

**BEFORE THE OREGON WATER RESOURCES DEPARTMENT**

IN THE MATTER OF AN INVESTIGATION	)	
IN AID OF DISTRIBUTION PURSUANT	)	<b>DETERMINATION ON STATUS</b>
TO ORS 540.210	)	<b>OF RELEASES OF WATER</b>
	)	<b>STORED UNDER</b>
Klamath Irrigation District	)	<b>DETERMINED CLAIM KA 294</b>
<i>Petitioner,</i>	)	
	)	
Bureau of Reclamation	)	
<i>Reservoir Owner.</i>	)	

To: Staff of the Oregon Water Resources Department

**I. BACKGROUND**

Pursuant to the order of the Marion County Circuit Court dated October 13, 2020 <sup>1</sup> (*Klamath Irrigation District v. Water Resources Department* (20CV15606)) the Oregon Water Resources Department (Department) determines whether water that is passing through the Link River Dam as of the date of this Determination is water stored pursuant to Determined Claim KA 294.

The Department will continue to provide updates as to the status of water released from UKL whenever circumstances change materially and at least monthly throughout 2021. This is the sixth determination for 2021 (Determination #6).

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<sup>1</sup> The October 13, 2020 order directed the Watermaster to:

“\* \* \* immediately stop the distribution, use and/or release of Stored Water from the UKL [Upper Klamath Lake] without determining that the distribution, use and/or release is for a permitted purpose by users with existing water rights of record or determined claims to use the Stored Water in UKL.

The term “existing water rights of record” has the meaning provided in ORS 540.045(4). The term “determined claim” has the meaning provided in Section 1, chapter 445, Oregon Laws 2015 (which is published in the Oregon Revised Statutes as a note following ORS 539.170).

## II. REGULATION OF DETERMINED CLAIMS

ORS 540.145 authorizes the Water Resources Commission to adopt rules to “secure the equal and fair distribution of water in accordance with the rights of the various users” which rules “shall apply to all water rights that have been established \* \* \* “[u]nder an order of the Commission or the Water Resources Director in proceedings for the determination of relative rights to the use of water \* \* \*.” The rules of the Commission authorizing the distribution of Determined Claims in the ACFFOD<sup>2</sup> to secure the equal and fair distribution of water in accordance with the rights of the various users are provided in Oregon Administrative Rules (OAR) Chapter 690 Division 250.

A “reservoir” includes a modified natural lake such as Upper Klamath Lake (UKL), in which water is collected for beneficial use or purpose.<sup>3</sup> “Legally stored water” means any “water impounded in a reservoir under the provisions of an established right to store water.”<sup>4</sup> Use of legally stored water is governed by the water rights that may call on that source of water and is limited to that amount of water that may be put to beneficial use without waste.<sup>5</sup> Any legally stored water that is in excess of the needs of the water rights calling on that stored water is considered “natural flow” which may be diverted according to the next water right in priority or is once again public water subject to appropriation.<sup>6</sup>

## III. FINDINGS OF FACT

### A. KA 294 and KA 1000

1. The Bureau’s Klamath Project (Project) was established in accord with federal legislation and state legislation in 1902 and 1905, respectively. The Bureau built and owns the facilities, known as the works in the Project area. UKL is a modified natural lake and is one of the three reservoirs in the Project which also comprises eight dams, five major pumping plants, 19 canals, and other works.

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<sup>2</sup> The term “ACFFOD” refers to the Amended and Corrected Findings of Fact and Order of Determination. The ACFFOD is the Director’s order of determination regarding claims filed in the Klamath Adjudication and is currently under review in the Klamath County Circuit Court. Pursuant to ORS 539.170 while the ACFFOD is pending before the circuit court, the “division of water from the stream involved in the appeal shall be made in accordance with the order of the Director.”

<sup>3</sup> OAR 690-250-0010(13); Modifications of the outlet of UKL along with the construction of the Link River Dam around 1916 allow the UKL to be operated and managed as a reservoir between the elevations of 4136 and 4143.3.

<sup>4</sup> OAR 690-250-0010(10).

<sup>5</sup> OAR 690-250-0010(3); *Bennett v. City of Salem*, 192 Or 531, 543 (1951)(An appropriator is never entitled to divert more water than is actually put to beneficial use, reasonable transmission losses excepted); *In re Water Rights of Deschutes River and Tributaries*, 134 Or 623, 644 (1930) (“The right of a prior appropriator is paramount, and the right is limited to such an amount of water as is reasonably necessary for such use and project as may be fairly within contemplation at the time the appropriation is made); *Tudor v. Jaca*, 178 Or 126, 143 (1945) *citing Bolter v. Garrett*, 44 Or 204 (1904) for the proposition that the use of water appropriated “must not only be beneficial to the lands of the appropriator, but it must also be reasonable in relation to the reasonable requirements of subsequent appropriators.”

<sup>6</sup> OAR 690-250-0150(4); *Jones v. Warm Springs*, 162 Or 186, 195 (1939) (Water discharged to the natural stream with no intent to recapture it becomes part of the natural stream and is subject to reappropriation).

2. The Bureau is the sole owner of Determined Claim KA 294. KA 294 provisionally authorizes the Bureau to store a maximum annual volume of 486,828-acre feet (AF) of water in UKL between elevations 4,136 feet and 4,143.3 feet, relative to the Bureau's Klamath Basin Datum.
3. The volume of water stored in UKL above elevation 4,136 is estimated based on an elevation capacity curve, or rating, provided by the Bureau, and using the weighted mean lake level as reported by the United States Geological Survey (USGS). The most recent rating provided by the Bureau indicates the maximum storage volume for KA 294 (486,828 AF) is met when the lake elevation is at 4,142.48 feet.<sup>7</sup>
4. The KID and 20 other Klamath Project Water Users (together the KPWU) and the Bureau are co-owners of Determined Claim KA 1000. KA 1000 provisionally authorizes the diversion of natural flow from UKL and water stored in UKL pursuant to KA 294 for beneficial use by the KPWU both upstream and downstream of the Link River Dam.<sup>8</sup> KA 1000 does not specify what amount of water must be taken from natural flow as opposed to stored water and does not prohibit the taking of water from both sources simultaneously.
5. Pursuant to KA 1000, KID may divert up to 1,150 cubic feet per second (cfs) through the A Canal for irrigation during the irrigation season March 1 through October 31, with a priority date of May 19, 1905.
6. The Link River Dam is a federally owned dam located on the Link River. The storage and release of water pursuant to KA 294 from UKL is through the Link River Dam.
7. Downstream of the Link River Dam, and pursuant to KA 1000, there are 34 authorized points of diversion from the Klamath River. Many of these diversions have an authorized season of use from March 1 to October 31, and two irrigation districts also maintain an additional season of use from November 1 to February 28. These 34 points of diversion have a total authorized instantaneous maximum diversion rate of 1,572.51 cfs.

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<sup>7</sup> The weighted mean lake level of UKL is monitored and reported by the USGS. Four separate lake stage gages are operated and maintained by the USGS, and the data from each gage are entered into an equation to calculate the weighted mean lake elevation. The provisional lake elevation data are available at the website: [https://waterdata.usgs.gov/or/nwis/uv/?site\\_no=11507001&agency\\_cd=USGS](https://waterdata.usgs.gov/or/nwis/uv/?site_no=11507001&agency_cd=USGS)

<sup>8</sup> KA 1000 erroneously refers to KA 293, but this is a typographical error.

## ***B. Determining Water Stored in UKL Pursuant to KA 294***

### **1. Calculating Storage Release**

8. The equation the Department is using to calculate stored water releases is:

$$\{eqn 1\} \text{ Storage Release} = \text{Link River Flow} - (\text{UKL Inflows} - \text{UKL Diversions})$$

with the storage release in excess of water rights then calculated as:

$$\{eqn 2\} \text{ Excessive Storage Release} = \text{Storage Release} - \text{Downstream Storage Diversion}_{KA1000}$$

If either equation results in a zero or negative value, then no storage release unrelated to water rights is occurring.

#### **Description of the variables used in the equation:**

**Link River flow** data are available from a USGS stream gage (USGS 11507500) operated on the river. The Keno power canal began diverting flow on 04/28/2021. The diversion starts at Link River Dam and the diverted water enters the Link River below the Link River stream gage. The Keno power canal diversion was added to the Link River flow to get the total outflow to the Klamath River from Upper Klamath Lake.

**UKL inflows** represent the total amount of *natural flow* coming into the lake from surface water, groundwater, and precipitation. Some of these inflows are measured directly (e.g., Wood and Williamson River stream gages) while others must be estimated (e.g., groundwater inflows) as explained below.

**UKL Diversions:** The largest UKL Diversion, the A Canal, is monitored by a gage accessible at this link:

<https://www.usbr.gov/pn-bin/wyreport.pl?site=acho&parameter=qj&head=yes>

There are 12 authorized points of diversion from UKL above the Link River Dam included in KA 1000. Additionally, there are 10 state certificated water rights and 8 non-KA 1000 determined claims each exceeding 1 cfs for the use of natural flow from UKL. These 18 non-KA 1000 water rights and determined claims have a combined total of 23 authorized points of diversion from UKL. Because many of these points of diversion do not have measuring devices installed, their diversion rates are estimated using the authorized diversion rate on the determined claim or water right, or if measured by watermaster staff.<sup>9</sup>

**Downstream Storage Diversions** <sub>KA1000</sub>: Gages monitor three of the KA 1000 diversions below UKL; the Lost River Diversion Channel (LRDC), the North Canal, and the Ady Canal. There are 34 authorized points of diversion identified under the KA 1000 below the Link River Dam and approximately 61 other diversions from the Klamath River downstream of the Link River Dam not associated with KA 1000. The ungaged diversions and individual pump diversions are currently estimated as described below (see footnote 9).

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<sup>9</sup> Efforts are underway to develop a more sophisticated mechanism of estimating these numerous smaller users that divert water directly from UKL, including inventorying each POD and working with the landowner to install measuring devices.

The estimated ungaged diversions between Link River Dam and Keno Dam, which are not part of equation 2, were updated on May 17, 2021 based on the water balance between those two sites from the gages monitoring inflows and outflows in the reach. The large number of diversions, inability to access these diversions, and lack of measuring devices made direct measurements of the diversion amounts impractical. This reach showed a neutral water balance (no unaccounted-for difference in flow between Link River Dam and Keno Dam) until the irrigation season started, at which time a negative water balance was calculated similar in magnitude to the theoretical diversion rate of the water rights in the reach. A 7-day moving average of the daily water balance is used to estimate the daily diversions to account for gaging uncertainty, travel time for water between the beginning and end of the reach, and ability of the channel to temporarily store and release water.

Both gaged and ungaged diversions below Link River Dam have been taking natural flow as no storage releases have occurred and the water rights allow for these users to divert natural flow.

## 2. Calculating Inflows

9. To manage the water rights and determined claims and distinguish between natural flow and stored water, the Department must quantify gross inflows to UKL. Table 1 contains measured inflows (all reported in cubic feet per second) between May 27, 2021 and June 24, 2021.
10. Stream tributaries constitute one component of inflow that contributes to UKL. Tributary inflows include the Williamson River, Wood River, Sevenmile Creek, Crystal Creek, Thomason Creek, and Fourmile Creek. These streams and their tributaries are listed as sources on KA 294.<sup>10</sup>
11. Groundwater contributions and direct precipitation are also estimated inflow contributions that contribute to UKL. Table 1 includes estimates of groundwater inflow<sup>11</sup> and direct precipitation into the UKL.<sup>12</sup>
12. Ungaged tributary inflows are also estimated inflow contributions to UKL. A constant ungaged inflow estimate for the ungaged tributaries (approximately 60 cfs) was implemented for the daily water distribution determination based on the average inflows from these tributaries observed a USGS water budget study of the lake (Hubbard, 1970). At the issuance of the present FOD, the ungaged inflow estimate was updated (199 cfs) based on the lake water balance reconciliation process as described in section 3.0 and equation 2 and applied retroactively backwards to the previous FOD. By using this approach, large swings in the daily gross inflow estimate are avoided, thereby reducing the need for large daily (or sub-daily) changes in water management unrelated to changes in actual hydrologic conditions.

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<sup>10</sup> Gaged inflow streams include the Williamson and Wood Rivers, and Sevenmile Creek. On November 5, 2020, the Department issued a FINAL ORDER MEASURING DEVICES to the Bureau requiring installation of measuring devices on Sevenmile Creek, Thomason Creek, Fourmile Creek, and Crystal Creek. On December 30, 2020, the Bureau requested reconsideration of this order, and on February 23, 2021, the Department notified the Bureau that it is reconsidering its order. At the time of the issuance of this order, the Department is working with the Bureau to evaluate the viability of installing gages on Crystal Creek and Fourmile Creek.

<sup>11</sup> Groundwater contributions are based on USGS estimates and adjusted for current hydro-climate conditions.

<sup>12</sup> Precipitation is scaled from the average daily precipitation recorded at the two USBR AgriMet sites KFLO and AGKO located north and south of the lake. The scaling is based on the PRISM precipitation data set ratio of the lake areal average compared to the two AgriMet sites and results in an approximately 14% increase from the recorded average values at the AgriMet sites.

Upper Klamath Lake Inflows (CFS)							
DATE	USGS Gage 11504115 Wood River	USGS Gage 11504290 Sevenmile at Dike Rd	USGS Gage 11502500 Williamson	GW Inflow Estimate	Fourmile, Crystal Creek & Other Ungaged Tributaries	Precipitati on	Total Inflow to UKL
5/27/2021	375	0	547	224	203	0	1350
5/28/2021	377	0	545	224	203	0	1350
5/29/2021	374	23	542	224	203	0	1370
5/30/2021	370	28	534	224	203	0	1360
5/31/2021	377	33	521	224	203	0	1360
6/1/2021	381	27	521	224	203	0	1360
6/2/2021	381	21	517	224	203	0	1350
6/3/2021	384	28	515	224	203	0	1350
6/4/2021	382	0	514	224	203	0	1320
6/5/2021	381	0	507	224	203	0	1320
6/6/2021	381	0	500	224	203	0	1310
6/7/2021	383	0	495	224	203	0	1310
6/8/2021	379	0	495	224	203	0	1300
6/9/2021	380	0	494	224	203	129	1430
6/10/2021	375	0	493	224	203	0	1300
6/11/2021	376	0	507	224	203	514	1820
6/12/2021	390	0	503	224	203	0	1320
6/13/2021	386	6	497	224	203	0	1320
6/14/2021	379	0	495	224	203	128	1430
6/15/2021	382	15	493	224	203	0	1320
6/16/2021	383	22	493	224	203	0	1330
6/17/2021	380	37	483	224	203	0	1330
6/18/2021	381	36	483	224	203	0	1330
6/19/2021	382	30	484	224	203	0	1320
6/20/2021	382	29	483	224	203	0	1320
6/21/2021	382	26	476	224	203	0	1310
6/22/2021	383	6	471	224	203	0	1290
6/23/2021	382	18	492	224	203	0	1320
6/24/2021	379	0	493	224	203	254	1550

**Table 1 Measured inflows into UKL in cubic feet per second. Note: OWRD gages were located and installed to monitor instream determined claims.**

### 3. Calculating Inflows in Relation to Outflows

13. The total UKL inflow estimate is reconciled against the change in UKL contents and the outflows based on a water balance of the lake performed periodically, expressed as the following equation:

$$\{eqn 2\} \text{ Reconciled UKL Inflows} = \text{Change in UKL Contents} + \text{UKL outflows}$$

Adjustments to the estimated ungaged tributary inflow are made based on this reconciliation to ensure the UKL water balance is satisfied (Table 2) as previously described in section two.

**Description of the variables used in the equation:**

The **change in UKL contents** is based on contents derived from the USBR elevation capacity table using the average UKL elevation from four USGS lake level gages.

**UKL outflows** consist of lake evaporation, outflows through the Link River and A- Canal, and 23 other authorized diversions greater than 1 cfs directly from the UKL. Lake evaporation is currently estimated using weather station data from two nearby AgriMet sites.<sup>13</sup> Flow through the Link River and A- Canal are measured with gages. The other diversions from the UKL are currently estimated.

<b>Water Balance Summary Table</b>		
Start Date (12:01 am)		5/27/2021
End Date (11:59 pm)		6/24/2021
Number of Days in Reporting Period		29
	AC-FT	<i>Equivalent CFS</i>
Change in Contents (+ = increase)	-32,326	-562
Gaged Inflows	51,580	897
Ungaged Inflows <sup>1</sup>	11,692	203
Groundwater Inflow <sup>2</sup>	12,885	224
Precipitation Inflow	2,034	35
<b>Total Inflow</b>	<b>78,191</b>	<b>1,359</b>
Evaporation	-45,487	-791
Link River Outflow	-61,837	-1,075
A Canal Diversions	0	0
Adjacent UKL Land Diversions	-3,193	-56
<b>Total Outflow</b>	<b>-110,517</b>	<b>-1,921</b>
<b>UKL Water Balance</b>	<b>0</b>	<b>0</b>
<sup>1</sup>	Adjusted to close water balance	
<sup>2</sup>	Updated from Hubbard using Spring Cr&Fall R as hydro-climate index	

**Table 2: Water balance table in reconciliation process.**

<sup>13</sup> The Department estimates evaporation by a Penman-Monteith equation that uses weather data from two USBR AgriMet weather stations just north and south of UKL. Evaporation estimates are adjusted for local lake conditions based on comparisons of the Penman-Montieth derived estimates with concurrent evaporation data on UKL from a study completed by USBR in 2015.

An estimate of lake evaporation between issued FODs is required to determine the lake water balance, as shown in Table 2. Estimates of daily lake evaporation are also shown in the distribution Table 3 as one component of the daily lake outflows. This daily UKL evaporative estimate from the lake (ac-ft) was modified to be based on the 14-day moving average of the daily rate. The daily rate is based on weather data recorded at two nearby USBR AgriMet sites (KFLO and AGKO).

14. Table 3 represents the Department’s calculations of inflows into UKL versus lake outflows for the time period between May 27, 2021 and June 24, 2021.

DATE	Lake Elevations (FT) and Storage (AC-FT)				Lake Inflows (CFS) Total Inflows into UKL	Lake Outflows (CFS)					Flow Distribution Calculation (cfs)						
	UKL Lake Elevation (USBRKB Datum)	UKL Storage	Stored since Jan 1, 2021	KLA 294 Remaining to Store (Max 486,828 AF)		Evap	Link River + Keno Canal Flow	A- Canal Diversion	KA 1000 Diversions from Adjacent UKL Lands	Non KA 1000 Diversions from Adjacent UKL Lands	Live Flow Available to Pass Link R Dam	Stored Water Released from Link R Dam	Gaged KA 1000 below LRD	Ungaged KA 1000 below LRD	Non KA 1000 Diversions below LRD	KA 1000 Storage Deliveries blw LRD	Stored Release in Excess of WRS
5/27/2021	4140.32	300,322	171,425	92,787	1350	631	1105	0	6.4	48.9	1295	0	48	0	139	0	0
5/28/2021	4140.32	300,322	171,841	92,371	1350	642	1085	0	6.4	48.9	1295	0	113	0	144	0	0
5/29/2021	4140.31	299,539	172,256	91,955	1370	640	1105	0	6.4	48.9	1315	0	128	0	129	0	0
5/30/2021	4140.30	298,756	172,653	91,559	1360	647	1105	0	6.4	48.9	1305	0	78	0	128	0	0
5/31/2021	4140.29	297,973	173,069	91,143	1360	659	1095	0	6.4	48.9	1305	0	105	0	131	0	0
6/1/2021	4140.28	297,190	173,484	90,727	1360	692	1095	0	6.4	48.9	1305	0	107	0	155	0	0
6/2/2021	4140.27	296,407	173,920	90,291	1350	724	1085	0	6.4	38.8	1305	0	103	0	166	0	0
6/3/2021	4140.26	295,624	174,396	89,815	1350	754	1065	0	6.4	38.8	1305	0	107	0	151	0	0
6/4/2021	4140.24	294,072	174,852	89,360	1320	794	1045	0	6.4	38.8	1275	0	109	0	151	0	0
6/5/2021	4140.21	291,744	175,288	88,924	1320	840	1055	0	6.4	38.8	1275	0	117	0	167	0	0
6/6/2021	4140.18	289,417	175,704	88,508	1310	846	1055	0	6.4	38.8	1265	0	125	0	176	0	0
6/7/2021	4140.15	287,095	176,120	88,092	1310	846	1055	0	6.4	38.8	1265	0	123	0	183	0	0
6/8/2021	4140.12	284,786	176,456	87,755	1300	852	1085	0	6.4	38.8	1255	0	119	0	184	0	0
6/9/2021	4140.11	284,016	177,031	87,180	1430	850	1095	0	6.4	38.8	1385	0	137	0	175	0	0
6/10/2021	4140.08	281,707	177,329	86,883	1300	848	1105	0	6.3	38.8	1255	0	157	0	163	0	0
6/11/2021	4140.07	280,938	178,677	85,534	1820	826	1095	0	6.3	38.8	1775	0	140	0	148	0	0
6/12/2021	4140.08	281,707	179,093	85,118	1320	821	1065	0	6.3	38.8	1275	0	125	0	130	0	0
6/13/2021	4140.06	280,168	179,510	84,702	1320	823	1065	0	6.3	38.8	1275	0	102	0	121	0	0
6/14/2021	4140.04	278,648	180,105	84,107	1430	813	1085	0	6.3	38.8	1385	0	100	0	118	0	0
6/15/2021	4140.05	279,408	180,481	83,730	1320	784	1085	0	6.3	38.8	1275	0	108	0	113	0	0
6/16/2021	4140.05	279,408	180,878	83,334	1330	787	1085	0	6.3	38.8	1285	0	127	0	108	0	0
6/17/2021	4140.03	277,888	181,274	82,937	1330	792	1085	0	6.3	38.8	1285	0	139	0	106	0	0
6/18/2021	4140.02	277,128	181,631	82,580	1330	799	1105	0	6.3	38.8	1285	0	143	0	109	0	0
6/19/2021	4140.00	275,608	181,968	82,243	1320	813	1105	0	6.3	38.8	1275	0	137	0	114	0	0
6/20/2021	4139.98	274,088	182,365	81,847	1320	836	1075	0	6.3	38.8	1275	0	140	0	111	0	0
6/21/2021	4139.96	272,568	182,781	81,431	1310	860	1055	0	6.3	38.8	1265	0	140	0	102	0	0
6/22/2021	4139.94	271,052	183,019	81,192	1290	885	1045	0	11.9	113.1	1165	0	143	0	102	0	0
6/23/2021	4139.92	269,537	183,418	80,794	1320	907	994	0	11.9	113.1	1195	0	139	0	102	0	0
6/24/2021	4139.91	268,779	184,267	79,945	1550	922	997	0	11.9	113.1	1425	0	145	0	102	0	0

**Table 3: Daily calculations of inflows versus outflows for UKL.**

15. Currently, the total gaged and ungaged inflows plus the estimated groundwater and precipitation inflow to UKL exceeds the amount of water passing through the Link River Dam. Therefore, the water passing through Link River Dam is natural flow as opposed to Legally Stored Water (Table 3.)

#### IV. ULTIMATE FINDINGS OF FACT

1. As of the date of this determination, water passing through the Link River Dam constitutes natural flow as opposed to water legally stored pursuant to KA 294.

#### V. CONCLUSION

1. No Legally Stored Water is presently passing through the Link River Dam.



## VI. DETERMINATION

As of the date of this Determination #6, water passing through the Link River dam is natural flow. The Department and the Watermaster, District 17, will continue to monitor conditions in the UKL throughout 2021 and will issue a status determination on a monthly basis or as conditions change. If the Department determines that Legally Stored Water in excess of the needs of KA 1000 is passing or may pass through the Link River Dam, it will issue a Notice of Violation directed to the Bureau based on the April 6, 2021 Order Regarding Release of Water Stored Under Determined Claim KA 294.

DATED this 25<sup>th</sup> day of June 2021.



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DANETTE WATSON,  
Watermaster, District 17  
Oregon Water Resources Department