

State Water Resources Control Board
Order 2020-0102-EXEC
Dated July 28, 2020

Term 11

Upper Russian River Diversion Forecast
Reporting Program



April 1, 2021

Prepared by

Sonoma County Water Agency

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1 Introduction

The Sonoma County Water Agency (Sonoma Water) submitted Temporary Urgency Change Petitions (TUCP) on June 8, 2020 for modifications to water-rights Permits 12947A, 12949, 12950 and 16595 requesting reductions in the minimum instream flow requirements in the Russian River. The State Water Resources Control Board (State Board) issued Order 2020-0102-EXEC (Order) on July 28, 2020, approving Sonoma Water's petitions. This report has been prepared by Sonoma Water to fulfill the requirements of Term 11 of the Order.

Term 11 of the Order requires the following actions:

'To facilitate releases of Lake Mendocino stored water with minimal operational buffers, Sonoma Water shall coordinate with the Mendocino County Russian River Flood Control and Water Conservation Improvement District (District) regarding implementation of a program for real-time 3-day advance forecasts of hourly diversions by all of the District's irrigation and municipal customers under all bases of right. Sonoma Water shall provide an update to the Deputy Director for Water Rights, CDFW and NMFS regarding the outcome of consultation and the effectiveness of reporting by April 1, 2021.'

2 Water Agency Coordination

Sonoma Water staff contacted the Mendocino County Russian River Flood Control and Water Conservation Improvement District (District) on July 28, 2020 to initiate discussions on the requirements in Term 11. Sonoma Water and the District convened a meeting on July 31, 2020 to review requirements and lay out an approach that followed that which was previously implemented under similar prior Temporary Urgency Change Petition orders. Similar terms were included in the State Board's August 25, 2014 order approving the District's 2014 TUCP, as well as orders issued for Sonoma Water TUCPs--June 17, 2015 order and May 4, 2016 order. The State Board order on the District's 2020 TUCP included a term that required the District to develop a real-time forecasting plan for the District's customers' diversions. The District and Sonoma Water collaborated to develop an approach and protocols that were intended to provide useful and timely information to improve stream flow predictions and better manage releases from Lake Mendocino. As part of that plan, Sonoma Water developed an online diversion forecast reporting tool that allowed District customers to log diversion forecasts from any web browser device with an internet connection. This online reporting tool was retooled and updated for the diversion forecast reporting required under Term 11 of the 2020 Order.

3 Diversion Forecast Reporting Program

As discussed in the previous section of this report, the protocols and tool implemented to comply with Term 11 were based on a diversion forecasting plan developed in 2014 that the District submitted to the State Board. Sonoma Water developed an online reporting tool that collected and processed information about the time, duration, location, method and rate of diversions. While the online reporting form only required that each forecasted diversion be identified by river reach, diverters optionally could also identify themselves and the specific locations of their diversions. Because the temporal impacts on stream flows of diversions from river intakes and from wells are different, each diverter was required to describe the method of diversion in the online reporting form. Information for up to five diversion forecasts could be submitted at the same time for a single river reach and single method of diversion. If a diverter's diversions were located on multiple river reaches or if the diverter operated both river intakes and wells, then a separate new online form submittal was required for each river reach and each type of diversion. Reporting protocols were established under which submittals of forecasted hourly diversions would be provided by District customers for the upcoming period of 72 hours from the daily forecast report process time at 10:00 a.m.

The initial webpage of the online reporting tool is shown in Attachment 1. Based on the submitted forecast information, Sonoma Water processed the data and developed a daily forecast report for Sonoma Water Operations staff.

4 Daily Forecast Reports

Daily forecast reports were issued each weekday beginning on August 13, 2020 and ran through December 21, 2020. Each daily forecast report charted hourly streamflow data for the Upper Russian River gages and hourly diversion forecasts over a 10-day period. Each period included the 72-hour forecast and previous 7-day historical data. The hourly diversion forecast data was charted for each river reach along with the calculated net reach loss for comparison. The estimates of observed net reach loss were calculated as the difference in coincident upstream and downstream gage readings. Additionally, the daily report listed the total reported diversions forecasted during that 10-day period and a comparison of the total diversions to the expected estimated diversions during that period based on historical monthly reporting of diversions under the District's water right License 13898. Starting with the report issued for October 13th, a comparison of the total reported diversions forecasted during the 72-hour forecast period with estimated diversions was added. Attachment 2 includes an example of the daily forecast report that was prepared for Sonoma Water Operations staff.

Each report published two metrics to evaluate the volumes forecasted for diversion. The first metric was the comparison of the total diversions to the expected estimated diversions during that period based on historical monthly reporting of diversions under the District's water right License 13898. This metric was used to estimate how complete the diversion forecasts may be. A three-year average of monthly diversion data from 2017 through 2019 as reported on the District's annual water rights reports for License 13898 was used as the basis of comparison. The calculated average monthly diversions and the total diversion forecasts reported are shown in Table 1.

Table 1: Total Forecast Diversion Comparison with Estimated Monthly Diversions for District Customers

	Aug	Sep	Oct	Nov	Dec	Total
Estimated Total Diversions (ac-ft)	950	740	450	166	50	2,356
Total Forecasted Diversions (ac-ft)	113	180	296	52	0	641
Estimated Percentage Represented by Reported Diversions	12%	24%	66%	31%	0%	27%

The second metric was the observed net reach losses for each river reach. The calculated net reach loss was plotted on each reach's diversion forecast chart to illustrate how the diversion forecasts compared quantitatively as well matching flow change patterns with the reach losses. Table 2 provides the monthly estimated totalized volumes for reach losses over the period of the Order.

Table 2: Observed Estimated Monthly Net Reach Losses in 2020 (ac-ft)

Reach	Aug	Sep	Oct	Nov	Dec	Total
Forks-Talmage	1,459	1,059	975	464	175	6,053
Talmage-Hopland	531	318	294	101	121	1,901
Hopland-Cloverdale	502	375	138	25	0	1,374
Total	2,491	1,751	1,406	590	296	9,328

5 Program Review


A summary of the daily river conditions over the reporting period and the forecasted diversions are included in Attachment 3 as a chart and in Attachment 4 in tabular format. The dataset includes daily average recorded stream flows at the river gages and the total diversions forecasted for the District's service area. As presented in the previous section of this report, the total of the daily diversion forecasts was only a small portion of the total estimated total diversions. During the full period of diversion forecast reporting, it was estimated that forecasts were provided for about 27% of the total estimated diversions by District customers.

If all District contractors were to participate in the diversion forecast program, it is likely that the forecasts would still underestimate total diversions under all water-right claims. This is due to the presence of diversions by non-District customer water-right claims. While it may be feasible to develop correlations and operational tools with a partially complete forecast dataset, the volume differences between calculated observed net reach losses and forecasted diversions is quite large. This point is illustrated by

comparing Table 1 and Table 2. Table 2 shows the monthly observed losses over the three listed river reaches. The total reported diversions that were forecasted in Table 1 represent about 7% of the total observed losses. If all diversions in the Upper Russian River by District customers were reported, forecasts would be expected to represent about a quarter of the total observed reach losses. The remainder of the observed losses may be attributed to other surface water diversions (e.g. City of Ukiah and other public water systems), groundwater pumping and recharge, evaporation, and riparian corridor vegetation.

Sonoma Water Operations staff consulted the daily forecasted diversion reports when evaluating river conditions and setting reservoir release rates. However, in order for these reports to have operational value there would have to be much higher participation rates by diverters and involve all water rights-holders in the region.

Attachment 1 -- Diversion Questionnaire Sample



Upper Russian River Mendocino Diversion Forecasts 2020

Report Submission Form for 3-day advance forecasts for Mendocino County RRFC customers per Term 11 of the State Water Resources Control Board Water Rights Order Approving Temporary Urgency Change on Permits 12947A, 12949, 12950 and 16596 on July 28, 2020.

Please submit your forecasted diversions that are planned under any basis of right on a river reach basis. This form can accommodate reports of up to five days of forecasted volumes for a single diversion or multiple diversion locations within a specific river reach (assuming all diversions are via same method of diversion).

If your diversions to report span more than one river reach, please submit one report for each reach. If your diversions to report have different methods of diversion (river intakes, wells), please submit one report for each diversion method. If you have more than five diversions to submit forecasts for, split your diversions into multiple form submittals. There is no limit to how many times you can submit this forecast report in a day.

If you should have any problems or questions, please contact Todd Schram at tschram@scwa.ca.gov. Forecasts can be submitted via your preferred web browser, but integrates best with Google Chrome.

* Required

Contact Name

Choose ▾

River Reach *
Select nearest DOWNSTREAM gage associated with this diversion report

Choose ▾

Method of Diversion *

Well

River Intake (or Lake)

Other: _____

Comments
Optional Include any supporting information that you would like to share.

Your answer _____

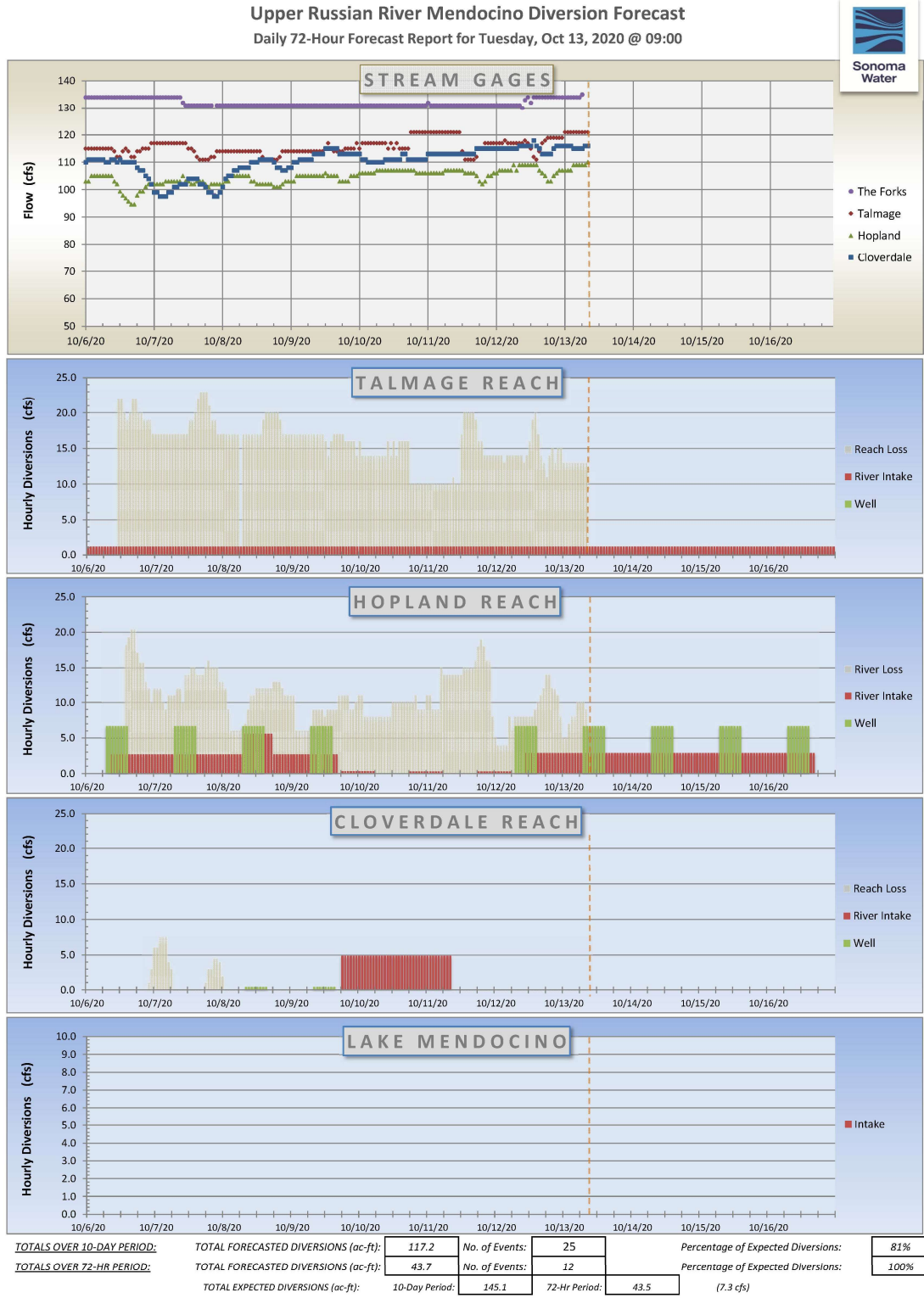
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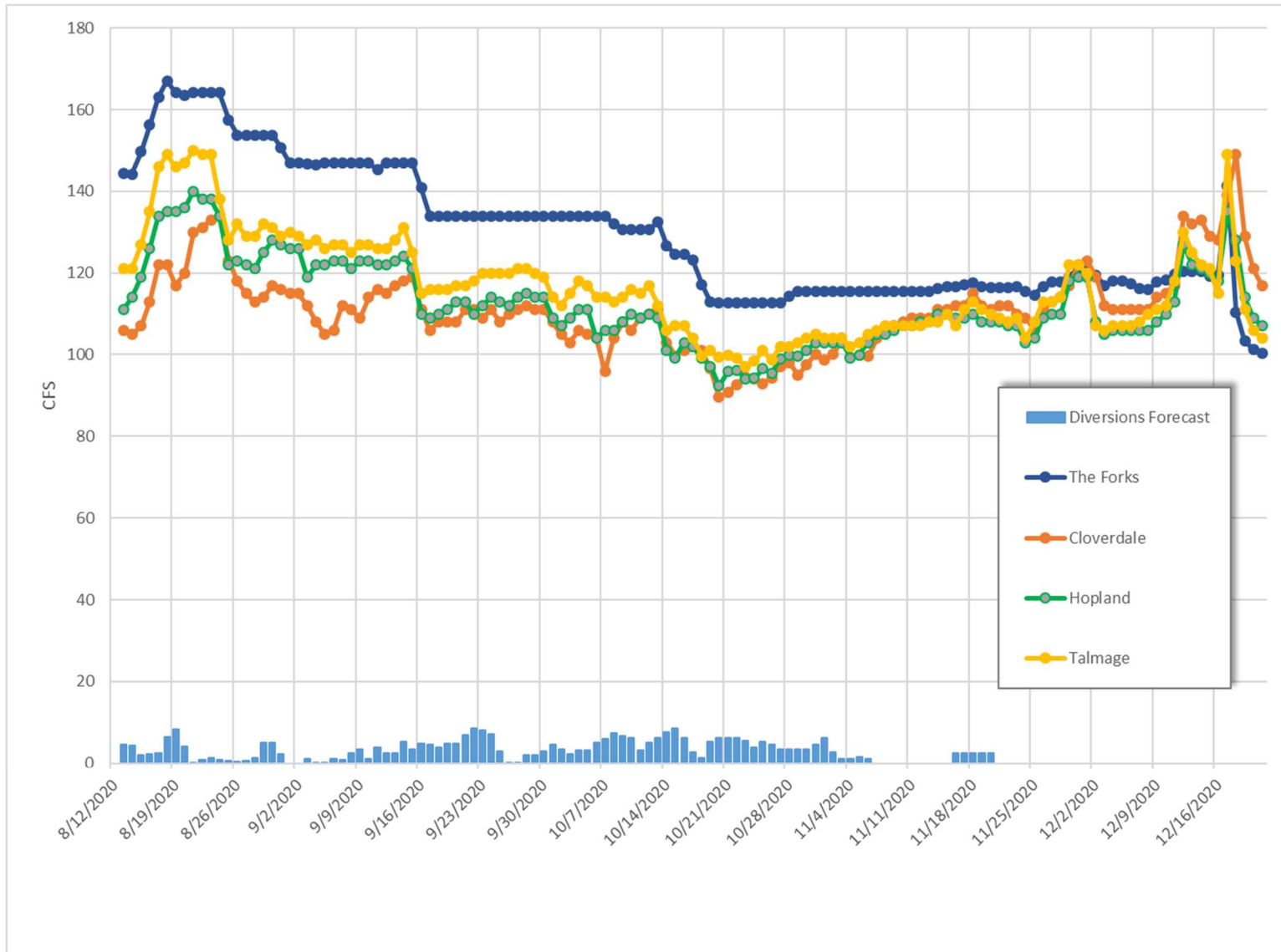
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Google Forms

Attachment 2 -- Example of Daily Diversion Forecast Report



Attachment 3 -- Summary Chart of Daily River Gage Flow Rates and Reported Forecast Diversions



Attachment 4 – Summary Table of Daily River Gage Flow Rates and Reported Forecast Diversions

Date	USGS Gage Stream Flow				Forecasted Diversion Total	
	The Forks (cfs)	Talmage (cfs)	Hopland (cfs)	Cloverdale (cfs)	(cfs)	(ac-ft)
8/13/2020	144	121	111	106	4.67	9.27
8/14/2020	144	121	114	105	4.38	8.68
8/15/2020	150	127	119	107	2.03	4.03
8/16/2020	156	135	126	113	2.32	4.59
8/17/2020	163	146	134	122	2.56	5.07
8/18/2020	167	149	135	122	6.43	12.76
8/19/2020	164	146	135	117	8.23	16.33
8/20/2020	164	147	136	120	4.14	8.21
8/21/2020	164	150	140	130	0.08	0.15
8/22/2020	164	149	138	131	0.88	1.74
8/23/2020	164	149	138	133	1.35	2.68
8/24/2020	164	138	134	134	0.81	1.62
8/25/2020	158	128	122	123	0.55	1.10
8/26/2020	154	132	123	118	0.29	0.58
8/27/2020	154	129	122	115	0.61	1.22
8/28/2020	154	129	121	113	1.30	2.58
8/29/2020	154	132	125	114	5.04	10.01
8/30/2020	154	131	128	117	5.03	9.99
8/31/2020	151	129	127	116	2.31	4.59
9/1/2020	147	130	126	115	0.00	0.00
9/2/2020	147	129	126	115	0.00	0.00
9/3/2020	147	127	119	112	1.02	2.03
9/4/2020	146	128	122	108	0.08	0.15
9/5/2020	147	126	122	105	0.14	0.28
9/6/2020	147	127	123	106	1.12	2.21
9/7/2020	147	127	123	112	0.92	1.82
9/8/2020	147	125	121	111	2.37	4.70
9/9/2020	147	127	123	109	3.34	6.63
9/10/2020	147	127	123	114	0.97	1.93
9/11/2020	145	126	122	116	3.88	7.70
9/12/2020	147	126	122	115	2.37	4.70
9/13/2020	147	128	123	117	2.36	4.68
9/14/2020	147	131	124	118	5.27	10.44
9/15/2020	147	125	121	119	3.43	6.81
9/16/2020	141	115	110	111	4.86	9.65
9/17/2020	134	116	109	106	4.62	9.17

Date	USGS Gage Stream Flow				Forecasted Diversion Total	
	The Forks (cfs)	Talmage (cfs)	Hopland (cfs)	Cloverdale (cfs)	(cfs)	(ac-ft)
9/18/2020	134	116	110	108	3.84	7.62
9/19/2020	134	116	111	108	4.74	9.40
9/20/2020	134	117	113	108	4.73	9.39
9/21/2020	134	117	113	111	6.83	13.55
9/22/2020	134	118	110	111	8.52	16.90
9/23/2020	134	120	112	109	8.03	15.94
9/24/2020	134	120	114	111	7.07	14.03
9/25/2020	134	120	113	108	3.05	6.05
9/26/2020	134	120	112	110	0.14	0.28
9/27/2020	134	121	114	111	0.13	0.26
9/28/2020	134	121	115	112	2.02	4.00
9/29/2020	134	120	114	111	1.95	3.87
9/30/2020	134	119	114	111	2.84	5.63
10/1/2020	134	114	109	108	4.62	9.17
10/2/2020	134	112	107	105	3.43	6.81
10/3/2020	134	115	109	103	2.21	4.38
10/4/2020	134	118	111	106	3.12	6.19
10/5/2020	134	117	111	105	3.14	6.22
10/6/2020	134	114	104	104	5.01	9.94
10/7/2020	134	114	106	96	6.02	11.93
10/8/2020	132	113	106	104	7.36	14.61
10/9/2020	131	114	108	108	6.67	13.23
10/10/2020	131	116	110	106	6.16	12.22
10/11/2020	131	115	109	109	3.08	6.12
10/12/2020	131	117	110	110	4.98	9.87
10/13/2020	132	112	109	111	6.24	12.37
10/14/2020	127	106	101	103	7.63	15.14
10/15/2020	125	107	99	100	8.47	16.79
10/16/2020	125	107	103	101	6.12	12.14
10/17/2020	123	104	102	102	2.72	5.39
10/18/2020	117	100	99	101	1.25	2.47
10/19/2020	113	101	97	97	5.22	10.35
10/20/2020	113	99	92	90	6.24	12.37
10/21/2020	113	100	96	91	6.24	12.37
10/22/2020	113	99	96	93	6.24	12.37
10/23/2020	113	97	94	94	5.47	10.85
10/24/2020	113	98	94	94	3.96	7.86
10/25/2020	113	101	97	93	5.26	10.43

Date	USGS Gage Stream Flow				Forecasted Diversion Total	
	The Forks (cfs)	Talmage (cfs)	Hopland (cfs)	Cloverdale (cfs)	(cfs)	(ac-ft)
10/26/2020	113	99	96	94	4.58	9.08
10/27/2020	113	102	99	97	3.34	6.63
10/28/2020	114	102	100	98	3.34	6.63
10/29/2020	116	103	100	95	3.34	6.63
10/30/2020	116	104	101	98	3.42	6.78
10/31/2020	116	105	103	100	4.48	8.89
11/1/2020	116	104	103	99	6.15	12.19
11/2/2020	116	104	103	100	2.81	5.58
11/3/2020	116	104	103	104	1.11	2.21
11/4/2020	116	102	99	100	1.11	2.21
11/5/2020	116	103	100	100	1.58	3.13
11/6/2020	116	105	103	100	1.02	2.03
11/7/2020	116	106	105	104	0.00	0.00
11/8/2020	116	107	105	106	0.00	0.00
11/9/2020	116	107	106	107	0.00	0.00
11/10/2020	116	107	107	108	0.00	0.00
11/11/2020	116	107	107	109	0.00	0.00
11/12/2020	116	107	108	109	0.00	0.00
11/13/2020	116	108	108	109	0.00	0.00
11/14/2020	116	108	110	111	0.00	0.00
11/15/2020	117	110	110	111	0.00	0.00
11/16/2020	117	107	109	112	2.43	4.82
11/17/2020	117	111	109	112	2.43	4.82
11/18/2020	118	113	110	115	2.43	4.82
11/19/2020	117	111	108	112	2.43	4.82
11/20/2020	116	110	108	111	2.43	4.82
11/21/2020	116	109	108	112	0.00	0.00
11/22/2020	116	108	107	112	0.00	0.00
11/23/2020	117	109	107	110	0.00	0.00
11/24/2020	115	104	103	109	0.00	0.00
11/25/2020	115	108	104	106	0.00	0.00
11/26/2020	117	113	109	111	0.00	0.00
11/27/2020	118	113	110	113	0.00	0.00
11/28/2020	118	114	110	114	0.00	0.00
11/29/2020	119	122	118	117	0.00	0.00
11/30/2020	121	122	119	122	0.00	0.00
12/1/2020	121	120	119	123	0.00	0.00
12/2/2020	120	107	108	119	0.00	0.00

Date	USGS Gage Stream Flow				Forecasted Diversion Total	
	The Forks (cfs)	Talmage (cfs)	Hopland (cfs)	Cloverdale (cfs)	(cfs)	(ac-ft)
12/3/2020	117	106	105	112	0.00	0.00
12/4/2020	118	107	106	111	0.00	0.00
12/5/2020	118	107	106	111	0.00	0.00
12/6/2020	117	107	106	111	0.00	0.00
12/7/2020	116	108	106	111	0.00	0.00
12/8/2020	116	110	106	111	0.00	0.00
12/9/2020	118	111	108	114	0.00	0.00
12/10/2020	118	112	110	115	0.00	0.00
12/11/2020	120	118	113	117	0.00	0.00
12/12/2020	120	130	127	134	0.00	0.00
12/13/2020	120	125	122	132	0.00	0.00
12/14/2020	120	122	121	133	0.00	0.00
12/15/2020	119	121	120	129	0.00	0.00
12/16/2020	120	115	118	128	0.00	0.00
12/17/2020	141	149	135	139	0.00	0.00
12/18/2020	110	123	128	149	0.00	0.00
12/19/2020	103	111	114	129	0.00	0.00
12/20/2020	101	106	109	121	0.00	0.00
12/21/2020	100	104	107	117	0.00	0.00