WALLA WALLA BASIN
WATERSHED COUNCIL

Water Temperature Monitoring in the Walla Walla Basin

2025 Water Year

FINAL REPORT

Submitted: March 2025

In Cooperation with:

State of Oregon Department of Environmental Quality

BONNEVILLE POWER ADMINISTRATION

OWEB Oregon Watershed Enhancement Board

Table of Contents

Figures

Tables

Abstract

This project monitors summer water temperature data at 29 stream sites on the Oregon side of the Walla Walla Watershed. Data is publicly available at www.wwbwc.org. High summertime stream temperatures are a primary limiting factor for aquatic life in the Walla Walla River and its tributaries. Data from this year's monitoring efforts were added to long term datasets, some dating back to 1999. Long-term monitoring helps us understand trends in watershed health and evaluate outcomes from restoration efforts intended to improve thermal conditions. Data collection and analysis during the 2025 water year followed a Sampling and Analysis Plan approved by the Oregon Department of Environmental Quality.

During the 2025 monitoring season, headwater areas remained cool throughout the summer. Sensors deployed through the levee reach below Milton-Freewater captured the highest water temperature values, while locations near the state line documented the cooling effects of groundwater returns below the levee system.

Introduction

Since 1999, the Walla Walla Basin Watershed Council (WWBWC) has collected and shared water temperature data from the Oregon portion of the watershed. During water year 2025 (WY2025), WWBWC monitored summer temperature at 29 sites in the Walla Walla River and its tributaries. High summertime stream temperatures are a primary limiting factor for aquatic life in the Walla Walla River and its tributaries. Long-term monitoring helps WWBWC and basin partners understand trends in watershed health and evaluate outcomes from restoration efforts intended to improve thermal conditions.

The primary objectives of this monitoring project are to:

- Monitor seasonal water temperature and identify trends.
- Support data-driven watershed assessment, habitat restoration, and outcomes tracking.

Monitoring Area

The Walla Walla basin covers an area of approximately 1,760 square miles. It lies on the western side of the Blue Mountains, about 70 miles west of where the border between Oregon and Washington meets the Idaho border (Figure 1). The Walla Walla River flows westerly from its headwaters in the Blue Mountains into the Walla Walla Valley. The river then heads north with a portion of the flow being diverted into the Little Walla Walla River, a distributary network managed for agricultural use. Downstream of the diversion at Milton-Freewater, the Walla Walla

River continues north, flowing through a leveed reach before crossing the state line and heading west.

In large part, summertime base flow in the Walla Walla River is supplied by basalt groundwater springs in the upper watershed. The South Fork Walla Walla River contributes the large majority of summertime water supply.

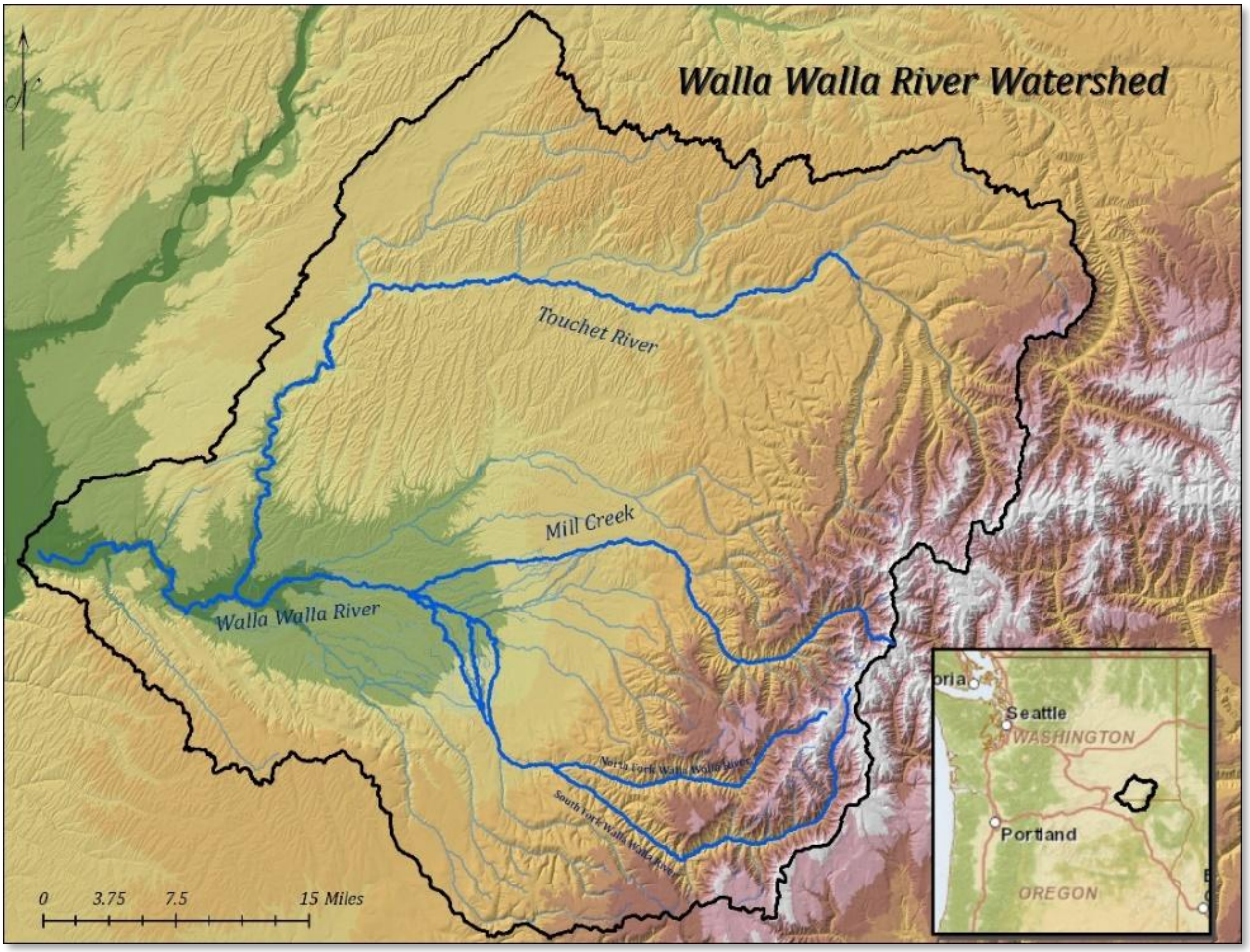

Figure 1. The Walla Walla Basin

Monitoring occurred in the mainstem Walla Walla River from the Oregon/Washington state line to the forks confluence, in the South Fork up to the headwaters at Deduct Spring, the North Fork Walla Walla River, Couse Creek, Dry Creek, and Pine Creek. Figure 2 shows a map of monitoring locations, and Table 1 lists site IDs, names, and coordinates.

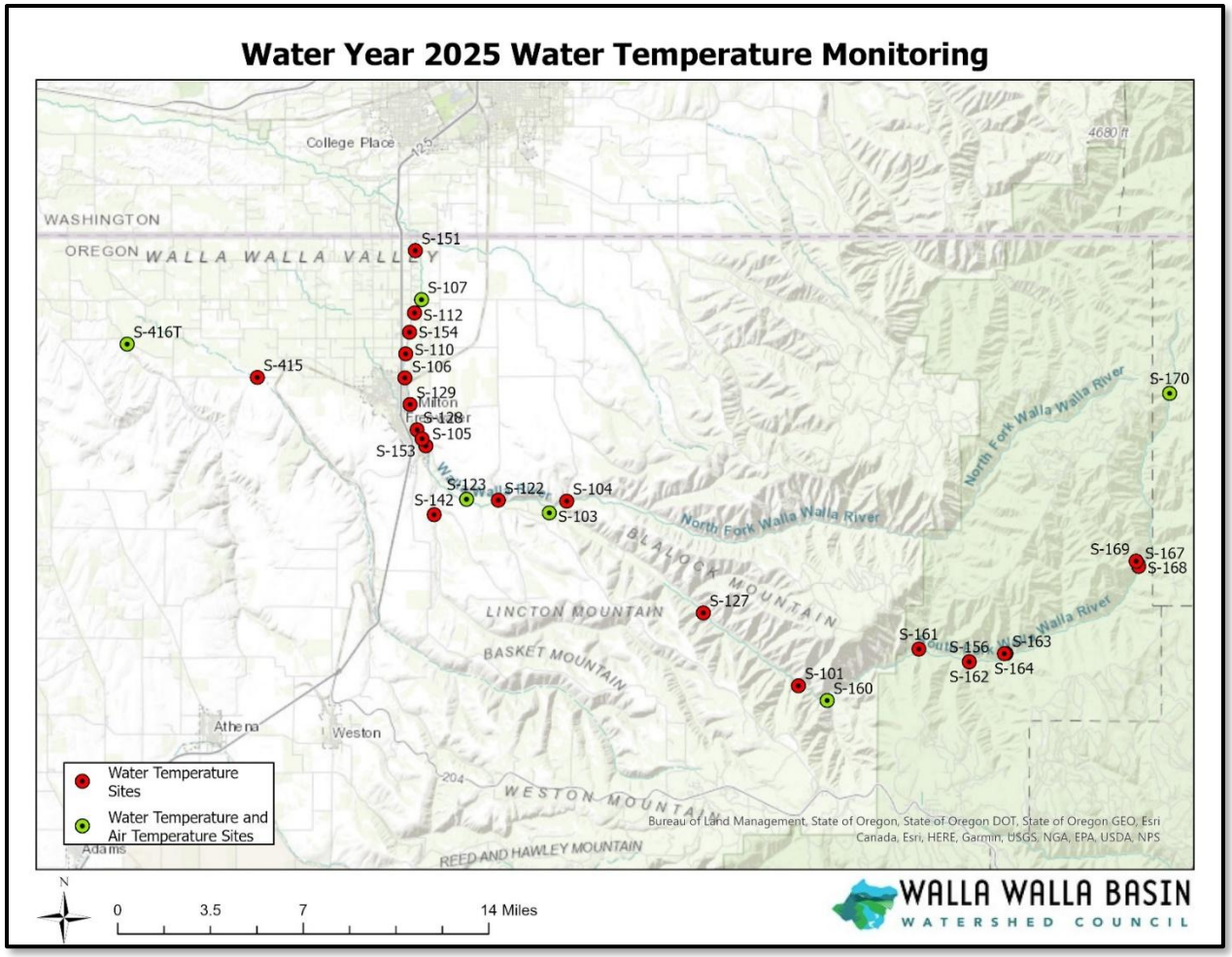

Figure 2. Map showing water temperature monitoring sites during water year 2025.

Table 1. List of site IDs, names, and coordinates of WY2025 water temperature monitoring locations during water year 2025.

Site ID	Site	Lat	Long
S-101	South Fork Walla Walla River at Harris Park	45.8305	-118.17087
S-103	South Fork Walla Walla River near mouth	45.896048	-118.306741
S-104	North Fork Walla Walla River	45.900503	-118.297254
S-105	Walla Walla River at Grove bridge	45.92143	-118.37410
S-106	Walla Walla River at M4 below Nursery Bridge	45.94731	-118.3856
S-107	Walla Walla River at M8 Tum-a-Lum Bridge	45.97735	-118.37631
S-110	Walla Walla River at M5 Lower Levee	45.95629	-118.38506
S-112	Walla Walla River at M7 Lower Levee	45.97177	-118.38025
S-122	Walla Walla River at Joe West Bridge	45.90086	-118.33454
S-123	Walla Walla River at Day Rd	45.90121	-118.35189
S-127	South Fork Walla Walla River at CTUIR Hatchery	45.85814	-118.22273
S-128	Walla Walla River at M2 above Cemetery Bridge	45.92753	-118.37888
S-129	Walla Walla River at M3 Smith Diversion	45.93713	-118.38267
S-142	Couse Creek at River Mile 1.1	45.89538	-118.36957
S-151	Walla Walla River at M10 Bier Lane	45.99536	-118.37983
S-153	Walla Walla River at M1 Frazier Farmstead	45.9241	-118.37614
S-154	Walla Walla River at M6 Lower Levee	45.96447	-118.38297
S-156	South Fork Walla Walla River at Burnt Cabin	45.839617	-118.077709
S-160	South Fork Walla Walla River at Elbow Creek	45.825299	-118.154185
S-161	South Fork Walla Walla River at Bear Creek	45.844286	-118.104744
S-162	Burnt Cabin Creek	45.839582	-118.077691
S163	South Fork Walla Walla River above Table Creek	45.842288	-118.05845
S-164	Table Creek	45.842468	-118.058333
S-167	South Fork Walla Walla River above Reser Creek	45.876329	-117.98538
S-168	Sheep Creek	45.87579	-117.985281
S-169	Reser Creek	45.877147	-117.98618
S-170	South Fork Walla Walla River below Deduct Spring	45.941362	-117.968006
S-415	Dry Creek at Seven Hills Road	45.94736	-118.46599
S-416T	Pine Creek at Schubert Road	45.95990	-118.53700

Methods

Data collection and analysis for this monitoring project followed the study plan, sample design, and protocols documented in BPA's MonitoringResources.org database and in WWBWC's Sample and Analysis Plan approved by Oregon Department of Environmental Quality[1].

Water temperature data loggers were deployed in the late spring/early summer after water levels dropped to safe levels. We deployed either an Onset Hobo data logger or In-Situ Leveltroll 300 pressure transducer (Figure 3) at each site and programmed them to record measurements every 15 minutes. Pre- and post-deployment quality checks were completed for all water temperature loggers. Field checks were conducted with either a NIST-traceable VWR thermometer or a NIST-calibrated YSI-30 water temperature meter.

Figure 3. Equipment used to collect water temperature data.

Data Processing

Data was processed using the AQUARIUS Time-Series software (www.aquaticinformatics.com) according to WWBWC's 2018 Standard Operating Procedures[2]. The water temperature recorded by data loggers was graphed with manual water temperature readings collected using a NIST-calibrated thermometer. If needed, offset and drift corrections were applied to align logger data with manual measurements. All data corrections were documented within the software and annually reviewed for approval. Data was graded according to the alignment of logger data with field check measurements as well as pre- and post-season quality control checks.

[1] 2024, Oregon Department of Environmental Quality. Sampling and Analysis Plan: Volunteer Water Quality Monitoring - Hydrological Trend Monitoring int eh Walal Walla Basin. https://wwbwc.org/images/Monitoring/SOP/DEQ24-VOL-0014-SAP_FINAL.pdf

[2] 2018, WWBWC Watershed Monitoring Program Standard Operating Procedures Version 1.3. https://wwbwc.org/images/Monitoring/SOP/WWBWC_SOP.pdf

Results

Walla Walla River Mainstem

Thermographs showing the seven-day average maximum (7dAM) for the 2025 water year and all 15-minute water temperature data (.cvs format) are available on our website at: https://wwbwc.org/water-temp. All water temperature data was submitted to the Oregon Department of Environmental Quality (ODEQ) for inclusion in the state Ambient Water Quality Monitoring System (AWQMS).

Figure 4 shows a comparison of peak stream temperatures over the last 7 years at 11 locations from the confluence of the North and South Forks and downstream in the mainstem Walla Walla River. During the summer of 2025, peak water temperatures were cooler compared to recent years at most monitoring locations but still warmer compared to temperatures before the 2020 high flow event.

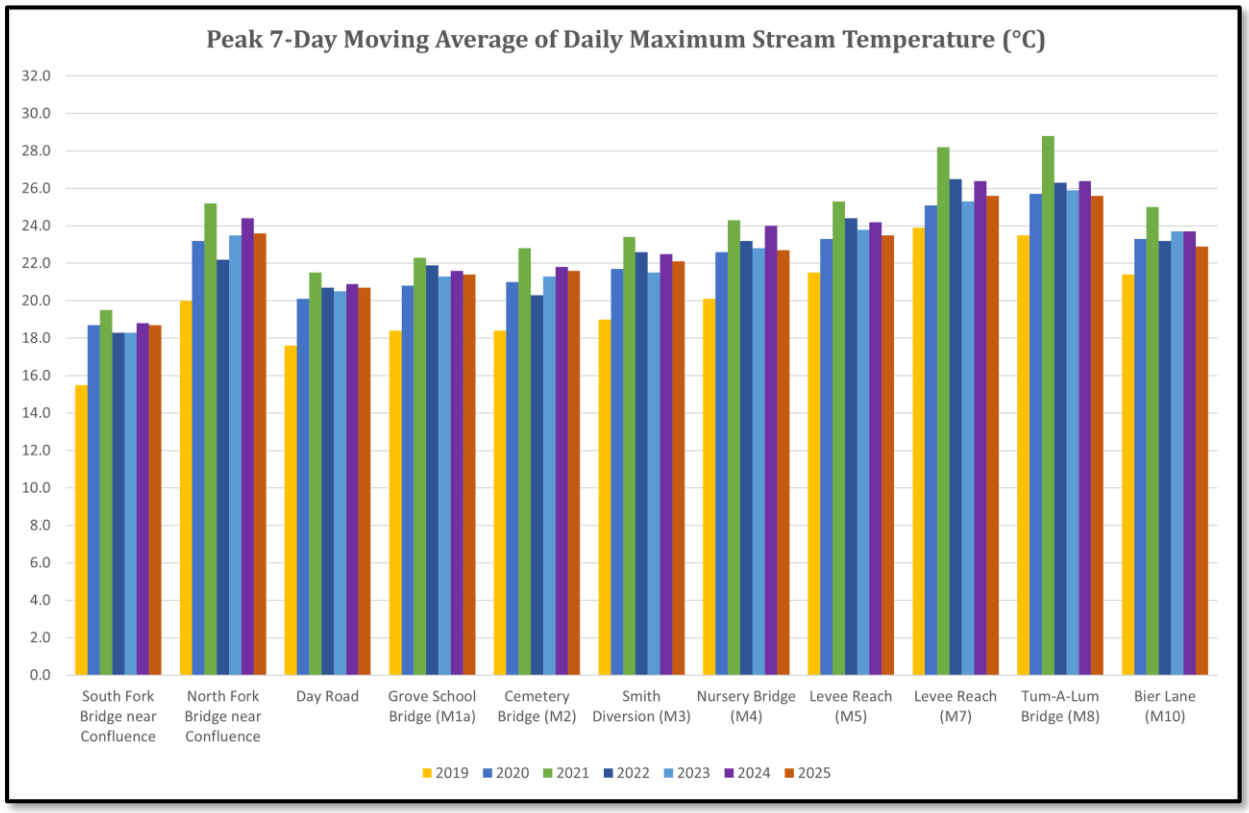

Figure 4. A comparison of peak 7-day average maximum stream temperatures at 11 Walla Walla River sites from the confluence of the North and South Forks and downstream in the mainstem over the last 7 years.

During summer 2025, peak 7dAM at the South Fork near the confluence was 18.7°C, a decrease of 0.1°C from 2024 (Figure 4). The North Fork Walla Walla River near the confluence had a peak 7dAM water temperature of 23.6°C, a 0.8°C decrease compared to 2024 (Figure 4).

Downstream on the mainstem Walla Walla River, water temperature above the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) spring Chinook salmon hatchery had a peak 7dAM water temperature of 17.1°C, no change compared to 2024 (Figure 4).

Peak temperatures increased notably below the Little Walla Walla Diversion at Milton Freewater, presumably due to reduced river flow, lack of floodplain function, and solar exposure in the levee reach. At Tum-A-Lum Bridge (M8), 2025 peak 7dAM was 25.6°C, a 0.8°C decrease compared to 2024 (Figure 4). About 2 miles downstream of Tum-A-Lum Bridge, water temperature cooled about 2°C, likely due to spring and hyporheic inflows near Bier Lane (M10).

Factors affecting stream temperature include flow rate, air temperature, riparian cover, and floodplain function. Air temperature data from the National Centers for Environmental Information (NCEI) in Figure 5 show that the 2025 monthly average temperatures exceeded the 40 and 90-year averages for most months except January, February, May and October.

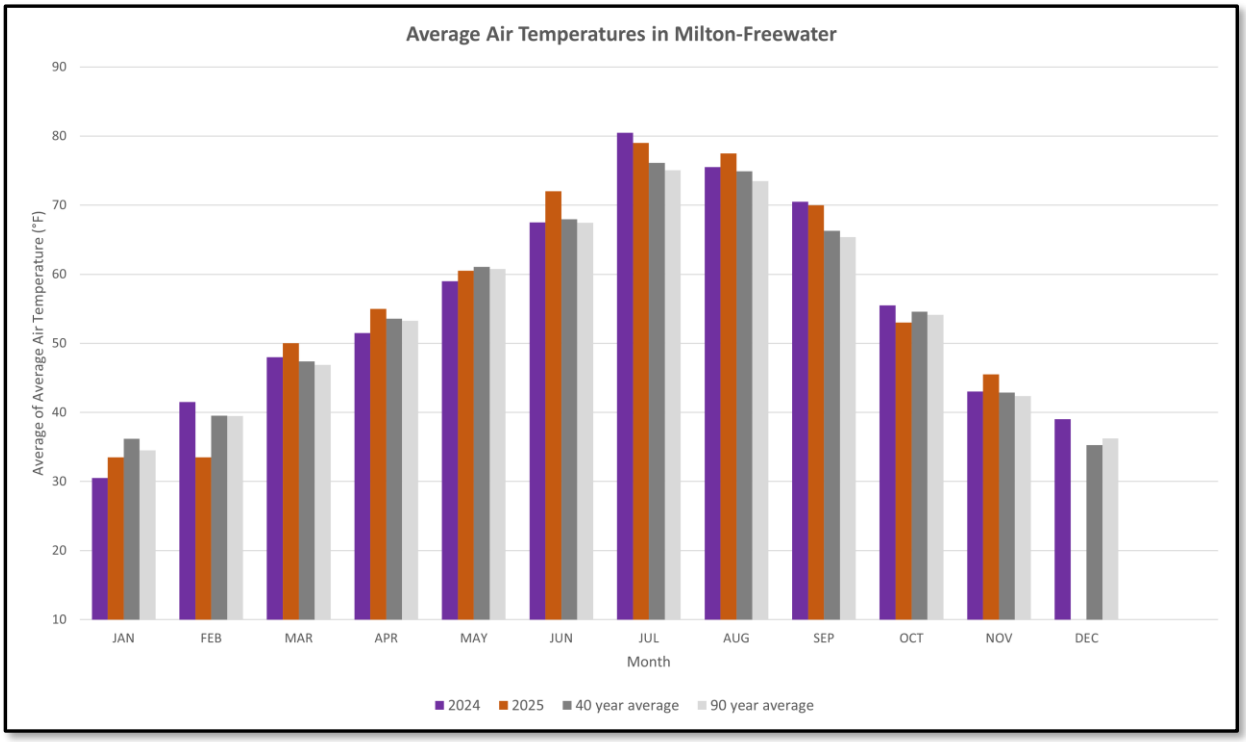

Figure 5. Monthly average air temperatures in Milton-Freewater in 2024 and 2025 compared to the 40-year and 90-year monthly averages.

The long-term dataset from the South Fork of the Walla Walla River near the forks confluence shows higher peak water temperatures following the 100-year flow event of 2020 (Figure 6).

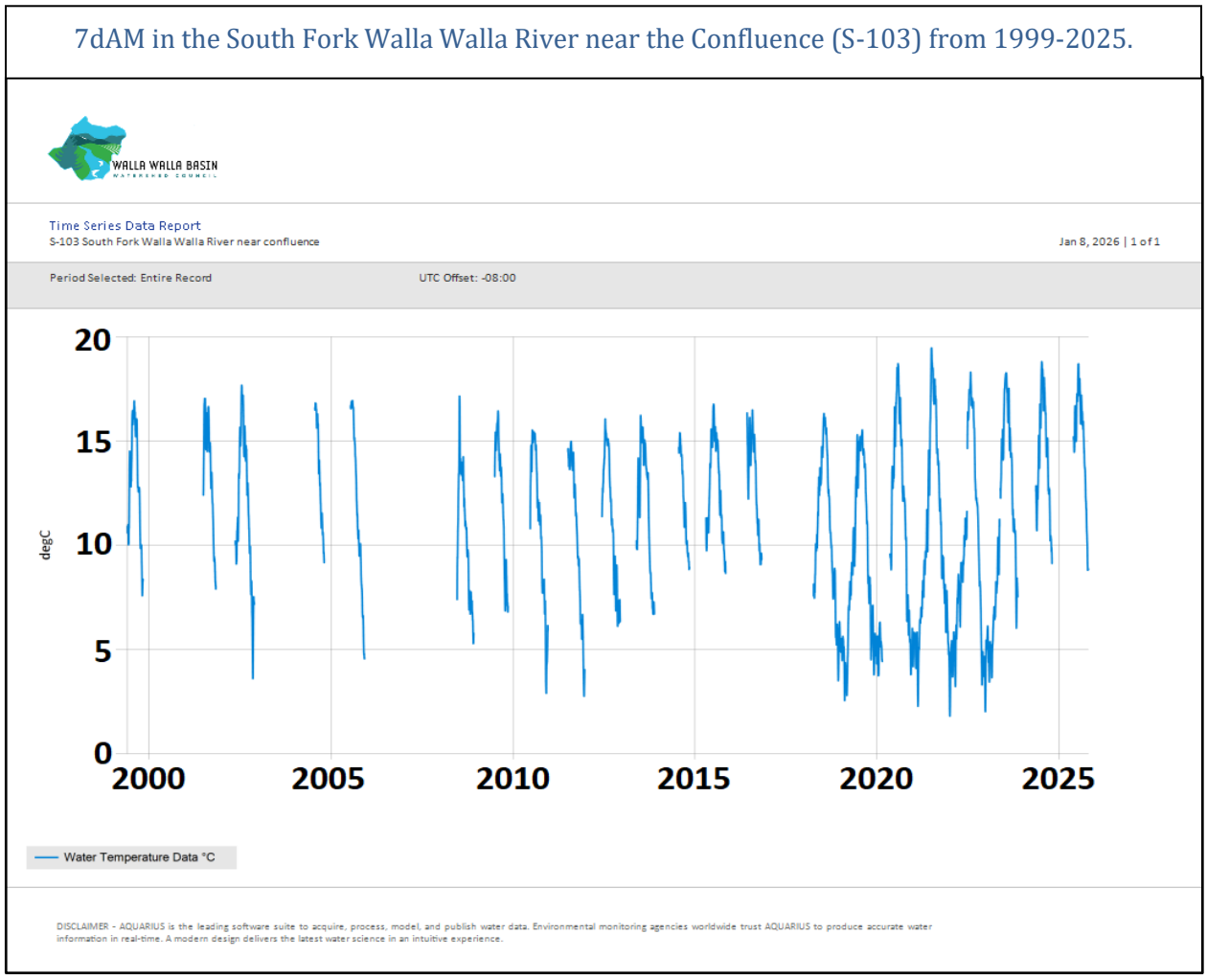

Figure 6. South Fork Walla Walla River 7-Day average maximum temperatures near the forks confluence from 1999-2025. Summer 2020, 2021, 2022, 2023, 2024, and 2025 had the highest summertime max temperatures during the monitoring period.

Historical Comparison

Water temperature data collected during the 2025 water year was compared with values published in the Walla Walla Basin Stream Temperature TMDL[3]. Table 2 shows how the seasonal peaks in recent years compare to the data collected during the TMDL project in 2000 and 2002. At most sites, recent peak temperatures were higher than the values documented in 2000 and 2002.

[3] ODEQ, 2005. Walla Walla Subbasin Stream Temperature TMDL and WQMP. https://www.oregon.gov/deq/FilterDocs/umaWWtmdlwqmp.pdf

Table 2. A comparison of seasonal peak 7-Day moving average of daily maximum water temperatures over the last 3 years compared to the data collected during the TMDL project (2000 and 2002).

Date and Value: Peak 7-Day moving average of daily maximum stream temperature (°C)												
Site ID	Site Name	River KM	2000		2002		2023		2024		2025	
S-101	South Fork at Harris Park	97.68	7/29/2000	14.9	7/13/2002	15.8	7/21/2023	15.5	7/14/2024	16.0	7/15/2025	16.2
S-127	South Fork at CTUIR Hatchery	92.16	7/23/2000	16.0	Not Available		7/22/2023	16.6	7/14/2024	17.1	7/15/2025	17.1
S-103	South Fork Bridge near Confluence	84.02	8/1/2000	17.0	7/13/2002	17.7	7/22/2023	18.3	7/14/2024	18.8	7/15/2025	18.7
S-104	North Fork Bridge near Confluence	0.83	7/31/2000	22.5	7/13/2002	28.8	8/18/2023	23.5	7/14/2024	24.4	7/19/2025	23.6
S-123	Day Road	79.82	8/1/2000	18.8	7/14/2002	19.1	7/22/2023	20.5	7/14/2024	20.9	7/18/2025	20.7
S-105	Grove School Bridge (M1a)	76.61	8/3/2000	19.8	7/14/2002	20.3	7/25/2023	21.3	7/14/2024	21.6	7/18/2025	21.4
S-128	Cemetery Bridge (M2)	75.82	8/1/2000	21.3	7/13/2002	21.8	7/22/2023	21.3	7/14/2024	21.8	7/19/2025	21.6
S-129	Smith Diversion (M3)	74.7	8/1/2000	21.6	7/13/2002	21.9	8/18/2023	21.5	7/14/2024	22.5	7/19/2025	22.1
S-106	Nursery Bridge (M4)	73.63	7/31/2000	22.0	7/13/2002	22.8	7/22/2023	22.8	7/14/2024	24.0	7/19/2025	22.7
S-110	Levee Reach (M5)	72.52	7/31/2000	24.4	7/13/2002	23.1	7/25/2023	23.8	7/14/2024	24.2	7/19/2025	23.5
S-112	Levee Reach (M7)	70.75	6/28/2000	24.1	7/13/2002	26.8	7/25/2023	25.3	7/14/2024	26.4	7/15/2025	25.6
S-107	Tum-A-Lum Bridge (M8)	69.8	6/25/2000	21.6	7/23/2002	24.1	7/25/2023	25.9	7/14/2024	26.4	7/15/2025	25.6

Upper Watershed Monitoring

Since 2020, the WWBWC has collected water temperature data in the upper South Fork Walla Walla River and its tributaries. In 2025, data loggers were deployed when the snow melted and staff were able to hike through the mountains to the sites in June. Field checks were done when the data loggers were deployed and when they were retrieved at the end of the season, but mid-deployment checks were not conducted because the sites are so remote. Water temperature at these upper watershed sites was cool throughout the summer (Figure 7). The South Fork peak water temperatures occurred in July, with some tributary peaks occurring in September.

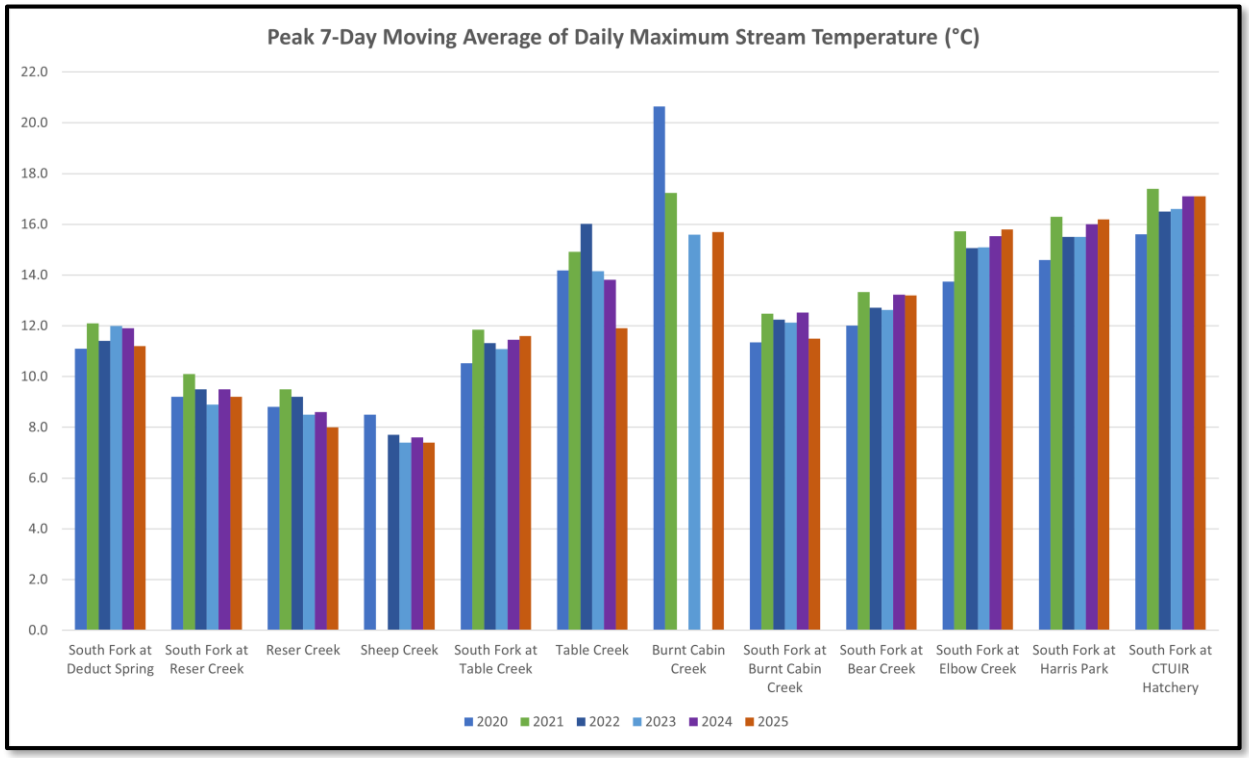

Figure 7. A comparison of seasonal peak 7-day average maximum stream temperatures over the last 6 years in the upper South Fork Walla Walla River at the headwaters (South Fork at Deduct Spring), eight downgradient sites, and also in four perennial tributaries.

Adaptive Management and Lessons Learned

Since the WWBWC began collecting water temperature data in 1999, numerous lessons have been learned. Key lessons include the importance of using appropriate instrumentation and technology; selecting optimal sites for data collection; conducting frequent site visits to obtain manual measurements and document current conditions; following established standard operating procedures; and regularly reviewing collected data for accuracy and completeness.

Without the support of the WWBWC's funding agencies, partners, and private landowners, this project would not be possible. Their involvement and support are very much appreciated.

- Oregon Watershed Enhancement Board
- Oregon Department of Environmental Quality
- Bonneville Power Administration
- U.S. Fish & Wildlife Service
- U.S. Forest Service
- Confederated Tribes of the Umatilla Indian Reservation

APPENDIX A

Explanation of Data Gaps during the 2025 Water Year

Note: Data were collected between 05/28/2025 to 11/18/2025

Site ID	Site Name	Gap Dates	Explanation
S-106	Walla Walla River at M4 below Nursery Bridge	09/27/25 – 09/28/25	Sensor was out of the water. Dry data were deleted.
		10/05/25 – 10/11/25	Sensor was out of the water. Dry data were deleted.
S-151	Walla Walla River at M10 Bier Lane	06/04/25	Sensor was out of the water. Dry data were deleted.
		06/07/25	Sensor was out of the water. Dry data were deleted.
		06/09/25 – 06/16/25	Sensor was out of the water. Dry data were deleted.
		06/23/25 – 06/25/25	Sensor was out of the water. Dry data were deleted.
S-156	South Fork Walla Walla River at Burnt Cabin	06/29/25 – 10/10/25	Sensor was out of the water. Dry data were deleted.