all data from USGS continuous monitor

2021: Dissolved oxygen conditions in the Tualatin River in 2021 at Oswego Dam continued to be an issue. The 30-day criterion (30-day mean with no credit for supersaturation) was not met from June 10 through July 30, and from August 16 through October 24— in all, 121 days. The 7-day criterion was not met from September 6 through October 1; the daily minimum criterion was not met on September 25 and 26. As is typical, 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 2021

Criterion	May	June	July	Aug	Sept	Oct	May–October Percentage	Nov
Tualatin River at RM 24.5								
30 day	0	0	0	0	0	0	0%	0
7 day	0	0	0	0	0	0	0%	0
Daily	0	0	0	0	0	0	0%	0
Tualatin River at Oswego Dam (RM 3.4)								
30 day	0	21	30	31	16	30	66%	0
7 day	0	0	2	0	5	1	3%	0
Daily	0	0	0	0	2	0	1%	0

Low dissolved oxygen at Oswego Dam in late summer and early fall are common. Although a moderate sustained algal bloom was evident in 2021, photosynthetic oxygen production was not sufficient to offset sediment oxygen demand which would have been especially high due to prolonged high temperatures.

As in 2018, 2019 and 2020, failure to meet the 30-day criterion began early in the season (June 10, 2021). Before 2018, the 30-day criterion had been met every day in June and July since continuous monitoring at Oswego Dam began in 1991. The lowest DO at Oswego Dam during the entire 2021 low flow season was 3.90 mg/L on September 26.

Water Quality Monitoring

Clean Water Services obtains grab samples at numerous sites throughout the basin, including several on the Tualatin River as well as tributaries. Field parameters (dissolved oxygen, water temperature and pH) are measured in the stream at the time of sample collection. Other constituents, including chlorophyll-*a*, phosphorus, nitrate and ammonia, are analyzed in the laboratory.

Continuous water quality monitors are deployed throughout the basin. Most are operated by USGS. Clean Water Service began operating the Tualatin River at Hwy 219 monitor in July 2020 and the Beaverton Creek at 170th monitor in October 2015; the data from these two monitors are still reviewed by USGS. All monitors record data at least half-hourly. The table below lists the currently operating continuous monitors that are not part of any special study.

LONG TERM CONTINUOUS WATER QUALITY MONITORS

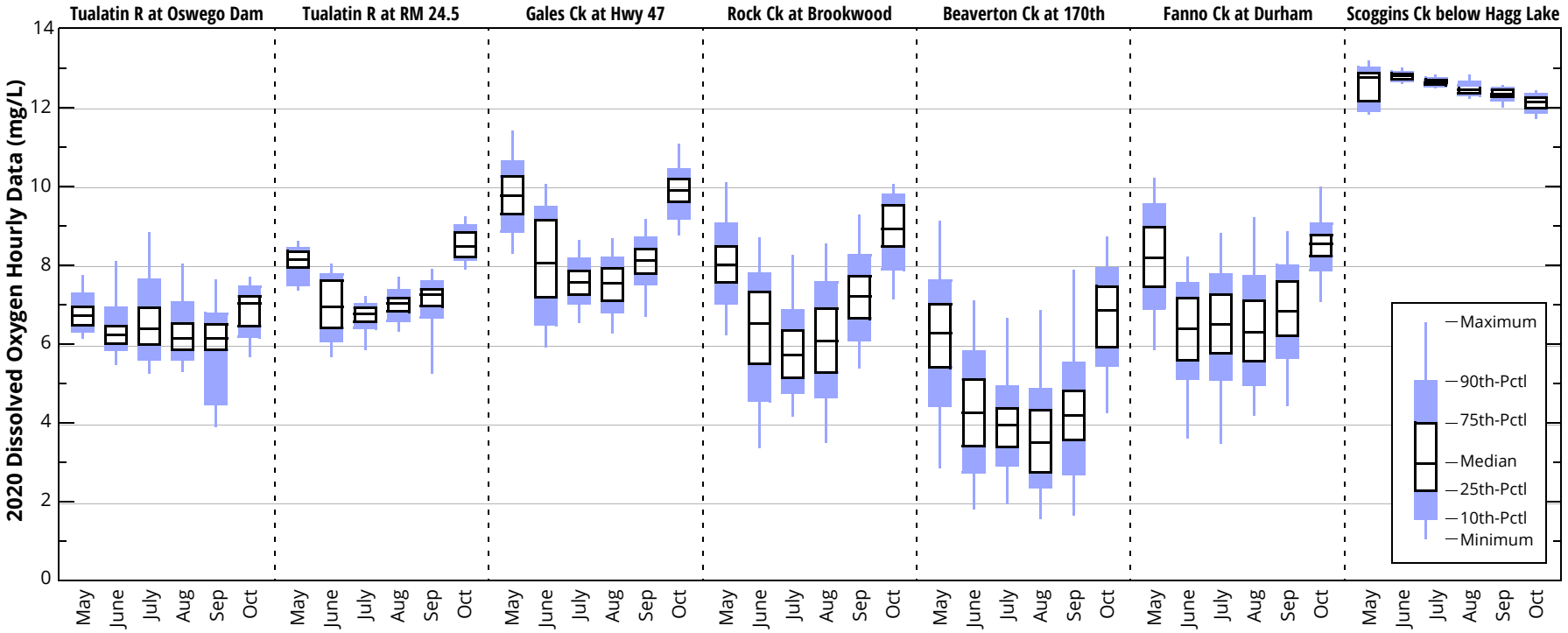
Site	River Mile	Parameters*								Notes
		DO	pH	WT	SC	Tbdy	Chl	Phyc	fDOM	
Tualatin River at Oswego Dam	3.4	●	●	●	●	●	●	●		most parameters since 1991
Tualatin River at RM 24.5	24.5	●	●	●	●					most since 1997, summer only
Tualatin River at Hwy 219	44.4	●	●	●	●	●				most parameters since 2004
Tualatin River at Dilley	58.8	●	●	●	●	●	●	●	●	most parameters since 2016
Fanno Creek at Durham		●	●	●	●	●				since 2003
Beaverton Creek at 170th		●	●	●	●	●				most parameters since 2001
Rock Creek at Brookwood		●	●	●	●	●				since 2004
Gales Creek at Old Hwy 47		●	●	●	●	●			●	most parameters since 2001
Scoggins Creek near Old Hwy 47		●	●	●	●	●	●	●	●	since 2020
Scoggins Creek below Hagg Lake		●	●	●	●	●	●	●	●	most parameters since 2002
Wapato Creek at Gaston Road		●	●	●	●	●	●	●	●	intermittent since 2010

*Parameter abbreviations: DO=dissolved oxygen, WT=water temperature, SC=specific conductance, Tbdy=turbidity, Chl=chlorophyll-*a*, Phyc=phycocyanin (indicator of cyanobacteria), fDOM=fluorescent dissolved organic matter

Dissolved oxygen throughout the Tualatin Basin

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 to be important sources of biochemical oxygen demands to the tributaries. Continuous monitoring can provide insight into the processes that affect DO concentrations. 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`

DISSOLVED OXYGEN LEVELS IN THE TUALATIN RIVER AND SELECTED TRIBUTARIES DURING LOW-FLOW SEASON — 2021

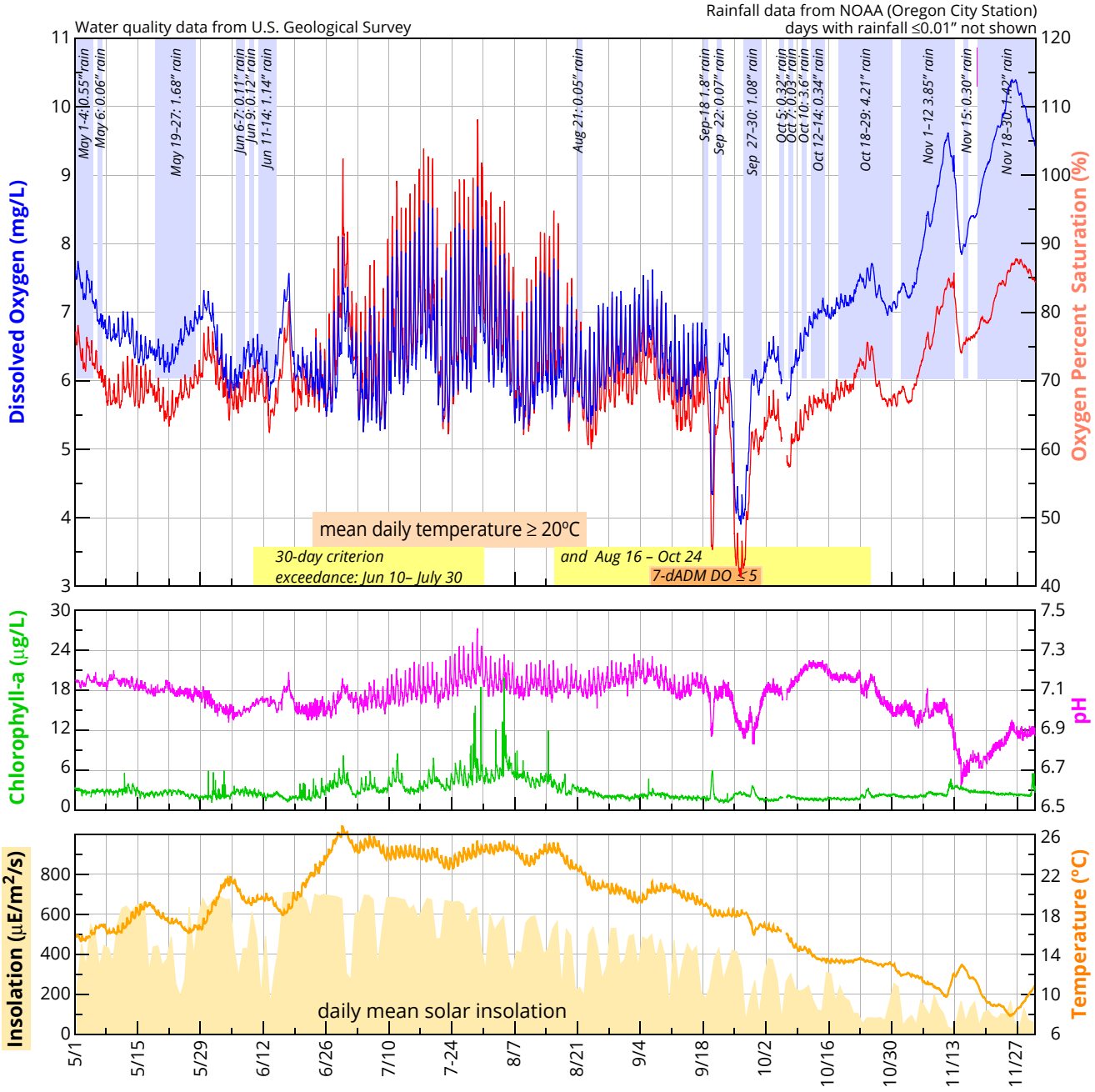


- In 2021, DO concentrations in the Tualatin River at Oswego Dam were exceptionally low in September. The very low DO occurred when an intense rainstorm following prolonged dry conditions caused oxygen demand in the tributaries to be suspended and then transported to the Tualatin River. With relatively warm river temperatures, oxygen in the river was rapidly depleted leading to a double sag in oxygen levels. (See page 50.)
- Several days of lower than usual DO concentrations occurred in the tributaries in June and can be attributed to high water temperature associated with an extreme heat wave. High temperatures increase oxygen consumption by SOD and decrease the solubility of oxygen in water.
- Because of releases from Hagg Lake, DO concentrations in Scoggins Creek are greater and show a different pattern than other sites.

Tualatin River — Oswego Dam

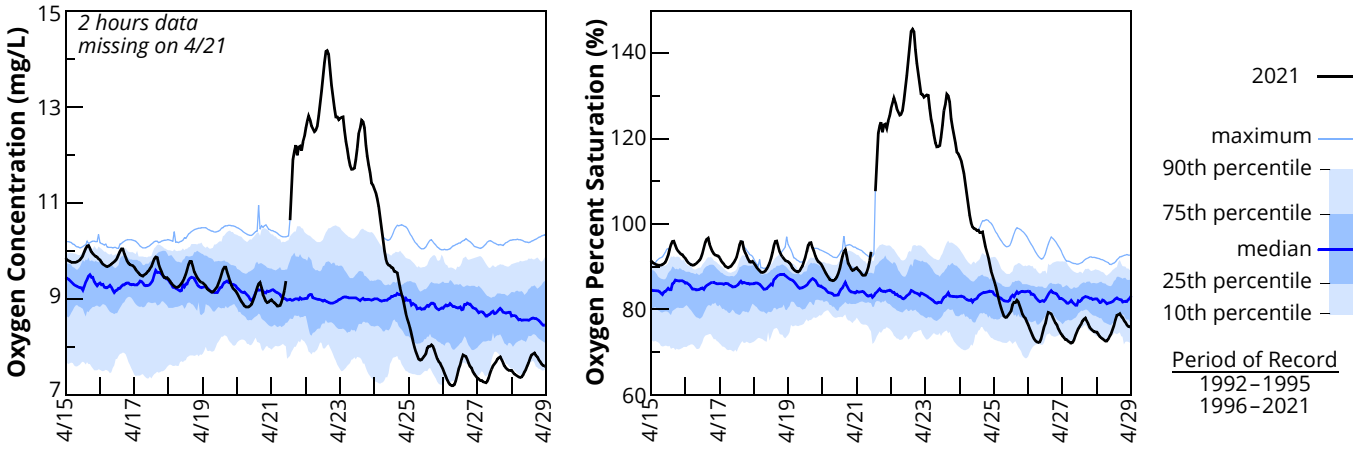
- Algal blooms strongly affect DO at the Oswego Dam site. Blooms can be identified by high chlorophyll concentrations, large daily DO ranges and DO concentrations greater than 100% saturation. Algal blooms have been rare and small in recent years, but were clearly evident from late June through mid August in 2021. Several factors likely contributed to the modest increase in algal growth in 2021, including low river flows, warmer than usual water, and increased phosphorus concentrations in the river (related to the new phosphorus treatment at Clean Water Services' WWTFs). No problematic high pH values occurred.
- Photosynthetic oxygen production by algae kept the DO mostly above 70% saturation even when water temperatures of 22ºC or more increased sediment oxygen demand. On cloudy days, however, oxygen production from photosynthesis could not keep up with SOD and DO dropped below 65% saturation. The 30-day criterion was not met from Jun-10–Jul-30 and Aug-16–Oct-24.
- A sharp decrease in DO in late September resulted in not meeting the 7-day criterion and daily criterion for several days. More detail about this event is on page 50.

Tualatin River at Oswego Diversion Dam (14207200) – Low Flow Season 2021



Tualatin River – Oswego Dam: *April 2021 algae bloom*

In 2021, a combination of conditions occurred in mid-April that led to a large algal bloom at the Oswego Dam site. As the graphs below show, an algal bloom of this size has not occurred this early in the season in 29 years of continuous monitoring.



Low flow, warm water & sunshine: The weather during the first half of April 2021 was extremely dry, sunny and warm. March had also been dry, with infrequent rainstorms that were showery and scattered. After a widespread storm with about 0.1–0.2" rain on March 28–29, no significant rainfall occurred until April 24. The dry and sunny conditions through early April caused streamflow to decrease and stream temperature to rise to levels that are more typical of late May or June.

Less dilution of algal seed: Throughout April, little water was being released from Hagg Lake and no water was being released from Barney Reservoir.

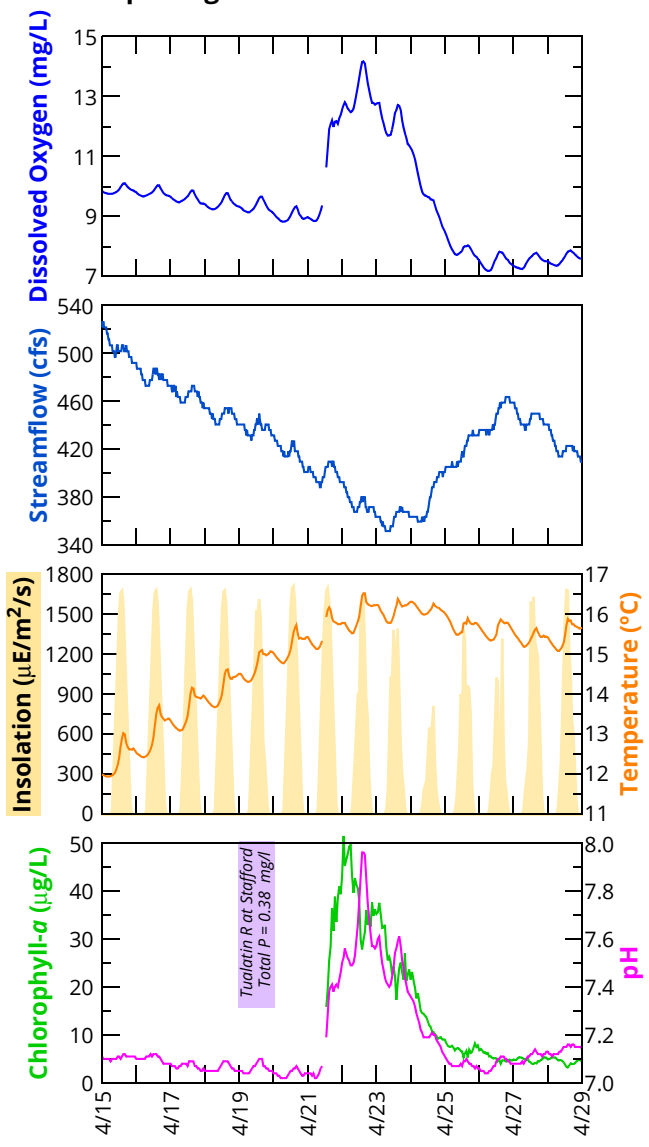
Ample phosphorus: Clean Water Services' strictest limits on phosphorus discharge are not imposed until May. The total phosphorus level in the Tualatin River at Stafford was 0.38 mg/L on April 19. The phosphorus target level in the Tualatin River (0.10 mg/L) is applicable only during May–October (low flow season).

Algae blooms in 2021: The algal bloom that ensued in mid-April was sizable. Chlorophyll-a levels rose to 51 µg/L, oxygen saturation to 146%, and pH to 7.96 (well below the 8.5 standard). The bloom was short-lived, abating when the weather turned cloudy.

A sustained algal bloom occurred July–August 2021, but chlorophyll-*a* was half of the April bloom even though lower flow, warmer water and longer sunny days were more favorable. Two conditions changed since April:

- By May, total phosphorus levels in the Tualatin River at Stafford decreased to 0.13 mg/L and remained in a range of 0.10–0.15 mg/L through September.
- On May 3, Clean Water Services began releasing flow augmentation water from Hagg Lake. By mid-May, TVID and JWC also began releases from Hagg Lake and Barney Reservoir. Water releases from the reservoirs continued through September, diluting natural flow that would carry algal seed to the lower river.

April Algal Bloom and Conditions



Tualatin River – Oswego Dam: *September 2021 double oxygen sag*

Two precipitous drops in DO concentration, about a week apart, occurred at the Oswego Dam in September 2021. The second DO sag resulted in dissolved oxygen concentration dropping below 4 mg/L. Double DO sag events have occurred before and are probably caused by oxygen demand that resulted from a large rainstorm that occurred after prolonged dry conditions. Continuous monitoring helps elucidate this event.

Antecedent conditions: Summer 2021 was dry. Before September 18, the last rain more than a couple hundreths of an inch occurred on June 11–14. Streamflow was low and settleable organic matter had been accumulating on streambeds all summer.

The rainstorm: Beginning very early on September 18, a storm dropped 1.2–2.0" rain over about a day and a half. Most of the rain fell in the first 6 hours.

Tributary response: Streamflow in the tributaries increased sharply in response to the intense rain. The flows would have been high enough to resuspend the organic matter that had been settling all summer. Once that organic matter was resuspended, it could exert an oxygen demand (BOD) in the water column.

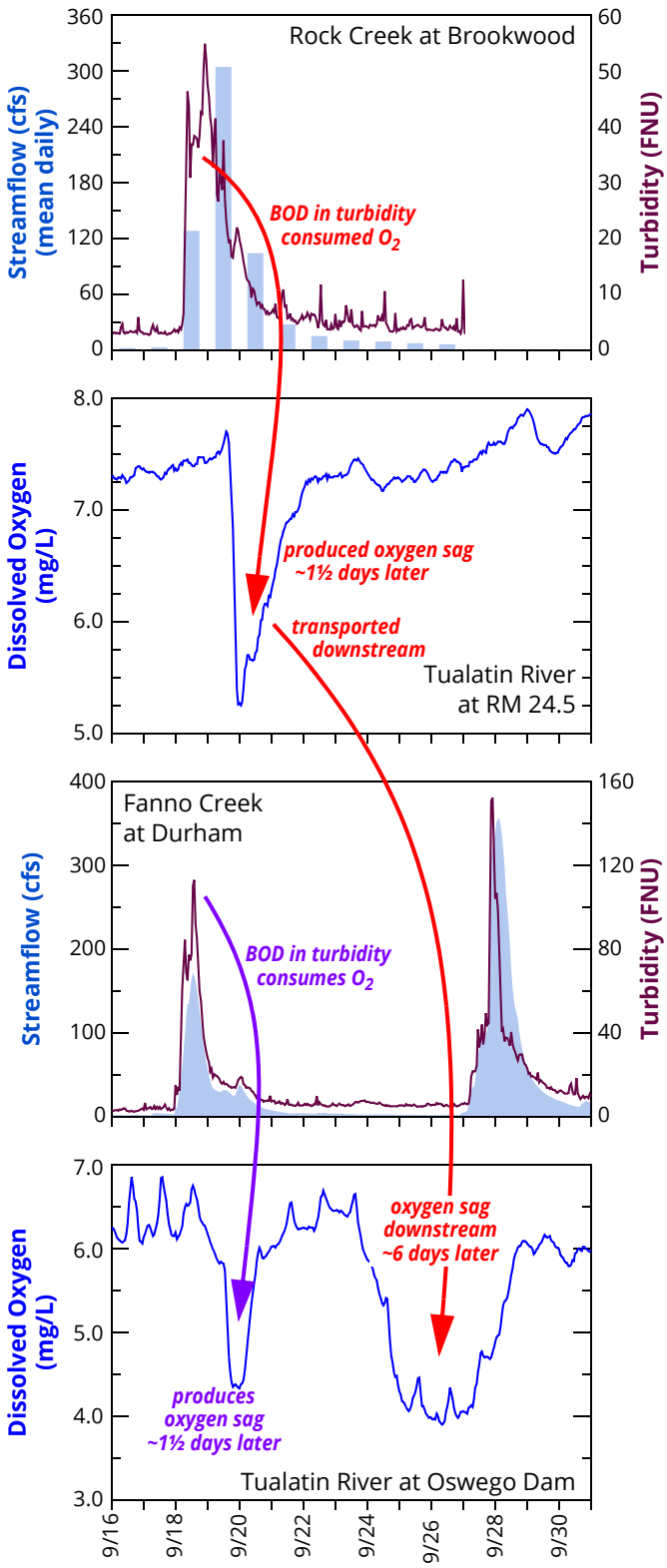
Transport of BOD from Rock Creek: As the water from Rock Creek at Brookwood (RM 2.4) flows toward the Tualatin River, the BOD associated with the turbidity is consuming oxygen, creating a plume with a low dissolved oxygen concentration. Oxygen consumption continues in the Tualatin River as the water flows from the confluence with Rock Creek (RM 38.1) to the monitoring site at RM 24.5. The plume of low DO can clearly be seen at the RM 24.5 site where it arrived about a 1½ days after the turbidity plume was observed at Brookwood. See the arrow on the Rock Creek and RM 24.5 graphs.

Transport of BOD from Fanno Creek: In a similar fashion to Rock Creek, BOD associated with turbidity in Fanno Creek consumes oxygen as it flows to the Tualatin River and continues to consume oxygen as the Tualatin River flows toward the Willamette River. The low DO associated with the turbidity plume observed at Durham arrived at the Oswego Dam about 1½ days later. See the arrow on the Fanno Creek and Oswego Dam graphs.

Transport of BOD from RM 24.5 to Oswego Dam: Not all of the BOD associated with Rock Creek was consumed producing the oxygen sag at RM 24.5. The remaining BOD continues to consume oxygen as it travels to Oswego Dam (RM 3.4), which took about 6 days. The plume of low oxygen concentration widens as dispersion occurs. Water temperatures in September 2021 were still warm (16–18°C) which increased the consumption of oxygen. See the RM 24.5 and Oswego Dam graphs.

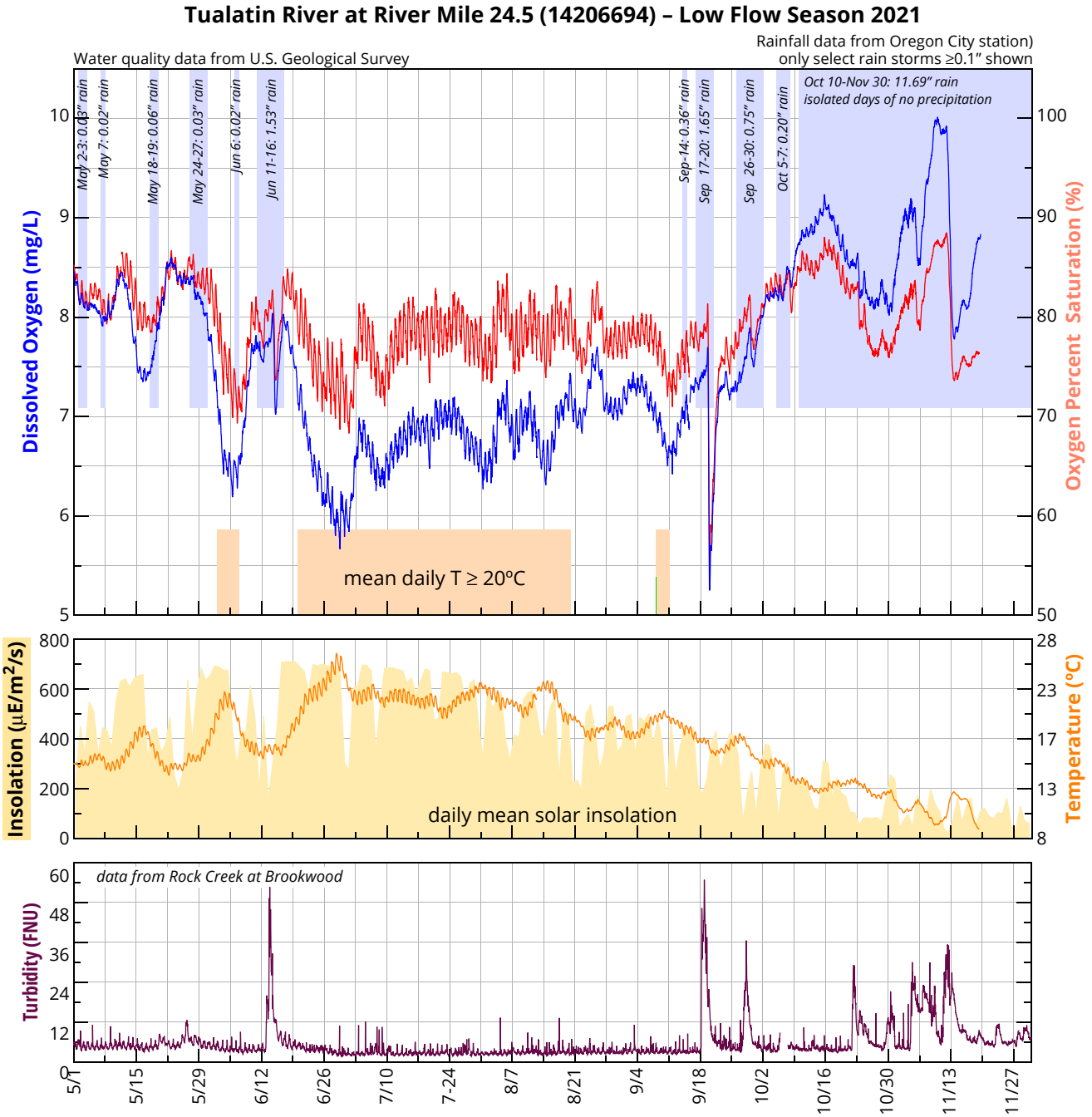
Although other creeks also deliver BOD to the Tualatin River, they are small and their effects are minimal compare to Rock and Fanno Creeks.

September Double Oxygen Sag



Tualatin River – RM 24.5

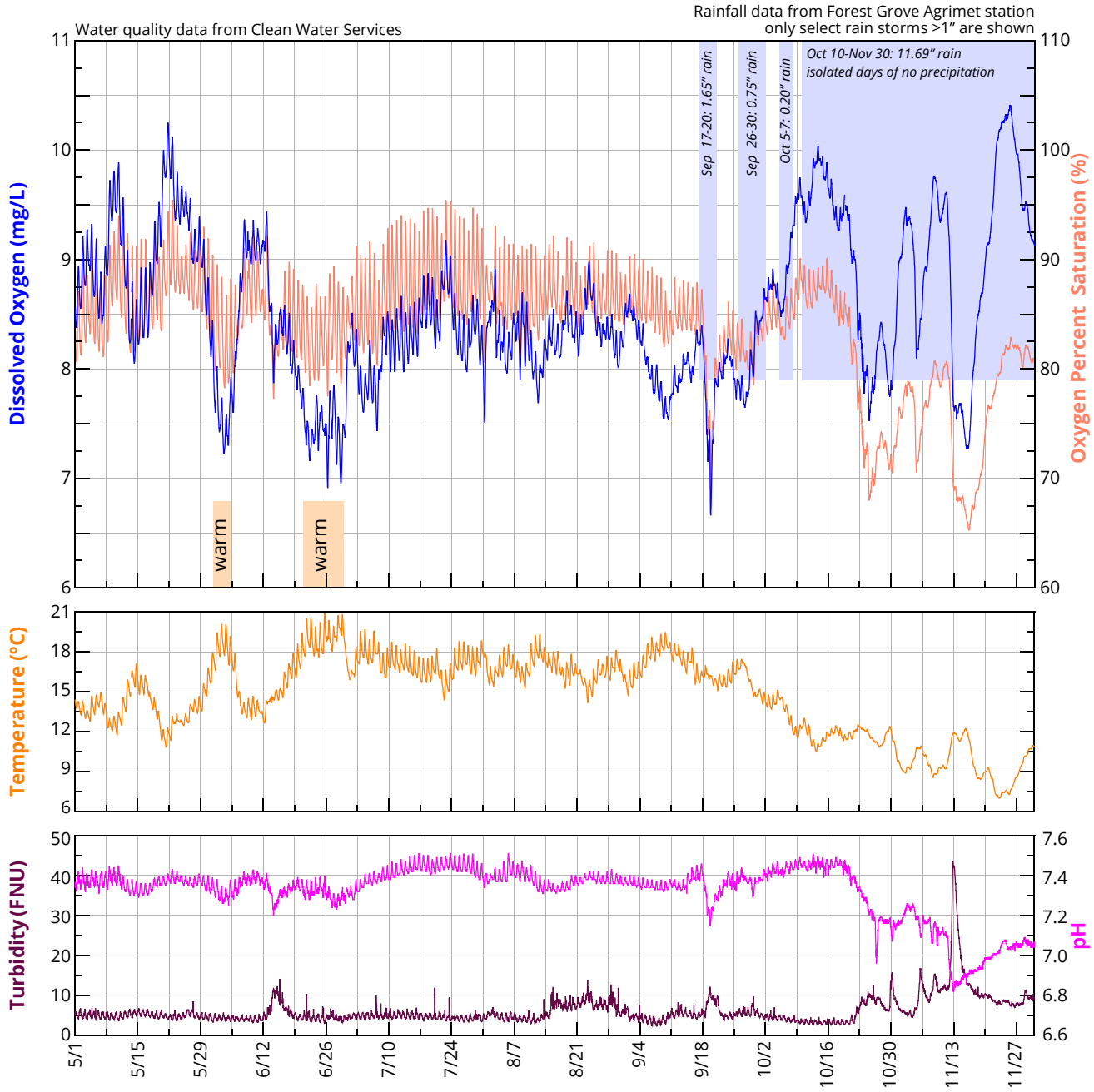
- DO concentrations at RM 24.5 were about 75-85% saturation for most of the summer.
- The lowest DO concentrations in June through August coincided with high temperatures which increase oxygen consumption by SOD.
- Temperatures in 2021 were higher than in previous years. Daily average temperatures were above 20°C from mid-June through mid-August. The maximum daily temperature exceeded 26°C on two days.
- Large algal blooms are rare at this site. Photosynthesis is evident by the daily range of dissolved oxygen, but the range is small, less than 0.5 mg/L.
- The lowest DO was likely related to intense rain on September 18 which increased turbidity in Rock Creek and other tributaries (see bottom graph). Turbidity is associated with an increase in oxygen demanding substances—from resuspension of sediment and from stormwater inflows.



Tualatin River – Hwy 219

- DO concentrations at Hwy 219 were 85-95% saturation in May, July and August.
- Two spells of particularly hot weather occurred in June that caused elevated water temperatures and a resultant decrease in oxygen saturation to below 80%. The rate of oxygen consumption by SOD increases with temperature.
  - —During the first instance (June 2–3), daily maximum water temperatures were over 20°C.
  - —The second spate of hot weather began in the second half of June. Daily *mean* water temperatures ranged from 18.6–19.8°C from June 21–29; seven of these days had daily maximum water temperatures over 20°C.
- Low dissolved oxygen at this site can be caused by heavy rain that increases streamflow enough to suspend labile organic matter which exerts an oxygen demand (BOD). Such instances can be identified by a simultaneous increase in turbidity and decrease in pH. (Rainfall has a lower pH than groundwater.) An example of this is the steep decrease in DO on September19–20 that coincided with heavy rain. The recurrent low DO periods in October and November are also likely related to BOD related to resuspension.

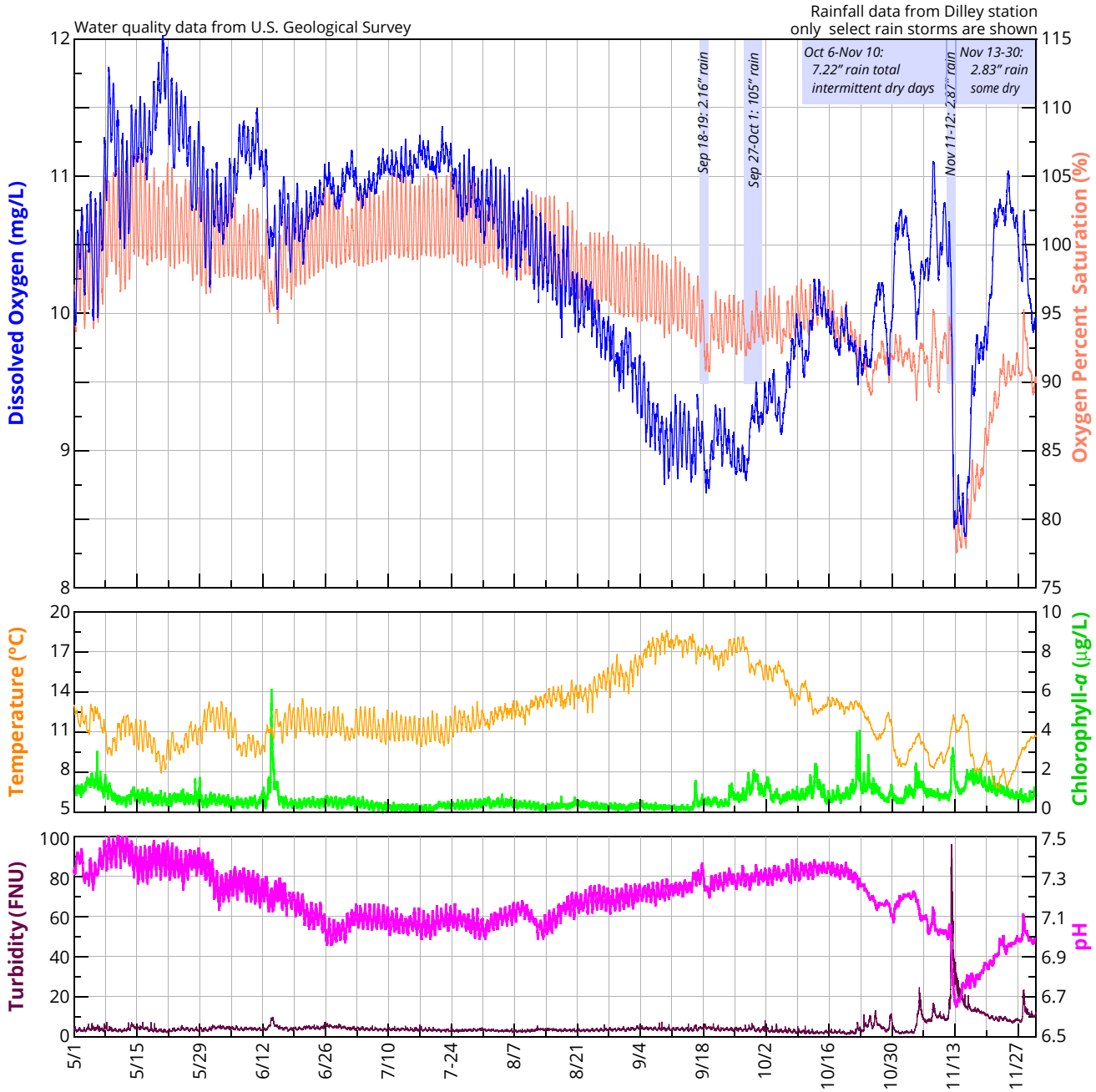
Tualatin River at Hwy 219 (14206241) – Low Flow Season 2021



Tualatin River – Dilley

- DO saturation at Dilley was generally close to 100% from May through mid-August, indicating that the variation in DO concentration during this time was mostly the effect of temperature on oxygen solubility.
- Beginning in mid-August, water temperature increased and both DO concentration and percent-saturation decreased, indicated that the warmer temperature had increased oxygen consumption by SOD. Oxygen consumption by SOD is greater at higher temperatures.
- Low DO in October and November coincided with heavy rain which likely caused an increase in oxygen demand from suspended sediment as evidenced by the increase in turbidity. Toward the end of large storms, DO increased as flows increased and turbidity decreased, diluting the oxygen demand.
- The rainstorm on September 18–19 was intense, but did not result in increased turbidity, decreased pH or an oxygen sag as might be expected. During this time, releases from Hagg Lake were scaled back and streamflow changed little (data not shown). Without high streamflow, sediment was not suspended. The pH did not change because both rain and Hagg Lake water have a lower pH than baseflow groundwater.
- Chlorophyll-*a* levels were low at this site and neither DO nor pH showed much daily variation, indicating little photosynthetic oxygen production. Photosynthesis may be limited by riparian shade.

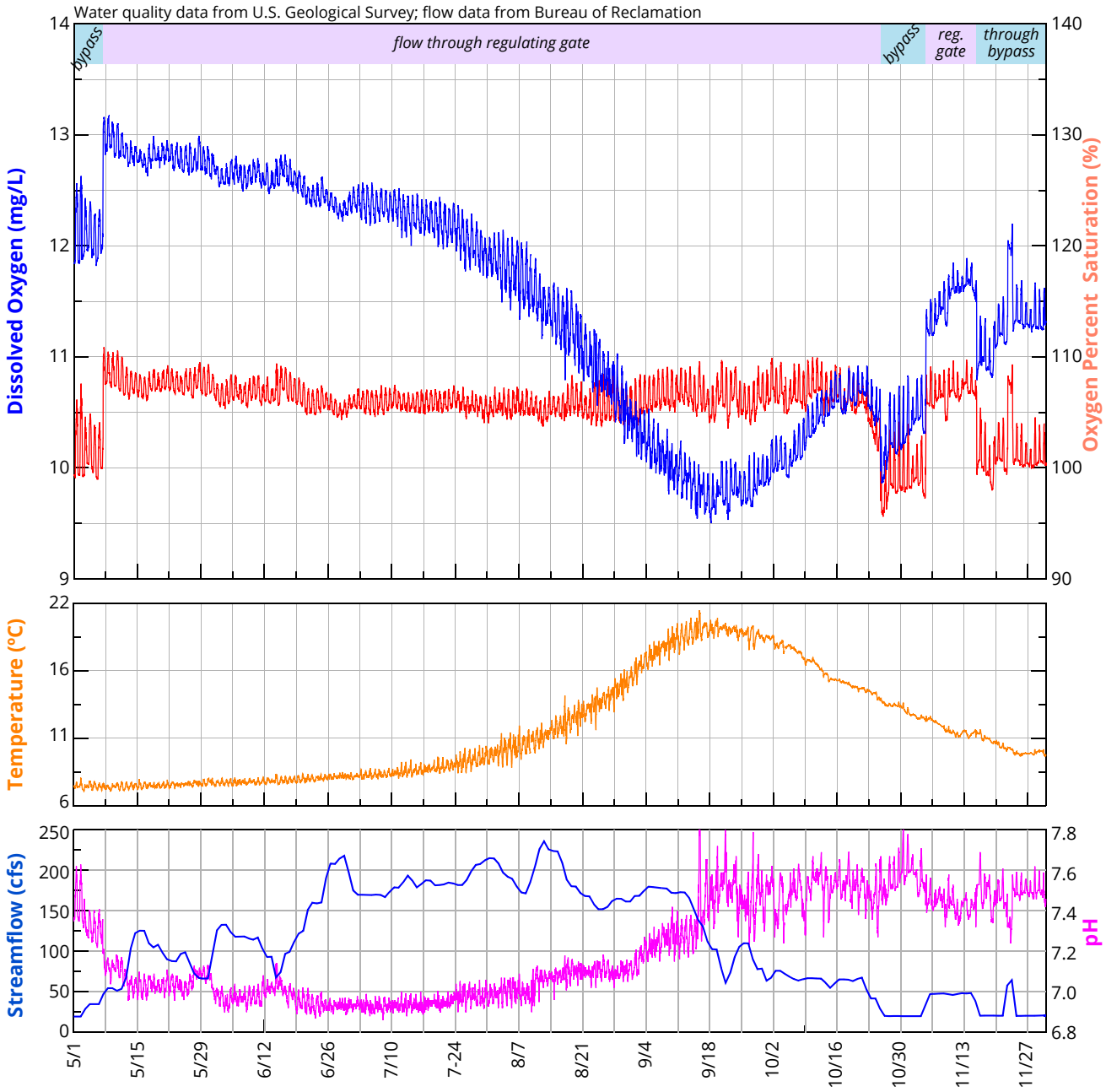
Tualatin River at Dilley (14207200) – Low Flow Season 2021



Scoggins Creek below Hagg Lake

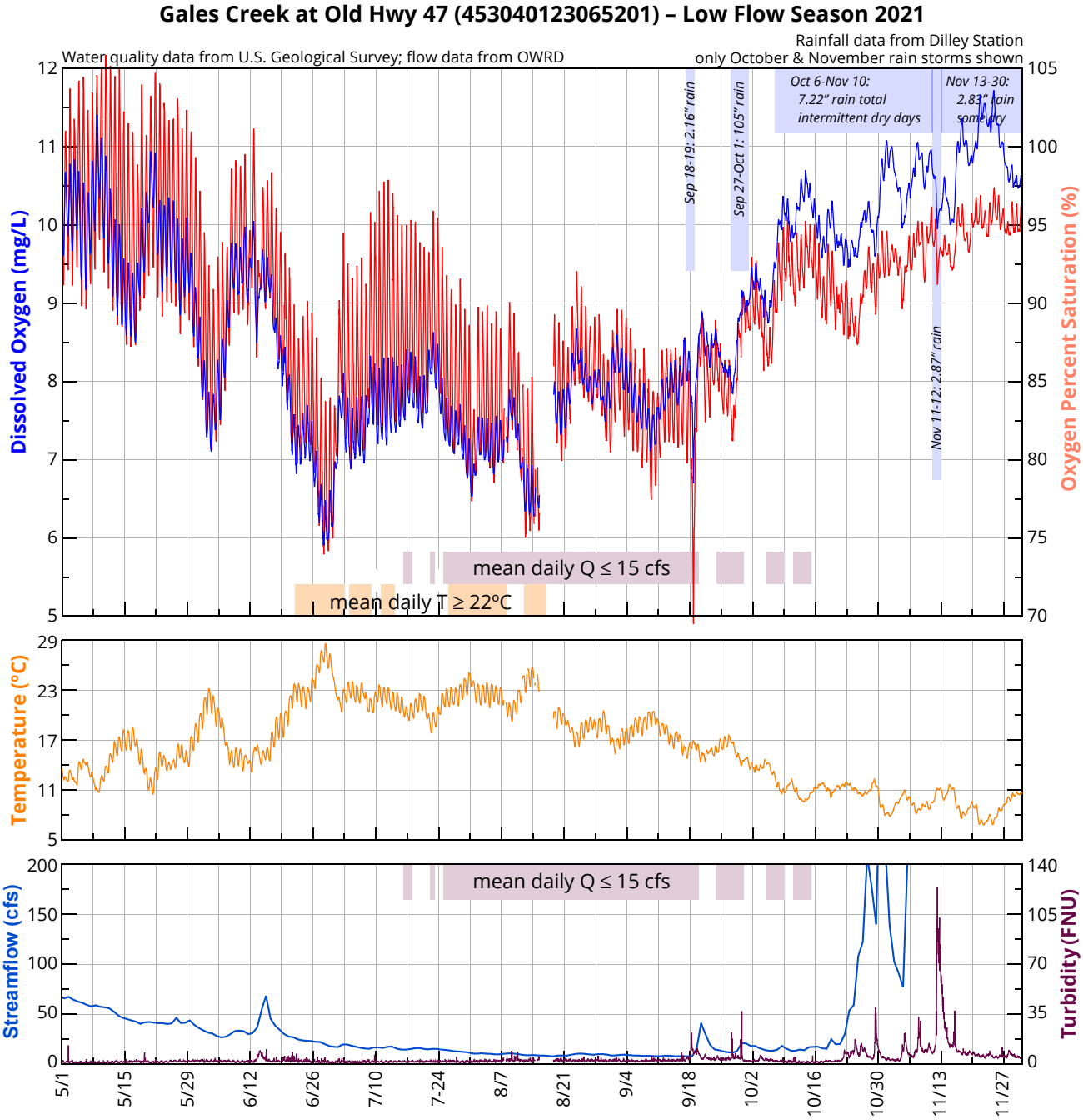
- The DO pattern through the low flow season at Scoggins Creek is very different from the other sites because streamflow at this site originates as releases from Hagg Lake.
- Temperatures at this site are colder in summer and warm through fall. As the reservoir is drawn down, more of the warmer water from the upper layer of the lake reaches the release inlet. Although the absolute DO concentration decreases, the percent saturation usually stays relatively constant.
- Flow rate affects travel time between the dam outlet and the monitoring site. When flow decreased in mid-September, the longer travel time allowed resident macrophytes to impose the typical daily pattern associated with photosynthesis and increase oxygen saturation.
- Flow rates affect dam operation which in turn affects DO. When releases are at least 35 cfs, the regulating gate is used. Entrained air results in DO saturation of about 105% and increases dissolved CO_2, lowering the pH. Water is diverted through the bypass when releases are less than 35 cfs, decreasing the turbulence and making travel time between the outlet and the monitoring site longer.

Scoggins Creek below Hagg Lake (14202980) – Low Flow Season 2021



Gales Creek at Old Hwy 47

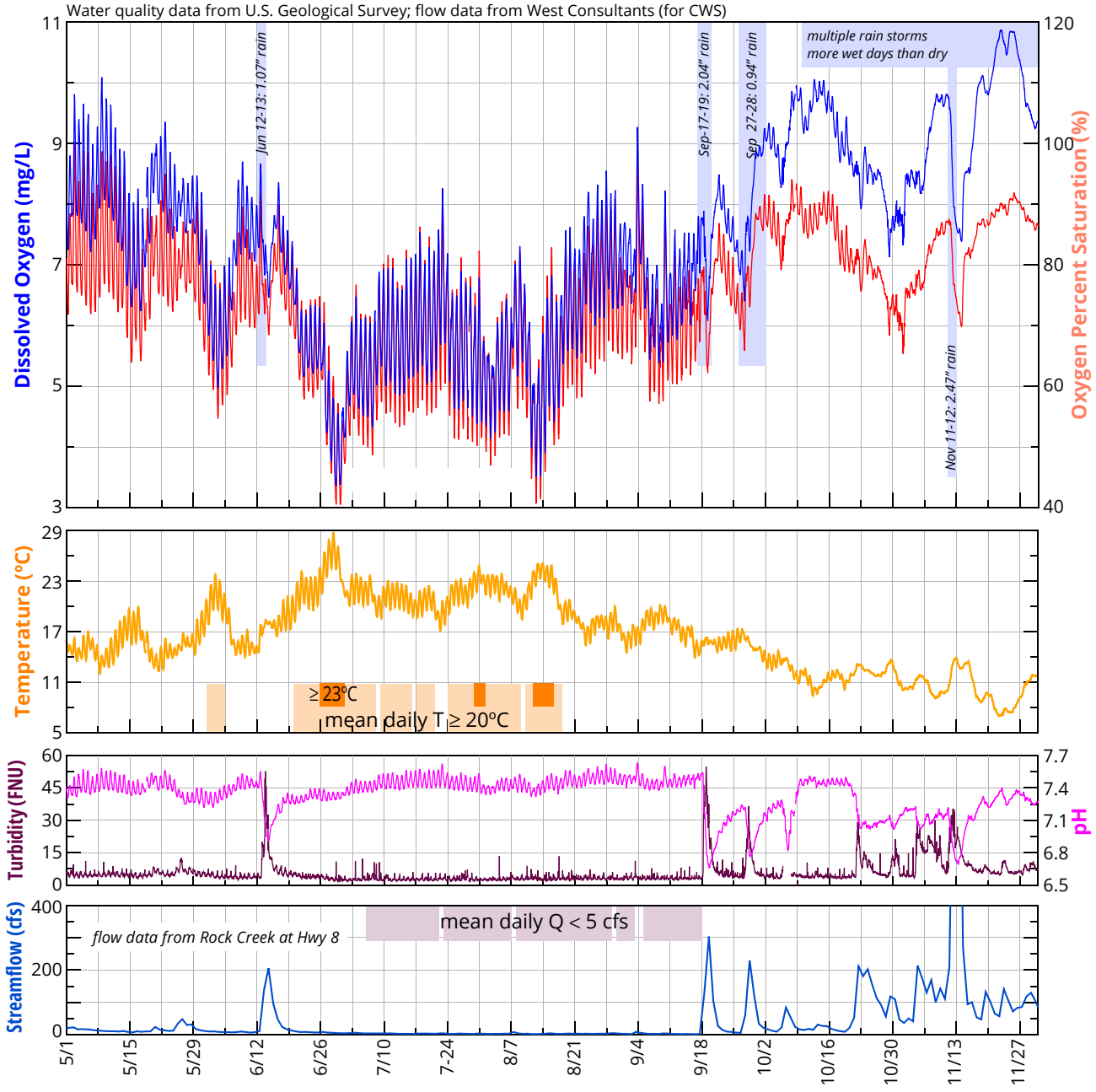
- Algal activity at Gales Creek was evident by a daily DO range of about 0.5–1 mg/L for May– July. Beginning in August, the daily DO range decreased to 0.3–0.5 mg/L, indicating a decline in algal activity. The decline may indicate a seasonal change in algal species or may be due to shorter days and cooler temperatures. Saturation concentrations exceeded 100% only in May and early June.
- From May through September daily average DO saturation mirrored water temperature, decreasing as the water warmed and increasing as the water cooled. Such behavior is consistent with oxygen consumption by SOD which is faster at higher temperatures.
- Other than temperature effects, DO also fell below 90% saturation shortly after flow dropped below 15 cfs. DO saturation rebounded once rainfall increased streamflow, but the effects of temperature were still evident. Low flow exacerbates oxygen loss from sediment oxygen demand because a smaller volume of water is in contact with the sediment for a longer time.
- The lowest DO occurred on September 18 (6.7 mg/L and 69% saturation) in response to an intense rainstorm that likely caused the suspension of labile organic matter that had settled over the summer. The last significant rainfall prior to the September storm was in June.



Rock Creek at Brookwood

- Rock Creek, a valley bottom stream with high sediment oxygen demand and little reaeration, tends to have low dissolved oxygen. Algal activity in Rock Creek was evident, especially in July and August when the daily DO range was 1.5–2.5 mg/L, but not enough to offset SOD, especially at higher temperatures.
- Temperature strongly affects DO in Rock Creek. SOD consumes oxygen faster at higher temperature. DO less than 3.5 mg/L occurred on June 29–30 and August 11–14. In both cases temperatures exceeded 25ºC.
- From mid-September to November, DO generally correlated with flow. Higher flow decreases oxygen consumption by SOD by minimizing the contact time between stream water and sediment.
- Intense rainfall can produce turbidity spikes from resuspended sediment and stormwater inflow that are associated with oxygen demand. In 2021, some intense rain events appear to have affected DO (November 11–12), but other events had no, or very short-lived effects. The oxygen demand related to turbidity spikes at this site likely did contribute to decreased oxygen at RM 24.5.

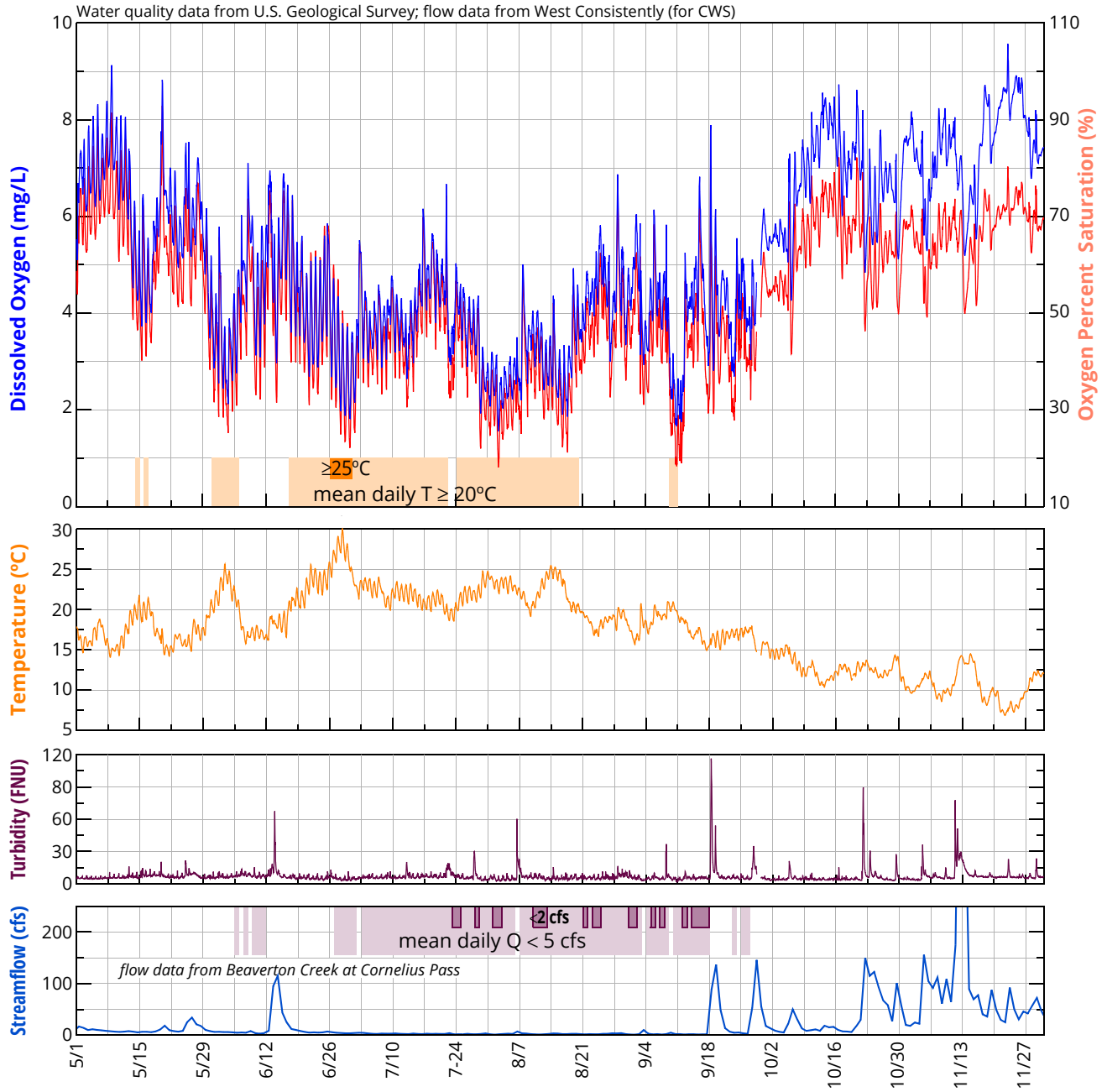
Rock Creek at Brookwood (453030122560101) – Low Flow Season 2021



Beaverton Creek at 170th

- The Beaverton Creek site has very low DO levels—usually less than 6 mg/L in summer. DO concentrations of 4 mg/L are not uncommon. The organic-rich, silty bottom and low flow of Beaverton Creek result in high sediment oxygen demand, minimal reaeration, and prolonged contact between water and sediment.
- Although algal activity was clearly present (daily DO range 1–3 mg/L), photosynthetic oxygen production was not sufficient to offset sediment oxygen demand.
- DO minima generally correlated with higher stream temperatures that increase the rate of oxygen consumption by SOD. Very low flow at this site exacerbates oxygen losses. DO concentrations dropped below 2 mg/L on June 28–30, on several days in July 29–Aug 17, and on September 10–11. In the late June episode, the maximum water temperature reached 30.1°C. In the August and September episodes, the lowest DO levels corresponded to days when the mean temperature was greater than 20°C and the flow was less than 2 cfs.
- Turbidity spikes caused by rainstorms that resuspend sediment and increase stormwater inflow are associated with oxygen demand. In 2021, such turbidity spikes did not clearly affect DO at this site, possibly because heavy rain caused high flows that contained well-oxygenated rain water.

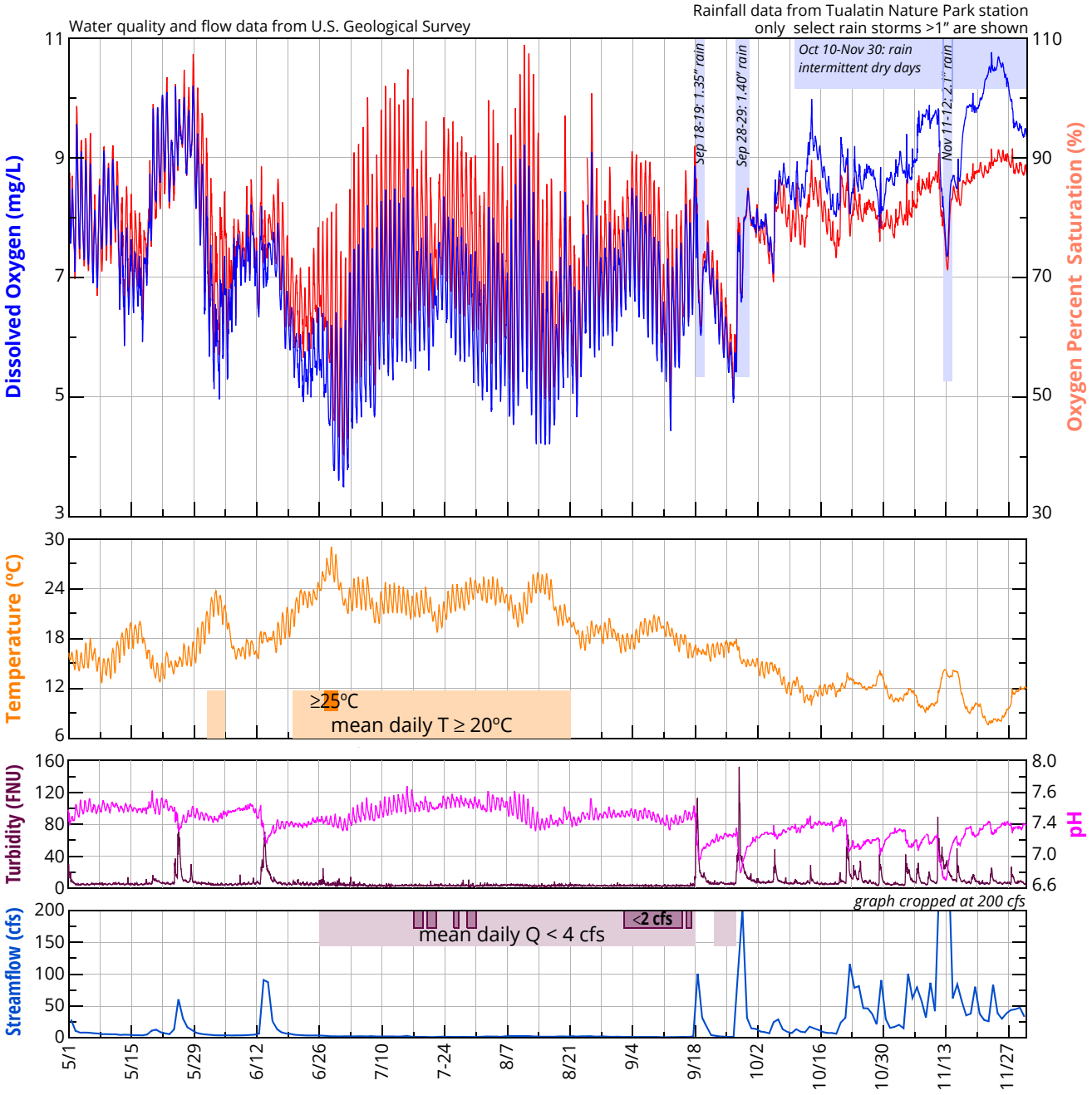
Beaverton Creek at 170th (453004122510301) – Low Flow Season 2021



Fanno Creek at Durham

- Algal activity in Fanno Creek, specifically *Cladophora sp*. is common. In 2021, algal activity was clear, but variable. Daily DO ranges were as low as 0.6 mg/L on cloudy days and up to 4 mg/L when it was sunny. Most of July and August of 2021 were sunny and the daily pattern associated with photosynthesis and respiration resulted in DO saturation that frequently neared or exceeded 100% in the afternoon, but dropped to 50–70% by early morning, depending on temperature.
- From May to early September, the day-to-day DO variation was dominated by temperature. Every period of low DO from May through August coincided with high temperature; the lowest DO level (3.49 on July 1) occurred when the daily mean temperature exceeded 25°C. During the episode of low DO near September 10, temperatures were lower, but still warm; flow, however, had decreased to less than 2 cfs.
- Rainstorms often produce sharp turbidity spikes at this site. The BOD associated with these spikes may or may not cause a DO sag. If flow increases enough, the added well-oxygenated rainwater can increase DO (rain on September 28–29). In other cases, the turbidity is associated with enough newly suspended oxygen demand that DO decreases (rain on November 11–12). The intense rain on September 18–19 caused a very brief DO sag in Fanno Creek, but a more notable sag in the Tualatin River at Oswego Dam.

Fanno Creek at Durham (14206950) – Low Flow Season 2021



APPENDIX A
STREAMFLOW

SCOPE

This appendix shows data for streamflow at selected sites in the Tualatin River and its tributaries. It is intended to be a comprehensive listing of sites where daily data were collected in 2021. Historical streamflow data exist for other sites. Most of the data represent daily mean flows and have been subject to quality assurance tests by the collecting entity.

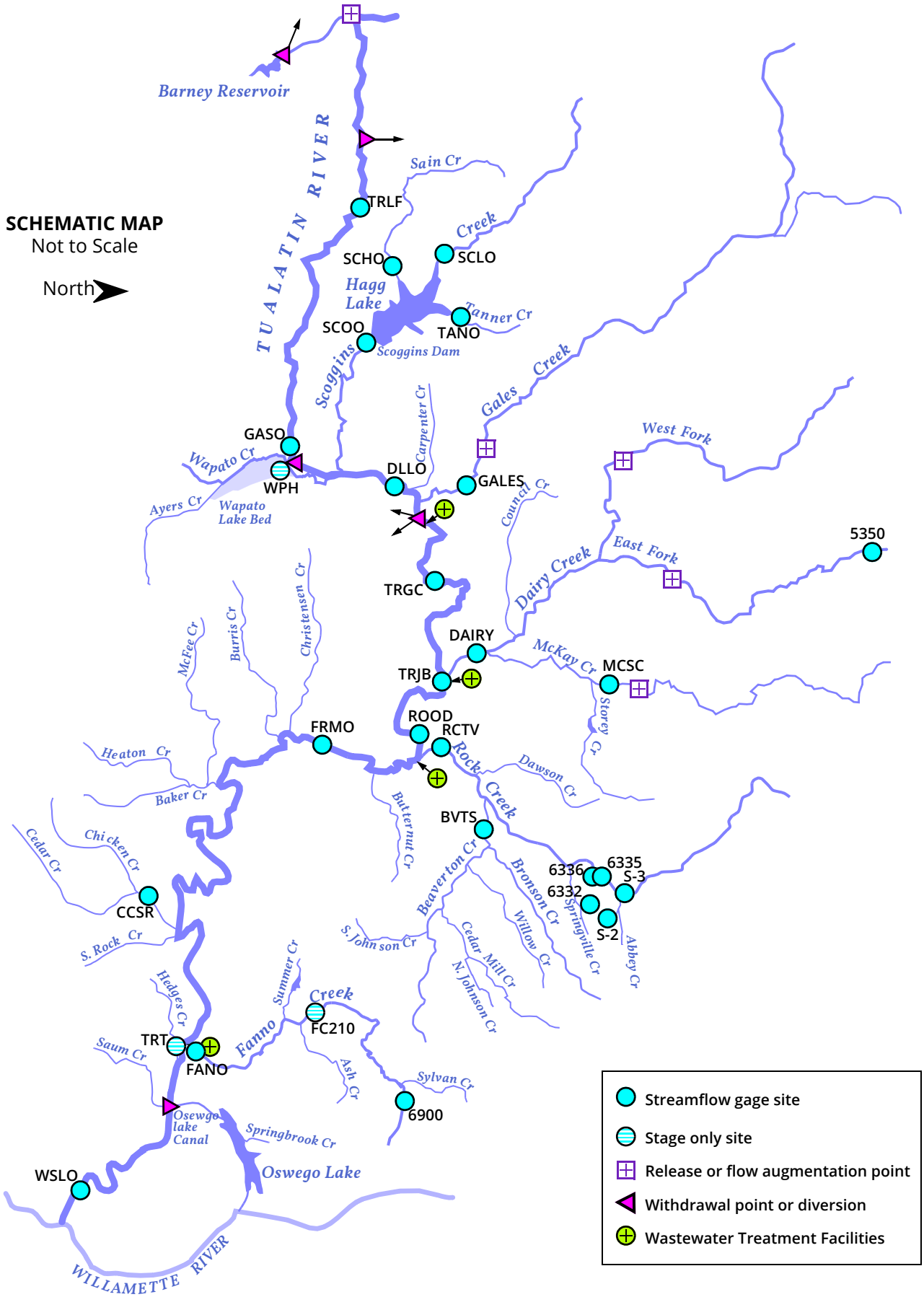
The following data and analyses are included for each site. A more detailed explanation of the analyses and graphics begins on page A-3:

- Table of 2021 data with summary statistics by month.
- Graph of 2021 data superimposed on percentile statistics for the period of record for the site.
- Table of monthly median streamflows by year for the period of record.

2021 HIGHLIGHTS

- All sites had high flow in late February with many setting records.
- Beginning in early March, rainfall was infrequent and flows through May were far below normal—in most cases flows were less than the 10th percentile. Both mainstem and tributary sites set records for low flow in April and early May.
- Flow at the Tualatin River sites rebounded to average levels in May when water from Barney Reservoir and Hagg Lake began to be released.
- Flow in the tributaries remained very low throughout the summer, with the exception of a brief increase in mid-June due to a rainstorm. In general, median monthly flows for April–August were half or less of their respective period of record medians.
- Rainfall through the summer was scarce and flows did not rebound until rain returned in late September. Flows that exceeded median levels occurred only during periods of rainfall which were usually short-lived until the latter half of October when the weather changed to a more wet pattern.

STREAMFLOW GAGE SITES



STREAMFLOW GAGE SITES — ALPHABETICAL LISTING BY SITE CODE

SITE CODE	SITE NAME	RIVER MILE	STATION ID	PAGE
5350	EF Dairy Creek above Murtaugh Creek near Meacham Corner, OR	13.4	14205350	A–28
6332	Bethany Creek at NW Springville Rd at Bethany, OR	—	14206332	A–37
6335	Rock Creek at NW 185th Ave near Hillsboro, OR	—	14206335	A–35
6336	Rock Creek Ditch at NW 185th Ave near Hillsboro, OR	—	14206336	A–36
6900	Fanno Creek at 56th Avenue	11.9	14206900	A–44
BVTS	Beaverton Creek at Cornelius Pass Road	1.2	14206435	A–38
CCSR	Chicken Creek at Roy Rogers Rd near Sherwood, OR	2.3	14206750	A-42
DAIRY	Dairy Creek at Hwy 8 near Hillsboro, Oregon	2.06	14206200	A–31
DLLO	Tualatin River near Dilley, Oregon	58.8	14203500	A–10
FANO	Fanno Creek at Durham Road near Tigard, Oregon	1.2	14206950	A–46
FC210	Fanno Creek at Hwy 210 at Beaverton, OR	—	—	A–50
FRMO	Tualatin River at Farmington, Oregon	33.3	14206500	A–16
GALES	Gales Creek at Old Hwy 47 near Forest Grove, Oregon	2.36	14204530	A–26
GASO	Tualatin River at Gaston, Oregon	62.3	14202510	A–6
MCSC	McKay Creek at Scotch Church Rd above Waible Ck near North Plains, Oregon	6.3	14206070	A–29
RCTV	Rock Creek at Hwy 8 near Hillsboro, Oregon	1.2	14206451	A–40
ROOD	Tualatin River at Rood Bridge Road near Hillsboro, Oregon	38.4	14206295	A–14
S-2	South Fork Abbey Creek Downstream of NW Kaiser Rd at Bethany, OR	—	—	A–33
S-3	Rock Creek at NW Germantown Rd at Bethany, OR	—	—	A–34
SCHO	Sain Creek above Henry Hagg Lake near Gaston, Oregon	1.6	14202920	A–22
SCLO	Scoggins Creek above Henry Hagg Lake near Gaston, Oregon	9.3	14202850	A–22
SCOO	Scoggins Creek below Henry Hagg Lake near Gaston, Oregon	4.80	14202980	A–8
TANO	Tanner Creek above Henry Hagg Lake near Gaston, Oregon	1.6	14202860	A–24
TRGC	Tualatin River at Golf Course Road near Cornelius, Oregon	51.5	14204800	A–12
TRJB	Tualatin River at Hwy 219 Bridge (data temporarily unavailable)	44.4	14206241	—
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–51
WPH	Wapato Canal at Pumphouse at Gaston, Oregon	—	14202630	A–48
WSLO	Tualatin River at West Linn	1.75	14207500	A–18

Explanation of Figures and Tables in this Appendix

Page 1–current year data and graph: A table of mean daily streamflow for the current year is at the top of page 1. A graph at the bottom of the page shows the current year's data superimposed on shaded percentile ranges for the period of record, providing historical context. A legend, located to the right of the graph, includes the period of record for the site and definitions of lines and shading. If the period of record is too short to accurately calculate some percentiles, the appropriate shaded areas are omitted.

Page 2–color-coded table of monthly medians: A table of monthly medians of daily mean streamflow by year is shown on page 2. Entries in this table are color-coded by percentiles calculated from the daily mean streamflow for the period of record. Two Keys are provided to the right of the table. The upper Key contains the values corresponding to the percentiles shown in the lower Key. Medians are not shown if more than 20% of the data are missing.

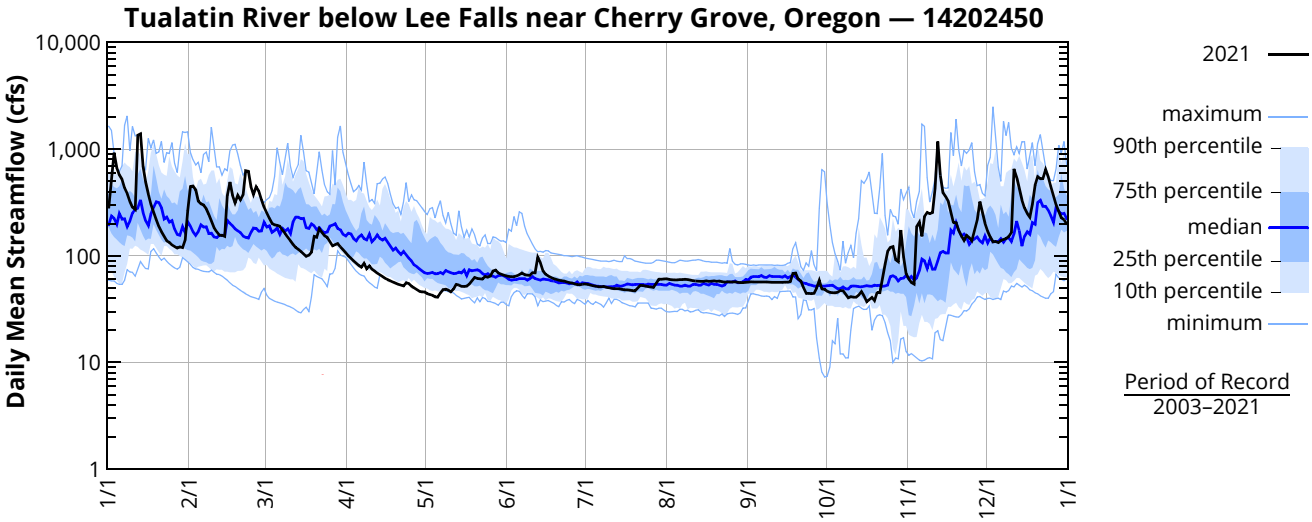
TRLF – Tualatin River below Lee Falls near Cherry Grove, Oregon – 14202450

Data source: Oregon Water Resources Department
River mile: 70.7 *Latitude:* 45 30 21 *Longitude:* 123 13 06

2021 — MEAN STREAMFLOW† (cfs) — TRLF

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	286	447	286	107	45.8	64.9	54.5	60.8	56.7	46.5	60.7	170
2	507	451	252	100	44.2	64.2	53.9	60.1	57.0	45.4	56.2	150
3	927	415	225	94.6	43.3	63.7	53.0	59.7	56.8	45.1	54.4	135
4	666	325	201	89.5	42.6	63.6	52.3	59.4	56.9	44.9	188	136
5	573	307	195	85.1	41.2	64.8	51.9	59.5	56.8	45.5	207	133
6	520e	299	193	81.0	40.9	66.6	51.3	59.8	56.8	47.1	152	139
7	431	276	189	78.1	44.9	68.9	51.2	59.9	56.9	47.1	233	142
8	384	244	174	84.8	48.1	66.3	51.5	60.2	56.9	43.7	255	145
9	323	212	162	75.5	48.6	66.0	50.7	59.8	56.6	40.4	248	151
10	285	183	149	80.3	47.7	65.4	50.1	59.2	56.5	41.4	254	165
11	272	168	138	74.9	45.9	69.5	49.5	58.4	56.4	40.9	428	654
12	1350	156	128	71.8	48.8	69.3	49.1	58.0	56.4	40.9	1180	545
13	1390	156	120	68.8	54.0	97.2	49.1	57.9	56.5	42.8	566	432
14	691	152	115	66.1	53.2	86.7	49.2	57.7	56.5	46.2	392	333
15	491	366	110	63.9	51.8	72.0	48.5	57.7	56.7	42.1	359	280
16	379	493	104	61.6	51.6	67.1	48.0	58.2	56.6	37.2	325	249
17	305	369	98.9	59.9	51.9	64.5	47.9	57.6	57.3	38.9	254	230
18	257	313	101	58.3	54.4	62.8	47.7	57.8	68.3	40.7	204	304
19	219	368	108	56.6	58.5	61.2	47.1	58.3	68.9	37.9	205	459
20	188	334	152	55.2	62.5	60.1	46.8	57.6	60.5	45.2	173	552
21	168	373	149	54.0	61.4	59.0	49.8	58.0	58.0	45.1	153	528
22	152	627	179	53.0	60.8	58.5	52.9	57.3	50.3	60.1	139	530
23	138	621	165	52.2	60.5	58.1	52.6	56.7	44.4	83.6	155	645
24	134	446	154	55.9	63.8	56.8	52.0	57.1	44.5	110	148	551
25	126	375	149	54.9	63.0	56.0	51.4	56.8	44.1	120	138	448
26	122	444	136	52.0	64.5	55.4	51.1	56.8	44.5	122	173	367
27	118	406	124	50.0	71.8	54.6	50.6	57.0	49.6	91.9	214	302
28	121	335	127	48.1	73.3	53.5	55.1	56.5	59.0	88.0	322	262
29	119	—	130	46.5	69.2	53.5	60.5	56.1	48.8	174	253	227
30	140	—	121	45.8	67.3	54.1	60.2	56.1	48.6	98.1	202	218
31	264	—	114	—	66.0	—	60.6	56.4	—	68.0	—	200
Mean	389	345	153	67.5	54.9	64.1	51.6	58.1	55.1	62.0	256	316
Max	1390	627	286	107	73	97	61	61	69	174	1180	654
Min	118	152	99	46	41	54	47	56	44	37	54	133
Ac-Ft	23893	19162	9419	4017	3375	3817	3174	3575	3280	3810	15255	19402

†All 2021 data are provisional—subject to revision; e=estimated



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — TRLF

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2003	206	177	350	165	45.8	48.5	51.1	67.2	55.9	39.2	38.0	182
2004	247	214	118	76.0	46.1	57.7	57.9	50.2	45.3	44.6	42.4	75.1
2005	88.2	60.4	40.0	134	62.6	44.3	41.1	50.1	65.4	51.4	119	116
2006	532	148	161	120	52.2	50.0	43.3	31.8	65.9	68.5	377	292
2007	169	144	206	91.6	47.4	40.7	40.7	29.9	45.7	40.5	47.1	306
2008	270	182	216	178	97.0	47.5	36.0	40.0	48.0	46.0	82.0	76.0
2009	251	80	181	119	102	47.0	50.0	43.0	52.0	43.0	211	116
2010	389	161	139	228	98.0	83.5	63.0	58.0	64.0	54.0	125	346
2011	207	110	359	306	150	107	89.0	87.0	74.0	26.0	39.5	58.0
2012	279	206	298	169	93.0	57.5	57.0	63.0	68.5	60.0	202	397
2013	164	152	138	107	80.0	64.5	50.0	53.0	59.0	56.0	76.5	81.0
2014	100	234	287	151	105	56.5	54.0	51.0	62.0	54.0	112	244
2015	171	145	97.0	74.0	72.0	65.0	62.0	58.0	79.0	51	108	523
2016	368	265	316	83.5	59.0	65.5	53.0	50.0	64.0	156	200	289
2017	165	398	401	203	106.0	53.0	68.0	62.0	79.0	50.0	246	139
2018	255	140	175	182	62.9	58.2	51.9	64.1	67.6	52.4	34.5	169
2019	178	143	123	126	50.1	58.1	53.9	39.2	54.7	54.9	35.8	98.8
2020	551	229	82.8	66.9	55.9	66.2	57.3	65.4	63.4	50.7	133	202
2021	285	351	149	62.75	53.2	63.95	51.2	57.9	56.65	45.4	206	262
median	230	171	184	125	67.0	58.4	53.4	54.0	60.0	52.0	110	193

KEY

Q in cfs

- Q ≤ 37.5
- 37.5 < Q ≤ 44.0
- 44.0 < Q ≤ 48.0
- 48.0 < Q ≤ 51.5
- 51.5 < Q ≤ 57.2
- 57.2 < Q ≤ 64.6
- 64.6 < Q ≤ 76.0
- 76.0 < Q ≤ 170
- 170 < Q ≤ 335
- 335 < Q ≤ 487
- Q > 487

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

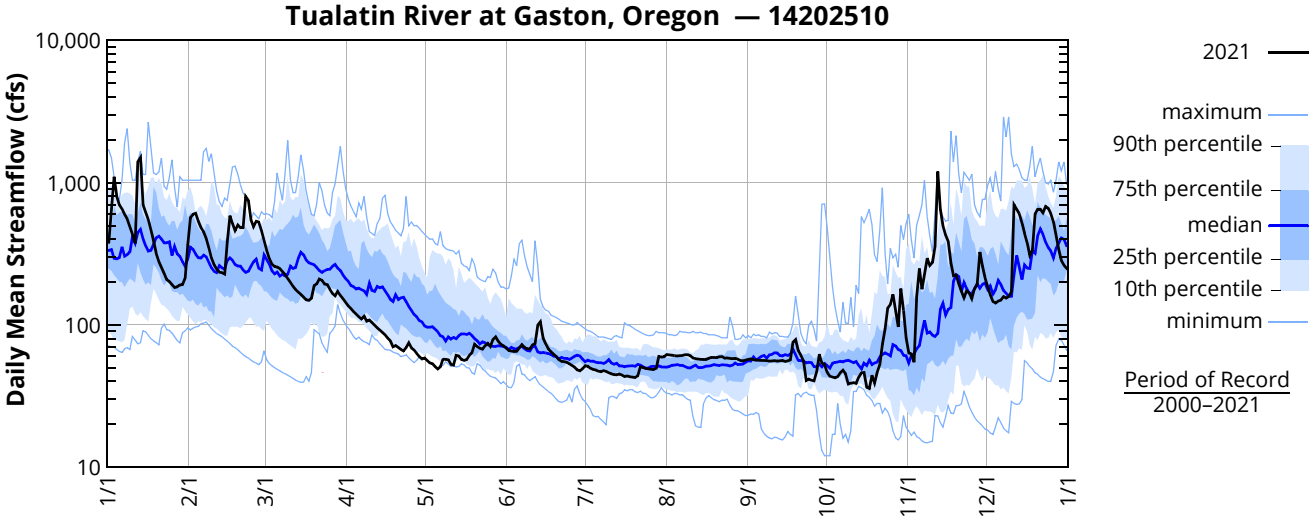
GASO — TUALATIN RIVER AT GASTON, OREGON — 14202510

Data source: Oregon Water Resources Department
River mile: 62.3 *Latitude:* 45 26 21 *Longitude:* 123 07 85

2021 — MEAN STREAMFLOW† (cfs) — GASO

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	381	568	392	144	58.5	68.6	51.6	61.9	57.2	46.4	63.3	186
2	630e	599	333	136	56.3	66.1	51.2	61.6	57.7	43.5	62.5	163
3	1100e	609	293	130	54.0	65.5	49.5	61.2	56.8	42.9	54.6	146
4	800e	538	267	124	53.4	65.0	48.6	60.7	56.6	42.4	158	142
5	700e	484	257	119	50.8	65.2	48.2	60.5	56.4	43.3	249	147
6	654	452	255	114	49.0	68.8	47.3	60.7	56.3	46.0	178	149
7	597	405	249	110	50.8	72.6	46.8	61.0	56.3	48.0	226	158
8	555	349	237	115	57.4	69.4	47.6	61.8	56.1	45.4	294	154
9	489	297	226	106	57.2	68.0	47.1	61.7	55.7	38.3	262	158
10	434	265	212	108	56.8	67.8	46.1	60.8	55.8	38.9	275	171
11	375	247	199	104	52.8	72.2	45.2	58.5	56.1	39.2	358	700e
12	1400e	235	187	99.5	52.0	73.8	44.8	57.9	55.7	38.7	1200e	650e
13	1500e	233	177	95.5	61.1	99.3	44.5	57.5	55.9	42.8	650e	607
14	700e	228	170	91.8	60.5	105	45.1	57.3	56.3	46.0	501	523
15	621	382	164	88.4	57.1	81.3	44.4	57.1	55.4	46.3	429	441
16	550	587	157	85.2	56.3	73.8	43.4	57.1	55.8	36.5	387	377
17	468	516	150	80.6	56.9	67.8	43.7	58.1	56.6	35.7	273	308
18	387	461	149	77.4	61.0	64.8	43.2	59.0	75.3	44.3	222	334
19	319	505	154	70.1	63.6	62.3	43.0	59.0	78.8	39.0	224	604
20	279	483	189	71.5	73.0	60.0	42.6	58.7	66.0	46.2	195	650e
21	254	483	194	69.3	70.3	57.0	43.9	59.7	61.0	52.5	172	650e
22	230	800e	210	67.3	68.4	55.3	50.7	59.8	55.9	73.1	155	614
23	208	750e	206	65.6	67.4	55.2	50.2	58.3	40.7	94.2	173	680e
24	202	550	194	69.3	71.4	54.6	49.4	58.6	41.6	131	168	660e
25	192	491	192	74.8	74.2	53.4	49.1	58.1	40.8	139	153	608
26	183	535	178	68.8	70.4	51.8	48.7	57.9	40.4	164	180	530
27	185	528	166	66.5	78.8	50.4	48.5	58.2	46.5	126	193	427
28	191	461	160	62.8	82.3	48.2	49.5	57.6	62.2	97.0	326	338
29	192	—	172	59.8	76.8	47.5	60.0	56.3	53.9	180	259	283
30	213	—	161	57.6	73.1	49.1	59.3	55.8	52.5	126	215	262
31	363	—	153	—	71.3	—	59.7	56.5	—	81.3	—	250
Mean	495	466	207	91.1	62.7	65.3	48.2	59.0	55.7	68.2	275	389
Max	1500	800	392	144	82.3	105	60.0	61.9	78.8	180	1200	700
Min	183	228	149	57.6	49.0	47.5	42.6	55.8	40.4	35.7	54.6	142
Ac-Ft	30450	25866	12700	5418	3854	3887	2961	3628	3317	4193	16374	23940

†All 2021 data are provisional—subject to revision; e=estimated



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — GASO

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2000	442	310	278	86.0	69.7	75.0	62.4	50.6	67.5	65.3	57.2	72.0
2001	78.2	103	81.2	71.5	68.0	38.3	31.7	30.0	23.5	35.6	95.3	571
2002	479	391	286	172	61.4	51.3	48.2	51.6	55.7	45.2	35.3	229
2003	353	315	545	307	97.6	57.4	54.1	72.5	64.9	41.5	47.0	320
2004	372	357	179	114	70.8	69.7	64.3	54.7	51.9	63.1	67.1	113
2005	123	78.0	51.5	179	99.2	57.3	44.5	51.9	71.5	84.7	184	235
2006	855	216	240	175	69.5	57.7	39.4	31.6	62.4	69.0	452	446
2007	256	189	300	120	56.5	41.9	40.2	34.6	48.3	55.3	76.7	426
2008	366	303	276	217	111	57.5	41.0	40.0	44.5	50.0	102	86.0
2009	379	102	248	155	126	62.0	50.0	40.0	48.0	47.0	284	199
2010	587	270	238	325	119	123	66.0	58.0	62.0	65.0	167	507
2011	385	296	583	482	260	123	87.0	85.0	68.5	24.0	41.5	64.0
2012	359	271	454	242	113	68.0	61.0	65.0	68.0	64.0	294	671
2013	224	181	180	126	83.0	72.0	49.0	50.0	58.5	61.0	103	102
2014	134	382	427	231	138	68.0	52.0	48.0	59.0	52.0	123	399
2015	255	231	152	101	72.0	62.0	58.0	54.0	76.5	47.0	149	840
2016	615	499	583	117	67.0	64.5	48.0	44.0	60.0	194	262	386
2017	248	538	511	300	150	63.0	63.0	55.0	78.0	55.0	348	197
2018	376	201	253	263	70.1	61.5	51.7	62.4	72.6	53.2	36.5	204
2019	244	227	177	178	56.7	58.0	52.2	35.3	55.0	62.3	30.5	111
2020	590	267	113	90.5	70.3	71.1	57.3	62.6	57.7	49.3	164	237
2021	387	484	192	86.8	60.5	65.4	47.6	58.6	56.1	46.0	223	338
median	344	272	250	161	82.0	63.0	52.3	52.0	57.7	56.0	120	269

KEY

Q in cfs

- Q ≤ 36.0
- 36.0 < Q ≤ 44.0
- 44.0 < Q ≤ 49.2
- 49.2 < Q ≤ 52.7
- 52.7 < Q ≤ 59.7
- 59.7 < Q ≤ 69.1
- 69.1 < Q ≤ 85.6
- 85.6 < Q ≤ 239
- 239 < Q ≤ 478
- 478 < Q ≤ 638
- Q > 638

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

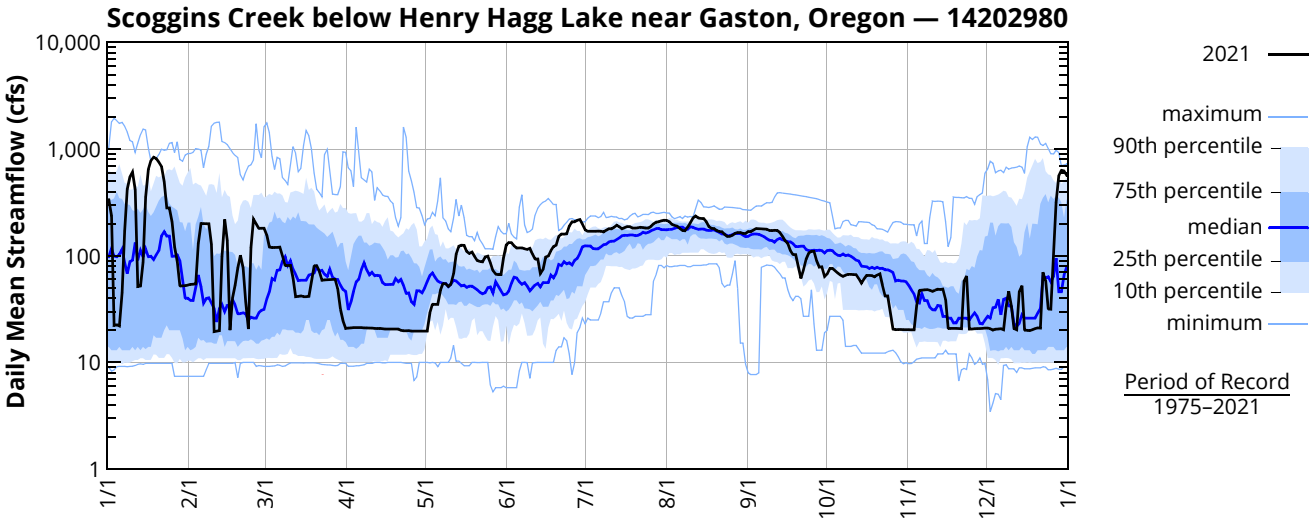
SCOO – SCOGGINS CREEK BELOW HENRY HAGG LAKE NEAR GASTON, OREGON – 14202980

Data source: Bureau of Reclamation (in cooperation with District 18 Watermaster)
River mile: 4.8 *Latitude:* 45 28 10 *Longitude:* 123 11 56

2021 — MEAN STREAMFLOW[†] (cfs) — SCOO

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	336	53.9	181	20.9	19.7	126	175	215	169	67.6	20.3	21.0
2	237	54.2	156	21.0	19.7	133	170	209	169	76.3	20.2	20.7
3	22.3	54.6	121	21.1	29.2	133	170	197	175	76.2	20.2	20.1
4	22.5	130	119	21.2	35.1	124	170	192	180	72.6	34.1	20.5
5	22.0	201	120	21.2	35.0	118	170	190	179	69.0	47.5	20.6
6	45.1	200	120	21.2	35.0	118	170	180	179	66.1	47.7	20.7
7	171	200	120	21.2	47.4	119	170	173	178	64.1	48.0	20.2
8	420	200	100	21.1	54.8	116	167	172	178	65.8	48.2	33.4
9	550	128	80.9	21.1	54.7	114	173	186	173	67.1	47.4	46.5
10	609	19.5	81.1	21.0	51.5	117	179	204	172	67.0	46.4	33.5
11	416	19.7	81.5	21.0	53.9	104	179	226	173	66.7	47.5	20.8
12	51.6	19.9	61.7	20.9	67.5	93.2	185	236	173	66.6	48.6	20.2
13	52.2	98.5	41.4	20.8	103	93.5	194	226	166	61.4	48.3	46.2
14	86.8	219	41.7	20.9	123	67.9	188	224	152	55.3	48.8	52.5
15	355	139	42.0	20.7	126	74.4	179	224	139	60.5	38.8	20.1
16	645	20.1	41.3	20.6	126	97.1	183	210	131	65.5	20.8	20.0
17	779	40.3	41.3	20.6	110	99.5	188	189	112	65.5	20.9	19.9
18	840	53.0	41.6	20.6	105	112	188	181	103	65.2	20.9	20.2
19	819	77.2	58.3	20.6	108	122	182	180	103	63.4	20.9	20.7
20	755	101	80.6	20.6	98.8	126	182	172	79.5	66.0	20.8	21.1
21	690	77.0	80.7	20.6	90.4	151	183	168	61.3	67.7	20.7	21.0
22	495	37.2	71.8	20.0	88.3	160	185	168	73.5	53.2	57.9	70.2
23	281	20.6	59.0	19.8	87.9	159	184	158	93.0	42.0	64.6	58.4
24	281	119	59.5	19.8	96.9	161	182	152	106	42.1	20.6	31.7
25	208	220	59.6	19.9	99.0	190	182	152	110	29.2	20.6	31.6
26	121	199	59.9	19.7	86.0	209	188	155	110	20.6	20.7	108
27	87.6	181	60.0	19.7	72.6	208	199	162	90.3	20.3	20.8	317
28	52.1	181	60.2	19.7	67.4	215	207	165	78.3	20.4	20.8	565
29	52.3	—	49.2	19.7	66.5	218	208	165	78.9	20.4	20.9	634
30	52.5	—	31.6	19.7	66.7	198	212	162	64.0	20.3	21.0	624
31	53.0	—	24.6	—	96.0	—	215	162	—	20.3	—	571
Mean	310	109	75.7	20.6	74.9	136	184	186	132	54.3	33.5	115
Max	840	220	181	21.2	126	218	215	236	180	76.3	64.6	634
Min	22.0	19.5	24.6	19.7	19.7	67.9	167	152	61.3	20.3	20.2	19.9
Ac-Ft	19052	6077	4657	1223	4603	8087	11323	11416	7829	3340	1993	7044

[†]All 2021 data are provisional—subject to revision



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — SCOO

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1975	98.0	93.0	166	34.0	65.0	50.5	154	271	348	35.0	37.0	31.0
1976	86.0	24.0	124	85.0	45.0	31.0	95.0	94.0	171	140	23.0	14.0
1977	13.0	10.0	11.0	10.5	21.0	10.0	82.0	82.0	81.5	13.3	76.7	374
1978	181	41.7	28.6	60.3	76.7	33.3	84.8	122	215	173	16.0	14.0
1979	14.0	14.0	45.0	21.0	49.0	33.0	92.0	121	141	142	31.5	150
1980	205	22.0	135	74.0	35.0	29.0	80.0	117	123	84.0	78.5	123
1981	21.0	32.5	47.0	55.0	35.0	50.0	78.0	176	104	130	129	353
1982	228	217	199	142	74.0	73.0	82.0	107	103	150	131	341
1983	333	76.0	343	97.5	55.0	67.4	49.1	104	155	175	119	348
1984	65.1	66.1	59.1	60.0	76.0	68.7	108	157	107	112	212	126
1985	21.0	17.9	12.0	12.0	90.6	99.9	178	142	66.7	31.0	22.0	50.0
1986	11.0	51.0	98.1	13.0	45.9	91.8	149	158	88.4	27.0	19.0	9.0
1987	27.0	13.5	194	36.0	34.0	54.5	173	162	91.0	45.0	16.0	13.0
1988	15.0	13.0	14.0	41.0	52.0	47.5	143	166	136	90.0	27.0	27.0
1989	120	18.0	175	36.0	26.0	72.0	144	158	152	116	31.5	13.0
1990	12.0	63.5	150	15.0	33.0	54.0	188	177	114	98.0	19.0	9.9
1991	10.0	10.0	69.0	107	37.0	23.0	148	192	152	135	17.0	9.1
1992	9.9	11.0	11.0	10.5	30.0	105	164	175	102	66.0	22.0	11.0
1993	12.0	11.0	12.0	135	82.0	32.0	44.0	118	179	102	107	13.0
1994	14.0	12.0	76.0	36.0	30.0	30.0	201	188	132	83.0	22.0	17.0
1995	585	145	177	62.0	47.0	57.0	134	181	128	54.0	21.0	569
1996	334	609	32.0	202	116	38.5	181	204	93.0	75.0	24.0	57.0
1997	365	78.0	221	10.0	74.0	46.5	129	209	192	61.0	38.0	372
1998	211	172	193	35.5	59.0	50.0	133	149	199	104	39.0	121
1999	409	582	158	52.5	53.0	111	167	183	170	112	26.5	73.0
2000	191	25.0	94.0	15.5	37.0	89.0	133	173	135	113	51.0	10.0
2001	9.8	9.8	10.0	9.9	10.0	68.5	105	99.0	79.5	43.4	14.3	16.7
2002	230	54.6	92.0	80.8	46.9	122	154	160	169	134	29.5	9.7
2003	13.3	104	199	127	63.6	108	162	177	154	116	90.5	10.7
2004	10.7	117	50.5	51.0	39.7	90.6	158	204	103	95.0	20.8	10.7
2005	10.4	10.6	9.9	10.5	81.0	51.3	168	197	155	105	21.2	10.8
2006	688	75.1	33.7	66.1	45.0	60.4	176	205	156	79.2	20.8	201
2007	193	25.4	99.4	39.8	52.3	145	182	202	180	49.0	21.2	23.4
2008	289	107	33.2	96.0	73.6	50.2	186	178	174	105	22.3	19.6
2009	58.2	15.9	16.6	57.0	110	58.0	180	183	154	74.4	21.7	90.0
2010	207	99.1	68.6	169	87.4	154	139	174	98.9	79.0	27.2	318
2011	222	28.4	290	174	97.5	51.8	99.4	134	149	92.0	50.5	56.0
2012	309	82.5	249	113	100	55.0	158	187	167	63.0	113	386
2013	124	27.5	25.0	14.0	36.0	67.0	184	182	97.5	32.0	33.0	91.0
2014	47.0	48.5	299	98.0	111	89.5	178	198	164	82.0	26.0	24.0
2015	152	85.5	47.0	20.5	67.0	170	225	214	115	85.0	21.0	205
2016	288	102	284	56.5	35.0	110	155	197	118	31.4	27.0	402
2017	165	280	314	162	75.8	41.6	158	180	140	79.4	42.7	98.1
2018	232	34.9	26.9	157	59.3	111	203	177	147	79.1	42.2	13.0
2019	16.9	16.6	16.1	61.1	43.6	136	136	186	64.0	53.9	58.3	20.5
2020	53.1	19.9	11.4	10.3	10.8	41.9	171	161	145	80.5	20.5	21.1
2021	237	99.9	60.2	20.7	72.6	123	182	180	135	65.2	21.0	21.1
median	97.0	31.2	66.0	53.0	53.0	63.5	149	170	134	84.0	31.0	34.1

KEY

Q in cfs

- Q ≤ 11.0
- 11.0 < Q ≤ 14.0
- 14.0 < Q ≤ 19.6
- 19.6 < Q ≤ 23.0
- 23.0< Q ≤ 39.7
- 39.7< Q ≤ 60.0
- 60.0 < Q ≤ 83.5
- 83.5 < Q ≤ 157
- 157 < Q ≤ 222
- 222 < Q ≤ 351
- Q > 351

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

DLLO — TUALATIN RIVER NEAR DILLEY, OREG. — 14203500

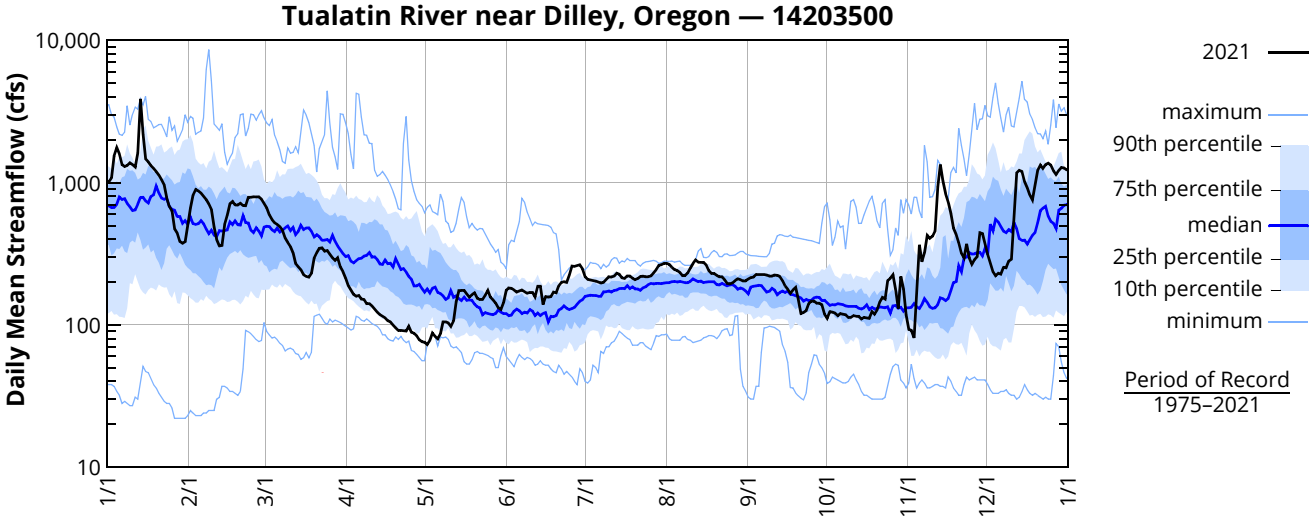
Data source: U.S. Geological Survey, Oregon Water Science Center

River Mile: 58.8 *Latitude:* 45 28 30 *Longitude:* 123 07 23 *Drainage area:* 125.00 sq mile *Datum:* 147.57 ft

2021 — MEAN STREAMFLOW† (cfs) — DLLO

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1010	664	716	213	75.6	175	218	271	210	111	93.0	313
2	1080	816	664	189	72.6	182	209	266	215	124	91.6	273
3	1540	896	594	176	77.7	181	207	254	217	123	81.1	237
4	1770	876	549	164	87.5	176	205	244	226	121	179	222
5	1600	844	522	159	82.9	170	203	241	226	116	366	231
6	1340	803	508	161	79.8	173	200	234	226	120	278	227
7	1300	759	490	152	86.7	176	197	222	226	119	321	254
8	1320	709	463	151	105	171	199	222	224	118	426	252
9	1380	648	408	141	105	167	208	232	220	113	406	280
10	1340	486	380	141	103	169	218	251	220	113	420	289
11	1290	399	356	136	97.7	169	217	270	224	116	457	568
12	1620	359	322	129	107	157	220	286	223	115	932	1170
13	3890	362	270	123	145	187	231	276	219	115	1340	1220
14	2190	510	256	118	174	187	227	275	205	110	1030	1200
15	1470	590	244	115	175	139	214	275	188	113	836	1020
16	1400	712	225	112	175	158	212	264	178	112	732	923
17	1320	738	219	107	165	157	221	241	167	111	606	820
18	1260	698	216	105	157	158	221	230	176	124	480	755
19	1200	696	230	99.8	163	170	213	230	183	119	433	971
20	1130	715	296	95.5	168	168	208	223	152	127	378	1220
21	1050	690	322	91.2	154	188	212	218	120	145	318	1330
22	965	688	346	91.5	151	199	219	218	122	156	296	1260
23	782	789	348	91.0	151	201	220	208	126	152	372	1340
24	682	790	330	90.6	161	199	218	196	141	205	295	1370
25	630	796	333	97.8	175	223	218	194	147	213	267	1330
26	474	795	314	88.8	157	259	221	197	147	225	288	1210
27	441	797	296	87.4	150	258	232	205	142	176	302	1140
28	386	765	284	83.7	142	261	245	211	142	130	444	1220
29	375	—	297	78.6	132	265	262	208	139	219	439	1280
30	384	—	255	76.2	128	249	265	204	119	178	371	1270
31	495	—	237	—	143	—	271	204	—	118	—	1230
Mean	1197	693	364	122	131	190	220	235	182	137	443	852
Max	3890	896	716	213	175	265	271	286	226	225	1340	1370
Min	375	359	216	76.2	72.6	139	197	194	119	110	81.1	222
Ac-Ft	73615	38459	22393	7268	8026	11290	13549	14420	10850	8444	26336	52413

† Data after Dec 8, 2021 are provisional—subject to revision



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — DLLO

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1975	833	637	688	212	189	83.5	151	302	382	65.0	316	702
1976	1010	310	546	311	111	68.5	93.0	111	199	195	42.0	35.0
1977	30.0	33.5	247	85.0	74.0	58.0	90.0	83.0	102	49.0	307	1120
1978	885	617	245	284	233	90.0	103	141	275	222	77.5	232
1979	183	745	305	146	147	62.0	99.0	134	160	170	143	632
1980	963	452	475	336	109	67.0	102	134	145	111	175	660
1981	260	431	222	297	132	138	125	198	174	191	611	1210
1982	877	1081	725	597	157	103	90.5	123	123	206	307	1070
1983	913	1415	1010	440	139	103	88.6	119	202	210	785	748
1984	516	595	460	303	280	169	143	187	126	166	761	588
1985	194	291	196	222	150	184	196	151	71.5	62.9	144	158
1986	474	568	452	117	138	105	153	162	107	66.0	117	373
1987	604	536	943	180	79.0	79.0	180	168	111	83.0	41.5	254
1988	541	264	161	193	156	92.0	148	171	153	114	190	259
1989	569	288	616	219	81.0	106	171	174	163	140	116	96.0
1990	368	1053	494	128	90.0	111	170	174	124	123	132	203
1991	327	386	354	394	149	68.0	159	192	163	136	84.0	187
1992	248	377	153	177	94.0	132	150	152	109	83.0	86.0	328
1993	278	160	310	458	207	120	89.0	120	190	135	123	150
1994	494	188	356	179	84.0	73.5	193	185	145	100	293	1050
1995	1450	1050	611	282	160	115	149	178	140	93.0	332	1970
1996	1290	1210	350	597	437	145	184	205	127	114	162	1440
1997	976	537	887	261	187	112	162	266	277	280	359	723
1998	1320	1014	673	229	171	142	184	235	241	139	150	1280
1999	1450	2285	696	344	181	156	209	224	226	173	259	902
2000	856	463	495	124	123	189	211	238	218	205	128	130
2001	112	140	116	103	108	109	131	136	98.5	95.0	153	1270
2002	1310	571	461	300	116	179	202	207	224	177	110	317
2003	536	508	1020	480	153	159	201	225	195	151	153	340
2004	572	613	293	194	120	157	205	240	154	133	66.8	139
2005	195	122	81.8	266	203	123	196	232	188	146	244	326
2006	2430	491	481	307	124	128	211	226	206	165	659	1100
2007	571	252	521	196	128	165	197	209	198	105	142	755
2008	1050	663	455	393	231	137	255	202	212	135	125	108
2009	931	151	318	271	252	105	213	200	162	117	310	411
2010	920	466	440	585	248	441	181	193	141	150	238	1110
2011	823	323	807	654	325	162	176	216	194	114	130	162
2012	719	465	809	500	237	129	193	217	217	137	389	1260
2013	416	280	267	167	161	126	198	204	151	121	154	187
2014	187	822	882	468	259	134	199	206	186	130	162	537
2015	513	408	360	159	142	202	254	238	153	124	219	1570
2016	1190	732	986	240	93.9	159	189	241	182	305	483	964
2017	644	1125	890	639	317	126	222	231	208	137	641	454
2018	774	287	429	571	132	154	245	221	191	138	87.0	290
2019	353	361	251	291	111	178	175	226	133	130	99.3	134
2020	955	421	177	108	91.9	127	208	211	218	137	238	333
2021	1260	714	322	114	143	176	218	230	186	120	375	1020
median	711	492	434	262	146	125	178	197	164	134	170	505

KEY

Q in cfs

- Q ≤ 78.0
- 78.0 < Q ≤ 96.0
- 96.0 < Q ≤ 111
- 111 < Q ≤ 122
- 122< Q ≤ 145
- 145< Q ≤ 170
- 170 < Q ≤ 200
- 200 < Q ≤ 400
- 400 < Q ≤ 878
- 877 < Q ≤ 1210
- Q > 1210

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

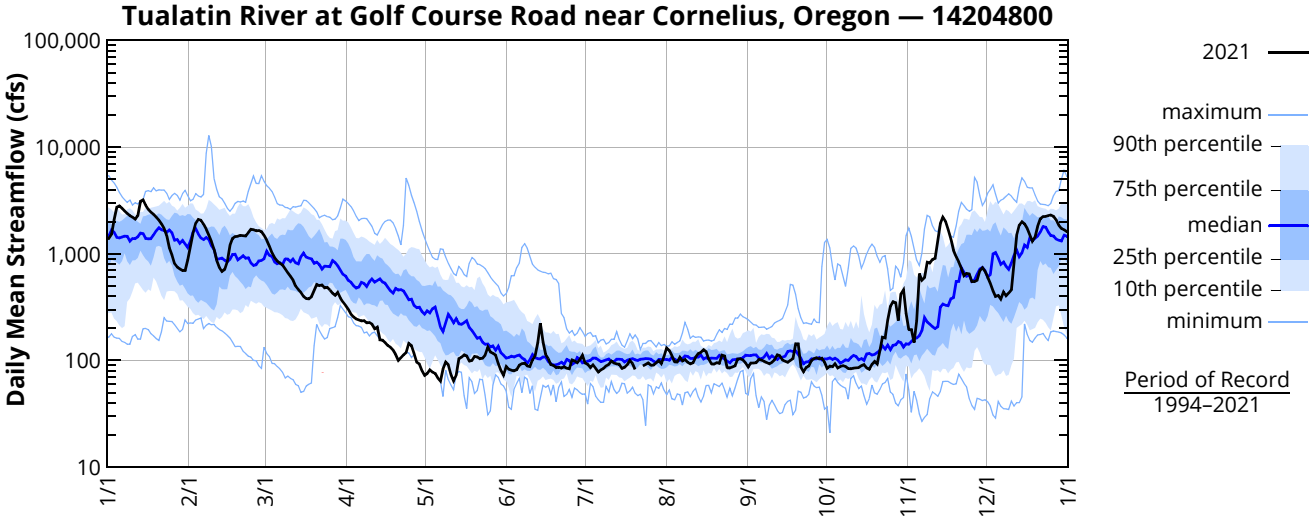
TRGC – Tualatin River at Golf Course Road near Cornelius, Oregon – 14204800

Data source: Oregon Water Resources Department
River mile: 51.5 *Latitude:* 45 30 08 *Longitude:* 123 03 22

2021 — MEAN STREAMFLOW† (cfs) — TRGC

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1390	1180	1490	327	72.3	87.7	94.7	131	86.9	84.3	194	605
2	1520	1560	1340	302	75.0	82.6	92.0	124	94.7	88.5	195	530
3	2080	1930	1180	271	81.5	81.0	85.6	111	94.6	87.3	147	451
4	2740	2100e	1020	256	77.6	79.8	90.9	97.0	95.1	93.3	235	398
5	2810	2060	918	245	75.7	81.7	84.2	96.7	102	85.0	652	406
6	2670	1900	857	240	68.7	90.3	77.9	107	101	87.6	564	376
7	2520	1700	813	235	64.1	93.4	81.6	98.8	98.4	89.3	597	438
8	2390	1500	786	236	82.9	94.2	84.0	102	95.7	87.7	833	404
9	2280	1310	724	225	96.6	88.8	89.0	96.0	93.0	83.7	816	428
10	2210	1100	665	227	91.5	87.6	91.7	92.7	95.9	83.5	884	461
11	2110	869	615	219	74.2	101	98.7	95.0	101	84.7	903	775
12	2270	744	569	198	64.4	110	94.3	107	113	85.3	1330	1490
13	3110	683	498	205	72.8	147	92.7	116	111	85.7	1920	1850
14	3210	712	462	156	104	223	92.2	119	101	89.3	2210	2000
15	2860	840	435	155	107	148	84.2	126	98.3	91.5	2010	1910
16	2610	1200	398	147	113	114	86.0	121	96.0	84.9	1690	1730
17	2460	1390	381	138	110	104	91.2	103	99.9	82.8	1380	1510
18	2340	1450	378	133	98.6	91.0	100	92.8	104	91.9	1080	1310
19	2210	1460	395	125	100	89.8	93.5	92.3	143	98.0	937	1440
20	2070	1490	453	114	109	85.6	82.4	95.3	143	92.7	839	1810
21	1910	1480	514	100	108	86.4	M	93.7	86.1	123	726	2130
22	1720	1470	501	106	104	84.6	M	112	78.3	165	621	2230
23	1480	1580	510	113	105	87.4	88.9	110	85.9	162	655	2240
24	1140	1700	479	119	112	84.3	91.8	85.2	88.6	239	647	2280
25	973	1680	485	144	133	83.3	94.8	85.0	100	321	548	2310
26	809	1640	458	138	120	101	90.1	86.9	104	355	548	2250
27	750	1650	427	117	117	98.9	90.5	88.9	106	348	565	2080
28	721	1610	408	96.3	112	95.1	95.1	103	103	236	694	1850
29	697	—	435	92.7	93.9	102	99.5	104	105	418	742	1730
30	697	—	385	80.0	80.5	112	93.4	101	96.3	458	688	1680
31	875	—	353	—	72.6	—	109	94.7	—	276	—	1620
Mean	1924	1428	624	175	93.4	101	91.0	103	101	157	862	1378
Max	3210	2100	1490	327	133	223	109	131	143	458	2210	2310
Min	697	683	353	80.0	64.1	79.8	77.9	85.0	78.3	82.8	147	376
Ac-Ft	118278	79315	38344	10433	5746	5981	5236	6323	5991	9636	51273	84738

†All 2021 data are provisional—subject to revision; e=estimated



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — TRGC

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1994	773	461	796	405	125	76.5	120	110	91.5	75.0	623	1780
1995	2051	1766	1550	591	240	94.3	77.3	117	96.0	88.4	616	2273
1996	2036	2709	613	1005	663	152	85.6	117	82.6	125	262	2922
1997	1905	963	1843	469	251	124	87.1	134	223	452	805	1174
1998	2431	1951	1188	469	278	128	114	106	131	135	248	2198
1999	2318	3448	1290	639	303	139	120	128	146	163	526	1410
2000	1637	846	835	244	181	149	110	142	170	184	147	231
2001	183	276	199	154	123	78.6	55.3	52.7	43.4	60.8	354	2256
2002	1693	1122	854	535	125	80.9	78.8	77.3	127	124	98.6	715
2003	1073	1042	1629	806	216	78.1	69.2	117	107	130	159	755
2004	1038	1168	546	316	127	68.3	83.4	116	84.9	131	91.4	247
2005	371	176	93.7	475	298	102	99.6	89.8	76.1	126	418	620
2006	2478	1183	864	530	140	102	103	99.9	111	93.1	1603	2058
2007	1172	382	998	328	112	100	107	109	113	83.3	145	1756
2008	1800	1435	790	647	244	123	133	106	126	125	192	175
2009	1810	286	597	454	427	68.5	117	116	112	104	575	646
2010	2070	845	799	994	376	621	110	102	105	119	468	2420
2011	1840	560	1990	1210	454	186	115	112	105	82.0	138	274
2012	1480	851	1490	740	313	139	111	101	113	113	656	2510
2013	748	487	531	326	154	127	105	97.0	106	143	244	271
2014	319	1545	1560	796	381	108	102	97.0	98.0	120	264	1170
2015	862	782	603	261	96.0	94.0	98.0	100	85.5	77.0	386	2770
2016	2270	1300	1860	332	82.0	75.0	92.0	99.0	113	501	762	1470
2017	1010	1960	1600	1115	457	111	105	96.0	110	100	1057	703
2018	1450	551	765	1010	149	89.3	107	103	106	96.5	66.1	549
2019	678	734	418	446	108	90.0	98.7	100	93.3	91.5	87.3	211
2020	1500	704	302	179	101	103	103	102	144	110	342	443
2021	2110	1485	498	151	96.6	90.7	91.7	101	99.2	91.5	710	1620
median	1465	973	837	480	192	101	101	104	108	117	321	1195

KEY

Q in cfs

- Q ≤ 69.5
- 69.5 < Q ≤ 82.0
- 82.0 < Q ≤ 90.3
- 90.3 < Q ≤ 98.0
- 98.0 < Q ≤ 114
- 114< Q ≤ 137
- 137 < Q ≤ 207
- 207 < Q ≤ 798
- 798 < Q ≤ 1772
- 1772 < Q ≤ 2297
- Q > 2297

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

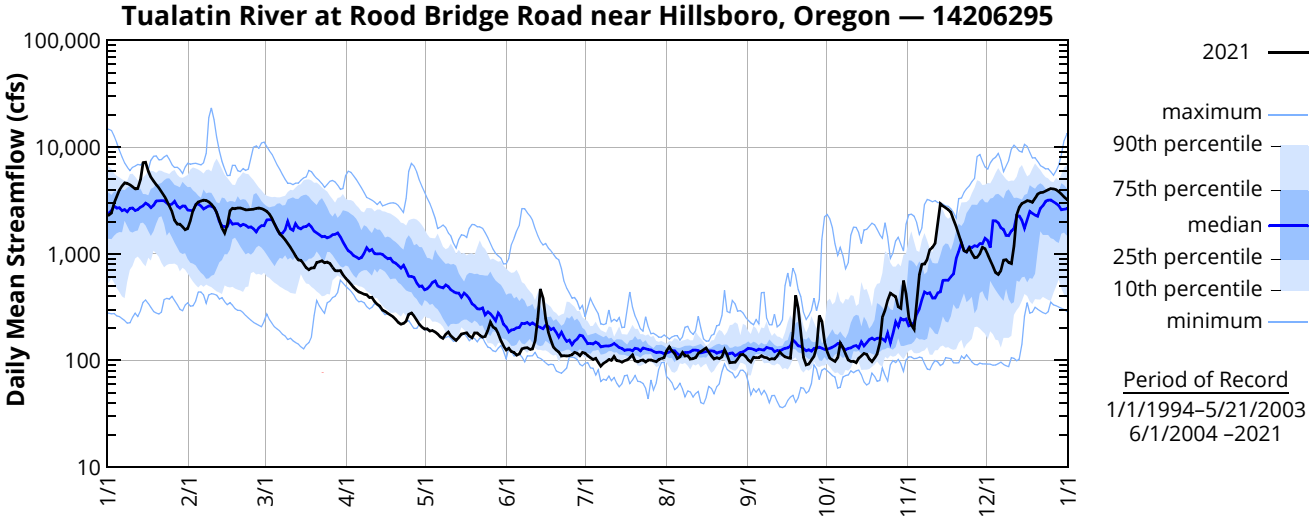
ROOD – TUALATIN RIVER AT ROOD BRIDGE ROAD NEAR HILLSBORO, OREGON – 14206295

Data source: Oregon Water Resources Department
River mile: 38.4 *Latitude:* 45 29 24 *Longitude:* 122 57 06

2021 — MEAN STREAMFLOW[†] (cfs) — ROOD

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	2300	2050	2590	588	197	125	117	123	101	121	253	988
2	2410	2540	2500	557	198	130	111	134	97	105	215	865
3	2970	2880	2360	520	188	121	106	123	107	101	196	763
4	3450	3060	2140	484	191	119	102	116	106	98	349	666
5	3950	3120	1890	458	185	112	105	104	106	106	637	640
6	4330	3180	1690	438	177	115	96	108	111	145	799	693
7	4620	3160	1530	429	166	128	88	119	107	132	803	873
8	4580	3070	1450	418	161	131	94	110	106	115	888	881
9	4440	2910	1350	413	176	132	97	111	102	101	1090	828
10	4250	2710	1250	389	185	127	102	103	104	98	1150	807
11	4050	2430	1150	391	170	128	100	104	103	98	1250e	1180
12	4080	2070	1050	357	161	152	109	106	110	95	2000e	2310
13	4940	1740	952	336	154	248	100	117	120	105	2950e	2720
14	7150	1560	875	322	164	468	99	121	113	110	2800e	2960
15	7230	1860	868	297	177	387	96	126	108	116	2700e	3050
16	5960	2530	806	289	179	247	99	131	106	114	2600e	3150
17	5240	2670	741	276	182	184	101	120	105	103	2450e	3120
18	4800	2640	710	267	169	155	106	110	181	97	2100e	3030
19	4450	2690	737	257	163	133	113	103	408	105	1800e	3310
20	4160	2690	739	243	181	125	99	106	308	115	1520	3630
21	3830	2630	831	227	181	120	97	104	173	146	1270	3750
22	3500	2580	839	218	172	110	100	108	107	253	1070	3770
23	3150	2590	859	222	165	111	101	126	91	296	1040	3880
24	2800	2610	823	234	167	110	97	113	92	365	1130	3980
25	2480	2620	837	271	191	111	101	95	101	426	1010	4080
26	2060	2660	813	279	228	113	101	96	109	410	919	4060
27	1900	2690	746	261	206	119	99	96	133	397	927	3990
28	1900	2650	694	239	199	117	97	103	264	318	1000	3830
29	1790	—	693	218	178	111	102	113	233	307	1150	3630
30	1680	—	696	205	153	119	104	114	149	561	1120	3410
31	1720	—	634	—	137	—	106	109	—	419	—	3250
Mean	3747	2593	1156	337	177	154	101	112	139	196	1306	2519
Max	7230	3180	2590	588	228	468	117	134	408	561	2950	4080
Min	1680	1560	634	205	137	110	88.2	95.2	90.8	95.2	196	640
Ac-Ft	230420	143980	71094	20039	10911	9140	6237	6887	8253	12056	77724	154897

[†]All 2021 data are provisional—subject to revision; e=estimated



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — ROOD

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1994	1310	762	1480	656	205	123	107.0	96.0	91.5	82	1095	3590
1995	3903	4086	2810	1104	478	207	111.0	115.8	106.8	140.5	972	5587
1996	2880	4720	1123	1705	1421	317	145	147	138	257	523	4549
1997	3934	1931	3518	815	412	322	128	135	236	610	1748	2470
1998	4637	3079	2163	798	496	300	152	121	131	179	367	4046
1999	5027	6820	2665	1129	457	207		134	128	142	695	2582
2000	2626	1670	1584	412	297	200	120	124	155	196	144	375
2001	293	429	326	282	194	111	66	57	49	84	544	3823
2002	2941	2476	1516	701	239	134	111	99	123	122	121	1037
2003	2683	3123	3382	1777	424							
2004						134	105	122	114	196	212	468
2005	721	387	222	1067	905	256	124	91	85	156	899	1497
2006	5846	3111	1569	1017	332	202	139	117	122	118	2850	4187
2007	2928	815	1739	622	235	148	129	126	135	146	254	3230
2008	3560	2905	1410	1205	461	184	154	118	129	120	361	304
2009	3280	523	1140	865	768	163	126	126	130	152	1047	1110
2010	3230	1775	1530	2265	801	1100	197	136	166	169	886	3750
2011	3370	1375	3380	2090	916	342	190	146	133	133	256	418
2012	2940	1690	2900	1495	679	344	169	130	134	236	1175	4130
2013	1330	859	1020	622	264	257	138	121	175	215	434	420
2014	609	2735	2810	1680	739	201	144	114	114	181	612	2240
2015	1610	2250	1360	638	219	127	116	113	115	81	580	5570
2016	3800	2440	2860	646	188	129	114	97	115	964	1425	3240
2017	2290	5140	3570	2100	864	247	159	128	139	165	1770	1370
2018	2710	1280	1620	2140	304	143	136	129	139	135	135	798
2019	1340	1995	856	902	251	134	128	124	149	144	132	458
2020	3010	1595	609	323	197	198	130	114	138	140	525	670
2021	3950	2645	859	293	177	125	101	110	107	115	1105	3050
median	2800	2006	1636	882	372	193	131	120	129	151	569	2310

KEY

Q in cfs

- Q ≤ 100
- 100 < Q ≤ 113
- 113 < Q ≤ 122
- 122 < Q ≤ 130
- 130< Q ≤ 157
- 157< Q ≤ 222
- 222 < Q ≤ 376
- 376 < Q ≤ 1544
- 1544 < Q ≤ 3302
- 3302 < Q ≤ 4431
- Q > 4431

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

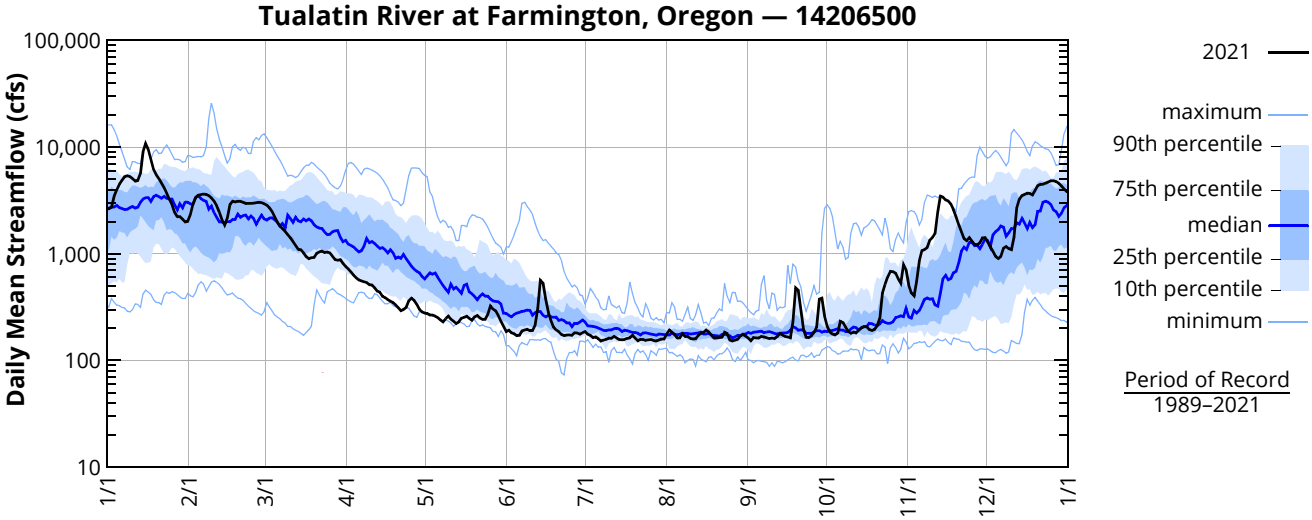
FRMO — TUALATIN RIVER AT FARMINGTON, OREGON — 14206500

Data source: Oregon Water Resources Department
River mile: 33.3 *Latitude:* 45 26 58 *Longitude:* 122 57 02

2021 — MEAN STREAMFLOW† (cfs) — FRMO

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	2640	2330	2950	760	278	186	186	176	162	210	507	1290
2	2740	2910	2860	720	276	192	176	193	153	184	430	1160
3	3450	3360	2710	676	267	182	172	184	164	177	403	1050
4	3980	3550	2490	630	267	178	164	175	163	173	556	944
5	4480	3580	2220	594	260	171	166	162	162	180	861	902
6	4880	3630	1990	568	252	172	160	163	168	233	1070	944
7	5270	3610	1820	556	240	189	152	178	166	227	1090	1130
8	5390	3510	1720	545	230	193	155	168	163	205	1140	1170
9	5290	3340	1620	537	246	196	157	168	160	186	1340	1120
10	5070	3110	1510	512	260	190	162	161	162	180	1420	1090
11	4810	2820	1410	510	244	191	161	159	160	185	1550	1430
12	4850	2450	1300	479	233	214	168	160	167	181	2480	2680
13	5670	2090	1200	446	222	310	162	172	179	192	3470	3230
14	9050	1850	1100	435	230	564	157	179	173	202	3400	3510
15	10800	2150	1090	399	249	531	156	183	168	207	3200	3600
16	9500	2900	1020	389	253	378	157	193	166	207	3130	3710
17	7700	3110	942	372	259	284	161	185	163	195	2920	3680
18	6150	3060	899	360	248	238	163	172	231	191	2590	3570
19	5510	3110	919	349	238	206	172	162	480	195	2210	3930
20	5060	3110	924	331	256	193	162	163	455	211	1880	4350
21	4600	3030	1010	311	264	186	153	164	302	248	1610	4490
22	4150	2960	1040	293	251	175	158	165	196	427	1390	4490
23	3690	2970	1060	300	243	171	157	184	165	518	1330	4590
24	3250	2970	1030	314	243	173	154	179	164	606	1420	4700
25	2890	2980	1040	362	270	174	156	155	170	684	1320	4830
26	2450	3010	1020	383	324	172	157	152	183	679	1220	4840
27	2220	3050	944	366	303	182	154	155	205	657	1210	4750
28	2230	3010	880	336	292	181	152	158	375	582	1270	4570
29	2110	—	869	302	264	176	155	170	383	530	1410	4330
30	1990	—	880	285	232	182	159	175	259	792	1420	4060
31	2010	—	815	—	209	—	159	169	—	706	—	3840
Mean	4641	2984	1396	447	255	224	161	170	212	334	1642	3032
Max	10800	3630	2950	760	324	564	186	193	480	792	3470	4840
Min	1990	1850	815	285	209	171	152	152	153	173	403	902
Ac-Ft	285382	165739	85849	26618	15675	13349	9884	10477	12629	20529	97680	186407

†All 2021 data are provisional—subject to revision



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — FRMO

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1989	3026	1135	3117	1154	332	157	169	186	149	185	223	390
1990	2923	5460	2514	552	406	417	203	174	164	224	419	968
1991	1349	2031	1940	2464	620	283	197	192	178	180	343	1020
1992	1184	3089	774	720	306	152	141	133	137	150	288	1763
1993	1618	723	1651	2111	938	450	200	155	202	193	217	799
1994	1797	969	1802	852	327	173	152	136	138	133	1349	3782
1995	3978	4361	2952	1296	590	264	186	180	170	215	1137	5537
1996	3520	5746	1421	2046	1794	379	200	200	196	299	600	5701
1997	4071	2127	3652	991	492	394	193	190	283	695	2069	2701
1998	5248	3584	2539	949	584	378	206	172	187	228	418	5136
1999	6113	8123	2929	1356	553	265	198	178	184	197	851	2802
2000	3002	1998	1870	503	370	252	172	172	205	255	207	375
2001	380	515	410	356	261	170	125	113	100	135	610	4827
2002	3552	2708	1803	850	299	186	148	130	166	170	172	1238
2003	2530	2870	3050	1790	535	207	148	169	170	219	219	1350
2004	2430	2555	1150	644	321	200	172	193	184	266	286	543
2005	920	505	286	1340	1180	344	180	145	144	239	1155	1910
2006	6010	3400	1800	1190	421	301	207	168	170	187	3100	4000
2007	3500	966	2120	823	339	219	190	180	190	223	397	3350
2008	4200	3360	1600	1400	587	263	223	193	204	210	430	361
2009	3830	630	1300	934	898	215	176	176	189	221	1170	1280
2010	3880	2020	1740	2590	930	1220	265	208	224	214	914	4500
2011	4110	1555	4140	2525	1060	450	257	212	193	190	299	497
2012	3560	2000	3720	1840	825	426	239	203	204	331	1455	5200
2013	1690	1105	1300	827	375	353	203	190	252	288	554	538
2014	731	3385	3550	1965	898	297	219	187	187	277	759	2670
2015	1910	2805	1660	777	307	202	178	173	183	169	793	8310
2016	4760	3020	3490	777	280	206	182	170	199	1170	1725	4060
2017	2860	7270	4550	2655	1070	334	198	167	182	222	2115	1610
2018	2960	1390	1710	2375	376	213	188	171	186	186	172	899
2019	1500	2185	978	1045	342	200	185	168	196	203	203	589
2020	3400	1710	714	426	287	284	177	165	210	191	676	821
2021	4600	3020	1060	394	252	188	159	169	168	207	1400	3600
median	2971	2338	1850	1032	458	254	189	175	185	210	574	2060

KEY

Q in cfs

- Q ≤ 152
- 152 < Q ≤ 167
- 167 < Q ≤ 178
- 178 < Q ≤ 189
- 189 < Q ≤ 218
- 217 < Q ≤ 285
- 285 < Q ≤ 456
- 456 < Q ≤ 1670
- 1670 < Q ≤ 3562
- 3562 < Q ≤ 4841
- Q > 4841

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

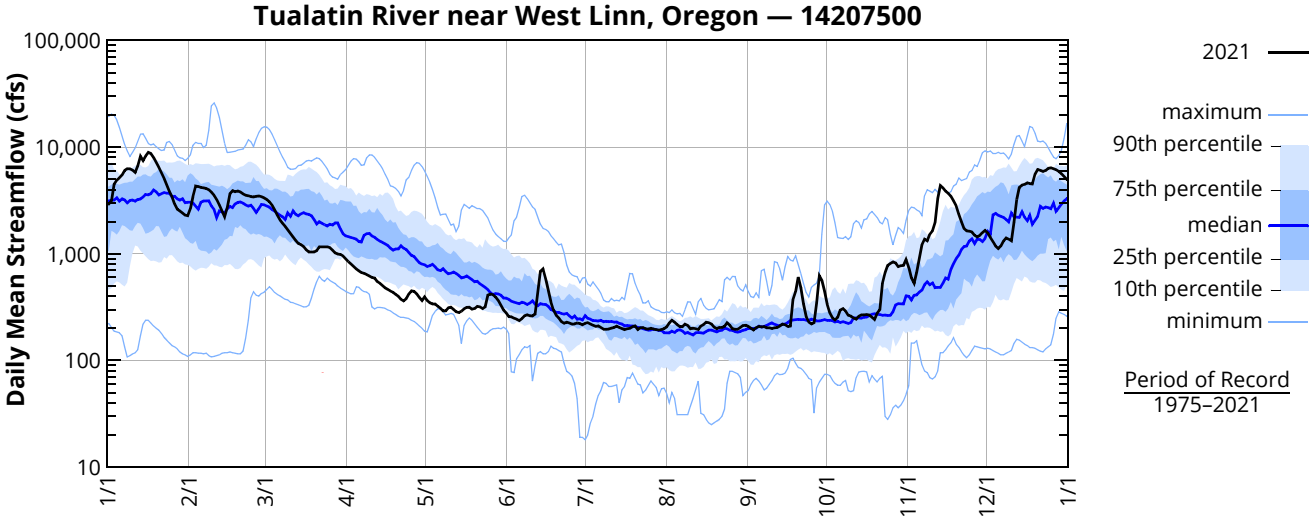
WSLO — TUALATIN RIVER AT WEST LINN, OREG. — 14207500

Data source: U.S. Geological Survey, Oregon Water Science Center

River Mile: 1.75 *Latitude:* 45 21 03 *Longitude:* 122 04 30 *Drainage area:* 706.00 sq mile *Datum:* 85.61 ft

2021 — MEAN STREAMFLOW (cfs) — WSLO

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	2930	2650	3340	895	394	279	223	206	209	337	745	1570
2	3150	3450	3230	845	365	258	226	224	201	278	595	1430
3	4480	4310	3080	803	347	257	220	238	193	251	528	1300
4	4910	4270	2850	761	339	249	214	228	203	240	670	1180
5	5150	4190	2580	720	338	244	209	217	209	253	925	1120
6	5480	4150	2310	691	323	236	211	207	206	297	1220	1180
7	6040	4100	2080	666	308	246	204	207	208	306	1370	1320
8	6270	3980	1940	655	292	262	196	219	202	291	1320	1410
9	6260	3790	1810	638	292	268	196	213	202	265	1520	1370
10	6100	3530	1680	619	312	262	197	198	199	260	1640	1320
11	5780	3230	1550	601	316	261	201	201	202	250	1960	1970
12	6650	2860	1440	592	301	271	204	198	204	244	3320	3220
13	8200	2540	1340	549	286	437	210	195	210	259	4360	4180
14	7480	2220	1250	529	281	683	204	210	219	268	4150	4400
15	8230	2710	1220	503	290	722	199	217	216	268	3870	4470
16	8920	3670	1170	479	305	587	194	228	208	269	3700	4620
17	8710	3900	1090	464	315	450	198	226	210	267	3460	4540
18	7980	3810	1040	448	316	354	200	220	370	254	3140	4510
19	7200	3880	1040	436	302	297	207	206	443	242	2810	5590
20	6450	3800	1040	416	306	265	211	199	604	276	2360	6170
21	5740	3640	1070	400	321	251	195	204	477	299	2000	6050
22	5070	3540	1160	374	318	231	202	204	339	524	1730	5920
23	4430	3500	1160	362	306	223	204	209	257	663	1640	6040
24	3870	3440	1160	379	317	228	198	225	229	776	1630	6330
25	3430	3410	1160	419	409	224	197	214	220	812	1600	6390
26	2930	3460	1140	449	419	219	200	198	226	840	1490	6260
27	2620	3490	1080	445	414	220	197	196	345	819	1440	6130
28	2520	3430	1020	420	392	224	195	196	622	757	1490	5920
29	2410	—	995	390	365	222	192	204	562	774	1580	5650
30	2300	—	986	364	328	216	195	212	443	777	1660	5310
31	2270	—	955	—	297	—	198	214	—	884	—	5010
Mean	5289	3534	1580	544	329	305	203	211	288	429	1997	3932
Max	8920	4310	3340	895	419	722	226	238	622	884	4360	6390
Min	2270	2220	955	362	281	216	192	195	193	240	528	1120
Ac-Ft	325210	196264	97123	32354	20259	18141	12490	12958	17133	26380	118855	241745



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — WSLO

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1975	5390	4570	3560	946	737	235	213	298	387	232	1070	3330
1976	4920	1585	3090	1255	441	247	161	176	232	213	144	132
1977	164	118	1000	306	219	161	61	37	172	150	850	4240
1978	4470	3470	1300	1035	959	347	142	128	376	268	197	905
1979	852	4435	2040	695	600	142	89	117	191	238	622	2820
1980	4450	2740	2600	1950	483	318	125	89	220	163	588	3220
1981	1390	2035	1120	1465	557	510	153	184	195	382	1785	6660
1982	4250	4765	3400	3005	598	193	99	124	184	264	780	5260
1983	4070	6610	5470	2045	609	282	254	128	267	272	3040	3380
1984	2510	3375	2440	1620	1210	757	259	133	182	333	2710	2470
1985	964	1575	964	895	345	323	128	142	143	100	431	666
1986	2080	2980	2250	618	640	182	159	78	89	100	335	1540
1987	3630	3525	5000	840	329	183	178	111	79	72	138	1830
1988	2900	1245	866	1235	735	389	147	122	117	118	688	1150
1989	3060	1235	3540	1325	441	229	135	160	117	189	228	432
1990	3320	6530	2580	582	389	411	174	135	130	203	460	1220
1991	1620	2170	2080	3055	676	339	244	147	131	139	377	1140
1992	1350	3765	882	821	330	143	110	84	96	110	306	2230
1993	2010	917	2010	2495	1200	580	235	141	177	172	196	932
1994	2010	1015	1960	966	337	205	135	126	124	113	1560	4200
1995	5030	5410	3390	1550	769	302	177	151	155	265	1365	6620
1996	4320	6930	1750	2395	2280	443	264	233	257	474	799	6440
1997	5060	2445	4680	1305	682	549	235	226	374	867	2340	3250
1998	6170	4375	3100	1150	798	569	280	212	251	340	673	5890
1999	6790	8685	3740	1745	805	416	262	230	240	261	1085	3470
2000	3910	2525	2300	758	590	385	221	212	268	367	285	596
2001	543	709	603	564	425	250	150	130	128	201	934	5430
2002	4770	3715	2440	1150	511	296	234	158	204	225	264	1610
2003	3250	3960	4140	2385	766	311	173	188	215	285	288	1740
2004	3020	3165	1350	840	432	263	178	198	228	363	358	712
2005	1030	706	436	1520	1380	485	234	171	188	282	1330	1910
2006	8630	4175	2150	1505	578	389	235	195	219	239	3500	5410
2007	3980	1140	2440	1005	454	282	235	237	248	319	482	4380
2008	4930	3855	1880	1550	692	351	261	225	242	260	603	537
2009	4380	742	1490	1110	1050	292	216	215	222	249	1230	1470
2010	4680	2300	2050	3115	1120	1490	326	245	290	289	1028	5510
2011	4930	1915	5200	2925	1320	573	341	249	254	284	439	618
2012	3890	2210	4390	2205	1020	511	278	228	237	451	1425	5990
2013	1650	1070	1250	853	436	459	245	208	293	330	626	554
2014	798	3945	4040	2280	985	347	255	199	209	329	897	2690
2015	2000	3085	1840	930	362	218	202	188	218	213	907	8020
2016	5350	3290	3880	1065	433	280	228	208	257	1210	1820	4480
2017	2980	7800	5090	2760	1230	450	242	212	238	310	2190	1810
2018	3310	1675	2070	2985	476	282	222	195	221	247	272	1020
2019	1740	2740	1270	1320	453	273	230	190	267	250	305	875
2020	4060	2075	873	532	408	375	223	197	241	243	747	918
2021	5480	3535	1170	491	316	258	200	209	213	278	1635	4510
median	3360	2800	2190	1200	587	315	212	189	222	259	675	2410

KEY

Q in cfs

- Q ≤ 120
- 120 < Q ≤ 160
- 160 < Q ≤ 194
- 194 < Q ≤ 215
- 215< Q ≤ 264
- 264< Q ≤ 359
- 359 < Q ≤ 570
- 570 < Q ≤ 1890
- 1890 < Q ≤ 4200
- 4200 < Q ≤ 5650
- Q > 5650

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

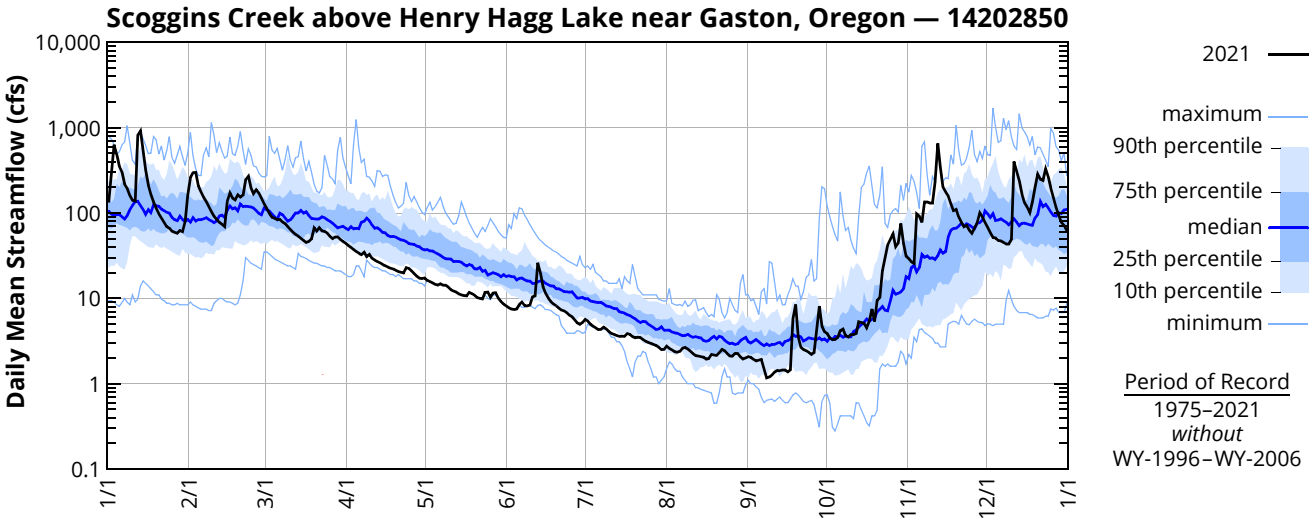
SCLO – Scoggins Creek above Henry Hagg Lake near Gaston, Oregon – 14202850

Data source: Oregon Water Resources Department
River Mile: 9.3 *Latitude:* 45 30 06 *Longitude:* 123 15 60

2021 — MEAN STREAMFLOW† (cfs) — SCLO

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	138	262	129	44.3	17.4	8.2	5.7	2.8	2.1	3.9	29.3	67.6
2	304	298	113	41.7	16.3	7.8	5.5	2.6	2.0	3.4	26.9	58.9
3	634	301	99.2	39.6	15.8	7.5	5.0	2.5	1.9	3.3	25.7	51.8
4	487	211	89.3	37.5	15.3	7.4	4.7	2.4	1.9	3.3	98.2	51.1
5	352	177	86.9	35.4	14.6	7.5	4.5	2.3	1.9	3.5	92.2	47.7
6	300	154	83.9	33.9	14.3	8.5	4.3	2.4	1.9	4.2	77.7	47.3
7	218	136	84.5	32.7	14.9	9.0	4.4	2.6	1.5	4.4	135	45.3
8	195	119	78.8	34.9	14.3	8.2	4.6	2.7	1.2	3.7	135	43.4
9	160	104	75.6	31.0	14.3	8.2	4.4	2.6	1.2	3.5	131	43.5
10	141	91.5	69.5	32.9	13.6	8.3	4.1	2.4	1.3	3.8	131	49.1
11	138	84.4	64.1	29.7	12.7	10.4	3.9	2.3	1.4	3.8	232	403
12	818	77.7	59.8	28.2	12.2	10.7	3.8	2.1	1.4	3.9	656	311
13	918	74.0	56.2	27.1	11.9	26.2	3.7	2.1	1.4	5.3	344	242
14	527	69.6	53.7	26.2	11.3	20.2	3.6	2.1	1.5	5.2	202	167
15	322	137	50.6	25.1	11.0	13.7	3.6	2.1	1.5	5.1	177	133
16	214	172	47.7	24.2	10.8	11.5	3.6	2.0	1.4	4.5	160	117
17	166	150	45.3	23.4	10.7	10.1	3.9	2.0	1.5	5.4	129	101
18	135	143	46.6	22.6	11.8	9.2	3.8	2.2	5.8	7.5	107	135
19	114	164	49.7	22.1	11.4	8.6	3.6	2.2	8.5	5.4	111	203
20	98.2	154	67.1	21.5	10.9	8.2	3.5	2.2	3.6	9.5	90.1	287
21	87.7	163	61.7	20.7	10.2	7.7	3.5	2.3	2.7	10.2	77.9	249
22	77.6	246	67.4	20.2	10.0	7.3	3.5	2.5	2.5	21.1	69.1	241
23	69.4	271	61.8	19.9	9.9	7.1	3.3	2.5	2.4	30.3	71.8	332
24	66.8	199	61.1	22.9	11.8	6.8	3.1	2.3	2.3	42.4	63.0	268
25	61.2	169	58.2	22.5	11.9	6.4	3.1	2.1	2.2	49.7	57.9	198
26	59.5	188	53.6	21.1	10.3	6.1	3.0	2.1	2.3	57.2	66.9	152
27	57.9	172	50.3	19.6	11.6	5.6	2.9	2.3	4.3	40.3	76.8	117
28	62.3	149	52.4	18.2	11.7	5.2	2.8	2.3	8.1	44.5	101	94.5
29	60.5	—	52.7	17.3	10.1	5.0	2.7	2.1	4.8	75.4	90.3	78.1
30	79.6	—	49.1	17.1	9.2	5.2	2.5	2.0	4.1	44.0	77.6	71.7
31	162	—	46.5	—	8.6	—	2.5	2.0	—	31.3	—	62.8
Mean	233	166	66.6	27.1	12.3	9.1	3.8	2.3	2.7	17.4	128	144
Max	918	301	129	44.3	17.4	26.2	5.7	2.8	8.5	75.4	656	403
Min	57.9	69.6	45.3	17.1	8.6	5.0	2.5	2.0	1.2	3.3	25.7	43.4
Ac-Ft	14328	9196	4096	1614	755	539	232	140	159	1069	7621	8864

†All 2021 data are provisional—subject to revision



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — SCLO

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1975	179	133	123	53	33	11	5.4	3.0	1.9	4.9	79	147
1976	164	92	129	60	21	12	5.7	3.8	2.4	2.2	5.9	6.8
1977	9.1	9.1	59	21	16	12	4.5	1.5	4.5	6.2	72	144
1978	163	122	55	51	46	17	5.7	1.6	3.8	1.8	6.7	45
1979	31	190	68	37	29	11	4.0	3.0	2.8	4.0	24	127
1980	151	125	93	67	21	15	6.2	3.4	3.2	2.2	40	117
1981	59	106	51	69	26	24	8.4	3.6	2.2	20	96	215
1982	147	202	131	110	33	14	7.9	4.1	3.8	11	50	211
1983	158	304	160	74	29	12	11	3.3	5.9	5.3	154	96
1984	102	132	102	66	68	31	12	6.3	5.2	11	135	94
1985	44	79	69	67	24	19	7.4	3.7	4.4	8.4	29	47
1986	124	138	93	39	35	13	9.1	2.3	4.4	5.5	34	65
1987	117	114	154	43	19	9.7	5.8	2.3	2.1	4.7	15	75
1988	98	72	43	50	26	16	7.8	2.9	1.8	3.5	53	54
1989	121	51	136	53	19	8.4	3.7	1.8	0.7	0.6	11	17
1990	80	172	109	35	22	19	5.1	3.0	3.0	4.6	21	41
1991	68	102	82	78	30	15	9.1	4.3	2.2	1.2	11	46
1992	70	91	32	40	16	8.1	2.4	1.1	1.7	3.1	16	80
1993	67	45	71	94	44	25	9.8	5.1	2.8	3.5	5.0	37
1994	71	63	74	44	20	12	5.5	2.4	1.5	2.3	77	183
1995	153	121	120	57	26	13	7.4	3.5	3.9			
1996–2005												
2006										2.5	187	150
2007	86	64	104	44	21	10	5.1	3.2	2.9	10	29	178
2008	139	112	107	85	39	19	7.2	4.6	3.4	6.2	40	39
2009	129	40	92	54	52	17	6.6	4.4	3.7	9.8	104	90
2010	202	90	81	99	41	41	12	6.1	7.5	9.7	81	189
2011	105	69	175	118	45	24	13	6.6	4.1	8.3	24	39
2012	125	90	150	78	44	22	9.6	4.9	3.3	7.0	94	200
2013	75	69	64	44	21	18	6.9	4.8	4.7	19	33	27
2014	35	111	136	75	50	16	7.5	3.9	2.9	8.2	60	126
2015	84	73	50	32	16	7.8	4.2	2.6	3.0	3.8	52	331
2016	177	137	165	44	17	11	5.4	2.9	3.0	80	110	130
2017	76	225	210	104	44	19	6.9	3.7	3.2	4.4	129	64
2018	147	64	87	90	22	12	4.6	2.7	2.8	3.2	7.0	74
2019	93	83	58	58	21	8.8	6.4	3.5	4.8	6.0	5.3	38
2020	203	86	33	28	20	13	6.7	3.3	4.6	7.8	47	90
2021	141	159	61	25	12	8.2	3.6	2.3	2.0	5.3	95	117
median	101	98	89	56	26	14	6.6	3.4	3.1	5.3	43	90

KEY

Q in cfs
- Q ≤ 2.3
- 2.3 < Q ≤ 3.1
- 3.1 < Q ≤ 3.9
- 3.9 < Q ≤ 4.9
- 4.9 Q ≤ 8.5
- 8.5< Q ≤ 15
- 15 < Q ≤ 27
- 27 < Q ≤ 81
- 81 < Q ≤ 162
- 162 < Q ≤ 234
- Q > 234

Q as percentile
- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

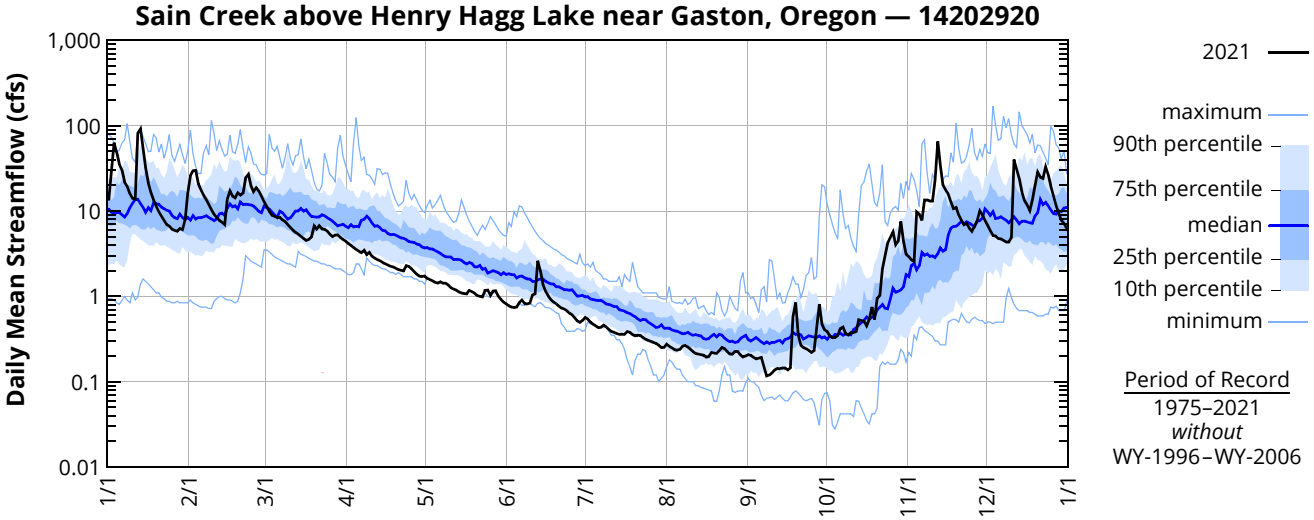
SCHO – Sain Creek above Henry Hagg Lake near Gaston, Oregon – 14202920

Data source: Oregon Water Resources Department
River Mile: 1.6 *Latitude:* 45 28 50 *Longitude:* 123 14 40

2021 — MEAN STREAMFLOW[†] (cfs) — SCHO

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	72.6	147e	73.0e	25.4e	11.5	6.3	3.9	2.2	1.6	2.5	12.0	37.1
2	172	167e	63.4e	23.9e	10.9	5.3	3.7	2.0	1.5	2.3	11.6	32.2
3	294	169e	56.1e	22.8e	10.6	6.2	3.5	1.9	1.4	2.2	11.7	28.4
4	235	118e	50.5e	21.6e	10.4	6.4	3.3	1.8	1.4	2.2	58.1	29.0
5	184	99.4e	49.1e	20.5e	9.9	6.8	3.1	1.8	1.4	2.4	48.5	27.4
6	158	86.5e	47.5e	19.6e	9.7	7.6	3.0	1.9	1.4	2.7	39.4	29.0
7	121	76.4e	47.8e	18.9e	9.9	7.7	3.0	2.0	1.4	2.6	66.7	29.1
8	111	66.8e	44.6e	23.0e	9.7	7.2	3.3	2.0	1.3	2.3	67.0	28.3
9	88.4	58.4e	42.9e	19.0	9.7	7.2	3.3	2.0	1.3	2.3	68.4	29.2
10	75.3	51.4e	39.5e	19.8	9.5	7.2	3.1	1.8	1.3	2.5	64.7	33.0
11	72.6	47.4e	36.4e	18.2	9.1	8.4	2.9	1.7	1.5	2.4	122	175
12	377	43.7e	34.0e	17.5	8.9	8.2	2.9	1.6	1.5	2.5	250	138
13	515e	41.6e	31.9e	16.8	8.7	21.9	2.9	1.6	1.5	3.4	114	125
14	296e	39.1e	30.5e	16.4	8.5	16.1	2.9	1.6	1.4	3.6	75.8	97.1
15	181e	77.5e	28.7e	16.1	8.3	10.6	2.9	1.6	1.3	3.4	67.9	81.5
16	120e	96.6e	27.2e	15.5	8.2	9.0	3.0	1.5	1.2	3.1	61.4	75.2
17	93.2e	84.2e	25.8e	15.0	8.2	8.1	3.0	1.6	1.3	3.6	50.9	68.8
18	75.8e	80.3e	26.6e	14.6	8.7	7.6	2.9	1.8	4.2	4.3	42.7	80.9
19	64.0e	92.1e	28.4e	14.3	8.8	7.2	2.8	1.7	5.0	3.4	42.6	118
20	55.1e	86.5e	38.2e	13.8	8.5	6.9	2.8	1.7	2.5	6.0	34.6	163
21	49.2e	91.5e	35.1e	13.4	8.3	6.3	2.9	1.9	2.1	5.8	30.5	145
22	43.6e	139e	38.4e	13.2	8.1	6.0	2.8	2.0	2.0	11.1	28.2	135
23	39.0e	153e	35.3e	13.0	8.1	5.9	2.7	1.8	2.0	14.8	31.1	157
24	37.5e	112e	34.9e	15.7	9.4	5.6	2.5	1.7	1.8	23.3	27.4	149
25	34.4e	95.4e	33.2e	14.9	9.0	5.2	2.4	1.6	1.7	27.9	25.7	125
26	33.4e	106e	30.6e	14.2	8.2	4.9	2.3	1.6	1.7	27.9	36.2	101
27	32.5e	97.1e	28.8e	13.4	8.5	4.8	2.3	1.7	3.0	17.6	44.6	82.7
28	35.0e	84.2e	30.0e	12.4	8.5	4.7	2.2	1.6	5.0	17.8	61.2	71.2
29	34.0e	—	30.2e	11.8	7.9	3.8	2.1	1.4	3.0	26.7	52.4	62.6
30	44.7e	—	28.1e	11.5	7.5	3.7	2.0	1.4	2.7	16.1	43.4	59.0
31	91.0e	—	26.7e	—	7.2	—	2.0	1.6	—	11.2	—	53.9
Mean	124	93.1	37.9	16.9	9.0	7.4	2.8	1.8	2.0	8.4	56.4	82.8
Max	515	169	73.0	25.4	11.5	21.9	3.9	2.2	5.0	27.9	250	175
Min	32.5	39.1	25.8	11.5	7.2	3.7	2.0	1.4	1.2	2.2	11.6	27.4
Ac-Ft	7607	5171	2327	1004	553	442	175	108	120	515	3353	5091

[†]All 2021 data are provisional—subject to revision; e=estimated



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — SCHO

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1975	115	86	78	27	16	5.1	1.9	0.80	0.19	2.3	26	70
1976	81	39	65	31	11	6.0	2.8	2.2	1.4	1.6	3.0	3.2
1977	3.9	4.2	30	10	6.9	1.4	0.50	0.60	2.0	2.7	20	70
1978	92	67	38	27	25	13	4.1	1.1	4.1	2.7	2.6	19
1979	17	87	35	19	15	6.4	3.6	2.7	2.4	2.6	10	62
1980	75	57	46	25	8.9	3.9	2.2	1.8	1.7	1.8	14	39
1981	27	55	26	34	12	9.5	2.2	0.19	0.11	10	43	89
1982	83	107	71	66	16	6.5	3.0	1.1	1.2	3.1	17	93
1983	77	157	89	45	17	11	6.5	3.0	4.1	3.0	73	53
1984	52	67	57	36	32	16	6.4	3.7	3.0	5.4	56	51
1985	26	43	29	29	11	7.7	2.4	1.7	1.9	1.9	9.3	20
1986	57	69	44	19	17	6.5	3.0	0.45	0.72	2.2	7.4	28
1987	59	60	81	19	7.4	5.1	3.3	0.51	0.25	0.25	1.3	30
1988	51	38	25	30	16	12	4.7	1.5	0.88	1.7	23	23
1989	68	27	68	34	11	5.7	2.5	1.1	0.61	1.1	3.7	7.1
1990	53	91	57	19	11	9.5	2.0	1.2	1.1	2.1	9.0	24
1991	35	49	43	35	15	7.1	3.5	2.1	1.1	1.1	7.2	23
1992	28	44	18	24	8.9	4.3	1.2	0.76	0.78	1.2	7.5	45
1993	35	21	33	44	21	11	5.2	3.0	1.6	1.2	1.4	16
1994	32	27	35	22	10	5.8	1.7	0.63	0.43	0.29	33	90
1995	82	68	63	31	15	7.8	4.7	4.2	4.1			
1996–2005												
2006										2.1	72	67
2007	51	39	57	29	14	6.7	4.1	2.6	1.9			
2008	72	63	53	50	17	9.7	3.6	2.3	2.0	3.6	21	22
2009	68	21	41	26	30	11	4.8	3.0	2.4	3.5	52	36
2010	119	54	52	62	30	26	8.1	4.3	4.5	4.2	33	125
2011	64	35	117	61	27	13	7.4	3.9	2.6	3.8	7.2	14
2012	85	52	88	40	24	12	5.6	3.2	2.1	2.9	52	118
2013	36	30	31	22	11	8.2	3.9	2.8	2.4	6.6	15	16
2014	20	83	90	51	28	9.5	4.3	2.4	1.8	3.0	18	67
2015	45	49	30	22	8.8	4.5	2.5	1.6	2.0	1.8	23	206
2016	109	83	91	24	10	6.3	3.8	2.1	2.2	39	55	81
2017	51	129	115	68	26	12	5.3	3.0	2.4	3.4	68	37
2018	79	39	51	54	15	7.8	3.4	2.2	2.0	2.2	3.4	30
2019	40	50	30	30	11	5.0	3.3	2.0	2.0	2.4	2.4	17
2020	109	45	20	15	11	7.0	3.8	2.1	2.0	3.1	19	50
2021	76	89	35	16	8.7	6.8	2.9	1.7	1.5	3.4	47	75
median	55	55	47	30	14	7.6	3.7	2.1	1.9	2.7	17	42

KEY

Q in cfs

- Q ≤ 1.0
- 1.0 < Q ≤ 1.7
- 1.7 < Q ≤ 2.1
- 2.1 < Q ≤ 2.7
- 2.7< Q ≤ 4.3
- 4.2< Q ≤ 7.7
- 7.8 < Q ≤ 14
- 14 < Q ≤ 41
- 41 < Q ≤ 84
- 84 < Q ≤ 121
- Q > 121

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

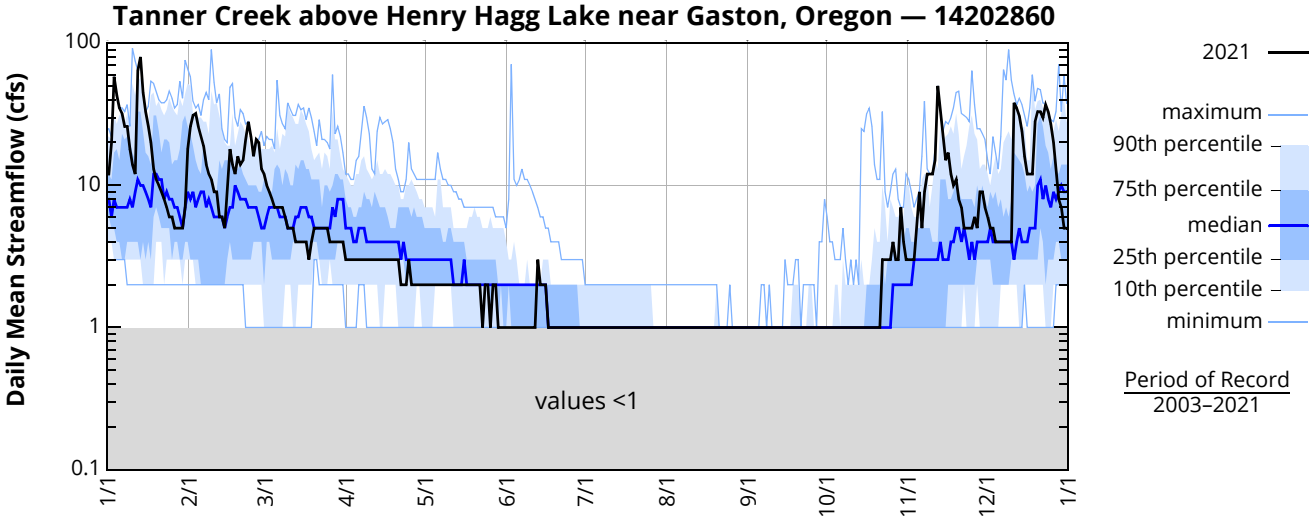
TANO – Tanner Creek above Henry Hagg Lake near Gaston, Oregon – 14202860

Data source: Tualatin Valley Irrigation District
River mile: 1.6 *Latitude:* 45 30 21 *Longitude:* 123 13 10

2021 — MEAN STREAMFLOW* (cfs) — TANO

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	12	26	12	3	2	1	1	1	1	1	3	6
2	20	31	10	3	2	1	1	1	1	1	3	5
3	58	32	9	3	2	1	1	1	1	1	3	5
4	43	26	8	3	2	1	1	1	1	1	5	4
5	35	22	7	3	2	1	1	1	1	1	9	4
6	32	19	7	3	2	1	1	1	1	1	5	4
7	26	14	7	3	2	1	1	1	1	1	9	4
8	26	12	7	3	2	1	1	1	<1	1	12	4
9	18	11	6	3	2	1	1	1	<1	1	12	4
10	14	9	5	3	2	1	1	1	<1	1	12	4
11	12	9	5	3	2	1	1	1	<1	1	15	38
12	64	6	5	3	2	1	1	1	<1	1	50	35
13	80	6	4	3	2	3	1	1	<1	1	35	31
14	45	5	4	3	2	2	1	1	<1	1	24	24
15	33	9	4	3	2	2	1	1	<1	1	15	16
16	26	18	4	3	2	2	1	1	<1	1	17	12
17	20	14	4	3	2	1	1	1	<1	1	12	12
18	13	12	3	3	2	1	1	1	1	1	10	12
19	11	16	4	3	2	1	1	1	1	1	11	28
20	10	14	5	3	2	1	1	1	1	1	8	33
21	9	15	5	3	2	1	1	1	1	1	7	33
22	8	21	5	2	2	1	1	1	1	3	5	30
23	7	28	5	2	1	1	1	1	1	3	5	37
24	6	22	5	2	2	1	1	1	1	3	5	33
25	6	16	5	3	2	1	1	1	1	3	5	27
26	5	21	4	2	1	1	1	1	1	4	6	20
27	5	20	4	2	2	1	1	1	1	3	5	13
28	5	13	4	2	2	1	1	1	1	3	9	8
29	5	—	4	2	1	1	1	1	1	7	9	7
30	7	—	4	2	1	1	1	1	1	4	7	5
31	18	—	4	—	1	—	1	1	—	3	—	5
Mean	22	17	5	3	2	1	1	1	1	2	11	16
Max	80	32	12	3	2	3	1	1	1	7	50	38
Min	5	5	3	2	1	1	1	1	<1	1	3	4
Ac-Ft	1347	926	335	163	113	69	61	61	50	113	660	998

*Values are read from a staff plate. Values may be daily readings taken at about 8:00 a.m. or averages over several days.



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — TANO

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2003	9	8	11	6	2	1	1	1	1	1	2	7
2004	10	8	4	3	2	1	1	0	1	1	2	2
2005	4	2	1	4	3	1	1	1	1	1	3	6
2006	25	5	3	2	1	1	1	1	0	1	10	9
2007	6	4	5	2	1	1	1	1	1	1	1	
2008	10	12	8	7	4	2	1	1	1	1	2	2
2009		2	5	1	1	0	1	1	1	1	3	2
2010				10	5	5	2	2	1	1		
2011		11	17	11	7	2	1	1	1	1	1	1
2012	5	4		4	2	2	2	1	1	1	6	5
2013	2	2	2	3	2	2	1	1	1	2	4	3
2014	4	6	6	5	4	1	1	1	1	1	4	9
2015	5	7	4	3	2	1	1	1	1	1	5	32
2016	27	19	19	4	2	1	1	1	1	7	9	12
2017	5	23	22	8	3	2	1	1	1	1	12	5
2018	13	5	7	9	3	2	1	1	1	1	1	5
2019	7	7	4	4	3	1	1	1	1	1	1	3
2020	24	3	3	3	2	2	1	1	1	1	4	5
2021	14	16	5	3	2	1	1	1	1	1	9	12
median	8	7	5	4	2	1	1	1	1	1	3	5

KEY

Q in cfs

- Q = 0
- Q = 1
- 1 < Q ≤ 2
- 2 < Q ≤ 5
- 5< Q ≤ 12
- 12< Q ≤ 20
- Q > 20

Q as percentile

- Q ≤ 3rd
- 3rd < Q ≤ 40th
- 40th < Q ≤ 56th
- 56th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

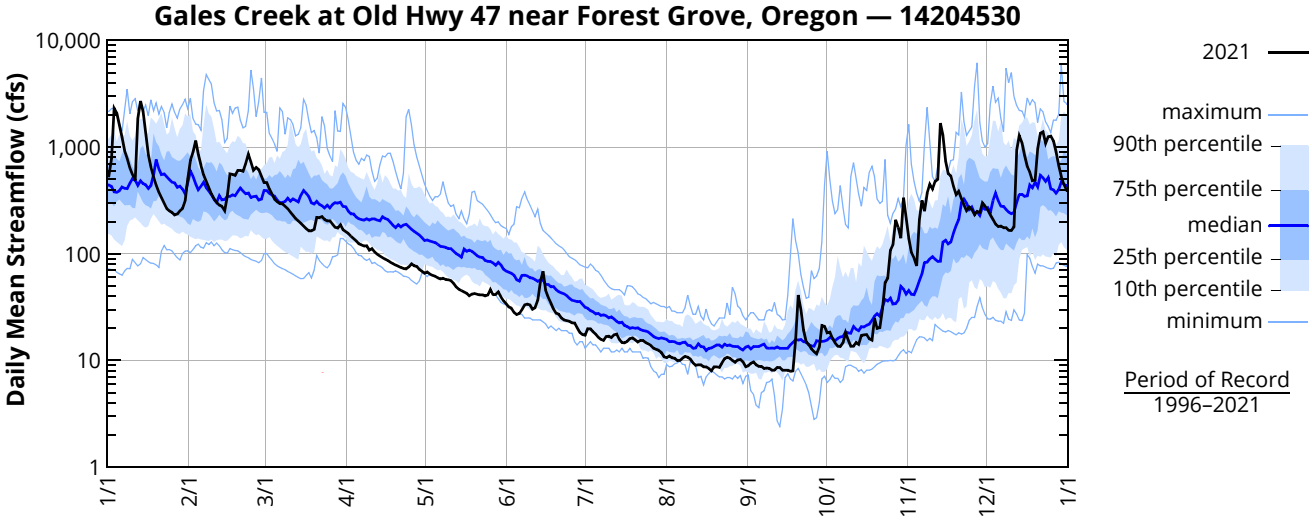
GALES – Gales Creek at Old Hwy 47 near Forest Grove, Oregon – 14204530

Data source: Oregon Water Resources Department
River Mile: 2.36 *Latitude:* 45 30 39 *Longitude:* 123 06 56

2021 — MEAN STREAMFLOW[†] (cfs) — GALES

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	537	752	466	155	67.5	31.7	19.8	11.0	9.4	18.4	103	232
2	780	894	406	146	64.6	30.9	19.8	10.6	9.7	16.1	91.3	210
3	2310	1150	361	139	62.8	28.2	18.6	10.5	9.1	14.6	77.0	190
4	2080	855	324	132	61.6	26.9	17.6	10.0	8.8	13.6	209	180
5	1600	673	308	124	59.4	27.5	16.5	10.0	8.8	13.5	316	182
6	1230	552	295	121	58.0	29.9	15.8	10.5	8.4	14.6	251	175
7	927	476	294	118	59.0	33.2	15.4	10.9	8.5	18.3	372	176
8	785	415	278	119	57.5	33.7	16.7	10.7	8.4	15.5	449	166
9	638	365	264	108	57.0	33.2	16.9	10.3	8.1	13.6	404	165
10	553	326	245	112	56.1	30.2	16.4	9.5	8.1	13.6	476	178
11	488	302	229	104	52.9	31.1	17.4	9.0	8.6	14.7	498	941
12	1850e	285	214	99.0	49.0	36.6	17.7	9.1	8.6	14.1	1680	1280
13	2700e	278	203	95.0	46.5	54.3	15.8	9.1	8.1	17.2	1290	1100
14	2160	254	193	91.9	45.2	68.4	14.7	8.7	8.1	17.4	738	837
15	1330	346	182	89.2	43.8	45.6	14.6	8.7	8.1	17.5	566	658
16	850	561	172	86.7	42.6	38.8	15.1	8.4	7.9	16.0	536	583
17	651	555	164	83.5	40.3	34.6	16.0	8.0	8.0	15.5	432	486
18	526	543	164	80.9	41.9	30.4	16.3	8.7	15.9	25.0	358	492
19	440	605	169	78.3	42.4	27.7	15.6	8.7	41.0	20.0	385	964
20	377	606	219	76.5	41.7	27.1	14.9	8.6	29.8	20.3	329	1350
21	337	594	218	74.5	41.2	25.0	15.4	9.5	19.3	30.0	287	1390
22	298	697	223	72.8	41.2	24.0	15.4	10.4	14.9	53.7	254	1080
23	265	862	210	72.2	40.2	23.6	14.7	10.7	14.1	59.0	275	1250
24	253	727	203	75.1	41.0	23.3	14.3	10.5	12.8	108	259	1270
25	244	606	204	80.5	46.4	22.5	13.8	10.0	12.1	122	232	1140
26	231	644	189	77.2	41.3	22.4	13.0	9.6	11.5	208	250	900
27	236	615	177	76.3	41.5	20.2	12.7	10.1	13.3	177	243	668
28	253	533	174	71.4	43.8	18.3	12.4	10.2	21.2	140	300	528
29	266	—	187	68.5	39.4	17.5	11.9	9.7	20.9	335	281	443
30	313	—	168	65.8	36.3	17.2	10.8	8.7	18.2	219	257	395
31	503	—	161	—	34.0	—	10.6	8.9	—	139	—	376
Mean	839	574	234	96.44	48.26	30.47	15.37	9.65	12.99	61.94	407	645
Max	2700	1150	466	155	068	068	020	011	041	335	1680	1390
Min	231	254	161	65.8	34.0	17.2	10.6	8.0	7.9	13.5	77.0	165
Ac-Ft	51592	31876	14408	5739	2967	1813	945	593	773	3809	24195	39640

[†]All 2021 data are provisional—subject to revision; e=estimated



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — GALES

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1996	634	751	256	336	231	70.1	26.2	12.6	18.1	32.9	87.7	1034
1997	645	356	725	195	97.1	71.5	28.9	15.5	26.3	146	342	314
1998	805	599	403	203	104	55.2	30.4	13.8	15.2	26.0	85.7	742
1999	628	1255	438	246	119	48.3	23.7	18.7	14.4	18.8	175	581
2000	527	337	310		88.3	61.9	26.0	14.2	11.1	15.2	30.7	101
2001	86.1	136	88.9	71.7	75.6	30.5	17.3	15.0	12.9	22.5	140	743
2002	648	474	298	185	78.2	40.3	15.0	7.7	7.6	9.5	67.9	239
2003	385	330	545	282	122	38.2	19.7	11.7	12.1	23.8	43.2	294
2004	431	429	255	168	87.0	45.0	20.6	13.5	20.4	28.5	88.0	141
2005	211	117	80.6	235	133	72.7	26.1	16.7	13.5	28.3	169	281
2006	986	279	279	215	99.1	60.1	21.5	10.0	8.7	10.7	538	512
2007	307	169	344	143	71.4	29.0	17.5	12.7	7.2	22.4	65.9	722
2008	581	465	333	274	119	38.0	15.0	13.0	11.0	15.0	76.5	82.0
2009	403	140	272	182	143	59.5	22.0	13.0	18.0	30.0	243	243
2010	745	321	285	349	146	145	41.0	25.0	28.5	29.0	190	758
2011	459	315	753	401	172	79.0	40.0	21.0	17.0	19.0	49.5	107
2012	461	376	566	275	141	65.5	27.0	16.0	12.0	21.0	271	1040
2013	291	226	233	142	86.0	54.5	20.0	15.0	15.0	65.0	113	116
2014	155	447	430	277	182	57.5	23.0	16.0	13.0	20.0	123	392
2015	283	283	207	150	62.0	22.5	13.0	13.0	14.0	16.0	167	1290
2016	732	518	656	132	60.0	28.0	19.0	10.0	10.0	194	309	578
2017	367	975	750	376	167	61.4	30.0	15.3	13.0	20.7	429	250
2018	485	228	304	328	82.5	39.9	17.4	13.1	15.2	14.2	27.8	211
2019	291	350	202	170	64.4	32.4	19.9	11.7	15.9	16.6	26.5	105
2020	872	308	127	105	61.1	40.0	23.1	13.2	13.7	21.7	148	169
2021	537	578	214	90.6	45.2	30.1	15.6	10.0	9.0	18.2	308	528
median	465	360	309	201	102	48.2	21.6	14.0	14.0	22.3	126	372

KEY

Q in cfs

- Q ≤ 11.0
- 11.0 < Q ≤ 13.6
- 13.6 < Q ≤ 15.6
- 15.6 < Q ≤ 18.6
- 18.6< Q ≤ 28.9
- 28.9< Q ≤ 54.3
- 54.3 < Q ≤ 95
- 95 < Q ≤ 296
- 296 < Q ≤ 624
- 624 < Q ≤ 969
- Q > 969

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

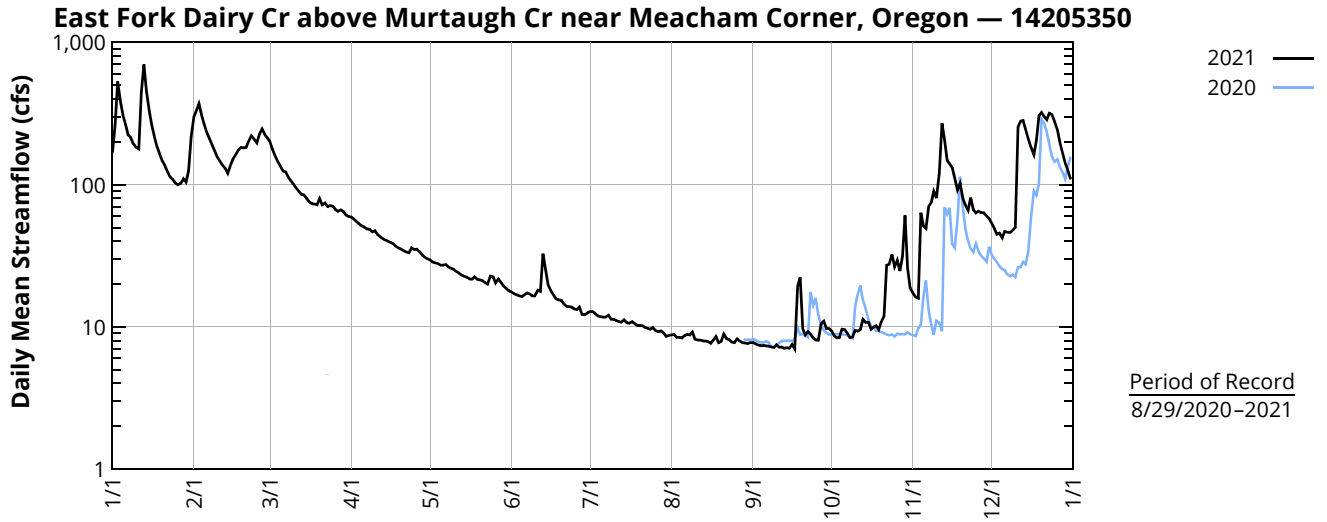
5350 – East Fork Dairy Cr abv Murtaugh Cr near Meacham Corner, Oregon – 14205350

Data source: U.S. Geological Survey, Oregon Water Science Center
River Mile: 13.4 *Latitude:* 45 41 38 *Longitude:* 123 04 12 *Drainage area:* 27.6 sq mile *Datum:* 350 ft

2021 — MEAN STREAMFLOW[†] (cfs) — 5400

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	171	297	202	59.3	29.7	17.6	12.8	8.80	7.74	9.36	17.3	53.4
2	262	333	178	57.3	28.7	17.1	12.8	8.87	7.61	8.69	16.2	49.3
3	531	370	160	55.2	28.2	16.8	12.4	8.45	7.45	8.38	15.9	44.9
4	387	311	145	52.9	27.9	16.5	11.9	8.46	7.35	8.42	63.4	45.6
5	311	268	135	51.2	27.2	16.3	11.8	8.34	7.43	9.65	51.3	42.2
6	267	232	125	50.3	27.2	16.8	11.7	8.70	7.35	9.58	49.2	46.8
7	224	210	123	48.9	27.5	17.3	11.7	8.87	7.33	9.01	70.4	46.3
8	215	190	113	48.6	26.4	17.1	12.1	8.80	7.23	8.36	75.2	46.2
9	195	172	107	46.6	25.8	16.5	11.3	9.19	7.18	8.50	89.9	47.8
10	183	156	101	47.7	25.4	16.5	11.3	8.19	7.49	9.44	80.4	50.0
11	178	147	95.0	44.6	24.6	18.1	11.1	8.10	7.22	9.33	120	256
12	448e	137	90.0	43.2	23.9	17.8	10.9	8.09	7.24	9.59	271	280
13	699e	130	85.6	41.9	23.2	32.7	10.8	7.94	7.08	11.3	207	284
14	451	120	84.8	40.8	22.7	25.3	11.2	7.96	7.13	10.8	149	245
15	333	138	80.0	40.1	22.3	19.8	10.7	7.84	7.07	10.8	140	211
16	263	153	75.9	39.2	21.8	18.1	10.6	7.66	7.51	9.65	132	185
17	219	163	73.5	38.6	21.7	16.9	10.9	8.08	7.01	9.98	111	163
18	187	175	73.2	36.8	22.5	15.8	10.5	8.55	19.2	10.2	91.4	206
19	164	183	72.4	35.8	21.7	15.5	10.2	7.75	22.3	9.56	102	306
20	147	181	79.9	35.2	21.4	15.4	10.2	7.91	9.73	10.9	79.7	323
21	136	183	72.4	34.3	21.1	14.5	10.2	8.88	8.84	11.9	71.5	302
22	123	203	74.4	33.6	20.5	14.0	9.91	8.22	9.27	27.1	66.0	286
23	113	221	70.0	33.2	20.0	13.9	9.78	8.12	8.91	27.6	81.1	319
24	109	208	71.2	36.0	22.7	13.8	9.60	7.81	8.37	32.3	66.6	312
25	103	197	70.8	35.1	22.5	13.4	9.90	7.77	8.09	26.4	63.3	280
26	99.8	227	66.9	35.3	20.4	13.2	9.38	8.24	8.06	29.4	65.1	244
27	102	246	64.8	33.7	21.8	13.8	9.26	7.96	10.5	24.8	63.6	198
28	110	227	66.5	32.1	20.7	12.3	9.35	7.74	11.0	31.3	63.5	167
29	104	—	65.3	30.8	19.5	12.2	9.11	7.71	9.72	60.9	60.4	142
30	125	—	61.3	30.1	18.7	12.6	8.60	7.63	9.74	25.8	57.7	127
31	216	—	59.8	—	18.0	—	8.72	7.76	—	18.7	—	111
Mean	231	206	94.3	41.6	23.4	16.6	10.7	8.21	8.94	16.4	86.4	175
Max	699	370	202	59.3	29.7	32.7	12.8	9.19	22.3	60.9	271	323
Min	99.80	120	59.8	30.1	18.0	12.2	8.6	7.63	7.01	8.36	15.9	42.2
Ac-Ft	459	409	188	82.5	46.4	32.9	21.2	16.28	17.7	32.5	171	347

[†]New site as of August 29. 2020; former site (14205400) was downstream of Murtaugh Creek; e=estimated

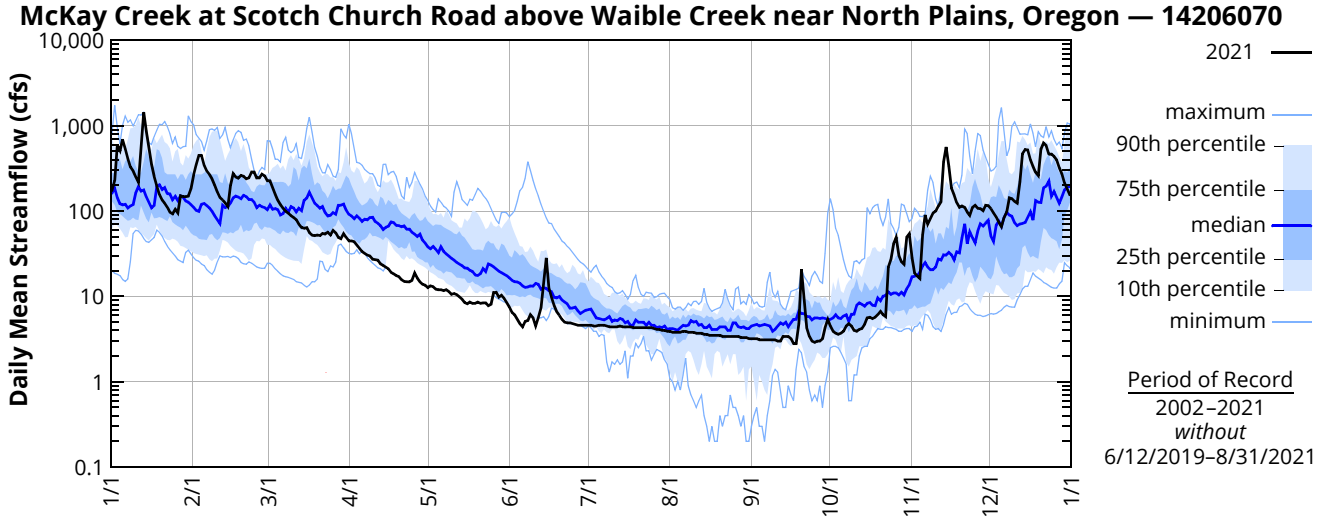


Data source: WEST Consultants for Clean Water Services
River Mile: 6.3 *Latitude:* 45 57 21 *Longitude:* 122 99 18

2021 — MEAN STREAMFLOW (cfs) — MCSC

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	175e	265	227	44.7	13.3	6.47	4.55e	3.83e	3.17e	3.88	18.8	95.5
2	228e	350	189	43.8	13.0	6.06	4.54e	3.83e	3.15e	3.66	17.3	85.5
3	596e	451	157	40.1	12.2	5.37	4.51e	3.81e	3.13e	3.58	16.2	74.0
4	510e	450	134	36.5	12.0	4.76	4.58e	3.84e	3.12e	3.69	52.5	65.8
5	694e	344	119	33.6	12.0	4.39	4.59e	3.88e	3.11e	3.89	90.2	84.2
6	537	295	108	32.0	11.7	5.10	4.56e	3.85e	3.08e	4.53	70.4	98.6
7	413	269	99.3	30.5	12.0	5.21	4.49e	3.82e	3.06e	4.78	82.0	143
8	330	239	94.3	29.8	11.4	6.06	4.42e	3.77e	3.06e	4.48	95.0	140
9	297	203	88.5	27.4	10.6	5.59	4.40e	3.76e	3.07e	4.00	100	130
10	253	168	84.0	27.0	10.8	4.48	4.43e	3.74e	2.95e	3.93	114	124
11	217	145	79.5	26.6	10.5	5.61	4.44e	3.70e	2.95	4.05	129	220
12	560	135	70.3	24.1	9.88	7.33	4.45e	3.66e	3.42	4.19	377	471
13	1440	125	64.3	23.1	9.25	14.1	4.43e	3.63e	3.43	4.66	563	526
14	867	113	62.9	22.0	8.49	28.3	4.36e	3.61e	3.38	5.59	334	522
15	556	199	64.0	21.1	8.21	12.8	4.36e	3.50e	3.21	5.73	187	399
16	353	275	55.9	19.2	8.58	9.76	4.35e	3.48e	2.82	5.53	155	334
17	257	252	52.3	18.5	8.28	7.89	4.34e	3.51e	2.80	5.65	126	285
18	198	243	51.6	17.5	8.32	6.58	4.33e	3.48e	4.76	6.10	111	260
19	157	262	52.5	17.1	8.55	5.97	4.31e	3.45e	20.8	6.74	115	528
20	135	256	51.7	15.7	8.29	5.44e	4.31e	3.40e	8.94	6.06	111	629
21	124	239	54.9	15.0	8.36	5.03e	4.32e	3.39e	4.28	5.77	97.3	588
22	111	245	53.9	14.9	8.35	4.87e	4.30e	3.42e	3.39	22.0	88.7	464
23	96.7	288	56.6	14.8	7.80	4.86e	4.26e	3.41e	2.95	27.0	111	467
24	92.7	288	52.6	15.4	8.09	4.83e	4.25e	3.37e	2.94	41.4	117	439
25	105	245	59.6	18.8	11.1	4.73e	4.20e	3.38e	2.95e	49.0	108	397
26	95.2	245	55.5	16.4	11.2	4.63e	4.14e	3.38e	3.02e	30.2	107	325
27	151	271	49.1	14.8	9.83	4.63e	4.08e	3.30e	3.15e	25.5	101	272
28	148	258	47.6	13.9	10.3	4.63e	4.04e	3.28e	4.30e	23.8	117	214
29	148	—	54.5	13.5	9.51	4.59e	3.99e	3.26e	5.41	49.4	116	182
30	150	—	49.2	12.7	8.45	4.56e	3.94e	3.24e	4.50	54.2	107	156
31	181	—	44.7	—	7.54	—	3.87e	3.23e	—	28.4	—	157
Mean	328	254	80.1	23.4	9.93	6.82	4.33	3.56	4.14	14.6	131	286
Max	1440	451	227	44.7	13.3	28.3	4.59	3.88	20.8	54.2	563	629
Min	92.7	113	44.7	12.7	7.54	4.39	3.87	3.23	2.80	3.58	16.2	65.8
Ac-Ft	20183	14118	4926	1389	611	406	266	219	247	895	7804	17604

e=estimated



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — MCSC

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002		130	91.8	46.1	17.0	9.18	3.18	0.45	0.69	4.15	7.67	52.7
2003	170	123	153	115	34.5	9.52	3.85	2.25	5.50	11.2	23.3	82.4
2004			86.9	41.4	14.9	8.67	4.30	3.45	5.40	10.6	16.5	31.4
2005	59.0	41.2	19.5	94.2	91.3	20.5	8.80	2.84	4.98	13.4	47.8	124
2006	573	82.4	94.8	72.9	26.5	18.2	6.24	5.49	5.35	29.8	140	
2007	95.9	65.9	94.4	53.3	21.6	9.63	5.37	4.61	7.93	5.61	11.0	230
2008	359	253	126	78.4	22.3	10.2	4.95	5.24	4.89	6.50	21.8	19.8
2009	109	29.4	61.3	43.9	35.3	12.4	5.20	3.62	4.19	5.86	39.1	29.6
2010	274	117	97.0	115	62.4	77.7	8.54	4.76	8.78	10.7	53.3	246
2011	149	88.3	311	117	54.3	20.4	8.86	5.62	3.60	4.49	9.20	22.0
2012	160	105	238	92.5	43.9	22.5	8.89	6.64	5.57	9.92	48.3	364
2013	75.4	57.7	75.7	39.6	15.2	18.7	7.10	6.44	9.52	10.1	33.6	25.8
2014	35.1	149	127	94.0	43.8	12.0	6.86	5.20	4.85	9.05	46.0	156
2015	87.3	96.3	82.5	45.7	13.7	6.35	5.12	5.32	6.62	5.51	19.2	540
2016	232	153	171	37.7	11.9	6.58	4.27	3.77	4.78	62.4	121	204
2017	146	447	278	145	67.1	11.5	4.51	4.20	4.93	10.4	104	122
2018	173	70.1	124	100	17.8	10.2	4.54	2.88	2.56	5.11	7.12	38.8
2019	96.1	153	68.8	79.3	19							
2020									6.42	6.85	13.2	71.4
2021	217	254	62.9	21.6	9.88	5.41	4.36	3.51	3.14	5.59	110	260
median	148	118	108	67.9	25.0	11.4	5.17	4.30	5.11	7.69	31.2	107

Key

Q in cfs

- Q ≤ 3.30
- 3.30 < Q ≤ 4.25
- 4.25 < Q ≤ 4.90
- 4.90 < Q ≤ 5.69
- 5.69< Q ≤ 8.16
- 8.16< Q ≤ 13.8
- 13.8 < Q ≤ 25.3
- 25.3 < Q ≤ 95.5
- 95.5 < Q ≤ 231
- 231 < Q ≤ 351
- Q > 351

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

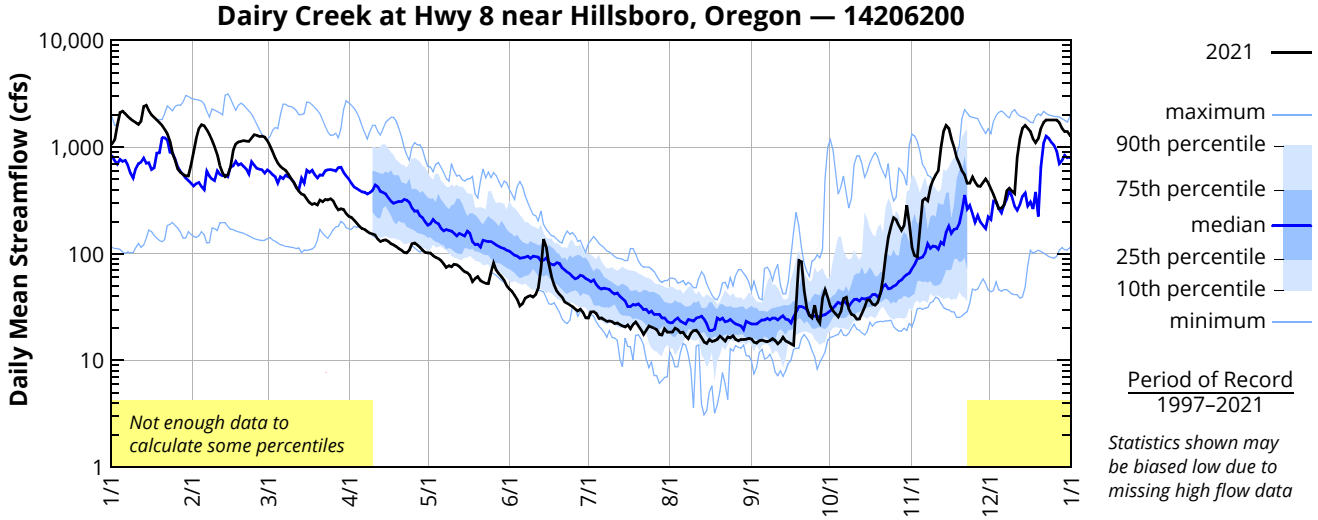
DAIRY – DAIRY CREEK AT HWY 8 NEAR HILLSBORO, OREGON – 14206200

Data source: Oregon Water Resources Department
River Mile: 2.06 *Latitude:* 45 30 38 *Longitude:* 123 06 56

2021 — MEAN STREAMFLOW† (cfs) — DAIRY

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1070e	909e	1150e	224	102	46.7	25.0	18.4	15.9	32.1	115	406
2	1170e	1200e	1030e	219	102	44.4	28.5	18.5	14.8	29.1	96.1	360
3	1600e	1490e	909e	206	96.1	40.9	28.7	20.1	14.5	27.3	93.5	308
4	2110e	1620e	786e	194	92.4	37.3	27.6	19.4	15.3	25.6	172	266
5	2170e	1590e	707e	181	90.2	32.5	24.8	18.2	15.5	28.8	316	268
6	2060e	1460e	660e	172	86.6	34.1	25.1	18.4	15.2	38.1	331	287
7	1940e	1310e	627e	169	80.6	38.3	24.1	16.9	15.0	39.1	314	389
8	1840e	1160e	606e	162	74.3	39.7	23.2	16.0	15.3	30.2	418	411
9	1760e	1010e	558e	156	77.2	40.5	23.5	18.0	16.0	26.9	489	388
10	1700e	848e	508	153	75.3	39.3	23.1	19.0	15.4	26.5	550e	367
11	1630e	670e	469	150	79.7	41.3	22.2	19.2	14.3	24.4	600e	800e
12	1750e	573e	423	137	79.0	47.5	22.4	18.0	15.1	24.5	1000e	1200e
13	2400e	527e	386	130	75.9	73.1	21.7	16.4	16.5	27.6	1400e	1500e
14	2470e	549e	363	134	71.4	137	21.1	14.9	15.2	31.5	1600e	1600e
15	2200e	648e	356	135	67.7	116	20.6	14.4	14.8	36.9	1500e	1500e
16	2010e	925e	326	131	66.3	80.3	21.5	15.7	14.3	36.8	1200e	1400e
17	1900e	1070e	302	124	62.9	61.1	19.8	15.1	13.9	33.7	1000e	1200e
18	1800e	1120e	290	121	54.9	51.3	21.7	15.3	32.2	32.9	800e	1100e
19	1700e	1130e	296	117	58.6	44.8	22.9	15.7	86.2	34.9	700e	1200e
20	1600e	1150e	287	112	61.2	41.7	21.2	16.9	84.2	42.3	600e	1500e
21	1470e	1140e	318	108	56.1	39.4	19.4	16.1	45.7	59.7	550e	1700e
22	1330e	1130e	308	103	54.4	35.4	17.5	15.2	31.3	95.1	460	1800e
23	1140e	1220e	323	102	52.8	34.3	19.1	16.6	26.4	143	460	1800e
24	879e	1310e	320	108	52.5	33.0	21.0	16.3	25.1	179	524	1800e
25	750e	1290e	329	124	67.0	32.0	20.5	17.0	32.9	218	471	1800e
26	623e	1260e	314	126	82.0	30.3	20.1	15.7	24.5	209	432	1800e
27	578e	1270e	279	121	70.5	29.1	19.5	15.3	22.4	183	428	1700e
28	556e	1240e	258	115	65.1	30.2	17.5	15.7	38.3	166	466	1500e
29	537e	—e	264	108	61.0	28.2	17.3	15.7	46.1	183	503	1400e
30	537e	—	261	103	56.4	25.1	19.8	15.8	38.8	285	464	1400e
31	674e	—	238	—	50.2	—	18.4	16.1	—	192	—	1300e
Mean	1482	1101	460	142	71.7	46.8	21.9	16.8	26.4	82.0	602	1111
Max	2470	1620	1150	224	102	137	28.7	20.1	86.2	285	1600	1800
Min	537	527	238	102	50.2	25.1	17.3	14.4	13.9	24.4	93.5	266
Ac-Ft	91148	61129	28266	8420	4408	2786	1346	1031	1569	5042	35807	68331

†All 2021 data are provisional—subject to revision; e=estimated



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — DAIRY

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1997				383	200	167	61.7	38.4	52.4	224		
1998				400	224	155	58.7	31.7	28.5	59.7	156	
1999				622	203	97.2	48.9	34.7	26.4	36.8	270	
2000				198	111	58.4	24.8	17.7	19.0	30.2	31.5	114
2001	140	207	157	142	92.7	45.5	16.4	13.9	16.3	44.2		
2002				388	115	54.9	27.0	19.3	19.0	36.3	64.6	
2003					171	70.9	30.7	16.5	27.3	52.0	62.7	
2004				210	90.7	57.9	21.0	13.0	26.2	46.8	69.2	114
2005		182	122			86.2	45.1	18.4	20.5	36.4	255	
2006				488	165	123	41.9	23.7	19.5	20.7		
2007				285	114	58.2	26.0	18.9	15.9	43.4	82.1	
2008				505	156	93.0	33.0	29.0	18.5	34.0	99.5	103
2009		198		300	216	82.5	34.0	27.0	30.0	60.0		
2010							85.0	39.0	53.5	47.0		
2011					309	130	71.0	40.0	34.0	38.0	70.5	136
2012	994	672	1240	620	254	137	54.0	34.0	27.0	55.0	388	1850
2013	552	367	460	255	116	103	35.0	30.0	41.5	76.0	149	136
2014	203	1245	1430	703	264	106	46.0	26.0	25.5	55.0	218	885
2015	697	740	603	266	103	44.0	23.0	17.0	25.0	26.0	157	1790
2016	1700	1010	1470	245	99.0	51.5	32.0	18.0	24.0	381	555	1080
2017	750	1475	1220	849	330	116	42.0	26.0	24.0	34.0	650	550
2018	950	536	675	825	128	65.7	30.4	19.0	20.3	25.8	51.2	263
2019	550	832	363	373	118	49.0	31.0	19.1	44.3	41.5	45.7	205
2020	1310	745	261	151	105	77.5	37.7	19.8	18.8	28.9	178	296
2021	1630	1145	329	131	70.5	39.6	21.5	16.3	16.0	36.8	480	1300
median	699	573	554	335	144	78.0	36.0	23.0	26.0	41.0	134	485

KEY

Q in cfs

- Q ≤ 17.5
- 17.5 < Q ≤ 22.0
- 22.0 < Q ≤ 26.0
- 26.0 < Q ≤ 30.9
- 30.9< Q ≤ 41.7
- 41.7< Q ≤ 62.0
- 62.0 < Q ≤ 101
- 101 < Q ≤ 351
- 351 < Q ≤ 882
- 882 < Q ≤ 1330
- Q > 1330

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

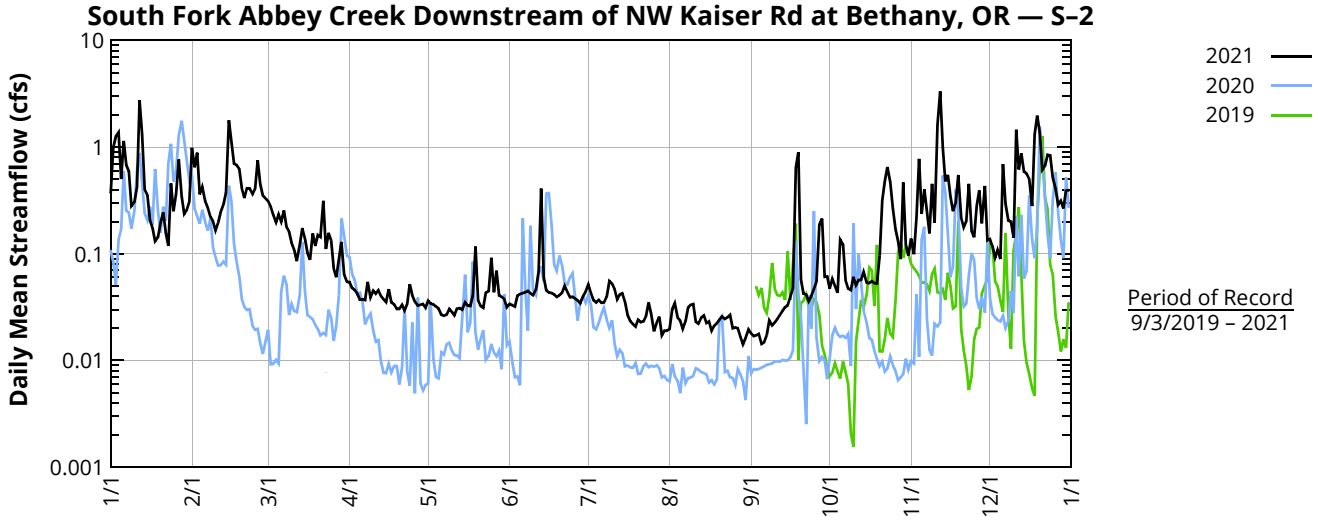
S-2 – South Fork Abbey Creek Downstream of NW Kaiser Rd at Bethany, OR

Data source: WEST Consultants for Clean Water Services

2021 — MEAN STREAMFLOW (cfs) — S-2

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.37	0.98	0.31	0.054e	0.036e	0.034e	0.051e	0.020e	0.018e	0.047e	0.14	0.14
2	1.00	0.65	0.28	0.048e	0.034e	0.033e	0.043e	0.030e	0.017e	0.058e	0.099	0.12
3	1.26	0.89	0.23	0.046e	0.034e	0.032e	0.037e	0.034e	0.017e	0.050e	0.22	0.092e
4	1.37	0.36	0.20	0.042e	0.032e	0.040e	0.035e	0.025e	0.018e	0.043e	0.78	0.11e
5	0.50	0.42	0.23	0.037e	0.031e	0.042e	0.037e	0.024e	0.014e	0.14e	0.24	0.089e
6	1.14	0.31	0.20	0.037e	0.027e	0.043e	0.035e	0.020e	0.015e	0.12e	0.40	0.69e
7	0.68	0.27	0.25	0.037e	0.026e	0.044e	0.035e	0.023e	0.017e	0.056e	0.25	0.30
8	0.60	0.22	0.18	0.054e	0.027e	0.045e	0.040e	0.031e	0.024e	0.047e	0.16	0.20
9	0.28	0.20	0.16	0.039e	0.030e	0.043e	0.056e	0.033e	0.021e	0.046e	0.45	0.20
10	0.31	0.17	0.13	0.045e	0.028e	0.041e	0.052e	0.034e	0.023e	0.061e	0.20	0.14e
11	0.42	0.20	0.11	0.042e	0.026e	0.046e	0.047e	0.023e	0.024e	0.051e	1.63	1.45e
12	2.75	0.25	0.085	0.045e	0.031e	0.068e	0.037e	0.022e	0.027e	0.057e	3.33	0.62
13	1.31	0.29	0.12e	0.040e	0.031e	0.41e	0.041e	0.025e	0.029e	0.057e	1.00	0.87
14	0.40	0.37	0.17	0.038e	0.030e	0.060e	0.043e	0.026e	0.031e	0.068e	0.48	0.59
15	0.35	1.79	0.14	0.035e	0.035e	0.045e	0.036e	0.022e	0.033e	0.053e	0.55	0.57
16	0.21	1.11	0.10	0.046e	0.033e	0.043e	0.027e	0.023e	0.040e	0.053e	0.34	0.50
17	0.18	0.70	0.088	0.035e	0.032e	0.043e	0.023e	0.019e	0.047e	0.055e	0.25	0.28
18	0.13e	0.68	0.16	0.034e	0.041e	0.042e	0.022e	0.021e	0.64e	0.053e	0.30	1.31
19	0.14e	0.62	0.12	0.030e	0.12e	0.039e	0.021e	0.022e	0.90e	0.053e	0.55	1.97
20	0.19	0.41	0.15e	0.030e	0.036e	0.041e	0.024e	0.024e	0.057e	0.096e	0.22	1.37
21	0.24	0.33	0.14e	0.033e	0.032e	0.043e	0.023e	0.026e	0.042e	0.32e	0.18	0.61
22	0.16	0.41	0.31	0.029e	0.031e	0.050e	0.023e	0.024e	0.041e	0.48	0.20	0.67
23	0.12	0.41	0.11	0.034e	0.043e	0.044e	0.026e	0.025e	0.036e	0.65	0.45	0.85
24	0.46	0.36	0.16	0.052e	0.045e	0.039e	0.035e	0.027e	0.040e	0.47	0.16	0.84
25	0.25	0.41	0.13e	0.041e	0.092e	0.040e	0.027e	0.020e	0.046e	0.27	0.14	0.52
26	0.36	0.75	0.073e	0.036e	0.044e	0.038e	0.019e	0.020e	0.055e	0.17	0.28	0.40
27	0.76	0.45	0.060e	0.033e	0.069e	0.037e	0.022e	0.020e	0.19e	0.13	0.39	0.29
28	0.35	0.35	0.088e	0.033e	0.041e	0.034e	0.026e	0.017e	0.21e	0.089	0.19	0.31
29	0.24	—	0.13e	0.034e	0.040e	0.040e	0.017e	0.014e	0.061e	0.47	0.43	0.27
30	0.26	—	0.064e	0.031e	0.038e	0.044e	0.019e	0.016e	0.061e	0.12	0.13e	0.39
31	0.31	—	0.055e	—	0.032e	—	0.019e	0.020e	—	0.096	—	0.39
Mean	0.551	0.513	0.153	0.039	0.039	0.055	0.032	0.024	0.093	0.146	0.471	0.553
Max	2.750	1.790	0.314	0.054	0.117	0.408	0.056	0.034	0.899	0.650	3.330	1.970
Min	0.118	0.165	0.055	0.029	0.026	0.032	0.017	0.014	0.014	0.043	0.099	0.089
Ac-Ft	1.093	1.017	0.303	0.077	0.078	0.108	0.064	0.047	0.185	0.289	0.935	1.097

e=estimated or poor data quality



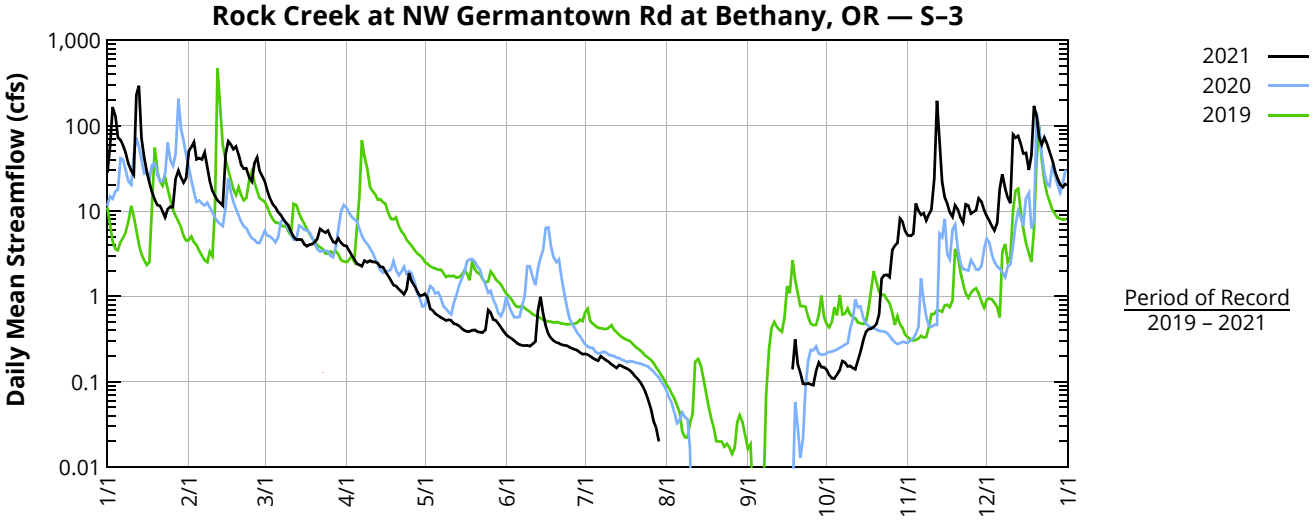
S-3 – Rock Creek at NW Germantown Rd at Bethany, OR

Data source: WEST Consultants for Clean Water Services

2021 — MEAN STREAMFLOW (cfs) — S-3

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	28.9	50.4	22.1	3.89	1.07	0.36	0.21e	no flow	no flow	0.14e	5.19e	8.71
2	58.1	56.4	17.2	3.47	0.97	0.33	0.21e	no flow	no flow	0.12e	5.13e	7.69
3	166e	64.1	14.1	3.07	0.71	0.32	0.20e	no flow	no flow	0.11e	5.44e	6.61
4	131	40.3	11.9	2.74	0.68	0.30	0.19e	no flow	no flow	0.11e	12.3e	5.91
5	72.4	41.5	11.0	2.41	0.62	0.28	0.18e	no flow	no flow	0.12e	10.1e	7.17
6	68.3	40.1	9.77	2.34	0.59	0.27	0.18e	no flow	no flow	0.14e	9.00e	18.3
7	58.5	48.2	9.04	2.26	0.57	0.27	0.20e	no flow	no flow	0.18e	9.43e	27.1
8	48.7	32.5	7.97	2.63	0.55	0.26e	0.19e	no flow	no flow	0.17e	7.78e	18.5
9	36.4	22.4	7.36	2.51	0.52	0.27	0.18e	no flow	no flow	0.15e	9.11e	14.4
10	29.9	17.3	6.75	2.63	0.53	0.26e	0.17e	no flow	no flow	0.15e	10.4e	12.4
11	26.6	15.0	5.74	2.53	0.52	0.28	0.16e	no flow	no flow	0.15e	23.9e	78.5
12	228e	13.3	4.97	2.54	0.48	0.30	0.15e	no flow	no flow	0.14e	196e	72.5
13	294e	12.5	4.59	2.44	0.47	0.68	0.15e	no flow	no flow	0.18e	76.0	76.0
14	71.7	11.6	4.66	2.23	0.45	0.99	0.16e	no flow	no flow	0.22e	21.9	62.1
15	43.5	46.4	4.62	2.19	0.42	0.63	0.15e	no flow	no flow	0.31	14.6	47.2
16	29.2	65.7	4.07	1.95	0.40	0.46	0.15e	no flow	no flow	0.38	12.3	48.1
17	21.8	60.2	3.87	1.74	0.39	0.36	0.14e	no flow	no flow	0.41	9.71	30.4
18	17.0	53.1	4.03	1.52	0.39	0.33	0.14e	no flow	0.14e	0.42	8.60	45.2
19	13.7	57.0	4.09	1.35	0.40	0.30	0.13e	no flow	0.31e	0.44	11.7	171
20	11.8	46.0	4.35	1.32	0.40	0.29	0.12e	no flow	0.16e	0.47	10.4	133
21	11.5	34.7	4.65	1.21	0.38	0.28	0.11e	no flow	0.13e	0.61	8.43	73.2
22	9.91	31.5	6.18	1.14	0.38	0.27	0.10e	no flow	0.09e	1.60	7.31	59.9
23	8.45	31.6	5.83	1.06	0.38	0.27	0.09e	no flow	0.09e	1.77	12.0	73.0
24	10.5	24.7	5.60	1.20	0.40	0.26e	0.08e	no flow	0.10e	1.78	11.6	62.3
25	11.2	22.3	5.92	1.88	0.69	0.26e	0.06e	no flow	0.09e	1.69	9.35	50.3
26	11.1	36.6	4.98	1.50	0.64	0.25e	0.05e	no flow	0.09e	3.50	9.77	39.3
27	23.6	42.4	4.37	1.32	0.54	0.24e	0.03e	no flow	0.13e	3.94	10.2	29.4
28	29.9	29.4	4.23	1.14	0.52	0.23e	0.03e	no flow	0.17e	4.23	14.1	24.0
29	24.7	—	4.79	1.01	0.48	0.22e	0.02e	no flow	0.15e	8.19	12.8	20.5
30	21.5	—	4.29	1.03	0.44	0.21e	no flow	no flow	0.15e	7.48	10.3	19.0
31	24.3	—	3.95	—	0.39	—	no flow	no flow	—	5.81e	—	20.8
Mean	52.97	37.40	7.00	2.01	0.53	0.33	0.13			1.45	19.16	43.95
Max	294.00	65.70	22.10	3.89	1.07	0.99	0.21			8.19	196.00	171.00
Min	8.45	11.60	3.87	1.01	0.38	0.21	0.02			0.11	5.13	5.91
Ac-Ft	105.07	74.18	13.88	3.98	1.05	0.66	0.27			2.89	38.01	87.18

e=estimated or poor data quality



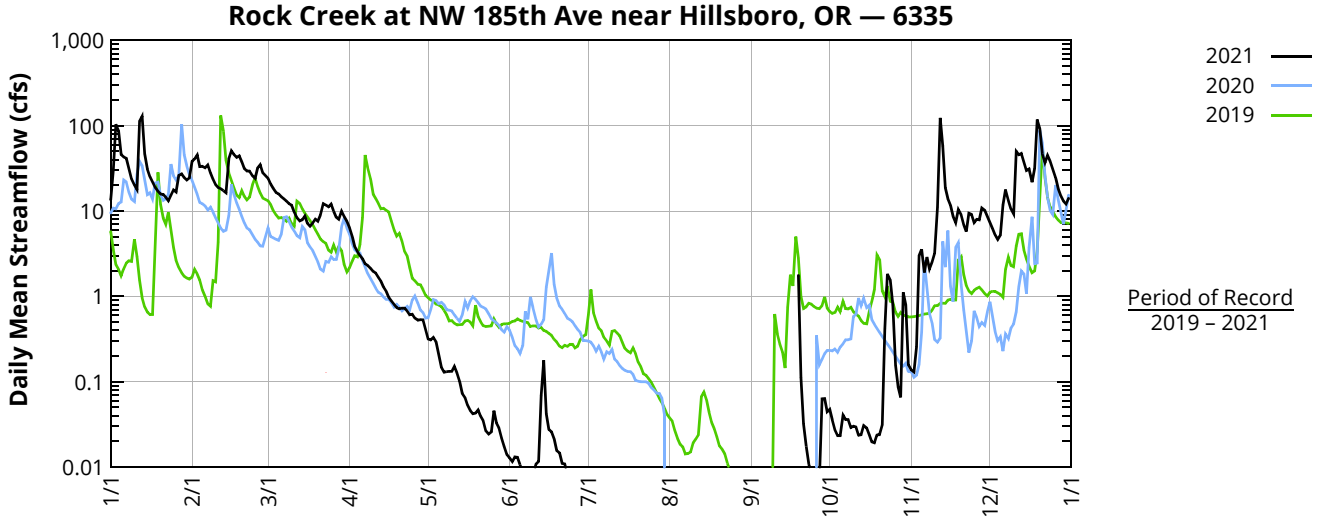
6335 – Rock Creek at NW 185th Ave near Hillsboro, OR – 14206335

Data source: WEST Consultants for Clean Water Services

2021 — MEAN STREAMFLOW (cfs) — 6335

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	13.6	38.2	24.1	6.41	0.32	0.01	<0.01	no flow	no flow	0.047	0.14	7.32
2	30.1	40.8	20.8	5.12	0.31	0.01	<0.01	no flow	no flow	0.035	0.13	6.28
3	104	45.3	18.5	3.84	0.33	0.01	no flow	no flow	no flow	0.027	0.26	5.28
4	87.0	33.4	16.5	3.35	0.30	0.01	no flow	no flow	no flow	0.023	2.98	4.63
5	46.1	33.5	15.9	3.02	0.22	0.01	no flow	no flow	no flow	0.023	3.56	5.23
6	43.2	32.1	14.7	2.76	0.15	0.01	no flow	no flow	no flow	0.041	1.90	11.8
7	41.7	34.8	13.9	2.41	0.13	0.01	no flow	no flow	no flow	0.036	2.88	17.8
8	31.5	28.1	13.1	2.31	0.13	0.01	no flow	no flow	no flow	0.036	2.09	13.3
9	23.8	23.6	12.2	2.13	0.13	0.01	no flow	no flow	no flow	0.029	2.50	10.6
10	20.1	20.4	11.8	1.96	0.13	0.01	no flow	no flow	no flow	0.030	3.17	9.23
11	17.9	18.9	9.79	1.87	0.15	0.01	no flow	no flow	no flow	0.030	11.1	50.1
12	113	18.2	8.41	1.67	0.13	0.01	no flow	no flow	no flow	0.024	124	45.8
13	129	17.3	7.65	1.51	0.10	0.07	no flow	no flow	no flow	0.024	57.3	47.2
14	46.9	16.4	7.89	1.29	0.07	0.18	no flow	no flow	no flow	0.031	18.8	37.6
15	31.1	41.1	8.79	1.15	0.06	0.04	no flow	no flow	no flow	0.029	14.0	30.0
16	25.2	50.7	7.19	0.97	0.05	0.03	no flow	no flow	no flow	0.024	11.8	31.2
17	21.9	46.1	6.62	0.89	0.05	0.03	no flow	no flow	no flow	0.020	8.78	21.8
18	19.1	42.4	7.24	0.80	0.04	0.02	no flow	no flow	no flow	0.019	7.34	31.6
19	17.1	44.5	8.03	0.74	0.04	0.02	no flow	no flow	1.76e	0.024	10.4	119
20	15.8	37.9	7.60	0.71	0.05	0.01	no flow	no flow	0.11	0.024	9.03	93.8
21	15.7	31.5	8.97	0.73	0.04	0.01	no flow	no flow	0.03	0.031	6.90	47.1
22	14.5	29.4	12.2	0.73	0.03	0.01	no flow	no flow	0.02	0.42	5.74	36.9
23	13.2	29.4	11.8	0.67	0.03	0.01	no flow	no flow	0.01	1.84	9.42	45.1
24	15.3	25.9	11.2	0.61	0.02	0.01	no flow	no flow	0.01	1.56	9.14	38.5
25	17.7	24.1	12.0	0.62	0.03	0.01	no flow	no flow	0.01	0.80	7.35	31.2
26	16.7	32.1	9.98	0.56	0.05	0.01	no flow	no flow	0.01	0.16	7.96	24.6
27	26.1	35.0	8.44	0.53	0.03	0.01	no flow	no flow	0.01	0.087	7.88	18.3
28	27.3	28.1	8.01	0.54	0.03	<0.01	no flow	no flow	0.06	0.065	10.9	15.0
29	24.6	—	10.0	0.53	0.02	<0.01	no flow	no flow	0.06	1.11	10.2	13.1
30	23.1	—	8.67	0.41	0.02	<0.01	no flow	no flow	0.04	0.80	8.64	12.1
31	24.5	—	7.54	—	0.01	—	no flow	no flow	—	0.16	—	14.1
Mean	35.38	32.11	11.27	1.69	0.10	0.02				0.24	12.54	28.89
Max	129.00	50.70	24.10	6.41	0.33	0.18				1.84	124.00	119.00
Min	13.20	16.40	6.62	0.41	0.01	0.00				0.02	0.13	4.63
Ac-Ft	70.18	63.70	22.36	3.36	0.20	0.04				0.49	24.88	57.30

e=estimated or poor data quality



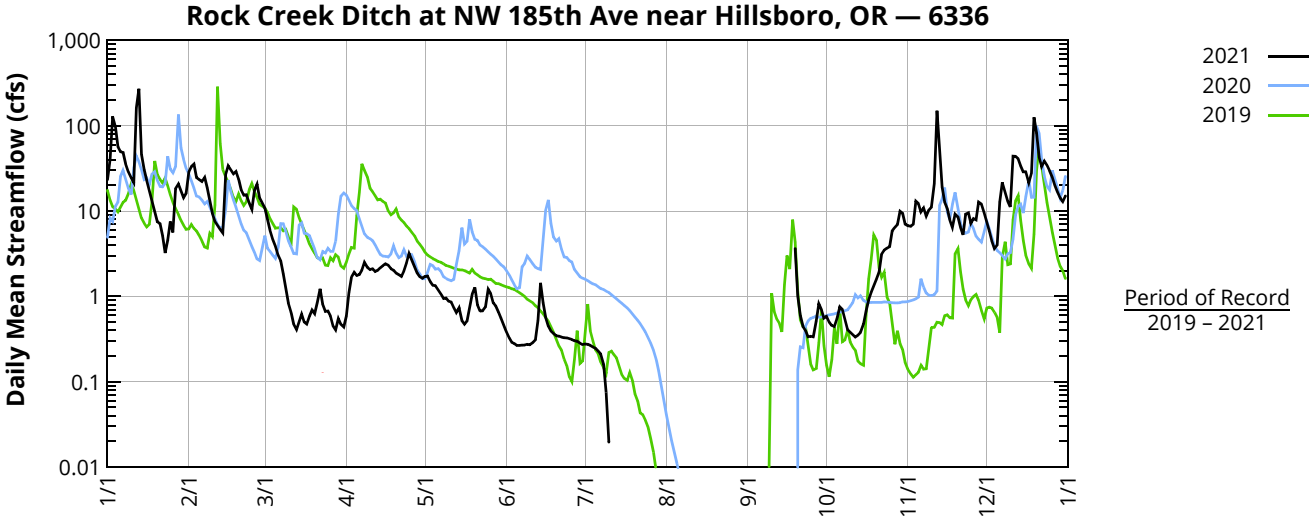
6336 – Rock Creek Ditch at NW 185th Ave near Hillsboro, OR – 14206336

Data source: WEST Consultants for Clean Water Services

2021 — MEAN STREAMFLOW (cfs) — 6336

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	23.5	28.8	10.8	0.59	1.71	0.39e	0.28e	no flow	no flow	0.58e	6.74	7.45
2	40.3	33.3	7.98	1.10	1.73	0.33e	0.27e	no flow	no flow	0.50e	6.61	5.86
3	129	35.5	5.95	1.68	1.49	0.29e	0.27e	no flow	no flow	0.46e	7.01	4.45
4	98.6	24.6	4.62	1.91	1.35	0.28e	0.26e	no flow	no flow	0.44e	13.1	3.63
5	56.5	23.5	3.86	1.76	1.34	0.27e	0.25e	no flow	no flow	0.54e	12.3	3.99
6	49.5	22.1	3.03	1.79	1.19	0.27e	0.23e	no flow	no flow	0.75e	9.75	12.7
7	48.6	24.8	2.61	2.03	1.07	0.27e	0.21e	no flow	no flow	0.70e	10.9	21.6
8	35.9	18.6	1.83	2.49	0.94	0.27e	0.16e	no flow	no flow	0.54e	8.68	16.6
9	28.9	13.2	1.24	2.18	0.96	0.27e	0.074e	no flow	no flow	0.41e	10.3	13.1
10	24.5	9.40	0.84	2.06	0.87	0.27e	0.020e	no flow	no flow	0.38e	11.1	11.2
11	21.5	7.62	0.66	2.11	0.86	0.29e	no flow	no flow	no flow	0.36e	20.9	44.0
12	161	6.78	0.47	1.96	0.74	0.31e	no flow	no flow	no flow	0.33e	150	43.8
13	270	6.07	0.41	2.01	0.64	0.52e	no flow	no flow	no flow	0.35e	59.4	40.9
14	46.4	5.55	0.51	2.16	0.73	1.44e	no flow	no flow	no flow	0.38e	19.2	33.7
15	30.5	26.6	0.62	2.30	0.52	0.85e	no flow	no flow	no flow	0.47e	12.7	28.8
16	22.8	34.1	0.50	2.41	0.47	0.57e	no flow	no flow	no flow	0.67e	10.7	28.9
17	17.4	30.6	0.47	2.33	0.51	0.45e	no flow	no flow	no flow	0.90e	7.85	21.3
18	13.3	27.2	0.59	2.10	0.74	0.39e	no flow	no flow	no flow	1.11e	6.44	27.5
19	9.91	29.1	0.69	2.03e	1.06	0.37e	no flow	no flow	3.64e	1.33e	9.23	126
20	7.51	23.7	0.63	1.88e	1.27	0.35e	no flow	no flow	1.01e	1.57e	8.52	82.4
21	7.10	17.7	0.84	1.80e	0.80	0.34e	no flow	no flow	0.60e	1.91e	6.46	43.0
22	5.12	15.4	1.23	1.71e	0.67	0.33e	no flow	no flow	0.44e	3.11e	5.27	33.4
23	3.24	15.6	0.81	1.99e	0.68	0.33e	no flow	no flow	0.40e	3.48e	9.22	38.8
24	4.58	12.4	0.67	2.47e	0.75e	0.33e	no flow	no flow	0.34e	3.69e	9.57	34.4
25	7.53	10.5	0.67	3.20e	1.21e	0.32e	no flow	no flow	0.34e	3.81e	7.19	29.9
26	5.61	17.5	0.59	2.70e	1.08e	0.31e	no flow	no flow	0.33e	5.81e	8.15	24.9
27	18.4	20.6	0.45	2.21e	0.84e	0.30e	no flow	no flow	0.51e	6.46e	7.89	19.9
28	20.8	14.3	0.40	1.88	0.77e	0.30e	no flow	no flow	0.82e	6.95e	12.7	16.5
29	17.2	—	0.55	1.70	0.66e	0.28e	no flow	no flow	0.70e	9.99e	12.0	14.2
30	14.4	—	0.47	1.62	0.56e	0.27e	no flow	no flow	0.55e	9.42	9.56	12.9
31	16.1	—	0.44	—	0.46e	—	no flow	no flow	—	7.04	—	15.0
Mean	40.51	19.83	1.79	2.01	0.93	0.38				2.40	16.31	27.77
Max	270.00	35.50	10.80	3.20	1.73	1.44				9.99	150.00	126.00
Min	3.24	5.55	0.40	0.59	0.46	0.27				0.33	5.27	3.63
Ac-Ft	80.34	39.32	3.55	3.98	1.84	0.76				4.76	32.36	55.08

e=estimated data or poor data quality



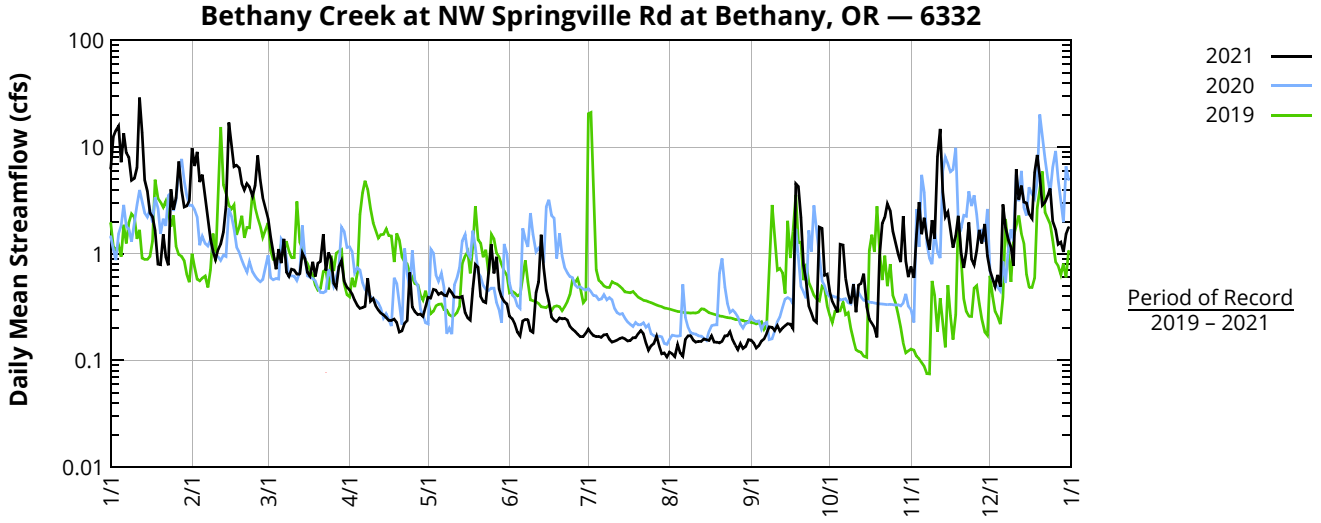
6332 – Bethany Creek at NW Springville Rd at Bethany, OR – 14206332

Data source: WEST Consultants for Clean Water Services

2021 — MEAN STREAMFLOW (cfs) — 6332

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	6.29e	9.80e	2.16e	0.46	0.39	0.26	0.20e	0.12	0.16	0.44e	0.76	0.70
2	12.5e	6.63e	1.44e	0.42	0.38	0.25	0.18e	0.12	0.15	0.36e	0.59	0.59
3	14.3e	9.06e	1.03e	0.37	0.47	0.22	0.17e	0.11	0.13	0.32e	1.52	0.50
4	15.8e	4.71e	0.72e	0.33	0.46	0.18	0.17e	0.14	0.14	0.28e	3.06e	0.63
5	7.22e	5.53e	1.11e	0.31	0.42	0.17	0.17e	0.12	0.15	1.23e	1.53	0.49
6	13.5e	3.44e	0.82e	0.31	0.43	0.24	0.16e	0.11	0.16	1.21e	2.18	2.90e
7	8.83e	2.21e	1.38e	0.32	0.41	0.24	0.17e	0.16	0.18	0.59	1.42	1.77e
8	8.01e	1.39e	0.67e	0.59	0.40	0.24	0.18e	0.17	0.21	0.43	1.09	1.35
9	4.86e	1.06e	0.62e	0.36	0.47	0.19	0.16e	0.17	0.21	0.34	2.07e	1.16
10	5.09e	0.88e	0.72e	0.38	0.43	0.18	0.15e	0.16	0.19	0.52	1.38	0.78
11	6.43e	1.10e	0.70	0.33	0.39	0.43	0.15e	0.15	0.21	0.28	8.16	6.20
12	29.2e	1.24e	0.65	0.30	0.39	0.55	0.16e	0.15e	0.19	0.51	14.8	3.22
13	13.7e	1.60e	0.64	0.28	0.39	1.51e	0.16e	0.15	0.20	0.53	3.81	4.37
14	4.90e	2.80e	1.02	0.27	0.40	0.73e	0.16e	0.16	0.21	0.65	2.22	3.04
15	3.86e	17.0e	0.91	0.25	0.28	0.46e	0.16e	0.16	0.22	0.32	2.46	3.00
16	2.42e	10.3e	0.67	0.24	0.25	0.36e	0.15	0.15	0.22	0.24	1.71	2.38
17	2.23e	6.57e	0.62e	0.24	0.24	0.26e	0.15	0.17	0.20	0.22	1.14	2.15
18	1.66e	6.75e	0.84e	0.24	0.47	0.24e	0.16	0.15e	4.56	0.20	1.48	5.77e
19	0.80e	6.39e	0.62	0.23	0.80	0.23e	0.16	0.15	4.27e	0.16	2.27	8.45e
20	0.79e	4.55e	0.82	0.18	0.75	0.25e	0.18	0.15	2.20e	0.96	1.01	5.33e
21	1.52e	3.97e	0.85	0.19	0.40	0.25e	0.19	0.15	0.78	1.92	0.74	2.86e
22	0.94e	4.54e	1.53	0.22	0.36	0.25e	0.18	0.17	0.56	2.20	1.05	3.04
23	0.78e	4.25e	0.70	0.24	0.35	0.24e	0.15	0.17	0.33e	2.96	1.97	3.48
24	4.04e	3.48e	1.03	0.67	0.71	0.21e	0.13	0.19	0.28e	2.54e	0.89e	4.11e
25	2.59e	4.37e	0.89	0.32	1.23	0.20e	0.14	0.16	0.24	1.63	0.79	2.03e
26	3.36e	8.35e	0.53	0.29	0.65	0.19e	0.15	0.14	0.23	1.29e	1.07	1.70e
27	7.38e	4.93e	0.48	0.27	0.94	0.18e	0.17	0.13e	1.79	1.00	1.68	1.23e
28	3.91e	3.35e	0.75	0.27	0.47	0.17e	0.14	0.14	1.74	0.84	1.25	1.29
29	2.75e	—	0.86	0.26	0.39	0.17e	0.12	0.13	0.63e	2.26	1.90	1.04
30	2.81e	—	0.56	0.32	0.36	0.18e	0.12	0.14	0.65e	0.86e	0.96	1.52
31	3.15e	—	0.49	—	0.34	—	0.11	0.16	—	0.60	—	1.77
Mean	6.31	5.01	0.86	0.31	0.48	0.31	0.16	0.15	0.71	0.90	2.23	2.54
Max	29.20	17.00	2.16	0.67	1.23	1.51	0.20	0.19	4.56	2.96	14.80	8.45
Min	0.78	0.88	0.48	0.18	0.24	0.17	0.11	0.11	0.13	0.16	0.59	0.49
Ac-Ft	12.52	9.94	1.72	0.62	0.95	0.61	0.31	0.29	1.41	1.79	4.43	5.04

e=estimated or poor data quality

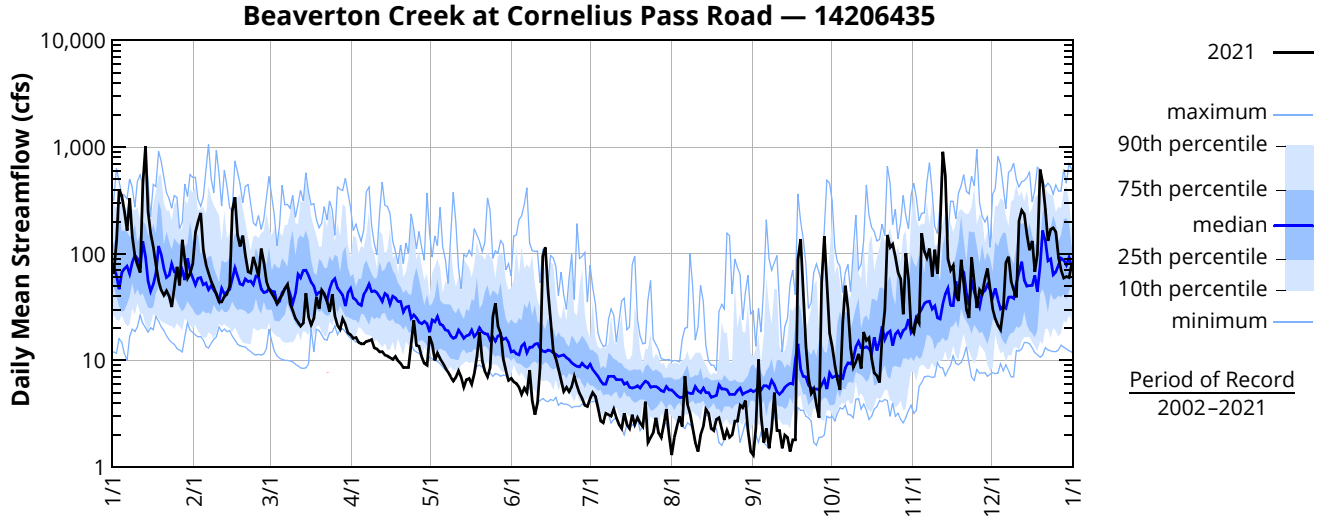


BVTS – Beaverton Creek at Cornelius Pass Road – 14206435

Data source: WEST Consultants for Clean Water Services
River Mile: 1.2 *Latitude:* 45 31 15 *Longitude:* 122 53 59

2021 — MEAN STREAMFLOW (cfs) — BVTS

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	66.6	159	46.9	17.4	16.9	6.83	4.42	1.32	1.33	13.5	18.1	30.4
2	132	199	42.4	16.1	14.3	6.34	5.02	1.91	2.32	9.00	24.7	24.6
3	399	242	38.4	16.4	10.0	6.14	4.60	2.36	10.2	6.55	22.3	21.3
4	348	109	34.0	14.8	11.7	5.57	3.58	2.97	2.97	5.26	156	19.4
5	252	79.6	37.9	14.3	10.4	4.82	2.74	2.36	1.67	22.7	105	30.7
6	165	66.2	41.1	14.3	9.46	5.48	2.64	7.10	2.33	50.2	91.5	82.0
7	333	55.0	47.3	15.1	8.54	4.96	3.18	3.89	1.53	30.3	112	93.7
8	147	48.5	51.5	15.3	7.77	8.06	3.11	3.18	2.27	13.1	61.1	55.4
9	94.3	41.6	33.9	15.7	6.97	4.18	3.04	2.34	5.02	8.61	109	45.7
10	78.7	35.4	29.5	13.1	6.42	3.07	3.45	1.71	2.20	9.65	64.7	39.0
11	66.6	35.4	24.8	12.8	6.88	3.98	2.94	1.44	2.17	11.5	175	202
12	440	39.8	22.8	12.0	8.00	8.61	2.49	1.96	1.47	8.44	905	255
13	1020	41.8	21.0	12.1	6.97	94.7	2.30	2.40	2.00	18.5	534	236
14	248	49.8	22.4	11.2	5.56	115	3.24	3.53	1.90	15.4	89.7	150
15	156	254	42.6	11.0	6.58	44.3	2.46	3.24	1.42	16.3	69.8	108
16	115	339	25.6	10.6	6.80	24.6	2.33	2.32	1.84	10.3	77.5	132
17	79.0	150	21.5	10.2	6.04	12.1	3.12	2.15	1.79	7.56	40.5	67.8
18	55.6	117	24.8	10.9	7.46	10.4	2.47	2.78	88.4	7.17	36.1	99.6
19	45.6	148	39.3	9.89	11.0	8.28	2.85	2.90	137	6.17	87.7	616
20	40.8	96.7	30.5	9.37	18.3	6.44	2.57	2.30	49.2	16.9	50.0	464
21	45.0	68.1	45.7	8.63	9.87	5.12	2.43	1.84	13.6	29.8	29.9	260
22	40.0	66.1	42.2	8.62	7.90	5.57	4.11	2.24	6.92	150	25.1	132
23	31.7	93.4	36.0	8.64	7.04	5.13	1.68	1.91	4.87	115	92.4	170
24	48.3	77.2	28.6	14.4	8.53	5.73	1.91	1.96	5.35	123	50.7	175
25	75.4	61.2	41.8	23.7	25.8	7.09	2.11	2.70	3.79	93.1	31.0	161
26	50.6	112	26.3	13.8	34.3	5.76	2.90	2.69	2.89	67.4	46.0	92.6
27	135	83.6	21.3	13.6	21.0	4.87	2.14	3.80	53.3	58.5	42.2	70.6
28	87.3	55.0	19.6	10.8	17.9	4.41	1.90	3.59	146	27.1	57.8	59.3
29	58.8	—	24.6	9.42	10.3	3.76	2.52	4.24	55.7	101	72.6	61.1
30	65.1	—	21.8	8.97	7.95	3.73	3.49	2.23	17.9	56.9	47.7	59.8
31	79.8	—	18.1	—	6.49	—	2.01	1.35	—	20.1	—	79.4
Mean	161	104	32.4	12.8	11.1	14.5	2.90	2.67	21.0	36.4	111	132
Max	1020	339	51.5	23.7	34.3	115	5.02	7.10	146	150	905	616
Min	31.7	35.4	18.1	8.62	5.56	3.07	1.68	1.32	1.33	5.26	18.1	19.4
Ac-Ft	9916	5798	1992	760	681	863	178	164	1248	2239	6595	8119



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — BVTS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2002		61.9	52.9	25.8	12.8	8.77	5.97	4.24	4.56	9.48	15.5	
2003	77.1	48.3	82.9	74.1	24.0	10.5	7.43	6.78	5.87	13.8	20.6	93.3
2004	115	80.7	35.5	19.3	13.1	10.1	7.52	7.46	9.08	29.1	25.0	37.6
2005	31.4	17.8	15.1	44.6	45.0	25.4	10.7	6.85	6.14	23.4	57.2	79.8
2006	272	42.7	49.5	38.5	21.3	14.0	8.24	6.22	7.69	10.8	130	88.6
2007	53.5	60.0	51.7	35.3	16.9	10.8	6.23	5.00	4.52	19.3	22.6	126
2008	145	44.9	46.7	30.1	15.8	9.33	5.02	5.93	4.64	4.61	27.4	21.9
2009	32.1	18.6	30.1	21.5	25.9	9.54	4.32	4.67	4.22	13.3	77.9	25.8
2010	101	60.7	44.0	51.0	35.1	39.8	9.57	7.97	12.9	14.4	54.5	143
2011	65.4	50.8	114	57.2	33.6	18.7	14.3	8.81	5.23	7.60	43.7	16.7
2012	74.5	46.9	102	65.9	30.5	22.4	7.12	5.90	5.23	29.9	86.2	154
2013	36.5	29.3	23.0	20.2	16.3	13.8	5.58	4.74	17.1	13.2	24.7	14.6
2014	19.1	67.9	66.0	53.4	28.4	11.3	6.08	3.95	3.24	25.7	34.3	59.6
2015	26.5	35.2	28.5	23.3	10.2	4.33	4.07	3.24	5.06	6.06	27.5	269
2016	149	67.1	85.2	25.6	12.8	8.39	5.60	3.81	5.04	70.6	59.2	63.5
2017	58.7	265	136	49.8	19.0	11.4	5.20	4.44	6.00	14.8	94.1	36.4
2018	92.6	36.3	32.6	30.9	9.96	7.52	2.99	2.78	3.88	6.08	11.9	51.3
2019	30.3	43.0	25.5	32.6	13.7	7.87	5.06	3.72	12.8	8.73	9.44	28.2
2020	103	34.5	25.9	17.0	18.5	20.1	4.31	4.94	10.7	4.17	33.7	54.9
2021	79.8	78.4	30.5	12.5	8.53	5.75	2.74	2.36	2.93	16.9	62.9	92.6
median	72.0	48.8	45.2	34.0	17.7	11.2	6.09	4.96	5.89	13.1	37.2	59.8

KEY

Q in cfs

- Q ≤ 3.70
- 3.70 < Q ≤ 4.63
- 4.63 < Q ≤ 5.66
- 5.66 < Q ≤ 6.92
- 6.92 < Q ≤ 10.1
- 10.1< Q ≤ 14.8
- 14.8 < Q ≤ 21.8
- 21.8 < Q ≤ 56.8
- 56.8 < Q ≤ 133
- 133 < Q ≤ 221
- Q > 221

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

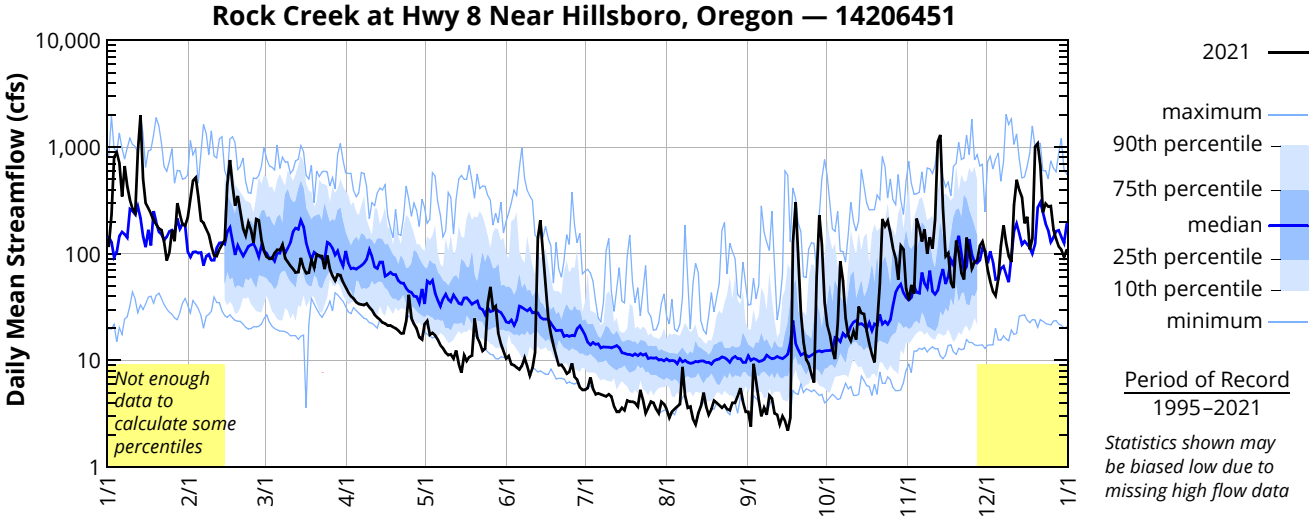
RCTV – Rock Creek at Hwy 8 near Hillsboro, Oregon – 14206451**

Data source: WEST Consultants for Clean Water Services
River Mile: 1.2 *Latitude:* 45 30 08 *Longitude:* 122 56 52

2021 — MEAN STREAMFLOW (cfs) — RCTV

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	119	328	106	48.4	22.0	10.4	5.32	3.48	3.26	21.7	36.7	70.1
2	234	485	93.0	43.5	23.5	11.0	5.53	2.85	2.36	17.4	51.0	54.9
3	807	518	90.1	39.9	17.4	9.21	6.86	3.26	9.32	12.5	42.2	44.3
4	892	344	90.0	38.2	18.1	8.99	5.36	3.47	6.28	10.3	214	40.5
5	714	205	102	35.2	17.2	8.60	4.79	3.66	4.24	22.4	176	58.5
6	345	195	109	33.9	15.8	8.16	4.91	3.94	3.03	84.7	130	118
7	664	170	108	33.5	13.9	8.94	4.75	8.74	3.64	55.5	169	185
8	432	151	122	33.0	13.0	10.6	4.65	4.70	3.06	25.1	100	126
9	321	118	90.6	34.2	11.8	8.93	4.60	3.64	4.72	17.1	143	95.6
10	266	96.5	83.9	31.5	11.2	7.21	4.82	3.68	4.41	15.2	112	83.9
11	241	94.9	77.0	29.7	11.4	8.54	4.58	2.77	3.20	18.8	209	287
12	887	110	72.2	26.8	10.4	11.9	3.70	2.54	3.07	15.7	1120	494
13	1990	122	66.9	25.3	12.4	138	3.34	3.18	2.50	32.0	1300	399
14	502e	133	67.4	24.1	9.21	206	3.29	3.66	3.04	27.7	271	340
15	298e	445	91.6	22.6	7.69	98.2	3.64	4.98	2.71	27.3	94.9	193
16	267e	755	73.8	22.2	11.2	49.0	3.37	3.69	2.15	18.8	101	222
17	238e	436	65.7	21.2	9.85	24.3	4.24	3.13	2.93	14.4	54.1	110
18	207	282	66.5	21.3	10.8	17.7	4.09	3.50	128	11.4	47.8	139
19	190	349	87.5	20.6	11.1	13.8	4.11	4.24	304	9.57	133	1010
20	173	249	74.1	20.0	24.7	11.1	3.97	4.03	104	21.2	103	1080
21	167	173	98.9	19.1	16.4	8.98	3.70	3.84	27.5	52.5	65.8	664
22	127	149	95.9	17.9	14.6	9.10	5.31	3.56	15.0	212	57.5	245
23	86.4	197	95.1	18.0	12.3	8.40	4.29	3.79	10.2	182	142	295
24	102	168	71.8	23.4	12.9	7.49	3.17	3.51	9.32	203	107	277
25	167	127	96.5	41.2	34.7	7.78	3.58	3.37	7.43	156	72.7	280
26	131	212	72.1	24.9	49.0	9.42	4.05	3.97	6.18	113	83.7	168
27	298	206	61.9	21.9	30.7	6.99	4.00	4.04	60.7	91.6	86.5	139
28	236	134	55.8	19.8	32.4	6.58	3.51	4.60	230	57.2	119	117
29	188	—	64.0	16.5	18.1	5.58	3.21	5.47	121	119	130	109
30	183	—	63.0	15.7	14.3	5.27	4.14	4.08	34.9	110	104	93.2
31	218	—	54.4	—	12.3	—	3.91	3.31	—	47.1	—	108
Mean	377	248	82.8	27.5	17.1	24.9	4.28	3.89	37.4	58.8	186	247
Max	1990	755	122	48.4	49.0	206	6.86	8.74	304	212	1300	1080
Min	86.4	94.9	54.4	15.7	7.69	5.27	3.17	2.54	2.15	9.57	36.7	40.5
Ac-Ft	23188	13790	5091	1633	1052	1480	263	239	2226	3614	11060	15166

**Site moved 120 feet downstream in 2012, previous ID was 14206450; e=estimated



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — RCTV

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1995				102	40.2	22.2	12.3	10.2	9.5	24.9		
1996					161	30.0	15.8	10.2	15.9	50.8		
1997				81.0	41.8	38.4	16.5	11.3	15.1			
1998				53.3	153	35.4	18.3	14.3	13.7	26.9		
1999				60.8	39.6	22.0	15.8	14.9	12.0	14.3		
2000		206	149	37.2	30.0	17.9		11.7	12.9	26.6	20.1	61.2
2001	37.5	41.1	35.9	38.1	17.9	16.0	9.8	9.5	8.6	13.7	83.6	
2002			125	41.1	22.8	16.8	13.2	10.0	9.4	17.7	27.0	133
2003			368	155	37.8	17.3	12.5	12.0	11.1	23.3	30.6	178
2004	288		61.6	30.4	18.8	16.2	11.5	11.3	14.0	31.4	30.6	50.5
2005	52.2	30.4	21.6	81.0	82.4	32.7	16.4	13.0	10.7	31.1	104	
2006			118	70.9	28.4	26.7	11.1	10.8	11.9	15.8	447	
2007		147	182	53.5	22.5	19.2	10.7		17.4	26.3	35.4	
2008	334	127	121	68.0	33.7	16.5	8.7	9.0	6.1	7.8	44.7	31.3
2009	102	45.1	71.3	49.7	54.7	28.1	7.6	7.0	8.0	25.2	177	59.9
2010	377	217	151	176	67.0	85.3	19.8	15.8	20.7	19.9	122	352
2011	231	103	265	118	64.8	29.9	19.5	9.0	6.8	18.6	43.8	30.0
2012	104	96.7	291	118	66.0	37.6	14.0	9.8	8.2	49.1	126	434
2013	91.1	70.7	56.0	41.5	24.2	32.4	9.6	7.3	28.2	19.8	42.2	26.8
2014	43.6	132	135	122	47.7	19.6	12.6	5.9	5.2	50.4	61.8	143
2015	54.0	53.4	53.7	55.5	18.2	7.8	5.8	4.5	8.1	10.5	68.4	433
2016	357	181	226	53.6	21.9	15.3	10.3	5.8	9.5	108	111	196
2017	147	404	295	137	62.5	20.8	8.2	7.2	8.1	24.2	146	92.0
2018	182	93.1	96.5	79.2	20.1	12.4	6.1	5.6	5.9	8.5	19.8	131
2019	89.0	92.8	57.6	69.2	25.8	15.3	13.2	7.2	24.3	16.6	18.9	63.5
2020	162	72.9	44.1	33.2	31.2	37.3	6.7	6.0	13.8	7.8	69.6	82.3
2021	238	196	83.9	24.5	13.9	9.0	4.1	3.7	5.5	27.3	106	139
median	162	111	106	65.6	34.2	22.2	11.8	10.0	11.2	22.0	67.7	126

KEY

Q in cfs

- Q ≤ 6.5
- 6.5 < Q ≤ 8.7
- 8.7 < Q ≤ 10.0
- 10.0 < Q ≤ 12.0
- 12.0< Q ≤ 17.0
- 17.0< Q ≤ 24.0
- 24.0 < Q ≤ 35.0
- 35.0 < Q ≤ 105
- 105 < Q ≤ 262
- 262 < Q ≤ 411
- Q > 411

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

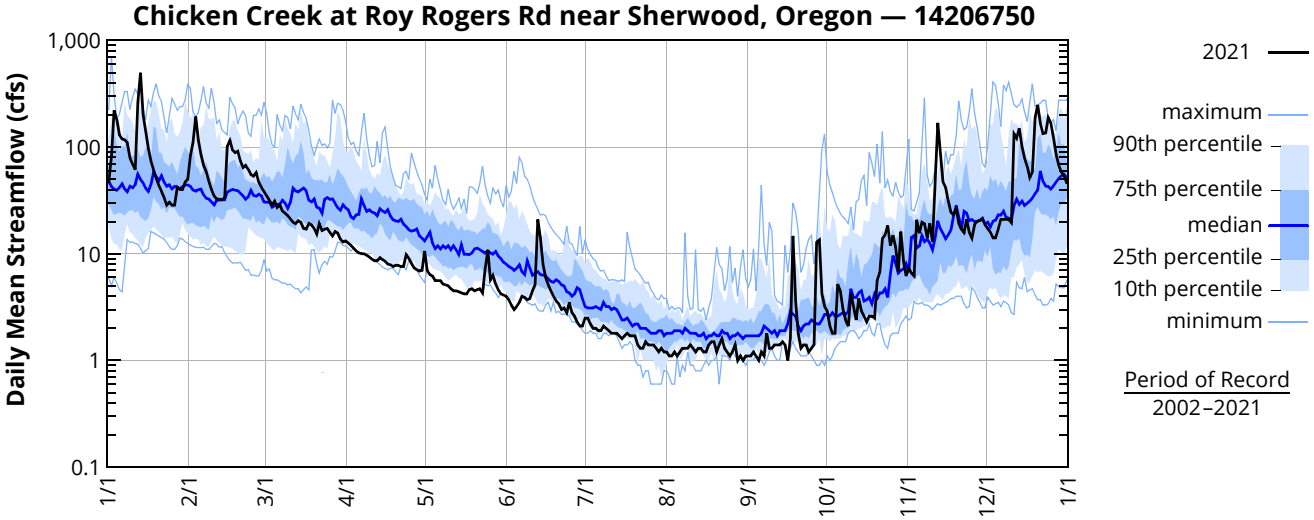
CCSR — Chicken Creek at Roy Rogers Rd near Sherwood, Oregon — 14206750

Data source: WEST Consultants for Clean Water Services
River Mile: 2.3 *Latitude:* 45 22 31 *Longitude:* 122 51 24

2021 — MEAN STREAMFLOW (cfs) — CCSR

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	47.4	83.8	38.4	13.2	10.6	4.04	2.53	1.18	1.09	2.92	7.27	17.2
2	83.4	111	34.8	12.6	6.99	3.73	2.49	1.08	1.10	2.05	6.58	16.0
3	221	193	31.7	12.0	6.41e	3.32	2.20	1.13	1.15	1.76	6.18	14.1
4	182	117	28.6	11.3	6.23e	3.04	1.99	1.23	1.06	1.77	20.8	14.1
5	131	84.7	31.2	10.6	5.58	3.21	1.99	1.08	1.01	5.21	15.6	17.0
6	119	67.6	27.2	10.2	5.56	3.45	1.89	1.17	1.15	4.46	19.8	21.0
7	117	58.8	28.7	10.0	5.56	3.98	1.89	1.30	1.11	2.98	19.1	21.0
8	111	48.1	25.2	9.95	5.24	3.90	2.09	1.34	1.75	2.35	14.1	21.1
9	79.5	40.3	24.0	9.73	5.10	3.70	1.97	1.27	1.29	2.08	19.3	21.0
10	69.5	34.8	22.8	9.29	4.97	3.84	1.89	1.37	1.33	4.32	13.0	19.6
11	61.3	32.6	21.2	8.87	4.72	4.52	1.80	1.25	1.38	3.17	47.2	133
12	258	32.5	19.8	8.59	4.52	5.07	1.82	1.23	1.41	2.42	169	121
13	498	32.0	19.2	8.55	4.49	21.0	1.78	1.27	1.37	3.81	85.4	150
14	202	33.7	20.4	9.16	4.39	14.2	1.71	1.31	1.51	2.89	47.3	101
15	139	102	19.7	8.79	4.30	7.90	1.64	1.18	1.42	2.55	41.9	79.4
16	97.7	116	17.3	8.47	4.22	6.04	1.74	1.24	1.02	2.25	31.4	65.8
17	74.6	94.3	17.0	7.99	4.22	5.14	1.83	1.36	1.56	2.62	24.5	51.9
18	61.2	88.9	19.3	7.88	4.61	4.50	1.67	1.47	14.7	2.58	23.2	58.5
19	51.1	91.6	18.7	7.60	4.68	3.96	1.70	1.45	3.61	2.46	26.3	189
20	43.6	74.6	17.3	7.78	4.53	3.61	1.71	1.17	1.75	5.61	19.3	249
21	38.6	64.4	15.3	7.75	4.56	3.40	1.39	1.39	1.34	6.74	16.9	167
22	33.7	67.7	19.2	7.58	4.69	3.02	1.30	1.64	1.35	13.9	15.8	134
23	28.6	61.5	16.5	7.56	4.26	3.13	1.29	1.32	1.43	15.0	21.1	136
24	30.5	55.2	17.0	9.76	7.20	2.82	1.49	1.17	1.24	18.4	15.8	189
25	28.5	53.3	17.3	9.08	10.8	3.52	1.42	1.12	1.30	11.9	14.0	169
26	28.6	57.6	15.9	8.11	5.72	2.83	1.41	1.20	1.38	14.9	18.8	122
27	42.1	46.9	14.7	7.42	6.25	2.62	1.38	1.41	12.9	11.4	20.2	85.9
28	40.2	41.8	16.2	7.12	5.23	2.28	1.34	0.97	13.5	6.77	20.5	67.3
29	40.0	—	15.7	6.90	4.56	2.14	1.20	1.07	4.19	16.1	21.1	58.4
30	47.0	—	13.7	6.96	4.20	2.09	1.31	1.01	3.18	8.49	18.8	54.1
31	49.7	—	12.9	—	4.09	—	1.16	1.09	—	6.15	—	46.4
Mean	98.5	70.9	21.2	9.03	5.43	4.67	1.71	1.24	2.79	6.13	28.0	84.2
Max	498	193	38.4	13.2	10.8	21.0	2.53	1.64	14.7	18.4	169	249
Min	28.5	32.0	12.9	6.90	4.09	2.09	1.16	0.97	1.01	1.76	6.18	14.1
Ac-Ft	6059	3939	1303	537	334	278	105	76.3	166	377	1667	5176

e=estimated



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — CCSR

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2002	65.0	48.5	46.5		9.80	5.00	2.20	1.70	1.70	2.70	6.95	30.0
2003	33.0	39.1	47.9	36.3	14.6	6.08	2.49	1.52	1.98	4.31	7.26	37.0
2004	45.2	43.2	21.7	12.8	6.82	4.22	1.50	1.27	1.93	4.47	5.68	14.7
2005	15.1	9.74	6.59	23.7	23.0	6.80	2.17	1.04	1.29	3.16	18.1	32.8
2006	180	31.2	30.2	20.8	9.49	5.37	2.33	1.47	1.26	2.50	54.0	62.4
2007	37.7	37.7	33.7	26.5	11.2	4.79	2.22	1.91	3.06	20.4	30.8	62.1
2008	61.1	44.9	41.9	27.2	14.4	7.23	2.92	3.16	3.51	4.37	7.97	8.68
2009	20.5	11.7	19.5	13.1	16.8	6.88	2.43	1.48	2.03	4.20	21.3	16.8
2010	66.6	36.7	36.5	28.0	16.4	21.2	4.05	1.82	2.83	4.29	27.7	77.3
2011	51.6	33.6	76.5	39.7	18.7	10.3	5.59	1.93	2.12	4.51	9.08	5.94
2012	40.5	34.8	67.7	43.0	22.9	11.9	5.59	2.33	1.83	10.1	25.7	102
2013	19.4	16.7	16.7	14.1	7.74	11.5	3.49	1.95	4.04	14.1	21.4	8.12
2014	15.5	42.0	43.2	30.1	14.9	6.04	3.38	2.15	2.18	4.02	15.7	39.3
2015	19.1	29.5	25.0	17.6	7.10	3.35	1.87	1.78	1.80	2.17	15.1	167
2016	74.0	43.5	49.1	15.3	7.34	4.52	2.57	1.84	2.12	26.5	32.9	53.2
2017	42.4	141	88.1	34.3	19.2	9.64	4.07	2.39	3.20	4.36	41.0	30.0
2018	55.4	27.5	32.7	33.2	8.39	5.50	1.68	1.49	1.47	3.00	3.86	23.0
2019	24.3	35.0	20.6	23.8	8.85	4.17	2.25	1.60	2.63	2.98	3.64	11.1
2020	60.1	26.0	12.1	8.50	8.51	6.96	1.88	1.64	1.99	2.11	11.3	24.3
2021	61.3	63.0	19.2	8.69	4.72	3.66	1.71	1.23	1.38	3.81	19.6	65.8
median	44.7	34.9	31.2	22.0	10.8	5.97	2.49	1.75	2.04	4.09	16.8	33.8

KEY

Q in cfs

- Q ≤ 1.52
- 1.52 < Q ≤ 1.79
- 1.79 < Q ≤ 2.13
- 2.13 < Q ≤ 2.60
- 2.60< Q ≤ 4.20
- 4.20< Q ≤ 6.81
- 6.81 < Q ≤ 11.3
- 11.3 < Q ≤ 30.5
- 30.5 < Q ≤ 61.8
- 61.8 < Q ≤ 108
- Q > 108

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

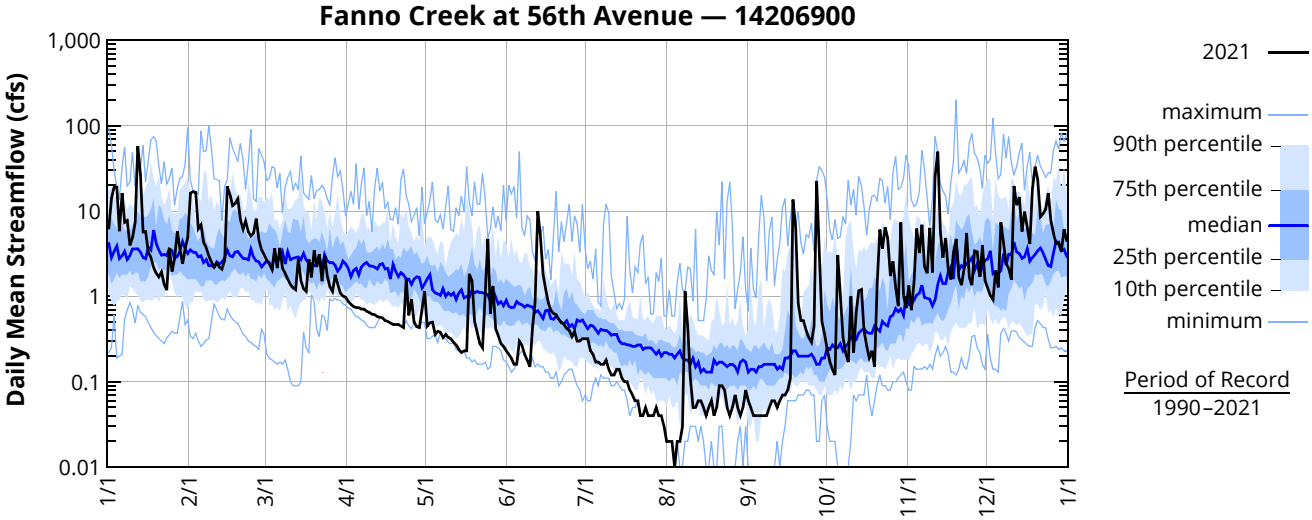
6900 – Fanno Creek at 56th Avenue – 14206900

Data source: U.S. Geological Survey, Oregon Water Science Center
River Mile: 12.6 *Latitude:* 45 29 17 *Longitude:* 122 44 01 *Drainage area:* 2.37 sq mile

2021 — MEAN STREAMFLOW† (cfs) — 6900

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	6.36	16.3	3.10	0.98	1.15	0.23	0.32	0.02	0.06	0.24	1.34	1.25
2	14.2	16.9	2.67	0.87	0.45	0.21	0.32	0.02	0.05	0.17	0.69	1.03
3	19.2	16.6	2.39	0.81	0.49	0.19	0.23	0.02	0.04	0.14	1.52	0.92
4	19.1	6.19	2.08	0.76	0.50	0.16	0.21	0.01	0.04	0.12	6.24	2.01
5	5.82	6.89	3.66	0.74	0.36	0.16	0.17	0.02	0.04	3.06	3.22	1.28
6	16.3	4.30	2.15	0.74	0.39	0.30	0.17	0.02	0.04	1.03	6.93	7.39
7	7.39	3.71	3.70	0.71	0.38	0.27	0.16	0.03	0.04	0.33	2.24	4.26
8	7.73	3.00	2.13	0.71	0.33	0.21	0.16	1.15	0.04	0.22	1.87	2.43
9	3.96	2.53	1.87	0.67	0.36	0.18	0.18	0.43	0.05	0.17	6.37	2.13
10	4.85	2.20	1.60	0.65	0.33	0.15	0.14	0.11	0.06	1.00	1.91	1.57
11	7.44	2.47	1.37	0.62	0.32	0.43	0.12	0.05	0.06	0.22	25.4	19.7
12	57.6	2.20	1.27	0.61	0.29	0.85	0.12	0.05	0.05	0.64	49.8	11.7
13	26.0	2.08	1.20	0.58	0.27	9.99	0.14	0.06	0.06	1.17	5.75	14.6
14	5.70	2.65	2.76	0.57	0.24	5.16	0.14	0.06	0.07	1.21	2.84	5.76
15	5.74	19.6	1.55	0.56	0.22	1.82	0.11	0.05	0.07	0.40	4.83	9.86
16	3.25	15.7	1.23	0.52	0.23	1.22	0.10	0.04	0.08	0.26	2.09	6.45
17	2.88	11.6	1.15	0.51	0.23	0.84	0.10	0.05	0.11	0.19	1.58	4.12
18	2.19	12.3	2.73	0.49	1.84	0.69	0.08	0.06	13.6	0.23	3.31	18.1
19	1.87	13.9	1.67	0.47	1.54	0.63	0.07	0.04	6.48	0.15	4.73	33.2
20	1.69	8.03	3.49	0.47	0.51	0.61	0.06	0.05	0.83	1.38	1.69	23.7
21	1.94	6.14	2.21	0.47	0.37	0.54	0.06	0.09	0.52	6.07	1.36	8.60
22	1.38	7.68	3.13	0.45	0.28	0.49	0.04	0.09	0.52	3.62	2.11	9.27
23	1.19	5.73	1.51	0.43	0.25	0.47	0.04	0.08	0.40	6.45	5.56	10.5
24	3.68	5.11	3.04	1.61	1.26	0.42	0.05	0.05	0.33	4.80	1.68	16.3
25	1.96	5.51	1.72	0.60	4.73	0.40	0.04	0.04	0.29	1.74	1.36	7.84
26	2.79	8.16	1.30	0.92	0.63	0.34	0.04	0.05	0.45	2.59	3.41	5.48
27	5.80	4.70	1.15	0.50	1.32	0.39	0.04	0.07	22.6	1.27	3.34	4.17
28	3.63	3.53	1.79	0.44	0.42	0.30	0.05	0.05	4.37	0.77	1.70	4.32
29	2.41	—	1.41	0.43	0.35	0.30	0.04	0.04	0.51	7.39	3.96	3.39
30	3.63	—	1.09	0.73	0.28	0.32	0.04	0.05	0.36	1.03	1.55	6.13
31	4.93	—	1.01	—	0.26	—	0.03	0.08	—	0.73	—	4.54
Mean	8.15	7.70	2.04	0.65	0.66	0.94	0.12	0.10	1.74	1.57	5.35	8.13
Max	57.6	19.6	3.70	1.61	4.73	9.99	0.32	1.15	22.6	7.39	49.8	33.2
Min	1.19	2.08	1.01	0.43	0.22	0.15	0.03	0.01	0.04	0.12	0.69	0.92
Ac-Ft	501	428	125	38.9	40.8	56.1	7.08	6.01	104	96.8	318	500

† Data after October 26, 2021 are provisional—subject to revision



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — 6900

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1990										0.46	1.50	2.10
1991	2.20	3.45	2.60	1.95	1.30	0.92	0.65	0.39	0.21	0.16	2.35	2.60
1992	2.50	2.95	1.50	1.70	0.50	0.26	0.14	0.09	0.08	0.19	0.85	1.60
1993	1.90	1.25	2.90	3.80	2.10	0.97	0.62	0.52	0.38	0.49	0.55	0.71
1994	1.30	1.50	1.40	1.60	0.70	0.49	0.34	0.19	0.13	0.15	2.05	5.30
1995	4.20	3.40	3.20	2.65	1.20	0.93	0.41	0.36	0.33	0.56	2.85	5.30
1996	6.40	9.55	2.20	2.75	2.30	0.75	0.43	0.22	0.20	1.70	4.10	12.0
1997	4.00	1.85	5.90	2.00	0.80	0.68	0.30	0.25	0.33	0.74	2.00	2.10
1998	6.50	4.85	3.30	1.20	2.80	1.00	0.44	0.27	0.21	0.41	4.85	7.30
1999	6.30	9.60	4.30	1.80	1.10	0.59	0.34	0.22	0.10	0.16	2.25	2.20
2000	4.80	3.35	2.70	1.05	1.00	0.50	0.28	0.20	0.20	0.37	0.60	1.00
2001	0.73	0.81	1.30	1.20	0.65	0.46	0.26	0.20	0.16	0.22	2.08	5.11
2002	4.71	3.21	2.76	1.24	0.65	0.46	0.20	0.14	0.19	0.21	0.40	2.92
2003	3.60	2.49	2.95	3.79	1.57	0.69	0.30	0.25	0.22	0.28	1.19	5.63
2004	6.56	3.93	1.67	0.69	0.27	0.20	0.13	0.16	0.24	0.44	0.90	2.35
2005	2.02	0.73	0.25	2.53	2.85	1.17	0.30	0.16	0.12	0.46	0.78	1.46
2006	8.45	2.41	2.47	1.99	1.03	0.78	0.30	0.14	0.12	0.24	6.16	3.46
2007	2.71	3.32	3.14	1.76	0.75	0.48	0.27	0.16	0.16	0.65	1.07	5.60
2008	5.28	3.16	3.42	1.84	0.79	0.57	0.19	0.21	0.11	0.16	1.44	1.56
2009	2.91	1.78	1.48	1.00	1.14	0.40	0.25	0.12	0.17	0.33	2.84	1.65
2010	5.31	2.58	1.93	2.60	2.01	2.05	0.42	0.21	0.27	0.43	2.53	4.60
2011	2.97	2.50	6.27	3.55	1.95	0.86	0.54	0.32	0.19	0.35	1.60	0.57
2012	2.70	1.95	6.18	3.60	1.89	1.17	0.38	0.11	0.08	0.53	2.03	5.63
2013	1.83	1.40	1.22	1.05	0.51	0.75	0.22	0.05	0.31	0.47	0.48	0.42
2014	0.43	1.96	3.27	3.45	2.08	0.74	0.54	0.09	0.07	0.40	1.42	3.15
2015	1.47	3.44	4.12	2.66	0.88	0.40	0.19	0.03	0.20	0.48	1.68	11.5
2016	6.76	5.53	5.12	1.50	1.03	0.37	0.09	0.03	0.12	3.12	2.24	3.00
2017	2.96	7.22	6.58	3.22	1.58	0.55	0.22	0.12	0.16	0.49	2.41	1.09
2018	3.48	1.87	1.90	2.76	0.49	0.30	0.11	0.08	0.13	0.21	0.32	2.23
2019	1.12	3.19	1.47	2.00	0.56	0.20	0.13	0.08	0.35	0.26	0.20	0.63
2020	5.65	1.56	1.31	0.92	0.87	0.57	0.15	0.08	0.12	0.11	1.29	2.33
2021	4.85	5.94	1.79	0.61	0.36	0.40	0.10	0.05	0.08	0.77	2.54	5.76
median	3.38	2.80	2.60	2.03	1.09	0.63	0.30	0.17	0.17	0.39	1.58	2.90

Key

Q in cfs

- Q ≤ 0.10
- 0.10 < Q ≤ 0.14
- 0.14 < Q ≤ 0.20
- 0.20 < Q ≤ 0.25
- 0.25< Q ≤ 0.42
- 0.42< Q ≤ 0.68
- 0.68 < Q ≤ 1.10
- 1.10 < Q ≤ 2.98
- 2.98 < Q ≤ 7.22
- 7.22 < Q ≤ 12.0
- Q > 12.0

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

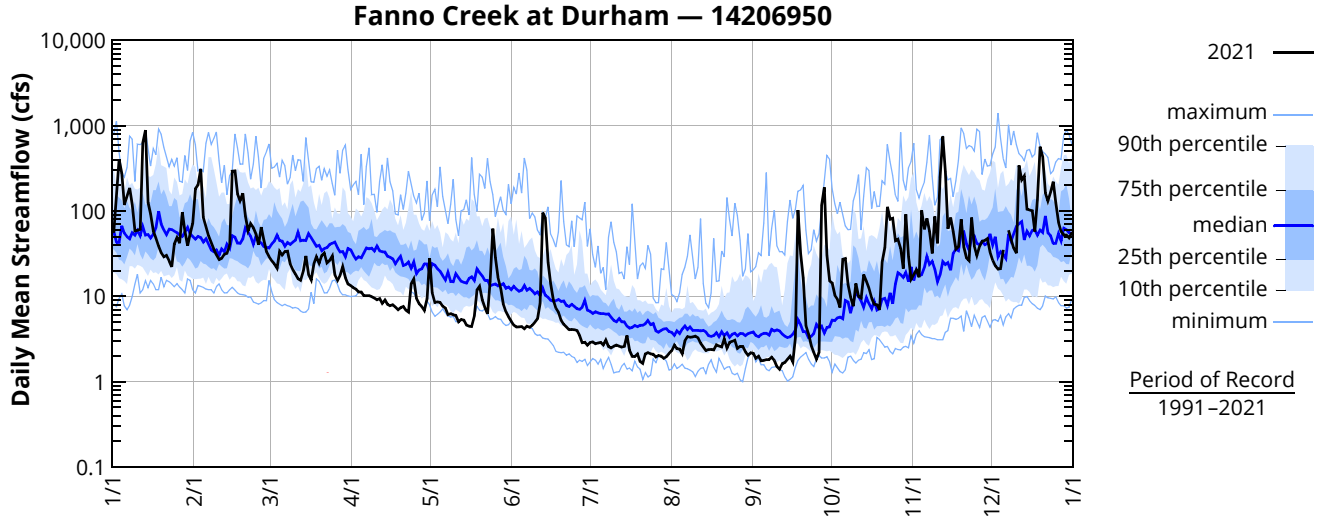
FANO – FANNO CREEK AT DURHAM – 14206950

Data source: U.S. Geological Survey, Oregon Water Science Center
River Mile: 1.2 *Latitude:* 45 24 13 *Longitude:* 122 45 13 *Drainage area:* 31.50 sq mile

2021 — MEAN STREAMFLOW† (cfs) — FANO

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC*
1	57.8	183	29.3	13.4	28.2	5.12	2.88	2.30	2.16	14.4	18.1	26.5
2	157	202	26.2	12.7	11.1	4.62	2.94	2.69	1.88	10.3	20.5	22.9
3	404	312	24.1	12.2	8.48	4.39	2.78	2.45	1.99	9.30	16.8	20.9
4	275	85.1	21.5	11.3	8.63	4.40	2.85	2.42	1.76	7.41	102	21.2
5	118	66.1	33.8	11.3	8.54	4.44	2.89	2.13	1.78	27.2	61.1	35.1e
6	149	51.6	30.6	10.2	7.70	4.18	2.70	3.02	1.82	27.8	82.3	
7	187	42.7	33.7	10.2	7.30	4.47	3.09	3.39	1.82	13.8	58.2	59.8e
8	119	35.9	33.9	10.2	6.12	4.35	2.59	3.33	1.94	9.86	31.9	46.7
9	58.8	30.7	24.0	9.94	6.26	4.59	2.49	3.35	1.78	7.70	86.7	36.8
10	59.4	27.0	20.7	9.56	6.09	4.98	2.61	3.42	1.51	14.2	42.0	32.1
11	61.1	27.9	18.2	9.14	6.02	5.46	2.69	3.27	1.40	9.96	251	344
12	629	31.3	16.1	9.46	5.06	8.26	2.61	2.84	1.63	9.53	749	232e
13	889	32.0	15.4	8.28	5.38	96.2	2.54	2.56	1.68	18.1	292	258
14	126	39.8	19.8	9.09	5.28	83.2	2.59	2.32	1.84	15.1	62.1	105
15	92.2	294	29.8	8.10	4.61	25.1	3.48	2.38	2.00	12.5	84.1	103
16	58.4	296	18.0	7.78	4.48	14.1	2.34	2.39	1.70	9.56	57.7	101
17	48.5	159	15.6	8.00	4.45	9.08	1.99	2.36	3.26	8.13	35.7	57.7e
18	38.9	132	24.0	7.53	5.81	7.32	1.97	2.71	103	7.98	38.2	135e
19	32.6	161	29.2	6.98	11.9	6.55	2.11	2.62	31.6	6.97	80.3	569
20	29.2	87.8	24.5	7.40	13.1	5.26	1.73	2.55	16.4	25.3	38.2	439
21	30.3	59.0	30.1	7.61	9.13	4.72	1.64	3.18	4.57	37.5	28.3	164e
22	26.1	71.2	32.2	6.89	7.48	4.38	2.12	2.49	3.68	112	26.3	131
23	22.2	64.1	24.7	6.56	6.26	4.07	2.20	2.89	2.67	80.1	83.9	167
24	41.1	54.3	26.3	14.1	15.1	4.10	2.12	2.97	2.22	82.1	39.0	221
25	49.0	40.4	29.8	16.0	62.5	4.07	2.10	3.07	1.84	45.0	30.1	125
26	42.1	64.8	17.9	9.46	28.6	3.98	1.95	2.46	2.20	47.0	38.7	74.2
27	97.5	46.1	15.4	8.22	16.8	3.49	2.03	2.60	117	36.7	44.2	57.9
28	58.2	33.4	17.7	7.61	12.5	2.87	2.00	2.60	190	21.2	45.3	52.6
29	39.3	—	22.3	6.87	8.21	2.91	1.88	2.24	30.5	92.1	47.6	52.6
30	54.4	—	16.6	9.38	6.62	2.68	1.96	2.05	15.2	29.0	33.3	48.6
31	71.8	—	14.0	—	5.78	—	2.15	2.19	—	15.9	—	55.2
Mean	133	97.5	23.7	9.52	11.1	11.4	2.39	2.69	18.4	27.9	87.5	126
Max	889	312	33.9	16.0	62.5	96.2	3.48	3.42	190	112	749	569
Min	22.2	27.0	14.0	6.56	4.45	2.68	1.64	2.05	1.40	6.97	16.8	20.9
Ac-Ft	8176	5415	1459	566	681	681	147	165	1097	1713	5206	7527

† Data after November 17, 2021 are provisional—subject to revision; *Incomplete record; e=estimated



MEDIAN OF DAILY MEAN STREAMFLOW BY MONTH AND YEAR — FANO

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1991	28	44	33	25	17	12	7.5	4.8	3.3	3.1	34	40
1992	42	50	22	33	12	5.2	3.4	2.8	2.9	3.7	20	56
1993	44	21	56	73	38	17	8.7	4.7	3.5	3.8	5.8	26
1994	41	37	34	25	12	8.7	3.8	3.8	3.4	3.6	49	68
1995	62	59	59	39	19	15	9.8	6.7	5.5	15	50	71
1996	95	124	25	37	25	7.8	6.6	5.9	7.5	19	80	221
1997	74	41	110	34	21	20	8.9	6.5	9.3	31	39	39
1998	100	73	58	21	54	18	9.2	7.8	24	34	70	100
1999	90	155	71	30	20	11	6.8	6.3	4.5	6.3	53	48
2000	61	68	52	17	17	7.5	5.6	3.9	3.8	12	8.9	21
2001	13	17	21	22	11	10	5.5	5.4	4.4	7.1	39	99
2002	86	54	44	19	11	7.9	5.5	3.8	4.0	4.1	8.5	66
2003	58	41	71	63	20	9.2	5.6	4.5	3.7	12	17	78
2004	100	64	25	12	9.1	6.7	3.8	5.2	6.5	17	15	25
2005	22	13	11	33	33	14	5.4	4.9	3.5	14	39	64
2006	195	32	42	33	15	9.5	4.3	3.0	2.7	4.4	117	65
2007	38	47	44	28	11	6.5	4.0	3.0	3.3	15	18	105
2008	109	34	54	29	16	9.0	4.5	4.6	3.4	4.9	19	17
2009	26	16	27	21	23	8.2	3.3	3.2	3.4	7.3	48	18
2010	86	41	31	36	21	28	6.0	3.5	6.5	5.6	46	96
2011	51	32	101	50	26	13	9.5	4.0	2.4	8.3	28	13
2012	50	35	81	46	23	15	5.5	2.7	2.0	21	49	137
2013	27	23	18	17	11	9.2	2.4	3.0	13	7.3	12	8.9
2014	20	50	67	48	21	7.6	4.8	2.2	2.2	17	26	53
2015	23	31	28	21	7.1	3.0	1.8	1.4	2.4	2.8	28	183
2016	84	55	67	16	11	6.9	3.5	1.7	3.6	58	48	55
2017	47	160	104	35	20	10	3.8	2.6	3.9	11	66	33
2018	72	36	33	35	7.7	5.3	2.0	3.0	3.2	4.7	14	42
2019	26	36	21	26	9.8	6.0	4.0	3.0	12	8.6	5.4	26
2020	86	25	20	13	13	11	2.5	2.4	3.1	3.6	23	39
2021	59	62	24	9.3	7.5	4.5	2.3	2.6	2.0	15	45	67
median	56	42	40	29	16	9.8	4.9	3.7	3.8	9.3	30	53

KEY

Q in cfs

- Q ≤ 2.5
- 2.5 < Q ≤ 3.3
- 3.3 < Q ≤ 4.0
- 4.0 < Q ≤ 5.0
- 5.0< Q ≤ 7.9
- 7.9< Q ≤ 12
- 12 < Q ≤ 18
- 18 < Q ≤ 47
- 47 < Q ≤ 114
- 114 < Q ≤ 189
- Q > 189

Q as percentile

- Q ≤ 5th
- 5th < Q ≤ 10th
- 10th < Q ≤ 15th
- 15th < Q ≤ 20th
- 20th < Q ≤ 30th
- 30th < Q ≤ 40th
- 40th < Q ≤ 50th
- 50th < Q ≤ 75th
- 75th < Q ≤ 90th
- 90th < Q ≤ 95th
- Q > 95th

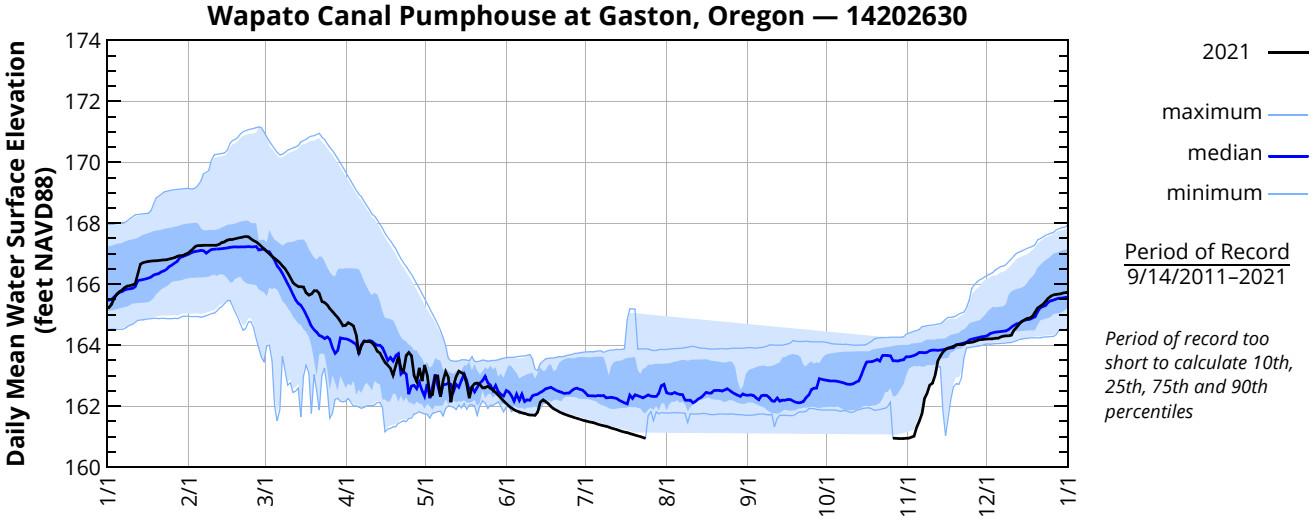
WPH – Wapato Canal Pumphouse at Gaston, Oreg. – 14202630

Data source: U.S. Geological Survey, Oregon Water Science Center
Latitude: 45 26 25 *Longitude:* 123 07 31

2021 — MEAN WATER SURFACE ELEVATION ABOVE NAVD88 (feet) — WPH

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul*	Aug*	Sep*	Oct*	Nov	Dec
1	165.23	167.09	167.16	164.65	163.35	162.09	161.52				160.95	164.21
2	165.34	167.16	167.08	164.74	163.03	162.01	161.50				160.98	164.21
3	165.53	167.25	167.00	164.69	162.34	161.94	161.48				161.01	164.21
4	165.67	167.27	166.91	164.63	162.37	161.88	161.46				161.30	164.23
5	165.75	167.27	166.85	164.34	162.98	161.84	161.43				161.51	164.23
6	165.81	167.28	166.78	163.70	162.99	161.81	161.40				161.74	164.27
7	165.89	167.28	166.70	163.98	162.31	161.78	161.38				162.25	164.30
8	165.94	167.28	166.60	164.14	162.83	161.76	161.36				162.43	164.31
9	165.95	167.28	166.51	164.12	163.13	161.73	161.34				162.69	164.31
10	165.98	167.28	166.37	164.12	162.95	161.71	161.31				162.75	164.33
11	166.01	167.28	166.21	164.08	162.13	161.71	161.28				163.00	164.49
12	166.32	167.31	166.05	163.98	162.67	161.70	161.25				163.48	164.59
13	166.66	167.37	165.98	163.80	162.97	161.81	161.23				163.64	164.69
14	166.71	167.39	165.92	163.74	163.15	162.13	161.20				163.77	164.78
15	166.73	167.45	165.92	163.58	163.10	162.21	161.17				163.86	164.83
16	166.75	167.47	165.91	163.43	163.04	162.15	161.15				163.91	164.88
17	166.76	167.47	165.72	163.34	162.73	162.08	161.13				163.93	164.89
18	166.77	167.49	165.64	163.25	162.26	161.99	161.10				163.96	164.94
19	166.77	167.51	165.68	163.01	162.64	161.92	161.08				164.01	165.09
20	166.78	167.53	165.79	163.30	162.74	161.87	161.05				164.02	165.22
21	166.79	167.55	165.79	163.62	162.76	161.82	161.02				164.02	165.28
22	166.80	167.57	165.70	163.23	162.71	161.78	161.00				164.03	165.34
23	166.80	167.56	165.43	163.15	162.60	161.74	160.97				164.08	165.44
24	166.83	167.49	165.40	163.66	162.60	161.71	160.95				164.09	165.54
25	166.85	167.43	165.32	163.76	162.66	161.68					164.10	165.61
26	166.87	167.39	165.20	163.65	162.58	161.65				160.95	164.12	165.65
27	166.92	167.32	165.10	163.01	162.53	161.62				160.95	164.15	165.67
28	166.94	167.24	165.00	162.81	162.45	161.60				160.94	164.18	165.68
29	166.94	—	164.91	163.26	162.36	161.57				160.94	164.19	165.69
30	166.98	—	164.78	162.82	162.27	161.54				160.94	164.2	165.72
31	167.01	—	164.64	—	162.17	—			—	160.95	—	165.73
Mean	166.42	167.37	165.94	163.72	162.69	161.83					163.21	164.91
Max	167.01	167.57	167.16	164.74	163.35	162.21					164.20	165.73
Min	165.23	167.09	164.64	162.81	162.13	161.54					160.95	164.21

*incomplete record, no data available for July 25–October 25, 2021.



MEDIAN OF DAILY MEAN WATER SURFACE ELEVATION BY MONTH AND YEAR — WPH

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2011									163.66	163.43	163.33	164.25
2012	165.06	166.32	164.45	161.89	162.23	162.24	161.90	161.74	161.73	161.95	163.58	166.04
2013	167.47	165.73	162.59	162.12	162.59	162.20	162.14	162.46	162.36	163.94	164.21	164.48
2014	164.86	165.42	166.23	164.54	162.13	162.14	162.07	162.18	161.91	162.03	163.82	164.84
2015	165.89	167.33	165.24	162.47	162.15	162.29	162.75	162.37	161.97	161.94	163.58	166.18
2016	168.31	169.40	169.29	166.37	163.49	163.00	162.37	162.21	161.94	163.51	164.88	167.18
2017	168.33	170.36	170.55	167.75	162.74	162.35	162.24	162.95	162.81	162.85	164.22	165.35
2018	166.35	167.29	165.10	163.75	163.38	163.54	163.52	163.60	163.52	163.64	163.88	164.68
2019	165.52	166.59	164.56	163.92	163.10	163.55	163.85	163.90	164.03	164.08	164.32	164.74
2020	166.05	167.08	164.71	162.36	162.09	163.42	163.72				163.93	164.30
2021	166.75	167.35	165.91	163.68	162.67	161.80	161.24			160.95	163.89	164.88
median	166.25	167.13	165.64	163.65	162.65	162.48	162.33	162.40	162.28	163.40	164.03	165.00

KEY

EL in feet

- EL ≤ 161.83
- 161.83 < EL ≤ 161.99
- 161.99 < EL ≤ 162.11
- 162.11 < EL ≤ 162.23
- 162.23 < EL ≤ 162.62
- 162.62< EL ≤ 163.35
- 163.35< EL ≤ 163.70
- 163.70 < EL ≤ 165.27
- 162.27 < EL ≤ 167.15
- 167.15 < EL ≤ 168.01
- EL > 168.01

EL as percentile

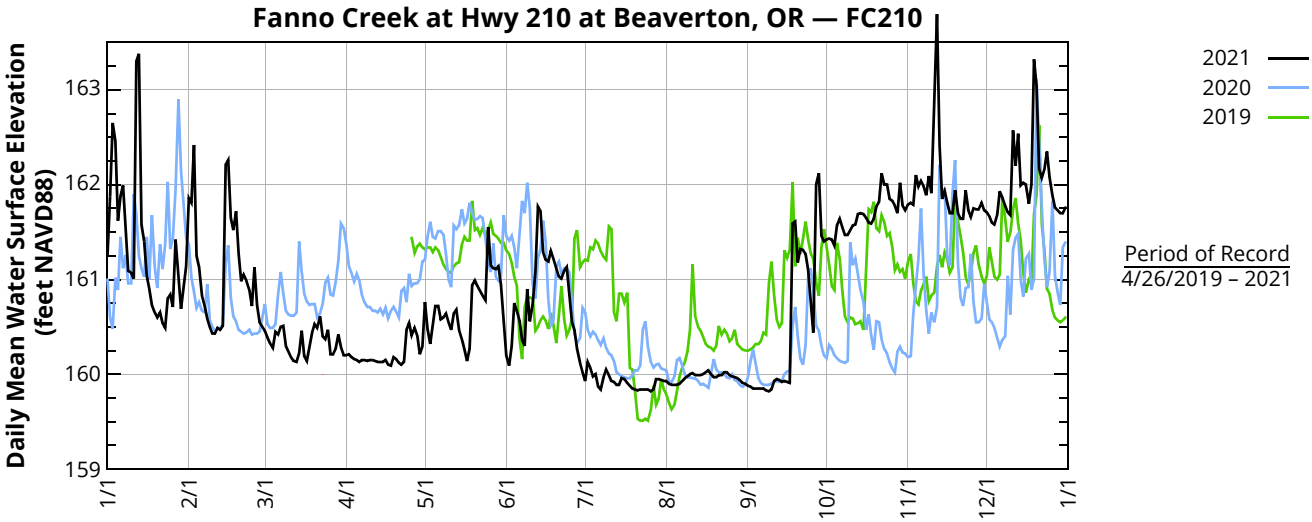
- EL ≤ 5th
- 5th < EL ≤ 10th
- 10th < EL ≤ 15th
- 15th < EL ≤ 20th
- 20th < EL ≤ 30th
- 30th < EL ≤ 40th
- 40th < EL ≤ 50th
- 50th < EL ≤ 75th
- 75th < EL ≤ 90th
- 90th < EL ≤ 95th
- EL > 95th

FC210 – Fanno Creek at Hwy 210 at Beaverton, OR

Data source: WEST Consultants for Clean Water Services

2021 — MEAN WATER SURFACE ELEVATION ABOVE NAVD88 (feet) — FC210

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	161.26	161.86	160.46	160.20	160.76	160.20	159.93	159.93	159.88	161.42	161.79	161.71
2	161.88	161.81	160.39	160.21	160.48	160.09	160.13	159.90	159.87	161.43	161.81	161.67
3	162.65	162.42	160.33	160.18	160.32	160.30	160.07	159.89	159.85	161.42	161.79	161.60
4	162.46	161.25	160.28	160.16	160.53	160.75	159.98	159.89	159.85	161.36	162.10	161.58
5	161.62	161.13	160.45	160.15	160.72	160.67	160.00	159.89	159.85	161.57	161.98	161.68
6	161.88	160.83	160.42	160.13	160.72	160.57	159.87	159.90	159.85	161.64	162.04	161.93
7	161.99	160.72	160.50	160.15	160.58	160.36	159.84	159.93	159.85	161.55	161.98	161.87
8	161.60	160.59	160.51	160.15	160.60	160.30	159.97	159.96	159.83	161.47	161.89	161.78
9	161.09	160.50	160.30	160.14	160.64	160.90	160.05	159.98	159.82	161.47	162.09	161.71
10	161.07	160.43	160.24	160.15	160.55	160.56	159.99	160.00	159.84	161.52	161.91	161.68
11	161.01	160.43	160.18	160.15	160.47	160.74	159.93	160.01	159.93	161.57	162.64	162.57
12	163.30	160.49	160.14	160.14	160.64	161.08	159.92	159.99	159.95	161.58	163.80	162.20
13	163.38	160.47	160.13	160.13	160.68	161.77	159.89	159.99	159.94	161.69	162.42	162.54
14	161.58	160.51	160.22	160.13	160.47	161.72	159.89	159.99	159.92	161.70	161.85	161.99
15	161.40	162.21	160.46	160.13	160.37	161.29	159.96	160.00	159.93	161.69	161.93	162.02
16	161.04	162.26	160.19	160.15	160.26	161.21	159.95	160.02	159.92	161.65	161.81	162.00
17	160.90	161.65	160.14	160.10	160.14	161.19	159.91	160.04	159.91	161.60	161.70	161.80
18	160.73	161.52	160.30	160.09	160.27	161.30	159.88	160.00	161.59	161.59	161.70	162.00
19	160.65	161.72	160.44	160.18	160.94	161.22	159.85	159.97	161.61	161.64	161.94	163.32
20	160.60	161.27	160.53	160.16	160.99	161.12	159.84	159.97	161.18	161.77	161.70	163.04
21	160.65	160.98	160.49	160.12	160.93	161.03	159.83	159.99	161.32	161.82	161.64	162.17
22	160.54	161.05	160.61	160.10	160.88	161.01	159.84	159.99	161.31	162.12	161.64	162.07
23	160.49	160.99	160.40	160.13	160.83	161.09	159.84	160.02	161.27	162.00	161.94	162.16
24	160.80	160.89	160.37	160.47	160.78	161.13	159.84	160.02	161.10	162.00	161.73	162.35
25	160.84	160.72	160.47	160.54	161.55	160.86	159.84	159.99	160.74	161.85	161.66	162.08
26	160.71	161.13	160.21	160.41	161.15	160.56	159.82	159.98	160.44	161.83	161.75	161.89
27	161.42	160.73	160.21	160.49	161.12	160.47	159.84	159.97	162.00	161.78	161.74	161.76
28	161.00	160.55	160.27	160.41	161.11	160.27	159.95	159.96	162.12	161.70	161.74	161.73
29	160.69	—	160.42	160.21	161.14	160.12	159.95	159.94	161.46	162.02	161.81	161.70
30	160.90	—	160.29	160.29	160.94	160.02	159.94	159.91	161.40	161.78	161.73	161.70
31	161.14	—	160.20	—	160.53	—	159.93	159.90	—	161.73	—	161.76
Mean	161.33	161.11	160.34	160.21	160.71	160.80	159.92	159.97	160.52	161.68	161.94	162.00
Max	163.38	162.42	160.61	160.54	161.55	161.77	160.13	160.04	162.12	162.12	163.80	163.32
Min	160.49	160.43	160.13	160.09	160.14	160.02	159.82	159.89	159.82	161.36	161.64	161.58

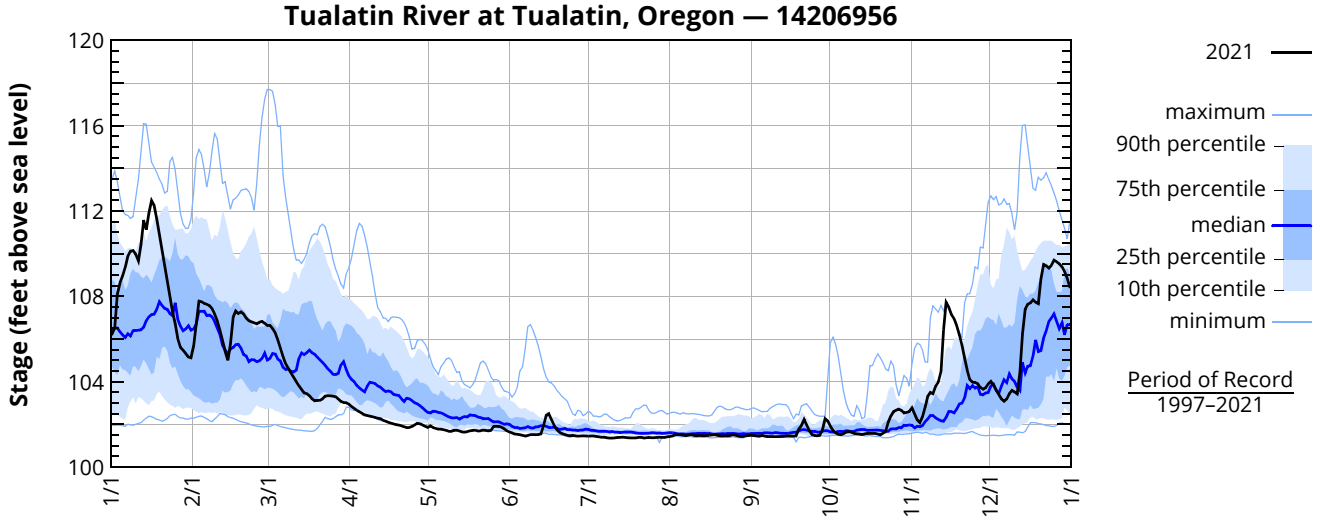


TRT – TUALATIN RIVER AT TUALATIN, OREGON – 14206956 (FORMERLY 14206960)

Data source: Oregon Water Resources Department
River mile: 8.9 *Latitude:* 45 23 14 *Longitude:* 122 45 46

2021 — MEAN WATER SURFACE ELEVATION (feet) — TRT

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	106.24	105.68	106.64	102.84	101.93	101.60	101.46	101.46	101.48	101.71	102.50	103.85
2	106.53	106.75	106.50	102.75	101.85	101.55	101.46	101.51	101.46	101.60	102.21	103.61
3	108.10	107.78	106.29	102.67	101.81	101.54	101.44	101.54	101.45	101.54	102.08	103.40
4	108.64	107.75	105.97	102.59	101.78	101.52	101.42	101.52	101.48	101.52	102.37	103.19
5	108.95	107.67	105.59	102.52	101.78	101.49	101.40	101.50	101.46	101.56	102.80	103.09
6	109.37	107.63	105.18	102.45	101.75	101.45	101.41	101.47	101.43	101.65	103.31	103.20
7	109.89	107.57	104.84	102.42	101.72	101.48	101.38	101.50	101.44	101.67	103.50	103.45
8	110.12	107.43	104.62	102.39	101.68	101.52	101.36	101.53	101.43	101.63	103.44	103.60
9	110.15	107.18	104.42	102.36	101.68	101.53	101.36	101.49	101.43	101.58	103.79	103.52
10	109.99	106.85	104.21	102.32	101.73	101.52	101.37	101.47	101.43	101.56	103.97	103.43
11	109.67	106.44	104.01	102.29	101.73	101.53	101.39	101.48	101.44	101.55	104.47	104.45
12	110.44	105.94	103.82	102.27	101.69	101.56	101.39	101.48	101.44	101.53	106.43	106.24
13	111.58	105.42	103.64	102.19	101.65	101.94	101.41	101.47	101.46	101.56	107.72	107.40
14	111.13	105.01	103.48	102.15	101.64	102.42	101.39	101.48	101.47	101.58	107.49	107.64
15	111.89	105.78	103.44	102.10	101.66	102.50	101.38	101.49	101.46	101.58	107.16	107.70
16	112.49	107.03	103.35	102.06	101.70	102.22	101.37	101.51	101.45	101.58	106.96	107.84
17	112.27	107.32	103.20	102.02	101.72	101.96	101.37	101.52	101.46	101.58	106.64	107.73
18	111.61	107.20	103.11	101.99	101.73	101.76	101.37	101.50	101.80	101.54	106.20	107.66
19	110.88	107.28	103.13	101.97	101.69	101.64	101.39	101.47	101.95	101.51	105.73	108.81
20	110.15	107.18	103.13	101.93	101.70	101.57	101.40	101.46	102.23	101.59	105.08	109.50
21	109.45	106.98	103.19	101.89	101.74	101.53	101.36	101.47	101.97	101.66	104.54	109.44
22	108.71	106.86	103.33	101.85	101.72	101.49	101.38	101.47	101.70	102.11	104.11	109.33
23	107.96	106.81	103.35	101.86	101.70	101.47	101.39	101.48	101.53	102.40	103.98	109.46
24	107.28	106.76	103.34	101.90	101.72	101.49	101.38	101.52	101.48	102.61	103.97	109.70
25	106.71	106.72	103.33	101.98	101.91	101.47	101.38	101.49	101.47	102.67	103.91	109.62
26	106.03	106.79	103.30	102.05	101.92	101.45	101.39	101.45	101.49	102.72	103.73	109.53
27	105.61	106.83	103.19	102.03	101.91	101.46	101.40	101.44	101.77	102.66	103.65	109.39
28	105.48	106.74	103.08	101.98	101.87	101.47	101.39	101.44	102.27	102.54	103.72	109.17
29	105.32	—	103.03	101.91	101.80	101.46	101.39	101.47	102.16	102.56	103.90	108.85
30	105.16	—	103.02	101.86	101.71	101.45	101.42	101.49	101.92	102.60	104.02	108.45
31	105.12	—	102.95	—	101.65	—	101.44	101.49	—	102.78	—	108.07
Mean	108.80	106.84	103.99	102.19	101.75	101.63	101.39	101.49	101.61	101.90	104.45	106.78
Max	112.49	107.78	106.64	102.84	101.93	102.50	101.46	101.54	102.27	102.78	107.72	109.70
Min	105.12	105.01	102.95	101.85	101.64	101.45	101.36	101.44	101.43	101.51	102.08	103.09



MEDIAN OF DAILY MEAN WATER SURFACE ELEVATION BY MONTH AND YEAR — TRT

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1997											104.87	106.60
1998	109.86	108.00	106.40	103.50	102.61	102.27	102.47	102.56	102.67	102.03	102.26	109.61
1999	110.47	112.37	107.42	104.50	102.61	101.77	101.67	101.66	101.90	101.79	103.16	106.84
2000	107.35	105.61	105.25	102.36	102.20	101.86	101.61	101.78	102.11	101.92	101.71	102.34
2001	102.25	102.53	102.33	102.29	102.03	101.64	101.56	101.47	101.42	101.62	102.67	109.24
2002	108.39	107.15	105.46	103.33	102.09	101.79	101.73	102.23	102.05	101.78	101.71	103.82
2003	106.19	107.07	107.24	105.17	102.61	101.85	101.64	102.23	101.99	101.95	101.65	104.18
2004	106.17	106.45	103.86	102.78	101.99	101.70	101.53	101.60	101.64	101.88	101.89	102.49
2005	103.05	102.39	101.91	103.92	103.66	102.06	101.70	101.47	101.46	101.77	103.45	104.39
2006	112.57	107.80	104.88	103.90	102.27	101.87	101.65	101.54	101.57	101.67	106.92	
2007	107.89	103.45	105.51	103.21	102.07	101.79	101.70	101.69	101.72	101.91	102.14	108.04
2008		107.23	104.42	104.01	102.54	101.89	101.77	101.61	101.64	101.62	102.29	102.20
2009	107.77	102.47	103.79	103.20	103.06	101.73	101.57	101.54	101.54	101.62	103.31	103.78
2010	107.71	104.99	104.66	106.44	103.18	103.68	101.81	101.65	101.72	101.67	102.89	108.91
2011	108.30	104.35	108.52	105.78	103.55	102.17	101.74	101.62	101.59	101.59	101.85	102.21
2012	106.94	104.92	107.55	105.31	102.99	102.19	101.70	101.59	101.59	101.88	103.71	109.58
2013	104.18	103.18	103.62	102.82	101.97	102.01	101.58	101.51	101.72	101.83	102.30	102.30
2014	102.71	107.14	107.29	104.94	103.08	101.83	101.65	101.47	101.58	101.78	102.85	105.62
2015	104.73	106.34	104.58	103.02	101.88	101.59	101.54	101.48	101.55	101.53	102.93	112.01
2016	109.12	106.49	107.28	102.98	101.85	101.64	101.47	101.46	101.52	103.35	104.13	
2017	106.16	111.59	108.95	105.87	103.43	101.99	101.59	101.52	101.57	101.77	104.22	
2018	106.56	103.97	104.65	105.97	102.15	101.72	101.55	101.46	101.55	101.63	101.64	102.93
2019	104.32	105.69	103.47	103.49	102.10	101.65	101.62	101.53	101.77	101.75	101.83	102.91
2020	107.43	104.95	102.97	102.32	102.06	102.06	101.62	101.540	101.62	101.64	102.71	103.03
2021	109.37	106.86	103.44	102.13	101.73	101.53	101.39	101.480	101.47	101.60	103.94	107.66
median	103.14	102.59	102.65	102.28	101.80	101.59	101.51	101.45	101.46	101.54	101.68	102.10

KEY

EL in feet

- EL ≤ 101.50
- 101.50< EL ≤ 101.55
- 101.55 < EL ≤ 101.59
- 101.59 < EL ≤ 101.65
- 101.65< EL ≤ 101.77
- 101.77< EL ≤ 102.00
- 102.00 < EL ≤ 102.34
- 102.34 < EL ≤ 104.53
- 104.53 < EL ≤ 107.67
- 107.67 < EL ≤ 109.44
- EL > 109.44

EL as percentile

- EL ≤ 5th
- 5th < EL ≤ 10th
- 10th < EL ≤ 15th
- 15th < EL ≤ 20th
- 20th < EL ≤ 30th
- 30th < EL ≤ 40th
- 40th < EL ≤ 50th
- 50th < EL ≤ 75th
- 75th < EL ≤ 90th
- 90th < EL ≤ 95th
- EL > 95th

HISTORICAL DATA SOURCES

Data were obtained from several sources. If more than one source had a value for the same date, the values were compared and the one judged as 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 measurements may not have been consistent over the period of record.

DATA SOURCES

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 (no data WY-1997–WY-2006)
14202860	Tanner Creek above Henry Hagg Lake near Gaston, Oregon	1/12003	Wally Otto, TVID, pers. comm.: 2003 previous Flow Reports: 2004–present (Scoggins Dam Ops tables)
14202920	Sain Creek above Henry Hagg Lake near Gaston, Oregon	1/1/1975	OWRD database: all (no data WY-1997–WY-2006)
14202980	Scoggins Creek below Henry Hagg Lake near Gaston, Oregon	1/1/1975	USGS database: 1975–WY-2006 BOR: WY-2007–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: OWRD 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: OWRD Dist 18) OWRD database: 2008–present
14205350	East Fork Dairy Creek above Murtaugh Creek near Meacham Corner, OR	8/29/2020	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–WY-2005 OWRD database: WY-2006–present
14206900	Fanno Creek at 56th Avenue	10/1/1990	USGS database: all
14206950	Fanno Creek at Durham, Oregon	1/1/1991	Stewart Rounds, USGS pers. comm.: 1991-WY-1993, 2/4/1996-WY-2000 USGS database: WY-1994-2/5/1996, WY-2001–present
14206956	Tualatin River at Tualatin, Oregon	10/22/1997	previous Flow Reports: 1997-1999 & 2002-2005 Stewart Rounds, USGS pers. comm.: 2000-2001 OWRD database: 2006–present
14207500	Tualatin River at West Linn, OR	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 Department; TVID=Tualatin Valley Irrigation District; USGS=United States Geological Survey; WY=water year

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APPENDIX B
SELECTED RELEASES AND WITHDRAWALS

SCOPE

This appendix shows data 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.

Streamflow measurements are in Appendix A.

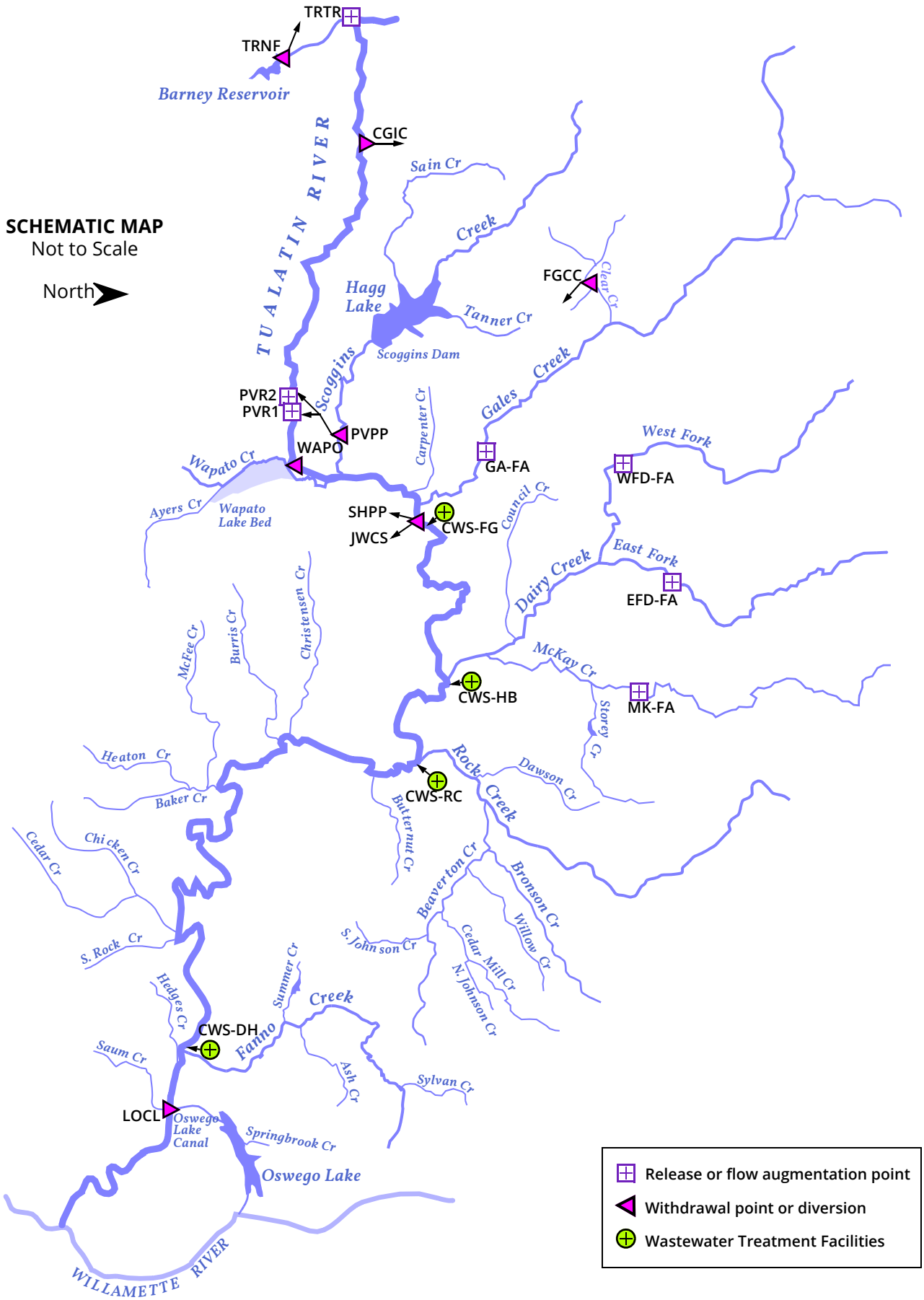
HIGHLIGHTS

- Withdrawals by Tualatin Valley Irrigation District (TVID) at Spring Hill Pump Plant (SHPP) in April–June were much larger than the period of record median. The was especially true for April, when the median withdrawal (10 cfs) was more than seven times the period of record median (1.4 cfs) and broke the record set in April 2020 (7.3 cfs). Unseasonably dry and warm weather in March–May increased the need for irrigation water by farmers and nurseries.
- Withdrawals by Joint Water Commission (JWC) at SHPP during April–September were also larger than in 2020 and likely related to lack of rainfall and some abnormally hot weather.
- Clean Water Services' Fernhill Natural Treatment System (NTS) operated from May–October, although flow to the Tualatin River was suspended from mid-July through September. During May–October, all effluent from the FG-WWTF was discharged either to the NTS or transferred to the RC-WWTF. Outside May–October, discharge from the FG-WWTF was either directly to the Tualatin River or routed through the NTS based on the operational needs of the WWTF.
- Clean Water Services continued its summer flow augmentation program to selected tributaries in cooperation with Tualatin Valley Irrigation District.

TRENDS OF NOTE

- Withdrawals in July-August by Joint Water Commission at the Spring Hill Pump Plant increased almost linearly from 1991 through about 2003. Similarly, July-August discharges from Clean Water Services' Rock Creek WWTF increased almost linearly from 1991 to about 2003. Both JWC withdrawals and RC-WWTF discharges have been relatively constant since 2004, with only minor year-to-year variation.
- Withdrawals in July-August by Tualatin Valley Irrigation District at the Spring Hill Pump Plant have remained relatively constant over the period of record 1991–2021.

Selected Release and Withdrawal Sites



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-8
CWS-DH	CWS Durham WWTF Discharge	9.33	B-20
CWS-FG	CWS Forest Grove WWTF and NTS Discharge	55.2	B-14
CWS-HB	CWS Hillsboro WWTF Discharge	43.8	B-16
CWS-RC	CWS Rock Creek WWTF Discharge	38.08	B-18
EFD-FA	CWS East Fork Dairy Creek Flow Augmentation with TVID	4.9	B-22
FGCC	City of Forest Grove Withdrawals in Clear Creek Watershed	—	*
GA-FA	CWS Gales Creek Flow Augmentation with TVID	5.0	B-22
JWCS	Joint Water Commission Withdrawal at Spring Hill Pump Plant	56.1	B-12
LOCL	Lake Oswego Corp. Canal Diversion	6.7	**
MK-FA	CWS McKay Creek Flow Augmentation with TVID	7.0	B-22
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-10
TRNF	Barney Reservoir Measured Flow to North Fork Trask River	—	B-4
TRTR	Barney Reservoir (Trask River) Release to Tualatin River	78.0	B-6
WAPO	Wapato Canal Diversion	62.0	***
WFD-FA	CWS West Fork Dairy Creek Flow Augmentation with TVID	5.2	B-22

*The City of Forest Grove withdraws water at several locations in the Clear Creek watershed. The data are not included in this report.
**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 2021.

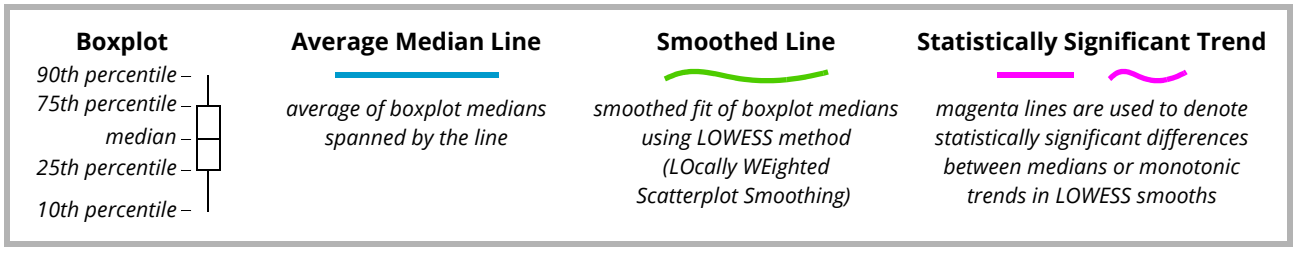
Explanation of Figures and Tables in this Appendix

Two pages of tables and graphs are included for every site.

Page 1–current year: Page 1 includes tabled data for daily releases or withdrawals plus a graph showing data for the current year compared to that of the previous year.

Page 2–statistical summary: A brief summary for the site is at the top of the page. The summary is followed by:

- a *color-coded table of the monthly medians* of daily mean releases or withdrawals for the period of record. The color-code is based on percentiles and is keyed to both cubic feet per second (cfs) and the equivalent percentile.
- a *graph showing boxplots for July-August* of daily releases or withdrawals by year for the period of record. July-August was chosen because it is typically a critical time for water management. An explanation of the features of these graphs is below.

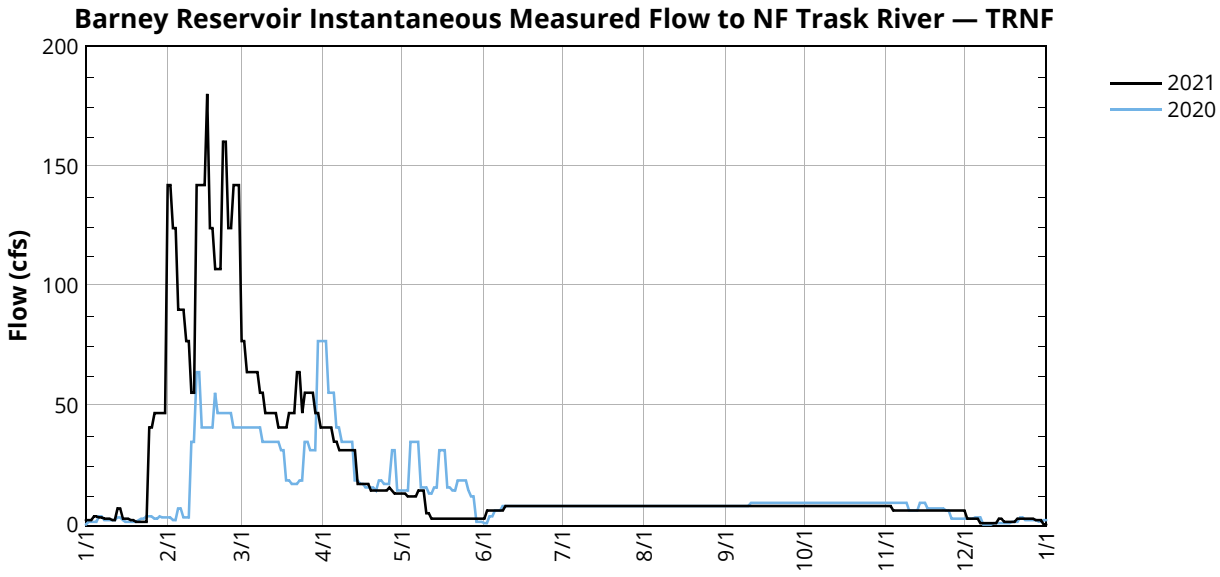


TRNF – Barney Reservoir Measured Flow to North Fork Trask River

Data source: Barney Reservoir Joint Ownership Commission

2021 — INSTANTANEOUS MEASURED FLOW (cfs) — TRNF

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1		142.0	77.0						8.2	8.2	8.2	3.0
2						6.4	8.2	8.2				
3		124.0	64.0		12.3				8.2		6.4	
4	4.0					6.4		8.2		8.2		
5		90.0	64.0	35.0	12.3		8.2				6.4	
6	3.5							8.2	8.2	8.2		1.1
7				31.5	14.8	6.4	8.2					
8	3.0	77.0	55.5						8.2	8.2	6.4	1.1
9				31.5		8.2	8.2	8.2			6.4	
10		55.5	47.0		5.2				8.2		6.4	1.1
11	2.4					8.2		8.2		8.2		
12		142.0	47.0	31.5	3.0		8.2				6.4	
13	7.3							8.2	8.2	8.2		3.0
14				17.5	3.0	8.2	8.2					
15	3.0		41.0						8.2	8.2	6.4	1.7
16		180.0		17.5		8.2	8.2	8.2				
17		124.0	41.0		3.0				8.2		6.4	1.7
18	2.4							8.2		8.2		
19		107.0	47.0	14.8	3.0		8.2				6.4	
20	1.7							8.2	8.2	8.2		3.0
21				14.8	3.0	8.2	8.2					
22	1.7	160.0	64.0						8.2		6.4	3.0
23				14.8		8.2	8.2	8.2				
24		124.0	47.0		3.0				8.2		6.4	
25	41.0		55.5			8.2		8.2		8.2		
26		142.0		16.0	3.0		8.2					
27	47.0			14.8				8.2	8.2	8.2		2.4
28				13.5	3.0	8.2	8.2					
29	47.0	77.0	47.0						8.2	8.2	6.4	2.4
30				13.5		8.2	8.2	8.2				0.5
31		—	41.0	—	3.0	—			—		—	



TRNF – Barney Reservoir measured flow to North Fork Trask River

Data source: Barney Reservoir Joint Ownership Commission

Summary

- Winter and spring releases from Barney Reservoir to the NF Trask River depend on inflow and whether or not the reservoir is filling. No trends are evident for 2011–2021.
- Winter and spring releases in 2021 (January through mid-June) were similar to those in recent years, except 2019 which was particularly low.
- Summer releases from Barney Reservoir to the North Fork Trask River have generally been constant (about 8.4 cfs). Releases were slightly lower in the past three years, 2019–2021 (8.2 cfs).

MEDIAN OF INSTANTANEOUS MEASURED FLOW — TRNF

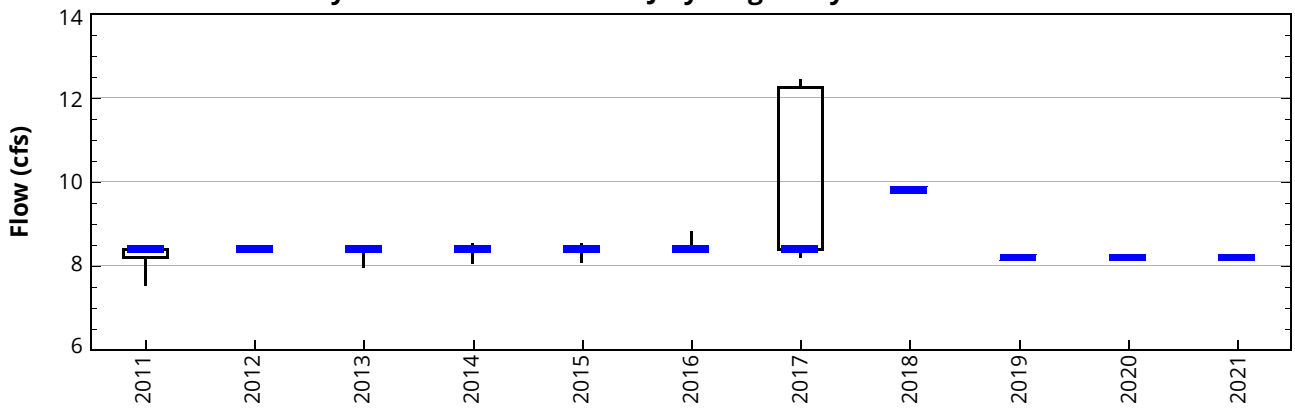
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2011	47.0	38.0	79.6	55.5	35.0	16.5	8.4	8.4	9.5	9.5	7.3	6.2
2012	7.3	4.0	4.0	47.0	35.0	14.8	8.4	8.4	8.4	8.4	9.0	6.2
2013	47.0	47.0	41.0	35.0	8.4	8.4	8.4	8.4	8.4	8.4	8.4	0.5
2014	0.5	2.3	79.6	41.0	35.0	8.4	8.4	8.4	8.4	8.4	6.2	1.1
2015	1.1	51.3	35.0	27.6	7.3	8.4	8.4	8.4	8.4	8.4	6.2	2.8
2016	2.3	64.0	79.6	33.2	6.2	8.4	8.4	8.4	8.4	8.4	8.4	1.7
2017	4.0	0.0	110.8	79.6	47.0	20.2	8.4	12.3	12.3	9.6	9.6	2.3
2018	2.3	22.9	31.0	31.0	12.3	6.4	9.8	9.8	9.8	9.8	4.9	3.2
2019	2.5	3.2	3.2	2.5	2.5	6.4	8.2	8.2	8.2	8.2	8.2	1.1
2020	2.4	41.0	35.0	19.0	16.0	8.2	8.2	8.2	9.6	9.6	7.3	1.8
2021	3.4	124	47.0	17.5	3.0	8.2	8.2	8.2	8.2	8.2	6.4	2.4
median	2.5	38.0	41.0	33.2	12.3	8.4	8.4	8.4	8.4	8.4	7.3	2.3

Key

Q in cfs
- 0. < Q ≤ 2.5
- 2.5 < Q ≤ 6.4
- 6.4 < Q ≤ 20
- 20 < Q ≤ 47
- Q > 47

Q as percentile
- Q ≤ 10th
- 10th < Q ≤ 25th
- 25th < Q ≤ 75th
- 75th < Q ≤ 90th
- Q > 90th

Daily Flow Distributions for July–August by Year — TRNF



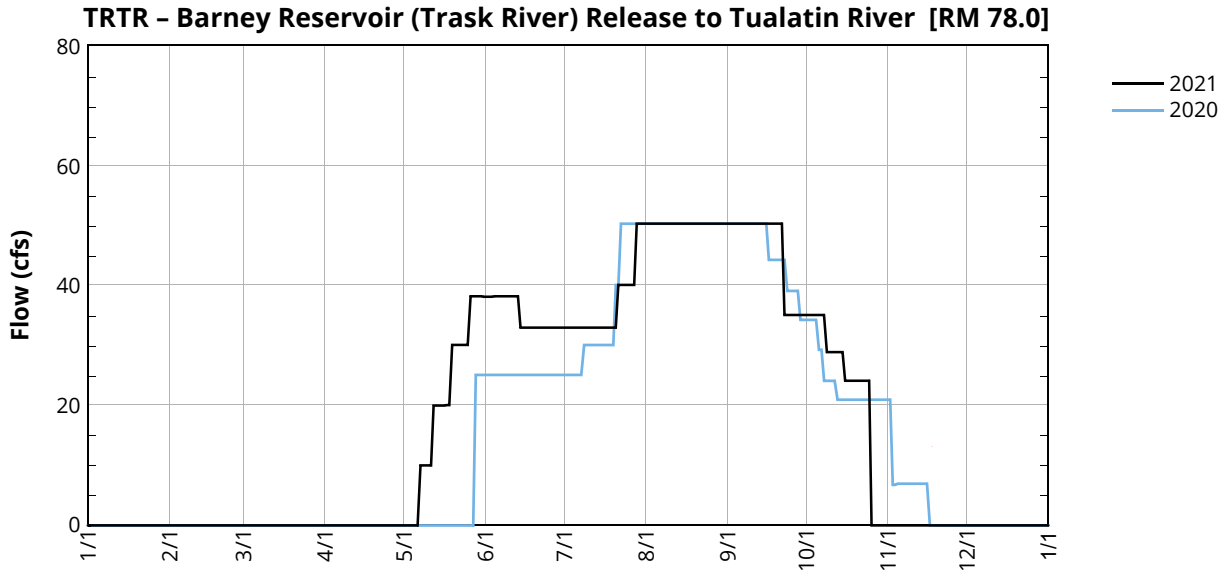
Note: Releases to the North Fork Trask River in the July–August period are often constant. Because the data vary little, the quartile boxes and whiskers are sometimes small or zero. Blue dashes are used to identify the median value.

TRTR — Barney Reservoir (Trask River) Release to Tualatin River [RM 78.0]

Data source: Barney Reservoir Joint Ownership Commission

2021 — INSTANTANEOUS MEASURED FLOW (cfs) — TRTR

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1		0.0	0.0						50.3	35.1	0.0	0.0
2						38.1	33.0	50.3				
3		0.0	0.0		0.0				50.3		0.0	
4	0.0					38.2		50.3		35.1		
5		0.0	0.0	0.0	0.0		33.0				0.0	
6	0.0							50.3	50.3	35.1		0.0
7				0.0	10.0	38.2	33.0					
8	0.0	0.0	0.0						50.3	28.9	0.0	0.0
9				0.0		38.2	33.0	50.3			0.0	
10		0.0	0.0		10.0				50.3		0.0	0.0
11	0.0					38.2		50.3		28.9		
12		0.0	0.0	0.0	20.0		33.0				0.0	
13	0.0							50.3	50.3	28.9		0.0
14				0.0	20.0	33.0	33.0					
15	0.0		0.0						50.3	24.1	0.0	0.0
16		0.0		0.0		33.0	33.0	50.3				
17		0.0	0.0		20.1				50.3		0.0	0.0
18	0.0							50.3		24.1		
19		0.0	0.0	0.0	30.1		33.0				0.0	
20	0.0							50.3	50.3	24.1		0.0
21				0.0	30.1	33.0	40.1					
22	0.0	0.0	0.0						35.1		0.0	0.0
23				0.0		33.0	40.1	50.3				
24		0.0	0.0		30.1				35.1		0.0	
25	0.0		0.0			33.0		50.3		0		
26		0.0		0.0	38.2		40.1					
27	0.0			0.0				50.3	35.1	0		0.0
28				0.0	38.2	33.0	50.3					
29	0.0	—	0.0						35.1	0	0.0	0.0
30		—		0.0		33.0	50.3	50.3				0.0
31		—	0.0	—	38.1	—			—		—	



Summary

- July–September are the peak months for water releases from Barney Reservoir to the Tualatin River.
- Releases in 2021 began May 7 and continued through October 24.
- The capacity of Barney Reservoir increased when the dam was raised in 1999. Water releases before the dam raise were smaller. Since the dam raise, releases have varied year-to-year, but have no overall trend. Releases in 2021 began early, but otherwise were similar to recent years except 2019.

MEDIAN OF INSTANTANEOUS FLOW — TRTR

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1991	0	0	0	0	0	6	6	6	6	6	0	0
1992	0	0	0	0	0	0	1	8	8	8	0	0
1993	0	0	0	0	0	6	14	19	19	3	2	2
1994	0	0	0	0	0	2	12	18	18	2	0	0
1995	0	0	0	0	2	16	8	5	5	5	5	0
1996	0	0	0	10	0	0	10	20	30	7	0	0
1997	0	0	0	0	0	0	3	10	5	0	0	0
1998	0	0	0	0	0	0	60	68	5	0	0	0
1999	0	0	0	0	0	10	20	20	30	35	0	0
2000	0	0	0	0	0	20	39	39	57	57	39	0
2001	0	0	0	0	0	5	20	20	15	19	0	0
2002	0	0	0	0	0	24	36	48	54	39	0	0
2003	0	0	0	0	0	26	40	66	44	12	0	0
2004	0	0	0	0	0	23	38	34	24	14	0	0
2005	0	0	0	0	0	0	22	36	50	31	0	0
2006	0	0	0	0	0	21	20	20	40	49	0	0
2007	0	0	0	0	0	12	20	20	39	19	0	0
2008	0	0	0	0	0	0	18	24	30	24	0	0
2009	0	0	0	0	0	0	20	24	34	20	0	0
2010	0	0	0	0	0	0	26	34	40	30	0	0
2011	0	0	0	20	50	49	49	60	49	10	0	0
2012	0	0	0	0	0	0	30	40	30	18	0	0
2013	0	0	0	0	15	20	20	32	38	14	0	0
2014	0	0	0	0	0	15	30	30	44	30	0	0
2015	0	0	0	0	25	30	40	40	50	30	0	0
2016	0	0	0	0	20	30	30	35	49	19	0	0
2017	0	0	0	0	0	0	40	40	56	20	0	0
2018	0	0	0	0	0	30	40	50	55	40	15	0
2019	0	0	0	0	0	35	35	25	39	39	15	0
2020	0	0	0	0	0	25	35	50	47	21	3	0
2021	0	0	0	0	20	33	33	50	50	24	0	0
median	0	0	0	0	0	12	26	32	39	19	0	0

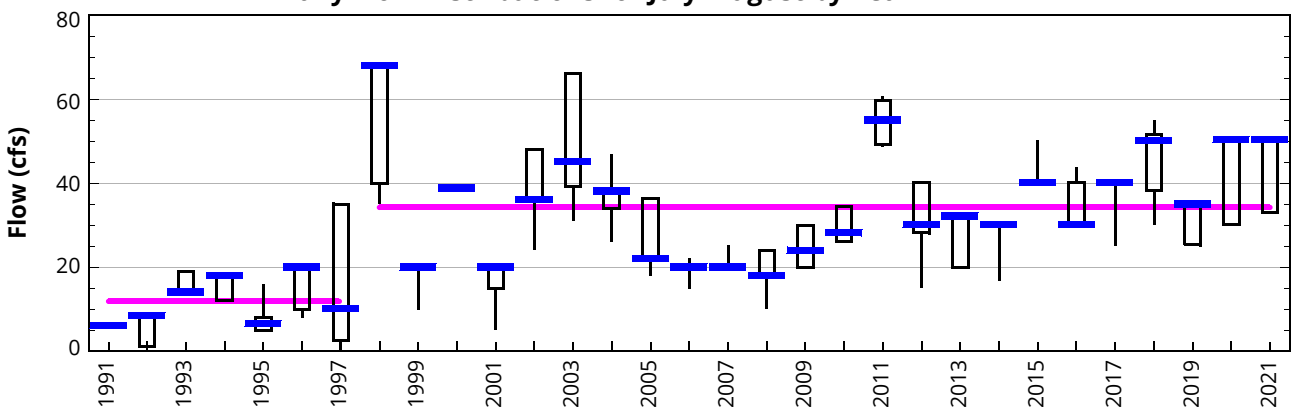
Key

Q in cfs
- 0 < Q ≤ 6
- 6 < Q ≤ 15
- 15 < Q ≤ 39
- 39 < Q ≤ 50
- Q > 50

Q as percentile
- Q ≤ 10th
- 10th < Q ≤ 25th
- 25th < Q ≤ 75th
- 75th < Q ≤ 90th
- Q > 90th

Only days with water releases were used to calculate percentiles

Daily Flow Distributions for July–August by Year — TRTR



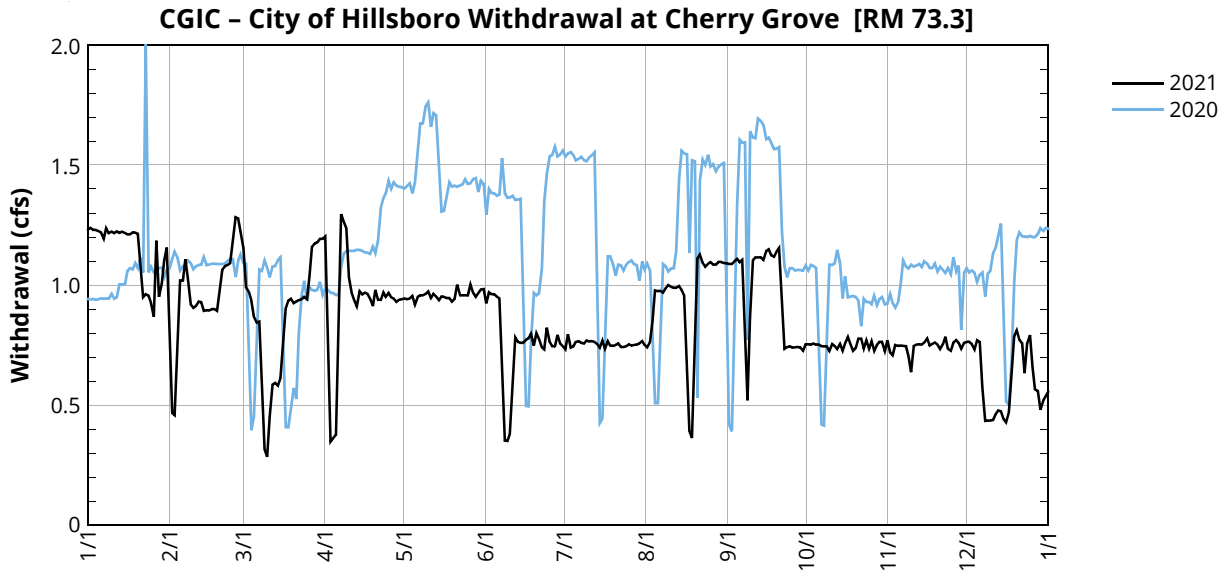
Note: Blue dashes are used to identify median values because quartile boxes and whiskers are sometimes small.

CGIC — City of Hillsboro Withdrawal at Cherry Grove [RM 73.3]

Data source: City of Hillsboro

2021 — MEAN WITHDRAWAL (cfs) — CGIC

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1.23	0.84	1.16	1.20	0.95	0.93	0.73	0.74	1.09	0.76	0.72	0.77
2	1.24	0.47	0.99	0.69	0.94	0.97	0.80	0.76	1.09	0.75	0.71	0.76
3	1.23	0.46	0.97	0.35	0.95	0.96	0.74	0.85	1.10	0.76	0.75	0.73
4	1.23	0.72	0.94	0.36	0.96	0.96	0.75	0.98	1.11	0.75	0.75	0.77
5	1.23	1.02	0.87	0.38	0.92	0.95	0.76	0.98	1.10	0.75	0.75	0.76
6	1.22	1.02	0.85	0.88	0.95	0.95	0.77	0.98	1.11	0.75	0.75	0.58
7	1.19	1.11	0.85	1.30	0.96	0.63	0.76	0.97	0.85	0.75	0.75	0.44
8	1.24	1.03	0.63	1.26	0.96	0.35	0.76	0.99	0.52	0.75	0.71	0.44
9	1.22	0.92	0.32	1.24	0.97	0.35	0.77	1.00	0.87	0.73	0.64	0.44
10	1.22	0.91	0.29	1.03	0.97	0.38	0.77	0.99	1.11	0.76	0.75	0.44
11	1.22	0.91	0.45	0.97	0.95	0.61	0.77	0.99	1.12	0.75	0.75	0.46
12	1.23	0.93	0.59	0.94	0.97	0.78	0.76	0.99	1.12	0.73	0.76	0.48
13	1.22	0.93	0.59	0.91	0.95	0.77	0.76	1.00	1.12	0.76	0.75	0.48
14	1.22	0.89	0.58	0.98	0.94	0.76	0.74	0.98	1.11	0.73	0.76	0.44
15	1.22	0.90	0.62	0.96	0.95	0.76	0.77	0.96	1.14	0.76	0.78	0.43
16	1.21	0.90	0.76	0.97	0.95	0.77	0.74	0.69	1.15	0.79	0.75	0.47
17	1.21	0.90	0.91	0.97	0.95	0.78	0.77	0.39	1.13	0.76	0.76	0.61
18	1.22	0.90	0.94	0.95	0.95	0.80	0.75	0.37	1.12	0.73	0.76	0.79
19	1.22	0.89	0.95	0.91	0.93	0.75	0.75	0.72	1.14	0.74	0.75	0.81
20	1.22	0.98	0.93	0.98	0.94	0.80	0.75	1.11	1.16	0.78	0.73	0.77
21	1.07	1.07	0.93	0.94	1.00	0.78	0.76	1.13	0.92	0.78	0.76	0.76
22	0.95	1.08	0.94	0.94	0.96	0.74	0.74	1.09	0.74	0.74	0.79	0.64
23	0.96	1.09	0.94	0.97	0.96	0.73	0.74	1.08	0.74	0.77	0.74	0.76
24	0.96	1.09	0.95	0.95	0.96	0.82	0.75	1.09	0.75	0.74	0.73	0.79
25	0.93	1.19	0.94	0.97	0.96	0.76	0.76	1.10	0.74	0.77	0.76	0.66
26	0.87	1.28	1.04	0.95	1.00	0.75	0.75	1.09	0.74	0.73	0.77	0.57
27	1.19	1.28	1.16	0.95	0.97	0.75	0.75	1.09	0.74	0.75	0.76	0.56
28	0.95	1.22	1.18	0.93	0.95	0.80	0.75	1.10	0.74	0.76	0.74	0.48
29	1.01	1.16	1.18	0.94	0.97	0.76	0.76	1.10	0.73	0.76	0.76	0.52
30	1.11	—	1.19	0.94	0.98	0.75	0.77	1.09	0.76	0.73	0.76	0.54
31	1.16	—	1.19	—	0.99	—	0.75	1.09	—	0.77	—	0.56



CGIC — City of Hillsboro Withdrawal at Cherry Grove [RM 73.3]

Data source: City of Hillsboro

Summary

- Withdrawals at Cherry Grove in 2021 were more constant through the year than in the past. In particular, withdrawals during dry season (May through September) were not greater than those in other months.
- The median withdrawal rate for July-August for the period of record was 1.43 cfs.
- Withdrawal rates at Cherry Grove are operational decisions by Joint Water Commission.

MEDIAN OF DAILY MEAN WITHDRAWAL — CGIC

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2011	0.91	1.14	1.17	1.28	1.35	1.59	1.42	1.74	1.47	1.35	1.24	1.34
2012	1.00	1.30	1.26	1.34	1.33	1.37	1.60	1.47	1.27	0.98	0.86	0.97
2013	1.12	1.15	1.10	1.12	1.48	1.45	1.45	1.73	1.09	1.00	1.11	0.93
2014	0.84	0.80	0.32	0.49	0.00	0.37	1.22	0.89	0.82	0.74	0.32	0.88
2015	0.99	1.11	1.29	0.88	1.34	1.21	1.49	1.34	1.26	0.82	0.55	0.54
2016	0.54	0.59	0.58	0.83	0.74	0.57	1.14	0.50	0.94	0.60	0.82	0.72
2017	0.69	0.40	0.39	0.37	0.36	0.65	0.66	0.59	0.56	0.57	0.57	0.57
2018	0.42	0.95	0.93	1.07	0.98	1.26	1.38	1.56	1.16	1.26	1.25	0.97
2019	0.97	0.97	0.96	0.98	0.95	1.76	1.77	1.12	1.17	1.22	0.91	0.90
2020	1.04	1.09	0.98	1.14	1.43	1.37	1.10	1.44	1.46	0.95	1.07	1.16
2021	0.93	0.94	0.95	0.96	0.96	0.77	0.76	0.99	1.09	0.75	0.75	0.57
median	0.97	0.96	0.98	0.98	0.98	1.26	1.38	1.34	1.16	0.95	0.86	0.90

Key

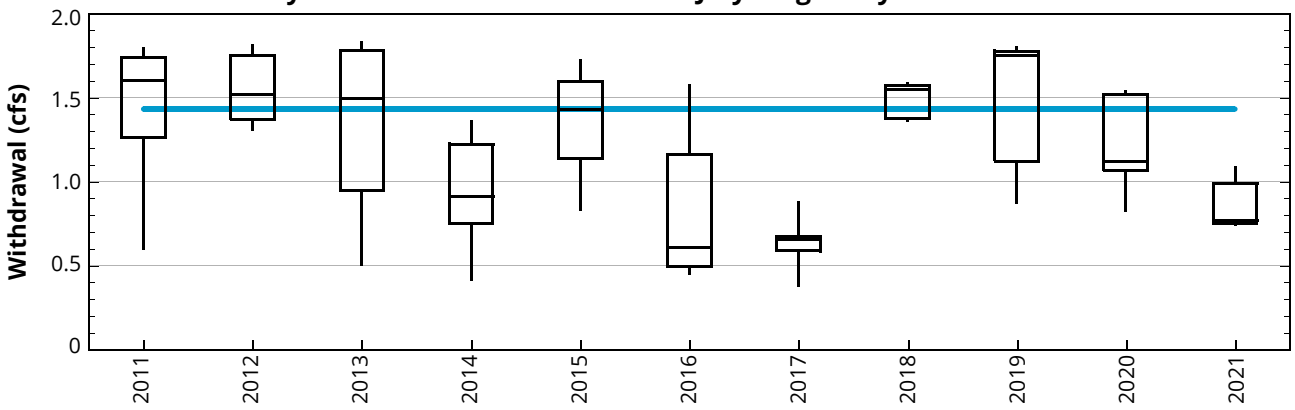
Q in cfs

- 0 < Q ≤ 0.45
- 0.45 < Q ≤ 0.66
- 0.66 < Q ≤ 1.26
- 1.26 < Q ≤ 1.48
- Q > 1.48

Q as percentile

- Q ≤ 10th
- 10th < Q ≤ 25th
- 25th < Q ≤ 75th
- 75th < Q ≤ 90th
- Q > 90th

Daily Withdrawal Distributions for July–August by Year — CGIC



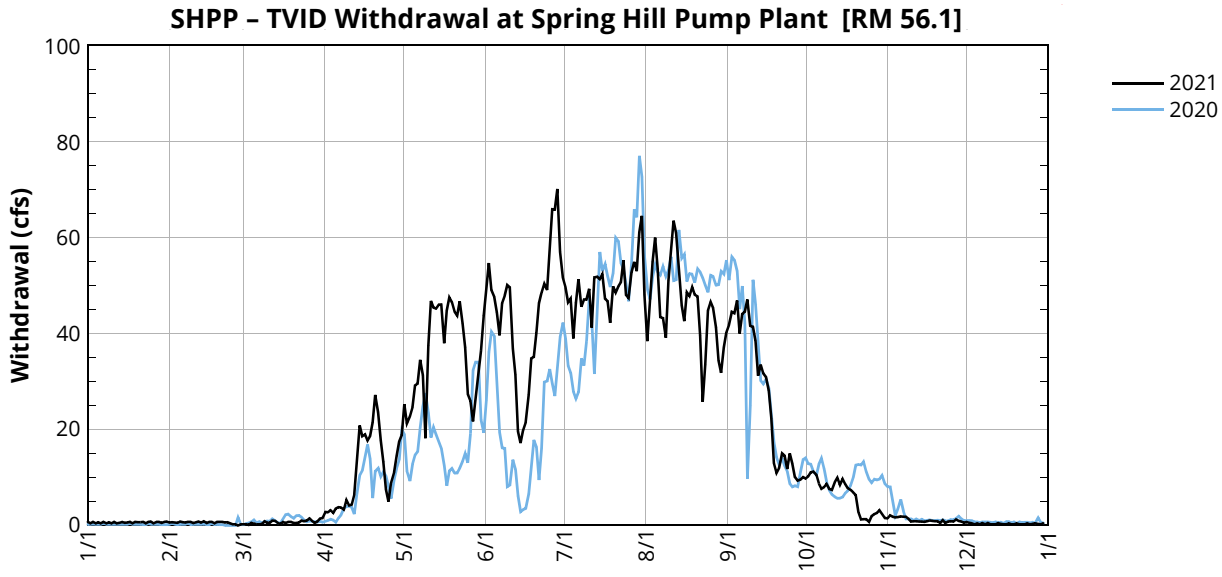
SHPP – TVID Withdrawal at Spring Hill Pump Plant [RM 56.1]

Data source: U.S. Geological Survey, Oregon Water Science Center

2021 — MEAN WITHDRAWAL† (cfs) — SHPP

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.77	0.62	0.24	2.79	25.3	49.2	49.6	38.4	41.8	10.2	2.16	0.59
2	0.47	0.71	0.24	2.75	21.3	54.7	46.5	47.7	44.5	11.1	1.83	0.47
3	0.77	0.62	0.17	3.18	22.8	49.0	47.3	54.9	44.2	11.2	1.71	0.24
4	0.47	0.56	0.55	2.60	24.7	47.6	39.0	60.0	46.9	10.6	1.77	0.47
5	0.71	0.83	0.38	3.57	29.2	44.4	46.4	53.5	40.0	8.74	1.86	0.24
6	0.47	0.68	0.24	3.84	29.6	39.6	51.3	43.4	44.1	7.66	1.83	0.53
7	0.77	0.62	0.24	3.78	34.5	46.4	45.6	43.2	44.5	7.98	1.83	0.24
8	0.47	0.77	0.32	3.31	31.3	47.9	47.1	39.1	47.1	8.68	1.39	0.53
9	0.71	0.77	0.86	5.35	18.2	50.1	47.1	51.0	41.6	7.63	0.83	0.24
10	0.47	0.53	0.59	4.20	37.5	49.6	49.3	57.1	41.4	7.44	0.89	0.24
11	0.77	0.71	0.59	4.39	46.8	36.9	41.2	63.5	38.5	9.06	0.89	0.24
12	0.47	0.83	1.00	6.41	45.4	31.4	51.7	60.9	31.2	10.0	0.83	0.53
13	0.58	0.62	0.94	12.8	45.2	19.6	51.8	53.0	33.5	8.46	0.83	0.30
14	0.77	0.86	0.50	20.9	46.0	17.2	51.3	45.9	31.7	9.72	0.77	0.24
15	0.56	0.53	0.35	18.6	46.0	19.9	52.4	42.6	30.9	8.68	0.89	0.24
16	0.62	0.77	0.74	19.0	38.0	21.5	47.2	48.6	28.1	7.79	1.09	0.47
17	0.77	0.77	0.53	17.7	44.8	27.2	46.7	47.8	22.3	7.44	0.92	0.24
18	0.47	0.47	0.77	18.6	47.5	34.8	42.2	49.7	12.9	6.94	0.89	0.24
19	0.77	0.77	0.74	21.5	46.5	35.1	49.8	48.1	10.9	6.37	0.89	0.47
20	0.68	0.77	0.53	27.2	44.5	40.1	48.5	47.7	12.0	2.75	0.50	0.24
21	0.68	0.77	0.53	23.6	43.7	46.3	49.8	39.6	15.0	1.24	1.15	0.24
22	0.77	0.62	0.65	17.7	46.7	48.5	50.7	25.8	14.5	1.30	0.53	0.24
23	0.47	0.68	1.00	13.2	42.1	50.4	55.3	33.5	11.8	1.30	0.83	0.47
24	0.77	0.47	0.89	7.56	37.1	49.1	48.0	44.9	15.0	0.77	0.89	0.24
25	0.83	0.24	1.00	4.99	27.3	58.6	47.4	46.6	12.9	1.95	0.83	0.30
26	0.47	0.24	1.54	8.94	25.9	65.9	52.7	45.3	10.1	2.36	1.27	0.47
27	0.77	0.00	0.94	11.1	21.7	65.8	54.9	41.3	9.34	2.66	0.92	0.30
28	0.74	0.24	0.53	14.5	26.3	70.1	53.0	34.4	9.60	3.16	0.83	0.24
29	0.56	—	0.80	17.6	31.8	57.0	61.1	31.8	10.1	2.45	0.59	0.47
30	0.77	—	1.45	18.9	36.4	51.5	64.5	37.1	9.76	1.59	0.77	0.30
31	0.80	—	1.59	—	43.7	—	48.1	40.3	—	1.51	—	0.24

†Data are not reviewed, but taken directly from measurements by Tualatin Valley Irrigation District



SHPP – TVID Withdrawal at Spring Hill Pump Plant [RM 56.1]

Data source: U.S. Geological Survey, Oregon Water Science Center

Summary

- TVID withdraws water at SHPP for irrigation. Peak season is usually July–August.
- Withdrawals during January, February, April, May and June in 2021 were much larger than their POR medians. The median in April 2021 was greater than that in 2020 which was also a record. Unseasonably dry weather in winter and spring of 2021 and very warm weather in April–June necessitated more irrigation.
- Historically, withdrawal rates in the winter were zero, but are now low volumes used to supply nurseries.

MEDIAN OF DAILY MEAN WITHDRAWAL — SHPP

	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1991	0	0	0	0	1.1	10.5	49.0	45.0	25.5	12.0	0.1	0
1992	0	0	0	0	18.0	40.0	50.0	49.0	18.0	4.8	0	0
1993	0	0	0	0.6	1.8	4.4	28.0	43.0	28.5	8.8	0.8	0
1994	0	0	0	0	13.0	21.5	58.0	50.0	24.0	6.8	0.2	0
1995	0	0	0	0	6.0	13.2	44.5	46.2	20.1	3.1	0	0
1996	0	0	0	0	0	25.2	62.0	54.0	9.1	2.1	0	0
1997	0	0	0	1.8	10.0	11.5	51.0	56.0	11.5	3.0	0.3	0
1998	0	0	0	1.5	1.9	14.5	49.0	52.0	28.5	4.2	0.6	0.3
1999	0	0	0.1	2.1	6.6	27.5	56.0	47.0	35.0	10.0	0.4	0.3
2000	0.3	0.3	0.3	4.8	5.9	20.5	49.0	45.0	21.5	0.0	0	0
2001	0	0	0	0	9.6	29.5	42.0	36.0	24.5	3.5	0.8	0
2002	0	0	0	0	15.0	37.0	50.0	51.0	30.0	8.6	1.7	0.3
2003	0.5	0	0	0.9	3.3	52.3	64.4	45.3	24.7	3.3	0	0
2004	0	0	0	0	13.2	41.8	57.9	46.3	4.1	3.1	1.1	0.2
2005	0.3	0.3	1.8	1.3	1.7	15.2	43.7	59.3	30.7	5.1	0.8	0.3
2006	0.2	0.3	0.6	1.6	17.7	24.3	56.7	55.7	29.9	10.7	1.0	0.3
2007	0.3	0.3	0.5	2.3	18.8	45.7	51.3	42.7	29.7	3.4	2.2	0.3
2008	0.3	0.4	0.9	1.9	17.0	32.0	54.0	39.0	32.5	5.1	2.7	0.3
2009	0.3	0.3	0.9	2.9	3.9	39.1	62.0	43.5	23.3	3.7	1.7	1.0
2010	1.0	1.1	1.4	2.5	3.4	3.1	53.0	56.0	20.5	3.6	1.3	0.3
2011	0.32	0.34	0.71	1.25	2.75	17.1	40.6	51.1	27.2	4.74	2.82	0.41
2012	0.40	0.40	0.45	1.55	6.20	16.5	42.0	53.0	37.5	6.00	1.40	0.41
2013							54.0	48.0	19.5	0	0	0
2014	0	0.23	0.43	1.45	11.0	39.0	53.0	54.0	38.0	5.10	0.73	0.22
2015	0.23	0.23	0.81	2.10	36.0	59.5	63.0	52.0	25.0	12.0	0.99	0.22
2016	0.22	0.23	0.51	4.82	25.6	43.1	51.5	56.8	24.1	1.98	1.03	0
2017	0.22	0.22	0.53	0.92	3.85	27.9	56.2	49.6	21.1	6.37	0.71	0.45
2018	0.45	0.45	0.71	0.98	25.8	41.9	53.0	47.0	21.7	9.40	1.73	0.22
2019	0.22	0.22	0.54	1.03	21.9	36.9	32.7	44.9	11.5	3.93	1.44	0.24
2020	0.24	0.25	0.87	7.31	16.1	17.1	50.3	52.2	24.0	9.68	1.25	0.71
2021	0.71	0.65	0.59	10.0	37.1	47.8	49.3	45.9	29.5	7.44	0.89	0.24
median	0.22	0.23	0.44	1.38	9.80	27.7	51.3	49.0	24.5	4.80	0.80	0.22

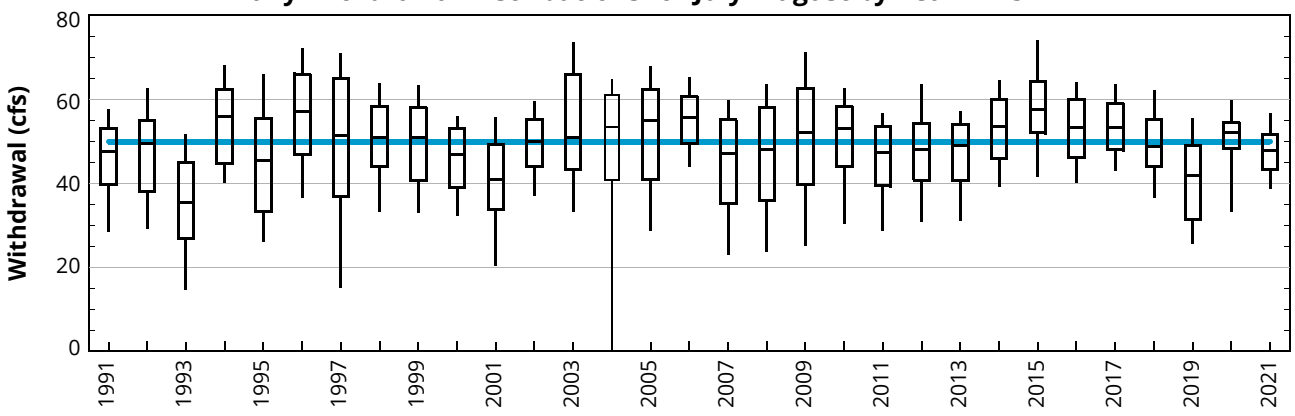
Key

Q in cfs
- Q=0
- 0 < Q ≤ 0.30
- 0.30 < Q ≤ 0.90
- 0.90 < Q ≤ 35.1
- 35.1 < Q ≤ 52.4
- Q > 52.4

Q as percentile*
- Q ≤ 10th
- 10th < Q ≤ 25th
- 25th < Q ≤ 75th
- 75th < Q ≤ 90th
- Q > 90th

Only days with withdrawals >0 were used to calculate percentiles

Daily Withdrawal Distributions for July–August by Year — SHPP

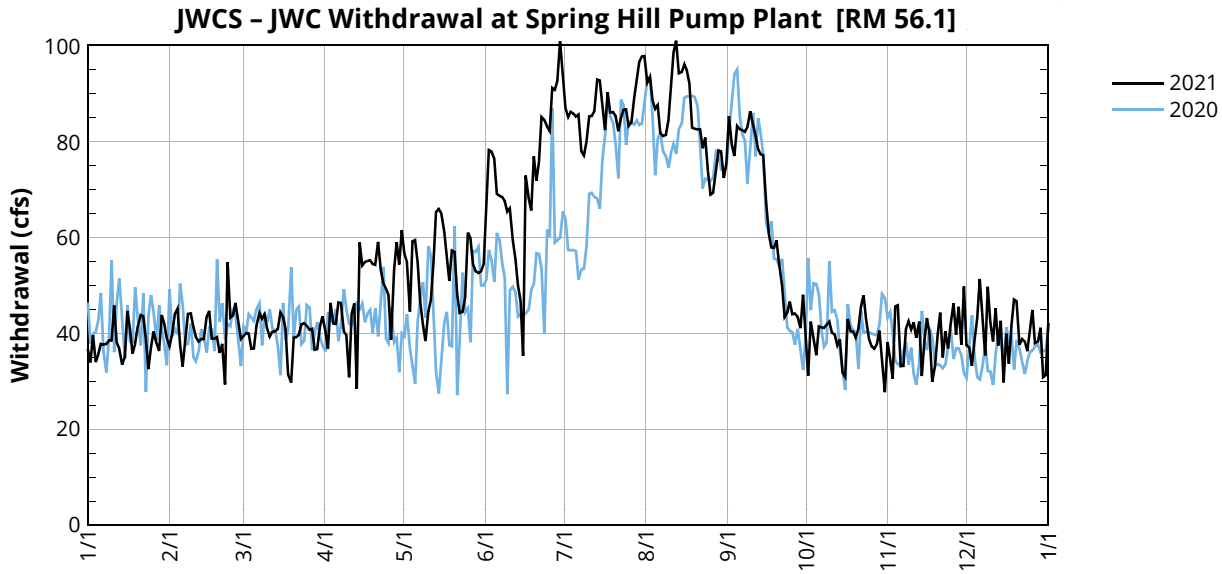


JWCS – JWC Withdrawal at Spring Hill Pump Plant [RM 56.1]

Data source: Joint Water Commission

2021 — MEAN WITHDRAWAL (cfs) — JWCS

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	36.7	37.3	39.5	40.5	56.6	65.8	86.9	92.3	85.2	31.3	34.8	37.0
2	33.9	39.8	40.1	36.8	54.9	78.2	85.0	93.5	79.3	42.5	30.6	33.2
3	39.7	44.2	40.0	46.4	44.6	77.9	86.2	88.5	77.0	39.2	45.6	38.5
4	34.1	45.2	36.8	42.1	59.2	76.4	85.8	86.8	83.3	35.5	45.9	43.1
5	35.7	37.7	36.9	42.0	59.5	69.1	85.2	87.6	82.6	41.5	33.2	51.4
6	37.8	33.1	41.5	46.5	54.9	68.7	85.6	81.7	82.4	41.3	33.2	44.2
7	37.7	38.3	44.3	46.3	46.6	68.4	78.0	81.1	82.0	41.2	41.1	35.5
8	37.8	44.1	43.0	40.4	41.9	67.6	77.1	81.4	82.9	41.9	42.6	49.7
9	38.6	44.2	44.0	39.6	38.4	65.4	80.0	84.4	86.3	42.5	40.8	42.4
10	38.6	41.4	41.0	30.9	44.6	66.1	85.3	91.8	83.6	40.2	42.3	38.3
11	45.8	39.2	39.4	44.2	47.0	59.4	85.3	98.6	81.3	39.8	39.1	45.3
12	38.1	38.3	40.4	46.2	54.7	55.6	86.3	101.0	78.4	37.6	42.5	37.5
13	36.8	38.9	40.5	28.4	65.3	50.0	92.9	94.2	77.4	38.8	31.1	42.7
14	33.5	38.9	41.0	59.0	65.9	46.9	92.7	94.5	77.2	31.8	38.3	29.9
15	35.2	43.5	44.4	54.2	65.0	35.3	87.7	96.1	67.6	30.9	43.2	40.0
16	44.7	44.7	43.5	54.9	61.3	72.9	82.4	94.8	60.8	43.0	40.1	33.7
17	40.9	38.9	40.9	55.1	56.5	68.2	90.3	92.1	57.9	40.5	29.9	41.6
18	35.8	38.9	31.4	55.2	51.0	65.6	86.1	82.9	57.8	40.4	33.4	47.1
19	37.9	39.2	29.8	54.5	57.3	76.9	86.1	82.7	59.4	39.1	39.7	46.7
20	41.4	36.0	39.1	54.3	57.0	71.8	85.3	82.5	54.6	41.1	44.3	37.7
21	43.9	37.8	39.2	59.1	48.2	75.6	82.1	82.5	50.0	45.6	35.0	38.9
22	43.6	29.4	39.8	53.3	44.3	85.1	84.9	78.6	43.4	48.0	40.5	38.3
23	38.9	54.9	41.9	50.4	44.5	84.5	86.6	80.8	44.3	42.9	36.9	36.3
24	32.6	43.3	42.2	49.4	47.5	83.0	86.7	73.7	46.6	38.9	41.8	40.7
25	37.0	43.7	41.6	48.0	61.0	82.2	83.2	68.9	44.1	37.3	46.3	44.9
26	40.4	46.4	40.8	38.7	59.9	91.1	84.0	69.3	44.1	36.8	39.7	38.0
27	37.9	42.9	41.0	53.2	54.3	90.8	89.0	73.9	43.6	37.8	45.6	38.4
28	36.4	38.9	36.6	59.0	52.9	92.6	92.9	78.1	41.1	40.6	37.7	41.2
29	43.8	—	36.7	54.4	52.6	100.9	96.6	77.9	48.1	34.5	49.8	30.9
30	42.1	—	41.5	61.5	53.0	94.0	97.7	72.4	39.2	27.8	37.6	31.3
31	39.0	—	43.6	—	54.6	—	97.8	75.4	—	38.2	—	42.1



JWCS – JWC Withdrawal at Spring Hill Pump Plant [RM 56.1]

Data source: Joint Water Commission

Summary

- JWC withdraws water at SHPP for municipal use. Peak season is July–August.
- Withdrawals in July–August 2021 were generally higher than those in recent years, but not record setting.
- Withdrawal rates in July–August increased from 1991 to the early-2000s. Withdrawal rates also increased for other months. Since 2003, no trend is evident. The median July-August withdrawal since 2003 is 74 cfs.

MEDIAN OF DAILY MEAN WITHDRAWAL — JWCS

	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1991	19.5	19.2	18.6	19.3	16.8	21.0	33.1	33.6	28.6	22.9	19.6	15.9
1992	17.9	17.9	18.0	19.8	28.3	37.1	32.7	34.6	27.7	22.2	17.8	16.5
1993	17.0	16.0	16.6	16.1	20.4	24.8	25.4	32.9	32.3	19.1	17.1	18.4
1994	17.7	15.7	15.6	16.4	24.3	27.6	42.8	40.6	33.1	23.9	16.0	20.7
1995	20.9	20.9	22.5	20.8	24.4	30.2	37.8	35.4	32.9	24.0	24.2	23.4
1996	23.0	29.6	27.6	27.8	25.5	34.5	46.4	42.6	27.3	23.5	24.8	25.1
1997	23.9	23.4	28.5	25.7	43.2	39.5	48.1	44.7	33.3	25.7	24.6	26.7
1998	28.2	29.3	29.2	30.3	31.9	42.2	56.9	55.0	52.7	33.9	32.2	33.1
1999	32.6	29.8	31.2	30.1	38.4	45.8	56.1	57.6	54.1	40.8	34.5	42.0
2000	34.7	33.1	32.8	36.0	41.7	59.0	67.6	69.2	53.2	44.0	42.4	42.7
2001	43.1	42.9	45.1	38.8	36.7	33.0	38.2	42.9	38.8	28.8	35.5	37.0
2002	38.2	38.9	42.2	43.5	44.0	52.8	60.2	62.9	55.1	47.8	44.4	45.7
2003	47.1	47.6	48.5	50.1	53.4	65.9	79.1	73.0	58.0	49.5	46.8	49.2
2004	52.5	37.8	51.7	56.6	61.6	67.5	80.1	78.8	57.9	52.9	47.9	46.0
2005	48.4	49.2	53.7	53.6	49.8	58.9	75.3	83.9	77.6	49.3	47.4	46.4
2006	50.0	50.8	49.2	53.8	57.4	61.0	79.4	79.4	70.2	52.5	48.8	40.8
2007	44.7	43.6	43.9	42.2	50.7	56.9	62.6	65.1	64.9	38.8	43.9	46.8
2008	48.3	47.0	43.7	38.2	43.7	46.9	68.2	63.4	60.3	42.0	36.4	42.4
2009	44.0	43.7	42.2	40.0	43.2	56.1	72.6	65.7	53.9	38.8	32.4	38.0
2010	41.5	42.6	39.3	33.7	33.8	36.1	64.3	67.0	43.3	38.9	32.2	33.0
2011	35.4	38.0	35.4	34.9	32.1	41.1	50.2	61.8	61.4	36.5	30.6	31.4
2012	32.2	33.2	35.7	37.0	42.4	41.7	57.5	67.5	65.8	39.4	32.6	35.2
2013	37.6	37.3	33.0	29.7	45.5	44.2	62.6	72.0	45.8	44.4	42.8	34.4
2014	38.2	39.5	39.7	38.1	45.0	55.2	67.1	72.7	66.2	45.9	39.9	46.6
2015	46.9	38.6	37.3	45.3	53.8	71.9	85.5	78.2	56.2	42.2	39.5	36.3
2016	38.6	40.5	40.4	44.8	54.1	68.4	66.7	76.9	56.8	39.2	39.6	38.5
2017	40.7	37.6	38.7	40.2	43.7	57.4	73.0	77.3	66.2	36.9	34.6	28.8
2018	27.9	33.9	33.7	34.3	55.5	71.8	86.7	83.2	72.4	44.8	38.4	38.9
2019	40.8	39.9	48.9	42.2	53.8	74.2	70.1	77.3	48.1	41.4	41.1	37.5
2020	40.9	40.9	41.5	42.5	43.3	52.6	76.3	78.0	63.3	41.6	35.1	36.4
2021	37.9	39.2	40.8	48.7	54.6	72.4	86.1	82.7	64.2	39.8	39.9	38.9
median	38.2	38.0	38.7	38.1	43.3	49.8	63.5	66.4	54.6	39.4	35.5	37.0

Key

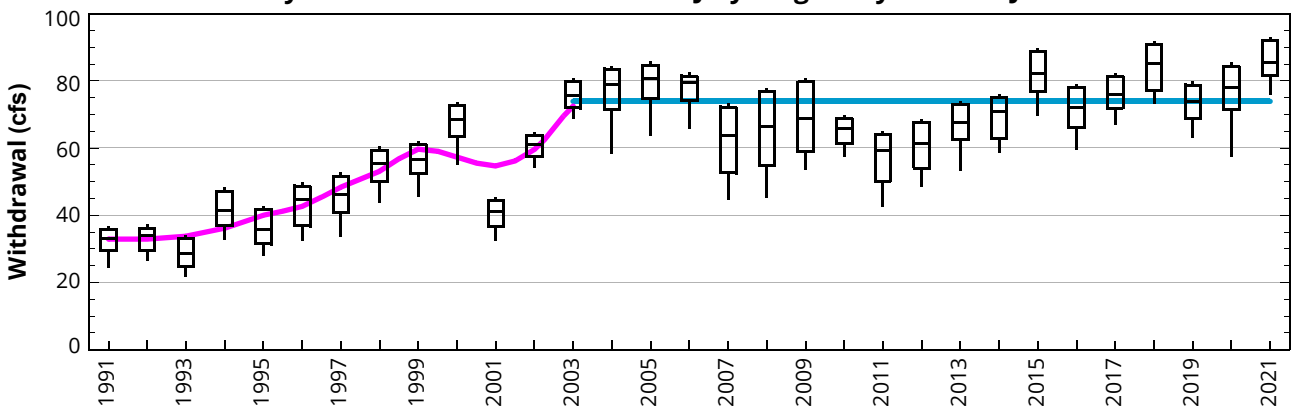
Q in cfs

- 0 < Q ≤ 22.8
- 22.8 < Q ≤ 31.8
- 31.8 < Q ≤ 52.4
- 52.4 < Q ≤ 68.7
- Q > 68.7

Q as percentile

- Q ≤ 10th
- 10th < Q ≤ 25th
- 25th < Q ≤ 75th
- 75th < Q ≤ 90th
- Q > 90th

Daily Withdrawal Distributions for July–August by Year — JWCS



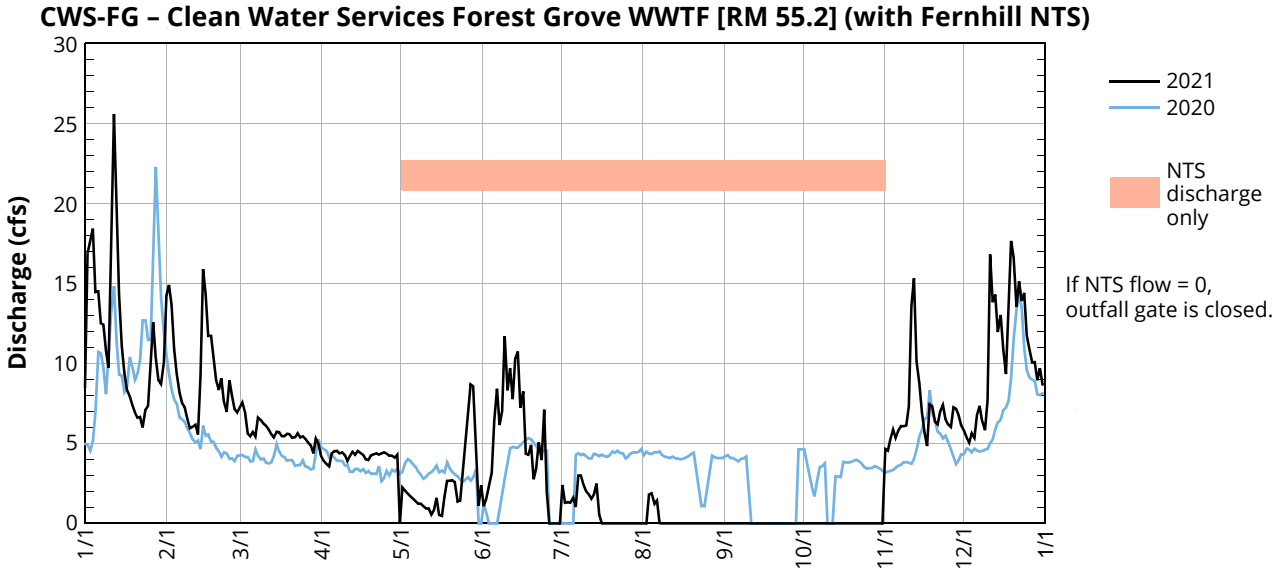
CWS-FG – Clean Water Services Forest Grove WWTF & NTS Discharge [RM 55.2]

Data source: Clean Water Services

2021 — MEAN DISCHARGE (cfs) — CWS-FG

DAY	Jan	Feb	Mar	Apr	May*	Jun*	Jul*	Aug*	Sep*	Oct*	Nov	Dec
1	8.51	14.2	7.56	3.93	2.26	1.08	2.40	closed	closed	closed	4.66	5.83
2	16.9	14.9	6.90	3.71	2.06	1.56	1.30	closed	closed	closed	4.55	5.37
3	17.7	13.7	5.62	3.57	1.87	2.32	1.33	1.81	closed	closed	5.31	5.04
4	18.4	10.9	5.46	4.38	1.70	3.16	1.30	1.89	closed	closed	5.88	5.65
5	14.5	9.37	5.72	4.52	1.55	6.44	1.59	1.22	closed	closed	5.35	5.35
6	14.5	8.17	5.43	4.53	1.39	8.42	1.04	1.44	closed	closed	5.79	6.81
7	12.5	7.50	6.61	4.39	1.24	6.16	2.99	0.02	closed	closed	6.08	7.35
8	12.4	7.27	6.45	4.44	1.24	7.02	2.99	closed	closed	closed	6.08	6.40
9	10.8	6.56	6.23	4.27	1.08	11.7	2.43	closed	closed	closed	6.14	5.83
10	9.75	5.94	6.10	3.91	0.93	8.32	2.03	closed	closed	closed	7.32	7.67
11	15.0	6.03	5.88	4.24	0.93	9.70	1.81	closed	closed	closed	13.6	16.8
12	25.6	6.17	5.58	4.49	0.56	7.78	1.55	closed	closed	closed	15.3	13.8
13	19.0	5.57	5.38	4.32	0.84	10.3	1.81	closed	closed	closed	10.1	14.3
14	14.3	9.25	5.74	4.53	1.59	10.8	2.49	closed	closed	closed	8.73	12.0
15	11.1	15.9	5.69	4.41	0.53	7.24	0.53	closed	closed	closed	6.93	13.0
16	9.42	14.3	5.45	4.29	0.48	8.26	closed	closed	closed	closed	5.69	10.9
17	8.35	11.7	5.45	4.01	1.70	4.36	closed	closed	closed	closed	4.84	9.34
18	7.92	11.7	5.60	3.96	2.68	4.32	closed	closed	closed	closed	7.46	13.5
19	7.39	10.3	5.58	4.25	2.66	4.92	closed	closed	closed	closed	7.33	17.7
20	6.95	8.90	5.35	4.33	2.71	2.77	closed	closed	closed	closed	6.34	16.6
21	6.62	8.35	5.40	4.38	2.58	3.47	closed	closed	closed	closed	6.20	13.5
22	6.65	9.08	5.65	4.32	1.38	5.07	closed	closed	closed	closed	7.01	15.1
23	6.00	7.60	5.37	4.39	1.44	3.96	closed	closed	closed	closed	7.41	13.9
24	7.13	6.98	5.45	4.44	3.33	7.12	closed	closed	closed	closed	6.51	14.4
25	7.35	8.94	5.29	4.36	5.11	1.98	closed	closed	closed	closed	6.19	11.8
26	9.65	7.97	5.07	4.24	7.07	closed	closed	closed	closed	closed	6.02	10.9
27	12.6	7.15	4.89	4.24	8.69	closed	closed	closed	closed	closed	7.27	10.1
28	10.4	6.93	4.39	4.12	8.59	closed	closed	closed	closed	closed	7.16	10.1
29	8.96	—	5.32	4.30	4.30	closed	closed	closed	closed	closed	6.78	8.96
30	8.71	—	5.00	0.00	1.11	closed	closed	closed	closed	closed	6.14	9.70
31	10.1	—	4.22	—	2.38	—	closed	closed	—	closed	—	8.66

*Discharge from the NTS. Effluent from the Forest Grove WWTF was not discharged directly to the Tualatin River at that time. It was either routed to the NTS or transferred to the Rock Creek WWTF depending on operational needs.



Summary

- Beginning in 1995, the Forest Grove WWTF discontinued discharges to the Tualatin River during the low-flow season (May/June – October/November, depending on river flow). Effluent was transferred to the Rock Creek WWTF during the entire low-flow season until 2017.
- In 2017, the Forest Grove Natural Treatment System (NTS) at Fernhill Wetlands began trial operation during the low-flow season. Since then, the Forest Grove WWTF either discharges into the NTS or transfers effluent to the Rock Creek WWTF during the low-flow season. The choice of destination is an operational decision and may change day-to-day. The WWTF does not discharge directly to the Tualatin River during the low-flow season.
- Outside of the low flow season, the WWTF may discharge effluent directly to the Tualatin River through the outfall, route effluent to the NTS or use a combination of the two.
- In 2021, the NTS discharged intermittently from May through October. Discharges to the Tualatin River during November and December were either from the NTS, which continued intermittent operation through December, or directly from the Forest Grove WWTF.

MEDIAN OF DAILY MEAN DISCHARGE — CWS-FG

	Jan	Feb	Mar	April	May*	Jun*	Jul*	Aug*	Sep*	Oct*	Nov	Dec
1991	7.8	9.8	8.8	8.2	6.3	5.0	4.1	3.0	3.1	2.6	4.8	6.4
1992	7.1	7.7	5.4	5.7	3.9	2.9	2.6	2.4	2.5	2.9	4.3	7.8
1993	7.8	6.2	7.7	7.7	5.7	4.2	2.9	2.7	2.6	2.7	2.8	4.8
1994	6.4	5.8	5.2	3.1	2.2	1.2	1.1	1.0	1.0	1.4	2.8	5.6
1995	4.7	5.3	5.7	5.4	3.9	0	0	0	0	0	5.0	9.1
1996	8.5	9.8	4.9	5.4	5.0	0	0	0	0	0	2.9	10.0
1997	9.0	4.5	8.3	3.4	0	0	0	0	0	0	0	5.4
1998	10.7	8.9	6.6	1.9	0	2.0	0	0	0	0	0	10.5
1999	8.4	16.4	9.7	3.7	0	0	0	0	0	0	5.2	7.8
2000	9.5	6.9	6.1	0	0	0	0	0	0	0	0	4.0
2001	3.6	3.8	2.8	2.7	0	0	0	0	0	0	0	8.7
2002	7.3	5.5	4.6	0	0	0	0	0	0	0	0	0
2003	7.8	6.8	8.2	0	0	0	0	0	0	0	0	6.0
2004	7.3	7.7	5.0	0	0	0	0	0	0	0	0	0
2005	4.7	3.4	3.3	5.8	0	0	0	0	0	0	0	8.3
2006	12.8	6.0	6.4	5.6	0	0	0	0	0	0	8.1	10.9
2007	6.6	6.9	6.3	4.9	0	0	0	0	0	0	0	8.4
2008	8.8	5.1	5.6	4.6	3.2	0	0	0	0	0	3.5	4.2
2009	5.7	3.9	5.6	0	0	0	0	0	0	0	5.4	4.7
2010	9.2	7.1	5.9	5.3	0	0	0	0	0	0	0	11.1
2011	7.5	6.5	10.1	11.3	9.7	6.1	0	0	0	0	1.3	3.7
2012	8.3	6.4	10.2	6.3	5.6	0	0	0	0	0	5.8	12.3
2013	4.6	4.3	5.0	4.2	0	0	0	0	0	0	3.5	3.4
2014	4.2	8.1	8.3	6.1	4.0	0	0	0	0	0	4.1	8.8
2015	5.6	7.1	6.1	4.4	0	0	0	0	0	0	3.5	15.4
2016	11.0	8.5	10.0	4.4	0	0	0	0	0	0	0	9.3
2017	8.0	13.8	11.0	7.0	4.5	2.9	3.9	0	0	0	8.0	5.9
2018	8.7	5.7	6.3	5.7	3.1	5.4	4.6	3.7	0.9	0.9	3.2	5.5
2019	5.9	7.6	4.1	5.4	0	3.0	2.8	0.7	0	0	0	4.7
2020	10.4	5.2	4.0	3.4	3.2	4.2	4.3	4.1	0.0	3.5	3.6	7.1
2021	10.1	8.6	5.5	4.3	1.7	4.6	0.0	0.0	0.0	0.0	6.3	10.1
median	7.8	6.8	6.1	4.6							2.9	7.1

*Since June 2017, discharges from May through October are from the NTS (provided that river flow is low). During this time treated wastewater from the Forest Grove WWTF is either routed to the NTS or transferred to the Rock Creek WWTF depending on operational needs.

Key

Q in cfs
- 0 < Q ≤ 2.7
- 2.7 < Q ≤ 3.8
- 3.8 < Q ≤ 8.0
- 8.0 < Q ≤ 11.0
- Q > 11.0

Q as percentile
- Q ≤ 10th
- 10th < Q ≤ 25th
- 25th < Q ≤ 75th
- 75th < Q ≤ 90th
- Q > 90th

Only days with discharges >0 were used to calculate percentiles

No July-August boxplots graph produced because direct discharge to the Tualatin River from the Forest Grove WWTF does not occur in July-August.
Since 2017, the FG-WWTF may discharge through the Fernhill NTS during this time.

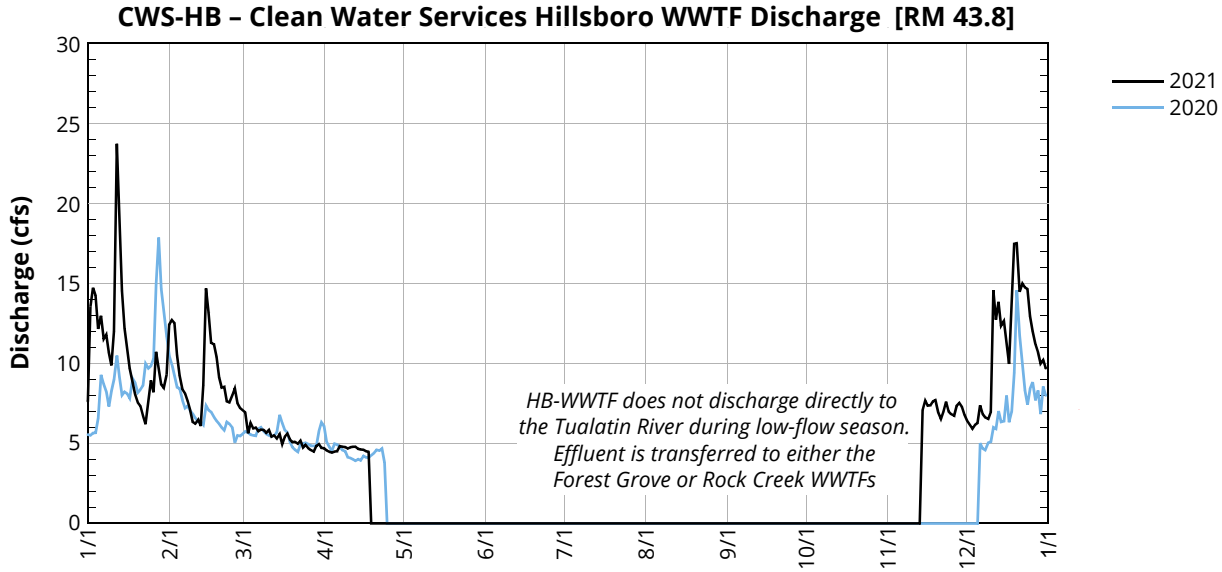
CWS-HB – Clean Water Services Hillsboro WWTF Discharge [RM 43.8]

Data source: Clean Water Services

2021 — MEAN DISCHARGE (cfs) — CWS-HB

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7.6	12.4	6.9	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4
2	13.6	12.7	5.6	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2
3	14.7	12.5	6.3	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9
4	14.2	10.5	5.9	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2
5	12.2	9.3	6.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3
6	13.0	8.4	5.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4
7	11.5	8.1	5.9	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8
8	11.8	7.6	5.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6
9	10.7	7.1	5.7	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5
10	9.9	6.3	5.8	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0
11	12.0	6.2	5.4	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.6
12	23.7	6.5	5.5	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7
13	19.0	6.1	5.3	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.9
14	14.5	8.6	5.6	4.6	0.0	0.0	0.0	0.0	0.0	0.0	7.1	12.3
15	12.2	14.7	5.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	7.7	12.7
16	10.9	13.2	5.4	4.5	0.0	0.0	0.0	0.0	0.0	0.0	7.4	11.3
17	9.7	11.3	5.6	4.5	0.0	0.0	0.0	0.0	0.0	0.0	7.4	10.0
18	8.8	11.2	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	13.1
19	8.0	10.4	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	17.5
20	7.5	9.1	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	17.5
21	7.3	8.5	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5	14.5
22	6.7	8.5	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	15.0
23	6.2	7.6	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	14.7
24	7.7	7.6	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	14.7
25	8.9	8.0	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	13.0
26	8.2	8.4	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	12.0
27	10.7	7.5	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4	11.2
28	9.8	7.2	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	10.7
29	8.7	—	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3	10.0
30	8.5	—	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	10.2
31	9.3	—	4.7	—	0.0	—	0.0	0.0	—	0.0	—	9.7

During the low-flow season the Hillsboro WWTF does not discharge directly to the Tualatin River. Effluent is transferred to either the Forest Grove or Rock Creek WWTFs depending on operational needs.



CWS-HB – Clean Water Services Hillsboro WWTF Discharge [RM 43.8]

Data source: Clean Water Services

Summary

- Beginning in 1995, the Hillsboro WWTF discontinued discharges to the Tualatin River during the low-flow season (May/June – October/November, depending on river flow). Effluent was transferred to the Rock Creek WWTF during the entire low-flow season until 2017.
- Since 2018, during the low flow season effluent was transferred from the Hillsboro WWTF to either the Forest Grove or Rock Creek WWTFs. Once at the Forest Grove WWTF, it was either discharged into the Natural Treatment System (NTS) at Fernhill Wetlands or transferred to the Rock Creek WWTF.

MEDIAN OF DAILY MEAN DISCHARGE — CWS-HB

	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1991	4.2	4.8	4.3	4.5	3.8	3.5	3.1	3.8	3.7	4.4	5.0	6.6
1992	6.8	7.7	6.2	6.4	5.4	5.0	4.6	4.5	4.6	4.5	5.1	7.4
1993	7.3	6.0	6.9	7.7	6.4	6.1	4.7	4.4	4.6	3.9	4.2	5.7
1994	7.2	6.5	5.4	4.1	3.3	3.3	1.9	2.0	2.1	2.2	5.1	10.3
1995	8.3	7.6	7.4	5.6	4.5	0	0	0	0	0	5.2	9.2
1996	11.2	12.6	6.0	6.8	6.3	0	0	0	0	0	5.2	15.5
1997	9.9	6.8	9.9	5.1	4.4	0	0	0	0	0	2.4	6.2
1998	11.7	9.5	7.6	5.9	7.1	5.4	0	0	0	0	5.7	12.7
1999	11.3	15.5	9.6	7.1	0	0	0	0	0	0	6.9	8.7
2000	9.8	7.9	7.8	5.8	0	0	0	0	0	0	0	5.6
2001	5.8	5.8	5.6	5.4	0	0	0	0	0	0	0	10.9
2002	10.5	7.5	7.5	7.2	0	0	0	0	0	0	0	7.5
2003	9.4	10.3	10.5	9.3	0	0	0	0	0	0	0	7.9
2004	10.1	9.5	7.6	6.7	0	0	0	0	0	0	0	0
2005	7.1	6.9	0	6.9	7.8	0	0	0	0	0	7.2	8.7
2006	16.3	7.6	7.5	6.7	0	0	0	0	0	0	8.6	10.6
2007	7.2	7.1	6.2	5.5	0	0	0	0	0	0	0	10.6
2008	10.5	6.8	7.1	6.3	0	0	0	0	0	0	4.6	5.0
2009	6.4	5.1	6.0	3.8	4.9	0	0	0	0	0	6.0	5.8
2010	11.2	8.0	6.5	7.0	5.3	5.6	0	0	0	0	0	6.0
2011	8.7	6.9	10.4	0	0	0	0	0	0	0	0	4.9
2012	7.9	7.2	11.7	0	0	0	0	0	0	0	6.0	13.4
2013	5.8	5.5	5.8	0	0	0	0	0	0	0	4.7	4.4
2014	4.8	8.6	8.2	6.4	4.0	0	0	0	0	0	4.4	7.7
2015	5.8	7.1	6.8	5.6	0	0	0	0	0	0	0	17.1
2016	12.3	8.8	10.1	5.6	0	0	0	0	0	0	6.9	9.5
2017	8.6	15.3	11.7	8.1	5.9	0	0	0	0	0	6.9	5.8
2018	7.8	6.8	7.3	6.9	0	0	0	0	0	0	0	0
2019	6.5	7.1	5.8	0	0	0	0	0	0	0	0	5.5
2020	5.6	4.3	3.6	2.7	0	0	0	0	0	0	0	4.4
2021	6.4	5.5	3.4	2.9	0	0	0	0	0	0	4.4	7.2
median	7.9	7.1	7.1	5.8	0.0	0.0	0.0	0.0	0.0	0.0	4.4	7.4

Key

Q in cfs
- Q ≤ 4.1
- 4.1 < Q ≤ 5.1
- 5.1 < Q ≤ 8.6
- 8.6 < Q ≤ 12.2
- Q > 12.2

Q as percentile
- Q ≤ 10th
- 10th < Q ≤ 25th
- 25th < Q ≤ 75th
- 75th < Q ≤ 90th
- Q > 90th

Only days with discharges were used to calculate percentiles

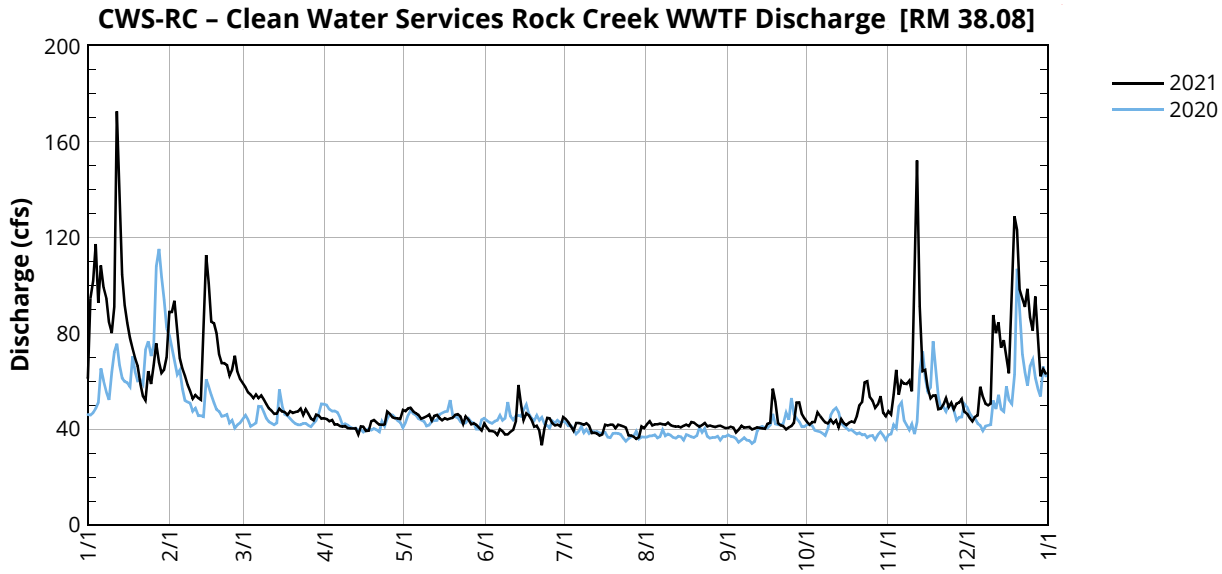
No July-August boxplots graph produced because direct discharge to the Tualatin River from the Hillsboro WWTF does not occur in July-August.

CWS-RC – Clean Water Services Rock Creek WWTF Discharge [RM 38.08]

Data source: Clean Water Services

2021 — MEAN DISCHARGE (cfs) — CWS-RC

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	61.4	89.0	57.6	44.3	47.7	40.8	44.4	42.1	40.7	43.1	47.6	46.6
2	94.7	89.0	55.4	43.4	48.9	39.4	43.1	43.5	41.2	42.1	46.3	44.8
3	101.9	93.7	54.5	44.0	49.0	39.4	41.3	41.7	40.7	43.1	54.5	43.4
4	117.3	81.9	53.1	42.1	47.6	39.0	39.5	42.2	38.7	43.1	64.8	45.3
5	92.7	69.7	54.6	42.2	46.8	37.7	42.6	42.2	39.9	47.1	54.5	45.9
6	108.4	65.5	53.1	41.4	46.1	40.1	42.7	42.4	41.6	45.6	60.3	57.9
7	99.1	62.4	54.2	41.2	44.5	39.2	42.4	42.2	40.8	44.3	59.0	53.6
8	94.4	58.6	52.4	41.4	45.0	37.9	42.0	41.9	40.9	43.0	58.9	50.7
9	84.5	55.9	50.5	40.5	45.5	38.0	42.6	42.8	41.0	42.6	60.4	50.0
10	80.2	52.8	48.8	40.4	46.2	39.0	41.6	41.9	40.0	44.1	55.9	50.9
11	91.1	54.4	47.7	40.5	43.7	39.9	38.5	41.4	40.5	42.5	99.2	87.7
12	172.5	53.1	46.6	40.5	45.8	43.5	38.7	41.1	40.9	43.9	152.1	80.1
13	134.7	52.4	46.6	37.8	46.2	58.5	38.4	41.3	40.7	41.0	91.2	84.6
14	104.6	75.2	48.6	41.3	44.7	50.6	37.4	40.9	40.4	44.3	64.3	74.0
15	91.7	112.7	47.5	41.2	43.9	44.0	37.8	41.5	40.3	42.6	64.9	77.3
16	84.5	101.1	47.3	39.4	44.7	46.8	42.1	42.0	42.4	41.8	57.2	70.2
17	78.2	84.9	46.2	39.5	44.2	45.9	41.7	41.4	42.9	42.9	53.0	63.4
18	73.7	84.3	47.7	43.5	44.6	44.1	42.0	43.1	57.0	43.3	54.1	94.7
19	69.6	80.1	46.9	43.9	44.8	41.2	41.9	42.9	51.5	42.9	54.1	128.9
20	66.4	71.2	47.2	43.0	46.1	41.5	40.5	41.8	42.6	45.6	48.4	123.1
21	59.0	67.6	47.6	42.0	46.3	39.6	42.1	41.2	41.7	50.1	48.7	98.2
22	53.9	67.6	48.7	41.9	45.4	33.4	41.6	41.8	41.4	51.4	50.5	94.4
23	52.1	66.9	46.0	42.0	42.4	40.7	41.2	42.8	40.0	59.7	53.2	91.1
24	64.3	62.5	48.4	47.3	45.4	44.9	40.8	41.3	40.9	60.1	49.3	98.5
25	58.9	64.9	46.5	46.6	44.0	44.6	37.5	41.7	41.4	53.5	51.0	86.9
26	66.7	70.8	44.4	45.1	42.2	42.6	37.5	41.3	42.8	52.0	48.5	81.2
27	75.8	64.1	43.8	44.8	42.6	41.7	37.0	41.1	51.2	49.1	50.8	95.4
28	68.1	61.1	46.3	44.6	42.0	42.1	36.1	41.5	51.3	50.6	51.2	79.5
29	63.6	—	45.8	44.4	40.8	41.2	36.9	41.5	46.5	53.9	52.8	62.2
30	64.9	—	44.5	48.2	39.6	45.3	41.3	41.1	44.7	46.8	47.3	65.1
31	70.2	—	44.7	—	42.6	—	40.5	40.5	—	45.5	—	63.3



Summary

- Discharges from the Rock Creek WWTF in 2021 from March–June were on somewhat lower than recent years (except 2020) and probably reflect the dry spring weather.
- Discharges in July–August steadily increased from1991 to the early-2000s. Discharges also increased for other months during this time period.
- From 2003–2017 discharges show no trend. Beginning in 2018, discharges have been slightly lower.

MEDIAN OF DAILY MEAN DISCHARGE — CWS-RC

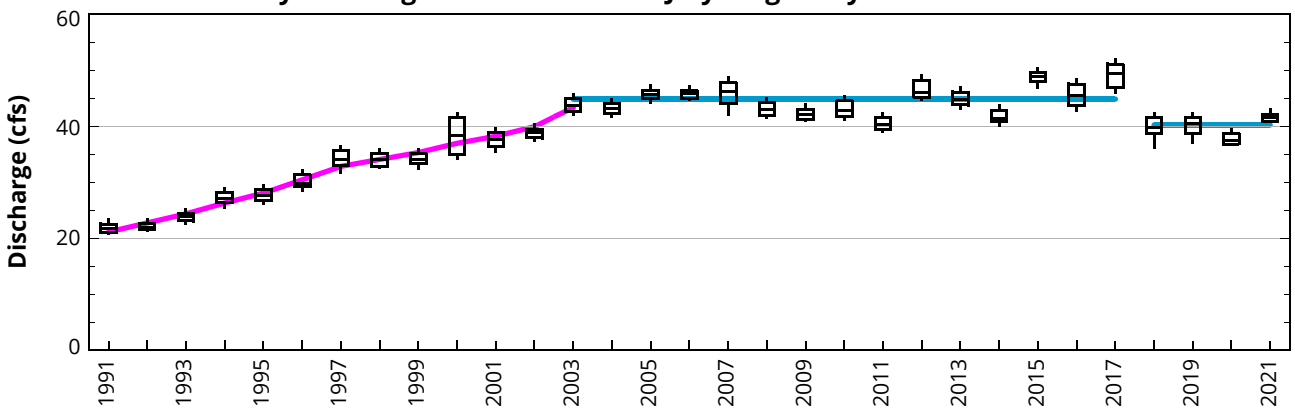
	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1991	26.9	32.7	33.8	30.0	28.5	23.9	21.3	22.3	21.3	21.4	28.3	30.0
1992	31.7	36.4	28.6	29.5	24.6	22.9	22.3	21.8	21.6	22.3	25.4	35.3
1993	38.1	31.4	36.9	40.4	28.7	27.4	24.2	23.4	22.2	22.2	21.1	27.1
1994	32.4	29.0	33.0	30.5	28.7	27.7	26.9	27.4	26.4	25.2	37.7	48.9
1995	55.3	51.0	52.8	37.0	33.0	28.7	28.2	27.3	27.2	28.6	34.0	71.3
1996	56.8	68.0	37.6	41.6	40.3	32.9	31.2	29.3	28.6	30.0	36.8	97.3
1997	63.0	38.2	60.8	34.8	34.7	36.8	34.8	33.5	33.8	38.7	48.3	39.6
1998	67.9	56.2	47.7	37.7	42.0	38.6	34.2	33.2	35.2	35.6	40.2	75.5
1999	73.0	89.3	55.9	39.5	39.2	38.0	33.9	34.4	32.1	30.5	44.6	51.2
2000	63.5	59.0	58.5	43.7	48.6	44.3	41.5	35.0	38.4	40.9	34.2	39.6
2001	38.2	39.5	39.4	39.4	38.3	36.7	37.5	37.7	38.9	41.5	47.8	71.3
2002	72.1	56.6	52.3	44.4	42.4	40.8	39.0	38.5	39.6	38.8	40.8	50.3
2003	59.3	57.8	63.4	63.4	47.3	45.6	43.9	43.8	40.5	40.7	39.6	51.5
2004	67.2	58.2	42.8	40.5	41.4	44.7	42.8	43.3	44.5	46.6	48.1	46.9
2005	45.3	41.8	38.4	49.3	57.3	48.3	46.0	45.6	45.8	48.4	50.1	58.0
2006	100.9	51.2	50.9	48.0	45.8	45.5	46.0	45.6	41.8	41.9	65.7	137.7
2007	55.6	55.8	52.0	48.4	48.0	44.2	46.1	46.4	42.3	47.4	47.1	73.8
2008	72.0	53.1	51.9	46.0	42.8	43.1	42.4	43.5	43.9	42.8	43.1	42.6
2009	49.8	41.3	47.0	46.2	49.6	46.5	41.7	42.7	43.0	44.5	50.6	46.2
2010	68.6	56.2	52.7	54.0	51.4	57.3	44.4	41.9	43.8	42.5	56.7	87.5
2011	62.0	51.3	73.4	59.8	45.5	41.0	41.2	39.6	39.9	42.3	45.6	37.9
2012	50.9	49.1	67.7	57.3	53.6	51.5	48.2	45.2	45.2	49.4	53.2	79.8
2013	48.0	45.1	43.4	46.8	47.2	49.0	44.2	45.7	50.5	49.9	45.7	43.4
2014	43.2	64.3	62.9	53.7	46.3	45.7	42.6	41.1	41.2	46.3	47.8	58.4
2015	48.8	58.4	59.1	52.2	51.9	50.3	49.0	48.7	51.2	51.8	59.4	100.4
2016	83.8	70.2	72.6	50.1	52.2	48.7	47.0	44.9	48.4	70.3	68.9	70.9
2017	67.0	99.3	82.4	65.9	53.5	52.0	47.0	50.7	51.5	55.6	69.8	64.6
2018	75.3	63.4	60.6	54.0	45.8	43.1	39.9	40.1	37.5	39.9	40.9	50.9
2019	48.3	56.0	47.7	54.6	47.4	42.7	40.7	40.1	43.5	41.9	40.7	44.5
2020	63.9	48.3	43.3	41.8	44.1	43.9	38.4	37.1	41.0	39.0	48.5	52.3
2021	78.2	67.6	47.6	42.1	44.8	41.2	41.3	41.7	41.1	44.3	54.1	74.0
median	59.3	55.8	521.9	46.0	45.5	43.1	41.3	40.1	41.0	41.9	45.7	51.5

Key

Q in cfs
- 0 < Q ≤ 29.3
- 29.3 < Q ≤ 38.6
- 38.6 < Q ≤ 52.6
- 52.6 < Q ≤ 69.7
- Q > 69.7

Q as percentile
- Q ≤ 10th
- 10th < Q ≤ 25th
- 25th < Q ≤ 75th
- 75th < Q ≤ 90th
- Q > 90th

Daily Discharge Distributions for July–August by Year — CWS-RC

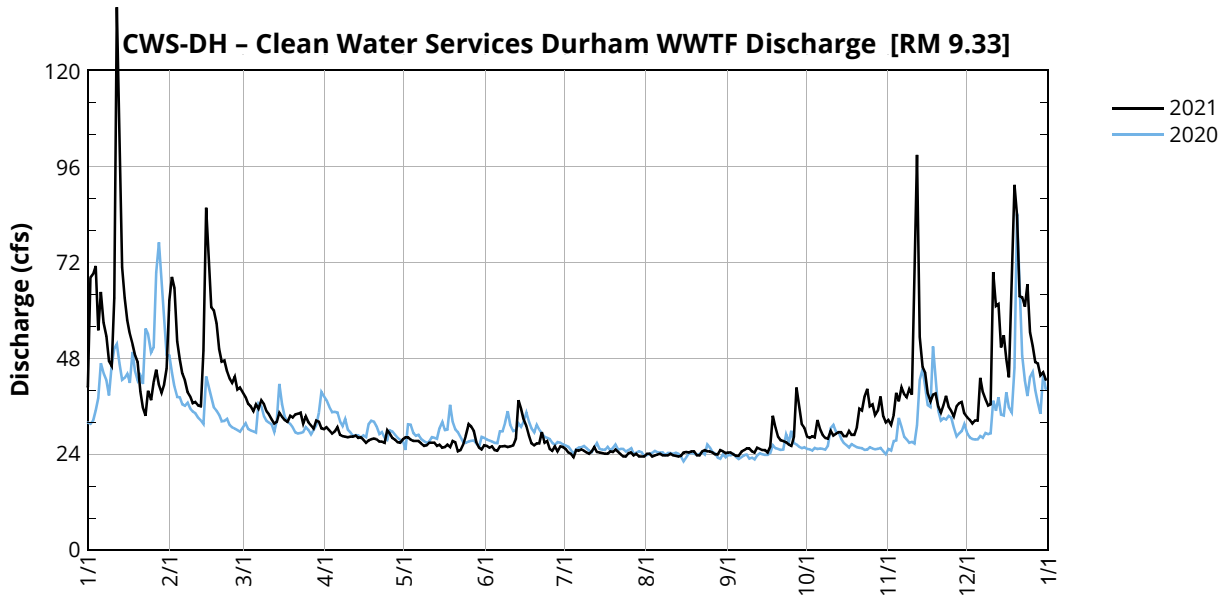


CWS-DH – Clean Water Services Durham WWTF Discharge [RM 9.33]

Data source: Clean Water Services

2021 — MEAN DISCHARGE (cfs) — CWS-DH

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	40.8	62.5	38.4	30.8	28.3	26.1	25.4	24.1	24.4	28.5	32.6	33.3
2	68.2	68.4	36.7	30.0	28.3	25.7	24.4	24.1	24.4	28.2	31.4	32.6
3	69.2	65.6	36.0	29.2	27.7	26.0	24.1	23.5	24.0	28.6	33.9	31.7
4	71.2	52.3	34.8	29.7	27.4	25.1	23.4	23.8	23.7	28.3	39.4	32.5
5	55.1	47.8	36.5	30.8	27.4	24.9	25.1	24.0	23.7	32.6	37.3	32.5
6	64.7	44.2	35.4	28.9	27.4	26.0	24.9	24.1	24.8	30.3	40.7	43.2
7	56.9	42.5	37.6	28.6	26.8	26.0	25.2	23.8	25.1	28.9	39.1	39.6
8	53.5	39.6	36.7	28.5	26.1	26.1	24.9	23.8	25.5	28.2	38.4	37.7
9	47.3	38.5	34.8	28.3	26.3	25.8	24.4	23.8	25.5	28.0	40.4	36.2
10	46.1	36.8	34.0	28.5	26.9	26.0	24.1	24.1	24.8	29.9	39.0	36.5
11	63.1	37.1	32.8	28.5	26.9	26.3	24.8	23.8	24.4	28.8	66.7	69.6
12	135.8	36.2	31.7	28.8	26.9	28.0	25.8	23.7	25.7	29.2	98.9	61.1
13	98.2	36.0	32.2	28.2	26.1	37.6	24.6	23.5	25.4	29.5	53.4	61.6
14	70.9	50.0	34.5	28.3	26.5	35.4	24.4	23.7	25.1	29.5	45.8	50.7
15	63.1	85.7	33.4	27.7	25.7	32.8	24.3	24.4	25.1	28.6	44.4	53.8
16	57.5	72.2	32.6	26.9	25.8	31.1	24.1	24.6	24.4	28.6	39.3	47.8
17	54.1	60.8	32.2	27.5	26.5	28.8	24.1	24.4	26.0	29.9	37.3	43.3
18	51.5	60.0	33.7	27.8	25.8	26.8	24.8	24.8	33.7	28.9	39.0	64.2
19	48.7	56.8	33.3	28.0	27.4	26.3	24.6	24.8	30.8	28.9	39.3	91.4
20	47.0	50.4	34.0	27.8	27.1	26.8	25.2	23.8	28.5	30.8	35.9	83.7
21	39.8	47.2	34.2	27.2	24.8	26.8	24.6	23.8	27.5	35.4	34.5	63.6
22	35.6	47.5	34.5	27.2	25.1	29.5	24.0	24.8	27.4	35.0	36.4	63.3
23	33.7	44.9	31.7	26.9	26.5	26.9	23.5	25.1	27.1	38.7	38.7	61.0
24	39.9	43.0	33.6	30.0	28.6	27.4	23.5	24.8	26.5	40.4	35.9	66.5
25	37.6	41.9	32.0	29.2	31.6	25.4	24.3	24.8	26.1	36.0	34.8	54.6
26	42.1	43.5	31.2	28.2	30.9	24.9	24.4	24.4	28.5	36.5	33.6	51.1
27	45.2	40.2	30.5	27.7	29.9	26.0	23.8	24.0	40.7	33.9	36.0	47.0
28	41.3	40.7	32.5	27.1	27.1	24.8	24.1	24.0	36.0	35.0	36.8	46.7
29	39.4	—	32.2	26.9	25.7	26.0	23.5	25.1	31.6	38.5	37.1	43.8
30	41.5	—	30.5	27.8	25.2	25.8	23.5	24.8	30.6	33.6	34.3	44.6
31	45.5	—	30.3	—	26.3	—	23.5	24.3	—	32.0	—	42.7



Summary

- Discharges from the Durham WWTF from the past four years were slightly lower than the median period of record discharges.
- Discharges before 1995 were lower than those after.
- Since 1995, discharges show no trend. Periods of lower and higher discharge repeatedly occur. The average discharge in July-August 1995–2020 was 25.6 cfs.

MEDIAN OF DAILY MEAN DISCHARGE — CWS-DH

	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1991	28.9	32.8	29.4	30.7	28.2	25.4	22.3	22.0	21.5	21.5	27.0	28.1
1992	29.6	34.4	26.6	27.9	23.7	22.1	19.9	18.5	21.0	20.9	24.9	33.4
1993	33.0	26.7	30.9	39.1	31.4	24.9	24.9	24.6	23.5	24.5	21.1	27.7
1994	31.2	30.7	32.1	28.9	24.6	23.8	22.7	23.1	23.9	23.7	36.2	40.5
1995	40.3	41.7	41.3	35.6	31.5	28.2	25.9	26.1	26.0	28.8	37.4	44.4
1996	49.0	56.4	40.2	40.7	36.4	27.9	25.6	24.8	26.5	31.0	38.7	69.8
1997	60.9	36.5	51.4	34.9	30.0	30.1	26.4	25.8	28.0	30.4	34.9	33.1
1998	49.2	45.3	41.7	33.1	35.9	30.3	26.3	25.8	26.7	29.4	37.9	51.0
1999	54.7	63.1	47.4	36.9	31.1	28.5	26.7	26.8	26.2	26.8	36.7	39.8
2000	42.1	42.5	39.7	32.0	31.4	28.7	27.2	24.9	25.6	26.5	26.7	30.0
2001	28.2	28.0	28.4	28.8	25.9	25.4	24.1	24.3	24.5	25.0	30.2	42.9
2002	41.9	38.4	36.8	31.7	26.6	25.8	24.6	23.5	24.1	23.7	25.2	34.0
2003	38.2	37.1	42.5	39.3	30.9	25.5	23.5	23.8	23.6	25.2	27.2	39.0
2004	43.9	39.8	32.3	28.5	26.1	24.5	23.4	24.4	25.1	27.7	27.5	30.0
2005	30.2	27.0	25.8	33.7	34.5	28.6	24.6	23.4	23.7	28.2	34.3	40.7
2006	64.0	41.5	38.8	35.5	30.0	27.8	25.1	25.2	25.3	24.6	46.2	47.8
2007	38.7	36.1	37.0	34.3	28.6	25.8	24.4	25.5	24.1	27.4	29.8	48.6
2008	48.4	35.9	41.8	37.9	30.8	28.8	28.0	26.8	25.2	27.1	31.0	30.0
2009	37.3	33.1	36.8	34.2	33.0	29.8	28.3	28.5	29.0	29.5	38.3	35.3
2010	52.4	41.2	39.4	41.8	35.7	40.9	30.8	29.2	30.2	30.5	41.1	57.9
2011	46.4	40.2	54.3	44.9	33.7	29.9	27.2	28.0	28.2	26.3	30.6	30.2
2012	39.6	36.2	48.1	38.6	33.1	30.3	28.6	27.7	28.2	33.1	44.4	66.5
2013	39.0	36.5	35.4	35.1	31.9	32.7	28.5	25.7	29.2	28.2	30.9	29.2
2014	31.2	43.9	42.9	38.3	31.1	27.7	26.7	25.3	25.2	28.2	31.3	39.4
2015	32.2	37.3	34.5	31.7	26.9	25.4	24.0	24.3	25.7	26.0	31.3	61.4
2016	52.6	43.6	45.9	31.7	29.4	27.4	25.5	25.1	26.1	40.8	38.5	42.9
2017	40.8	64.4	52.3	41.0	34.5	30.2	26.6	26.1	27.1	28.0	39.0	36.0
2018	45.6	37.7	36.7	36.7	28.8	26.5	25.1	24.1	25.4	25.5	26.5	33.4
2019	32.8	37.4	31.4	34.3	28.3	26.1	24.8	24.4	27.6	26.8	25.9	30.8
2020	44.7	34.7	31.5	29.7	28.3	29.7	25.3	24.2	24.2	25.7	31.4	35.8
2021	48.7	46.0	33.6	28.2	26.9	26.1	24.4	24.1	25.6	29.9	37.8	47.0
median	40.8	37.4	37.0	34.3	30.8	27.8	25.3	24.9	25.6	27.1	31.3	39.0

Key

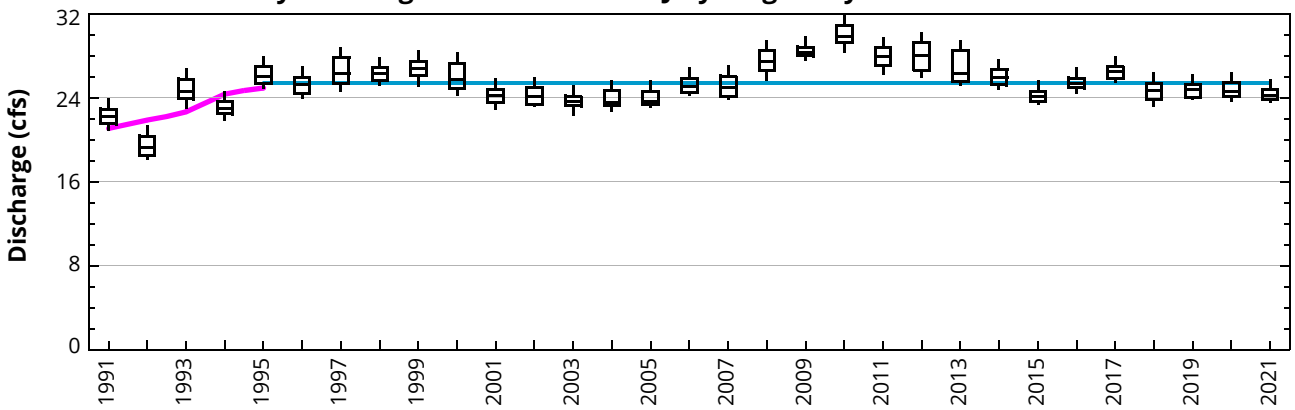
Q in cfs

- 0 < Q ≤ 24.1
- 24,1 < Q ≤ 26.1
- 26.1 < Q ≤ 29.9
- 29.9 < Q ≤ 48.1
- Q > 48.1

Q as percentile

- Q ≤ 10th
- 10th < Q ≤ 25th
- 25th < Q ≤ 75th
- 75th < Q ≤ 90th
- Q > 90th

Daily Discharge Distributions for July–August by Year — CWS-DH



Clean Water Services Tributary Flow Augmentation

Summary

- Since 2011, Clean Water Services has partnered with TVID to use the TVID pipeline to deliver flow augmentation water to selected tributaries that have conveniently located TVID release points. (A pilot program started at McKay Creek in 2005.)
- Typical rates of tributary flow augmentation range from 0.5 cfs to 2 cfs.
- Tributary flow augmentation usually begins sometime in July and ends sometime in October.

2021 RELEASES FOR TRIBUTARY FLOW AUGMENTATION

Site Name	River Mile	Start Date	End Date	Average Flow (cfs)	Average Daily Release (ac-ft)	Total Release (ac-ft)
McKay Creek	7.0	7/12/2021	10/20/2021	2.10	4.16	419
East Fork Dairy Creek	4.9	7/12/2021	10/20/2021	0.68	1.35	136
West Fork Dairy Creek	5.2	7/13/2021	10/20/2021	0.82	1.63	163
Gales Creek	5.0	7/12/2021	10/20/2021	1.14	2.25	227

HISTORY OF TRIBUTARY FLOW RESTORATION

Year	Dates	McKay Creek #1 (RM 7.0)		EF Dairy Creek #2 (RM 4.9)		WF Dairy Creek #3 (RM 5.2)		Gales Creek #4 (RM 5.0)	
		Mean cfs	Total ac-ft	Mean cfs	Total ac-ft	Mean cfs	Total ac-ft	Mean cfs	Total ac-ft
2011	7/11 – 9/30	0.4	67	0.6	96	0.4	72	1.5	240
2012	7/20 – 10/16	2.2	388	0.7	118	0.8	146	na	177
2013	7/9 – 9/1	3.0	444	0.9	125	0.8	118	2.0	287
2014	7/11 – 10/21	1.6	319	1.0	205	0.7	151	1.9	384
2015	6/30 – 10/30	2.1	512	1.6	395	0.7	158	1.3	315
2016	7/16 – 10/13	2.0	348	1.5	274	0.7	122	1.7	303
2017	7/7 – 10/18	1.0	202	0.5	95	1.0	193	0.5	104
2018	7/18 – 10/29	1.7	355	0.8	167	0.9	188	1.7	342
2019	7/23 – 10/14	2.2	361	0.7	113	0.8	132	1.8	300
2020	7/9 – 10/22	1.7	356	0.9	193	0.9	190	1.7	353
2021	7/12 – 10/20	2.1	419	0.7	136	0.8	163	1.1	227

Releases at sites that have been discontinued:
McKay Creek (RM (6.5): 2011 (118 ac-ft) 2012 (140 ac-ft)
WF Dairy Creek (RM7.5): 2011 (106 ac-ft) 2012 (175 ac-ft)
Blackjack Creek: 2013 (144 ac-ft) 2014 (168 ac-ft) 2015 (234 ac-ft)

APPENDIX C
SCOGGINS DAM OPERATIONS — MONTHLY REPORTS

2021 SUMMARY

- Maximum Hagg Lake storage: 53,200 ac-ft on May 4 (99.8%)
- First day of allocated releases: May 4
- Last day of allocated releases: December 14
- Days with allocated releases: 191
- Maximum daily allocated release: 236 cfs on August 12
- Minimum Hagg Lake storage: 12,967 ac-ft on October 22 (24.3% of full pool)

RELEASE SEASON — 2021

Details of releases for each month follow in this appendix.

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	RELEASE SEASON
Number of days of with allocated releases											
TVID	0	0	18	30	31	31	30	20	0	0	160
CWS	0	0	10	30	31	31	30	22	0	0	154
LO	0	0	0	0	19	31	30	4	0	0	84
JWC	0	0	24	29	31	31	29	24	0	0	168
Other	0	14	18	30	31	31	30	18	13	3	174
TOTAL	**0**	**0**	**28**	**30**	**31**	**31**	**30**	**25**	**13**	**3**	**191**
Allocation releases in acre-feet											
TVID	0	0	2,154	4,487	5,250	5667	2,908	426	0	0	20,892
CWS	0	0	198	912	2,704	2,945	2,364	1,260	0	0	10,384
LO	0	0	0	0	113	184	179	24	0	0	500
JWC	0	0	887	1,634	2,577	2,104	1,980	865	0	0	10,046
Other	0	0	36	133	196	268	137	63	694	198	1726
TOTAL	**0**	**0**	**3,275**	**7,166**	**108,40**	**11,169**	**7,567**	**2,638**	**694**	**198**	**43,547**

Abbreviations: TVID=Tualatin Valley Irrigation District; CWS=Clean Water Services; LO=Lake Oswego Corporation; JWC=Joint Water Commission

SCOGGINS DAM RESERVOIR OPERATIONS — JANUARY 2021

[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]	TOTAL INFLOW (cfs) [4]	W.S. ELEV (ft) [5]	STORAGE CONTENT (ac-ft) [6]	CHANGE STORAGE (ac-ft) [7]	RELEASE (cfs) [8]	COMP INFLOW (cfs) [9]	GASO (cfs) [10]	DLLO (cfs) [11]	GOLF (cfs) [12]	ROOD (cfs) [13]	FRMO (cfs) [14]	WSLO (cfs) [15]	PREC (in) [16]	MAX TEMP (°F) [17]	MIN TEMP (°F) [18]	TVID (cfs) [19]	CWS (cfs) [20]	LO (cfs) [21]	JWC (cfs) [22]	OTHER (cfs) [23]
1	70	141	12	223	282.97	32503	-164	-83	335	252	377	983	1400	2310	2680	2920	0.07	51	46	0	0	0	0	0
2	104	184	20	308	282.86	32402	-101	-51	335	284	451	995	1520	2370	2730	2980	0.40	49	46	0	0	0	0	0
3	249	759	58	1066	284.50	33913	1511	762	129	891	>700	1318	1990	2890	3430	4460	2.02	49	38	0	0	0	0	0
4	263	539	43	845	286.17	35479	1566	790	24	814	>700	1674	2790	3400	3970	4710	0.92	50	38	0	0	0	0	0
5	194	397	35	626	287.57	36811	1332	672	22	694	>700	1580	2880	3870	4450	5120	0.25	52	42	0	0	0	0	0
6	164	342	32	538	288.63	37832	1021	515	22	537	661	1297	2730	4280	4880	5350	0.37	46	42	0	0	0	0	0
7	126	242	26	394	289.43	38610	778	392	75	467	606	1276	2590	4610	5310	5980	0.20	47	42	0	0	0	0	0
8	124	237	26	387	289.73	38903	293	148	292	440	568	1255	2460	4600	5460	6230	0.35	48	41	0	0	0	0	0
9	90	172	18	280	289.38	38561	-342	-172	541	369	494	1337	2340	4470	5390	6250	0.01	51	32	0	0	0	0	0
10	76	154	14	244	288.81	38006	-555	-280	571	291	447	1304	2270	4290	5180	6160	0.15	46	34	0	0	0	0	0
11	63	134	12	209	287.94	37166	-840	-424	644	220	363	1276	2180	4080	4910	5790	0.03	46	40	0	0	0	0	0
12	396	847	64	1307	288.75	37948	782	394	216	610	>700	1208	2230	4010	4810	6270	2.18	53	44	0	0	0	0	0
13	711	1030	80	1821	292.04	41188	3240	1634	52	1686	>700	4102	3020	4710	5570	8500	1.70	58	43	0	0	0	0	0
14	*304	608	45	957	293.95	43118	1930	973	50	1023	>700	2315	3320	6960	8670	7390	0.00	54	38	0	0	0	0	0
15	*187	374	33	594	294.92	44112	994	501	152	653	627	1572	2950	7470	11300	8020	0.01	55	38	0	0	0	0	0
16	*121	242	26	389	294.71	43896	-216	-109	606	497	559	1534	2680	6060	10100	8880	0.01	53	44	0	0	0	0	0
17	*93	186	20	299	293.96	43128	-768	-387	715	328	475	1485	2530	5320	8340	8830	0.03	48	44	0	0	0	0	0
18	*76	151	13	240	292.77	41922	-1206	-608	803	195	393	1425	2410	4860	6590	8070	0.00	48	33	0	0	0	0	0
19	*64	127	11	202	291.39	40540	-1382	-697	830	133	319	1368	2290	4500	5640	7290	0.00	53	32	0	0	0	0	0
20	*56	112	10	178	290.06	39226	-1314	-662	766	104	275	1303	2160	4210	5140	6510	0.00	52	30	0	0	0	0	0
21	*52	103	9	164	288.78	37977	-1249	-630	702	72	249	1248	2000	3900	4680	5820	0.10	47	31	0	0	0	0	0
22	*45	89	8	142	287.60	36840	-1137	-573	634	61	221	1183	1820	3560	4220	5120	0.00	47	39	0	0	0	0	0
23	*41	81	7	129	287.12	36381	-459	-231	281	50	197	914	1620	3220	3770	4490	0.00	50	29	0	0	0	0	0
24	*39	77	6	122	286.79	36066	-315	-159	281	122	180	800	1240	2860	3310	3880	0.08	46	30	0	0	0	0	0
25	*36	72	6	114	286.49	35782	-284	-143	281	138	179	768	1060	2560	2960	3460	0.33	37	33	0	0	0	0	0
26	*34	67	5	106	286.41	35706	-76	-38	121	83	165	559	892	2150	2520	2940	0.00	41	34	0	0	0	0	0
27	*34	67	5	106	286.48	35772	66	33	122	155	169	541	816	1880	2200	2610	0.94	38	33	0	0	0	0	0
28	*36	72	5	113	286.58	35868	96	48	52	100	190	469	786	1940	2240	2480	0.09	38	33	0	0	0	0	0
29	*35	70	5	110	286.75	36028	160	81	52	133	194	465	765	1820	2130	2400	0.00	45	31	0	0	0	0	0
30	*43	85	7	135	286.92	36190	162	82	52	134	205	379	740	1700	2000	2290	0.21	43	32	0	0	0	0	0
31	*86	172	18	276	287.28	36533	343	173	53	226	313	462	875	1700	1970	2220	0.48	49	42	0	0	0	0	0
TOTALS																	10.93 inches							
cfs	4012	7933	679	12624	—	—	1949	9811	11760	13077	38395	61354	116560	146550	163420	MAX	54	49	0	0	0	0	0	
ac-ft	7958	15735	1347	25040	—	—	3866	19460	23326	25938	76156	121696	231197	290682	324144	MIN	39	30	0	0	0	0	0	

Reservoir Storage Status on Jan-31

Comparison to fill curve: 0.37 ft
349 ac-ft
Percent of full reservoir: 68.5%

Minimum Required Discharges

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

SNOWTEL Summary for WY 2021 on Jan-31

	SECO	SDMO
precip to date:	42.8"	59.50"
snow depth:	1"	7"
water content:	0.9"	2.7"

The allocations (used & remaining) shown in this table are provisional.

Reservoir Delivery Status on Jan-31

	ALLOCATION (ac-ft) USED	REMAINING
TVID	0	
CWS	0	12,615
LO	0	500
JWC	0	13,500
Other	0	

*SCHO (Sain Creek above Hagg Lake) not operating; SCHO calculated as 50% of SCLO (Scoggins Creek above Hagg Lake)

SCOGGINS DAM RESERVOIR OPERATIONS — FEBRUARY 2021

[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	TOTAL INFLOW	W.S. ELEV	STORAGE CONTENT	CHANGE STORAGE	RELEASE	COMP INFLOW	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PREC	MAX TEMP	MIN TEMP	TVID	CWS	LO	JWC	OTHER
	(cfs) [1]	(cfs) [2]	(cfs) [3]	(cfs) [4]	(ft) [5]	(ac-ft) [6]	(ac-ft) [7]	(cfs) [8]	(cfs) [9]	(cfs) [10]	(cfs) [11]	(cfs) [12]	(cfs) [13]	(cfs) [14]	(cfs) [15]	(cfs) [16]	(in) [17]	(°F) [18]	(°F) [19]	(cfs) [20]	(cfs) [21]	(cfs) [22]	(cfs) [23]	(cfs) [24]
1	126	252	26	404	287.98	37205	672	339	53	392	542	626	1180	1950	2210	2400	0.73	53	47	0	0	0	0	0
2	161	321	31	513	288.87	38065	860	434	54	488	598	811	1580	2510	2860	3310	0.71	49	43	0	0	0	0	0
3	179	358	32	569	289.86	39030	965	487	55	542	627	890	1960	2840	3310	4270	0.97	48	35	0	0	0	0	0
4	126	252	26	404	290.61	39767	737	372	54	426	544	881	2190	3060	3550	na	0.00	43	35	0	0	0	0	0
5	102	204	22	328	290.97	40123	356	179	201	380	475	854	2160	3110	3570	4160	0.02	45	38	0	0	0	0	0
6	89	178	19	286	291.18	40332	209	105	200	305	446	814	1930	3190	3630	4100	0.00	54	33	0	0	0	0	0
7	78	156	14	248	291.36	40510	178	90	200	290	399	766	1730	3180	3620	4080	0.06	48	36	0	0	0	0	0
8	71	141	12	224	291.41	40560	50	25	200	225	344	719	1530	3100	3540	3970	0.00	47	33	0	0	0	0	0
9	63	125	11	199	291.46	40610	50	25	200	225	292	665	1340	2950	3370	3780	0.00	45	29	0	0	0	0	0
10	55	110	9	174	291.69	40839	229	115	65	180	259	504	1140	2760	3150	3520	0.00	47	31	0	0	0	0	0
11	51	101	9	161	292.00	41148	309	156	20	176	238	405	891	2500	2880	3250	0.06	46	32	0	0	0	0	0
12	39	77	6	122	292.29	41439	291	147	20	167	226	366	761	2150	2510	2880	0.25	37	27	0	0	0	0	0
13	38	75	6	119	292.69	41841	402	203	170	373	230	348	690	1800	2130	2570	0.49	28	24	0	0	0	0	0
14	34	67	5	106	292.60	41750	-91	-46	219	173	220	507	700	1570	1860	2200	0.78	33	25	0	0	0	0	0
15	53	105	9	167	292.55	41700	-50	-25	219	194	272	563	788	1750	2000	2450	0.55	34	29	0	0	0	0	0
16	88	175	18	281	293.02	42174	474	239	67	306	593	696	1160	2490	2840	3660	0.18	49	33	0	0	0	0	0
17	77	154	14	245	293.56	42721	547	276	20	296	520	745	1370	2690	3120	3900	0.01	48	31	0	0	0	0	0
18	66	132	12	210	293.96	43128	407	205	53	258	442	703	1450	2640	3050	3730	0.00	48	33	0	0	0	0	0
19	84	167	16	267	294.45	43629	501	253	53	306	501	686	1460	2700	3110	3850	0.49	40	36	0	0	0	0	0
20	77	154	14	245	294.85	44040	411	207	102	309	485	722	1480	2700	3120	3780	0.06	49	33	0	0	0	0	0
21	80	159	15	254	295.24	44442	402	203	101	304	452	689	1480	2650	3040	3620	0.09	49	35	0	0	0	0	0
22	96	192	21	309	295.74	44960	518	261	60	321	537	680	1460	2590	2970	3480	0.08	54	43	0	0	0	0	0
23	136	272	28	436	296.60	45857	897	452	27	479	626	779	1550	2610	2960	3470	0.33	51	34	0	0	0	0	0
24	104	208	22	334	297.32	46613	756	381	21	402	555	789	1700	2620	2970	3400	0.10	48	32	0	0	0	0	0
25	85	169	16	270	297.59	46898	285	144	187	331	483	803	1690	2630	2980	3370	0.08	47	32	0	0	0	0	0
26	99	198	21	318	297.81	47131	233	117	221	338	522	789	1640	2660	2990	3390	0.59	48	38	0	0	0	0	0
27	91	181	20	292	298.14	47481	350	176	181	357	534	800	1650	2700	3060	3450	0.17	47	33	0	0	0	0	0
28	76	151	13	240	298.36	47715	234	118	181	299	463	773	1620	2660	3010	3400	0.00	49	36	0	0	0	0	0
TOTALS																	6.80 inches							
cfs	2424	4834	467	7725	—	—	5638	3204	8842		12425	19373	40280	72760	83410	93440	**MAX:**	54	47	0	0	0	0	0
ac-ft	4808	9588	926	15323	—	—	11182	6355	17537		24645	38426	79895	144319	165444	185338	**MIN:**	28	24	0	0	0	0	0

Reservoir Storage Status on Feb-28		
Comparison to fill curve:	0.16	ft
	165.8	ac-ft
Percent of full reservoir:	89.5%	

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

SNOWTEL Summary for WY 2021 on Feb-28	SECO	SDMO
precip to date:	51.9"	76.1"
snow depth:	0	16"
water content:	0	6.9

The allocations (used & remaining) shown in this table are provisional.

Reservoir Delivery Status on Feb-28		
	ALLOCATION (ac-ft)	
	USED	REMAINING
TVID	0	
CWS	0	12,615
LO	0	500
JWC	0	13,500
Other	0	

SCOGGINS DAM RESERVOIR OPERATIONS — MARCH 2021

[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	TOTAL INFLOW	W.S. ELEV	STORAGE CONTENT	CHANGE STORAGE	RELEASE	COMP INFLOW	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PREC	MAX TEMP	MIN TEMP	TVID	CWS	LO	JWC	OTHER
	(cfs) [1]	(cfs) [2]	(cfs) [3]	(cfs) [4]	(ft) [5]	(ac-ft) [6]	(ac-ft) [7]	(cfs) [8]	(cfs) [9]	(cfs) [10]	(cfs) [11]	(cfs) [12]	(cfs) [13]	(cfs) [14]	(cfs) [15]	(cfs) [16]	(in) [17]	(°F) [18]	(°F) [19]	(cfs) [20]	(cfs) [21]	(cfs) [22]	(cfs) [23]	(cfs) [24]
1	*66	132	12	210	298.51	47875	160	81	181	262	389	724	1520	2610	2960	3320	0.00	53	36	0	0	0	0	0
2	*57	114	10	181	298.63	48003	128	65	181	246	325	673	1370	2530	2880	3200	0.00	59	36	0	0	0	0	0
3	*52	103	9	164	298.75	48131	128	65	136	201	286	602	1200	2400	2740	3070	0.00	54	32	0	0	0	0	0
4	*46	91	8	145	298.87	48259	128	65	119	184	261	557	1040	2200	2540	2850	0.00	57	34	0	0	0	0	0
5	*43	85	7	135	298.96	48356	97	49	120	169	245	523	930	1930	2250	2560	0.19	48	39	0	0	0	0	0
6	*43	85	7	135	299.07	48473	117	59	120	179	249	511	867	1730	2020	2310	0.16	47	40	0	0	0	0	0
7	*44	87	7	138	299.15	48559	86	43	120	163	240	491	814	1560	1830	2050	0.40	49	37	0	0	0	0	0
8	*41	81	7	129	299.23	48645	86	43	120	163	232	476	792	1470	1730	1910	0.05	50	33	0	0	0	0	0
9	*40	79	6	125	299.36	48785	140	71	81	152	221	411	733	1370	1630	1770	0.12	51	36	0	0	0	0	0
10	*36	72	5	113	299.47	48903	118	59	81	140	207	385	678	1270	1520	1650	0.03	53	38	0	0	0	0	0
11	*33	65	5	103	299.55	48989	86	43	82	125	215	359	631	1160	1420	1530	0.00	55	30	0	0	0	0	0
12	*31	62	5	98	299.63	49075	86	43	81	124	204	333	589	1070	1320	1410	0.00	60	32	0	0	0	0	0
13	*29	58	4	91	299.75	49205	130	66	41	107	193	272	525	969	1210	1310	0.00	61	31	0	0	0	0	0
14	*28	55	4	87	299.88	49345	140	71	41	112	184	255	487	873	1100	1210	0.00	60	38	0	0	0	0	0
15	*26	52	4	82	299.99	49464	119	60	42	102	180	248	469	869	1080	1180	0.14	50	28	0	0	0	0	0
16	*25	49	4	78	300.07	49550	86	43	41	84	174	226	435	817	1040	1140	0.06	45	27	0	0	0	0	0
17	*24	47	4	75	300.19	49680	130	66	41	107	167	221	420	743	946	1060	0.00	55	28	0	0	0	0	0
18	*23	45	3	71	300.25	49745	65	33	41	74	160	212	414	701	893	1000	0.04	58	31	0	0	0	0	0
19	*24	48	4	76	300.38	49886	141	71	41	112	164	219	434	725	907	1010	0.25	49	38	0	0	0	0	0
20	34	67	5	106	300.46	49973	87	44	82	126	199	271	455	718	912	1010	0.25	51	42	0	0	0	0	0
21	*31	62	5	98	300.55	50071	98	49	82	131	213	302	544	813	984	1030	0.03	52	38	0	0	0	0	0
22	*35	70	5	110	300.62	50147	76	38	81	119	223	294	512	828	1030	1100	0.18	49	38	0	0	0	0	0
23	*32	64	5	101	300.73	50267	120	61	59	120	227	310	541	857	1060	1120	0.00	50	29	0	0	0	0	0
24	*31	61	5	97	300.82	50365	98	49	60	109	208	289	509	817	1030	1120	0.01	57	33	0	0	0	0	0
25	*31	61	5	97	300.92	50474	109	55	60	115	213	296	517	828	1020	1150	0.09	52	36	0	0	0	0	0
26	*28	55	4	87	301.00	50561	87	44	60	104	197	277	492	817	1020	1140	0.00	52	31	0	0	0	0	0
27	*26	52	4	82	301.07	50638	77	39	60	99	185	258	465	749	948	1090	0.00	57	34	0	0	0	0	0
28	*26	51	4	81	301.14	50714	76	38	60	98	175	245	442	687	875	1020	0.00	64	37	0	0	0	0	0
29	*25	50	4	79	301.22	50802	88	44	60	104	194	271	471	672	853	987	0.34	50	32	0	0	0	0	0
30	*26	51	4	81	301.32	50911	109	55	40	95	181	218	421	703	882	981	0.01	50	28	0	0	0	0	0
31	*24	48	4	76	301.43	51032	121	61	31	92	173	204	393	635	814	962	0.00	52	29	0	0	0	0	0
TOTALS																	2.35 inches							
cfs	1060	2102	169	3331	—	—	1672	2445	4117	6684	10933	20110	36121	43444	48250		**MAX:**	64	42	0	0	0	0	0
ac-ft	2103	4169	335	6607	—	—	3317	4850	8167	13258	21686	39888	71646	86171	95704		**MIN:**	45	27	0	0	0	0	0

Reservoir Storage Status on Mar-31	
Comparison to fill curve:	-0.20 ft
	-215.7 ac-ft
Percent of full reservoir:	95.7%

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

SNOWTEL Summary for WY 2021 on Mar-31	SECO	SDMO
precip to date:	56.0″	82.1″
snow depth:	0″	5″
water content:	0″	4.1″

The allocations (used & remaining) shown in this table are provisional.

Reservoir Delivery Status on Mar-31	ALLOCATION (ac-ft)	
	USED	REMAINING
TVID	0	
CWS	0	12,615
LO	0	500
JWC	0	13,500
Other	0	

*SCHO (Sain Creek above Hagg Lake) not operating; SCHO calculated as 50% of SCLO (Scoggins Creek above Hagg Lake)

SCOGGINS DAM RESERVOIR OPERATIONS — APRIL 2021

[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	TOTAL INFLOW	W.S. ELEV	STORAGE CONTENT	CHANGE STORAGE	RELEASE	COMP INFLOW	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PREC	MAX TEMP	MIN TEMP	TVID	CWS	LO	JWC	OTHER
	(cfs) [1]	(cfs) [2]	(cfs) [3]	(cfs) [4]	(ft) [5]	(ac-ft) [6]	(ac-ft) [7]	(cfs) [8]	(cfs) [9]	(cfs) [10]	(cfs) [11]	(cfs) [12]	(cfs) [13]	(cfs) [14]	(cfs) [15]	(cfs) [16]	(in) [17]	(°F) [18]	(°F) [19]	(cfs) [20]	(cfs) [21]	(cfs) [22]	(cfs) [23]	(cfs) [24]
1	23	45	3	71	301.56	51174	142	72	21	93	164	183	366	586	759	893	0.00	68	33	0	0	0	0	0
2	22	44	3	69	301.67	51295	121	61	21	82	156	157	337	554	715	845	0.00	67	32	0	0	0	0	0
3	21	42	3	66	301.78	51416	121	61	21	82	150	146	302	516	672	799	0.00	64	35	0	0	0	0	0
4	20	39	3	62	301.88	51526	110	55	21	76	144	135	283	476	622	759	0.00	68	38	0	0	0	0	0
5	19	37	3	59	301.95	51603	77	39	22	61	139	126	265	450	586	716	0.00	57	30	0	0	0	0	0
6	18	35	3	56	302.02	51680	77	39	21	60	135	131	218	430	556	689	0.00	60	30	0	0	0	0	0
7	17	34	3	54	302.12	51790	110	55	21	76	130	123	213	420	543	662	0.00	65	34	0	0	0	0	0
8	19	38	3	60	302.20	51879	89	45	21	66	136	118	202	409	535	651	0.10	53	38	0	0	0	0	0
9	17	33	3	53	302.27	51956	77	39	21	60	127	113	195	408	525	636	0.01	54	30	0	0	0	0	0
10	19	37	3	59	302.37	52067	111	56	21	77	126	107	188	375	498	620	0.00	56	33	0	0	0	0	0
11	16	31	3	50	302.42	52122	55	28	21	49	126	109	195	379	493	595	0.01	50	27	0	0	0	0	0
12	15	30	3	48	302.49	52199	77	39	21	60	121	103	157	349	472	589	0.00	58	30	0	0	0	0	0
13	15	29	3	47	302.55	52266	67	34	21	55	117	96	166	321	430	552	0.00	64	35	0	0	0	0	0
14	14	28	3	45	302.61	52332	66	33	21	54	113	92	163	317	430	522	0.00	65	34	0	0	0	0	0
15	14	27	3	44	302.67	52399	67	34	21	55	110	88	164	280	380	502	0.00	68	37	0	0	0	0	0
16	13	26	3	42	302.76	52465	66	33	21	54	105	86	155	276	373	473	0.00	74	39	0	0	0	0	0
17	13	25	3	41	302.78	52521	56	28	21	49	102	82	146	260	355	459	0.00	78	42	0	0	0	0	0
18	12	24	3	39	302.83	52576	55	28	21	49	99	80	146	245	338	441	0.00	82	41	0	0	0	0	0
19	12	23	3	38	302.87	52621	45	23	20	43	95	76	140	237	327	432	0.00	81	38	0	0	0	0	0
20	12	23	3	38	302.90	52654	33	17	21	38	94	74	129	225	312	414	0.00	71	44	0	0	0	0	0
21	11	21	3	35	302.94	52699	45	23	21	44	91	68	106	212	294	393	0.00	73	41	0	0	0	0	0
22	10	20	2	32	302.97	52732	33	17	20	37	89	67	111	210	270	372	0.00	76	39	0	0	0	0	0
23	10	20	2	32	302.99	52754	22	11	20	31	88	67	113	216	274	352	0.00	63	39	0	0	0	0	0
24	11	21	2	34	303.03	52799	45	23	20	43	88	64	114	220	281	364	0.13	60	44	0	0	0	0	0
25	12	23	3	38	303.10	52876	77	39	20	59	100	77	145	258	329	405	0.27	53	43	0	0	0	0	0
26	11	21	2	34	303.15	52932	56	28	20	48	91	66	134	282	370	436	0.29	56	41	0	0	0	0	0
27	10	20	2	32	303.19	52977	45	23	20	43	89	65	104	272	359	436	0.02	56	38	0	0	0	0	0
28	10	19	2	31	303.23	53021	44	22	19	41	86	62	99	249	331	414	0.00	65	39	0	0	0	0	0
29	9	18	2	29	303.27	53066	45	23	19	42	56	57	99	219	282	388	0.00	73	45	0	0	0	0	0
30	9	17	2	28	303.31	53110	44	22	19	41	54	54	89	208	262	356	0.00	77	47	0	0	0	0	0
TOTALS																	0.83 inches							
cfs	434	850	82	1366	—	—	1048	618	1666	3321	2872	5244	9859	12973	16165	**MAX:**	82	47	0	0	0	0	0	
ac-ft	861	1686	163	2709	—	—	2078	1226	3304	6587	5697	10401	19555	25732	32063	**MIN:**	50	27	0	0	0	0	0	

Reservoir Storage Status on Apr-30

Comparison to fill curve:	-0.15 ft
	-168.6 ac-ft
Percent of full reservoir:	99.6%

Minimum Required Discharges

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

SNOWTEL Summary for WY 2021 on Apr-30

	SECO	SDMO
precip to date:	57.7″	84.0″
snow depth:	0″	0″
water content:	0″	0″

The allocations (used & remaining) shown in this table are provisional.

Reservoir Delivery Status on Apr-30

	ALLOCATION (ac-ft) USED	REMAINING
TVID	0	
CWS	0	12,615
LO	0	500
JWC	0	13,500
Other	0	

SCOGGINS DAM RESERVOIR OPERATIONS — MAY 2021

[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	TOTAL INFLOW	W.S. ELEV	STORAGE CONTENT	CHANGE STORAGE	RELEASE	COMP INFLOW	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PREC	MAX TEMP	MIN TEMP	TVID	CWS	LO	JWC	OTHER
	(cfs) [1]	(cfs) [2]	(cfs) [3]	(cfs) [4]	(ft) [5]	(ac-ft) [6]	(ac-ft) [7]	(cfs) [8]	(cfs) [9]	(cfs) [10]	(cfs) [11]	(cfs) [12]	(cfs) [13]	(cfs) [14]	(cfs) [15]	(cfs) [16]	(in) [17]	(°F) [18]	(°F) [19]	(cfs) [20]	(cfs) [21]	(cfs) [22]	(cfs) [23]	(cfs) [24]
1	9	18	2	29	303.34	53144	34	17	20	37	55	53	77	194	254	397	0.07	66	44	0	0	0	0	0
2	9	17	2	28	303.36	53166	22	11	20	31	53	51	81	195	252	356	0.00	60	46	0	0	0	0	0
3	8	16	2	26	303.38	53189	23	12	19	31	50	50	72	190	246	336	0.00	64	41	0	0	0	0	0
4	8	16	2	26	303.39	53200	11	6	36	42	50	66	80	200	250	333	0.04	61	48	0	15	0	0	0
5	8	16	2	26	303.37	53177	-23	-12	35	23	48	84	80	191	262	329	0.00	69	40	0	15	0	0	0
6	8	15	2	25	303.38	53189	12	6	35	41	45	81	76	182	252	317	0.00	80	46	0	15	0	0	0
7	8	16	2	26	303.35	53155	-34	-17	35	18	46	78	71	169	240	303	0.04	62	42	0	15	0	0	0
8	8	15	2	25	303.29	53088	-67	-34	55	21	53	101	85	155	227	289	0.00	57	36	0	5	0	29	0
9	8	15	2	25	303.25	53044	-44	-22	55	33	54	103	96	173	243	278	0.01	59	43	0	5	0	29	0
10	8	15	2	25	303.22	53010	-34	-17	55	38	55	106	102	189	258	296	0.01	61	40	0	5	0	29	0
11	7	13	2	22	303.18	52966	-44	-22	50	28	50	96	85	175	246	306	0.00	69	39	0	5	0	24	0
12	7	13	2	22	303.14	52921	-45	-23	57	34	47	100	71	168	236	292	0.00	74	43	0	5	0	31	0
13	7	13	2	22	303.04	52810	-111	-56	74	18	57	128	80	159	222	278	0.00	78	44	0	15	0	38	0
14	6	12	2	20	302.88	52632	-178	-90	120	30	57	172	115	158	223	268	0.00	77	49	66	0	0	33	1
15	6	12	2	20	302.69	52421	-211	-106	126	20	53	174	115	179	246	275	0.00	79	41	72	0	0	33	1
16	6	11	2	19	302.49	52199	-222	-112	126	14	55	173	116	180	247	292	0.00	79	45	73	0	0	33	1
17	6	11	2	19	302.30	51891	-308	-155	126	-29	55	173	123	186	254	303	0.00	82	45	73	0	0	33	1
18	7	13	2	22	302.16	51835	-56	-28	101	73	55	153	100	176	247	310	0.16	64	43	60	0	0	17	1
19	6	11	2	19	301.99	51647	-188	-95	109	14	56	160	106	167	233	292	0.01	59	37	64	0	0	25	1
20	6	12	2	20	301.83	51471	-176	-89	108	19	69	175	120	186	247	292	0.11	56	35	62	0	0	25	1
21	6	11	2	19	301.69	51317	-154	-78	92	14	67	155	115	188	269	310	0.03	60	36	62	0	0	7	1
22	6	11	2	19	301.56	51174	-143	-72	89	17	65	151	114	177	252	314	0.00	65	38	63	0	0	2	1
23	5	10	1	16	301.44	51043	-131	-66	88	22	63	150	113	171	245	299	0.00	70	44	64	0	0	2	1
24	6	11	2	19	301.32	50911	-132	-67	89	22	65	154	120	168	240	296	0.11	62	49	66	0	0	2	1
25	6	12	2	20	301.21	50791	-120	-61	104	43	72	181	137	192	258	360	0.33	61	51	64	0	0	19	1
26	5	10	1	16	301.07	50638	-153	-77	96	19	65	162	124	242	321	418	0.00	62	45	60	0	0	19	1
27	6	11	2	19	300.96	50518	-120	-61	80	19	73	151	120	217	308	414	0.09	70	47	51	0	0	9	1
28	6	12	2	20	300.88	50430	-88	-44	66	22	79	144	119	214	295	384	0.01	60	45	43	0	0	2	1
29	5	10	1	16	300.81	50354	-76	-38	66	28	73	132	104	191	271	364	0.01	67	45	47	0	0	2	1
30	5	10	1	16	300.75	50289	-65	-33	67	34	68	127	90	164	237	325	0.00	81	46	48	0	0	2	1
31	5	9	1	15	300.69	50223	-66	-33	66	33	67	124	85	144	211	292	0.00	84	49	48	0	0	2	1
TOTALS																	1.03 inches							
cfs	207	397	57	661	—	—	-1456	2265	809	1820	3908	3092	5640	7792	9918		**MAX:**	84	51	1086	100	0	447	18
ac-ft	411	787	113	1311	—	—	-2887	4493	1606	3610	7752	6133	11187	15455	19672		**MIN:**	56	35	2154	198	0	887	36

Reservoir Storage Status on May-31

Comparison to fill curve:	-2.81 ft
	-3100 ac-ft
Percent of full reservoir:	94.2%

Minimum Required Discharges

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

SNOWTEL Summary for WY 2021 on May-31

	SECO	SDMO
precip to date:	59.0″	88.9″
snow depth:	0″	0″
water content:	0″	0″

The allocations (used & remaining) shown in this table are provisional.

Reservoir Delivery Status on May-31

	ALLOCATION (ac-ft) USED	REMAINING
TVID	2,154	
CWS	198	12,417
LO	0	500
JWC	887	12,613
Other	36	

SCOGGINS DAM RESERVOIR OPERATIONS — JUNE 2021

[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	TOTAL INFLOW	W.S. ELEV	STORAGE CONTENT	CHANGE STORAGE	RELEASE	COMP INFLOW	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PREC	MAX TEMP	MIN TEMP	TVID	CWS	LO	JWC	OTHER
	(cfs) [1]	(cfs) [2]	(cfs) [3]	(cfs) [4]	(ft) [5]	(ac-ft) [6]	(ac-ft) [7]	(cfs) [8]	(cfs) [9]	(cfs) [10]	(cfs) [11]	(cfs) [12]	(cfs) [13]	(cfs) [14]	(cfs) [15]	(cfs) [16]	(in) [17]	(°F) [18]	(°F) [19]	(cfs) [20]	(cfs) [21]	(cfs) [22]	(cfs) [23]	(cfs) [24]
1	4	8	1	13	300.54	50060	-163	-82	113	31	65	167	100	128	191	268	0.00	87	54	77	10	0	12	1
2	4	8	1	13	300.35	49854	-206	-104	133	29	62	181	95	141	198	249	0.00	97	59	81	10	0	28	1
3	4	7	1	12	300.16	49648	-206	-104	133	29	61	182	89	130	192	246	0.00	89	51	82	10	0	28	1
4	4	7	1	12	299.95	49421	-227	-114	133	19	61	181	89	128	185	242	0.00	82	45	82	10	0	28	1
5	4	7	1	12	299.77	49226	-195	-98	118	20	60	169	87	122	180	230	0.00	75	50	75	10	0	20	1
6	4	8	1	13	299.56	49000	-226	-114	118	4	64	173	93	121	175	230	0.00	61	42	74	10	0	20	1
7	5	9	1	15	299.39	48817	-183	-92	118	26	68	175	100	137	192	233	0.07	62	47	72	10	0	20	1
8	4	8	1	13	299.22	48634	-183	-92	119	27	65	172	102	138	199	252	0.00	63	47	75	10	0	20	1
9	4	7	1	12	299.03	48431	-203	-102	114	12	63	167	94	140	205	258	0.00	63	42	76	10	0	15	1
10	4	8	1	13	298.87	48259	-172	-87	114	27	63	167	96	124	197	252	0.01	64	40	75	10	0	15	1
11	4	8	1	13	298.71	48088	-171	-86	119	33	64	174	96	122	196	249	0.11	64	49	74	10	0	20	2
12	5	10	1	16	298.60	47971	-117	-59	93	34	70	159	115	147	208	255	0.13	62	46	60	10	0	5	2
13	14	27	3	44	298.57	47939	-32	-16	93	77	88	169	129	198	262	372	0.78	74	54	32	10	0	5	2
14	11	20	2	33	298.55	47917	-22	-11	93	82	107	214	243	475	557	636	0.66	65	57	43	10	0	5	2
15	7	13	2	22	298.54	47907	-10	-5	50	45	77	126	132	427	568	737	0.06	71	47	20	10	0	0	2
16	6	11	2	19	298.43	47789	-118	-59	90	31	69	154	121	260	393	620	0.01	66	43	31	10	0	28	2
17	5	9	1	15	298.30	47651	-138	-70	103	33	63	159	109	191	293	464	0.00	77	46	43	10	0	33	2
18	4	8	1	13	298.18	47523	-128	-65	95	30	60	147	99	164	245	356	0.00	82	47	51	10	0	19	2
19	4	8	1	13	297.99	47322	-201	-101	122	21	57	169	96	138	213	296	0.00	77	45	62	15	0	32	2
20	4	7	1	12	297.82	47141	-181	-91	122	31	55	167	94	131	199	258	0.00	82	55	62	15	0	32	3
21	4	7	1	12	297.63	46940	-201	-101	142	41	53	182	96	125	192	242	0.00	91	58	80	15	0	32	3
22	3	6	1	10	297.39	46687	-253	-128	157	29	50	195	92	117	187	227	0.00	95	57	80	20	0	42	3
23	3	6	1	10	297.12	46402	-285	-144	162	18	50	202	101	114	176	224	0.00	85	53	85	20	0	42	3
24	3	6	1	10	296.88	46150	-252	-127	158	31	50	197	90	113	179	218	0.00	84	52	86	20	0	37	3
25	3	6	1	10	296.62	45878	-272	-137	162	25	49	200	92	118	182	218	0.00	90	58	86	25	0	37	4
26	3	6	1	10	296.26	45501	-377	-190	209	19	47	259	120	113	176	213	0.00	94	62	120	30	0	45	4
27	3	5	1	9	295.92	45147	-354	-178	209	31	45	258	116	122	190	210	0.00	102	66	121	30	0	45	4
28	3	5	1	9	295.56	44773	-374	-189	208	19	44	256	115	120	189	218	0.00	108	73	120	30	0	45	4
29	3	5	1	9	295.16	44360	-413	-208	219	11	42	265	111	115	184	213	0.00	112	61	119	30	0	57	4
30	3	5	1	9	294.76	43948	-412	-208	218	10	43	265	131	122	184	207	0.00	90	58	118	30	0	57	4
TOTALS																	1.83 inches							
cfs	136	255	35	426	—	—	-3164	4037	873	1815	5651	3243	4741	6887	8893	**MAX:**	112	73	2262	460	0	824	67
ac-ft	270	506	69	845	—	—	-6275	8007	1732	3600	11209	6432	9404	13660	17639	**MIN:**	61	40	4487	912	0	1634	133

Reservoir Storage Status on Jun-30

Comparison to fill curve:	-8.74 ft
	-9375 ac-ft
Percent of full reservoir:	82.4%

Minimum Required Discharges

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

SNOWTEL Summary for WY 2021 on Jun-30

	SECO	SDMO
precip to date:	61.3"	89.6"
snow depth:	0"	0"
water content:	0"	0"

The allocations (used & remaining) shown in this table are provisional.

Reservoir Delivery Status on Jun-30

	ALLOCATION (ac-ft) USED	REMAINING
TVID	6,641	
CWS	1,111	11,504
LO	0	500
JWC	2,521	10,979
Other	169	

SCOGGINS DAM RESERVOIR OPERATIONS — JULY 2021

[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]	TOTAL INFLOW (cfs) [4]	W.S. ELEV (ft) [5]	STORAGE CONTENT (ac-ft) [6]	CHANGE STORAGE (ac-ft) [7]	RELEASE (cfs) [8]	COMP INFLOW (cfs) [9]	GASO (cfs) [10]	DLLO (cfs) [11]	GOLF (cfs) [12]	ROOD (cfs) [13]	FRMO (cfs) [14]	WSLO (cfs) [15]	PREC (in) [16]	MAX TEMP (°F) [17]	MIN TEMP (°F) [18]	TVID (cfs) [19]	CWS (cfs) [20]	LO (cfs) [21]	JWC (cfs) [22]	OTHER (cfs) [23]
1	3	6	1	10	294.40	43578	-370	-187	184	-3	46	225	101	125	192	213	0.00	72	62	92	30	0	47	4
2	3	6	1	10	294.10	43271	-307	-155	170	15	45	208	102	117	179	218	0.00	75	56	80	35	0	47	3
3	3	5	1	9	293.81	42975	-296	-149	170	21	44	206	92	113	177	213	0.00	84	54	76	35	0	47	3
4	3	5	1	9	293.52	42680	-295	-149	170	21	43	205	94	100	168	207	0.00	87	52	77	35	0	47	2
5	3	5	1	9	293.22	42376	-304	-153	170	17	42	202	99	109	168	204	0.00	86	48	77	35	0	47	2
6	2	4	1	7	292.92	42073	-303	-153	169	16	42	200	99	99	165	201	0.00	85	49	78	35	0	47	2
7	2	4	1	7	292.62	41770	-303	-153	171	18	41	197	96	92	159	199	0.00	90	57	88	35	0	39	2
8	3	5	1	9	292.31	41459	-311	-157	163	6	42	198	91	100	159	190	0.00	77	51	78	40	0	34	2
9	3	5	1	9	292.00	41148	-311	-157	166	9	42	201	100	99	161	188	0.00	78	50	78	43	0	34	2
10	2	4	1	7	291.68	40829	-319	-161	178	17	43	218	104	94	164	188	0.00	88	55	83	45	0	41	2
11	2	4	1	7	291.34	40490	-339	-171	180	9	42	217	105	92	166	190	0.00	86	50	85	45	0	41	2
12	2	4	1	7	291.00	40153	-337	-170	178	8	41	215	110	105	171	196	0.00	86	51	85	45	0	41	2
13	2	4	1	7	290.63	39787	-366	-185	194	9	41	231	102	93	166	196	0.00	86	51	88	45	3	49	2
14	2	4	1	7	290.26	39423	-364	-184	193	9	48	232	102	93	161	196	0.00	88	50	87	45	3	49	2
15	2	4	1	7	289.89	39059	-364	-184	184	0	48	219	100	93	163	190	0.00	82	50	78	45	3	49	2
16	2	4	1	7	289.55	38727	-332	-167	175	8	46	207	97	89	146	188	0.00	79	48	80	45	3	38	3
17	2	4	1	7	289.19	38376	-351	-177	187	10	46	220	98	92	154	185	0.00	77	54	82	45	3	47	3
18	2	4	1	7	288.84	38036	-340	-171	188	17	46	220	104	93	151	190	0.00	80	49	83	45	3	47	3
19	2	4	1	7	288.48	37687	-349	-176	187	11	45	218	106	105	161	196	0.00	85	51	82	45	3	47	3
20	2	4	1	7	288.12	37339	-348	-175	178	3	45	203	88	96	158	207	0.00	87	52	78	45	3	42	3
21	2	4	1	7	287.74	36974	-365	-184	184	0	45	215	110	86	141	196	0.00	77	46	84	45	3	42	3
22	2	4	1	7	287.40	36639	-335	-169	182	13	53	218	96	92	151	190	0.00	73	na	82	50	3	37	3
23	2	4	1	7	287.03	36295	-344	-173	187	14	53	221	98	92	147	196	0.00	80	48	86	50	3	37	4
24	2	4	1	7	286.68	35962	-333	-168	182	14	52	217	94	85	145	190	0.00	84	56	86	50	3	32	5
25	2	3	1	6	286.34	35639	-323	-163	182	19	52	219	96	91	148	188	0.00	89	54	86	50	3	32	5
26	2	3	1	6	285.97	35290	-349	-176	182	6	51	218	94	94	148	190	0.00	88	52	86	50	3	32	5
27	2	3	1	6	285.59	34932	-358	-180	192	12	51	227	96	88	145	190	0.00	89	54	91	50	3	37	5
28	2	3	1	6	285.18	34548	-384	-194	205	11	51	242	97	90	143	185	0.00	88	53	96	50	3	45	5
29	2	3	1	6	284.77	34165	-383	-193	208	15	63	262	115	92	143	185	0.00	93	57	99	50	3	45	5
30	2	3	1	6	284.36	33783	-382	-193	208	15	63	261	103	93	150	188	0.00	95	59	104	50	3	40	5
31	2	3	1	6	283.95	33404	-379	-191	216	25	62	270	111	91	149	193	0.00	99	70	112	50	3	40	5
TOTALS																	0.00 inches							
cfs	69	126	31	226	—	—	-5316	5683	367	1474	6812	3100	2993	4899	6046	MAX:	99	70	2647	1363	57	1299	99
ac-ft	137	250	61	448	—	—	-10544	11272	728	2924	13512	6149	5937	9717	11992	MIN:	72	46	5250	2704	113	2577	196

Reservoir Storage Status on Jul-31

Comparison to fill curve: -19.55 ft
-19,919 ac-ft
Percent of full reservoir: 62.6%

Minimum Required Discharges

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

SNOWTEL Summary for WY 2021 on Jul-31

	SECO	SDMO
precip to date:	61.4″	89.9″
snow depth:	0″	0″
water content:	0″	0″

The allocations (used & remaining) shown in this table are provisional.

Reservoir Delivery Status on Jul-31

	ALLOCATION (ac-ft) USED	REMAINING
TVID	11,891	
CWS	3,814	8,801
LO	113	387
JWC	5,098	8,402
Other	365	

SCOGGINS DAM RESERVOIR OPERATIONS — AUGUST 2021

[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	TOTAL INFLOW	W.S. ELEV	STORAGE CONTENT	CHANGE STORAGE	RELEASE	COMP INFLOW	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PREC	MAX TEMP	MIN TEMP	TVID	CWS	LO	JWC	OTHER
	(cfs) [1]	(cfs) [2]	(cfs) [3]	(cfs) [4]	(ft) [5]	(ac-ft) [6]	(ac-ft) [7]	(cfs) [8]	(cfs) [9]	(cfs) [10]	(cfs) [11]	(cfs) [12]	(cfs) [13]	(cfs) [14]	(cfs) [15]	(cfs) [16]	(in) [17]	(°F) [18]	(°F) [19]	(cfs) [20]	(cfs) [21]	(cfs) [22]	(cfs) [23]	(cfs) [24]
1	2	3	1	6	283.48	32970	-434	-219	215	-4	65	272	134	109	161	193	0.00	84	58	111	50	3	40	5
2	2	3	1	6	283.03	32557	-413	-208	215	7	64	269	138	124	179	213	0.00	89	56	111	50	3	40	5
3	2	3	1	6	282.62	32183	-374	-189	205	16	65	259	119	112	173	230	0.00	95	59	106	50	3	35	5
4	2	3	1	6	282.21	31810	-373	-188	192	4	64	244	108	107	162	221	0.00	90	53	98	50	3	30	5
5	2	3	1	6	281.82	31457	-353	-178	190	12	64	242	105	90	150	210	0.00	95	57	96	50	3	30	5
6	1	2	1	4	281.43	31105	-352	-177	189	12	64	240	117	93	149	199	0.00	84	66	103	50	3	24	5
7	1	2	1	4	281.07	30781	-324	-163	174	11	64	222	105	109	168	199	0.00	80	59	88	50	3	24	5
8	2	3	1	6	280.69	30450	-331	-167	170	3	65	221	109	94	153	207	0.00	76	53	82	50	3	24	5
9	2	3	1	6	280.33	30120	-330	-166	170	4	65	220	109	97	155	204	0.00	75	49	82	50	3	24	5
10	2	3	1	6	279.94	29774	-346	-174	195	21	64	244	98	90	149	193	0.00	84	59	91	50	3	40	5
11	1	2	1	4	279.50	29386	-388	-196	209	13	63	260	107	87	141	193	0.00	91	63	107	50	3	40	5
12	1	2	1	4	279.02	28964	-422	-213	240	27	61	287	121	89	146	190	0.00	101	63	122	50	3	56	5
13	1	2	1	4	278.54	28544	-420	-212	229	17	60	278	129	109	156	185	0.00	103	66	122	50	3	45	5
14	1	2	1	4	278.05	28118	-426	-215	224	9	60	273	126	115	165	199	0.00	97	63	112	50	3	50	5
15	1	2	1	4	277.58	27712	-406	-205	224	19	60	274	131	117	164	207	0.00	92	61	112	50	3	50	5
16	1	2	1	4	277.09	27291	-421	-212	223	11	60	274	141	128	175	215	0.00	96	54	112	50	3	50	5
17	1	2	1	4	276.63	26898	-393	-198	201	3	61	251	109	121	173	218	0.00	85	55	95	50	3	45	4
18	1	2	1	4	276.22	26549	-349	-176	180	4	62	230	96	109	175	213	0.00	70	48	85	50	3	34	4
19	1	2	1	4	275.83	26219	-330	-166	180	14	62	228	100	101	162	201	0.00	82	51	85	50	3	34	4
20	1	2	1	4	275.44	25891	-328	-165	180	15	59	228	105	100	162	190	0.00	82	52	85	50	3	34	4
21	1	2	1	4	275.07	25580	-311	-157	169	12	60	216	100	101	165	196	0.25	73	57	79	45	3	34	4
22	2	3	1	6	274.69	25263	-317	-160	168	8	61	218	113	97	161	196	0.00	68	54	76	45	3	34	4
23	2	3	1	6	274.31	24948	-315	-159	168	9	59	216	122	121	179	196	0.03	68	42	76	45	3	34	4
24	1	2	1	4	273.97	24667	-281	-142	152	10	60	198	94	114	184	213	0.00	73	44	76	40	3	25	4
25	1	2	1	4	273.65	24406	-261	-132	153	21	60	196	92	92	155	210	0.00	83	49	77	40	3	25	4
26	1	2	1	4	273.31	24124	-282	-142	152	10	60	194	96	92	151	188	0.00	78	55	76	45	3	20	4
27	1	2	1	4	272.97	23847	-277	-140	157	17	60	200	95	90	156	185	0.00	74	55	77	45	3	25	3
28	2	2	1	5	272.58	23530	-317	-160	165	5	60	213	111	92	155	188	0.00	70	50	79	45	3	30	3
29	2	2	1	5	272.23	23247	-283	-143	165	22	58	208	106	105	169	190	0.00	86	52	79	45	3	30	3
30	2	2	1	5	271.86	22949	-298	-150	165	15	57	206	108	112	173	201	0.00	86	47	79	45	3	30	3
31	2	2	1	5	271.47	22637	-312	-157	159	2	58	203	103	105	169	207	0.00	69	44	78	45	3	25	3
TOTALS																	0.28 inches							
cfs	45	72	31	148	—	—	-5428	5778	350	1905	7284	3447	3222	5035	6250	**MAX:**	103	66	2857	1485	93	1061	135
ac-ft	89	143	61	294	—	—	-10767	11461	694	3779	14448	6837	6391	9987	12397	**MIN:**	68	42	5667	2945	184	2104	268

Reservoir Storage Status on Aug-31

Comparison to fill curve: -32.03 ft
-30686 ac-ft
Percent of full reservoir: 42.5%

Minimum Required Discharges

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

SNOWTEL Summary for WY 2021 on Aug-31

	SECO	SDMO
precip to date:	61.4"	89.6"
snow depth:	0"	0"
water content:	0"	0"

The allocations (used & remaining) shown in this table are provisional.

Reservoir Delivery Status on Aug-31

	ALLOCATION (ac-ft) USED	REMAINING
TVID	17,558	
CWS	6,760	5,855
LO	298	202
JWC	7,202	6,298
Other	633	

SCOGGINS DAM RESERVOIR OPERATIONS — SEPTEMBER 2021

[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]	TOTAL INFLOW (cfs) [4]	W.S. ELEV (ft) [5]	STORAGE CONTENT (ac-ft) [6]	CHANGE STORAGE (ac-ft) [7]	RELEASE (cfs) [8]	COMP INFLOW (cfs) [9]	GASO (cfs) [10]	DLLO (cfs) [11]	GOLF (cfs) [12]	ROOD (cfs) [13]	FRMO (cfs) [14]	WSLO (cfs) [15]	PREC (in) [16]	MAX TEMP (°F) [17]	MIN TEMP (°F) [18]	TVID (cfs) [19]	CWS (cfs) [20]	LO (cfs) [21]	JWC (cfs) [22]	OTHER (cfs) [23]
1	2	2	1	5	271.09	22333	-304	-153	162	9	59	206	90	100	165	201	0.00	67	42	68	45	3	38	3
2	2	2	1	5	270.70	22023	-310	-156	170	14	60	218	102	92	153	196	0.00	76	46	68	45	3	46	3
3	2	2	1	5	270.33	21729	-294	-148	166	18	59	210	100	101	163	182	0.00	84	46	69	45	3	41	3
4	2	2	1	5	269.92	21405	-324	-163	181	18	60	226	105	101	165	193	0.00	83	49	77	45	3	48	3
5	2	2	1	5	269.51	21081	-324	-163	180	17	59	225	107	97	162	196	0.00	86	55	76	45	3	48	3
6	2	2	1	5	269.09	20752	-329	-166	179	13	59	226	110	105	168	199	0.00	82	54	75	45	3	48	3
7	2	2	1	5	268.68	20431	-321	-162	178	16	60	225	107	101	168	196	0.00	83	48	74	45	3	48	3
8	2	1	1	3	268.26	20105	-326	-164	178	14	60	225	105	103	164	190	0.00	88	53	76	45	3	48	3
9	2	1	1	3	267.86	19795	-310	-156	178	22	58	221	98	99	162	190	0.00	87	54	68	45	3	53	3
10	2	1	1	3	267.44	19472	-323	-163	169	6	58	217	103	99	162	190	0.00	83	55	67	45	3	48	3
11	2	1	1	3	267.02	19150	-322	-162	173	11	59	223	102	97	163	193	0.00	80	53	62	45	3	53	3
12	2	1	1	3	266.59	18822	-328	-165	173	8	59	222	114	101	165	190	0.00	80	53	62	45	3	53	3
13	2	1	1	3	266.16	18496	-326	-164	172	8	59	223	122	117	178	199	0.00	72	44	61	45	3	53	3
14	2	1	1	3	265.78	18209	-287	-145	161	16	61	212	106	111	176	210	0.00	74	47	62	40	3	46	2
15	1	1	1	3	265.42	17938	-271	-137	145	8	60	193	103	104	170	210	0.00	83	50	60	37	3	34	2
16	1	1	1	3	265.08	17684	-254	-128	134	6	60	180	98	104	166	199	0.00	70	39	63	35	3	28	2
17	2	1	1	3	264.74	17430	-254	-128	129	1	60	177	105	101	163	199	0.00	74	44	63	35	3	23	2
18	5	4	1	10	264.56	17297	-133	-67	103	36	74	169	93	138	187	325	0.93	73	55	35	35	3	18	2
19	7	9	1	17	264.37	17156	-141	-71	102	31	86	180	138	390	447	388	0.58	65	53	27	35	3	18	2
20	3	3	1	7	264.15	16993	-163	-82	102	20	73	169	158	333	484	615	0.06	64	45	37	35	3	18	2
21	2	2	1	5	264.00	16883	-110	-55	66	11	66	123	89	205	335	502	0.00	70	46	24	25	3	8	1
22	2	2	1	5	263.86	16780	-103	-52	59	7	63	113	80	126	208	352	0.00	83	51	25	25	3	0	1
23	2	2	1	5	263.64	16619	-161	-81	82	1	44	119	90	102	172	258	0.01	70	48	23	35	3	15	1
24	2	2	1	5	263.39	16436	-183	-92	100	8	46	137	92	106	171	224	0.00	76	48	31	40	3	20	1
25	2	2	1	5	263.13	16247	-189	-95	110	15	45	145	102	108	173	210	0.00	86	48	31	45	3	25	2
26	2	2	1	5	262.83	16029	-218	-110	110	0	45	147	105	122	189	213	0.00	81	52	30	45	3	25	2
27	3	2	1	6	262.55	15827	-202	-102	110	8	48	151	106	124	193	262	0.15	72	53	29	45	3	25	2
28	6	8	1	15	262.41	15726	-101	-51	76	25	61	134	100	250	358	630	0.67	61	48	1	35	3	20	2
29	3	4	1	8	262.22	15590	-136	-69	79	10	63	142	111	253	417	568	0.29	60	45	11	30	3	25	2
30	3	3	1	7	262.03	15453	-137	-69	78	9	52	125	103	151	274	464	0.03	64	48	11	30	3	25	2
TOTALS																	2.72 inches							
cfs	72	70	25	167	—	—	-3622	4005	383	1776	5483	3144	4141	6421	8344	MAX:	88	55	1466	1192	90	998	69
ac-ft	143	139	50	332	—	—	-7184	7944	760	3523	10876	6236	8214	12736	16550	MIN:	60	39	2908	2364	179	1980	137

Reservoir Storage Status on Sep-30	
Comparison to fill curve:	-41.47 ft
	-37890 ac-ft
Percent of full reservoir:	29.0%

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

SNOWTEL Summary for WY 2021 on Sep-30		
	SECO	SDMO
precip to date:	64.6″	93.8″
snow depth:	0″	0″
water content:	0″	0″

The allocations (used & remaining) shown in this table are provisional.

Reservoir Delivery Status on Sep-30		
	ALLOCATION (ac-ft)	
	USED	REMAINING
TVID	20,466	
CWS	9,124	3,491
LO	476	24
JWC	9,182	4,318
Other	770	

SCOGGINS DAM RESERVOIR OPERATIONS — OCTOBER 2021

[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	TOTAL INFLOW	W.S. ELEV	STORAGE CONTENT	CHANGE STORAGE	RELEASE	COMP INFLOW	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PREC	MAX TEMP	MIN TEMP	TVID	CWS	LO	JWC	OTHER
	(cfs) [1]	(cfs) [2]	(cfs) [3]	(cfs) [4]	(ft) [5]	(ac-ft) [6]	(ac-ft) [7]	(cfs) [8]	(cfs) [9]	(cfs) [10]	(cfs) [11]	(cfs) [12]	(cfs) [13]	(cfs) [14]	(cfs) [15]	(cfs) [16]	(in) [17]	(°F) [18]	(°F) [19]	(cfs) [20]	(cfs) [21]	(cfs) [22]	(cfs) [23]	(cfs) [24]
1	3	2	1	6	291.70	15218	-135	-68	77	9	49	123	92	99	192	278	0.00	65	42	14	35	3	17	2
2	2	2	1	5	261.51	15083	-135	-68	76	8	48	123	92	96	184	246	0.01	71	43	14	35	3	17	2
3	2	2	1	5	261.31	14941	-142	-72	76	4	48	122	94	94	180	233	0.00	68	45	14	35	3	17	2
4	2	2	1	5	261.11	14800	-141	-71	69	-2	47	113	85	97	180	227	0.00	69	52	10	35	0	17	2
5	3	2	1	6	260.92	14666	-134	-68	69	1	50	119	88	149	225	289	0.18	56	43	13	35	0	12	2
6	3	3	1	7	260.78	14567	-99	-50	64	14	54	119	89	132	221	303	0.54	58	39	13	30	0	12	2
7	3	2	1	6	260.61	14448	-119	-60	63	3	52	117	91	113	204	289	0.00	60	37	13	30	0	12	2
8	3	2	1	6	260.42	14315	-133	-67	67	0	44	111	85	99	182	262	0.01	59	41	12	30	0	17	2
9	3	2	1	6	260.25	14197	-118	-59	66	7	44	111	84	91	172	249	0.03	61	47	11	30	0	17	2
10	3	2	1	6	260.07	14072	-125	-63	66	3	45	115	87	96	177	242	0.01	57	36	11	30	0	17	2
11	2	2	1	5	259.88	13940	-132	-67	66	-1	44	115	85	92	173	236	0.00	59	34	12	30	0	17	2
12	4	4	1	9	259.72	13829	-111	-56	66	10	50	117	86	103	184	249	0.20	50	37	8	30	0	17	2
13	4	3	1	8	259.57	13726	-103	-52	58	6	50	110	90	107	192	262	0.10	52	41	8	30	0	10	2
14	3	4	1	8	259.45	13643	-83	-42	53	11	55	111	93	113	196	262	0.03	58	46	9	30	0	5	1
15	3	3	1	7	259.29	13533	-110	-55	66	11	43	112	86	111	198	262	0.00	58	44	11	25	0	22	1
16	3	3	1	7	259.12	13416	-117	-59	66	7	41	109	83	99	183	258	0.00	61	45	11	25	0	22	1
17	4	6	1	11	259.00	13334	-82	-41	66	25	54	125	85	94	177	249	0.27	57	42	7	25	0	22	1
18	3	4	1	8	258.81	13205	-129	-65	63	-2	39	119	100	99	177	236	0.00	58	41	8	25	0	22	0
19	5	5	1	11	258.66	13103	-102	-51	63	12	39	118	91	109	187	255	0.27	58	41	5	25	0	22	0
20	5	10	1	16	258.52	13008	-95	-48	67	19	54	146	122	137	224	272	0.15	58	48	0	25	0	27	0
21	11	28	3	42	258.46	12967	-41	-21	67	46	75	160	146	290	378	517	0.85	60	50	0	10	0	32	0
22	10	21	3	34	258.46	12967	0	0	42	42	75	134	159	321	465	595	0.42	59	49	0	0	0	21	0
23	17	27	3	47	258.54	13021	54	27	43	70	107	181	235	407	564	716	0.64	54	50	0	0	0	21	0
24	10	30	3	43	258.66	13103	82	41	42	83	128	221	360	497	654	793	0.32	57	50	0	0	0	21	0
25	22	51	4	77	258.93	13287	184	93	21	114	169	244	365	489	662	810	0.80	52	49	0	0	0	0	0
26	14	44	3	61	259.13	13423	136	69	20	89	138	194	376	472	632	810	0.16	55	48	0	0	0	0	0
27	13	40	3	56	259.24	13499	76	38	21	59	95	131	243	407	578	743	0.22	58	49	0	0	0	0	0
28	25	89	7	121	259.45	13643	144	73	21	94	188	171	298	319	473	759	0.39	66	50	0	0	0	0	0
29	13	48	4	65	259.63	13767	124	63	20	83	138	197	495	661	757	694	0.01	56	43	0	0	0	0	0
30	9	34	3	46	259.70	13815	48	24	20	44	87	127	302	524	716	863	0.00	59	43	0	0	0	0	0
31	3	2	1	6	291.70	15218	-135	-68	77	9	49	123	92	99	192	278	0.00	65	42	0	0	0	0	0
TOTALS																	5.74 inches							
cfs	210	480	57	747	—	—	-826	1697	871	2203	4217	4874	6640	9909	12803		**MAX:**	71	52	215	635	12	436	32
ac-ft	417	952	113	1482	—	—	-1638	3366	1728	4370	8364	9668	13170	19655	25395		**MIN:**	50	34	426	1260	24	865	63

Reservoir Storage Status on Oct-31	
Comparison to fill curve:	-43.80 ft
	-39508 ac-ft
Percent of full reservoir:	25.9%

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

SNOWTEL Summary for WY 2022 on Oct-31	SECO	SDMO
precip to date:	8.3″	11.1″
snow depth:	0″	0″
water content:	0″	0″

The allocations (used & remaining) shown in this table are provisional.

Reservoir Delivery Status on Oct-31	ALLOCATION (ac-ft)	
	USED	REMAINING
TVID	20,892	
CWS	10,384	2,231
LO	500	0
JWC	10,046	3,454
Other	833	

SCOGGINS DAM RESERVOIR OPERATIONS — NOVEMBER 2021

[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]	TOTAL INFLOW (cfs) [4]	W.S. ELEV (ft) [5]	STORAGE CONTENT (ac-ft) [6]	CHANGE STORAGE (ac-ft) [7]	RELEASE (cfs) [8]	COMP INFLOW (cfs) [9]	GASO (cfs) [10]	DLLO (cfs) [11]	GOLF (cfs) [12]	ROOD (cfs) [13]	FRMO (cfs) [14]	WSLO (cfs) [15]	PREC (in) [16]	MAX TEMP (°F) [17]	MIN TEMP (°F) [18]	TVID (cfs) [19]	CWS (cfs) [20]	LO (cfs) [21]	JWC (cfs) [22]	OTHER (cfs) [23]
1	8	28	3	39	259.75	13850	35	18	20	38	61	98	188	325	505	732	0.04	61	44	0	0	0	0	0
2	9	29	3	41	259.82	13898	48	24	20	44	66	104	203	209	405	573	0.33	48	45	0	0	0	0	0
3	8	26	3	37	259.88	13940	42	21	20	41	56	91	150	192	382	487	0.13	51	45	0	0	0	0	0
4	35	64	5	104	260.05	14058	118	59	20	79	100	115	150	287	459	563	0.90	56	48	0	0	0	0	0
5	43	105	9	157	260.43	14322	264	133	48	181	270	391	673	546	755	822	0.46	56	46	0	0	0	0	25
6	27	75	5	107	260.64	14469	147	74	48	122	179	279	582	778	1020	1060	0.22	55	43	0	0	0	0	25
7	44	110	9	163	260.88	14638	169	85	48	133	204	302	560	783	1060	1290	0.41	49	41	0	0	0	0	25
8	59	149	12	220	261.38	14991	353	178	48	226	321	439	843	814	1060	1230	0.46	46	42	0	0	0	0	25
9	62	144	12	218	261.79	15282	291	147	48	195	260	393	797	1030	1260	1400	0.52	53	43	0	0	0	0	25
10	55	141	12	208	262.23	15597	315	159	46	205	291	425	876	1110	1370	1560	0.32	54	41	0	0	0	0	25
11	76	161	15	252	262.65	15899	302	152	48	200	263	409	873	1180	1410	1820	0.58	51	43	0	0	0	0	25
12	293	694	50	1037	264.36	17178	1279	645	48	693	>670	752	1260	1920	2150	2830	1.90	61	51	0	0	0	0	25
13	108	391	35	534	266.17	18503	1325	668	48	716	>670	1413	1820	2940	3440	4370	0.31	60	45	0	0	0	0	25
14	66	223	24	313	267.04	19165	662	334	48	382	521	1069	2230	2850	3410	4140	0.00	59	45	0	0	0	0	25
15	49	167	15	231	267.63	19618	453	228	49	277	427	851	2070	2680	3170	3780	0.00	63	55	0	0	0	0	25
16	51	172	17	240	268.24	20089	471	237	29	266	436	750	1740	2660	3110	3700	0.34	58	36	0	0	0	0	0
17	39	141	12	192	268.75	20486	397	200	21	221	309	626	1440	2470	2930	3450	0.09	50	34	0	0	0	0	0
18	30	114	10	154	269.16	20807	321	162	21	183	244	497	1120	2240	2610	3120	0.00	52	37	0	0	0	0	0
19	34	125	11	170	269.59	21144	337	170	21	191	252	437	939	1780	2210	2860	0.44	49	41	0	0	0	0	0
20	24	99	8	131	269.92	21405	261	132	21	153	216	387	868	1520	1870	2360	0.00	53	37	0	0	0	0	0
21	21	85	7	113	270.22	21642	237	119	21	140	192	324	753	1260	1580	1990	0.00	51	32	0	0	0	0	0
22	19	75	5	99	270.44	21816	174	88	21	109	174	283	653	1040	1350	1700	0.00	48	32	0	0	0	0	0
23	20	75	5	100	270.58	21927	111	56	84	140	183	379	649	953	1240	1600	0.48	42	33	0	0	0	0	63
24	19	69	5	93	270.78	22086	159	80	35	115	188	300	684	1090	1360	1560	0.10	50	32	0	0	0	0	12
25	17	64	5	86	271.01	22269	183	92	21	113	172	271	575	971	1340	1560	0.00	43	33	0	0	0	0	0
26	27	77	6	110	271.27	22477	208	105	21	126	199	275	540	859	1220	1460	0.36	48	41	0	0	0	0	0
27	23	69	5	97	271.53	22684	207	104	21	125	198	298	584	870	1210	1370	0.04	49	47	0	0	0	0	0
28	49	110	9	168	271.96	23029	345	174	21	195	387	442	697	907	1240	1430	0.38	58	46	0	0	0	0	0
29	40	103	9	152	272.38	23368	339	171	21	192	297	450	771	1070	1380	1490	0.15	60	47	0	0	0	0	0
30	32	89	7	128	272.73	23652	284	143	21	164	238	381	725	1080	1440	1610	0.01	55	51	0	0	0	0	0
TOTALS																	8.97 inches							
cfs	1387	3974	333	5694	—	—	4959	1007	5966	8044	13231	26013	38414	47946	57917		**MAX:**	63	55	0	0	0	0	350
ac-ft	2751	7882	661	11294	—	—	9837	1997	11835	15955	26244	51597	76194	95101	114878		**MIN:**	42	32	0	0	0	0	694

Reservoir Storage Status on Nov-30	
Comparison to fill curve:	-10.77 ft
	-9337 ac-ft
Percent of full reservoir:	44.4%

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

SNOWTEL Summary for WY 2022 on Nov-30	SECO	SDMO
precip to date:	23.2″	31.9″
snow depth:	0″	0″
water content:	0″	0″

The allocations (used & remaining) shown in this table are provisional.

Reservoir Delivery Status on Nov-30	ALLOCATION (ac-ft)	
	USED	REMAINING
TVID	20,892	
CWS	10,384	2,231
LO	500	0
JWC	10,046	3,454
Other	1,527	

SCOGGINS DAM RESERVOIR OPERATIONS — DECEMBER 2021

[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	TOTAL INFLOW	W.S. ELEV	STORAGE CONTENT	CHANGE STORAGE	RELEASE	COMP INFLOW	GASO	DLLO	GOLF	ROOD	FRMO	WSLO	PREC	MAX TEMP	MIN TEMP	TVID	CWS	LO	JWC	OTHER
	(cfs) [1]	(cfs) [2]	(cfs) [3]	(cfs) [4]	(ft) [5]	(ac-ft) [6]	(ac-ft) [7]	(cfs) [8]	(cfs) [9]	(cfs) [10]	(cfs) [11]	(cfs) [12]	(cfs) [13]	(cfs) [14]	(cfs) [15]	(cfs) [16]	(in) [17]	(°F) [18]	(°F) [19]	(cfs) [20]	(cfs) [21]	(cfs) [22]	(cfs) [23]	(cfs) [24]
1	27	79	6	112	273.01	23879	227	114	21	135	207	320	645	943	1310	1530	0.00	59	43	0	0	0	0	0
2	22	69	5	96	273.27	24092	213	107	21	128	184	279	570	813	1170	1400	0.00	56	45	0	0	0	0	0
3	19	62	5	86	273.47	24255	163	82	20	102	164	241	491	717	1060	1260	0.00	52	32	0	0	0	0	0
4	17	58	4	79	273.67	24420	165	83	21	104	154	219	438	615	946	1142	0.00	49	33	0	0	0	0	0
5	18	59	4	81	273.90	24609	189	95	21	116	168	242	459	567	885	1060	0.31	50	32	0	0	0	0	0
6	19	59	4	82	274.08	24757	148	75	21	96	154	211	411	592	903	1060	0.23	44	33	0	0	0	0	0
7	19	59	4	82	274.33	24964	207	104	21	125	175	257	486	784	1090	1230	0.18	46	39	0	0	0	0	0
8	19	58	4	81	274.54	25139	175	88	20	108	169	243	446	814	1160	1350	0.05	50	44	0	0	0	0	0
9	27	53	4	84	274.65	25230	91	46	47	93	169	277	429	749	1100	1330	0.01	48	32	0	0	0	0	25
10	30	59	4	93	274.82	25372	142	72	46	118	188	293	457	725	1060	1270	0.27	44	34	0	0	0	0	25
11	172	452	38	662	275.35	25815	443	223	22	245	466	398	532	802	1110	1450	1.57	45	38	0	0	0	0	0
12	136	391	35	562	277.04	27248	1433	722	20	742	662	968	1510	2140	2530	2850	0.71	49	38	0	0	0	0	0
13	124	321	31	476	278.20	28248	1000	504	20	524	627	968	1920	2560	3090	3990	0.76	41	37	0	0	0	0	0
14	97	215	24	336	279.08	29016	768	387	63	450	557	981	2110	2850	3430	4230	0.57	38	33	0	0	0	0	50
15	81	169	16	266	279.77	29624	608	307	36	343	416	859	2040	2920	3510	4200	0.15	38	33	0	0	0	0	0
16	73	149	12	234	280.45	30227	603	304	20	324	384	805	1880	3050	3640	4420	0.51	38	33	0	0	0	0	0
17	67	134	12	213	280.98	30701	474	239	20	259	308	714	1660	3030	3630	4290	0.01	47	33	0	0	0	0	0
18	67	139	12	218	281.51	31177	476	240	20	260	292	641	1410	2930	3510	4180	0.14	44	34	0	0	0	0	0
19	109	267	28	404	282.34	31928	751	379	21	400	609	800	1480	3130	3790	5200	1.09	49	33	0	0	0	0	0
20	153	352	33	538	283.36	32860	932	470	21	491	647	952	1850	3500	4270	5910	0.89	40	34	0	0	0	0	0
21	146	358	33	537	284.54	33951	1091	550	21	571	646	1056	2200	3620	4440	5760	0.26	43	37	0	0	0	0	0
22	126	306	30	462	285.52	34866	915	461	22	483	584	993	2330	3640	4440	5560	0.25	46	37	0	0	0	0	0
23	159	439	37	635	286.52	35810	944	476	99	575	na	1069	2340	3750	4520	5720	0.72	47	39	0	0	0	0	0
24	150	358	33	541	287.63	36868	1058	533	34	567	659	1082	2370	3830	4630	5850	0.55	44	37	0	0	0	0	0
25	124	283	27	434	288.63	37832	964	486	32	518	606	1096	2410	3960	4790	5990	0.48	39	35	0	0	0	0	0
26	101	189	20	310	289.47	38649	817	412	32	444	550	976	2370	3950	4810	5860	0.47	38	30	0	0	0	0	0
27	81	149	13	243	289.89	39059	410	207	152	359	449	915	2220	3890	4740	5730	0.23	35	27	0	0	0	0	0
28	69	97	8	174	289.57	38746	-313	-158	426	268	352	960	1990	3730	4570	5520	0.08	31	27	0	0	0	0	0
29	62	81	7	150	288.82	38016	-730	-368	600	232	292	1030	1850	3530	4330	5250	0.02	34	31	0	0	0	0	0
30	56	72	5	133	287.86	37089	-927	-467	638	171	257	1005	1800	3310	4050	4900	0.10	34	27	0	0	0	0	0
31	52	64	5	121	286.92	36190	-899	-453	607	154	259	989	1750	3140	3810	4590	0.10	39	32	0	0	0	0	0
TOTALS																	10.71inches							
cfs	2422	5600	503	8525	—	—	6321	3185	9506	11354	21839	44854	74581	92324	114082		**MAX:**	59	45	0	0	0	0	100
ac-ft	4804	11108	998	16909	—	—	12538	6317	18856	22521	43318	88968	147931	183125	226282		**MIN:**	31	27	0	0	0	0	198

Reservoir Storage Status on Dec-31

Comparison to fill curve:	3.42 ft
	3201 ac-ft
Percent of full reservoir:	67.9%

Minimum Required Discharges

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

SNOWTEL Summary for WY 2022 on Dec-31

	SECO	SDMO
precip to date:	37.7″	52.5″
snow depth:	18″	37″
water content:	3.9″	8.4″

The allocations (used & remaining) shown in this table are provisional.

Reservoir Delivery Status on Dec-31

	ALLOCATION (ac-ft) USED	REMAINING
TVID	20,892	
CWS	10,384	2,231
LO	500	0
JWC	10,046	3,454
Other	1,726	

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APPENDIX D
BARNEY RESERVOIR OPERATIONS — MONTHLY REPORTS

2021 SUMMARY

- Maximum Barney Reservoir storage: 20,000 ac-ft on January 24 (full pool, from SCADA)
- First day of allocated releases: May 7
- Last day of allocated releases: December 5
- Days with allocated releases: 213
- Maximum daily allocated release: 58.5 cfs on September 1
- Minimum Barney Reservoir storage: 6,225 ac-ft on October 25 (31.1% of full pool)

RELEASE SEASON — 2021

Details of releases for each month follow in this appendix.

	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	RELEASE SEASON
Number of days of with allocated releases									
JWC	25	30	31	31	30	24	0	0	171
CWS	0	0	0	0	30	24	0	0	54
ODFW (Trask)	20	30	31	31	30	31	30	5	208
TOTAL	**25**	**30**	**31**	**31**	**30**	**31**	**30**	**5**	**213**
Allocated releases in acre-feet									
JWC	1,246	2,093	2,261	3,074	1,875	728	0	0	11,277
CWS	0	0	0	0	833	666	0	0	1,500
ODFW (Trask)	119	453	504	504	488	504	392	30	2,993
TOTAL	**1,365**	**2,545**	**2,765**	**3,579**	**3,196**	**1,899**	**392**	**30**	**15,770**

Abbreviations: JWC=Joint Water Commission; CWS=Clean Water Services; ODFW=Oregon Department of Fish and Wildlife; Trask=Trask River

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF JANUARY 2021

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

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	WEATHER @ BARNEY			MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		ALLOCATED STORAGE RELEASED TO TUALATIN			
				RAIN	TEMP						CWS		MUNICIPAL	
					min	max	TRASK	TUALATIN						
	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	1629.3	15,489	1576	7.16	40	41	4.0	0.0	0	0	0	0	0	0
5									0	0	0	0	0	0
6	1630.9	16,088	599	1.43	38	40	3.5	0.0	0	0	0	0	0	0
7									0	0	0	0	0	0
8	1632.0	15,500	-588	0.83	38	40	3.0	0.0	0	0	0	0	0	0
9									0	0	0	0	0	0
10									0	0	0	0	0	0
11	1633.1	16,913	1413	0.30	32	37	2.4	0.0	0	0	0	0	0	0
12									0	0	0	0	0	0
13	1636.5	18,250	1337	6.62	41	45	7.3	0.0	0	0	0	0	0	0
14									0	0	0	0	0	0
15	1638.2	19,080	830	0.16	38	40	3.0	0.0	0	0	0	0	0	0
16									0	0	0	0	0	0
17									0	0	0	0	0	0
18	1639.3	19,520	440	0.09	34	38	2.4	0.0	0	0	0	0	0	0
19									0	0	0	0	0	0
20	1639.8	19,720	200	0.01	32	42	1.7	0.0	0	0	0	0	0	0
21									0	0	0	0	0	0
22	1640.2	19,880	160	0.11	34	38	1.7	0.0	0	0	0	0	0	0
23									0	0	0	0	0	0
24									0	0	0	0	0	0
25	1640.7	20,000	120	0.61	31	35	41.0	0.0	0	0	0	0	0	0
26									0	0	0	0	0	0
27	1640.7	20,000	0	1.02	30	30	47.0	0.0	0	0	0	0	0	0
28									0	0	0	0	0	0
29	1640.7	20,000	0	0.04	30	32	47.0	0.0	0	0	0	0	0	0
30									0	0	0	0	0	0
31									0	0	0	0	0	0
Monthly Totals			6,087	18.38						0		0		0
Year to Date Totals			6,087	18.38						0		0		0

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF FEBRUARY 2021

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

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	WEATHER @ BARNEY			MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		ALLOCATED STORAGE RELEASED TO TUALATIN			
				RAIN	TEMP						CWS		MUNICIPAL	
					min	max	TRASK	TUALATIN						
	feet	ac-ft	ac-ft	in.	°F	°F	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1	1640.9	20,000	0	2.58	33	38	142.00	0.0	0	0	0	0	0	0
2									0	0	0	0	0	0
3	1640.9	20,000	0	3.08	32	38	124.0	0.0	0	0	0	0	0	0
4									0	0	0	0	0	0
5	1640.8	20,000	0	0.39	33	36	90.0	0.0	0	0	0	0	0	0
6									0	0	0	0	0	0
7									0	0	0	0	0	0
8	1640.7	20,000	0	0.70	33	38	77.0	0.0	0	0	0	0	0	0
9									0	0	0	0	0	0
10	1640.7	20,000	0	0.02	32	33	55.5	0.0	0	0	0	0	0	0
11									0	0	0	0	0	0
12	1640.9	20,000	0	0.34	29	31	142.0	0.0	0	0	0	0	0	0
13									0	0	0	0	0	0
14									0	0	0	0	0	0
15									0	0	0	0	0	0
16	1640.9	20,000	0	4.44	26	35	180.0	0.0	0	0	0	0	0	0
17	1640.9	20,000	0	0.33	33	34	124.0	0.0	0	0	0	0	0	0
18									0	0	0	0	0	0
19	1640.9	20,000	0	0.86	32	34	107.0	0.0	0	0	0	0	0	0
20									0	0	0	0	0	0
21									0	0	0	0	0	0
22	1640.9	20,000	0	2.00	34	40	160.0	0.0	0	0	0	0	0	0
23									0	0	0	0	0	0
24	1640.9	20,000	0	1.24	31	38	124.0	0.0	0	0	0	0	0	0
25									0	0	0	0	0	0
26	1640.9	20,000	0	1.45	32	32	142.0	0.0	0	0	0	0	0	0
27									0	0	0	0	0	0
28									0	0	0	0	0	0
29									0	0	0	0	0	0
Monthly Totals			0	17.43						0		0		0
Year to Date Totals			6,087	35.81						0		0		0

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF MARCH 2021

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

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	WEATHER @ BARNEY			MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		ALLOCATED STORAGE RELEASED TO TUALATIN			
				RAIN	TEMP						CWS		MUNICIPAL	
					min	max	TRASK	TUALATIN						
	feet	ac-ft	ac-ft	in.	°F	°F	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1	1640.8	20,000	0	0.49	34	40	77.00	0.0	0	0	0	0	0	0
2									0	0	0	0	0	0
3	1640.7	20,000	0	0.00	32	43	64.0	0.0	0	0	0	0	0	0
4									0	0	0	0	0	0
5	1640.7	20,000	0	0.52	34	42	64.0	0.0	0	0	0	0	0	0
6									0	0	0	0	0	0
7									0	0	0	0	0	0
8	1640.7	20,000	0	0.78	32	43	55.5	0.0	0	0	0	0	0	0
9									0	0	0	0	0	0
10	1640.7	20,000	0	0.34	34	37	47.0	0.0	0	0	0	0	0	0
11									0	0	0	0	0	0
12	1640.7	20,000	0	0.07	32	40	47.0	0.0	0	0	0	0	0	0
13									0	0	0	0	0	0
14									0	0	0	0	0	0
15	1640.7	20,000	0	0.12	31	44	41.0	0.0	0	0	0	0	0	0
16									0	0	0	0	0	0
17	1640.7	20,000	0	0.01	32	38	41.0	0.0	0	0	0	0	0	0
18									0	0	0	0	0	0
19	1640.7	20,000	0	0.63	38	42	47.0	0.0	0	0	0	0	0	0
20									0	0	0	0	0	0
21									0	0	0	0	0	0
22	1640.7	20,000	0	2.60	34	37	64.0	0.0	0	0	0	0	0	0
23									0	0	0	0	0	0
24	1640.7	20,000	0	0.15	31	39	47.0	0.0	0	0	0	0	0	0
25	1640.7	20,000	0	0.77	36	38	55.5	0.0	0	0	0	0	0	0
26									0	0	0	0	0	0
27									0	0	0	0	0	0
28									0	0	0	0	0	0
29	1640.7	20,000	0	0.68	32	45	47.0	0.0	0	0	0	0	0	0
30									0	0	0	0	0	0
31	1640.7	20,000	0	0.03	31	38	41.0	0.0	0	0	0	0	0	0
Monthly Totals			0	4.59						0		0		0
Year to Date Totals			6,087	40.40						0		0		0

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF APRIL 2021

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

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	WEATHER @ BARNEY			MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		ALLOCATED STORAGE RELEASED TO TUALATIN			
				RAIN	TEMP						CWS		MUNICIPAL	
					min	max	TRASK	TUALATIN						
	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									0	0	0	0	0	0
5	1640.6	20,000	0	0.00	30	51	35.0	0.0	0	0	0	0	0	0
6									0	0	0	0	0	0
7	1640.6	20,000	0	0.00	30	32	31.5	0.0	0	0	0	0	0	0
8									0	0	0	0	0	0
9	1640.6	20,000	0	0.66	32	44	31.5	0.0	0	0	0	0	0	0
10									0	0	0	0	0	0
11									0	0	0	0	0	0
12	1640.6	20,000	0	0.48	31	43	31.5	0.0	0	0	0	0	0	0
13									0	0	0	0	0	0
14	1640.6	20,000	0	0.00	38	46	17.5	0.0	0	0	0	0	0	0
15									0	0	0	0	0	0
16	1640.6	20,000	0	0.00	40	56	17.5	0.0	0	0	0	0	0	0
17									0	0	0	0	0	0
18									0	0	0	0	0	0
19	1640.600	20,000	0	0.00	43	72	14.8	0.0	0	0	0	0	0	0
20									0	0	0	0	0	0
21	1640.6	20,000	0	0.00	44	57	14.8	0.0	0	0	0	0	0	0
22									0	0	0	0	0	0
23	1640.6	20,000	0	0.00	40	58	14.8	0.0	0	0	0	0	0	0
24									0	0	0	0	0	0
25									0	0	0	0	0	0
26	1640.6	20,000	0	0.69	38	44	16.0	0.0	0	0	0	0	0	0
27	1640.6	20,000	0	0.01	39	45	14.8	0.0	0	0	0	0	0	0
28	1640.6	20,000	0	0.00	40	50	13.5	0.0	0	0	0	0	0	0
29									0	0	0	0	0	0
30	1640.6	20,000	0	0.01	46	60	13.5	0.0	0	0	0	0	0	0
Monthly Totals			0	1.85					0	0	0	0	0	0
Year to Date Totals			6,087	42.25						0		0		0

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF MAY 2021

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

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	WEATHER @ BARNEY			MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		ALLOCATED STORAGE RELEASED TO TUALATIN			
				RAIN	TEMP		TRASK	TUALATIN			CWS		MUNICIPAL*	
					min	max								
	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	1640.6	20,000	0	0.07	42	51	12.3	0.0	0	0	0	0	0	0
4									0	0	0	0	0	0
5	1640.6	20,000	0	0.00	43	53	12.3	0.0	0	0	0	0	0	0
6									0	0	0	0	0	0
7	FIRST DAY OF STORED WATER RELEASE FOR MUNICIPAL USE													
	1640.6	20,000	0	0.37	40	60	14.8	10.0	0	0	0	0	10	20
8									0	0	0	0	10	20
9									0	0	0	0	10	20
10	1640.6	20,000	0	0.20	44	52	5.2	10.0	0	0	0	0	10	20
11									0	0	0	0	10	20
12	FIRST DAY OF STORED WATER RELEASE TO TRASK RIVER													
	1640.6	20,000	0	0.00	42	58	3.0	20.0	3.0	6.0	0	0	20	40
13									3.0	6.0	0	0	20	40
14	1640.5	20,000	0	0.00	46	60	3.0	20.0	3.0	6.0	0	0	20	40
15									3.0	6.0	0	0	20	40
16									3.0	6.0	0	0	20	40
17	1640.2	19,880	-120	0.00	42	65	3.0	20.1	3.0	6.0	0	0	20	40
18									3.0	6.0	0	0	20	40
19	1640.1	19,840	-40	0.23	40	50	3.0	30.1	3.0	6.0	0	0	30	60
20									3.0	6.0	0	0	30	60
21	1639.8	19,720	-120	0.25	40	44	3.0	30.1	3.0	6.0	0	0	30	60
22									3.0	6.0	0	0	30	60
23									3.0	6.0	0	0	30	60
24	1639.5	19,600	-120	0.18	41	53	3.0	30.1	3.0	6.0	0	0	30	60
25									3.0	6.0	0	0	30	60
26	1639.3	19,520	-80	0.31	42	48	3.0	38.2	3.0	6.0	0	0	38	75
27									3.0	6.0	0	0	38	75
28	1638.9	19,360	-160	0.48	43	46	3.0	38.2	3.0	6.0	0	0	38	75
29									3.0	6.0	0	0	38	75
30									3.0	6.0	0	0	38	75
31	1638.5	19,200	-160	0.00	44	64	3.0	40.1	3.0	6.0	0	0	38	75
Monthly Totals			-800	2.09						119		0		1,246
Year to Date Totals			5,287	44.34						119		0		1,246

*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 is one day later.

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF JUNE 2021

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

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	WEATHER @ BARNEY			MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		ALLOCATED STORAGE RELEASED TO TUALATIN			
				RAIN	TEMP						CWS		MUNICIPAL*	
					min	max	TRASK	TUALATIN						
	feet	ac-ft	ac-ft	in.	°F	°F	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1									3.0	6.0	0	0	38	75
2	1638.1	19,040	-160	0.00	64	74	6.4	38.1	6.4	13	0	0	38	75
3									6.4	13	0	0	38	75
4	1637.8	18,900	-140	0.00	49	68	6.4	38.2	6.4	13	0	0	38	75
5									6.4	13	0	0	38	75
6									6.4	13	0	0	38	75
7	1637.2	18,600	-300	0.55	42	59	6.4	38.2	6.4	13	0	0	38	75
8									6.4	13	0	0	38	75
9	1636.8	18,400	-200	0.09	41	46	8.2	38.2	8.2	16	0	0	38	75
10									8.2	16	0	0	38	75
11	1636.5	18,250	-150	0.45	44	49	8.2	38.2	8.2	16	0	0	38	75
12									8.2	16	0	0	38	75
13									8.2	16	0	0	38	75
14	1636.1	18,050	-200	1.76	45	56	8.2	33.0	8.2	16	0	0	33	65
15									8.2	16	0	0	33	65
16	1635.8	17,925	-125	0.04	45	53	8.2	33.0	8.2	16	0	0	33	65
17									8.2	16	0	0	33	65
18									8.2	16	0	0	33	65
19									8.2	16	0	0	33	65
20									8.2	16	0	0	33	65
21	1634.9	17,588	-337	0.00	48	68	8.2	33.0	8.2	16	0	0	33	65
22									8.2	16	0	0	33	65
23	1634.5	17,438	-150	0.00	54	74	8.2	33.0	8.2	16	0	0	33	65
24									8.2	16	0	0	33	65
25	1634.2	17,325	-113	0.00	62	67	8.2	33.0	8.2	16	0	0	33	65
26									8.2	16	0	0	33	65
27									8.2	16	0	0	33	65
28	1633.6	17,100	-225	0.00	64	94	8.2	33.0	8.2	16	0	0	33	65
29									8.2	16	0	0	33	65
30	1633.2	16,950	-150	0.00	57	77	8.2	33.0	8.2	16	0	0	33	65
Monthly Totals			-2,250	2.89						453		0		2,093
Year to Date Totals			3,037	47.23						572		0		3,338

*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 is one day later.

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF JULY 2021

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

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	WEATHER @ BARNEY			MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		ALLOCATED STORAGE RELEASED TO TUALATIN			
				RAIN	TEMP		TRASK	TUALATIN			CWS		MUNICIPAL*	
					min	max								
	feet	ac-ft	ac-ft	in.	°F	°F	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1									8.2	16	0	0	33	65
2	1632.9	16,838	-112	0.00	58	68	8.2	33.0	8.2	16	0	0	33	65
3									8.2	16	0	0	33	65
4									8.2	16	0	0	33	65
5	1632.2	16,575	-263	0.00	56	65	8.2	33.0	8.2	16	0	0	33	65
6									8.2	16	0	0	33	65
7	1631.8	16,425	-150	0.00	48	56	8.2	33.0	8.2	16	0	0	33	65
8									8.2	16	0	0	33	65
9	1631.4	16,275	-150	0.00	54	60	8.2	33.0	8.2	16	0	0	33	65
10									8.2	16	0	0	33	65
11									8.2	16	0	0	33	65
12	1630.9	16,088	-187	0.00	54	66	8.2	33.0	8.2	16	0	0	33	65
13									8.2	16	0	0	33	65
14	1630.4	15,900	-188	0.00	54	65	8.2	33.0	8.2	16	0	0	33	65
15									8.2	16	0	0	33	65
16	1630.0	15,750	-150	0.00	54	60	8.2	33.0	8.2	16	0	0	33	65
17									8.2	16	0	0	33	65
18									8.2	16	0	0	33	65
19	1629.3	15,489	-261	0.00	53	62	8.2	33.0	8.2	16	0	0	33	65
20									8.2	16	0	0	33	65
21	1628.9	15,338	-151	0.00	51	51	8.2	40.1	8.2	16	0	0	40	79
22									8.2	16	0	0	40	79
23	1628.4	15,150	-188	0.00	49	59	8.2	40.1	8.2	16	0	0	40	79
24									8.2	16	0	0	40	79
25									8.2	16	0	0	40	79
26	1627.6	14,850	-300	0.00	63	67	8.2	40.1	8.2	16	0	0	40	79
27									8.2	16	0	0	40	79
28	1627.1	14,663	-187	0.00	62	67	8.2	50.3	8.2	16	0	0	50	99
29									8.2	16	0	0	50	99
30	1625.5	14,438	-225	0.00	67	72	8.2	50.3	8.2	16	0	0	50	99
31									8.2	16	0	0	50	99
Monthly Totals			-2,512	0.00						504		0		2,261
Year to Date Totals			525	47.23						1,076		0		5,599

*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 is one day later.

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF AUGUST 2021

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

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	WEATHER @ BARNEY			MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		ALLOCATED STORAGE RELEASED TO TUALATIN			
				RAIN	TEMP						CWS		MUNICIPAL*	
					min	max	TRASK	TUALATIN						
	feet	ac-ft	ac-ft	in.	°F	°F	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1									8.2	16	0	0	50	99
2	1625.5	14,063	-375	0.04	60	77	8.2	50.3	8.2	16	0	0	50	99
3									8.2	16	0	0	50	99
4	1624.9	13,838	-225	0.00	62	70	8.2	50.3	8.2	16	0	0	50	99
5									8.2	16	0	0	50	99
6	1624.2	13,575	-263	0.00	62	71	8.2	50.3	8.2	16	0	0	50	99
7									8.2	16	0	0	50	99
8									8.2	16	0	0	50	99
9	1623.3	13,238	-337	0.00	53	60	8.2	50.3	8.2	16	0	0	50	99
10									8.2	16	0	0	50	99
11	1622.7	13,013	-225	0.03	62	68	8.2	50.3	8.2	16	0	0	50	99
12									8.2	16	0	0	50	99
13	1622.0	12,750	-263	0.00	70	76	8.2	50.3	8.2	16	0	0	50	99
14									8.2	16	0	0	50	99
15									8.2	16	0	0	50	99
16	1621.3	12,489	-261	0.00	63	75	8.2	50.3	8.2	16	0	0	50	99
17									8.2	16	0	0	50	99
18	1629.3	12,113	-376	0.00	54	63	8.2	50.3	8.2	16	0	0	50	99
19									8.2	16	0	0	50	99
20	1619.7	11,900	-213	0.00	55	60	8.2	50.3	8.2	16	0	0	50	99
21									8.2	16	0	0	50	99
22									8.2	16	0	0	50	99
23	1618.6	11,533	-367	0.08	48	52	8.2	50.3	8.2	16	0	0	50	99
24									8.2	16	0	0	50	99
25	1618.0	11,333	-200	0.02	52	60	8.2	50.3	8.2	16	0	0	50	99
26									8.2	16	0	0	50	99
27	1617.3	11,100	-233	0.00	50	58	8.2	50.3	8.2	16	0	0	50	99
28									8.2	16	0	0	50	99
29									8.2	16	0	0	50	99
30	1616.2	10,733	-367	0.00	51	66	8.2	50.3	8.2	16	0	0	50	99
31									8.2	16	0	0	50	99
Monthly Totals			-3,705	0.17						504		0		3,074
Year to Date Totals			-3,180	47.40						1,580		0		8,674

*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 is one day later.

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF SEPTEMBER 2021

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

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	WEATHER @ BARNEY			MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		ALLOCATED STORAGE RELEASED TO TUALATIN			
				RAIN	TEMP		TRASK	TUALATIN			CWS		MUNICIPAL*	
					min	max								
	feet	ac-ft	ac-ft	in.	°F	°F	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1	FIRST DAY OF STORED WATER RELEASE FOR TUALATIN RIVER WATER QUALITY													
	1615.5	10,500	-233	0.00	46	53	8.20	50.3	8.2	16	14	28	36	72
2									8.2	16	14	28	36	71
3	1614.8	10,266	-234	0.00	54	61	8.2	50.3	8.2	16	14	28	36	71
4									8.2	16	14	28	36	71
5									8.2	16	14	28	36	71
6	1613.7	9,925	-341	0.00	55	65	8.2	50.3	8.2	16	14	28	36	71
7									8.2	16	14	28	36	71
8	1613.0	9,750	-175	0.00	55	65	8.2	50.3	8.2	16	14	28	36	71
9									8.2	16	14	28	36	71
10	1612.3	9,575	-175	0.00	58	64	8.2	50.3	8.2	16	14	28	36	71
11									8.2	16	14	28	36	71
12									8.2	16	14	28	36	71
13	1611.2	9,300	-275	0.00	50	57	8.2	50.3	8.2	16	14	28	36	71
14									8.2	16	14	28	36	71
15	1610.4	9,100	-200	0.00	54	60	8.2	50.3	8.2	16	14	28	36	71
16									8.2	16	14	28	36	71
17	1609.9	8,966	-134	0.00	47	52	8.2	50.3	8.2	16	14	28	36	71
18									8.2	16	14	28	36	71
19									8.2	16	14	28	36	71
20	1608.7	8,566	-400	2.29	49	51	8.2	50.3	8.2	16	14	28	36	71
21									8.2	16	14	28	36	71
22	1608.0	8,333	-233	0.03	53	54	8.2	35.1	8.2	16	14	28	21	42
23									8.2	16	14	28	21	42
24	1607.8	8,266	-67	0.00	58	67	8.2	35.1	8.2	16	14	28	21	42
25									8.2	16	14	28	21	42
26									8.2	16	14	28	21	42
27	1606.6	7,866	-400	0.83	44	65	8.2	35.1	8.2	16	14	28	21	42
28									8.2	16	14	28	21	42
29	1606.2	7,733	-133	0.88	45	46	8.2	35.1	8.2	16	14	28	21	42
30									8.2	16	14	28	21	42
Monthly Totals			-3,000	4.03						488		833		1,875
Year to Date Totals			-6,180	51.43						2,068		833		10,549

*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 is one day later.

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF OCTOBER 2021

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

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	WEATHER @ BARNEY			MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		ALLOCATED STORAGE RELEASED TO TUALATIN			
				RAIN	TEMP						CWS		MUNICIPAL*	
					min	max	TRASK	TUALATIN						
	feet	ac-ft	ac-ft	in.	°F	°F	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1	1605.7	7,566	-167	0.12	46	50	8.20	35.1	8.2	16	14	28	21	42
2									8.2	16	14	28	21	42
3									8.2	16	14	28	21	42
4	1604.8	7,266	-300	0.02	46	60	8.2	35.1	8.2	16	14	28	21	42
5									8.2	16	14	28	21	42
6	1604.3	7,100	-166	0.52	50	54	8.2	35.1	8.2	16	14	28	21	42
7									8.2	16	14	28	21	42
8	1603.7	6,925	-175	0.13	40	42	8.2	28.9	8.2	16	14	28	15	30
9									8.2	16	14	28	15	30
10									8.2	16	14	28	15	30
11	1603.0	6,750	-175	0.55	43	46	8.2	28.9	8.2	16	14	28	15	30
12									8.2	16	14	28	15	30
13	1602.5	6,625	-125	0.35	42	40	8.2	28.9	8.2	16	14	28	15	30
14									8.2	16	14	28	15	30
15	1602.1	6,525	-100	0.68	42	46	8.2	24.1	8.2	16	14	28	10	20
16									8.2	16	14	28	10	20
17									8.2	16	14	28	10	20
18	1601.5	6,385	-140	0.41	44	44	8.2	24.1	8.2	16	14	28	10	20
19									8.2	16	14	28	10	20
20	1601.3	6,325	-60	0.78	42	48	8.2	24.1	8.2	16	14	28	10	20
21									8.2	16	14	28	10	20
22									8.2	16	14	28	15	30
23									8.2	16	14	28	15	30
24	LAST DAY OF STORED WATER RELEASE FOR MUNICIPAL USE AND TUALATIN RIVER WATER QUALITY								8.2	16	14	28	15	30
25	1600.9	6,225	-100	2.54	30	59	8.2	0.0	8.2	16	0	0	0	0
26									8.2	16	0	0	0	0
27	1601.7	6,425	200	2.20	30	59	8.2	0.0	8.2	16	0	0	0	0
28									8.2	16	0	0	0	0
29	1602.1	6,525	100	1.47	47	49	8.2	0.0	8.2	16	0	0	0	0
30									8.2	16	0	0	0	0
31									8.2	16	0	0	0	0
Monthly Totals			-1,208	9.77						504		666		728
Year to Date Totals			-7,388	61.20						2,572		1,500		11,277

*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 is one day later.

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF NOVEMBER 2021

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

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	WEATHER @ BARNEY			MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		ALLOCATED STORAGE RELEASED TO TUALATIN			
				RAIN	TEMP						CWS		MUNICIPAL*	
					min	max	TRASK	TUALATIN						
	feet	ac-ft	ac-ft	in.	°F	°F	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1	1602.4	6,600	75	0.41	42	44	8.20	0.0	8.2	16	0	0	0	0
2									8.2	16	0	0	0	0
3	1602.5	6,625	25	0.26	40	44	6.4	0.0	8.2	16	0	0	0	0
4									6.4	13	0	0	0	0
5	1603.4	6,850	225	2.36	40	46	6.4	0.0	6.4	13	0	0	0	0
6									6.4	13	0	0	0	0
7									6.4	13	0	0	0	0
8	1604.4	7,133	283	1.29	38	42	6.4	0.0	6.4	13	0	0	0	0
9	1604.8	7,266	133	1.00	24	55	6.4	0.0	6.4	13	0	0	0	0
10	1605.2	7,400	134	0.41	34	39	6.4	0.0	6.4	13	0	0	0	0
11									6.4	13	0	0	0	0
12	1607.2	8,066	666	4.78	47	48	6.4	0.0	6.4	13	0	0	0	0
13									6.4	13	0	0	0	0
14									6.4	13	0	0	0	0
15	1609.5	8,833	767	1.19	45	47	6.4	0.0	6.4	13	0	0	0	0
16									6.4	13	0	0	0	0
17	1610.2	9,050	217	0.91	37	44	6.4	0.0	6.4	13	0	0	0	0
18									6.4	13	0	0	0	0
19	1610.8	9,200	150	0.71	40	44	6.4	0.0	6.4	13	0	0	0	0
20									6.4	13	0	0	0	0
21									6.4	13	0	0	0	0
22	1611.3	9,325	125	0.02	35	36	6.4	0.0	6.4	13	0	0	0	0
23									6.4	13	0	0	0	0
24	1611.7	9,425	100	1.15	36	37	6.4	0.0	6.4	13	0	0	0	0
25									6.4	13	0	0	0	0
26									6.4	13	0	0	0	0
27									6.4	13	0	0	0	0
28									6.4	13	0	0	0	0
29	1613.0	9,750	325	2.09	39	45	6.4	0.0	6.4	13	0	0	0	0
30									6.4	13	0	0	0	0
Monthly Totals			3,225	16.58						392		0		0
Year to Date Totals			-4,163	77.78						2,964		1,500		11,277

*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 is one day later.

BARNEY RESERVOIR OPERATIONS FOR THE MONTH OF DECEMBER 2021

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

DAY	SURFACE ELEVATION	STORAGE	CHANGE IN STORAGE	WEATHER @ BARNEY			MEASURED FLOW TO		STORAGE RELEASED TO TRASK—ODFW		ALLOCATED STORAGE RELEASED TO TUALATIN			
				RAIN	TEMP						CWS		MUNICIPAL	
					min	max	TRASK	TUALATIN						
	feet	ac-ft	ac-ft	in.	°F	°F	cfs	cfs	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft
1	1613.4	9,850	100	0.03	46	47	3.00	0.0	3.0	6.0	0	0	0	0
2									3.0	6.0	0	0	0	0
3									3.0	6.0	0	0	0	0
4									3.0	6.0	0	0	0	0
5									3.0	6.0	0	0	0	0
	LAST DAY OF STORED WATER RELEASE TO TRASK RIVER FOR FISH USE													
6	1614.3	10,100	250	1.19	35	44	1.1	0.0	0	0	0	0	0	0
7									0	0	0	0	0	0
8	1614.7	10,233	133	0.82	38	40	1.1	0.0	0	0	0	0	0	0
9									0	0	0	0	0	0
10	1615.3	10,433	200	0.98	30	37	1.1	0.0	0	0	0	0	0	0
11									0	0	0	0	0	0
12									0	0	0	0	0	0
13	1618.1	11,366	933	5.24	36	37	3.0	0.0	0	0	0	0	0	0
14									0	0	0	0	0	0
15	1618.9	11,633	267	1.74	32	42	1.7	0.0	0	0	0	0	0	0
16									0	0	0	0	0	0
17	1619.5	11,833	200	0.41	36	36	1.7	0.0	0	0	0	0	0	0
18									0	0	0	0	0	0
19									0	0	0	0	0	0
20	1621.1	12,413	580	2.89	36	37	3.0	0.0	0	0	0	0	0	0
21									0	0	0	0	0	0
22	1622.4	12,900	487	0.87	38	48	3.0	0.0	0	0	0	0	0	0
23									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	1625.6	14,100	1200	3.00	26	34	2.4	0.0	0	0	0	0	0	0
28									0	0	0	0	0	0
29	1626.1	14,288	188	0.22	26	31	2.4	0.0	0	0	0	0	0	0
30	1612.4	9,600	-4688	0.20	32	38	0.5	0.0	0	0	0	0	0	0
31									0	0	0	0	0	0
Monthly Totals			-150	17.59						30		0		0
Year to Date Totals			-4313	95.37						2,993		1,500		11,277

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APPENDIX E
MUNICIPAL WATER USE ALLOCATIONS — MONTHLY REPORTS

2021 SUMMARY

- Length of release season: 171 days
- First day of stored water delivery for municipal use: 77.3 acre-feet (25.2 MG) on May 8
- Last day of stored water delivery for municipal use: 71.4 acre-feet (23.3 MG) on October 25
- Mean daily used allocation of stored water: 125 acre-feet per day (40.6 MGD)
- Maximum daily used allocation of stored water: 210 acre-feet per day (68.5 MGD) on August 12

2021 MUNICIPAL WATER USE ALLOCATIONS

Details of releases for each month follow in this appendix.

	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	RELEASE SEASON*
Barney Reservoir (acre-feet)									
Hillsboro	597	853	649	1702	860	448	0	0	5,109
Forest Grove	2	2	0	0	5	3	0	0	13
Beaverton	442	412	380	291	211	242	0	0	1,978
TVWD	129	835	1198	1081	856	76	0	0	4,176
TOTAL	1,170	2,103	2,227	3,074	1,932	770	0	0	11,276
Hagg Lake (acre-feet)									
Hillsboro	455	777	1,369	814	1,088	405	0	0	4,908
Forest Grove**	85	213	394	432	297	180	0	0	1,600
Beaverton	347	645	813	858	595	279	0	0	3,538
TOTAL	887	1634	2,577	2,104	1,980	865	0	0	10,046

*The Release Season total may not equal the sum of the Monthly Allocations because of round-off error.
Abbreviations: TVWD=Tualatin Valley Water District
**Releases from Hagg Lake allocated to Forest Grove may include water that was leased to TVWD. Details about allocation leases from Forest Grove to TVWD can be obtained from the JWC.

MUNICIPAL ALLOCATIONS FOR THE MONTH OF MAY 2021

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	Hagg Lake	Barney	Hagg Lake	Barney	Hagg Lake	Barney	Hagg Lake	Barney
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1										
2										
3										
4										
5										
6	FIRST DAY OF MUNICIPAL USE OF STORED WATER									
7	Barney Reservoir: May 8 (released May 7) Hagg Lake: May 8									
8	39	10	29	3.3	13.9	0.0	1.0	3.3	14.1	3.4
9	39	10	29	3.5	14.3	0.0	0.9	3.4	13.7	3.1
10	39	10	29	3.5	13.4	0.0	1.6	3.6	14.0	3.0
11	34	10	24	3.8	12.5	0.0	0.9	3.2	10.6	3.0
12	41	10	31	2.5	16.8	0.0	1.8	1.9	12.4	5.6
13	58	20	38	8.0	22.2	0.0	1.6	5.0	14.2	7.0
14	53	20	33	7.9	17.9	0.0	2.1	5.8	13.0	6.3
15	53	20	33	10.7	19.3	0.0	1.9	6.5	11.8	2.8
16	53	20	33	10.7	19.3	0.0	2.3	6.3	11.4	2.9
17	53	20	33	9.9	18.0	0.0	2.4	6.9	12.6	3.3
18	37	20	17	9.4	8.4	0.0	1.4	8.0	7.1	2.6
19	45	20	25	9.4	13.0	0.0	1.8	7.4	10.2	3.1
20	55	30	25	15.0	12.7	0.0	1.9	13.0	10.4	2.0
21	37	30	7	16.7	3.2	0.0	1.6	11.7	2.2	1.6
22	32	30	2	16.1	0.2	0.0	1.6	12.5	0.2	1.4
23	32	30	2	15.5	0.3	0.0	1.5	13.3	0.2	1.2
24	32	30	2	14.5	0.0	0.0	2.0	14.2	0.0	1.2
25	49	30	19	16.4	9.3	0.0	3.0	11.8	6.7	1.9
26	49	30	19	16.3	9.5	0.0	2.8	11.4	6.7	2.4
27	47	38	9	20.3	4.1	0.0	1.8	15.5	3.1	2.2
28	40	38	2	21.5	0.3	0.0	1.5	14.6	0.2	1.9
29	40	38	2	22.3	0.1	0.0	1.9	14.3	0.1	1.4
30	40	38	2	22.4	0.3	0.0	1.5	14.6	0.2	1.0
31	40	38	2	21.6	0.0	1.0	2.1	14.6	0.0	0.8
Monthly Summary (May)										
Mean daily cfs	43.2	24.6	18.6	12.6	9.6	0.0	1.8	9.3	7.3	2.7
Total ac-ft	2,057	1,170	887	597	455	2.1	85	442	347	129
Stored Water Use Summary to Date (May 8–May 31)										
Mean daily cfs	43.2	24.6	18.6	12.6	9.6	0.0	1.8	9.3	7.3	2.7
Total ac-ft	2,057	1,170	887	597	455	2.1	85	442	347	129

†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 2021

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	Hagg Lake	Barney	Hagg Lake	Barney	Hagg Lake	Barney	Hagg Lake	Barney
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1	50	38	12	15.0	5.5	0.0	2.7	10.2	3.8	12.8
2	66	38	28	21.3	7.4	0.0	2.5	0.0	18.1	16.7
3	66	38	28	22.0	7.5	0.0	3.0	0.0	17.5	16.0
4	66	38	28	24.6	7.6	0.0	2.9	0.0	17.5	13.4
5	58	38	20	15.5	10.1	0.0	2.6	11.1	7.3	11.4
6	58	38	20	15.4	10.2	0.0	2.5	11.1	7.3	11.5
7	58	38	20	21.3	2.5	0.0	4.6	5.3	12.9	11.3
8	58	38	20	22.0	1.4	0.0	7.7	5.5	10.9	10.6
9	53	38	15	17.7	5.6	0.0	5.5	12.3	3.9	8.0
10	53	38	15	17.0	5.7	0.0	5.2	12.4	4.2	8.6
11	58	38	20	15.5	8.3	0.0	5.4	11.9	6.3	10.7
12	43	38	5	15.7	1.8	0.0	1.6	14.2	1.6	8.1
13	43	38	5	15.4	1.6	0.0	1.9	14.3	1.5	8.3
14	43	38	5	15.3	1.8	0.0	1.6	14.0	1.6	8.7
15	33	33	0	16.0	0.0	1.2	0.0	11.8	0.0	4.0
16	61	33	28	14.6	14.8	0.0	2.5	10.6	10.7	7.8
17	66	33	33	13.6	18.6	0.0	1.8	9.3	12.7	10.1
18	52	33	19	14.2	9.8	0.0	2.7	9.4	6.5	9.4
19	65	33	32	11.7	18.3	0.0	2.4	7.2	11.3	14.2
20	65	33	32	11.7	18.1	0.0	2.6	7.3	11.2	14.0
21	65	33	32	11.6	17.8	0.0	3.3	7.1	10.9	14.3
22	75	33	42	11.2	20.1	0.0	3.5	0.0	18.4	21.8
23	75	33	42	13.1	19.9	0.0	3.5	0.0	18.7	19.9
24	70	33	37	9.0	21.5	0.0	3.9	4.9	11.7	19.1
25	70	33	37	9.1	20.5	0.0	4.5	5.3	12.0	18.5
26	78	33	45	6.2	24.4	0.0	5.0	4.0	15.7	22.7
27	78	33	45	6.6	25.0	0.0	4.5	4.1	15.6	22.3
28	78	33	45	7.0	23.9	0.0	6.1	4.4	15.0	21.7
29	90	33	57	10.5	31.0	0.0	5.8	0.0	20.2	22.5
30	90	33	57	10.4	31.1	0.0	5.5	0.0	20.3	22.6
Monthly Summary (June)										
Mean daily cfs	62.8	35.3	28.4	14.3	13.5	0.04	3.7	6.9	11.2	14.0
Total ac-ft	3,737	2,103	1,634	853	777	2.4	213	412	645	835
Stored Water Use Summary to Date (May 8–June 30)										
Mean daily cfs	54.7.1	30.6	24.0	13.5	11.7	0.04	2.8	8.0	9.4	9.0
Total ac-ft	5,794	3,273	2,521	1450	1,232	4.5	297	854	992	964

†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 2021

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	Hagg Lake	Barney	Hagg Lake	Barney	Hagg Lake	Barney	Hagg Lake	Barney
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1	80	33	47	6.0	25.6	0.0	5.5	3.8	16.0	23.2
2	80	33	47	6.9	25.8	0.0	5.4	4.3	15.8	21.8
3	80	33	47	7.3	25.3	0.0	4.9	4.9	16.7	20.8
4	80	33	47	7.4	25.2	0.0	4.9	4.9	16.8	20.7
5	80	33	47	7.2	25.0	0.0	5.0	4.9	17.0	20.8
6	80	33	47	7.1	24.7	0.0	5.1	4.9	17.2	21.0
7	72	33	39	9.7	21.2	0.0	4.7	5.9	13.1	17.4
8	67	33	34	10.5	18.2	0.0	4.5	6.5	11.3	16.0
9	67	33	34	9.9	18.1	0.0	4.6	6.1	11.3	17.0
10	74	33	41	9.3	21.7	0.0	6.2	5.6	13.0	18.2
11	74	33	41	9.5	21.0	0.0	7.4	5.7	12.6	17.8
12	74	33	41	8.8	21.4	0.0	6.2	5.5	13.3	18.7
13	82	33	49	7.4	26.1	0.0	7.4	4.4	15.5	21.2
14	82	33	49	7.1	27.0	0.0	6.7	4.1	15.4	21.8
15	82	33	49	7.8	28.3	0.0	5.9	4.0	14.7	21.1
16	71	33	38	10.7	20.3	0.0	6.4	5.9	11.3	16.4
17	80	33	47	9.5	25.7	0.0	7.2	5.2	14.0	18.4
18	80	33	47	9.5	26.0	0.0	7.1	5.1	14.0	18.3
19	80	33	47	9.2	25.6	0.0	7.1	5.1	14.3	18.7
20	75	33	42	7.8	21.7	0.0	6.9	4.8	13.5	20.4
21	75	33	42	7.8	21.8	0.0	6.7	4.8	13.4	20.3
22	77	40	37	13.4	18.4	0.0	7.4	8.2	11.2	18.4
23	77	40	37	14.5	18.7	0.0	7.4	8.4	10.9	17.1
24	72	40	32	14.3	15.3	0.0	6.9	9.1	9.8	16.6
25	72	40	32	14.1	15.4	0.0	6.5	9.1	10.0	16.8
26	72	40	32	14.7	15.7	0.0	6.9	8.8	9.4	16.6
27	77	40	37	12.5	19.2	0.0	6.8	7.2	11.1	20.2
28	85	40	45	12.1	24.6	0.0	7.3	6.4	13.0	21.4
29	95	50	45	18.1	24.8	0.0	8.1	8.9	12.1	23.1
30	90	50	40	18.8	21.1	0.0	7.8	9.8	11.0	21.4
31	90	50	40	18.1	21.3	0.0	7.7	9.4	11.0	22.5
Monthly Summary (July)										
Mean daily cfs	78.1	36.2	41.9	10.5	22.3	0.0	6.4	6.2	13.2	19.5
Total ac-ft	4,804	2,227	2,577	649	1,369	0	394	380	813	1,198
Stored Water Use Summary to Date (May 8–July 31)										
Mean daily cfs	62.9	32.6	30.6	12.4	15.6	0.03	4.2	7.3	10.8	12.8
Total ac-ft	10,598	5,500	5,098	2,099	2,601	4.5	691	1,234	1,805	2,163

†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 2021

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	Hagg Lake	Barney	Hagg Lake	Barney	Hagg Lake	Barney	Hagg Lake	Barney
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1	90	50	40	17.9	21.2	0.0	7.7	9.4	11.1	22.7
2	90	50	40	21.9	17.3	0.0	7.7	5.5	15.0	22.6
3	85	50	35	23.6	13.2	0.0	7.8	5.9	14.0	20.5
4	80	50	30	26.2	9.4	0.0	7.7	6.5	12.9	17.3
5	80	50	30	25.7	8.4	0.0	7.7	6.4	13.8	17.9
6	74	50	24	25.6	5.7	0.0	7.2	6.4	11.1	18.0
7	74	50	24	25.8	6.5	0.0	6.6	6.4	10.9	17.8
8	74	50	24	26.7	8.3	0.0	6.2	6.7	9.5	16.6
9	74	50	24	25.2	5.3	0.0	7.1	6.3	11.6	18.4
10	90	50	40	22.5	16.1	0.0	7.9	5.6	16.0	21.9
11	90	50	40	24.6	21.1	0.0	7.0	6.1	11.9	19.3
12	106	50	56	22.1	33.1	0.0	8.0	5.5	14.9	22.3
13	95	50	45	22.7	23.0	0.0	7.7	5.7	14.2	21.6
14	100	50	50	22.1	25.3	0.0	8.0	5.5	16.7	22.4
15	100	50	50	22.0	24.9	0.0	7.9	5.5	17.2	22.5
16	100	50	50	22.0	25.0	0.0	7.9	5.5	17.1	22.5
17	95	50	45	24.4	22.4	0.0	6.9	6.1	15.7	19.5
18	84	50	34	25.6	15.9	0.0	6.9	6.4	11.2	18.0
19	84	50	34	27.8	16.1	0.0	6.8	7.0	11.2	15.2
20	84	50	34	27.8	16.2	0.0	6.6	6.9	11.2	15.3
21	84	50	34	27.6	15.1	0.0	6.7	6.9	12.2	15.5
22	84	50	34	27.5	15.8	0.0	6.8	6.9	11.5	15.7
23	84	50	34	34.3	9.0	0.0	6.7	0.0	18.3	15.7
24	75	50	25	36.1	2.1	0.0	6.7	0.0	16.3	13.9
25	75	50	25	37.3	1.9	0.0	6.5	0.0	16.6	12.7
26	70	50	20	30.7	7.1	0.0	5.8	7.7	7.1	11.6
27	75	50	25	35.7	3.6	0.0	5.9	0.0	15.5	14.3
28	80	50	30	36.9	6.5	0.0	6.3	0.0	17.2	13.1
29	80	50	30	36.8	5.9	0.0	6.6	0.0	17.4	13.2
30	80	50	30	36.7	6.2	0.0	6.3	0.0	17.5	13.3
31	75	50	25	36.6	3.0	0.0	6.0	0.0	16.0	13.4
Monthly Summary (August)										
Mean daily cfs	84.2	50.0	34.2	27.7	13.2	0.0	7.0	4.7	14.0	17.6
Total ac-ft	5,179	3,074	2,104	1,702	814	0.0	432	291	858	1,081
Stored Water Use Summary to Date (May 8–August 31)										
Mean daily cfs	68.6	37.3	31.6	16.5	15.0	0.02	4.9	6.6	11.7	14.1
Total ac-ft	15,777	8,575	7,202	3,801	3,415	4.5	1,123	1,526	2,664	3,243

†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 2021

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	Hagg Lake	Barney	Hagg Lake	Barney	Hagg Lake	Barney	Hagg Lake	Barney
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1	88	50	38	27.1	14.5	0.0	6.5	0.0	17.0	22.9
2	82	36	46	16.0	24.2	0.0	6.2	0.0	15.6	20.0
3	77	36	41	17.2	20.6	0.0	5.8	0.0	14.6	18.8
4	84	36	48	14.0	25.9	0.0	5.8	0.0	16.3	22.0
5	84	36	48	14.1	25.9	0.0	5.7	0.0	16.3	21.9
6	84	36	48	10.0	30.0	0.0	5.7	4.1	12.3	21.9
7	84	36	48	10.2	29.3	0.0	6.7	4.2	12.0	21.7
8	84	36	48	10.4	30.4	0.0	5.7	4.1	12.0	21.5
9	89	36	53	9.8	34.0	0.0	6.2	3.7	12.8	22.4
10	84	36	48	11.5	30.8	0.0	5.6	4.3	11.6	20.2
11	89	36	53	10.6	33.3	0.0	6.3	4.3	13.4	21.1
12	89	36	53	10.6	33.4	0.0	6.3	4.3	13.4	21.1
13	89	36	53	11.9	32.0	0.0	6.3	3.0	14.7	21.1
14	82	36	46	12.7	26.0	0.0	6.4	3.2	13.7	20.1
15	70	36	34	15.0	17.8	0.0	6.1	3.8	10.1	17.2
16	64	36	28	17.2	12.6	0.0	5.9	4.3	9.5	14.5
17	59	36	23	16.5	8.9	0.0	5.5	4.1	8.6	15.3
18	54	36	18	20.4	6.2	0.0	4.7	5.1	7.1	10.5
19	54	36	18	20.4	6.2	0.0	4.7	5.1	7.1	10.5
20	54	36	18	20.3	6.0	0.0	4.7	5.1	7.3	10.6
21	44	36	8	19.6	2.3	0.0	4.6	9.4	1.1	7.0
22	36	36	0	18.7	0.0	2.4	0.0	9.7	0.0	5.2
23	36	21	15	12.8	5.7	0.0	3.2	3.2	6.1	5.0
24	41	21	20	12.8	11.5	0.0	3.0	3.2	5.4	5.0
25	46	21	25	10.9	15.1	0.0	3.5	2.7	6.4	7.4
26	46	21	25	10.7	15.5	0.0	2.9	2.7	6.7	7.6
27	46	21	25	10.7	15.0	0.0	3.5	2.7	6.5	7.7
28	41	21	20	12.8	10.6	0.0	3.4	3.2	6.0	5.0
29	46	21	25	14.2	11.2	0.0	5.0	3.6	8.8	3.2
30	46	21	25	14.5	13.6	0.0	3.8	3.6	7.6	2.9
Monthly Summary (September)										
Mean daily cfs	65.7	32.5	34.4	14.5	18.9	0.08	5.2	3.5	10.3	14.4
Total ac-ft	3,911	1,932	1,980	860	1,088	4.8	297	211	595	856
Stored Water Use Summary to Date (May 8–September 30)										
Mean daily cfs	68.0	36.3	32.1	16.0	15.8	0.03	5.0	6.0	11.4	14.2
Total ac-ft	19,688	10,507	9,182	4,640	4,503	9.4	1,420	1,737	3,258	4,099

†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 2021

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	Hagg Lake	Barney	Hagg Lake	Barney	Hagg Lake	Barney	Hagg Lake	Barney
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1	21	21	0	13.1	0.0	1.7	0.0	5.4	0.0	0.9
2	38	21	17	15.4	7.3	0.0	3.6	3.9	6.0	1.7
3	38	21	17	15.4	8.4	0.0	2.8	3.8	5.7	1.8
4	38	21	17	13.7	9.5	0.0	3.2	6.2	4.3	1.2
5	38	21	17	13.9	9.5	0.0	3.3	6.1	4.2	0.9
6	33	21	12	13.0	5.5	0.0	3.5	7.1	3.0	1.0
7	33	21	12	12.7	5.0	0.0	4.4	6.8	2.7	1.5
8	33	21	12	12.7	5.5	0.0	3.6	6.8	2.9	1.5
9	32	15	17	8.6	7.9	0.0	4.0	5.0	5.0	1.5
10	32	15	17	8.6	7.9	0.0	4.0	4.9	5.0	1.4
11	32	15	17	8.7	7.9	0.0	4.0	5.1	5.1	1.2
12	32	15	17	8.7	7.5	0.0	4.4	5.3	5.1	1.0
13	32	15	17	8.6	7.6	0.0	4.4	5.1	5.0	1.3
14	25	15	10	9.3	4.7	0.0	2.8	4.5	2.5	1.2
15	20	15	5	9.2	1.8	0.0	2.2	4.8	1.0	1.0
16	32	10	22	5.4	11.3	0.0	4.3	2.8	6.3	1.8
17	32	10	22	5.5	11.5	0.0	4.3	2.7	6.2	1.7
18	32	10	22	5.4	11.3	0.0	4.4	2.8	6.4	1.9
19	32	10	22	5.1	10.2	0.0	4.3	3.4	7.5	1.5
20	32	10	22	5.0	10.8	0.0	3.2	3.3	8.0	1.7
21	37	10	27	4.8	13.9	0.0	3.3	3.1	9.8	2.1
22	42	10	32	4.9	16.0	0.0	4.3	3.2	11.7	1.9
23	36	15	21	7.5	9.2	0.0	3.4	6.3	8.4	1.3
24	36	15	21	7.1	9.4	0.0	3.6	5.6	8.0	2.3
25	36	15	21	3.8	4.7	0.0	5.5	7.9	10.8	3.2
26	LAST DAY OF MUNICIPAL USE OF STORED WATER									
27	Barney Reservoir: October 25 (released October 24) Hagg Lake: October 25									
28										
29										
30										
31										
Monthly Summary (October)										
Mean daily cfs	33.0	15.5	18.2	9.0	8.5	0.07	3.8	4.9	5.9	1.5
Total ac-ft	1,634	770	865	448	405	3.4	180	242	279	76
Stored Water Use Summary to Date (May 8–October 25)										
Mean daily cfs	62.9	33.2	30.1	15.1	14.7	0.04	4.8	5.8	10.6	12.3
Total ac-ft	21,323	11,276	10,046	5,109	4,908	12.7	1,600	1,978	3,538	4,176

†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.

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APPENDIX F
STREAM TEMPERATURE

SCOPE

This appendix shows data for stream temperature at selected sites in the Tualatin River and its tributaries. Most of the data were obtained by continuous monitoring at a resolution of 15 minutes to 1 hour. Resolution may have changed over time for an individual site. The data have been subject to quality assurance tests by the collecting entity.

The following data and analyses are included for each site. A more detailed explanation is on page F-3:

- Table of 2021 data with summary statistics by month.
- Graph of 2021 data superimposed on percentile statistics for the period of record for the site.
- Color coded table of monthly median stream temperatures by year for the period of record.
- Graphs showing the number of days that the State of Oregon rearing and migration temperature standard was exceeded over the period of record and the period when that exceedance occurred. The spawning standard may apply at some sites, but data were not evaluated relative to that standard in this report.
- Not all statistics and graphs are shown for sites where monitoring was begun recently or where monitoring was intermittent over the period of record.

2021 HIGHLIGHTS

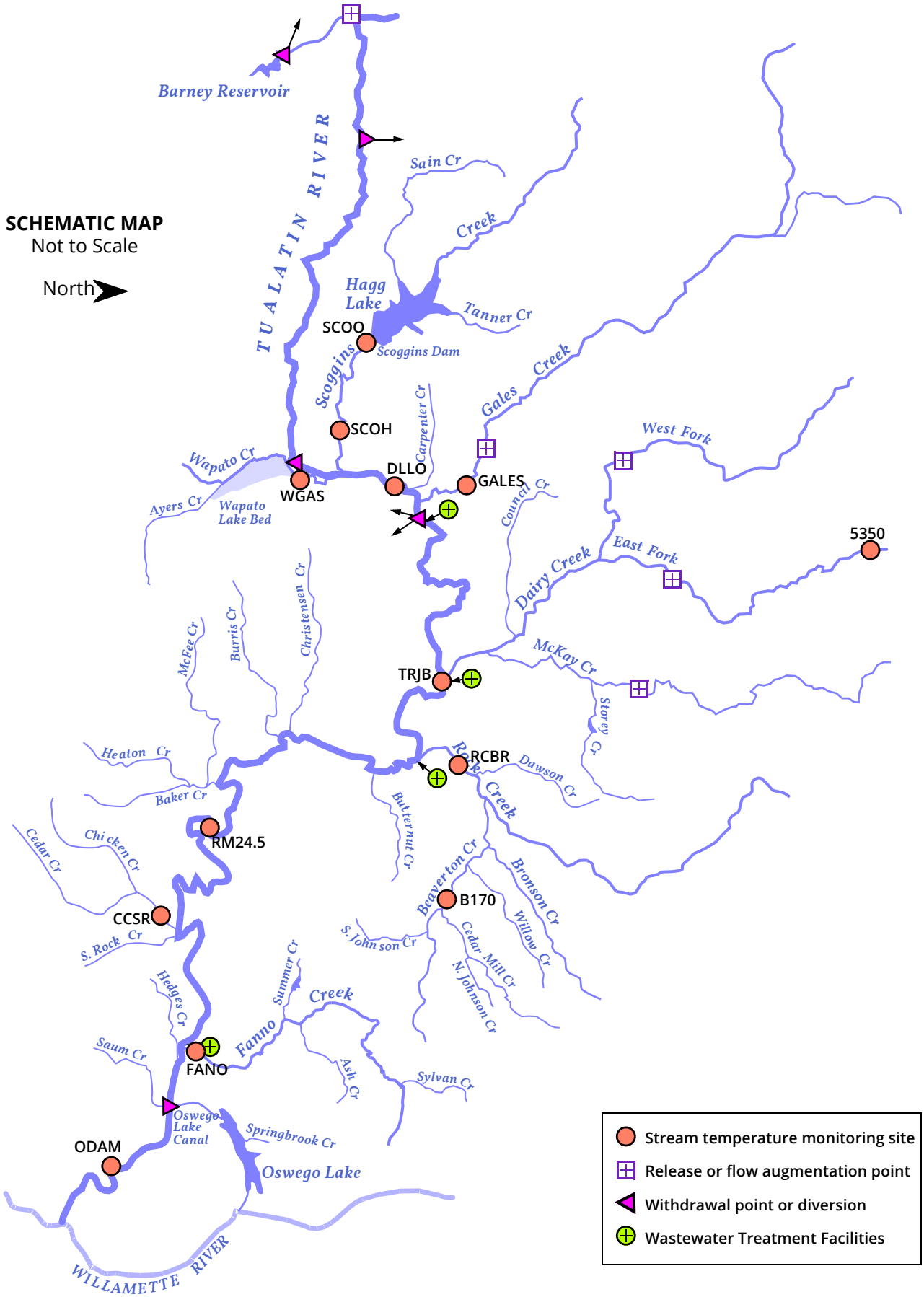
- Temperatures throughout much of 2021 were above average at most sites, especially during January and April. Record high temperatures were set in January at every site except Tualatin River at RM 24.5, Beaverton Creek and Chicken Creek. Records were set in April at every site except Tualatin River at RM 24.5, Gales Creek, Chicken Creek and Fanno Creek.
- Record high temperatures were set in June at every tributary site.
- The 7-day average daily maximum temperature standard for rearing and migration (>18°C) was exceeded at every temperature site, including Tualatin River at Dilley where exceedances of the standard had not occurred before (sixty year period of record). In addition, the standard was exceeded for more days in 2021 than in most years.

EXCEEDANCES OF OREGON REARING AND MIGRATION TEMPERATURE STANDARD

SITE	NUMBER OF DAYS		DATE RANGE OF EXCEEDANCES*		PERCENT OF YEARS WITH EXCEEDANCES
	2021	MEDIAN	2021	AVERAGE (MEAN)	
Mainstem Tualatin River and Scoggins Creek sites					
Scoggins Creek below Hagg Lake	28	0	Sep-9 – Oct-6	Sep-21 – Oct-6	45% (9 of 20)
Scoggins Creek at Old Hwy 47**	28	—	Sep-9 – Oct-6	—	—
Tualatin River at Dilley	7	0	Sep-10 – Sep-16	none	17% (1 of 6)
Tualatin River at Hwy 219 Bridge	51	16	Jun-4 – Sep-16	Jun-23 – Jul-29	76% (13 of 17)
Tualatin River at RM 24.5	110	96	May-17 – Sep-21	Jun-6 – Sep-18	100% (25 of 25)
Tualatin River at Oswego Dam	128	111	May-16 – Sep-29	Jun-3 – Sep-25	100% (31 of 31)
Tributary sites					
Gales Creek at Old Hwy 47	100	87	Jun-1 – Sep-17	Jun-16– Sep-16	100% (21 of 21)
EF Dairy Creek above Murtaugh Cr**	50	—	Jun-25 – Aug-20	—	—
Beaverton Creek at 170th	122	117	Apr-21– Sep-16	May-14 – Sep-19	100% (21 of 21)
Rock Creek at Brookwood Ave	105	95	May-16 – Sep-15	May-27 – Sep-13	100% (18 of 18)
Chicken Cr at Scholls-Sherwood Hwy	76	66	Jun-1 – Aug-24	Jun-9 – Sep-2	100% (13 of 13)
Fanno Creek at Durham Road	115	107	May-15 – Sep-18	May-25 – Sep-15	100% (19 of 19)

*Date range may include days when the standard was not exceeded (7-day average daily maximum ≤ 18 °C).
**Period of record for these sites too short for summary statistics (averages and medians)

STREAM TEMPERATURE MONITORING SITES



STREAM TEMPERATURE MONITORING SITES — ALPHABETICAL LISTING BY SITE CODE

SITE CODE	SITE NAME	RIVER MILE	STATION ID	PAGE
5350	East Fork Dairy Creek above Murtaugh Cr near Meacham Corner, OR	13.4	14205350	F-19
B170	Beaverton Creek at 170th	4.9	453004122510301	F-20
CCSR	Chicken Creek at Roy Rogers Road	2.3	452230122512201	F-25
DLLO	Tualatin River near Dilley, Oregon	58.8	14203500	F-8
FANO	Fanno Creek at Durham Road near Tigard, Oregon	1.2	14206950	F-26
GALES	Gales Creek at Old Hwy 47 near Forest Grove, Oregon	2.36	453040123065201 OWRD#: 14204530	F-16
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	453030122560101	F-22
RM24.5	Tualatin River at RM 24.5 near Scholls, Oregon	24.5	14206694	F-11
SCOH	Scoggins Creek near Old Hwy 47 near Gaston, Oregon	1.7	452731123092100	F-6
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-9
WGAS	Wapato Creek at Gaston Road at Gaston, Oregon	1.9	14202650	F-15

EXPLANATION OF FIGURES AND TABLES IN THIS APPENDIX — PAGES 1-2

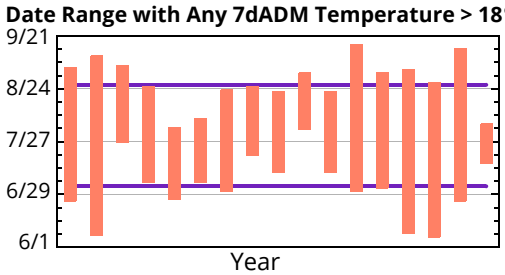
Page 1–current year data and graph: A table of mean daily stream temperature for the current year is at the top of page 1. A graph at the bottom of the page shows the current year's data superimposed on shaded percentile ranges for the period of record, providing historical context. A legend, located to the right of the graph, includes the period of record for the site and definitions of lines and shading. If the period of record is too short to accurately calculate some percentiles, the appropriate shaded areas are omitted.

Page 2–color-coded table of monthly medians: A table of monthly medians of daily mean stream temperature by year is at the top of the page. Entries in this table are color-coded by percentiles calculated from the daily mean temperature for the period of record. Two Keys are provided to the right of the table. The upper Key contains the values corresponding to the percentiles shown in the lower Key. Medians are not shown if more than 20% of the data are missing.

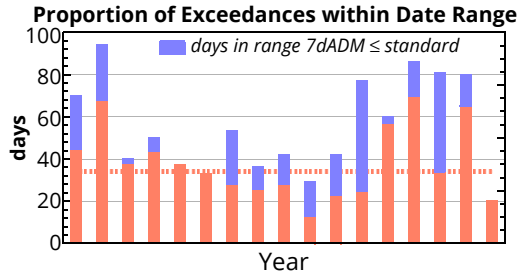
Page 2–Oregon temperature standard: The Oregon standard for salmonid rearing and migration applies in the Tualatin Basin. The standard is:

The seven day average of the daily maximum temperature (7dADM) is not to exceed 18°C.

Daily maximum temperature and the 7dADM were computed for sites with data of at least hourly frequency. Example graphs pertaining to the temperature standard are shown below.



Each bar spans the first and last days of the year when the 7dADM exceeded 18°C. Some days within the range may not exceed the standard. Purple lines, if present, show the mean first and last days of exceedance for the period of record. A magenta line, if shown, shows a statistically significant trend.



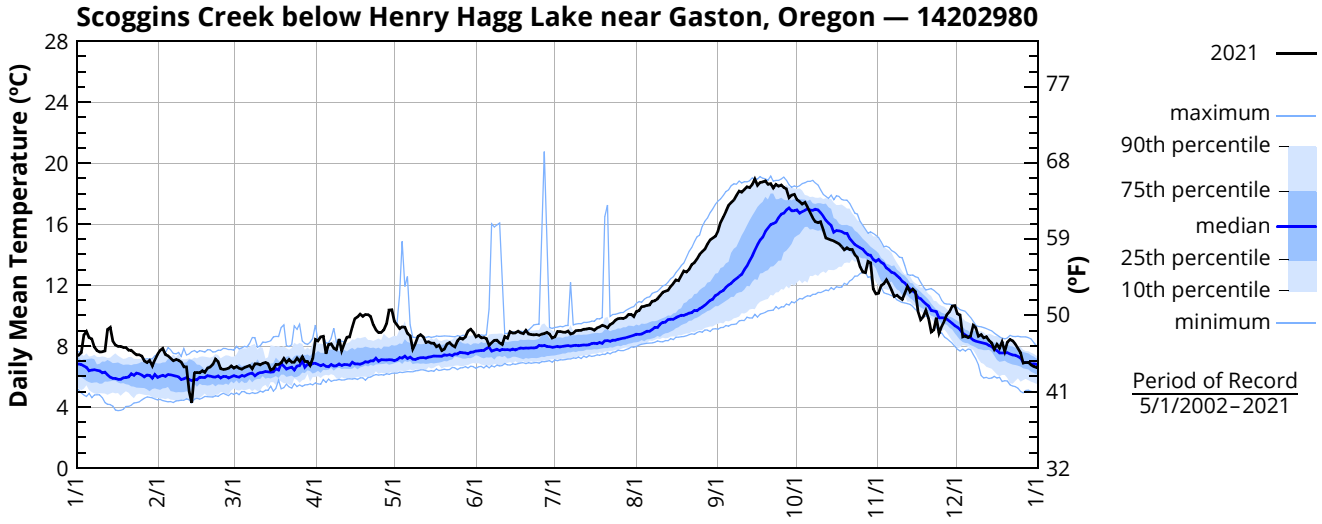
The height of each bar shows the number of days in the date range. The orange portion is the number of days when the standard was exceeded. The blue portion is the number of days when the standard was not exceeded. The dotted line, if present, is the median number of exceedances in a year.

SCOO – Scoggins Creek below Henry Hagg Lake near Gaston, Oregon – 14202980

Data source: U.S. Geological Survey, Oregon Water Science Center
River mile: 4.80 *Latitude:* 45 28 10 *Longitude:* 123 15 61

2021 — DAILY MEAN WATER TEMPERATURE (°C) — SCOO

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7.39	7.71	6.55	8.43	9.61	8.60	8.60	10.26	15.55	17.61	11.46	10.11
2	7.56	7.85	6.65	8.33	9.39	8.70	8.95	10.32	16.10	17.48	11.96	10.03
3	8.71	7.44	6.54	8.60	9.14	8.53	8.95	10.58	16.46	17.31	12.08	8.60
4	8.95	7.36	6.47	8.64	9.26	8.55	8.91	10.60	16.82	17.43	12.34	8.66
5	8.55	7.19	6.58	7.49	9.24	8.49	8.90	10.66	17.23	17.12	12.03	8.55
6	8.47	7.03	6.64	8.10	8.83	8.05	8.98	10.70	17.41	16.77	11.66	8.65
7	7.93	7.11	6.72	8.14	8.67	8.21	8.78	10.94	17.57	16.41	11.25	9.36
8	7.70	7.06	6.51	7.85	7.80	8.37	8.84	10.97	17.88	16.16	11.34	9.20
9	7.61	6.95	6.83	7.76	8.18	8.38	9.00	11.08	18.16	16.09	11.18	8.64
10	7.62	6.63	6.83	8.45	8.63	8.20	9.03	11.30	18.09	16.16	11.05	8.75
11	7.67	6.63	6.76	7.67	8.74	8.09	9.03	11.52	18.26	15.63	11.45	8.53
12	9.08	5.01	6.86	8.16	8.59	8.62	9.10	11.59	18.45	15.08	11.90	8.61
13	9.21	4.27	6.91	8.58	8.23	8.50	9.11	11.65	18.39	15.02	11.55	8.36
14	8.33	6.25	6.84	8.60	8.28	8.94	9.15	11.90	18.60	14.95	11.74	8.21
15	8.07	6.26	6.42	9.23	8.19	8.85	9.13	12.10	18.97	14.90	11.58	7.79
16	7.98	6.24	6.50	9.78	8.19	8.86	9.04	12.33	18.55	14.80	10.30	8.11
17	7.98	6.38	6.79	9.91	7.95	8.97	9.18	12.28	18.74	14.71	9.73	7.85
18	7.90	6.26	6.79	10.10	8.05	8.86	9.25	12.61	18.76	14.52	9.92	8.27
19	7.90	6.55	6.89	9.94	7.70	8.81	9.36	12.92	18.83	14.31	10.34	7.64
20	7.72	6.61	7.19	10.07	7.79	9.03	9.30	12.85	18.61	14.44	9.83	8.25
21	7.72	6.79	6.93	10.06	8.13	8.79	9.18	13.02	18.66	14.33	8.92	8.43
22	7.56	7.15	7.11	9.94	8.23	8.75	9.40	13.34	18.36	14.34	9.06	8.34
23	7.42	6.98	6.94	9.38	8.04	8.73	9.50	13.46	18.60	13.98	9.85	8.12
24	7.43	6.51	6.94	9.06	7.93	8.75	9.70	13.71	18.49	13.81	8.83	7.85
25	7.35	6.46	7.21	8.88	8.34	8.70	9.79	14.00	18.57	13.19	9.28	7.54
26	7.02	6.48	7.00	8.89	8.52	8.78	9.82	14.18	18.40	12.86	9.64	6.87
27	6.92	6.54	7.29	9.05	8.45	8.82	9.80	14.35	18.32	12.82	10.07	6.92
28	7.06	6.69	6.99	9.46	8.59	8.89	9.89	14.69	17.73	13.55	10.27	6.93
29	6.68	—	6.99	10.36	8.97	8.78	10.08	14.96	17.90	13.47	10.62	6.76
30	7.09	—	6.73	10.38	9.10	8.52	10.08	15.07	17.95	11.74	10.65	6.65
31	7.46	—	7.17	—	8.91	—	9.93	15.20	—	11.42	—	6.59
Mean	7.81	6.66	6.82	8.98	8.51	8.64	9.28	12.42	18.01	14.92	10.73	8.17
Max	9.21	7.85	7.29	10.38	9.61	9.03	10.08	15.20	18.97	17.61	12.34	10.11
Min	6.68	4.27	6.42	7.49	7.70	8.05	8.60	10.26	15.55	11.42	8.83	6.59



MEDIAN OF DAILY MEAN TEMPERATURE BY MONTH AND YEAR — SCOO

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2002					7.1	7.4	8.0	9.5	14.6	16.2	10.6	8.0
2003	6.9	7.1	7.4	7.9	8.2	8.5	9.1	11.0	18.2	18.5	10.3	7.5
2004	4.9	5.6	6.3	6.7	7.1		7.8	10.2	14.9	16.9	11.7	8.4
2005	5.8	5.9	6.4	7.1	7.5	7.9	8.2	9.3	11.8	15.5	10.7	6.3
2006	7.1	6.8	6.3	6.7	7.2	7.5	8.0	10.2	17.0	16.3	10.9	7.5
2007	5.6	5.2	5.9	6.3	6.8	7.1	8.0	10.1	17.0	15.0	10.9	7.0
2008	5.6	4.6	5.2	5.8	6.6	6.9	7.5	9.2	14.3	15.6	11.9	7.0
2009	5.1	4.6	5.4	6.4	6.8	7.1	7.5	9.1	12.4	15.0	10.7	6.1
2010	5.7	6.3	7.0	7.8	8.2	9.0	9.1	9.9	11.4	13.1	12.0	8.2
2011	6.2	6.1	6.7	6.7	7.3	7.8	8.1	8.6	10.0	11.8	11.7	7.3
2012	6.0	5.9	6.5	7.0	7.2	7.5	7.8	8.6	10.5	14.5	11.7	8.7
2013	5.7	5.5	6.2	6.8	6.8	7.2	7.6	9.1	12.4	14.2	12.1	6.5
2014	5.6	5.0	5.9	6.7	7.2	7.8	8.5	9.8	13.3	17.2	11.1	8.6
2015	7.2	7.6	8.0	8.4	8.6	8.9	9.6	12.8	18.8	17.3	11.9	8.0
2016	6.0	6.3	7.5	7.8	8.2	8.3	8.9	11.0	18.0	14.8	12.5	7.7
2017	4.5	5.2	6.1	6.8	7.7	8.3	8.7	10.0	13.6	15.8	11.3	7.7
2018	6.8	7.1	6.9	7.4	7.8	8.1	8.8	10.2	15.6	15.9	11.7	7.6
2019	6.6	5.6	5.7	6.0	6.4	6.8	7.4	9.1	15.1	15.0	11.2	7.8
2020	7.1	7.3	7.4	8.0	8.3	8.1	8.4	9.4	14.4	17.0	11.0	8.2
2021	7.7	6.6	6.8	8.9	8.5	8.7	9.2	12.3	18.3	14.8	10.9	8.3
median	6.2	6.0	6.4	6.9	7.4	7.8	8.2	9.8	14.2	15.4	11.3	7.8

KEY

T in °C

T ≤ 5.5
5.5 < T ≤ 5.9
5.9 < T ≤ 6.3
6.3 < T ≤ 6.6
6.6< T ≤ 7.1
7.1< T ≤ 7.5
7.5 < T ≤ 8.0
8.0< T ≤ 10.4
10.4 < T ≤ 14.5
14.5 < T ≤ 16.5
T > 16.5

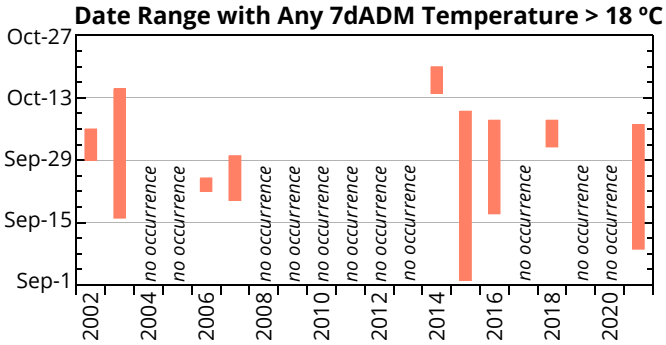
T as percentile

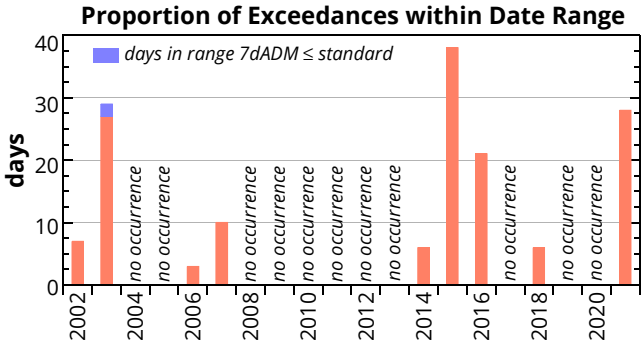
T ≤ 5th
5th < T ≤ 10th
10th < T ≤ 15th
15th < T ≤ 20th
20th < T ≤ 30th
30th < T ≤ 40th
40th < T ≤ 50th
50th < T ≤ 75th
75th < T ≤ 90th
90th < T ≤ 95th
T > 95th

OREGON WATER TEMPERATURE STANDARD

- Exceedances of the water temperature standard occurred in less than half of the years. The temperature standard was exceeded for 28 consecutive days in 2021— from September 9 through October 6.

fraction of years with any exceedance	45%
median days/year exceeding standard	0
average first day of exceedance (if it occurred)	Sep-21
average last day of exceedance (if it occurred)	Oct-6





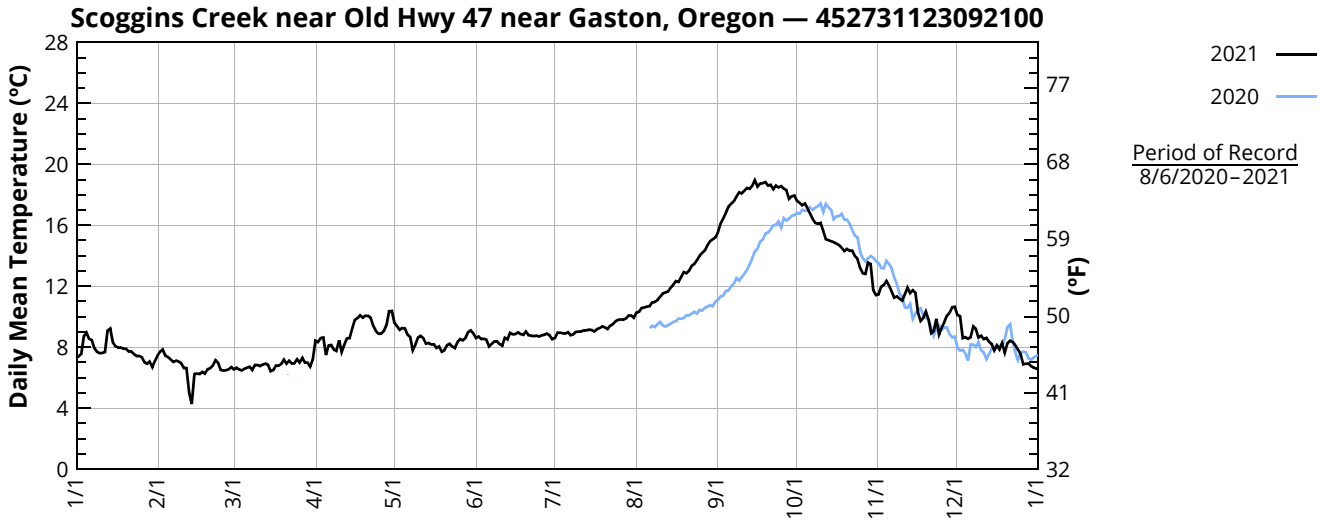
SCOH – Scoggins Creek near Old Hwy 47 near Gaston, OR – 452731123092100

Data source: U.S. Geological Survey, Oregon Water Science Center
River mile: 1.70 *Latitude:* 45 27 31 *Longitude:* 123 09 21 Datum: 176 ft

2021 — DAILY MEAN WATER TEMPERATURE† (°C) — SCOO

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7.39	7.71	6.55	8.43	9.61	8.60	8.60	10.26	15.55	17.61	11.46	10.11
2	7.56	7.85	6.65	8.33	9.39	8.70	8.95	10.32	16.10	17.48	11.96	10.03
3	8.71	7.44	6.54	8.60	9.14	8.53	8.95	10.58	16.46	17.31	12.08	8.60
4	8.95	7.36	6.47	8.64	9.26	8.55	8.91	10.60	16.82	17.43	12.34	8.66
5	8.55	7.19	6.58	7.49	9.24	8.49	8.90	10.66	17.23	17.12	12.03	8.55
6	8.47	7.03	6.64	8.10	8.83	8.05	8.98	10.70	17.41	16.77	11.66	8.65
7	7.93	7.11	6.72	8.14	8.67	8.21	8.78	10.94	17.57	16.41	11.25	9.36
8	7.70	7.06	6.51	7.85	7.80	8.37	8.84	10.97	17.88	16.16	11.34	9.20
9	7.61	6.95	6.83	7.76	8.18	8.38	9.00	11.08	18.16	16.09	11.18	8.64
10	7.62	6.63	6.83	8.45	8.63	8.20	9.03	11.30	18.09	16.16	11.05	8.75
11	7.67	6.63	6.76	7.67	8.74	8.09	9.03	11.52	18.26	15.63	11.45	8.53
12	9.08	5.01	6.86	8.16	8.59	8.62	9.10	11.59	18.45	15.08	11.90	8.61
13	9.21	4.27	6.91	8.58	8.23	8.50	9.11	11.65	18.39	15.02	11.55	8.36
14	8.33	6.25	6.84	8.60	8.28	8.94	9.15	11.90	18.60	14.95	11.74	8.21
15	8.07	6.26	6.42	9.23	8.19	8.85	9.13	12.10	18.97	14.90	11.58	7.79
16	7.98	6.24	6.50	9.78	8.19	8.86	9.04	12.33	18.55	14.80	10.30	8.11
17	7.98	6.38	6.79	9.91	7.95	8.97	9.18	12.28	18.74	14.71	9.73	7.85
18	7.90	6.26	6.79	10.10	8.05	8.86	9.25	12.61	18.76	14.52	9.92	8.27
19	7.90	6.55	6.89	9.94	7.70	8.81	9.36	12.92	18.83	14.31	10.34	7.64
20	7.72	6.61	7.19	10.07	7.79	9.03	9.30	12.85	18.61	14.44	9.83	8.25
21	7.72	6.79	6.93	10.06	8.13	8.79	9.18	13.02	18.66	14.33	8.92	8.43
22	7.56	7.15	7.11	9.94	8.23	8.75	9.40	13.34	18.36	14.34	9.06	8.34
23	7.42	6.98	6.94	9.38	8.04	8.73	9.50	13.46	18.60	13.98	9.85	8.12
24	7.43	6.51	6.94	9.06	7.93	8.75	9.70	13.71	18.49	13.81	8.83	7.85
25	7.35	6.46	7.21	8.88	8.34	8.70	9.79	14.00	18.57	13.19	9.28	7.54
26	7.02	6.48	7.00	8.89	8.52	8.78	9.82	14.18	18.40	12.86	9.64	6.87
27	6.92	6.54	7.29	9.05	8.45	8.82	9.80	14.35	18.32	12.82	10.07	6.92
28	7.06	6.69	6.99	9.46	8.59	8.89	9.89	14.69	17.73	13.55	10.27	6.93
29	6.68	—	6.99	10.36	8.97	8.78	10.08	14.96	17.90	13.47	10.62	6.76
30	7.09	—	6.73	10.38	9.10	8.52	10.08	15.07	17.95	11.74	10.65	6.65
31	7.46	—	7.17	—	8.91	—	9.93	15.20	—	11.42	—	6.59
Mean	7.81	6.66	6.82	8.98	8.51	8.64	9.28	12.42	18.01	14.92	10.73	8.17
Max	9.21	7.85	7.29	10.38	9.61	9.03	10.08	15.20	18.97	17.61	12.34	10.11
Min	6.68	4.27	6.42	7.49	7.70	8.05	8.60	10.26	15.55	11.42	8.83	6.59

†All data after October 3, 2021 are provisional—subject to revision

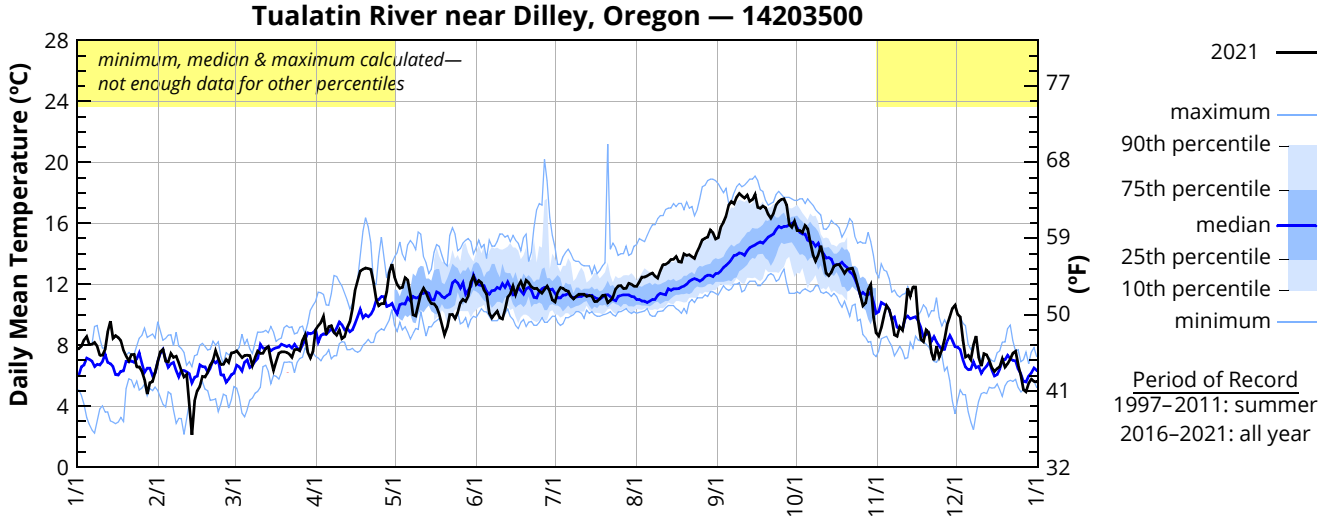


DLLO – Tualatin River near Dilley, Oregon – 14203500

Data source: U.S. Geological Survey, Oregon Water Science Center
River mile: 58.8 *Latitude:* 45 28 30 *Longitude:* 123 07 23

2021 — DAILY MEAN WATER TEMPERATURE (°C) — DLLO

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7.77	7.58	7.52	9.02	12.48	12.00	10.83	11.86	15.05	15.53	8.59	10.03
2	7.93	7.72	7.63	9.28	11.99	12.24	11.46	12.16	15.75	15.53	9.14	9.85
3	8.34	6.95	7.41	9.49	11.74	12.10	11.78	12.47	16.07	15.40	9.95	8.33
4	8.57	6.89	7.18	9.89	11.79	11.62	11.74	12.47	16.47	15.85	10.60	7.22
5	8.05	7.46	7.32	8.71	12.43	11.36	11.59	12.54	17.19	15.64	10.33	7.34
6	8.06	7.20	7.35	9.21	12.28	10.09	11.55	12.66	17.43	14.76	9.71	7.05
7	8.17	7.27	7.32	9.28	11.31	9.78	11.21	12.73	17.28	13.94	8.68	8.03
8	7.94	6.85	6.66	8.84	9.99	10.03	11.03	12.53	17.70	13.52	8.58	8.59
9	7.33	6.34	7.19	8.66	9.92	10.23	11.20	12.40	17.95	13.92	9.20	7.22
10	7.35	5.92	7.61	9.00	10.62	9.79	11.35	12.88	17.79	14.53	8.97	6.63
11	7.73	6.08	7.46	8.43	11.38	9.72	11.35	13.29	17.66	13.70	9.89	7.44
12	8.87	4.21	7.47	8.55	11.73	10.32	11.35	13.30	17.86	12.72	11.73	7.37
13	9.57	2.12	7.79	9.14	11.45	11.16	11.20	13.41	17.44	12.56	11.21	7.01
14	8.45	4.34	7.90	9.54	11.00	11.37	11.26	13.62	17.55	12.78	11.83	6.52
15	8.63	5.00	7.06	10.40	10.73	11.89	11.21	13.64	17.90	13.18	11.82	6.27
16	8.50	5.31	6.34	11.58	10.72	11.33	10.86	13.81	17.05	13.28	9.63	6.46
17	8.30	5.95	6.92	12.25	10.50	11.88	10.87	13.48	16.98	13.30	8.39	6.58
18	7.65	5.91	7.47	12.87	10.06	12.19	11.04	13.45	17.13	13.02	8.23	7.11
19	7.28	6.22	7.57	12.98	9.35	11.72	11.27	13.99	17.02	12.71	9.00	6.56
20	6.96	6.69	7.57	13.07	8.68	12.26	11.28	13.89	16.60	12.96	8.83	6.78
21	7.38	7.00	7.52	13.03	9.17	12.11	10.79	13.94	16.33	13.03	7.52	7.09
22	7.40	7.64	7.42	12.97	10.00	11.83	10.92	13.80	16.64	13.06	7.01	7.47
23	6.57	7.14	7.20	12.09	10.02	11.71	11.14	13.69	17.21	12.58	7.92	7.60
24	6.58	6.74	7.70	11.03	9.75	11.74	11.68	14.16	17.43	11.97	7.22	6.73
25	6.28	6.75	7.73	10.59	10.15	11.56	11.89	14.51	17.56	11.28	7.66	6.01
26	5.75	7.06	7.64	10.73	10.78	11.41	11.91	14.92	17.61	10.58	8.39	5.08
27	4.79	6.86	8.33	10.73	11.00	11.65	11.71	15.02	17.22	10.77	9.32	4.94
28	5.53	7.49	8.68	11.51	10.87	11.87	11.73	15.08	15.92	11.65	9.87	5.50
29	5.60	—	7.52	12.76	11.23	11.51	12.06	15.56	15.74	11.98	10.41	5.77
30	6.19	—	7.16	13.32	12.15	10.97	12.00	15.39	16.13	9.85	10.63	5.62
31	6.94	—	7.57	—	12.52	—	11.87	14.97	—	8.82	—	5.59
Mean	7.43	6.38	7.46	10.63	10.90	11.31	11.39	13.60	16.99	13.05	9.34	6.96
Max	9.57	7.72	8.68	13.32	12.52	12.26	12.06	15.56	17.95	15.85	11.83	10.03
Min	4.79	2.12	6.34	8.43	8.68	9.72	10.79	11.86	15.05	8.82	7.01	4.94



DLLO – Tualatin River near Dilley, Oregon – 14203500

Data source: U.S. Geological Survey, Oregon Water Science Center

MEDIAN OF DAILY MEAN TEMPERATURE BY MONTH AND YEAR — DLLO

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1997					12.9	13.2	10.6	10.8	14.1			
1998					10.4	13.8	12.0	12.5	13.7	15.3		
1999					12.0	10.8	10.5	11.5	15.9	15.0		
2000					12.2	11.5	10.7	10.8	14.8	14.5		
2001				9.2	12.0	11.6	13.2	17.0	18.1	12.9		
2002	6.3	6.0	6.8	8.8	10.6	10.8	10.9	11.3	14.6	14.3	9.1	
2003	7.4	7.1	8.6	9.5	11.1	11.6	11.5	12.3	15.6	15.1	10.1	
2004								12.0	14.4	15.1		
2005						12.4	11.1	11.3	12.2	14.0		
2006					11.0	12.3	10.3	11.3	14.7	13.6		
2007					10.9	9.8	10.4	11.6	15.7	12.1		
2008					11.2	11.3	11.3	11.3	14.4	12.9		
2009					10.8	14.0	10.4	11.1	13.4	13.3		
2010					11.2	12.3	12.6	12.1	12.7	11.5		
2011					10.0	12.2	12.4	12.4	12.3	11.6		
2012												
2013												
2014												
2015												
2016			8.8	11.6	12.9	11.5	11.5	12.7	16.4	11.7	10.5	5.9
2017	4.1	6.0	8.3	9.2	12.4	12.2	11.7	12.1	13.9	13.0	8.8	5.8
2018	7.2	6.3	7.7	9.1	11.3	11.1	11.1	11.9	14.7	13.7	8.6	6.6
2019	6.5	5.4	7.4	9.6	11.8	10.4	10.3	11.1	14.8	12.1	9.1	6.5
2020	7.3	6.8	7.9	10.9	13.0	12.1	11.3	11.7	14.7	14.5	8.1	6.9
2021	7.7	6.8	7.5	10.5	10.9	11.6	11.4	13.6	17.2	13.0	9.2	7.0
median	6.8	6.3	7.7	9.6	11.4	11.7	11.2	11.8	14.6	13.3	9.2	6.5

Key

T in °C

- T ≤ 6.0
- 6.0 < T ≤ 7.1
- 7.1 < T ≤ 8.0
- 8.0 < T ≤ 9.0
- 9.0 < T ≤ 10.3
- 10.1 < T ≤ 10.9
- 10.9 < T ≤ 11.4
- 11.4 < T ≤ 12.9
- 12.9 < T ≤ 14.8
- 14.8 < T ≤ 15.9
- T > 15.9

T as percentile

- T ≤ 5th
- 5th < T ≤ 10th
- 10th < T ≤ 15th
- 15th < T ≤ 20th
- 20th < T ≤ 30th
- 30th < T ≤ 40th
- 40th < T ≤ 50th
- 50th < T ≤ 75th
- 75th < T ≤ 90th
- 90th < T ≤ 95th
- T > 95th

Oregon Water Temperature Standard

- Exceedance of the water temperature standard can be assessed only for 2016–2021 because those are the only years when daily maximum temperatures are available.
- The water temperature standard was exceeded for 7 consecutive days in 2021— September 10–16. The water temperature standard was not exceeded during 2016–2020. (no graphs shown).

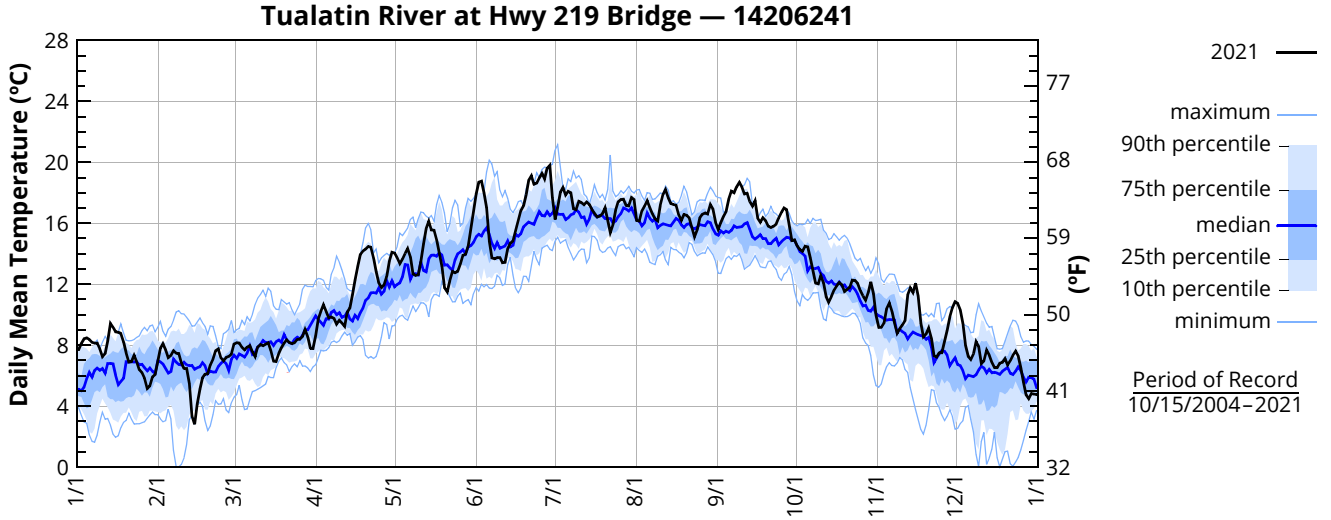
TRJB – Tualatin River at Hwy 219 Bridge – 14206241

Data source: Clean Water Services

River mile: 44.4 *Latitude:* 45 30 01 *Longitude:* 123 59 24

2021 — DAILY MEAN WATER TEMPERATURE (°C) — TRJB

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	7.71	7.80	8.08	8.63	14.05	17.93	16.25	16.19	15.59	14.53	9.17	10.75
2	8.13	8.10	8.16	9.70	13.74	18.70	17.06	16.13	16.04	14.28	9.17	10.33
3	8.42	7.70	8.14	10.22	13.35	18.76	18.05	16.81	16.45	14.16	9.46	9.40
4	8.48	7.19	7.86	10.65	13.65	17.98	18.35	17.13	16.77	14.50	10.40	7.99
5	8.37	7.33	7.69	10.21	14.02	17.02	17.86	17.49	17.59	14.45	10.78	7.26
6	8.19	7.64	7.87	9.79	14.35	14.82	18.10	17.03	18.11	13.74	10.25	7.06
7	8.13	7.47	7.98	9.86	13.80	13.73	18.01	16.62	18.00	12.87	9.48	7.44
8	8.14	7.46	7.58	9.76	12.68	13.67	16.94	16.29	18.39	12.07	8.78	8.23
9	7.76	6.86	7.24	9.38	12.57	13.75	16.89	16.16	18.69	12.02	9.08	7.91
10	7.25	6.46	7.88	9.63	12.62	13.75	17.44	17.17	18.38	12.58	9.33	6.79
11	7.46	6.47	8.04	9.46	13.49	13.42	17.36	17.89	17.92	12.09	9.60	6.96
12	8.29	5.48	7.96	9.24	14.65	13.44	17.22	18.22	17.97	11.20	11.29	7.67
13	9.43	3.38	8.07	10.16	15.63	14.35	17.39	17.68	17.44	10.82	11.76	7.36
14	9.18	2.81	8.16	10.45	16.13	14.70	17.24	17.30	17.13	11.19	11.44	6.86
15	8.88	4.14	7.66	11.32	15.57	14.84	16.90	17.23	17.49	11.60	12.06	6.53
16	8.85	5.11	6.96	12.27	15.55	15.48	16.66	17.18	16.33	11.88	11.23	6.53
17	8.77	5.85	6.93	13.17	14.92	16.18	16.41	16.57	16.07	12.11	9.45	6.82
18	8.22	6.10	7.46	13.95	14.06	16.83	16.46	16.19	16.37	11.97	8.54	6.86
19	7.50	6.13	7.84	14.18	13.16	17.15	16.63	16.58	16.18	11.53	8.73	7.11
20	6.89	6.70	8.14	14.30	11.78	17.87	17.01	16.52	15.82	11.67	9.13	6.70
21	6.91	7.09	8.35	14.48	11.50	18.82	16.19	16.36	15.72	11.79	8.47	6.99
22	7.33	7.63	8.18	14.43	12.22	19.13	15.38	15.73	15.80	12.27	7.31	7.33
23	6.92	7.76	8.10	13.72	12.85	18.56	15.88	15.11	15.95	12.25	7.22	7.61
24	6.40	7.18	8.15	12.83	12.75	18.63	16.86	15.57	16.36	12.06	7.51	7.29
25	6.20	6.98	8.39	12.09	12.85	18.98	17.42	16.36	16.72	11.58	7.50	6.48
26	5.83	7.20	8.40	11.78	13.31	19.27	17.56	16.60	17.01	11.24	8.26	5.57
27	5.15	7.26	8.56	11.94	13.89	18.91	17.58	16.68	16.90	10.95	8.96	4.75
28	5.32	7.42	9.03	12.51	13.96	19.61	17.17	16.61	15.83	11.44	9.85	4.49
29	5.93	—	8.54	13.49	14.51	19.81	17.14	17.23	14.86	12.16	10.45	4.82
30	6.08	—	7.79	14.10	15.59	17.67	17.69	16.93	14.92	11.37	10.85	4.79
31	6.98	—	7.78	—	16.69	—	17.56	16.05	—	9.95	—	4.75
Mean	7.52	6.60	7.97	11.59	13.87	16.79	17.12	16.70	16.76	12.20	9.52	7.01
Max	9.43	8.10	9.03	14.48	16.69	19.81	18.35	18.22	18.69	14.53	12.06	10.75
Min	5.15	2.81	6.93	8.63	11.50	13.42	15.38	15.11	14.86	9.95	7.22	4.49



MEDIAN OF DAILY MEAN TEMPERATURE BY MONTH AND YEAR — TRJB

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2004										11.8	7.7	5.8
2005	5.0	5.4	9.0	10.3	13.1	14.6	17.1	15.5	13.6	13.2	7.3	5.6
2006	7.5	6.6	7.6	10.7	13.2	15.6	16.3	14.9	15.4	12.4	8.7	6.1
2007	4.7	7.2	9.0	10.0	13.5	14.3	15.8	14.9	15.4	11.6	8.3	5.9
2008	4.9	6.1	7.1	8.3	12.7	14.8	15.0	15.1	14.8	11.5	8.9	4.3
2009	4.6	4.7	7.0	10.1	12.0	16.5	16.5	14.8	14.8	12.3	8.2	3.9
2010	7.4	8.1	8.8	10.6	11.8	13.2	17.0	16.3	14.6	11.2	8.6	7.1
2011	6.7	5.6	8.0	9.1	11.2	14.1	16.1	16.3	15.0	12.1	7.8	4.7
2012	6.0	6.7	7.1	10.6	12.3	14.9	16.6	16.0	13.6	11.6	8.8	6.7
2013	4.6	6.6	8.2	11.0	13.2	15.5	16.4	16.2	15.9	10.5	9.0	4.0
2014	4.8	6.3	9.3	10.9	13.7	15.9	17.4	16.6	15.5	14.4	8.8	8.1
2015	7.2	9.1	10.4	10.9	14.2	16.9	17.1	17.3	16.1	14.5	8.9	7.4
2016	7.3	8.4	9.4	12.2	14.6	16.4	16.0	16.4	16.0	12.1	11.1	5.3
2017	3.6	6.5	9.1	10.2	13.5	16.0	17.3	16.7	15.7	11.6	8.8	5.2
2018	7.5	6.6	7.9	10.4	14.8	15.6	16.6	15.9	15.1	12.6	7.3	6.7
2019	6.3	5.5	7.9	10.7	14.6	16.2	15.7	15.5	15.9	11.0	7.1	6.6
2020	7.4	6.9	8.1	11.9	14.1	15.8	16.4	15.6	15.5	14.0	7.9	6.6
2021	7.7	7.1	8.0	11.6	13.8	17.4	17.2	16.6	16.6	12.0	9.4	7.0
median	6.3	6.7	8.2	10.4	13.5	15.4	16.5	16.0	15.2	12.1	8.5	6.1

Key

T in °C

- T ≤ 4.5
- 4.5 < T ≤ 5.6
- 5.6 < T ≤ 6.5
- 6.5 < T ≤ 7.1
- 7.1 < T ≤ 8.1
- 8.1 < T ≤ 9.4
- 9.4 < T ≤ 11.3
- 11.3 < T ≤ 15.1
- 15.1 < T ≤ 16.6
- 16.6 < T ≤ 17.2
- T > 17.2

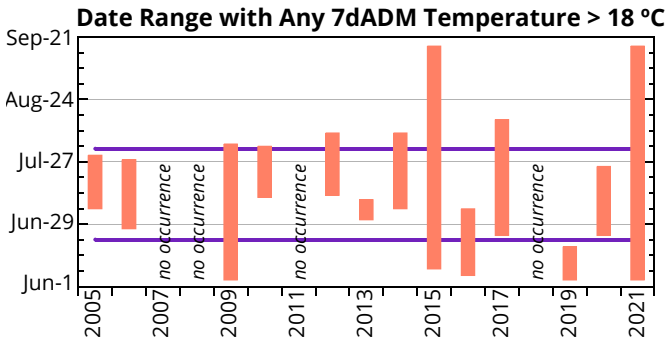
T as percentile

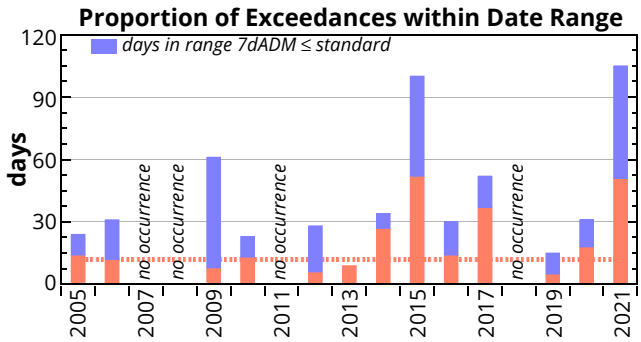
- T ≤ 5th
- 5th < T ≤ 10th
- 10th < T ≤ 15th
- 15th < T ≤ 20th
- 20th < T ≤ 30th
- 30th < T ≤ 40th
- 40th < T ≤ 50th
- 50th < T ≤ 75th
- 75th < T ≤ 90th
- 90th < T ≤ 95th
- T > 95th

Oregon Water Temperature Standard

- Exceedances of the water temperature standard occurred in about three-quarters of the years.
- The temperature standard was exceeded for 51 days in 2021— including 27 consecutive days in June-July. The 7dADM exceeded 20°C on six days; previously this had only occurred twice (both in 2013).
- Days when the 7dADM did not exceed the standard were common within the date range of exceedances.

fraction of years with any exceedance	76%
median days/year exceeding standard	12
average first day of exceedance (if it occurred)	Jun-22
average last day of exceedance (if it occurred)	Oct-1





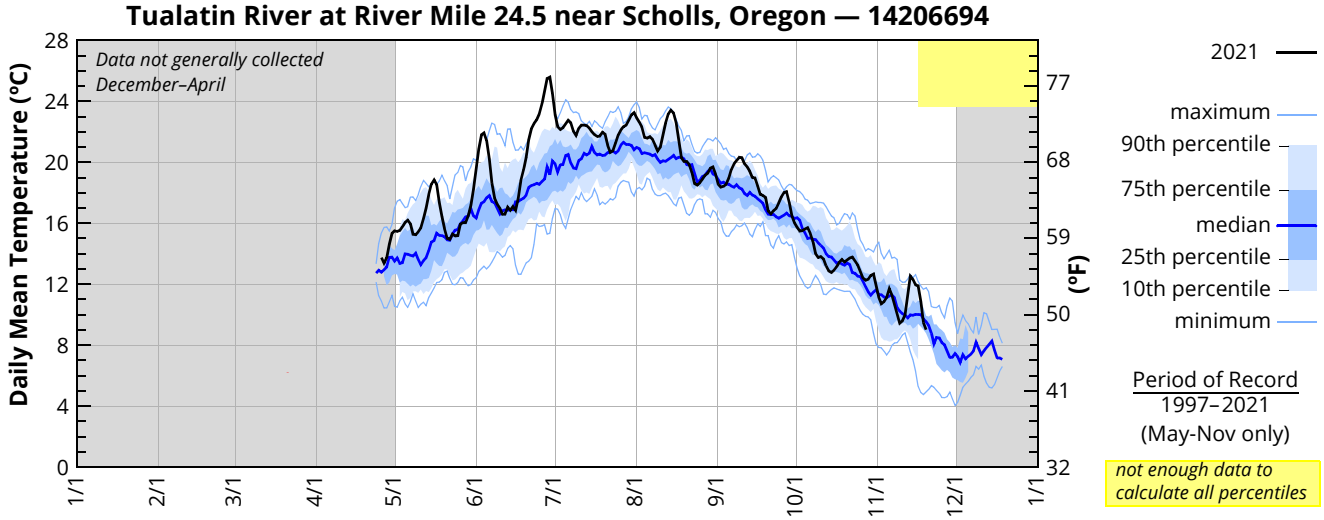
TRM24.5 – TUALATIN RIVER AT RIVER MILE 24.5 NR SCHOLLS, OREGON – 14206694

Data source: U.S. Geological Survey, Oregon Water Science Center
River mile: 24.5 *Latitude:* 45 24 06 *Longitude:* 122 53 38

2021 — DAILY MEAN WATER TEMPERATURE (°C) — RM24.5

DAY	JAN	FEB	MAR	APR*	MAY	JUN	JUL	AUG	SEP	OCT	NOV*	DEC
1					15.50	19.52	23.13	22.93	18.56	15.74	11.15	
2					15.46	20.87	22.34	22.63	18.37	15.49	10.72	
3					15.53	21.81	22.15	22.32	18.42	15.52	10.85	
4					15.77	21.93	22.27	21.64	18.56	15.63	11.13	
5					16.06	21.44	22.52	21.58	18.96	15.71	11.71	
6					16.21	20.22	22.76	21.69	19.53	15.35	11.29	
7					15.97	18.64	22.60	21.52	19.90	14.80	10.67	
8					15.28	17.66	22.04	21.15	20.12	14.01	10.05	
9					15.25	17.27	21.76	20.74	20.33	13.75	9.45	
10					15.44	17.00	22.24	20.99	20.31	13.81	9.60	
11					15.69	16.60	22.45	21.77	19.91	13.66	9.98	
12					16.31	16.60	22.45	22.57	19.70	13.20	11.27	
13					17.00	17.06	22.41	23.17	19.42	12.88	12.53	
14					17.90	16.85	22.25	23.42	18.99	12.77	12.31	
15					18.56	17.10	22.01	23.24	18.98	12.92	11.96	
16					18.84	16.85	21.82	22.61	18.45	13.15	11.89	
17					18.54	17.67	21.70	21.49	17.90	13.44	10.85	
18					17.40	18.80	21.72	20.30	17.83	13.63	9.49	
19					16.44	19.51	21.97	20.06	17.70	13.46	9.02	
20					15.65	20.32	21.85	20.06	16.81	13.59		
21					15.01	21.48	21.10	19.86	16.62	13.72		
22					14.94	22.21	20.65	19.33	16.83	13.78		
23					15.30	22.54	20.76	18.61	16.97	13.53		
24					15.17	22.79	21.27	18.51	17.33	13.28		
25					15.19	23.17	21.78	18.66	17.74	12.83		
26				13.75	15.95	23.83	22.12	18.89	18.01	12.42		
27				13.38	16.04	24.67	22.34	19.15	18.08	12.26		
28				13.74	16.04	25.50	22.45	19.28	17.36	12.32		
29				14.61	16.47	25.60	22.76	19.62	16.50	12.57		
30		—		15.34	17.20	24.55	23.13	19.70	16.02	12.67		
31		—		—	18.23	—	23.27	19.22	—	11.90	—	
Mean					16.27	20.34	22.13	20.86	18.34	13.67		
Max					18.84	25.60	23.27	23.42	20.33	15.74		
Min					14.94	16.60	20.65	18.51	16.02	11.90		

*Incomplete record



MEDIAN OF DAILY MEAN TEMPERATURE BY MONTH AND YEAR — RM24.5

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1997					16.0	16.9	20.1	20.0	16.8	12.0		
1998					12.9	17.2	20.4	19.4	17.2	13.4	10.4	
1999					12.4	16.2	18.8	19.2	16.9	12.8	10.5	
2000					14.6	17.6	19.8	18.0	16.2	14.0	7.1	
2001					15.1	17.6	21.1	21.0	19.1	13.7	9.9	
2002					14.5	17.9	21.1	19.7	16.9	14.0	10.0	7.0
2003					13.6	18.4	21.8	19.5	17.6	15.0	8.6	8.0
2004					15.7	18.8	21.6	20.1	17.7	15.0	9.4	
2005			9.8	10.7	14.0	16.1	20.5	20.4	16.8	14.5		
2006					14.4	17.3	20.2	19.2	17.2	13.6	9.1	
2007					15.2	17.5	20.5	18.9	17.5	13.4	9.8	6.6
2008					14.5	16.5	19.3	18.6	17.1	12.8	10.2	
2009					13.2	18.9	21.3	18.7	17.3	13.4	9.4	
2010					13.0	14.1	19.6	19.8	16.8	12.8	10.5	
2011					12.1	15.6	18.8	19.9	17.9	13.9	9.3	
2012					13.5	16.7	19.9	20.2	16.8	13.3	9.5	8.3
2013					14.8	17.6	20.7	20.2	18.6	11.9	10.1	
2014					15.2	18.2	21.3	21.1	18.4	16.1	9.6	8.1
2015					16.1	20.7	21.6	21.1	17.9	16.0	10.4	
2016					16.4	18.9	20.1	20.4	17.5	12.9	12.1	
2017					14.3	17.8	20.9	21.0	18.3	12.8	9.9	
2018					16.8	18.6	21.1	20.5	17.1	14.2	11.3	
2019					16.3	19.3	20.5	19.9	17.9	12.4	9.1	
2020					15.8	17.8	21.1	20.0	17.7	14.8	9.3	
2021					16.0	20.3	22.2	21.0	18.4	13.5	10.9	
median					14.9	17.7	20.6	20.0	17.4	13.6	9.8	

Key

T in °C

- T ≤ 8.7
- 8.7 < T ≤ 10.3
- 10.3 < T ≤ 11.6
- 11.6 < T ≤ 12.4
- 12.4 < T ≤ 14.1
- 14.1 < T ≤ 15.7
- 15.7 < T ≤ 16.8
- 16.8< T ≤ 19.3
- 19.3 < T ≤ 21.0
- 21.0 < T ≤ 21.7
- T > 21.7

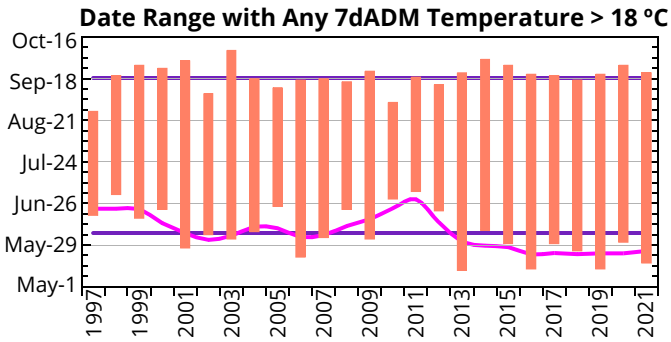
T as percentile

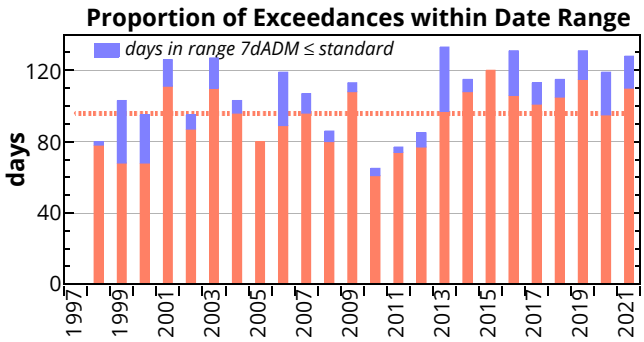
- T ≤ 5th
- 5th < T ≤ 10th
- 10th < T ≤ 15th
- 15th < T ≤ 20th
- 20th < T ≤ 30th
- 30th < T ≤ 40th
- 40th < T ≤ 50th
- 50th < T ≤ 75th
- 75th < T ≤ 90th
- 90th < T ≤ 95th
- T > 95th

Oregon Water Temperature Standard

- Exceedances of the water temperature standard occurred in all years.
- Days when the 7dADM did not exceed the standard usually occurred within the date range of exceedances, but were a minor fraction.

fraction of years with any exceedance	100%
median days/year exceeding standard	96
average first day of exceedance (if it occurred)	Jun-6
average last day of exceedance (if it occurred)	Sep-18





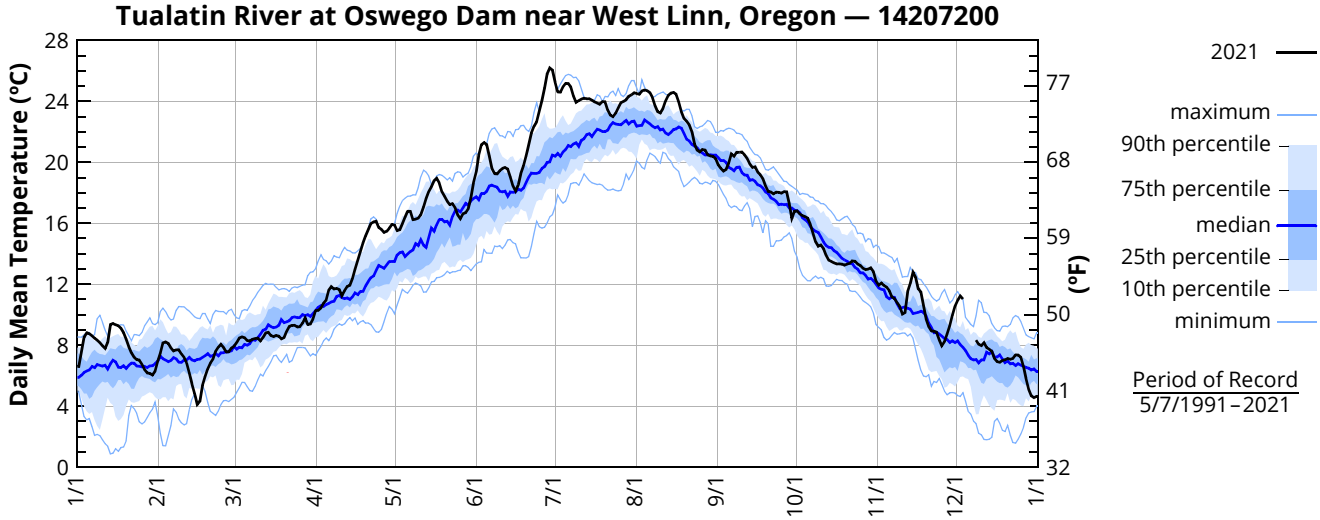
ODAM – Tualatin River at Oswego Dam near West Linn, Oregon – 14207200

Data source: U.S. Geological Survey, Oregon Water Science Center
River mile: 3.4 *Latitude:* 45 21 24 *Longitude:* 122 41 02

2021 — DAILY MEAN WATER TEMPERATURE (°C) — ODAM

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC*
1	6.60	7.48	7.92	10.28	15.88	19.35	25.26	24.51	19.84	16.82	11.95	10.95
2	7.54	8.14	8.18	10.29	15.52	20.46	24.62	24.47	19.61	16.61	12.08	11.23
3	8.52	8.22	8.47	10.44	15.58	21.16	24.61	24.68	19.42	16.50	11.91	11.03
4	8.82	8.12	8.54	10.76	15.97	21.30	24.96	24.75	19.53	16.44	11.81	
5	8.75	7.82	8.49	10.97	16.41	21.18	25.19	24.70	19.96	16.34	11.58	
6	8.62	7.62	8.31	11.61	16.80	20.40	25.18	24.58	20.56	15.96	11.17	
7	8.46	7.69	8.27	11.84	16.79	19.60	24.96	24.26	20.40	15.35	11.07	
8	8.33	7.70	8.39	11.68	16.24	19.25	24.35	23.74	20.66	14.80	10.79	8.33
9	8.16	7.43	8.44	11.72	16.27	19.24	23.94	23.33	20.66	14.50	10.55	8.07
10	7.97	7.20	8.47	11.65	16.33	19.46	24.05	23.24	20.68	14.58	10.04	7.98
11	7.79	6.84	8.28	11.25	16.55	19.60	24.15	23.54	20.50	14.34	10.14	8.16
12	8.19	6.17	8.50	11.59	17.06	19.66	24.21	24.03	20.25	13.90	11.54	7.84
13	9.35	5.47	8.80	11.85	17.62	19.57	24.17	24.40	19.90	13.58	12.05	7.73
14	9.42	4.83	8.85	11.92	18.09	19.05	24.18	24.55	19.66	13.50	12.79	7.60
15	9.34	4.11	8.64	12.37	18.39	18.45	24.08	24.59	19.71	13.40	12.46	7.13
16	9.28	4.33	8.56	12.97	18.79	18.11	23.97	24.47	19.36	13.33	11.71	6.92
17	9.12	5.36	8.64	13.57	18.95	18.52	23.90	23.98	19.19	13.34	11.49	6.87
18	8.83	5.93	8.59	14.11	18.65	19.26	23.81	23.32	18.94	13.32	10.63	6.99
19	8.41	6.45	8.42	14.71	18.07	19.78	23.99	22.89	18.44	13.25	9.72	7.04
20	7.90	6.82	8.50	15.17	17.77	20.42	23.98	22.70	18.10	13.32	9.22	7.12
21	7.50	7.09	8.91	15.58	17.45	21.13	23.42	22.47	18.06	13.37	8.93	7.07
22	7.21	7.60	9.23	15.98	17.23	21.93	23.10	22.00	17.93	13.53	8.92	7.13
23	7.05	7.87	9.30	16.09	17.29	22.36	22.99	21.21	18.05	13.51	8.85	7.37
24	7.03	8.06	9.31	16.13	17.04	22.67	23.22	20.80	18.04	13.33	8.35	7.36
25	6.75	7.86	9.19	15.73	16.54	23.34	23.57	20.68	17.97	13.24	7.96	7.21
26	6.40	7.56	9.21	15.60	16.30	24.07	23.92	20.84	18.08	13.06	8.24	6.61
27	6.18	7.57	9.45	15.40	16.62	24.87	24.00	20.81	18.07	12.96	8.73	5.81
28	6.15	7.81	9.79	15.47	16.69	25.80	24.10	20.49	17.27	12.99	9.29	5.10
29	6.04	—	9.36	15.67	16.94	26.20	24.34	20.42	16.31	13.08	9.96	4.68
30	6.28	—	9.39	15.93	17.69	26.06	24.43	20.40	16.80	12.83	10.58	4.55
31	6.96	—	9.71	—	18.65	—	24.57	20.25	—	12.22	—	4.65
Mean	7.84	6.97	8.78	13.28	17.10	21.08	24.17	22.94	19.07	14.11	10.48	7.35
Max	9.42	8.22	9.79	16.13	18.95	26.20	25.26	24.75	20.68	16.82	12.79	11.23
Min	6.04	4.11	7.92	10.28	15.52	18.11	22.99	20.25	16.31	12.22	7.96	4.55

*Incomplete record



MEDIAN OF DAILY MEAN TEMPERATURE BY MONTH AND YEAR — ODAM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1991					13.0	16.1	21.5	21.8	18.5	14.8	9.8	6.9
1992	6.4	8.5	11.2	12.5	16.6	20.8	21.4	21.1	17.5	14.1	10.5	5.6
1993	4.0	5.9	8.3	10.0	16.3	16.7	18.9	20.6	16.5	14.7	8.3	6.9
1994	7.5	5.6	9.3	11.6	16.3	17.8	21.7		18.6	13.5	7.0	7.6
1995	6.7	9.5			14.7	18.5	22.1	20.1	18.7	14.1	11.0	7.9
1996	8.0				13.6	18.1	21.2	20.8	16.9	14.5	9.6	7.1
1997		7.5	8.7	11.3	17.4	18.1	20.8	22.4	17.6	12.4	9.9	6.8
1998	7.1	8.6	9.9	11.1	13.5	18.4	21.8	22.0	19.6	14.0	10.8	7.1
1999	7.0	7.1	8.6	11.2	12.9	17.5	20.1	21.1	18.1	13.7	10.6	8.2
2000	6.0	7.5			15.2	18.1	21.1	20.6	17.6	14.4	8.2	6.7
2001	6.5	6.6	9.8	10.8	15.8	18.6	21.0	21.1	19.5	14.3	10.8	7.2
2002	6.6	6.7	7.5	11.7	15.3	19.3	22.4	21.3	18.6	14.0	9.7	7.5
2003	7.6	8.1	9.8	11.5	13.8	20.0	22.9	21.4	18.4	15.3	9.2	7.8
2004	6.0	7.3	10.6	12.5	16.5	18.7	23.0	23.1	18.6	15.6	9.5	7.8
2005	6.0	6.7			14.9	17.0	21.2	22.5	18.5	15.0	8.8	6.0
2006	7.8	7.0	8.1	11.5	15.4	18.2	22.3	21.3	18.2	14.1	9.3	6.1
2007	5.3	7.6	9.9	11.1	15.7	18.9	21.6	20.6	18.8	13.8	10.2	6.5
2008	5.3	6.6	8.4	9.5	15.3	16.6	21.7	20.8	18.6	13.6	11.3	4.9
2009	5.0	5.6	7.7	11.0	13.3	19.6	21.8	20.8	18.9	14.0	9.0	4.8
2010	7.6	8.3	9.4	11.8	13.3	14.5	21.0	21.6	17.8	14.3	10.2	7.3
2011	7.0	6.7			12.9	16.7	19.7	21.4	19.4	14.4	9.5	5.5
2012	6.3	7.2	7.5	11.5	14.5	17.2	21.3	22.2	18.4	13.8	10.1	7.5
2013	4.7	7.4	8.8	12.3	16.5	18.7	22.4	22.0	20.0	12.2	10.5	5.6
2014	5.8	6.6	9.9	12.3	15.4	18.8	22.7	23.0	19.5	16.5	9.8	8.6
2015	7.5	9.5	11.2	12.3	16.7	21.9	24.1	22.6	18.9	16.2	10.7	7.7
2016	7.5	8.7	10.0	13.7	17.2	19.6	21.5	22.3	18.4	13.8	12.1	5.7
2017	4.1	7.2	9.6	10.8	14.7	18.9	22.5	22.4	19.9	12.9	9.8	6.1
2018	7.9	7.4	8.6	10.9	17.7	18.9	23.3	23.0	18.4	13.9	10.1	7.6
2019	7.2	6.1	8.5	12.0	17.0	20.4	22.0	21.9	19.1	12.9	9.3	7.3
2020	8.0	7.5	8.9	14.0	16.5	18.8	22.1	22.4	17.9	15.2	9.2	7.3
2021	8.0	7.5	8.6	12.7	16.9	20.4	24.1	23.3	19.4	13.5	10.6	7.1
median	6.6	7.3	9.1	11.6	15.6	18.7	21.8	21.7	18.5	14.2	9.9	7.0

Key

T in °C

- T ≤ 5.5
- 5.5< T ≤ 6.5
- 6.5 < T ≤ 7.2
- 7.2 < T ≤ 7.
- 7.8 < T ≤ 9.1
- 9.1 < T ≤ 10.8
- 10.8 < T ≤ 13.0
- 13.0 < T ≤ 18.7
- 18.7 < T ≤ 21.6
- 21.6 < T ≤ 22.5
- T > 22.5

T as percentile

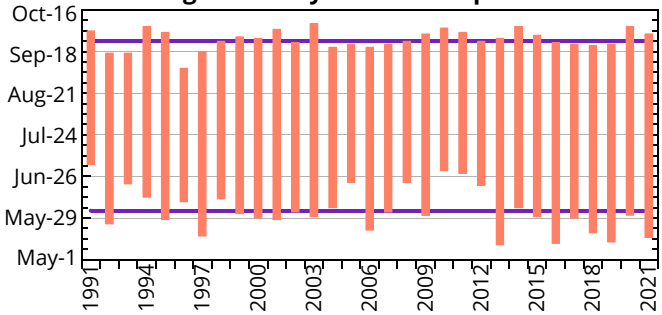
- T ≤ 5th
- 5th < T ≤ 10th
- 10th < T ≤ 15th
- 15th < T ≤ 20th
- 20th < T ≤ 30th
- 30th < T ≤ 40th
- 40th < T ≤ 50th
- 50th < T ≤ 75th
- 75th < T ≤ 90th
- 90th < T ≤ 95th
- T > 95th

Oregon Water Temperature Standard

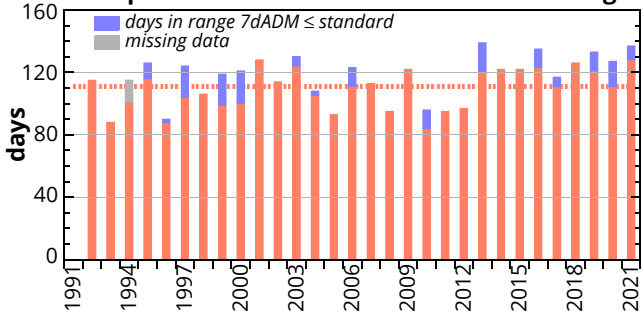
- Exceedances of the water temperature standard occurred in all years.
- Days when the 7dADM did not exceed the standard usually occurred within the date range of exceedances, but were a minor fraction.

fraction of years with any exceedance	100%
median days/year exceeding standard	111
average first day of exceedance (if it occurred)	Jun-3
average last day of exceedance (if it occurred)	Sep-25

Date Range with Any 7dADM Temperature > 18 °C



Proportion of Exceedances within Date Range

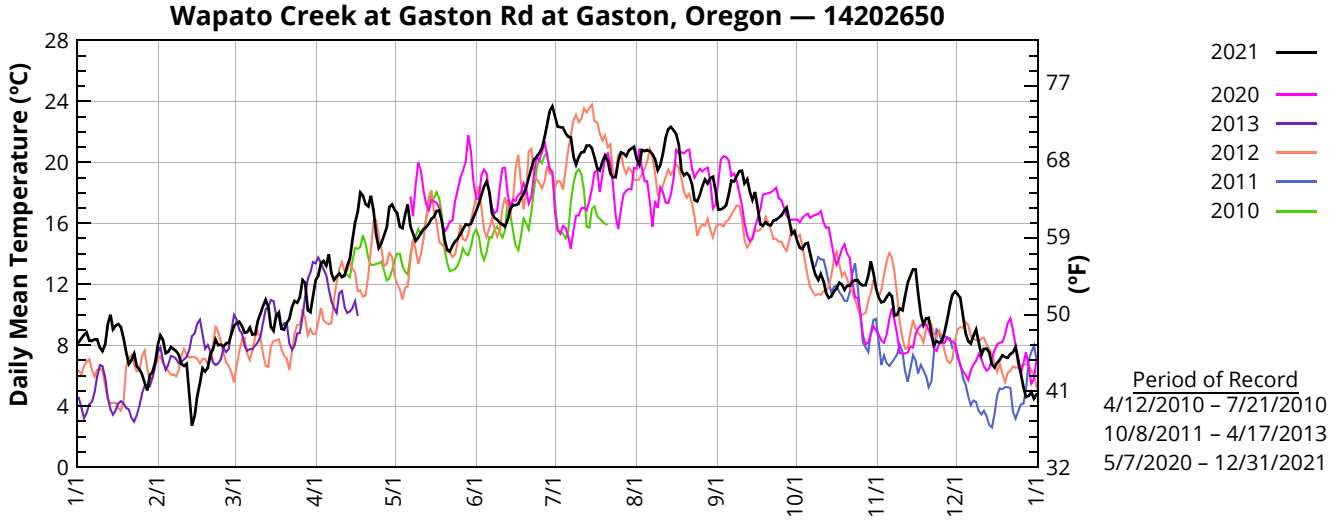


WGAS – Wapato Creek at Gaston Rd at Gaston, Oregon – 14202650

Data source: U.S. Geological Survey, Oregon Water Science Center
River mile: 1.9 *Latitude:* 45 26 26 *Longitude:* 123 07 30

2021 — DAILY MEAN WATER TEMPERATURE (°C) — WGAS

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	8.19	8.64	9.27	12.27	16.89	16.81	22.99	20.23	16.91	14.85	11.12	11.35
2	8.45	8.35	9.44	12.55	16.68	17.26	22.35	19.84	16.91	14.40	10.81	11.11
3	8.67	7.47	9.54	13.36	15.78	17.86	22.31	20.81	17.01	14.31	10.86	9.97
4	8.84	7.57	9.27	13.52	15.68	18.41	22.29	20.73	17.16	14.64	11.16	8.82
5	8.30	7.88	8.83	13.23	16.56	18.74	21.90	20.81	17.92	14.71	11.40	8.26
6	8.28	7.74	8.86	13.95	17.23	18.10	21.68	20.73	18.79	13.96	11.22	8.10
7	8.39	7.61	9.16	12.74	15.81	16.67	21.66	20.54	18.74	13.21	9.95	8.62
8	8.38	7.38	8.70	12.28	15.36	16.35	20.38	20.21	19.09	12.61	9.99	9.02
9	7.85	6.77	8.72	12.51	14.85	16.24	19.84	19.49	19.42	12.28	10.40	8.18
10	7.61	6.64	9.56	12.71	15.06	16.01	20.36	19.81	19.45	12.67	10.29	7.36
11	8.04	6.78	10.06	12.47	15.35	15.94	20.65	20.61	18.61	12.21	11.21	7.76
12	9.35	4.51	10.55	12.58	15.61	15.78	20.69	21.59	18.89	11.42	12.09	7.78
13	10.00	2.72	10.98	13.18	15.75	16.22	21.09	22.18	18.11	11.10	12.52	7.53
14	9.04	3.33	10.54	13.68	15.97	16.93	21.11	22.33	17.53	11.21	12.97	6.75
15	9.28	4.66	9.20	14.93	16.29	17.21	20.93	22.10	18.06	11.54	12.97	6.54
16	9.38	5.51	8.95	16.03	16.44	17.18	20.35	21.88	16.91	11.73	11.38	6.85
17	9.19	6.48	9.94	16.76	16.81	17.26	19.60	21.21	15.94	12.10	10.00	7.04
18	8.44	6.27	10.16	18.03	16.85	17.64	19.46	19.47	15.85	11.98	9.32	7.34
19	7.54	6.51	9.07	17.81	16.13	17.92	20.04	19.15	16.07	11.63	9.76	7.22
20	6.76	7.43	9.02	17.26	14.98	18.32	20.44	19.30	15.91	11.91	9.79	7.17
21	7.01	7.72	9.45	17.11	14.27	18.94	20.09	19.13	15.87	11.90	8.75	7.41
22	7.43	8.36	9.71	17.80	14.15	19.62	19.27	18.59	16.19	12.14	8.01	7.52
23	6.63	8.00	10.49	16.81	14.54	20.19	19.02	17.52	16.23	12.27	8.26	7.89
24	6.42	8.04	10.90	15.24	14.80	20.36	19.03	17.44	16.37	12.26	8.17	7.06
25	6.11	7.90	10.79	14.39	15.00	20.60	20.05	17.85	16.51	12.02	8.25	6.10
26	5.57	8.13	11.14	14.70	15.27	20.93	20.65	18.42	16.80	11.92	8.86	5.25
27	5.03	8.14	12.28	15.19	15.60	21.65	20.59	18.88	17.02	11.95	9.64	4.59
28	6.04	8.72	12.10	15.71	15.92	22.51	20.41	18.61	16.18	12.54	10.61	4.67
29	6.24	—	10.30	17.05	15.87	23.39	20.77	18.97	15.29	13.49	11.31	4.92
30	6.85	—	10.17	17.23	15.97	23.69	20.90	19.05	15.48	12.71	11.53	4.50
31	8.01	—	11.16	—	16.37	—	21.02	18.13	—	11.76	—	4.77
Mean	7.78	6.97	9.95	14.77	15.74	18.49	20.71	19.86	17.17	12.56	10.42	7.34
Max	10.00	8.72	12.28	18.03	17.23	23.69	22.99	22.33	19.45	14.85	12.97	11.35
Min	5.03	2.72	8.70	12.27	14.15	15.78	19.02	17.44	15.29	11.10	8.01	4.50



Oregon water temperature standard

- Exceedances of the water temperature standard occurred in all years for which adequate data are available.
- Monitoring during some years did not coincide with the time period in which high temperatures would be expected. During other years time periods of temperature standard exceedance could only be approximated because temperature monitoring started after or ended while temperature exceedances were occurring. Periods of temperature standard exceedances are shown below.

TEMPERATURE STANDARD EXCEEDANCES

Year	Time Period	Days	Percent of Time Period	Notes
2010	5/14 – after 7/17	≥24	37%	monitoring ended while standard was exceeded
2011	—	—	—	monitoring began October 7th, after water cooled
2012	5/15 – 8/24	86	84%	
2013	—	—	—	monitoring ended April 17, before water warmed
2020	before 5/7 – 9/27	≥125	87%	monitoring began after standard was exceeded
2021	4/20 – 9/18	100	66%	

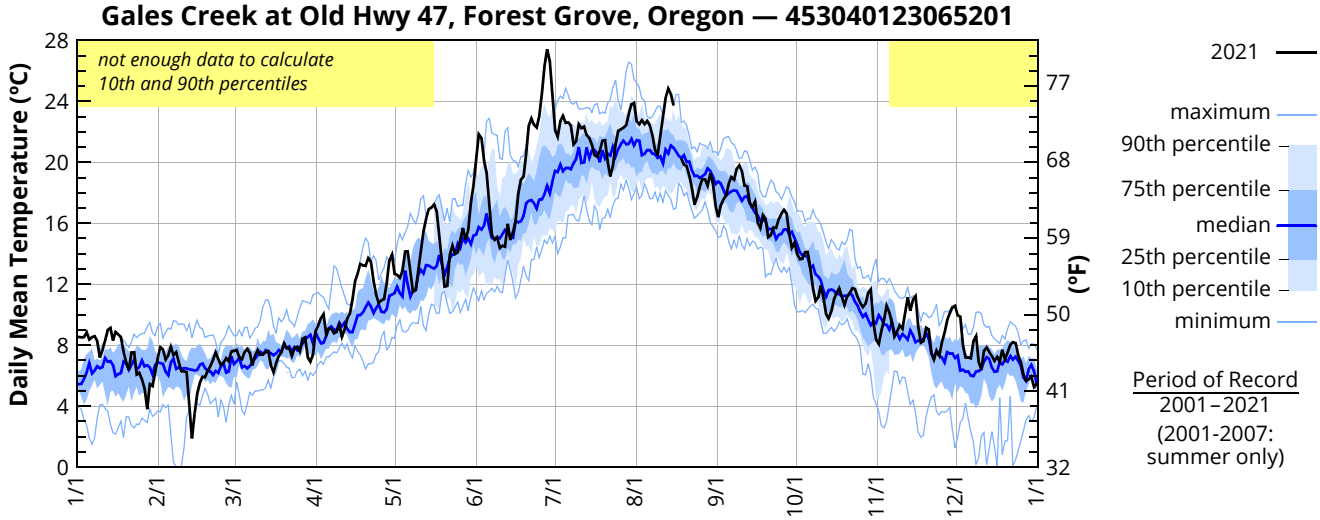
GALES – GALES CREEK AT OLD HWY 47, FOREST GROVE, OREGON – 453040123065201

Data source: U.S. Geological Survey, Oregon Water Science Center
River mile: 2.36 *Latitude:* 45 28 40 *Longitude:* 123 06 52

2021 — DAILY MEAN WATER TEMPERATURE† (°C) — GALES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG*	SEP	OCT	NOV	DEC
1	8.54	7.86	7.62	8.93	12.68	20.26	22.12	22.71	16.40	13.98	8.08	9.97
2	8.51	7.72	7.69	9.29	12.62	21.84	21.69	22.50	17.20	13.65	8.92	9.88
3	8.53	7.05	7.21	9.77	12.42	21.59	22.72	22.77	17.57	13.67	9.67	7.99
4	8.85	7.32	7.07	10.03	12.82	20.11	23.05	22.51	17.80	14.11	10.60	7.20
5	8.37	7.90	7.55	8.70	14.14	19.31	22.59	22.72	18.60	14.12	10.16	7.20
6	8.53	7.35	7.75	9.09	14.16	17.02	22.62	22.43	19.03	13.06	9.46	7.14
7	8.58	7.53	7.50	9.09	12.87	15.21	22.42	21.78	18.87	11.75	8.56	8.28
8	8.28	6.90	6.67	8.78	11.49	14.91	21.18	20.82	19.55	10.90	8.90	8.59
9	7.19	6.29	7.34	8.87	11.62	15.09	21.39	20.54	19.79	11.14	9.30	6.92
10	7.64	6.30	7.69	9.34	12.96	14.38	22.51	21.77	19.42	11.91	9.08	6.41
11	8.30	6.23	7.38	8.54	14.18	14.53	22.25	23.09	18.48	11.07	10.10	7.63
12	8.99	4.23	7.40	9.01	15.50	14.47	22.35	24.20	18.42	10.03	11.15	7.85
13	9.13	1.88	7.54	9.74	16.28	15.97	21.80	24.84	17.36	9.75	10.26	7.56
14	8.31	3.52	7.61	10.07	16.93	14.91	21.58	24.49	17.08	10.22	10.99	7.28
15	8.87	4.81	6.70	10.99	17.03	15.42	21.17	23.73	17.43	10.99	11.21	6.96
16	8.70	5.54	6.22	12.19	17.24	16.14	20.47		16.04	11.43	9.26	7.22
17	8.54	5.93	6.81	12.71	16.80	17.95	20.36		15.69	11.75	8.16	6.92
18	7.57	5.90	7.28	13.33	15.08	18.86	20.75	20.25	16.53	11.19	8.27	7.70
19	6.92	6.32	7.54	13.24	13.53	19.07	21.42	19.86	16.28	10.63	9.14	7.07
20	6.39	6.62	8.11	13.21	11.85	20.56	21.45	19.76	15.08	11.21	9.04	7.51
21	7.51	7.03	7.80	13.71	11.89	22.37	19.99	19.16	15.21	11.42	7.46	8.02
22	7.53	7.53	7.81	13.49	13.92	22.88	19.07	18.28	15.72	11.73	7.05	8.20
23	6.08	7.08	7.29	12.20	14.55	22.48	19.75	17.22	15.69	11.68	7.64	8.13
24	6.19	6.71	7.82	11.32	13.99	22.29	21.21	17.72	16.26	11.16	7.30	7.35
25	5.77	6.83	7.90	10.76	14.10	23.03	22.07	18.41	16.64	10.77	8.16	6.88
26	5.18	7.15	7.59	10.95	14.94	24.58	22.17	18.90	16.88	10.50	8.81	6.07
27	3.80	6.95	8.43	11.01	15.68	26.35	22.27	18.89	16.65	10.73	9.61	5.67
28	5.44	7.61	8.51	12.08	14.92	27.41	22.44	18.47	15.27	11.45	10.10	5.76
29	5.32	—	7.20	13.55	15.54	26.61	23.16	19.29	14.40	11.66	10.49	5.94
30	6.21	—	6.92	13.94	17.36	24.63	23.81	18.59	14.74	9.45	10.59	5.26
31	7.19	—	7.36	—	18.49	—	23.91	17.12	—	8.37	—	5.45
Mean	7.45	6.43	7.46	10.93	14.44	19.67	21.80	20.79	17.00	11.47	9.25	7.29
Max	9.13	7.90	8.51	13.94	18.49	27.41	23.91	24.84	19.79	14.12	11.21	9.97
Min	3.80	1.88	6.22	8.54	11.49	14.38	19.07	17.12	14.40	8.37	7.05	5.26

†All data after October 11, 2021 are provisional—subject to revision; * Incomplete record



MEDIAN OF DAILY MEAN TEMPERATURE BY MONTH AND YEAR — GALES

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2001					13.9	15.8	19.9	20.0	17.1	10.8		
2002					12.2	17.1	21.2	19.6	16.3	11.5	7.9	5.9
2003					14.4	16.8	21.0	20.3	17.4	13.7		
2004					14.9	17.3	21.9	21.3	16.6	12.7		
2005						14.7	20.1	20.3	15.4	12.6		
2006					13.3	15.8	20.8	19.3	15.9	11.3	8.7	
2007					14.3	16.8	20.8	19.1	16.3	10.9	7.6	6.2
2008	5.5		6.8	7.8	12.9	15.4	20.0	19.5	16.7	10.7	8.7	4.8
2009	4.6	4.6	6.6	9.3	12.0	16.7	21.6	19.5	16.5	11.3	8.2	4.3
2010	7.5	7.8	8.0	9.7	11.1	12.5	19.1	19.1	16.4	10.9	8.1	7.4
2011	6.6	5.6	7.2	8.1	10.6	14.5	17.8	19.3	17.1	12.1	6.9	4.7
2012	6.1	6.4	7.0	9.4	12.0	14.8	19.6	20.0	16.3	11.1	8.9	7.2
2013	4.7	6.4	7.7	10.1	13.3	16.2	20.5	19.9	18.1	10.3	8.6	3.9
2014	5.1	6.3	8.2	10.0	12.6	16.7	21.2	20.7	17.5	13.9	8.5	8.1
2015	7.3	8.7	9.6	10.1	14.4	20.1	22.0	20.3	16.0	13.9	8.4	8.0
2016	7.4	8.2	8.7	11.3	14.6	18.1	19.4	20.0	16.4	11.6	10.2	6.1
2017	4.1	6.3	7.9	8.9	12.8	16.2	20.2	20.9	16.7	10.6	8.5	5.4
2018	7.5	6.1	7.2	9.0	14.5	16.6	21.8	20.6	15.9	11.9	6.9	7.1
2019	6.7	5.6	7.2	10.1	14.6	17.8	20.1	20.1	17.1	10.2	6.3	6.8
2020	7.8	6.8	7.6	11.2	13.5	17.0	19.8	19.6	17.1	13.0	7.9	6.8
2021	7.6	6.9	7.5	10.9	14.2	19.7	22.1	20.5	16.8	11.2	9.2	7.2
median	6.5	6.4	7.6	9.6	13.3	16.4	20.4	20.0	16.6	11.6	8.2	6.4

KEY

T in °C

T ≤ 4.9
4.9 < T ≤ 6.0
6.0 < T ≤ 6.8
6.8 < T ≤ 7.4
7.4 < T ≤ 8.4
8.4 < T ≤ 10.1
10.1 < T ≤ 12.1
12.1 < T ≤ 17.7
17.7 < T ≤ 20.5
20.5 < T ≤ 21.6
T > 21.6

T as percentile

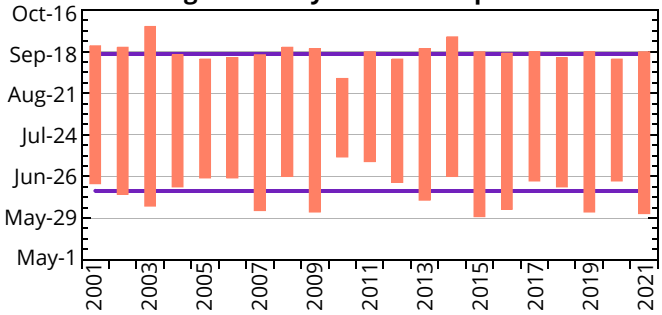
T ≤ 5th
5th < T ≤ 10th
10th < T ≤ 15th
15th < T ≤ 20th
20th < T ≤ 30th
30th < T ≤ 40th
40th < T ≤ 50th
50th < T ≤ 75th
75th < T ≤ 90th
90th < T ≤ 95th
T > 95th

OREGON WATER TEMPERATURE STANDARD

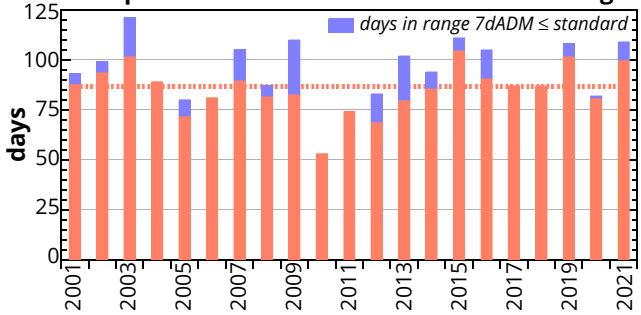
- Exceedances of the water temperature standard occurred in all years.
- Days when the 7dADM did not exceed the standard usually occurred within the date range of exceedances, but were a minor fraction.

fraction of years with any exceedance	100%
median days/year exceeding standard	87
average first day of exceedance (if it occurred)	Jun-16
average last day of exceedance (if it occurred)	Sep-16

Date Range with Any 7dADM Temperature > 18 °C



Proportion of Exceedances within Date Range

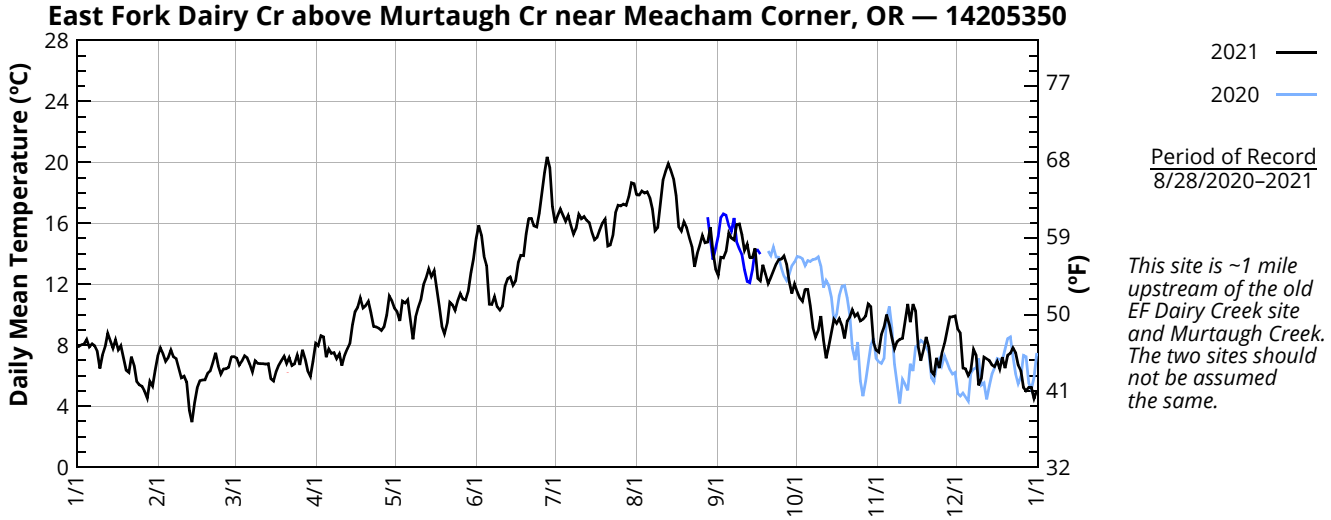


5350 – East Fork Dairy Cr abv Murtaugh Cr near Meacham Corner, Oregon – 14205350

Data source: U.S. Geological Survey, Oregon Water Science Center
River mile: 13.4 *Latitude:* 45 41 38 *Longitude:* 123 04 12 *Drainage area:* 27.6 sq mile *Datum:* 350 ft

2021 — DAILY MEAN WATER TEMPERATURE (°C) — 5350

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7.91	7.82	7.25	8.12	10.42	15.02	16.01	17.87	12.60	11.52	7.55	9.08
2	8.03	7.45	7.16	7.97	10.20	15.87	16.50	17.86	13.77	11.09	8.68	8.82
3	8.07	6.94	6.69	8.62	9.59	15.23	16.93	18.12	13.73	10.88	9.18	6.50
4	8.38	7.18	6.97	8.54	10.89	13.85	16.55	17.98	14.15	11.67	10.01	6.45
5	7.89	7.68	7.30	7.21	10.77	13.24	16.13	18.07	15.37	11.66	9.37	6.02
6	8.09	7.23	7.18	7.74	10.98	10.70	16.51	17.68	15.03	10.60	8.48	6.35
7	7.96	7.11	6.75	7.46	9.56	10.67	15.89	16.92	14.91	9.15	7.75	7.73
8	7.62	6.47	6.25	7.51	8.39	11.19	15.29	15.51	15.91	8.53	8.24	7.36
9	6.47	5.86	6.98	7.12	9.85	10.53	15.67	15.73	15.96	8.96	8.39	5.36
10	7.35	5.97	6.81	7.43	10.48	10.30	16.59	17.32	15.24	9.91	8.44	5.81
11	7.90	5.59	6.79	6.65	10.97	10.55	16.30	18.82	14.21	8.30	9.60	7.22
12	8.78	3.72	6.79	7.32	11.97	11.86	16.45	19.39	14.62	7.14	10.71	7.10
13	8.28	2.95	6.76	7.74	12.41	12.36	16.20	19.90	13.74	7.90	9.51	7.01
14	7.80	4.25	6.79	8.12	13.02	12.48	16.04	19.48	13.75	8.86	10.70	6.71
15	8.36	5.19	5.80	9.34	12.51	11.95	15.41	18.93	14.36	9.71	10.25	6.59
16	7.69	5.67	5.64	10.20	12.89	12.23	14.93	17.81	12.39	9.44	7.92	6.96
17	7.96	5.72	6.25	10.50	11.68	13.43	15.08	15.78	12.23	9.74	6.98	6.44
18	7.11	5.73	6.69	11.10	10.58	13.90	15.56	15.49	13.28	9.29	7.65	7.21
19	6.36	6.16	6.99	10.44	9.24	13.88	16.02	16.10	12.67	8.45	8.54	6.50
20	6.21	6.32	7.27	10.59	8.74	15.31	16.27	15.71	12.05	9.58	7.93	7.33
21	7.25	6.88	6.80	10.87	9.42	16.31	14.51	15.08	12.45	9.83	6.27	7.46
22	6.68	7.50	7.19	10.14	10.82	16.32	14.58	14.49	12.88	10.32	6.06	7.83
23	5.62	6.63	6.66	9.24	10.64	15.83	15.19	13.14	13.32	9.90	7.17	7.50
24	5.40	6.11	6.77	9.20	10.28	15.76	16.70	14.01	13.61	10.08	6.49	6.69
25	5.31	6.44	7.36	9.12	10.92	16.66	17.19	14.56	13.66	9.59	7.45	6.32
26	4.98	6.45	6.71	8.96	11.38	17.95	17.14	15.20	13.87	9.70	8.11	5.22
27	4.53	6.55	7.70	9.19	11.03	19.34	17.26	14.72	13.34	9.92	8.98	5.00
28	5.62	7.24	7.12	9.98	10.97	20.36	17.17	14.76	12.14	10.71	9.86	5.23
29	5.31	—	6.30	11.22	11.53	19.63	17.73	15.74	11.39	10.54	9.86	5.23
30	6.34	—	5.95	10.89	12.75	17.11	18.66	14.14	12.03	8.21	9.92	4.49
31	7.30	—	6.93	—	13.67	—	18.60	13.00	—	7.68	—	4.97
Mean	7.05	6.24	6.79	8.95	10.92	14.33	16.29	16.43	13.62	9.64	8.54	6.60
Max	8.78	7.82	7.70	11.22	13.67	20.36	18.66	19.90	15.96	11.67	10.71	9.08
Min	4.53	2.95	5.64	6.65	8.39	10.30	14.51	13.00	11.39	7.14	6.06	4.49



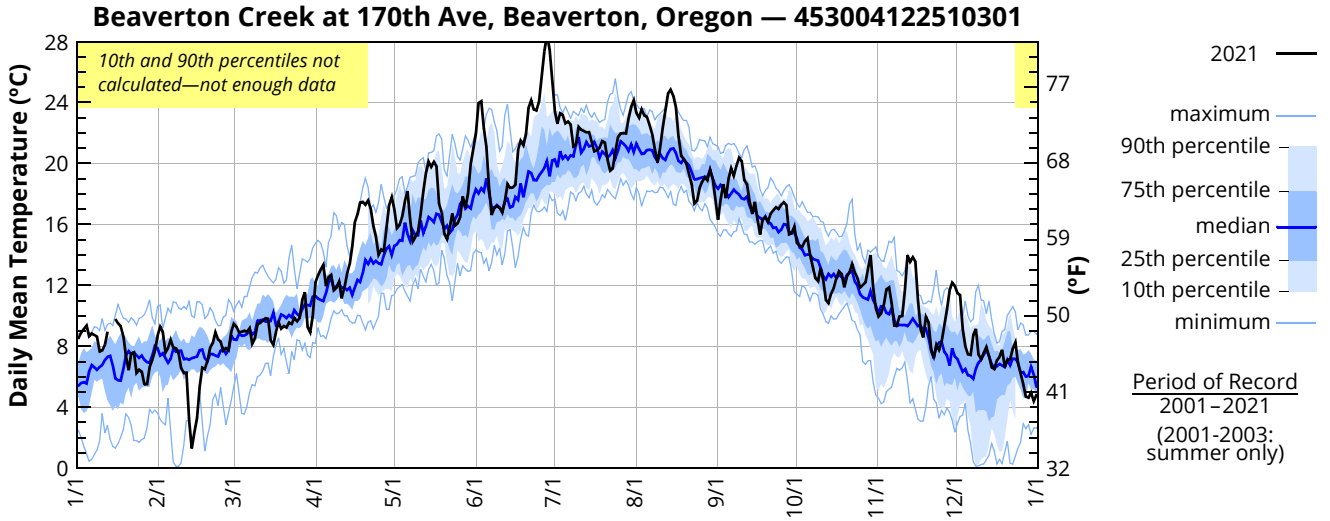
B170 – Beaverton Creek at 170th Ave, Beaverton, OR – 453004122510301

Data source: U.S. Geological Survey, Oregon Water Science Center
River mile: 4.9 *Latitude:* 45 28 04 *Longitude:* 122 51 03

2021 — DAILY MEAN WATER TEMPERATURE (°C) — B170

DAY	JAN*	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	8.56	9.28	9.48	12.18	16.98	22.03	23.41	23.32	16.31	14.78	9.96	11.50
2	8.92	8.96	9.28	12.64	15.76	23.97	22.61	23.00	17.62	14.61	10.15	11.37
3	9.13	7.60	8.91	13.04	15.97	24.09	23.30	23.56	18.65	14.54	10.73	9.11
4	9.36	7.88	8.96	13.35	16.51	22.31	23.20	23.15	17.72	14.91	11.73	8.02
5	8.66	8.44	9.02	11.95	17.52	21.08	22.64	23.07	19.00	15.10	11.86	7.47
6	8.84	7.92	8.94	12.55	18.19	18.34	22.75	22.52	19.69	14.01	10.80	7.43
7	8.75	7.87	9.19	12.69	16.28	16.62	22.57	21.93	19.18	13.24	9.36	8.73
8	8.64	7.56	8.18	11.68	14.89	17.08	21.12	20.96	19.83	12.48	9.36	9.14
9	7.66	6.56	8.55	11.83	15.19	17.20	21.22	20.07	20.38	12.28	9.96	7.48
10	7.74	6.25	9.46	12.24	15.55	17.09	22.41	21.02	20.16	13.14	10.00	7.16
11	8.12	6.28	9.53	11.15	16.67	16.78	22.22	22.39	18.92	12.29	11.62	7.56
12	8.97	3.12	9.69	11.84	18.18	17.49	22.13	23.48	18.65	11.05	13.99	7.96
13		1.30	9.85	12.74	19.36	18.67	22.05	24.60	17.52	10.83	13.56	7.37
14		2.38	9.82	13.39	20.13	18.41	22.06	24.85	16.70	11.48	13.85	6.61
15	9.80	3.29	8.40	14.56	19.78	18.43	21.43	24.44	17.48	11.82	13.56	6.51
16	9.51	5.38	8.11	16.14	20.11	18.60	20.80	23.69	16.31	12.47	11.05	7.10
17	9.33	6.60	8.91	16.66	19.81	20.87	20.88	21.78	15.34	12.93	9.13	7.31
18	8.67	6.51	9.59	17.44	17.39	21.49	21.03	20.50	16.36	12.74	8.59	7.77
19	7.36	7.07	9.16	17.48	16.79	21.20	21.47	20.31	16.47	11.88	9.94	6.63
20	6.43	7.91	9.33	17.29	15.39	21.90	21.38	19.97	16.15	12.61	9.60	7.11
21	7.54	8.23	9.23	17.58	15.04	23.63	20.23	19.33	16.71	12.86	7.79	7.15
22	7.60	8.92	9.56	17.05	15.73	24.14	19.53	18.61	16.93	13.41	7.22	7.83
23	6.26	8.45	9.47	15.89	16.73	23.55	19.68	17.37	17.14	12.84	8.10	8.25
24	6.47	8.32	9.86	15.18	15.92	23.48	20.81	17.56	17.01	12.48	7.76	6.91
25	6.34	7.71	9.65	14.01	16.05	24.07	21.72	18.39	17.29	11.86	8.32	6.21
26	5.51	7.88	9.86	14.35	16.46	25.68	21.97	18.81	17.45	12.01	9.37	5.51
27	5.52	7.75	11.06	14.24	17.84	27.36	22.00	19.10	17.27	12.19	10.39	4.70
28	6.62	8.96	11.56	15.75	17.11	28.46	21.98	18.89	15.35	13.11	11.67	4.63
29	7.10	—	9.26	17.26	18.03	27.48	22.95	19.59	15.41	14.00	12.18	4.97
30	7.68	—	8.92	17.79	19.97	25.62	23.72	19.00	15.85	11.78	11.97	4.41
31	8.70	—	9.98	—	20.94	—	24.14	17.54	—	10.51	—	4.80
Mean	7.92	6.94	9.38	14.40	17.30	21.57	21.92	21.06	17.50	12.78	10.45	7.25
Max	9.80	9.28	11.56	17.79	20.94	28.46	24.14	24.85	20.38	15.10	13.99	11.50
Min	5.51	1.30	8.11	11.15	14.89	16.62	19.53	17.37	15.34	10.51	7.22	4.41

†All data after November 22, 2021 are provisional—subject to revision; * Incomplete record



MEDIAN OF DAILY MEAN TEMPERATURE BY MONTH AND YEAR — B170

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2001					17.6		20.4	20.4	17.9	12.6		
2002					15.2	18.7	21.6	19.7	17.1	12.7	9.3	
2003					14.5	20.0	21.8	20.4	17.4	14.3	7.3	
2004		8.2	11.3	13.2	16.3	19.0	22.4	22.1	17.7	14.3	9.0	6.9
2005	5.7	6.9	10.3	11.7	15.7	17.1	21.1	20.6	16.1	13.9	8.1	5.7
2006	8.3	7.3	8.7	12.6	15.8	18.3	21.6	19.5	16.4	12.3	9.4	6.3
2007	5.1	7.8	10.6	12.0	16.3	18.3	20.9	18.9	16.6	12.1	8.4	6.2
2008	5.3	7.1	8.8	10.4	14.9	16.8	19.8	19.1	16.5	11.4	9.5	5.5
2009	4.7	5.8	8.2	12.0	15.0	18.8	20.7	19.0	17.1	11.7	8.7	3.5
2010	8.1	8.9	9.9	12.4	13.9	15.5	19.7	19.2	16.6	12.2	9.5	7.6
2011	7.4	6.4	9.0	10.5	13.4	17.2	19.2	20.0	17.3	12.9	8.5	4.3
2012	6.4	7.5	8.5	12.3	15.2	17.0	20.4	20.2	16.5	12.7	9.6	7.3
2013	4.6	7.6	9.5	12.3	15.7	18.2	20.6	20.2	18.1	11.4	10.0	4.5
2014	5.5	7.1	10.2	12.5	16.8	18.3	21.8	20.8	17.8	14.7	9.8	8.3
2015	7.5	9.9	11.5	12.5	16.6	19.9	21.3	19.7	15.9	13.9	9.6	8.0
2016	8.0	9.5	10.9	14.6	16.8	18.8	19.5	19.6	16.2	13.5	11.9	5.9
2017	3.6	7.2	10.1	11.9	17.3	19.4	21.2	20.2	16.9	12.3	9.5	5.0
2018	8.1	7.1	9.6	12.6	17.8	18.6	21.1	20.2	16.0	12.5	7.9	7.4
2019	6.5	5.9	10.2	13.7	17.7	19.4	20.5	20.6	17.8	11.5	7.4	7.0
2020	7.9	7.7	9.7	14.2	16.6	19.0	20.0	19.9	17.5	14.2	8.2	6.6
2021	8.1	7.7	9.3	14.1	16.8	21.7	22.0	21.0	17.3	12.6	10.1	7.3
median	7.0	7.5	9.7	12.5	16.1	18.5	20.8	20.1	16.9	12.8	9.1	6.7

Key

T in °C

- T ≤ 4.9
- 4.9 < T ≤ 6.3
- 6.3 < T ≤ 7.3
- 7.3 < T ≤ 8.0
- 8.0 < T ≤ 9.4
- 9.4 < T ≤ 11.3
- 11.3 < T ≤ 13.3
- 13.3 < T ≤ 18.2
- 18.2 < T ≤ 20.6
- 20.6 < T ≤ 21.6
- T > 21.6

T as percentile

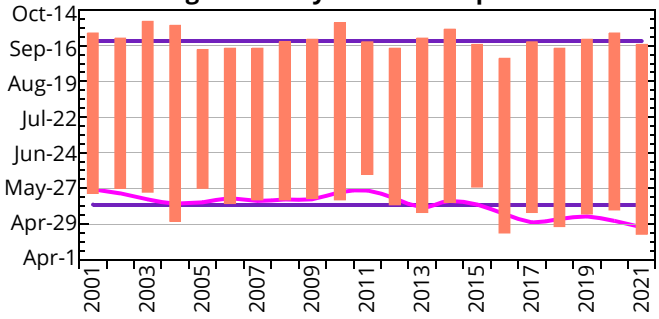
- T ≤ 5th
- 5th < T ≤ 10th
- 10th < T ≤ 15th
- 15th < T ≤ 20th
- 20th < T ≤ 30th
- 30th < T ≤ 40th
- 40th < T ≤ 50th
- 50th < T ≤ 75th
- 75th < T ≤ 90th
- 90th < T ≤ 95th
- T > 95th

Oregon Water Temperature Standard

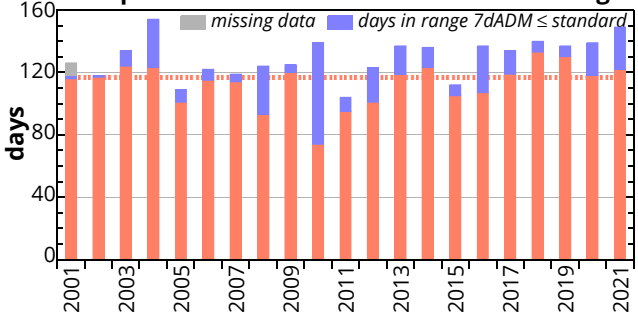
- Exceedances of the water temperature standard occurred in all years.
- Days when the 7dADM did not exceed the standard usually occurred within the date range of exceedances, but were a minor fraction.

fraction of years with any exceedance	100%
median days/year exceeding standard	117
average first day of exceedance (if it occurred)	May-14
average last day of exceedance (if it occurred)	Sep-19

Date Range with Any 7dADM Temperature > 18 °C



Proportion of Exceedances within Date Range

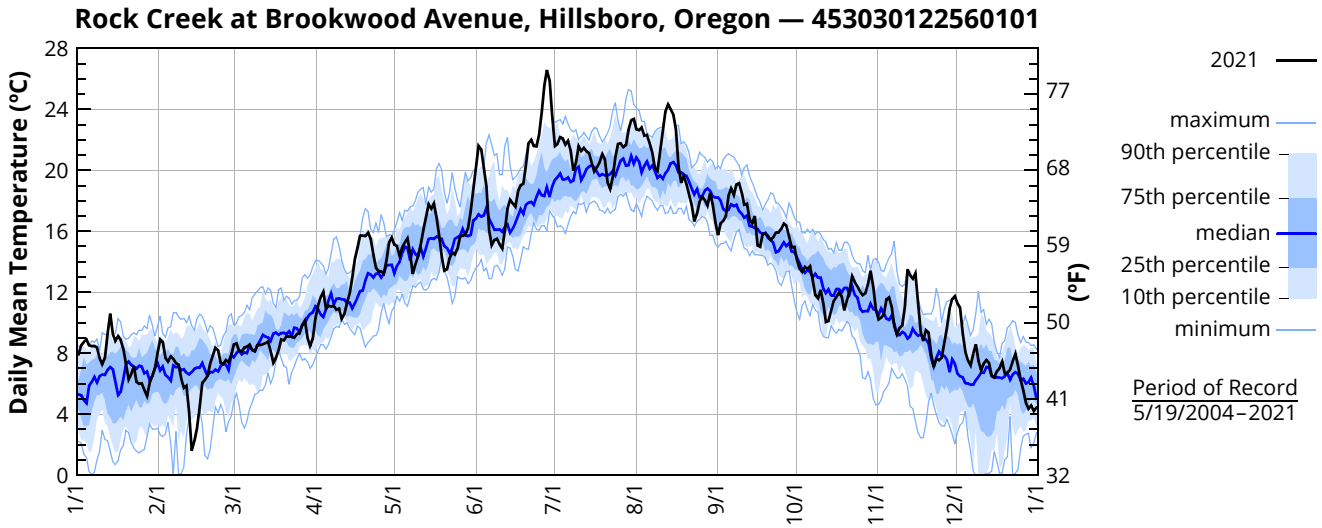


RCBR – Rock Creek at Brookwood Avenue, Hillsboro, OR – 453030122560101

Data source: U.S. Geological Survey, Oregon Water Science Center
River mile: 2.4 *Latitude:* 45 30 30 *Longitude:* 122 56 01

2021 — DAILY MEAN WATER TEMPERATURE (°C) — RCBR

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7.92	8.90	8.56	10.30	15.13	20.07	21.60	22.69	15.75	14.13	10.21	11.27
2	8.52	8.75	8.64	11.10	15.04	21.61	21.73	22.63	16.51	13.55	10.33	10.99
3	8.73	7.69	8.18	11.68	14.37	21.36	22.18	22.82	16.68	13.34	10.55	9.28
4	8.90	7.45	8.10	12.03	14.95	20.08	22.10	22.28	17.00	13.67	11.52	8.11
5	8.51	7.79	8.39	10.93	15.27	18.95	21.69	22.33	18.34	13.53	11.66	7.51
6	8.46	7.63	8.42	11.12	15.54	16.07	21.94	21.78	18.81	13.70	11.06	7.20
7	8.48	7.33	8.57	11.05	14.50	15.08	21.32	21.20	18.39	12.77	9.79	7.98
8	8.38	7.25	8.22	11.11	13.20	15.43	19.98	20.18	19.07	11.81	9.24	8.57
9	7.67	6.36	8.12	10.85	13.83	15.52	20.47	19.95	19.16	11.60	9.66	7.52
10	7.28	5.73	8.54	10.93	14.35	15.14	21.59	21.17	18.56	12.15	9.81	6.88
11	7.70	5.87	8.53	10.25	15.09	14.88	21.27	22.59	17.74	11.25	11.01	7.30
12	9.25	4.08	8.58	10.59	16.08	16.04	21.48	23.83	17.80	10.04	13.50	7.55
13	10.59	1.60	8.66	11.28	16.92	17.49	21.25	24.32	16.81	10.11	13.11	7.37
14	9.28	2.24	8.76	11.92	17.77	18.07	21.12	24.01	16.52	10.78	12.88	6.51
15	8.81	3.08	8.14	12.95	17.48	17.83	20.50	23.65	17.00	11.42	13.25	6.41
16	9.12	4.49	7.37	14.16	17.83	17.62	19.93	22.68	15.07	11.69	11.50	6.82
17	8.89	6.05	7.68	14.93	16.93	18.63	20.21	20.28	14.99	11.98	9.43	7.01
18	8.28	6.23	8.21	15.72	15.77	19.02	20.51	19.18	15.83	11.72	8.79	7.43
19	7.27	6.52	8.90	15.71	14.34	19.13	21.06	19.63	15.85	10.81	9.51	6.66
20	6.27	7.29	8.84	15.69	13.41	20.36	20.73	19.11	15.71	11.47	9.36	6.71
21	6.62	7.83	9.11	15.91	13.51	21.77	19.21	18.45	15.43	12.10	7.91	6.93
22	7.13	8.35	9.09	15.51	14.23	22.00	18.79	17.70	15.60	13.05	7.09	7.45
23	6.12	8.20	9.11	14.47	14.61	21.61	19.52	16.65	15.93	12.66	7.61	7.94
24	5.99	7.36	9.01	13.60	14.48	21.57	20.89	17.16	15.91	12.39	7.53	7.19
25	6.02	7.29	9.26	13.38	14.88	22.33	21.73	17.94	16.16	12.04	7.69	6.24
26	5.60	7.55	9.32	13.37	15.68	23.84	21.77	18.27	16.50	11.81	8.67	5.56
27	5.20	7.40	9.86	13.22	15.70	25.58	21.52	18.05	16.38	11.93	9.66	4.77
28	6.03	7.88	10.14	14.11	15.80	26.58	21.66	17.69	15.67	12.53	10.92	4.36
29	6.49	—	8.99	15.27	16.19	25.91	22.66	18.52	14.95	13.42	11.55	4.57
30	7.00	—	8.48	15.59	17.33	23.58	23.29	17.75	14.98	12.34	11.75	4.19
31	8.04	—	8.93	—	18.57	—	23.37	16.58	—	10.87	—	4.42
Mean	7.70	6.58	8.67	12.96	15.44	19.77	21.20	20.36	16.64	12.15	10.22	7.05
Max	10.59	8.90	10.14	15.91	18.57	26.58	23.37	24.32	19.16	14.13	13.50	11.27
Min	5.20	1.60	7.37	10.25	13.20	14.88	18.79	16.58	14.95	10.04	7.09	4.19



MEDIAN OF DAILY MEAN TEMPERATURE BY MONTH AND YEAR — RCBR

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2004						18.4	21.3	20.5	16.5	13.7	8.5	6.4
2005	5.4	6.1	9.8	11.3	15.3	16.4	20.0	19.8	15.1	13.4	7.6	5.7
2006	8.1	6.6	8.3	12.4	15.0	17.6	20.3	18.4	15.7	11.5	9.2	6.0
2007	4.3	7.6	9.9	11.4	14.9	16.8	19.8	18.3	16.0	11.8	8.0	6.3
2008	4.4	6.5	8.3	9.9	14.7	15.6	19.0	18.8	15.9	10.5	9.4	4.9
2009	4.3	4.8	7.9	11.6	14.6	18.0	20.4	19.0	16.6	11.4	8.6	3.2
2010	7.9	8.6	9.3	11.9	13.6	15.0	18.6	18.3	16.3	11.5	9.3	7.3
2011	7.1	6.0	8.6	10.1	12.9	16.2	18.1	18.9	16.8	12.8	8.0	3.9
2012	6.0	7.1	7.9	11.6	14.4	16.4	19.5	19.5	15.7	12.1	9.2	7.1
2013	4.0	7.0	9.2	12.1	15.0	17.4	19.5	19.9	18.1	10.6	9.6	3.9
2014	4.9	6.9	9.7	12.3	16.1	17.4	20.9	20.4	17.4	14.6	9.5	8.2
2015	7.1	9.4	11.2	12.0	15.5	19.1	21.0	19.7	15.4	13.4	9.5	7.6
2016	7.7	8.8	10.4	13.7	15.8	17.7	18.9	19.1	15.8	13.4	11.9	5.5
2017	3.0	6.8	9.7	11.3	16.0	18.2	20.0	20.0	16.3	11.7	9.1	4.7
2018	7.9	6.7	9.2	12.0	16.7	17.1	20.9	19.9	15.3	11.9	7.5	7.1
2019	6.3	5.6	9.1	12.7	16.2	17.7	19.7	19.8	17.2	10.8	6.5	6.7
2020	7.8	7.2	8.7	13.4	15.4	17.3	19.4	19.5	17.1	13.9	8.1	6.4
2021	7.9	7.3	8.6	13.1	15.1	19.6	21.3	20.2	16.4	12.0	10.0	7.2
median	6.6	6.9	9.1	11.9	15.1	17.4	19.9	19.5	16.3	12.2	8.9	6.4

KEY

T in °C

- T ≤ 4.4
- 4.4 < T ≤ 5.9
- 5.9 < T ≤ 6.8
- 6.8 < T ≤ 7.5
- 7.5 < T ≤ 8.8
- 8.8 < T ≤ 10.4
- 10.4 < T ≤ 12.4
- 12.4 < T ≤ 17.2
- 17.2 < T ≤ 19.7
- 19.7 < T ≤ 20.8
- T > 20.8

T as percentile

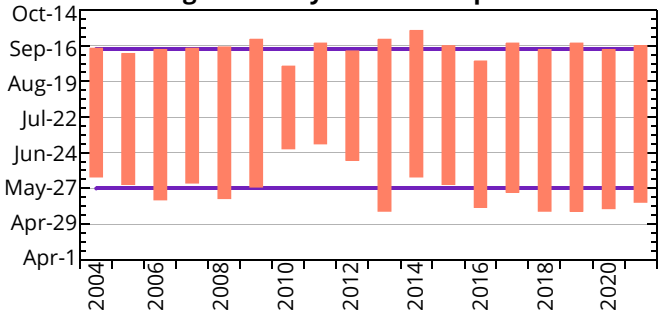
- T ≤ 5th
- 5th < T ≤ 10th
- 10th < T ≤ 15th
- 15th < T ≤ 20th
- 20th < T ≤ 30th
- 30th < T ≤ 40th
- 40th < T ≤ 50th
- 50th < T ≤ 75th
- 75th < T ≤ 90th
- 90th < T ≤ 95th
- T > 95th

OREGON WATER TEMPERATURE STANDARD

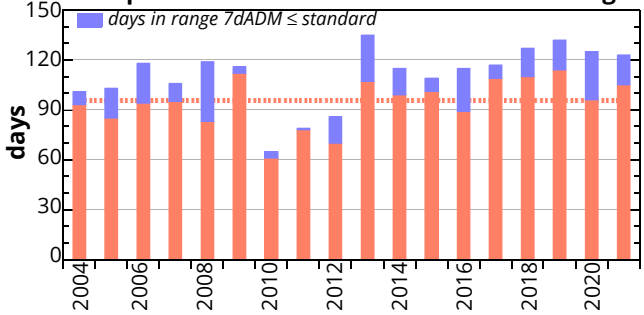
- Exceedances of the water temperature standard occurred in all years.
- Days when the 7dADM did not exceed the standard usually occurred within the date range of exceedances, but were a minor fraction.

fraction of years with any exceedance	100%
median days/year exceeding standard	96
average first day of exceedance (if it occurred)	May-27
average last day of exceedance (if it occurred)	Sep-13

Date Range with Any 7dADM Temperature > 18 °C



Proportion of Exceedances within Date Range



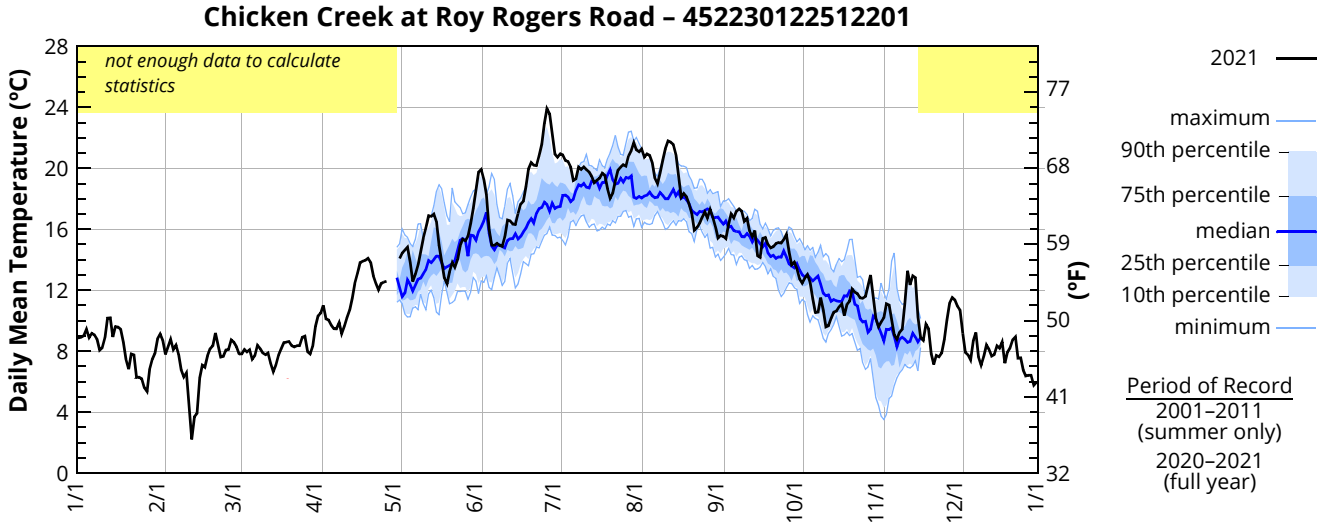
CCSR – Chicken Creek at Roy Rogers Road – 452230122512201

Data source: U.S. Geological Survey, Oregon Water Science Center
River mile: 2.3 *Latitude:* 45 22 30 *Longitude:* 122 51 22

2021 — DAILY MEAN WATER TEMPERATURE (°C) — CCSR

DAY	Jan	Feb	Mar	Apr*	May*	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	8.88	9.13	8.60	9.62		18.56	20.93	21.22	15.42	13.41	9.60	10.96
2	8.92	8.72	8.29	10.31		19.75	20.73	21.09	15.59	12.74	9.91	10.71
3	9.01	7.79	7.82	10.50	14.09	19.93	20.95	21.28	15.55	12.47	10.19	9.17
4	9.45	8.27	7.83	11.01	14.44	19.29	20.88	20.75	15.39	12.81	11.11	7.92
5	8.89	8.78	8.11	10.12	14.64	18.28	20.50	20.95	16.32	13.03	11.03	7.76
6	9.17	8.11	7.95	10.04	14.83	16.00	20.45	20.86	17.02	12.54	10.00	7.42
7	9.08	8.41	8.10	9.72	13.84	14.96	20.10	20.39	16.74	11.44	9.07	8.69
8	8.80	7.81	7.47	9.48	12.56	14.95	19.20	19.37	17.18	10.54	8.77	9.23
9	8.06	6.79	7.71	9.47	13.06	15.09	19.31	18.99	17.34	10.57	9.24	7.64
10	8.22	6.31	8.38	9.87	13.65	14.94	20.08	19.69	17.20	11.51	9.45	7.08
11	8.88	6.58	8.16	9.14	14.54	14.88	19.93	20.55	16.52	10.67	11.11	7.64
12	10.17	4.25	7.88	9.63	15.42	15.49	20.09	21.28	16.72	9.59	13.28	8.41
13	10.19	2.21	7.77	10.19	16.08	16.61	19.91	21.79	15.89	9.67	12.35	8.12
14	8.93	3.69	7.88	10.70	16.89	16.55	19.76	21.72	15.50	10.16	12.94	7.68
15	9.61	3.91	7.22	11.47	16.85	16.34	19.47	21.56	15.91	10.56	12.83	7.78
16	9.58	6.25	6.65	12.45	17.01	16.31	19.05	20.91	14.25	10.63	10.24	8.35
17	9.45	7.08	7.08	13.11	16.51	17.03	19.22	19.47	14.15	10.91	8.88	8.20
18	8.58	6.95	7.74	13.81	14.97	17.65	19.35	18.10	15.39	11.10	8.71	8.59
19	7.48	7.70	8.15	13.91	13.81	17.85	19.68	18.35	15.46	10.34	9.77	7.21
20	6.82	8.16	8.56	13.96	12.82	18.80	19.55	18.14	15.01	11.08	9.48	7.93
21	7.82	8.36	8.60	14.10	12.43	19.96	18.66	17.68	14.78	11.28	7.83	8.23
22	7.76	9.19	8.64	13.84	13.22	20.38	18.04	17.05	14.85	12.08	7.12	8.74
23	6.28	8.41	8.36	12.94	13.81	20.21	18.36	15.94	15.06	11.87	7.72	8.93
24	6.30	7.61	8.28	12.45	13.50	20.18	19.20	16.11	15.13	11.79	7.63	7.55
25	6.19	7.65	8.36	12.03	14.00	20.81	19.88	16.39	15.10	11.50	7.87	7.57
26	5.61	8.08	8.36	12.45	14.91	21.58	20.08	16.79	15.33	11.47	8.77	6.76
27	5.36	8.11	8.91	12.53	15.35	22.94	20.24	17.14	15.66	11.59	10.04	6.38
28	6.80	8.74	8.98	12.59	15.25	23.92	20.15	16.74	14.52	12.29	11.17	6.42
29	7.47	—	7.96		15.55	23.57	20.81	17.31	13.67	12.99	11.53	6.42
30	7.85	—	7.82		16.40	22.23	21.16	16.82	13.85	11.44	11.37	5.77
31	8.83	—	8.32	—	17.37	—	21.69	16.18	—	10.16	—	5.96
Mean	8.21	7.25	8.06	11.48	14.75	18.50	19.92	19.05	15.55	11.43	9.97	7.91
Max	10.19	9.19	8.98	14.10	17.37	23.92	21.69	21.79	17.34	13.41	13.28	10.96
Min	5.36	2.21	6.65	9.14	12.43	14.88	18.04	15.94	13.67	9.59	7.12	5.77

†All data after October 7, 2021 are provisional—subject to revision; * Incomplete record



MEDIAN OF DAILY MEAN TEMPERATURE BY MONTH AND YEAR — CCSR

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2001					15.4	15.5	18.1	17.9	15.4	10.7		
2002					13.5	17.0	19.2	17.5	14.5	10.9	8.2	5.8
2003					12.7	16.7	19.0	18.4	15.4	13.1	6.6	7.8
2004	6.2				14.4	17.2	20.0	19.4	15.5	12.9	8.3	
2005				11.8	14.6	15.5	19.3	18.9	14.4	12.7	9.2	
2006					14.0	16.4	19.1	17.5	14.2	10.5	9.7	
2007					13.7	15.4	18.5	17.0	14.8	11.3		
2008				9.3	13.8	14.8	18.0	17.4	14.8	10.4	8.7	
2009					13.5	16.9	18.9	17.8	15.4	10.7	8.4	
2010				11.2	12.5	13.8	17.5	17.5	15.0	10.8	9.1	
2011				9.7	11.9	14.6	16.6	17.6	15.7	12.3	8.0	
2012												
2013												
2014												
2015												
2016												
2017												
2018												
2019												6.8
2020	8.1	7.3	8.1	12.0	14.0	16.0	18.4	18.0	15.8	12.9	7.9	6.5
2021	8.8	7.8	8.1	11.2	14.6	18.4	19.9	19.4	15.4	11.4	9.8	7.8
median	7.9	7.4	8.1	11.0	13.7	16.0	18.7	17.8	15.1	11.6	8.5	7.2

Key

T in °C

- T ≤ 6.7
- 6.7 < T ≤ 7.8
- 7.8 < T ≤ 8.5
- 8.5 < T ≤ 9.3
- 9.3 < T ≤ 11.3
- 11.3 < T ≤ 12.9
- 12.9 < T ≤ 14.2
- 14.2 < T ≤ 17.0
- 17.0 < T ≤ 18.8
- 18.8 < T ≤ 19.7
- T > 19.7

T as percentile

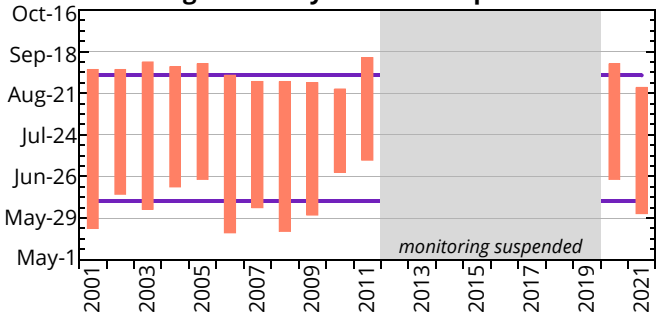
- T ≤ 5th
- 5th < T ≤ 10th
- 10th < T ≤ 15th
- 15th < T ≤ 20th
- 20th < T ≤ 30th
- 30th < T ≤ 40th
- 40th < T ≤ 50th
- 50th < T ≤ 75th
- 75th < T ≤ 90th
- 90th < T ≤ 95th
- T > 95th

Oregon Water Temperature Standard

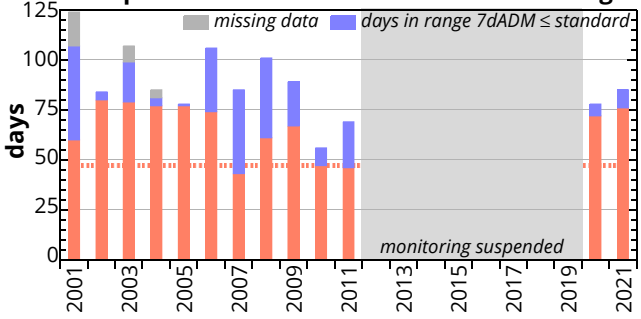
- Exceedances of the water temperature standard occurred in all years.
- Days when the 7dADM did not exceed the standard frequently occurred within the date range of exceedances, and varied from a few days to more than half of the range.

fraction of years with any exceedance	100%
median days/year exceeding standard	47
average first day of exceedance (if it occurred)	Jun-9
average last day of exceedance (if it occurred)	Sep-2

Date Range with Any 7dADM Temperature > 18 °C



Proportion of Exceedances within Date Range



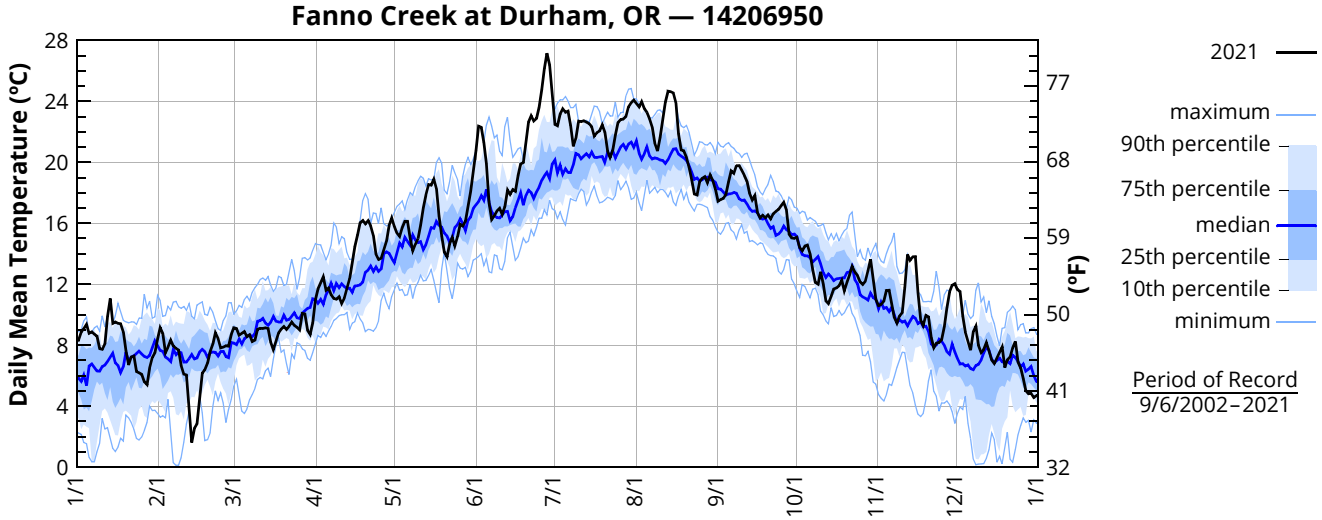
FANO – FANNO CREEK AT DURHAM, OR – 14206950

Data source: U.S. Geological Survey, Oregon Water Science Center
River mile: 1.2 *Latitude:* 45 24 13 *Longitude:* 122 45 13

2021 — DAILY MEAN WATER TEMPERATURE (°C) — FANO

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	8.32	9.15	9.14	10.99	15.80	20.78	22.50	23.86	17.45	15.08	10.60	11.65
2	8.86	8.78	9.10	11.69	15.36	22.37	22.40	23.63	17.55	14.41	10.67	11.52
3	9.09	7.50	8.66	12.10	15.13	22.30	23.18	23.99	17.63	14.20	10.90	9.92
4	9.37	7.87	8.77	12.48	15.70	21.30	23.52	23.53	17.89	14.51	11.59	8.87
5	8.78	8.33	8.89	11.61	16.13	19.90	23.29	23.29	18.73	14.57	11.61	8.27
6	8.88	7.95	8.55	11.76	16.13	17.30	23.36	22.84	19.44	14.02	10.67	7.67
7	8.72	7.79	8.68	11.32	14.99	16.24	22.42	22.32	19.27	12.93	9.82	8.90
8	8.59	7.68	8.24	11.06	14.19	16.50	21.05	21.27	19.78	12.11	9.44	9.26
9	7.77	6.67	8.33	11.01	14.64	16.81	21.57	20.75	19.79	12.00	9.92	8.00
10	7.72	6.10	9.04	11.18	15.00	16.99	22.71	21.63	19.48	12.82	10.14	7.51
11	8.10	6.04	9.11	10.74	15.88	16.59	22.67	22.77	19.16	11.99	11.80	7.71
12	9.89	3.66	9.10	11.10	17.03	17.07	22.73	23.95	18.76	10.91	13.96	8.17
13	11.06	1.61	9.14	11.72	17.85	18.18	22.65	24.67	17.97	10.73	13.57	7.64
14	9.43	2.55	9.10	12.38	18.54	17.90	22.54	24.64	17.53	11.20	13.80	7.03
15	9.53	2.84	8.22	13.38	18.50	18.21	22.34	24.56	17.83	11.68	13.81	6.80
16	9.44	4.67	7.70	14.46	18.90	18.10	21.72	23.92	16.68	11.76	11.47	7.19
17	9.41	6.16	8.23	15.23	18.28	19.14	21.95	21.88	16.34	11.90	9.67	7.55
18	8.87	6.38	8.80	16.04	16.47	19.89	22.06	20.81	16.52	12.27	9.29	7.89
19	7.64	6.82	9.05	16.19	15.15	19.99	22.46	20.77	16.37	11.56	9.96	6.53
20	6.71	7.57	9.23	15.97	14.11	21.30	21.99	20.33	16.55	12.12	9.87	7.04
21	7.22	8.06	9.04	16.18	13.80	22.64	20.76	19.68	16.29	12.60	8.51	7.22
22	7.28	8.82	9.24	15.84	14.63	23.06	20.31	18.83	16.63	13.17	7.83	7.82
23	6.27	8.44	9.52	15.20	15.07	22.71	20.78	17.92	16.79	12.81	8.13	8.25
24	6.19	7.82	9.30	13.97	14.51	22.88	21.81	17.86	16.90	12.59	8.18	6.92
25	6.09	7.87	9.17	13.63	15.13	23.60	22.61	18.72	17.15	12.15	8.36	6.51
26	5.60	7.96	9.00	13.71	15.94	24.79	22.81	18.95	17.37	11.99	9.22	5.80
27	5.41	7.93	10.09	14.24	15.82	26.14	22.83	19.06	16.90	12.21	10.45	5.01
28	6.50	8.69	10.06	14.82	16.13	27.16	23.00	18.66	15.28	12.88	11.50	4.80
29	7.19	—	8.97	15.84	17.05	26.38	23.64	19.18	15.04	13.64	11.93	4.85
30	7.50	—	8.71	16.36	18.12	24.46	23.92	18.82	15.01	12.23	12.04	4.56
31	8.42	—	9.47	—	19.38	—	24.08	18.24	—	11.02	—	4.68
Mean	8.06	6.85	8.96	13.41	16.11	20.69	22.44	21.33	17.47	12.58	10.62	7.47
Max	11.06	9.15	10.09	16.36	19.38	27.16	24.08	24.67	19.79	15.08	13.96	11.65
Min	5.41	1.61	7.70	10.74	13.80	16.24	20.31	17.86	15.01	10.73	7.83	4.56

†All data after October 7, 2021 are provisional—subject to revision



MEDIAN OF DAILY MEAN TEMPERATURE BY MONTH AND YEAR — FANO

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2002									15.7	12.0	9.1	7.1
2003	7.8	7.8	10.0	11.9	14.0	17.8	20.3	19.5	16.5	14.1	7.1	7.6
2004	6.3	7.9	11.0	12.5	15.5	18.1	21.1	20.8	16.7	13.8	9.0	6.9
2005	5.6	6.7	10.0	11.5	15.4	16.3	20.0	19.7	15.6	13.7	8.0	5.9
2006	8.3	7.0	8.6	12.3	15.1	17.4	20.3	18.6	15.8	11.8	9.6	6.4
2007	5.0	7.6	10.3	11.6	14.8	16.9	20.0	18.6	16.6	12.1	8.8	6.6
2008	5.6	7.2	8.5	9.8	14.5	15.8	19.4	18.9	16.1	11.2	9.9	5.6
2009	4.9	5.8	8.0	11.7	14.9	18.0	20.8	19.1	17.0	11.8	8.9	4.1
2010	8.1	8.8	9.7	12.0	13.7	15.0	19.1	19.0	16.4	12.1	9.6	7.4
2011	7.6	6.2	8.8	10.4	13.1	16.2	18.1	19.5	17.1	13.2	8.6	4.5
2012	6.6	7.5	8.2	12.2	14.8	16.6	19.7	19.6	16.4	12.6	9.8	7.4
2013	4.2	7.5	9.4	12.3	15.2	17.8	20.0	20.3	18.2	11.4	9.9	4.9
2014	5.8	7.0	10.0	12.6	16.5	17.7	21.4	21.0	17.9	14.7	9.8	8.2
2015	7.4	9.8	11.7	12.5	15.7	20.0	21.8	20.4	16.2	14.2	9.6	8.0
2016	7.9	9.4	10.6	14.1	16.2	18.4	19.3	20.3	16.6	13.5	11.9	6.0
2017	3.2	7.0	9.9	11.6	15.9	18.4	20.5	20.5	17.0	12.4	9.6	5.4
2018	8.1	7.1	9.3	12.1	17.0	17.9	21.7	20.8	16.0	12.6	8.5	7.6
2019	6.6	6.0	9.6	13.1	16.5	18.8	20.8	20.6	17.6	11.5	7.9	7.1
2020	7.9	7.6	9.1	13.5	15.8	17.9	20.4	20.4	17.4	14.2	8.5	6.9
2021	8.3	7.7	9.0	13.5	15.8	20.4	22.5	21.3	17.4	12.2	10.5	7.6
median	6.9	7.4	9.5	12.1	15.4	17.6	20.4	19.9	16.7	12.8	9.2	6.8

KEY

T in °C

- T ≤ 4.9
- 4.9 < T ≤ 6.2
- 6.2 < T ≤ 7.1
- 7.1 < T ≤ 7.8
- 7.8 < T ≤ 9.1
- 9.1 < T ≤ 10.5
- 10.5 < T ≤ 12.5
- 12.5 < T ≤ 17.4
- 17.4 < T ≤ 20.0
- 20.0 < T ≤ 21.0
- T > 21.0

T as percentile

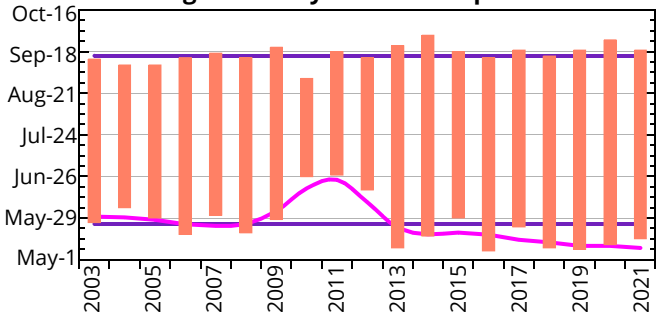
- T ≤ 5th
- 5th < T ≤ 10th
- 10th < T ≤ 15th
- 15th < T ≤ 20th
- 20th < T ≤ 30th
- 30th < T ≤ 40th
- 40th < T ≤ 50th
- 50th < T ≤ 75th
- 75th < T ≤ 90th
- 90th < T ≤ 95th
- T > 95th

OREGON WATER TEMPERATURE STANDARD

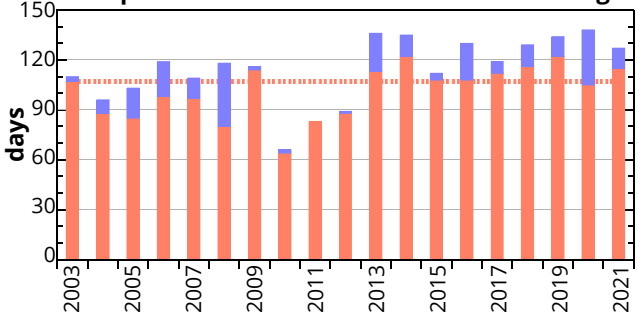
- Exceedances of the water temperature standard occurred in all years.
- Days when the 7dADM did not exceed the standard frequently occurred within the date range of exceedances, but were a minor fraction.

fraction of years with any exceedance	100%
median days/year exceeding standard	107
average first day of exceedance (if it occurred)	May-25
average last day of exceedance (if it occurred)	Sep-15

Date Range with Any 7dADM Temperature > 18 °C



Proportion of Exceedances within Date Range



DATA SOURCES

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

SITE ID	SITE NAME	START DATE	SOURCES OF DATA FOR DISTRIBUTION
Mainstem Tualatin River and Scoggins Creek sites			
14202980	Scoggins Creek below Henry Hagg Lake near Gaston, Oregon	4/30/2002	USGS database: all (data collected by USGS)
452731123092100	Scoggins Creek near Old Hwy 47 near Gaston, Oregon	8/6/2020	USGS database: all (data collected by USGS)
14203500	Tualatin River at Dilley, Oregon	5/16/1997	USGS database: 2016–present; previous Flow Reports: 1997–2000 (data collected by OWRD) Flow Report source files 2001–2013 (Bernie Bonn) (data collected by: OWRD 2001–2007, consultant 2008–2011)
14206241	Tualatin River at Hwy 219 Bridge	10/15/2004	Stewart Rounds, USGS pers. comm.: all (data collected by: Jackson Bottom Wetland Education Center 2003–2020 Clean Water Services 2020–2021
14206694	Tualatin River at RM 24.5 near Scholls, Oregon	5/31/1997	USGS database: all (data collected by USGS; no data collection in winter)
14207200	Tualatin River at Oswego Dam near West Linn, Oregon	5/7/1991	USGS database: all (data collected by USGS)
Tributary sites			
14202650	Wapato Creek at Gaston Road at Gaston, Oregon	4/12/2010	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)
14205350	East Fork Dairy Creek above Murtaugh Creek near Meacham Corner, OR	8/28/2020	USGS database: all (data collected by USGS)
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)
4522301225012201	Chicken Creek at Roy Rogers Road	5/11/2001	USGS database: all (data collected by USGS) (no data from 12/13/2011–12/2/2019)
14206950	Fanno Creek at Durham Road near Tigard, Oregon	9/6/2002	USGS database: all (data collected by USGS)

Abbreviations: CWS=Clean Water Services; OWRD=Oregon Water Resources Department; USGS=United States Geological Survey; WY=water year

APPENDIX G
PRECIPITATION

SCOPE

This appendix shows precipitation data for selected sites the Tualatin River Basin. Because relatively few active precipitation monitoring stations with an adequate period of record are located in the basin, three sites are located just outside the basin boundaries. Precipitation may be monitored at other sites in the basin that are not included in the Appendix. Streamflow measurements are in Appendix A.

2021 HIGHLIGHTS

- The beginning of water year 2021 was near average with most sites having total rainfall from October through December between the 25th and 75th percentiles.
- January and February of 2021 tended toward above average rainfall, although not record setting.
- The dry season began early in 2021. Total rainfall from March–August varied from only 30% to 54% of the POR median, depending on the site.

MONTHLY TOTAL RAINFALL FOR MARCH–AUGUST (INCHES)

	Saddle Mountain	Sain Creek	Scoggins Creek	Tualatin R@ Dilley	Forest Grove	Hillsboro Airport	Tualatin Nature Pk	KGW-TV	Oregon City
POR median	25.30	19.15	12.69	11.97	10.44	9.17	10.89	13.30	12.86
2021	13.70	9.70	6.32	4.64	4.13	3.74	3.25	7.00	5.62
	54%	51%	50%	39%	40%	41%	30%	53%	44%

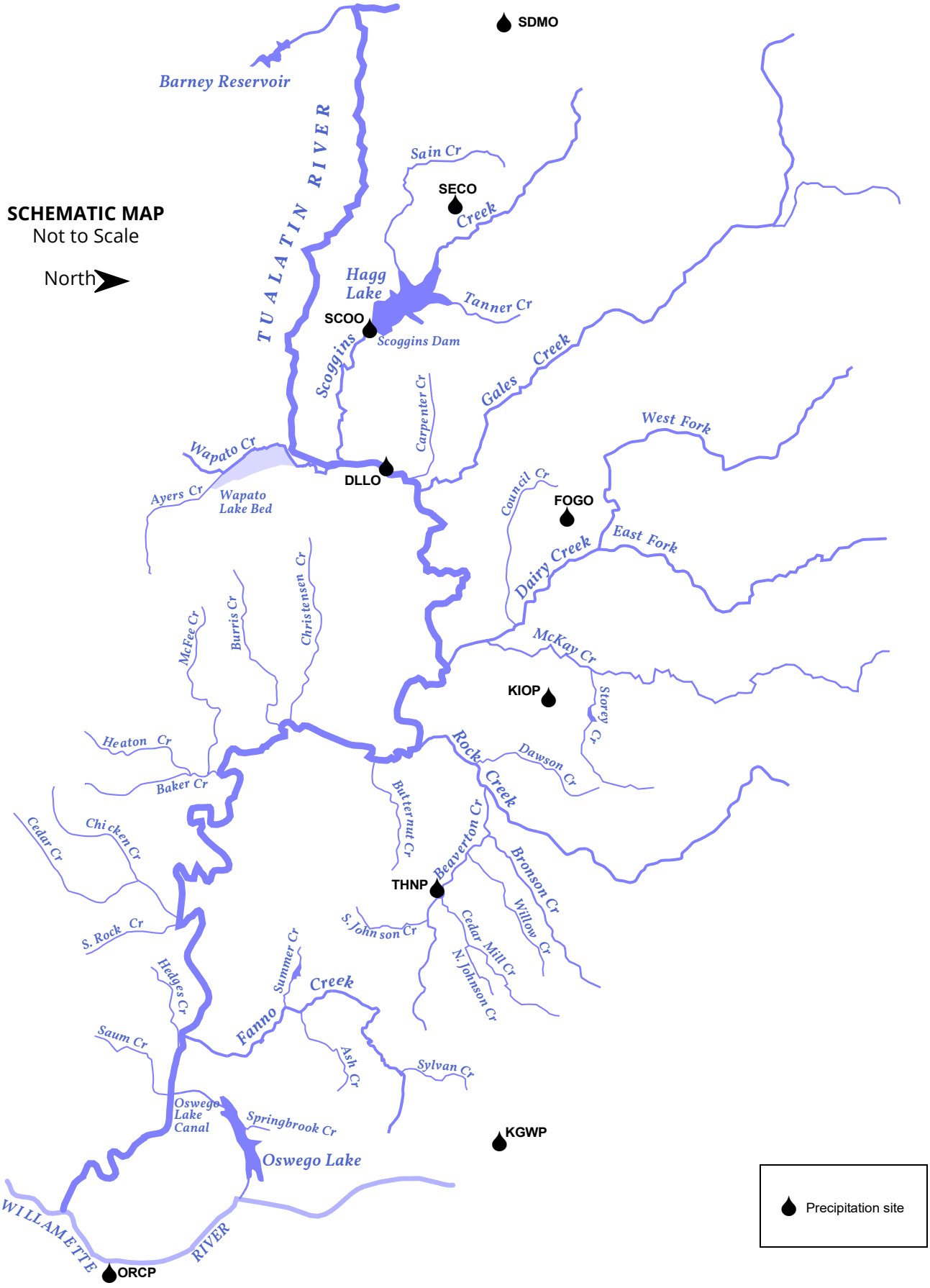
- Record low rainfall occurred at most sites in April. The Dilley site has the longest period of record, dating back to 1944. April rainfall at Dilley was only 0.29 inches. The previous April low rainfall record at Dilley (in 1977) was 0.51 inches. The median April rainfall at Dilley is 2.45 inches.
- At several sites, records for low rainfall were tied in July and August. At some sites, no rainfall was recorded during July. Very low rainfall in these two months is typical.
- Although September was slightly wetter than average, no rain fell at all from September 1–16.
- Rainfall in the first three months of water year 2021 was typical of the period of record.

COMPARISON OF 2021 WITH PERIOD OF RECORD BY MONTH

Precipitation Sites	First Record	Water Year 2021												WY 2022		
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
South Saddle Mountain	Oct-1980							R				R				
Sain Creek	Oct-1981							R			R					
Scoggins Ck below Hagg Lake	Dec-1970										R					
Tualatin River at Dilley	Dec-1944							R			R					
Forest Grove Agrimet	Oct-1992							R			R					
Hillsboro Airport	Nov-1999						R	R								
Tualatin Nature Park	Oct-2008	no data					R	R			R					
KGW-TV	Aug-1973										R					
Oregon City	Feb-1948							R								no data

R Record for month was set or tied
<10th percentile for month
10th – <25th percentile
25th – 75th percentile
>75th – 90th percentile
>90th percentile

SELECTED PRECIPITATION MONITORING SITES



SELECTED PRECIPITATION MONITORING SITES — ALPHABETICAL LISTING BY SITE CODE

SITE CODE	SITE NAME	ELEVATION (FT)	PAGE
DLLO	Dilley Precipitation Station (COOP ID#352325)	170	G-10
FOGO	Forest Grove, Oregon AgriMet Weather Station (Verboort)	180	G13
KHIO	Hillsboro Airport Weather Station (WBAN ID#94261)	204	G-15
KGWP	*KGW-TV Weather Station – Portland (COOP ID#356749)	159	G-19
ORCP	*Oregon City (COOP ID#356334)	167	G-21
SCOO	Scoggins Creek below Henry Hagg Lake	215	G-8
SDMO	*South Saddle Mountain Precipitation Station (SNOTEL #726)	3250	G-4
SECO	Sain Creek Precipitation Station (SNOTEL #743)	2000	G-6
THNP	Tualatin Hills Nature Park (COOP ID#355945)	185	G-17

*Stations that are not within the Tualatin Basin boundary.

SITES OUTSIDE OF TUALATIN BASIN

- South Saddle Mountain is located in the Coast Range and indicative of conditions in the headwaters and Barney Reservoir area. Because this site is at a higher elevation and on the western side of the Coast Range divide, it will receive greater rainfall than most areas in the basin.
- KGW-TV is located in downtown Portland and indicative of conditions in the northeastern part of the basin. Because this site is in the rain shadow of the Tualatin Mountains (east side), it likely receives less rain than locations in the basin which are on the west side.
- Oregon City is directly across the Willamette River from West Linn. This site is representative of the far southeastern part of the basin.

EXPLANATION OF FIGURES AND TABLES IN THIS APPENDIX

One table and two graphs are included for every site. Water year, rather than calendar year, is used for precipitation data.

Page 1 (-2) –historical record: Tabled data for precipitation by month and year for the period of record.

- The monthly total was not reported if more than 3 days of data were missing.
- Data for October–December of the next water year are included to provide compatibility with the other parts of the flow report that use calendar year. This row is shaded in gray and these data were not used to compute any statistics in this appendix.
- A statistical summary for each month is at the bottom of the table. Data in the gray shaded row were not used to compute these statistics.
- In some cases this table continues on a second page.

Page 2 (3) –graphical summary: Two graphs showing the distribution of precipitation by month and year:

- *A graph of expanded boxplots of monthly total precipitation* for the period of record is at the top of the page. An explanation of the features of this graph is shown next to the graph on the right side.
- *A graph of total precipitation for each water year* for the period of record is at the bottom of the page.
  - —Bars shown in blue have up to 3 days of missing data per month.
  - —Gray bars have more than 3 days of missing data in at least one month and up to 36 days in a year.
  - —The extent to which the gray bars underestimate the total annual precipitation is unknown. If the missing data occurred during the rainy season, the bar could be significantly less than the true total. If the missing data occurred during the dry months (July–August), the bar is likely a close estimate of the total.

SDMO – South Saddle Mountain Precipitation Station

Data source: Natural Resources Conservation Service (SNOTEL #726)
https://wcc.sc.egov.usda.gov/nwcc/rgrpt?report=precsnotelmon&state=OR

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

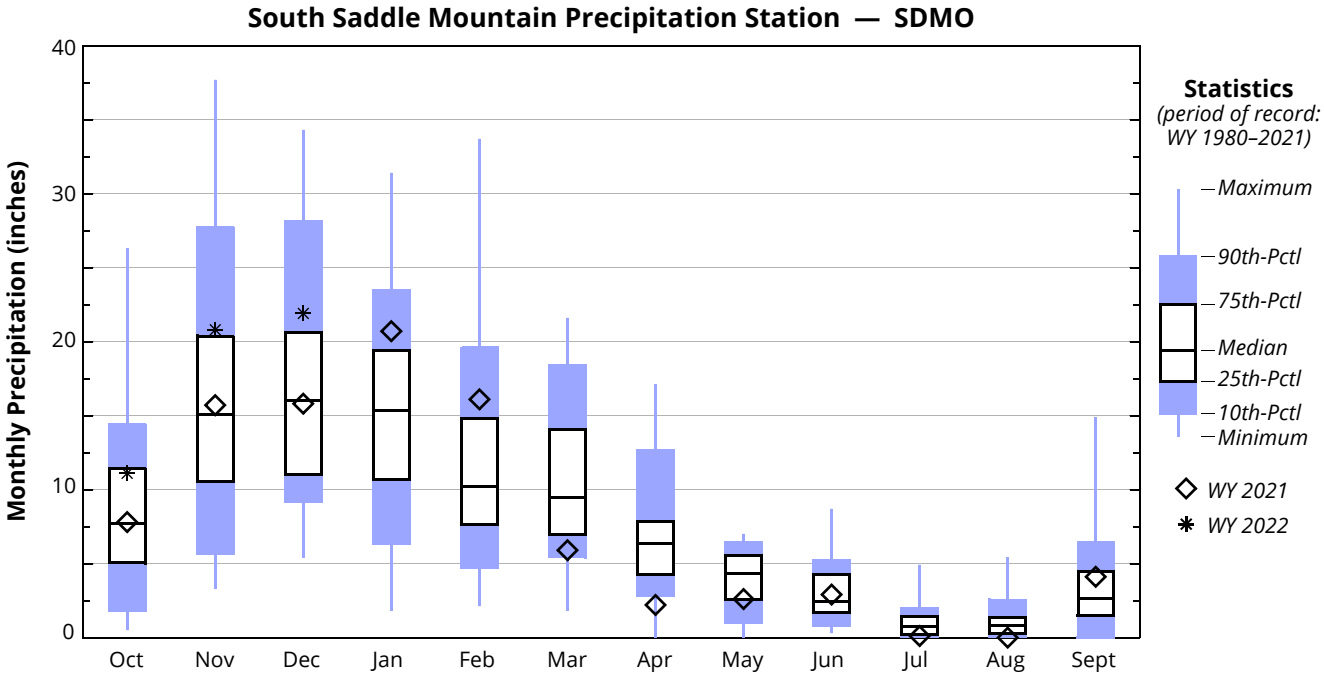
MONTHLY TOTAL PRECIPITATION (inches) — SDMO

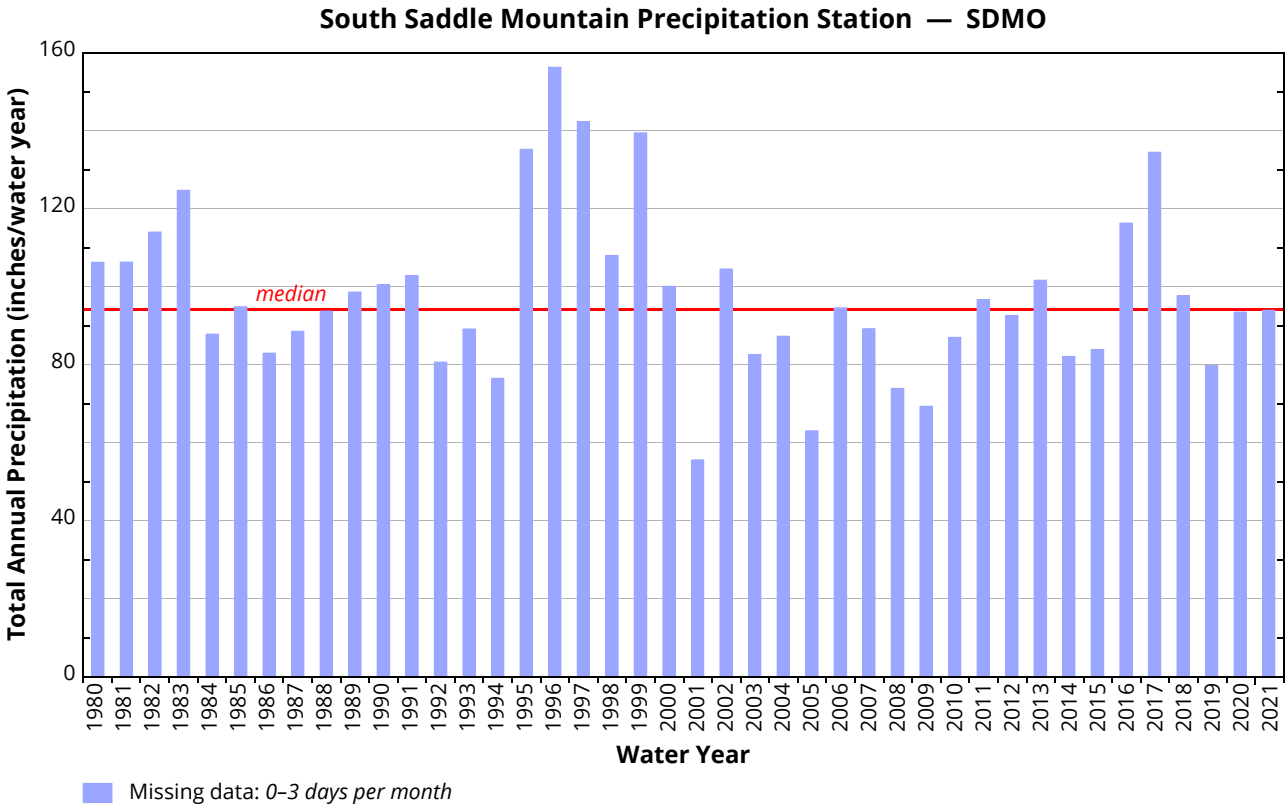
Water Year*	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1980	10.8	7.5	19.2	19.3	11.2	10.1	6.5	6.4	8.7	1.0	0.6	4.9
1981	4.2	19.3	26.8	5.2	18.6	7.5	7.9	4.1	7.2	0.4	0.7	4.4
1982	13.0	14.9	26.6	19.3	17.2	7.5	7.2	0.0	2.0	1.1	1.9	3.3
1983	13.4	16.7	21.5	17.3	15.2	11.5	7.1	4.3	4.7	4.9	3.4	4.7
1984	1.7	23.3	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	1.5
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	3.2
2001	4.3	5.6	9.2	5.5	4.8	6.2	6.1	5.2	3.3	1.4	3.1	0.8
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	3.4	3.1	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	11.6	4.4	7.1	4.8	7.0	0.8	0.5	1.3	2.6
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	1.4	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
2017	26.3	18.0	14.4	11.1	20.0	21.6	11.7	4.2	3.1	0.0	0.2	3.9
2018	13.8	21.9	10.9	18.9	7.8	7.6	13.0	0.1	1.2	0.1	0.1	2.3
2019	6.6	9.9	17.0	10.3	12.8	3.0	7.7	3.2	0.5	1.2	0.8	6.7
2020	7.4	3.3	15.5	31.4	9.8	6.8	2.6	5.1	4.6	0.3	0.2	6.5
2021	7.8	15.7	15.8	20.7	16.1	5.9	2.2	2.6	2.9	0.1	0.0	4.1
2022	11.1	20.8	21.9	*Data in this row are not included in statistics because water year is incomplete.*								
MIN	0.5	3.3	5.4	1.8	2.1	1.8	2.2	0.0	0.3	0.0	0.0	0.0
MAX	26.3	37.7	34.3	31.4	33.7	21.6	17.1	7.0	8.7	4.9	5.4	14.9
MEDIAN	7.7	15.1	16.0	15.4	10.2	9.5	6.4	4.4	2.5	0.8	0.8	2.7
MEAN	8.40	16.02	16.85	15.44	11.67	10.45	6.78	4.00	2.91	0.92	1.07	3.29

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

SDMO – South Saddle Mountain Precipitation Station

Data source: Natural Resources Conservation Service (SNOTEL #726)





SECO – Sain Creek Precipitation Station

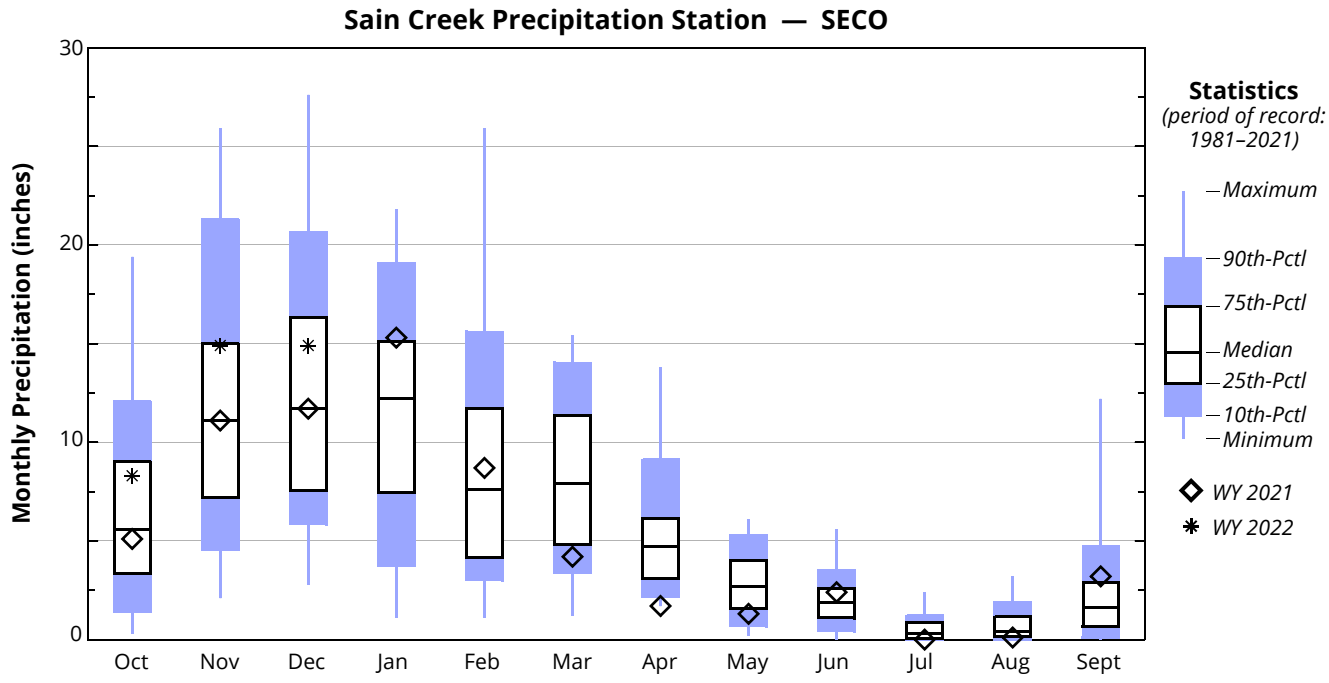
Data source: Natural Resources Conservation Service (SNOTEL #743)
https://wcc.sc.egov.usda.gov/nwcc/rgrpt?report=precsnotelmon&state=OR

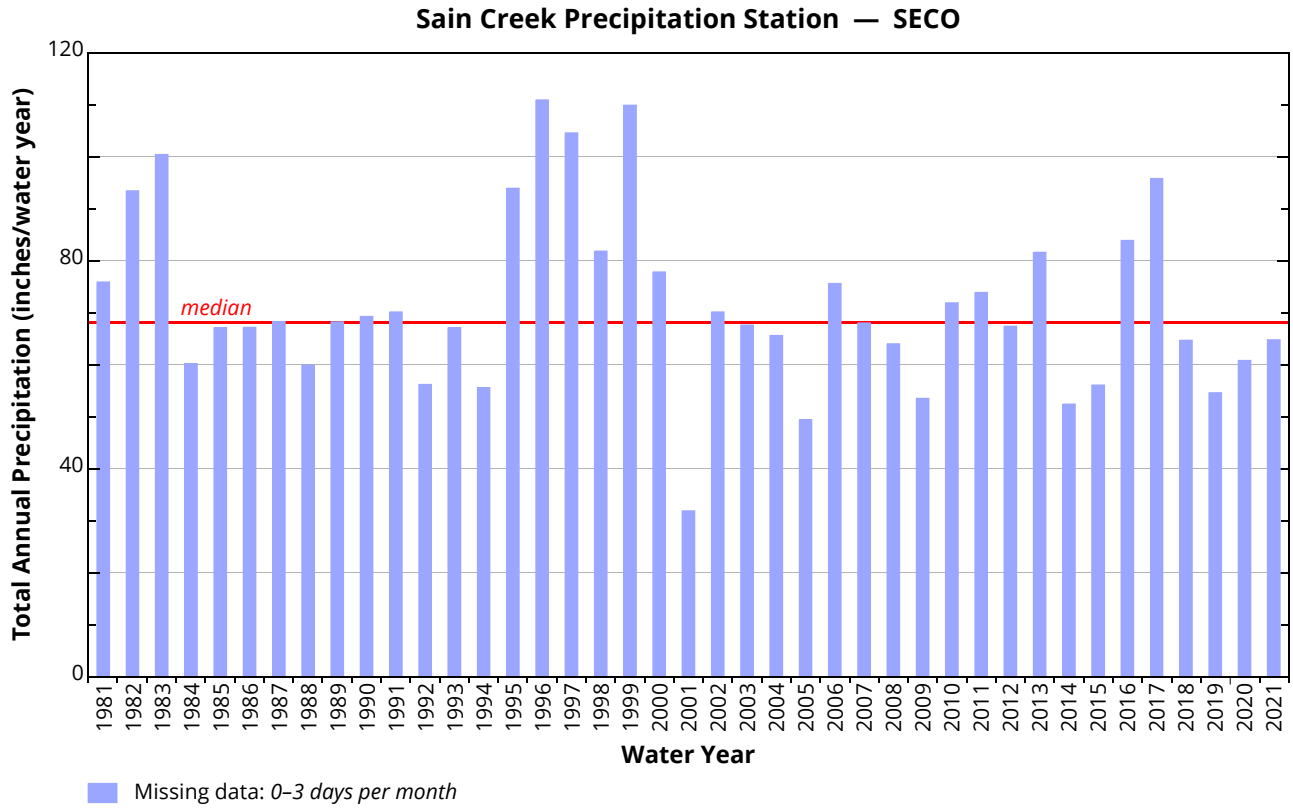
Elevation: 2000 ft Latitude: 45 31 12 Longitude: 123 16 48

MONTHLY TOTAL PRECIPITATION (inches) — SECO

Water Year*	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	1.6
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	0.5
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	1.0
2006	9.1	10.4	14.7	21.8	3.7	6.9	3.0	3.2	1.5	0.2	0.0	1.1
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	1.9
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	2.7	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	0.0	0.4	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	6.2	11.9	25.0	12.9	8.5	11.5	2.5	0.7	1.6	0.9	0.6	1.6
2017	19.4	12.7	10.2	8.7	15.7	15.1	7.7	2.1	1.3	0.3	0.1	2.5
2018	9.1	14.7	7.3	12.9	3.8	5.4	8.7	0.2	1.1	0.0	0.1	1.4
2019	4.6	6.6	10.8	7.5	9.5	2.3	5.5	2.6	0.2	0.7	0.6	3.7
2020	4.7	2.1	11.3	20.6	4.1	4.3	1.8	3.8	3.1	0.0	0.2	4.8
2021	5.1	11.1	11.7	15.3	8.7	4.2	1.7	1.3	2.4	0.0	0.1	3.2
2021	8.3	14.9	14.9	*Data in this row are not included in statistics because water year is incomplete.*								
MIN	0.3	2.1	2.8	1.1	1.1	1.2	1.7	0.2	0.0	0.0	0.0	0.0
MAX	19.4	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	11.1	11.7	12.2	7.6	7.9	4.7	2.7	1.9	0.3	0.4	1.6
MEAN	6.20	11.67	12.27	11.33	8.66	7.98	5.14	2.95	1.92	0.50	0.66	2.22

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


Sain Creek Precipitation Station — SECO
Monthly Precipitation (inches)
30
20
10
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Statistics
(period of record: 1981–2021)
Maximum
90th-Pctl
75th-Pctl
Median
25th-Pctl
10th-Pctl
Minimum
WY 2021
WY 2022


Sain Creek Precipitation Station — SECO
Total Annual Precipitation (inches/water year)
120
80
40
0
median
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
2017
2018
2019
2020
2021
Water Year
Missing data: 0–3 days per month

SCOO – SCOGGINS CREEK BELOW HENRY HAGG LAKE PRECIPITATION STATION

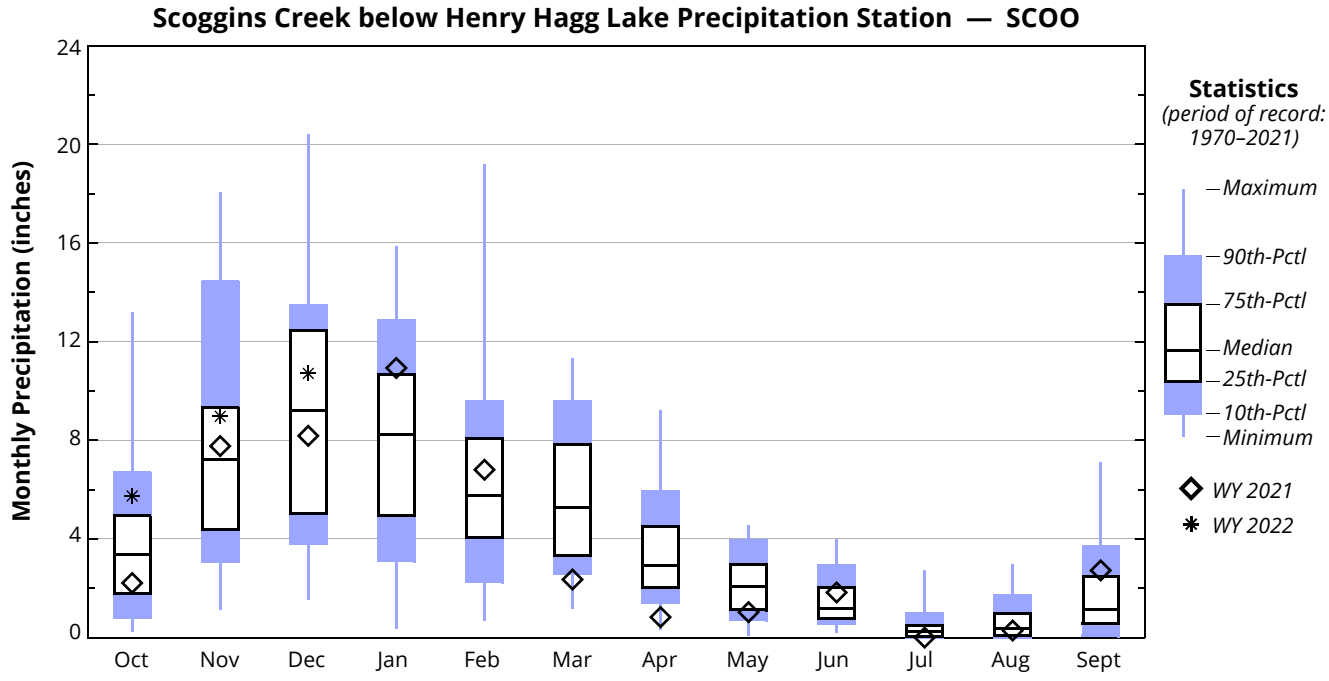
Data source: Tualatin Valley Irrigation District
data not available online

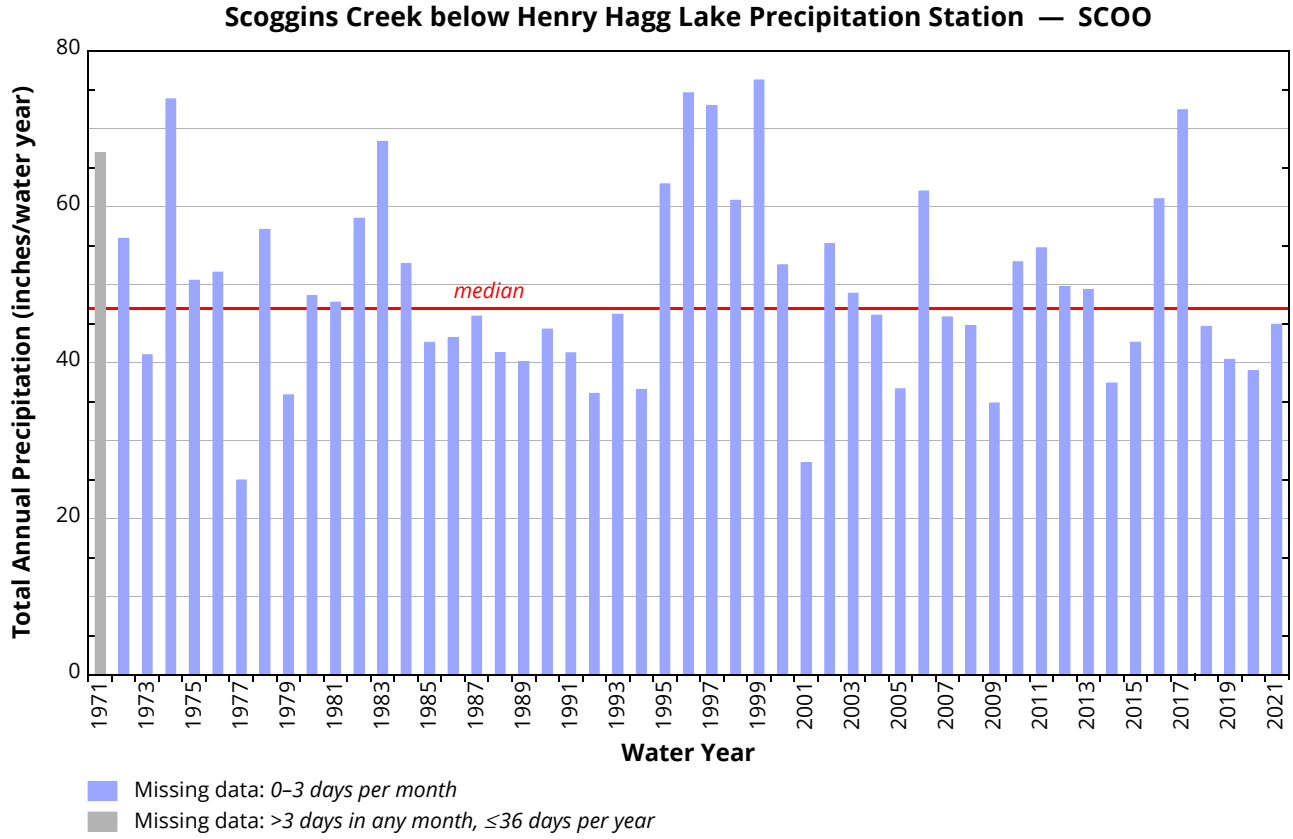
Elevation: 187.5 ft Latitude: 45 28 10 Longitude: 123 11 56

MONTHLY TOTAL PRECIPITATION (inches) — SCOO

WATER YEAR*	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
2017	13.19	10.43	7.82	6.41	14.24	9.75	5.99	1.85	0.86	0.00	0.15	1.74
2018	6.05	10.21	5.02	8.37	2.51	4.75	5.70	0.10	0.78	0.01	0.02	1.13
2019	3.28	3.75	7.72	5.05	8.30	1.73	4.21	2.00	0.24	0.45	0.54	3.15
2020	2.72	1.12	7.18	13.50	2.22	2.59	1.15	2.92	2.07	0.02	0.10	3.41
2021	2.21	7.76	8.18	10.93	6.80	2.35	0.83	1.03	1.83	0.00	0.28	2.72
2022	5.74	8.97	10.71	*Data in this row are not included in statistics because water year is incomplete.*								
MIN	0.23	1.12	1.54	0.37	0.70	1.16	0.32	0.09	0.20	0.00	0.00	0.03
MAX	13.19	18.05	20.40	15.85	19.20	11.32	9.23	4.56	3.98	2.73	2.99	7.10
MEDIAN	3.35	7.24	9.19	8.25	5.78	5.28	2.94	2.06	1.18	0.25	0.37	1.12
MEAN	3.70	7.67	9.15	7.99	6.19	5.58	3.43	2.12	1.45	0.40	0.62	1.60

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


Scoggins Creek below Henry Hagg Lake Precipitation Station — SCOO
Monthly Precipitation (inches)
0
4
8
12
16
20
24
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Statistics
(period of record: 1970–2021)
Maximum
90th-Pctl
75th-Pctl
Median
25th-Pctl
10th-Pctl
Minimum
WY 2021
WY 2022


Scoggins Creek below Henry Hagg Lake Precipitation Station — SCOO
Total Annual Precipitation (inches/water year)
0
20
40
60
80
median
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
Water Year
Missing data: 0–3 days per month
Missing data: >3 days in any month, ≤36 days per year

DLLO – DILLEY PRECIPITATION STATION

Data source: National Weather Service COOP Program (COOP ID#352325)
http://scacis.rcc-acis.org

Elevation: 170 ft Latitude: 45 27 48 Longitude: 123 06 49

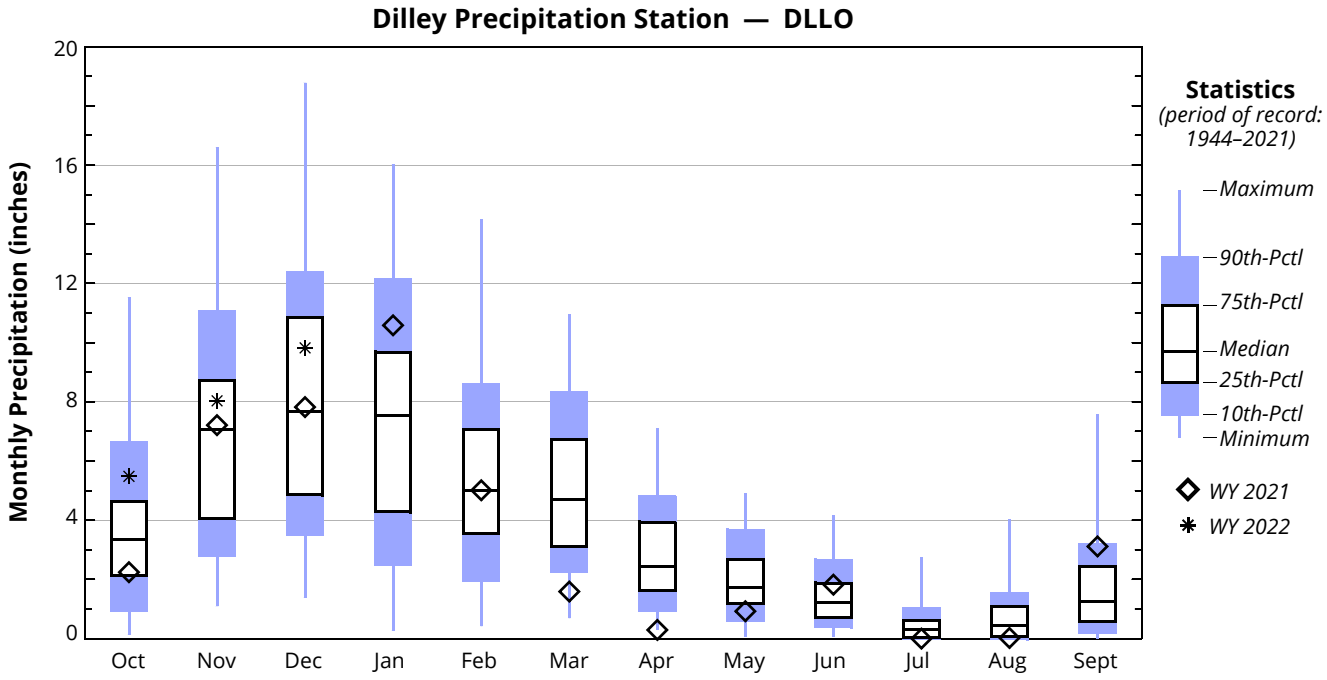
MONTHLY TOTAL PRECIPITATION (inches) — DLLO

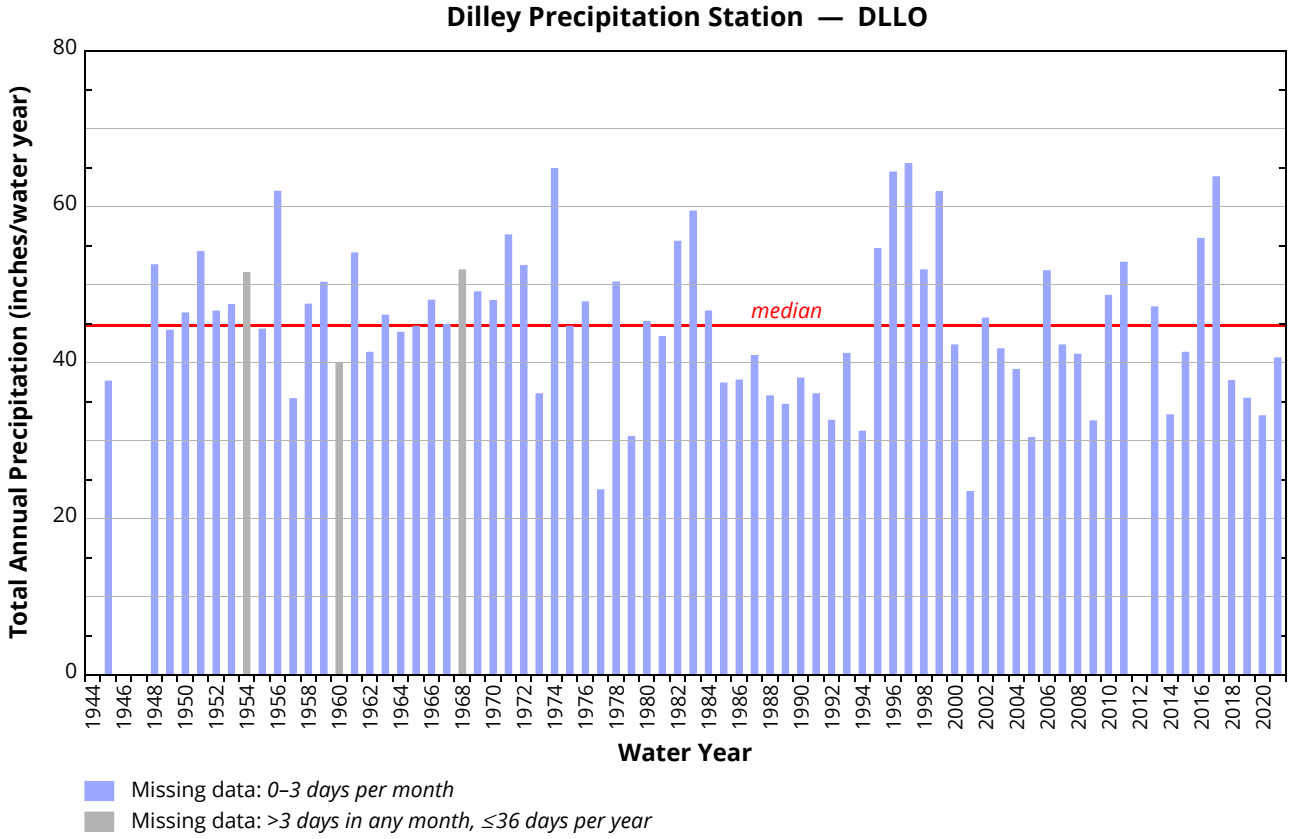
WATER YEAR*	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1944			4.08		3.98	3.22	3.93	0.94	0.74	1.06	0.20	2.80
1945	1.56	5.50	2.74	4.13	6.99	7.18	2.09	3.71	0.22	0.20	0.13	3.17
1946	1.45	11.82	7.56	7.21	7.61	6.09	1.41	1.51	1.74			
1947			5.38	5.47	4.46	4.69	1.30	0.09	3.12	0.86	0.50	1.28
1948	9.68	4.08	4.99	7.28	7.52	4.55	3.97	4.92	0.90	0.59	1.35	2.72
1949	2.52	8.67	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	7.40	13.80	7.32	2.95	3.26	1.33	2.06	0.56		1.97
1955	3.92	7.61	7.66	4.36	4.36	5.23	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	4.55	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	6.90	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		4.65	4.37	4.16	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	4.57	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		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	9.42	7.75	3.89	4.83	0.44	1.31	0.36	1.24	2.40
1983	4.87	5.36	11.16	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	8.00	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	2.60	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

MONTHLY TOTAL PRECIPITATION (inches) — DLLO (continued)

WATER YEAR*	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
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
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	2.30	2.52	0.37	0.07	0.04
2013	5.86	8.87	11.29	1.96	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	7.90	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
2017	11.53	9.66	5.97	5.91	12.83	8.70	4.53	1.99	1.18	0.00	0.09	1.42
2018	5.15	8.42	4.70	7.24	1.86	3.79	4.91	0.06	0.62	0.00	0.05	0.92
2019	3.15	3.47	6.68	4.23	6.48	1.07	3.73	1.49	0.69	0.51	1.17	2.78
2020	2.11	1.09	6.95	11.11	1.50	2.32	0.96	2.32	1.41	0.46	0.08	2.86
2021	2.24	7.21	7.82	10.58	5.01	1.59	0.29	0.92	1.82	0.00	0.02	3.11
2021	5.48	8.03	8.08	*Data in this row are not included in statistics because water year is incomplete.*								
MIN	0.14	1.09	1.37	0.27	0.41	0.69	0.29	0.06	0.07	0.00	0.00	0.00
MAX	11.53	16.59	18.77	16.01	14.15	10.95	7.09	4.92	4.16	2.74	4.01	7.57
MEDIAN	3.335	7.05	7.67	7.55	5.02	4.69	2.45	1.715	1.21	0.3	0.425	1.26
MEAN	3.63	6.84	8.08	7.46	5.45	4.92	2.74	1.95	1.39	0.43	0.64	1.52

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


Dilley Precipitation Station — DLLO
Monthly Precipitation (inches)
0
4
8
12
16
20
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Statistics
(period of record: 1944–2021)
Maximum
90th-Pctl
75th-Pctl
Median
25th-Pctl
10th-Pctl
Minimum
WY 2021
WY 2022


Dilley Precipitation Station — DLLO
Total Annual Precipitation (inches/water year)
0
20
40
60
80
median
1944
1946
1948
1950
1952
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
Water Year
Missing data: 0–3 days per month
Missing data: >3 days in any month, ≤36 days per year

FOGO – Forest Grove Precipitation Station (Verboort)

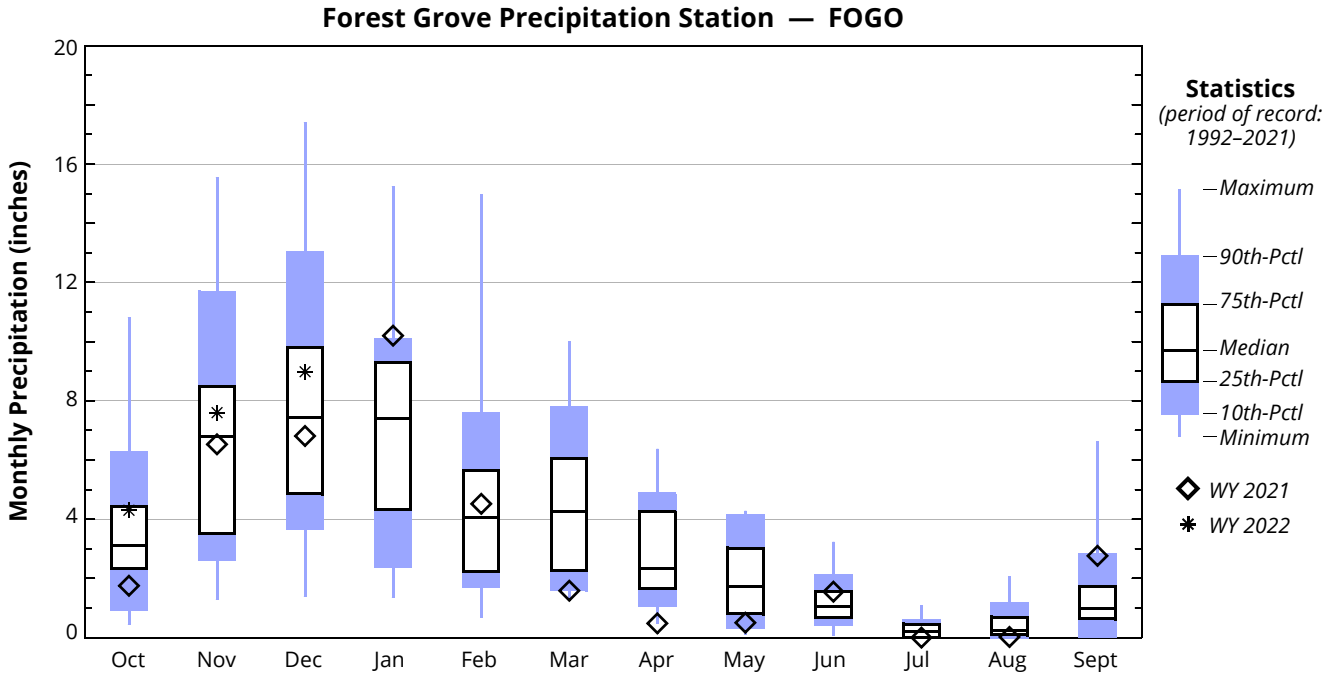
Data source: Bureau of Reclamation – AgriMet
https://www.usbr.gov/pn/agrimet/webarcread.html

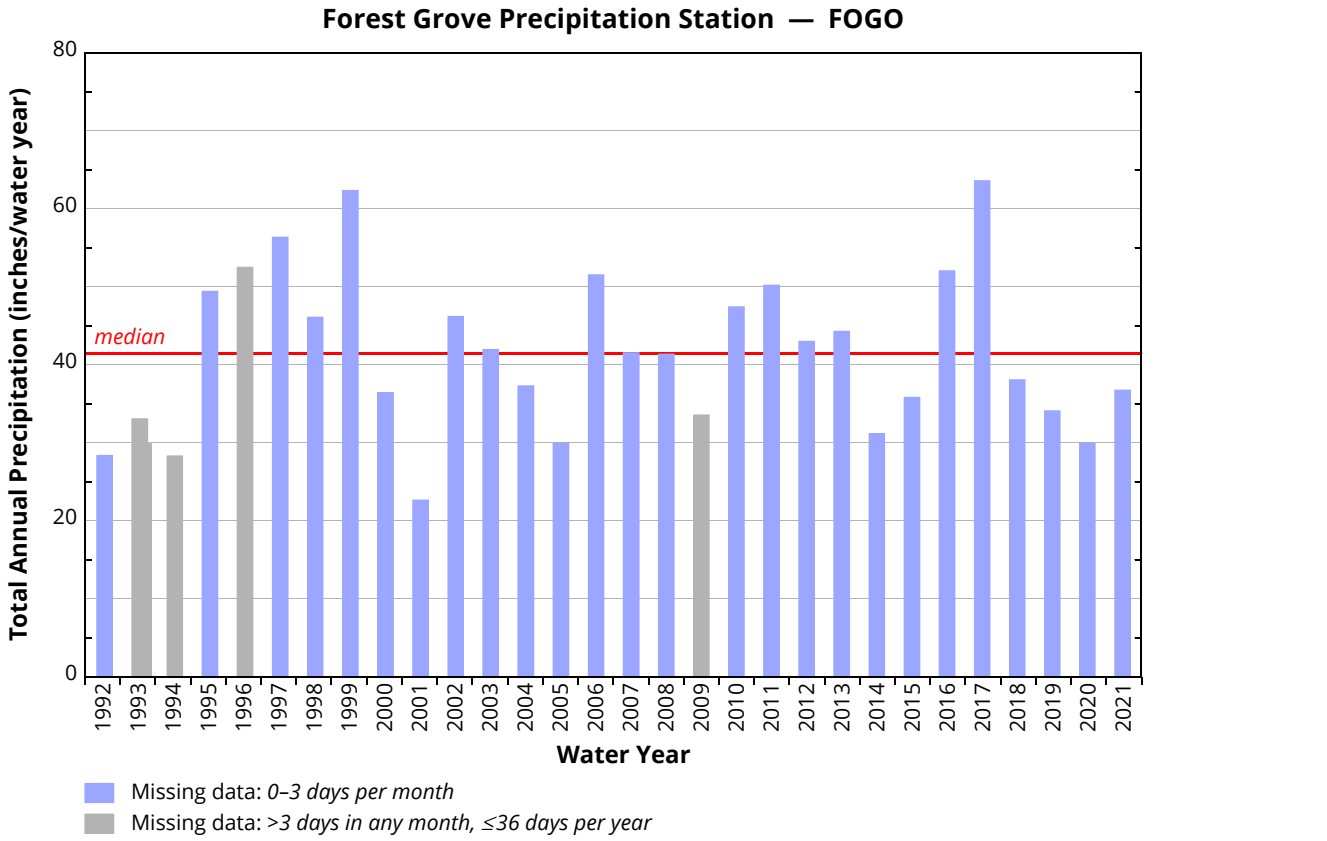
Elevation: 180 ft Latitude: 45 33 11 Longitude: 123 05 01

MONTHLY TOTAL PRECIPITATION (inches) — FOGO

Water Year*	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		2.22	4.15	4.88	4.22	0.57	1.09	0.14	0.00
1994	1.08	1.68	7.61		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		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	13.02	8.81	2.70	4.13	2.46	0.71	0.78	0.01	0.97	0.11
2009	2.66	5.69		6.06	1.91	3.69	1.77	3.43	1.17	0.13	1.06	1.22
2010	3.78	7.70	5.34	7.44	4.78	5.28	4.24	3.37	3.23	0.51	0.23	1.52
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	3.82	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	6.33
2014	0.68	2.96	1.39	2.98	7.57	7.73	3.70	1.30	0.87	0.29	0.10	1.55
2015	6.13	3.19	7.45	3.61	5.90	4.67	1.48	0.80	0.44	0.28	1.02	0.84
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
2017	10.82	9.09	6.96	6.15	12.26	8.37	4.49	1.74	1.41	0.00	0.11	2.16
2018	4.90	9.19	4.08	7.35	2.53	3.31	4.70	0.11	1.11	0.02	0.00	0.75
2019	2.99	3.62	5.76	4.07	7.31	1.31	3.37	1.73	0.50	0.55	0.21	2.67
2020	2.04	1.29	6.16	9.25	1.55	1.85	0.85	2.10	1.95	0.02	0.09	2.80
2021	1.75	6.53	6.81	10.20	4.52	1.58	0.48	0.50	1.55	0.00	0.02	2.76
2022	4.30	7.60	8.98	*Data in this row are not included in statistics because water year is incomplete.*								
MIN	0.43	1.29	1.39	1.36	0.67	1.31	0.48	0.10	0.07	0.00	0.00	0.00
MAX	10.82	15.55	17.40	15.24	14.97	10.00	6.37	4.28	3.23	1.09	2.08	6.63
MEDIAN	3.11	6.81	7.45	7.40	4.05	4.27	2.33	1.71	1.05	0.20	0.23	1.00
MEAN	3.58	6.61	7.77	7.02	4.54	4.41	2.77	1.89	1.16	0.26	0.43	1.37

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


Forest Grove Precipitation Station — FOGO
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: 1992–2021)
Maximum
90th-Pctl
75th-Pctl
Median
25th-Pctl
10th-Pctl
Minimum
WY 2021
WY 2022


Forest Grove Precipitation Station — FOGO
Total Annual Precipitation (inches/water year)
80
60
40
20
0
median
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
2017
2018
2019
2020
2021
Water Year
Missing data: 0–3 days per month
Missing data: >3 days in any month, ≤36 days per year

KHIO – Hillsboro Airport Precipitation Station

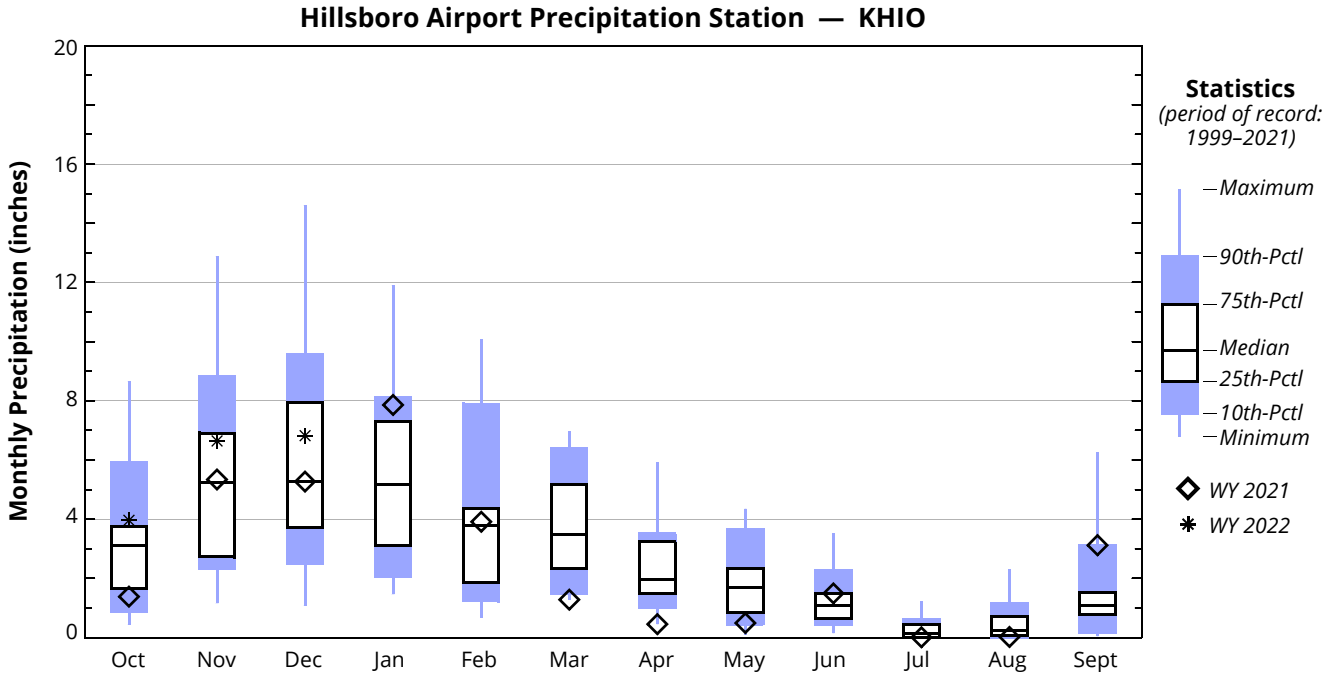
Data source: National Weather Service COOP Program (WBAN ID#94261)
http://scacis.rcc-acis.org

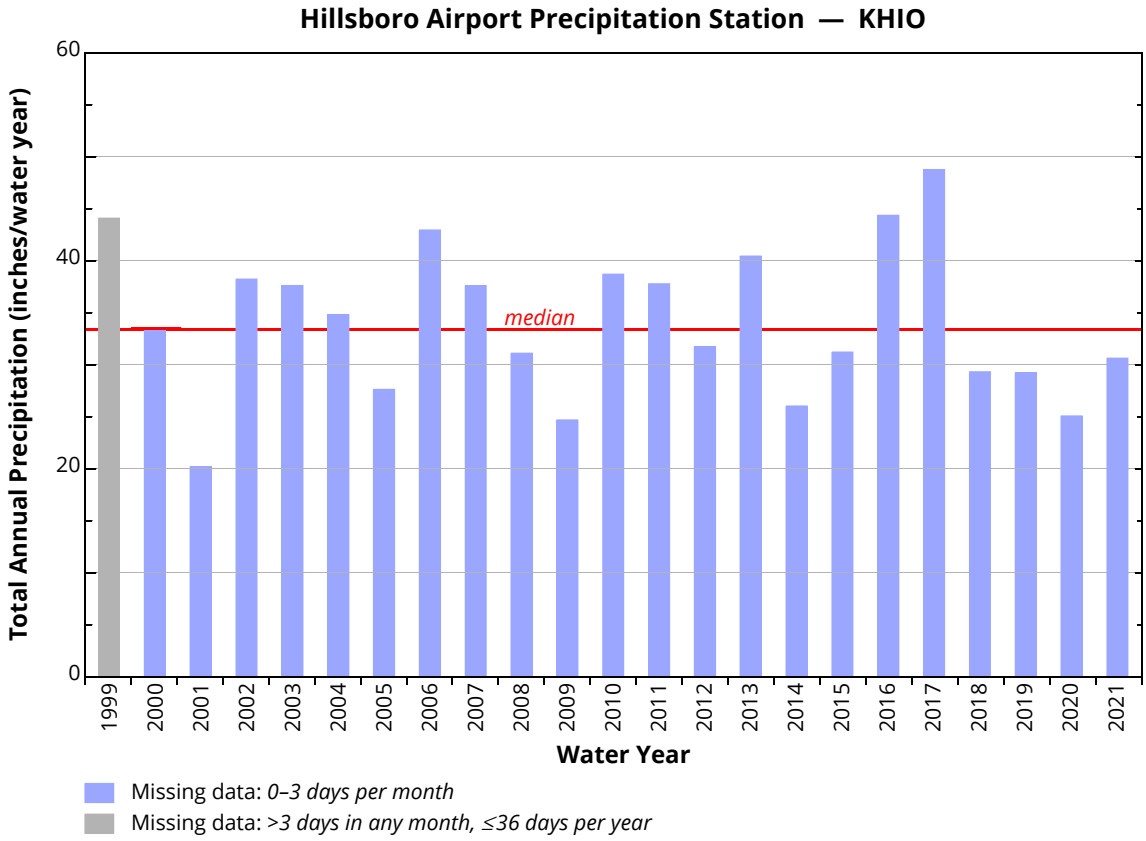
Elevation: 204 ft Latitude: 45 32 26 Longitude: 122 56 55

MONTHLY TOTAL PRECIPITATION (inches) — KHIO

Water Year*	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1999		9.03	7.07	7.48	9.78	4.29	1.50	1.74	1.55	0.66	0.84	0.14
2000	2.49	6.91	3.91	6.92	4.35	3.02	1.36	1.91	1.04	0.08	0.15	1.27
2001	3.00	2.16	3.24	1.94	1.58	2.33	1.86	0.85	1.20	0.45	0.79	0.79
2002	3.13	8.54	6.98	7.31	3.13	3.49	1.71	1.44	1.30	0.32	0.05	0.83
2003	0.43	2.61	9.88	8.29	2.93	5.16	5.91	0.75	0.15	0.00	0.55	0.94
2004	3.07	4.43	7.93	5.90	4.27	1.68	1.79	1.24	0.82	0.00	2.31	1.37
2005	3.55	2.61	3.72	2.27	0.68	4.42	2.56	4.35	1.55	0.24	0.32	1.36
2006	3.68	6.09	9.09	11.90	1.99	3.57	2.02	2.70	1.08	0.14	0.08	0.59
2007	0.90	12.88	7.49	3.24	3.80	2.39	1.96	1.29	0.97	0.40	0.53	1.73
2008	3.12	3.90	8.94	5.38	1.49	3.31	1.94	0.97	0.36	0.09	1.37	0.22
2009	1.69	4.51	2.77	4.36	1.08	2.40	1.24	2.92	1.34	0.13	0.72	1.51
2010	3.32	5.72	3.96	5.14	4.06	3.76	3.22	3.16	3.52	0.45	0.17	2.21
2011	3.98	5.23	8.16	3.59	3.83	5.39	3.42	2.10	0.59	1.23	0.00	0.26
2012	1.88	5.38	2.33	5.79	2.48	6.59	2.38	2.34	2.42	0.09	0.02	0.04
2013	5.45	7.59	7.50	1.47	1.87	1.81	2.33	3.98	1.31	0.00	0.85	6.27
2014	0.87	2.73	1.08	2.41	5.06	6.07	3.42	1.70	0.92	0.52	0.14	1.10
2015	6.12	2.83	5.88	3.01	4.57	4.68	1.41	0.44	0.54	0.32	0.55	0.86
2016	3.42	4.00	14.60	7.53	3.96	5.31	1.88	0.80	1.33	0.33	0.25	0.93
2017	8.66	6.25	4.77	4.11	10.06	6.96	3.56	1.82	1.05	0.00	0.13	1.39
2018	4.04	7.38	2.92	5.17	2.15	2.79	3.32	0.11	0.65	0.00	0.00	0.79
2019	3.33	2.61	4.74	3.12	4.96	1.36	3.23	1.45	0.64	0.49	0.21	3.08
2020	1.51	1.16	5.22	7.18	1.49	2.12	0.88	1.86	2.04	0.07	0.25	1.28
2021	1.38	5.34	5.27	7.86	3.91	1.28	0.45	0.49	1.49	0.01	0.02	3.12
2022	3.96	6.64	6.82	*Data in this row are not included in statistics because water year is incomplete.*								
MIN	0.43	1.16	1.08	1.47	0.68	1.28	0.45	0.11	0.15	0.00	0.00	0.04
MAX	8.66	12.88	14.60	11.90	10.06	6.96	5.91	4.35	3.52	1.23	2.31	6.27
MEDIAN	3.13	5.23	5.27	5.17	3.80	3.49	1.96	1.70	1.08	0.14	0.25	1.10
MEAN	3.14	5.21	5.98	5.28	3.63	3.66	2.32	1.76	1.21	0.26	0.45	1.39

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


Hillsboro Airport Precipitation Station — KHIO
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: 1999–2021)
Maximum
90th-Pctl
75th-Pctl
Median
25th-Pctl
10th-Pctl
Minimum
WY 2021
WY 2022


Hillsboro Airport Precipitation Station — KHIO
Total Annual Precipitation (inches/water year)
60
40
20
0
median
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Water Year
Missing data: 0–3 days per month
Missing data: >3 days in any month, ≤36 days per year

THNP – Tualatin Hills Nature Park Precipitation Station

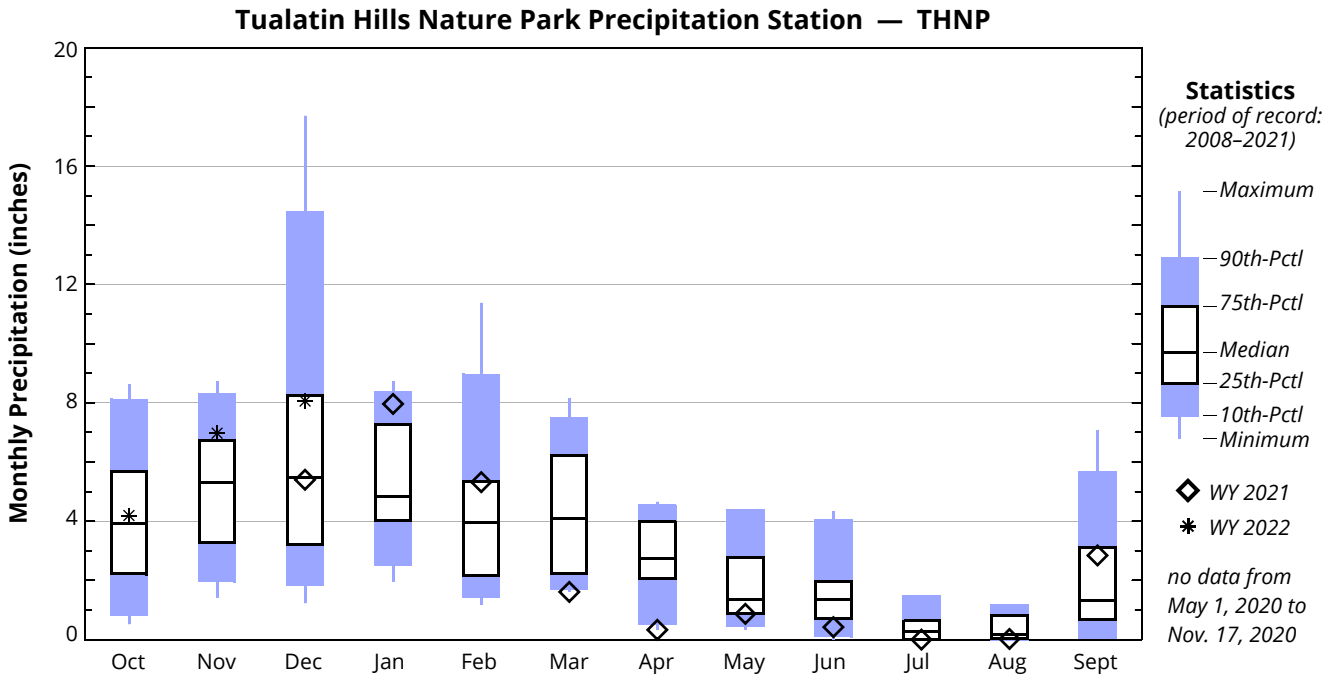
Data source: National Weather Service COOP Program (COOP ID#355945)
http://scacis.rcc-acis.org

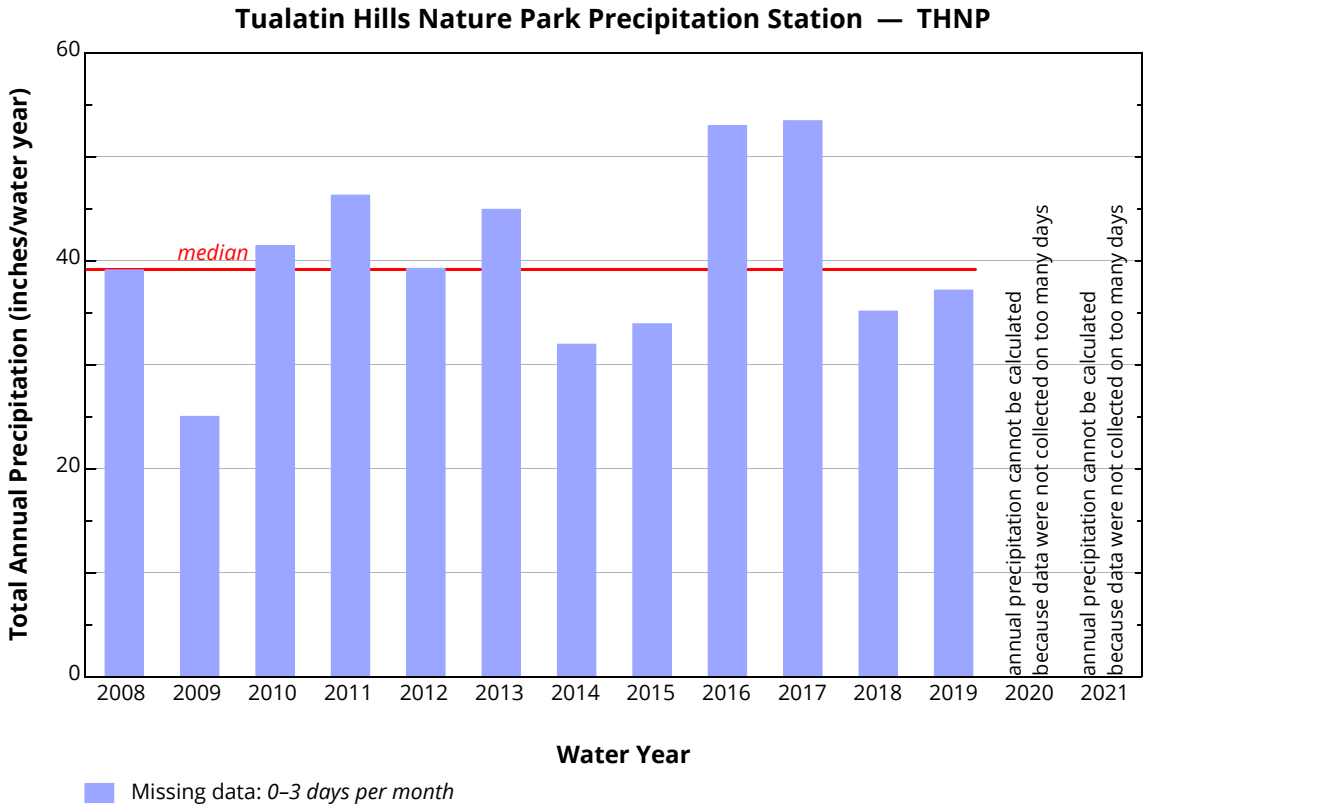
Elevation: 185 ft Latitude: 45 29 53 Longitude: 122 50 22

MONTHLY TOTAL PRECIPITATION (inches) — THNP

Water Year*	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
2008	3.92	4.43	11.17	6.38	2.18	3.98	2.18	1.30	0.99	1.50	0.94	0.13
2009	1.38	4.65	3.26	4.46	2.31	3.16	2.73	0.90	0.00	0.00	0.70	1.45
2010	3.62	6.41	3.08	5.22	3.87	4.07	2.76	4.26	4.33	0.42	0.01	3.39
2011	4.86	6.60	8.38	4.28	5.45	6.08	4.41	2.83	1.40	1.37	0.03	0.60
2012	2.65	5.46	2.50	7.08	3.36	8.15	3.60	2.70	3.52	0.19	0.00	0.04
2013	6.51	8.71	8.22	1.96	1.76	1.87	2.11	4.41	1.21	0.00	1.11	7.07
2014	0.52	3.21	1.23	3.12	6.51	6.77	4.65	2.47	1.53	0.72	0.12	1.09
2015	7.32	3.37	5.56	3.52	4.03	4.48	1.85	0.70	0.33	0.26	1.17	1.34
2016	4.23	5.32	17.69	8.72	4.21	5.81	2.42	1.37	1.74	0.53	0.19	0.76
2017	8.61	7.60	6.29	4.25	11.37	6.69	3.92	1.80	1.34	0.01	0.24	1.33
2018	3.93	6.86	3.93	6.41	2.14	4.09	4.21	0.34	2.18	0.00	0.03	1.01
2019	4.71	2.81	7.94	4.18	4.96	2.25	3.66	1.17	1.08	0.40	0.50	3.50
2020**	1.79	1.43	4.62	7.80	1.17	2.20	0.75					
2021**			5.40	7.96	5.32	1.61	0.33	0.87	0.42	0.00	0.02	2.84
2022	4.19	6.97	8.06	*Data in this row are not included in statistics because water year is incomplete.*								
MIN	0.52	1.43	1.23	1.96	1.17	1.61	0.33	0.34	0.00	0.00	0.00	0.04
MAX	8.61	8.71	17.69	8.72	11.37	8.15	4.65	4.41	4.33	1.50	1.17	7.07
MEDIAN	3.93	5.32	5.48	4.84	3.95	4.08	2.745	1.37	1.34	0.26	0.19	1.33
MEAN	4.16	5.14	6.38	5.38	4.19	4.37	2.83	1.93	1.54	0.42	0.39	1.89

*Water Year (WY) begins October 1st of the previous calendar year and ends September 30th of current year.
**No data collected May 1, 2020 – November 17, 2020.


Tualatin Hills Nature Park Precipitation Station — THNP
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: 2008–2021)
Maximum
90th-Pctl
75th-Pctl
Median
25th-Pctl
10th-Pctl
Minimum
WY 2021
WY 2022
no data from May 1, 2020 to Nov. 17, 2020


Tualatin Hills Nature Park Precipitation Station — THNP
Total Annual Precipitation (inches/water year)
60
40
20
0
median
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
annual precipitation cannot be calculated because data were not collected on too many days
annual precipitation cannot be calculated because data were not collected on too many days
Water Year
Missing data: 0–3 days per month

KGWP – KGW-TV Precipitation Station

Data source: National Weather Service COOP Program (COOP ID#356749)
http://scacis.rcc-acis.org

Elevation: 159 ft Latitude: 45 31 05 Longitude: 122 41 22

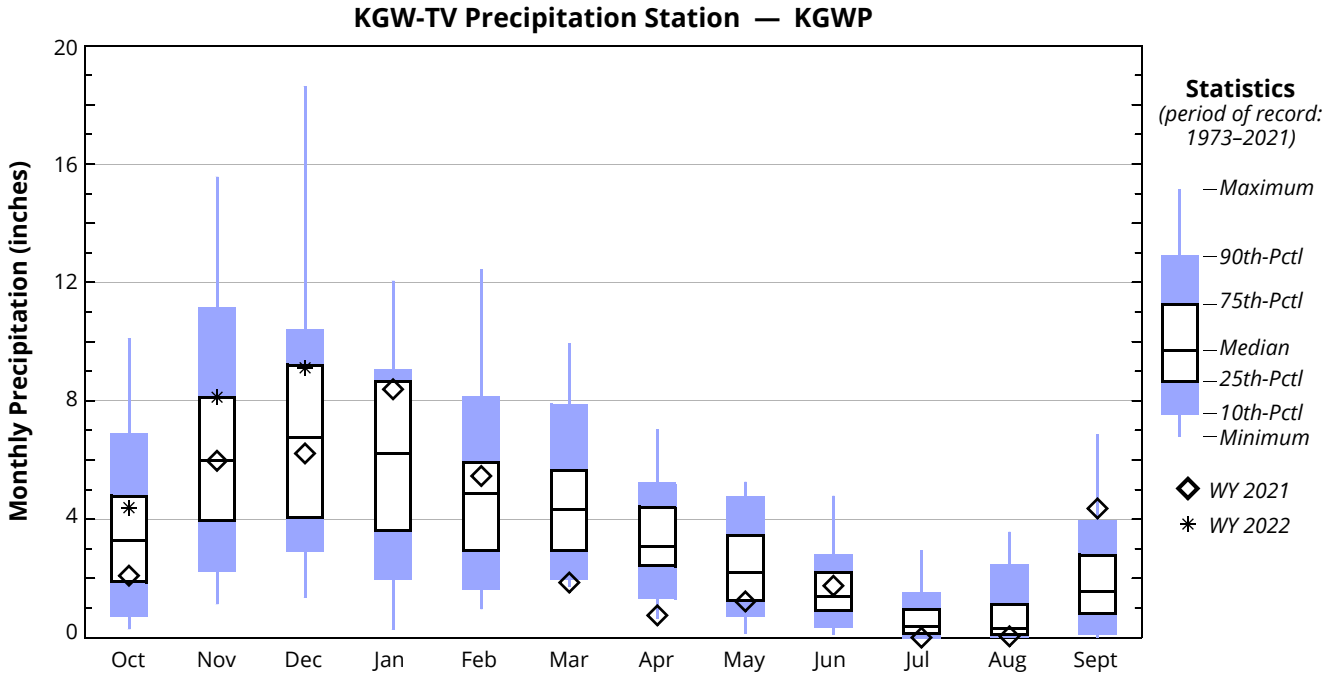
MONTHLY TOTAL PRECIPITATION (inches) — KGWP

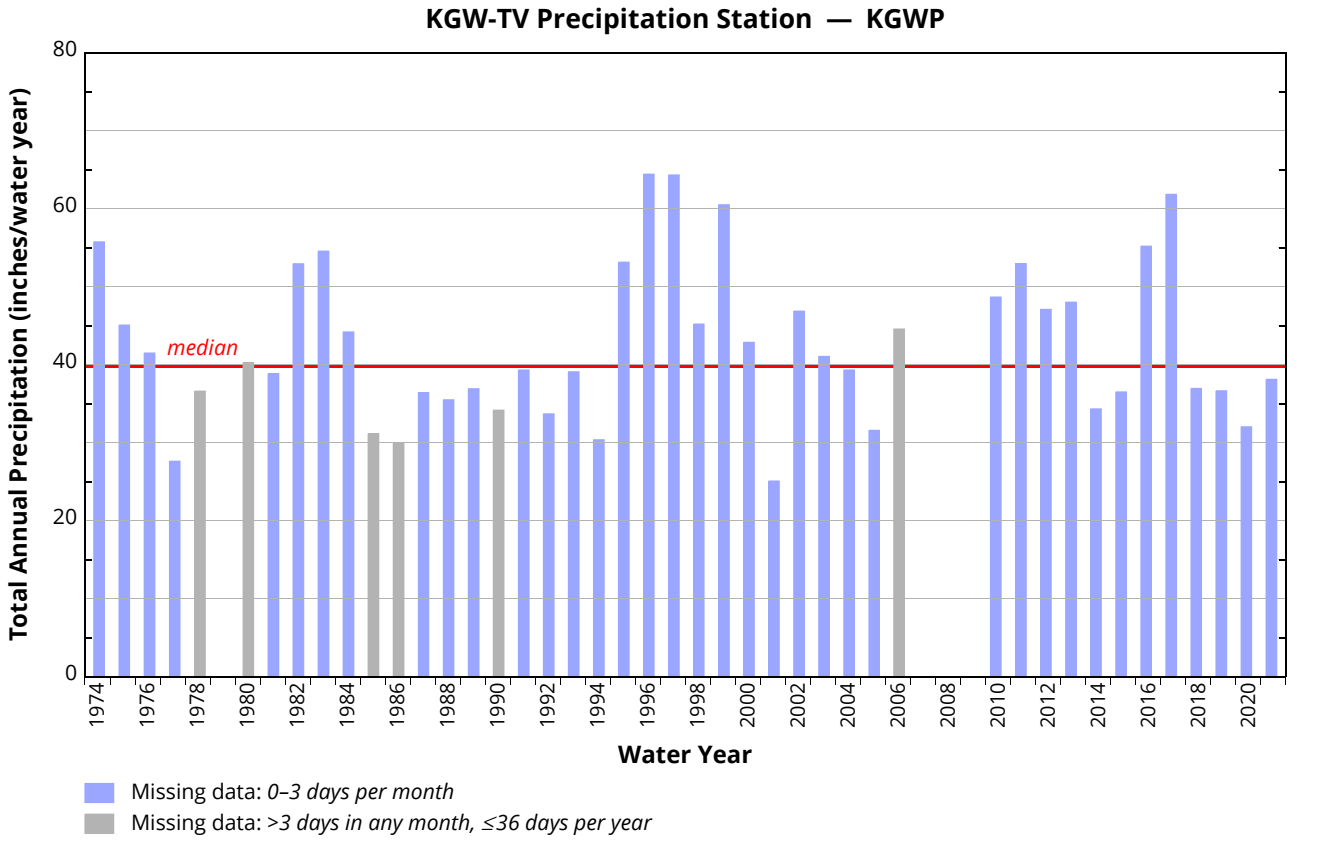
Water Year*	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1973											1.66	3.76
1974	3.81	13.46	9.88	9.07	4.85	6.43	2.64	2.17	0.86	2.27	0.14	0.15
1975	2.22	7.13	6.93	8.83	6.03	5.02	2.48	1.97	1.22	0.41	2.84	0.00
1976	5.67	4.71	6.74	6.07	5.41	3.41	2.63	1.74	0.92	0.75	2.50	0.93
1977	1.73	1.13	1.36	1.26	2.71	4.10	0.63	4.39	0.99	1.05	3.57	4.69
1978	3.51	5.87		5.93	3.81	1.73	3.53	3.70	1.41	1.17	2.36	3.58
1979	0.48	4.08	2.85	3.04	7.00	2.58	2.83	2.18	0.39	0.25		
1980		4.58	7.35	8.88	4.51	4.45	3.11	2.16	2.77	0.18	0.21	2.06
1981	1.25	7.09	10.27	1.67	3.84	2.74	3.11	1.81	4.03	0.21	0.04	2.76
1982	4.57	5.99	10.34	8.76	7.10	3.61	4.89	0.59	0.99	0.83	1.92	3.33
1983	4.96	3.84	9.40	7.71	9.05	7.31	2.44	2.38	2.04	2.94	2.01	0.47
1984	1.92	10.73	5.78	2.38	4.05	4.32	4.38	4.09	4.48	0.00	0.08	1.99
1985	4.60	10.69	3.38	0.27		4.06	1.14	0.88	2.28	0.12	0.99	2.71
1986	3.05		2.20	5.87	7.15	2.78	1.32	2.33	0.32	1.86	0.04	2.96
1987	2.09	6.36	4.23	7.33	2.99	6.50	2.45	1.88	0.20	1.56	0.46	0.36
1988	0.28	1.97	9.19	6.31	1.38	4.08	5.08	2.97	2.20	0.26	0.11	1.66
1989	0.33	8.34	3.04	4.43	2.64	8.74	1.63	3.53	0.97	1.01	1.11	1.13
1990	1.68	4.46	3.82	8.51	5.44	2.68	3.01		1.89	1.10	1.04	0.52
1991	5.87	4.88	3.74	3.66	4.92	4.52	4.02	4.13	2.43	0.12	0.93	0.10
1992	2.17	7.44	4.88	5.04	4.58	1.78	5.06	0.13	0.56	0.45	0.25	1.33
1993	3.17	5.45	6.84	3.60	0.96	5.20	6.31	4.02	1.94	1.42	0.18	0.00
1994	1.44	1.79	6.86	4.95	6.11	2.72	2.31	1.23	1.10	0.07	0.14	1.63
1995	9.02	7.49	6.53	7.44	5.22	5.02	4.19	1.13	2.29	0.98	1.69	2.14
1996	4.35	11.71	7.84	8.56	12.43	4.46	5.95	4.84	0.09	0.49	0.50	3.22
1997	6.17	9.72	16.28	8.86	2.14	8.24	3.78	2.46	1.62	0.64	1.55	2.84
1998	7.58	5.19	4.01	7.76	6.80	4.21	1.49	5.18	1.61	0.34	0.00	1.02
1999	3.57	13.36	9.21	8.97	11.39	5.67	1.61	2.59	2.45	0.38	1.12	0.19
2000	2.89	7.67	7.67	8.08	4.96	3.62	2.39	2.51	0.90	0.25	0.15	1.76
2001	3.19	2.91	3.85	1.99	1.79	3.73	3.09	1.12	1.40	0.46	0.87	0.66
2002	4.37	7.44	7.83	8.03	4.92	5.40	3.60	1.57	2.19	0.19	0.01	1.31
2003	0.32	2.49	10.48	9.14	3.17	5.16	7.03	1.60	0.11	0.00	0.06	1.50
2004	2.30	5.38	10.43	5.02	4.86	2.01	2.16	1.17	1.03	0.00	3.20	1.76
2005	3.27	2.46	4.58	2.02	0.99	4.73	4.44	5.06	2.03	0.39	0.22	1.37
2006	4.26	6.54	10.20	12.05	2.38	3.63	2.52		1.12	0.19	0.07	1.12
2007	1.83	15.56										
2008								1.22				
2009												1.63
2010	3.54	7.21	4.99	6.68	3.96	5.62	3.99	4.63	4.79	0.30		2.94
2011	5.16	7.39	10.23	5.13	5.79	7.59	5.37	3.25	0.87	1.36	0.10	0.70
2012	2.64	8.32	3.37	8.74	3.71	9.95	3.85	3.21	2.78	0.51	0.00	0.01
2013	6.59	8.53	9.14	3.11	1.51	2.37	2.59	5.26	1.43	0.00	0.63	6.85
2014	0.93	3.52	1.77	3.34	5.95	7.58	4.51	2.79	1.84	0.92	0.13	1.05
2015	7.26	3.58	6.78	3.69	4.11	5.12	2.61	0.64	0.44	0.60	0.78	0.87
2016	4.39	5.61	18.61	8.93	4.87	5.71	2.46	1.30	1.11	0.75	0.16	1.26
2017	10.11	8.74	6.12	5.65	12.18	8.40	4.63	2.25	1.12	0.00	0.09	2.53
2018	5.19	7.90	4.23	6.21	2.93	3.11	5.08	0.29	1.06	0.00	0.03	0.90
2019	3.75	3.65	6.84	3.55	5.58	2.00	3.53	1.83	0.65	0.26	0.59	4.40
2020	1.81	1.58	5.16	9.53	2.07	3.50	1.36	2.22	2.48	0.10	0.38	1.82
2021	2.09	5.97	6.22	8.39	5.46	1.86	0.75	1.22	1.75	0.00	0.04	4.36
2022	4.39	8.12	9.11	*Data in this row are not included in statistics because water year is incomplete.*								
MIN	0.28	1.13	1.36	0.27	0.96	1.73	0.63	0.13	0.09	0.00	0.00	0.00
MAX	10.11	15.56	18.61	12.05	12.43	9.95	7.03	5.26	4.79	2.94	3.57	6.85
MEDIAN	3.27	5.99	6.76	6.21	4.855	4.32	3.09	2.2	1.4	0.39	0.315	1.57
MEAN	3.59	6.44	6.85	6.10	4.86	4.61	3.29	2.45	1.58	0.60	0.79	1.83

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

KGWP – KGW-TV Precipitation Station

Data source: National Weather Service COOP Program (COOP ID#356749)





ORCP – OREGON CITY PRECIPITATION STATION

Data source: National Weather Service COOP Program (COOP ID#356334)
http://scacis.rcc-acis.org

Elevation: 167 ft Latitude: 45 21 21 Longitude: 122 36 17

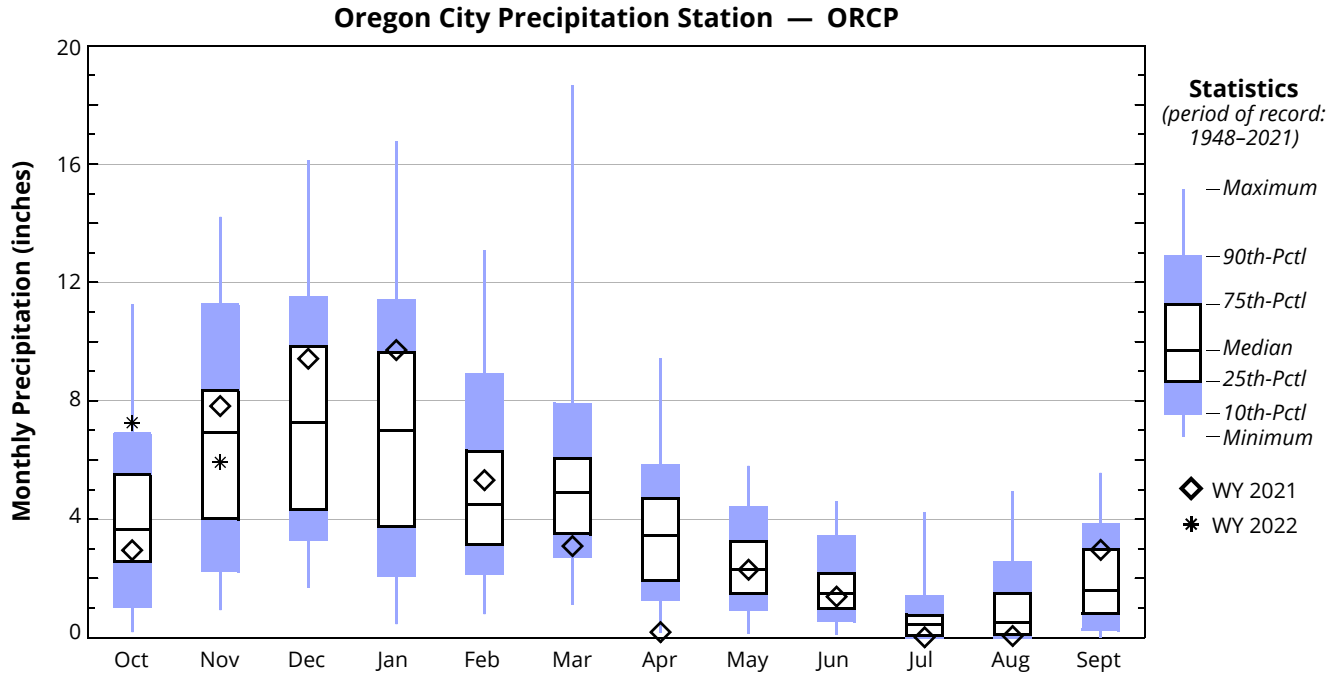
MONTHLY TOTAL PRECIPITATION (inches) — ORCP

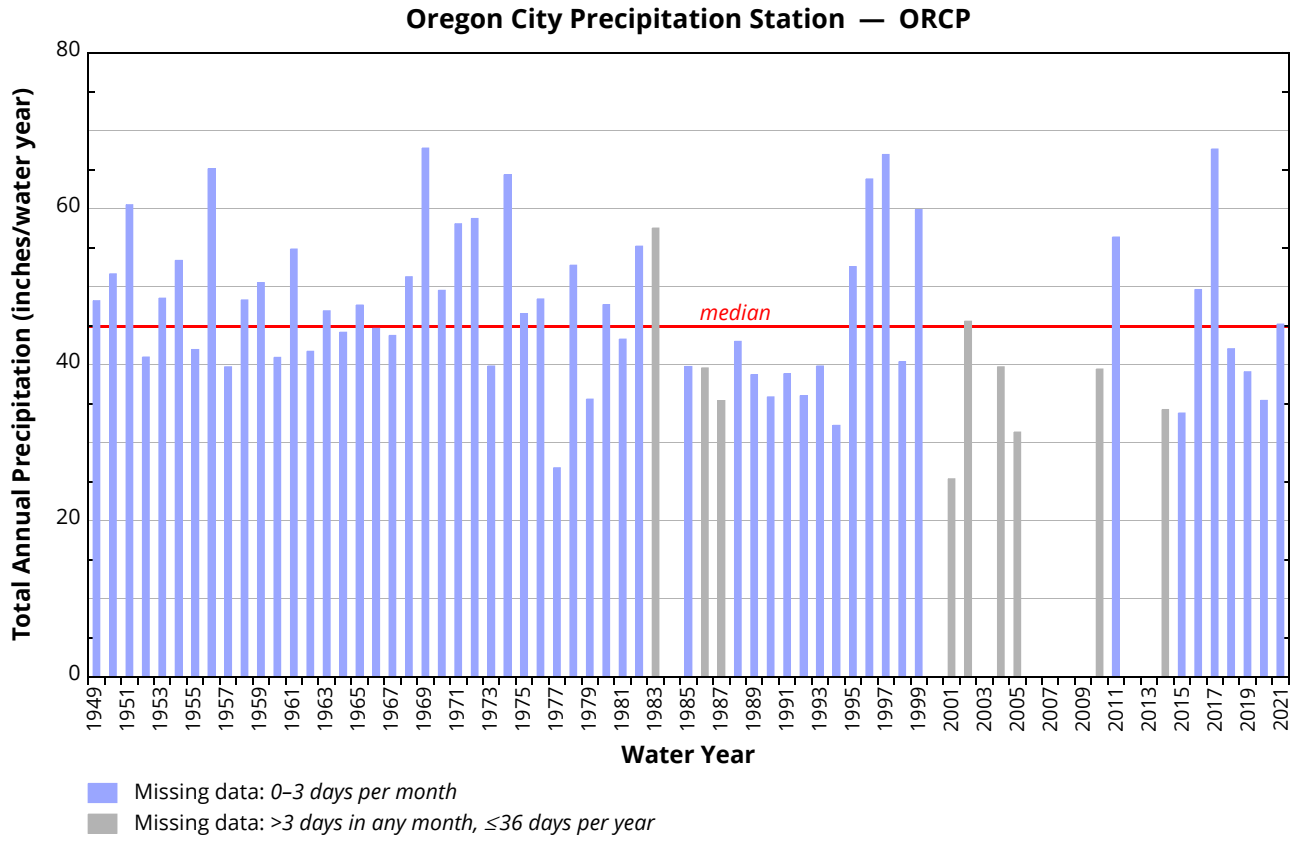
WATER YEAR*	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1948					7.57	4.70	4.27	4.73	1.15	0.91	2.07	3.46
1949	2.70	8.46	10.26	1.48	13.09	3.34	1.16	2.69	1.25	0.94	0.22	2.60
1950	3.17	6.92	6.50	11.44	6.97	6.29	3.13	1.09	2.05	1.35	0.45	2.26
1951	10.34	12.70	7.48	10.50	5.93	5.63	1.06	2.58	0.09	0.16	0.34	3.71
1952	5.55	6.25	7.29	6.20	4.72	4.51	1.75	0.89	3.30	0.00	0.09	0.42
1953	0.87	1.32	7.70	16.77	4.76	4.96	2.52	4.15	1.50	0.04	2.53	1.40
1954	3.39	7.46	9.04	11.25	5.06	3.46	3.88	2.17	3.76	0.69	2.18	1.01
1955	3.91	5.61	6.49	3.02	3.62	5.32	6.30	1.45	1.37	1.39	0.00	3.46
1956	7.68	9.71	11.20	14.25	4.44	7.61	0.68	2.30	1.99	0.02	3.57	1.67
1957	7.69	1.81	4.53	3.26	4.81	9.43	1.66	3.10	1.95	0.43	0.37	0.68
1958	3.97	4.02	10.60	9.43	6.93	2.67	5.38	0.61	3.26	0.00	0.04	1.40
1959	1.73	8.21	7.12	10.41	5.75	5.07	1.65	3.76	2.00	0.83	0.17	3.81
1960	4.17	3.34	3.86	4.91	4.94	6.64	4.09	5.80	0.64	0.00	1.33	1.20
1961	3.49	12.68	4.18	5.22	11.74	7.01	3.47	4.14	0.60	0.57	0.85	0.84
1962	4.04	6.01	6.65	2.13	4.33	5.88	4.05	3.62	1.15	0.06	1.37	2.43
1963	4.36	11.78	3.00	1.96	4.99	6.33	5.06	4.36	1.74	1.30	0.54	1.46
1964	3.68	7.73	4.22	13.64	1.22	4.43	1.85	1.07	2.90	0.76	0.95	1.72
1965	1.22	9.65	14.78	10.67	1.99	1.47	3.42	1.91	0.75	0.24	1.50	0.03
1966	2.54	7.28	8.87	9.75	2.19	6.43	1.29	1.31	1.67	1.26	0.31	1.72
1967	3.32	6.60	8.29	8.65	2.76	6.08	3.54	2.52	1.17	0.00	0.00	0.81
1968	6.36	2.74	6.24	5.53	8.87	3.60	1.95	3.23	3.44	0.50	4.95	3.83
1969	7.09	7.89	14.56	10.47	3.92	2.99	9.44	2.23	4.48	0.09	0.11	4.50
1970	5.00	3.77	9.15	14.05	6.03	3.01	3.76	1.81	0.69	0.09	0.00	2.15
1971	3.59	8.69	9.36	10.08	4.50	6.27	4.33	2.41	3.16	0.37	1.50	3.79
1972	4.37	7.66	10.25	9.17	6.71	6.53	4.81	2.87	0.73	0.50	0.71	4.41
1973	1.04	6.47	9.79	5.90	2.34	4.00	1.79	1.62	2.23	0.08	1.40	3.18
1974	4.00	14.21	11.93	9.57	6.70	8.04	2.81	2.63	1.18	2.82	0.06	0.40
1975	2.44	7.21	6.87	8.28	5.51	5.67	2.44	1.93	2.12	0.73	3.31	0.00
1976	6.25	5.53	7.79	6.33	8.11	3.64	3.55	2.12	0.67	0.87	2.30	1.25
1977	1.20	0.93	1.69	1.65	3.52	4.20	0.77	4.31	1.41	0.68	3.01	3.41
1978	2.92	7.17	11.49	5.96	4.53	1.88	5.84	4.45	1.71	1.53	2.36	2.88
1979	0.61	4.73	3.27	2.90	8.99	3.30	3.94	2.49	0.70	0.52	0.98	3.14
1980	5.70	3.75	7.73	11.38	4.38	3.71	3.91	1.30	3.79	0.18	0.22	1.65
1981	1.56	7.60	12.61	1.84	4.51	3.13	2.55	1.83	4.52	0.28	0.00	2.84
1982	4.79	5.49	11.42	7.76	8.22	5.18	4.37	1.66	1.05	0.22	1.27	3.76
1983	4.25	5.42	10.39	8.70	8.93	7.87	2.50	2.11		4.24	2.57	0.53
1984	2.16	9.82	6.78	3.29	5.53		3.82	5.19	4.60	0.00	0.03	
1985	6.24	12.34	4.27	0.46	3.64	4.39	1.38	0.93	2.51	0.43	0.52	2.65
1986	3.59	6.47	3.05	6.56	7.99	3.19	2.40	2.89	0.57	1.92		
1987	2.08	6.93		7.92	4.44	6.00	2.71	2.11	0.49	1.62	0.23	0.84
1988	0.29	2.25	10.77	9.17	2.04	4.91	5.85	3.58	1.94	0.59	0.08	1.51
1989	0.18	11.24	3.43	5.18	3.18	7.08	2.02	2.23	1.05	0.58	1.45	1.10
1990	2.25	3.69	3.98	9.65	4.58	2.78	2.59	1.92	2.46	0.48	1.00	0.47
1991	5.94	4.94	3.31	3.50	4.26	3.71	4.63	4.40	2.32	0.06	1.61	0.15
1992	2.98	7.65	5.99	5.24	4.48	1.12	5.10	0.16	0.41	0.26	0.76	1.86
1993	4.19	4.46	6.51	3.74	1.11	5.24	6.15	4.24	1.73	2.23	0.23	0.00
1994	1.43	1.91	6.48	5.38	6.33	4.12	2.14	1.71	1.53	0.08	0.00	1.10
1995	7.22	8.74	6.62	7.61	5.44	4.23	3.88	1.54	1.97	0.76	1.62	2.93
1996	4.82	11.00	8.36	9.17	12.05	3.86	5.63	5.00	0.91	0.63	0.11	2.25
1997	5.33	9.96	16.13	8.45	2.20	8.63	4.91	2.37	2.38	1.01	1.54	4.02

MONTHLY TOTAL PRECIPITATION (inches) — ORCP (continued)

WATER YEAR*	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1998	5.70	3.97	3.47	8.91	4.86	4.68	1.19	4.99	1.03	0.43	0.02	1.13
1999	4.21	11.32	9.74	9.14	10.01	5.60	3.43	3.41	1.78	0.20	0.84	0.19
2000	2.70		5.01		6.29	3.08	2.26		1.41	0.46	0.02	0.48
2001	3.88		2.98		1.33	5.02		1.60		0.73	1.05	0.80
2002	2.85	6.52	9.54		3.96	5.55	3.58	1.50	2.09	0.37	0.29	
2003	0.47	2.81	10.18		3.86		5.58	0.52	0.70	0.00		1.02
2004	3.02	6.20	9.30	5.98	3.33		1.74	2.38	2.15	0.15	3.20	2.27
2005	5.62	1.89	4.35	2.15	0.78	5.43	2.88		2.06	0.57		1.58
2006	3.19	6.73	9.91	13.20	2.60	3.70	6.28		1.01	0.08	0.00	1.25
2007				1.01	2.13		1.39	0.61		0.32	0.00	0.32
2008					3.08				0.40		1.53	0.25
2009		7.13		6.86	3.06	4.88	1.38	0.98	1.05	0.17	0.69	1.60
2010	2.74	6.35	5.05	5.39	3.65	5.06		2.85		0.22	0.17	2.24
2011	5.73	7.91	11.43	5.35	5.17	8.25	5.58	3.32	1.48	1.10	0.00	1.04
2012		9.14	4.30	9.24	3.11		4.84	3.16	3.54			0.09
2013		9.00	9.74	3.56	2.48	1.95		2.69	0.12	0.00		5.56
2014	1.05	3.94	2.08		3.83	9.02	3.93	2.59	1.33	0.91	0.77	1.56
2015	6.86	3.39	5.08	3.28	3.99	5.52	2.35	1.00	0.32	0.26	0.80	0.96
2016	4.31	7.50	14.15	7.35	3.43	5.47	3.45	1.12	1.49	0.43	0.10	0.82
2017	11.24	7.56	5.98	3.75	9.17	18.65	5.16	1.29	1.38	0.00	0.23	3.22
2018	6.51	7.72	4.18	6.98	2.85	4.32	7.08	0.12	1.73	0.00	0.05	0.52
2019	2.85	3.99	7.26	4.43	8.12	2.03	4.67	1.19	0.80	0.23	0.46	3.07
2020	2.70	1.57	3.68	9.83	2.45	2.76	1.42	3.04	2.80	0.02	0.14	5.00
2021	2.95	7.82	9.42	9.71	5.32	3.09	0.18	2.29	1.38	0.01	0.05	2.96
2022	7.26	5.92	*Data in this row are not included in statistics because water year is incomplete.*									
MIN	0.18	0.93	1.69	0.46	0.78	1.12	0.18	0.12	0.09	0.00	0.00	0.00
MAX	11.24	14.21	16.13	16.77	13.09	18.65	9.44	5.80	4.60	4.24	4.95	5.56
MEDIAN	3.635	6.92	7.26	6.98	4.505	4.895	3.46	2.295	1.495	0.43	0.52	1.58
MEAN	3.92	6.68	7.52	7.10	5.00	5.05	3.44	2.46	1.73	0.58	0.92	1.90

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


Oregon City Precipitation Station — ORCP
Monthly Precipitation (inches)
0
4
8
12
16
20
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Statistics
(period of record: 1948–2021)
Maximum
90th-Pctl
75th-Pctl
Median
25th-Pctl
10th-Pctl
Minimum
WY 2021
WY 2022


Oregon City Precipitation Station — ORCP
Total Annual Precipitation (inches/water year)
0
20
40
60
80
median
1949
1951
1953
1955
1957
1959
1961
1963
1965
1967
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
Water Year
Missing data: 0–3 days per month
Missing data: >3 days in any month, ≤36 days per year

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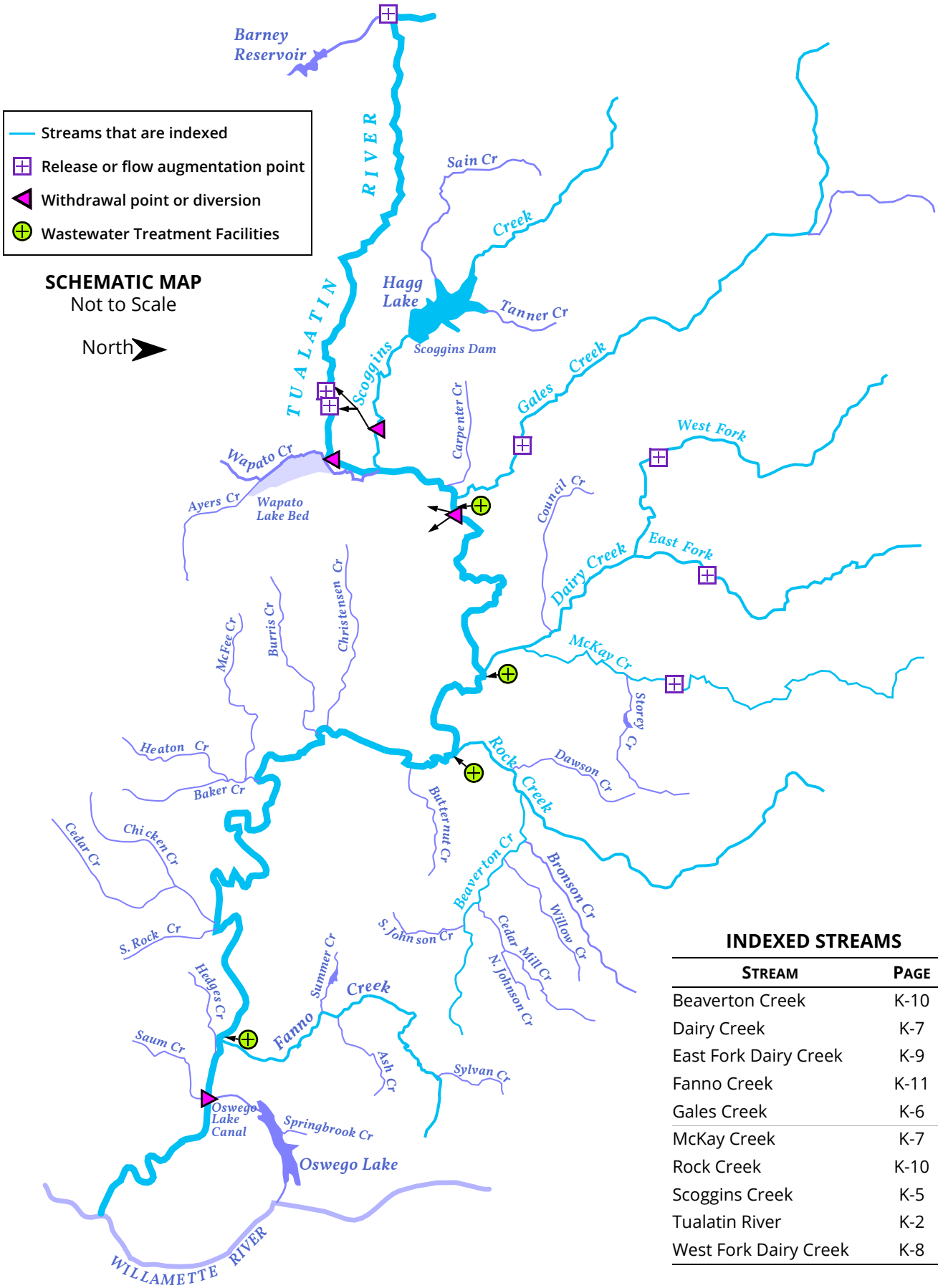
APPENDIX H
River Mile Indices



INDEXED STREAMS

Stream	Page
Beaverton Creek	K-10
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Gales Creek	K-6
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Scoggins Creek	K-5
Tualatin River	K-2
West Fork Dairy Creek	K-8

TUALATIN RIVER – RIVER MILE INDEX

[Abbreviations: RB= right bank, LB= left bank]

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		
1.69		State Hwy 212 Bridge (Fields Bridge)		
1.75	LB	USGS Gage #14207500: Tualatin River at West Linn	706	85.61
2.40	LB	Tate Creek		
3.45		Lake Oswego Corp. Diversion Dam		
4.25		Interstate 205 Bridge		
4.56	LB	Wilson Creek		
5.34	LB	Boat Launch		
5.36	LB	Shipley Creek		
5.38		Shipley Bridge– Stafford Rd NWS Wire Weight Gage		
5.62	LB	Pecan Creek		
6.02	RB	Athey Creek		
6.70	RB	Saum Creek		
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		
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 *[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	13.7	
15.50	RB	Chicken Creek		
16.09	RB	Chicken Creek Drainage Ditch		
16.22	RB	Shamberg Bridge (Elsner Road) Rated Staff Gage for Stream Flow		

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		
30.76	LB	Unnamed Stream (Jacktown)		
31.62	RB	Burris Creek		
31.92	RB	Christensen Creek		
33.30	LB	Harris Bridge (State Highway 208) Farmington Recording Stream Gage #14206500	568	100.42
35.68	LB	Butternut Creek		
37.38	LB	Gordon Creek		
38.08	LB	Rock Creek Wastewater Treatment Plant Outfall (37.7 on NPDES permit)		
38.09	LB	Rock Creek Beaverton Creek	74.6 36	
38.44	LB LB	Rood Bridge Small Watercraft Launch Rood Bridge Road Bridge Recording Stream Gage #14206295		105.16
40.44	RB	Davis Creek		
41.64		Minter Bridge Road Bridge		
43.88	LB LB	Jackson Slough Jackson Bottom Wetlands Hillsboro Wastewater Treatment Plant Effluent Outfall (42.9 and 43.3 on NPDES permit)		
44.40	RB	State Highway 219 Bridge Recording Stream Gage #14206241		
44.73	LB	Dairy Creek *[Index on page I-9]* McKay Creek (LB) *[Index on page I-10]* East Fork Dairy Creek *[Index on page I-11]* West Fork Dairy Creek *[Index on page I-12]*	226 63.4	
51.54	RB	Golf Course Road Bridge 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 and CWS Natural Treatment System		
55.32		Fernhill Road Bridge		
56.10		Springhill Pump Plant Intake		
56.80	LB	Gales Creek *[Index on page I-8]*	78.6	
57.38	LB	Carpenter Creek		
57.84	LB	Dilley Creek		
58.04	LB	Johnson Creek		
58.82	LB	Springhill Road Bridge USGS Gage #14203500: Tualatin River at Dilley	125	147.57
59.02	LB	O'Neil Creek		
60.00	LB	Scoggins Creek *[Index on page I-7]*		
60.80	RB	Wapato Creek Wapato Creek Improvement District Return Flow		

TUALATIN RIVER – RIVER MILE INDEX

[Abbreviations: RB= right bank, LB= left bank]

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		
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		
65.90		Mt. Richmond Road Bridge		
67.30	LB	Hering Creek		
67.83		South Road Bridge (Cherry Grove)		
68.44	RB	Roaring Creek		
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		
74.05	RB	Patten Creek		
75.70	LB	Sunday Creek		
76.60	LB	Maple Creek		
76.95		Ki–A–Cut Falls		
78.00	RB	Barney Reservoir Aqueduct Outfall		
79.3+		Headwaters of Tualatin River		

SCOGGINS CREEK — STREAM MILE INDEX

[Abbreviations: RB= right bank, LB= left bank]

RIVER MILE	BANK	DESCRIPTION
0.00		Confluence with Tualatin River @ River Mile 60.00
0.94		RR Bridge
1.00		State Highway 47 Bridge
1.70		Old State Highway 47 Bridge
1.71		USGS Gage #14203000: Scoggins Creek near Gaston, OR (10/1940 – 9/1974) Drainage Area = 43.3 square miles
4.80		USGS Gage #14202980: Scoggins Creek below Henry Hagg Lake, near Gaston, OR (1/1975 –present) Drainage Area = 38.8 square miles
5.10		Scoggins Dam
7.00	RB	Sain Creek
7.62	LB	Tanner Creek
8.40	LB	Wall Creek
9.70		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
15.50	LB	Fisher Creek
15.5+		Headwaters

GALES CREEK — STREAM MILE INDEX

[Abbreviations: RB= right bank, LB= left bank, ISWR= Instream Water Right]

RIVER MILE	BANK	DESCRIPTION
0.00	RB	Confluence with Tualatin River@ 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
6.98		Stringtown Road Bridge (County Road A–176)
7.70	RB	Roderick Creek
8.56		Roderick Road Bridge (County Road 395) USGS Gage #14204500: Gales Creek near Forest Grove Oregon (10/1940–9/1956, 10/1970–9/1981)
8.94	RB	Godfrey Creek
9.22	LB	Kelly Creek
10.68	RB	Clear Creek
11.44	RB	Iler Creek
11.46		NW Gales Creek Road (County Road 1312) Community of Gales Creek
11.47	RB	Fir Creek
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 ***ISWR:*** C–59512 5/25/66
12.92		Parson Road Bridge
14.44	RB	White Creek
14.68		NW Wilson River Highway Bridge (State Highway 6)
15.74	RB	Lyda Creek
16.26	RB	Bateman Creek
17.50		USGS Gage #1420400: Gales Creek near Gales Creek, OR – (10/1935–9/1945 & 10/1963–9/1970)
18.00	LB	Beaver Creek 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
20.07	LB	Finger Creek
20.70	RB	South Fork Gales Creek ***ISWR:*** C–59514 5/25/66
21.60	LB	North Fork Gales Creek ***ISWR:*** C–59513 5/25/66
22.76	RB	Low Divide Creek
		Gales Creek Forest Park
23.20		USGS Gage #14203750: Gales Creek near Glenwood, OR (7/94 – present)
23.2+		Headwaters

Dairy Creek — Stream mile index

[Abbreviations: RB= right bank, LB= left bank]

River Mile	Bank	Description
0.00		Confluence with Tualatin River @ River Mile 44.73
1.65		Southern Pacific RR Bridge
2.06		State Highway 8 Bridge USGS Gage #14206200: Dairy Creek at TV Hwy
2.20		Oregon Electric RR Bridge
2.26	LB	McKay Creek
3.53	RB	Council Creek
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 & West Fork Dairy Ck

McKay Creek — Stream mile index

[Abbreviations: RB= right bank, LB= left bank]

River Mile	Bank	Description
0.00		Confluence with Dairy Creek @ 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
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
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
16.66	LB	East Fork McKay Creek
24.0+		Headwaters

West Fork Dairy Creek — Stream mile index

[Abbreviations: RB= right bank, LB= left bank]

River Mile	Bank	Description
0.00		Confluence with East Fork Dairy Creek @ River Mile 10.56 of Dairy Creek
1.96		Evers Road Bridge (County Road A–187) Rated Staff Gage for Stream Flow
2.09	RB	Lousignant Canal
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
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 USGS Gage #14205000: West Fork Dairy Creek at Banks, OR (10/1940 – 9/1943) 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
12.19		NW Turk Road Bridge (County Road 233)
12.36	RB	Kuder Creek
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
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
15.58	RB	Burgholzer Creek
15.60		US Highway 26 Bridge
16.00		Community of Buxton – ½ mile east
17.02	LB	Williams Creek
17.98	RB	Cummings Creek
18.10		State Highway 47 Bridge
18.85		Port of Tillamook Bay RR Bridge
22.0+		Headwaters

East Fork Dairy Creek — Stream mile index

[Abbreviations: RB= right bank, LB= left bank, ISWR= Instream Water Right]

River Mile	Bank	Description
0.00		Confluence with West Fork Dairy Creek @ River Mile 10.56 of Dairy Creek
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
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
8.44		Dairy Creek Road Bridge (County Road 2067) Rated Staff Gage for Stream Flow
8.55		USGS Gage #14205500: East Fork Dairy Creek at Mountaindale, OR – (10/1940–9/1951) 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
13.00		***ISWR:*** C–59525 5/25/66
13.95	RB	Murtaugh Creek
14.04	LB	Meadow Brook Creek
14.17		Meacham Road Bridge (County Road 742)
15.55	LB	Plentywater Creek ***ISWR:*** C–59527 5/25/66
16.52	RB	Denny Creek ***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
17.50		Little Bend Park
17.60		Fern Flat Road Crossing (County Road 241)
18.15	LB	Panther Creek
18.31		Fern Flat Road Crossing (County Road 241)
18.84	RB	Roundy Creek
19.10	RB	Campbell Creek
21.30		Washington County – Columbia County Boundary
21.48		BPA Power Line Crossing
22.0+		Headwaters

Rock Creek — Stream mile index

[Abbreviations: RB= right bank, LB= left bank

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

[Abbreviations: RB= right bank, LB= left bank

River Mile	Bank	Description
0.00		Confluence with Rock Creek @ 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
3.32	RB	Willow Creek
4.90		Southwest 170th Avenue Road Bridge– Rated Staff Gage for Stream Flow
5.47	LB	Unnamed Stream
6.06	LB	Johnson Creek
6.30	LB	Unnamed Stream
6.66		Oregon Electric Railroad
7.45		Cedar Hills Boulevard
7.90	RB	Reasoners Creek
8.75+		Headwaters

FANNO CREEK – STREAM MILE INDEX

[Abbreviations: RB= right bank, LB= left bank]

RIVER MILE	BANK	DESCRIPTION
0.00		Confluence with the Tualatin River at River Mile 9.32
0.86		Oregon Electric RR Bridge
1.19		Durham Road Bridge USGS Gage #14206950: Fanno Creek at Durham
2.00	LB	Ball Creek
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 Rated Staff Gage at Fowler School
5.32		SW Tigard Ave Bridge
5.53		SW North Dakota St Bridge
5.54	LB	Ash Creek 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
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: Fanno Creek at 56th
12.81		SW Shattuck Road Bridge
13.22		SW 45th Ave Bridge
13.23	RB	Ivey Creek
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
14.1+		Headwaters