# DRAFT ANNUAL COMPLIANCE REPORT

**Instream Flow Agreement**
**for the**
**Cedar River**

Cedar River Watershed Habitat Conservation Plan Year 24:
January 1 through December 31, 2024,
Including Summaries for HCP Years 1-24

Prepared by

City of Seattle

Seattle Public Utilities
and
Seattle City Light

April, 2024

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## Acknowledgements

In 2024, Cedar River Instream Flow Commission (IFC) members devoted substantial time and effort to help manage water resources in the Cedar River Basin. IFC members also helped guide the development and implementation of supplemental biological studies and other technical analyses that continue to inform their management recommendations. The IFC members are, herein recognized for their continued commitment to effectively manage water resources in the Cedar River Basin and provide beneficial conditions for instream resources.

Organizational membership and representation are as follows:
Voting Organizations:

- National Marine Fisheries Service
    - Temporarily absent due to staffing issues
- United States Fish and Wildlife Service
    - Jeff Garnett
- Washington Department of Fish and Wildlife
    - Peggy Miller
- Washington Department of Ecology
    - Buck Smith
- Muckleshoot Indian Tribe
    - Eric Warner
- City of Seattle
    - Paul Faulds – Seattle Public Utilities
    - Karl Burton – Seattle Public Utilities
    - Elizabeth Garcia – Seattle Public Utilities
    - Matthew Porter – Seattle Public Utilities
    - Julia Padilla – Seattle Public Utilities
    - Leska Fore– Seattle City Light

Non-Voting Organizations:

- Army Corps of Engineers
    - Kyle Comanor
- WRIA 8
    - Mary Ramirez

In addition, it takes many people in an organization to translate good intentions into successful operations. Providing beneficial conditions for fish and other instream resources in the Cedar River is a 24-hour, 365-day a year responsibility.

Special thanks go to staff from:

- SCL Cedar Falls Headworks
- SPU Water Supply and Treatment (Landsburg Operators and Control Center)
- SPU Watershed Management Division
- SPU Water Resources Section

## TABLE OF CONTENTS

# 1. Introduction

The City of Seattle ("City") influences river flows in the Cedar River through its water supply and hydroelectric operations within the municipal watershed. Water from the Cedar River is used by approximately two-thirds of the City's 1.6 million customers in King and Snohomish Counties. The objective of the Cedar River Instream Flow Agreement (IFA), one of several agreements that establish the provisions of the Cedar River Watershed Habitat Conservation Plan (HCP), is to provide beneficial conditions for instream resources, while preserving Seattle's water supply and power generation capabilities.

The IFA establishes an interagency body, the Cedar River Instream Flow Oversight Commission (IFC) to assist the City in carrying out its river management responsibilities. The IFC was first convened in July 2000, and has met, on average, six to ten times a year since then. Meetings are chaired by Seattle Public Utilities (SPU).

## 1.1 Purpose of Report

SPU and Seattle City Light (SCL), on behalf of the City, present this report to the Commission as documentation of compliance with flow requirements established in the IFA. Section D.3 (a) of the IFA stipulates that an annual compliance report be submitted to the IFC. This report covers the period from January 1, 2024 through December 31, 2024. The report also summarizes compliance results for HCP years 1-24.

1.2 Highlights in 2024:

- Stream flows remained above the normal guaranteed levels at all times in 2024. All required supplemental stream flows were provided during the year.
- In 2024, there were two downramping exceedances at the U.S. Geological Survey (USGS) Gage 12117600 below Landsburg Diversion (see section 5.2.1).
- All downramping and minimum flow requirements below Masonry Dam (recorded at USGS gage 12116400) were met in 2024. Similarly, all downramping requirements below the Cedar Falls Powerhouse were met (recorded at USGS gage 12116500) were met with the exception of one downramping event on June 10, 2024 when downramping began two hours before the end of the day due to operator error.
- Construction of the new switchyard for the Cedar Falls Powerhouse began in mid-2023. A switchyard is a critical component of an electrical power system that serves as the connection point between the power plant and the transmission grid. Both Generators 5 and 6 were shut down on June 5, 2023. After construction was completed, generators were returned to operation on December 16, 2024.
- As in previous years, some minor, short-term fluctuations in flow and water surface elevation were identified below the Cedar Falls Powerhouse at USGS gage 12116500. Additional analysis of these occurrences found that small changes in flow are associated with turbines that drift from their set point during normal operations. Although the turbines are set to generate a specific amount of power, they fluctuate slightly which

can result in measurable changes in river flow. Fluctuations are more evident at lower flows, but generally last for less than an hour.

- The average annual Cedar River daily diversion for calendar year 2024 was 79.6 MGD.
- There were no flow events that exceeded the redd scour threshold of 2,200 cfs in the Cedar River (USGS Gage 12119000, Renton) in 2024. The highest flow recorded at the Renton Gage was 1930 cfs on January 28th.
- Spring redd surveys performed by SPU and WDFW documented seven steelhead redds and 24 trout redds in the mainstem Cedar River. The firm summer supplemental block of water was allocated and all observed redds were protected against dewatering throughout incubation and emergence.

## 2. Measuring Points

Flow and downramping compliance is measured at several locations throughout the Cedar River Watershed including:

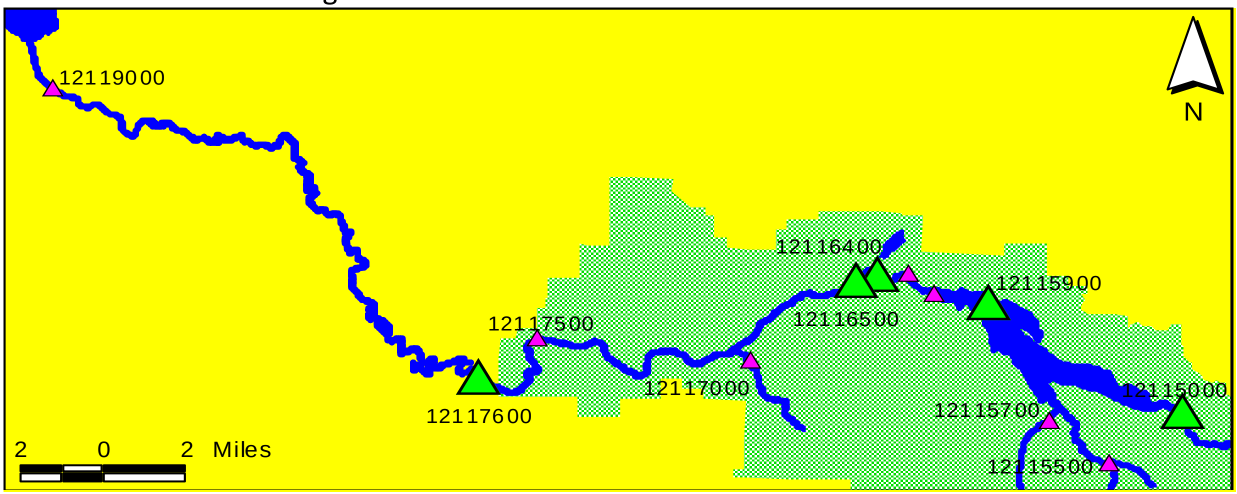



**Figure 2.1.** Map of Cedar River from Chester Morse Reservoir to Lake Washington showing flow measurement points for IFA.

**USGS Gaging Station 12117500** – Cedar River below Diversion near Landsburg, Washington. Located at River Mile 20.4, this gage measures regulated stream flow downstream of Landsburg Diversion Dam. This is the measuring point for flows and downramping rates immediately below the Landsburg Diversion Dam, as required in Section B and sub-section C.2.c in the IFA.

**Seattle Public Utilities Diversion Just Above 12117600** – Cedar River at the Diversion Dam near Landsburg, Washington. Located at River Mile 21.9, this measures the volume of water (in millions of gallons per day) diverted for municipal use and is monitored at the Landsburg Diversion Dam Facility.

**USGS Gaging Station 12116500** – Cedar River at Cedar Falls, Washington. Located at River Mile 33.2, immediately below the Cedar Falls Powerhouse, this gage measures regulated stream flow downstream of the Cedar Falls Powerhouse. This is the measuring point for downramping rates immediately below the Powerhouse at Cedar Falls, as required in sub-section C.2.b in the IFA.

**USGS Gaging Station 12116400** – Cedar River at Powerhouse at Cedar Falls, Washington. Located at River Mile 33.7, this gage is immediately upstream of the Cedar Falls Powerhouse and measures regulated stream flow downstream of Masonry Dam. This is the measuring point for flows and downramping rates immediately above the Cedar Falls Powerhouse, as required in sub-section C.1.a in the IFA. (Note: Date of installation Oct. 1, 2001).

**USGS Gaging Station 12115900** – Chester Morse Reservoir at Cedar Falls, Washington. This gage located at the Overflow Dike at River Mile 37.2 and measures water surface elevation of Chester Morse Reservoir. This is the measuring point for determining reservoir elevation, as required in sub-sections B.7.b. (1) and B.8.c. (1).

**USGS Gaging Station 12115000** – Cedar River near Cedar Falls, Washington. This gage located at River Mile 43.5 and measures unregulated inflows to Chester Morse Reservoir. This is the measuring point for determining reservoir inflows, as required in sub-sections B.7.b. (2), B.7.b. (3), and B.8.c. (2), and serves as an index for total reservoir inflow.

## 3. Instream Flows Below Landsburg Diversion Dam

In accordance with the IFA Section B.1.a, the City has two types of commitments, minimum instream flows and supplemental instream flows:

*"consist of two types of commitments by the City. The minimum instream flows or volumes, as described in sub-sections B.2., B.4., B.6., B.7., and B.8., represent requirements of the City and are referred to as "firm" flows or volumes, subject to the specific conditions and procedures set forth therein. Additional flows or volumes provided to supplement minimum flows, as described in sub-sections B.3. and B.5., represent goals of the City and are referred to as "non-firm" flows or volumes, subject to the specific conditions and procedures set forth therein."*

On June 3, 2009, the Cedar River Habitat Conservation Plan Oversight Committee established interim weekly adjustments in the critical, normal, and supplemental flow schedules to compensate for hydrologic alterations of the Walsh Lake Ditch that occurred as a result of the January 2009 flood event (see Appendix 1). During this event, a landslide triggered a failure of the Walsh Ditch which resulted in the flow in Walsh Creek (the outlet from Walsh Lake) being reestablished in its original natural pathway flowing into Rock Creek and then to the Cedar River upstream of Landsburg Dam and upstream of the nearby instream flow compliance point at USGS Gage 12117600, (Cedar River Below Diversion Near Landsburg). Prior to this event, the flow from Walsh Creek was delivered via the Walsh Lake Ditch directly to the Cedar River approximately ½ mile downstream of the compliance point at USGS Gage 12117600. As long as Walsh Creek continues to flow in its current pathway to Rock Creek and the Cedar River upstream of the Landsburg Dam, SPU will comply with the revised instream flow schedule. SPU will also continue to monitor actual flows in Walsh Creek in an effort to further evaluate the degree to which the interim adjustments appropriately reflect actual Walsh Creek flow trends.

### 3.1 Minimum Instream Flows Below Landsburg Dam

Compliance with minimum flow requirements is assessed at one monitoring location in the Cedar River below Landsburg: USGS Gage 12117600 - Cedar River below Diversion near Landsburg.

#### 3.1.1 Requirements

Required minimum flows are specified in Sections B.2.a and B.2.b in the IFA and the minimum flow requirement schedule is specified in Section B.2.c:

"*The City shall provide the minimum instream flows as set forth in sub-section B.2.c. Unless otherwise specified, the flows listed in sub-section B.2.c and elsewhere in this Agreement represent flow rates measured as "provisional real-time" data at the existing USGS Gage number 12117600, located below Landsburg Diversion Dam at river mile 20.4. Normal minimum flows are defined as the minimum instream flow rates that the City will provide below Landsburg Diversion Dam except when all of the conditions and procedures specified in Section B.8. are met, in which case the City, in consultation with the Commission, may provide critical minimum flows*."

#### 3.1.2 Compliance

During the 2024 reporting period, the project was in compliance with the IFA guaranteed minimum flows at USGS Gage 12117600. See Figure 8.1 and Tables 8.1 and 8.2.

For long-term tracking purposes, stream flows have remained at or above guaranteed normal minimum levels at all times in HCP Years 1 through 24, with the exception of an event in 2023 when flows dropped slightly below the minimum flow, and a 7-day period in October of 2015 when flows were managed at levels between low normal minimums and critical flows due to a significant statewide drought. The minimum flow violation in 2023 occurred on November 11$^{th}$ between 9:30 am and 10:15 am when flows dropped to 278 cfs at the 12117600 gage. The minimum flow for November 11$^{th}$ is 279 cfs. The 2015 event was approved by the IFC.

### 3.2 Non-Firm Supplemental Flow in Late Winter and Early Spring for Sockeye Outmigration

#### 3.2.1 Goals

Flow requirements are specified in Section B.3.a in the IFA:

*"Between February 11 and April 14, the City will, as a goal, expect to supplement the normal minimum instream flows listed in sub-section B.2.c. by 105 cfs at least 70% of the time throughout said period in any year in which normal flows are in effect throughout said period."*

#### 3.2.2 Compliance

The City met and exceeded the goal in 2024 by providing more than 105 cfs of supplemental flow 92% of the days during the February 11 to April 14 supplemental period (59 of 64 days). See Table 3.2.1.

For long-term tracking, this goal has been met or exceeded in 22 of 24 years (Table 3.2.2.). The supplemental flow was not provided in 2001 and 2005, years in which the State of Washington declared statewide droughts.

**Table 3.2.1** Supplemental flows for sockeye fry outmigration 2024.

| Calendar Dates | Required Normal Minimum Instream Flows (cfs) | Minimum Instream Flows Plus Non-Firm Supplemental Flows (cfs) | Actual Recorded Mean Daily Flow (cfs) | Calendar Dates | Required Normal Minimum Instream Flows (cfs) | Minimum Instream Flows Plus Non-Firm Supplemental Flows (cfs) | Actual Recorded Mean Daily Flow (cfs) |
|---|---|---|---|---|---|---|---|
| 11-Feb | 273 | 378 | 425 | 15-Mar | 273 | 378 | 391 |
| 12-Feb | 273 | 378 | 465 | 16-Mar | 273 | 378 | 393 |
| 13-Feb | 273 | 378 | 453 | 17-Mar | 273 | 378 | 394 |
| 14-Feb | 273 | 378 | 460 | 18-Mar | 273 | 378 | 395 |
| 15-Feb | 273 | 378 | 443 | 19-Mar | 273 | 378 | 397 |
| 16-Feb | 273 | 378 | 445 | 20-Mar | 273 | 378 | 394 |
| 17-Feb | 273 | 378 | 445 | 21-Mar | 273 | 378 | 432 |
| 18-Feb | 273 | 378 | 429 | 22-Mar | 273 | 378 | 507 |
| 19-Feb | 273 | 378 | 410 | 23-Mar | 273 | 378 | 542 |
| 20-Feb | 273 | 378 | 416 | 24-Mar | 273 | 378 | 446 |
| 21-Feb | 273 | 378 | 421 | 25-Mar | 273 | 378 | 424 |
| 22-Feb | 273 | 378 | 433 | 26-Mar | 273 | 378 | 463 |
| 23-Feb | 273 | 378 | 487 | 27-Mar | 273 | 378 | 529 |
| 24-Feb | 273 | 378 | 481 | 28-Mar | 273 | 378 | 534 |
| 25-Feb | 273 | 378 | 566 | 29-Mar | 273 | 378 | 513 |
| 26-Feb | 273 | 378 | 630 | 30-Mar | 273 | 378 | 497 |
| 27-Feb | 273 | 378 | 624 | 31-Mar | 273 | 378 | 483 |
| 28-Feb | 273 | 378 | 668 | 1-Apr | 273 | 378 | 472 |
| 29-Feb | 273 | 378 | 776 | 2-Apr | 273 | 378 | 459 |
| 1-Mar | 273 | 378 | 728 | 3-Apr | 273 | 378 | 428 |
| 2-Mar | 273 | 378 | 707 | 4-Apr | 273 | 378 | 406 |
| 3-Mar | 273 | 378 | 691 | 5-Apr | 273 | 378 | 396 |
| 4-Mar | 273 | 378 | 688 | 6-Apr | 273 | 378 | 393 |
| 5-Mar | 273 | 378 | 667 | 7-Apr | 273 | 378 | 399 |
| 6-Mar | 273 | 378 | 652 | 8-Apr | 273 | 378 | 395 |
| 7-Mar | 273 | 378 | 642 | 9-Apr | 273 | 378 | 389 |
| 8-Mar | 273 | 378 | 633 | 10-Apr | 273 | 378 | 326 |
| 9-Mar | 273 | 378 | 556 | 11-Apr | 273 | 378 | 304 |
| 10-Mar | 273 | 378 | 453 | 12-Apr | 273 | 378 | 305 |
| 11-Mar | 273 | 378 | 449 | 13-Apr | 273 | 378 | 322 |
| 12-Mar | 273 | 378 | 484 | 14-Apr | 273 | 378 | 315 |
| 13-Mar | 273 | 378 | 425 | | | | |
| 14-Mar | 273 | 378 | 396 | | | | |

**Table 3.2.2** Percent of days by year that supplemental flows were provided for juvenile sockeye outmigration during the February 11 to April 14 period, 2000-2024.

| Year | % of Feb.11 to April 14 Time Period with 105 cfs Supplemental Flow | Year | % of Feb.11 to April 14 Time Period with 105 cfs Supplemental Flow |
|---|---|---|---|
| 2000 | 100 | 2013 | 100 |
| 2001 | 13 | 2014 | 100 |
| 2002 | 100 | 2015 | 71 |
| 2003 | 90.5 | 2016 | 100 |
| 2004 | 100 | 2017 | 100 |
| 2005 | 24 | 2018 | 100 |
| 2006 | 100 | 2019 | 83 |
| 2007 | 100 | 2020 | 97 |
| 2008 | 100 | 2021 | 100 |
| 2009 | 100 | 2022 | 100 |
| 2010 | 92 | 2023 | 83 |
| 2011 | 92 | 2024 | 92 |
| 2012 | 100 | | |

3.2.3 Hydrologic Summaries for HCP Years When Supplemental Flows for Juvenile Sockeye Outmigration Were Not Met for 70% of the Feb 11 – April 14 Period.

2001**:** Supplemental flows for sockeye outmigration were provided only 13% of the 2001 supplemental outmigration flow time period. The underlying consideration that prevented the City from meeting the supplemental flow goal of 70% for the supplementation period was the unprecedented drought conditions that prevailed in the region from November through mid-March. Entering the February 11 to April 14 period, all indicators showed reason for concern and resulted in SPU’s conservative treatment for the water held in storage in Chester Morse Reservoir as well as the South Fork Tolt Reservoir. Extremely low winter precipitation (the lowest in 70 years) and associated low reservoir inflows, poor snowpack, and low reservoir contents were observed during this period. SPU's SEAFM forecast model was showing a significant likelihood of not refilling the mountain reservoirs before summer.

Precipitation at Chester Morse Reservoir was about 30 inches for October, November, December, January and February combined; normal precipitation is over 62 inches in those months. The four-month period of November through February had the lowest precipitation for the same four-month period ever recorded in the Cedar Watershed. Inflows to the City’s reservoirs were above normal until late October, but by late November and through December they were near record low levels. From October 1 to January 1, Chester Morse Reservoir went from being five feet above normal, to ten feet below normal and the South Fork Tolt Reservoir went from being near normal to 12 feet below normal. Chester Morse Reservoir approached its lowest elevation of 1540 feet in late November and then held relatively steady until the last week of December.  Typically, Chester Morse Reservoir is in flood management mode in November and December and the reservoir surface elevation is above 1550 feet.  In November 2000, South Fork Tolt Reservoir reached elevation 1742 feet.  The drought weather pattern changed temporarily on December 25$^{th}$and inflows rebounded to normal levels, although snowpack did not build significantly.

In late December and early January, Chester Morse Reservoir gradually rose about eight feet and the South Fork Tolt Reservoir rose about two feet.  Shortly after January 1, 2001, the weather turned unusually dry again, and unregulated streamflows and inflows to the City's reservoirs returned to very low levels throughout January 2001.  Storms in early February improved streamflows for a time, but extremely dry conditions returned and persisted until mid-March 2001.  Significant storm events in mid-March improved the water supply outlook somewhat.  Total March and April precipitation in the Cedar River Watershed was about 21.2 inches; in an average March and April, precipitation is about 18.5 inches.  However, the improvement was not considered adequate to ensure refill and the IFC agreed to forego flow supplementation for the remainder of the Feb. 11 to April 14 time period.

2005**:**  Supplemental flows for sockeye outmigration were provided for 24% of the Supplemental Outmigration Flow time period.  The underlying consideration that prevented the City from meeting the supplemental flow goal of 70% for the supplementation period was the extremely low snowpack and exceptionally dry conditions that prevailed in the region from January through March.  Based on worsening snowpack and record low inflows the City reduced the supplemental flow to normal flow levels on February 26.  On March 4 the City issued a news release stating Seattle Public Utilities was cautious about the water supply conditions and that the recent dry conditions led to a reduction in supplemental flows.  On March 10, Governor Christine Gregoire authorized the Department of Ecology to declare a statewide drought emergency, based on the extremely low snowpack in the mountains and record-low flows.  On March 16 Seattle Mayor Greg Nickels invoked the Advisory Stage of Seattle's Water Shortage Contingency Plan.  The following is a brief synopsis of the drought through April:  Precipitation at Chester Morse Reservoir was about 29 inches for January through April combined; normal precipitation is over 42 inches.  Following the low rainfall pattern, eight-week moving average inflows to City reservoirs were above normal until late January, but by early March they were below the alert phase index.  From March 1 to April 8, Chester Morse Reservoir was below the generalized rule curve.  Chester Morse Reservoir approached its lowest 2005 elevation in late March.  The March 1 statewide Natural Resources Conservation Service (NRCS) Snow Telemetry (SNOTEL) Snow Water Equivalent (SWE) readings were 26% of average. NRCS reported the Central Puget Basin SWE was 20% of average.

The IFC were aware of the developing difficult hydrologic conditions and took an active role in the development and implementation of a water management strategy to manage impacts to instream resources and municipal water users.  General consensus was reached that both instream resources and municipal water users could be potentially impacted by the developing conditions and that interest of both needed to be considered in developing potential management responses.  The Commission agreed that early proactive steps were necessary to reduce the risk of major impacts later in the year. The first step in a coordinated management response was the suspension of supplemental spring stream flows coupled with a strong SPU public messaging campaign and SPU's formal implementation of the Advisory Stage of Seattle's Water Shortage Contingency Plan to encourage municipal water users to conserve water. Due in part to these early actions, stream flows were never reduced to critical levels and remained at or above normal guaranteed levels for the remainder of the year.

### 3.3 Firm Block of Water in Early Summer to Supplement Normal Minimum Flows for Steelhead Incubation

3.3.1 Requirements

Flow requirements are specified in Section B.4 in the IFA:

*"Between June 17 and August 4, in addition to the normal minimum flows listed in subsection B.2.c., the City shall provide such supplemental flow volumes as the Commission may direct, provided that the total volume of such supplemental flows shall not exceed 2500 acre-feet of water, and that other procedures and conditions in this sub-section B.4. are met."*

3.3.2 Compliance

In 2024, the City provided the Firm Block as prescribed by the Commission. See Table 3.3.1 and Figure 8.1. The firm block was distributed as late in the period as allowed by the IFA.

**Table 3.3.1** Minimum flows and minimum flows plus summer supplemental firm block by week, June 17 – August 4.

| Calendar Dates | Required Minimum Instream Flows, cfs | Required Minimum Flow plus 2022 Summer Supplemental Firm Block, cfs |
|---|---|---|
| June 17 – July 30 | 231 | 231 |
| July 1 – July 7 | 174 | 174 |
| July 8 – July 18 | 109 | 164 |
| July 19 – July 23 | 84 | 134 |
| July 24 – July 28 | 84 | 118 |
| Jul 29 – Aug 1 | 84 | 108 |
| Aug 2 – Aug 4 | 83 | 95 |

For long-term tracking, this goal has been met or exceeded in all 24 HCP years.

**3.4 Non-Firm Block of Water in Early Summer to Supplement Normal Minimum Flows for Steelhead Incubation**

3.4.1 Goals

Flow requirements are specified in Section B.5 in the IFA:
*"Between June 17 and August 4, in addition to the normal minimum flows listed in sub-section B.2.c, and the "firm block" described in sub-section B.4., the City will, as a goal and under the conditions set forth in this sub-section B.5., expect to further supplement normal minimum flows by 3500 acre-feet of "non-firm" water in 63% of all years."*

3.4.2 Compliance

The City did not offer the 3,500 Acre-Feet Supplemental Block in 2024. See Table 8.1 and Figure 8.1.

For long-term tracking purposes, SPU has offered the full non-firm block in 20 out of 24 years (83% with 2003, 2015, 2016 and 2024 being the exceptions). The Commission was offered but declined allocation of the block in two years (2004 and 2023). As described in the Instream Flow Agreement, the City received credit for allocating the non-firm supplemental block in 2004 and 2023 as part of the commitment to provide the non-firm block in 63% of HCP years

3.4.3 Hydrologic Conditions and Vulnerable Redd Summary for HCP Years when the 3,500 acre-foot Non-firm Supplemental Block of Water was not Offered by the City

2003 – Chester Morse Reservoir was at surface water elevation 1561.5 feet in early June. Very small amounts of snow remained in the Cedar Basin and the expected elevation without additional rain was 1562 feet. The month of May had only 66% of its normal rainfall and April was also relatively dry. The watershed was considered very dry at the time of the non-firm block decision with most local and inflow streams registering near the 20-percentile dry condition. The snowpack was poor in early June with approximately 65% of normal SWE. The winter also had low rain volume at lower elevations after a very dry summer and fall the previous year. The Chester Morse and South Fork Tolt reservoirs were relatively full in 2003 but continued dryness caused the reservoirs to drop faster than normal. In June, SPU was not anticipating any problems that would require water curtailments. In 2003, there were 12 observed steelhead redds in the Cedar River, none of which needed supplemental flow above summer minimums to remain submerged through the end of emergence. The City decided not to offer the 3,500 acre-foot of supplemental water.

2015 - Precipitation levels in May of 2015 were the driest on record for that month. April also had below average precipitation. The extended forecast in June was for very dry weather. Cedar River Municipal Watershed flow measurements indicated that tributaries to Chester Morse Reservoir were flowing at levels typically observed in late July or August. Chester Morse Reservoir elevation in early June was 1561.6 feet and dropping ¼ foot a day with record low inflows. Snowmelt was complete in the first week of May. Demand was substantially higher than 2014 and SPU sent out a customer mailer dedicated to urging wise water use. Due to the lack of snow, all Hydrocomp Forecast and Analysis Model (HFAM) hydrologic model runs assumed that the 3,500 acre-foot non-firm supplemental block of water had not been allocated. HFAM is a continuous simulation hydrologic model that is designed specifically for the South Fork Tolt and Cedar River Watersheds. The snowpack in the Central Puget Sound Basin was 0% of normal and the 8-week average inflow was below the alert phase, which is unusual for that time of year.

Four steelhead redds and 15 trout redds were observed in the Cedar River in 2015. One steelhead redd was vulnerable to partial dewatering at flows below 255 cfs. No trout redds were vulnerable to dewatering. The vulnerable steelhead redd needed 24 cfs of voluntary flow supplementation from June 10 to June 14 to keep it submerged through the predicted end of emergence. No supplemental water was needed to keep all remaining incubating redds fully watered throughout the supplemental flow allocation period (June 17 – August 4). SPU did not offer the non-firm supplemental block of water in 2015. The allocation plan for the 2,500 acre-foot firm block was allocated to load the available water as late into the summer as allowed to provide maximum benefits to instream resources.

2016 **-** Snowpack in 2016 was lower than average and snowmelt occurred approximately one month earlier than normal. Precipitation in April and May was below average. An early refill strategy for Chester Morse Reservoir was implemented and refill occurred during the second week in May. Chester Morse Reservoir was still full on June 1. The South Fork Tolt Watershed had lower than average snowpack and the reservoir did not reach the refill target in 2016. The early refill strategy and a substantial rain event in early June allowed combined reservoir storage to be above normal in early June. Due to the South Fork Tolt Reservoir elevation being lower than normal, SPU relied more heavily on Cedar River water with 70% of water supply originating from the Cedar Basin. Inflows were below the switching criteria for critical flows but the reservoir elevation was well above switching criteria level. HFAM model runs indicated that SPU would need to mobilize its two floating pump plants to access water stored below elevation 1538 feet in the Chester Morse Reservoir if summer precipitation was equivalent to a 98-percentile dry year in the historic weather record. The floating pump plants can be used to pump the lower elevation water over the natural outlet in the reservoir and into the river, thereby augmenting both instream flows and water availability for customer use. This assumed that the 3,500 acre-foot non-firm supplemental block was not allocated and SPU provided high normal flows in the fall. HFAM model runs indicated that Chester Morse Reservoir elevation could reach as low as 1540 feet and South Fork Tolt Reservoir elevation could reach 1716 feet. The long-term weather forecast was calling for normal precipitation and above normal temperatures.

Redd surveys between early March and late May documented six steelhead redds and 24 trout redds in the Cedar River. All trout redds were fully protected against dewatering by the HCP minimum flow regime without allocation of supplemental water. Of the six identified steelhead redds, only one redd required additional water above summer HCP minimum flows for protection against redd dewatering. The vulnerable redd required 95 cfs to maintain redd submergence until emergence was complete on or before July 24. Therefore, given the very low inflows and dry hydrologic conditions in both watersheds, the forecast for warmer than normal summer conditions, and the very small amount of water necessary to protect the vulnerable steelhead redd, SPU believed it was not prudent to allocate the summer non-firm block of supplemental water (3500 acre-feet) in 2016. The IFC agreed with the allocation plan in early June and the City provided adequate water to protect the vulnerable steelhead redd.

2024 - Snowpack in 2024 was well below average and there was no significant snow accumulation after mid-March. Precipitation in April and May was average but March was relatively dry with only approximately 60% of normal precipitation. An early refill strategy for Chester Morse Reservoir was implemented with a new refill target of 1565 feet. Refill occurred during the first week of June. The South Fork Tolt Watershed also had well below average snowpack. The South Fork Tolt Reservoir reached 1765 feet in early June. Inflows to both reservoirs were slightly above the switching criteria for critical flows. The long-term weather forecast was calling for dryer than normal in for precipitation and above normal temperatures.

Redd surveys between early March and late May documented seven steelhead redds and 24 trout redds in the Cedar River. All steelhead redds were fully protected against dewatering by the HCP minimum flow regime without allocation of supplemental water. Of the 24 identified trout redds, only one redd needed additional water above summer HCP minimum flows for protection against redd dewatering. The vulnerable redd required 159 cfs (USGS 12117600) to maintain redd submergence until emergence was complete on or before July 22$^{nd}$ when the minimum flow would be 84 cfs without supplementation. The vulnerable redd required less than 2,500 acre feet of water for full protection and SPU allocated the firm supplemental block accordingly. SPU decided not to allocate the summer non-firm block of supplemental water (3500 acre-feet) because it wasn't required for redd protection and because the City has met the non-firm block allocation for 83% of HCP years while the target for allocation is 63% of years. The IFC agreed with the summer supplemental water allocation plan in early June and the City provided the supplemental water to protect the vulnerable trout redd and provide benefits to other instream resources.

### 3.5 Higher Normal and Critical Minimum Flows in September for Sockeye and Chinook Spawning

#### 3.5.1 Requirements

Flow requirements are specified in Section B.6 in the IFA:

*"In any year in which the temporary flashboards, as they presently exist in the City's Overflow Dike or may hereafter be reconstructed, are in place throughout the period of June 1 through September 30, the normal minimum flows listed in sub-section B.2.c. shall be increased by the amount of 38 cfs between September 15 and 22, and by the amount of 115 cfs between September 23 and 30, and the critical minimum flows shall be increased by the amount of 10 cfs through the period between September 1 and 15."*

3.5.2 Compliance

Temporary flashboards were in place throughout the period from June 1 through September 30, 2024, and the City provided the required additional flows. See Tables 3.5.1, 8.1 and Figure 8.1.

**Table 3.5.1** Minimum flows when flashboards are in place September 16 – September 30.

| Calendar Dates | Required Minimum Instream Flows, cfs | Minimum Instream Flows Plus High Normal Minimum Flows, cfs |
|---|---|---|
| Sep 16 - Sep 22, 2024 | 98 | 136 |
| Sep 23 - Sep 30, 2024 | 98 | 214 |

For long-term tracking, high normal flows have been provided at all times during this period in HCP Years 1 through 24.

**3.6 Two-Part Normal Minimum Flow Regime in the fall for Sockeye and Chinook Spawning**

3.6.1 Requirements

Flow requirements are specified in Section B.7 in the IFA:

*"Between October 8 and December 31, the City shall provide either high-normal minimum flows of 330 cfs or low-normal minimum flows of 275 cfs, except when flows are reduced to critical minimum flows under the terms of sub-section B.8. More specifically, the City, beginning on October 8, will meet the high-normal and low-normal flow regimes with the following long-term average frequencies assuming that the critical minimum flow regime will be in effect at a long-term average frequency of one of ten years:*

*(1) The City will follow the high-normal minimum flow regime in six of ten years, provided that it may switch down to low-normal in one of those years when actual or forecasted water availability conditions worsen significantly from those projected and understood at the time of the decision to provide high-normal minimum flows.*

*(2) The City may follow the <u>low-normal</u> minimum flows in three of ten years, provided that it will switch up to high-normal at such time after October 8 if the City determines that improving conditions allow, or when criteria for high-normal are met, whichever comes first."*

3.6.2 Compliance

In early October 2024, the 15-day antecedent inflows to Chester Morse Reservoir were below the criteria of 32 cfs for providing high normal flows. Forecasts predicted that October would be dryer than normal. Low normal flows were provided for the period between October 8th and December 3rd. there were 8 days in that period when flows exceeded 330 cfs. In early December there was a significant rain event and high normal flows were provided between December 3rd and December 30th with the exception of when significant rain increased inflows and criteria for high normal were met. High normal flows were maintained until unusually low late November and early December precipitation levels prompted SPU to ask the IFC to reduce flows to low normal levels until significant precipitation occurred. The IFC approved the request and low normal flows were implemented between December 17th and 19th and again between December 21st and 23rd, when a storm provided sufficient rain volumes to return to high normal flows through December 30th. See Table 8.1 and Figure 8.1.

The City has exceeded the expected amount of time High Normal Flows were to be provided as outlined in the IFA (Actual 67% vs IFA Expected 60%). Low Normal Flows have been provided 28% of years and Critical Flows have been provided 4% of years. For long term tracking for provision of High Normal, Low Normal and Critical Flows by Week and by Number of Days. See Tables 3.6.1 and 3.6.2.

**Table 3.6.1.** Actual and expected high normal, low normal and critical flows by week, October 8 to December 30, 2024.

| Week Period | Actual 2024 | Expected % of time as per IFA | | | Actual % of time 2000-2024 | | |
|---|---|---|---|---|---|---|---|
| | | High Flow | Low Flow | Critical Flow | High Flow | Low Flow | Critical Flow |
| Oct. 8 – Oct. 14 | Low | 60 | 30 | 10 | 74 | 26 | 0 |
| Oct. 15 – Oct. 21 | Low | 60 | 30 | 10 | 81 | 19 | 0 |
| Oct. 22 – Oct. 28 | 5 Low, 2 High | 60 | 30 | 10 | 79 | 18 | 3 |
| Oct. 29 – Nov. 4 | 5 Low, 2 High | 50 | 40 | 10 | 86 | 13 | 1 |
| Nov. 5 – Nov. 11 | 5 Low 2 High | 55 | 35 | 10 | 91 | 9 | 0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Nov. 12 – Nov. 18 | High | 65 | 25 | 10 | 89 | 11 | 0 |
| Nov. 19 – Nov. 25 | High | 65 | 25 | 10 | 92 | 8 | 0 |
| Nov. 26 – Dec. 2 | 4 Low<br>3 High | 70 | 20 | 10 | 92 | 8 | 0 |
| Dec. 3 – Dec. 9 | 4 Low<br>3 High | 75 | 15 | 10 | 93 | 7 | 0 |
| Dec. 10 – Dec. 16 | Low | 75 | 15 | 10 | 95 | 5 | 0 |
| Dec. 17 – Dec. 23 | 1 Low<br>6 High | 80 | 10 | 10 | 92 | 8 | 0 |
| Dec. 24 – Dec. 30 | High | 80 | 10 | 10 | 96 | 4 | 0 |

**Table 3.6.2.** Actual high normal, low normal and critical flows by number of days in week, October 8 to December 30, 2001 - 2024.

| Week of Fall Supplemental Flow Period | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oct 8 - Oct 14 | High | High | 3 Low, 4 High | High | High | High | High | High | Low | High | High | Low |
| Oct 15 - Oct 21 | High | High | High | High | High | High | High | High | 6 Low, 1 High | High | High | High |
| Oct 22 - Oct 28 | High | Low | High | High | High | High | High | High | 6 High, 1 Low | High | High | High |
| Oct 29 - Nov 4 | High | Low | High | High | High | High | High | High | High | High | High | High |
| Nov 5 - Nov 11 | High | Low | High | High | High | High | High | High | High | High | High | High |
| Nov 12 - Nov 18 | High | Low | High | High | High | High | High | High | High | High | High | High |
| Nov 19 - Nov 25 | High | Low | High | High | High | High | High | High | High | High | High | High |
| Nov 26 - Dec 2 | High | Low | High | High | High | High | High | High | High | High | High | High |
| Dec 3 - Dec 9 | High | Low | High | High | High | High | High | High | High | High | High | High |
| Dec 10 - Dec 16 | High | 5 Low, 2 High | High | High | High | High | High | High | High | High | High | High |
| Dec 17 - Dec 23 | High | Low | High | High | High | High | High | High | High | High | High | High |
| Dec 24 - Dec 30 | High | 6 Low, 1 High | High | High | High | High | High | High | High | High | High | High |
| **Week of Fall Supplemental Flow Period** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** | **2024** |
| Oct 8 - Oct 14 | High | High | Low | High | High | High | High | High | High | Low | 6 Low, 1 high | Low |
| Oct 15 - Oct 21 | High | High | Low | High | High | High | High | High | High | Low | 5 Low, 2 high | Low |
| Oct 22 - Oct 28 | High | High | 2 Low, 5 Critical | High | High | High | High | High | High | Low | Low | Low |
| Oct 29 - Nov 4 | High | High | 2 Critical, 5 High | High | High | High | High | High | High | 2 Low, 5 High | Low | 5 Low, 2 high |
| Nov 5 - Nov 11 | High | High | High | High | High | High | High | High | High | High | 3 Low, 4 High | 5 Low, 2 high |
| Nov 12 - Nov 18 | High | High | High | High | High | High | High | High | High | High | Low | 5 Low, 2 high |
| Nov 19 - Nov 25 | High | High | High | High | High | High | High | High | High | High | Low | High |
| Nov 26 - Dec 2 | High | High | High | High | High | High | High | High | High | High | 6 Low, 1 High | High |
| Dec 3 - Dec 9 | High | High | High | High | High | High | High | High | High | High | High | 4 Low, 3 High |
| Dec 10 - Dec 16 | High | High | High | High | High | High | High | High | High | High | High | 4 Low, 3 High |
| Dec 17 - Dec 23 | High | High | High | High | High | High | High | High | High | 6 Low, 1 High | High | 1 Low, 6 High |
| Dec 24 - Dec 30 | High | High | High | High | High | High | High | High | High | High | 1 Low, 6 High | High |

## 3.7 Reductions to Critical Minimum Flows

### 3.7.1 Requirements

Required minimum flows are specified in Section B.8 in the IFA:

*"This sub-section describes the circumstances under which the Parties agree that the City may switch to the minimum flow levels indicated in the column headed "Critical Flows" in the table which appears in sub-section B.2.c., until such time as those criteria may be modified pursuant to section E.4."*

### 3.7.2 Compliance

The City did not switch to the critical flow levels at any time during the 2024 reporting period. See Table 8.1 and Figure 8.1.

For long-term tracking purposes, stream flows have remained at or above guaranteed normal critical levels at all times in HCP Years 1 through 24, with the exception of a 7-day period in October of 2015 when flows were managed between low normal minimums and critical flow levels, as approved by the IFC. This exception is observed as if critical levels had been realized in 2015 (4% of HCP years).

### 3.7.3 Summary of 2015 Hydrologic Conditions Leading to Reduction of Flows to Levels Between Low Normal and Critical Flows

In 2015, snowpack was well below average and snowmelt in the Cedar River Municipal Watershed was complete by the first week of May. Precipitation levels in May were the driest on record for that month. April also had below average precipitation. Reservoir refill was moved up to May 1 and an additional one foot of water was stored compared to the normal refill elevation of 1563 feet. With very little snowmelt and a very dry spring, reservoir drawdown began a few weeks early. The extended forecast in June was for above average temperatures and very dry weather. In early June, Cedar River Municipal Watershed flow measurements indicated that tributaries to Chester Morse Reservoir were flowing at levels typically observed in late July or August. Chester Morse Reservoir elevation in early June was 1561.6 feet and dropping ¼ foot a day with record low inflows. Demand was higher than 2014 and SPU sent out a customer mailer dedicated to using water wisely. The 8-week average inflow was below the alert phase, which was unusual for early June. The month of June was the warmest and driest on record and many streams reached record low flows.

In July, there was a steep decline in the elevation of Chester Morse Reservoir. Unusually warm weather exacerbated normal reservoir decline by increasing water consumption. The May-June-July period was the driest on record for those three months combined. The 8-week moving average for inflows in July was below the alert phase and below the 5-percentile dry level. SPU implemented the use of their Seattle Wells from July to October to provide an additional 8 MGD of groundwater.

In early August, Chester Morse Reservoir elevation was slightly below 1550 feet and South Fork Tolt Reservoir elevation was approximately 1734 feet. Masonry Pool was split from the reservoir and SPU was drawing down Masonry Pool to limit leakage into the Cedar Moraine. Reservoir elevation was below the alert phase indicating SPU may need to consider plans to revert to a lower flow regime and floating pump plant mobilization. At 30 cfs, the 8-week moving average for reservoir inflows into Chester Morse was well below the alert phase. SPU invoked its Water Shortage Contingency Plan in late July and voluntary curtailment began in early August. August HFAM runs predicted a reservoir elevation of 1538 feet by the first week of October assuming precipitation was at 80 to 95-percentile dry, the City continued using the wells, did not curtail water, and critical flows were not realized. SPU also used municipal pump stations in the distribution system to convey Cedar River water to some customers that are usually supplied water by the South Fork Tolt Reservoir.

By early September, the elevation of Chester Morse Reservoir was 1548.6 feet and the elevation of South Fork Tolt Reservoir was 1722 feet. Combined reservoir storage was well below the average for early September. HFAM model runs assumed low normal flows through October 8 and reduced flow scenarios thereafter in combination with 10% curtailment. The runs for 95-percentile dry and 98-percentile extremely dry showed that flows would need to be reduced to below low normal or to critical levels to ensure water supply and adequate flows for fish. Pump plants were mobilized and ready to pump to maintain low normal flows with a pumping capacity of 350 cfs.

By the end of September, Chester Morse Reservoir elevation was 1546.4 feet and Masonry Pool was drawn down to 1512 feet to limit seepage to the Cedar Moraine. The 8-week moving average for inflows was well below the inflow requirement of 37 cfs for moving to critical flows but the reservoir was above the 1540 feet elevation required to switch to critical flows. Normal flow levels had been provided throughout September. To provide high normal flows on October 8, the reservoir needs to be above 1541.5 feet and average inflows for the antecedent 30-day period and the antecedent 15-day period need to be greater than 31 cfs and 32 cfs, respectively. The South Fork Tolt Reservoir elevation was 1717 feet, which is below the elevation necessary to move to critical flows. After SPU invoked the voluntary curtailment process in the Water Shortage Contingency Plan in late July, regional water users conserved 14% when compared to projected water use. HFAM model run scenarios assumed continued use of Seattle's wells and water curtailment, low normal fall flows and 1 in 40 dry year, resulted in a predicted reservoir elevation of 1524 feet in first week of December. Model results that assumed a switch to critical flows on October 8 and one in 20-year dry conditions indicated that SPU would not need to operate the floating pump plants. Conditions remained dry and pump plants began pumping on October 18 to raise Masonry Pool elevation and provide an emergency source of water in case the pumps failed. Between elevations 1525 feet and 1530 feet, Masonry Pool can provide up to 2.5 days of water for instream flows. SPU followed the low normal flow regime until October 23 when the decision was made to drop to a minimum flow midway between low normal and critical flows. At the time, Chester Morse Reservoir was at elevation 1539.8 feet and South Fork Tolt Reservoir was at elevation 1713.8 feet. Inflows to both reservoirs were well below levels for switching to critical flows. For seven days in October, flows were at or slightly above critical flows. On October 31, an atmospheric river delivered over ten inches of rain to both basins and reservoir levels and stream flows improved substantially allowing SPU to provide high normal flows in the Cedar River for the remainder of the year.

## 4. Instream Flows Above Landsburg Diversion Dam

### 4.1 Flows between Cedar Falls Powerhouse and Masonry Dam

Compliance with minimum flow requirements is assessed at one monitoring location within the Cedar River Watershed:  USGS Gage 12116400 - Cedar River at Powerhouse near Cedar Falls.

#### 4.1.1 Requirements

Required minimum flows are specified in Section C.1.a in the IFA:
*"After construction of a fish ladder at Landsburg Diversion Dam and subsequent upstream passage of selected species of anadromous fish, the City will provide a minimum flow of 30 cfs on a continuous basis to protect rearing habitat in the Cedar River "Canyon Reach," measured by a new USGS stream gage to be installed near river mile 33.7 and funded by the City"*

The fish ladder was completed and operational September 1, 2003.  The first anadromous fish passed above Landsburg Diversion Dam on September 19, 2003, which marks the date the City started to provide a minimum flow of 30 cfs on a continuous basis in the Cedar River "Canyon Reach below USGS Gage 12116400 (see map, page 7)."

#### 4.1.2 Compliance

During the 2024 reporting period, the project was in compliance with the IFA for minimum flow at USGS Gage 12116400.  See Table 8.4 and Figure 8.6.

For long-term tracking purposes, stream flows at the USGS Gage 12116400 location have remained above 30 cfs at all times after the implementation of the 30 cfs minimum flow requirement in 2003.

## 5. Downramping below City Facilities

### 5.1 Downramping below Landsburg Diversion Dam

#### 5.1.1 Requirements

Required downramping rates below Landsburg Dam are specified in Section C.2.c in the IFA:

*"(1) General*

*(a) The downramping rates and procedures set forth in this sub-section C.2.c. will become effective not later than the end of HCP Year 2 and will apply to operations at Landsburg Diversion Dam when flows are less than 850 cfs.*

*(b) The measuring point for downramping rates at the Landsburg Diversion Dam will be the existing USGS Gage number 12117600 located below the Dam at river mile 20.4.  Not later than the end of HCP Year 2, the City will install equipment to monitor this gage on a "real time" basis.  For compliance purposes, specific ramping rate values set forth in this sub-section C.2.c. will be calculated from provisional real time data and gage error, as determined by USGS, shall be factored into the ramping rate calculation.*

*(c) The downramping rates and prescriptions set forth in this sub-section C.2.c. will not apply when flows exceed 850 cfs.*

*(2) Downramping During Normal Operations*

*(a) Between February 1 and October 31, the maximum downramping flow rate will be one inch per hour.*

*(b) Between November 1 and January 31, the maximum downramping flow rate will be two inches per hour.*

*(c) The tainter gates will be down and closed during normal operations.*

*(3) Downramping During Startup Following Full System Shutdown*

*(a) Based on past experience, full system shutdown at flows less than 850 cfs can be expected to occur one to two times per year for scheduled and unscheduled maintenance, and at least once per year for forebay cleaning. Shutdowns for construction may also occur depending on the nature of the construction project.*

*(b) To minimize risk of cavitation and mechanical damage of equipment at Landsburg Diversion Dam, initial downramping following full system shutdown will be at a maximum of 60 cfs per hour."*

### 5.1.2 Compliance

During the 2024 reporting period, there were two formal downramping exceedance violations at USGS Gage 12117600 Cedar River below Landsburg. The exceedances occurred on October 17th between 4:30 am and 5:30 am and October 21st between 7:30 pm and 8:30 pm. The one-inch per hour downramping rate was exceeded by 0.32 inches and 2.12 inches, respectively. For the first downramping rate exceedance the Landsburg Forebay had a relatively high elevation and the operator switched the operating mode from automated to manual for a short period of time. This released some excess water before the flows returned to normal. In the second incident there was a natural increase in flows above Landsburg and a subsequent rise in the forebay level. The operational mode at the dam was switched from flow to level while the elevation of the forebay was excessively high. This caused a large quantity of water to be released, followed by sudden drop in flow.

All other downramping exceedances occurred when flows at the 12117600 Gage were above 850 cfs or during annual forebay cleaning operations and, therefore, did not result in a violation. See Table 8.1 and Figures 8.2 and 8.3.

**Table 5.1.1** Downramping below Landsburg Dam: events that exceeded the maximum downramping flow rate of one inch per hour and less than 850 cfs between February 1 and October 31, 2003-2024.

| Year/Date | Hour | Rate per Hour (inches) | Flow (cfs) | Comments/Explanations |
|---|---|---|---|---|
| **2003** | | | | |
| 2-May | 8 pm | -1.2 | 278 | Tainter gate operation error preparing for Landsburg Foregay cleaning |
| 22-Oct | 12 am | -1.08 | 802 | Tainter gate operation error |
| 28-Oct | 8 pm | -1.2 | 354 | Tainter gate operation error |
| 31-Oct | 11 am | -1.32 | 358 | Downstream passage gate flow mode malfunction |
| **2004** | | | | |
| 11-Feb | 8 pm | -1.08 | 727 | Dowstream passage gate opened too fast |
| 26-May | 6pm | -1.56 | 786 | Operator Error |
| 28-May | 5pm | -1.08 | 443 | Lake Youngs supply line 5 opened too fast |
| **2005** | | | | |
| 27-Mar | 2 am | -1.08 | 332 | Operator error trying to maximize diversion during large rain event |
| 31-Oct | 4pm | -1.2 | 535 | Dowstream passage gate opened too fast |
| **2006** | | | | |
| Mar-21 | 5 pm | -1.32 | 374 | Dowstream passage gate opened too fast |
| **2007** | | | | |
| 1-Mar | 7 am | -1.32 | 727 | Operator error during closing of tainter gate |
| 3-Oct | 12 am | -1.08 | 625 | Dowstream passage gate opened too fast |
| 3-Oct | 1am | -1.56 | 563 | Dowstream passage gate opened too fast |
| **2008** | | | | In Compliance with all rates |
| **2009** | | | | |
| 18-Aug | 9 am | -1.2 | 136 | Downstream Passage gate raised too fast |
| 26-Oct | 6 pm | -1.32 | 802 | Decrease in generation flow during acute natural flow drop |
| 28-Oct | 8 pm | -1.44 | 325 | Adjustment to set point for level mode on the downstream passage gate caused gate to rise too fast |
| **2010** | | | | |
| 18-Jun | 11:30 pm | -1.08 | 611 | Final adjustment on radial gate caused exceedance |
| 4-Aug | 9 pm | -1.2 | 217 | Reopening of diversion after turbidity event combined with natural rapid decline in flows |
| **2011** | | | | |
| 5-Aug | 7 pm | -1.08 | 108 | Operator error switching from direct bypass mode to standard operating configuration |
| 16-Sep | 12:30 am | -1.92 | 165 | Downstream Passage gate raised too fast |
| 23-Oct | 5 pm | -1.08 | 675 | rapid change in diversion rate caused rise in forebay triggering excessive downstream passage gate adjustment |
| **2012** | | | | In Compliance with all rates |
| **2013** | | | | |
| 24-Jul | 2 pm | -2.64 | 140 | Operator error during Downstream Passage Gate operation |
| 16-Oct | 10:15 pm | -1.2 | 480 | Unanticipated fluctuations in automatic mechanism on Downstream Passage Gate |
| 17-Oct | 5pm | -1.56 | 416 | Unanticipated fluctuations in automatic mechanism on Downstream Passage Gate |
| 17-Oct | 11:15 am | -1.32 | 381 | Unanticipated fluctuations in automatic mechanism on Downstream Passage Gate |
| 17-Oct | 12:45 pm | -1.44 | 373 | Unanticipated fluctuations in automatic mechanism on Downstream Passage Gate |
| **2014** | | | | |
| 7-Apr | 2:15 pm | -1.68 | 815 | Operator error |
| 7-Apr | 2:30 pm | -1.68 | 815 | Operator error |
| 3-Sep | 1 pm | -1.56 | 429 | Operator error |
| 3-Sep | 1:15 pm | -1.56 | 429 | Operator error |
| 3-Sep | 2:30 pm | -1.08 | 394 | Operator error |
| **2015** | | | | In Compliance with all rates |
| **2016** | | | | |
| 24-Jun | 10:30 am | -1.2 | 809 | Operator error during Downstream Passage Gate operation |
| 24-Jun | 10:45 am | -1.2 | 755 | Operator error during Downstream Passage Gate operation |
| **2017** | | | | |
| 1-Oct | 4 am | -1.12 | 278 | Operator error during Downstream Passage Gate operation |
| **2018** | | | | In Compliance with all rates |
| **2019** | | | | In Compliance with all rates |
| **2020** | 2 pm | -1.44 | 755 | Operator error durinjg a diversion shutdown from a beaver dam break Upstream of Landsburg |
| **2021** | | | | |
| 2-Jun | 8 pm | -1.08 | 321 | Operator error during forebay refill after forebay cleaning |
| **2022** | | | | In Compliance with all rates |
| **2023** | | | | |
| 3-Mar | 9 pm | -1.68 | 565 | Operator error during Downstream Passage Gate operation |
| 30-Mar | 1 pm | -1.2 | 353 | Operator error during Downstream Passage Gate operation |
| 23-Apr | 12 pm | -1.32 | 329 | Operator error during Downstream Passage Gate operation |
| 6-Jun | 10 pm | -1.08 | 267 | Operator error during Downstream Passage Gate operation |
| 16-Jun | 2 am | -1.44 | 314 | Operator error during closing off diversion |
| 16-Oct | 7 pm | -1.2 | 254 | Operator error during Downstream Passage Gate operation |
| **2024** | | | | |
| 17-Oct | 4:30 am | -1.1 | 310 | Operator error during a change from manual gate operation to automated gate operation |
| 21-Oct | 7:30 pm | -0.26 | 349 | Operator error while switching Downstream Passage Gate from from flow to level operating mode |

**Table 5.1.2** Downramping below Landsburg Dam: Events exceeding the maximum downramping flow rate of two inches per hour and less than 850 cfs between November 1 and January 31, 2003-2024.

| Year/Date | Hour | Rate per Hour (inches) | Flow (cfs) | Comments/Explanations |
|---|---|---|---|---|
| **2003** | | | | |
| 17-Nov | 1 pm | -2.28 | 321 | Operator error during Downstream Passage gate operation |
| **2004** | | | | In Compliance |
| **2005** | | | | In Compliance |
| **2006** | | | | |
| 12-Dec | 2 pm | -2.28 | 786 | Sluice gate at downstream end of V-screen opened too fast |
| **2007** | | | | In Compliance |
| **2008** | | | | In Compliance |
| **2009** | | | | In Compliance |
| **2010** | | | | In Compliance |
| **2011** | | | | In Compliance |
| **2012** | | | | In Compliance |
| **2013** | | | | In Compliance |
| **2014** | | | | In Compliance |
| **2015** | | | | In Compliance |
| **2016** | | | | In Compliance |
| **2017** | | | | In Compliance |
| **2018** | | | | In Compliance |
| **2019** | | | | In Compliance |
| **2020** | | | | In Compliance |
| **2021** | | | | In Compliance |
| **2022** | | | | |
| 24-Dec | 4 am | -2.16 | 407 | Operator error while bringing down the forebay level and switching control to Automatic Level mode. |
| **2023** | | | | In Compliance |
| **2024** | | | | In Compliance |

## 5.2 Downramping below Cedar Falls Powerhouse

### 5.2.1 Requirements

Required Downramping rates below Cedar Falls Powerhouse are specified in Section C.2.b in the IFA:

"*(1) The measuring point for downramping rates at the Cedar Falls Powerhouse will be the existing USGS Gage number 12116500 located ½ mile below the Powerhouse at river mile 33.2. For compliance purposes, specific ramping rate values set forth in this sub-section C.2.b will be calculated from provisional real time data and gage error, as determined by USGS, and shall be factored into the ramping rate calculation.*

*(2) The downramping rates and prescriptions set forth in this sub-section C.2.b will not apply when flows exceed 300 cfs*

*b. Downramping During Normal Operations*

*(1) Between February 1 and June 15, the maximum downramping flow rate will be two inches per hour with no daylight downramping (defined as one hour before sunrise until one hour after sunset).*

*(2) Between June 16 and October 31, the maximum downramping flow rate will be one inch per hour.*

*(3) Between November 1 and January 31, the maximum downramping flow rate will be two inches per hour.*

*c. Downramping during full system shutdown*

*(1) Based on past experience, full system shutdown at flows less than 300 cfs can be expected to occur one to two times per year due to low flow conditions or for scheduled and unscheduled maintenance or construction projects.*

*(2) When the lone unit is shutdown the wicket gates close at a prescribed speed (a condition of the machine safety mechanisms), which results in a sudden drop in flow, averaging a total of 25 cfs per occurrence.*

*d. Swapping load during daytime downramping restrictions*

*(1) During daytime downramping restrictions there may be a need to swap loads between generators. In most circumstances it is seamless and would not show up as a change in stage. However, there are situations in moving water from one machine to the other, due to the normal shutdown sequence, that can cause a sudden drop followed by an increase, or vice-versa. These are typically short duration occurrences.*

*e. Extended shutdowns during the February to June 15 time frame.*

*(1) The City will notify the Commission ahead of time of circumstances that could require an extended shutdown of both generators and discuss the need for leniency on daytime downramping*."

5.2.2 Compliance

During the 2024 reporting period, there was one downramping event on June 10, 2024. Downramping was recorded during daylight hours during the daytime dowramping restriction period. The event was initiated at the dam and was not caused by powerhouse operations. The downramp was recorded at USGS gage 12116500 one hour after the incident between 21:00 and 22:00 and was observed to be approximately 0.5 inch per hour. Restrictions on daytime downramping are designed to prevent stranding of juvenile Chinook. The change in flow was not recorded downstream at USGS gage 12117500 until June 11 at 00:15, which means the early downramp did not impact the Chinook redd locations during daytime hours. The cause of this event was human error.

As in years past, there were some minor, short-term fluctuations in flow and water surface elevation detected at USGS gage 12116500. Some of these events have been observed during the daytime downramping restriction period (February 1 through June 15). These events are infrequent, last for an hour or less and typically do not exceed 0.5 inch per hour. A detailed analysis determined that these fluctuations cannot be eliminated with the current turbines in place at the Cedar Falls Powerhouse. The turbines are set to operate within a range of 0.4 MWs. When the turbine drifts too far, a speeder motor nudges it back within range, but this operation is not highly accurate. These changes in flow are not caused by operations to ramp generators or swap flows between generators. Upgrades to equipment, such as new digital generators, would be needed to improve the precision. Going forward, these small and brief fluctuations that are not associated with changes to operations will not be reported.

**Table 5.2.1** Downramping below Cedar Falls Powerhouse: events exceeding no daytime downramping, and night time maximum downramping flow rate of two inches per hour and less than 300 cfs from February 1 to June 15, 2003-2024.

| Year/Date | Time | Rate per hour (inches) | Flow (cfs) | Comments/Description |
|---|---|---|---|---|
| **2003** | | | | In Compliance |
| **2004** | | | | |
| 16-Apr | 6:30 am | -2.5 | 165 | Emergency bypass system activated but provided insufficient flow |
| 14-Jun | 8:30 am | -1.9 | 122 | Frequency excursion caused flow fluctuation |
| **2005** | | | | |
| Apr-21 | 5:45 am | -2.2 | 32 | Operator closed unit 5 and started up unit 6 causing drop in flow |
| **2006** | 4:30 am | -0.4 | 53 | Valve closure at Masonry Dam registered downstream during daylight hours |
| **2007** | | | | In Compliance |
| **2008** | | | | In Compliance |
| **2009** | | | | In Compliance |
| **2010** | | | | In Compliance |
| **2011** | | | | In Compliance |
| **2012** | | | | In Compliance |
| **2013** | | | | In Compliance |
| **2014** | | | | In Compliance |
| **2015** | | | | |
| 13-Jun | 1 am | -4.2 | 150 | During generator shutdown the unit would not trip off line |
| **2016** | | | | In Compliance |
| **2017** | | | | In Compliance |
| **2018** | | | | In Compliance |
| **2019** | | | | In Compliance |
| **2020** | | | | In Compliance |
| **2021** | | | | |
| 29-Mar | 1:45 pm to 3:30 pm | -2.0 | | Downramping occurred during daylight hours for 1.75 hours |
| **2022** | | | | |
| 14-Apr | 8:45 PM | -2.8 | 177 | Operator restarting generator, failed to match outflows when bringing the unit back online |
| 15-Jul | | | | |
| **2023** | | | | In Compliance |
| **2024** | | | | |
| June 10 | 9:00 PM | Daytime Downramp | | Operator initiated downramping 2 hours early during period of daytime downramping restrictions |

**Table 5.2.2** Downramping below Cedar Falls Powerhouse: events exceeding maximum downramping flow rate of one inch per hour and less than 300 cfs between June 16 and October 31, 2003-2024.

| Year/Date | Time | Rate per hour (inches) | Flow (cfs) | Comments/Description |
|---|---|---|---|---|
| **2003** | | | | |
| Oct-21 | 9 am | -1.4 | 116 | Operator Error |
| **2004** | | | | In Compliance |
| **2005** | | | | In Compliance |
| **2006** | | | | In Compliance |
| **2007** | | | | In Compliance |
| **2008** | | | | In Compliance |
| **2009** | | | | In Compliance |
| **2010** | | | | In Compliance |
| **2011** | | | | In Compliance |
| **2012** | | | | In Compliance |
| **2013** | | | | In Compliance |
| **2014** | | | | In Compliance |
| **2015** | | | | |
| Jul-21 | 11:30 am | -1.1 | 74 | Unit downramped to speed-no-load (less than 25 cfs) during low flow period |
| **2016** | | | | In Compliance |
| **2017** | | | | |
| Jul-19 | 10:30 am | -1.1 | 107 | Unplanned valve position change of 48" Masonry Spill Valve |
| Sep-21 | 1:15 pm | -1.2 | 95 | SOPs ignored: Gen 5 brought online while 48" spill valve at dam was closing |
| Oct-20 | 6:45 am | -1.1 | 156 | Occurred during last hour of 15 hour downramp during flow recession after heavy rain |
| **2018** | | | | |
| Jul-26 | 9:45 am | -1.2 | 67 | SOP for downramping when unit generating less than 1MW were not followed |
| **2019** | | | | In Compliance |
| **2020** | | | | In Compliance |
| **2021** | | | | In Compliance |
| **2022** | | | | In Compliance |
| **2023** | | | | In Compliance |
| **2024** | | | | In Compliance |

**Table 5.2.3** Downramping below Cedar Falls Powerhouse: events exceeding maximum downramping flow rate of one inch per hour and less than 300 cfs June 16th and January 31 and November 1 through December 31, 2003-2024.

| Year/Date | Time | Rate per hour (inches) | Flow (cfs) | Comments/Description |
|---|---|---|---|---|
| **2003** | | | | In Compliance |
| **2004** | | | | In Compliance |
| **2005** | | | | In Compliance |
| **2006** | | | | In Compliance |
| **2007** | | | | In Compliance |
| **2008** | | | | In Compliance |
| **2009** | | | | |
| Apr-30 | 2:15 am | -1.7 | 79 | Operator failed SOP to reduce downramping rate when flows reached 90 cfs |
| **2010** | | | | In Compliance |
| **2011** | | | | In Compliance |
| **2012** | | | | In Compliance |
| **2013** | | | | In Compliance |
| **2014** | | | | In Compliance |
| **2015** | | | | In Compliance |
| **2016** | | | | In Compliance |
| **2017** | | | | |
| Jul-19 | 10:30 -10:45 am | -1.3-1.9 | 74-78 | Unplanned valve position change of 48" Masonry Spill Valve |
| **2018** | | | | In Compliance |
| **2019** | | | | In Compliance |
| **2020** | | | | In Compliance |
| **2021** | | | | In Compliance |
| **2022** | | | | In Compliance |
| **2023** | | | | In Compliance |
| **2024** | | | | In Compliance |

## 5.3 Downramping below Masonry Dam

### 5.3.1 Requirements

Required Downramping rates below Masonry Dam are specified in Section C.2.a in IFA:

*"(1) The measuring point for downramping rates at the Masonry Dam will be the USGS Gage number 12116400 located below the Dam at river mile 33.7. For compliance purposes, specific ramping rate values set forth in this sub-section C.2.a will be calculated from provisional real time data and gage error, as determined by USGS, and shall be factored into the ramping rate calculation.*

*(2) The downramping rates and prescriptions set forth in this sub-section C.2.a will not apply when flows exceed 80 cfs*

*b. Downramping During Normal Operations*

*(1) Between February 1 and October 31 the final maximum downramping flow rate will be one-inch per hour.*
*(2) Between November 1 and January 31, the maximum downramping flow rate will be two inches per hour."*

### 5.3.2 Compliance

During the 2024 reporting period, downramping below the Masonry Dam was in compliance with the IFA at USGS Gage 12116400. See Figures 8.6 and 8.7.

For long term tracking of the City's performance in meeting downramping requirements below Masonry Dam see Table 5.3.1.

**Table 5.3.1** Downramping compliance below Masonry Dam, 2003 – 2024.

| Year/Date | Time | Rate per hour (inches) | Flow (cfs) | Comments/Description |
|---|---|---|---|---|
| **2003** | | | | In Compliance |
| **2004** | | | | In Compliance |
| **2005** | | | | In Compliance |
| **2006** | | | | In Compliance |
| **2007** | | | | In Compliance |
| **2008** | | | | In Compliance |
| **2009** | | | | |
| Apr-30 | 2:15 am | -1.7 | 79 | Operator failed SOP to reduce downramping rate when flows reached 90 cfs |
| **2010** | | | | In Compliance |
| **2011** | | | | In Compliance |
| **2012** | | | | In Compliance |
| **2013** | | | | In Compliance |
| **2014** | | | | In Compliance |
| **2015** | | | | In Compliance |
| **2016** | | | | In Compliance |
| **2017** | | | | |
| Jul-19 | 10:30 -10:45 am | -1.3-1.9 | 74-78 | Unplanned valve position change of 48" Masonry Spill Valve |
| **2018** | | | | In Compliance |
| **2019** | | | | In Compliance |
| **2020** | | | | In Compliance |
| **2021** | | | | In Compliance |
| **2022** | | | | In Compliance |
| **2023** | | | | In Compliance |
| **2024** | | | | In Compliance |

# 6. Emergency Bypass Capability

## 6.1 Emergency Bypass Requirements

Emergency bypass Capabilities are specified in Section C.2.a in IFA:

In 1999, the City installed, tested and implemented operating procedures for new equipment to provide bypass flows around its hydroelectric turbines during most emergency plant shutdowns to protect against stranding of fish and dewatering of redds as a result of such events.

In its original configuration, the Cedar Falls Hydroelectric Project was not able to provide flow to the river during emergency shutdown of electrical generating equipment. To remedy this situation, in early 1999, the City installed equipment to provide bypass flows around its hydroelectric turbines during most emergency plant shutdowns. This original bypass system's flow capacity was limited to approximately 70% of the original flow passing through the generator prior to the load rejection. The City decided to expand the emergency bypass system's scope to improve the flow capacity through the bypass system. This work was completed in 2002 and has resulted in a more reliable system that has provided matching flow continuation to the river during most emergency shutdowns.

6.2 Compliance

During the 2024 reporting period there were no emergency shutdowns at the powerhouse. The Cedar Falls Powerhouse was not in operation until the last two weeks of December, 2024, while the new substation was being completed. When the generators returned to operation on December 16, 2024, the equipment to provide bypass flows was tested and found to be working properly.

For long term tracking of the City's performance using the Emergency Bypass Capability, see Table 6.2.1.

**Table 6.2.1** Emergency Bypass Activations 2003-2024

| Year | # of Emergency Bypass Activations | # of Activations with Complete Flow Continuation | # of Unsuccessful Activations/EB failure | Comments/Descriptions (DRE = Downramping Exceedance) |
|---|---|---|---|---|
| 2003 | 0 | 0 | 0 | |
| 2004 | 1 | 0 | 1 | flow continuation did not match pre-event flows resulting in DRE |
| 2005 | 0 | 0 | 0 | Loss of generator and transmission line power during a windstorm prevented activation, DRE |
| 2006 | 0 | 0 | 0 | |
| 2007 | 1 | 0 | 1 | Emergency bypass equipment did not function properly during emergency plant shutdown, DRE |
| 2008 | 4 | 1 | 3 | on 2 occasions only partial flow continuation and on one occasion EB failed, DRE |
| 2009 | 4 | 4 | 0 | |
| 2010 | 10 | 9 | 1 | Both units tripped offline and one unit's relief valve lost air, gripper shut the valve, DRE |
| 2011 | 2 | 2 | 0 | |
| 2012 | 3 | 3 | 0 | |
| 2013 | 9 | 9 | 0 | |
| 2014 | 2 | 2 | 0 | |
| 2015 | 2 | 1 | 1 | Sudden load reduction to one unit caused relief valve to close resulting in DRE |
| 2016 | 5 | 5 | 0 | |
| 2017 | 13 | 12 | 1 | Activated EB but butterfly valve began to close, operator intervened manually no DRE |
| 2018 | 5 | 5 | 0 | |
| 2019 | 0 | 0 | 0 | |
| 2020 | 0 | 0 | 0 | |
| 2021 | 6 | 6 | 0 | |
| 2022 | 8 | 8 | 0 | |
| 2023 | 0 | 0 | 0 | |

# 7. Municipal Water Use

### 7.1 Requirements

In 2020, the City's maximum diversion rate from the Cedar River, as described in the Muckleshoot Settlement, changed from 105 MGD to 110 MGD. The new maximum rate is in effect until 2030.

### 7.2 Compliance

The City was in compliance with the provision in 2024. Actual average annual water diversion in 2023 was 90.7 MGD. The City was relying on Cedar River water more than usual for water supply due to the South Fork Tolt Reservoir being well below normal elevations for most of 2023. See Table 8.7. For long term tracking of the City's annual average water diversion at Landsburg Dam on the Cedar River, see Table 7.2.1.

**Table 7.2.1** Municipal Water Use: annual average water Diversion at Landsburg Dam on the Cedar River, 2001-2024.

| Year | Annual Average Daily Water Diversion (MGD) | Year | Annual Average Daily Water Diversion (MGD) |
|---|---|---|---|
| **2001** | 89.6 | **2013** | 72.8 |
| **2002** | 78.6 | **2014** | 72.7 |
| **2003** | 81.7 | **2015** | 77.6 |
| **2004** | 85.9 | **2016** | 79.7 |
| **2005** | 78.7 | **2017** | 78.7 |
| **2006** | 81.9 | **2018** | 78.3 |
| **2007** | 79.3 | **2019** | 84.6 |
| **2008** | 77.4 | **2020** | 74.5 |
| **2009** | 81.4 | **2021** | 76.8 |
| **2010** | 75 | **2022** | 73.3 |
| **2011** | 72.1 | **2023** | 90.7 |
| **2012** | 73.7 | **2024** | 79.6 |

### 7.3 Municipal Water Service Area

The retail service and wholesale service areas remained the same as in 2022.

# 8. Measurement and Reporting

Annual reports are provided to the Commission to evaluate the City's compliance with the terms of the Instream Flow Agreement Section D.3.a:

*"The City will provide to the Commission, on an annual basis, the record of measurements from the locations listed in subsection D.1. Average daily flows and reservoir elevations will be provided to indicate compliance with minimum instream flow requirements and goals. A table will be provided to show flows at the measuring points compared to the critical, low-normal, high-normal, and non-firm flow levels as identified in section B. For periods affected by downramping operations, flow data will be provided in one-hour increments to indicate compliance with downramping prescriptions."*

These flow and elevation records are described in the following compliance graphs and tables:

Figure 8.1 – Instream Flows Below Landsburg
Figure 8.2 – Downramping Flows Below Landsburg
Figure 8.3 – Downramping Rate of Change Below Landsburg
Figure 8.4 – Downramping Flows below Powerhouse
Figure 8.5 – Downramping Rate of Change Below Powerhouse
Figure 8.6 – Downramping Flows below Masonry Dam
Figure 8.7 – Downramping Rate of Change Below Masonry Dam

Table 8.1 – USGS 12117600 Mean Daily Flows
Table 8.2 – Instream Schedule with Firm and Non-Firm Flows
Table 8.3 – USGS 12116500 Mean Daily Flows
Table 8.4 – USGS 12116400 Mean Daily Flows
Table 8.5 – SPU Chester Morse Reservoir Daily 7AM Elevation
Table 8.6 – USGS 12115000 Mean Daily Flows
Table 8.7 – SPU Landsburg Daily Diversion
Table 8.8 – SPU Landsburg 24 Hour Total Precipitation
Table 8.9 – SPU Masonry Dam 24 Hour Precipitation

## Figure 8.1 – Instream Flows Below Landsburg Compliance USGS Gage 12117600

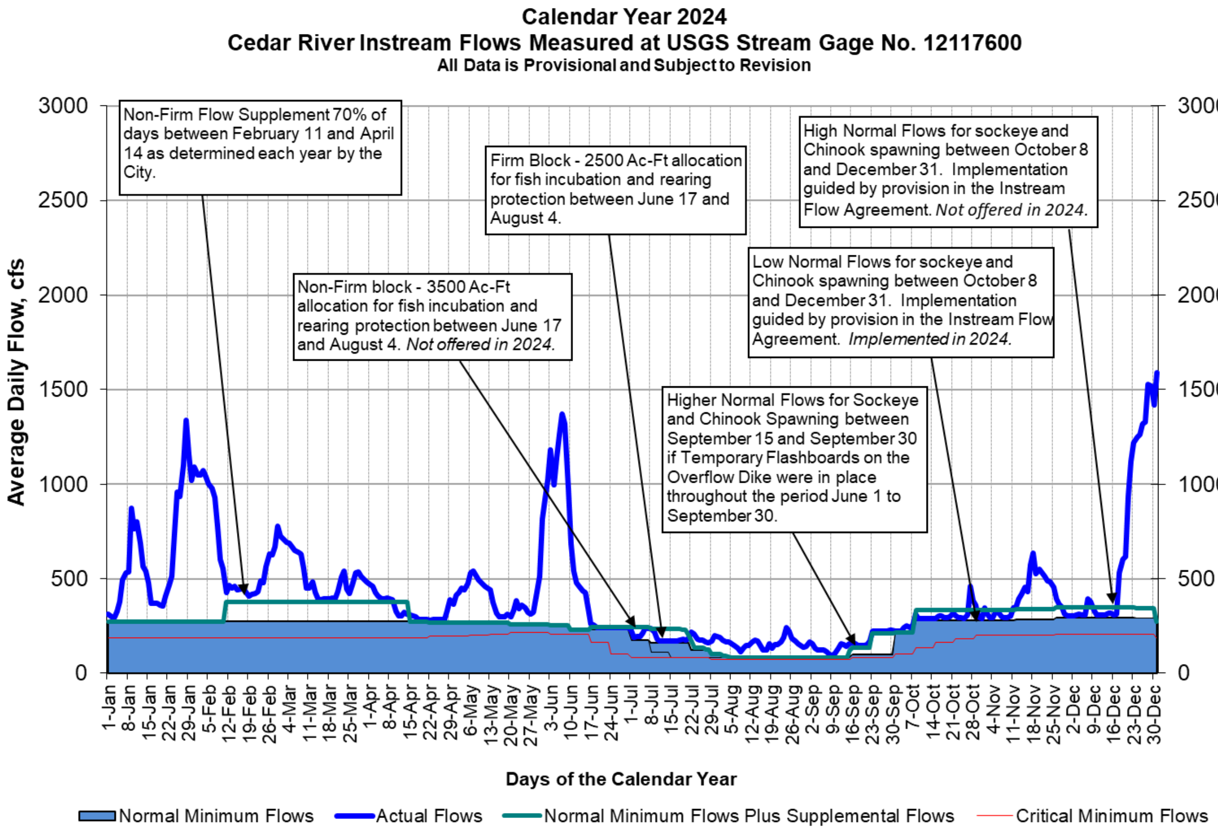
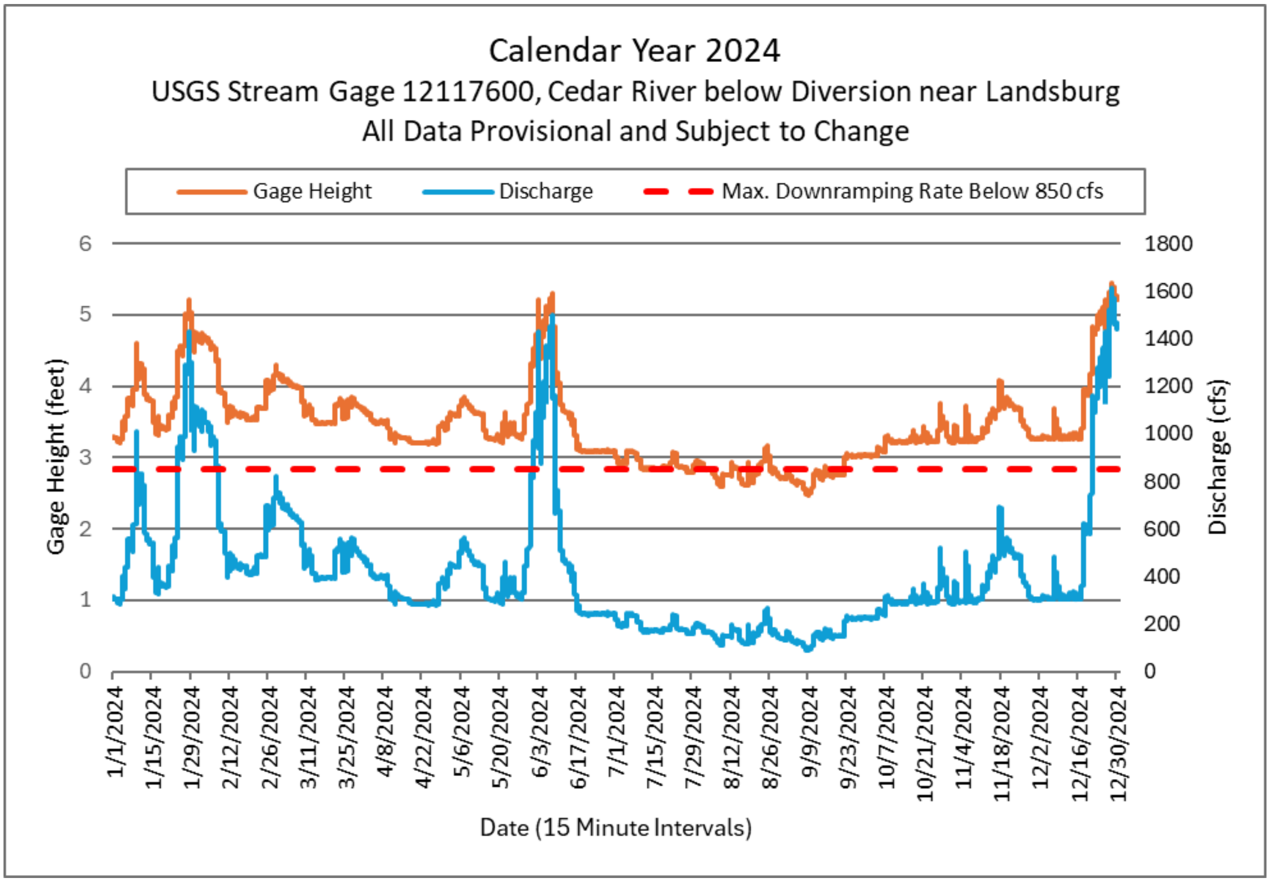
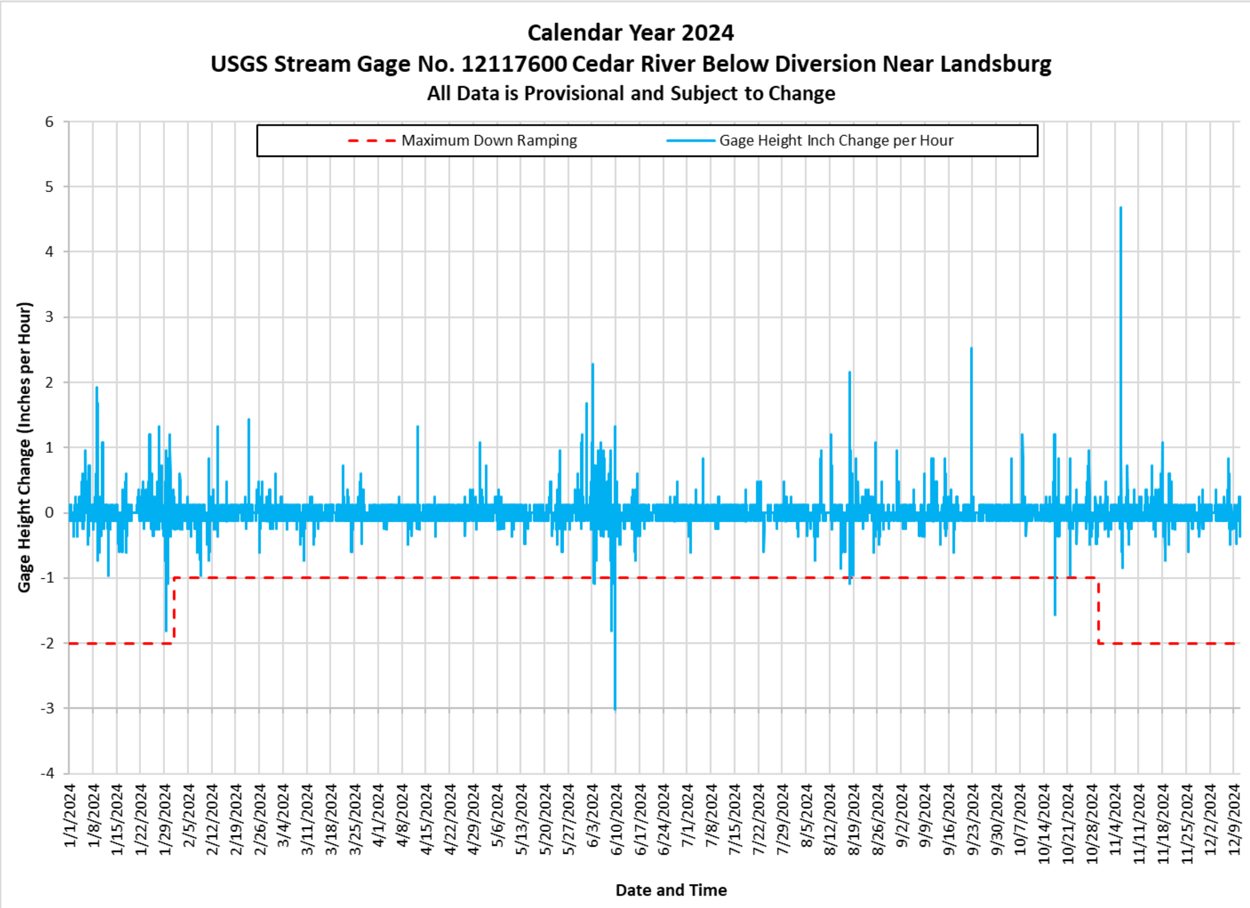


**Figure 8.2 – Downramping Flows Below Landsburg Compliance Graph**



## Figure 8.3 – Downramping Rate of Change Below Landsburg Compliance Graph



## Figure 8.4 – Downramping Flows below Powerhouse Compliance Graph

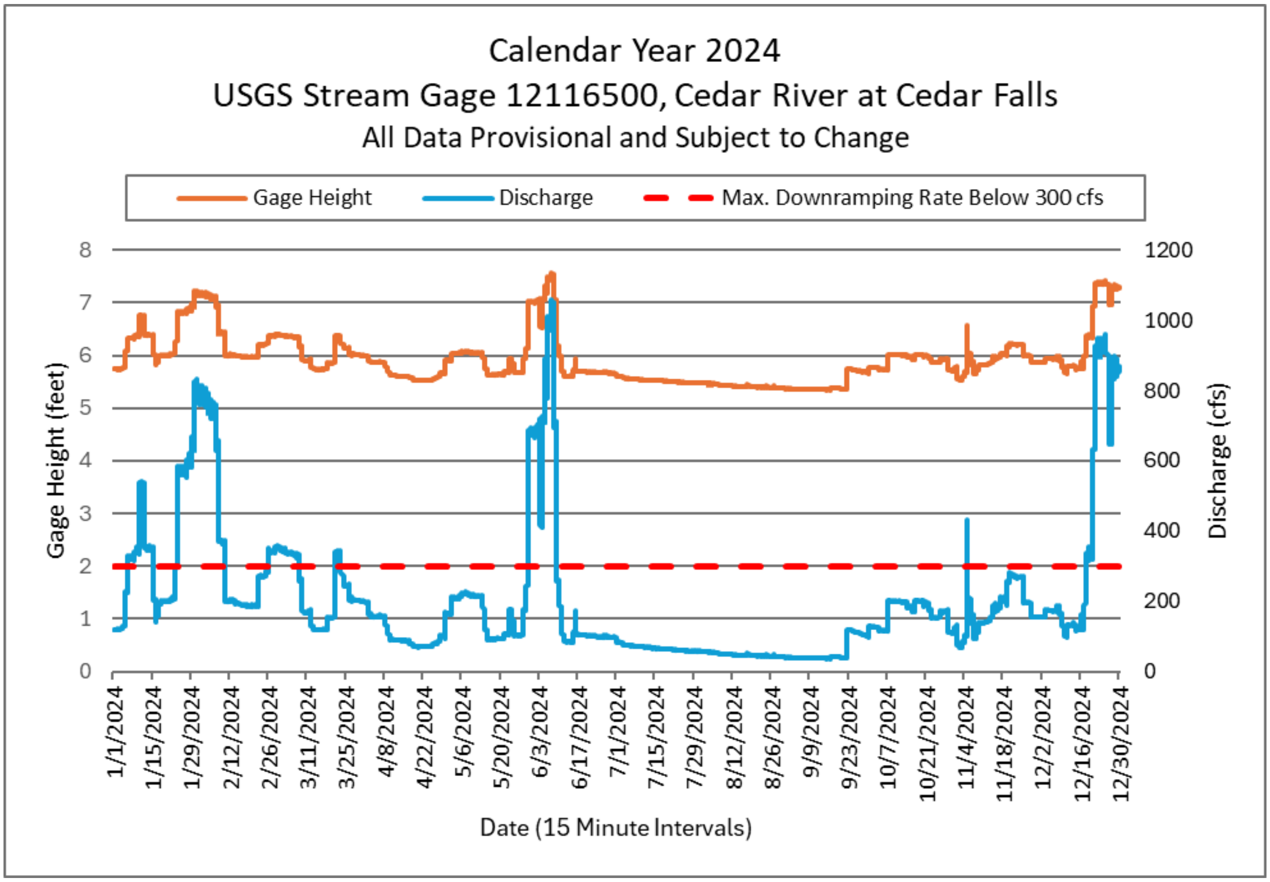
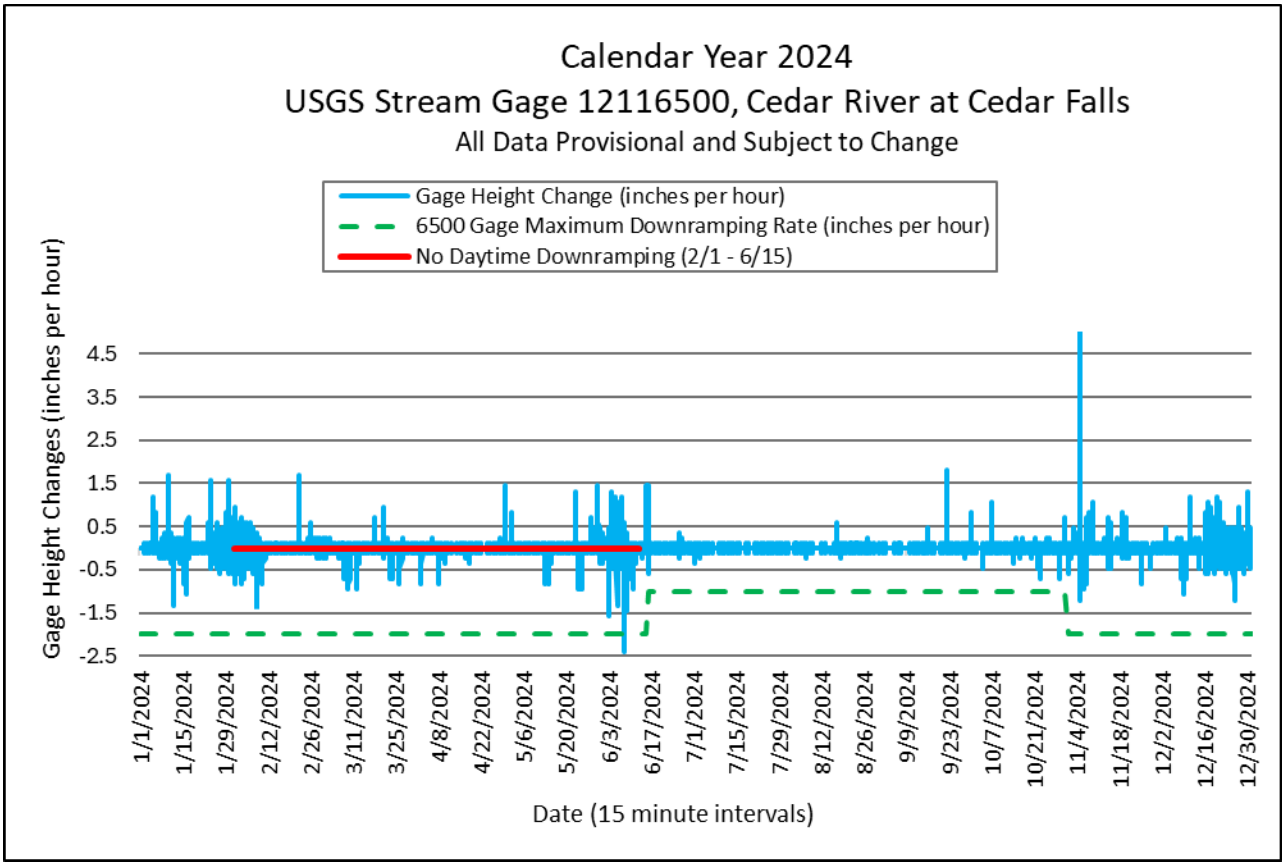


**Figure 8.5 – Downramping Rate of Change Below Powerhouse Compliance Graph**



## Figure 8.6 – Downramping Flows below Masonry Dam Compliance Graph

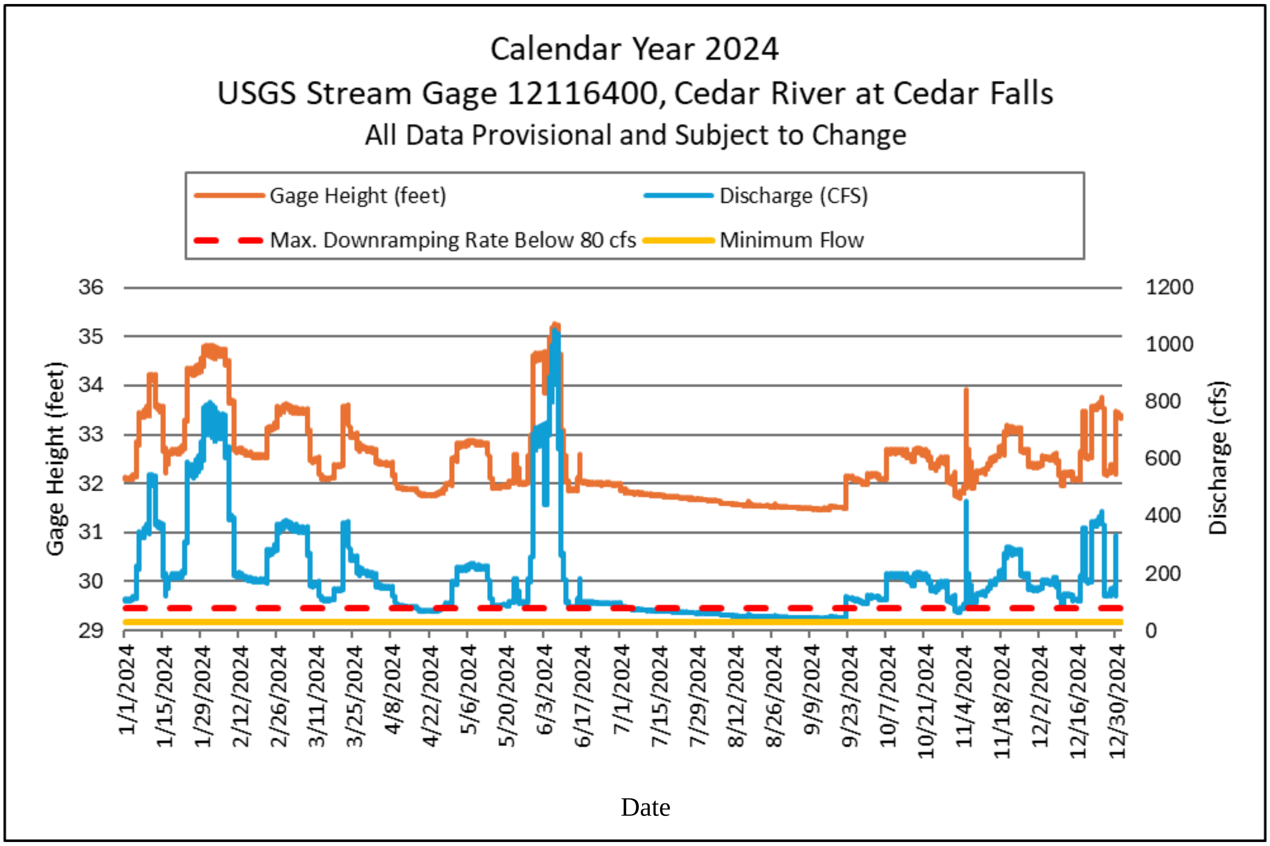


**Figure 8.7 – Downramping Rate of Change Below Masonry Dam Compliance Graph**

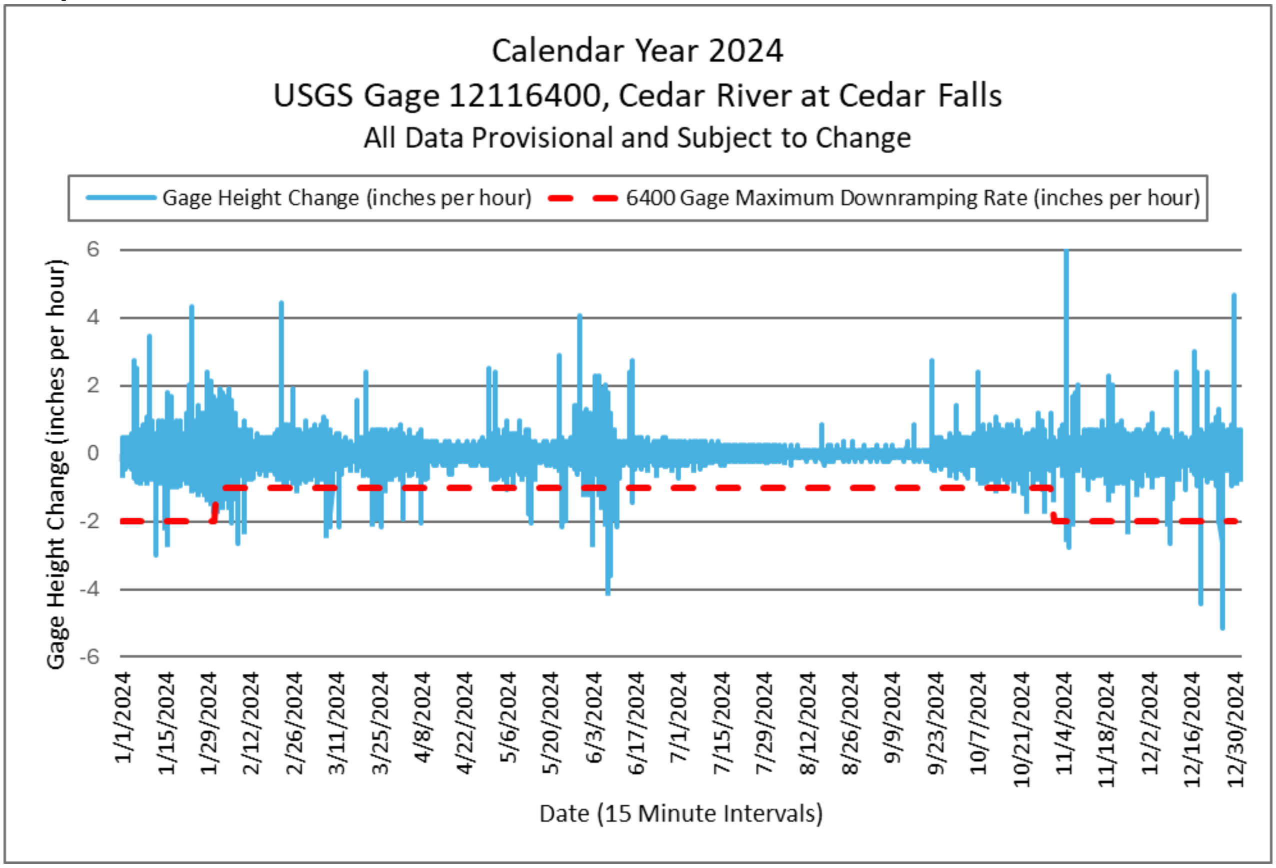


Table 8.1

U.S. DEPARTMENT OF THE INTERIOR - U.S. GEOLOGICAL SURVEY - WATER RESOURCES

STATION NUMBER 12117600 CEDAR RIVER BELOW DIVERSION NEAR LANDSBURG, WA

SOURCE AGENCY USGS STATE 53 COUNTY 033

LATITUDE 472247 LONGITUDE 1215856 NAD27 DRAINAGE AREA 124 sq. mi. DATUM 490 NGVD29

Daily Discharge, cubic feet per second

CALENDAR YEAR JANUARY TO DECEMBER 2024

DAILY MEAN VALUES

| DAY | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 311 | 1050 | 728 | 472 | 414 | 920 | 226 | 188 | 164 | 225 | 345 | 303 |
| 2 | 299 | 1050 | 707 | 459 | 429 | 1020 | 191 | 177 | 155 | 225 | 314 | 303 |
| 3 | 293 | 1070 | 691 | 428 | 449 | 1180 | 193 | 166 | 133 | 225 | 294 | 308 |
| 4 | 329 | 1040 | 688 | 406 | 443 | 998 | 196 | 166 | 123 | 244 | 294 | 313 |
| 5 | 380 | 1000 | 667 | 396 | 474 | 1140 | 212 | 158 | 122 | 250 | 334 | 308 |
| 6 | 495 | 976 | 652 | 393 | 530 | 1260 | 241 | 145 | 123 | 244 | 317 | 306 |
| 7 | 532 | 932 | 642 | 399 | 543 | 1370 | 239 | 131 | 113 | 258 | 301 | 395 |
| 8 | 534 | 780 | 633 | 395 | 517 | 1320 | 236 | 114 | 97.2 | 311 | 292 | 379 |
| 9 | 873 | 602 | 556 | 389 | 495 | 979 | 217 | 135 | 96.2 | 291 | 296 | 334 |
| 10 | 765 | 553 | 453 | 326 | 473 | 682 | 178 | 149 | 102 | 288 | 304 | 310 |
| 11 | 800 | 425 | 449 | 304 | 458 | 540 | 172 | 147 | 134 | 288 | 345 | 309 |
| 12 | 690 | 465 | 484 | 305 | 453 | 480 | 173 | 166 | 157 | 289 | 351 | 309 |
| 13 | 564 | 453 | 425 | 322 | 448 | 459 | 171 | 174 | 151 | 288 | 392 | 307 |
| 14 | 543 | 460 | 396 | 315 | 374 | 438 | 173 | 172 | 143 | 288 | 417 | 316 |
| 15 | 480 | 443 | 391 | 308 | 322 | 425 | 173 | 149 | 158 | 290 | 457 | 318 |
| 16 | 370 | 445 | 393 | 305 | 306 | 348 | 171 | 125 | 159 | 302 | 430 | 308 |
| 17 | 370 | 445 | 394 | 299 | 301 | 262 | 169 | 123 | 157 | 302 | 575 | 313 |
| 18 | 368 | 429 | 395 | 285 | 302 | 257 | 177 | 156 | 147 | 296 | 635 | 529 |
| 19 | 360 | 410 | 397 | 283 | 319 | 243 | 178 | 131 | 149 | 292 | 526 | 603 |
| 20 | 357 | 416 | 394 | 283 | 297 | 243 | 176 | 154 | 149 | 297 | 550 | 618 |
| 21 | 408 | 421 | 432 | 283 | 334 | 243 | 183 | 152 | 151 | 316 | 529 | 933 |
| 22 | 467 | 433 | 507 | 282 | 385 | 242 | 217 | 164 | 169 | 304 | 512 | 1120 |
| 23 | 514 | 487 | 542 | 283 | 340 | 243 | 208 | 192 | 222 | 294 | 490 | 1220 |
| 24 | 741 | 481 | 446 | 283 | 362 | 243 | 180 | 242 | 221 | 292 | 483 | 1250 |
| 25 | 957 | 566 | 424 | 284 | 345 | 243 | 176 | 222 | 222 | 291 | 454 | 1260 |
| 26 | 934 | 630 | 463 | 286 | 323 | 244 | 175 | 187 | 223 | 309 | 393 | 1320 |
| 27 | 1100 | 624 | 529 | 284 | 314 | 243 | 166 | 169 | 225 | 462 | 365 | 1330 |
| 28 | 1340 | 668 | 534 | 334 | 321 | 243 | 159 | 158 | 225 | 384 | 349 | 1530 |
| 29 | 1160 | 776 | 513 | 387 | 401 | 242 | 173 | 147 | 226 | 362 | 311 | 1520 |
| 30 | 1020 | | 497 | 364 | 514 | 244 | 197 | 139 | 226 | 298 | 303 | 1420 |
| 31 | 1090 | --- | 483 | | 818 | --- | 193 | 140 | --- | 287 | --- | 1590 |
| TOTAL | 19444 | 18530 | 15905 | 10142 | 12804 | 16994 | 5889 | 4938 | 4842 | 9092 | 11958 | 21682 |
| MEAN | 627 | 639 | 513 | 338 | 413 | 566 | 190 | 159 | 161 | 293 | 399 | 699 |
| MAX | 1340 | 1070 | 728 | 472 | 818 | 1370 | 241 | 242 | 226 | 462 | 635 | 1590 |
| MIN | 293 | 410 | 391 | 282 | 297 | 242 | 159 | 114 | 96 | 225 | 292 | 303 |

Table 8.2

SEATTLE PUBLIC UTILITIES

**OPERATIONAL MINIMUM INSTREAM FLOW SCHEDULE WITH FIRM AND NON-FIRM FLOWS**

STATION NUMBER 12117600 CEDAR RIVER BELOW DIVERSION NEAR LANDSBURG, WA

SOURCE AGENCY SPU - (With Walsh Ditch adjustment)

LATITUDE 472247 LONGITUDE 1215856 NAD27 DRAINAGE AREA 124 sq. mi. DATUM 490 NGVD29

All Data is Provisional and Subject to Revision

Discharge, cubic feet per second

CALENDAR YEAR JANUARY TO DECEMBER 2024

DAILY MEAN VALUES

| DAY | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 275 | 275 | 378 | 378 | 268 | 258 | 244 | 85 | 83 | 214 | 334 | 347 |
| **2** | 275 | 275 | 378 | 378 | 268 | 258 | 244 | 85 | 83 | 214 | 334 | 347 |
| **3** | 275 | 275 | 378 | 378 | 268 | 256 | 244 | 83 | 83 | 214 | 334 | 347 |
| **4** | 275 | 275 | 378 | 378 | 268 | 256 | 244 | 83 | 83 | 214 | 334 | 347 |
| **5** | 275 | 275 | 378 | 378 | 268 | 256 | 244 | 83 | 83 | 214 | 334 | 347 |
| **6** | 275 | 275 | 378 | 378 | 268 | 256 | 244 | 83 | 83 | 214 | 334 | 347 |
| **7** | 275 | 275 | 378 | 378 | 268 | 256 | 244 | 83 | 83 | 214 | 334 | 347 |
| **8** | 275 | 275 | 378 | 378 | 268 | 256 | 244 | 83 | 83 | 334 | 334 | 347 |
| **9** | 275 | 275 | 378 | 378 | 268 | 256 | 244 | 83 | 83 | 334 | 334 | 347 |
| **10** | 275 | 275 | 378 | 378 | 268 | 231 | 244 | 83 | 83 | 334 | 334 | 347 |
| **11** | 275 | 378 | 378 | 378 | 268 | 231 | 244 | 83 | 83 | 334 | 334 | 347 |
| **12** | 275 | 378 | 378 | 378 | 268 | 231 | 244 | 83 | 83 | 334 | 339 | 347 |
| **13** | 275 | 378 | 378 | 378 | 268 | 231 | 244 | 83 | 83 | 334 | 339 | 347 |
| **14** | 275 | 378 | 378 | 378 | 268 | 231 | 244 | 83 | 83 | 334 | 339 | 347 |
| **15** | 275 | 378 | 378 | 273 | 268 | 231 | 244 | 83 | 121 | 334 | 339 | 347 |
| **16** | 275 | 378 | 378 | 273 | 268 | 231 | 244 | 83 | 136 | 334 | 339 | 347 |
| **17** | 275 | 378 | 378 | 273 | 268 | 244 | 244 | 83 | 136 | 334 | 339 | 347 |
| **18** | 275 | 378 | 378 | 273 | 268 | 244 | 244 | 83 | 136 | 334 | 339 | 347 |
| **19** | 275 | 378 | 378 | 273 | 268 | 244 | 212 | 83 | 136 | 334 | 339 | 347 |
| **20** | 275 | 378 | 378 | 273 | 258 | 244 | 212 | 83 | 136 | 334 | 339 | 347 |
| **21** | 275 | 378 | 378 | 273 | 258 | 244 | 180 | 83 | 136 | 334 | 339 | 347 |
| **22** | 275 | 378 | 378 | 268 | 258 | 244 | 180 | 83 | 136 | 334 | 339 | 347 |
| **23** | 275 | 378 | 378 | 268 | 258 | 244 | 148 | 83 | 213 | 334 | 339 | 347 |
| **24** | 275 | 378 | 378 | 268 | 258 | 244 | 148 | 83 | 213 | 334 | 339 | 345 |
| **25** | 275 | 378 | 378 | 268 | 258 | 244 | 124 | 83 | 213 | 334 | 339 | 345 |
| **26** | 275 | 378 | 378 | 268 | 258 | 244 | 124 | 83 | 213 | 334 | 347 | 345 |
| **27** | 275 | 378 | 378 | 268 | 258 | 244 | 116 | 83 | 213 | 334 | 347 | 345 |
| **28** | 275 | 378 | 378 | 268 | 258 | 244 | 108 | 83 | 213 | 334 | 347 | 345 |
| **29** | 275 | --- | 378 | 268 | 258 | 244 | 108 | 83 | 213 | 334 | 347 | 345 |
| **30** | 275 | --- | 378 | 268 | 258 | 244 | 108 | 83 | 213 | 334 | 347 | 345 |
| **31** | 275 | --- | 378 | --- | 258 | --- | 85 | 83 | --- | 334 | --- | 275 |
| TOTAL | 8525 | 9554 | 11718 | 9615 | 8188 | 7341 | 6245 | 2577 | 3939 | 9514 | 10155 | 10671 |
| MEAN | 275 | 339 | 378 | 322 | 264 | 245 | 202 | 83 | 128 | 306 | 338 | 344 |
| MAX | 275 | 378 | 378 | 378 | 268 | 258 | 244 | 85 | 213 | 334 | 347 | 347 |
| MIN | 275 | 275 | 378 | 268 | 258 | 231 | 85 | 83 | 83 | 214 | 334 | 275 |
| AC-FT | 16557 | 18555 | 22758 | 18674 | 15902 | 14257 | 12129 | 5005 | 7650 | 18478 | 19723 | 20725 |

| Table 8.3 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U.S. DEPARTMENT OF THE INTERIOR - U.S. GEOLOGICAL SURVEY - WATER RESOURCES | | | | | | | | | | | | |
| STATION NUMBER 12116500 CEDAR RIVER AT CEDAR FALLS, WA | | | | | | | | | | | | |
| SOURCE AGENCY USGS STATE 53 COUNTY 033 | | | | | | | | | | | | |
| LATITUDE 472502 LONGITUDE 1214727 NAD27 DRAINAGE AREA 84.2 sq. mi. DATUM 902.10 NGVD29 | | | | | | | | | | | | |
| Discharge, cubic feet per second | | | | | | | | | | | | |
| CALENDAR YEAR JANUARY TO DECEMBER 2024 | | | | | | | | | | | | |
| DAILY MEAN VALUES | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **DAY** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| **1** | 158 | 785 | 351 | 197 | 166 | 682 | 90 | 56 | 41 | 128 | 118 | 154 |
| **2** | 120 | 779 | 345 | 193 | 186 | 689 | 82 | 56 | 40 | 126 | 71 | 154 |
| **3** | 120 | 770 | 341 | 159 | 210 | 552 | 80 | 56 | 40 | 126 | 75 | 166 |
| **4** | 125 | 758 | 339 | 158 | 209 | 536 | 76 | 55 | 40 | 120 | 93 | 175 |
| **5** | 169 | 745 | 336 | 157 | 211 | 803 | 74 | 55 | 40 | 116 | 201 | 174 |
| **6** | 259 | 742 | 334 | 157 | 218 | 930 | 74 | 55 | 39 | 116 | 143 | 172 |
| **7** | 322 | 699 | 332 | 158 | 223 | 1019 | 73 | 53 | 38 | 151 | 129 | 181 |
| **8** | 323 | 514 | 323 | 156 | 219 | 863 | 72 | 49 | 38 | 199 | 104 | 175 |
| **9** | 344 | 369 | 252 | 116 | 216 | 482 | 71 | 48 | 38 | 199 | 127 | 146 |
| **10** | 406 | 313 | 167 | 93 | 214 | 251 | 70 | 48 | 38 | 198 | 137 | 114 |
| **11** | 527 | 198 | 168 | 91 | 213 | 117 | 70 | 48 | 38 | 198 | 140 | 119 |
| **12** | 418 | 204 | 170 | 89 | 213 | 87 | 69 | 47 | 37 | 198 | 142 | 133 |
| **13** | 352 | 201 | 122 | 88 | 212 | 84 | 68 | 46 | 37 | 198 | 151 | 133 |
| **14** | 351 | 196 | 119 | 88 | 129 | 83 | 68 | 46 | 38 | 190 | 166 | 125 |
| **15** | 265 | 192 | 118 | 88 | 94 | 84 | 67 | 46 | 37 | 184 | 175 | 118 |
| **16** | 173 | 190 | 118 | 87 | 91 | 157 | 66 | 46 | 39 | 180 | 176 | 134 |
| **17** | 180 | 188 | 120 | 86 | 92 | 105 | 66 | 46 | 43 | 177 | 197 | 131 |
| **18** | 197 | 188 | 134 | 72 | 92 | 104 | 65 | 46 | 42 | 201 | 205 | 289 |
| **19** | 199 | 187 | 152 | 71 | 94 | 103 | 64 | 45 | 41 | 200 | 216 | 335 |
| **20** | 198 | 188 | 152 | 71 | 92 | 103 | 64 | 45 | 41 | 195 | 272 | 403 |
| **21** | 203 | 187 | 254 | 71 | 98 | 102 | 63 | 44 | 40 | 191 | 274 | 779 |
| **22** | 209 | 219 | 340 | 71 | 106 | 100 | 62 | 43 | 85 | 183 | 271 | 923 |
| **23** | 225 | 271 | 338 | 71 | 134 | 101 | 62 | 44 | 119 | 164 | 268 | 921 |
| **24** | 446 | 271 | 247 | 71 | 175 | 99 | 62 | 45 | 116 | 152 | 268 | 930 |
| **25** | 570 | 281 | 245 | 75 | 107 | 98 | 60 | 43 | 114 | 153 | 229 | 932 |
| **26** | 569 | 312 | 245 | 78 | 103 | 98 | 60 | 43 | 111 | 159 | 196 | 689 |
| **27** | 576 | 341 | 206 | 82 | 103 | 99 | 59 | 44 | 109 | 172 | 195 | 733 |
| **28** | 601 | 347 | 206 | 95 | 122 | 98 | 58 | 43 | 106 | 171 | 180 | 861 |
| **29** | 622 | 357 | 203 | 102 | 187 | 97 | 59 | 42 | 102 | 145 | 156 | 868 |
| **30** | 710 | | 200 | 113 | 338 | 97 | 59 | 41 | 114 | 111 | 156 | 946 |
| **31** | 791 | | 198 | | 685 | | 58 | 41 | | 116 | | 1074 |
| TOTAL | 10728 | 10992 | 7175 | 3204 | 5553 | 8824 | 2087 | 1466 | 1803 | 5118 | 5233 | 13189 |
| MEAN | 346 | 379 | 231 | 107 | 179 | 294 | 67 | 47 | 60 | 165 | 174 | 425 |
| MAX | 791 | 785 | 351 | 197 | 685 | 1019 | 90 | 56 | 119 | 201 | 274 | 1074 |
| MIN | 120 | 187 | 118 | 71 | 91 | 83 | 58 | 41 | 37 | 111 | 71 | 114 |

| Table 8.4 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U.S. DEPARTMENT OF THE INTERIOR - U.S. GEOLOGICAL SURVEY - WATER RESOURCES | | | | | | | | | | | | |
| STATION NUMBER 12116400 CEDAR RIVER AT CEDAR FALLS, WA | | | | | | | | | | | | |
| SOURCE AGENCY USGS STATE 53 COUNTY 033 | | | | | | | | | | | | |
| LATITUDE 472508 LONGITUDE 1214649 NAD27 DRAINAGE AREA 83.9 sq. mi. DATUM 940 NGVD29 | | | | | | | | | | | | |
| Discharge, cubic feet per second | | | | | | | | | | | | |
| CALENDAR YEAR JANUARY TO DECEMBER 2024 | | | | | | | | | | | | |
| DAILY MEAN VALUES | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **DAY** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| **1** | 220 | 743 | 373 | 197 | 166 | 676 | 88 | 60 | 45 | 120 | 108 | 146 |
| **2** | 106 | 742 | 366 | 193 | 190 | 681 | 81 | 59 | 45 | 119 | 67 | 148 |
| **3** | 106 | 730 | 360 | 155 | 216 | 562 | 79 | 59 | 45 | 118 | 71 | 162 |
| **4** | 111 | 726 | 358 | 153 | 215 | 552 | 76 | 58 | 44 | 112 | 82 | 172 |
| **5** | 158 | 717 | 355 | 153 | 218 | 798 | 75 | 58 | 44 | 109 | 195 | 171 |
| **6** | 260 | 718 | 354 | 151 | 225 | 903 | 74 | 57 | 44 | 109 | 132 | 168 |
| **7** | 335 | 676 | 354 | 151 | 230 | 971 | 73 | 56 | 44 | 147 | 119 | 177 |
| **8** | 336 | 521 | 341 | 148 | 227 | 821 | 73 | 53 | 43 | 194 | 95 | 170 |
| **9** | 360 | 395 | 254 | 107 | 223 | 479 | 72 | 52 | 43 | 195 | 118 | 137 |
| **10** | 423 | 324 | 158 | 87 | 222 | 260 | 71 | 52 | 43 | 194 | 127 | 105 |
| **11** | 532 | 192 | 159 | 85 | 221 | 111 | 71 | 51 | 43 | 195 | 131 | 109 |
| **12** | 431 | 198 | 160 | 84 | 220 | 84 | 70 | 51 | 42 | 194 | 133 | 123 |
| **13** | 370 | 193 | 110 | 83 | 218 | 81 | 70 | 51 | 42 | 193 | 144 | 123 |
| **14** | 367 | 185 | 107 | 83 | 125 | 81 | 69 | 50 | 42 | 185 | 156 | 114 |
| **15** | 267 | 180 | 105 | 83 | 89 | 82 | 69 | 50 | 42 | 178 | 167 | 107 |
| **16** | 162 | 178 | 106 | 83 | 87 | 155 | 68 | 50 | 44 | 173 | 171 | 107 |
| **17** | 171 | 174 | 109 | 82 | 87 | 100 | 67 | 50 | 47 | 171 | 194 | 116 |
| **18** | 188 | 173 | 124 | 70 | 88 | 99 | 67 | 50 | 46 | 197 | 203 | 303 |
| **19** | 191 | 172 | 144 | 70 | 90 | 98 | 66 | 49 | 46 | 197 | 215 | 227 |
| **20** | 191 | 173 | 143 | 70 | 88 | 98 | 66 | 49 | 45 | 190 | 278 | 174 |
| **21** | 196 | 174 | 268 | 70 | 93 | 98 | 65 | 48 | 44 | 187 | 283 | 247 |
| **22** | 201 | 211 | 372 | 70 | 100 | 97 | 65 | 48 | 84 | 178 | 279 | 373 |
| **23** | 220 | 277 | 369 | 69 | 132 | 97 | 64 | 48 | 113 | 157 | 277 | 374 |
| **24** | 459 | 276 | 254 | 70 | 174 | 96 | 64 | 49 | 110 | 144 | 276 | 388 |
| **25** | 563 | 287 | 252 | 72 | 101 | 95 | 63 | 47 | 108 | 145 | 232 | 391 |
| **26** | 558 | 324 | 252 | 76 | 98 | 94 | 63 | 47 | 105 | 151 | 195 | 149 |
| **27** | 568 | 361 | 208 | 79 | 97 | 95 | 62 | 48 | 103 | 165 | 194 | 123 |
| **28** | 589 | 367 | 208 | 90 | 118 | 94 | 62 | 47 | 100 | 165 | 176 | 134 |
| **29** | 608 | 379 | 205 | 96 | 190 | 94 | 61 | 46 | 97 | 138 | 149 | 140 |
| **30** | 679 | | 202 | 109 | 357 | 95 | 61 | 46 | 108 | 101 | 145 | 214 |
| **31** | 750 | | 200 | | 678 | | 60 | 46 | | 107 | | 343 |
| TOTAL | 10680 | 10764 | 7331 | 3089 | 5584 | 8646 | 2136 | 1582 | 1853 | 4928 | 5112 | 5935 |
| MEAN | 345 | 371 | 236 | 103 | 180 | 288 | 69 | 51 | 62 | 159 | 170 | 191 |
| MAX | 750 | 743 | 373 | 197 | 678 | 971 | 88 | 60 | 113 | 197 | 283 | 391 |
| MIN | 106 | 172 | 105 | 69 | 87 | 81 | 60 | 46 | 42 | 101 | 67 | 105 |

| Table 8.5 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEATTLE PUBLIC UTILITIES | | | | | | | | | | | | |
| CHESTER MORSE LAKE - DAILY 7AM ELEVATION | | | | | | | | | | | | |
| SOURCE AGENCY USGS | | | | | | | | | | | | |
| LATITUDE 472434 LONGITUDE 1214322 NAD27 DRAINAGE AREA 78.4 sq mi* | | | | | | | | | | | | |
| Elevation, Feet | | | | | | | | | | | | |
| CALENDAR YEAR JANUARY TO DECEMBER 2024 | | | | | | | | | | | | |
| Daily Water Level | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **DAY** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| **1** | 1551.8 | 1555.7 | 1555.2 | 1557.2 | 1561.7 | 1564.2 | 1563.18_E | 1557.4 | 1552.3 | 1550.1 | 1547.4 | 1551.1 |
| **2** | 1551.8 | 1555.9 | 1555.4 | 1557.2 | 1561.8 | 1563.7 | 1563.19_E | 1557.2 | 1552.3 | 1550.0 | 1547.8 | 1551.0 |
| **3** | 1551.8 | 1555.8 | 1555.5 | 1557.3 | 1561.8 | 1564.3 | 1563.19_E | 1557.0 | 1552.3 | 1549.9 | 1548.2 | 1550.9 |
| **4** | 1551.9 | 1555.5 | 1555.5 | 1557.4 | 1561.8 | 1564.6 | 1563.18_E | 1556.8 | 1551.8 | 1549.8 | 1548.7 | 1550.7 |
| **5** | 1552.1 | 1555.2 | 1555.4 | 1557.4 | 1561.8 | 1565.3 | 1563.18_E | 1556.7 | 1551.7 | 1549.7 | 1549.1 | 1550.5 |
| **6** | 1552.3 | 1554.7 | 1555.2 | 1557.4 | 1562.0 | 1565.1 | 1563.18_E | 1556.5 | 1551.5 | 1549.6 | 1549.6 | 1550.6 |
| **7** | 1552.3 | 1554.3 | 1555.0 | 1557.5 | 1562.3 | 1564.8 | 1563.18_E | 1556.5 | 1551.3 | 1549.5 | 1549.8 | 1550.7 |
| **8** | 1552.2 | 1553.9 | 1554.8 | 1557.5 | 1562.6 | 1564.6 | 1563.18_E | 1556.5 | 1551.2 | 1549.3 | 1549.9 | 1551.1 |
| **9** | 1552.5 | 1553.7 | 1554.6 | 1557.8 | 1562.8 | 1564.2 | 1563.18_E | 1556.0 | 1551.0 | 1549.1 | 1550.0 | 1551.3 |
| **10** | 1552.8 | 1553.5 | 1554.5 | 1558.3 | 1562.9 | 1564.2 | 1561.8 | 1555.8 | 1550.9 | 1548.9 | 1550.1 | 1551.4 |
| **11** | 1552.7 | 1553.4 | 1554.5 | 1558.7 | 1563.0 | 1564.2 | 1561.6 | 1555.6 | 1550.7 | 1548.6 | 1550.3 | 1551.5 |
| **12** | 1552.6 | 1553.6 | 1554.5 | 1559.0 | 1563.2 | 1564.2 | 1561.4 | 1555.4 | 1550.6 | 1548.4 | 1550.4 | 1551.6 |
| **13** | 1552.6 | 1553.7 | 1554.7 | 1559.2 | 1563.3 | 1564.2 | 1561.2 | 1555.2 | 1550.5 | 1548.1 | 1550.7 | 1551.6 |
| **14** | 1552.2 | 1553.8 | 1554.8 | 1559.4 | 1563.4 | 1564.2 | 1561.0 | 1555.0 | 1550.4 | 1547.9 | 1551.0 | 1551.6 |
| **15** | 1552.0 | 1553.7 | 1554.8 | 1559.6 | 1563.5 | 1564.2 | 1560.8 | 1554.8 | 1550.4 | 1547.7 | 1551.2 | 1551.7 |
| **16** | 1551.9 | 1553.8 | 1554.8 | 1559.8 | 1563.6 | 1564.2 | 1560.6 | 1554.6 | 1550.4 | 1547.5 | 1551.2 | 1551.7 |
| **17** | 1551.9 | 1553.7 | 1554.9 | 1560.0 | 1563.7 | 1564.2 | 1560.4 | 1554.2 | 1550.4 | 1547.4 | 1551.4 | 1551.7 |
| **18** | 1552.0 | 1553.6 | 1555.1 | 1560.0 | 1563.8 | 1564.2 | 1560.2 | 1554.3 | 1550.3 | 1547.2 | 1551.9 | 1551.9 |
| **19** | 1551.8 | 1553.5 | 1555.3 | 1560.1 | 1563.8 | 1564.2 | 1560.0 | 1554.2 | 1550.3 | 1547.1 | 1552.3 | 1552.6 |
| **20** | 1551.7 | 1553.4 | 1555.6 | 1560.2 | 1563.8 | 1564.2 | 1559.8 | 1554.0 | 1550.3 | 1547.0 | 1552.3 | 1552.9 |
| **21** | 1551.6 | 1553.4 | 1555.9 | 1560.1 | 1563.8 | 1564.1 | 1559.5 | 1553.9 | 1550.3 | 1546.9 | 1552.2 | 1552.8 |
| **22** | 1551.6 | 1553.3 | 1555.9 | 1560.1 | 1564.1 | 1564.1 | 1559.3 | 1553.7 | 1550.2 | 1546.8 | 1552.1 | 1552.4 |
| **23** | 1551.6 | 1553.2 | 1556.0 | 1560.1 | 1564.4 | 1564.0 | 1559.1 | 1553.5 | 1550.2 | 1546.6 | 1552.0 | 1552.1 |
| **24** | 1551.8 | 1553.0 | 1556.0 | 1560.1 | 1564.4 | 1563.9 | 1558.9 | 1553.4 | 1550.2 | 1546.5 | 1551.9 | 1552.0 |
| **25** | 1551.9 | 1552.9 | 1556.2 | 1560.1 | 1564.5 | 1563.8 | 1558.7 | 1553.3 | 1550.2 | 1546.5 | 1551.7 | 1551.8 |
| **26** | 1551.9 | 1553.5 | 1556.3 | 1560.3 | 1564.6 | 1563.6 | 1558.5 | 1553.2 | 1550.3 | 1546.3 | 1551.6 | 1551.8 |
| **27** | 1552.0 | 1553.9 | 1556.5 | 1560.4 | 1564.7 | 1563.6 | 1558.3 | 1553.1 | 1550.3 | 1546.4 | 1551.5 | 1552.4 |
| **28** | 1552.8 | 1554.1 | 1556.9 | 1560.7 | 1564.8 | 1563.5 | 1558.1 | 1552.9 | 1550.3 | 1546.7 | 1551.4 | 1552.8 |
| **29** | 1554.2 | 1554.7 | 1557.1 | 1561.1 | 1564.8 | 1563.4 | 1557.9 | 1552.8 | 1550.2 | 1546.9 | 1551.3 | 1553.8 |
| **30** | 1555.0 | --- | 1557.2 | 1561.5 | 1564.9 | 1563.2 | 1557.8 | 1552.6 | 1550.2 | 1547.1 | 1551.2 | 1554.3 |
| **31** | 1555.5 | --- | 1557.2 | --- | 1564.6 | --- | 1557.6 | 1552.4 | --- | 1547.2 | --- | 1554.3 |
| TOTAL | 48122.5 | 45066.3 | 48221.0 | 46775.8 | 48466.1 | 46923.9 | 34312.0 | 48198.4 | 46522.9 | 47986.5 | 46520.2 | 48108.4 |
| MEAN | 1552 | 1554 | 1556 | 1559 | 1563 | 1564 | 1560 | 1555 | 1551 | 1548 | 1551 | 1552 |
| MAX | 1555 | 1556 | 1557 | 1561 | 1565 | 1565 | 1562 | 1557 | 1552 | 1550 | 1552 | 1554 |
| MIN | 1552 | 1553 | 1555 | 1557 | 1562 | 1563 | 1558 | 1552 | 1550 | 1546 | 1547 | 1551 |

| Table 8.6+A1:M41A9A1:M48A1:I | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U.S. DEPARTMENT OF THE INTERIOR - U.S. GEOLOGICAL SURVEY - WATER RESOURCES | | | | | | | | | | | | |
| Retrieved from SPU IMS SCADA Database: 2022-03-03 | | | | | | | | | | | | |
| STATION NUMBER 12115000 CEDAR RIVER NEAR CEDAR FALLS,WA | | | | | | | | | | | | |
| SOURCE AGENCY USGS STATE 53 COUNTY 033 | | | | | | | | | | | | |
| LATITUDE 472213 LONGITUDE 1213726 NAD27 DRAINAGE AREA 40.7 sq. mi. DATUM 1560.0 NGVD29 | | | | | | | | | | | | |
| All Data is Provisional and Subject to Revision | | | | | | | | | | | | |
| Discharge, cubic feet per second | | | | | | | | | | | | |
| CALENDAR YEAR JANUARY TO DECEMBER 2024 | | | | | | | | | | | | |
| DAILY MEAN VALUES | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **DAY** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| **1** | 170 | 748 | 474 | 229 | 323 | 269 | 126 | 48.3 | 33.4 | 25.5 | 109 | 119 |
| **2** | 166 | 625 | 380 | 223 | 302 | 331 | 120 | 46.1 | 33 | 25 | 165 | 111 |
| **3** | 166 | 499 | 313 | 264 | 282 | 757 | 114 | 44.8 | 32.5 | 24.9 | 171 | 105 |
| **4** | 184 | 413 | 271 | 255 | 281 | 827 | 108 | 43.6 | 32.1 | 25.9 | 215 | 98.9 |
| **5** | 205 | 355 | 234 | 240 | 301 | 814 | 102 | 42.4 | 31.3 | 27.3 | 229 | 94.3 |
| **6** | 222 | 314 | 208 | 223 | 353 | 602 | 97.7 | 41.4 | 30.5 | 28.3 | 175 | 90.7 |
| **7** | 204 | 277 | 189 | 227 | 376 | 487 | 93.5 | 41 | 30 | 26.8 | 143 | 174 |
| **8** | 195 | 250 | 179 | 229 | 353 | 426 | 90.1 | 40.1 | 29.8 | 25.8 | 124 | 264 |
| **9** | 312 | 233 | 171 | 434 | 335 | 374 | 87 | 39.3 | 29.3 | 25.1 | 115 | 234 |
| **10** | 279 | 212 | 169 | 433 | 376 | 330 | 84.5 | 38.4 | 28.7 | 24.6 | 110 | 204 |
| **11** | 239 | 209 | 175 | 381 | 473 | 288 | 81.6 | 37.9 | 30.3 | 24.3 | 128 | 183 |
| **12** | 204 | 240 | 200 | 345 | 493 | 257 | 78.8 | 38 | 32.2 | 23.5 | 168 | 166 |
| **13** | 170 | 227 | 194 | 328 | 421 | 231 | 75.3 | 37.7 | 31.5 | 22.9 | 272 | 153 |
| **14** | 165 | 214 | 180 | 347 | 370 | 211 | 72.4 | 37.5 | 31.7 | 22.7 | 313 | 142 |
| **15** | 160 | 202 | 173 | 355 | 380 | 225 | 68.6 | 37.4 | 33.2 | 23.2 | 290 | 138 |
| **16** | 153 | 188 | 183 | 319 | 388 | 230 | 64.6 | 37.3 | 32.1 | 25.1 | 247 | 130 |
| **17** | 150 | 177 | 222 | 276 | 344 | 224 | 63.3 | 37.4 | 30.6 | 30.6 | 486 | 142 |
| **18** | 146 | 169 | 290 | 244 | 289 | 239 | 61.2 | 45.8 | 29.6 | 35.1 | 479 | 405 |
| **19** | 139 | 162 | 374 | 221 | 259 | 219 | 58.9 | 40.4 | 28.5 | 44.2 | 348 | 368 |
| **20** | 129 | 162 | 415 | 206 | 233 | 207 | 56.9 | 38.6 | 27.8 | 51.5 | 275 | 310 |
| **21** | 132 | 161 | 388 | 199 | 264 | 197 | 56.6 | 38.6 | 27.6 | 57.6 | 227 | 295 |
| **22** | 145 | 154 | 355 | 187 | 379 | 184 | 56.1 | 37.6 | 27 | 49.3 | 243 | 320 |
| **23** | 165 | 147 | 355 | 179 | 320 | 173 | 54.3 | 39.9 | 26.4 | 42.7 | 224 | 433 |
| **24** | 196 | 145 | 342 | 181 | 292 | 160 | 52.2 | 53.8 | 25.8 | 38.6 | 208 | 429 |
| **25** | 243 | 291 | 329 | 203 | 285 | 149 | 51.5 | 51.1 | 26.4 | 35.8 | 190 | 384 |
| **26** | 258 | 471 | 342 | 270 | 293 | 144 | 50.3 | 42.5 | 27 | 36.9 | 172 | 510 |
| **27** | 427 | 356 | 364 | 292 | 280 | 158 | 48.7 | 41.2 | 28.5 | 106 | 158 | 515 |
| **28** | 838 | 420 | 354 | 359 | 286 | 152 | 47.6 | 39.6 | 29.3 | 120 | 146 | 673 |
| **29** | 903 | 594 | 310 | 387 | 303 | 136 | 50.8 | 37.3 | 28.2 | 124 | 136 | 771 |
| **30** | 830 | --- | 275 | 353 | 303 | 134 | 58.7 | 35.6 | 29.6 | 99.6 | 128 | 577 |
| **31** | 806 | --- | 249 | --- | 276 | --- | 52.4 | 34.3 | --- | 84.1 | --- | 447 |
| TOTAL | 8701 | *8615* | 8657 | 8389 | *10213* | --- | *2284* | 1265 | 894 | 1357 | 6394 | 8986 |
| MEAN | 281 | *297* | 279 | 280 | *329* | --- | *74* | 41 | 30 | 44 | 213 | 290 |
| MAX | 903 | *748* | 474 | 434 | *493* | --- | *126* | 54 | 33 | 124 | 486 | 771 |
| MIN | 129 | *145* | 169 | 179 | *233* | --- | *48* | 34 | 26 | 23 | 109 | 91 |
| AC-FT | 16899 | *16732* | 16813 | 16293 | *19835* | --- | *4435* | 2457 | 1736 | 2635 | 12418 | 17452 |

Table 8.7

SEATTLE PUBLIC UTILITIES

Data Retrieved from SPU IMS SCADA Database: 2022-03-03

LANDSBURG TUNNEL - FLOW VOL 24 HR TOT - MG

SOURCE AGENCY SPU IMS

LATITUDE 472247 LONGITUDE 1215856 NAD27 DRAINAGE AREA 124 sq. mi. DATUM 490 NGVD29

All Data is Provisional and Subject to Revision

Flow Volume, Million Gallons

CALENDAR YEAR JANUARY TO DECEMBER 2024

24 Hour Total

| DAY | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 65 | 116 | 66 | 49 | 74 | 66 | 127 | 100 | 96 | 88 | 67 | 70 |
| 2 | 65 | 86 | 60 | 54 | 68 | 59 | 128 | 107 | 103 | 83 | 63 | 64 |
| 3 | 75 | 70 | 48 | 63 | 71 | 6 | 127 | 111 | 111 | 86 | 63 | 65 |
| 4 | 74 | 69 | 46 | 66 | 67 | 97 | 122 | 107 | 111 | 73 | 63 | 67 |
| 5 | 75 | 83 | 46 | 74 | 68 | 137 | 105 | 111 | 109 | 68 | 68 | 64 |
| 6 | 82 | 89 | 46 | 69 | 69 | 84 | 86 | 116 | 110 | 68 | 79 | 64 |
| 7 | 91 | 91 | 47 | 74 | 67 | 66 | 87 | 128 | 114 | 70 | 49 | 76 |
| 8 | 91 | 86 | 47 | 73 | 72 | 4 | 86 | 133 | 124 | 76 | 36 | 87 |
| 9 | 45 | 91 | 56 | 95 | 65 | 0 | 106 | 116 | 116 | 94 | 42 | 82 |
| 10 | 75 | 88 | 66 | 106 | 72 | 0 | 120 | 111 | 119 | 83 | 42 | 58 |
| 11 | 90 | 91 | 65 | 105 | 74 | 0 | 124 | 112 | 94 | 94 | 42 | 52 |
| 12 | 82 | 98 | 67 | 92 | 67 | 0 | 128 | 95 | 77 | 81 | 41 | 61 |
| 13 | 80 | 85 | 64 | 79 | 68 | 0 | 125 | 94 | 90 | 88 | 42 | 59 |
| 14 | 80 | 68 | 69 | 77 | 68 | 0 | 124 | 94 | 101 | 83 | 43 | 51 |
| 15 | 76 | 72 | 63 | 76 | 77 | 32 | 122 | 110 | 95 | 78 | 43 | 49 |
| 16 | 78 | 57 | 62 | 74 | 71 | 128 | 124 | 120 | 84 | 74 | 42 | 59 |
| 17 | 88 | 57 | 60 | 77 | 75 | 139 | 121 | 126 | 94 | 72 | 27 | 85 |
| 18 | 95 | 67 | 65 | 74 | 75 | 132 | 114 | 124 | 89 | 85 | 24 | 74 |
| 19 | 96 | 71 | 71 | 72 | 74 | 136 | 113 | 117 | 91 | 87 | 46 | 56 |
| 20 | 95 | 70 | 71 | 67 | 79 | 131 | 112 | 108 | 89 | 81 | 50 | 49 |
| 21 | 95 | 71 | 104 | 64 | 87 | 127 | 105 | 106 | 88 | 81 | 52 | 51 |
| 22 | 95 | 71 | 114 | 62 | 89 | 123 | 80 | 93 | 92 | 81 | 58 | 52 |
| 23 | 87 | 74 | 110 | 60 | 94 | 122 | 101 | 95 | 81 | 60 | 58 | 51 |
| 24 | 79 | 73 | 114 | 58 | 104 | 120 | 108 | 1 | 87 | 54 | 58 | 50 |
| 25 | 79 | 76 | 112 | 80 | 92 | 113 | 106 | 78 | 82 | 51 | 63 | 51 |
| 26 | 81 | 73 | 88 | 86 | 91 | 117 | 111 | 95 | 82 | 55 | 66 | 23 |
| 27 | 42 | 75 | 88 | 89 | 92 | 127 | 115 | 102 | 81 | 40 | 74 | 0 |
| 28 | 0 | 73 | 55 | 88 | 90 | 120 | 116 | 107 | 78 | 51 | 74 | 27 |
| 29 | 82 | 69.6 | 51 | 84 | 92 | 112 | 110 | 108 | 0 | 55 | 76 | 48 |
| 30 | 127 | --- | 51 | 88 | 114 | 118 | 102 | 106 | 79 | 58 | 72 | 50 |
| 31 | 115 | --- | 49 | 63.1 | 146 | --- | 97 | 108 | --- | 57 | --- | 48.5 |
| TOTAL | 2477 | 2257 | 2121 | 2333 | 2511 | 2416 | 3451 | 3234 | 2766 | 2256 | 1622 | 1741 |
| MEAN | 79 | 78 | 68 | 75 | 81 | 81 | 111 | 104 | 92 | 73 | 54 | 56 |
| MAX | 127 | 116 | 114 | 106 | 146 | 139 | 128 | 133 | 124 | 94 | 79 | 87 |
| MIN | 0 | 57 | 46 | 49 | 65 | 0 | 80 | 1 | 0 | 40 | 24 | 0 |

| Table 8.8 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEATTLE PUBLIC UTILITIES | | | | | | | | | | | | |
| Data Retrieved from SPU IMS SCADA Database: 2022-03-03 | | | | | | | | | | | | |
| LANDSBURG WEATHER STATION - PRECIP 24HR TOT ODE | | | | | | | | | | | | |
| SOURCE AGENCY SPU IMS | | | | | | | | | | | | |
| LATITUDE 472247 LONGITUDE 1215856 NAD27 DATUM 490 NGVD29 | | | | | | | | | | | | |
| All Data is Provisional and Subject to Revision | | | | | | | | | | | | |
| Rainfall, Inches | | | | | | | | | | | | |
| CALENDAR YEAR JANUARY TO DECEMBER 2024 | | | | | | | | | | | | |
| 24 Hour Total | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **DAY** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| **1** | 0 | 0.14 | 0.11 | 0.21 | 0 | 0.04 | 0.01 | 0.11 | 0.23 | 0.02 | 0.02 | 0.37 |
| **2** | 0.03 | 0.22 | 0.14 | 0.01 | 0.03 | 0.1 | 0 | 0 | 0.01 | 0 | 0.01 | 0 |
| **3** | 0 | 0.09 | 0 | 0.04 | 0.21 | 0.03 | 0.25 | 0.08 | 0.13 | 0.2 | 0.02 | 0.21 |
| **4** | 0.15 | 0.16 | 0.02 | 0 | 0.02 | 0.01 | 0 | 0 | 0.04 | 0.02 | 0 | 0.13 |
| **5** | 0.19 | 0.26 | 0 | 0.02 | 0.03 | 0.24 | 0.22 | 0.28 | 0.21 | 0.35 | 0.05 | 0 |
| **6** | 0.05 | 0 | 0.14 | 0 | 0 | 0.04 | 0.06 | 0.15 | 0 | 0.01 | 0.72 | 0.59 |
| **7** | 0.68 | 0.01 | 0 | 0.05 | 0.17 | 0.26 | 0 | 0.01 | 0.04 | 0.24 | 0 | 0.42 |
| **8** | 0.03 | 0.05 | 0.13 | 0.02 | 0 | 0.02 | 0.37 | 0 | 0 | 0.45 | 0.06 | 0.25 |
| **9** | 0.02 | 0 | 0.1 | 0.26 | 0.07 | 0 | 0.27 | 0.09 | 0.19 | 0.01 | 0.08 | 0.62 |
| **10** | 0.05 | 0.18 | 0.08 | 0 | 0.06 | 0.05 | 0.59 | 0 | 0.02 | 0 | 0 | 0.02 |
| **11** | 0.16 | 0.11 | 0.17 | 0.13 | 0 | 0.02 | 0.03 | 0.07 | 0 | 0.27 | 0.02 | 0.12 |
| **12** | 0.27 | 0.02 | 0 | 0.05 | 0.04 | 0 | 0.05 | 0 | 0.43 | 0.16 | 0.62 | 0.54 |
| **13** | 0.01 | 0.3 | 0.02 | 0 | 0 | 0.01 | 0.25 | 0.02 | 0.3 | 0.3 | 0.03 | 0.03 |
| **14** | 0.04 | 0.1 | 0 | 0.07 | 0.08 | 0.2 | 0 | 0.16 | 0.38 | 0.04 | 0.07 | 0.16 |
| **15** | 0 | 0.05 | 0.13 | 0.03 | 0 | 0.15 | 0.01 | 0.01 | 0.02 | 0.06 | 0.12 | 0.08 |
| **16** | 0.12 | 0 | 0.04 | 0.13 | 0.08 | 0.12 | 0 | 0.1 | 0.03 | 0.34 | 0 | 0.07 |
| **17** | 0.26 | 0.36 | 0.03 | 0.14 | 0 | 0.03 | 0.02 | 0.2 | 0.09 | 0 | 0.01 | 0.3 |
| **18** | 0.59 | 0.03 | 0.01 | 0 | 0.13 | 0.1 | 0.07 | 0 | 0 | 0.06 | 0.28 | 0.01 |
| **19** | 0 | 0.4 | 0.14 | 0.15 | 0.14 | 0 | 0.18 | 0.01 | 0.01 | 0 | 0 | 0.21 |
| **20** | 0.03 | 0.08 | 0.06 | 0 | 0 | 0.23 | 0 | 0 | 0 | 0.07 | 0.26 | 0 |
| **21** | 0 | 0 | 0 | 0.02 | 0.04 | 0.16 | 0.03 | 0.02 | 0.29 | 0.17 | 0.25 | 0.028 |
| **22** | 0.02 | 0.01 | 0.14 | 0 | 0 | 0.02 | 0.04 | 0.07 | 0 | 0 | 0.5 | 0.033 |
| **23** | 0 | 0 | 0.24 | 0.04 | 0.01 | 0 | 0 | 0 | 0.03 | 0.01 | 0.2 | 0 |
| **24** | 0.1 | 0.15 | 0 | 0.15 | 0 | 0.52 | 0.08 | 0.06 | 0 | 0 | 0 | 0.37 |
| **25** | 0.12 | 0 | 0.01 | 0 | 0.04 | 0.32 | 0.11 | 0 | 0.08 | 0.21 | 0.01 | 0.31 |
| **26** | 0.37 | 0.11 | 0.06 | 0.21 | 0 | 0 | 0 | 0.08 | 0 | 0.04 | 0.08 | 0 |
| **27** | 0.01 | 0.01 | 0 | 0 | 0.02 | 0.11 | 0.11 | 0 | 0.09 | 0.03 | 0 | 0.21 |
| **28** | 0.09 | 0.1 | 0.1 | 0.03 | 0.07 | 0.08 | 0.07 | 0.44 | 0.34 | 0.3 | 0.23 | 0.1 |
| **29** | 0.11 | 0 | 0.07 | 0.01 | 0.05 | 0 | 0 | 0 | 0.42 | 0.16 | 0 | 0.13 |
| **30** | 0 | --- | 0.02 | 0.17 | 0.13 | 0.18 | 0.002 | 0.65 | 0.15 | 0.11 | 0.05 | 0 |
| **31** | 0.1 | --- | 0.36 | 0.37 | 0.11 | --- | 0.23 | 0.38 | --- | 0 | --- | 0.59 |
| TOTAL | 3.6 | 2.9 | 2.3 | 2.3 | 1.5 | 3.0 | 3.1 | 3.0 | 3.5 | 3.6 | 3.7 | 5.9 |
| MEAN | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 |
| MAX | 0.68 | 0.40 | 0.36 | 0.37 | 0.21 | 0.52 | 0.59 | 0.65 | 0.43 | 0.45 | 0.72 | 0.62 |
| MIN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Table 8.9 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEATTLE PUBLIC UTILITIES | | | | | | | | | | | | |
| Data Retrieved from SPU IMS SCADA Database: 2021-03-03 | | | | | | | | | | | | |
| MASONRY WEATHER STATION - PRECIP 24HR TOT ODE | | | | | | | | | | | | |
| SOURCE AGENCY SPU IWRMS | | | | | | | | | | | | |
| LATITUDE 472443 LONGITUDE 1214504 NAD27 DATUM 490 NGVD29 | | | | | | | | | | | | |
| All Data is Provisional and Subject to Revision | | | | | | | | | | | | |
| Rainfall, Inches | | | | | | | | | | | | |
| CALENDAR YEAR JANUARY TO DECEMBER 2024 | | | | | | | | | | | | |
| 24 Hour Total | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **DAY** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| **1** | 0 | 0.06 | 0.11 | 0.35 | 0 | 0.02 | 0 | 1.11 | 0.62 | 0.39 | 0.88 | 1.14 |
| **2** | 0.07 | 0 | 0.5 | 0.24 | 0.33 | 0 | 0.58 | 0.2 | 0.1 | 0.03 | 0.77 | 0.53 |
| **3** | 0.87 | 0.34 | 0.35 | 0 | 0.72 | 0.03 | 0.32 | 0.01 | 0.1 | 0.01 | 0.1 | 0.06 |
| **4** | 0.73 | 0 | 0.13 | 0.01 | 0.29 | 0 | 0.11 | 0.15 | 0 | 0 | 1.42 | 1.56 |
| **5** | 1.21 | 1.2 | 0.65 | 0.16 | 0.34 | 0.16 | 0.32 | 0.13 | 0 | 0.43 | 1.11 | 0.99 |
| **6** | 0.35 | 0.25 | 0.41 | 1.12 | 0.01 | 0.17 | 0.45 | 0.47 | 0.16 | 0.58 | 0.38 | 1.42 |
| **7** | 0.12 | 0 | 1.09 | 0.03 | 0 | 0 | 1.02 | 0.26 | 0.17 | 0.32 | 0.2 | 0.85 |
| **8** | 1.9 | 0.01 | 0.15 | 0 | 0.25 | 0.14 | 0.01 | 0.18 | 0 | 0.11 | 0.01 | 0.62 |
| **9** | 0.23 | 0 | 0.02 | 0.01 | 0.02 | 0.75 | 0.14 | 0.1 | 0.14 | 0.32 | 0.15 | 0.6 |
| **10** | 0.17 | 0.37 | 0.01 | 0 | 0 | 0.01 | 0.01 | 0 | 0.75 | 0.45 | 0.13 | 0.1 |
| **11** | 0.2 | 0.61 | 0 | 1.03 | 0.9 | 0 | 0.28 | 0.14 | 0.01 | 1.02 | 0.47 | 0.1 |
| **12** | 0 | 0.01 | 0.68 | 0.25 | 0.01 | 0.14 | 2.35 | 0 | 0 | 0.01 | 0.26 | 0 |
| **13** | 1.48 | 0 | 0 | 0 | 0.36 | 0 | 0.55 | 1.1 | 0.14 | 0.14 | 0.18 | 0.04 |
| **14** | 0.22 | 1.23 | 0.33 | 1.59 | 0.11 | 0.06 | 0.76 | 1.45 | 0 | 0.01 | 0.1 | 0.29 |
| **15** | 0.07 | 1.02 | 0.09 | 0.17 | 0.02 | 0.01 | 0.1 | 0 | 0.06 | 0.28 | 0 | 0.8 |
| **16** | 0.68 | 0.28 | 0.38 | 0 | 0 | 0 | 0.22 | 0.01 | 0.01 | 2.35 | 0.14 | 0.22 |
| **17** | 0.78 | 0.99 | 0.18 | 0.36 | 0.02 | 0.02 | 1.29 | 0 | 0 | 0.55 | 0 | 0.2 |
| **18** | 0.49 | 1.88 | 1.09 | 0.22 | 0 | 0.37 | 1.09 | 0.04 | 0.02 | 0.76 | 1.1 | 2.1 |
| **19** | 0.79 | 0.12 | 0.09 | 0.14 | 0.89 | 0.46 | 0.48 | 0.29 | 0.37 | 0.1 | 1.45 | 0.01 |
| **20** | 0.42 | 0.17 | 0.01 | 0 | 0.37 | 0.01 | 0.54 | 0.8 | 0.46 | 0.22 | 0 | 0.56 |
| **21** | 0.78 | 0.52 | 0.08 | 1.44 | 0.01 | 0.02 | 0.02 | 0.2 | 0.01 | 1.29 | 0.01 | 1.14 |
| **22** | 1.22 | 0.02 | 0 | 0.01 | 0 | 0 | 0.06 | 2.1 | 0.02 | 1.09 | 0 | 0.53 |
| **23** | 0.12 | 0 | 0.07 | 0 | 0.01 | 0.12 | 0 | 0.01 | 0 | 0.48 | 0.04 | 0.06 |
| **24** | 0 | 0.18 | 0.14 | 0.3 | 0.35 | 0 | 0.22 | 0.56 | 0.12 | 0.54 | 0.29 | 1.56 |
| **25** | 0.32 | 0.77 | 0 | 2.46 | 0.19 | 0.68 | 0.74 | 1.14 | 0.01 | 0.02 | 0.8 | 0.99 |
| **26** | 0.09 | 0.34 | 0.31 | 0.56 | 0.01 | 0.01 | 1.1 | 0.53 | 0 | 0.06 | 0.22 | 1.42 |
| **27** | 0.16 | 0.01 | 0 | 0.75 | 0.23 | 0 | 0.81 | 0.06 | 0.68 | 0 | 0.2 | 0.85 |
| **28** | 0.14 | 0 | 0.54 | 0.02 | 0.89 | 0.39 | 0.88 | 1.56 | 0.01 | 0.22 | 2.1 | 0.62 |
| **29** | 0.12 | 0.52 | 1.6 | 0 | 0.38 | 0.03 | 0.77 | 0.99 | 0 | 0.74 | 0.01 | 0.6 |
| **30** | 0 | --- | 0.73 | 0.02 | 0 | 0.01 | 0.1 | 1.42 | 0.02 | 1.1 | 0.56 | 0.1 |
| **31** | 0.23 | --- | 1.23 | --- | 0.73 | --- | 1.42 | 0.85 | --- | 0.81 | --- | 0.02 |
| TOTAL | 14.0 | 10.9 | 11.0 | 11.2 | 7.4 | 3.6 | 16.7 | 15.9 | 4.0 | 14.4 | 13.1 | 20.1 |
| MEAN | 0.5 | 0.4 | 0.4 | 0.4 | 0.2 | 0.1 | 0.5 | 0.5 | 0.1 | 0.5 | 0.4 | 0.6 |
| MAX | 1.9 | 1.9 | 1.6 | 2.5 | 0.9 | 0.8 | 2.4 | 2.1 | 0.8 | 2.4 | 2.1 | 2.1 |
| MIN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# APPENDIX 1: Guaranteed Instream Flow Schedule with June 4, 2009 Walsh Ditch Adjustment, USGS Gage 12117600.

| Water Week Starting | Critical Instream Flow Requirement | Normal Instream Flow Requirement | Normal Supplemental Instream Flow Requirement |
|---|---|---|---|
| 1-Oct. | 103 | 214 | 214 |
| 8-Oct. | 133 | 279 | 334 |
| 15-Oct. | 163 | 279 | 334 |
| 22-Oct. | 183 | 279 | 334 |
| 29-Oct. | 203 | 279 | 334 |
| 5-Nov. | 203 | 279 | 334 |
| 12-Nov. | 203 | 284 | 339 |
| 19-Nov. | 203 | 284 | 339 |
| 26-Nov. | 206 | 292 | 347 |
| 3-Dec. | 206 | 292 | 347 |
| 10-Dec. | 206 | 292 | 347 |
| 17-Dec. | 206 | 292 | 347 |
| 24-Dec. | 206 | 290 | 345 |
| 31-Dec. | 188 | 275 | 275 |
| 7-Jan. | 188 | 275 | 275 |
| 14-Jan. | 188 | 275 | 275 |
| 21-Jan. | 188 | 275 | 275 |
| 28-Jan. | 188 | 275 | 275 |
| 4-Feb. | 188 | 275 | 275 |
| 11-Feb. | 188 | 273 | 378 |
| 18-Feb. | 188 | 273 | 378 |
| 25-Feb. | 188 | 273 | 378 |
| 4-Mar. | 188 | 273 | 378 |
| 11-Mar. | 188 | 273 | 378 |
| 18-Mar. | 188 | 273 | 378 |
| 25-Mar. | 188 | 273 | 378 |
| 1-Apr. | 188 | 273 | 378 |
| 8-Apr. | 186 | 273 | 378 |
| 15-Apr. | 186 | 273 | 273 |
| 22-Apr. | 196 | 268 | 268 |
| 29-Apr. | 196 | 268 | 268 |
| 6-May | 200 | 268 | 268 |
| 13-May | 205 | 268 | 268 |
| 20-May | 215 | 258 | 258 |
| 27-May | 215 | 258 | 258 |
| 3-Jun. | 205 | 256 | 256 |
| 10-Jun. | 205 | 231 | 231 |
| *17-Jun. | 164 | 231 | 246 |
| 24-Jun. | 104 | 231 | 246 |
| 1-Jul. | 84 | 174 | 240 |
| 8-Jul. | 84 | 109 | 209 |
| 15-Jul. | 84 | 84 | 200 |
| 22-Jul. | 83 | 84 | 168 |
| 29-Jul. | 73 | 83 | 119 |
| 5-Aug. | 73 | 83 | 83 |
| 12-Aug. | 73 | 83 | 83 |
| 19-Aug. | 73 | 83 | 83 |
| 26-Aug. | 73 | 83 | 83 |
| 2-Sept. | 73 | 83 | 83 |
| 9-Sept. | 72 | 83 | 83 |
| 16-Sept. | 82 | 98 | 136 |
| 23-Sept. | 82 | 98 | 213 |

*From June 17 through August 4, actual annual supplemental flow levels will vary according to daily allocations established by Cedar River Instream Flow Commission