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FIGURES AND TABLES

ABBREVIATIONS, DEFINTIONS, AND MEMBERSHIPS TABLE

1991 EIR	Environmental Impact Report regarding water from the Owens Valley to supply the second LAA from 1970-1990, and from 1990 onward pursuant to the Water Agreement
1997 MOU	1997 Memorandum of Understanding between the MOU Parties
AF	acre feet
AFY	acre feet per year
AWC	available water content
CDFW	California Department of Fish and Wildlife (formerly "...Fish and Game")
cfs	cubic feet per second
City	City of Los Angeles
County	County of Inyo
E/M	Enhancement/Mitigation
Eastern Sierra Runoff	runoff within Mono Basin, Long Valley, and Owens Valley
Green Book	Technical Appendix to Water Agreement and 1991 EIR
ICWD	Inyo County Water Department
LAA	Los Angeles Aqueduct
LADWP	City of Los Angeles Department of Water & Power
Long Valley	Area south of Mono Basin, from Owens River headwaters to Long Valley Dam, contained within Mono County
LORP	Lower Owens River Project
Mono Basin	Mono Lake watershed area, contained within Mono County
Mono Basin Runoff	Runoff in Mono County that generally drains towards Mono Lake
Operations Plan	Annual Owens Valley Report
operations water	water released for operational purposes
OVC	Owens Valley Committee
OVLMP	Owens Valley Land Management Plan
Owens River Basin Runoff	runoff that generally drains to the Owens River within Long Valley and Owens Valley
Owens Valley	Area from Round Valley to Haiwee Reservoir, contained within Inyo County
Owens Valley Runoff	runoff within Owens Valley and contained within Inyo County that generally drains towards the Owens River
MOU Parties	LADWP, County, CDFW, SLC, SC, OVC
RY	runoff year (April 1 to following March 31)
SC	Sierra Club

SLC	California State Lands Commission
2004 and 2010 Stip and Orders	August 2004 and March 2010 Amended Stipulations and Orders in Case No. S1CVCV01 29768
water spreading	water release due to waterway capacity limitations or other downstream conditions, for the purpose of groundwater recharge
Standing Committee	comprised of elected and appointed officials from the City and County
Technical Group	comprised of County and City staff
Water Agreement	Agreement between the County of Inyo and the City of Los Angeles and its Department of Water and Power on a Long-Term Groundwater Management Plan for Owens Valley and Inyo County, administered by the Standing Committee and Technical Group
WY	water year (October 1 to following September 30)

EXECUTIVE SUMMARY

This report includes LADWP's proposed RY 2022-23 Operations Plan, an update on Owens Valley conditions, and the current status of LADWP's environmental mitigation projects and other legal commitments under the Water Agreement, 1991 EIR, the Laws Type E transfer, 1997 MOU, and the 2004 and 2010 Stip and Orders.

The Water Agreement provides that by April 20th each year, LADWP will prepare and submit to the Technical Group a proposed operations plan and pumping program for the twelve (12) month period beginning on April 1st. Additionally, Section 11 of the 2004 Stip and Order requires that on or about May 1 of each year LADWP shall complete and release an annual report in conformance with Section III.H of the 1997 MOU. This report will describe environmental conditions in the Owens Valley and studies, projects, and activities conducted under the Water Agreement and the 1997 MOU.

This Operations Plan is intended to fulfill these requirements.

1. Owens Valley Operations Plan for RY 2022-23

Section 1 of this report contains LADWP's Annual Operations Plan for RY 2022-23. As mentioned above, pursuant to Water Agreement Section V.D:

> *By April 20th of each year, the Department shall prepare and submit to the Inyo County Technical Group a proposed operations plan and pumping program for the twelve (12) month period beginning on April 1st. (In the event of two consecutive dry years when actual and forecasted Owens Valley runoff for the April to September period is below normal and averages less than 75 percent of normal, the Department shall prepare a proposed plan for the six (6) month period beginning on April 1st and October 1st, and submit such plans by April 20th and October 20th.)*

The Owens Valley experienced a drier than normal snow season in the winter of 2021-22, concluding the lowest RY on record with an estimated 45% of normal runoff. The forecast for the 2022-23 RY is calling for 194,300 AF, or 47% of normal. As called for in Water Agreement Section V.D, in the event of two consecutive dry years, this Operations Plan includes a proposed pumping plan for the six month period beginning on April 1st and will prepare a second pumping program for the period beginning on October 1st, 2022, and ending on March 31, 2023, later this year.

LADWP plans to export approximately 62,700 AF of water from the Eastern Sierra during the 2022-23 RY. Uses in the Owens Valley on Los Angeles City-owned lands are planned to be 78,890 AF, of which 34,750 AF is intended for irrigation. Being a drier than normal year, LADWP is not planning on water spreading in Owens Valley.

LADWP groundwater pumping in the Owens Valley is governed by the ON/OFF provisions of the Water Agreement. Accordingly, approximately 192,100 AF of water is available for groundwater pumping from Owens Valley wellfields, but LADWP's planned

groundwater pumping ranges from 43,230 AF to 51,400 AF for the first six months of 2022-23 RY.

A program for reasonable reductions in irrigation is built into the Operations Plan. This program will limit water for irrigation to 4 AF per acre, but will not affect irrigation supply for water uses with lower allotments than 4 AF per acre and no reductions in enhancement and mitigation projects are planned. LADWP will request approval of the program for irrigation reductions at a Standing Committee meeting prior to the Operations Plan being finalized.

2. Conditions in the Owens Valley

The overall Eastern Sierra snowpack in watersheds contributing to the LAA is estimated to be 41% of normal as of April 1, 2022. Precipitation on the Owens Valley floor during the 2021-22 RY averaged 3.5 inches, which was 62% of the long-term average of 5.6 inches.

The groundwater levels in the Owens Valley declined by an average of 0.9 feet as a result of the drier than normal runoff condition in 2021-22.

The Lower Owens River was in full operational status with a minimum average flows of 40 cfs or greater as measured at all gauging stations. The total water use by the Lower Owens River, the Delta, Blackrock Waterfowl Management Area, and other LORP uses were approximately 17,300 AF for the year.

3. LADWP Environmental Mitigation Projects and Other Legal Commitments

Section 3 of this report provides information on all of LADWP's Mitigation Projects and other commitments required under the Water Agreement, 1991 EIR, the 1997 MOU, and related documents.

Tables 3.1 and 3.2 provide a quick reference guide to these commitments. For reference, the status of these projects is classified into the following categories:

1. ***Complete*:** Project has no additional commitments required (no water allotment or other financial or environmental mitigation; no continual monitoring and reporting),
2. ***Ongoing as necessary/required:*** These measures are only applied when necessary (monitoring and reporting for mitigation measures for new projects, construction, etc.),
3. ***Implemented and ongoing:*** The project is fully implemented and is currently meeting goals; however, there may be ongoing water or financial commitments or monitoring and reporting requirements,
4. ***Fully implemented but not meeting goals:*** The project is fully implemented but has not yet met prescribed goals or success criteria, and

5. ***Not fully implemented:*** *Project under development or under construction, but not fully implemented*.

Presently, of the 64 required environmental mitigation projects, LADWP reports:

- 8 are complete,
- 43 are implemented and ongoing,
- 13 are fully implemented but not meeting goals,
- 0 are not fully implemented

Of the 49 other commitments, LADWP reports:

- 18 are complete,
- 6 are ongoing as necessary or required,
- 23 are implemented and ongoing,
- 0 are fully implemented and not meeting goals, and
- 2 are not fully implemented

More detailed information regarding each of these projects and other commitments is provided in Section 3. Additionally, comprehensive monitoring reports for the Yellow-Billed Cuckoo Habitat Enhancement Plans and the OVLMP are also supplied in Section 3.

OWENS VALLEY OPERATIONS PLAN FOR RY 2022-23

1.0 Owens Valley Operations Plan for RY 2022-23

This year's annual Operations Plan and pumping program is consistent with the management strategy of the Water Agreement between the County and the City dated October 18, 1991. As stated in the Water Agreement:

> *The overall goal of managing the water resources within Inyo County is to avoid certain described decreases and changes in vegetation and to cause no significant effect on the environment which cannot be acceptably mitigated while providing a reliable supply of water for export to Los Angeles and for use in Inyo County.*

The overall goal of the Water Agreement: environmental protections and a reliable water supply are the basis of the LADWP's operations plans. Groundwater pumping in the Owens Valley is managed in conformance with the provisions of the Water Agreement. The Water Agreement provides:

> *By April 20th of each year, the Department shall prepare and submit to the Inyo County Technical Group a proposed operations plan and pumping program for the twelve (12) month period beginning on April 1st. (In the event of two consecutive dry years when actual and forecasted Owens Valley runoff for the April to September period is below normal and averages less than 75 percent of normal, the Department shall prepare a proposed plan for the six (6) month period beginning on April 1st and October 1st, and submit such plans by April 20th and October 20th.)*

A program for reasonable reductions in irrigation is built into the Operations Plan for the 2022-23 RY. This program will limit water for irrigation to 4 AF per acre, but will not affect irrigation supply for water uses with lower allotments than 4 AF per acre and no reductions in enhancement and mitigation projects are planned. LADWP will request approval of the program for irrigation reductions at a Standing Committee meeting prior to the Operations Plan being finalized. See Appendix B for further discussion factors to be considered when implementing a program for reasonable reductions in irrigation under the Agreement and Greenbook.

1.1. Eastern Sierra Runoff Forecast

The Runoff Forecast for Eastern Sierra, including the Owens River Basin and Mono Basin runoffs for the 2022-23 RY (Table 1.1) is based on snow surveys of key Eastern Sierra watersheds in Inyo and Mono counties. The Eastern Sierra Runoff forecast is used for planning aqueduct operations as it is a primary indicator of water supply. The April 1 forecast of the Owens River Basin runoff during the 2022-23 RY is 194,300 AF, or about 47% of the 50-year (1971-2020) average annual runoff value of 409,000 AF.

The runoff forecast for April 1, 2022, through September 30, 2022, is 117,200 AF for the Owens River Basin, 39% of the 50-year average (300,000 AF).

Figure 1.1 summarizes Owens River Basin runoff and groundwater pumping by LADWP since the 1972 RY. This figure demonstrates this year's forecasted runoff and planned pumping compared to the past runoff in the Owens Valley Basin.

Table 1.1. Eastern Sierra Runoff Forecast for 2022-23 RY

2022 EASTERN SIERRA RUNOFF FORECAST
April 1, 2022

APRIL THROUGH SEPTEMBER RUNOFF

	MOST PROBABLE VALUE (Acre-feet)	MOST PROBABLE VALUE (% of Avg.)	REASONABLE MAXIMUM (% of Avg.)	REASONABLE MINIMUM (% of Avg.)	LONG-TERM MEAN (1971 - 2020) (Acre-feet)
MONO BASIN:	**56,200**	**56%**	69%	43%	100,307
OWENS RIVER BASIN:	**117,200**	**39%**	52%	26%	300,298

APRIL THROUGH MARCH RUNOFF

	MOST PROBABLE VALUE (Acre-feet)	MOST PROBABLE VALUE (% of Avg.)	REASONABLE MAXIMUM (% of Avg.)	REASONABLE MINIMUM (% of Avg.)	LONG-TERM MEAN (1971 - 2020) (Acre-feet)
MONO BASIN:	**70,900**	**60%**	74%	46%	118,170
OWENS RIVER BASIN:	**194,300**	**47%**	60%	35%	409,364

MOST PROBABLE - That runoff which is expected if median precipitation occurs after the forecast date.

REASONABLE MAXIMUM - That runoff which is expected to occur if precipitation subsequent to the forecast is equal to the amount which is exceeded on the average once in 10 years.

REASONABLE MINIMUM - That runoff which is expected to occur if precipitation subsequent to the forecast is equal to the amount which is exceeded on the average 9 out of 10 years.

2022 Runoff Forecast 2.1 forecast 4/6/2022 3:02 PM

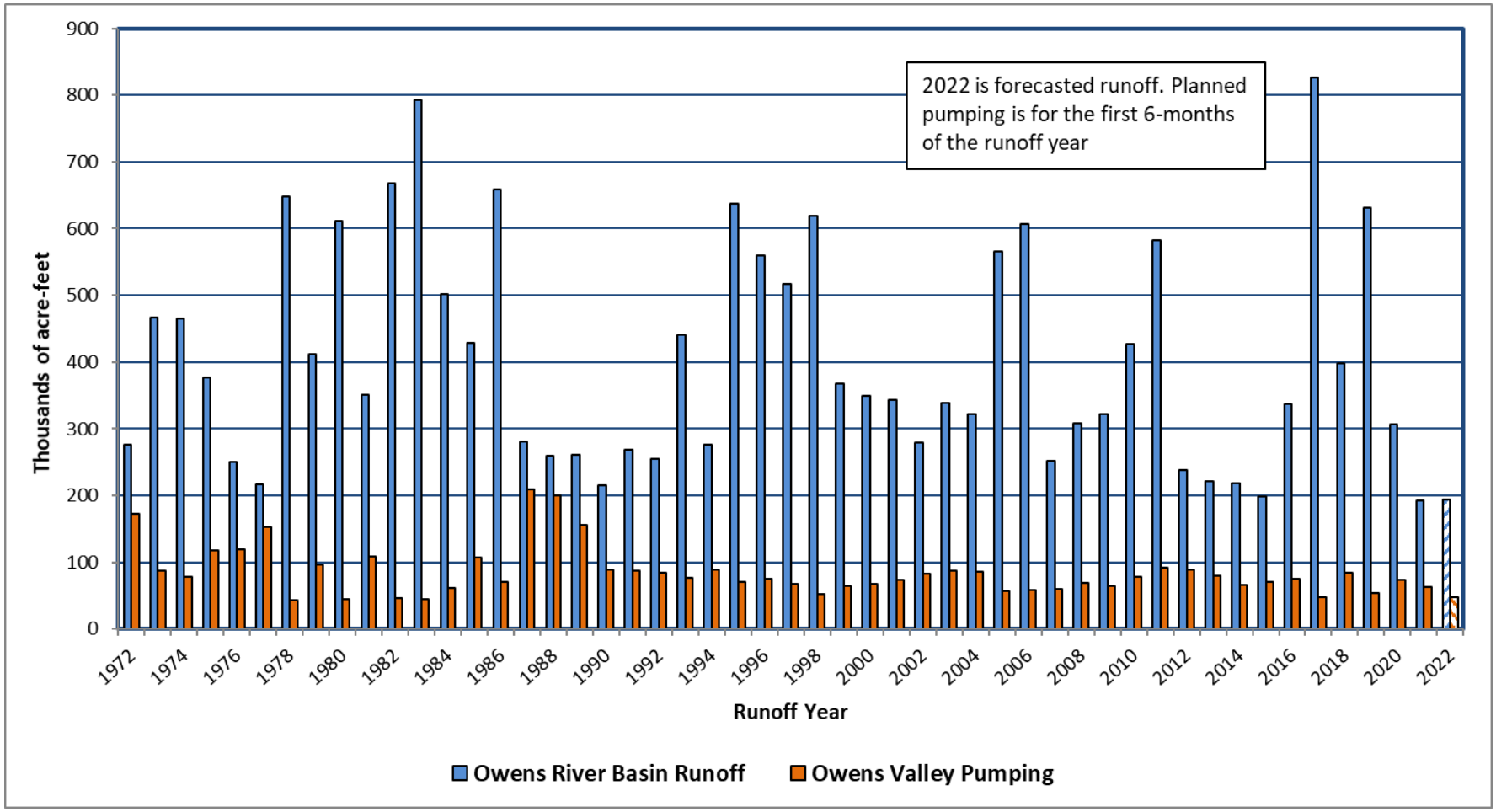


Figure 1.1. Owens River Basin Runoff and Groundwater Pumping

1.2. Owens Valley Groundwater Production

LADWP has prepared its Operations Plan based on the goals and principles of the Water Agreement. The Operations Plan is designed to avoid adverse impacts on the environment while providing a reliable supply of water for in-valley uses and export to Los Angeles for municipal use.

Under the terms of the Water Agreement, the allowable amount of groundwater pumping from each Owens Valley wellfield is based on the ON/OFF status of monitoring sites located within each wellfield and the capacity of the wells linked to those sites (see Water Agreement Sections V.B and V.C). Table 1.2 lists the ON/OFF status of the monitoring sites within the Owens Valley as of April 2022. Based on Table 1.2, 14 vegetation monitoring sites are in ON status and 8 sites are in OFF status. The Water Agreement or Technical Group has designated certain town supply wells, irrigation supply wells, fish hatchery supply wells, E/M project supply wells, and other wells determined to not significantly impact areas with groundwater-dependent vegetation as exempt from the ON/OFF provisions of the Water Agreement. These exempt wells may be pumped for their intended purpose.

Table 1.3 provides a breakdown of the available annual pumping capacity and planned groundwater pumping for the first six months of 2022-23 RY by wellfield. Table 1.3 also shows the monitoring sites in ON status as of April 2022, the wells associated with the ON status monitoring sites, and the exempt wells in each wellfield. Accordingly, approximately 192,100 AF of water is available for groundwater pumping from Owens Valley wellfields under the terms of the Water Agreement during the 2022-23 RY. LADWP plans to pump between 43,230 AF and 51,400 AF of groundwater during the first six months of the 2022-23 RY, which is between 22 percent and 27 percent of the amount allowed under the terms of the Water Agreement. The planned range of groundwater pumping for the first six months of the 2022-23 RY will provide LADWP with the needed operational flexibility to supply water for in-valley uses and export to the City.

Working independently and with the Inyo/Los Angeles Technical Group, LADWP will monitor Owens Valley runoff and environmental conditions to assess if further changes to the planned pumping are needed for the second half of the 2022-23 RY. LADWP's groundwater management approach during this extremely dry runoff condition is more conservative than the environmentally conservative pumping plans advocated by the Standing Committee during the dry years of the early 1990s.

Figure 1.2 compares the amount of Owens Valley groundwater pumping allowed under the provisions of the Water Agreement and the actual groundwater pumping by LADWP for each RY since 1992 (available pumping was not calculated prior to 1992). LADWP's planned pumping for the first six months of the 2022-23 RY is consistent with its past conservative pumping plans. LADWP is committed to conducting its operations in a conservative, responsible, and environmentally sustainable manner.

In addition to complying with the ON/OFF provisions and the environmental protection goals of the Water Agreement, LADWP's pumping program for the first six months of

the 2022-23 RY complies with the groundwater mining provisions of the Green Book. Table 1.4 shows the latest update of the mining calculations based on the procedures described in Section IV.C of the Green Book. As shown in this table, none of the wellfields in the Owens Valley will be in deficit by the end of the first half of the 2022-23 RY.

Table 1.5 is a list of Owens Valley wells exempted under the Water Agreement or by approval of the Technical Group from linkage to the ON/OFF provisions of the Water Agreement. This table includes a list of wells by well number, the general location of the exempt well, and the reason the well is exempt. This table was revised and approved by the Technical Group at their May 6, 2016 meeting.

Table 1.6 details the planned month-to-month groundwater pumping for the first six months of the 2022-23 RY for each wellfield. Pumping for town water systems, fish hatcheries, and E/M projects is included in the pumping distribution. Owens Valley groundwater production for the first six months of the 2022-23 RY is consistent with the provisions of the Water Agreement. While Table 1.6 provides the planned monthly pumping volumes from each wellfield, the actual pumping amounts could vary due to the uncertainty inherent in runoff conditions, operational needs, and safety concerns of the LAA system, which could result in changes in the operation of surface and ground water facilities throughout Eastern Sierra. Any pumping tests will be in addition to the planned pumping for the first six months of the 2022-23 RY. Planned pumping may also be increased to provide freeze protection of the LAA .

The following is a discussion of the planned pumping program by wellfield. Figures 1.3, and 1.5, followed by figures 1.6 through 1.10 show locations of LADWP's Owens Valley pumping wells by wellfield. These figures show the location of production wells, selected monitoring wells, and vegetation monitoring sites in each area.

Table 1.2. Soil/Vegetation Water Balance Calculations for April 2022 According to Section III of the Green Book

Site	October 2021 Soil AWC (cm)	50% Annual Precip. (cm)	Projected Soil AWC (cm)	October 2021 Vegetation Water Requirement (cm)	October 2021 Required Soil AWC For Turn-ON	October 2021 ON/OFF Status	April 2022 Soil AWC (cm)	April 2022 Required Soil AWC For Turn-ON	April 2022 ON/OFF Status
L1	27.4	7.9	35.3	8.2	NA	ON	55.7	NA	ON
L2	35.5	7.9	43.4	5.0	NA	ON	37.1	NA	ON
L3	8.0	7.9	15.9	11.9	NA	ON	19.6	NA	ON
BP1	22.2	7.9	30.1	8.1	NA	ON	24.8	NA	ON
BP2	1.5	NA	NA	5.7	28.4	OFF	5.3	28.4	OFF (7/98)
BP3	60.5	7.6	68.1	6.8	NA	ON	60.6	NA	ON
BP4	61.3	8.2	69.5	6.6	NA	ON	69.2	NA	ON
TA3	10.1	NA	NA	7.4	28.4	OFF	13.7	28.4	OFF (10/17)
TA4	15.8	7.3	23.1	5.7	NA	ON	21.4	NA	ON
TA5	19.8	8.2	28.0	1.6	NA	ON	22.6	NA	ON
TA6	17.4	7.3	24.7	6.5	NA	ON	23.6	NA	ON
TS1	6.7	NA	NA	9.6	28.9	OFF	10.3	28.9	OFF (7/17)
TS2	13.1	7.3	20.4	5.4	NA	ON	17.8	NA	ON
TS3	16.1	7.3	23.4	6.3	NA	ON	23.4	NA	ON
TS4	35.9	7.3	43.2	20.0	NA	ON	48.5	NA	ON
IO1	20.1	NA	NA	15.8	42.2	OFF	24.9	42.2	OFF (10/98)
IO2	2.8	NA	NA	1.0	3.9	OFF	2.7	3.9	OFF (7/20)
SS1	24.2	NA	NA	4.3	34.0	OFF	27.6	34.0	OFF (7/17)
SS2	2.5	NA	NA	0.6	25.6	OFF	3.5	25.6	OFF (7/11)
SS3	27.0	6.5	33.5	5.2	NA	ON	30.1	NA	ON
SS4	8.1	NA	NA	2.4	15.9	OFF	7.7	15.9	OFF (7/05)
BG2	26.2	6.6	32.8	1.4	NA	ON	25.2	NA	ON

Table 1.3. Annual Pumping Capacity According to Monitoring Sites with ON Status and Planned Pumping for First Six Months of 2022-23 RY

Wellfield	Vegetation Monitoring Site	Associated Production Wells	Available Capacity (AF/year)	Planned Pumping (AF)
Laws	L1	398, 247, 248, 249	12,670	
	L2	239, 243, 244, 426	10,430	
	L3	240, 241, 399, 376, 377	9,990	
	L5*	245, 387, 388	9,770	
	Exempt	236, 354, 422, 413	1,520	
	Wellfield Pumpage		**44,380**	**7,000-8,200**
Bishop**	All wells	140, 371, 406, 407, 408, 410, 411, 412	18,310	
	Wellfield Pumpage		**18,310**	**9,720**
Big Pine	BP1	378, 379, 389, 352	10,430	
	BP3	222, 223,232	4,850	
	BP4	331	7,530	
	Exempt	218, 219, 330, 332, 352, 375, 415	27,700	
	Wellfield Pumpage		**50,510**	**10,200-11,700**
Taboose Aberdeen	TA4	342, 347	19,400	
	TA5	349	12,240	
	TA6	109, 370	5,720	
	Exempt	118, 355	2,560	
	Wellfield Pumpage		**39,920**	**3,000-7,050**
Thibaut Sawmill	TS2	155	800	
	TS3	103, 104, 382	2,970	
	TS4	380, 381	4,350	
	Exempt	351, 356	8,000	
	Wellfield Pumpage		**16,120**	**5,040-5,280**
Indep. - Oak	Exempt	59, 60, 65, 357, 383EM, 384EM, 401, W427	12,200	
	Wellfield Pumpage		**12,200**	**5,860-6,600**
Symmes Shepherd	SS3	W092, W396	5,650	
	Exempt	402EM	1,200	
	Wellfield Pumpage		**6,850**	**1,200**
Bairs Georges	BG2	76, 343, 348, 403	2,830	
	Exempt	343	500	
	Wellfield Pumpage		**2,830**	**450-890**
Lone Pine	Exempt	344, 346, 425	990	
	Wellfield Pumpage		**990**	**760**
	Total Owens Valley		**192,110**	**43,230 - 51,400**

* Monitoring site has yet to be located.

** Pumping is subject to the Hillside Decree

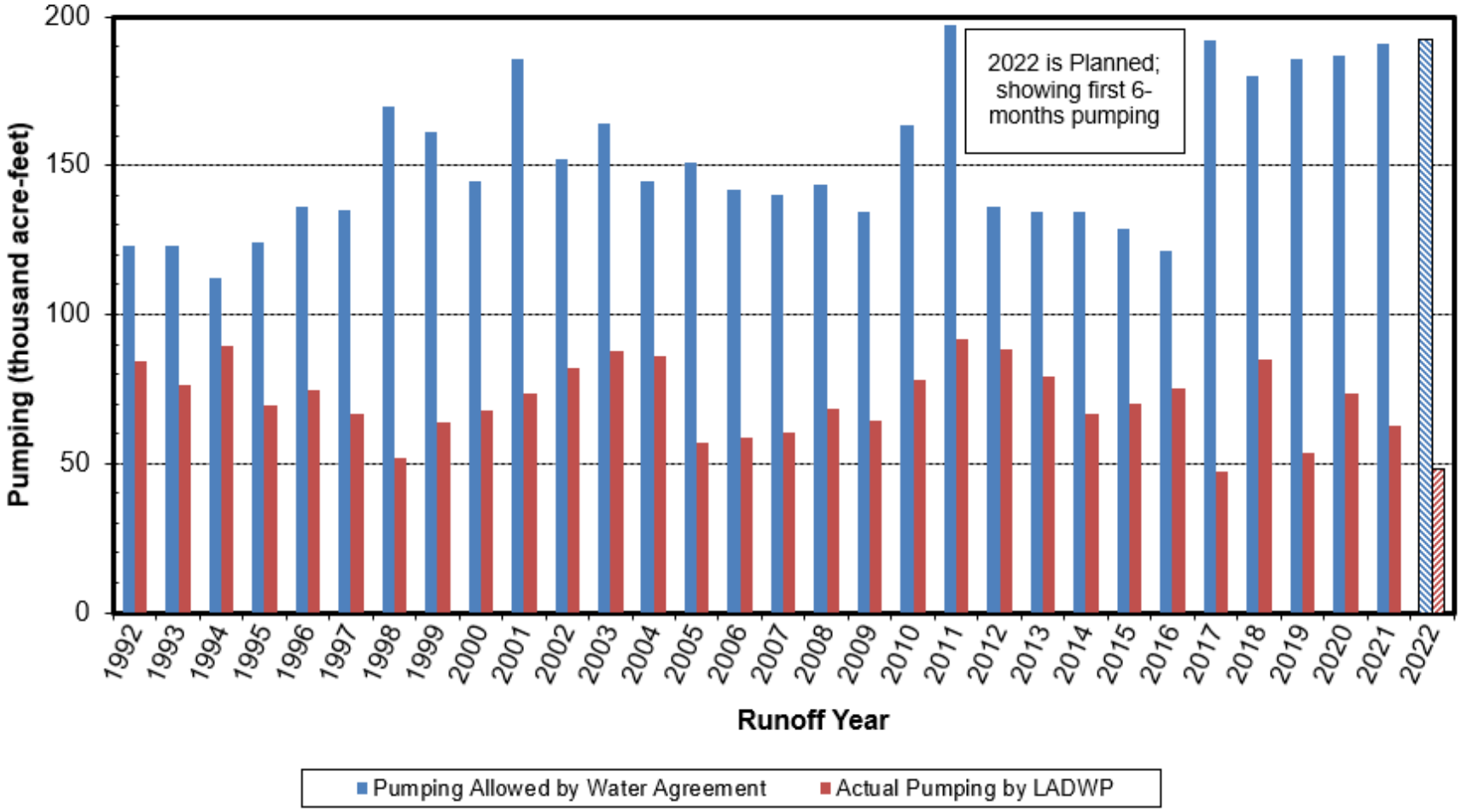


Figure 1.2. Owens Valley Pumping – Provided by Water Agreement and Actual Since Inyo/Los Angeles Water Agreement

Table 1.4. Summary of Recharge and Pumping for WY 2002 - 2021 and Estimated Pumping Limit for Apr-Sep 2022 in AF

Water	OWENS VALLEY	LAWS		BISHOP		BIG PINE		TABOOSE-THIBAUT		IND-SYM-BAIRS		LONE PINE		OWENS VALLEY	
Year	Runoff Percent (c)	Recharge	Pumping	Recharge	Pumping	Recharge	Pumping	Recharge	Pumping	Recharge	Pumping	Recharge	Pumping	Recharge	Pumping
2003	75%	11,454	5,786	38,486	11,407	21,883	25,885	26,166	27,387	32,455	14,294	13,088	1,179	143,532	85,938
2004	71%	11,138	7,412	37,149	11,777	21,126	26,149	25,044	25,159	29,771	15,750	11,357	1,119	135,586	87,366
2005	120%	18,389	3,841	47,471	7,093	32,686	19,423	40,500	18,674	46,441	18,585	17,191	1,128	202,678	68,744
2006	138%	35,336	3,013	54,337	5,667	39,650	20,686	47,757	15,707	53,873	9,944	19,956	1,119	250,911	56,136
2007	64%	10,947	7,840	34,470	10,516	19,757	20,525	25,855	14,578	27,624	10,674	10,454	1,100	129,108	65,233
2008	68%	10,855	7,939	35,850	10,228	20,432	20,243	28,619	18,542	27,759	9,219	11,563	858	135,078	67,029
2009	73%	11,049	6,233	37,416	12,123	21,555	22,891	29,385	14,751	29,359	9,603	12,147	775	140,912	66,376
2010	93%	11,154	6,333	41,987	10,509	26,566	22,514	35,541	20,239	36,863	13,031	14,252	626	166,362	73,252
2011	134%	17,375	7,188	52,182	9,889	35,539	27,089	47,562	21,933	50,619	14,527	19,057	998	222,333	81,624
2012	72%	11,058	9,514	37,315	11,134	21,297	27,220	28,369	26,156	28,905	16,570	11,538	1,048	138,482	91,642
2013	62%	10,644	6,642	34,811	11,536	19,408	26,115	24,795	25,225	24,749	17,907	10,364	721	124,771	88,146
2014	50%	10,393	6,287	31,325	10,849	16,871	22,560	21,241	15,778	20,508	11,347	8,960	946	109,297	67,767
2015	43%	10,103	5,824	30,667	10,521	15,380	19,939	18,671	15,563	18,695	11,873	7,995	925	101,512	64,645
2016	63%	10,392	6,038	34,844	10,842	19,551	22,798	25,634	20,642	25,354	18,829	10,306	984	126,082	80,133
2017	175%	45,270	2,000	67,171	4,399	56,730	22,106	71,201	12,959	66,222	9,243	24,741	915	331,335	51,622
2018	93%	14,351	8,646	41,346	9,588	25,911	23,140	34,601	18,896	35,628	12,050	13,807	973	165,643	73,293
2019	130%	34,481	7,127	53,925	5,670	40,241	21,356	47,748	17,000	49,029	9,994	18,307	973	243,731	62,120
2020	73%	10,986	11,170	37,201	9,437	22,577	18,647	28,626	21,503	28,757	9,949	11,402	985	139,548	71,691
2021	44%	10,294	8,337	30,389	10,901	15,807	11,366	19,538	22,339	18,332	9,128	7,810	1,010	102,169	63,081
2022 (a)	48%	10,777	1,806	29,632	2,094	14,216	10,405	17,882	7,474	20,131	2,536	8,772	157	101,410	24,472
(b) TOTAL		316,448	128,976	807,971	186,180	507,185	431,057	644,735	380,505	671,075	245,053	263,068	18,539	3,210,481	1,390,310
Estimated Apr-Sep 2022 Pumping Limit			187,472		621,791		76,128		264,230		426,021		244,529		1,820,171

(a) Estimated Recharge for the 2022 Water Year; Approximate Pumping for First Half of Water year 2022 (Oct-Mar).

(b) Estimated 20 Year Total for Recharge; actual 19.5 Year Total for Pumping.

(c) Mining caluculations are based Water Year (October-September) instead of Rrunoff Year (April-March).

Table 1.5. LADWP Groundwater Pumping Wells Exempt from ON/OFF Provisions of Water Agreement

Revised: May 6, 2016

Well Number	Wellfield	Duration	Reason
354	Laws	Annual	Sole Source-Town Supply
413 [1]	Laws	Annual	Same as above
422[2]	Laws	Annual	Sole Source-Irrigation; no impact on groundwater dependent vegetation
236[2]	Laws	Irrigation Season	Sole Source-Irrigation
413 E/M[1]	Laws	Irrigation Season	Sole Source – Irrigation for Laws Museum irrigation project
415 [3]	Big Pine	Annual	Sole Source-Town Supply
341	Big Pine	Annual	Same as above
352	Big Pine	Annual	Same as above
375 E/M	Big Pine	Annual	Make-up water for Big Pine Regreening Project up to 150 AF per year
330[4]	Big Pine	Annual	Sole Source-Fish Hatchery
332[4]	Big Pine	Annual	Same as above
409[4]	Big Pine	Annual	Same as above
218	Big Pine	Annual	No impact on groundwater dependent vegetation
219	Big Pine	Annual	Same as above
118	Taboose-Aberdeen	Annual	Same as above
355	Taboose-Aberdeen	Annual	Sole Source- supply 1,600 acre project
351	Thibaut-Sawmill	Annual	Sole Source – Fish Hatchery
356	Thibaut-Sawmill	Annual	Same as above
401	Independence-Oak	Annual	No Impact on groundwater dependent vegetation
59	Independence-Oak	Annual	Same as above
60	Independence-Oak	Annual	Same as above
65	Independence-Oak	Annual	Same as above
383 E/M	Independence-Oak	Annual	Same as above
384 E/M[1]	Independence-Oak	Annual	Same as above
61	Independence-Oak	Irrigation season	Sole Source-Irrigation; no impact on groundwater dependent vegetation
423 E/M	Independence-Oak	Irrigation Season	Same as above
357	Independence-Oak	Annual	Sole Source – Town Supply
384 [1]	Independence-Oak	Annual	Same as above
402 E/M	Symmes-Shepherd	Irrigation season	Sole Source-Irrigation; no impact on groundwater dependent vegetation
343[5]	Bairs-Georges	Annual	Sole Source-irrigation and stock water
425 E/M	Lone Pine	Irrigation Season	Sole Source-Irrigation; no impact on groundwater dependent vegetation
344	Lone Pine	Annual	Sole Source – Town Supply
346	Lone Pine	Annual	Same as above

1. Wells 413 in Laws and 384 in Independence are dual purpose wells to supply water for E/M supply and backup for town domestic supply.
2. Well 422 designated as primary and Well 236 designated as backup irrigation supply.
3. Replaced well W341 as the primary Big Pine town supply.
4. Wells 330, 332, and 409 may only be pumped two at a time, unless pumped for testing or emergencies.
5. Well 343 is exempt in below normal RYs to supplement flow in Georges Creek for irrigation and stock water supply

Table 1.6. Planned Owens Valley Pumping for the First Six Months of 2022-23 RY (AF)

Month	Laws	Bishop	Big Pine	Taboose-Aberdeen	Thibaut-Sawmill	Indep.-Oak	Symmes-Shepherd	Bairs-Georges	Lone Pine	TOTAL
April	1,150-1,300	1,620	1,700-1,950	500-1,175	840-880	980-1,100	200	0-100	120	7,110-8,445
May	1,150-1,300	1,620	1,700-1,950	500-1,175	840-880	980-1,100	200	90-110	120	7,200-8,455
June	1,200-1,400	1,620	1,700-1,950	500-1,175	840-880	980-1,100	200	90-150	120	7,250-8,595
July	1,200-1,400	1,620	1,700-1,950	500-1,175	840-880	980-1,100	200	90-150	120	7,250-8,595
August	1,150-1,400	1,620	1,700-1,950	500-1,175	840-880	980-1,100	200	90-150	140	7,220-8,615
September	1,150-1,400	1,620	1,700-1,950	500-1,175	840-880	960-1,100	200	90-230	140	7,200-8,695
TOTAL	7,000-8,200	9,720	10,200-11,700	3,000-7,050	5,040-5,280	5,860-6,600	1,200	450-890	760	43,230-51,400

Groundwater Level Forecasts

LADWP uses regression models to forecast the approximate changes in groundwater levels in the shallow aquifer. Groundwater pumping for the first six months of the 2022-23 RY will be contingent on environmental conditions, runoff volumes, and water needs assessed during the year. Given the extremely dry year and resulting low recharge of the Owens Valley groundwater aquifers, LADWP forecasts declining groundwater levels during the 2022-23 RY.

The range of planned LADWP groundwater pumping for the first six months of the year by wellfield is included in Table 1.3. Based on the planned groundwater pumping in each wellfield during the first six months of the 2022-23 RY and the potential pumping for the entire year, the forecasted depth-to-water changes between April 1, 2022, and April 1, 2023, in each Owens Valley wellfield and overall in Owens Valley, utilizing select monitoring wells, are presented in Table 1.7.

Table 1.7. Forecasted Change in Average Wellfield Groundwater Levels between April 1, 2022, and April 1, 2023

Wellfield	Planned 2022-23 Pumping (af)	Select Monitoring Wells	Forecast Change in Average Groundwater Level from April 1, 2022 to April 1, 2023 (ft)*
Laws	*8,900 TO 10,710*	*T107, T435, T490, T492*	*-3.35 TO -3.90*
Big Pine	*20,200 TO 23,100*	*T425, T571, T691, 800*	*-1.58 TO -2.32*
Taboose-Aberdeen	*6,000 TO 14,850*	*T502, T586, T801, T803*	*-0.31 TO -1.75*
Thibaut-Sawmill	*10,080 TO 10,920*	*T376, T415, T463, T660*	*-0.68 TO -1.02*
Independence-Oak	*7,000 TO 8,800*	*T407, T409, T453, T809*	*-0.38 TO -1.25*
Symmes-Shepherd	*1,200 TO 2,910*	*T403, T601, T644, V009G*	*+0.09 TO -0.95*
Bairs-George	*930 TO 2,110*	*T398, T400, T444, T652*	*+0.02 TO -0.48*
Owens Valley	*67,210 TO 86,300***	*All Above Monitoring Wells*	*-0.90 TO -1.68*

* Using the forecasted Owens Valley runoff and wellfield planned pumping.

** Including planned pumping in Bishop and Lone Pine.

1.2.1. Laws Wellfield (Figure 1.3)

Monitoring sites L1, L2, and L3 are in ON status. Production wells controlled by these monitoring sites have available production capacities of 12,670, 10,430, and 9,990 AF,

respectively. Wells linked to monitoring site L5 have a capacity of 9,770 AF. Exempt wells within the Laws Wellfield have a capacity of 2,100 AF. The total available pumping capacity in the Laws Wellfield is 44,380 AF. Well 426, associated with monitoring site L2, is used as a backup along with Well 422 as an exempt well irrigation water supply.

LADWP's planned groundwater pumping in the Laws Wellfield for the first six months of 2022-23 RY ranges between 7,000 AF and 8,200 AF, contingent on runoff and operation conditions, water needs, and environmental conditions. Groundwater pumping is planned to supply water for Owens Valley demands, including the town water system, E/M projects, and irrigated lands, and for export to the City.

LADWP, in cooperation with ICWD, conducted a two-month operaional test of modified well W385 between December 2019 and February 2020. Wells W385 and W386 associated with monitoring site L4 were modified in 2014 by sealing the screened zone within the shallow aquifer. The modification resulted in a reduction of pumping capacity in W385 from 10.2 cfs to 2.8 cfs and in W386 from 6.1 cfs to 2.8 cfs based on the initial 24-hour pumping test. The goal of the operational test was to document the effect of well modification and to allow comparison with a similar operational test conducted in 1993-94 based on the effect on nearby shallow groundwater levels both on the north and south of Owens River. Using data collected fron the operational the Bishop-Laws groundwater flow modelst was update and recalibrate. The model can simulate the longer-term operation of W385 and W386 wells.

During the two-month operational test of W385, groundwater levels were monitored at 29 locations. Six wells were designated as trigger wells, and trigger levels were assigned to each well by staff from LADWP, ICWD, and CDFW. During the test, groundwater levels in none of the trigger wells reached the preset trigger levels. W385 pumped 463 AF of water during the pumping test. LADWP spread the same volume of water to the Five Bridges Area during the following RY from Bishop Creek Canal. Staff from LADWP and ICWD prepared a joint report that described the operational test and presented the data collected during the test.

Based on the two-month operational test results at W385, LADWP plans to conduct a similar testing of W386. LADWP has expanded hydrologic monitoring in the vicinity of wells W385 and W386 and is currently collecting baseline hydrologic data. Quarterly monitoring data are being compiled and reports are submitted to ICWD and CDFW. LADWP will prepare and submit a testing plan to Inyo County/Los Angeles Technical Group for consideration. The testing plan for W386 should include a similar monitoring plan and trigger mechanism to the W385 operational test.

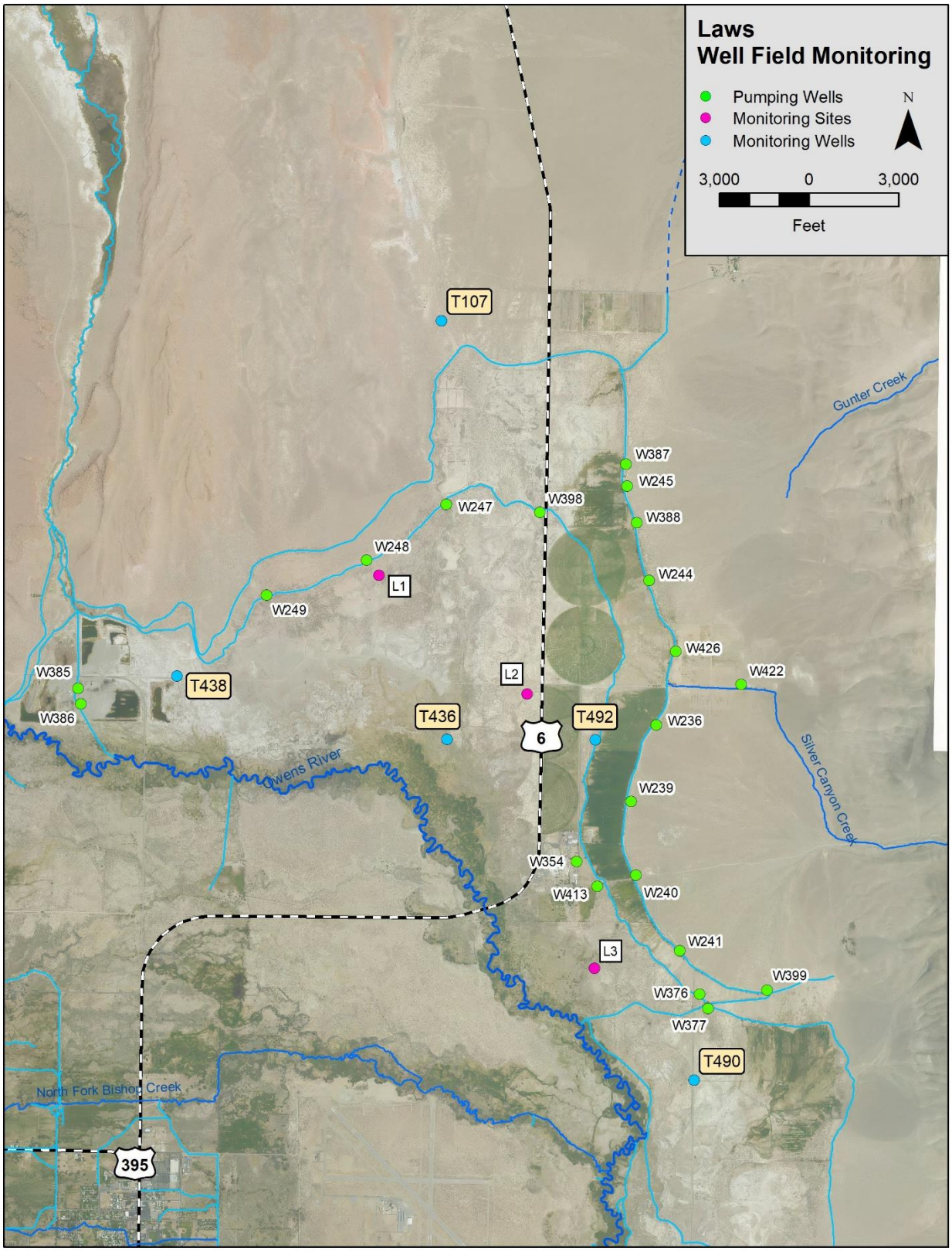


Figure 1.3. Laws Wellfield

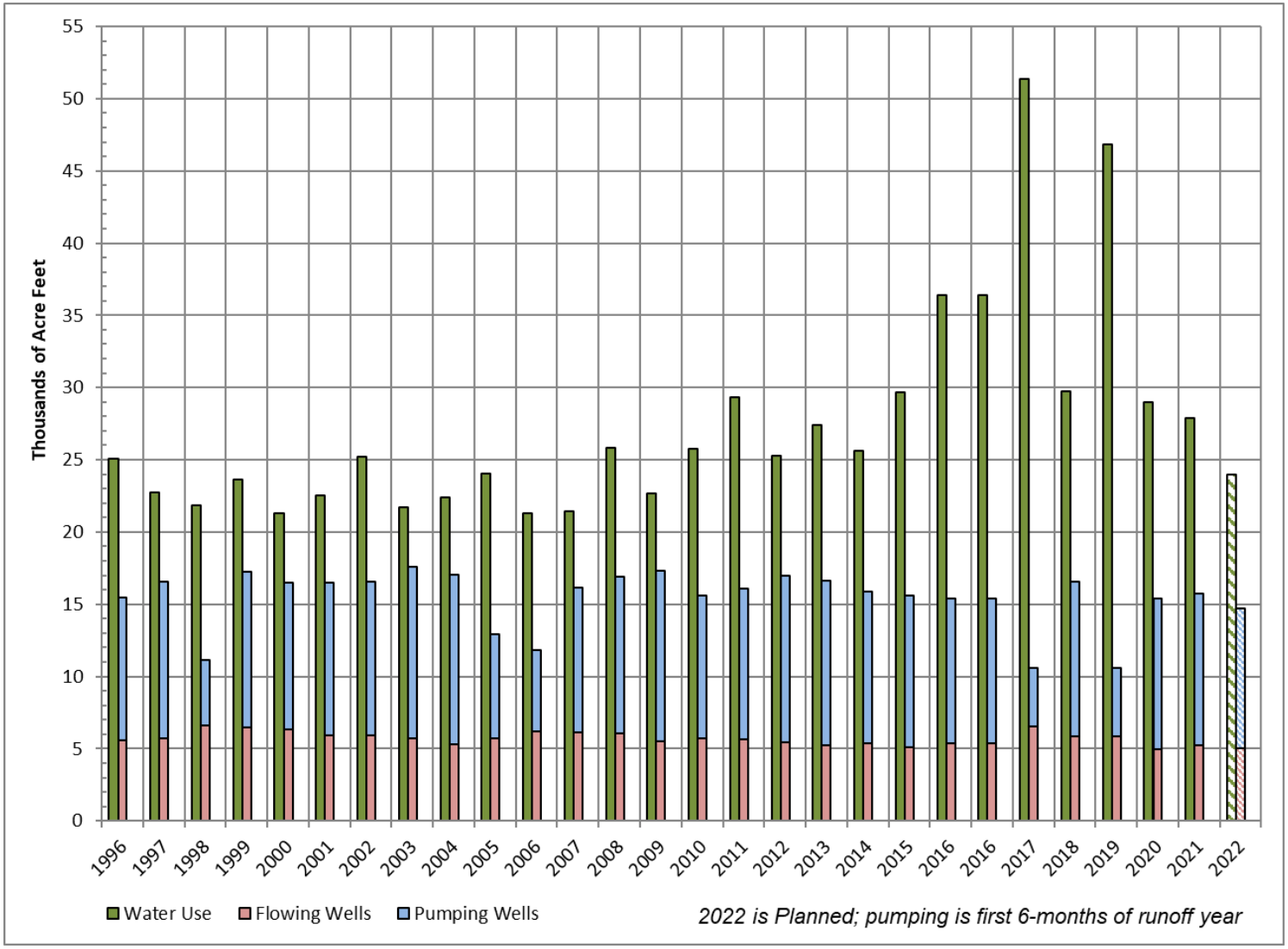
1.2.2. Bishop Wellfield (Figure 1.5)

Figure 1.4 illustrates water use on City-owned Lands on Bishop Cone compared to groundwater extractions (flowing and pumping wells) for RYs 1996 to the present.

Pumping in the Bishop Wellfield is governed by the provisions of the Hillside Decree and the Water Agreement, which limit LADWP's annual groundwater extractions (pumping and flowing wells) from Bishop Cone to an amount commensurate with the total amount of water used on City lands on Bishop Cone (including conveyance and other losses). Beginning with the 2015-16 RY, the audit of water accounting methods were modified to analyze each area's inflows and outflows to calculate total water use. Under the modified audit protocols, the recent years, the total water used on City lands within the Bishop Cone area has been approximately 38,000 AF per year. The total water used during the first six months of 2022-23 RY will be approximately 20,000 AF. The current total available groundwater extraction capacity in Bishop Wellfield is approximately 18,310 AF. The planned groundwater pumping from the Bishop Wellfield for the first six months of 2022-23 RY is 9,720 AF, contingent on runoff condition, water needs, and environmental conditions.

LADWP has had operational issues with well W371 in the past and particularly in the last irrigation season. LADWP drilled well W428 to replace Well W371 in 2021 and plans to pump equip it during the current RY.

Currently, LADWP has no backup wells in Bishop Cone in case of operational issues with any of it supply wells. Installing a well at Site B-2 would provide LADWP with the operational flexibility in supplying water to uses on City-owned lands in Bishop Cone.



**According to the Hillside Decree, total groundwater extraction cannot be more than water use on City-owned land on the Bishop Cone.*

Figure 1.4. Groundwater Extraction (Flowing & Pumping) and Water Use on City Land in Bishop Cone

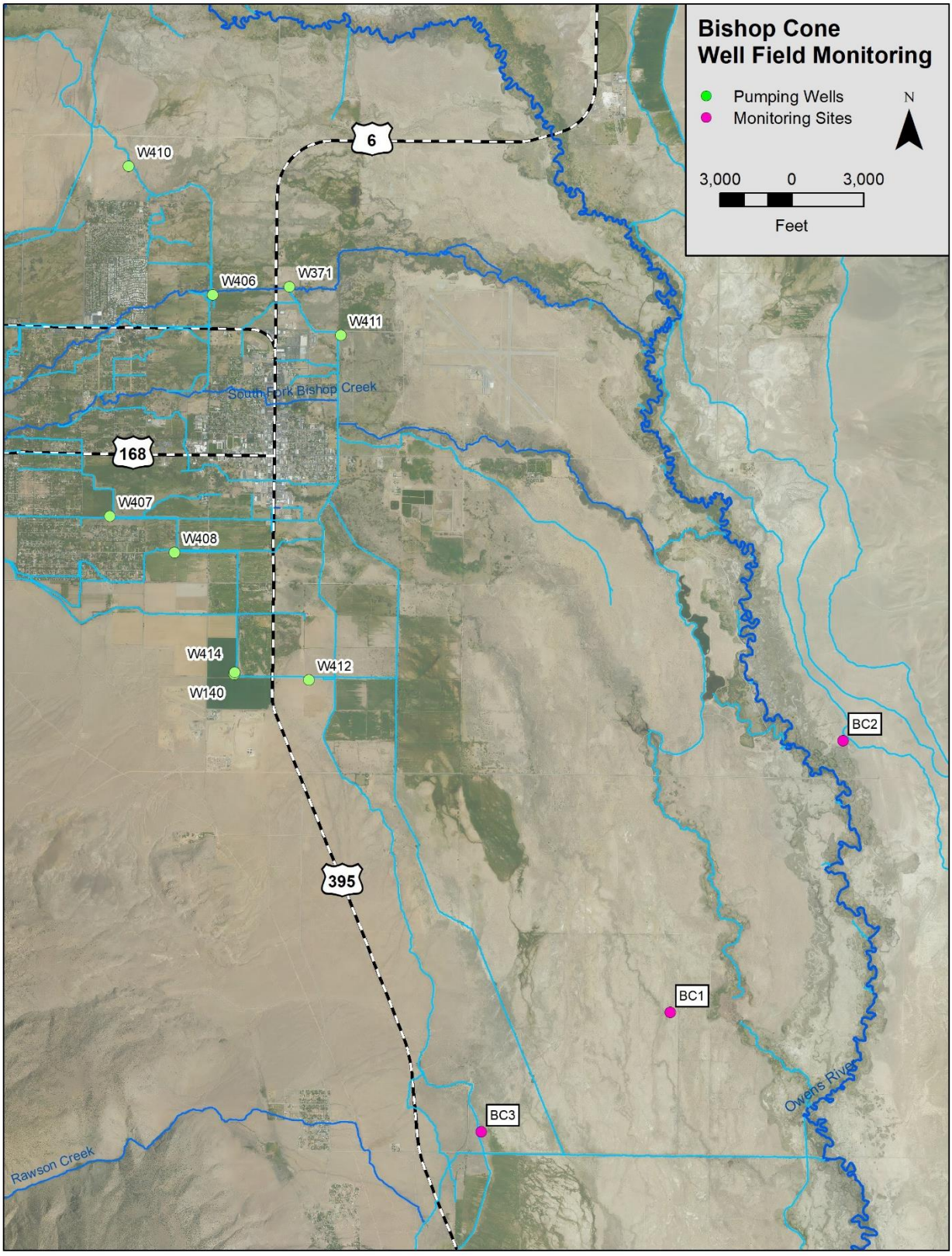


Figure 1.5. Bishop Wellfield

1.2.3. Big Pine Wellfield (Figure 1.6)

Monitoring sites BP1, BP3, and BP4 are in ON status. Production wells controlled by monitoring site BP1 have 10,430 AF pumping capacity, production wells controlled by monitoring site BP3 have 4,850 AF pumping capacity, and production Well 331, controlled by monitoring site BP4, has 7,530 AF pumping capacity. Exempt wells, including Well 218, Well 219, town supply wells, and Fish Springs Fish Hatchery wells in the Big Pine Wellfield, have a combined 27,00 AF pumping capacity. The total available pumping capacity in the Big Pine Wellfield is 50,510 AF. The planned pumping in the Big Pine Wellfield for the first six months of 2022-23 RY ranges between 10,200 AF and 11,700 AF, contingent on runoff conditions, water needs, and environmental conditions.

LADWP installed Well W415 in 2002 to replace Well W341 as the primary town water system source and to provide water to the town ditch system. Following the installation of five new monitoring wells in the vicinity of west Big Pine in 2017 and the completion all permitting requirements, LADWP has transferred the town water system supply to Well W415 and has decommissioned Well W341. Well W341 will be converted to a deep monitoring well utilizing LADWP's next well drilling contract.

A 6-month proposed operational testing W415 has been proposed by ICWD and approved by the Technical Group in order to test the capacity of the well when supplying both the Big Pine water system and the town ditch system. The testing plan includes provision for the protection groundwater-dependent resources, including the Big Pine Paiute Tribe's water supply well. The proposed operational test will not occur this RY.

1.2.4. Taboose-Aberdeen Wellfield (Figure 1.7)

Vegetation monitoring sites TA4, TA5, and TA6 in Taboose-Aberdeen Wellfield are in ON status. Production wells controlled by monitoring site TA4 have 19,400 AF available pumping capacity. Production well W349, controlled by the vegetation monitoring site TA5, has 12,240 AF available pumping capacity. Production wells associated with monitoring site TA6 have 5,720 AF pumping capacity. Exempt wells W118 and W355 have an available pumping capacity of 2,560 AF. The total available groundwater pumping capacity in the Taboose-Aberdeen Wellfield is 39,920 AF. The planned groundwater pumping in the Taboose-Aberdeen Wellfield for the first six months of 2022-23 RY ranges between 3,000 AF and 7,050 AF, contingent on runoff conditions, water needs, and environmental conditions.

1.2.5. Thibaut-Sawmill Wellfield (Figure 1.8)

Vegetation monitoring sites TS2, TS3, and TS4 in Thibaut-Sawmill Wellfield are in ON status. Production well W155, controlled by vegetation monitoring site TS2, has a pumping capacity of 800 AF. Production wells W103, W104, and W382, controlled by vegetation monitoring site TS3, have 2,970 AF of available pumping capacity, and production wells W380 and W381, controlled by vegetation monitoring site TS4, have 4,350 AF of available pumping capacity. Exempt Blackrock Fish Hatchery supply wells W351 and W356 are limited to pump 8,000 AF per year combined based on the resolution of a dispute between Inyo County and LADWP regarding the conditions of the

vegetation parcel BLK94. The total available pumping capacity in the Thibaut-Sawmill Wellfield for the 2022-23 RY is 16,120 AF. The planned pumping in the Thibaut-Sawmill Wellfield for the first six months of the 2022-23 RY ranges between 5,040 AF and 5,280 AF, subject to hatchery demands, runoff conditions, water supply needs, and environmental conditions.

1.2.6. Independence-Oak Wellfield (Figure 1.8)

All vegetation monitoring sites in the Independence-Oak Wellfield are in OFF status. Exempt wells in the Independence-Oak Wellfield have a combined pumping capacity of 12,200 AF. The planned groundwater pumping in the Independence-Oak Wellfield for the first six months of the 2022-23 RY ranges between 5,860 AF and 6,600 AF, subject to runoff conditions, irrigation, and town water system and E/M projects water demand.

Production well W061 in Independence Wellfield is associated with the vegetation monitoring site IO3 and exempt from ON/OFF provisions of the Green Book during the irrigation season as the sole source for an alfalfa field. Well W061 has become inoperable recently. LADWP replaced well W061 with a new well and converted W061 to a multi-string monitoring well.

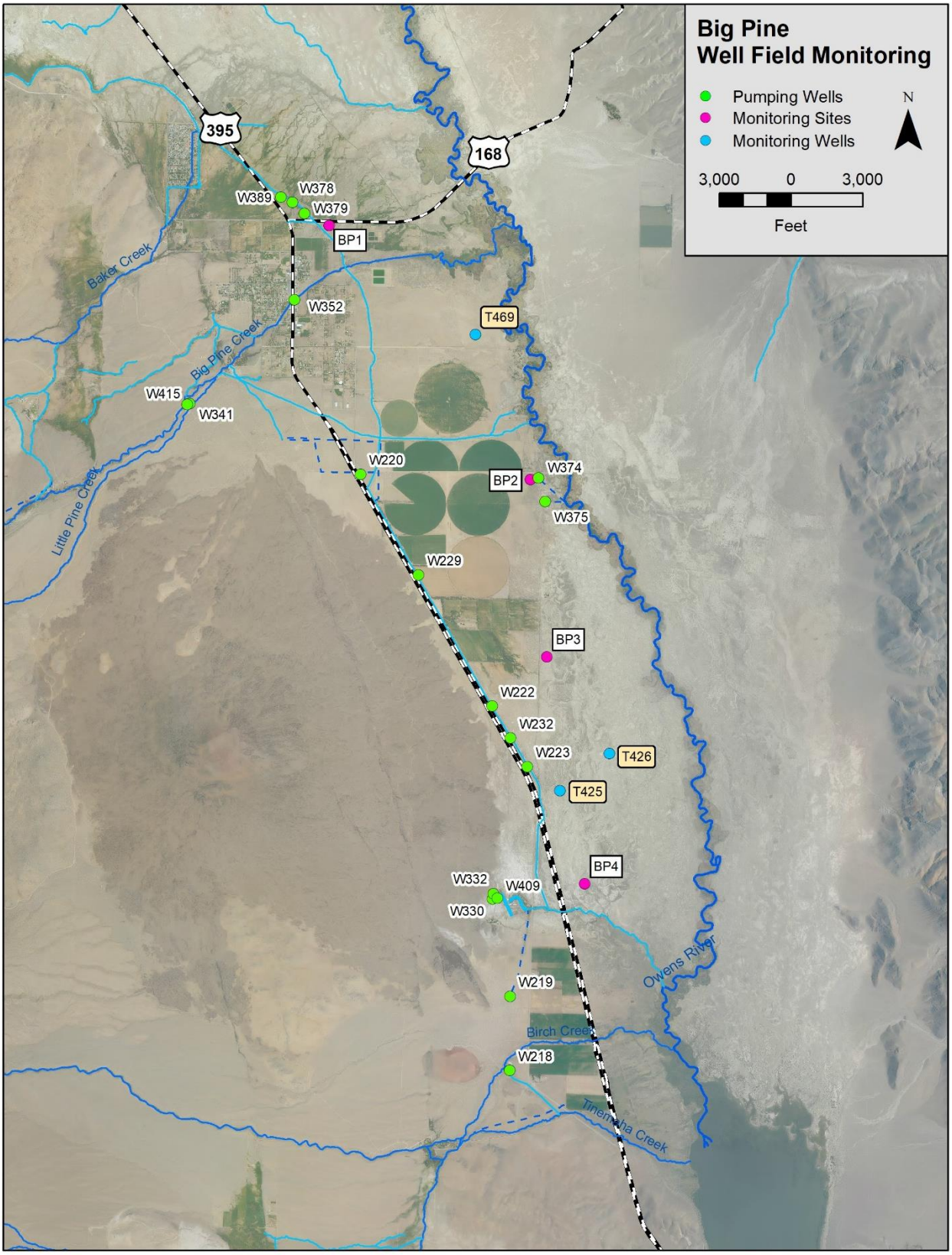


Figure 1.6. Big Pine Wellfield

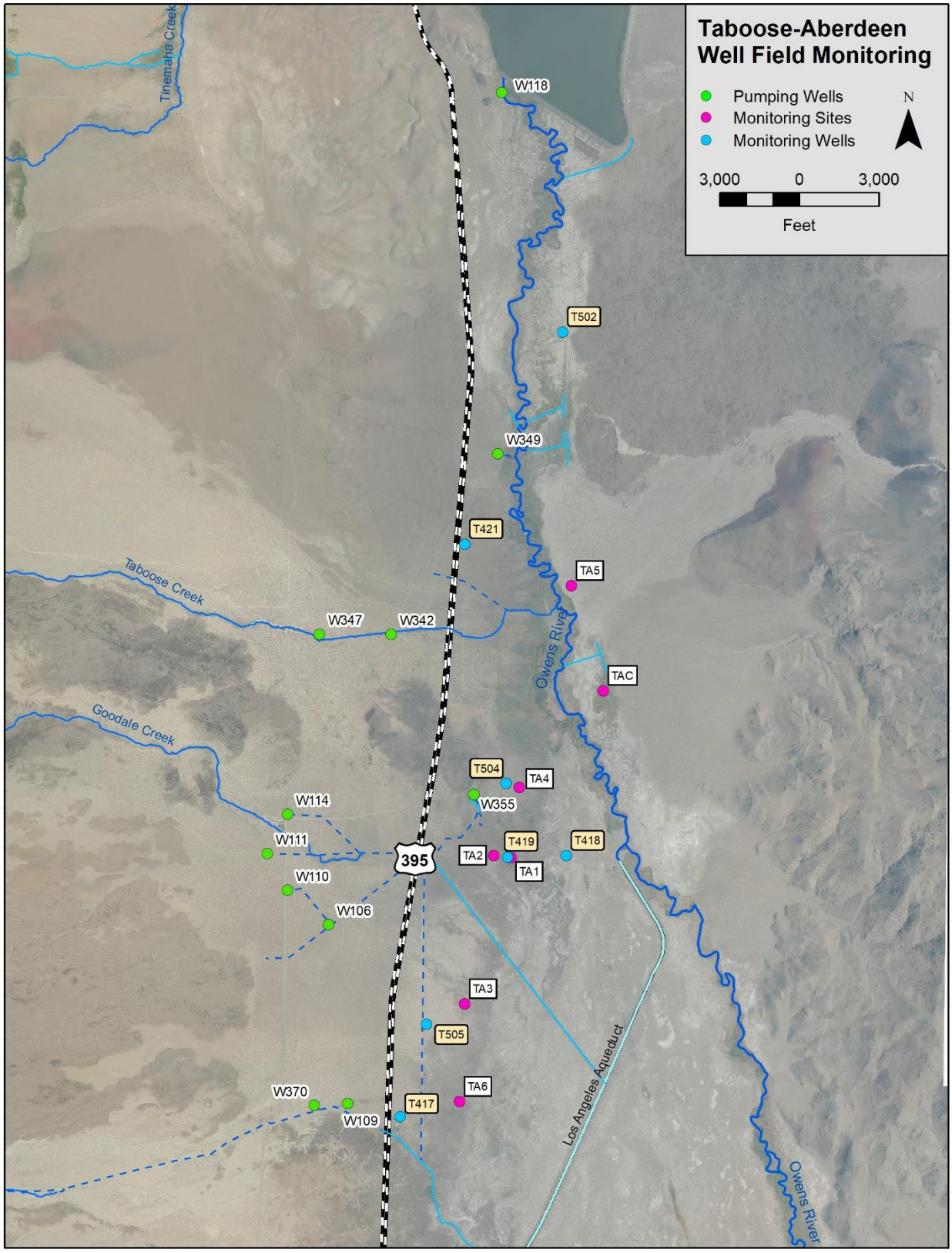


Figure 1.7. Taboose-Aberdeen Wellfield

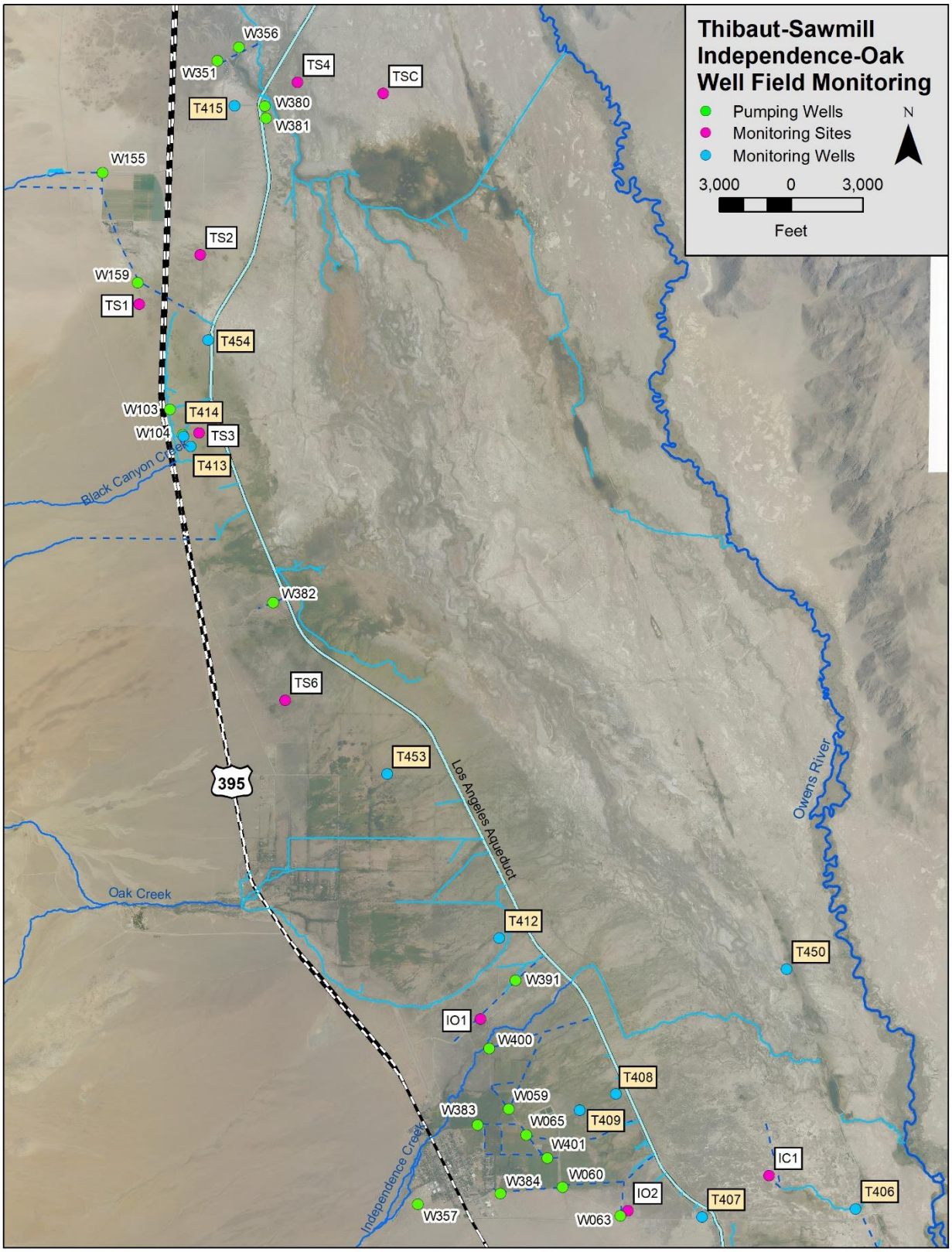


Figure 1.8. Thibaut-Sawmill and Independence-Oak Wellfields

1.2.7. Symmes-Shepherd Wellfield (Figure 1.9)

The vegetation monitoring site SS3 is in ON status. The pumping capacity of wells associated with site SS3 is 5,650 AF. Exempt well W402 has a capacity of about 1,200 AF. The total available pumping capacity in the Symmes-Shepherd Wellfield for the 2022-23 RY is approximately 6,850 AF. The planned pumping in the Symmes-Shepherd Wellfield for the first six months of the 2022-23 RY is approximately 1,200 AF, contingent on runoff conditions, E/M project water needs, and environmental conditions.

LADWP has had difficulty operating well W402 in recent years, specifically during the peak of summer, when water demand for irrigation is the highest. As a result, LADWP replaced W402 last year and plans to equip the replacement well during the 2022-23 runoff to meet the water demand of the lessee for irrigation.

1.2.8. Bairs-Georges Wellfield (Figure 1.9)

Vegetation monitoring site BG2 is in ON status. The wells controlled by this monitoring site have a combined 2,880 AF pumping capacity. Well W343 is exempt for pumping approximately 500 AF (based upon a six-month exemption period in dry years). The current available pumping capacity in the Bairs Georges Wellfield for the 2022-23 RY is approximately 2,830 AF. Planned groundwater pumping in the Bairs Georges Wellfield for the first six months of 2022-23 RY ranges between 450 and 890 AF, contingent on runoff conditions, water needs, and environmental conditions. In this wellfield, LADWP has replaced well W076, which has been out of operation in recent years. The replacement well W430 will be pump-equipped during the 2022-23 RY.

1.2.9. Lone Pine Wellfield (Figure 1.10)

Lone Pine exempt wells are town supply wells W344 and W346, and E/M project supply Well W425. These three wells have an annual available pumping capacity of approximately 980 AF.

The planned groundwater pumping from Lone Pine Wellfield during the first six months of the 2022-23 RY is approximately 760 AF, contingent on runoff conditions, water supply needs, and environmental conditions.

Well W416 is a production well in the Lone Pine Wellfield, drilled in 2002. An operational pumping test was conducted on Well W416 during the 2009 RY. This well was modified in 2014 to seal the screen portion of the well within the shallow aquifer. LADWP is planning to equip and conduct the initial operation of this well. If the initial operation is performed during the 2022-23 RY, it will be in addition to the currently planned pumping from Lone Pine Wellfield. LADWP has requested the Technical Group to designate a vegetation monitoring site for this well.

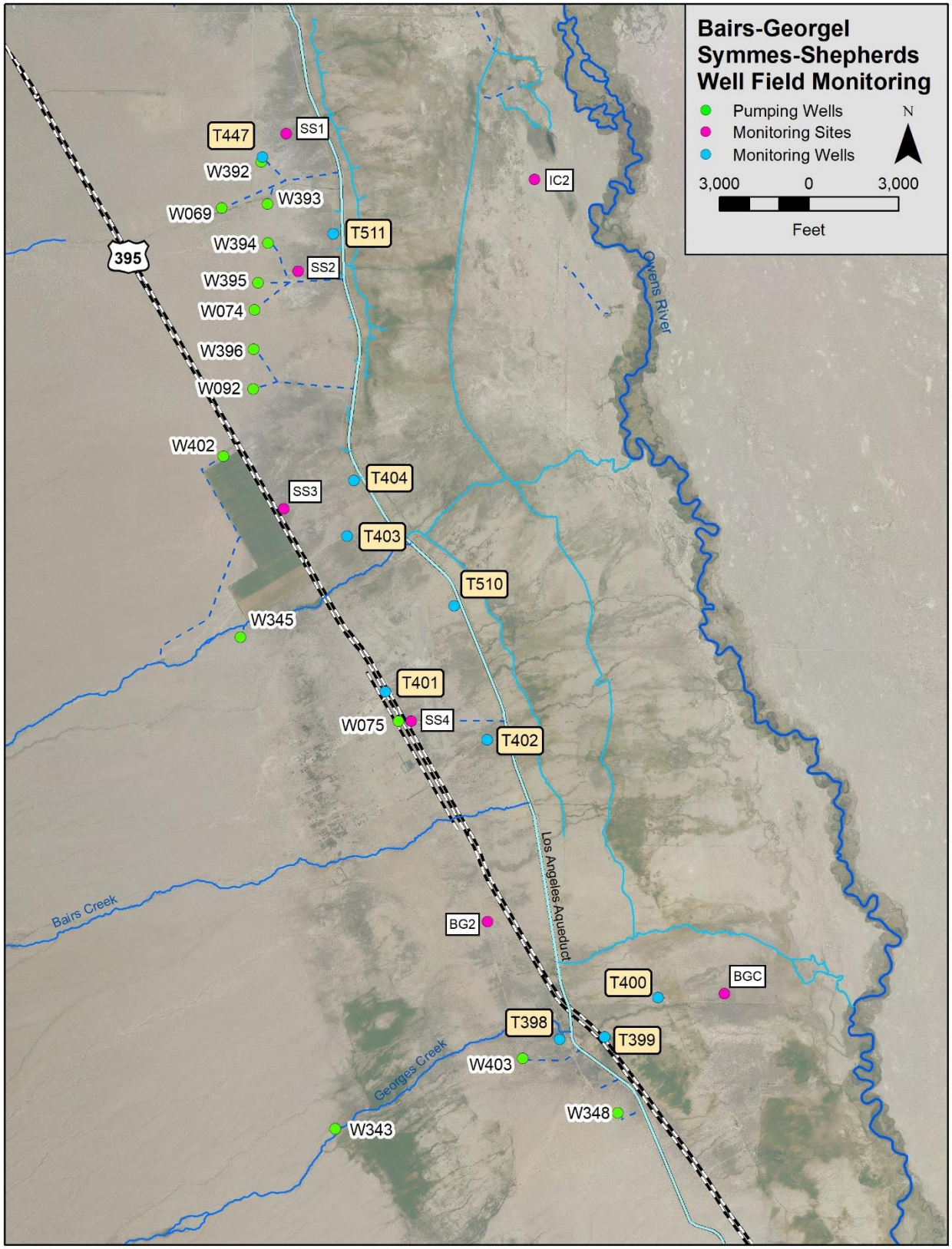


Figure 1.9. Symmes-Sheperds and Bairs-Georges Wellfields

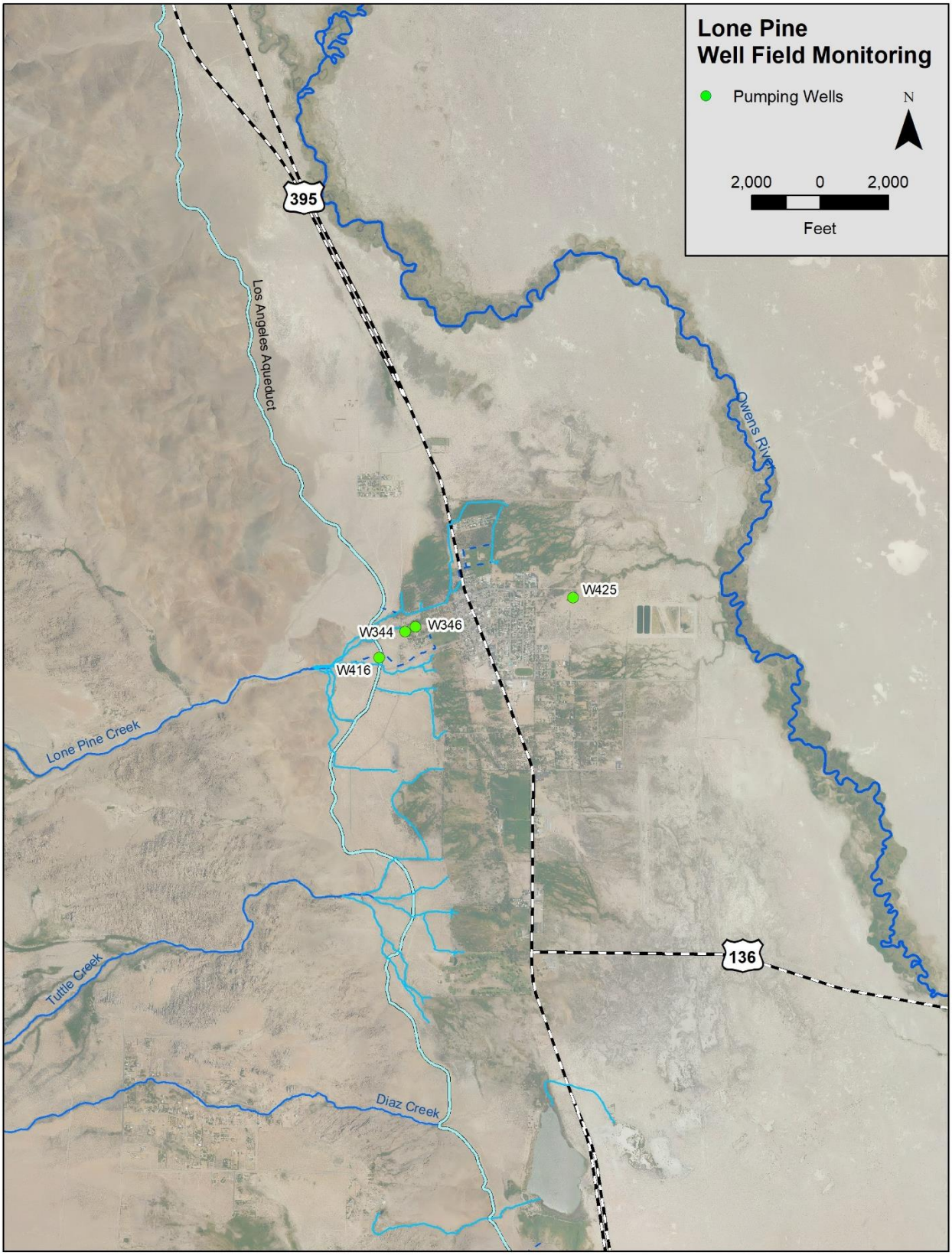


Figure 1.10. Lone Pine Wellfield

1.3. Owens Valley Uses (Including E/M Projects)

Table 1.8 shows the historical (1981-82) uses and the planned monthly uses on City-owned lands within the Owens Valley for the 2022-23 RY. The in-valley uses shown in Table 1.8 consist of irrigation, stockwater, recreation and wildlife projects, E/M projects supply, LORP usage, and 1600 AF Projects. As shown in Table 1.8 and Figure 1.11, LADWP plans to provide approximately 78,890 AF for in valley uses on City-owned lands this RY.

Releases to the LORP from the LAA Intake facility began on December 6, 2006. An average flow of over 40 cfs is now maintained throughout the entire 62 mile stretch of the Lower Owens River, south of the Intake structure. When needed, the releases at the Intake are augmented through additional releases at the Independence, Blackrock, Georges, Locust, and Alabama Spill Gates to maintain required flows in the river channel. Table 1.8 shows projected 2022-23 RY water use by the LORP on a monthly basis, totaling 18,100 AF. Total LORP uses include the Lower Owens River, Owens Delta, Blackrock Waterfowl Management Area, and project associated losses.

The Water Agreement provides that "... E/M projects shall continue to be supplied by E/M wells as necessary." Due to the monitoring sites controlling some of the production wells supplying E/M projects being in OFF status, the amount of water supplied to E/M projects has often exceeded the amount of water provided by E/M project supply wells. In the past, LADWP chose to supply certain E/M projects from surface water sources. Future E/M allotments may be influenced by the availability of E/M wells and operational demands. Table 1.9 shows the planned water supply to E/M projects and the forecast imbalance between the E/M project water use and the E/M project groundwater supply through the end of the 2022-23 RY. E/M project water demands during the 2022-23 RY are expected to be approximately 1,300 AF greater than E/M groundwater pumping. The cumulative E/M water supply shortfall, that began accumulating in the 1992-93 RY, will be approximately 205,000 AF by the end of the 2022-23 RY.

The Technical Group is currently evaluating the water supply issues associated with the E/M projects and will provide its findings to the Inyo/Los Angeles Standing Committee. It is expected that the Standing Committee will be requested to take the appropriate action necessary to ensure water supplied to E/M projects is in conformance with the provisions of the Water Agreement.

Table 1.8. Water Uses on City Owned Lands in Owens Valley – Actual Use in 1981-82 and Planned Use in RY 2022-23 (AF)

Use	April		May		June		July		August		September		TOTAL Apr-Sep	
	1981	2022	1981	2022	1981	2022	1981	2022	1981	2022	1981	2022	1981	2022
Irrigation	3,980	4,320	7,958	5,990	10,373	7,480	9,476	7,230	8,295	6,430	6,321	3,130	**46,403**	34,580
Stockwater	1,141	830	1,319	920	1,244	910	1,245	990	1,219	860	1,319	770	**7,487**	5,280
E / M	0	1,190	0	1,120	0	1,290	0	1,090	0	910	0	860	**0**	6,460
LORP	0	800	0	1,500	0	2,900	0	2,800	0	2,400	0	2,600	**0**	13,000
Rec. & Wildlife	379	410	804	590	1,160	730	1,455	770	1,381	550	1,406	560	**6,585**	3,610
1600 ACFT Proj.	0	80	0	80	0	70	0	100	0	50	0	50	**0**	430
Total	***5,500***	***7,630***	***10,081***	***10,200***	***12,777***	***13,380***	***12,176***	***12,980***	***10,895***	***11,200***	***9,046***	***7,970***	***60,475***	***63,360***

Use	October		November		December		January		February		March		TOTAL Oct-Mar		TOTAL Apr-Mar	
	1981	2022	1981	2022	1981	2022	1982	2023	1982	2023	1982	2023	81-82	21-22	81-82	21-22
Irrigation	263	30	0	0	0	0	0	0	0	0	14	140	**277**	170	**46,680**	34,750
Stockwater	1,065	860	1,045	910	1,050	790	1,007	720	1,010	630	1,098	820	**6,275**	4,730	**13,762**	10,010
E / M	0	480	0	270	0	250	0	290	0	270	0	320	**0**	1,880	**0**	8,340
LORP	0	2,000	0	1,300	0	500	0	300	0	400	0	600	**0**	5,100	**0**	18,100
Rec. & Wildlife	781	820	713	480	565	470	478	240	342	240	447	230	**3,326**	2,480	**9,911**	6,090
1600 ACFT Proj.	0	230	0	120	0	200	0	200	0	200	0	220	**0**	1,170	**0**	1,600
Total	***2,109***	***4,420***	***1,758***	***3,080***	***1,615***	***2,210***	***1,485***	***1,750***	***1,352***	***1,740***	***1,559***	***2,330***	***9,878***	***15,530***	***70,353***	***78,890***

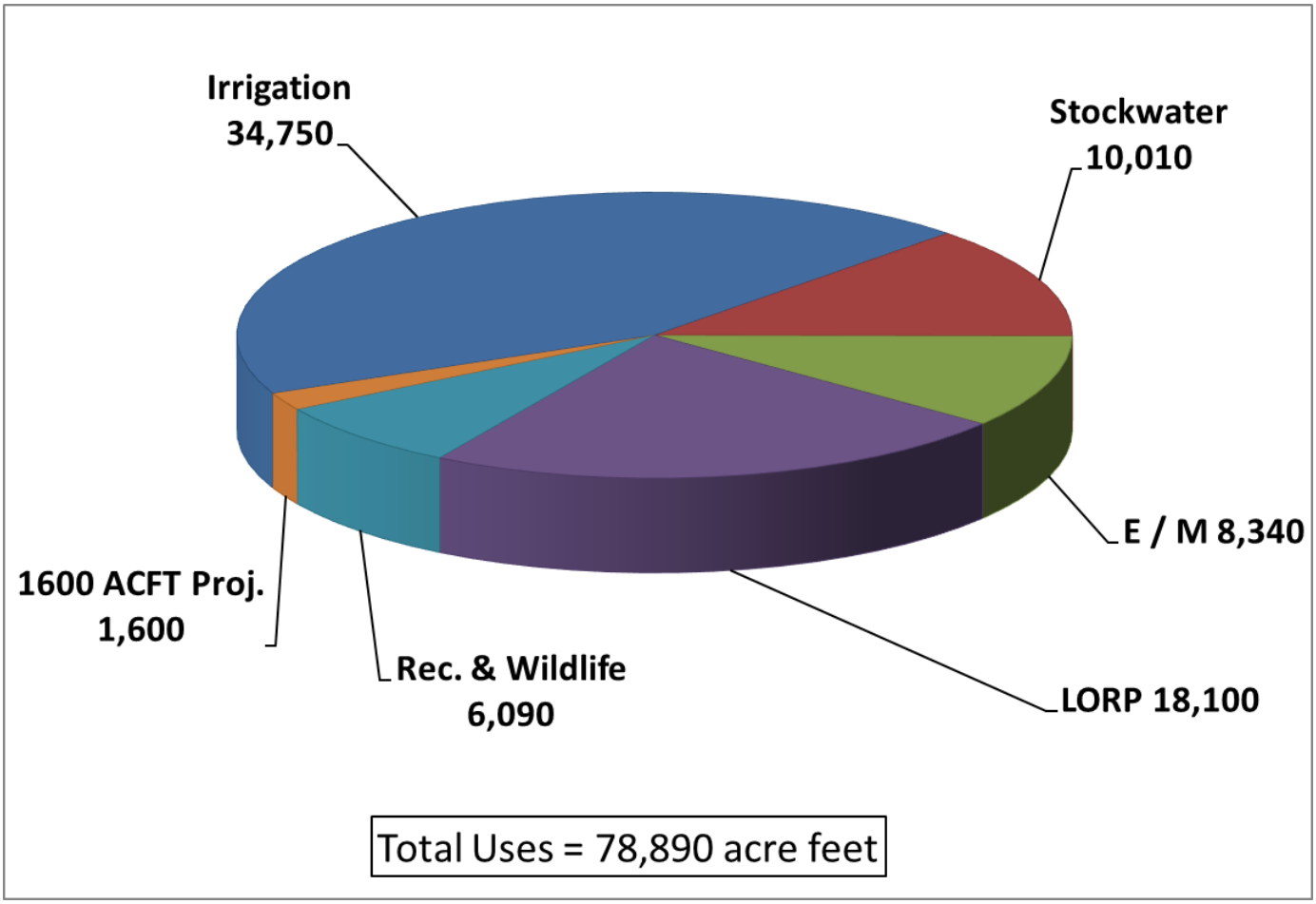


Figure 1.11. Distribution of Planned Owens Valley Water Use on City Owned Lands for 2022-23 RY

Table 1.9. Owens Valley Groundwater Pumping and E/M Water Use (1992-93 through 2022-23 RY (AF))

Runoff Year	Owens River Basin Runoff (1)	Total Pumping	Non-E/M Pumping	E/M Pumping	E/M Water Uses	E/M Pumping & Use Imbalance	Cumulative E/M Pumping & Use Imbalance
1992-93	62%	84,453	70,688	13,765	18,357	-4,592	-9,319
1993-94	108%	76,329	67,338	8,991	19,310	-10,319	-19,638
1994-95	68%	89,219	78,209	11,010	20,812	-9,802	-29,440
1995-96	156%	69,752	57,180	12,572	22,943	-10,342	-39,782
1996-97	137%	74,904	57,981	16,923	23,949	-7,026	-46,808
1997-98	126%	66,914	52,760	14,154	21,608	-7,346	-54,154
1998-99	151%	51,574	47,353	4,221	19,672	(3)	-54,154
1999-00	90%	63,675	59,342	4,333	24,452	-20,117	-74,271
2000-01	85%	67,795	61,456	6,339	20,782	-14,272	-88,543
2001-02	84%	73,349	70,055	3,294	21,815	-18,521	-107,064
2002-03	68%	81,979	76,059	5,920	21,394	-15,474	-122,538
2003-04	83%	87,732	80,734	6,998	21,116	-14,118	-136,656
2004-05	79%	85,820	78,110	7,710	18,918	-10,617	-147,273
2005-06	138%	56,766	51,695	5,071	20,032	-14,285	-161,558
2006-07	148%	58,621	53,925	4,696	17,357	(3)	-161,558
2007-08	61%	60,338	53,413	6,925	11,565	-4,640	-166,198
2008-09	75%	68,971	61,053	7,918	10,646	-2,728	-168,926
2009-10	79%	64,138	57,946	6,192	10,697	-4,505	-173,431
2010-11	104%	78,248	71,233	7,015	10,407	-3,392	-176,823
2011-12	142%	91,699	84,365	7,334	11,462	-4,128	-180,951
2012-13	58%	88,689	83,034	5,655	9,257	-3,602	-184,553
2013-14	55%	78,809	73,678	5,131	8,222	-3,091	-187,644
2014-15	53%	66,625	60,735	5,890	9,510	-3,620	-191,264
2015-16	48%	70,344	65,220	5,124	8,413	-3,289	*-194,553*
2016-17	82%	76,000	70,730	5,270	10,903	-5,633	-196,897
2017-18	202%	47,511	44,571	2,940	11,554	(3)	-196,897
2018-19	97%	84,774	77,824	6,950	9,813	-2,863	-199,760
2019-20	154%	53,453	49,832	3,621	11,063	(3)	-199,760
2020-21	74%	73,313	64,533	8,780	9,246	-466	-200,226
2021-22	*45%*	*62,800*	*56,300*	*6,500*	*10,100*	*-3,600*	*-203,826*
2022-23	*47%*	*(2)*		*7,000*	*8,340*	*-1,340*	*-205,166*

(1) Based on applicable 50-year mean

(2) See Section 1.2 for Owens Valley pumping discussion

(3) surface water was available

1.4. Aqueduct Operations

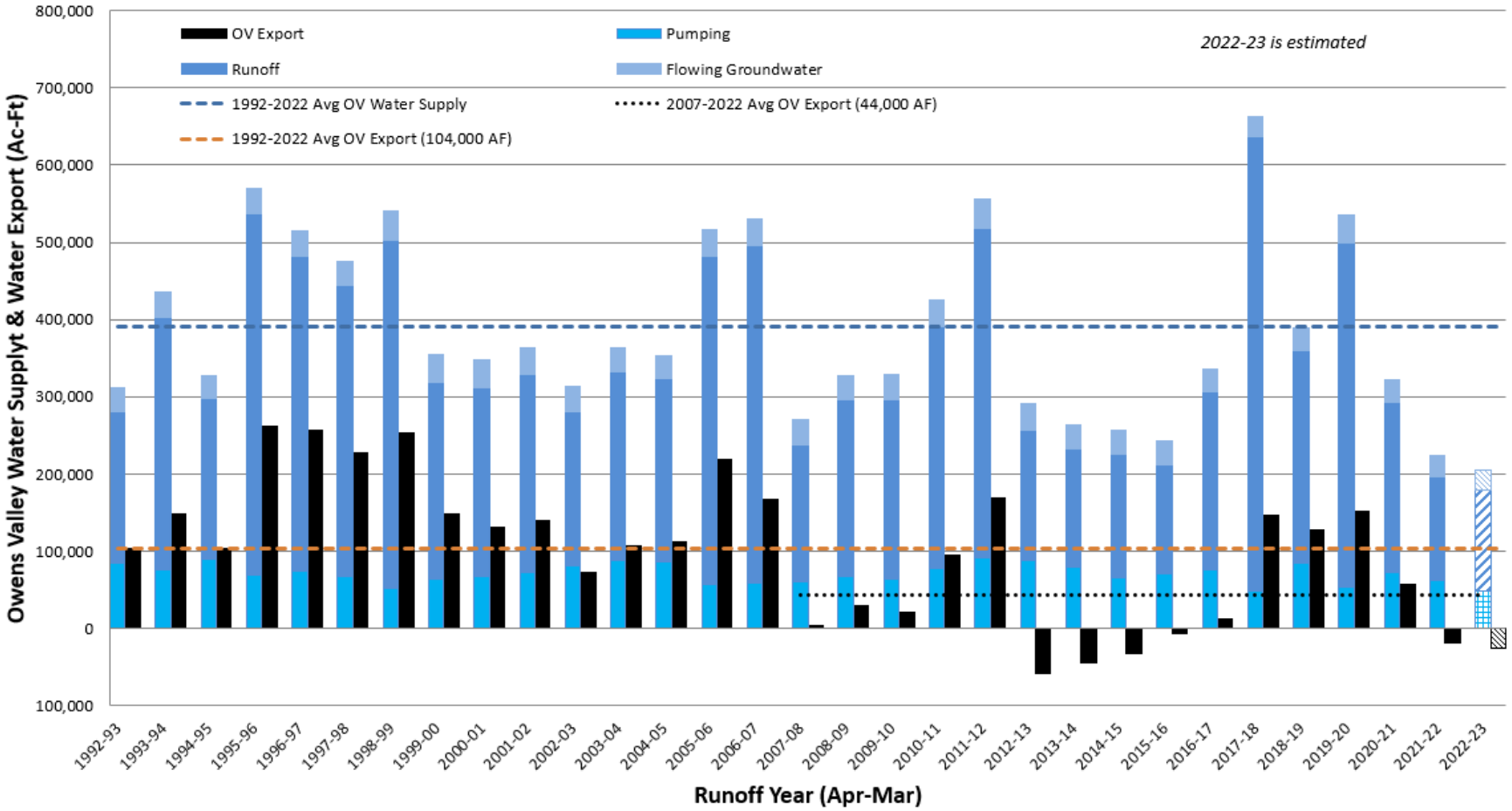
Table 1.10 shows planned LAA reservoir storage levels and monthly deliveries to Los Angeles. Based on this plan, approximately 62,700 AF will be exported from Eastern Sierra to the City during the 2022-23 RY. Of this amount, 0 AF will come from the Owens Valley water supply. Figure 1.12 shows historical Owens Valley water supply (made up of flowing groundwater, runoff, and pumping) alongside the amount of this water exported to Los Angeles.

Prior to the building of the Second LAA in 1971, 38% of Owens Valley Water Supply was exported to Los Angeles on an annual basis. The 1991 EIR projected 44% of Owens Valley Water Supply being exported to Los Angeles annually. However, since implementation of the Water Agreement, on average, 27% of the Owens Valley water supply has been exported to Los Angeles.

In the 2021-22 RY, 19,800 AF was imported from the Mono Basin and from Long Valley to the Owens Valley in order to provide water for uses in excess of the Owens Valley water supply. No water originating in the Owens Valley was exported for water supply to Los Angeles in the 2021-22 RY. For RY 2022-23, an estimated 24,800 AF will be imported into the Owens Valley to provide water for uses in excess of the Owens Valley water supply.

Table 1.10. Planned LAA Operations for 2022-23 RY

Month	Owens Valley-Bouquet Reservoir Storage 1st of month Storage (acre-feet)	Exports from Eastern Sierra (acre-feet)
April, 2021	*186,600*	*0*
May	*192,400*	*6,800*
June	*181,600*	*6,500*
July	*173,300*	*6,800*
August	*164,700*	*6,800*
September	*154,900*	*1,800*
October	*139,500*	*0*
November	*138,800*	*4,500*
December	*147,600*	*9,900*
January, 2022	*153,900*	*9,400*
February	*162,100*	*6,900*
March	*168,500*	*3,300*
TOTAL	***-18,100***	***62,700***



Note: The blue bar made up of Runoff, Flowing Groundwater, and Pumping is the Owens Valley water supply.
The black bar is the amount of the Owens Valley water supply exported to Los Angeles. The black bar is below 0 in certain RYs because the Owens Valley uses exceeded the supply and imported water was used to meet the water demands.

Figure 1.12 Owens Valley Supply and Export

1.5. Water Exports to Los Angeles

Figure 1.13 provides a record of water exports from the Eastern Sierra to Los Angeles since 1970. Figure 1.14 shows the LAA contribution to the City water supply relative to other sources and the total annual water supplied to Los Angeles since 1970. LADWP estimates that the City will require about 480,000 AF of water during the 2022-23 RY. Water from the Owens Valley will make up 0% of the 2022-23 supply for Los Angeles, while water from the entire Eastern Sierra will make up about 11% of the total supply. The percentages of other sources (Metropolitan Water District of Southern California, Los Angeles area aquifers, local groundwater, stormwater capture, and recycled water) are still in the planning stages as of publication of this report.

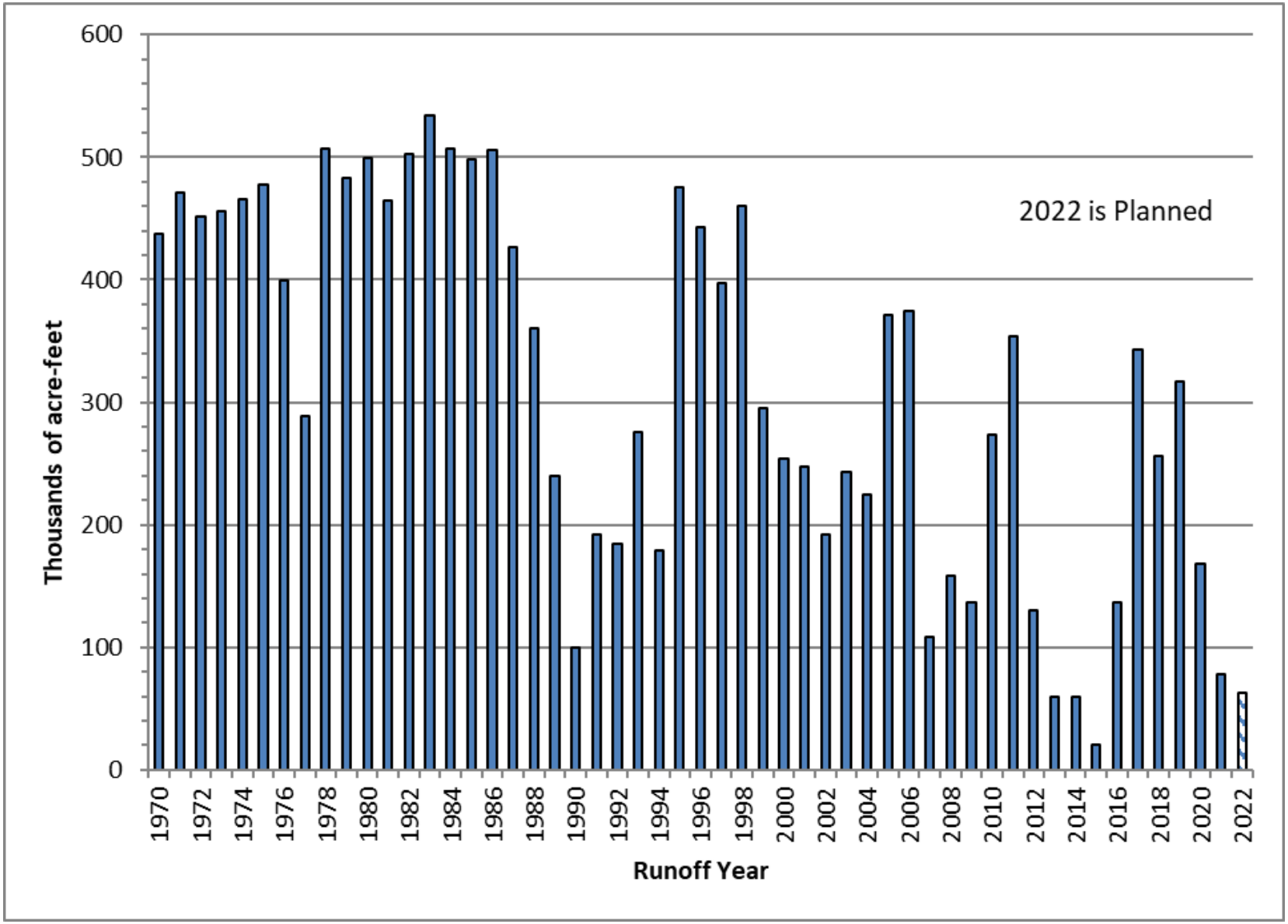


Figure 1.13. Water Export from Eastern Sierra to Los Angeles

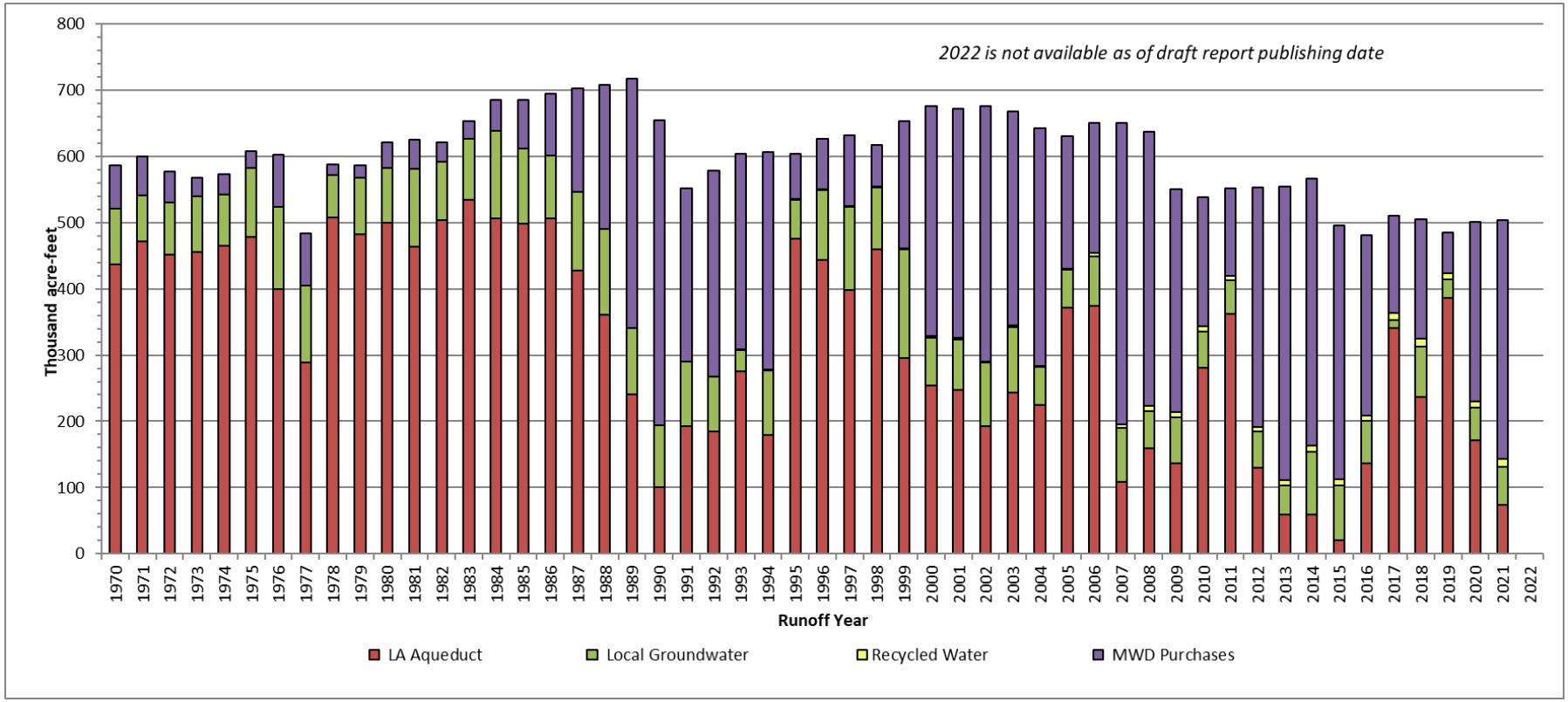


Figure 1.14. Sources of Water for the City

CONDITIONS IN THE OWENS VALLEY

2.0 CONDITIONS IN THE OWENS VALLEY

As of April 1, 2022, the Eastern Sierra overall snowpack was measured to be 41% of normal (Tables 2.2). Owens River Basin runoff during the 2022-23 RY is forecast to be 194,300 AF or approximately 47% of normal (Section 1, Table 1.1). Owens Valley floor precipitation during the 2021-22 RY was about 62% of average (Table 2.3). Overall, vegetation cover in the Owens Valley is comparable to mid-1980s baseline conditions. A graphical summary of Owens Valley conditions is provided in Figure 2.1. Groundwater levels are generally stable in most areas of the valley, based on depth to water in selected monitoring wells in each of LADWP's nine wellfields, as shown in Figures 2.2 through Figure 2.10.

2.1. Well ON/OFF Status

The Water Agreement includes the vegetation protection provisions of linking pumping wells to specific monitoring sites. If the available soil moisture measured at a vegetation monitoring site is not sufficient to meet the estimated demands of the vegetation associated with that monitoring site, the wells linked to that site are designated as being in the OFF status and may not be operated. The wells linked to a monitoring site may be operated if the available soil water is determined to be sufficient to have met the estimated water requirements of the vegetation at the time that the associated wells were designated as being in the OFF status. The Green Book includes the complete well ON/OFF procedures. Table 2.1 provides a listing of Owens Valley monitoring site ON/OFF status as of April 2022, the monitoring wells associated with each monitoring site, and the linked pumping wells.

Some pumping wells are designated as being exempt from linkage to vegetation sites and the ON/OFF provisions of the Water Agreement because these wells are in areas that cannot cause significant adverse impacts to the vegetation or because these wells have been determined by County and LADWP to be a necessary source of water. A list of exempt wells and the reasons for exemption are included in Section 1, Table 1.5.

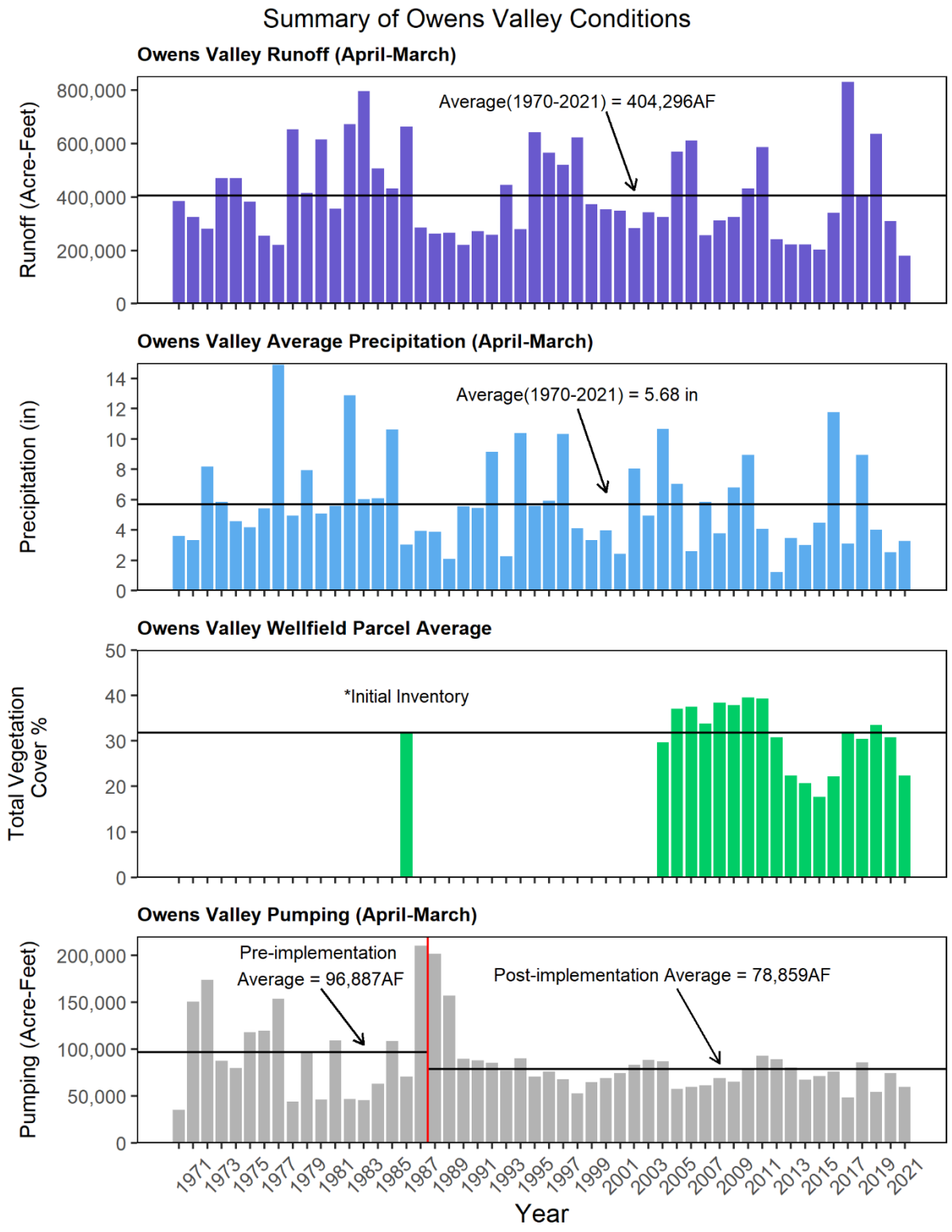


Figure 2.1. Summary of Owens Valley Conditions

Table 2.1. Owens Valley Monitoring Site Status (ON/OFF) as of April 2022

Wellfield	Monitoring Site	Monitoring Well	Pumping Wells	E/M Wells	ON/OFF Status
Laws	L1	795T	247, 248, 249, 398		ON
	L2	USGS 1	236*, 239, 243, 244		ON
	L3		240, 241, 242	376, 377	ON
	L4a, L4b			385, 386	na
	L5**		245	387, 388	na
	Exempt		236*, 354, 422, 413		Exempt
Bishop	All wells		140, 411, 410, 371		na
			406, 407, 408, 412		na
Big Pine	BP1	798T	210, 352	378, 379, 389	ON
	BP2	799T	220, 229, 374		OFF
	BP3	567T	222, 223, 231, 232		ON
	BP4	800T	331		ON
	Exempt		218, 219, 330, 332, 341, 352, 375, 415		Exempt
Taboose-Aberdeen	TA3	505T	106, 110, 111, 114		OFF
	TA4	586T	342, 347		ON
	TA5	801T	349		ON
	TA6	803T	109, 370		ON
	Exempt		118		Exempt
Thibaut-Sawmill	TS1	807T	159		OFF
	TS2	T806	155		ON
	TS3	454T	103, 104	382	ON
	TS4	804T		380, 381	ON
	Exempt		351, 356		Exempt
Independence-Oak	IO1	809T	391, 400		OFF
	IO2	548T	63		OFF
	Exempt		59, 60, 61, 65, 401, 357, 384*	383, 384	Exempt
Symmes-Shepherd	SS1	USGS 9G	69, 392, 393		OFF
	SS2	646T	74, 394, 395		OFF
	SS3	561T	92, 396		ON
	SS4	811T	75, 345		OFF
	Exempt			402	Exempt
Bairs-Georges	BG2	812T	76, 343*, 348, 403		ON
	Exempt		343*		na
Lone Pine	Exempt		344, 346	425	Exempt
	Other		416		na

2.2. Groundwater Level Fluctuations

LADWP Water Operations hydrographers monitor groundwater levels in over 900 monitoring wells throughout the Owens Valley on a regular basis, which has allowed the evaluation of groundwater levels since the early 1970s when LADWP began to utilize groundwater resources on a more consistent basis. This section presents hydrographs of the average groundwater levels in each wellfield and overall in the Owens Valley. Groundwater levels in select monitoring wells were used to calculate the average groundwater level for each wellfield. Four monitoring wells were selected per wellfield, listed in Table 2.2 using the following criteria: 1) be representative of the shallow aquifer that support vegetation, 2) be located spatially distributed throughout the wellfield, and 3) have groundwater level measurements back to early 1970s.

Table 2.2 Selected Monitoring Wells in Each Wellfield Used to Prepare Hydrographs

Wellfield	Monitoring Wells
Laws	*T107, T436, T438, T490*
Bishop	*T389, T390, T485, T501*
Big Pine	*T425, T426, T469, T470*
Taboose-Aberdeen	*T417, T419, T421, T502*
Thibaut-Sawmill	*T413, T414, T415, T454*
Independence-Oak	*T406, T408, T412, T453*
Symmes-Shepherd	*T402, T403, T440, T511*
Bairs-George	*T398, T400, T444, V087*
Lone-Pine	*T446, V015N, V172, V256*

A summary of the data analyzed is presented in Table 2.3, showing average wellfield pumping, Owens River Basin runoff, and DTW, for the 1991 through 2021 RYs.

The last row of the table shows the same information for the entire Owens Valley based the data from all of the monitoring wells in Table 2.2.

Table 2.3 Average Pumping and Groundwater Levels since 1991 ROY

Wellfield	Average (1991-2021 ROYs)	
	Pumping (AF)	DTW§ (FT)
Laws	*6,880*	*-16.0*
Bishop	*9,547*	*-12.4*
Big Pine	*22,791*	*-17.1*
Taboose-Aberdeen	*7,631*	*-20.6*
Thibaut-Sawmill	*11,655*	*-12.4*
Independence-Oak	*8,295*	*-5.6*
Symmes-Shepherd	*3,002*	*-6.6*
Bairs-George	*682*	*-7.0*
Lone Pine	*1,019*	*-17.7*
Owens Valley	***71,502***	***-12.8***

§ Average distance to groundwater is calculated using 1992-2022 April 1 values.

The following figures show graphically the change in average groundwater level with Owens River Basin runoff and pumping for each of the wellfields and for the overall Owens Valley from the early 1970s to the 2021 RY The figures also show the correlation coefficient of the average wellfield DTW with both runoff and pumping. The correlation coefficient (r value) represents the statistical relationship between two variables and can vary between 0.0 and 1.0 for positively related variables and between -1.0 and 0.0 for negatively related variables. The closer the correlation coefficient is to 1.0 or -1.0, the stronger relationship between the two variables.

A review of Table 2.3 and the following wellfield and overall Owens Valley hydrographs shows that since the implementation of Inyo/Los Angeles Water Agreement in 1991:

- Owens River Basin runoff was highly variable, ranging from 192,000 af in 2021 to 826,000 af in 2017 and an average of 393,500 af/yr,

- LADWP pumping in Owens Valley was relatively stable, ranging from 47,000 af in 2017 to 91,000 af in 2011 and an average of 71,500 af/yr,

- Average Owens Valley groundwater level was generally stable, ranging from 7 to 17 feet below ground surface with an average of 12.8 ft below ground surface and without any long-term rising or declining trends,

- The year-to-year average groundwater level trend in Owens Valley has been relatively stable based on the calculated autocorrelation.

As presented in Figures 2.2-2.21, historical groundwater levels in Owens Valley correlate positively with Owens River Basin Runoff ($r = 0.67$) and negatively with pumping ($r = -0.58$). Among all wellfields, groundwater levels in Lone Pine correlated strongest with runoff ($r = 0.75$), while groundwater levels in Bishop and Symmes-Shepherd correlated weakest with runoff (0.39). Groundwater levels in Bairs-Georges Wellfield correlated strongest with pumping ($r=-0.63$), while groundwater levels in Lone Pine correlated weakest with pumping ($r=-0.09$). Generally, groundwater levels have a stronger correlation with runoff than pumping in all wellfields, except Taboose-Aberdeen, Symmes-Shepherd, and Bairs-Georges wellfields.

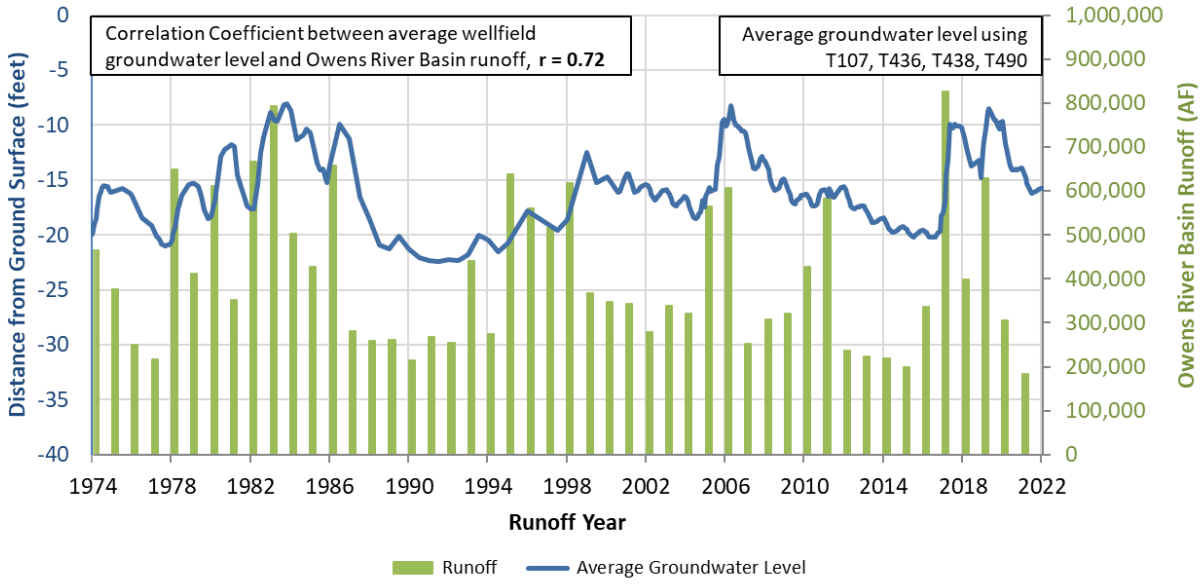


Figure 2.2. Average Laws Wellfield Groundwater Level and Owens River Basin Runoff

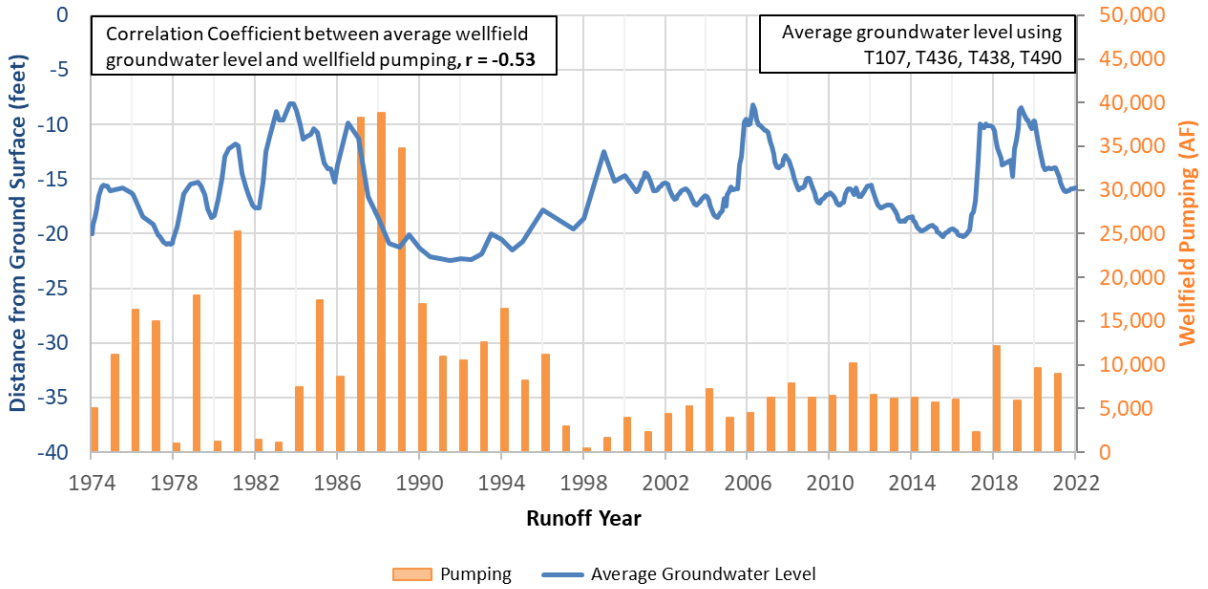


Figure 2.3. Average Laws Wellfield Groundwater Levels and Pumping

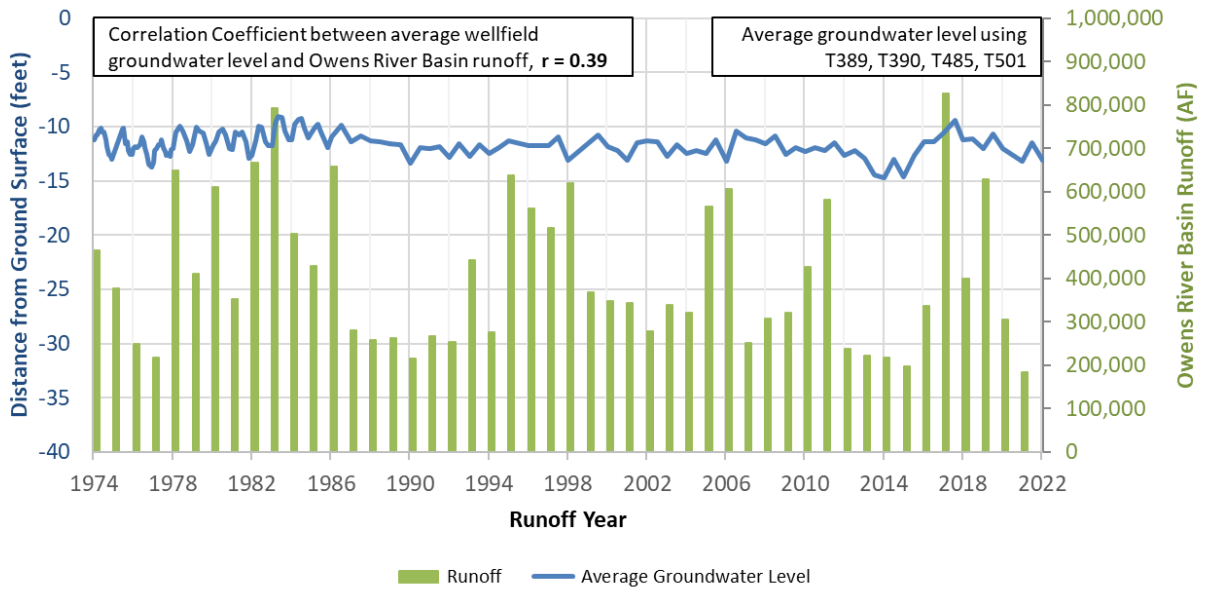


Figure 2.4. Average Bishop Wellfield Groundwater Level and Owens River Basin Runoff

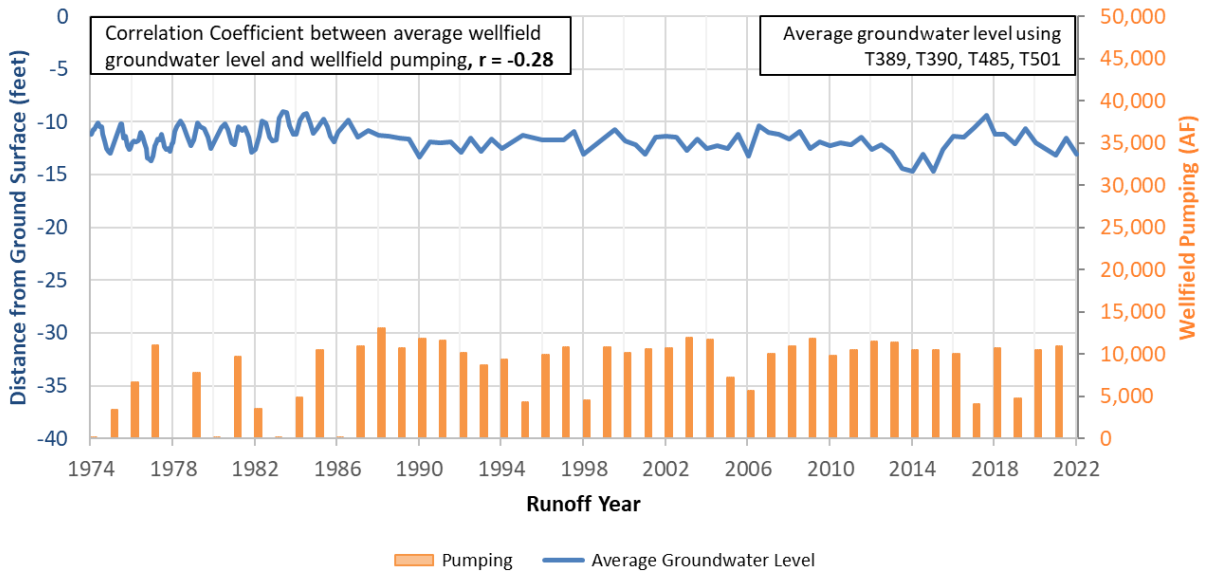


Figure 2.5. Average Bishop Wellfield Groundwater Levels and Pumping

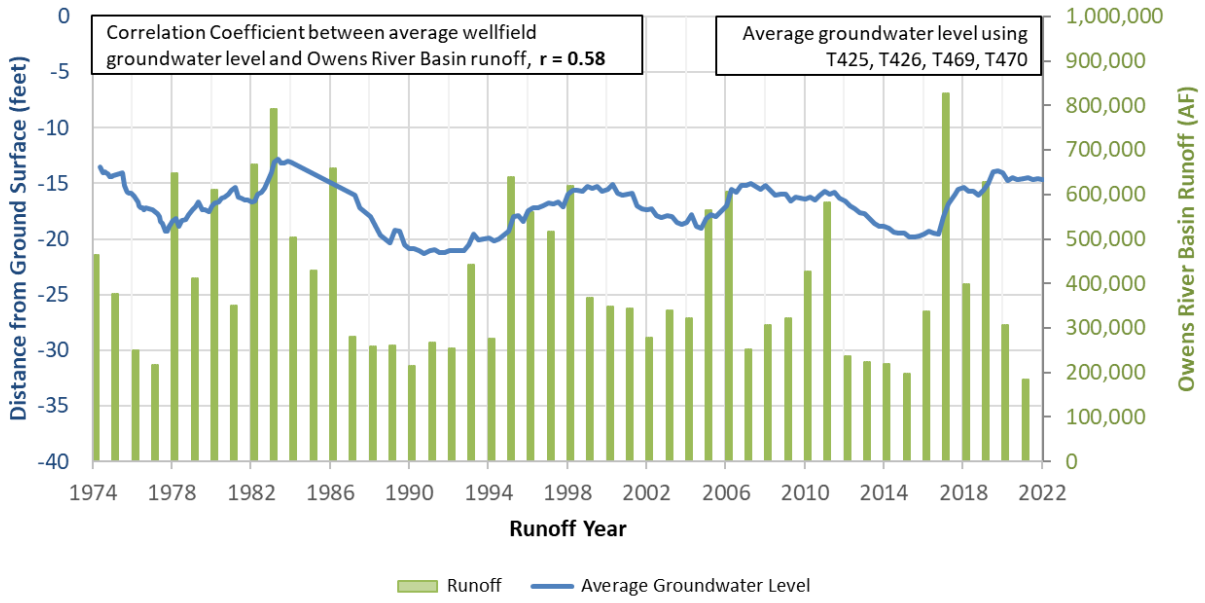


Figure 2.6. Average Big Pine Wellfield Groundwater Level and Owens River Basin Runoff

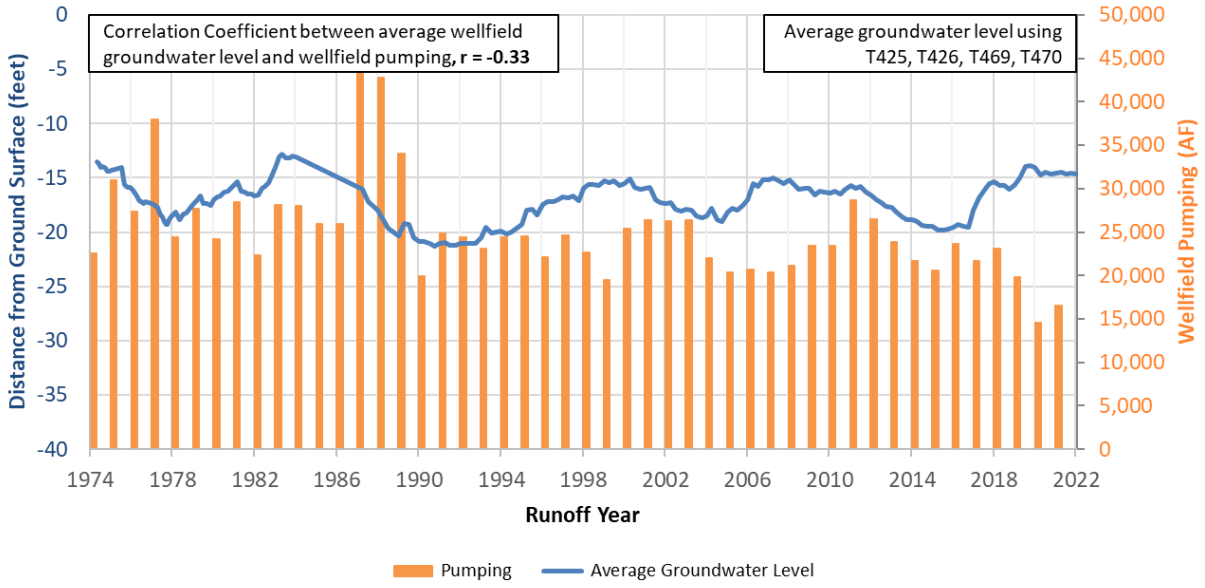


Figure 2.7. Average Big Pine Wellfield Groundwater Levels and Pumping

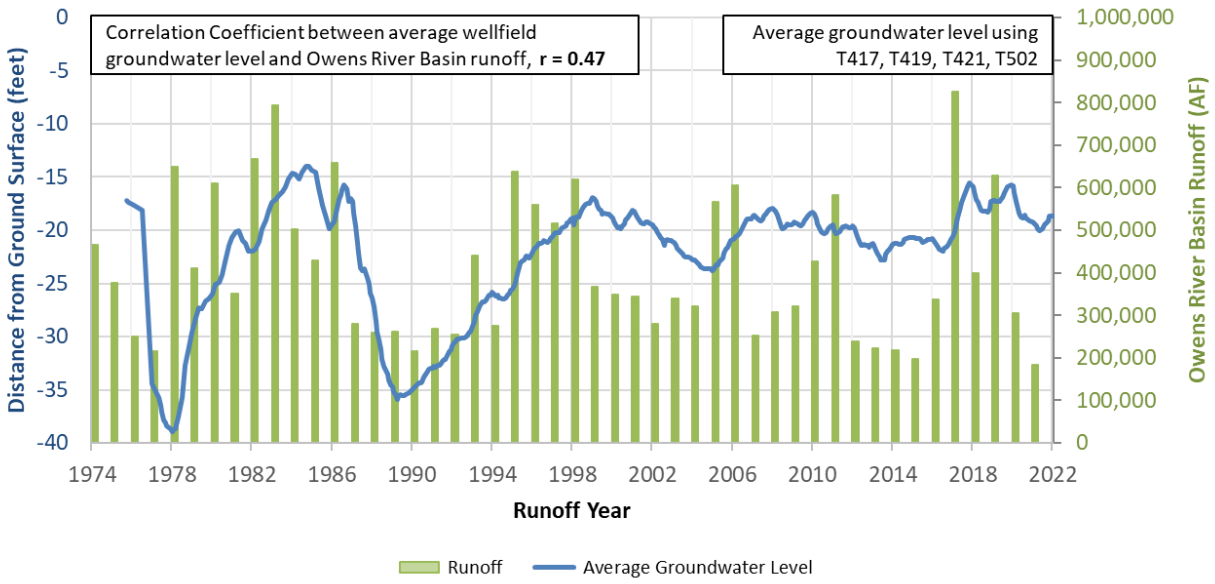


Figure 2.8. Average Taboose-Aberdeen Wellfield Groundwater Level and Owens River Basin Runoff

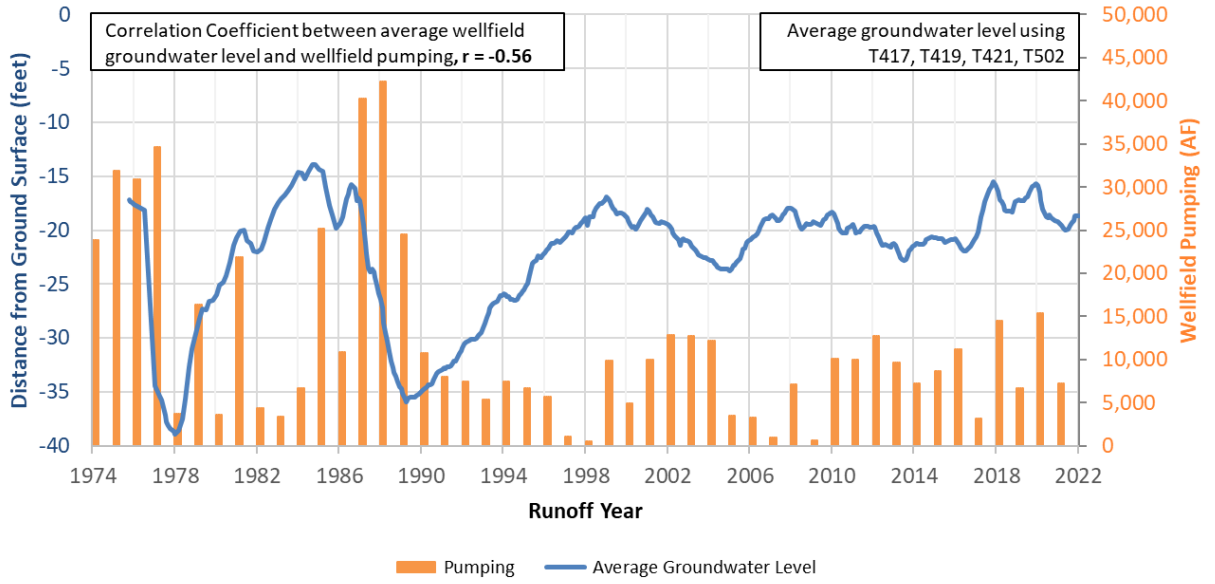


Figure 2.9. Average Taboose-Aberdeen Wellfield Groundwater Levels and Pumping

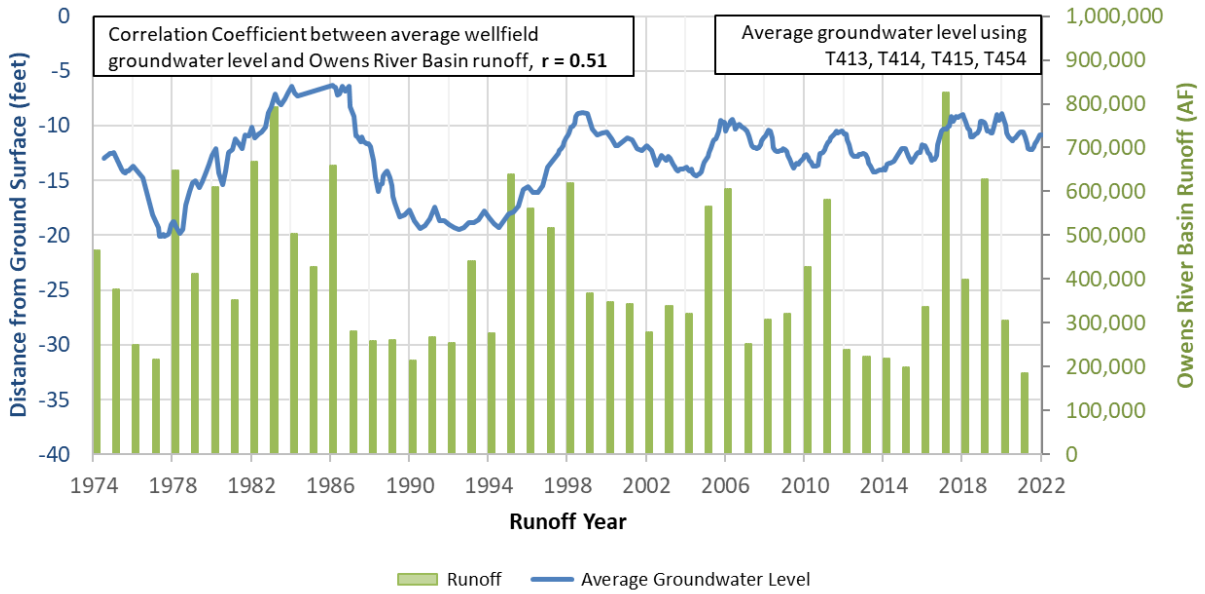


Figure 2.10. Average Thibaut-Sawmill Wellfield Groundwater Level and Owens River Basin Runoff

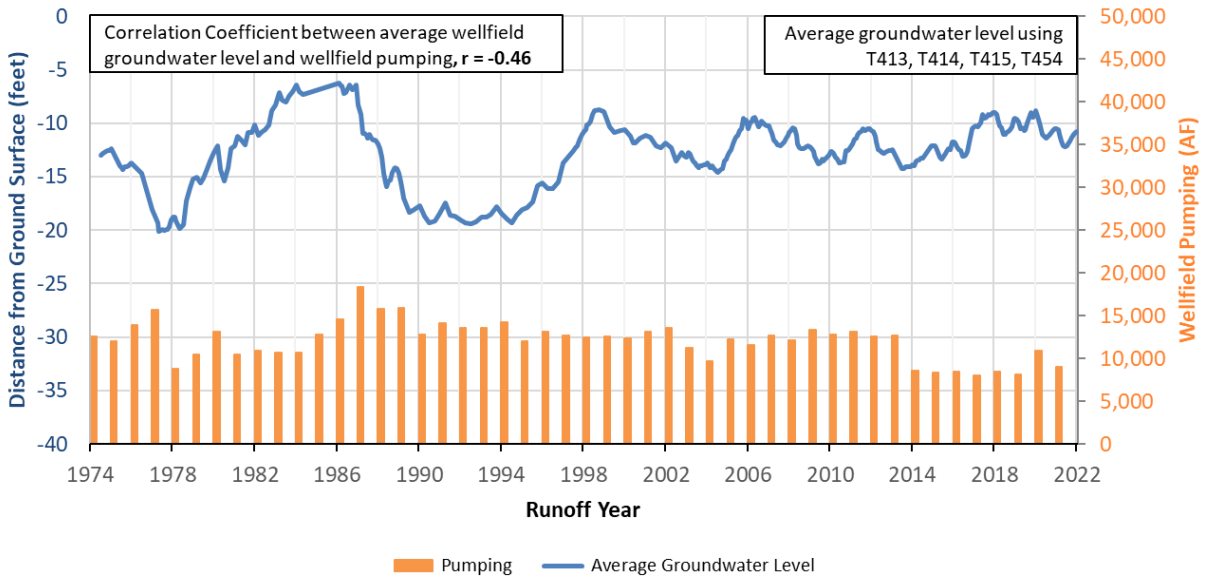


Figure 2.11. Average Thibaut-Sawmill Wellfield Groundwater Levels and Pumping

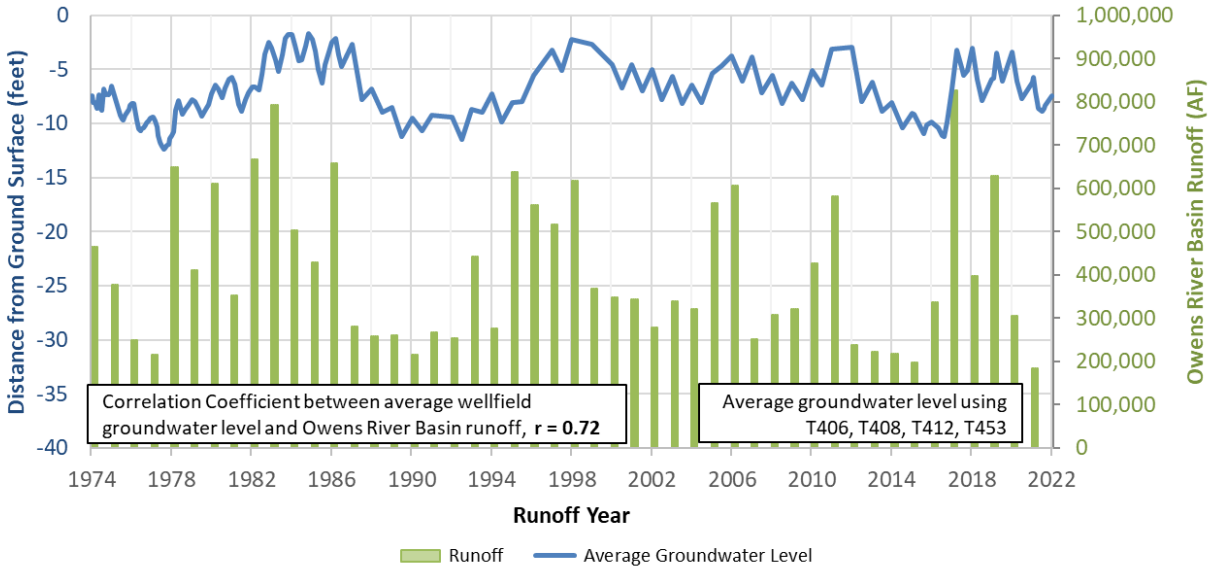


Figure 2.12. Average Independence-Oak Wellfield Groundwater Level and Owens River Basin Runoff

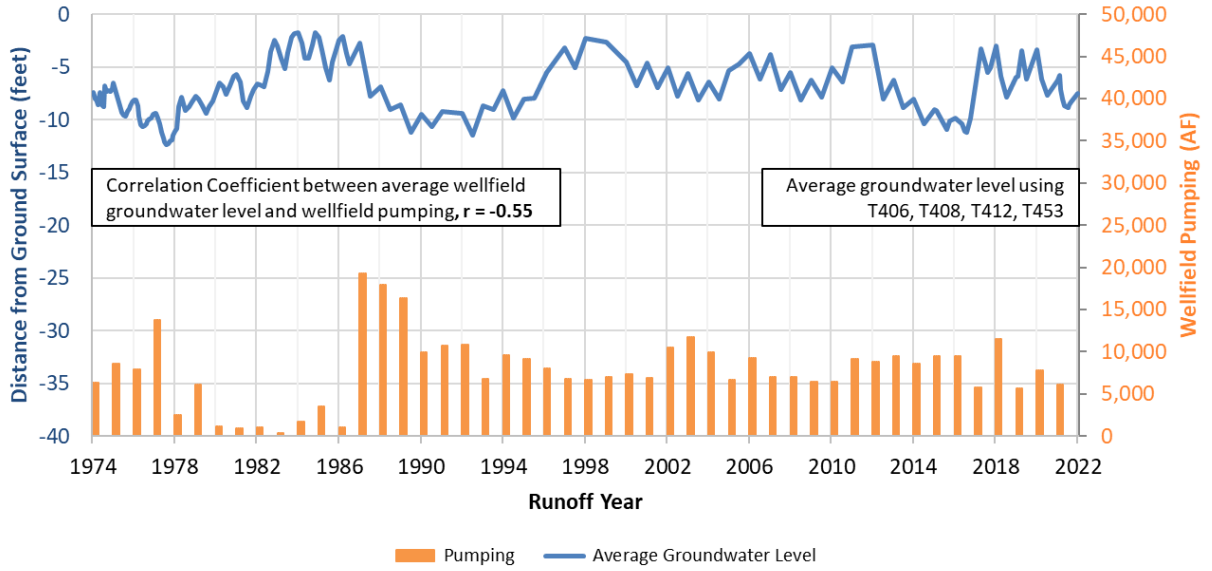


Figure 2.13. Average Independence-Oak Wellfield Groundwater Levels and Pumping

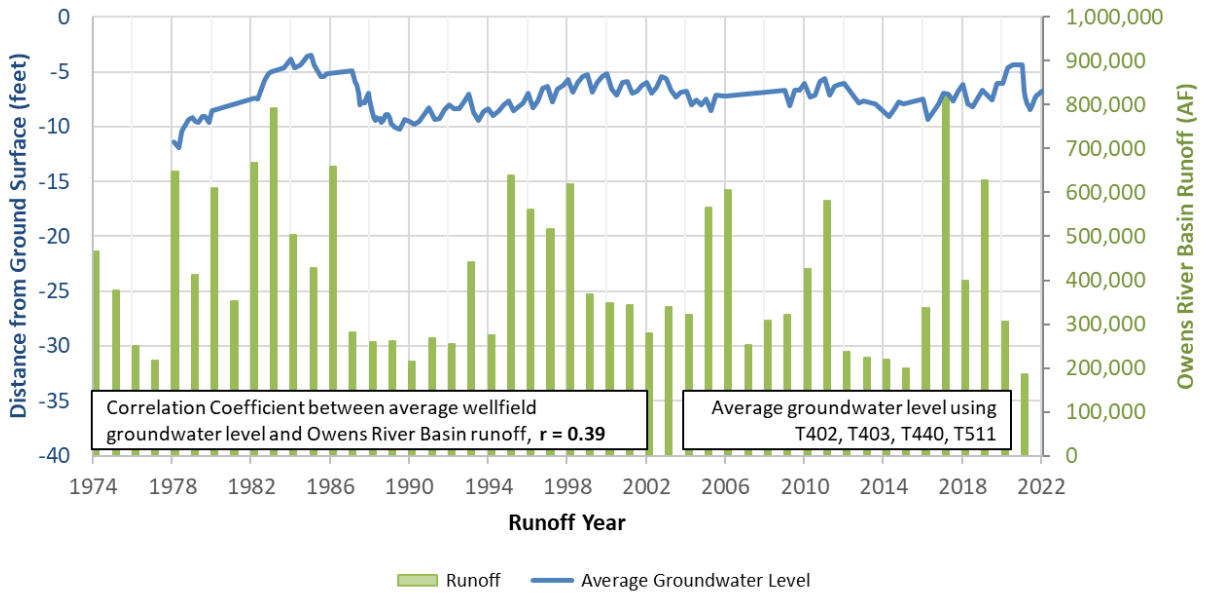


Figure 2.14. Average Symmes-Shepherd Wellfield Groundwater Level and Owens River Basin Runoff

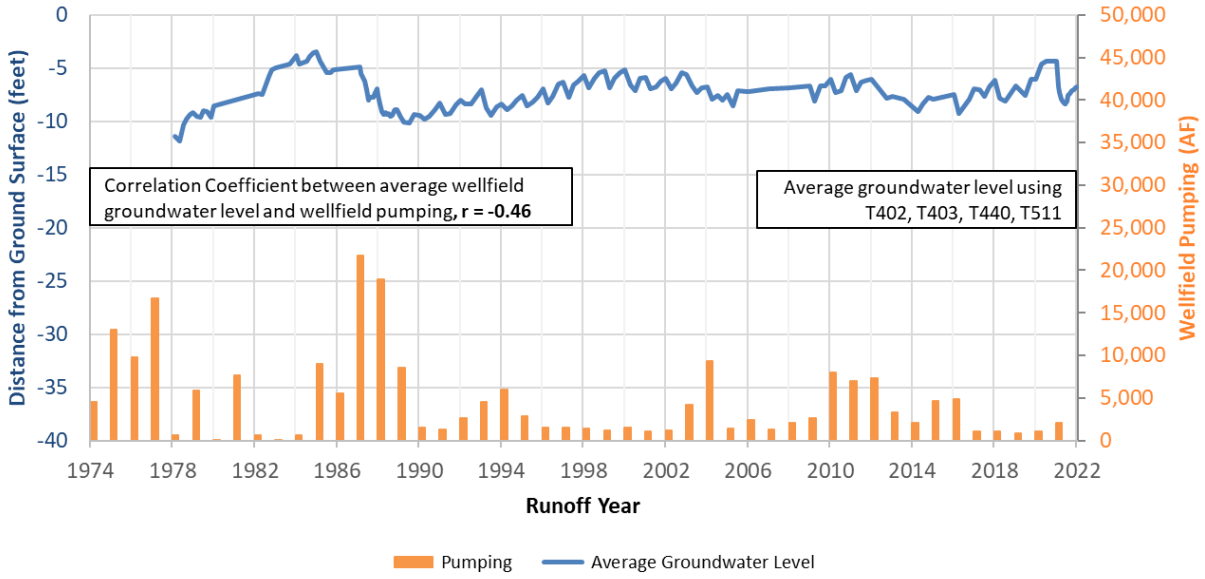


Figure 2.15. Average Symmes-Shepherd Wellfield Groundwater Levels and Pumping

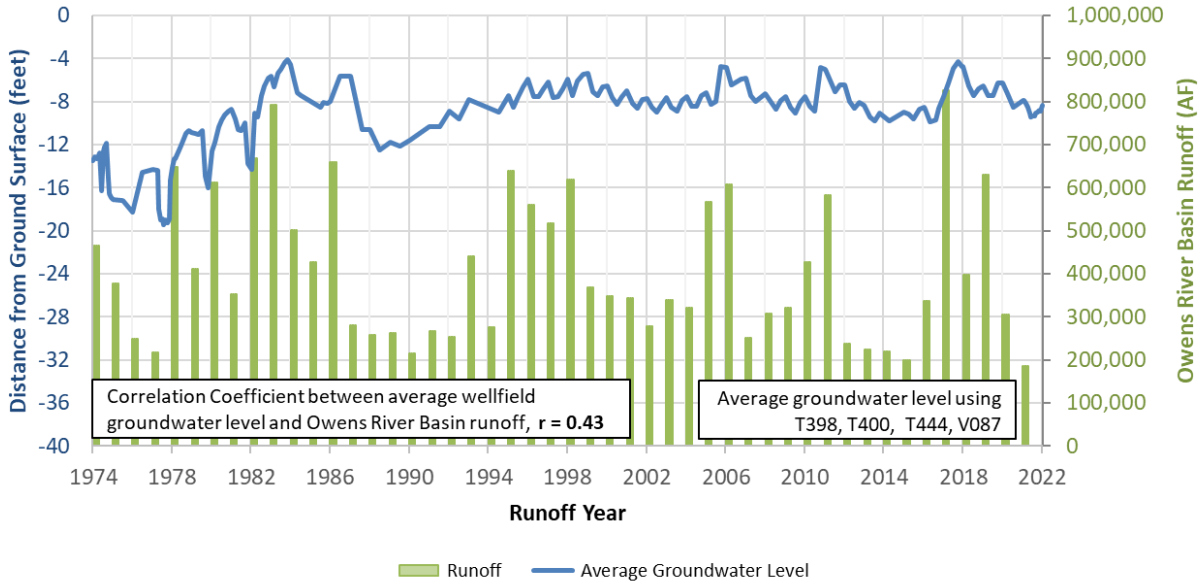


Figure 2.16. Average Bairs-George Wellfield Groundwater Level and Owens River Basin Runoff

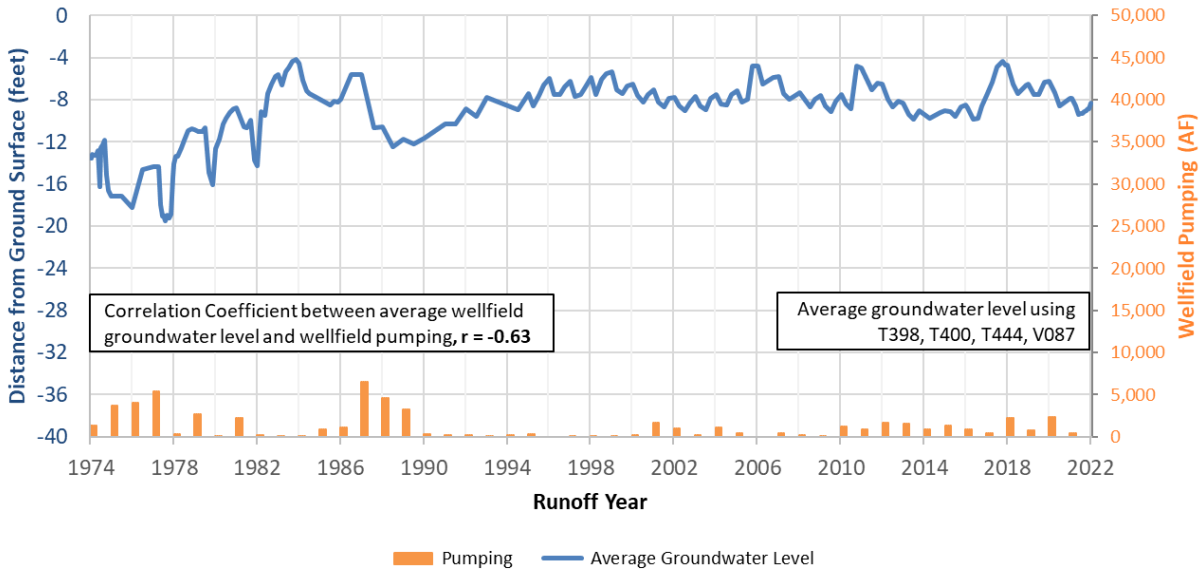


Figure 2.17. Average Bairs-George Wellfield Groundwater Levels and Pumping

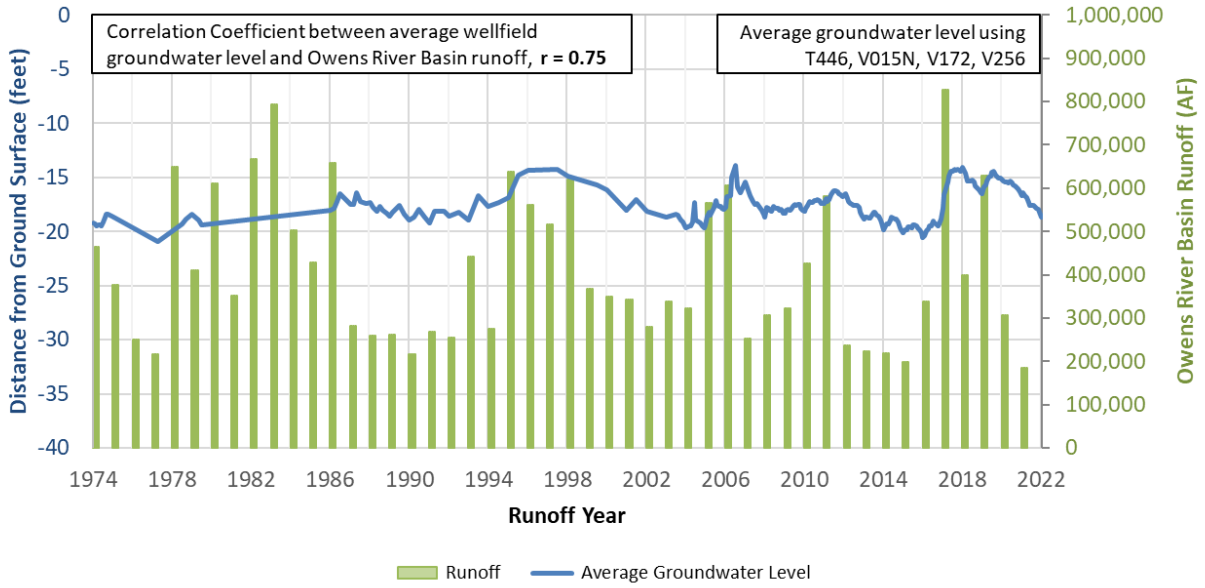


Figure 2.18. Average Lone Pine Wellfield Groundwater Level and Owens River Basin Runoff

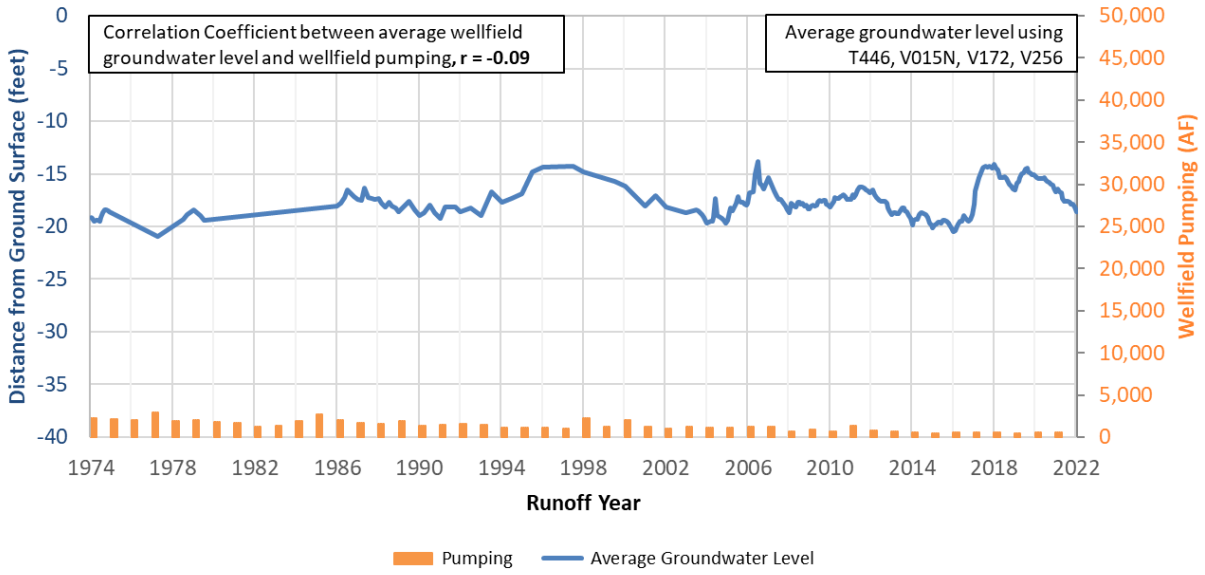


Figure 2.19. Average Lone Pine Wellfield Groundwater Levels and Pumping

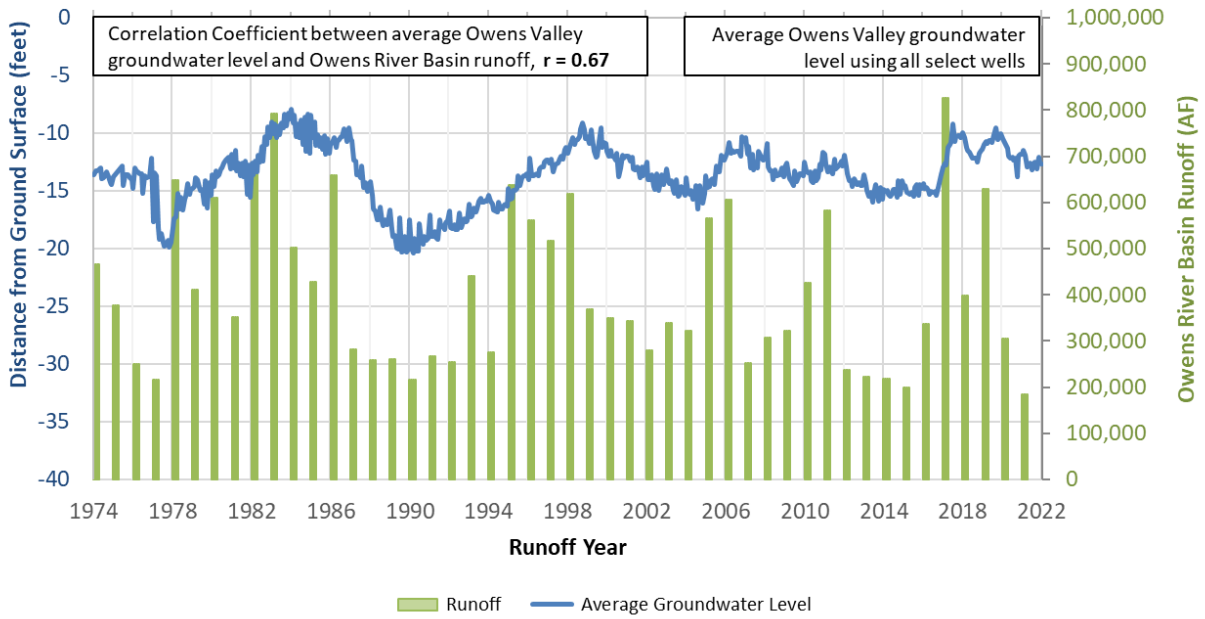


Figure 2.20. Average Owens Valley Groundwater Level and Owens River Basin Runoff

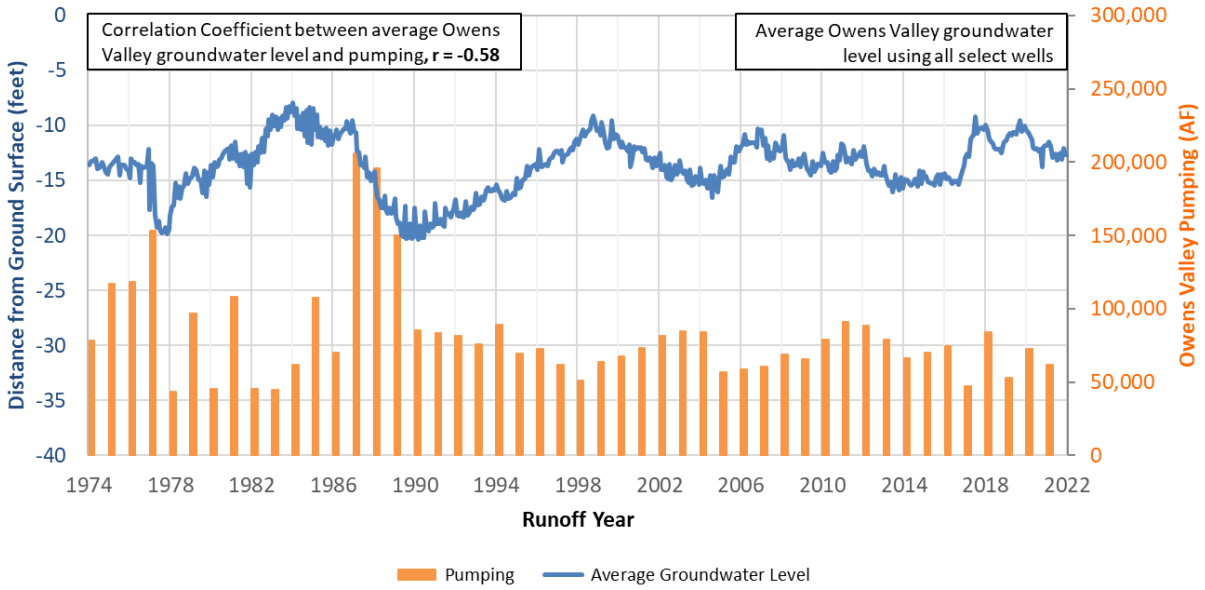


Figure 2.21. Average Owens Valley Wellfield Groundwater Levels and Pumping

Table 2.4 Change in Average Wellfield and Owens Valley Groundwater Levels between April 2021 and April 2022

Wellfield	2021-22 ROY Pumping (af)	Groundwater Level Change From April 2021 to April 2022§ (ft)
Laws	*8,979*	*-1.8*
Bishop	*10,969*	*+0.1*
Big Pine	*16,490*	*-0.1*
Taboose-Aberdeen	*7,325*	*+0.6*
Thibaut-Sawmill	*8,999*	*-0.3*
Independence-Oak	*6,133*	*-0.3*
Symmes-Shepherd	*2,046*	*-2.4*
Bairs-George	*441*	*-1.0*
Lone Pine	*543*	*-1.9*
Owens Valley	***61,925***	***-0.9***

§ Based on data from select monitoring wells in Table 2.2.

2.3. Precipitation Record and Runoff Forecast

The Eastern Sierra snowpack as of April 1, 2022 was 54% of normal in the Mammoth Lakes area, 19% of normal in the Rock Creek area, 43% of normal in the Bishop area, 28% of normal in the Big Pine area, and 19% of normal in the Cottonwood Lakes area. The Eastern Sierra overall snowpack, weighted by contribution to Owens River watershed runoff was calculated to be 41% of the 50-year (1971-2020) average snowpack. (Table 2.5).

The Eastern Sierra runoff forecast for the 2022-23 RY is 194,300 AF or 47% of 50-year average (Table 1.1). Figure 2.22 provides a comparison of the forecasted runoff for the 2022-23 year to actual runoff in previous RYs.

Average precipitation on the valley floor for the 2021-22 year was 3.5 inches, which is 62% of the 50-year average precipitation of 5.6 inches. Table 2.6 details monthly precipitation totals for the 2021-22 RY as well as the long-term averages at representative precipitation gauges throughout the Owens Valley.

Table 2.5. Eastern Sierra April 1, 2022 Snow Survey Results

EASTERN SIERRA SNOW SURVEY RESULTS
April 1, 2022

MAMMOTH LAKES AREA (Contributes 27% of Owens River Basin runoff)

Course	Water Content	April 1 Normal	% of April 1 Normal
Mammoth Pass	24.8	42.7	58%
Mammoth Lakes	9.8	20.1	49%
Minarets 2	15.6	29.3	53%
Average:	16.7	30.7	54%

ROCK CREEK AREA (Contributes 16% of Owens River Basin runoff)

Course	Water Content	April 1 Normal	% of April 1 Normal
Rock Creek 1	1.4	7.1	20%
Rock Creek 2	2.0	10.1	20%
Rock Creek 3	2.3	13.2	17%
Average:	1.9	10.1	19%

BISHOP AREA (Contributes 19% of Owens River Basin runoff)

Course	Water Content	April 1 Normal	% of April 1 Normal
Sawmill	8.2	19.0	43%
Average:	8.2	19.0	43%

BIG PINE AREA (Contributes 13% of Owens River Basin runoff)

Course	Water Content	April 1 Normal	% of April 1 Normal
Big Pine Creek 2	2.7	12.6	21%
Big Pine Creek 3	5.9	17.5	34%
Average:	4.3	15.1	28%

COTTONWOOD AREA (Contributes 25% of Owens Basin River runoff)

Course	Water Content	April 1 Normal	% of April 1 Normal
Cottonwood Lakes 1	2.5	12.3	21%
Trailhead*	2.2	12.5	18%
Average:	2.4	12.4	19%

EASTERN SIERRA OVERALL SNOW PACK (Weighted by contribution to Owens River Basin runoff)

	Water Content	April 1 Normal	% of April 1 Normal
Average of all Snow Courses	7.6	18.7	41%

Normals are based on the 1971-2020 period.

Table 2.6- Owens Valley Precipitation during RY 2021-22 in Inches

Month	Bishop	Big Pine	Tinemaha Reservoir	LAA Intake	Indep. Yard	Alabama Gates	Lone Pine	Cotton-wood	South Haiwee	Average Owens Valley
April, 2021	0.00	0.00	0.09	0.00	0.00	0.00	2.04	0.02	0.00	0.24
May	0.02	0.03	0.00	0.03	0.01	0.02	0.00	0.16	0.00	0.03
June	0.02	0.40	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.05
July	0.03	0.24	0.38	0.26	0.18	0.52	0.00	0.20	0.27	0.23
August	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
September	0.00	0.00	0.00	0.07	0.00	0.01	0.00	0.00	0.00	0.01
October	0.90	0.65	0.24	0.17	0.25	0.03	0.60	0.34	0.08	0.36
November	0.14	0.07	0.05	0.09	0.09	0.00	0.00	0.00	0.00	0.05
December	3.97	3.17	2.96	2.28	2.52	0.58	1.51	3.20	1.44	2.40
January, 2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
February	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
March	*0.13*	*0.37*	*0.38*	*0.21*	*0.00*	*0.01*	*0.00*	*0.03*	*0.06*	*0.13*
2021-22	5.2	4.9	4.1	3.1	3.1	1.2	4.2	4.0	1.9	3.5
Average*	6.0	6.4	6.3	5.3	5.3	4.0	3.8	6.5	7.0	5.6
% of Average	87%	77%	65%	58%	58%	30%	109%	61%	26%	62%

* Average for 1971 to 2020 runoff year

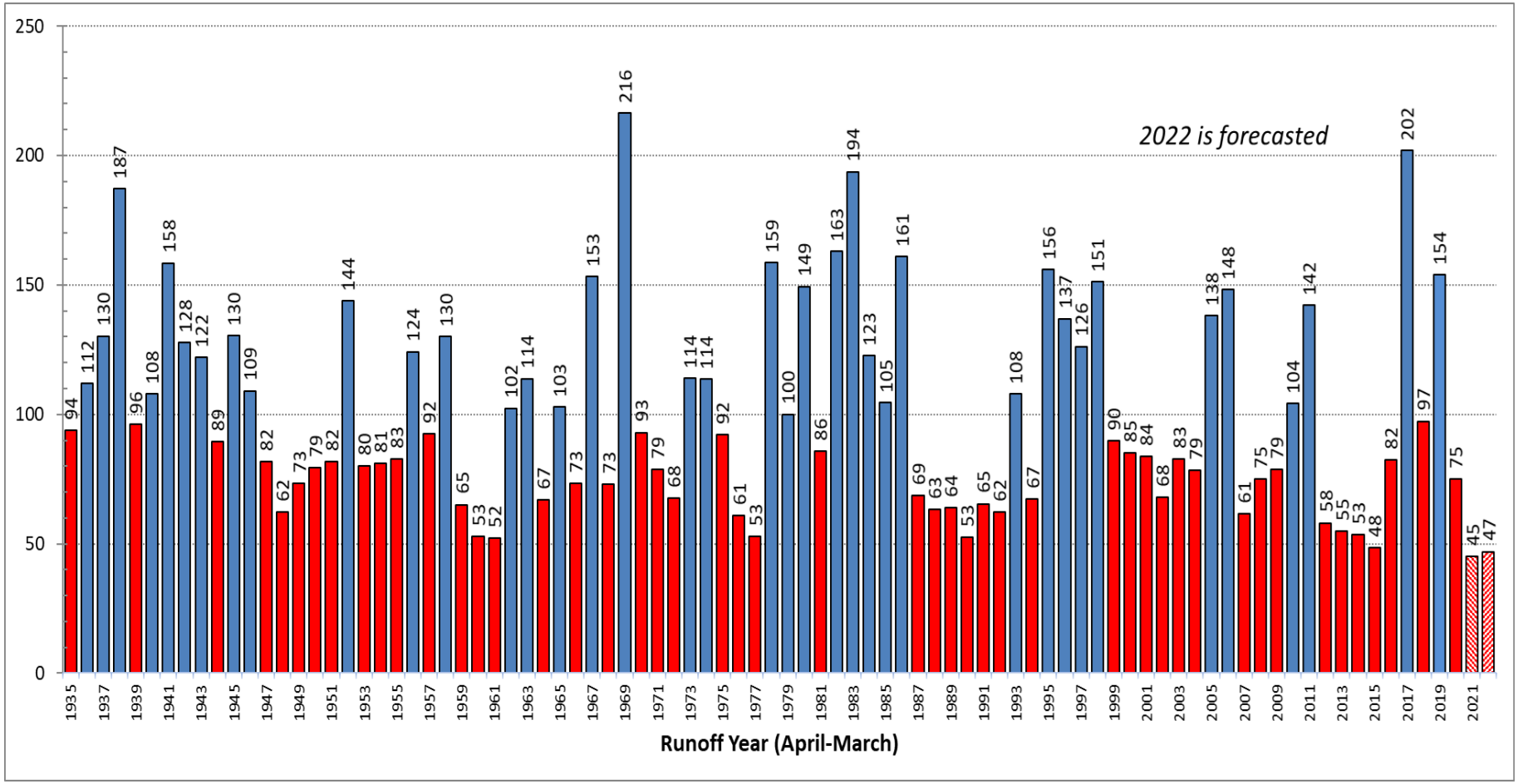


Figure 2.22. Eastern Sierra Runoff – Percent of Normal

2.4. Owens Valley Water Supply and Uses

Table 2.7 provides an overview of the Owens Valley water supply, in-valley uses and losses, and LAA exports for the post-Water Agreement period (1992-93 through 2021-22 RYs) as compared to the pre-project average (pre-Second LAA) and projected water supply and uses (based on the Water Agreement, 1991 EIR, and 1997 MOU). Actual water uses in the Owens Valley are generally consistent with the projected values under the 1991 EIR and 1997 MOU.

While Owens Valley water supply (runoff, flowing wells, and pumped groundwater) has remained about the same over the long term average, exports are considerably less than anticipated under the 1991 EIR and 1997 MOU. The fundamental reasons for the reduction in the exports for the municipal water supply in Los Angeles are increased water uses for dust mitigation on Owens Lake, mandated decreases in water exported from the Mono Basin, and less groundwater pumping than anticipated under the Water Agreement.

Current Owens Valley water uses are compared to pre-project uses as well as those uses projected under the Water Agreement and 1997 MOU in Figure 2.23. The components of LADWP's water exports from the Eastern Sierra are compared to pre-project exports as well as those projected under the Water Agreement and 1997 MOU in Figure 2.24.

Table 2.8 provides a breakdown of Owens Valley water uses from 1992 to the present and planned water uses for the 2022-23 RY. While much of Table 2.8 is self-explanatory, for clarity E/M water supply is the water supplied to E/M projects referenced in the 1991 EIR.

Table 2.9 lists a breakdown of water supplied to E/M projects during the 2021-22 RY.

Table 2.7 Owens Valley Water Supply and Uses

(Amounts in Thousands of Acre-Feet/Year)

	Pre-Project (1945-70)	Projected per MOU/ Water Agreement	Actual Data for Runoff Year 2021-22	Actual Post Water Agreement Averages (1992-2022)
Owens Valley Water Supply				
Runoff (Owens Valley & Round Valley)	292	310[1]	*133*	288
Flowing Wells	44	15	*28*	31
Pumped Groundwater	10	110[2]	*63*	72
Total	346	435	*224*	391
In-Valley Uses & Losses				
Water Used on City Lands in O.V.				
Irrigated Lands [3]	62	46	*39*	48
Stockwater, Wildlife, and Rec. Uses [4]	20	23	*16*	21
Post 1985 E/M Projects [5]	0	12	*10*	10[8]
Lower Owens River [6]	0	27[7]	*17*	15[8]
Additional Mitigation (1,600 af from MOU)	0	0	*2*	2[8]
Sub-Total	82	110	*84*	96
Other O.V. Uses and Losses [9]	134	135	*159*	191
Total	216	245	*243*	287
Components of Aqueduct Export				
Owens Valley Contribution to Export	130	190	*(19)*	104
Long Valley Contribution to Export	134	135	*82*	135
Mono Basin Contribution to Export [10]	58	30	*14*	12
Total	322	355	*77*	251

1. Average runoff for period 1935 to 1988 (Runoff Year)
2. Assumed based on 1991 O.V. Groundwater Pumping EIR
3. Does not include areas receiving water supplies non-tributary to the Owens River/Aqueduct (approx. 7,000 AFY).
4. Includes projects such as the Tule Elk Field, Farmers Ponds implemented after 1970 and before 1985 when E/M projects commenced. Also includes the LORP Off-River Lakes and Ponds uses.
5. Except Lower Owens River Rewatering E/M Project
6. Includes river losses, releases to the Blackrock Waterfowl Habitat Area, and the Delta
7. Assumes: 6,000 AF year-round flow to delta, 1,000 AF to Blackrock, and 19,600 AF for river channel losses.
8. Represents recent history.
9. Includes uses for dust mitigation for Owens Lake, Indian land, private lands, conveyance losses, recharge, evaporation, and operational releases.
10. 1993 Court decision allows approximately 30,000 AFY when lake reaches elevation 6392. Prior to Court decision Mono Basin export averaged 81,000/yr.

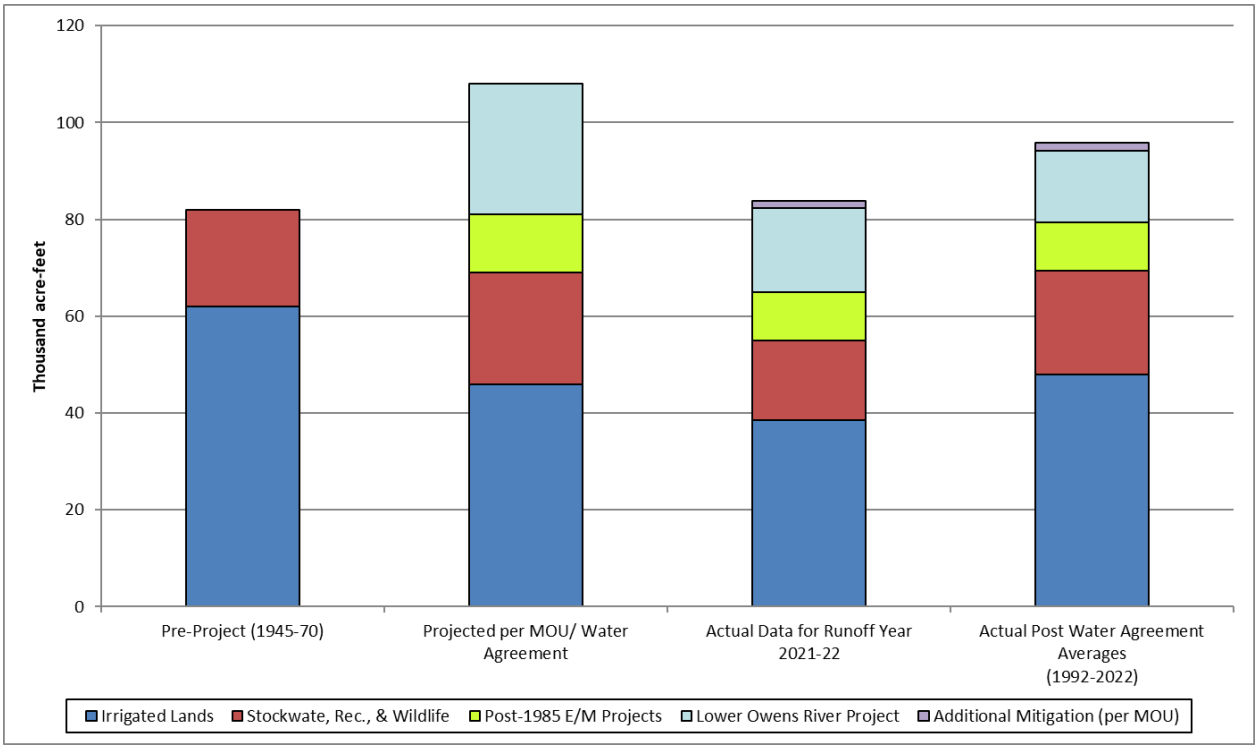


Figure 2.23. Owens Valley Water Uses on City-Owned lands

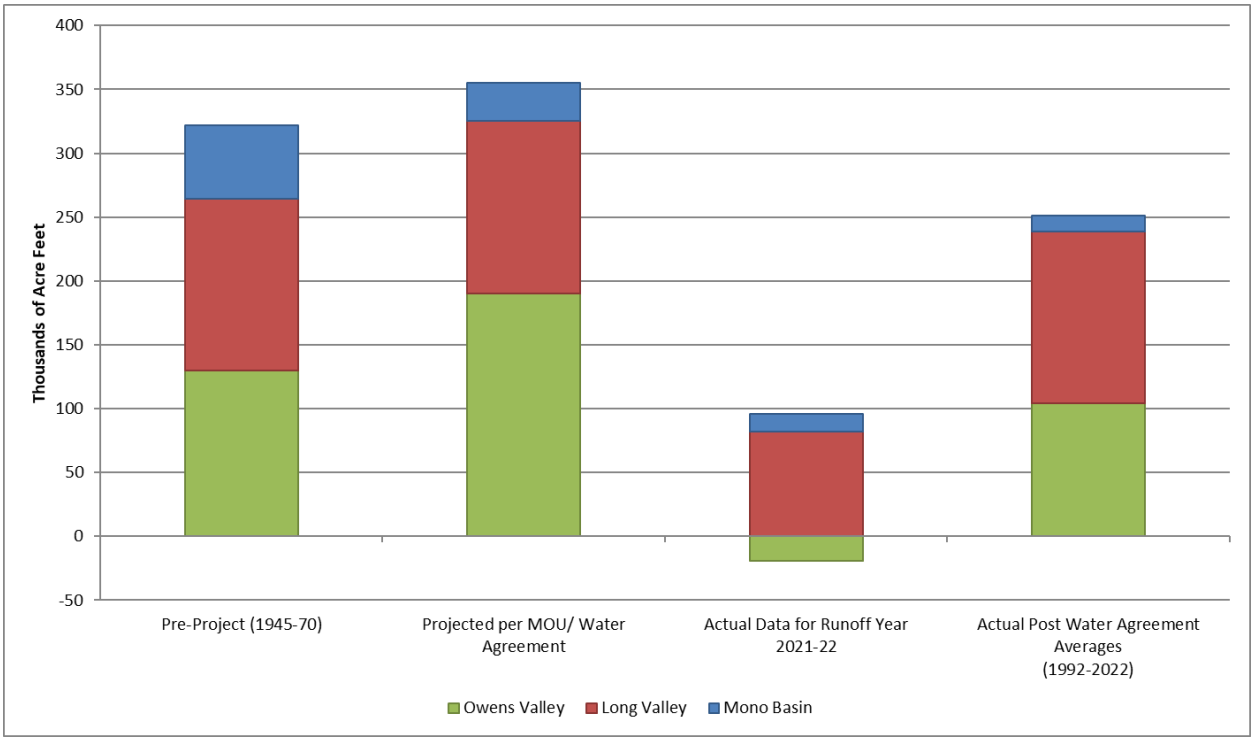


Figure 2.24. Components of the Eastern Sierra Water Exports

Table 2.8 Water Uses for 1992-93 through 2021-22 and Planned Uses for the 2022-23 RY (AF)

(1) Runoff Year	(2) Owens River Basin Runoff %	(3) Owens Valley Pumping (1000 af)	(4) Irrigation	(5) Stock Water	(6) E/M	(7) Rec. & Wildlife	(8) LORP	(9) 1600 AF Projects	(10) In-Valley Uses (sum of 4+5+6+ 7+8+9)	Groundwater Recharge		(13) Operations	(14) All Uses (sum of 10+11+12+13)
										(11) Big Pine & Independence Spreading	(12) Laws Spreading		
1992-93	62%	84	37,131	17,828	9,088	7,725	9,269		81,041	0	0	12,179	93,220
1993-94	108%	76	47,798	17,230	13,443	8,676	5,867		93,014	14,512	10,640	12,433	130,599
1994-95	68%	89	37,790	17,178	9,132	8,116	11,638		83,854	0	56	12,102	96,012
1995-96	156%	70	57,748	20,919	11,162	12,479	11,636		113,944	30,126	21,148	13,561	178,779
1996-97	137%	75	46,171	19,757	10,989	9,438	13,031		99,386	4,606	0	21,125	125,117
1997-98	126%	67	47,114	16,422	8,114	8,022	13,069		92,741	4,113	4,106	13,874	114,834
1998-99	151%	52	45,445	13,654	9,075	8,691	11,192		88,057	24,970	31,077	23,016	167,120
1999-00	90%	64	49,529	14,461	8,836	7,470	15,973		96,269	0	0	11,263	107,532
2000-01	85%	68	49,327	13,442	7,989	7,263	12,090		90,111	0	790	12,517	103,418
2001-02	84%	73	43,296	12,759	9,401	7,487	12,485		85,428	0	230	12,973	98,631
2002-03	68%	82	43,929	12,291	11,442	7,377	9,690		84,729	0	0	8,431	93,160
2003-04	83%	88	45,974	11,620	10,926	6,853	10,243		85,616	0	0	8,787	94,403
2004-05	79%	86	50,311	11,546	9,915	6,866	8,910		87,548	243	695	9,536	98,022
2005-06	138%	57	53,832	11,355	11,587	7,807	7,566		92,147	16,212	24,187	14,814	147,360
2006-07	148%	59	50,968	12,041	11,551	7,849	11,700		94,109	29,457	16,855	38,937	179,358

(1) Runoff Year	(2) Owens River Basin Runoff %	(3) Owens Valley Pumping (1000 af)	(4) Irrigation	(5) Stock Water	(6) E/M	(7) Rec. & Wildlife	(8) LORP	(9) 1600 AF Projects	(10) In-Valley Uses (sum of 4+5+6+ 7+8+9)	Groundwater Recharge (11) Big Pine & Independence Spreading	Groundwater Recharge (12) Laws Spreading	(13) Operations	(14) All Uses (sum of 10+11+12+13)
2007-08	61%	60	47,699	12,161	11,565	10,122	22,501		104,048	0	0	5,631	109,679
2008-09	75%	69	56,130	11,435	10,646	8,479	20,957		107,647	1,342	0	7,651	116,640
2009-10	79%	65	52,933	11,450	10,695	10,398	15,708		101,184	0	0	8,453	109,637
2010-11	104%	80	52,983	12,275	10,807	12,106	17,020		105,191	2,993	1,973	14,280	124,437
2011-12	142%	92	62,391	11,566	11,847	9,702	19,556		115,062	13,231	4,119	8,785	141,197
2012-13	58%	89	48,763	10,961	9,257	9,254	20,927	1,612	100,774	0	0	4,081	104,855
2013-14	55%	79	44,160	11,161	8,222	8,022	17,845	1,625	91,035	0	0	1,926	92,961
2014-15	53%	66	45,491	11,582	9,520	7,615	12,681	1,604	88,493	8,742	0	1,423	98,658
2015-16	48%	70	39,598	11,752	8,412	7,934	16,828	1,614	86,138	434	0	1,255	87,827
2016-17	82%	76	49,219	10,969	10,903	8,199	18,585	1,702	99,577	4,200	7,783	17,770	129,330
2017-18	202%	48	53,864	12,534	11,554	10,313	19,533	1,615	109,413	85,175	38,815	90,407	323,810
2018-19	97%	85	49,836	11,437	9,814	7,742	13,777	1,645	94,251	1,406	2,489	2,640	100,786
2019-20	154%	53	53,981	12,429	11,064	8,336	20,749	1,608	108,167	33,976	26,346	32,002	200,491
2020-21	74%	73	47,249	11,189	9,246	6,600	20,643	1,650	96,577	0	0	1,697	98,274
2021-22	*45%*	*63*	*38,600*	*9,850*	*10,080*	*6,460*	*17,300*	*1,606*	*83,896*	0	0	*2,150*	86,046
2022-23	47%	*(A)*	*34,750*	*10,010*	*8,340*	*6,090*	*18,100*	*1,600*	*78,890*	*0*	*0*	*0*	*78,890*
AVG.	95%	72	47,871	13,073	10,149	8,371	14,744	1,626	94,785	8,895	6,171	13,732	123,583

NOTES: 2022-23 REFLECTS CURRENT YEAR OPERATIONS FORECAST. E/M EXCLUDES RELEASES TO THE LORP
LORP IS RECORD OF THE REWATERING E/M (1985-2006) AND THE MITIGATION PROJECTS (STARTED IN DECEMBER 2006)
LORP RECORD INCLUDES RIVERINE LOSS, RELEASES TO BLACKROCK WATERFOWL, AND RELEASES TO DELTA
(A) SEE SECTION 1.2 FOR OWENS VALLEY PUMPING DISCUSSION

Table 2.9 Water Supplied to E/M Projects During 2021-22

Project	Water Supplied (acre-feet)
McNally Canals Conveyance Losses	*690*
McNally/Laws/Poleta Native Pasture Lands	*1,450*
McNally Ponds	*1,440*
Laws Historical Museum	*90*
Klondike Lake	*1,850*
Big Pine Regreening	*70*
Lower Owens River Rewatering	-
Independence Pasture Lands	*1,010*
Independence Springfield	*1,060*
Independence Ditch System	*70*
Independence Woodlot	*90*
Independence Regreening	*110*
Shepherd Creek Alfalfa Lands	*940*
Lone Pine Park/Richards Field	*400*
Lone Pine Woodlot	*110*
Lone Pine Van Norman Field	*490*
Lone Pine Regreening	*240*
Total E/M Uses	10,110

2.5. Owens Valley Vegetation Conditions

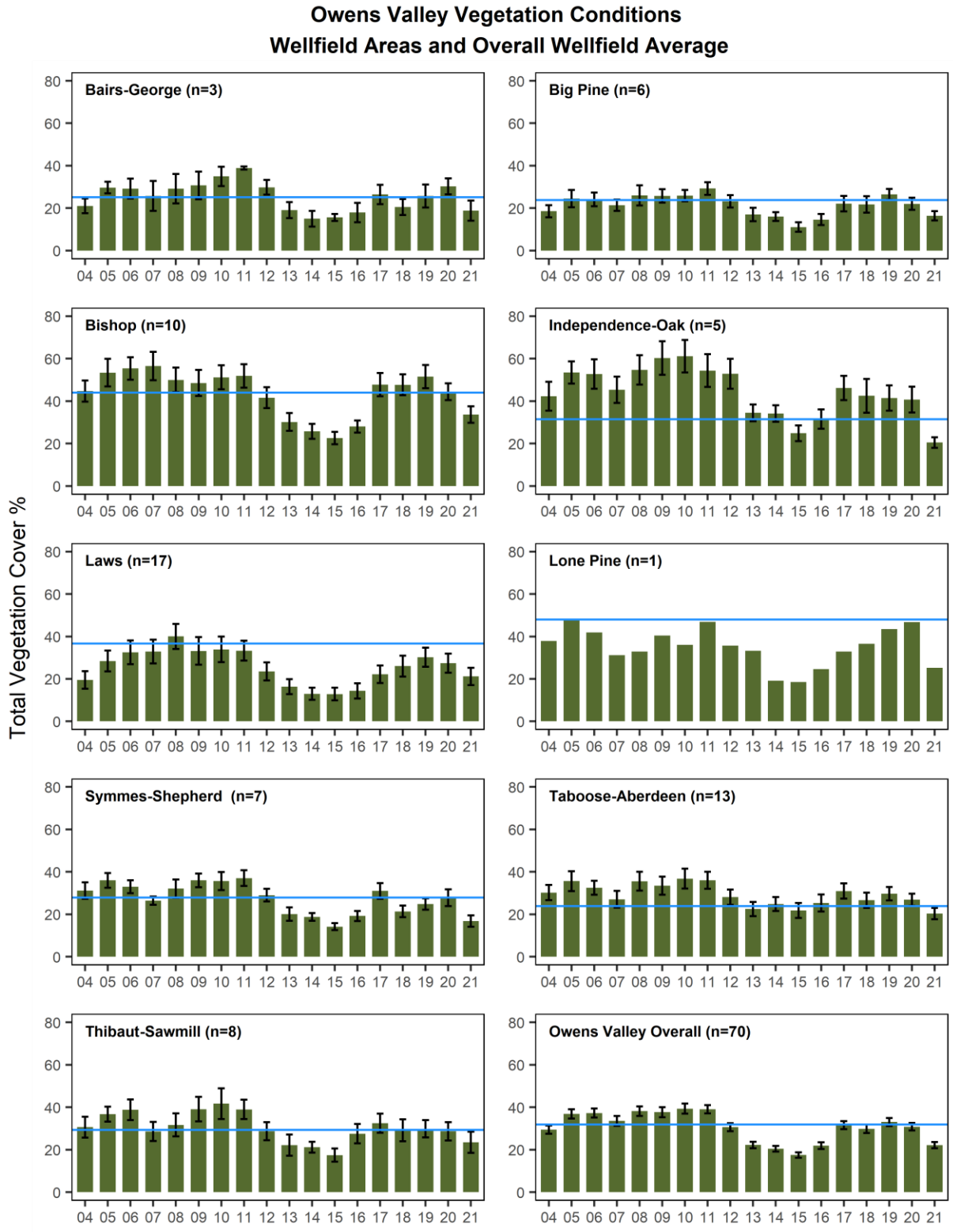
Vegetation conditions within the Owens Valley are monitored using vegetation transects as well as other methods. The Green Book describes the methodology and purposes of vegetation transects. As stated in the Green Book: "Vegetation transects are included within the Green Book to serve two purposes: 1) to estimate transpiration from a monitoring site, and 2) for use in determining whether vegetation has decreased or changed significantly from the previous cover." A reference for comparison of vegetation changes is the 1984-87 vegetation inventory data.

The Green Book requires the 1984-87 vegetation inventory to be used as a baseline when determining whether vegetation cover and/or species composition have changed. The 1984-1987 inventory transects were chosen using aerial photos to aid in determining transect locations. Transects were located visually by choosing lines that appeared to cover the representative units of vegetation within the parcel being measured. Transects were generally run toward the center of the parcels in order to avoid transitional areas at parcel edges. A minimum of five transects were run on each parcel. If the vegetation cover was particularly heterogeneous, a qualitative method was employed in selecting additional transects. The transect data were checked visually and additional transects were run to lessen the degree of variability as necessary.

The Green Book directs that future transects should be performed in a similar manner as the initial inventory to determine whether vegetation has changed, but allows the technique to be modified by the Technical Group to permit statistical comparison by randomly selected transects. The procedures for modifying the Green Book procedures are included under Water Agreement Section XXV. In any case, the Green Book requires the Technical Group to perform a statistical analysis in order to determine the statistical significance of any suspected vegetation changes from the 1984-87 inventory maps.

In 2004, LADWP began running transects annually within parcels located both inside and outside wellfields. Some parcels are evaluated annually, while others are not. Percent total cover is calculated and compared to data collected within parcels during the period of baseline inventory.

Figure 2.25 includes vegetation transect data collected by LADWP and presented in a series of graphs documenting Owens Valley vegetation conditions. LADWP monitors vegetation using established vegetation transects that enable the Technical Group to reliably assess annual changes in vegetation cover and composition.



Notes: ▬ represents a mean cover during the initial inventory. Data were collected by LADWP and ICWD.

Figure *2.25. Owens Valley* Vegetation *Condition for Wellfields*

2.6. Bishop Cone Audit

LADWP's groundwater pumping on the Bishop Cone is governed by the provisions of the Stipulation and Order filed on August 26, 1940, in Inyo County Superior Court in the case of Hillside Water Company, a corporation et al. vs. the City, a Municipal Corporation et al., (Hillside Decree) as well as the Water Agreement. Annual groundwater extractions from the Bishop Cone are limited to an amount not greater than the total amount of water used on City lands on the Bishop Cone during that year. Annual groundwater extractions by LADWP on the Bishop Cone are the sum of all groundwater pumped plus the amount of artesian water that has flowed from wells on the Bishop Cone during the year. Water used on City lands on the Bishop Cone are the quantity of water supplied to such lands, including conveyance losses, less any return flow to the aqueduct system.

The ICWD performs an annual audit of LADWP water uses and groundwater extractions by LADWP on the Bishop Cone. Section 2 Appendices contain a copy of ICWD's audit for the 2020-21 RY. As shown in Figure 1.4, LADWP has historically pumped much less than allowed under the terms of the Hillside Decree. Beginning in the 2015-16 RY, the audit water account methods were modified to analyze each areas inflows and outflows to calculate total water use. In the 2020-21 RY LADWP extracted 15,388 AF of water from the Bishop Cone area (10,459 AF pumping, 4,929 AF flowing), about 53 percent of the allowed amount.

2.7. Reinhackle Spring Monitoring

As required by the 1991 EIR, Owens Valley groundwater pumping is managed to avoid reductions in spring flows that would cause significant decreases or changes in spring-associated vegetation. Groundwater pumping from wells that may affect flow from Reinhackle Spring are managed so that flows from the spring are not significantly reduced compared to flows under prevailing natural conditions. Table 2.10 shows daily flow values for Reinhackle Spring. Over the 2021-22 RY, Reinhackle Spring had an average daily flow of about 1.6 cfs.

Analysis of Reinhackle Spring was included in a 2004 cooperative study by LADWP and ICWD on the Owens Valley groundwater geochemistry. During the study, water samples from Reinhackle Spring were chemically analyzed and compared to water samples from the LAA, nearby pumping wells, samples from the deep aquifer, and samples from shallow monitoring wells. The 2004 study concluded that the water flowing from Reinhackle Spring is similar in composition to aqueduct water and not similar to the deep aquifer samples or up-gradient shallow aquifer wells. Testing to determine the effects of groundwater pumping and LAA seepage on Reinhackle Spring flow was conducted between May 2010 and April 2011. Data and analysis from the 2004 cooperative study and 2010-11 testing have been included in a draft monitoring and operations plan for the Bairs-Georges Wellfield known as the draft Reinhackle Spring Flow Characterization Report and Operations Plan. The draft Reinhackle Spring Flow Characterization Report and Operations Plan was sent to the ICWD for review in November 2012.

Table 2.10. Reinhackle Spring Flow in cfs during 2021-22 RY

Day of Month	April	May	June	July	August	September	October	November	December	January	February	March	Annual
1	1.58	1.59	1.61	1.66	1.56	1.52	1.67	1.70	1.65	1.61	1.42	*1.40*	
2	1.56	1.57	1.61	1.65	1.56	1.54	1.70	1.70	1.65	1.61	1.41	*1.42*	
3	1.56	1.56	1.61	1.65	1.56	1.56	1.69	1.69	1.65	1.61	1.42	*1.42*	
4	1.57	1.56	1.61	1.65	1.56	1.56	1.68	1.69	1.65	1.61	1.41	*1.44*	
5	1.56	1.58	1.61	1.64	1.56	1.56	1.67	1.70	1.61	1.61	1.40	*1.43*	
6	1.57	1.58	1.61	1.64	1.56	1.56	1.65	1.70	1.61	1.61	1.40	*1.42*	
7	1.57	1.61	1.61	1.63	1.56	1.56	1.65	1.70	1.61	1.55	1.37	*1.43*	
8	1.59	1.61	1.61	1.60	1.56	1.56	1.65	1.70	1.61	1.49	1.35	*1.42*	
9	1.61	1.61	1.61	1.58	1.56	1.56	1.65	1.70	1.61	1.51	1.35	*1.43*	
10	1.61	1.59	1.61	1.57	1.56	1.56	1.65	1.70	1.61	1.52	1.35	*1.43*	
11	1.61	1.56	1.61	1.56	1.56	1.55	1.65	1.70	1.61	1.52	1.35	*1.41*	
12	1.64	1.57	1.61	1.56	1.56	1.54	1.65	1.70	1.61	1.45	1.35	*1.41*	
13	1.63	1.56	1.63	1.56	1.56	1.52	1.65	1.70	1.63	1.39	1.36	*1.42*	
14	1.65	1.56	1.63	1.56	1.56	1.52	1.65	1.70	1.64	1.39	1.39	*1.43*	
15	1.62	1.57	1.61	1.56	1.56	1.54	1.65	1.70	1.61	1.39	1.43	*1.43*	
16	1.61	1.58	1.61	1.56	1.53	1.55	1.65	1.68	1.61	1.39	1.43	*1.43*	
17	1.61	1.56	1.61	1.62	1.52	1.56	1.63	1.65	1.61	1.39	1.43	*1.43*	
18	1.61	1.57	1.61	1.65	1.52	1.54	1.61	1.66	1.61	1.39	1.43	*1.43*	
19	1.61	1.58	1.65	1.65	1.52	1.56	1.61	1.65	1.61	1.39	1.43	*1.42*	
20	1.61	1.59	1.65	1.64	1.52	1.56	1.62	1.65	1.61	1.39	1.43	*1.42*	
21	1.61	1.61	1.65	1.63	1.52	1.56	1.65	1.65	1.61	1.39	1.43	*1.40*	
22	1.60	1.61	1.65	1.62	1.52	1.56	1.65	1.66	1.61	1.39	1.43	*1.39*	
23	1.56	1.61	1.65	1.62	1.52	1.60	1.65	1.66	1.62	1.39	1.44	*1.40*	
24	1.56	1.61	1.65	1.65	1.52	1.61	1.65	1.65	1.61	1.39	1.45	*1.41*	
25	1.56	1.59	1.65	1.63	1.52	1.61	1.65	1.65	1.61	1.39	1.45	*1.41*	
26	1.56	1.56	1.66	1.63	1.52	1.61	1.65	1.65	1.61	1.39	1.43	*1.43*	
27	1.56	1.57	1.68	1.61	1.52	1.65	1.65	1.65	1.64	1.39	1.41	*1.43*	
28	1.56	1.59	1.67	1.61	1.52	1.65	1.66	1.65	1.64	1.39	1.41	*1.43*	
29	1.56	1.61	1.65	1.61	1.52	1.65	1.68	1.65	1.63	1.39		*1.43*	
30	1.60	1.61	1.66	1.59	1.52	1.65	1.70	1.65	1.62	1.39		*1.43*	
31		1.61		1.57	1.52		1.70		1.61	1.40		*1.46*	
Average	1.59	1.59	1.63	1.61	1.54	1.57	1.66	1.68	1.62	1.46	1.41	1.42	1.56

2.8. Water Spreading in the Owens Valley

In years with much greater than normal snowmelt, the volume of runoff may at times exceed the capacity of the LAA system. During periods of high snowpack runoff, LADWP may spread runoff water for operational reasons. In addition, other operational needs may require LADWP to spread water.

No water spreading is planned in the Owens Valley for the 2022-23 RY.

LADWP ENVIRONMENTAL MITIGATION PROJECTS AND OTHER LEGAL COMMITMENTS

3.0 LADWP ENVIRONMENTAL MITIGATION PROJECTS AND OTHER LEGAL COMMITMENTS

3.1. Introduction

Section 3 provides information on all of LADWP's environmental mitigation projects and other commitments required under the Inyo/Los Angeles Water Agreement (Water Agreement), the *1991 Environmental Impact Report on Water From the Owens Valley to Supply the Second Los Angeles Aqueduct* (1991 EIR), the subsequent *1997 Memorandum of Understanding between the City of Los Angeles Department of Water and Power, the County of Inyo, California Department of Fish and Game, the California State Lands Commission, the Sierra Club, and the Owens Valley Committee* (1997 MOU) and related documents. Tables 3.1 and 3.2 provide a quick reference guide to all of these commitments. Projects/commitments are listed alphabetically in Tables 3.1 and 3.2 and have a corresponding number in the left column for reporting purposes only and show current status of these projects/commitments.

For reference, status of these projects is classified into the following categories:

Complete: Project has no additional commitments required (no water allotment or other financial or environmental mitigation; no continual monitoring and reporting),

Ongoing as necessary/required: These measures are only applied when necessary (monitoring and reporting for mitigation measures for new projects, construction, etc.),

Implemented and ongoing: Project is fully implemented and is currently meeting goals; however, there may be ongoing water or financial commitments or monitoring and reporting requirements,

Fully implemented but not meeting goals: Project is fully implemented but has not yet met prescribed goals or success criteria,

Not fully implemented: Project is under development or under construction, but not fully implemented.

Presently, of the 64 required environmental mitigation projects, LADWP reports:

- 8 are complete,
- 43 are implemented and ongoing (with ongoing water or financial commitments or monitoring and reporting requirements),
- 13 are fully implemented but not meeting goals,
- 0 are not fully implemented

Of the 49 other commitments, LADWP reports:

- 18 are complete,
- 6 are ongoing as necessary or required,
- 23 are implemented and ongoing,
- 0 are fully implemented and not meeting goals, and
- 2 are not fully implemented

More detailed information regarding each of these projects and other commitments is provided in tabular format later in this chapter in Table 3.3 and 3.5.

Additional monitoring reports are found for the Additional Mitigation Projects Developed by the MOU Ad Hoc Group (Section 3.1.1), the Yellow Billed Cuckoo Habitat Enhancement Plans (Section 3.2.1), and the Owens Valley Land Management Plan (OVLMP) (Section 3.2.2).

Table 3.1. LADWP Mitigation and Monitoring Summary

1991 EIR	1991 EIR Enviro. Project	1991 EIR E/M Project	Revegetation Project	1997 MOU	**Table 3.1. LADWP MITIGATION PROJECT COMMITMENTS**	Complete	Ongoing as necessary	Implemented and Ongoing	Implemented; not met goal	Not Fully Implemented
				X	Aberdeen Ditch Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			X		
X	X				Big and Little Seely Springs (1 acre pond near Well W349; EIR Impact 10-14, EIR Table 5-2)			X		
X			X		Big Pine Area Revegetation Project (160 acres; EIR Impact 10-19)				X	
X			X		Big Pine Area Revegetation Project (20 acres; EIR Impact 10-19)				X	
X					Big Pine Ditch System (EIR Impact 10-19)			X		
X		X	X		Big Pine Northeast Regreening (30 acres; EIR Impact 10-11, EIR Table 5-3)			X		
X			X		Bishop Area Revegetation Project (124 acres; EIR Impact 10-16)				X	
X			X		Blackrock 16E Revegetation Project (EIR Impact 10-11)	X				
X	X				Blackrock Hatchery (EIR Impact 10-14)			X		
X	X				Buckley Ponds (EIR Impact 10-5 and 11-1, EIR Table 5-2)			X		
X	X				Calvert Slough (EIR Impact 10-5, EIR Table 5-2)			X		
X	X			X	Diaz Lake (EIR Table 5-2, Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			X		
X		X			Eastern California Museum (EIR Tables 4-3 and 5-3)			X		
X	X				Farmers Pond (EIR Impact 10-5, 10-18, 11-1, EIR Table 5-2)			X		
X	X				Fish Springs Hatchery (EIR Impact 10-14)			X		
X			X		Five Bridges Area Revegetation Project (300 acres; EIR Impact 10-12)	X				
				X	Freeman Creek Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			X		
X				X	Hines Spring (1 to 2 acres, EIR Impact 10-14), implemented as the Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3)			X		
X			X		Hines Spring South (EIR Impact 10-11)				X	
				X	Hines Spring Well 355 Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			X		
				X	Homestead Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			X		
X			X		Independence 105 (EIR Impact 10-13)	X				
X			X		Independence 123 (EIR Impact 10-13)	X				
X			X		Independence 131 (EIR Impact 10-13)				X	
X		X			Independence Ditch System (EIR Table 4-3)			X		
X		X			Independence East Side Regreening Project (23 acres; EIR Impact 10-11, EIR Table 5-3)			X		
X		X			Independence Pasturelands and Native Pasturelands (610 acres; EIR Impact 12-1, EIR Tables 4-3 and 5-3)			X		
X		X			Independence Roadside Rest Area (0.5 acres; EIR Tables 4-3 and 5-3)			X		
X		X			Independence Springfield (286 acres; EIR Impact 12-1, EIR Tables 4-3 and 5-3)			X		
X		X			Independence Woodlot (20 acres; EIR Impact 10-11, EIR Table 4-3)			X		
X	X	X			Klondike Lake Aquatic Habitat (160 acres; EIR Impact 10-5 and 11-1, EIR Tables 4-3, 5-2, and 5-3)			X		
					Klondike SSHA (Big Pine Ditch System MND)			X		
			X		LAWS 118 (19 acre portion) (Laws Type E Transfer MND)				X	
			X		LAWS 129 (Laws Type E Transfer MND)				X	
			X		LAWS 27 (Native Seed Farm) (Laws Type E Transfer MND)				X	
			X		LAWS 90 (Laws Type E Transfer MND)				X	
			X		LAWS 94 (Laws Type E Transfer MND)				X	
			X		LAWS 95 (Laws Type E Transfer MND)				X	
X			X		Laws Area Revegetation Project (140 acres; EIR Impact 10-18)				X	
X		X			Laws Historical Museum Pasturelands (21+15 acres; EIR Impact 10-18, EIR Table 5-3)			X		
X		X			Laws/Poleta Native Pasture (216 acres; EIR Impact 10-16, EIR Tables 4-3 and 5-3)			X		
X	X				Little Blackrock Springs (EIR Impact 10-14, EIR Table 5-2)			X		
X		X			Lone Pine East Side Regreening (11 acres; EIR Impact 10-16, EIR Table 5-3)			X		
X		X			Lone Pine-North Lone Pine Clean Up (EIR Table 4-3)	X				
X		X			Lone Pine Riparian Park (320 acres, EIR Tables 4-3 and 5-3)			X		
X		X			Lone Pine Sports Complex (EIR Table 5-3)	X				
X		X			Lone Pine West Side Regreening (8 acres; EIR Impact 10-16, EIR Tables 4-3 and 5-3)			X		
X		X			Lone Pine Woodlot (12 acres; EIR Impact 10-11, EIR Table 4-3)			X		
X	X	X		X	LORP Project (60 miles, perhaps more than 1,000 acres)/ Lower Owens Rewatering Project)			X		
X		X			McNally Ponds and Native Pasturelands (300 acres pasture, 60 acres ponds; EIR Impact 10-5 and 10-18, EIR Tables 4-3, 5-3)			X		
X	X	X			Millpond Recreation Area (EIR Impact 10-5, EIR Table 5-2 and 5-3)			X		
				X	North of Mazourka Canyon Road Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			X		
X					Reinhackle Spring (EIR Impact 10-14)			X		
X		X			Richards Fields (160 acres; EIR Impact 10-16, EIR Table 4-3)			X		
X	X				Saunders Pond (EIR Impact 10-5, EIR Table 5-2)			X		
X		X			Shepherd Creek Alfalfa Field (198 acres; EIR Impact 10-11, EIR Tables 4-3 and 5-3)			X		
X		X			Shepherd Creek Potential (60 acres; EIR Impact 10-11, EIR Table 5-3)	X				
X					Steward Ranch (EIR Impact 9-14)	X				
X			X		Tinemaha 54 Revegetation Project (EIR Impact 10-11)				X	
X		X			Tree Planting along Roadways (EIR Table 4-3)			X		
X	X				Tule Elk Field (EIR Table 5-2)			X		
X		X			Van Norman Fields (170 acres; EIR Impact 10-16, EIR Table 4-3)			X		
				X	Warren Lake Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			X		
				X	Well 368 Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			X		
						8	0	43	13	0

Table 3.2. LADWP Other Legal Commitments Summary

Water Agreement	1991 EIR	Other Agreement	1997 MOU	Table 3.2. LADWP OTHER LEGAL COMMITMENTS	Completed	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented; Not Meeting Goals	Not Fully Implemented
			X	Aerial Photo Analysis (MOU Section III.E)	X				
			X	Annual Report on the Owens Valley (MOU Section III.H)			X		
		X		Blackrock 94 Burns (2014 Stipulation)	X				
X				Cooperative Studies (Water Agreement Section IX)			X		
X				Dispute Resolution (Water Agreement Section XXVI)		X			
			X	Dispute Resolution and Litigation (MOU Section VI)		X			
X				Enhancement/ Mitigation Projects (Water Agreement Section X)			X		
X				Exchange of Information and Access (Water Agreement Section XVII)			X		
X				Financial Assistance- Big Pine Ditch System (Agreement Section XIV.E)			X		
X				Financial Assistance- General Financial Assistance to the County (Water Agreement Section XIV.D)			X		
X				Financial Assistance- Park & Environmental Assistance to City of Bishop (Water Agreement Section XIV.F)			X		
X				Financial Assistance- Park Rehabilitation, Development, & Maintenance (Water Agreement Section XIV.B)			X		
X				Financial Assistance- Salt Cedar Control (Water Agreement Section XIV.A)			X		
X				Financial Assistance- Water and Environmental Activities (Water Agreement Section XIV)			X		
			X	Financial Provisions (MOU Section IX)	X				
			X	Fish Slough (MOU Section IV)			X		
X				Groundwater Management (Water Agreement Section II)			X		
X				Groundwater Pumping on the Bishop Cone (Water Agreement Section VII)			X		
X				Groundwater Recharge Facilities (Water Agreement Section VIII)		X			
			X	Habitat Conservation Plan (MOU Section III.B)	X				
X				Haiwee Reservoir (Water Agreement Section XIII)	X				
			X	Inventory of Plants and Animals at Spring and Seeps (outside LORP Planning Area) (MOU Section III.C)	X				
	X			Laws Area Potential Mitigation-Consideration by Standing Committee (640 acres; EIR Impact 10-18)		X			
X				Legislative Coordination (Water Agreement Section XVI)			X		
			X	LORP Agency Consultation and Public Involvement (MOU Section II.D)	X				
			X	LORP EIR (MOU Section II.F)	X				
			X	LORP Implementation (MOU Section II.H)	X				
			X	LORP Monitoring and Adaptive Management Plan (MOU Section II.E)			X		
			X	LORP Permits Approvals and Licenses (MOU Section II.I)	X				
			X	LORP Plan (MOU Section II.A)	X				
			X	LORP Planning Area- Inventory of Plants and Animals at Spring and Seeps (MOU Section III.A.2)	X				
			X	LORP Pumpback System (MOU Section II.G)	X				
			X	Lower Owens Off River Lakes and Ponds (MOU Section II.C.3)			X		
X				Lower Owens River (financial commitment) (Water Agreement Section XII)			X		
			X	Lower Owens River Delta Habitat Area (MOU Section II.C.2)			X		
			X	Lower Owens River Project 1500-Acre Blackrock Waterfowl HHabitat Area (MOU II.C.4)			X		
			X	Lower Owens River Riverine- Riparian System (MOU Section II.C.1)			X		
			X	Mitigation Plans for Impacts Identified in the 1991 EIR and the Water Agreement (MOU III.F)			X		
X				New Wells & Production Capacity (Water Agreement Section VI)					X
X				Owens River Recreational Use Plan (Water Agreement XV.B)					X
			X	Owens Valley Land Management Plans (MOU Section III.B)			X		
X				Release of City Owned Lands - Lands for Public Purposes (Water Agreement Section XV.D)		X			
X				Release of City Owned Lands- Bishop (Water Agreement Section XV.B)	X				
X				Release of City Owned Lands- Inyo County (Water Agreement Section XV.A)	X				
X				Release of City-owned lands- Additional Sales (Water Agreement Section XV.C)	X				
			X	Technical Group Meetings (MOU Section III.G)		X			
X				Town Water Systems (Water Agreement Section XI)	X				
			X	Type E Vegetation Inventory (MOU Section III.D)	X				
			X	Yellow-billed Cuckoo Habitat (MOU Section III.A.1)			X		
					18	6	23	0	2

3.2. LADWP ENVIRONMENTAL MITIGATION PROJECTS

Table 3.3 provides project title, legal reference, mitigation measure/provision, progress to date, and current status (according to LADWP) on each of LADWP's environmental mitigation projects listed in Table 3.1.

Again, categories describing status are:

Complete: Project has no additional commitments required (no water allotment or other financial or environmental mitigation; no continual monitoring and reporting),

Ongoing as necessary/required: These measures are only applied when necessary (monitoring and reporting for mitigation measures for new projects, construction, etc.),

Implemented and ongoing: Project is fully implemented and is currently meeting goals; however, there may be ongoing water or financial commitments or monitoring and reporting requirements,

Fully implemented but not meeting goals: Project is fully implemented but has not yet met prescribed goals or success criteria,

Not fully implemented: Project under development or under construction, but not fully implemented.

Following Table 3.3, there is an annual monitoring report for the Additional Mitigation Projects Developed by the MOU Ad Hoc Group (1600 AF Projects), and updates to the Mitigation Monitoring and Reporting Programs (MMRP) for the Irrigation Project in the Laws Area (Laws Type E Transfer), and the Big Pine Ditch System.

Table 3.3. LADWP Mitigation and Monitoring

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	**Table 3.3 LADWP MITIGATION AND MONITORING**				Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
						Project Title	**Impact (Where Relevant)**	**Measure/Provision**	**Progress to Date**	Status				
1					X	Aberdeen Ditch Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			Project was implemented in April 2011 as part of the Additional Mitigation Projects Developed by the MOU Ad Hoc Group. Water continues to be provided annually to this project. Please refer to Section 3.2.1 for more information. Project is implemented and ongoing.			X		
2	X	X				Big and Little Seely Springs (1 acre pond near Well W349; EIR Impact 10-14, EIR Table 5-2)	10-14: Increased groundwater pumping has reduced or eliminated flows from Fish Springs, Big and Little Seely Springs, Hines Spring, Big and Little Blackrock Springs, and Reinhackle Spring. This has caused significant adverse impacts to vegetation at several of these spring areas.	In the area of Big and Little Seely Springs, LADWP well number 349 discharges water into a pond approximately one acre in size. This pond provides a temporary resting place for waterfowl and shorebirds when the pump is operating or Big Seely Spring is flowing. This water passes through the pond to the Owens River. Riparian vegetation has become established around this pond.	Project implementation is complete. Water continues to be provided annually to this project from Well 349. Project is implemented and ongoing.			X		
3	X			X		Big Pine Area Revegetation Project (160 acres; EIR Impact 10-19)	10-19: Water management practices in a portion of the Big Pine Well Field have resulted in a significant adverse change and decrease of plant cover.	A revegetation program will be implemented for approximately 160 acres within the Big Pine area, which have lost all or part of its vegetation cover due to increased groundwater pumping or to abandonment of irrigation as part of operations to supply the second aqueduct. Will be revegetated.	Site was fenced to reduce disturbance in 1998. Permanent vegetation transects were established in 1999. Mulch was applied to the site in 1999 and soil microbial studies were conducted in 1999, 2003, 2004, and 2005 by Montgomery Watson Harza (MWH). Drill seeding of the site occurred in Spring 2011 (20 acres), Winter 2014 (28 acres), and Fall/Winter 2015/2016 (154 acres). Seed germination from the 2015/2016 seeding effort was largely successful at this site. Additionally, some natural recruitment is occurring along the perimeter of the site. LADWP planted 100 *Sarcobatus vermiculatus* shrubs utilizing the Cocoon Planting System from Land Life Company in the fall of 2018. This technology allows for shrubs to grow in arid environments without additional irrigation post planting. As of 2019, there was only a 10% survivability rate of shrubs which could be due to the quality of the plants. Unlike the other sites that the Cocoon Planting System was tested, plants used for this effort were bought from an outside vendor.				X	

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	**Table 3.3 LADWP MITIGATION AND MONITORING**				Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
						Project Title	**Impact (Where Relevant)**	**Measure/Provision**	**Progress to Date**	Status				
									Permanent transects were read in 2019. The parcel has achieved 10% native perennial vegetation cover with 11 native perennial species (16% cover goal, 8 perennial species). The project has obtained the composition goal. There has been a significant upward trend in cover due to 2017 and 2019 precipitation years. Project is implemented but has not yet attained cover goals.					
4	X			X		Big Pine Area Revegetation Project (20 acres; EIR Impact 10-19)	10-19: Water management practices in a portion of the Big Pine Well Field have resulted in significant adverse change and decrease of plant cover.	An area of approximately 20 acres directly to the east of Big Pine that is poorly vegetated as a result of pre-project activities and activities which are not a part of the project will be evaluated as a potential enhancement/mitigation project. If, in planning this project, it is determined that it is not feasible to permanently irrigate this area, a revegetation program will be implemented.	Site was fenced to reduce disturbance and promote reestablishment in 2007. In February 2014, LADWP crews seeded approximately 3.2 acres of this area with a native seed mix in conjunction with the adjacent 160 acre Big Pine parcel. Approximately 18 acres were drill seeded at 10lbs/acre using native shrub seed mix during Winter 2015/2016. Seed germination from the 2015/2016 seeding efforts was largely successful at this site. Additionally, some natural recruitment is occurring at this site. Permanent transects were read in 2019. The parcel has achieved 2.4% native perennial vegetation cover with 3 perennial species (16% cover goal, 8 perennial species). LADWP reseeded a 10-acre low cover portion of this parcel with native species in March 2021. The project is implemented but has not yet attained goals.				X	
5	X					Big Pine Ditch System (EIR Impact 10-19)	10-19: Water management practices in a portion of the Big Pine Well Field have resulted in significant adverse change and decrease of plant cover.	The Big Pine Ditch Project was planned to be implemented as provided in the Agreement. Per the Agreement, LADWP is to provide up to $100,000 for reconstruction and upgrading of the ditch system. Additionally, LADWP is to supply up to 6 cfs to the ditch system from a new well to be constructed west of Big Pine. The Inyo/Los Angeles Water Agreement was modified in 2003 to change the source of the replacement water and to specify new sources for the Big Pine Ditch System. This revised project includes a new well to be drilled in Bell Canyon and also includes an expansion of replacement water to include diversion from Big Pine Creek and Bell Canyon Ditch. Surface water flow in Big Pine Creek will be augmented with groundwater pumped from Well 415, and the surface water flow in Bell Canyon Ditch will	The Standing Committee approved procedures and guidelines for implementing the project in 1998. An *Initial Study and Mitigated Negative Declaration for the Big Pine Ditch System and Modification to the Klondike Lake Project in the Big Pine Area of Inyo County* was circulated in 2003 and was approved by the Board of Water and Power Commissioners on November 12, 2003. The Water Agreement was also amended at this time, changing the project as originally described. The Big Pine Irrigation and Improvement Association has implemented all phases required of them for the project and it has been in operation since 2005. LADWP has provided $99,745 of the $100,000 committed to the project. LADWP annually supplies the required water to the project but is not currently recovering the makeup water. Well 415 has been drilled and equipped but is not yet operational. ICWD and LADWP adopted protocols for a 6 month pumping test of W415 with associated monitoring requirements at their May 6, 2020 Technical				X	

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Status: Complete	Status: Ongoing as Necessary/Required	Status: Implemented and Ongoing	Status: Fully Implemented but not meeting goals	Status: Not fully implemented
								be augmented from the proposed Bell Canyon Well. The project will be constructed, operated and maintained by the Big Pine Irrigation and Improvement Association.	Group Meeting. The test has not yet been conducted but may occur in 2022. The Bell Canyon well has not yet been drilled. Although these two wells are not operational, this project is implemented and ongoing with water supplied annually to the project.					
6	X		X	X		Big Pine Northeast Regreening (30 acres; EIR Impact 10-11 and 10-19, EIR Table 5-3)	10-11: Fluctuations in water tables due to groundwater pumping have caused approximately 655 acres of groundwater dependent vegetation to die off. Loss of vegetation cover has occurred on these lands.10-19: Water management practices in a portion of the Big Pine Well Field have resulted in a significant adverse change and decrease of plant cover.	10-11: In the near future, two enhancement/mitigation projects will be initiated to mitigate areas affected by groundwater pumping adjacent to the towns of Independence (east side regreening project) and Big Pine (northeast regreening project). Each project was originally planned to be approximately 30 acres of irrigated pasture.10-19: LADWP and Inyo County will implement the Big Pine Regreening enhancement/mitigation project by establishing irrigated pasture on approximately 30 acres to the north and east of Big Pine.The Standing Committee approved a revised scope of work for the Big Pine Northeast Regreening Project as an Enhancement/ Mitigation Project under the EIR on November 4, 2010. The revised scope modified the boundaries of the project and amended the water supply source to be Big Pine Creek via the Big Pine Ditch System, Baker Creek via the Mendenhall Park Ditch, or Baker Return Ditch, or the Big Pine Canal, or a combination of these. The project will be supplied with up to 150 AF of water per year, and surface water supplied to the project will be made up by pumping W375 in an amount equivalent to that supplied to the project on an annual basis. Additionally, irrigation water will be supplied by flood or sprinkler irrigation.	LADWP prepared and circulated an Initial Study and Negative Declaration for the Big Pine Northeast Regreening Project. This ND was approved by the Board of Water and Power Commissioners on March 6, 2012 and its Notice of Determination was filed with the State Clearinghouse and Inyo County Clerk on March 7, 2012. The Owens Valley Committee and the Big Pine Paiute Tribe brought a lawsuit against LADWP April 6, 2012 (Case No: SICVPT12-53541) challenging the adequacy of the ND and impacts from the use of W375 for makeup water for the project. This suit was settled in November 26, 2012. The Technical Group exempted well W375 on November 6, 2013 for project makeup water in order to make this project feasible. Installation of the irrigation system for this project occurred in Winter 2013/2014. The Big Pine Northeast Regreening was fully implemented in Spring 2014. Water continues to be provided annually to this project. Project is implemented and ongoing.			X		

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
7	X			X		Bishop Area Revegetation Project (120 acres; EIR Impact 10-16)	10-16: Approximately 1,080 acres of formerly irrigated lands had not successfully revegetated following the abandonment of agriculture. This was a significant adverse impact because these lands had a loss of vegetation and were the source of blowing dust.	120 acres of formerly irrigated land near Bishop with a loss of vegetation cover will be revegetated. The process to successfully revegetate these lands will be determined through studies to be conducted by LADWP and Inyo County. These lands will not be permanently irrigated, but will be revegetated with Owens Valley vegetation not requiring irrigation except perhaps during its initial establishment. Depending on the amount of rainfall and runoff, successful revegetation of these lands could take a decade or longer. The goal will be to achieve as full a vegetation cover as is feasible, but at a minimum, a vegetation cover sufficient to avoid blowing dust.	Site was fenced to reduce disturbance in 1998. Permanent transects were established in 1999. MWH conducted dryland revegetation studies at this site in 2003 and a soil microbial study at this site in 2005. In 2011, approximately 35 acres were drill seeded with locally collected seeds. In 2012, a buried drip irrigation system was installed across 16 acres of the site and seed was planted at these emitters. In 2015, approximately 6 acres were hand seeded at emitters with native seed mix and 11.3 acres were drill seeded at the south end of the site. LADWP planted 230 shrubs consisting of *Atriplex canescens*, *Atriplex polycarpa*, and *Eriogonum fasciculatum* utilizing the Cocoon Planting System from Land Life Company in the spring 2019. The cocoon planting technology allows for shrubs to grow in arid environments without additional irrigation post planting. As of 2019, the shrubs had a 48% survivability rate. The shrubs will continue to be monitored for success. Permanent vegetation transects were read in 2019. The parcel has achieved 14.3% cover with 4 native perennial species (goal 14% native perennial cover with 9 species). Project implementation is complete. Although species composition has not met 9 species, the goal of 14% native perennial cover has been met. LADWP seeded a 10-acre low cover area in this parcel with native perennial species in March 2021.				X	

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Status: Complete	Status: Ongoing as Necessary/Required	Status: Implemented and Ongoing	Status: Fully Implemented but not meeting goals	Status: Not fully implemented
8	X			X		Blackrock 16E Revegetation Project (7.5 acres, EIR Impact 10-11)	10-11: Fluctuations in water tables due to groundwater pumping have caused approximately 655 acres of groundwater dependent vegetation to die off. Loss of vegetation cover has occurred on these lands.	Approximately 80 acres of land that lost a significant amount of its native vegetation cover as a result of increased groundwater pumping will be revegetated. The techniques that will be employed to revegetate these lands will be determined through studies that will be conducted by LADWP and Inyo County. These lands will not be permanently irrigated, but will be revegetated with native Owens Valley vegetation not requiring irrigation except perhaps during its initial establishment. Depending on the amount of rainfall and runoff, successful revegetation of these lands could take a decade or longer. The goal will be to restore as full a native vegetation cover as is feasible, but at a minimum, vegetation cover sufficient to avoid blowing dust will be achieved in that area.	Site was fenced to reduce disturbance and permanent vegetation transects were established. These transects were run in 2010 and the parcel attained cover and composition goals (31% cover consisting of 5 perennial species). Exclusionary fencing has been removed. Project is complete.	X				
9	X					Blackrock Hatchery (EIR Impact 10-14)	10-14: Increased groundwater pumping has reduced or eliminated flows from Fish Springs, Big and Little Seely Springs, Hines Spring, Big and Little Blackrock Springs, and Reinhackle Spring. This has caused significant adverse impacts to vegetation at several of these spring areas.	No on-site mitigation will be implemented at Fish Springs and Big Blackrock Springs; however, CDFW fish hatcheries at these locations serve as mitigation of a compensatory nature by producing fish that are stocked throughout Inyo County.	The Blackrock Hatchery Ponds were first operated in 1941. In 1976, the hatchery was expanded. Spawning activities ceased in 2012 at this hatchery. This hatchery raises rainbow and California Golden trout for distribution to approved waters in the State of California. Hatchery operations are managed by CDFW. The hatchery is on City of Los Angeles property and LADWP annually supplies water to the project. Project is implemented and ongoing.			X		

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
10	X	X				Buckley Ponds (EIR Impact 10-5 and 11-1, EIR Table 5-2)	10-5: Between 1970 and 1990, the project resulted in beneficial changes to lakes and ponds, and the creation of new lakes and ponds, with no significant adverse impact on vegetation.11-1: Changes of surface water management practices and increased groundwater pumping have altered the habitats on which wildlife depends. Vegetation changes have been significant in many locations throughout the Valley. Therefore, impacts to certain species of wildlife, which were entirely dependent upon the impacted habitat, can be presumed to be significant.	Under this project, water is provided for a warm-water fishery and waterfowl area.	The dike system forming the Buckley Pond Series was originally constructed in the 1950s to create a water spreading and groundwater recharge area to be used only in above normal years. In 1968, a cooperative agreement between LADWP and CDFG proposed a habitat improvement project and permanent wildlife habitat area. Work under this agreement began in 1970 when it was implemented as an LADWP Environmental Project. LADWP, California Department of Fish and Game, and California Department of Forestry signed onto the joint *Habitat Management Plan for the Buckley Pond Series* in 1976 that described how the pond series was to be managed. LADWP has conducted significant maintenance in these ponds in recent years. In December 2011, LADWP conducted controlled burns on Rawson Ponds #1, 2, and 3 with assistance from Cal Fire. Additional controlled burns were conducted on Rawson Pond #1 in December 2012 and on Rawson Pond #2 in January 2014. Following burning, all ponds were cleaned and new inlet/outlet structures installed, and handicap accessible fishing platforms were constructed by the local Lion's Club at each site. Ponds were back in service at the following times: Rawson Pond #3: March 2012; Rawson Pond #1: March 2013; and Rawson Pond #2: April 2014. Water continues to be provided annually to this project. Maintenance occurs as necessary. Project is implemented and ongoing.			X		
11	X	X				Calvert Slough (EIR Impact 10-5, EIR Table 5-2)	10-5: Between 1970 and 1990, the project resulted in beneficial changes to lakes and ponds, and the creation of new lakes and ponds, with no significant adverse impact on vegetation.	Under this project, water is provided to maintain habitat, small pond, and marsh area near the Los Angeles Aqueduct Intake.	Calvert Slough was originally implemented as an LADWP Environmental Project in the 1970s. Water continues to be provided to this project. Project is implemented and ongoing.			X		

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
12	X	X			X	Diaz Lake (EIR Table 5-2, Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))		As described in the EIR, supplemental water supply is provided to Diaz Lake Recreational Area for this project. Under the 1997 MOU as one of the Additional Mitigation Projects Developed by the MOU Ad Hoc Group, the Diaz Lake Project provides a secure water supply for Diaz Lake and reduces the dependence on pumping conducted by Inyo County to supply the lake, as was the case with the original project. The primary benefit of the MOU project is reduced pumping by Inyo County in the Bairs-George wellfield to provide water for Diaz Lake.	The Diaz Lake Project was originally implemented as an LADWP Environmental Project in the 1970s. The changes in water supply and accounting for the project under the MOU were implemented in Spring 2012. Please refer to Section 3.2.1 for more information on this and other Additional Mitigation Projects Developed by the MOU Ad Hoc Group. Project is implemented and ongoing.			X		
13	X		X			Eastern California Museum (EIR Tables 4-3 and 5-3)		This project enhanced the appearance of the Eastern California Museum grounds in Independence. It consists of a small pond, trees, expanded lawn areas, and an irrigation system.	This project was implemented in 1989. Water continues to be provided annually to this project. Project is implemented and ongoing.			X		
14	X	X				Farmers Pond (EIR Impact 10-5, 10-18, 11-1, EIR Table 5-2)	10-5: Between 1970 and 1990, the project resulted in beneficial changes to lakes and ponds, and the creation of new lakes and ponds, with no significant adverse impact on vegetation. 10-18: Significant adverse vegetation decrease and change have occurred in the Laws area due to a combination of factors, including abandoned agriculture, groundwater pumping, water spreading in wet years, livestock grazing, and drought. 11-1: Changes of surface water management practices and increased groundwater pumping have altered the habitats on which wildlife depends. Vegetation changes have been	In the 1970s, LADWP started the Farmer's Pond environmental project. Water is provided in fall of each year to offer increased habitat for migrating waterfowl. The project area is two miles north of Bishop.	This project was originally implemented as an LADWP Environmental Project in the 1970s. Water continues to be provided annually to this project in the fall. Project is implemented and ongoing.			X		

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
							significant in many locations throughout the Valley. Therefore, impacts to certain species of wildlife, which were entirely dependent upon the impacted habitat, can be presumed to be significant.							
15	**X**					Fish Springs Hatchery (EIR Impact 10-14)	10-14: Increased groundwater pumping has reduced or eliminated flows from Fish Springs, Big and Little Seely Springs, Hines Spring, Big and Little Blackrock Springs, and Reinhackle Spring. This has caused significant adverse impacts to vegetation at several of these spring areas.	No on-site mitigation will be implemented at Fish Springs and Big Blackrock Springs; however, CDFG fish hatcheries at these locations serve as mitigation of a compensatory nature by producing fish that are stocked throughout Inyo County.	The Fish Springs Hatchery was originally constructed in 1952 and was modernized in 1972 and again in 2009. This hatchery produces and distributes rainbow and Eagle Lake trout to Inyo and Mono Counties. Hatchery operations are managed by CDFW. The hatchery is on City of Los Angeles property and LADWP annually supplies water to the project. Project is implemented and ongoing.			**X**		
16	**X**			**X**		Five Bridges Area Revegetation Project (300 acres; EIR Impact 10-12)	10-12: Vegetation in an area of approximately 300 acres near Five Bridges Road north of Bishop was significantly adversely affected during 1988 because of the operation of the two wells, to supply water to enhancement/mitigation projects.	Water has been spread over the affected area since 1988. By the summer of 1990, revegetation of native species had begun on approximately 80% of the affected area. LADWP and Inyo County are developing a plan to revegetate approximately 60 acres with riparian and meadow vegetation. This plan will be implemented when it has been completed.	Since 1989, LADWP has implemented various efforts to recover native vegetation in the mitigation area through re-irrigating the affected area each growing season, extensive weed treatment to eradicate perennial pepperweed (*Lepidium latifolium),* and development and implementation of a grazing management plan to compliment these efforts. LADWP has also used controlled burns, sprinkler irrigation, seeding banks and outplanting native species to assist in mitigating the original impacts. In 2017, LADWP determined that mitigation for the impacts from groundwater pumping at Five Bridges was complete. Inyo County and LADWP utilized the dispute resolution process to settle disagreements over the W385R pump test and the status of the Five Bridges Mitigation Project in 2017. On June 25, 2018, both parties entered into a Settlement Agreement as resolution to these disputes. Subsequently, at their July 19, 2018 meeting, the Inyo/Los Angeles Technical Group adopted resolutions to (1) adopt a monitoring and management plan for the W385R pump test and (2) amend the 1999 Revegetation Plan to temporarily suspend the provision requiring Wells 385 and 386 be permanently shut down in order to conduct the pump test. At their February 21, 2019 meeting, the Technical Group adopted a Work Plan for the Five Bridges Mitigation Area for the 2019 and 2020 calendar years to	**X**				

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	**Table 3.3 LADWP MITIGATION AND MONITORING**				Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
						Project Title	**Impact (Where Relevant)**	**Measure/Provision**	**Progress to Date**	Status				
									coincide with the W385 pump test which occurred December 2019-February 2020. LADWP conducted the work outlined in that plan per agreement with Inyo County. Mitigation is complete.					
17					X	Freeman Creek Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			Project was implemented in July 2010 as part of the Additional Mitigation Projects Developed by the MOU Ad Hoc Group. Water continues to be provided annually to this project. Please refer to Section 3.2.1 for more information on these projects. Project is implemented and ongoing.			X		
18	X				X	Hines Spring (1 to 2 acres, EIR Impact 10-14), implemented as the Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3)	10-14: Increased groundwater pumping has reduced or eliminated flows from Fish Springs, Big and Little Seely Springs, Hines Spring, Big and Little Blackrock Springs, and Reinhackle Spring. This has caused significant adverse impacts to vegetation at several of these spring areas.	The original mitigation measure called for onsite mitigation at the Hines Spring vent and its surroundings. This project was also identified in the 1997 MOU and subject of 2004 and 2010 Stipulations and Orders.Per the MOU Section III.A.3 (Additional Mitigation), a total of 1600 AF of water per year will be supplied by LADWP for the implementation of the on-site mitigation measure at Hines Springs and on-site or off-site mitigation identified in the 1991 EIR for impacts at Fish Springs, Big and Little Seely Springs and Big and Little Blackrock Springs. Under the direction of LADWP and the County, Ecosystem Sciences will recommend reasonable and feasible on-site and/or off site mitigation measures, including the implementation of mitigation at Hines Springs.	Ecosystem Sciences developed a draft plan for this project that was finalized in October 2005. The MOU Parties found this plan to be inadequate and decided to enter into an ad hoc process to analyze the project at Hines Springs and other potential project areas. The Additional Mitigation Projects Developed by the MOU Ad Hoc Group document was finalized in September 2008 and describes a series of eight mitigation projects to satisfy this 1600AF mitigation commitment of the 1997 MOU. This plan was completed and agreed to by the MOU Parties. CEQA analysis was conducted in Spring 2010 and the projects were adopted by the Board of Water and Power Commissioners in June 2010. Implementation of the projects began shortly thereafter and all were fully implemented by March 2012, per the 2010 Stipulation and Order (Case No: S1CVCV01-29768). Projects are further described in Section 3.2.1. Projects are implemented and ongoing.			X		
19	X			X		Hines Spring South (9 acres, EIR Impact 10-11)	Fluctuations in water tables due to groundwater pumping have caused approximately 655 acres of groundwater dependent vegetation to die off. Loss of vegetation cover has occurred on these lands.	Approximately 80 acres of land that lost a significant amount of its native vegetation cover as a result of increased groundwater pumping will be revegetated. The techniques that will be employed to revegetate these lands will be determined through studies that will be conducted by LADWP and Inyo County. These lands will not be permanently irrigated, but will be revegetated with native Owens Valley vegetation not requiring irrigation except perhaps during its initial establishment. Depending on the amount of rainfall and runoff, successful revegetation of these lands could	Per the Additional Mitigation Projects Developed by the MOU Ad Hoc Group, the timeline for implementing the Hines Spring South Revegetation Project was extended to three years post implementation of the Additional Mitigation Projects. All of the Additional Mitigation Projects were implemented by Spring 2012. The Revegetation Plan for Hines Spring South is complete and was provided in LADWP's 2015 Annual Owens Valley Report. The 9-acre exclosure was fenced in 2015 per this plan. Initial response to exclusion of this area was positive as demonstrated by prolific native grasses. Permanent vegetation transects were established and read in 2019. The parcel has achieved 10.2% cover with 5 native perennial species (goal 31.5% cover with 3 native				X	

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
								take a decade or longer. The goal will be to restore as full a native vegetation cover as is feasible, but at a minimum, vegetation cover sufficient to avoid blowing dust will be achieved in that area.	perennial species). The composition goal has been met. Project is implemented but cover criteria has not yet been met.					
20					X	Hines Spring Well 355 Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			Project was implemented in January 2012 as part of the Additional Mitigation Projects Developed by the MOU Ad Hoc Group. Please refer to Section 3.2.1 for more information on these projects. Project is implemented and ongoing.			X		
21					X	Homestead Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			Project was implemented in February 2012 as part of the Additional Mitigation Projects Developed by the MOU Ad Hoc Group. Please refer to Section 3.2.1 for more information on these projects. Project is implemented and ongoing.			X		
22	X			X		Independence 105 Revegetation Project (14 acres, EIR Impact 10-13)	Increased groundwater pumping has significantly adversely affected approximately 60 acres of vegetation in the Symmes Shepherd well field area.	A revegetation program will be implemented for these effected areas utilizing native vegetation of the type that has died off. Water may be spread as necessary in these areas to accomplish the revegetation.	This project contains a portion of the 60 acres required for revegetation under EIR Impact 10-13. This 14-acre site was fenced to reduce disturbance in 1999 and permanent vegetation transects were established in 2000. As of 2017, the parcel contained 23% perennial vegetation cover consisting of 3 perennial species, attaining the goal for cover and composition (15% cover and 3 perennial species). Project is complete.	X				
23	X			X		Independence 123 Revegetation Project (28 acres, EIR Impact 10-13)	Increased groundwater pumping has significantly adversely affected approximately 60 acres of vegetation in the Symmes Shepherd well field area.	A revegetation program will be implemented for these effected areas utilizing native vegetation of the type that has died off. Water may be spread as necessary in these areas to accomplish the revegetation.	This project contains a portion of the 60 acres required for revegetation under EIR Impact 10-13. This 28-acre site was fenced to reduce disturbance in 1999 and permanent vegetation transects were established in 2000. As of 2006, this site had attained 17% cover with 4 native perennial species, attaining the goals for cover and composition (15% cover and 3 perennial species). Project is complete.	X				

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
24	X			X		Independence 131 Revegetation Project (23 acres, EIR Impact 10-13)	Increased groundwater pumping has significantly adversely affected approximately 60 acres of vegetation in the Symmes Shepherd well field area.	A revegetation program will be implemented for these effected areas utilizing native vegetation of the type that has died off. Water may be spread as necessary in these areas to accomplish the revegetation.	This project contains a portion of the 60 acres required for revegetation under EIR Impact 10-13. This 74.6 acre revegetation site is segmented by Symmes Creek and was fenced to reduce disturbance in 1999. Permanent vegetation transects were established in 2000. SAIC and MWH conducted dryland revegetation studies using various irrigation methods and planting techniques in 2003 and 2005. 25 acres were drill seeded with locally collected seeds in the spring of 2011. As of 2012, IND131N (north of Symmes Creek) had achieved 15% cover with 5 native perennial species, attaining the goals for cover and composition (15% cover and 3 perennial species). Vegetation transects in IND131S (south of Symmes Creek) were monitored in 2017. This portion of the site had 10% cover and 6 perennial species, meeting the composition requirement. This project has been fully implemented but the southern portion has not yet attained cover goals.				X	
25	X		X			Independence Ditch System (EIR Table 4-3)		This project will provide water to a ditch through Independence. After passing through town, the unused water may supply irrigation water to the Independence Pasturelands and/or Independence Springfield enhancement/mitigation projects.	This project was implemented as an LADWP Enhancement/Mitigation Project in 1987. Water continues to be supplied annually to the project. Project is implemented and ongoing.			X		
26	X		X	X		Independence East Side Regreening Project (23 acres; EIR Impact 10-11, 12-1, EIR Table 5-3)	10-11: Fluctuations in water tables due to groundwater pumping have caused approximately 655 acres of groundwater dependent vegetation to die off. Loss of vegetation cover has occurred on these lands. 12-1: Significant impacts on air quality resulting from groundwater pumping during the period of 1970 to 1990 have occurred due to vegetation losses.	10-11: In the near future, two enhancement/ mitigation projects will be initiated to mitigate areas affected by groundwater pumping adjacent to the towns of Independence (east side regreening project) and Big Pine (northeast regreening project). Each project was originally planned to be approximately 30 acres of irrigated pasture.12-1: As part of the Independence Pasturelands and Springfield enhancement/mitigation projects, approximately 730 acres of barren or near barren ground have been revegetated with either native pasture or alfalfa. This area was affected by groundwater pumping and surface diversions of water.	Installation of the irrigation system for this project occurred in Winter 2013/2014. The Independence East Side Regreening Project was fully implemented in spring 2014. Water is supplied annually to the project for irrigation. Project is implemented and ongoing.			X		

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
27	X		X			Independence Pasturelands and Native Pasturelands (610 acres (520 acres per EIR Figure 12-2); EIR Impact 12-1, EIR Tables 4-3 and 5-3)	12-1: Approximately 1,080 acres of formerly irrigated lands had not successfully revegetated following the abandonment of agriculture. This was a significant adverse impact because these lands had a loss of vegetation and were the source of blowing dust.	As part of the enhancement/mitigation projects implemented by LADWP and Inyo County since 1985, approximately 942 acres of these abandoned agricultural lands have been revegetated with irrigated pasture or alfalfa. These areas are the Independence Pasture and native pasture lands, the Van Norman and Richards Fields, and the Lone Pine Woodlot adjacent to Lone Pine.	This project was implemented as an LADWP Enhancement/Mitigation Project 1987-1988. Approximately 520 acres are incorporated into the project per Figure 12-2 in the 1991 EIR. Water continues to be provided annually to this project for irrigation. Project is implemented and ongoing.			X		
28	X		X			Independence Roadside Rest Area (0.5 acres; EIR Tables 4-3 and 5-3)		This project consisted of planting shade and windbreak trees and grass, installation of an irrigation system, and placement of a picnic table on a ½-acre site south of the town of Independence.	This project was implemented as an LADWP Enhancement/Mitigation Project in 1989. Water is provided from the Independence Town Water System through a metered connection and paid for by Inyo County. Project is complete.	X				
29	X		X			Independence Springfield (286 acres; EIR Impact 10-11, 12-1, EIR Tables 4-3 and 5-3)	10-11: Fluctuations in water tables due to groundwater pumping have caused approximately 655 acres of groundwater dependent vegetation to die off. Loss of vegetation cover has occurred on these lands. 12-1: Significant impacts on air quality resulting from groundwater pumping during the period of 1970 to 1990 have occurred due to vegetation losses.	10-11: As part of the Independence Springfield and Woodlot enhancement/mitigation projects, approximately 317 acres of barren or near-barren ground have been revegetated with either native pasture or alfalfa. This area was affected by groundwater pumping and surface diversions of water. 12-1: As part of the Independence Pasturelands and Springfield enhancement/mitigation projects, approximately 730 acres of barren or near barren ground have been revegetated with either native pasture or alfalfa. This area was affected by groundwater pumping and surface diversions of water.	This project was implemented as an LADWP Enhancement/Mitigation Project in 1988 and irrigates approximately 300 acres. Water continues to be provided annually to the project for irrigation. Project is implemented and ongoing.			X		

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
30	X		X			Independence Woodlot (20 acres; EIR Impact 10-11, EIR Table 4-3)	10-11: Fluctuations in water tables due to groundwater pumping have caused approximately 655 acres of groundwater dependent vegetation to die off. Loss of vegetation cover has occurred on these lands.	As part of the Independence Springfield and Woodlot enhancement/mitigation projects, approximately 317 acres of barren or near-barren ground have been revegetated with either native pasture or alfalfa. This area was affected by groundwater pumping and surface diversions of water.	The Independence Wood Lot was initially planted in 1987. The wood lot was planted at a high density with the intent of thinning to a 12-foot spacing after planting success was determined. Over time, this high density of trees resulted in reduced growth and increased competition. While the hybrid poplar portions of the wood lots have been harvested several times since project implementation, the locust portions of the wood lots had never been harvested until 2015-2016. At that time, LADWP and CAL Fire conducted a significant thinning effort in both the Lone Pine and Independence Wood Lots resulting in approximately 130 cords of wood harvested and distributed to the Lone Pine Future Farmers of America (FFA), who holds the lease to both wood lots and manages the distribution of wood.In Winter 2016-17, LADWP and CAL Fire continued thinning the Hybrid Popular and Black Locust tree portions of both wood lots, resulting in another 120 cords of wood harvested and distributed to the Lone Pine FFA. Maintenance of the wood lots continues as needed. Replanting efforts of the harvested portions of the Independence woodlot occurred in spring 2017 with the planting of 675 Hybrid Popular pole plantings. Water is supplied annually to the project for irrigation. Project is implemented and ongoing.			X		
31	X	X	X			Klondike Lake Aquatic Habitat (160 acres; EIR Impact 10-5 and 11-1, EIR Tables 4-3, 5-2, and 5-3)	Changes of surface water management practices and increased groundwater pumping have altered the habitats on which wildlife depends. Vegetation changes have been significant in many locations throughout the Valley. Therefore, impacts to certain species of wildlife, which were entirely dependent upon the impacted habitat, can be presumed to be significant.	The importance of riparian, marsh and aquatic habitats is recognized for mitigation of the impacts to wildlife that occurred during the 1970 to 1990 period. Wetter habitats support many more species and greater populations of wildlife; therefore, water management to create wet habitats will be used to mitigate the significant adverse impacts of the project.	The Klondike Lake Project was implemented as an LADWP Enhancement/Mitigation Project in 1986. Klondike sustains a year round water supply in a 160-acre formerly seasonal lakebed area providing nesting and feeding areas for waterfowl, and permitting water skiing and other water sports in summer months. Water continues to be provided annually to the project. The estimated water usage for the project was modified in the Big Pine Ditch System MND from 2,200 AF to 1,700 AF, with 1,500 AF allocated for conveyance and lake level maintenance and up to 200 AF allocated for the Klondike South Shore Habitat Area (SSHA) south of the lake. LADWP provides boat inspections for nonnative quagga and zebra mussels at Klondike annually from Memorial Day to Labor Day to ensure that these mussels are not introduced into LA's water system. Project is implemented and ongoing.			X		

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
32						Klondike SSHA (Big Pine Ditch System MND)		Per the Big Pine Ditch System MND, up to 200 acre feet of water will be supplied to a habitat area south of Klondike Lake for waterfowl nesting and feeding.	The Klondike South Shore Habitat Area (SSHA) Project was implemented as part of the Big Pine Ditch System Project and MND (2003), as the water supply for the Klondike Lake Project was modified to supply up to 200 AF of water to the SSHA project. A new diversion was installed and implementation of the releases for waterfowl habitat south of the lake began in May 2005. Delivery and measurement of the total allocation of up to 200 AF to the south was initially problematic because of the low hydraulic gradient between the lake and the waterfowl habitat areas as well as sand accumulation in this area. An alternate water release location was utilized starting in 2012. In March 2015, LADWP disked the tules in the habitat area that had resulted from multiple years of flooding throughout the growing season to increase the amount of shallow flooding acreage available for migrants. Water continues to be provided to the project annually as required; 43.3 acre feet of water was released to the project in 2021 (April-May; September-October). Project is implemented and ongoing.			**X**		
33				**X**		LAWS 118 Revegetation Project (19 acre portion, additional to 1991 EIR commitment; Laws Type E Transfer MND/2003 Laws Revegetation Plan)		Per the 2003 Laws Revegetation Plan, this project requires native revegetation of 19-acre portion of LAWS 118 (in addition to acreage required under 1991 EIR) with 10% cover and eight native species.	The 19-acre portion of Laws 118 covered in the Laws 2003 Plan has a complete irrigation system installed. Approximately 8,000 plants were planted in this parcel from 2008 to 2018. Initial planting is 100% complete. Overplanting in this parcel will continue. Project is fully implemented but has not yet attained goals.				**X**	
34				**X**		LAWS 129 Revegetation Project (47 acres, Laws Type E Transfer MND/2003 Laws Revegetation Plan)		Per the 2003 Laws Revegetation Plan, this project requires native revegetation of 47 acres of abandoned agriculture land with 10% cover and eight native species.	The drip irrigation system is fully installed at this site. Approximately 26,000 plants were planted in this parcel from 2008 to 2018. Initial planting in this parcel was 100% completed by fall 2015. In the fall of 2018, approximately 6,000 plants were overplanted within the parcel, filling in all vacant emitter locations. Overplanting in this parcel will continue until criteria are met. Project is fully implemented but has not yet attained goals.				**X**	

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Status: Complete	Status: Ongoing as Necessary/Required	Status: Implemented and Ongoing	Status: Fully Implemented but not meeting goals	Status: Not fully implemented
35				X		LAWS 27 (Native Seed Farm) (Laws Type E Transfer MND)		Per the Laws Type E Transfer MND (Irrigation Project in the Laws Area, this project requires LADWP to initiate a native seed farm for use on Owens Valley Revegetation projects.	A seed farm was initiated for seed harvest in 2004. The seed farm will aid in the implementation of all revegetation projects in the Owens Valley. In addition, LADWP has purchased and operates two greenhouses to grow up to 18,000 plants biannually for the seed farm and other revegetation efforts. Portions of the Seed Farm are currently well established and are producing viable seed from native grasses and shrubs. Approximately 40 acres of drip irrigation was hand seeded with *Ericameria nauseosa* and 2 acres of land without irrigation was drill seeded with a native upland scrub mix in winter of 2015. LADWP completed initial planting of the Laws Native Seed Farm in Spring 2017 by outplanting approximately 10,500 native plants at the site. LADWP overplanted an additional 6,000 plants at the site in Fall 2017. Survivability monitoring of the outplantings was performed in the fall of 2018. 12,492 emitters were surveyed for living plants. Of them, 8,021 had a live plant, equating to 64% survivability. In the spring of 2018, 15 acres of sprinkler irrigation was drill seeded with Indian ricegrass. Success was low, possibly due to timing of the seeding and competition from existing weedy growth. In the spring of 2019, the entire western section of sprinkler irrigation (30 acres) was mowed and disked to prepare a clean seed bed for seeding. When temperatures were appropriate, the area was drill seeded with Indian ricegrass at 30lbs/acre and irrigation was commenced. The ricegrass germinated quickly and began to grow, putting on seed early in the season. However, the area became very weedy and the ricegrass was outcompeted by annual forbes. A trial application of herbicide was applied to a small area to test for effectiveness with the goal of treating all 30 acres. Results showed that the herbicide did not harm the ricegrass while proving effective on killing the competitive weeds. In the spring of 2020, the entire western section was treated with herbicide. This reduced the weedy, competitive growth of forbes, and allowed the ricegrass to expand. By the end of the growing season, the entire western section of the seed farm was dominated by pasture grass with very little weedy growth. This area will continue to be monitored but no future seeding in this section should be necessary. There is no specific cover and composition criteria for this site.				X	

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
36				X		LAWS 90 Revegetation Project (101 acres, Laws Type E Transfer MND/2003 Laws Revegetation Plan)		Per the 2003 Laws Revegetation Plan, this project requires native revegetation of 101 acres of abandoned agriculture land with 10% cover and 10 ten native species.	The drip irrigation system is fully installed at this site. Initial planting in this large parcel is 100% complete. Approximately 71,400 plants have been planted in this parcel from 2008 to 2016. In 2014 and 2015, LADWP implemented a series of demonstration projects at Laws 90 including pre-emergent weed control, sand fencing, hay bale placement, exclusionary fencing, and mulch application. Knowledge gained from these demonstration projects have helped guide revegetation efforts in the Laws area. All of Laws 90 was overplanted in 2016 with approximately 26,400 additional plants filling in all emitter basins with either new or established live plants. Survivability monitoring of the outplantings was performed in the fall of 2018. LADWP biologists surveyed 36,072 emitters for living plants. Of them, 26,841 had a live plant, equating to 74% survivability. In the fall of 2020, approximately 16,000 native plants were overplanted at this site. Initial planting across all 101 acres is 100% complete, but has not yet achieved success criteria. Overplanting in this parcel will be ongoing until goals are met. Project is fully implemented but has not yet attained goals.				X	
37				X		LAWS 94 Revegetation Project(40 acres, Laws Type E Transfer MND/2003 Laws Revegetation Plan)		Per the 2003 Laws Revegetation Plan, this project requires native revegetation of 40 acres of abandoned agriculture land with 10% cover and ten native species.	The initial planting for the entire parcel was complete in Fall 2013. This parcel was formerly a combination of buried and aboveground drip irrigation systems; as of spring 2018, LADWP replaced all remaining above ground drip line with new buried drip irrigation lines. Approximately 38,000 plants have been planted in this parcel from 2008 to 2019. LADWP seeded the (former) above ground drip portion in 2015/2016 but had little success with germination. Survivability monitoring of the outplantings was performed in the fall of 2018. Biologists surveyed 11,522 emitters for living plants. Of them, 8,191 had a live plant, equating to 71% survivability. In the spring of 2019, approximately 15,000 native plants were overplanted at this site. Initial planting across all 40 acres is 100% complete, but has not yet achieved success criteria. Overplanting in this parcel will be ongoing until goals are met. Project is fully implemented but has not yet attained goals.				X	

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
38				X		LAWS 95 Revegetation Project (46 acres, Laws Type E Transfer MND/2003 Laws Revegetation Plan)		Per the 2003 Laws Revegetation Plan, this project requires native revegetation of 46 acres of abandoned agriculture land with 10% cover and ten native species.	The initial planting for the entire parcel was complete in Fall 2013. This parcel was formerly a combination of buried and aboveground drip irrigation systems; as of spring 2018, LADWP replaced all remaining above ground drip line with new buried drip irrigation lines. Approximately 43,500 plants have been planted in this parcel from 2008 to 2019. LADWP seeded the above ground drip portion in 2015/2016 but had little success with germination. Survivability monitoring of the outplantings was performed in the fall of 2018. Biologists surveyed 17,160 emitters for living plants. Of them, 10,837 had a live plant, equating to 63% survivability. In the fall of 2019, approximately 9,000 native plants were overplanted at this site. Initial planting across all 46 acres is 100% complete, but has not yet achieved success criteria. Overplanting in this parcel will be ongoing until goals are met. Project is fully implemented but has not yet attained goals.				X	
39	X			X		Laws Area Revegetation Project (LAWS118) (140 acres; EIR Impact 10-18)	10-18: Significant adverse vegetation decrease and change have occurred in the Laws area due to a combination of factors, including abandoned agriculture, groundwater pumping, water spreading in wet years, livestock grazing, and drought.	Approximately 140 acres will be revegetated within the Laws area, which has lost all or part of its vegetation cover due to increased groundwater pumping or to abandonment of irrigation operations to supply the second aqueduct.	Site was fenced to reduce disturbance in 1998. Permanent transects were established in 1999. Dryland revegetation studies examining various planting and watering techniques were conducted in a portion of LAWS 118 by SAIC and MWH Americas in 2003 and 2004. In 2004, the above ground drip irrigation system was expanded and seed was planted at all emitters. The above-ground irrigation system was moved to a new area in 2005 and seed was planted at the new emitters at that time. In 2005, MWH conducted a soil microbial study at the site. In Spring 2011, 18 acres were seeded with locally collected seeds. In 2012, a buried drip system was installed at this site over approximately 30 acres. In the fall of 2018, approximately 11,000 plants were outplanted within the 30 acres of drip irrigation. New fencing was installed in 2013 on the west side of the project area along the new boundary with the Cashbaugh Lease established in the Laws Type E transfer. Approximately 46 acres was drill seeded during Winter 2015/2016. In the summer of 2020, buried drip irrigation was expanded to the west to include a barren area adjacent to Laws Poleta Road. Approximately 17,000 plants were outplanted in this section in the fall of 2021. Permanent vegetation transects were read in 2019. The parcel has achieved 5.5% cover with 15 native perennial species (10% cover				X	

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
									goal, 8 perennial species). The composition goal has been met. This project is fully implemented but has not yet attained cover goals.					
40	X		X			Laws Historical Museum Pasturelands (21+15 acres; EIR Impact 10-18, EIR Table 5-3)	Significant adverse vegetation decrease and change have occurred in the Laws area due to a combination of factors, including abandoned agriculture, groundwater pumping, water spreading in wet years, livestock grazing, and drought.	In the mid-1980s, LADWP and Inyo County implemented the Laws-Poleta Pasture Land, Laws Museum, and McNally Ponds enhancement/mitigation projects in the Laws area totaling approximately 541 acres of pasture land.	This project was implemented as an LADWP Enhancement/Mitigation Project in 1990. This project provides a regular water supply to improve the native vegetation on a 21-acre parcel, establish irrigated pasture on 15 acres and establish windbreak trees, all adjacent to the museum. Water continues to be provided annually to this project for irrigation. Project is implemented and ongoing.			X		
41	X		X			Laws/Poleta Native Pasture (216 acres; EIR Impact 10-18, EIR Tables 4-3 and 5-3)	Significant adverse vegetation decrease and change have occurred in the Laws area due to a combination of factors, including abandoned agriculture, groundwater pumping, water spreading in wet years, livestock grazing, and drought.	In the mid-1980s, LADWP and Inyo County implemented the Laws-Poleta Pasture Land, Laws Museum, and McNally Ponds enhancement/mitigation projects in the Laws area totaling approximately 541 acres of pasture land.	This project was implemented as an LADWP Enhancement/Mitigation Project in 1988. This project provides water for irrigation of 220 acres of sparsely vegetated land to reestablish native vegetation on abandoned pasture lands and increase livestock grazing capabilities. Water continues to be provided annually to this project for irrigation. Project is implemented and ongoing.			X		
42	X	X				Little Blackrock Springs (EIR Impact 10-14, EIR Table 5-2)	Increased groundwater pumping has reduced or eliminated flows from Fish Springs, Big and Little Seely Springs, Hines Spring, Big and Little Blackrock Springs, and Reinhackle Spring. This has caused significant adverse impacts to vegetation at several of these spring areas.	LADWP will continue to supply water from Division Creek to the site of the former pond at Little Blackrock Springs. The marsh vegetation at this site will thus be maintained.	This project was implemented as an LADWP Environmental Project in the 1970s. Water is supplied from Division Creek to maintain the marsh vegetation as required. Project is implemented and ongoing.			X		

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
43	X		X			Lone Pine East Side Regreening (11 acres; EIR Impact 10-16, EIR Table 5-3)	10-16: Approximately 1,080 acres of formerly irrigated lands had not successfully revegetated following the abandonment of agriculture. This was a significant adverse impact because these lands had a loss of vegetation and were the source of blowing dust.	A field of approximately seven acres along the Whitney Portal Road in Lone Pine, and a field of approximately 11 acres north of Lone Pine and east of Highway 395, have been converted to irrigated pasture as part of the Lone Pine Regreening enhancement/mitigation projects.	This project was implemented as an LADWP Enhancement/Mitigation Project in 1990. This project was implemented to enhance the aesthetics of abandoned agricultural or pasture lands in areas around the towns of Big Pine, Independence, and Lone Pine. Water is supplied from LADWP facilities to promote and maintain vegetation. Water continues to be provided annually to this project for irrigation. Project is implemented and ongoing.			X		
44	X		X			Lone Pine-North Lone Pine Clean Up (EIR Table 4-3)		This project consisted of clearing unsightly, diseased or dead trees and cleaning up refuse around the community of Lone Pine.	This project was implemented as an LADWP Enhancement/Mitigation Project in 1989 to improve the aesthetics of a 23-acre area north of Lone Pine east of Highway 395. This project is complete.	X				
45	X		X			Lone Pine Riparian Park (320 acres, EIR Tables 4-3 and 5-3)		Provide a continuous water supply to a reestablished ditch running through Lone Pine Town Park and then easterly to the Lone Pine Woodlot Project. Water not used by this project or the Woodlot Field project could flow to the historic Lone Pine Creek Channel east of Lone Pine and returned to the Owens River Channel.	This project was implemented as an LADWP Enhancement/Mitigation Project in 1987. This project supplies water through a historic ditch to the Lone Pine Riparian Park, the Lone Pine Wood Lot, and approximately 320 acres of reestablished pasturelands in Richards and Van Norman Fields. Water continues to be provided annually to this project for irrigation as required. Project is implemented and ongoing.			X		
46	X		X			Lone Pine Sports Complex (EIR Table 5-3)		This project consists of a sports complex that includes a playground for Lo-Inyo School, soccer fields, softball/baseball fields, and parking and picnic area over approximately 10 acres.	This project was implemented as an LADWP Enhancement/Mitigation Project in 1990. This project converted vacant City property to an outdoor sports complex consisting of baseball fields, soccer fields, parking, picnic, and park areas. Project is complete.	X				

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
47	X		X			Lone Pine West Side Regreening (8 acres; EIR Impact 10-16, EIR Tables 4-3 and 5-3)	10-16: Approximately 1,080 acres of formerly irrigated lands had not successfully revegetated following the abandonment of agriculture. This was a significant adverse impact because these lands had a loss of vegetation and were the source of blowing dust.	A field of approximately seven acres along the Whitney Portal Road in Lone Pine, and a field of approximately 11 acres north of Lone Pine and east of Highway 395, have been converted to irrigated pasture as part of the Lone Pine Regreening enhancement/mitigation projects.	This project was implemented as an LADWP Enhancement/Mitigation Project in 1990. This project was implemented to enhance the aesthetics of abandoned agricultural or pasture lands in areas around the towns of Big Pine, Independence, and Lone Pine. Water is supplied annually from LADWP facilities to promote and maintain vegetation. Project is implemented and ongoing.			X		
48	X		X			Lone Pine Woodlot (12 acres; EIR Impact 10-11, EIR Table 4-3)	10-11: Approximately 1,080 acres of formerly irrigated lands had not successfully revegetated following the abandonment of agriculture. This was a significant adverse impact because these lands had a loss of vegetation and were the source of blowing dust.	As part of the enhancement/mitigation projects implemented by LADWP and Inyo County since 1985, approximately 942 acres of these abandoned agricultural lands have been revegetated with irrigated pasture or alfalfa. These areas are the Independence Pasture and native pasture lands, the Van Norman and Richards Fields, and the Lone Pine Woodlot adjacent to Lone Pine.	The Lone Pine Wood Lot was initially planted in 1987. The wood lot was planted at a high density with the intent of thinning to a 12-foot spacing after planting success was determined. Over time, this high density of trees resulted in reduced growth and increased competition. While the hybrid poplar portions of the wood lots have been harvested several times since project implementation, the locust portions of the wood lots had never been harvested until 2015-2016. At that time, LADWP and CAL Fire conducted a significant thinning effort in both the Lone Pine and Independence Wood Lots resulting in approximately 130 cords of wood harvested and distributed to the Lone Pine Future Farmers of America (FFA), who holds the lease to both wood lots and manages the distribution of wood.In Winter 2017-18, LADWP and CAL Fire planted 825 Hybrid Popular trees in the Popular section of the Lone Pine Wood Lot. The trees were planted in areas where there were spaces from trees not re-sprouting. Maintenance of the wood lots continues as needed. Water is supplied annually to the project for irrigation. Project is implemented and ongoing.			X		

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
49	X	X	X		X	LORP Project (60 miles, perhaps more than 1,000 acres)/ Lower Owens Rewatering Project; EIR Impacts 10-14, 10-17, 10-20; EIR Tables 4-3 and 5-3, 1997 MOU Section II)	Increased groundwater pumping has reduced or eliminated flows from Fish Springs, Big and Little Seely Springs, Hines Spring, Big and Little Blackrock Springs, and Reinhackle Spring. This has caused significant adverse impacts to vegetation at several of these spring areas.	Although not all springs and associated riparian and meadow vegetation will receive on-site mitigation, the Lower Owens River Project will provide mitigation of a compensatory nature. This project will rewater over 50 miles of the river channel allowing for restoration of riparian vegetation along the river. This project also will result in the creation of several new ponds along the river and will provide the continuation of existing lakes associated with the project. The project will restore large areas of wetland and meadow vegetation, perhaps exceeding 1,000 acres adjacent to the river and in its delta. In comparison, the area of riparian and meadow vegetation that has been lost and will not be restored because of the elimination of spring flow due to groundwater pumping is estimated to be less than 100 acres.	Flows were initiated in the Lower Owens River Project in December 2006. All four elements of the LORP are functioning and are being adaptively managed. Monitoring is ongoing and water is annually supplied to the project as required. For more information on the monitoring and management of the LORP, refer to LADWP and ICWD's LORP Annual Report. Project is implemented and ongoing.			X		
50	X		X			McNally Ponds and Native Pasturelands (300 acres pasture, 60 acres ponds; EIR Impact 10-5 and 10-18, EIR Tables 4-3 and 5-3)	10-5: Between 1970 and 1990, the project resulted in beneficial changes to lakes and ponds, and the creation of new lakes and ponds, with no significant adverse impact on vegetation.10-18: Significant adverse vegetation decrease and change have occurred in the Laws area due to a combination of factors, including abandoned agriculture, groundwater pumping, water spreading in wet years, livestock grazing, and drought.	In the mid-1980s, LADWP and Inyo County implemented the Laws-Poleta Pasture Land, Laws Museum, and McNally Ponds enhancement/mitigation projects in the Laws area totaling approximately 541 acres of pasture land.	This project was implemented as an LADWP Enhancement/Mitigation Project in 1986-1987. When in operation, this project provides water for 300 acres during the spring and summer months to mitigate and sustain vegetation, and to provide water to 60 acres of ponds during the fall months for waterfowl habitat. The Standing Committee agreed in 1991 to reduce the water commitment to the McNally Ponds Project because of dry conditions. In most normal and below-normal runoff years since that time, the Standing Committee has reduced water releases to this project. In years of abundant runoff the project receives its full allotment of water. In drier years the McNally Canals are not operated. The Water Agreement states that LADWP shall operate the canals in accordance with its practices from 1970. There is an alternate water supply source when wells are in ON status. This project was supplied with water in 2017 due to the high runoff conditions and water spreading in the Laws Area. Project is implemented and ongoing with water supplied to the project in years where the McNally Canals are in operation or the associated wells are in ON status. Project is implemented and ongoing.			X		

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
51	X	X	X			Millpond Recreation Area (EIR Impact 10-5, EIR Table 5-2 and 5-3)	Between 1970 and 1990, the project resulted in beneficial changes to lakes and ponds, and the creation of new lakes and ponds, with no significant adverse impact on vegetation.	This project was first implemented as an LADWP Environmental Project and required water to be provided to the pond as the recreation area either by creek flow or a well at the site. Millpond is also an Enhancement Mitigation Project that has required LADWP to provide funds to purchase energy to operate the recreation area's sprinkler system that waters 18 acres of the community park including two softball fields.	This project is managed by the Inyo County Parks and Recreation. LADWP continues to provide water and funds for power annually to this project. Project is implemented and ongoing.			X		
52					X	North of Mazourka Canyon Road Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			Project was implemented in December 2011 as part of the Additional Mitigation Projects Developed by the MOU Ad Hoc Group. Please refer to Section 3.2.1 for more information on these projects. Project is implemented and ongoing.				X		
53	X					Reinhackle Spring (EIR Impact 10-14)	10-14: Increased groundwater pumping has reduced or eliminated flows from Fish Springs, Big and Little Seely Springs, Hines Spring, Big and Little Blackrock Springs, and Reinhackle Spring. This has caused significant adverse impacts to vegetation at several of these spring areas.	When it was determined in the late 1980s that groundwater pumping was affecting the flow from Reinhackle Spring, pumping from certain wells in the area was discontinued and the spring flow increased. No significant adverse impacts on vegetation in this area have resulted from the reduced flow. At Reinhackle Spring, groundwater pumping from wells that affect the spring flow will be managed so that flows from the spring will not be significantly reduced compared to flows under prevailing natural conditions. In addition, all of the provisions for protecting springs, described in impact 10-15 and contained in the Water Agreement and the Green Book, will be applied equally to Reinhackle Spring.	Spring flows are being monitored continually. The flow followed the typical seasonal pattern of reaching a peak flow in winter and a low flow in the spring. A geochemistry study of flow in Reinhackle Spring was conducted in 2003 as a cooperative study by LADWP, MWH Americas, Inc., and ICWD, which concluded that water from Reinhackle Spring is similar in origin to the Los Angeles Aqueduct and dissimilar to the deep aquifer samples and up gradient shallow aquifer wells. An operational test was conducted in Bairs Georges Wellfield to study the response of the spring flow to groundwater pumping by active wells in the wellfield and the flow in the Los Angeles Aqueduct (March 2011). Results show that the flow in Reinhackle Spring is affected mainly by the water levels in the shallow aquifer west of the spring. Groundwater pumping in the Bairs Georges Wellfield could affect the flow in the spring only to the extent that it affects water levels in the shallow aquifer west of the spring. LADWP has developed a monitoring and operational plan for Bairs Georges Wellfield that has been submitted to ICWD for comment. Project is implemented and ongoing.			X		

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
54	X		X			Richards Fields (160 acres; EIR Impact 10-16, EIR Table 4-3)	10-16: Approximately 1,080 acres of formerly irrigated lands had not successfully revegetated following the abandonment of agriculture. This was a significant adverse impact because these lands had a loss of vegetation and were the source of blowing dust.	As part of the enhancement/mitigation projects implemented by LADWP and Inyo County since 1985, approximately 942 acres of these abandoned agricultural lands have been revegetated with irrigated pasture or alfalfa. These areas are the Independence Pasture and native pasture lands, the Van Norman and Richards Fields, and the Lone Pine Woodlot adjacent to Lone Pine.	This project was implemented as a LADWP Enhancement/Mitigation Project in 1987. Water continues to be provided annually to the project for irrigation. Project is implemented and ongoing.			X		
55	X	X				Saunders Pond (EIR Impact 10-5, EIR Table 5-2)	10-5: Between 1970 and 1990, the project resulted in beneficial changes to lakes and ponds, and the creation of new lakes and ponds, with no significant adverse impact on vegetation.	Under this project, water is provided for a warm-water fishery and waterfowl area.	The dike system forming the Buckley Pond Series was originally constructed in the 1950s to create a water spreading and groundwater recharge area to be used only in above normal years. In 1968, a cooperative agreement between LADWP and CDFG proposed a habitat improvement project and permanent wildlife habitat area. Work on Saunders Pond was complete in 1971. LADWP, California Department of Fish and Game, and California Department of Forestry signed onto the joint Habitat Management Plan for the Buckley Pond Series in 1976 that described how the pond series was to be managed. More recently, LADWP burned Saunders Pond in spring 2016, removed aquatic vegetation, and resumed flows to the pond in fall 2016. The local Lion's Club installed a handicap accessible fishing platform/dock on the south end of the pond in summer 2016. Water continues to be provided annually to the project. Project is implemented and ongoing.			X		

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Status: Complete	Status: Ongoing as Necessary/Required	Status: Implemented and Ongoing	Status: Fully Implemented but not meeting goals	Status: Not fully implemented
56	X		X			Shepherd Creek Alfalfa Field (198 acres; EIR Impact 10-11, 12-1, EIR Tables 4-3 and 5-3)	10-11: Fluctuations in water tables due to groundwater pumping have caused approximately 655 acres of groundwater dependent vegetation to die off. Loss of vegetation cover has occurred on these lands. 12-1: Significant impacts on air quality resulting from groundwater pumping during the period of 1970 to 1990 have occurred due to vegetation losses.	10-11: Under the Shepherd Creek enhancement/mitigation project, approximately 198 acres of poorly vegetated land has been converted to alfalfa. This area was affected by groundwater pumping and abandonment of irrigation. In addition, an area of approximately 60 acres to the east of the existing project area on the opposite side of U.S. Highway 395 is poorly vegetated. If the density of the native cover in this area does not naturally increase, the existing enhancement/mitigation project may be expanded to include this additional area. 12-1: Under the Shepherd Creek enhancement/mitigation project, approximately 200 acres of poorly vegetated land has been converted to alfalfa.	This project was implemented as an LADWP Enhancement/Mitigation Project in 1986. The Shepherd Creek Alfalfa Field Project has been revegetated with alfalfa that is sprinkler irrigated and wind break trees. Water continues to be provided annually to the project for irrigation. Project is implemented and ongoing.			X		
57	X		X			Shepherd Creek Potential (60 acres; EIR Impact 10-11, 12-1, EIR Table 5-3)	10-11: Fluctuations in water tables due to groundwater pumping have caused approximately 655 acres of groundwater dependent vegetation to die off. Loss of vegetation cover has occurred on these lands. 12-1: Significant impacts on air quality resulting from groundwater pumping during the period of 1970 to 1990 have occurred due to vegetation losses.	10-11: Under the Shepherd Creek enhancement/mitigation project, approximately 198 acres of poorly vegetated land has been converted to alfalfa. This area was affected by groundwater pumping and abandonment of irrigation. In addition, an area of approximately 60 acres to the east of the existing project area on the opposite side of U.S. Highway 395 is poorly vegetated. If the density of the native cover in this area does not naturally increase, the existing enhancement/mitigation project may be expanded to include this additional area.	The Shepherd Creek Potential Project was evaluated and natural increases in the density of native cover have occurred making the site comparable to baseline conditions in adjacent undisturbed parcels. Therefore, the goals for this potential project, as stated in the EIR, have been met. Project is complete.	X				

Table 3.3
LADWP MITIGATION AND MONITORING

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	Project Title	Impact (Where Relevant)	Measure/Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
										Status				
58	X					Steward Ranch (EIR Impact 9-14)	9-14: Los Angeles Department of Water and Power (LADWP) pumping between 1970 and 1990 in the Big Pine area contributed to lowered water levels in the wells of Steward Ranch and resulted in an adverse economic effect. It is expected that LADWP will continue to pump from this area in the future. The proposed mitigation measure would reduce this impact to less-than significant.	Because groundwater pumping in the Big Pine well field was contributing to a lowering of groundwater levels at Steward Ranch, one of two wells became inoperable. LADWP reached agreement with the ranch owners to permanently mitigate the lowered groundwater levels that have existed since 1972.	The mitigation efforts are complete. LADWP continues to compensate the ranch owners for added power costs of pumping water from a greater depth. Project is implemented and ongoing.			X		
59	X			X		Tinemaha 54 Revegetation Project (EIR Impact 10-11)	10-11: Fluctuations in water tables due to groundwater pumping have caused approximately 655 acres of groundwater dependent vegetation to die off. Loss of vegetation cover has occurred on these lands.	Approximately 80 acres of land that lost a significant amount of its native vegetation cover as a result of increased groundwater pumping will be revegetated. The techniques that will be employed to revegetate these lands will be determined through studies that will be conducted by LADWP and Inyo County. These lands will not be permanently irrigated, but will be revegetated with native Owens Valley vegetation not requiring irrigation except perhaps during its initial establishment. Depending on the amount of rainfall and runoff, successful revegetation of these lands could take a decade or longer. The goal will be to restore as full a native vegetation cover as is feasible, but at a minimum, vegetation cover sufficient to avoid blowing dust will be achieved in that area.	Project implementation is complete. The 0.4 acre area has been fenced, planted with 108 grass plants and drip irrigated between 1999 and 2004 to encourage plant establishment. In 2016-2017, LADWP planted 125 shrubs consisting of *Atriplex torreyi, Atriplex canescens, Atriplex polycarpa*, and *Krascheninnikovia lanata* utilizing the Cocoon Planting System from Land Life Company. The cocoon planting technology allows for shrubs to grow in arid environments without additional irrigation post planting. As of 2019, there was a 56% survivability rate of the shrubs. The shrubs will continue to be monitored for success. The road through the middle of the site was removed and reclaimed as well during this planting process. Plantings will be periodically monitored. Permanent transects were run in 2017 and the site had attained 5% cover with 4 native perennial species (30% cover goal with 2 native perennial species). The composition goal has been met. Project is implemented but has not yet attained cover goals.				X	
60	X		X			Tree Planting along Roadways (EIR Table 4-3)		This project consisted of planting new trees and maintaining new and existing trees along roadways within the towns of Laws, Big Pine, Independence, and Lone Pine.	The goal of this project was to provide shade and greenways in Owens Valley communities to mitigate trees lost since the 1970s due to a reduction in surface water irrigation, higher water costs, age, disease, etc. LADWP was responsible for purchasing and planting the trees and replacement once within two years if needed. This project was implemented in Laws, Independence and Lone Pine as an LADWP Enhancement/Mitigation Project in 1988. Additional planting occurred in Big Pine in 1992. This project	X				

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	**Table 3.3** **LADWP MITIGATION AND MONITORING**				Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
						Project Title	**Impact (Where Relevant)**	**Measure/Provision**	**Progress to Date**	Status				
									resulted in 14 trees planted in Laws, approximately 130 trees in Big Pine (Arizona cypress), 84 in Independence, and 77 in Lone Pine. Ongoing irrigation is the responsibility of the adjacent property owner. Project is complete.					
61	X	X				Tule Elk Field (EIR Table 5-2)		Under this project, water is provided to a field that is heavily used in summer by Tule elk, near U.S. Highway 395 and Tinemaha Reservoir.	This project was implemented as and LADWP Environmental Project in the 1970's to enhance/expand elk feeding grounds in the Owens Valley. Water continues to be provided annually to this project for irrigation. This project is implemented and ongoing.			X		
62	X		X			Van Norman Fields (170 acres; EIR Impact 10-16, EIR Table 4-3)	10-16: Approximately 1,080 acres of formerly irrigated lands had not successfully revegetated following the abandonment of agriculture. This was a significant adverse impact because these lands had a loss of vegetation and were the source of blowing dust.	As part of the enhancement/mitigation projects implemented by LADWP and Inyo County since 1985, approximately 942 acres of these abandoned agricultural lands have been revegetated with irrigated pasture or alfalfa. These areas are the Independence Pasture and native pasture lands, the Van Norman and Richards Fields, and the Lone Pine Woodlot adjacent to Lone Pine.	This project was implemented as an LADWP Enhancement/Mitigation Project in 1987. A portion of the project could not be irrigated due to topography. Additionally, Well 390 met the end of its service life and was replaced with Well 425 in 2014. The project was modified by the Standing Committee April 22, 2014 to include 10 acres for the Lone Pine High School Farm. The agreed upon water allotment for the modified project is approximately 2.8 AF/acre. Water continues to be provided annually to the project for irrigation. Project is implemented and ongoing.			X		
63					X	Warren Lake Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			Project was implemented in April 2011 as part of the Additional Mitigation Projects Developed by the MOU Ad Hoc Group. The Warren Lake Project is implemented and ongoing as needed; it serves to balance the annual 1600 acre-foot water commitment for this provision of the MOU. Please refer to Section 3.2.1 for more information on these projects. Project is implemented and ongoing.			X		
64					X	Well 368 Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			Project was implemented in February 2012 as part of the Additional Mitigation Projects Developed by the MOU Ad Hoc Group. Please refer to Section 3.2.1 for more information on these projects. Project is implemented and ongoing.			X		

3.2.1. Additional Mitigation Projects Developed by the MOU Ad Hoc Group

Introduction

Section III.A.3. Additional Mitigation of the 1997 MOU describes LADWP's commitment to supply 1,600 acre-feet (AF) of water per year for:

> 1) the implementation of the on-site mitigation measure at Hines Spring identified in the 1991 EIR, and
>
> 2) the implementation of on and/or off-site mitigation in addition to that identified in the 1991 EIR for impacts that occurred at Fish Springs, Big and Little Blackrock Springs, and Big and Little Seely Springs.

The Second Amendment of Amended Stipulation and Order Case No. S1CVCV01-29768 was executed on March 8, 2010, by the Superior Court of California, Inyo County. This order accepts the eight projects described in the *Additional Mitigation Projects Developed by the MOU Ad Hoc Group* (Additional Mitigation Projects) document as mitigation for impacts identified above and establishes a two year timeline for their implementation. The projects are named according to their locations: Freeman Creek, Warren Lake, Hines Spring Well 355, Hines Spring Aberdeen Ditch, North of Mazourka Canyon Road, Homestead, Well 368, and Diaz Lake. LADWP completed an Initial Study for the Additional Mitigation Projects and prepared a Mitigated Negative Declaration (MND) and released it for public review March 23 - April 26, 2010. The final MND, Mitigation Monitoring and Reporting Program, and proposed implementation schedule were approved by the City of Los Angeles Board of Water and Power Commissioners (Board) on June 1, 2010. A Notice of Determination was filed with the Inyo County Clerk on June 2, 2010. LADWP began implementing the projects shortly thereafter and implemented all eight Additional Mitigation Projects by March 8, 2012 as required in the Stipulation and Order.

3.2.1.1. Additional Mitigation Projects Annual Monitoring Report

LADWP conducted the required monitoring described in the Additional Mitigation Projects document for five years post implementation and performed a five-year evaluation of the projects in 2017. This evaluation was provided in LADWP's 2017 Annual Owens Valley Report, and described implementation, monitoring data, and recommendations for the future management of each project where relevant. Many of the initial monitoring efforts were discontinued following this evaluation.

Flow monitoring for the projects is still conducted monthly per the Additional Mitigation Project document. Table 3.4 shows flow data recorded for each of the projects from April 1, 2021 through March 31, 2022. During this time, LADWP provided 1,603 acre-feet of water to the Additional Mitigation Projects.

Table 3.4. Additional Mitigation Projects Developed by the MOU Ad Hoc Group
Annual Water Accounting in Acre-feet (April 1, 2021 - March 31, 2022)

Additional Mitigation Projects Developed by the MOU Ad Hoc Group
Annual Accounting in Acre Feet (April 1, 2021-March 31, 2022)

2021-2022	Freeman Creek (*Average**) (2054)	Warren Lake (2173)	Hines Well 355 (W355)	Aberdeen Ditch (400)	North of Mazourka (F418)	North of Mazourka (404)	Homestead T775 (F421)	Homestead Well (F419)	Well 368 (F420)	Diaz Lake (86)	Total
April	20	0	18	8	13	3	7	29	12	0	110
May	19	0	19	9	13	3	7	18	12	80	179
June	14	0	18	8	11	3	7	14	12	0	87
July	13	0	18	9	12	2	7	15	12	103	192
August	10	0	18	6	12	3	7	29	12	0	96
September	13	0	17	8	11	2	7	22	11	0	91
October	22	0	18	10	12	3	7	22	12	0	105
November	22	15	17	8	13	3	7	21	11	67	185
December	23	28	17	8	14	3	7	22	12	0	134
January	23	63	18	7	14	2	8	21	12	0	167
February	18	67	15	6	12	2	7	20	11	0	156
March	18	0	17	9	12	4	7	22	12	0	101
Total					*148*	*31*	*87*	*254*			***1603***
Project Total	*215*	*173*	*210*	*95*	*179*		*341*		*140*	*250*	
Annual Target AF	*215**	*0*	*240*	*145*	*300*		*300*		*150*	*250*	***1600***
Monthly Target AF	*18*	*0*	*20*	*12*	*25*		*25*		*13*		*133*

**Freeman Creek will be recorded as 215 AF/year based on long term average regardless of varying flow reads.*

***Amount in excess of project allotment may not be carried over to future years.*

3.2.2. Irrigation Project in the Laws Area (Laws Type E Transfer)

3.2.2.1.Laws 2003 Revegetation Plan

Introduction

The Revegetation Plans for Lands Removed from Irrigation, Laws Parcels 90, 95, and 129 and Abandoned Agricultural Land Parcel 94 (Plan) (January 2003) established goals to restore native vegetation in each of these parcels that is similar in cover and species composition to nearby sites. Under this Plan, all 253 acres of these parcels were to be successfully revegetated by 2013 and persist for an additional two years with no onsite revegetation activities.

Previous Owens Valley Annual Reports describe the various methods used to attain successful revegetation of these parcels at Laws as well as the challenges this project has presented since 2003. The text below describes LADWP's active revegetation efforts at the Laws parcels in 2021. Please refer to LADWP's 2020 Owens Valley Annual Report for more detailed discussion on the progression of this project since 2003. While success criteria has not been met at these sites, LADWP has acted in good faith and has completed initial planting across all 253 acres at Laws 90, 94, 95, 118, and 129, as well as 92 acres at the Laws Native Seed Farm to date. In addition to the 253 acres, 13 acres of new drip irrigation was installed within Laws 118 in the summer of 2021. These efforts totaled nearly 209,000 greenhouse-propagated plants and thousands of pounds of seed. All parcels will be overplanted as necessary and/or treated with alternative methods as they become available to achieve goals. Please refer to Table 3.3 for current status of each of these parcels.

Revegetation Activities - 2021

Due to construction activities resulting in the power and water supply being interrupted for both LADWP greenhouses, the greenhouses were not re-seeded after the fall 2020 planting. Therefore, there was no crop to outplant in spring 2021. LADWP focused on reseeding low cover area of revegetation parcels during this period. Spring 2021 efforts at Laws focused on plans to inject a 13-acre section of Laws 118, having that ground ready for planting in the fall 2021. Ongoing efforts continued throughout the Laws area to maintain existing irrigation systems and continued deep set irrigation schedules for the existing native plants in all of the parcels. The 30-acre portion of the Laws Native Seed Farm (LAW027) has almost completely filled in with native grass. All other parcels are responding well to the deep-set irrigation schedule adopted a few years ago. The deep-set irrigation schedule is designed to water the entire root zone of a plant while not inundating the surface. Once the surface is saturated, the irrigation is turned off allowing the roots to follow the water deep into the ground, continuing as needed throughout the season.

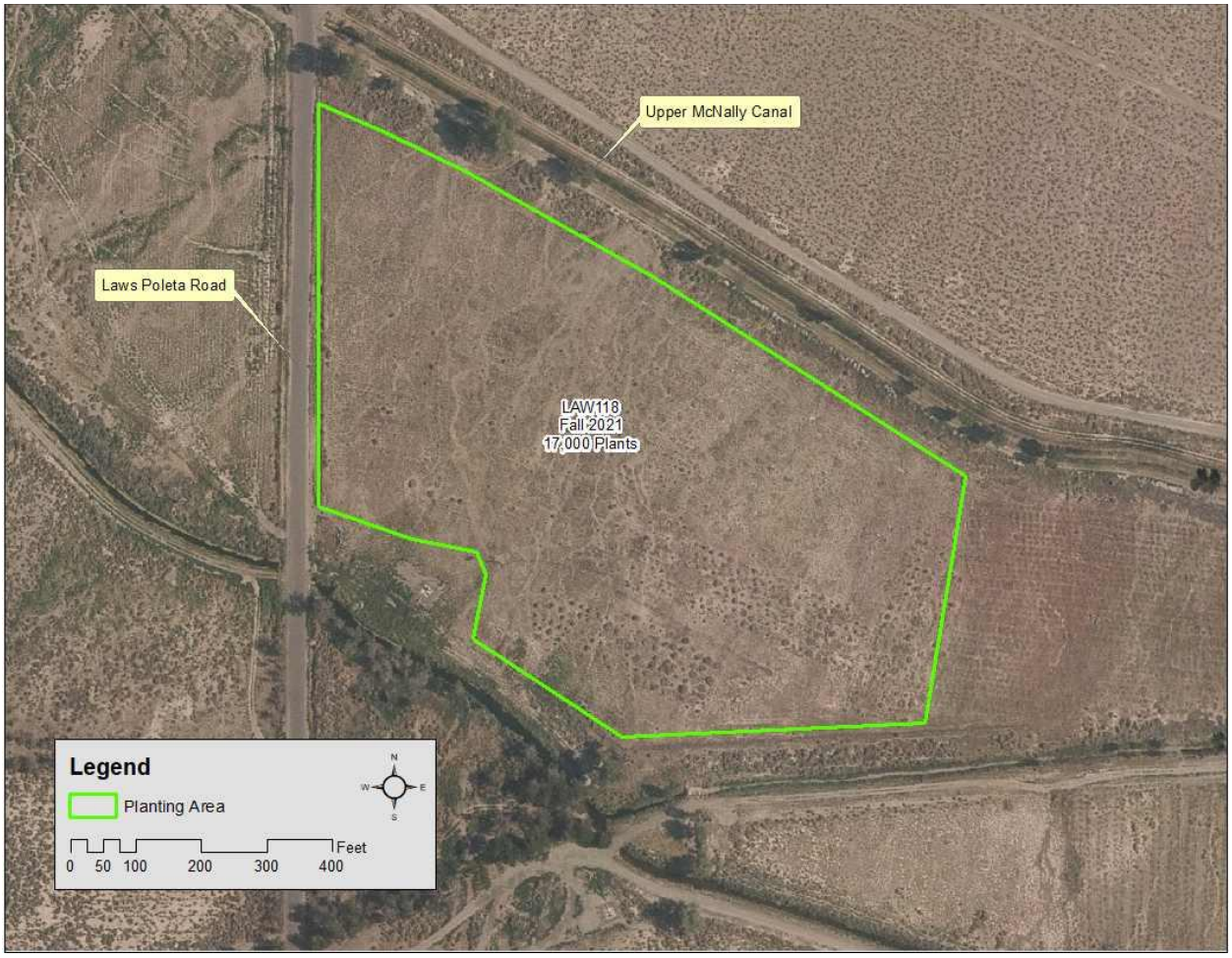
Fall 2021 Planting Effort

The fall planting effort was conducted October 4-7, 2021 (see figure and table below). A total of 17,000 native plants were planted within the newly installed drip irrigation area of LAW118. The goal of this planting effort was to revegetate a barren area within the parcel allowing vegetation to colonize and expand throughout the parcel. Fertilizer packs were used and plant vigor will be monitored.

Species planted were *Atriplex canescens* (ATCA2) and *Atriplex polycarpa* (ATPO).

Species planted at LAW118 in October 2021

Species	Number Planted
ATCA2	8,500
ATPO	8,500



Area planted at LAW118 in fall 2021.

3.2.2.2. Mitigation Monitoring Reporting Program for Irrigation Project in the Laws Area

POT. IMPACT		MITIGATION			MONITORING			
Summary of Impact	**MM No.**	**Measure**	**Timing**	**Responsibility**	**Method**	**Period**	**Frequency**	**Responsibility**
Air Quality								
Creation of dust during pipeline installation and ground preparation for planting.	M-1	Ground surfaces will be thoroughly wet prior to and during work to minimize dust.	To be implemented throughout the project as needed.	LADWP construction staff and/or LADWP lessee.	Water trucks will pre-wet construction areas and water as necessary throughout construction. Ground will be pre-irrigated prior to planting.	As needed throughout construction and/ or prior to planting.	Throughout the construction or agricultural period.	LADWP construction staff and/or LADWP lessee.
Groundwater pumping to supply water to the project could adversely affect groundwater dependent vegetation in the vicinity of the project and cause blowing dust.	M-2	Section III and Section IV of the Agreement between the County of Inyo and the City of Los Angeles and its Department of Water and Power on a Long Term Groundwater Management Plan for Owens Valley and Inyo County	To be implemented throughout the project as needed.	Inyo/Los Angeles Technical Group	Annual monitoring of the vegetation in the vicinity is being conducted.	During the period when groundwater pumping and water management practices could affect vegetation.	Annually during the growing season.	Inyo/Los Angeles Technical Group
Hydrology and Water Quality								
Groundwater pumping	M-3	Water Agreement	To be implemented throughout the project as needed.	Inyo/Los Angeles Technical Group	Monitoring at each identified site will consist of one or more field visits during the period when groundwater pumping and water management practices could affect such vegetation.	During the period when groundwater pumping and water management practices could affect vegetation.	Annually during the growing season.	Inyo/Los Angeles Technical Group

POT. IMPACT		MITIGATION			MONITORING			
Summary of Impact	**MM No.**	**Measure**	**Timing**	**Responsibility**	**Method**	**Period**	**Frequency**	**Responsibility**
Reducing the irrigation duty from 5 AF per acre to 3 AF per acre and of changing from flood irrigation to sprinkler irrigation.	M-4	Water Agreement	To be implemented throughout the work as needed.	Inyo/Los Angeles Technical Group	Monitoring at each identified site will consist of one or more field visits during the period when groundwater pumping and surface water management practices could affect such vegetation.	During irrigation season	Annually during the growing season.	Inyo/Los Angeles Technical Group
Biological Resources								
Altering the flow in a ditch that carries water diverted from Coldwater Canyon.	M-5	Water Agreement	To be implemented throughout the work as needed.	Inyo/Los Angeles Technical Group	Monitoring at each identified site will consist of one or more field visits during the period when surface water management practices could affect such vegetation.	During the period of changes in surface water management practices could affect vegetation.	Annually during the growing season.	Inyo/Los Angeles Technical Group
Altering the flow in Silver Canyon Ditch.	M-6	Water Agreement	To be implemented throughout the work as needed.	Inyo/Los Angeles Technical Group	Monitoring at each identified site will consist of one or more field visits during the period when surface water management practices could affect such vegetation.	During the period of changes in surface water management practices could affect vegetation.	Annually during the growing season.	Inyo/Los Angeles Technical Group
Growth of noxious weeds	M-7	LADWP or its lessee or lessees, in conjunction with Inyo County's weed abatement program, will promptly treat or remove the weed.	To be implemented throughout the work as needed.	LADWP Watershed Resources Staff; LADWP Lessee; and/or Inyo County Agricultural Department.	Monitoring consists of field visits during the growing season.	Annually during the growing season.	Annually during the growing season.	LADWP Watershed Resources Staff; LADWP Lessee; and/or Inyo County Agricultural Department.

POT. IMPACT		MITIGATION			MONITORING			
Summary of Impact	**MM No.**	**Measure**	**Timing**	**Responsibility**	**Method**	**Period**	**Frequency**	**Responsibility**
Cultural Resources								
Archaeological investigations identified six previously unrecorded archaeological sites and 11 isolates within the project area.	M-8	Pipeline placement was to avoid identified sites; if new sites are encountered during implementation, work will be halted until an archaeologist can be consulted.	To be implemented throughout the work as needed.	LADWP Construction Manager	Construction personnel will monitor for unidentified sites during the progression of construction.	During construction activities.	Throughout the construction period.	LADWP Construction Manager

MITIGATION MEASURES

Mitigation Measure M-1

Impact: Creation of dust during pipeline installation and ground preparation for planting.

Measure: Ground surfaces will be thoroughly wet prior to and during work to minimize dust.

All seeding work during 2021 was conducted utilizing the Truax No-till drill seeder. Water was applied before initiating seeding and following seeding to control dust emissions.

LADWP currently applies water through irrigation systems at the revegetation sites as described in the previous section and additionally with water trucks for dust control if and where necessary.

Mitigation Measure M-2 and M-3

Impact: G roundwater pumping to supply water to the project could adversely affect groundwater-dependent vegetation in the vicinity of the project and cause blowing dust.

Measure: *1991 Agreement between the County of Inyo and the City of Los Angeles and its Department of Water and Power on a Long Term Groundwater Management Plan for Owens Valley and Inyo County* (Water Agreement).

The following table shows the vegetation cover in vegetation parcels within the Laws Wellfield as determined by LADWP. Data from the baseline period 1985 to 1987 (depicted as 1986 for simplicity) indicates estimates of vegetation cover in the parcels prior to implementation of the irrigation project in the Laws area. Data since 2004 are estimates of vegetation cover after implementation of the irrigation project in the Laws area.

Table 3.5 Vegetation Cover in Selected Parcels within the Laws Wellfield

Parcel	1986	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
FSL048	18												8	8	20	34	30	34	24
LAW030	23	26	30	51	40	39	36	31	35	22	24	12	13	17	24	33	23	32	22
LAW035	34	3	14	17	11	13	3	12	17	4	2	1	1	1	6	5	17	3	2
LAW043	61	5	13	10	16	21	8	11	20	7	3	3	6	4	14	10	17	13	5
LAW052	28	5	14	11	9	15	15	6	16	8	4	4	4	3	5	11	13	12	7
LAW062	21	5	11	14	16	22	12	12	17	10	5	4	2	2	4	9	9	10	8
LAW063	11	9	17	15	19	26	14	15	25	12	6	6	4	5	11	14	19	16	14
LAW065	10	7	8	11	12	18	12	10	20	7	5	4	3	2	7	9	12	9	10
LAW070	59	6	8	18	20	21	14	20	23	10	6	3	4	3	12	11	39	10	5
LAW072	64										10	6	6	4	37	53	42	58	33
LAW078	52	36	49	54	59	67	69	65	53	35	27	23	23	16	35	46	41	44	35
LAW082	17	4	5	10	6	9	8	12	10	8	6	5	4	6	8	9	13	17	8
LAW085	30	7	13	21	26	35	29	31	14	15	6	5	4	6	13	17	17	17	16
LAW105	26	35	49	48	44	68	41	58	43	43	27	19	26	21	33	38	44	35	35
LAW107	47	46	68	71	79	80	90	81	65	54	45	31	35	47	59	67	68	59	59
LAW112	20	17	37	33	38	49	40	31	33	33	14	11	8	10	21	20	36	38	28
LAW120	26	33	41	47	48	48	50	52	47	35	39	26	30	21	41	49	55	55	31
LAW122	60	64	73	78	75	70	78	68	77	60	45	42	30	32	51	82	61	63	55
LAW137	22	19	33	32	24	27	20	27	28	21	17	14	14	16	23	23	24	21	15

The following table illustrates the depth to water in Laws area test holes prior to and after implementation of the irrigation project in the Laws area.

Table 3.6 April Depth to Water (in feet) for Test Holes in the Laws Wellfield

	Test Hole				
Year	T107	T436	T438	T490	T492
2004	30.1	10.1	11.6	14.6	31.9
2005	31.9	10.2	8.9	14.7	31.5
2006	18.1	4.5	3.7	13.2	24.0
2007	21.1	5.3	6.3	10.2	23.1
2008	25.1	7.3	8.6	12.5	27.6
2009	28.0	8.8	9.4	13.8	29.1
2010	30.8	9.5	11.4	13.6	31.0
2011	31.5	9.6	9.1	13.2	32.3
2012	31.9	10.1	9.6	10.9	32.7
2013	33.1	11.1	12.0	13.2	32.7
2014	34.4	11.8	12.5	15.1	33.9
2015	35.5	12.7	13.0	16.0	36.6
2016	35.8	12.8	13.2	16.5	36.2
2017	35.8	10.4	8.7	16.0	33.3
2018	22.9	5.1	5.5	8.6	21.9
2019	27.2	6.4	5.1	8.4	26.3
2020	22.9	4.8	4.5	7.3	23.0
2021	26.5	7.2	10.3	12.2	30.0

Mitigation Measure M-4

Impact: Reducing the irrigation duty from 5 AF per-acre to 3 AF per acre and of changing from flood irrigation to sprinkler irrigation.

Measure: Water Agreement

LADWP evaluates pasture condition using the Natural Resource Conservation Service Pasture Condition Assessment (Cosgrove et. al. 1991). This protocol is designed to optimize plant and livestock productivity while minimizing detrimental effects to soil or water resources. These pastures were most recently evaluated in 2019. The average pasture score for the 2019 growing season was 89%.

Mitigation Measure M-5

Impact: Altering the flow in a ditch that carries water diverted from Coldwater Canyon.

Measure: Water Agreement

Diversions from Coldwater Canyon Ditch are utilized for irrigation of the Seed Farm. During operation, approximately one-quarter of the total flow remains in the ditch.

Diversions for irrigation from Coldwater Canyon Ditch continued in 2021. Periodic examinations were conducted along the ditch throughout the growing season. These examinations did not indicate any signs of vegetation stress.

Mitigation Measure M-6

Impact: Altering the flow in Silver Canyon Ditch.

Measure: Water Agreement

Diversions from Silver Canyon Ditch are utilized for irrigation of Parcels LAWS 90, 94, and 95. During operation, approximately one-quarter of the total flow remains in the ditch.

Diversions for irrigation from Silver Canyon Ditch for the Laws Parcels 90, 94, and 95, continued in 2021. Periodic examinations were conducted along the ditch throughout the growing season.

Mitigation Measure M-7

Impact: Growth of State-rated A or B noxious weeds in the project area.

Measure: LADWP or its lessee or lessees, in conjunction with Inyo County's weed abatement program, will promptly treat or remove the weed.

Surveys were conducted on the irrigation project in the Laws area for noxious weeds during the 2012 growing season. No A or B listed noxious weeds were found. The lessee treats weeds through a combination of grazing and burning as necessary.

Mitigation Measure M-8

Impact: Archaeological investigations identified six previously unrecorded archaeological sites and 11 isolates within the project area.

Measure: Pipeline placement was to avoid identified sites; if new sites are encountered during implementation, work will be halted until an archeologist can be consulted.

No cultural resources were encountered during construction or operation of the irrigation project in the Laws area in 2006.

3.2.3. Irrigation Project in the Big Pine Area (Big Pine Ditch System)

POT. IMPACT		**MITIGATION**			**MONITORING**			
Summary of Impact	**MM No.**	**Measure**	**Timing**	**Responsibility**	**Method**	**Period**	**Frequency**	**Responsibility**
Hydrology and Water Quality								
The cumulative effect of groundwater pumping from Well W415, the new Bell Canyon well, as proposed in the project, in combination with the operation of other wells in the Big Pine area could cause significant adverse impacts to groundwater dependent vegetation, other vegetation, or non-LADWP wells in the area.	M-1	Water Agreement	To be implemented throughout the project as needed.	Inyo/Los Angeles Technical Group	A monitoring site will be developed by the Inyo/Los Angeles Technical Group as called for in the Inyo/Los Angeles Water Agreement to manage operation of each well.	During the period when groundwater pumping is needed for the project.	As decided by the Inyo/Los Angeles Technical Group, consistent with the Water Agreement.	Inyo/Los Angeles Technical Group

Well 415 has been drilled and equipped but is not yet in operation. The Bell Canyon Well has not yet been drilled. In Spring of 2020, ICWD and LADWP agreed upon a 6-month pumping test and associated monitoring for W415. The test has not yet been conducted but may occur in 2022.

3.3. LADWP OTHER COMMITMENTS

Table 3.5 provides title, legal reference, provision, progress to date, and current status on each of LADWP's other commitments listed on Table 3.2.

Again, categories describing status are:

Complete: Project has no additional commitments required (no water allotment or other financial or environmental mitigation; no continual monitoring and reporting),

Ongoing as necessary/required: These measures are only applied when necessary (monitoring and reporting for mitigation measures for new projects, construction, etc.),

Implemented and ongoing: Project is fully implemented and is currently meeting goals; however, there may be ongoing water or financial commitments or monitoring and reporting requirements,

Fully implemented but not meeting goals: Project is fully implemented but has not yet met prescribed goals or success criteria,

Not fully implemented: Project under development or under construction, but not fully implemented.

Following Table 3.5, there are additional reports for the Yellow-Billed Cuckoo Habitat Enhancement Plan and the Owens Valley Land Management Plan (OVLMP).

Table 3.7. LADWP Other Legal Commitments

Reporting No.	Table 3.7 LADWP OTHER LEGAL COMMITMENTS				Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
	Commitment	**Legal Reference**	**Provision**	**Progress to Date**	Status				
1	Aerial Photo Analysis	MOU Section III.E	By June 2000, LADWP, the County, and experts in aerial photography interpretation will conduct a study analyzing existing air photos of the Owens Valley to evaluate the merits of using air photos in monitoring vegetation in the valley, to determine the feasibility of using air photos to analyze and refine the vegetation map data base, and to provide recommendations on how aerial photography, or other remote sensing techniques, could be used to monitor vegetation conditions and changes. If feasible and cost-effective relative to other field monitoring techniques, recommendations will be implemented.	The deadline was extended by the 1997 MOU Parties. In January 2002, Ecosat Geobotanical Surveys, Inc. completed reports addressing the 1997 MOU requirements. Complete.	X				
2	Annual Report on the Owens Valley	MOU Section III.H	LADWP and the County will prepare an annual report describing environmental conditions in the Owens Valley and studies, projects, and activities conducted under the Inyo-Los Angeles Agreement and the MOU. Copies of the report will be distributed to the other Parties and made available to the public. The report will be released on or about May 1 of each year.	ICWD has prepared annual reports since 1991. LADWP has released annual reports since 2001. Presently, annual reports are written separately by each agency due to timing constraints; LADWP must issue their annual report in conjunction with their Annual Operations Plan near May 1 each year. ICWD is not required to meet this timeline for their report.			X		
3	BLK 094 Burns	Proposed Resolution of the Blackrock 94 Dispute (2014)	To enhance certain alkali meadows by reversing the encroachment of woody shrubs into such meadows, LADWP will perform prescribed burns on approximately 665 acres of shrub encroached alkali meadows in the Owens Valley. Recognizing CALFIRE and GBAPCD will require that regulatory permits be issued prior to burning, burning the entire 665 acres may take several years; however, if permits and conditions allow, LADWP will conduct the burning of the 665 acres within 5 years of the date of this Settlement Agreement. The burning of the 665 acres will be conducted as described in LADWP's land management plans.	LADWP conducted the following burns with the assistance from Calfire to meet this commitment: White Meadow Burns (2015, 2016), 167 acres; Long Pond Burn (2019), 318 acres; Calvert Burn (2021)- 193 acres. LADWP's prescribed burn commitment has been met. Project is complete.	X				
4	Cooperative Studies	Water Agreement Section IX	It is recognized that additional cooperative studies related to the effects of groundwater pumping on the environment of the Owens Valley are necessary. The reasonable costs of the studies implemented under the Stipulation and Order or the Green Book shall be funded by the Department. If necessary, such funding will be in addition to funds provided under section XIV (Financial Assistance).	Several cooperative studies have been performed to date. Currently, LADWP and ICWD are conducting a cooperative study with Formation Environmental LLC to evaluate the utility of remote sensing technology in Owens Valley vegetation monitoring. Information gathered may be used to improve upon current methods of monitoring described in the Green Book.			X		

Reporting No.	Table 3.7 LADWP OTHER LEGAL COMMITMENTS				Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
	Commitment	**Legal Reference**	**Provision**	**Progress to Date**	Status				
5	Dispute Resolution	Water Agreement Section XXVI	The agreement provides a process for resolving disputes between Inyo and Los Angeles regarding issues related to the agreement or the Green Book.	Inyo County and Los Angeles use the Dispute Resolution process identified in the Water Agreement as needed. Inyo County and Los Angeles entered into a Settlement Agreement on June 25, 2018 as resolution to the dispute regarding issues surrounding W385R pump test and the status of the Five Bridges Mitigation Project. The pump test was conducted December 2019-February 2020.		X			
6	Dispute Resolution and Litigation	MOU Section VI	The parties to the 1997 MOU will maintain frequent, informal communications to minimize disagreements. In the event of a dispute among the parties over the 1997 MOU, the parties will meet and confer before any litigation concerning the dispute may be commenced. The parties may elect to retain the services of a mutually acceptable impartial mediator/facilitator to assist in dispute resolution. Any litigation arising out of the 1997 MOU is to be commenced in the Inyo County Superior Court.	The MOU Signatory Group has met regularly and on an as needed basis.		X			
7	Enhancement/ Mitigation Projects	Water Agreement Section X	All existing E/M projects will continue unless the Standing Committee agrees to modify or discontinue a project. Periodic evaluations should be made by the Technical Group. Enhancement/mitigation projects shall continue to be supplied by enhancement/mitigation wells as necessary. New enhancement projects will be implemented if such projects are approved by the Standing Committee.	All Enhancement/Mitigation Projects defined in the 1991 EIR are complete or are implemented/ongoing.			X		
8	Exchange of Information and Access	Water Agreement Section XVII	The County and LADWP shall make any data or information in its possession that reasonably pertains to purposes of the Water Agreement available to the other party with reasonable notice.	LADWP and ICWD exchange data and information as necessary per the Water Agreement.			X		
9	Financial Assistance-Big Pine Ditch System	Water Agreement Section XIV.E	LADWP is to provide up to $100,000 for reconstruction and upgrading of the Big Pine ditch system. LADWP is to supply up to 6 cfs to the ditch system from a new well to be constructed west of Big Pine.	The Big Pine Irrigation and Improvement Association has implemented all Phases of the project. LADWP has provided $99,745 of the $100,000 committed to the project. The Improved Big Pine Ditch System has been in operation since 2005. After test pumping and identification of a monitoring site for Well 415 to supply supplemental water and makeup water for the ditch system, a contract will be considered for the installation of another well in Bell Canyon to provide additional water for the project.			X		
10	Financial Assistance-General Financial Assistance to the County	Water Agreement Section XIV.D	LADWP is to make an annual payment to Inyo to assist the County in providing services to its citizens. The first payment shall be $1,221,685 minus previous contributions made during the 1991-1992 fiscal year. The annual payment thereafter is to be adjusted upward or downward each year in accordance with a formula in the State Constitution for an assessment of Los Angeles-owned property in Inyo County.	Los Angeles has provided these annual payments to Inyo County since 1991, and provided $4,910,146 in 2021. Funds provided by Los Angeles have been deposited into Inyo County's General Fund and expended on Inyo County services as directed by the Board of Supervisors. LADWP has paid Inyo County more than $78 million since 1991 for this purpose.			X		

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11	Financial Assistance-Park & Environmental Assistance to City of Bishop	Water Agreement Section XIV.F	LADWP is to make an annual payment to the City of Bishop to assist the City in maintaining its park and for other environment-related activities. The payment of $125,000 is to be adjusted upward or downward each year in accordance with the consumer price index, not to exceed 5% in any year. Inyo County shall make an annual payment to the City of Bishop in an amount equal to the payment made by LADWP.	Los Angeles has provided annual payments to the City of Bishop, and provided $219,437 in 2021. LADWP has paid the City of Bishop $4,366,891 since 1997 for this purpose. Inyo County has made its required payment under this section of the agreement.	X				
12	Financial Assistance-Park Rehabilitation, Development, & Maintenance	Water Agreement Section XIV.B	LADWP shall provide funding to the County for rehabilitation of existing County parks and campgrounds, development of new County campgrounds, parks, and recreational facilities and programs, and for the annual operation and maintenance of existing and new facilities and programs on lands owned by the City of Los Angeles. LADWP is to provide up to $2 million to the County for these purposes. LADWP is to make an annual payment of $100,000 (adjusted upward or downward in accordance with the consumer price index not to exceed 5%) by July 10 of each year. The annual funding will be placed in trust by the County and shall be used only for the purposes of existing and new parks, recreational facilities and programs. If at any time $300,000 or more is accumulated in the trust, LADWP shall not be required to make an additional annual payment until the trust is less than $100,000 as of June 30 any given year.	LADWP has provided annual payments to Inyo County for parks operation and maintenance activities including a payment in 2021 of $179,060 for a total of $3,451,077. Combined with the $1,831,914 paid to Inyo County for parks rehabilitation during the first 10 years of the Stipulation and Order, LADWP has paid Inyo County County $5,282,991 since 1997 under this provision of the Agreement.			X		
13	Financial Assistance-Salt Cedar Control	Water Agreement Section XIV.A	LADWP shall provide funding to Inyo County to implement a Saltcedar Control Program: a total of $750,000 for the first three years of the program; thereafter, $50,000 per year for annual maintenance and control efforts (adjusted upward or downward in accordance with the consumer price index not to exceed 5% in any year). The funds are to be placed in trust with the County and will be used only for the purposes of salt cedar control. If at any time, $150,000 or more is accumulated in trust, LADWP shall not be required to make an annual payment until fund in trust are less than $50,000.	ICWD initiated the Saltcedar Control Program in 1997. LADWP began making required payments at that time. In 2021, LADWP paid ICWD $83,879 for this work. LADWP has paid Inyo County $2,219,470 since 1997 under this provision of the Water Agreement. In 2004, as part of a Wildlife Conservation Board (WCB) grant, LADWP provided $56,000 for Saltcedar control, and the balance of the program was funded from a WCB grant for $490,000 obtained by Inyo County working in cooperation with LADWP. A second grant from the WCB for $560,000 was received in February 2004. A third grant for $600,000 from the WCB was received by ICWD in November 2007.			X		

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14	Financial Assistance-Water and Environmental Activities	Water Agreement Section XIV.C	LADWP shall assist the County in funding water and environmentally related activities by making an annual payment to the County. The amount of the first payment shall be $820,580. The annual payment is to be adjusted upward or downward each year in accordance with the consumer price index and shall be made by July 10th each year. The maximum adjustment shall not exceed 5% in any year.Annual funding has been placed in trust with the County and shall be used only for purposes of operation and maintenance of water and environmentally related activities. If at any time $1,500,000 or more is accumulated in the trust, LADWP should not be required to make an additional payment until the funds in the trust are less than $820,580 as of June 30 of any year.	Los Angeles has provided annual payments to Inyo County, and provided $1,669,067 in 2021. Funds provided by Los Angeles have been expended to fund Inyo County Water Department. LADWP has paid Inyo County $37,878,809 since 1988 for this purpose.			X		
15	Financial Provisions	MOU Section IX	Within 90 days after the discharge of the writ, the County will pay the sum of $53,000 to Sierra Club, and the sum of $30,000 to the Owens Valley Committee for professional services in the development and preparation of the MOU.	The specified amounts have been paid by the County to the identified parties.	X				
16	Fish Slough	MOU Section IV	The Parties acknowledge that LADWP and CDFG have reached agreement concerning threatened and endangered species that involves land management and other activities in the Fish Slough area of Mono County. The agreement is to be memorialized in a letter from LADWP to CDFG.	A letter agreement was never memorialized; however, LADWP has worked closely with CDFG on the Fish Slough Area of Critical Environmental Concern (ACEC) for many years.			X		
17	Groundwater Management	Water Agreement Section II	Inyo and LADWP are to manage water resources within Inyo County to avoid certain described decreases and changes in vegetation and to cause no significant effect on the environment which cannot be acceptably mitigated while providing a reliable supply of water for export to Los Angeles and for use in Inyo County.	By agreement of the Standing Committee, implementation of groundwater management pursuant to the Agreement commenced in 1987.			X		
18	Groundwater Pumping on the Bishop Cone	Water Agreement Section VII	LADWP pumping on the Bishop Cone must be in strict adherence to the provisions of the "Hillside Decree." Before LADWP may increase groundwater pumping on the Cone, or construct new wells on the Cone, the Technical Group must agree on a method for determining the exact amount of water annually used on Los Angeles owned lands on the Cone. The agreed upon method shall be based on a jointly conducted audit of such water uses. LADWP's annual groundwater extractions from the Cone shall be limited to an amount not greater than the total amount of water used on Los Angeles owned lands on the Cone during that year.	The Standing Committee adopted the Bishop Cone audit procedure and the audit has been conducted since 1996. In 1998, the Superior Court entered a "Memorandum of Judgment" in Matlick vs. City of Los Angeles which reaffirmed LADWP's pumping practices on the Bishop Cone. Revised audit methods were agreed upon by Inyo County and LADWP in 2016 because past audits did not account for stockwater use and ditch losses on the Bishop Cone. Audits beginning with the 2015-16 runoff year reflect all sources of water supplied to the Bishop Cone.			X		

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19	Groundwater Recharge Facilities	Water Agreement Section VIII	LADWP may construct groundwater banking and groundwater recharge facilities in the Owens Valley and in Rose Valley. (The EIR describes certain groundwater recharge facilities in Laws, Big Pine, and Rose Valley.) Development of such facilities are subject to agreement by the Standing Committee.	These facilities have not been constructed to date and are not under development at this time.		X			
20	Habitat Conservation Plan	MOU Section III.B	LADWP, in consultation with the parties to the 1997 MOU and others, is to identify areas of City-owned land, which are not included in the LORP planning area, and develop plans for the identified areas to remedy problems caused by livestock grazing and other uses of the land. Priority will be given to riparian areas, irrigated meadows and sensitive plant and animal habitats. The plans will provide for the continuation of sustainable uses (including recreation, livestock grazing, agriculture, and other activities) will promote biodiversity and a healthy ecosystem, and will consider the enhancement of threatened and endangered species habitats. Habitat conservation plans for Threatened and Endangered Species will be incorporated if and where appropriate.	LADWP finalized the *Habitat Conservation Plan for City lands in Inyo and Mono Counties* in 2015. On October 7, 2015 the USFWS announced the availability of the Draft Low Effect Habitat Conservation Plan (draft HCP) for LADWP's operations, maintenance, and management activities on City land in Inyo and Mono Counties, California. The comment period ended on January 15, 2016. A total of nine comment letters were received from the public and other governmental agencies. LADWP and USFWS staff have completed responses to comments and developed the final HCP. Complete as of April 2017.	X				
21	Haiwee Reservoir	Water Agreement Section XIII	Inyo County and Los Angeles will develop a recreational plan for South Haiwee. The recreation plan will be implemented and operated by Inyo County or a concessionaire. Any plan must take into account Los Angeles' operating and security needs.	A recreational plan has not been developed. A security audit was performed following the September 11, 2001 national security incident. This audit concluded that due to a potential security threat to a municipal water source, Haiwee Reservoir should be closed to the public. A Negative Declaration was filed to close Haiwee Reservoir on December 16, 2004. The facility was officially closed to the public in 2005.	X				
22	Inventory of Plants and Animals at Spring and Seeps (outside LORP Planning Area)	MOU Section III.C	Within 36 months of the discharge of the writ, DWP and the County will jointly complete an inventory of plants and animals at existing springs and seeps and associated wetlands on lands owned by the City of Los Angeles within the portion of the Owens River watershed located in Inyo County that is not included in the LORP Planning area.	LADWP completed data collection for spring and seep discharge. Ecosystem Sciences completed the inventory of plants and animals from 1998-2000.	X				
23	Laws Area Potential Mitigation-Consideration by Standing Committee	1991 EIR Impact 10-18	Approximately 640 acres in the Laws area have a very low density of vegetation cover. The loss or reduction of vegetation cover in these areas was caused by the abandonment of agriculture following purchase of lands by Los Angeles, wet year water spreading from the McNally Canals by LADWP during the pre-project and project periods, wildfire, groundwater pumping, and other factors. The primary cause of the loss or reduction of the vegetation is, therefore, not a result of the project. Although these conditions on these lands are not a result of the project, because of the existing sparse vegetation conditions, these lands will be considered by the Standing Committee for selective mitigation, which would be compatible with water spreading and groundwater recharge activities during wet years.	These lands have not been presented to the Standing Committee to date for selective mitigation. LADWP continues to implement the defined mitigation requirements prescribed in the 1991 EIR and other guiding legal documents.		X			

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24	Legislative Coordination	Water Agreement Section XVI	Except under certain circumstances, Inyo and LA are to refrain from seeking or supporting any legislation, administrative regulation, or litigation that would weaken or strengthen local or state authority to regulate groundwater or that would affect any provision of the agreement.	The legislative coordination policy has been followed by both Inyo County and Los Angeles to date.			X		
25	LORP Agency Consultation and Public Involvement	MOU Section II.D	Consultation with the Parties, agencies, DWP ranch lessees, and the public concerned with the development of the LORP Plan will occur throughout the development and implementation of the LORP Plan.	The MOU Parties, agencies, LADWP ranch lessees, and the public were consulted during the development of Ecosystem Sciences' 2002 LORP Ecosystem Management Plan.	X				
26	LORP EIR	MOU Section II.F	DWP as the lead agency and the County as responsible agency will jointly prepare an EIR on the LORP. A draft LORP EIR will be released within 36 months of the discharge of the writ, and a final LORP EIR will be completed and presented for certification as soon as possible following the release of the draft. Extension of these deadlines may be granted by unanimous consent of the Parties or due to circumstances beyond the control of the DWP and/or the County.	The LORP DEIR was released November 1, 2002. The public comment period concluded January 14, 2003. The Final EIR was approved by the Board of Water and Power Commissioners in July 2004 and the Inyo County Board of Supervisors in November 2005. LADWP received all the necessary permits for implementation by January 9, 2006 and construction began immediately thereafter.	X				
27	LORP Implementation	MOU Section II.H	DWP will commence the baseflow of 40 cfs in the river channel by the 72nd month after the discharge of the writ unless circumstances beyond DWP's control prevent the completion of the pumpback system and/or the commencement of the baseflow within the 72 month period. DWP will commence implementation of the other physical features of the LORP upon the certification of the LORP EIR.	The LORP DEIR stated that the baseflow would not commence on June 13, 2003. The Final EIR was completed in June 2004 per the February 13, 2004 Stipulation and Order. Phase I flow releases began December 6, 2006. Phase II releases of 40 cfs were achieved in February 2007, and were certified by the court in July 2007. Additional punitive conditions involving maintaining flows and recording of flows were added to the 2007 Stipulation and Order following certification of the 40 cfs base flows.	X				
28	LORP Monitoring and Adaptive Management Plan	MOU Section II.E	Monitoring sites and water flow gaging stations will be identified and a program for data collection, analysis, and reporting will be described as part of this plan. Should the reported information reveal that adaptive modifications to the LORP management are necessary to ensure the successful implementation of the project, or the attainment of the LORP goals, such adaptive modifications will be made.	Ecosystem Sciences finalized the LORP Monitoring and Adaptive Management Plan (MAMP) in 2008. Monitoring follows that prescribed in this plan and LADWP and ICWD generate a joint annual report each year that contains monitoring results and adaptive management recommendations.			X		
29	LORP Permits Approvals and Licenses	MOU Section II.I	The Parties will work cooperatively with LADWP and/or the County in obtaining, and will support the issuance of, any permits, approvals, licenses, or agreements which are required by law and/or are necessary for the implementation of the LORP.	Permits were received from the following agencies to facilitate implementation of the LORP: California State Water Resources Control Board, California Department of Fish and Game, California State Lands Commission, US Army Corps of Engineers, California Department of Transportation, and the Bureau of Land Management.	X				

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30	LORP Plan	MOU Section II.A	LADWP and the County will direct and assist Consultants in the preparation and implementation of the LORP ecosystem management plan. This plan will apply to all lands within the LORP Planning area and will address the four physical features of the LORP.	The Lower Owens River Project Ecosystem Management Plan was authored by Ecosystem Sciences in 2002. This document was prepared for LADWP and ICWD per the 1997 MOU.	X				
31	LORP Planning Area-Inventory of Plants and Animals at Spring and Seeps	MOU Section III.A.2	An inventory of plants and animals at existing springs and seeps and associated wetlands on lands owned by the City of Los Angeles located within the LORP Planning Area will be conducted by Consultants.	Ecosystem Sciences completed the inventory and submitted results to the MOU Parties in June 2001.	X				
32	LORP Pumpback System	MOU Section II.G	Construction of a pumpback system will commence as soon as possible following the certification of the LORP EIR and will proceed as expeditiously as possible. Construction should be completed within 3 years after it is commenced.	The Pumpback Station was constructed prior to flow releases associated with project implementation in December 2006.	X				
33	Lower Owens Off River Lakes and Ponds	MOU Section II.C.3	Off-river lakes and ponds in the LORP area will be maintained and/or established through flow and land management to provide habitat for fisheries, waterfowl, shorebirds, and other animals. These habitats will be as self-sustaining as possible.	Several of these ponds were originally supplied water in the 1980s as part of the Lower Owens River Rewatering (E/M) Project. Water supply to the ponds continues as managed under the LORP.			X		
34	Lower Owens River (financial commitment)	Water Agreement Section XII	Los Angeles will pay the costs of implementing the LORP. Inyo County will repay Los Angeles one half of the project costs up to maximum of $3.75 million. Any funds provided for the project from sources other than Los Angeles will be an off-set against Inyo County's repayment obligation. Los Angeles will pay the annual costs of operating the pumpback system. Inyo County and Los Angeles will each pay one half of the other costs of the project.	As part of a negotiated agreement with Inyo County to not pursue funding from the USEPA, LADWP has credited Inyo County $5.1 million to cover Inyo County's $3.75 million obligation for LORP implementation with the remaining $1.35 million to be used by Inyo County towards post implementation costs. LADWP and Inyo County continue to share costs of operations and maintenance of the LORP per the LORP Post Implementation Agreement.			X		
35	Lower Owens River Delta Habitat Area	MOU Section II.C.2	This feature provides for the enhancement and maintenance of approximately 325 acres of existing habitat and the establishment and maintenance of new habitat consisting of riparian areas and ponds suitable for shorebirds, waterfowl, and other animals. An annual average of approximately 6 to 9 cfs will be released below the pumpback system to supply this area.	Releases for the Delta Habitat Area occur simultaneously with the 40 cfs baseflow. No construction was necessary for this component of the project other than the completion of the Pumpback Station.			X		

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36	Lower Owens River Project 1500-Acre Blackrock Waterfowl Habitat Area	MOU Section II.C.4	The goal of this component is to maintain this waterfowl habitat area to provide the opportunity for the establishment of resident and migratory waterfowl populations and to provide habitat for other native species. Diverse natural habitats will be created and maintained through flow and land management to the extent feasible consistent with the needs of the "habitat indicator species" for the Blackrock Waterfowl Habitat Area. These habitats will be as self-sustaining as possible. In average and above runoff years, approximately 500 acres within an overall project area of 1500 acres will be flooded to provide habitat for resident and migratory waterfowl and other native species. In years when the runoff is forecasted to be less than average, the water supply to the area will be reduced in general proportion to the forecasted runoff in the watershed.	All preliminary construction work identified for implementation of the Blackrock Waterfowl component is complete. The Blackrock Waterfowl Habitat Area has been managed in accordance with the LORP EIR and 1997 MOU since implementation. In Spring 2021, the Inyo/Los Angeles Standing Committee adopted a 5 year Interim Management and Monitoring Plan to manage the BWMA with seasonal flooding and moist soil management to further improve habitat for wildlife. LADWP and Inyo County implemented the first year of the Interim Plan in 2021-2022.			X		
37	Lower Owens River Riverine- Riparian System	MOU Section II.C.1	A continuous flow will be established and maintained in the river channel from at or near the intake structure which diverts the Owens River into the Los Angeles Aqueduct to a pumpback system located near the river delta which will convey water from the river to the Los Angeles Aqueduct. A base flow of approximately 40 cfs from at or near the Intake to the pumpback system will be maintained year round. Additionally, a seasonal habitat flow of up to 200 cfs will be released annually based on estimated runoff in the Owens River watershed.Any water in the river channel that is above the amount specified in this MOU for release below the pumpback system to supply the Owens River Delta Habitat Area will be recovered by the pumpback system for delivery to Los Angeles.	The Lower Owens River Project was implemented in 2006 and project base flows were achieved in July 2007 throughout the system. Seasonal habitat flows are released annually according to the guidelines provided in the LORP EIR (2004).			X		
38	Mitigation Plans for Impacts Identified in the 1991 EIR and the Water Agreement	MOU Section III.F	The Technical Group will prepare mitigation plans and implementation schedules for all areas for which on-site mitigation measures have been adopted in the 1991 EIR. The plans will be completed by June 1998. In accordance with the EIR, on-site mitigation will be accomplished through revegetation with native Owens Valley species and through establishment of irrigation.	To date, projects associated with all mitigation measures have been implemented, satisfying the relevant mitigation measures found in the 1991 EIR. Project and plan enforcement is within the jurisdiction of the LTWA and the Technical Group through dispute resolution. Some projects are complete, some are implemented and ongoing, and some are implemented but not yet meeting goals. Refer to Table 3.1 for current status of each of these projects.				X	
39	New Wells & Production Capacity	Water Agreement Section VI	LADWP's groundwater pumping capacity may be increased to provide increased operational flexibility and to facilitate rotational pumping. The Department may replace existing wells and construct new wells in areas where hydrogeologic conditions are favorable, and where the operation of that well will not cause a change in vegetation that would be consistent with these goals and principles.	The Water Agreement and 1991 EIR describe 15 new wells that LADWP proposes to construct in the Owens Valley. LADWP has constructed 6 replacement wells on Bishop Cone and one of the 15 new wells allowed under the Water Agreement (located in Lone Pine). The Technical Group must establish management for the well before it can be operated. Development of two new wells on the Bishop Cone (B2 and B5) is presently on hold. LADWP is evaluating potential new well development in the Owens Valley.					X

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40	Owens River Recreational Use Plan	Water Agreement XIV.B	As part of the parks rehabilitation program, Inyo is to develop a plan for recreational use and management of the Owens River from Pleasant Valley Reservoir to the Owens River delta as one of the first new programs.	Inyo County Water Department initiated this project in 2007 by forming a collaborative group to gather preliminary information. In 2010, MIG Consultants were selected to write the LORP Recreational Use Plan. A Draft Recreation Use Plan was released February 2012. This plan was presented to the Standing Committee and the public in October 2012. Next steps include further review of the draft plan, CEQA evaluation and obtaining permits prior to implementation of the project. Inyo County is pursuing the development of the Owens River Water Trail in 6 river miles of the LORP. ICWD obtained a $500,000 grant from California Boating and Waterways to implement the project. LADWP funded the CEQA evaluation of the project ($546,000) in 2018; the Draft EIR for the project was issued for public review in Spring 2010.					X[6]
41	Owens Valley Land Management Plans	MOU Section III.B	LADWP, in consultation with the parties to the 1997 MOU and others, is to identify areas of City-owned land, which are not included in the LORP planning area, and develop plans for the identified areas to remedy problems caused by livestock grazing and other uses of the land. Priority will be given to riparian areas, irrigated meadows and sensitive plant and animal habitats. The plans will provide for the continuation of sustainable uses (including recreation, livestock grazing, agriculture, and other activities) will promote biodiversity and a healthy ecosystem, and will consider the enhancement of threatened and endangered species habitats.	LADWP's Owens Valley Land Management Plan (OVLMP) was completed in 2010. The OVLMP contains guidance on grazing management of City lands, as well as recreation, fire, cultural resources, commercial uses, and flow management. A Mitigated Negative Declaration was prepared and circulated with the plan which was adopted by the Board of Water and Power Commissioners in June 2010. Implementation of fencing and recreational management measures were complete in early 2011. City lands outside the LORP Planning Area are currently being managed under this plan.			X		
42	Release of City Owned Lands - Lands for Public Purposes	Water Agreement Section XV.D	Los Angeles shall negotiate in good faith for the sale or lease to the County of any Los Angeles-owned land requested by the County for use as a public park or for other public purposes.	LADWP currently has 40 leases, 13 license agreements, 0 use permits, and 3 sign permits with Inyo County for public purposes. These include agreements for local parks, campgrounds, landfills, maintenance yards, borrow pits, etc. LADWP responds as needed upon request by Inyo County.		X			
43	Release of City Owned Lands-Bishop	Water Agreement Section XV.B	Los Angeles will sell at public auction, or sell directly to the City of Bishop Community Development Agency, properties within the Bishop City limits totaling 26 acres of surplus Los Angeles owned land.	LADWP has fulfilled this requirement by selling 26 acres in the Bishop City limits in 1995.	X				
44	Release of City Owned Lands- Inyo County	Water Agreement Section XV.A	Los Angeles shall offer for sale 75 acres of Los Angeles owned lands in Inyo County for the orderly development of the towns in the county.	LADWP has fulfilled this requirement by offering for sale 75 acres in 2011.	X				

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45	Release of City-owned lands-Additional Sales (Water Agreement Section XV.C)	Water Agreement Section XV.C	Upon the request of the Inyo County Board of Supervisors or Bishop City Council, Los Angeles shall negotiate in good faith for the sale at public auction of additional surplus City land in or near valley towns for specific identified needs.	**Big Pine Area** • LADWP has released land to the Big Pine Fire Department for the sale of 1.02 acres. **City of Bishop Area** • LADWP has completed the sale of 3.48 acres with the City of Bishop for the Silver Peaks Project. This property, located at 935 Spruce Street, is designated for disabled and affordable housing purposes. • LADWP is processing the sale of land to the City of Bishop for the See Vee Lane Signal Project and an aerial easement for powerlines. • LADWP is processing the sale of an easement to the City of Bishop for a water pipeline. • LADWP is processing the sale of an easement with the City of Bishop for a multi-use path for the Seibu to School Project. • LADWP is in the process of approving a sale of 275 acres to the Bishop Area Wastewater Authority for expansion of the wastewater treatment facilities. • LADWP has completed the sale of land where Bishop Nursery was located. **Lone Pine Area and South** • LADWP has granted the sale of two easements to Caltrans for highway purposes associated with the Olancha-Cartago Four-Lane Expressway Project. • LADWP is processing two sales for easements to Inyo County for the Pine Creek and Carroll Creek bridge replacements. **LADWP Initiative** • LADWP has taken steps to meet with its commercial lessees and modify its land divestment policy for in-town leased property. It is planning to present a policy to its Board this year that focuses on divesting of in-town properties that are no longer needed for operational purposes. Commitment is complete.	X				
46	Technical Group Meetings	MOU Section III.G	All scheduled meetings of the Technical Group will be open to the public.	Scheduled Technical Group meetings were opened to the public beginning October 15, 1997.		X			
47	Town Water Systems	Water Agreement Section XI	LADWP shall transfer ownership of the water systems in the towns of Lone Pine, Independence, and Laws to Inyo County, or another Owens Valley public entity or entities. Prior to transferring the systems, evaluations of each system will be performed by a mutually agreed upon consultant, and if necessary, work will be done to upgrade the systems.	Inyo County contracted with a private company to assume the operation, maintenance and billing for the systems in July 1999. Pursuant to an agreement with LADWP, the County completed upgrades of the systems in December 2002, using $2.6M in funds provided by LADWP. LADWP completed the transfer of ownership to Inyo County in January 2005.	X				

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48	Type E Vegetation Inventory	MOU Section III.D	Within 30 months of the discharge of the writ (December 1999), LADWP and the County are to develop baseline conditions for management of vegetation classified as Type E in the long-term agreement. These conditions will be adopted by the Standing Committee.	The inventory of Type E Vegetation was conducted by Resource Concepts, Inc. (RCI) under a contract administered by Inyo County and funded by LADWP. The final report on the inventory was complete in December 1999.	X				
49	Yellow-billed Cuckoo Habitat	MOU Section III.A.1	The MOU Consultants will conduct an evaluation of the condition of Yellow-billed Cuckoo habitat in the riparian woodland areas of Hogback and Baker Creeks. Based on that evaluation, Consultants will develop, as they deem warranted, Yellow-billed Cuckoo Habitat Enhancement Plans for these areas.	Ecosystem Sciences completed a Yellow-billed Cuckoo (YBC) Habitat Enhancement Plan in April 2005. LADWP released a Draft EIR in January 2006. The MOU Parties and others expressed displeasure with the Consultant's project. The MOU Parties and the lessees for the Baker Creek and Hogback Creek areas entered into negotiations with LADWP staff to develop another alternative for the YBC Habitat Plan. The *Ad Hoc Yellow-billed Cuckoo Habitat Enhancement Plan* was completed and a Mitigated Negative Declaration was released for public review in 2010. The Los Angeles Board of Water and Power Commissioners approved the project on January 19, 2010. Required initial plantings and replacement plantings have been fully implemented on schedule per the plan. Please see Section 3.3.1 for a progress report on this project.			X		

3.3.1. Yellow Billed Cuckoo Habitat Enhancement Plan

The *Final Ad Hoc Yellow-billed Cuckoo Habitat Enhancement Plan* (Enhancement Plan) states in Section 2.1.8.3:

> *"Annual reports will be prepared each year by LADWP to summarize the progress of the willow and cottonwood planting and black locust control. The annual reports will include a brief introduction to include the performance standards, monitoring methodologies, monitoring results for the year, and discussion of any adjustments required to achieve the overall goal to improve the habitat."*

Fences

All fencing required by the Enhancement Plan was completed as of 2011.

Baker Creek Planting

All planting areas (Figure 3.1) within Baker Creek have received their initial plantings and replacement pole plantings based on the first growing season monitoring.

Nonnative Species Control - Black Locust (*Robinia pseudoacacia*)

All planting area cover values are below the criterion for upper canopy nonnative values.

Planting Area Monitoring

Section 2.1.8.1. of the Enhancement Plan states:

> *"Quantitative monitoring will assess the attainment of final success criteria and identify the need to implement contingency measures in the event of failure. Monitoring will begin in late summer after the second growing season since initial planting to capture the fullest extent of the growing season and after the majority of avian species have finished breeding. Monitoring will continue annually through Year 6 within each planting area or until the success criteria are met."*

Planting criteria for the planting area are as follows: Absolute cover values for upper and mid canopy native species is greater than or equal to 50 percent for planting areas E, and F. Planting area G, absolute cover values for upper and mid canopy native species is greater than or equal to 65 percent. In LADWP's 2017 Owens Valley Annual Report, LADWP recommended that the native understory cover criterion of 50% be eliminated due to competing goals with upper and mid canopy cover values and the resulting drop in ground water levels due to the prolonged drought that had negative impacts on the understory. Nonnative species will be less than five percent for all canopy cover and understory values will be less than 25 percent in all planting areas.

A comprehensive analysis of each planting area was conducted in 2016 and is summarized in LADWP's 2017 Owens Valley Annual Report. From this analysis, it was recommended to discontinue further planting and monitoring efforts in areas A, B, and C

(through Adaptive Management Sections 2.1.9. and 2.1.9.1 of the Enhancement Plan) based on little success since implementation at each of these sites. Although all planted multiple times, Planting areas A, B, and C have been unable to support the establishment of pole plantings to attain desired canopy cover as described in the Enhancement Plan, most likely due to clay soils as a limiting factor and poor suitability of planting sites.

Planting areas D, F and H have met all enhancement criteria as of 2018 and therefore, vegetation monitoring in these areas was not conducted in 2021. Vegetation monitoring for areas E and G occurred August 23, 24, and 26, 2021. This information is summarized in Table 3.6. Since initial planting was phased over three years, 2021 was the ninth year of line point monitoring for planting area E and the eleventh year for planting area G.

Figure 3.1. Overview of Pole Planting Areas in the Baker Creek Watershed

Table 3.8. Percent Absolute Cover Values for 2011-2021 within Planting Areas D, E, F, G & H

		Planting Area D Met Criteria	Planting Area E	Planting Area F Met Criteria	Criteria for Areas D, E and F	Planting Area G	Planting Area H Met Criteria	Criteria for Area G and H
Upper Canopy Native	2011			1		6		
	2012	2		1		5	7	
	2013	3	7	2		15	8	
	2014	2	8	2		13	4	
	2015	5	11	3		3	8	
	2016	8	9	2		17	5	
	2017	7	13	6		27	12	
	2018	**	13	4		13	**	
	2019	**	19	**		15	**	
	2020	**	21	**		9	**	
	2021	**	12	**		7	**	
Upper Canopy Non-Native	2011			T*		1*		
	2012	0*		2*		4*	1*	
	2013	0*	6	1*		T*	T*	
	2014	0*	5	T*		T*	T*	
	2015	0*	7	T*		T*	1*	
	2016	0*	11	1*	**<5**	13	T*	**<5**
	2017	0*	9	3*		1*	4*	
	2018	**	11	2*		T*	**	
	2019	**	7	**		1*	**	
	2020	**	13	**		1*	**	
	2021	**	11	**		1*	**	
Mid Canopy	2011			30		15		
	2012	45		45		15	35	
	2013	48	6	42		26	37	
	2014	55	6	36		21	46	
	2015	62	6	50		31	47	
	2016	59	8	46		27	48	
	2017	67	14	51		37	71	
	2018	**	15	52		35	**	
	2019	**	14	**		40	**	
	2020	**	11	**		52	**	
	2021	**	8	**		45	**	
Upper & Mid Canopy	2011			32		21		
	2012	46		46		20	42	
	2013	51*	12	44		41	45	
	2014	57*	15	38		34	48	
	2015	67*	17	52*		34	55	
	2016	67*	16	48	**≥50**	44	53	**≥65**
	2017	74*	28	57*		64	83*	
	2018	**	27	56*		48	**	
	2019	**	33	**		55	**	
	2020	**	32	**		61	**	
	2021	**	20	**		52	**	
Understory Non-Native	2011			11*		13*		
	2012	3*		11*		13*	4*	
	2013	T*	7*	10*		7*	9*	
	2014	2*	2*	2*		6*	7*	
	2015	2*	4*	2*	**<25**	1*	6*	**<25**
	2016	3*	17*	2*		11*	11*	
	2017	18*	9*	36		14*	11*	
	2018	**	16*	18*		12*	**	

	2019	**	8*	**		1*	**	
	2020	**	4*	**		T*	**	
	2021	**	4*	**		T*	**	

**Has met criteria as stated above. **Area has met all enhancement plan criteria. T=Trace<1*

Planting Area E

Pre-existing conditions

Located in the Brown Pasture, planting area E is approximately 8.7 acres in size. The site is dominated by meadow vegetation with tree and shrub willows, as well as cottonwoods and black locust (*Robinia pseudoacacia*) scattered throughout the site. This area was burned during the Center Fire in 2011. Soils in this planting area are loam to sandy loam to sand in the near surface horizons.

Desired condition

Recommended number of pole planting for area E is 3,036 pole plantings based on 12-foot spacing. If successful, planting in area E would increase habitat acreage and connect with existing habitat located to the south in the Brown Pasture to habitat in the north in the Apple Orchard Exclosure. Pre-fire habitat suitability was classified as low. Habitat condition 6 to 10 years post implementation of medium suitability is desired.

Implementation Efforts

In 2012, initial pole planting was implemented in area E. The plan called for an estimate of 3,036 pole plantings but only 1,205 were planted due to 12 foot spacing from existing canopy and depth to ground water. The Enhancement Plan required that 222 of the original 1,205 pole plantings in area E be replanted in 2013. In 2014, an additional 260 pole plantings were planted to again try and meet the target canopy cover goals by the sixth year following the initial planting. A total of 1,687 pole plantings were planted in area E over three years. In 2019, an additional 300 pole plantings were planted to fill in areas that had low survivability and to help meet cover criteria goals.

Current conditions

Planting of area E is in the ninth year since the initial planting. According to the Enhancement Plan, upper and mid canopy cover should be ≥50%. Nonnative canopy cover should be < 5% and nonnative understory should be <25%.

Until the growing season of 2021, upper and mid canopy cover had been slowly trending upward since the implementation of the planting area (Figure 3.3). Upper and mid canopy cover has increased from a low of 12% in 2013 to 20% in 2021. At 20%, this planting area is 30% from meeting the enhancement criterion of ≥50%.

The nonnative canopy cover in 2021 was 11% which is 6% over the criterion for this planting area. As reported in previous reports, there are mature stands of black locust that were not removed because they may not be able to be replaced with willows and cottonwoods due to the depth of ground water in the area. The nonnative understory cover value of 4% in 2020 and 2021 has met the enhancement plan's criteria of ≤25% for area E (Table 3.6).

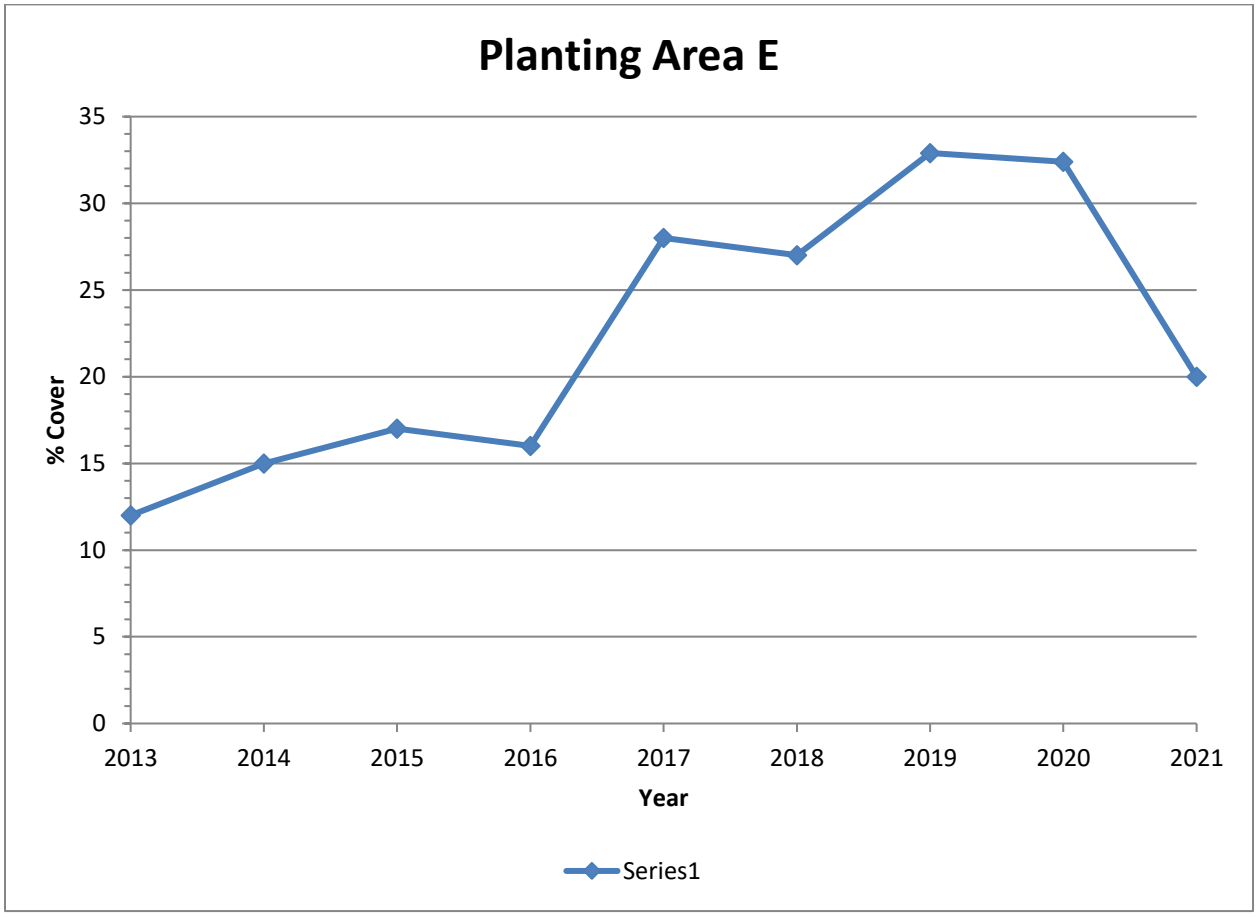

Figure 3.2. Percent Absolute Cover Values for 2013-2021 for Area E

Planting Area G

Pre-existing conditions

Area G lies adjacent to area F but has been designated as a separate planting area due to variation in the vegetation composition between the two areas. Planting area G is approximately 1.0 acres in size and is also located in the Apple Orchard exclosure. Vegetation in this area includes creeping wildrye, brome (*Bromus* spp.), tree and shrub willow, and black locust. Vegetation in this area is also recovering from the 2007 Inyo Complex Fire. Soils are sandy loam in the near surface horizons with sand at depth.

Desired condition

A total of 262 pole plantings were recommended based on 12-foot spacing. If planting area G is successful, it combined with existing habitat to the north and east would increase the acreage of suitable habitat in the Apple Orchard Exclosure. Prefire suitability for area G was medium with a desired condition in 6 to 10 years of high suitability.

Implementation Efforts

Area G was implemented as one unit with area F. In 2010, the initial pole planting was implemented in planting area F. Area F and G were planted as one planting area due to their proximity with each other and received 589 of the recommended 995 due to the 12 foot spacing from existing canopy. In 2011, areas F and G received the replacement pole plantings required by the plan. A total of 371 of the 589 pole plantings were replanted in areas F and G. In 2013, area F and G received an additional 55 pole plantings and then another 130 in 2014. Total number of poles planted in areas F and G was 1,145.

Current conditions

Planting of area G is in the eleventh year since the initial planting. According to the Enhancement Plan, upper and mid canopy cover requirement is higher for this planting area at ≥65%. Nonnative canopy cover should be < 5% and nonnative understory should be <25%.

Upper and mid canopy cover decreased from 64% in 2017 to 52% in 2021 (Figure 3.3). At 64% planting area G was only 1% from meeting the Enhancement Plan's criterion of 65%. Now at 52%, planting area G is 13% from meeting the 65% criterion.

Nonnative cover values in 2021 are at trace levels well below the 5% criterion. Nonnative understory had decreased in cover from 12% in 2018 to .6% in 2021 and is 24.4% below the Enhancement Plan's criterion (Table 3.6).

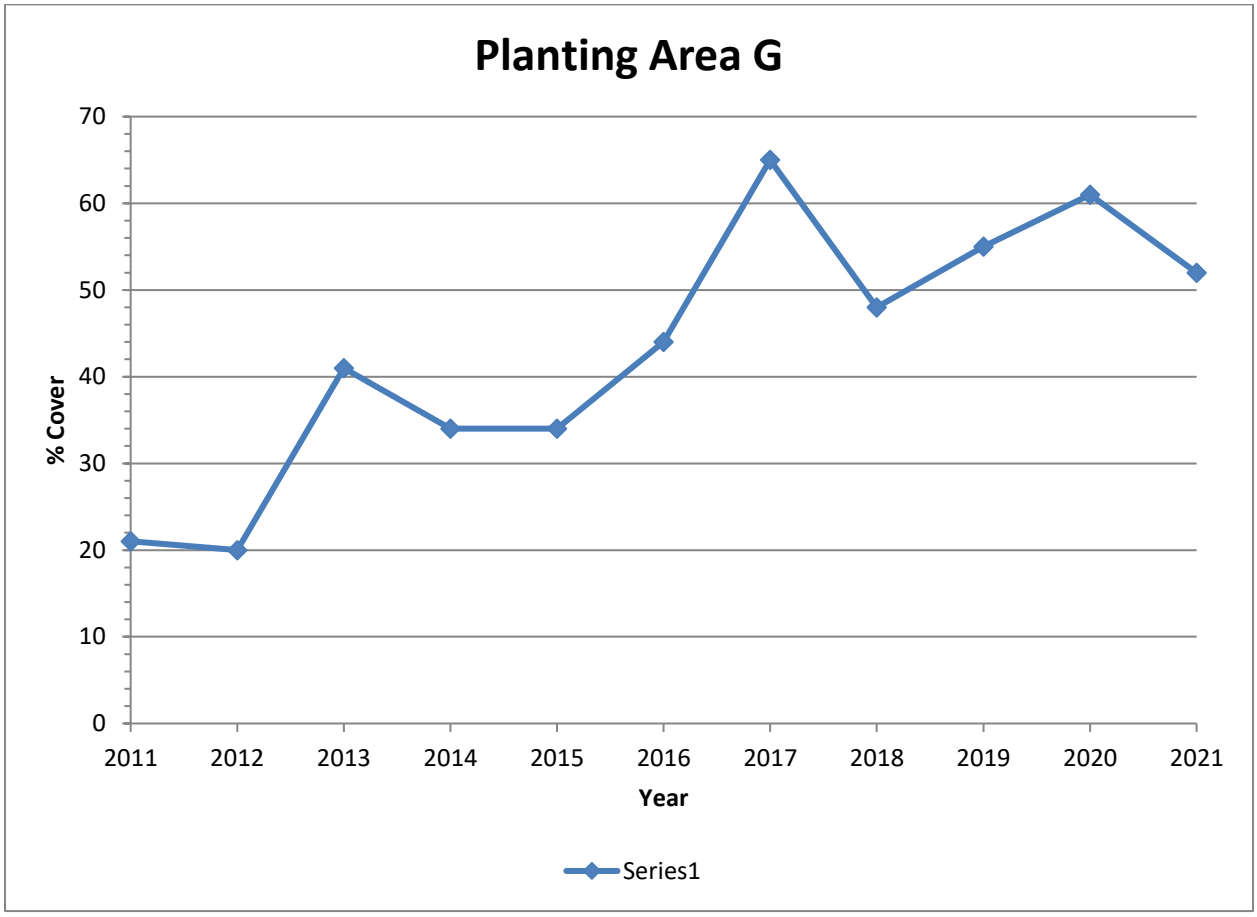

Figure 3.3. Percent Absolute Cover Values for 2011-2021 for Area G

Discussion

Year 2021 marks the eleventh year since pole planting at the Baker Creek yellow-billed cuckoo project was implemented. Since that time, the project area has seen one major wildland fire, a five-year drought and the second wettest winter on record. The 2020/2021 winter was above average for precipitation.

Out of the five planting areas, areas D and H have met the goals stated in the Enhancement Plan and were complete as of 2017. In 2018, planting area F met all criteria stated in the Enhancement Plan and is also complete. Planting area G met all non-native criteria and is 13% percent from meeting the 65% criterion for upper and mid canopy cover. Planting area E was initially planted in 2013 and is in its ninth year. At 20% in 2021, upper and mid canopy cover for this planting area is still 30% from meeting the criterion stated in the Enhancement Plan.

Recommendations

LADWP recommends discontinuing monitoring in all planting areas that have met the criterion in the Enhancement Plan. Additionally, it is recommended that no new pole plantings be planted in areas E and G. Areas E and G have been planted a number of times with little space left for additional pole plantings since the original plan called for a 12-foot spacing of pole plantings. It is recommended that areas E and G be left to rest to allow for natural succession. It will take time to for the pole plantings to increase in canopy cover, filling in the areas.

LADWP will continue monitoring planting areas E and G until the planting areas reach the criteria as described in the Enhancement Plan. LADWP will report on conditions of the two remaining planting areas (E and G) in its 2023 Owens Valley Annual Report.

3.3.2. Owens Valley Land Management Plan (OVLMP)

Introduction

Section II.B of the 1997 MOU describes the requirement for a land management plan for City of Los Angeles (City) non-urban lands in the Owens River Watershed in Inyo County (excluding the LORP planning area). The 1997 MOU states that LADWP shall continue to protect water resources used by the citizens of Los Angeles while providing for the continuation of sustainable uses such as recreation, livestock grazing, agriculture, and other activities. In doing so, LADWP shall promote biodiversity and healthy ecosystems, and address situations or problems that occur from the effects of various land uses on City property. The 1997 MOU states that priority is to be given to riparian areas, irrigated meadows, and sensitive plant and animal habitats.

Subsequently, LADWP developed the Owens Valley Land Management Plan (OVLMP) (LADWP and Ecosystem Sciences 2010) to fulfill this requirement of the 1997 MOU and guide management of the City's lands in the Owens Valley. The OVLMP consists of 10 chapters that describe current conditions and future management of grazing, riverine-riparian ecosystems, recreation, cultural resources, fire, commercial uses, threatened and endangered species, and areas of special management concern. The fundamental role of resource management is to assess and evaluate the effects of existing land and water use practices, and recommend flow management and land management improvements if necessary.

CEQA Process for the OVLMP

An Initial Study and Mitigated Negative Declaration (MND) (LADWP 2010) was prepared for the OVLMP in March 2010. After review of the comments received and based on the information in the Initial Study, LADWP determined that with adoption of mitigation measures, implementation of the OVLMP would not have a significant impact on the environment. The final MND and Mitigation Monitoring and Reporting Program were approved by the City of Los Angeles Board of Water and Power Commissioners on June 1, 2010. A Notice of Determination was filed with the Inyo County Clerk on June 2, 2010.

3.3.2.1. OVLMP Grazing Management Monitoring Report

Introduction

The land use component of the OVLMP is composed of project elements related to livestock grazing management. Under the land management program, the intensity, location, and duration of grazing is managed through the establishment of riparian pastures, forage utilization rates, and prescribed grazing periods (described in Section 3.3 Owens Valley Land Management Plan, 2010). Other actions include protection of rare plant populations, establishment of off-river watering sources (to reduce use of the river and off-river ponds for livestock watering) and the monitoring of utilization and rangeland trend throughout the leases to ensure that grazing rates maintain the long-term productivity of the forage base.

Grazing management plans developed modified grazing practices in riparian and upland areas on LADWP leases in order to support OVLMP goals. The leases contained in the Owens Valley Report are listed in Table 3.7 below. Maps detailing the locations of each of these leases can be found in the OVLMP.

Table 3.9. Ranch Lease Numbers and Names

RL #	Ranch Name		RL #	Ranch Name		RL #	Ranch Name	
I-401	Brockman Ranch Lease		I-438	Big Pine Canal Lease		I-480	Horse Shoe Ranch Lease	
I-402	U Bar Ranch Lease		I-439	Rafter DD Ranch Lease		I-483	Round Valley Ranch Lease	
I-404, 413	Quarter Circle B Ranch Lease		I-451, 500	CT Ranch Lease		I-487	LI Bar Ranch Lease	
I-406, 489	Fort Independence Ranch Lease		I-452	Lone Pine Dairy Lease		I-489	Archie Adjunct	
I-407	Coloseum Ranch Lease		I-453	Reata Ranch Lease		I-489	Georges Creek Parcel	
I-408	Eight Mile Ranch Lease		I-454	Independence Lease		I-489	Island Ranch Lease	
I-411	Cashbaugh Ranch Lease		I-455	Independence Lease		I-490	Delta Ranch Lease	
I-412	Chance Ranch Lease		I-456	Lone Pine Ranch Lease		I-491,	Twin Lakes Ranch Lease	
I-420	Rockin DM Ranch Lease		I-460	Rainbow Pack Outfit Lease		I-491, 499	Four J Ranch Lease	
I-424	Mandich Ranch Lease		I-461	ST Ranch Lease		I-492	Reinhackle Ranch Lease	
I-427	Olancha Creek Adjunct		I-462	Horseshoe Bar Ranch Lease		I-493	Rockin' C Ranch Lease	
I-428	Blackrock Ranch Lease		I-464	Three Corner Round Ranch Lease		I-495	Mount Whitney Pack Lease	
I-428A	Homeplace Adjunct		I-475	Intake Ranch Lease		I-497	Warm Springs Ranch Lease	
I-430	Thibaut Ranch Lease		I-475	Baker Road Ranch Lease		I-498	Pine Creek Ranch	
I-435	3V Ranch Lease		I-479	Aberdeen Pack Lease				

Utilization Monitoring

Monitoring methodologies are fully described in Section 4.6.2 of the *Lower Owens River Monitoring Adaptive Management and Reporting Plan* (Ecosystem Sciences, 2008), as they are also used for monitoring City land within the Lower Owens River Project Area.

Utilization is compliance monitoring and involves determining whether the utilization guidelines set forth in the grazing plans are being adhered to. Similar to precipitation data, utilization data alone cannot be used to assess ecological condition or trend. Utilization data is used to assist in interpreting changes in vegetative and soil attributes collected from other trend monitoring methods.

Utilization monitoring is conducted annually. Permanent utilization transects have been established in upland and riparian areas of pastures within the MORP, LORP, and areas outside these two project locations. An emphasis has been placed on establishing utilization monitoring sites within riparian management areas. Each monitoring site is visited prior to any grazing in order to collect ungrazed plant heights for the season. Sites are visited again approximately mid-way through the grazing period (mid-season) and again at the conclusion of the grazing period (end-of-season).

Utilization estimates are conducted on all range trend transects if there is an adequate amount of the key forage species (alkali sacaton, saltgrass, etc.). There are additional utilization transects not associated with range trend sites. These are designated as spatial utilization transects and will be read annually as long as they represent typical use in a pasture. If they fail to be representative (e.g. fire, flooding, and change in grazing patterns) they will be temporarily or permanently abandoned.

Watershed Resources staff updates each lessee with their mid-season if close to or exceeding utilization standards (40% or 65%). In either case the lessee is instructed to move livestock. All lessees are informed on end-of-season utilization results for each year. This allows LADWP and the lessees to communicate and make grazing management changes as needed in order to meet land management goals.

Target stubble heights have been calculated for each transect and pasture on a given lease. The lessee is notified of the set utilization standards and corresponding pasture or field associated with either riparian (40%), or upland (65%) standards. If requested by the lessee, field visits will occur to assess utilization on a particular field. If not requested, Watershed Resources staff adhere to the monitoring schedule previously mentioned. To calculate target stubble heights, ungrazed plant heights are collected after the end of the growing season to allow the plants to reach maximum production before the grazing season begins. The ungrazed heights are then averaged by species and transect in order to calculate the stubble heights that will meet the utilization standards for each field. The resulting calculated stubble heights are based on the same height/weight curves used in the mid- and end-of-season utilization calculations.

Range Trend Monitoring

Overview of Monitoring and Assessment Program

Monitoring is conducted at all irrigated pastures and at key areas within riparian and upland management areas. Areas not identified as irrigated pasture, riparian management areas, or springs and seeps are considered upland management areas. Monitoring and assessment of key sites in riparian and upland management areas includes utilization and range trend monitoring.

This report presents data collected during various periods typically beginning in 2007. Each site will generally be read every three years unless a significant change has occurred such as a fire or a major change in management.

A description of monitoring methods, data compilation and analysis techniques can be found in the *2008 LORP Monitoring, Adaptive Management and Reporting Plan*. Descriptions of the range trend monitoring sites and their locations on the leases are in the individual lease monitoring narratives and maps in this section.

Because of the high resource value associated with riparian areas on City property in the Owens Valley, the majority of the monitoring plots are either located on Moist Floodplain or Saline Meadow sites in close proximity to the Owens River.

Utilization is compliance monitoring and involves determining whether the utilization guidelines set forth in the grazing plans are being adhered to. Similar to precipitation data, utilization data alone cannot be used to assess ecological condition or trend. Utilization data is used to assist in interpreting changes in vegetative and soil attributes collected from trend monitoring methods.

Following implementation of the grazing management plans, the utilization standard for riparian management areas is 40%. The utilization standard for upland areas is 65% if grazing occurs during the plant dormancy season. The standard for upland areas is 50% if grazing occurs during the active plant growing period; however, if the pasture is completely rested for a minimum of 60 continuous days during the latter part of the active stage to allow seed set, allowable forage utilization is 65%.

These standards are not expected to be met precisely every year because of the influence of annual climatic variation, livestock distribution and the inherent variability associated with techniques for estimating utilization. Rather, these levels should be reached over an average of several years. If utilization levels are consistently 10% above or below desired limits during this period, adjustments should be implemented (Holecheck and Galt, 2000; Smith et al., 2007).

An additional driver for the 40% utilization rate on riparian pastures in the northern portion of the Owens Valley are grazing requirements as they relate to the federally listed Southwestern Willow Flycatcher. Within the Middle Owens River management area, beginning from just north of Tinemaha Reservoir to Pleasant Valley and adjacent

Horton Slough, LADWP and the United States Fish and Wildlife (USFWS), developed a Conservation Strategy designed to increase the endangered Southwestern Willow Flycatcher habitat in the Owens Valley. This strategy also specifies a 40% utilization limit along the river with livestock grazing permitted between October and May of each year.

Range trend monitoring involves the quantitative sampling of the following attributes: frequency of all plant species, canopy cover estimates for herbaceous plant species, line intercept sampling for shrub canopy cover, estimates for ground cover, shrub density, and age classification of shrubs. Photo documentation of the site conditions is included as part of range trend monitoring.

Range trend monitoring at permanent transects provides quantitative data to determine the state of monitoring sites relative to baseline conditions and how a given site compares to the desired plant community. The desired plant community can be one of several plant communities that may occupy a site or one that has been identified through a management plan to best meet the plan's objective for the site. The desired plant community must protect the site as a minimum and may be described as dynamic, changing through time, or within a range of variability (Bedell, 1988). Until site-specific objectives are established, the desired plant community, which will serve as the benchmark for evaluating conditions, will be the "reference plant community" described in the ecological site description for a site. The reference plant community is the historic climax or potential plant community described for each ecological site.

Ecological site descriptions are a tool developed by USDA Natural Resource Conservation Service (NRCS) that can be used to assist in management decisions. Ecological sites are distinct units distinguished between one another by significant differences in potential vegetation composition or production between soils (NRCS, 2003). Ecological site descriptions are represented spatially as soil map units, developed from soil survey data in the Owens Valley.

Soil surveys in the area were conducted by NRCS and the final data can be found in the *Soil Survey of Benton-Owens Valley Area, California, Parts of Inyo and Mono Counties* (USDA NRCS, 2002). Vegetation data used to develop the ecological site descriptions were collected by LADWP between 1984 and 1994. This vegetation data is also referred to as "baseline" as described in the *Green Book for the 1990 Long-Term Groundwater Management Plan for the Owens Valley and Inyo County.* Ecological site descriptions include the expected production (pounds per-acre) for each soil map unit based on growing conditions (normal, favorable, unfavorable). Yearly growing conditions are based on annual precipitation data (October through September).

Nested frequency, and cover data are presented for each lease and are presented as range trend transect data tables for each sampling transect and sampling year. To compare range trend sites to the associated reference plant community in the ecological site descriptions, the soil map unit that each transect was located on was cross-referenced to the *Soil Survey of Benton-Owens Valley Area, California*, *Parts of*

Inyo and Mono Counties (USDA NRCS, 2002). The soil map unit narrative references the ecological site descriptions. The ecological site description describes the potential plant community by percent composition by dried weight of the major plant species. The potential plant community information does not set a specific percent composition for each species, but specifies an expected range of abundance of each of the major plant species by soil type and ecological site.

The majority of land management monitoring transects are located on the Moist Floodplain Ecological Site (MLRA 29-20). The site describes axial-stream floodplains. This ecological site does not include actual river or stream banks. Moist floodplain sites are dominated by saltgrass and to a lesser extent alkali sacaton and Beardless wildrye (*Leymus triticoides*). Only 10% of the total plant community is expected to be composed of shrubs and the remaining 10% forbs.

Saline Meadow ecological sites (MLRA 29-2) are the second most commonly encountered ecological sites on the MORP. These sites are located on fan, stream, lacustrine terraces, and may also be found on axial stream banks. Potential plant community groups are 80% perennial grass with a larger presence of alkali sacaton than moist floodplain sites. Shrubs and trees comprise up to 15% of the community while forbs are only 5% of the community at potential. Saline Bottom (MLRA 29-7) and Sodic Fan (MLRA 29-5) ecological sites were also associated with several range trend sites. These are more xeric stream and lacustrine terrace sites. Saline Bottom ecological sites still maintain up to 65% perennial grasses, the majority of which is alkali sacaton, while shrubs compose up to 25% of the plant community, and forbs occupy the remaining 10%. Sodic Fan ecological sites are 70% shrubs, primarily Nevada saltbush (*Atriplex torreyi*), with a minor component of alkali sacaton of up to 25% and 5% forbs.

With regard to the ecological site descriptions for the Owens Valley, management objectives for a given area may or may not correlate directly to high similarity indexes or different seral conditions. For example, a portion of the reference plant communities described for the moist floodplain ecological site allow for a species composition (dry weight) of 10% for shrubs and 80% for perennial grass; optimum wildlife habitat for a particular species might require more woody plants than allowed for and livestock production would improve with a greater percent composition of perennial grass and a decrease in shrubs. Each of these scenarios are feasible through different management prescriptions but none would reflect a high similarity to the reference plant community for the ecological site. Furthermore, due to historical or existing disturbances or the presence of nonnative species, attaining “excellent condition” or 76-100% similarity may not be feasible.

It is important to note that reference plant communities associated with ecological sites are amalgamations of both existing reference sites and professional judgment of what the site’s potential could have been under pristine conditions. The reference plant community is a conceptual model intended to help managers gauge how a site compares to what potentially could be found on similar sites. To expect any existing location to identically match the described community would be erroneous. Estimating

how similar a given site is to its potential described in the ecological site description is useful when conducting an inventory across an area. However, if repeat monitoring is available for the site (as it is for most LADWP leases), changes over time (trend) compared to baseline data collected at the same location is a more effective approach to assessing the trend of that particular key area. This is because comparisons are made directly to the site and not between the key area and a reference plant community in an ecological site description, which ultimately has no physical existence. For this reason similarity indices were not calculated and discussions in trend will not focus on changes in similarity indices.

Reference plant community data is derived from annual aboveground production (dry weight). The vegetative attribute of annual production and canopy cover are very sensitive to annual growing conditions and will therefore vary in accordance to natural climatic fluctuations. Annual production and canopy cover are inappropriate attributes to interpret long-term impacts of management decisions on plant communities when compared to other plant monitoring methods such as nested frequency.

Because frequency data is sensitive to plant densities and dispersion, frequency is an effective method for monitoring and documenting changes in plant communities (Mueller-Dombois and Ellenberg, 1974; Smith et al., 1986; Elzinga, Salzer et al., 1988; BLM 1996; Heywood and DeBacker, 2007). For this reason frequency data will be the primary means for evaluating trend at a given site during subsequent years. Based on recommendations for evaluating differences between summed nested frequency plots (Smith et al.,1987 and Mueller-Dombois and Ellenberg, 1974), a Chi-Square analysis with a Yate's correction factor was used to determine significant differences between years. Future analysis will compare estimates to the baseline datasets presented in this report.

During the pre-project period, a range of environmental conditions were encountered including "unfavorable" growing years when precipitation in the southern Owens Valley was less than 50% of the 1970-2009 average, "normal" years, when precipitation was 50-150% of average, and "favorable" conditions when precipitation was greater than 150% of average. Many of the monitoring sites responded to the variability in precipitation during the baseline period, this provided the Watershed Resources staff an opportunity to sample across a broad amplitude of ecological conditions for these sites which contributed to a robust baseline dataset.

Range trend analysis on the LORP leases began in 2002. In response to the potential critical habitat designation and subsequent MOU with the USFWS concerning the Southwestern Willow Flycatcher, rangeland analysis expanded to include the Middle Owens River areas beginning in 2007. Because of the lengthier period of monitoring on the LORP leases there is greater discussion of overall trends on those leases. As monitoring continues on the MORP leases, further discussion of results will be included in the reporting component of the project.

On transects with a long history of monitoring, trends appear to be fairly static with no obvious trajectories as each year captures and extends what appears to be the normal range of variability. The majority of range trend sites are situated on moist flood plain or saline meadow ecological sites. These sites are naturally sub-irrigated and less influenced by annual fluctuations in precipitation when compared to the more xeric ecological sites such as Saline Bottom or Sodic sites. In general perennial grass and forb communities on the mesic sites are resilient to both moderate and heavy grazing, particularly if grazing occurs during the dormant season which is the case for most LADWP grazing leases.

Sites where apparent trends are occurring tend to be on:

1) shrub dominated sites where encroachment accelerates in a non-linear fashion;
2) burned sites where shrub cover is significantly reduced;
3) on sites where changes in water tables act as the primary driver for plant community composition and/or species abundance.

Rising water tables in moist flood plain sites adjacent to the Owens River will reduce shrub cover as the root zone of shrubs becomes permanently inundated. A dropping water table will have the reverse effect but similar end results with increased shrub mortality as well as a shift in plant composition. Transects along the Owens River on the Twin Lakes, Thibaut, and Blackrock leases have experienced a spike in cover and then a subsequent mortality of Nevada saltbush on terraces closest to the water's edge. Conversely, diminished flows on the Middle Owens River have contributed to a declining water table on moist floodplain sites and have led to a decrease in abundance of herbaceous graminoids.

Range Trend in 2021

Range Trend transects were sampled on the Independence Lease (RI-454), Aberdeen Lease (RLI-479), Cashbaugh Lease (RLI-411), Coloseum Lease (RLI-407),Twin Lakes Lease (RLI-491) and the Lone Pine Lease (RLI-456).

Irrigated Pasture Monitoring

Irrigated Pasture Condition Scoring is used to monitor all irrigated pastures using protocols developed by the (NRCS, 2001). Irrigated pastures that score 80% or greater are considered to be in good to excellent condition. If a pasture rates below 80%, changes to pasture management will be implemented. All pastures were evaluated in 2019.

Because all pastures are evaluated every three years, only irrigated pastures that scored 80% or below are evaluated in off years. Most pastures have recovered from the 2011-2015 extreme drought conditions. All pastures will be reevaluated in 2022.

3.3.2.1.1. 2019 Grazing Management Monitoring Data

Tables containing summarized utilization, range trend, and irrigated pasture data for each pasture/field and transects within the pasture/field can be found in Appendices 1-3.

ST Ranch Lease (RLI-461)

The ST Ranch Lease (10,925 acres) consists of parcels from Aberdeen, Bishop, and Round Valley. The ST Ranch is a commercial cow/calf operation that also raises and sells quarter horses. Almost the entirety of moist floodplains in the Bishop area were burned by a wildfire in late February of 2018. Range trend transects will be resampled in the summer of 2020 and will provide information regarding post-fire recovery on the transects that burned during the 2018 fire.

Utilization

Utilization on the Aberdeen portion of the lease was below the allowable utilization prescription of 40%. A range burn was conducted in 2021 on the irrigated portion of the Calvert Slough pasture and utilization standards were waived.

The Charlie Butte Field has only one transect, TATUM_10 (21%), which was below allowable utilization standards. LADWP Watershed Resources Staff recommends periodically moving supplemental feeding locations and cattle to help distribute livestock better throughout the field.

The Pleasant Valley portion of the lease recovered from a wildfire that occurred on February 19, 2018. The fire started at the Pleasant Valley Campground and moved east burning all of the riparian pastures. Post fire, livestock that had not been lost were moved to the lease's irrigated pastures. There was no grazing restriction placed on the Pleasant Valley portion of the lease for 2019 due to the seven months of rest and recovery that the riparian pastures received. Utilization in 2021 was below the allowable standard in all fields except West River Field (52%). This was due to flow fluctuation in the Owens River allowing cattle to cross back and forth. No management changes were recommended.

In April 2016, LADWP constructed a 23-acre exclosure on City of Los Angeles (City) property along Horton Creek within the lease. The exclosure was subsequently reinforced in 2019.

Range Trend

Range trend transects were sampled in the summer of 2017 and were relatively stable on the RLI-461 lease. To capture the effects of the Pleasant Fire that occurred on February 19, 2018, range trend transects inside the burned area were re-read in the summer of 2018 (Tatum_01, Tatum_02, Tatum_03, Tatum_04, Tatum_05, and Tatum_06). Transects were not sampled in 2021.

Dixon Place Parcel

Northeast McCumber Field

TATUM_01 is located on a Saline Meadow Ecological Site. The transect corresponds to the Torrifluvents-Fluvaquentic Endoaquaolls Complex soil unit however the site is on an elevated terrace above the functioning floodplain and exhibits botanical characteristics similar to a Torrifluvent site (Saline Meadow). No sampling occurred in 2021.

North Horton Slough Riparian Pasture

TATUM_02 is located on a Saline Meadow Ecological site in the North Horton Slough Riparian Pasture on a Torrifluvent soil unit. Frequency trends have remained static on the site during the sampling period of 2007-2017. No sampling occurred in 2021.

Southeast McCumber Riparian

TATUM_03 is located on a Moist Floodplain Ecological Site on the Torrifluvents-Fluvaquentic Endoaquaolls Complex soil unit. No sampling occurred in 2021.

Northwest McCumber Riparian

TATUM_04 is located on a Saline Meadow Ecological Site, directly south the terrace elevation drops down to a Moist Floodplain Ecological Site. The entire area from the river north to chalk bluffs is mapped as a Torrifluvents-Fluvaquentic Endoaquaolls Complex soil unit. However the site is on a Torrifluvent soil unit. No sampling occurred in 2021.

Southwest McCumber Riparian

TATUM_05 is located on a Moist Floodplain Ecological Site on the Torrifluvents-Fluvaquentic Endoaquaolls Complex soil unit. No sampling occurred in 2021.

South Horton Slough Riparian Pasture

TATUM_06 is located on a Moist Floodplain Ecological Site on the Torrifluvents-Fluvaquentic Endoaquaolls Complex soil unit. No sampling occurred in 2021.

Irrigated Pastures

Watershed Resources staff has been working with the lessee to improve irrigated pasture condition scores since 2007. One of the main problems on the lease was water management and availability which was being impeded by old irrigation diversions and lack of water supply. A new irrigation schedule was implemented and maintenance and repairs to ditches and head gates has improved irrigated pasture condition scores.

Stockwater Sites

There are no stockwater sites planned for the ST Ranch Lease. Stockwater is provided by the Owens River and irrigation diversions on the lease.

Fencing

Interior fencing was destroyed during the Calvert Fire of 2021 when the perscribed burn escaped north beyond its original project area. This fencing was replaced by LADWP.

Salt and Supplement Sites

Feed pellets that contain trace minerals and protein are distributed for supplement on the lease.

Pine Creek Ranch (RLI-498)

The Pine Creek Lease (2,632 acres), consists of two separate leases: the Round Valley Parcel RLI-498 (1,175 acres) is located between Birchim Lane and Pine Creek Road. Forage consists primarily of irrigated pasture with a small section of Big Sagebrush Scrub. The Paradise Field RLM-486 (1,457 acres) is located west of Old Sherwin Grade Road and south of Paradise in Mono County. Forage consists of primarily Big Sagebrush Scrub with native perennial bunch grasses occurring throughout. The ranch is a commercial cattle business that also runs goats and sheep in contained pastures near the lease headquarters. The Paradise Field (RLM-486) will not be discussed in this report since it is located in Mono County.

Utilization

All pastures on the lease are irrigated. Irrigated pastures are not subject to utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

Irrigated pasture scores on the Pine Creek Ranch Lease have been consistently high, with scores ranging 90% and higher since 2007. There has been some heavy runoff from Pine Creek on above average water years. This has caused some flooding and head cuts on the irrigated pastures. The lessee has since repaired these but the potential for reoccurrence remains.

Stockwater Sites

Stockwater is provided by irrigation diversions on the lease.

Fencing

Repair to an existing boundary fence along Lower Rock Creek Road and Birchim Lane was conducted on the lease.

Salt and Supplement Sites

Cattle are fed hay and protein supplement during the winter.

3V Ranch Lease (RLI-435)

The 3V Ranch, west of Bishop is 33 acres. There are four irrigated pastures that comprise the lease and they are grazed on a rotational grazing schedule year round.

The ranch is a commercial cow/calf operation.

Utilization

All pastures on the lease are irrigated. Irrigated pastures are not subject to utilization monitoring.

Range Trend

All pastures on the lease are irrigated. Irrigated pastures are not subject to range trend monitoring.

Irrigated Pastures

Irrigated pasture scores on the 3V Ranch Lease have been consistently high since 2007. Under new management in 2010 an irrigation schedule was implemented that measured irrigation water more accurately. As a result any excess water that was received previously, is no longer available. Drought had decreased irrigated pasture scores for several years but, due an above normal water year irrigated pasture conditions have improved. Although pasture scores have increased, annual and perennial weeds continue to persist.

Stockwater Sites

Stockwater is provided by irrigation diversions on the lease.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Cattle are fed hay and protein supplement during the winter.

Reata Ranch Lease (RLI-453)

The Reata Ranch (139 acres) consists of the Fish Slough Parcel (84 acres), north of Bishop; and the Reata Parcel (55 acres) west of Bishop. The ranch is a cow/calf operation; pairs spend summer months on private property and winter on the Reata Parcel. The Fish Slough Parcel is in nonuse.

Utilization

The Fish Slough Parcel is in nonuse and the remaining pastures on the lease are irrigated. Irrigated pastures are not subject to utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

Irrigated pastures on lease are in good condition all rating 82%. There are no weed or spot grazing issues on the lease.

Stockwater Sites

Stockwater is provided by irrigation diversions and Bishop Creek.

Fencing

Routine fence repairs continue on the lease.

Salt and Supplement Sites

Cattle are supplemented with hay and protein during the winter months.

Horseshoe Bar Ranch Lease (RLI-462)

The Horseshoe Bar Ranch (329 acres) is a cow/calf operation that consists of two separate parcels: the 144-acre Sewer Parcel, which lies to the east of Bishop; and the 185-acre Dairy Parcel, which lies west of Bishop. Pastures are typically grazed during the winter months but the Sewer Parcel does get some grazing during the summer.

Utilization

All pastures on the lease are irrigated. Irrigated pastures are not subject to utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease because it lacks rangelands and is comprised of irrigated pastures.

Irrigated Pastures

Irrigated pastures were scored in 2020, all pastures rated 80%. The previous low scores were due to spot grazing, a large amount of weeds and shrub encroachment. The lessee was contacted and is working on irrigation diversions and spraying weeds. This effort has improved the pasture condition scores in all fields.

Stockwater Sites

All stockwater is provided by irrigation diversions.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Cattle are supplemented with protein tubs during the winter.

Rainbow Pack Outfit Lease (RLI-460)

The Rainbow Pack Outfit Lease (144 acres) is a commercial pack operation that grazes horses and mules. The lease consists of the Wye Road, Brockman, and Dutch John Parcels, all in the Bishop area. The Wye Road Parcel consists of the Spruce Street and the Wye Road Fields, which are separated by a ditch. The Brockman Pasture is irrigated and is located just off of U.S. Highway 395 and Brockman Lane. The Dutch John Parcel is located up the Bishop Creek drainage off of Highway 168, it currently does not receive any use.

Utilization

The Wye Road Field is the only field on the lease that requires utilization monitoring. Livestock begin grazing in January and remain in the field until a 2-inch stubble height is reached, or the Owens Valley checkerbloom (*Sidalcea covillei*) begins growing. When either one of these criteria are met, livestock are moved from the field.

Grazing by horses and mules exceeded the 2” maximum stubble height in 2021. The lessee was asked to move the livestock.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

In 2007, the Brockman Pasture was not rated because there was no grazing allowed. At that time the condition of the pasture was too poor to allow any grazing. In 2008, irrigated pasture condition improved as a result of better irrigation practices and grazing management. In the winter and spring of 2019 the lessee overgrazed the pasture and

was asked to remove the livestock. The pasture condition improved over the summer of 2019 to meet the minimum pasture condition score of 80%. Water distribution and weeds have continued to be a problem that the lessee is working on.

Stockwater Sites

Stockwater is provided by irrigation diversions.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Supplements are placed in a previously disturbed location at the north end of the Wye Road pasture.

Rockin C Ranch Lease (RLI-493)

The Rockin C Ranch (320 acres) lies east of Bishop and is used to graze cattle and five to ten horses. The livestock spend the summer on the Sewer Farm Pasture (RLI-462). Grazing occurs on the Sewer Farm Pasture, Holding Pasture and Little Horse Pasture, all of which are irrigated pastures.

Utilization

The lease is comprised of irrigated pastures and dry grazing. Irrigated pastures are not subject to utilization monitoring. The dry grazing portions on the lease do not have sufficient forage to warrant utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

Irrigated pastures Rain Gun (80%) and Little Horse (84%) rated at or above the irrigated pasture standard in 2019.

Stockwater Sites

Stockwater is provided by irrigation diversions, water troughs, and the Kingsley Ditch.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Cattle and horses are fed hay in the winter along with cake and salt blocks.

Rafter DD Ranch Lease (RLI-439)

The Rafter DD Ranch (80 acres), is located east of Bishop. The Bishop Parcel consists of irrigated pastures and some dry grazing located in the Desert Field.

Utilization

The Mare Pasture, Pasture 1, Pasture 2, and Pasture 3 are all irrigated. Irrigated pastures are not subject to utilization monitoring. Dry grazing fields within this lease do not have sufficient forage to warrant utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

Irrigated pastures Mare (86%), Pasture 1(80%), and Pasture 2 (68%) were rated in 2019. The low pasture condition score in Pasture 2 was a result of overgrazing during the growing season. Cattle were left on the lease year round with all gates open to all pastures allowing livestock to continually graze the pastures while irrigation was in progress. This management did not allow the pastures to recover and grow. This caused over grazing and all livestock were removed from the lease. The lease has not been grazed since 2020, except for the Mare pasture.

Stockwater Sites

All stockwater is provided by irrigated diversions or troughs.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Hay and salt are provided for horses and mules on the lease during the winter.

Frontier Pack Lease (RLI-426)

The Frontier Pack Lease (160 acres) is located in Round Valley, one mile west of U.S. Highway 395 on Pine Creek Road. Vegetation on the lease is comprised entirely of irrigated pastures (159 acres). The lease grazes 50-100 horses and mules.

Utilization

All pastures on the lease are irrigated. Irrigated pastures are not subject to utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

Irrigated pastures were evaluated in 2019. All pastures scored above 80% except for the Corral Holding (74%), Schober (74%), and South Schober (74%) pastures. These pastures rated low due to willow and cattail encroachments caused by consistently elevated groundwater levels. The lessee plans to mow shrubs within pasture interiors and herbicide treat cattails to gain better control. Saturated soils make mechanical control difficult in some locations. However, existing wildlife habitat also provides refuge and foraging opportunities to a multitude of plants, small mammals, ungulates, insects and birds. All pastures will be evaluated in 2022.

Stockwater Sites

All stockwater is provided by irrigated diversions or troughs.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Hay and salt are provided for horses and mules on the lease during the winter.

Quarter Circle B Ranch Lease (RLI-404, 413)

The Quarter Circle B Ranch (1,129 acres) lies west of Bishop and is a cow/calf operation. The RLI-404 portion of the lease produces alfalfa or grass hay, the stubble is subsequently grazed by cattle and horses in the winter. The RLI-413 portion of the lease consists of irrigated and dry grazing fields which are which are both primarily grazed by cattle.

Utilization

The lease is comprised of irrigated pastures and dry grazing. Irrigated pastures are not subject to utilization monitoring. Dry grazing fields within this lease do not have sufficient forage to warrant utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

Pasture condition scores have been consistently below or at the minimum standard of 80%. These pastures rate continually low, due to a lack of consistent irrigation, weed control, and sucker elm tree growth. The lessee has been working on removing the elm trees and treating the weeds. They have also been working on different irrigation

strategies to improve pasture condition. Yearly evaluations of the lease will continue to be made until pasture conditions improve.

Stockwater Sites

Stockwater is provided by irrigation ditches when livestock are present.

Fencing

There are no new fencing projects planned for the lease beyond regular maintenance.

Salt and Supplement Sites

Hay and protein supplement are fed to the cattle during the winter months.

CT Ranch Lease (RLI-412, 451,500)

The C-T Ranch (6,055 acres) consists of three different leases. The Chance Ranch Lease RLI-451 (1,040 acres) is located in Round Valley. The first parcel (569 acres) in this lease is located approximately 10 miles northwest of Bishop, east of Rock Creek Road, and north of Birchim Road. The second Parcel (471 acres) consists of the Roberts Ranch, north of Pine Creek Road and west of Rock Creek Road; and the Evans Ranch west of U.S. Highway 395 and south of Pine Creek Road. The Sunland Parcel RLI-500 (249 acres) is southwest of Bishop and west of Sunland Road; and the Patch Parcel (4,766 acres) is 13 miles northeast of Bishop in Mono County, near Chalfant Valley. The livestock program is a commercial cow/calf operation.

Utilization

All of CT Ranch pastures within Inyo County are irrigated. Irrigated pastures are not subject to utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

All of the pastures on the CT Ranch are well above the required irrigated pasture condition score of 80%. Irrigated pastures will be rated again in 2022.

Stockwater Sites

All stockwater is provided by irrigation diversions or perennial streams.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Hay and protein supplement are fed on a seasonal basis, and sites are rotated.

Mandich Ranch Lease (RLI-424)

The Mandich Ranch (163 acres) southwest of Bishop is a cow/calf operation.

Utilization

All Mandich Ranch Lease pastures are irrigated. Irrigated pastures are not subject to utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

Irrigated pastures on this lease have consistently scored high since 2007. The lessee routinely mows, sprays weeds and drags all pastures. All pastures rated above the irrigated pasture condition score of 80%.

Stockwater Sites

All water is provided by irrigation diversions.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Hay and protein supplements are fed during the winter and all feed sites are rotated.

LI Bar Ranch Lease (RLI-487)

The LI-Bar Ranch Lease (684 acres) consists of two separate parcels: the South Bishop Place, which lies to the southeast of Bishop, east of U.S. Highway 395; and the Hess Place, which is west of Bishop, south of west Line Street, and east of Barlow Lane. The LI Bar Ranch is a commercial cow/calf operation.

Utilization

The LI Bar Ranch lease is comprised of irrigated pastures and upland vegetation. Irrigated pastures are not subject to utilization monitoring. The upland portion of the lease is comprised of shrubs and annual vegetation. Dry grazing fields within this lease do not have sufficient forage to warrant utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

All irrigated pastures on the lease have consistently been at or above 80% since 2007. Irrigated pastures were rated in 2019 and scored above 80%.

Stockwater Sites

All stockwater is provided by irrigation diversions and the Bishop Creek Canal.

Fencing

There were no new fencing projects on the lease.

Salt and Supplement Sites

Cattle are supplemented with hay pellets and protein tubs.

U-Bar Ranch Lease (RLI-402)

The U-Bar Ranch Lease (407 acres) lies south of Bishop, east of U.S. Highway 395 and is a cow/calf operation. The ranch is comprised of irrigated pasture and abandoned agriculture used for dry grazing.

Utilization

All pastures are either irrigated or abandoned agriculture. Irrigated pastures are not subject to utilization monitoring. Dry grazing fields within this lease do not have sufficient forage to warrant utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

The irrigated pastures on the lease are managed by mowing and spraying weeds, this has kept them in good condition since 2007. Irrigated pastures were rated in 2019 and scored above 80%.

Stockwater Sites

Stockwater is provided by irrigation diversions.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Hay and protein supplement are fed to the cattle during the winter months. Feeding areas are rotated periodically for cattle health and to minimize grazing impacts.

Round Valley Ranch Lease (RLI-483)

The Round Valley Ranch Lease (19,780 acres) is a commercial cow/calf operation. The Round Valley Ranch is broadly distributed across several different locations within the Owens Valley. In the Big Pine area, the lease consists of 13 separate pastures. The southernmost pasture lies on the east side of the Owens River and extends from Tinemaha Reservoir, on the south, to U.S. Highway 168, on the north. On the east side of the Owens River, the lease extends from north of Steward Lane to north of Klondike Lake. The Round Valley portion of the ranch, approximately eight miles northwest of Bishop, consists of 22 pastures/fields. The Buttermilk portion of the ranch lies approximately eight miles west of Bishop, and consists of eight pastures/fields.

There are five pastures on the Round Valley Ranch lease within the MORP boundary. The East Side Riparian, East Side River Field, Hole Pasture, River Pasture, and Zurich Riparian are all located in the Big Pine portion of the lease.

Utilization

The end-of-season utilization for RLI-483 was light. Grazing in the East Side Riparian (0%), Zurich Riparian Pasture (10%), East Side River Field (1%), Hole Field (0%) and River Riparian (21%) were all below the allowable utilization standard of 40%.

Range Trend

Range trend transects were not scheduled for monitoring in 2021.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

No new stockwater sites were developed on the lease in 2021.

Fencing

A new cross fence to separate the riparian and upland portion of the Zurich Pasture from the irrigated portion to the west was completed in 2019.

Salt and Supplement Sites

Hay and protein supplement tubs are used during the winter. Supplement sites are rotated regularly to improve livestock distribution and reduce impacts to supplement sites.

Big Pine Canal Lease (RLI-438)

The Big Pine Canal Lease (9,441 acres) is made up of the Canal and Coyote Mountain Parcels. The Canal Parcel (9,084 acres) lies south of the City of Bishop, along U.S. Highway 395. The Coyote Mountain Parcel (357 acres) includes three fields north of Baker Creek that are surrounded by U.S. Forest Service land. The livestock operation is a cow/calf operation.

Utilization

Grazing was below the allowable standard of 40% throughout the North 40 (36%) and South 40 (23%) Fields.

Range Trend

Range trend monitoring was not scheduled for this lease in 2021.

Irrigated Pastures

All irrigated pastures on the lease have consistently rated well. Sanger and Cow Creek are high altitude meadows located on the Coyote Flat and irrigation water comes from spring flow and snow melt. Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

One stockwater well is located in the Horse Field and provides water for the Old Bull, North 40 Pasture, and Horse Fields. The lessee also installed several new troughs and stock tanks in 2021.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Hay and mineral supplement are fed during the winter months. Supplemental feeding sites are rotated regularly to improve livestock distribution and reduce impacts to supplement sites.

Cashbaugh Ranch Lease (RLI-411)

The Cashbaugh Ranch Lease (23,602 acres) is located around the eastern edges of Bishop, extending south to Big Pine on the east side of the Owens River. The lease is a commercial cow/calf operation.

Utilization

Utilization was below or at the allowable 40% standard in 2021 with the Laws River Field (10%), East of the River Field (0%), Slough Field (6%) and Bishop Creek Field

(12%). The lessee's continued effort to keep gates closed in the Warm Springs Holding Field and East of the River Field has made a significant difference in utilization. There was no utilization in the Ears Field.

Range Trend

Range trend transects on the Cashbaugh Ranch were sampled in 2007, 2009, 2010, 2012, 2015,2019, and this year in 2021.

Laws River Field

CASHBA_07 is located on a Torrifluvents, 0-2% slopes soil unit, Saline Meadow ecological site. Plant frequencies remained static over the past seven sampling events.

CASHBA_08 is located on a Torrifluvents, 0-2% slopes soil unit, Saline Meadow ecological site. The site remained stable in 2021.

Bishop Creek Field

CASHBA_02 is located on a Torrifluvents, 0-2% slopes soil unit, Saline Meadow ecological site. Plant frequencies remained static over the past seven sampling events.

CASHBA_04 is located on a Torrifluvents, 0-2% slopes soil unit, Saline Meadow ecological site. Baltic rush continued to decline on the site while beardless wildrye has significantly increased on the site outside of the range previously observed. Shrub cover has increased on the site.

CASHBA_06 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, Moist Flood Plain ecological site. The site was not read in 2021 because the area has remained relatively static during past sampling events and based on ocular evaluation did not appear to have undergone any substantial changes from earlier conditions.

CASHBA_09 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, Moist Flood Plain ecological site. Saltgrass (DISP) significantly increased in 2018 on the site and then decreased in 2021. All other species were undeviating from prior events.

White Mountain Field

CASHBA_12 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, Moist Flood Plain ecological site. Plant trends have remained static on the site over the past seven sampling events.

CASHBA_14 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, Moist Flood Plain ecological site. The transect was not read in 2021. Efforts concentrated on monitoring CASHBA_12, 600m northwest and situated in a similar plant community in the same pasture.

Warm Springs Holding Field

CASHBA_15 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, Moist Flood Plain ecological site. The site has resembled almost near identical conditions observed in 2018.

Slough Pasture

CASHBA_17 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, Moist Flood Plain ecological site. Saltgrass significantly declined in 2018 but remained with the historic range while other plant frequencies remained static. Shrub cover has remained relatively unchanged since 2007. Because of the stability of the site, no evidence of any dramatic changes occurring in the area and close proximity to CASHBA_23 the transect was not read in 2022.

CASHBA_23 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the Slough Pasture. Plant trends have remained static over the past six sampling events although saltgrass did decline in 2021.

East of the River Field

CASHBA_24 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, Moist Flood Plain ecological site. Saltgrass (DISP) and alkali sacaton (SPAI) have both shown long term declines on the site.

Warm Springs Pasture

CASHBA_25 is located on the NUMU Loam, 0-2% slopes soil series, Saline Bottom ecological site. The saltgrass and alkali sacaton declined significantly in 2021, likely in response to drought conditions. Grazing rarely occurs in these areas.

Ears Field

CASHBA_19 is located on the NUMU Loam, 0-2% slopes soil series, Saline Bottom ecological site. Alkali sacaton and saltgrass declined significantly in 2021 on this site. The probable driver behind this is the recent drought.

CASHBA_22 is located on the NUMU Loam, 0-2% slopes soil series, Saline Bottom ecological site. Species have been static over the last four sampling periods. This transect was not sampled in 2021 because of it's similarities to CASHBA_19.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

No additional stockwater sites are planned for RLI-411.

Fencing

A quarter acre extension (holding pen) to an existing operating structure located on Laws Poleta Road was constructed in 2017.

Salt and Supplement Sites

Hay and Protein supplement tubs are fed during the winter months. Supplemental feeding sites are rotated regularly to improve livestock distribution and reduce impacts to supplement sites.

Warm Springs Ranch Lease (RLI-497)

The Warm Springs Lease (4,161 acres) lies southeast of Bishop, north of Warm Springs Road, between U.S. Highway 395 and the Owens River. The ranch operates a commercial cow/calf operation.

Utilization

Utilization was below the allowable standard of 40% on the River Field (5%) and White Mountain Field (41%). Although utilization is technically above the allowable standard there are no management changes recommended.

Range Trend

Range trend transects were not scheduled for monitoring in 2021.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

No additional stockwater wells are planned for the lease.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Cottonseed meal and protein supplement tubs are fed during the winter months at rotated supplement sites.

Reinhackle Ranch Lease (RLI-492)

The Reinhackle Ranch Lease (5,563 acres) consists of three separate parcels: the Reinhackle Parcel, which lies to the east of Bishop and south of U.S. Highway 395; the Five Bridges Parcel, which is north of Bishop and west of Five Bridges Road; and the Laws Parcel, which lies west of U.S. Highway 6 and east of Five Bridges Road.

Utilization

Utilization in the Laws Holding Riparian Field has remained below the allowable utilization standard of 40%. Utilization standards had been suspended due to a wildfire that occurred on February 19, 2018. The fire started at the Pleasant Valley Campground and moved east burning all of the riparian pastures. Post fire livestock that had not been lost were moved to the leases irrigated pastures. There was no grazing restrictions placed on the Pleasant Valley portion of the lease for 2019 due to the seven months of rest and recovery that the riparian pastures received. All fields were below the allowable utilization standard of 40% in 2021.

Range Trend

Range trend was not sampled in 2021 on this lease.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

Two stockwater wells were drilled in 2011 in the Laws area. One supplies water for the Holding Field. The second well, situated just north of the Lower McNally Canal supplies water for the northern portion of the lease.

Fencing

Fencing along the east and west side of the Multi-completion Field on the Five Bridges Parcel were rebuilt, and a new northern section was constructed following the Pleasant Fire.

Salt and Supplement Sites

Portable liquid supplement stations are used during the winter. These stations are placed in designated areas outside the riparian corridor and are periodically moved.

Four J Cattle Ranch Lease (RLI-491, RLI-499)

The 4-J Ranch Lease consists of two different ranches. The Big Pine Ranch (RLI-491) contains approximately 10,993 acres, and is located near the community of Big Pine. The Laws Ranch (RLI-499) contains approximately 1,197 acres and lies north of Laws,

between U.S. Highway 6 and the Upper McNally Canal. The Big Pine Lease (RLI-491) is comprised of the Baker Creek area near Big Pine and the Twin Lakes area near Blackrock. The majority of the mature breeding cattle graze in the Owens Valley in winter and summer in Long Valley. However, there are small herds that graze the Laws Ranch and Baker Creek Ranch periodically throughout the year. Cattle that graze on the Long Valley and Baker Creek leases also utilize adjacent federal grazing allotments.

The Big Pine portion of the lease consists of irrigated pastures with the surrounding fields being a mix of native alkali sacaton meadows and dry uplands. Cattle typically graze from late October to early May. The duration of grazing may vary from year to year dependent upon forage conditions in Long Valley. During the grazing season cattle are moved using the best pasture rotation strategy.

The Laws Ranch consists entirely of irrigated pastures. Cattle graze the ranch on a year round basis under various stocking rates that are dependent upon available forage.

Utilization

All grazing on the lease occurs on irrigated pastures or federal grazing allotments. Irrigated pastures are not subject to utilization monitoring. The Twin Lakes portion of the lease is part of the LORP which will be discussed later in this report.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80% except for the Fish Springs Pasture (78%). The low score was mainly due to invasive species of Sand Burs and Love Grass. The lessee is working on planting different rotational crops and weed wiping herbicide to control the invasive species.

Stockwater Sites

All stockwater is provided by irrigation diversions, the Big Pine Canal, Baker Creek, and Big Pine Creek for RLI-491. Laws RLI-499 is supplied by Silver Canyon or the Upper McNally Canal or troughs.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Hay and liquid supplement are used during the winter.

Independence Ranch Lease (RLI-416, 454, 455)

The Independence Lease (9,619 acres) consists three leases in Inyo county; one in Big Pine and two in the Independence area. The Big Pine lease (4,630 acres) consists of seven irrigated pastures and a large upland/riparian pasture. The Independence Lease consists of the Springfield's Parcel and the Shepherd Creek Parcel. The Springfield's Parcel (4,674 acres) consists of 13 pastures (plus a county landfill, several revegetation sites, and livestock corrals) east of U.S. Highway 395 and west of the Los Angeles Aqueduct near the town of Independence. The Shepherd Creek Parcel (315 acres) is an irrigated alfalfa field and hay yard west of U.S. Highway 395 and north of the Manzanar National Monument.

Utilization

Utilization has increased in the South River Field mainly due to a change in management in 2010. The utilization increased under the new lessee and was over utilized for several years. Since 2010, the lessee has been working with Watershed Resources staff to decrease utilization. More frequent pasture rotation along with changing the timing of the grazing has resulted in 2019 utilization in the South River Field of 36%. Utilization in 2017/18 on the Manzanar Field (Ind_65) exceeded 65% with a total use of 79% for the upland transect. The lessee opted to not stock the pasture and let the area rest during the 2018/19 grazing season. Utilization was below the allowable standard of 40% in 2021.

Range Trend

Range trend transects were monitored in 2018 on the Big Pine section and the Independence section of the Independence Ranch Lease.

South River Field

4J_02 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, Moist Flood Plain ecological site. Trends have remained static over the past seven sampling events.

4J_03 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, Moist Flood Plain ecological site. Trends have remained static over the past seven sampling events.

4J_04 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, Moist Flood Plain ecological site. Overall trend is static on the site.

Manzanar Field

INDEP_65 is located on the Winnedumah Fine Sandy Loam, 0-2% slopes, Sodic Fan ecological site. Shrub cover has remained static over the past ten sampling events. Alkali sacaton decreased significantly in 2021.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

Stockwater is provided by irrigation diversions or the Owens River.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Cake blocks that contain trace minerals and protein are distributed for supplement on the lease.

Rockin DM Ranch Lease (RLI-420)

The 110-acre Rockin DM Ranch Lease west of Big Pine is a cow/calf operation. The ranch is located on the south side of the Baker Creek Road and contains one irrigated pasture and two dry grazing fields.

Utilization

All pastures on the lease are either irrigated or dry grazing. Irrigated pastures are not subject to utilization monitoring. Dry grazing fields within this lease do not have sufficient forage to warrant utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

Stockwater is provided by irrigation diversions.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Cake blocks that contain trace minerals and protein are distributed for supplement on the lease.

Baker Road Ranch Lease (RLI-475)

The Baker Road Ranch Lease is managed in conjunction with the lessee's other LADWP ranch leases in the LORP project area. The lease grazes horses and mules that are used in a commercial packer operation. The Baker Road Ranch Lease (391 acres) is comprised of nine irrigated pastures and two mountain meadows. The Fuller and Saulk mountain meadow portions of the lease are located at the base of Kid and Birch Mountains and are naturally irrigated by annual spring flows. These meadows are also grazed by pack stock during the summer.

The 185-acre Intake Pasture lies to the west of the Owens River and the LAA at the Intake. The 104-acre Big Meadow Pasture lies to the east of the Owens River, north of the Intake and east of the LAA below the Intake. These areas are inside the LORP project area.

Utilization

Utilization on the Intake portion (LORP) of the Baker Road Ranch has been well below the allowable riparian utilization standard of 40%. There are no management changes planned the lease.

Range Trend

Because of the small area of meadow on the Intake Pasture the initial range trend transect had been decommissioned. If conditions decline on the site the transect monitoring will resume.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater

Stockwater is provided by irrigation diversions, springs and the Owens River.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement

No salt supplements are used by the lessee.

Aberdeen Pack Lease (RLI-479)

The Aberdeen Lease is used to graze horses and mules used in a commercial packer operation. The lease (3,081 acres) is made up of the Hines Spring and Haystack Parcels. The Bairs Parcel is a use permit and is managed in conjunction with this ranch

lease. The Hines Spring Parcel includes the area from the Blackrock Fish Hatchery north to Hines Spring. This is an upland area and utilization is set at 65% for all fields. There are three fields in this portion of the lease. The Haystack Parcel borders the east side of the town of Independence. The Independence sewer treatment facilities border the northeast corner of the parcel. The lessee uses the parcel to raise alfalfa and graze pack stock. There are 16 pastures and operating structures in the lease.

Utilization

Utilization on the Aberdeen lease has been below the allowable utilization standard of 65% since 2007.

Range Trend

Hines Spring Exclosure

ABERDEEN_30 is on a Winnedumah Silt Loam 0-2% slopes, Sodic Fan ecological site. Trends across the ten sampling periods appear static with the exception of a significant decline in alkali saltgrass. Shrub cover has dramatically increased from 2003 with 9% cover to 70% cover in 2018 but had decreased to 39% in 2021 because of the drought conditions.

Pipeline Field

ABERDEEN_33 is on a Pokonahbe Loamy fine Sand, 0-2% slopes, Saline Bottom ecological site. Because of the static nature of the site and limited staffing, only a site photo was taken.

Irrigated Pastures

Irrigated pastures were monitored in 2019. The North (78%), Middle (78%), and South (74%) were below the irrigated pasture standard of 80%. The pastures were below the standard due to summer grazing and weeds. The lessee is making management changes to improve pasture. These pastures will be evaluated again in2022.

Stockwater Sites

Since the implementation of the Hines Spring Well 355 Mitigation Project in 2012 stock no longer water at Aberdeen Ditch.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Pack stock is supplemented with hay and trace mineral blocks if needed by the lessee.

Coloseum Ranch Lease (RLI-407)

The Coloseum Ranch Lease lies West of Lone Pine in the Alabama hills, and south of the Blackrock Fish Hatchery and Eight Mile Ranch on the west and the east side of U.S. Highway 395. The ranch grazes horses on the Lone Pine portion of the lease (Movie Field) and cattle on the Blackrock portion of the lease (South East Field). Cattle graze the South East Field in the fall, winter and summer on federal grazing allotments.

Utilization

Utilization on the Coloseum Lease in 2021 was below athe allowable level of 65% in all fields except Southeast Field (77%). The lessee agreed to rest the field for one year.

Range Trend

South East Pasture

COLOSEUM_38 is on a Shondow Loam 0-2% slopes, Saline Meadow ecological site. The transect is located in the South East Pasture in the Sawmill parcels of RLI-407. Trends across the seven year period appear static with the exception of alkali sacaton (SPAI) which did significantly decline compared to 2015 but still remains inside the historic range in 2018. However in 2021 alkali sacaton declined drastically. The pasture was overgrazed in 2020-21 and was rested one year. Frequency of rubber rabbit brush (ERNA10) did increase significantly in 2018 but was not similarly reflected in line intercept cover at that time. ERNA10 cover has since increased from 5% to 15%. This is likely an artefact of the high germination experienced in 2017.

Movie Field

COLOSEUM_02 is on a Dehy-Conway-Lubkin association, 0-9% slopes, SalineMeadow ecological site. This transect is located in the Movie Filed on the Mt. Whitney Parcels of RLI-407. Trends across the six sampling periods have been static. The transect was not read in 2021 because of the relatively static trends in the past and the minimal use by livestock in the pasture.

Irrigated Pastures

There are no irrigated pastures on the Coloseum Ranch Lease.

Stockwater Sites

Stockwater is provided by a diversion coming off Sawmill Creek.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Hay is fed during the winter, no other supplements are used.

Three Corner Round Lease (RLI-464)

The Three-Corner-Round Ranch Lease (1,792 acres) is east of Aberdeen, between new and old U.S. Highway 395, and is leased to the Three-Corner-Round Pack Outfit. The ranch grazes burros that are used during the summer months for youth camp and pack trips in the Sierra Nevada Mountains. The fields are upland vegetation.

Utilization

There are no utilization transects for this lease due the composition of the vegetation. There are no perennial grasses and the bulk of the vegetation is made up of sagebrush, Nevada Saltbush, and annuals. The burros forage on the shrubs and annuals when available in the Spring. If needed they are supplemented with hay during the winter. The lease was evaluated in 2022 and was found to be in good condition with current stocking rates.

Range Trend

There are no range trend transects on the lease. Grazing pressure is relatively low and the xeric plant communities appear to be in good condition. If a decline from current conditions is observed then a range trend monitoring program for the lease will be initiated.

Irrigated Pastures

There are no irrigated pastures on the lease.

Stockwater Sites

Stockwater is provided from well V108 and Goodale Creek

Salt and Supplement Sites

Hay is fed throughout the year, no other supplements are used.

Fencing

No new fencing projects occurred on the lease in 2019.

Eight Mile Ranch Lease (RLI-408)

The 770-acre Eight-Mile Lease is operated as a commercial packer operation and uses the ranch to graze pack stock during winter and grow alfalfa hay during the summer. The lease is located south of Aberdeen, bordered on the east by U.S. Highway 395. Horses and mules graze the hay stubble in the fall and winter, if precipitation allows spring grazing will occur on the upland portions of the lease. The lease includes an alfalfa field, a small partially irrigated field (Tree Lot), two small fields (Yearling and Feed Lot) and six large fields (Upper North, Lower North, West, Upper South, Lower

South and Willow Fields) that are not irrigated. A corral and a stockyard complete the lease.

Utilization

There are no utilization data for the upland fields on the lease as they are recovering from the 2007 Inyo Complex fire. The South Field was partially burned. Utilization transects have been established in this field, which has perennial grass components and monitoring is planned once grazing resumes.

Range Trend

There are no range trend transects on the lease. Grazing pressure is relatively low the xeric plant communities appear to be in good condition. If a decline from current conditions is observed then a range trend monitoring program for the lease will be initiated.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement

When necessary, hay is provided to livestock during the winter months.

Fort Independence Ranch Lease (RLI-406,489)

The Fort Independence Lease includes 3,849 acres covered by RLI-406, and 1526 acres covered by RLI-489. The Fort Independence Lease is managed in conjunction with the Islands (north of Lone Pine); Delta (south of Lone Pine); Georges Creek (northwest of Lone Pine); Archie Adjunct (south of Owens Lake); and Lubkin Adjunct (south of Lone Pine) grazing leases. The livestock program is a commercial cow/calf operation.

Utilization

The Fort Independence lease is comprised entirely of irrigated pastures. Irrigated pastures are not subject to utilization monitoring.

Range Trend

The Fort Independence lease is comprised entirely of irrigated pastures. Irrigated pastures are not subject to range trend monitoring.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

Stockwater is provided by irrigation ditches and diversions.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Mineral tubs or cake blocks are used to supplement feed in designated areas.

Georges Creek Parcel (RLI-489)

The Georges Creek Parcel (4,000 acres) is a cow/calf operation in conjunction with a surrounding BLM grazing allotment. This parcel borders BLM land to the west, U.S. Highway 395 to the east, the Moffat Ranch to the south, and the Shepherd Creek alfalfa field to the north. The parcel is presently managed as four pastures.

The Georges Creek parcel is managed in conjunction with the Fort Independence Lease, the Islands (north of Lone Pine); Delta (south of Lone Pine); Archie Adjunct (south of Owens Lake); and Lubkin Adjunct (south of Lone Pine) grazing leases. The livestock program is a commercial cow/calf operation.

Georges Pastures #1 and #2 are irrigated and the perimeters are fenced. The North Field, north and west of Manzanar, is not fenced separate from BLM lands. This pasture is grazed with the adjacent BLM grazing allotment and has no utilization transects in it. The South Field is located between Moffat Ranch and Georges Creek irrigated pastures. It also borders BLM land and has no fences, so it is managed the same as the North Field. The only portion of the parcel presently fenced is the irrigated pasture in the center western edge of the parcel. A small corral near Georges Creek along the west boundary of the parcel is used to work cattle.

Utilization

Utilization on the Georges Creek Parcel has been within the upland standard of 65%. Grazing has been moderate to light for the past eight years.

Range Trend

Range trend transects have not been monitored since 2014 because of the relatively static trends in the past and minimal use by livestock.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

Stockwater is provided by Georges Creek, irrigation ditches and diversions.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Mineral tubs and cake blocks are used to supplement cattle in designated areas.

Lone Pine Dairy Lease (RLI-452)

The Lone Pine Dairy Lease (80 acres) is south of Lone Pine, north of the Lone Pine Golf Course, and west of U.S. Highway 395. The Lone Pine Dairy Lease grazes stocker steers and heifer pairs.

Utilization

The lease is comprised entirely of irrigated pastures. Irrigated pastures are not subject to utilization monitoring.

Range Trend

The lease is comprised entirely of irrigated pastures. Irrigated pastures are not subject to range trend monitoring.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

Stockwater is provided by irrigation diversion and water troughs.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

All salt and supplemental feeding is in designated areas away from any riparian areas.

Mount Whitney Pack Lease (RLI-495)

The Mount Whitney Ranch (626 acres) consists of the Diaz Parcel (146 acres), south of Diaz Lake and Lone Pine; and the Tuttle Parcel (480 acres), west of Lone Pine, and is periodically used for horses/mules.

Utilization

The Tuttle Field is rarely grazed. Most use typically occurs from wildlife. Monitoring will continue regardless of grazing frequency. Utilization in 2021 was again below the standard 65%.

Range Trend

Range trend transects were not scheduled for monitoring in 2021.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

There were no stockwater sites implemented on the Mount Whitney Lease. Stockwater is provided by the irrigation ditches and diversions.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

All salt and supplemental feeding is in designated areas.

Horseshoe Ranch Lease (RLI-480)

The 2,966-acre Horseshoe Grazing Lease (RLI-480) is comprised of the Lake and Cottonwood Parcels. The Cottonwood Parcel, located on the Kern Plateau at 10,000 feet elevation, is being grazed under USDA Forest Service grazing prescriptions. The lower elevation Lake Parcel borders the southwest side of Owens Lake.

Lake Parcel

The Lake Parcel includes a portion of what was once the Owens lakebed and later the shoreline of Owens Lake. The 1,956-acre parcel lies west and east of U.S. Highway 395, about 24 miles south of Lone Pine near lower Cottonwood Creek. Some of the lease lies west of U.S. Highway 395 (West Field), while most of the forage lies east of U.S. Highway 395, in the East Field. Only very dry vegetation types (i.e., Creosote bush) survive on the west side. The eastern part of the lease lies along a remnant wind wave-formed shoreline of Owens Lake.

The majority of the livestock forage occurs along a north-south running fault that forces underground water to the surface along an old lakeshore contour. Springs emerge from the fault forming open water ponds, marshes, and wet and dry meadows. The springs all drain eastward and disappear in the "old" lakebed.

Utilization is not measured on this portion of the lease due to species composition of the vegetation around the spring. Annual monitoring of seeps and springs is conducted.

Cottonwood Parcel

The Cottonwood Parcel lies in high elevation hills with topography heavily modified by snow and ice during past glacial periods. These rolling hills enclose grassy, high elevation meadows. A Forest Service trailhead and camping area borders the parcel on the north and serves as a "jump-off" point for recreationists to the Golden Trout Wilderness. City lands, totaling 1,010 acres, abut the south end of the trailhead parking and camping area. City lands are scattered in separate sub-parcels surrounded by Forest Service lands. These sub-parcels lie in and around Horseshoe Meadows, two parcels are in or around Round Valley Meadows, and the last and largest sub-parcel is in Last Chance Meadow, with Cottonwood Creek flowing through it. The Last Chance Meadow area is classified as a "Research Natural Area." All LADWP meadows being grazed in this parcel are approximately 10,000 feet in elevation.

Horseshoe and Round Valley Creeks flow through City lands and merge downstream with Cottonwood Creek. The Golden Trout Wilderness surrounds City lands.

Since these parcels are surrounded by the national forest and there are no fences, the parcels are managed under federal grazing guidelines.

Utilization

Utilization standards fall under USFS management guidelines.

Range Trend

Vegetation monitoring is conducted by the USFS.

Irrigated Pastures

There are no irrigated pastures on the Cottonwood Parcel. Naturally irrigated meadows are managed by the USFS.

Stockwater Sites

Stockwater is provided by riparian streams and springs.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

All salt and supplemental feeding is in designated areas.

Archie Adjunct (RLI-490)

The Archie Adjunct Lease comprises about 627 acres and is managed in conjunction with the LADWP leases at Islands, Delta, Georges Creek, Fort Independence, and Lubkin, as well as the lessees' private land. The Archie Adjunct Lease is located just north of Olancha, lying on both sides of U.S. Highway 395 and south of the Crystal Geyser Bottling Plant. The lease borders the Homeplace Lease to the south and BLM land to the west and north. The lease is divided into one pasture, two fields, a corral, and holding pen. The Archie Pasture east of U.S. Highway 395 is irrigated exclusively from Cartago Creek through a water delivery pipeline. A 17-acre marsh along the east side of the Archie Pasture has formed in response to irrigation run-off.

In 1989, mudslides covered large parts of the North Field and eliminated large forage areas. The North Field is used in the Spring to hold livestock prior to going to a Forest Service grazing allotment for summer grazing and again in the fall when they return from the Forest Service grazing allotment.

Utilization

The Archie Adjunct is comprised primarily of irrigated pastures and dry grazing. Irrigated pastures are not subject to utilization monitoring. Dry grazing fields within this lease do not have sufficient forage to warrant utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

There are no new stockwater sites planned for the lease.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Supplement cake tubs are used in designated sites.

Olancha Creek Adjunct (RLI-427)

The Olancha Creek Adjunct Lease (RLI–427) is managed in conjunction with the Lone Pine Lease (RLI–456) in the Lower Owens River area. The lessee manages the Olancha Creek Adjunct Lease in combination with the Ash Creek BLM allotment located between Cartago and Lone Pine, and the Monache Meadows Forest Service allotment in the southern Sierras.

The lease has been used as a staging area for cattle coming to and from the Lower Owens River area on their way to graze Forest Service lands in the southern Sierras. The lessee typically sends cows with calves to the Forest Service's Monache Meadows on July 1 and grazes this allotment until about October 1. Animals are taken to the Lone Pine area for the winter.

The lease lies in Olancha and is bisected by U.S. Highway 395. Saltgrass-sacaton meadow, irrigated pasture, and semi-desert shrub vegetation types are prominent. The lease shares a common boundary with the Homeplace Lease to the north. The Olancha Creek Adjunct Lease is made up of seven fields and pastures (269 acres).

There are 56 acres on the lease irrigated with water diverted from Olancha Creek. Both Olancha Creek and the diversion ditch need frequent cleaning to allow sufficient water to reach irrigated lands. The irrigated pastures are used to grow livestock forage. No grass hay or alfalfa hay is produced on the lease. All four Esta fields and most of the two Oesta Fields are irrigated. The West Field, east of the Olancha Creek Diversion Ditch, is abandoned agricultural land that is not grazed except for two days in October and one day in the Spring for weed control. The West Field, west of the diversion ditch, is semi-desert shrubland.

Utilization

The majority of the lease is comprised primarily of irrigated pastures and dry grazing. Irrigated pastures are not subject to utilization monitoring. Dry grazing fields within this lease do not have sufficient forage to warrant utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80% except Oesta 1(76%). This was due to high runoff in the Spring of 2019 that washed sand all over the field and covered up the pasture and rabbit brush encroachment. The rabbitbrush was mowed during the fall of 2019 and grasses are colonizing the sanded areas. Oesta 1 was monitored in 2020 and was 80%, this pasture will be monitored again in 2022.

Stockwater Sites

Stockwater is provided by irrigation ditches and troughs located in the pastures.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Cake mineral and protein tubs are put out during the winter. Supplement tubs are rotated through the pastures to minimize impacts across all supplement areas.

Homeplace Adjunct (RLI-428)

The Homeplace Adjunct Lease is located just north of Olancha, between the Olancha Creek Lease to the south and the Archie Lease to the north. The lease consists of 14 pastures and fields. The lease is bisected by U.S. Highway 395. Two small fields (Little Bull and South Fields) are west of the highway. About a third of the lease is irrigated grass pasture (207 acres) east of the highway. No irrigated grass hay or alfalfa hay is harvested on the lease.

The Homeplace Adjunct Lease (644 acres) is managed as part of the 32,641-acre Blackrock Lease (RLI-428). The lease is managed by Mark Lacey and John Lacey, in combination with their Blackrock Lease in the Lower Owens River area. The Homeplace Adjunct Lease was a pivotal part of the Lacey grazing operation in the past. Historically, the lease was used as a holding area for cattle herds going to and from Forest Service lands in the southern Sierras. During this holding period, the lease was nearly vacant of livestock most of the summer and fall (a 90-day period) when the herd was on Forest Service lands. The lessees sold their Forest Service permits and cattle must now either remain on the Homeplace Adjunct Lease year-round or go to another grazing property.

The lease is mainly grazed as a cow-calf operation. Olancha Creek provides irrigation and stockwater. LADWP Well 404 supplies supplemental irrigation and stockwater water when Olancha Creek flows decrease.

Livestock are fed supplements when needed. Supplemental feeding sites are rotated around the pastures to reduce trampling effects. Feeding sites are mainly on the more alkali portions of the pastures where less grass is produced. One hired person manages the grazing and irrigation on the lease year-round.

Pastures and fields are flood irrigated from April 1 to October 1 to increase livestock forage production. Most pastures are also sub-irrigated by the elevated water table resulting from irrigation. Because Gus Walker Creek recently washed out and changed channels, the stream no longer delivers water to the lease. Olancha Creek, in combination with well water, delivers water year-round for livestock. All irrigated pastures have ditches to carry the necessary livestock drinking water. Water troughs are present in all pastures that are supplemented by irrigation water. All pastures and fields are completely fenced. The lessees maintain all exterior and interior fences, which are in good to fair condition.

A proposed California Department of Transportation plan for the reconstruction and widening of U.S. Highway 395 could take the eastern side of this lease for construction of a new roadway. Most of the land identified for the proposed roadway is now irrigated pasture. The grazing plan assumes that highway relocation will not take place and there will be no infringement on the lease. If, in the future, the highway construction project takes part of the lease the plan will be modified. Cattle numbers, grazing duration, and timing will all need to be adjusted to match the lesser amount of forage available on the remaining grazing lands.

Utilization

The majority of the lease is comprised primarily of irrigated pastures with limited dry grazing. Irrigated pastures are not subject to utilization monitoring. Dry grazing fields within this lease do not have sufficient forage to warrant utilization monitoring.

Range Trend

Range trend monitoring is not appropriate for this lease.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

Stockwater is provided by irrigation ditches and troughs located in the pastures.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Supplement is comprised of hay and liquid molasses. Feeding locations are designated each year.

Blackrock Lease (RLI-428)

The Blackrock Lease is a cow/calf operation consisting of 32,641 acres divided into 26 management units or pastures. Blackrock is the largest LADWP grazing lease within the LORP area. The pastures/leases on the Blackrock Lease provide eight months of Fall through Spring grazing, which can begin any time after 60 continuous days of rest. A normal grazing season begins in early to mid-October and ends in mid-May or June.

There are 26 pastures/fields on the Blackrock Lakes lease within the LORP boundary. Twelve of these pastures are monitored using range trend and utilization. The other 14

pastures are holding pastures for cattle processing or parts of the actual operating facilities.

Utilization

The Blackrock Lease has shown a steady decline in utilization in riparian pastures since 2007. This has been due to the implementation of the Lower Owens River Project (LORP). Since the beginning of the project there has been a need to add or drop transects in the riparian pastures due to flooding. If current management of the LORP continues there will likely be a substantial loss of meadow habitat to wetlands. This will reduce viable grazing areas from the Blackrock lease portion of the LORP. It will also continue to hinder the establishment of woody recruitment.

Range Trend

Range Trend transects were not read on the Blackrock lease in 2021.

Irrigated Pastures

There is a small portion of irrigated acreage on the Blackrock lease. It is surrounded by upland vegetation and is not monitored.

Stockwater Sites

All the wells for the Blackrock lease had been drilled and fitted for solar pumps and necessary plumbing for the troughs. However, the north of Mazourka stockwater well was drilled on BLM property and is going to be removed and a new stockwater well will be drilled south of the current location. The lessee will be responsible for water trough installation. There are also three other stockwater sites that have been developed as part of the 1997 MOU, which required additional mitigation (1600 Acre-Foot Mitigation Projects). The North of Mazourka Canyon Road Project will provide stockwater in the Reservation Field and the Well 368 and Homestead Projects will provide stockwater in the Little Robinson Field and East Robinson Field.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Many of the supplement sites located on the Blackrock Lease have been in place for many years and are located in upland management areas. Some of these sites have been moved in order to adapt to the installation of new fencing. These new locations were selected as to better distribute cattle within the newly created riparian pastures.

Twin Lakes Lease (RLI-491)

The Twin Lakes Lease is a 4,971-acre cow/calf operation situated just south of the Los Angeles Aqueduct Intake. It includes a reach of the Owens River that lies mainly

north of Twin Lakes, which is located at the southern end of the Twin Lakes Lease. Of the 4,971 acres, approximately 4,200 acres are used as pastures for grazing; the other 771 acres are comprised of riparian/wetland habitats and open water. In all but dry years, cattle usually graze the lease from late October or early November to mid-May.

There are four pastures on the Twin Lakes Lease within the LORP boundary: Lower Blackrock Riparian Field, Upper Blackrock Field, Lower Blackrock Field, and the Holding Field. The Lower Blackrock Riparian, Upper Blackrock Riparian, and Lower Blackrock Fields contain both upland and riparian vegetation. The Holding Field contains only upland vegetation. There are no irrigated pastures on the Twin Lakes Lease. Range trend and utilization transects exist in all fields except the Holding Field.

Utilization

Utilization in the Lower Blackrock Riparian (0%), Upper Blackrock Field (13%) and Lower Blackrock Field (6%) was below the allowable utilization for the grazing season.

Range Trend

Range trend transects were read in 2021.

Upper Blackrock Field

INTAKE_01 is located in the Upper Blackrock Field. The soils are mapped as Torrifluvents-Fluvaquentic Endoaquolls Complex; but the majority of the study plot is located on the adjacent soil unit, Torrifluvents, 0-2% slopes, which is associated with the xeric Saline Meadow ecological site. Because of the xeric nature of the site, the area has been impacted from the current drought demonstrating a significant decline in saltgrass and alkali sacaton to the lowest abundance seen on the site since monitoring began in 2002.

Lower Blackrock Field

TWINLAKES_02 is located in the Lower Blackrock Field on the Pokonahbe-Rindge Family Association soil series, which corresponds to the Saline Bottom Wetland ecological site. Presently, there is no ecological site description for Saline Bottom Wetland ecological site. Referencing the site to a Saline Bottom ecological site, the similarity index ranged between 42%-62%. The site would be in a higher ecological condition if the wetland component was accounted for in the ecological site description. This is because of the greater abundance of mesic graminoids such as Baltic rush (*Juncus balticus,* JUBA) and alkali cordgrass (*Spartina gracilis* SPGR) present on the site. These species are typically minor components on the more xeric Saline Bottom ecological site.

This transect was burned in mid-February 2009. Shrub cover prior to the burn was moderate which resulted in a lower intensity burn when compared to similar areas further south in Drew Slough. Because of the low intensity fire, a decrease in shrub frequency, shrub cover, and shrub recruitment were observed in 2009-12 and total disappearance of shrubs on the transect continues into 2021. Alkali cordgrass increased to highest levels observed for the site while saltgrass declined compared to 2018. Utilization was minimal on the site in 2021 and has historically been very light.

Lower Blackrock Field

TWINLAKES_05 is on a Manzanar-Division Association, 0 2% slopes, Saline Meadow ecological site. The transect was burned in late January 2009 and was subsequently submerged when the Drew Unit of the BWMA was flooded. Because of this, range trend sampling and utilization estimates are unavailable.

Lower Blackrock Riparian Field

TWINLAKES_03 is located in the Lower Blackrock Riparian Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, which corresponds to the Moist Floodplain ecological site. The similarity index during baseline period ranged between 63%-65%, placing it in good ecological condition, explained by the dominance of DISP on the site. Nevada saltbush was much greater than the described potential for the site prior to 2013. The transect was inside the Twin Lakes burn in 2013 which reduced Nevada saltbush shrub cover to zero from 2015 to present.

The site also lacks in diversity of perennial grasses. DISP on the site has remained relatively static over time on the site until 2021 where abundance declined to the lowest level since monitoring began in 2002. Alkali sacaton has made a slight increase in abundance in 2021. Salt heliotrope (*Heliotropium curassavicum* HECU3) appeared for the first time on the site in 2018 and disappeared in 2021. Fivehorn smotherweed returned to the site again in 2018 but was absent in 2021.

TWINLAKES_04 is located in the Lower Blackrock Riparian Field in the former dry reach. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, which corresponds to the Moist Floodplain ecological site. The similarity index is poor, ranging between 4-5%. Unlike TWINLAKES_03, which has historically benefitted from a shallow water table, TWINLAKES_04 has yet to respond favorably from returned flows into the Lower Owens River. The site is predominantly Nevada saltbush, inkweed, and bassia. Salt heliotrope (HECU3) dramatically increased within the site in 2018 and has since dominated a large portion of the area supplanting wildrye. Bassia frequency disappeared in 2021 on the site. Inkweed frequency in 2009 and 2010 was greater than baseline parameters (2002-04 and 2007) but dropped significantly. Nevada saltbush

cover appears to be in decline on the site. There is a large population of pepperweed in the general area and has expanded on to the transect in 2021. The area was sprayed once in 2021 but would have benefitted from a retreatment later in the summer. This did not happen and overall abundance of pepperweed appears to remain unchanged. No utilization estimates exist for the site due to the absence of key forage species.

TWINLAKES_06 is located in the Lower Blackrock Riparian Field. Soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, which corresponds to the Moist Floodplain ecological site. Similarity index to the site's potential was 19% between 2006-07. As with TWINLAKES_04, the site is dominated by shrubs, invasive annual forbs, and a scant amount of perennial grasses in the understory. Plant frequency in 2009 indicated a significant increase in Nevada saltbush and bassia. Bassia disappeared until 2017 and was absent again in 2018. In 2010, DISP decreased to its lowest level for the site but has since recovered. Pepperweed is found in and around the area. Flooding in 2017 eliminated all Nevada saltbush on the site and inkweed has not been observed over the last two years of sampling.

Irrigated Pasture

There are no irrigated pastures on the Twin Lakes Lease.

Stockwater Sites

Livestock access water from the Owens River, Blackrock Ditch, Twin Lakes, Drew Slough and several springs present on the lease.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Supplement is composed of a liquid mix that is put in large tubs with rollers for cattle consumption. These tubs are placed in established supplement sites and are used annually.

Intake Lease (RLI-475)

The Intake Lease is a commercial packer operation used to graze horses and mules. The lease is comprised of three fields: Intake, Big Meadow Field, and East Field (289 acres). The Intake Field contains riparian vegetation and an associate range trend transect. The Big Meadow Field contains upland and riparian vegetation. There are no utilization or range trend transects in the Big Meadow Field due to a lack of adequate areas to place a transect that would meet the proper range trend/utilization criteria. Much of the meadow in the Big Meadow Field has been covered with dredged material

from the LORP Intake. The East Field consists of upland and riparian vegetation. There are no irrigated pastures on the Intake Lease.

Utilization

Utilization on the Intake Lease was well below the allowable 40% utilization standard.

Range Trend

LADWP no longer monitors range trend transects on this lease because of the small size of the riparian area. The area receives an ocular evaluation annually.

Irrigated Pastures

There are no irrigated pastures on the Intake Lease.

Stockwater Sites

Livestock access water from the Owens River.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Hay is occasionally provided to horses and mules during the winter.

Thibaut Lease (RLI-430)

The 5,259-acre Thibaut Lease is utilized by three lessees for wintering pack stock. Historically, the lease was grazed as one large pasture by mules and horses. Since the implementation of the LORP and installation of new fencing, four different management areas have been created on the lease. These areas are the Blackrock Waterfowl Management Area, Rare Plant Management Area, Thibaut Field, and the Thibaut Riparian Exclosure. Management differs among these areas. The Riparian Exclosure which was excluded from grazing for 11 years is now accessible to livestock beginning in 2018/19.

Utilization

Utilization on the Thibaut Lease remained below the upland standard of 65% in 2021.

Range Trend

Range trend transects were not scheduled for monitoring in 2021.

Irrigated Pasture

Irrigated pastures were monitored in 2019, the Thibaut (72%) was below the irrigated pasture standard of 80%. This was due to spot grazing, weeds, and grazing during the growing season.

Stockwater Sites

Livestock access water from the Owens River, livestock wells, and stockwater ditches.

Fencing

A livestock exclosure was constructed in the Thibaut riparian pasture in 2018.

Salt and Supplement Sites

Hay is provided to horses and mules during the winter.

Islands Lease (RLI-489)

The Islands Lease is an 14,981-acre cow/calf operation divided into 11 pastures. In some portions of the lease, grazing occurs year round with livestock rotated between pastures based on forage conditions. Other portions of the lease are grazed October through May. The Islands Lease is managed in conjunction with the Delta Lease. Cattle from both leases are moved from one lease to the other as needed throughout the grazing season.

Utilization

The Depot Riparian Field and River Field remained below the allowable standard of 40%.

All fields on the lease were in good condition except the large meadow portion of the River Field located southeast of the Alabama Gates. This location had been previously burned by LADWP in an effort to remove perennial shrubs, saltcedar slash, and improve forage production. This burn was successful meeting the previously mentioned goals. Despite the beneficial effects of the burn, the prolonged inundation from flow augmentation, has had a negative effect on this area. A shift in vegetation composition is occurring, accompanied by visually stressed perennial grasses and spreading of aquatic vegetation such as bull rush, that thrive in flooded and saturated locations. Continued inundation of this area has resulted in the loss of meadow habitat.

Range Trend

Range trend transects were not scheduled for monitoring in 2021.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

There are two stockwater sites located 1-1.5 miles east of the river in the River Field uplands near the old highway. These wells were drilled in 2010 and are now operational. The lessee has yet to install water troughs at the wells.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Site

Cake blocks and molasses tubs that contain trace minerals and protein are distributed for supplement on the lease. The blocks and tubs are dispersed randomly each time and if uneaten they are collected to be used in other areas.

Lone Pine Lease (RLI-456)

The Lone Pine Lease is a 7910-acre cow/calf operation divided into 16 pastures and adjacent to private ranch land. Grazing on the lease occurs from January 1 to March 30 and again in late May to early June. In early June the cattle are moved south to Olancha and then driven to Forest Service Permits in Monache.

Utilization

The Johnson Pasture was lightly utilized at 4%. The River Field utilization was 26%, and grazing was even throughout the field.

Range Trend

Range trend transects were visited on the Lone Pine Lease in 2021.

River Pasture

LONEPINE_01 is in a riparian management area on the west side of the Owens River, just north of Lone Pine Creek in the River Pasture. The soil series associated with the transect is Torrifluvents Fluvaquentic Endoaquolls complex, 0-2% slopes, and is on a Moist Floodplain ecological site. During the baseline period from 2002 to 2007, similarity index had ranged between 76% and 79%. Annual aboveground production at this riparian site has exceeded typical quantities found in the Moist Floodplain ecological site description. This site supports four perennial graminoid species and is dominated by DISP. The overall cover of shrubs is typical for a Moist Floodplain ecological site. No non native species were detected at the site. Beardless wildrye significantly increased in 2009 and continues to remain stable on the site. Saltgrass increased on this site compared to 2018. Shrub cover appears to be decreasing on this site.

LONEPINE_02 is in a riparian management area on the west side of the Owens River, east of the Lone Pine Dump in the River Pasture. The soil series is Torrifluvents-Fuvaquentic Endoaquolls complex, 0 2% slopes, and is on a Moist Floodplain ecological site. The similarity index ranged between 65% and 87% from 2002 to 2007. The site is in excellent condition. The site is grass dominated with saltgrass (DISP) comprising the bulk of the biomass. DISP frequency significantly increased in 2009, outside its historic range from 2002-07 and in 2010-12 returned to levels typically observed on the site. DISP again increased in 2015 and then decreased in 2018 to levels typical for the site. In 2021, DISP significantly increased in abundance. Alkali sacaton (SPAI) increased slightly in 2018 and rose significantly again in 2021 but is below the range observed between 2002-13. No non native species were detected at the site.

LONEPINE_03 is in a riparian management area on the west side of the Owens River in the River Pasture. The soil series is Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, and is on a Moist Floodplain ecological site. The similarity index had ranged between 74% and 87% during sampling periods between 2002 and 2007, indicating the site is in excellent condition. The site is grass dominated with DISP comprising the bulk of the biomass and creeping wildrye closely reaching the potential described for the site at 13% in 2007. Frequency for creeping wildrye (LETR) increased significantly in 2009 and remained significantly higher in 2010 when compared to all sampling periods during the baseline period. There were no changes in frequency for all forage species in 2021. Overall, following the Lone Pine Fire shrub cover is minimal. No non native species were detected at the site. This site, based on the ecological site description and frequency trends, is stable and in excellent ecological condition.

LONEPINE_04 is in a riparian management area on the west side of the Owens River in the River Pasture. The transect is located at the edge of the floodplain and currently incorporates a portion of the transition zone to upland vegetation. The soil series is Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes at the beginning of the transect and transitions to the Mazourka Eclipse complex, 0-2% slopes. The transition in ecological sites is from Moist Floodplain to a Sodic Terrace. Because of the mixed soils and associated ecological sites found across the transect evaluating trend for this site will concentrate on changes on trend rather than how well the site matches ecological site descriptions.

The similarity index had ranged widely between 59% and 73% from 2002 to 2007. Site production has generally been less than potential based on the ecological site description for a Moist Floodplain site. When compared to the Moist Floodplain ecological site description, the site has less than the expected biomass of forage species such as LETR and JUBA. This is explained by the transition from mesic conditions on the Moist Floodplain to more xeric conditions of the uplands which results in a decreasing abundance of LETR, JUBA and riparian trees and the disproportionate amount of SPAI which can better thrive in both the mesic and xeric transitional zones. The site is grass dominated with DISP and SPAI comprising the bulk of the biomass. The shrub component of the site is dominated by rubber rabbitbrush (Ericameria nauseosa [ERNA10]). As flows on the Lower Owens River continue, soil moisture may

rise toward the upland zone of the transect and future changes in species composition may be observed. However, frequency data indicates that there is an inverse trend, with decreasing DISP, and increasing SPAI which is typical for gradient in zones moving from wet to dry areas. No non native species were detected at the site. The site remained static in 2018. In 2021 there were significant declines in saltgrass (DISP) and alkali sacaton (SPAI) which is expected as the current drought is more severely impacting areas further from the river (xeric zones).

LONEPINE_05 is in an upland management area in the Winnedumah fine sandy loam, 0-2% slopes soil series which is associated with a Sodic Fan ecological site, just east of the Lone Pine Airport in the Johnson Pasture. In 2004, the site flooded and was not sampled.

The similarity index has ranged between 69% and 77% between 2002 and 2007. Nevada saltbush (Atriplex torreyi [ATTO]) has trended down over time. Frequency of DISP significantly increased in 2009 and decreased in 2010 to similar levels to that seen during the baseline period. In 2015, SPAI and DISP dramatically declined. Shrub cover has also decreased significantly in 2015. This site was flooded between 2004-05. The subsequent decline in plant frequency and cover is a result of the area drying out. In 2017 the site was fully submerged with cattail present in the sampling area. Range trend transects are selected in part because they are representative of a larger area or ecological site that has been identified as important for land managers. Because of these atypical impacts to the Lonepine_05 are not representative of the Johnson Pasture as a whole, the transect was not read in 2018 or in 2021.

LONEPINE_06 is in a riparian management area on the east side of the Owens River in the River Pasture. This monitoring transect is located inside a riparian exclosure, constructed in February 2009. This exclosure is a non-grazed reference site. The soil series is Torrifluvents Fluvaquentic Endoaquolls complex, 0-2% slopes on a Moist Floodplain ecological site. In the spring of 2015 the exclosure was compromised and livestock entered and grazed the exclosure. The fence has since been repaired and extended further into the river to prevent cattle reentry.

The similarity index had ranged between 66% and 84% between 2003 and 2007. Site production had varied during the baseline period from above to below the expected based on the ecological site description. Compared to the potential outlined in the ecological site description, this site lacks the forb and woody riparian species component. The forage base is dominated by DISP and SPAI. Other forage species such as LETR and JUBA are lacking at this site. One non native species, bassia, has been detected at the site. Frequency results in 2010 were static since baseline. There was a significant decrease in salt grass in 2012. The exclosure was completed in February 2009. SPAI, following the 2013 fire was at its all-time low while in 2015, both SPAI and DISP had increased to its highest level seen. In 2021 SPAI disappeared from the transect while DISP increased.

LONEPINE_07 is in a riparian management area on the east side of the Owens River in the River Pasture. This site was first established in the summer of 2007. The soil series is Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes on a Moist Floodplain ecological site.

The similarity index was 60% in 2007. Site production was similar to that expected based on the ecological site description. There is a low diversity of perennial graminoids as the only species detected was DISP. Other forage species such as SPAI and creeping wild rye are lacking on the transect but are present in the area. The biomass of forbs and riparian woody species is less than expected as compared to the desired plant community. No non native species were detected at the site. Between 2007 and 2015 frequency had not changed significantly on the site. In 2018, DISP significantly decreased but still remained inside the historical range for the transect. In 2021 DISP had further declined to its lowest level since monitoring began in 2003. The transect is located 260 ft from the river and is situated on a small terrace above the floodplain. The decline in saltgrass is similar to other locations where perennial grasses away from the shallow water table have become more susceptible to the impacts of the current drought.

LONEPINE_08 is located in a riparian management area on the east side of the Owens River in the River Pasture. This site was first established in the summer of 2011. The soil series is Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes on a Moist Floodplain ecological site. The only change that had occurred has been an increase in Scirpus americanus. In 2018 this site was enveloped by marsh and has become inaccessible to monitor.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

One stockwater well was drilled in the River Pasture uplands approximately two miles east of the river on an existing playa. The lessee had made an effort to install a trough but, the well had a silting problem that plugged the pipes and floats. A new well was drilled in 2018 and is currently awaiting installation of the pad, pump, and storage tank.

Fencing

No ne fence projects occurred on the lease.

Salt and Supplement Sites

All supplement tubs were situated outside of the floodplain.

Delta Lease (RLI-490)

The Delta Lease is a cow/calf operation and consists of 7,004 acres divided into four pastures: Lake Field, Bolin Field, Main Delta Field, and the East Field. The Delta lease is located within the LORP boundary. Grazing typically occurs for 6 months, from mid-November to April. Grazing in the Bolin Field may occur during the growing season. The Delta and Islands Leases are managed as one, in conjunction with state lands leases to the east of the Delta lease.

Grazing utilization is monitored in the Main Delta Field and the Bolin Field which contains the Owens River. The East Field, located on the upland of Owens Lake, supports little in the way of forage and has no stockwater.

Utilization

Utilization in the Main Delta in 2021 was below the 40% limit for riparian pastures. Utilization was well below 65% for the upland, Bolin pasture.

Range Trend

Range Trend transects not read in 2021 on the Delta Lease.

Irrigated Pastures

Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

The Bolin Field was supposed to receive a stockwater site supplied by the Lone Pine Visitors Centers well in 2010. After a more in-depth analysis of water availability was undertaken, it was ascertained that there was not an adequate amount of water to sustain both uses. To address the issue, stockwater is now being supplied from a diversion that runs from the LAA.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Sites

Cake blocks that contain trace minerals and protein are distributed for supplement on the lease. The blocks are dispersed randomly each time and if uneaten they biodegrade within one grazing season. There are also supplement tubs that are used in established supplement sites.

Brockman Lease (RLI-401)

The Brockman Ranch Lease lies west of Bishop and west of Brockman Lane between West Line Street (to the south) and U.S. Highway 395 (to the north). The Brockman Ranch (182 acres) is a cow/calf operation that produces registered Red Angus cows.

Utilization

The lease consists entirely of irrigated pastures. Irrigated pastures are not subject to utilization monitoring.

Range Trend

All pastures on the lease are irrigated pastures and are not subject to range trend monitoring.

Irrigated Pastures

Irrigated pastures on the Brockman Lease have rated well in the past but with drought conditions and water availability scores have declined. With several good years of precipitation the pastures should recover. Irrigated pastures were monitored in 2019 and all were above the irrigated pasture condition standard of 80%.

Stockwater Sites

Stockwater is provided by irrigation diversions, Bishop Creek, and troughs.

Fencing

No new fencing projects occurred on the lease.

Salt and Supplement Site:

Hay and mineral are supplied for supplementing feeding.

Summary and Conclusion

Overall utilization on all leases was within allowable standards with range conditions stable with little vegetation change. However, continued inundation in the Lower Owens River Project (LORP), especially below Mazourka Canyon road, will continue to aggrade the existing meadows and result in the loss of meadow habitat and riparian forest. This could result in greater grazing pressure on the upland and irrigated portions of the leases in the LORP. All irrigated pastures were evaluated in 2019 and analysis of the data showed overall pasture condition to be good with a few pastures on 11 leases that needed improvement. These leases were contacted and management changes should improve the pastures in the upcoming years. All irrigated pasutres are scheduled to be reevaluated in the summer of 2022. However, the winter of 2021/22 has been below average which could affect irrigation water delivery on some leases. This could cause increased grazing pressure and poor pasture condition on all grazing lands managed by LADWP.

3.3.2.1.2. Land Management Appendices

Land Management Appendix 1. End of Season Grazing Utilization by Lease and Pasture, 2012-2021

Lease Name	Pasture Name	Transect Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Aberdeen RLI-479	**Hines Spring Exclosure**	**ABERDEEN_30**	66%				36%				26%	21%
		HINES_SPRING_02	20%			11%	30%	19%	39%	14%	23%	1%
		HINES_SPRING_03	20%			9%	41%	28%	43%	7%	5%	0%
	Hines Spring Exclosure Average		35%			10%	35%	23%	41%	11%	18%	7%
	Pipeline Field	**ABERDEEN_33**	57%			14%	31%	8%	23%	9%		9%
		PIPELINE_02	35%			11%	26%				17%	9%
		PIPELINE_03	26%			20%	33%	10%	26%	6%		
	Pipeline Field Average		39%			15%	30%	9%	25%	8%	17%	9%
Aberdeen Total			37%			13%	33%	16%	33%	9%	14%	8%
Big Pine Canal RLI-438	**North 40**	**YRIB_03**		33%		69%	18%	51%		4%		
		YRIB_04	28%	23%	25%	49%	49%	48%	11%	38%	40%	41%
		YRIB_06	46%	30%	4%	40%	10%	0%	28%	0%		31%
	North 40 Average		37%	29%	15%	53%	25%	33%	20%	14%	40%	36%
	South 40	**YRIB_01**	28%	26%	2%	22%	8%	9%	14%	1%	37%	13%
		YRIB_02	10%	9%		26%	24%	79%	40%	0%	38%	30%
		YRIB_05		17%		15%	16%	6%	23%	4%		28%
	South 40 Average		19%	17%	2%	21%	16%	31%	26%	1%	37%	24%
Big Pine Canal Total			28%	23%	10%	37%	21%	32%	23%	8%	38%	28%
Blackrock RLI-428	**Horse Holding**	**BLKROC_09**	31%	0%	0%	0%	0%	0%		0%	4%	0%
		HORSEHOLD_02			0%					0%		
	Horse Holding Average		31%	0%	0%	0%	0%	0%		0%	4%	0%

Lease Name	Pasture Name	Transect Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Locust Field	**BLKROC_06**	32%	32%	53%	18%	32%	0%	25%	0%	0%	7%
	Locust Field Average		32%	32%	53%	18%	32%	0%	25%	0%	0%	7%
	North Riparian Field	**BLKROC_12**										
		BLKROC_22	10%		21%	20%	23%	20%	12%	9%	0%	19%
	North Riparian Field Average		10%		21%	20%	23%	20%	12%	9%	0%	19%
	Reservation Field	**BLKROC_02**	18%	35%	0%	17%	11%	30%	0%	0%	0%	53%
		BLKROC_03	27%	33%	12%	13%	13%	11%	3%	0%	6%	4%
		BLKROC_44	28%	40%	22%	43%	10%	0%	0%	3%	0%	22%
		BLKROC_49	11%	0%	0%	0%	0%	0%	0%	0%	0%	2%
		BLKROC_51	39%	44%	15%	30%	16%	12%	26%	0%	28%	23%
		RESERVATION_06	34%	30%	18%	15%	13%	30%	0%	2%	2%	3%
	Reservation Field Average		26%	30%	11%	20%	10%	14%	5%	1%	20%	18%
	Reservation Riparian Field	**BLKROC_17**										
	Reservation Riparian Field Average											
	Robinson Field	**BLKROC_04**	38%	24%		9%	1%	0%	0%	6%	3%	35%
		ROBINSON_02	18%	25%			7%	0%	0%			13%
	Robinson Field Average		28%	25%		9%	4%	0%	0%	6%	3%	24%
	Russell Field	**BLKROC_05**	24%	22%	2%	2%	13%	0%	13%	9%	3%	1%
		RUSSELL_02	28%	31%	0%	1%	4%	0%	13%	0%		6%
	Russell Field Average		26%	26%	1%	1%	8%	0%	13%	5%	3%	4%
	South Riparian Field	**BLKROC_13**			15%		0%	5%	23%		23%	9%

Lease Name	Pasture Name	Transect Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
		BLKROC_23	8%			27%	0%	25%	7%	15%	32%	8%
		SOUTHRIP_03			7%	12%	0%	7%				
		SOUTHRIP_04			2%	5%		0%	5%		19%	6%
	South Riparian Field Average		8%		8%	15%	0%	9%	12%	15%	25%	8%
	Springer Field	**BLKROC_08**			0%	5%	1%	0%		1%		
	Springer Field Average				0%	5%	1%	0%		1%		
	White Meadow Field	**BLKROC_01**	9%	18%	0%		7%	0%	0%	0%	0%	9%
		BLKROC_39	0%	0%	0%	3%	0%	0%	0%		0%	4%
		WHITEMEADOW_03	29%	43%	0%	10%	19%		4%	0%	9%	23%
		WHITEMEADOW_04	3%	0%	5%	0%	0%	0%	0%	4%	8%	0%
		WHITEMEADOW_05	54%	32%	29%	0%	35%	0%	13%	0%		6%
	White Meadow Field Average		19%	19%	7%	3%	12%	0%	3%	1%	4%	9%
	White Meadow Riparian Field	**BLKROC_11**	55%		16%	27%	26%	22%	5%	11%	33%	22%
		BLKROC_14										
		BLKROC_26			18%				31%			
		WMRIP_T2					0%	0%				
		WMRIP_T5	23%				11%	3%				
		WMRIP_T4	23%				44%		4%			
		WMRIP_T1	26%				12%	27%				
	White Meadow Riparian Field Average		32%		17%	27%	19%	13%	13%	11%	33%	22%
	Wrinkle Field	**BLKROC_07**	7%	28%	6%	7%	16%	0%	4%	0%	3%	3%

Lease Name	Pasture Name	Transect Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
		WRINKLE_03	34%	17%	35%	0%		0%	9%	7%	6%	
	Wrinkle Field Average		20%	22%	21%	3%	16%	0%	6%	3%	4%	12%
	Wrinkle Riparian Field	**BLKROC_18**				3%	10%	7%	10%		31%	
		BLKROC_19				10%	18%	0%	13%	11%		11%
		BLKROC_20				28%	15%	13%	0%	13%	34%	
		BLKROC_21				15%	19%	0%	0%	12%	35%	
	Wrinkle Riparian Field Average					14%	16%	5%	6%	12%	33%	11%
	West Field	**WRINKLE_02**	41%	36%	9%	39%	7%	0%	0%	0%	3%	31%
	West Field Average		41%	36%	9%	39%	7%	0%	0%	0%	3%	31%
Blackrock Total			25%	24%	11%	13%	12%	6%	7%	4%	11%	13%
Cashbaugh RLI-411	**Bishop Creek Field**	**CASHBA_02**	11%	10%	1%	7%	12%	15%	33%	17%	27%	3%
		CASHBA_04	53%	81%	74%	0%	12%	22%	23%	1%	13%	34%
		CASHBA_05	14%	27%	10%	12%	30%	6%	25%	20%	12%	15%
		CASHBA_06	14%	12%	36%	7%	2%	0%	2%	1%	0%	5%
		CASHBA_09	16%	17%	0%	46%	22%	0%	21%	9%	16%	5%
	Bishop Creek Field Average		22%	29%	24%	14%	16%	9%	21%	10%	14%	12%
	Ears Field	**CASHBA_19**	0%	0%	0%	0%	50%	0%	0%	0%		
		CASHBA_20	0%	0%		0%	60%	0%	0%	0%		
		CASHBA_21	15%		0%	0%	41%	0%	0%	0%		
		CASHBA_22	0%	0%	0%	0%	14%	0%	0%	0%		
		CASHBA_25		16%	0%	0%	20%	0%	0%	0%		
	Ears Field Average		4%	4%	0%	0%	37%	0%	0%	0%	0%	0%
	East of the River Field	**CASHBA_16**	28%		7%	30%	8%	0%	12%	42%	15%	0%
		CASHBA_24	38%		0%	15%	18%	11%	6%	12%	10%	
		CASHBA_26	48%		62%	24%	47%	0%		9%	32%	
		CASHBA_27					18%					

Lease Name	Pasture Name	Transect Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	East of the River Field Average		38%		23%	23%	23%	4%	10%	21%	19%	0%
	Laws River Field	**CASHBA_01**	44%	50%		37%	46%	26%	40%	1%	22%	
		CASHBA_03	66%	56%								
		CASHBA_07	47%	31%	6%	19%	32%	1%	0%	0%	5%	
		CASHBA_08	31%	43%	14%	17%	22%	5%	7%	0%	8%	
	Laws River Field Average		47%	45%	10%	24%	34%	10%	16%	0%	12%	
	Slough Field	**CASHBA_17**	19%	25%	31%	24%	22%	24%	27%	7%	11%	9%
		CASHBA_18	39%	15%	12%	50%	17%	33%	23%	0%	21%	0%
		CASHBA_23	30%	6%	15%	28%	17%	27%	30%	18%	43%	8%
	Slough Field Average		29%	15%	19%	34%	18%	28%	27%	8%	25%	6%
	Warm Springs Holding Field	**CASHBA_15**			32%		44%	31%	0%	11%	59%	10%
	Warm Springs Holding Field Average				32%		44%	31%	0%	11%	59%	10%
	White Mountain Field	**CASHBA_12**	55%	64%	53%	37%	54%	51%	41%	14%	65%	55%
		CASHBA_14	29%	21%	24%	9%	32%	25%		7%	54%	27%
	White Mountain Field Average		42%	42%	39%	23%	43%	38%	41%	10%	59%	41%
Cashbaugh Ranch Total			28%	26%	19%	17%	28%	13%	14%	8%		11%
Coloseum RLI-407	**Movie Field**	**COLOSEUM_01**				25%	41%	19%	2%		3%	
		COLOSEUM_02										13%
		COLOSEUM_03	3%									
	Movie Field Average		3%			25%	41%	19%	2%		3%	13%
	South East Field	**COLOSEUM_38**	70%						80%	0%	78%	73%
		COLOSEUM_T1				23%		62%	71%		59%	68%

Lease Name	Pasture Name	Transect Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
		COLOSEUM_T2	74%						43%		10%	81%
		COLOSEUM_T3	79%			36%		39%	58%			
		COLOSEUM_T4	64%						17%	27%	58%	
		COLOSEUM_T5				0%		49%	42%		23%	
	South East Field Average		72%			20%		50%	52%		45%	58%
	Northeast Pasture	**NORTHEAST_01**	0%			0%		10%			22%	52%
	Northeast Pasture Average		0%			0%		10%			22%	52%
Coloseum Total			48%			17%	41%	36%	45%	14%	36%	62%
Delta RLI-490	**Bolin Field**	**BOLIN_02**		25%		5%			16%	0%	13%	
		BOLIN_01	65%	27%	16%				0%	0%	50%	5%
	Bolin Field Average		65%	26%	16%	5%			8%	0%	31%	5%
	Main Delta	**DELTA_01**	30%	19%	39%	35%	53%	9%	3%	26%		13%
		DELTA_02										
		DELTA_03	45%	26%	50%	8%	59%	12%		18%	18%	18%
		DELTA_04	44%	38%	30%	11%	63%	15%	5%	31%	11%	13%
		DELTA_05	42%	40%	22%	60%	43%	24%	14%	0%		
		DELTA_06	41%	26%	30%	66%	55%	36%		8%	12%	
		DELTA_07	58%	36%	49%	63%	20%	13%	21%	14%	13%	7%
	Main Delta Average		43%	31%	37%	41%	49%	18%	11%	16%	14%	13%
	Dune Pasture	**DELT_UP_01**										
	Dune Pasture Average											
Delta Total			47%	30%	34%	35%	49%	18%	10%	16%	17%	11%
Intake RLI-475	**Intake**	**STUART_01**										
	Intake Average											
Intake Total												
Islands RLI-489	**Bull Field**	**ISLAND_03**										

Lease Name	Pasture Name	Transect Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Bull Field Average											
	Carasco Riparian Field South	**ISLAND_06**	26%	21%		5%	41%	3%			20%	
	Carasco Riparian Field South Average		26%	21%		5%	41%	3%			20%	
	Carasco South	**ISLAND_05**										
	Carasco South Average											
	Depot Riparian Field	**ISLAND_08**	68%	27%	31%	23%	25%	16%	13%	5%	15%	20%
		ISLAND_09	67%	39%	91%	71%	48%	9%	40%	2%	50%	17%
		RIVERFIELD_07	52%	47%	19%	60%	61%	24%	14%	10%	11%	36%
		RIVERFIELD_09	9%		51%		15%	27%				24%
		RIVERFIELD_12	71%	58%	38%	63%	53%	1%	0%	30%	19%	17%
	Depot Riparian Field Average		53%	43%	46%	54%	41%	16%	17%	12%	24%	23%
	Lubkin	**LUBKIN_01**	5%	6%	3%	16%	34%	33%	8%	0%	1%	0%
	Lubkin Average		5%	6%	3%	16%	34%	33%	8%	0%	1%	0%
	Reinhackle Field	**ISLAND_04**										
	Reinhackle Field Average											
	River Field - Islands	**ISLAND_07**		0%	0%							
		ISLAND_10	40%	44%	0%	25%	40%	8%	22%	20%	27%	44%
		ISLAND_11	6%	0%		7%	0%	0%	3%	1%	1%	4%
		ISLAND_12	31%	0%	41%	28%						
		RIVERFIELD_08	71%	52%		34%	0%	5%		17%	10%	
		RIVERFIELD_11	89%	0%		20%						
		RIVERFIELD_06	31%		0%	0%						

Lease Name	Pasture Name	Transect Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
		ISLAND_14	81%	20%	48%	49%	67%	0%				
	River Field - Islands Average		50%	17%	18%	23%	27%	3%	13%	13%	13%	24%
	South Field	**ISLAND_02**	0%		0%		14%					
		ISLAND_59			0%	0%	29%		0%			
		SOUTHFIELD_02	19%		0%	0%	36%		14%		15%	
	South Field Average		10%		0%	0%	26%		7%			
Islands Total			42%	24%	23%	27%	33%	12%	13%	12%	15%	20%
Lone Pine RLI-456	**Johnson Pasture**	**LONEPINE_05**	0%		79%	0%	21%	0%	10%	0%		4%
	Johnson Pasture Average		0%		79%	0%	21%	0%	10%	0%		4%
	River Field - Lone Pine	**LONEPINE_01**	22%		38%	42%	26%	26%	37%	39%		32%
		LONEPINE_02	32%		30%		29%	24%	45%	29%		31%
		LONEPINE_03	63%		64%	49%	45%	25%	28%	26%	6%	24%
		LONEPINE_04	45%		20%	40%	29%	26%	47%	20%	40%	20%
		LONEPINE_06									13%	
		LONEPINE_07	21%		0%	19%	25%	13%	20%	5%	33%	21%
		LONEPINE_08	42%		52%	21%	24%	35%	49%			
	River Field - Lone Pine Average		37%		34%	34%	30%	25%	38%	24%	23%	26%
Lone Pine Total			32%		40%	29%	28%	21%	34%	24%	20%	22%
Reinhackle RLI-492	**Laws Holding Field**	**LACEY_03**	34%	27%	41%	19%	44%	13%		4%	22%	
		LACEY_05	65%	35%	79%	45%	58%	0%		31%	15%	11%
		LACEY_08	19%	38%	26%	18%	42%	9%	0%	23%	0%	14%
	Laws Holding Field Average		39%	33%	49%	27%	48%	7%	0%	19%	19%	12%
	Triangle Field	**LACEY_01**	79%	56%	38%	58%	29%	0%		21%		17%

Lease Name	Pasture Name	Transect Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
		LACEY_02	35%	41%	0%	3%	34%	0%		0%		19%
		LACEY_04	21%	0%	0%	21%	0%	12%	26%	0%	18%	
		LACEY_06	62%	50%	29%	29%	4%	17%	18%	24%	23%	0%
		LACEY_07	31%	65%	23%	33%	39%	17%	64%	18%	15%	25%
	Triangle Field Average		46%	43%	18%	29%	21%	9%	36%	13%	19%	15%
Reinhackle Ranch Total			43%	39%	29%	28%	31%	9%	27%	15%	13%	14%
Round Valley RLI-483	**East Side Riparian**	**MEND_04**	28%	0%		56%	68%	63%	0%	0%		0%
	East Side Riparian Average		28%	0%		56%	68%	63%	0%	0%		0%
	East Side River Field	**MEND_05**		0%		33%	64%	46%	41%		28%	10%
		MEND_06	62%	29%		34%	39%	41%	35%	30%	35%	25%
		MEND_07	12%	26%		33%	57%	38%	0%		26%	
		MEND_08	17%	0%		0%	35%	0%	0%			
	East Side River Field Average		30%	14%		25%	49%	31%	19%	30%	30%	18%
	Hole Pasture	**MEND_12**				11%	30%	50%	76%		45%	0%
	Hole Pasture Average					11%	30%	50%	76%		45%	0%
	River Riparian	**MEND_03**	51%	28%		36%	26%	25%	44%	41%	65%	50%
		MEND_09	2%	6%		17%	5%	0%	16%	2%		0%
		MEND_10	0%	33%		5%	15%	0%	1%	35%	27%	11%
		MEND_11	25%	0%		82%	19%	4%	0%		52%	24%
		MEND_1								27%		
	River Riparian Average		20%	17%		35%	16%	7%	15%	27%	48%	21%
	Zurich Riparian	**MEND_02**	18%	16%		61%	31%	55%	13%		16%	10%
	Zurich Riparian Average		18%	16%		61%	31%	55%	13%		16%	10%
Round Valley Ranch Total			24%	14%		33%	35%	29%	21%	23%		14%

Lease Name	Pasture Name	Transect Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
S-T Ranch RLI-461	Calvert Slough Pasture	CALVERT_02		0%								
		CALVERT_03	0%	0%	55%		27%					
		CALVERT_04		0%	35%	5%	9%		0%	0%		
		TATUM_11	69%	71%	86%	85%		48%				
		TATUM_13	42%	20%	28%	31%	28%	11%	43%	14%	23%	
		TATUM_29	0%	0%	29%	35%	14%	5%	15%	0%	18%	
	Calvert Slough Pasture Average		28%	15%	47%	39%	20%	21%	19%	5%	20%	
	Charlie Butte Field	TATUM_10	29%	15%	60%	51%	49%	39%	35%	21%	43%	43%
	Charlie Butte Field Average		29%	15%	60%	51%	49%	39%	35%	21%	43%	43%
	East River Field	TATUM_07	16%	31%	26%	41%	13%	0%	0%	20%		0%
		TATUM_08	28%	28%	28%	10%	32%	26%	74%	14%	29%	28%
		TATUM_09	49%	30%	52%	45%		54%	56%	27%		
		TATUM_12	28%	22%	5%	6%	19%	11%	36%	11%	41%	27%
		TATUM_14	17%	17%	27%	29%	16%	21%	64%	11%	12%	18%
	East River Field Average		28%	26%	28%	26%	20%	22%	46%	17%	27%	18%
	North Horton Slough Riparian	TATUM_02	21%	0%	17%	0%	5%	13%		74%	0%	18%
	North Horton Slough Riparian Average		21%	0%	17%	0%	5%	13%		74%	0%	18%
	Northeast McCumber Riparian	TATUM_01	45%	0%	3%	0%	8%	21%		7%	37%	16%
	Northeast McCumber Riparian Average		45%	0%	3%	0%	8%	21%		7%	37%	16%
	Northwest McCumber Riparian	TATUM_04	59%	21%	11%	8%	7%	1%		29%	17%	38%

Lease Name	Pasture Name	Transect Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Northwest McCumber Riparian Average		59%	21%	11%	8%	7%	1%		29%	17%	38%
	South Horton Slough Riparian	**TATUM_06**	28%	0%	52%	31%	15%	59%		79%	22%	12%
	South Horton Slough Riparian Average		28%	0%	52%	31%	15%	59%		79%	22%	12%
	Southeast McCumber Riparian	**TATUM_03**	14%	77%	45%	41%	49%	26%		6%	32%	0%
	Southeast McCumber Riparian Average		14%	77%	45%	41%	49%	26%		6%	32%	0%
	Southwest McCumber Riparian	**TATUM_05**	72%			54%	23%	27%		5%	56%	9%
	Southwest McCumber Riparian Average		72%			54%	23%	27%		5%	56%	9%
	West River Field	**TATUM_15**	34%	8%	46%	37%	29%	34%	25%	34%	0%	52%
	West River Field Average		34%	8%	46%	37%	29%	34%	25%	34%	0%	52%
S-T Ranch Total			32%	19%	36%	30%	21%	25%	35%	22%	24%	22%
Thibaut RLI-430	**Rare Plant Management Area**	**RAREPLANT_02**				0%		16%	22%			
		RAREPLANT_03	45%	4%		8%	15%					
		THIBAUT_02	34%	36%	29%	13%	34%	11%	7%		16%	5%
	Rare Plant Management Area Average		39%	20%	29%	7%	25%	14%	14%		16%	5%
	Thibaut Field	**THIBAUT_03**	15%	20%	40%	6%	56%	78%	16%	4%	9%	0%
		THIBAUT_08	14%	0%	0%	1%	7%	2%	0%	1%		
		THIBAUT_09	0%	0%	0%	0%	0%	0%	0%	0%		
		THIBAUTFIELD_02	30%	0%	22%		44%					5%
		THIBAUTFIELD_03		5%	0%		2%	0%			0%	33%

Lease Name	Pasture Name	Transect Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
		THIBAUTFIELD_04	0%	0%	0%		7%	0%		0%	0%	1%
	Thibaut Field Average		12%	4%	10%	2%	19%	16%	8%		9%	10%
	Waterfowl Management Area	**THIBAUT_01**			50%	40%	3%	9%	0%	1%	31%	21%
		WATERFOWL_02			56%	30%	16%	8%				
		WATERFOWL_03			33%	25%	4%		7%			
		WATERFOWL_04										
		WATERFOWL_05										
	Waterfowl Management Area Average				46%	32%	8%	8%	3%		31%	21%
Thibaut Total			19%	8%	23%	14%	17%	14%	8%	1%	11%	11%
Tuttle RLI-495	**Tuttle Field**	**TUTTLE_01**	27%			0%	6%	12%	59%		0%	0%
	Tuttle Field Average		27%			0%	6%	12%	59%		0%	0%
Tuttle Total			27%			0%	6%	12%	59%		0%	0%
Twin Lakes RLI-491		**BLKROC_37**	5%	15%		2%		5%	16%	3%	6%	12%
		BLKROC_FIELD_04		23%				7%	0%			
		TWINLAKES_02		0%	6%		0%	0%		0%	0%	0%
		TWINLAKES_05										
	Average		5%	13%	6%	2%	0%	4%	8%	3%	6%	6%
	Lower Blackrock Riparian Field	**BLKROC_RIP_07**	72%		14%	0%		0%	11%			
		TWINLAKES_03	36%				0%	14%				
		TWINLAKES_04										
		TWINLAKES_06										
	Lower Blackrock Riparian Field Average		54%		14%	0%	0%	7%	11%			
	South River Field	**4J_02**	61%		26%	51%	68%		51%		19%	2%
		4J_03	6%		7%	12%	10%	0%	33%			7%
		4J_04	24%		9%	33%	34%	0%	25%			0%

Lease Name	Pasture Name	Transect Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	South River Field Average		30%		14%	32%	37%	0%	36%		19%	3%
	Upper Blackrock Field	**BLKROC_RIP_05**	51%		9%	0%	10%	3%	2%	26%		19%
		BLKROC_RIP_06	74%		10%		0%		56%	66%	5%	4%
		BLKROC_RIP_08	70%		50%		69%	27%	61%		18%	
		INTAKE_01	49%		10%	12%	2%	9%	4%	0%	3%	15%
		BLKROC_RIP_09				43%						
	Upper Blackrock Field Average		61%		20%	18%	20%	13%	31%	44%	9%	13%
Twin Lakes Total			45%	13%	16%	19%	21%	7%	26%	19%		10%
Warm Spring RLI-497	**River Field - Warm Springs**	**CASHBA_10**	32%	48%	53%	60%	44%	18%	15%	22%	10%	
		CASHBA_11	21%	22%	6%	11%	18%	0%	0%		27%	6%
		CASHBA_13	34%	41%	30%	18%	50%	0%	0%		0%	8%
	River Field - Warm Springs Average		29%	37%	30%	30%	37%	6%	5%		19%	7%
Warm Spring Total			29%	37%	30%	30%	37%	6%	5%	22%	12%	7%
Fish Slough RLM-488	**Hospital Field**	**FISHSLOUGH_01**	15%			84%						
	Hospital Field Average		15%			84%						
	North Bench Field	**FISHSLOUGH_02**	9%			46%		0%				
	North Bench Field Average		9%			46%		0%				
	Lake Field	**FISHSLOUGH_07**					5%	8%		0%		
	Lake Field Average						5%	8%		0%		
	Square Field	**FISH04_2015**					0%					

Lease Name	Pasture Name	Transect Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Square Field Average						0%					
	Hospital East	**HOSPITAL EAST**						27%				
	Hospital East Average							27%				
	South Bench Field	**FISHSLOUGH_05**				100%						
		FISH03_2015						21%				
		FISHSLOUGH_02_RT					0%					
	South Bench Field Average					100%	0%	21%				
	Bench	**FISHSLOUGH_03**				27%					21%	
	Bench Average					27%						
	Calochortis Field	**FISHSLOUGH_05_RT**					0%	11%			2%	
	Calochortis Field Average						0%	11%				
Fish Slough Total			12%			64%	1%	11%		0%	12%	
Independence	**Manzanar**	**INDEP_65**		52%	75%	65%	12%	60%	79%	0%	0%	0%
	Manzanar Average			52%	75%	65%	12%	60%	79%	0%	0%	0%
Independence Total				52%	75%	65%	12%	60%	79%	0%	0%	0%

Cashbaugh Lease (RLI-411)

Transect	CASHBA_01			
Frequency	Species	2007	2010	2021
Annual Forb	ATTR	2	17	0
Perennial Graminoid	DISP	137	134	149
	JUBA	6	4	16
	LETR5	86	82	31
	SPAI	33	36	37
Shrubs	ATTO	0	2	1
Nonnative Species	BAHY	0	12	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Transect	CASHBA_02							
Frequency	Species	2007	2009	2010	2012	2015	2018	2021
Annual Forb	ATPH	0	0	6	0	0	0	0
	ATTR	0	0	28	0	0	0	0
	CLOB	0	0	7	0	0	0	0
Perennial Forb	ANCA10	0	18	0	0	0	0	0
	GLLE3	6	17	9	5	16	19	20
	PYRA	0	0	0	4	0	0	0
Perennial Graminoid	CAREX	0	4	0	0	0	0	0
	DISP	72	141	60	59	39	39	37
	JUBA	21	9	15	4	3	4	10
	LETR5	0	69	0	0	0	0	5
	SPAI	77	21	79	79	75	88	81
Shrubs	ATTO	0	0	1	0	2	13	40
	ERNA10	0	0	2	0	0	5	7
Nonnative Species	BAHY	0	11	3	2	0	1	0
	SATR12	0	0	1	0	0	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2010	2012	2015
ATTO	0	0.55	1.29
ERNA10	0.45	0.3	1.5
Total	0.45	0.85	2.79

Transect	CASHBA_03				
Frequency	Species	2007	2010	2012	2015
Annual Forb	ATTR	0	5	0	0
	COMAC	0	2	0	0
Perennial Forb	ANCA10	12	0	17	13
	GLLE3	8	0	21	10
Perennial Graminoid	CADO2	4	0	0	0
	DISP	117	124	154	130
	JUBA	4	17	4	3
	LETR5	41	84	82	34
	SPAI	20	0	15	26
	SPGR	1	0	0	0
Shrubs	ROWO	0	2	0	3
Nonnative Species	BAHY	1	2	34	18

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)		
Species	2010	2015
ATTO	0.3	0
ERNA10	6.3	0
ROWO	0.65	0
Total	7.25	0

Transect	CASHBA_04						
Frequency	Species	2007	2009	2012	2015	2018	2021
Annual Forb	HEAN3				1	0	4
Perennial Forb	ANCA10	3	0	9	5	13	8
Perennial Graminoid	CAREX				3	0	0
	DISP	113	121	137	129	122	128

	JUBA	56	60	62	29	34	7
	LETR5	17	16	12	36	77.0	70
	PADI6	0	0	0	3	0	0
	SPAI	0	0	0	0	3	0
Shrubs	ATTO	2	0	5	3	10	7
	ERNA10				1	0	0
	SAEX				1	4	3
Nonnative Species	BAHY	0	0	1	0	7	0
	LELA2	0	0	0	0	1	5
	PHAU7	1	3	0	0	4	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2009	2012	2015	2021
ATTO	0.2	0.53	2.2	4.2
ERNA10	0.3	0	1	0
SAEX	0	0	1.3	0
Total	0.5	0.53	4.5	4.2

Transect	CASHBA_05				
Frequency	Species	2007	2010	2012	2021
Annual Forb	ATPH	0	7	0	Pic only
	ATTR	0	5	0	
	COMAC	0	4	0	
Perennial Forb	GLLE3	2	3	3	
	NIOC2	2	6	3	
Perennial Graminoid	DISP	101	109	74	
	JUBA	39	41	38	
	LETR5	0	0	1	
	PADI6	5	0	0	
	SPAI	39	62	57	
Shrubs	ATPA3	0	0	0	
Nonnative Species	BAHY	0	7	0	

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Transect CASHBA_05

Shrub Cover (m)	2012
ERNA10	0.09
Total	0.09

Transect	CASHBA_06						
Frequency	Species	2007	2009	2010	2012	2015	2018
Annual Forb	ATTR	0	0	4	0	0	0
	COMAC	0	0	9	0	0	0
Perennial Forb	GLLE3	15	13	12	6	3	4
	NIOC2	0	3	0	0	0	0
	PYRA	0	4	0	0	0	0
Perennial Graminoid	DISP	118	223	129	138	98	127
	JUBA	5	44	7	9	7	8
	LETR5	8	8	11	6	0	9
	SPAI	0	65	0	5	0	0
Shrubs	ATTO	3	7	9	9	0	67
	ERNA10	3	1	0	3	2	1
Nonnative Species	BAHY	0	0	69	9	0	29
	LELA2	0	0	0	0	0	3

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2007	2009	2010	2012	2015	2018
ATTO	0.4	3.35	6.68	7.01	9.3	16.7
ERNA10	2.2	3.65	2.35	5.65	5.9	0
Total	2.6	7	9.03	12.66	15.2	16.7

Transect	CASHBA_07							
Frequency	Species	2007	2009	2010	2012	2015	2018	2021
Annual Forb	ATTR	0	0	17	0	0	0	0
	CORA5	0	0	6	0	0	0	0
Perennial Forb	GLLE3	16	12	20	13	24	16	8
	PYRA	1	0	0	0	0	0	0
Perennial Graminoid	JUBA	8	9	19	12	11	14	10

	LECI4	0	0	0	1	0	0	0
	SPAI	88	97	110	101	106	110	101
Shrubs	ALOC2	7	3	1	1	2	1	1
	ATTO	1	1	0	0	0	5	0
	ERNA10	4	6	4	5	5	6	4
Nonnative Species	BAHY	4	0	5	0	0	4	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2007	2009	2010	2012	2015	2018	2021
ALOC2	1.8	0.61	0	0	0	0	0
ERNA10	1.75	1.93	2.65	2.77	3.9	5.2	6.6
Total	3.55	2.54	2.65	2.77	3.9	5.2	6.6

Transect	CASHBA_08						
Frequency	Species	2007	2010	2012	2015	2018	2021
Annual Forb	ATPH	0	0	6	0	0	0
	ATTR	0	40	0	0	0	0
	CORA5	0	11	0	0	0	0
Perennial Forb	GLLE3	13	22	6	7	13	8
Perennial Graminoid	DISP	96	93	96	75	47	54
	JUBA	24	24	26	8	24	12
	LETR5	9	10	3	3	4	4
	SPAI	58	73	56	74	85	85
Shrubs	ATTO	9	0	11	2	25	12
Nonnative Species	BAHY	0	15	0	0	13	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2007	2010	2012	2015	2018	2021
ATTO	1.8	1.1	0.5	0.4	1.3	0
ERNA10	0	0.1	0	0.6	2.8	3.3
Total	1.8	1.2	0.5	1	4.1	3.3

Transect	CASHBA_09							
Frequency	Species	2007	2009	2010	2012	2015	2018	2021
Annual Forb	ATPH	0	0	1	0	0	0	0

	ATTR	0	0	3	0	0	0	0
	COMAC	0	0	13	0	0	0	0
	HEAN3	0	0	4	0	0	0	0
Perennial Forb	ASTER	0	0	10	0	0	0	0
	CIMO	0	0	11	0	0	0	0
	CIOC2	0	7	0	0	0	0	0
	CIRSI	13	0	0	0	0	1	0
	ERIGE2	0	0	0	0	0	0	0
	GLLE3	16	17	13	9	6	7	10
	PYRA	11	6	14	0	2	1	3
Perennial Graminoid	CAREX	21	44	0	0	0	10	5
	DISP	64	73	70	94	46	68	46
	JUBA	24	14	8	0	2	18	0
	LETR5	16	31	29	19	18	20	37
	POSE	2	0	25	0	0	0	0
	SPAI	78	86	96	73	75	87	77
Shrubs	ATTO	0	0	0	0	0	0	0
	ERNA10	5	2	5	2	3	8	8
	MACAI3	0	2	0	0	0	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2009	2010	2012	2015	2021
ERNA10	0.75	0.3	3.23	6.4	5.6
Total	0.75	0.3	3.23	6.4	5.6

Transect	CASHBA_10			
Frequency	Species	2007	2009	2014
Perennial Forb	CIOC2	2	0	0
	GLLE3	3	0	0
	NIOC2	26	20	25
Perennial Graminoid	DISP	100	103	103
	JUBA	5	1	5
	LETR5	9	8	1
	SPAI	73	88	87

Shrubs	SAVE4	2	0	0				

Transect	CASHBA_12							
Frequency	Species	2007	2009	2010	2012	2015	2018	2021
Annual Forb	ATTR	0	0	20	0	0	0	0
	CORA5	0	0	4	0	0	0	0
Perennial Forb	GLLE3	1	2	0	3	2	5	3
Perennial Graminoid	DISP	90	58	67	104	89	93	86
	JUBA	0	0	2	0	0	0	0
	LETR5	0	0	0	3	0	0	10
	SPAI	104	115	115	112	115	123	117
	SPGR	0	0	3	0	0	0	0
Shrubs	ATTO	1	5	1	0	3	10	5
Nonnative Species	BAHY	0	1	19	10	0	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2009	2012	2015	2021
ATTO	0.48	1.23	1.5	3.8
Total	0.48	1.23	1.5	3.8

Transect	CASHBA_14						
Frequency	Species	2007	2009	2010	2012	2015	2018
Annual Forb	ATTR	0	0	18	0	0	0
	CORA5	0	0	0	0	0	0
Perennial Forb	GLLE3	14	14	14	11	13	9
	PYRA	5	5	0	0	5	0
Perennial Graminoid	DISP	16	23	7	24	14	7
	JUBA	13	7	0	2	3	0
	LETR5	3	0	3	0	1	0
	SPAI	118	132	137	130	130	131
Shrubs	ALOC2	3	6	8	7	3	8
	ATTO	4	5	1	0	1	0
	ERNA10	0	0	0	5	1	3
Nonnative Species	BAHY	0	0	2	0	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2007	2009	2010	2012	2015	2018
ALOC2	0.55	0.1	0	0	0	0
ATTO	0	0	0.2	0.01	0	0
ERNA10	0	0	0	0	0.7	0.9
Total	0.55	0.1	0.2	0.01	0.7	0.9

Transect	CASHBA_15						
Frequency	Species	2007	2009	2010	2012	2015	2018	2021
Annual Forb	ATPH	0	0	3	0	0	0	0
Perennial Forb	GLLE3	15	2	5	1	7	8	4
	HECU3	2	2	0	0	0	1	1
Perennial Graminoid	DISP	83	66	79	85	58	46	50
	JUBA	3	0	2	0	0	0	0
	LETR5	15	19	23	25	0	0	13
	SPAI	79	99	95	81	80	90	86
Nonnative Species	BAHY	0	9	31	16	14	10	3

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2007	2009	2010	2012	2015	2018	2021
ATTO	0.15	1.45	0.3	0.48	2.1	6.5	13.25
ERNA10	1.55	0.4	0.7	0.9	1.85	1.6	1.7
Total	1.7	1.85	1	1.38	3.95	8.1	14.32

Transect	CASHBA_16					
Frequency	Species	2007	2009	2010	2012	2015
Perennial Graminoid	DISP	24	32	26	14	27
	SPAI	105	100	99	86	99
Shrubs	ATCO	0	0	8	0	0
	ATTO	12	5	1	5	2
Nonnative Species	BAHY	0	0	3	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2007	2009	2010	2012	2015
ATTO	0.3	0.65	0.75	0.42	0.7

ERNA10	1.25	1.8	2	2.26	2.3		
SAVE4	0	0	0	0.04	0		
Total	1.55	2.45	2.75	2.72	3		

Transect	CASHBA_17						
Frequency	Species	2007	2009	2010	2012	2015	2018
Annual Forb	ATPH	0	0	29	0	0	0
	ATTR	0	0	4	0	0	0
	CLOB	0	0	1	0	0	0
	COMAC	0	0	15	0	0	0
	CORA5	0	0	4	0	0	0
	CLPL2	0	0	0	1	0	0
Perennial Forb	GLLE3	0	0	0	0	0	0
	MACA2	0	0	11	0	0	0
	PYRA	0	4	4	0	0	0
	STPA4	0	0	0	5	0	0
Perennial Graminoid	DISP	67	69	47	59	78	55
	LECI4	0	0	0	0	0	0
	SPAI	107	88	91	111	94	102
Shrubs	ERNA10	3	7	1	0	1	5
	MACA17	11	0	0	0	8	7
	MACAI3	0	5	0	0	0	0
Nonnative Species	BAHY	0	0	5	0	0	3

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)

Species	2007	2009	2010	2012	2015	2018
ERNA10	2.13	4.35	2.65	3.55	2.5	2.4
Total	2.13	4.35	2.65	3.55	2.5	2.4

Transect	CASHBA_18		Slough Pasture		
Frequency	Species	2007	2009	2012	2015
Perennial Forb	CALI4	0	0	0	0
	GLLE3	0	12	0	0

	STPA4	4	1	0	0
Perennial Graminoid	DISP	74	147	45	47
	JUBA	0	27	0	0
	LETR5	0	9	0	0
	SPAI	95	122	39	41
Shrubs	ATCO	18	0	4	3
	ATPA3	19	1	3	3
	ATTO	0	7	0	0
	ERNA10	12	10	2	2
	MACA17	12	0	13	0
	SAVE4	4	0	0	0
	MACAI3	0	7	0	0
Nonnative Species	BAHY	0	3	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2007	2009	2012	2015
ARTR2	0	0.75	0	0
ATCO	1.35	0.55	2.14	0.7
ATPA3	0.7	1.3	0	0.8
ATTO	0	1.1	0	0
ERNA10	3.2	3.7	2.24	1.9
SAVE4	1.05	0	0	0
Total	6.3	7.4	4.38	3.4

Transect	CASHBA_19		Revisited in 2018		
Frequency	Species	2007	2009	2010	2012	2021
Annual Forb	ATPH	0	0	5	0	0
	CORA5	0	0	16	0	0
	ERAM2	0	0	1	0	0
Perennial Forb	GLLE3	5	6	10	4	3
	HECU3	0	0	3	0	2
	MACA2	0	0	4	0	0
	NIOC2	0	2	1	0	0
	STEPH	0	0	4	9	0

	STPA4	6	7	0	0	0
Perennial Graminoid	DISP	40	45	41	38	28
	JUBA	3	5	4	2	0
	SPAI	90	96	97	87	54
Shrubs	ATCO	7	2	4	15	0
	ATTO	15	11	15	0	3
	ERNA10	17	15	17	15	0
	MACA17	0	7	0	0	0
	ROWO	0	0	0	2	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2007	2009	2010	2012	2021
ATCO	0	0	0	0.2	0.5
ATTO	0.5	0.35	0.15	0.23	0
EPNE	0	0	0.1	0	0
ERNA10	4.75	4.6	4.55	2.34	0
Total	5.25	4.95	4.8	2.77	3.9

Transect	CASHBA_20					
Frequency	Species	2007	2009	2010	2012	2015
Perennial Forb	ASTRA	0	1	2	0	0
	MACA2	0	0	7	0	0
	STEPH	0	0	22	0	0
	STPA4	22	0	0	15	18
Perennial Graminoid	DISP	7	5	7	5	8
	SPAI	82	83	84	78	71
Shrubs	ATCO	2	1	3	0	1
	ATTO	8	4	3	4	3
	ERNA10	34	19	14	23	34
	MACA17	0	30	0	0	2
	SAVE4	8	9	10	4	9
	TEAX	1	1	0	0	1
	ATPO	0	0	0	9	0
Nonnative Species	BRTE	0	3	0	0	0

	BRRU2	0	0	68	0	0
			indicates a significant difference, α≤0.1 between 2014 and prior sampling event			
Shrub Cover (m)	2007	2009	2010	2012	2015	
ATCO	0.1	0	0.25	0	0	
ATTO	0	0.2	0	0.01	0.4	
ERNA10	5.68	8.5	7.55	6.29	5.6	
SAVE4	2.1	2.2	2.4	3.07	2.25	
STEPH	0	0	1.75	0	0	
TEAX	0	0	0	0	0.3	
Total	7.88	10.9	11.95	9.37	8.55	
Transect	CASHBA_21		Revisited in 2018			
Frequency	Species	2007	2009	2010	2012	
Annual Forb	ATPH	0	0	3	0	
	CORA5	0	0	44	0	
	HEAN3	0	0	0	4	
Perennial Forb	ASFA	4	2	1	3	
	HECU3	3	2	3	0	
	MACA2	0	0	9	0	
	NIOC2	0	2	2	0	
	STEPH	0	0	11	0	
	STPA4	19	0	0	11	
	SUMO	0	0	0	3	
Perennial Graminoid	DISP	25	27	24	15	
	LECI4	13	10	16	16	
	SPAI	58	61	48	47	
Shrubs	ATCO	4	1	2	5	
	ATTO	1	0	0	0	
	ERNA10	35	29	35	34	
	MACA17	11	32	0	0	
	SAVE4	7	2	4	8	
Nonnative Species	SATR12	0	1	0	0	
	BRRU2	0	0	8	0	
			indicates a significant difference, α≤0.1 between 2014 and prior sampling event			

Shrub Cover (m)	2007	2009	2010	2012
ATCO	0	0.4	0	0.05
ATTO	0.7	1	0.98	1.04
ERNA10	4.55	6	4.37	6.31
SAVE4	2	1.3	2.37	1.66
Total	7.25	8.7	7.72	9.06

Transect	CASHBA_22				
Frequency	Species	2007	2009	2010	2012
Annual Forb	ATPH	0	0	2	0
Perennial Forb	MACA2	0	0	17	0
	MALE3	0	0	1	0
	NIOC2	0	0	0	0
	STEPH	0	0	10	0
	STPA4	0	0	0	3
	SUMO	2	1	2	0
Perennial Graminoid	DISP	56	51	59	44
	SPAI	116	116	117	116
Shrubs	ATCO	19	6	7	0
	ATTO	0	2	0	0
	ERNA10	3	8	1	3
	MACA17	20	20	0	0
	MESP2	2	0	0	0
	SAVE4	4	0	4	4
	ARTR2	5	4	1	4
	LYCO2	0	0	0	2

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2007	2009	2010	2012
ARTR2	0.65	0.53	0	0.67
ERNA10	0.75	0.79	0.65	0.5
MESP2	0.2	0	0	0
SAVE4	0.05	0.62	0	0.05
SUMO	0	0.15	0	0.17

TECA2	0	0.13	0	0				
Total	1.65	2.22	0.65	1.39				

Transect	CASHBA_23		Slough Pasture					
Frequency	Species	2007	2009	2010	2012	2015	2018	2021
Annual Forb	ATPH	0	0	13	0	0	0	0
	CLEOM2	0	0	0	2	0	0	0
	COMAC	0	0	12	0	0	0	0
	CORA5	0	0	21	0	0	0	0
Perennial Forb	MACA2	0	0	6	0	0	0	0
	PYRA	6	7	5	6	8	3	5
	STPA4	0	0	0	9	0	0	0
	SUMO	0	5	0	0	0	0	3
Perennial Graminoid	DISP	118	144	125	125	110	123	2
	JUBA	4	0	3	0	1	0	114
	SPAI	18	145	30	23	17	27	1
Shrubs	ATCO	0	3	0	0	0	0	19
	ATTO	0	25	0	0	0	1	0
	ERNA10	0	2	0	0	0	0	0
	MACA17	6	0	0	0	4	0	0
	SAVE4	3	1	3	6	3	5	0
	MACAI3	0	4	0	0	0	0	1
Nonnative Species	BAHY	0	0	0	2	0	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2007	2009	2010	2012	2015	2018	2021
ATTO	0.85	3.85	0.8	0.42	0.6	0.8	0
ERNA10	0	1.25	0.45	0.26	0.7	1.2	0.6
SAVE4	6.45	6.32	5.8	5.11	6.67	5	7.1
Total	7.3	11.42	7.05	5.79	7.97	7	7.7

Transect	CASHBA_24						
Frequency	Species	2007	2010	2012	2015	2018	2021
Annual Forb	ATPH	0	3	0	0	0	0

	COMAC	0	4	0	0	0	0
	CORA5	0	1	0	0	0	0
Perennial Forb	SUMO	6	5	3	5	0	0
Perennial Graminoid	DISP	24	35	49	15	6	7
	SPAI	120	132	128	92	83	79
Shrubs	ATCO	11	6	0	4	0	0
	ATTO	18	20	21	9	28	12
	ERNA10	7	2	3	6	0	1
Nonnative Species	BAHY	0	23	15	0	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2007	2010	2012	2015	2018	2021
ATCO	0.15	0.05	0	0.35	0	0
ATTO	3.25	4.5	5.67	1.65	11	2.9
ERNA10	0.55	1.2	1.09	1	1	0.8
SAVE4	0.3	0.4	0.71	0.35	1.2	0.7
SUMO	0	0.1	0	0.05	0	0
Total	4.25	6.25	7.47	3.4	13.3	4.4

Transect	CASHBA_25						
Frequency	Species	2009	2010	2012	2015	2018	2021
Annual Forb	ATPH	0	30	2	0	0	0
	CLOB	0	2	0	0	0	0
	COMAC	0	2	0	0	0	0
Perennial Forb	MACA2	0	5	0	0	0	0
	PYRA	0	0	3	0	0	0
Perennial Graminoid	DISP	87	78	78	64	57	14
	SPAI	116	97	99	95	88	46
Shrubs	ALOC2	0	0	0	0	2	0
	ATCO	0	11	0	0	3	0
	ATPA3				3	0	0
	ERNA10	10	5	10	12	9	0
	MACA17	7	0	0	14	0	0
	SAVE4	3	0	3	6	3	2

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2009	2010	2012	2015	2018	2021
ATCO	0	0	0	0	0.1	0
ATPA3	0	0.02	0	0.4	0.5	0
ERNA10	0.25	1.12	1.76	2.5	2.8	3.4
SAVE4	0	0.12	0	0	0.3	0
Total	0.25	1.26	1.76	2.9	3.7	3.4

Independence Lease (RLI-454)

Transect	4J_02	South River Field						
Frequency	Species	2007	2009	2010	2012	2015	2018	2021
Annual Forb	COCA5	0	0	0	0	0	2	0
Perennial Forb	ARSP	0	1	0	0	0	0	0
	ASFA	4	3	3	0	1	0	0
	GLLE3	6	8	11	12	12	12	9
	ARDR4	0	1	1	0	0	0	0
Perennial Graminoid	DISP	69	83	57	45	55	55	84
	HOJU	0	0	0	1	0	0	0
	JUBA	65	51	66	61	75	72	60
	LETR5	33	40	50	53	50	47	53
	SPAI	90	65	79	66	74	70	62
Shrubs	ATTO	0	0	0	1	5	3	5
	ERNA10	0	0	0	0	1	0	0
Nonnative Species	BAHY	0	12	22	3	4	9	0
	DESO2	0	0	0	0	0	0	0
	LOCO6	2	0	0	3	1	2	0
	LOTUS	0	0	0	0	0	0	16

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2007	2009	2010	2012	2015	2018	2021
ATTO	1.45	2.15	2.3	1.27	0.6	1.3	1.2
SUMO	0	0	0	0	0.3	0	0
Total	1.45	2.15	2.3	1.27	0.9	1.3	1.2

Transect	4J_03		South River Field					
Frequency	Species	2007	2009	2010	2012	2015	2018	2021
Annual Forb	ATPH	0	0	2	0	0	0	0
	CLPA4	0	0	1	0	0	0	0
	CLPL2	0	0	25	0	0	0	0
Perennial Forb	STPA4	4	4	6	2	0	0	0
Perennial Graminoid	DISP	137	136	137	143	112	110	124
	SPAI	46	48	44	34	36	24	51
Shrubs	ATTO	3	0	0	3	0	0	0
	SAVE4	8	4	2	3	4	3	2
		indicates a significant difference, α≤0.1 between 2014 and prior sampling event						
Shrub Cover (m)	2007	2009	2010	2012	2015	2018	2021	
ATTO	0.2	0	0.75	0.3	0	0	0	
SAVE4	0.5	1.55	2	2.15	1.2	0.9	0.2	
Total	0.7	1.55	2.75	2.45	1.2	0.9	0.2	

Transect	4J_04						
Frequency	Species	2007	2009	2010	2012	2015	2018	2021
Perennial Forb	GLLE3	3	0	0	3	0	0	0
	NIOC2	18	18	22	18	19	20	21
Perennial Graminoid	DISP	144	126	134	152	147	127	134
	LECI4	5	0	0	0	0	0	0
	LETR5	24	27	27	16	22	21	23
	SPAI	30	30	36	24	16	29	20
Shrubs	ATTO	0	2	0	0	0	0	0
	ERNA10	0	0	0	5	1	3	0
Nonnative species	LELA2	0	0	0	0	0	0	5
		indicates a significant difference, α≤0.1 between 2014 and prior sampling event						
Shrub Cover (m)	2007	2009	2010	2012	2015	2018	2021	

ATTO	1.4	2.1	8.42	1.51	1.4	2.3	0.1
ERNA10	1	0	0	0.64	1.4	0.7	0
Total	2.4	2.1	8.42	2.15	2.8	3	0.1

Transect	INDEP_65										
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2015**	**2018**	**2021**
Annual Forb	ATPH	0	30	0	0	0	0	0	0	0	0
	CLOB	0	7	0	0	0	0	0	0	0	0
	ERIAS	0	15	0	0	0	0	0	0	0	0
Perennial Graminoid	DISP	56.1	48	69	62	65	73	76	68	68	36
	SPAI	119	129	130	124	127	124	123	123	109	58
Shrubs	ATCO	5.1	12	12	4	18	9	14	5	10	0
	ATTO	5.1	2	4	3	2	5	2	2	0	0
Nonnative Species	SATR12	0	10	18	0	6	0	0	0	0	0

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2015**	**2018**	**2021**
ATCO	1.9	0.6	0.95	0.83	1.15	0.98	0.75	0	1.2
ATTO	0.2	0	0.05	0	0	0.2	0.3	0.8	0
Total	2.1	0.6	1	0.83	1.15	1.18	1.05	0.8	1.1

Aberdeen Ranch (RLI-479)

Transect	ABERDEEN_30									
Frequency	Species	2002	2003	2004	2007	2009	2010	2012	2015	2018	2021
Annual Forb	2FORB	37.4	0	0	0	0	0	0	0	0	0
	ATPH	0	3	0	0	0	0	0	0	0	0
	ATTR	0	82	76	0	0	0	0	0	0	0
	CLOB	0	2	0	0	0	0	0	0	0	0
	GILIA	0	8	0	0	0	0	0	0	0	0
Perennial Forb	OENOT	0	12	4	0	0	0	0	0	0	0
Perennial Graminoid	SPAI	81.6	57	68	59	60	60	70	46	49	29
Shrubs	ATTO	8.5	51	51	34	64	58	48	29	33	39
	SAVE4	0	0	3	0	0	0	0	0	0	0
Nonnative Species	BAHY	0	3	3	0	0	0	0	0	0	0

	SCAR	0	58	3	0	0	0	0	0	0	0
	SATR12	6.8	122	127	0	0	4	0	0	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2003	2004	2007	2009	2010	2012	2015	2018	2021
ATCA	0	0	0.35	0.8	0.75	0.72	0.3	0	0
ATTO	2.6	6.35	37.3	40.75	46.65	42.12	46.7	67.6	38.5
SAVE4	6.2	7.3	6.85	5.3	8.85	5.47	3.8	2.4	0
Total	8.8	13.65	44.5	46.85	56.25	48.31	50.7	70	38.5

Transect_Name	ABERDEEN_33										
Frequency	Species	2002	2003	2004	2007	2009	2010	2012	2015	2018	2021
Annual Forb	2FORB	0	0	3	0	0	0	0	0	0	NA
	ERIAS	0	3	18	0	0	0	0	0	0	
	GILIA	0	0	6	0	0	0	0	0	0	
Perennial Forb	STEPH	3.4	3	4	0	0	0	0	0	0	
	STPA4	0	0	0	2	0	0	0	0	0	
Perennial Graminoid	DISP	0	6	8	5	6	6	8	5	4	
	ELEL5	0	8	4	0	0	0	0	0	0	
	JUBA	0	0	0	0	0	0	0	0	0	
	SPAI	103.7	111	111	111	103	90	96	120	99	
Shrubs	ARTRW8	0	0	0	0	0	0	0	0	0	
	ATCO	1.7	14	9	24	13	12	12	10	9	
	ATTO	3.4	0	0	0	0	0	0	0	0	
	EPNE	5.1	1	2	0	1	0	0	0	0	
	ERNA10	0	5	3	5	2	0	0	0	0	
	MACA17	0	0	0	0	2	0	0	0	0	
	SAVE4	0	0	0	0	0	0	0	0	0	
	ARTR2	37.4	45	36	34	35	29	26	25	27	
Nonnative Species	BRTE	0	0	0	0	4	0	0	0	0	
	BRRU2	0	0	0	0	2	0	0	0	0	

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

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Shrub Cover (m)	2003	2004	2007	2009	2010	2012	2015	2018
ARTR2	17.34	7.5	13.55	13.85	14.2	12.1	10	12.5

ATCO	1.7	0.6	3.45	1.9	2.6	1.24	1.55	0
EPNE	0	0	0	0.4	0	0.2	0.3	0
EPVI	0.41	0	0	0	0	0	0	0
ERNA10	0.44	0	0	0	0	0	0	0
Total	19.89	8.1	17	16.15	16.8	13.54	11.85	12.5

Coloseum (RLI-407)

Transect	COLOSEUM_02						
Frequency	**Species**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**
Annual Forb	ATPH	36	0	0	0	31	3
	CLEOM2	7	0	0	0	0	0
	CLOB	2	3	0	0	0	0
	CORA5	0	0	0	0	2	0
	PSRA	4	0	0	0	0	0
Perennial Forb	MACA2	0	0	0	0	9	0
	PYRA	4	14	0	0	0	0
	STEPH	11	0	0	0	0	0
	PSATH	0	0	0	3	0	0
Perennial Graminoid	DISP	93	116	110	93	100	98
	JUBA	16	26	25	18	27	17
	POSE	0	0	5	0	0	0
	SPAI	27	24	35	41	41	40
Shrubs	ATCO	0	2	0	0	0	0
	ATTO	0	0	1	0	0	0
	ERNA10	0	19	0	3	4	0
	LEFR2	0	0	1	2	0	0
	MACA17	0	0	13	10	0	10
	SAVE4	3	17	7	8	1	5
	ARTR2	0	2	0	1	0	0
Nonnative Species	PHAU7	0	0	0	0	1	0
	POA	3	0	0	0	0	0

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**
ARTR2	0.71	0.35	0.3	0.35	0.7	0.2

ATCO	0.82	0	0.35	0.6	1.35	0.25
ATPA3	0	0	0.3	0	0	0
ERNA10	5.53	3.2	6.05	4.35	7.5	5.19
SAVE4	3.27	51.9	4.15	3.9	3.25	4.55
Total	10.33	55.45	11.15	9.2	12.8	10.19

Transect	COLOSEUM_38			South East Pasture						
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2015**	**2018**	**2021**
Annual Forb	2FORB	0	39	0	0	0	0	0	0	0	0
	ATPH	0	0	3	0	8	13	0	0	0	0
	CORA5	0	0	10	0	0	0	0	0	0	0
	ERIAS	0	21	15	0	0	0	0	0	0	0
	ERSP3	0	0	0	0	2	0	0	0	0	0
Perennial Forb	STEPH	17	11	16	0	0	0	0	0	0	0
	STPA4	0	0	0	0	3	12	10	2	0	0
	STEX	0	0	0	0	0	0	3	0	0	0
Perennial Graminoid	DISP	13.6	21	29	6	27	25	27	20	6	3
	SPAI	107.1	136	123	126	133	136	138	119	109	68
Shrubs	ARTRW8	0	0	0	0	0	0	0	0	0	0
	ATCO	0	5	2	0	0	0	0	0	0	0
	ATPA3	0	10	0	0	0	0	0	0	0	0
	ATTO	8.5	7	5	0	0	0	1	6	9	0
	ERNA10	10.2	13	21	5	19	3	2	4	37	12
	MACA17	0	0	0	0	3	0	3	1	3	0
	SAVE4	3.4	0	0	0	1	0	1	0	9	0
	ARTR2	42.5	30	31	5	0	0	1	3	13	5
Nonnative Species	FESTU	0	2	0	0	0	0	0	0	0	0
	SATR12	0	0	0	0	10	1	2	0	0	0
	BRRU2	0	0	0	0	9	0	0	0	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2015**	**2018**	**2021**
ARTR2	9.28	4.18	0	0	0	0.12	0.85	0.3	0
ATCO	0.1	0	0	0	0	0	0	0	0

ATTO	1.77	2.05	0	0.05	0	0.23	0.4	1	0
ERNA10	1.13	0.8	0.5	0.3	0	1.31	3.15	2.9	15.3
SAVE4	0	0	0	0.3	0.2	0.24	0.4	0.9	0
STPA4	0	0	0	0	1.65	0	0	0	0
Total	12.28	7.03	0.5	0.65	1.85	1.9	4.8	5.1	15.3

Twin Lakes Ranch (RLI-491)

Transect INTAKE_01

Frequency	Species	2002	2003	2004	2007	2009	2010	2012	2015	2017	2018	2021
Annual Forb	2FORB	0	0	1	0	0	0	0	0	0	0	0
	ATPH	0	18	5	0	0	0	0	0	6	0	0
	ATTR	0	0	2	0	0	0	0	0	0	0	0
	CHST	0	2	0	0	0	0	0	0	0	0	0
	CLEOM2	0	2	0	0	0	0	0	0	0	0	0
	CLOB	0	3	0	0	0	0	0	0	5	0	0
	CRCI2	0	0	7	0	0	0	0	0	0	0	0
	ERIAS	0	23	0	0	0	0	0	0	0	0	0
	ERIOG	0	5	0	0	0	0	0	0	0	0	0
	ERMA2	0	0	2	0	0	0	0	0	0	0	0
	MEAL6	0	0	10	0	0	0	0	0	0	0	0
	CLPL2	0	0	0	0	0	5	0	0	0	0	0
Perennial Forb	MACA2	17	0	0	0	0	11	0	0	0	0	0
	MALAC3	0	2	1	0	0	0	0	0	0	0	0
	STEPH	0	18	16	0	0	0	0	0	0	0	0
	SUMO	3.4	4	4	2	2	2	0	0	0	0	0
Perennial Graminoid	DISP	59.5	54	67	52	82	59	92	77	106	104	38
	JUBA	13.6	19	15	11	11	8	14	15	14	13	3
	SPAI	96.9	117	103	105	109	117	115	101	104	112	73
Shrubs	ATCO	23.8	15	23	19	25	11	25	19	12	15	3
	ATPA3	0	0	0	1	1	2	0	0	0	0	0
	ATTO	0	10	8	6	3	11	3	5	9	8	1
	ERNA10	8.5	22	27	26	28	17	12	11	2	0	0
	MACA17	0	0	0	14	18	0	10	12	7	4	0

Nonnative Species	BAHY	0	0	0	0	10	10	0	0	3	0	0	
	BRTE	0	0	1	0	0		0	0	0	0	0	0
	POMO5	0	3	0	0	0		0	0	0	0	0	0
	SATR12	0	0	0	0	0		0	0	3	0	0	0
	BRRU2	0	0	0	0	1		0	0	0	0	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Transect	INTAKE_01										
Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2015**	**2017**	**2018**	**2021**	
ATCO	1.15	0.85	0.95	0.75	0.75	1.52	0.5	0.64	0.1	0	
ATTO	0.76	1.35	1.6	1	2.35	1.07	0.05	0.31	0	0	
ERNA10	1.16	3.6	3.5	4.5	2.55	2.45	0.71	0.05	0	0	
SAVE4	0	0	0.25	0.15	0	0	0.28	0.15	0	0	
SUMO	0	0	0	0.1	0	0.18	0	0	0	0	
Total	3.07	5.8	6.3	6.5	5.65	5.22	1.54	1.15	0.1	0	

Transect	TWINLAKES_02										
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2015**	**2018**	**2021**
Annual Forb	ATPH	0	2	1	0	0	2	0	0	0	0
	CHENO	0	2	0	0	0	0	0	0	0	0
	CHHI	0	0	2	0	0	0	0	0	0	0
	CLOB	0	8	3	0	0	0	0	0	0	0
	COMAC	0	0	0	0	0	1	0	0	0	0
Perennial Forb	NIOC2	3.4	4	2	3	5	15	14	11	14	16
	PYRA	0	6	2	7	9	12	2	2	10	1
	STEPH	0	3	0	0	0	0	0	0	0	0
Perennial Graminoid	DISP	74.8	61	65	60	73	80	81	89	103	66
	JUBA	73.1	96	103	78	72	72	76	79	82	51
	LECI4	0	4	16	0	0	1	0	4	3	3
	LETR5	3.4	4	0	0	0	0	0	0	0	0
	POSE	0	0	0	0	2	11	0	0	0	0
	SPAI	59.5	53	69	44	36	39	68	24	32	38
	SPGR	34	20	19	65	57	76	89	90	97	114
Shrubs	ATTO	0	6	5	5	0	0	0	0	3	0

	ERNA10	11.9	28	24	27	1	0	0	0	0	0	
Nonnative Species	FESTU	0	3	1	0	0	0	0	0	1	0	
	POA	0	0	0	11	0	0	0	0	0	0	

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2015**	**2018**	**2021**
ATTO	6.4	5.9	4.3	0.32	1.05	1.17	0	0	0
ERNA10	18.3	15.85	13.52	0	0	0	0	0	0
Total	24.7	21.75	17.82	0.32	1.05	1.17	0	0	0

Transect TWINLAKES_03

Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2015**	**2017**	**2018**	**2021**
Perennial Forb	HECU3	0	0	0	0	0	0	0	0	0	46	0
	SUMO	0	0	5	11	15	2	14	0	0	3	0
Perennial Graminoid	DISP	144.5	144	141	153	163	127	158	150	115	153	114
	SPAI	0	1	5	1	2	0	0	0	0	1	6
Shrubs	ATTO	47.6	0	64	18	31	10	11	0	0	0	0
Nonnative Species	BAHY	0	37	27	0	26	38	0	0	3	30	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2015**	**2017**	**2018**	**2021**
ATTO	16.95	16.95	6.45	8.4	12.1	8.58	0	0	0	0
SUMO	0	0.1	2.4	0.6	0.9	1.08	0.2	0	0	0
Total	16.95	17.05	8.85	9	13	9.66	0.2	0	0	0

Transect TWINLAKES_04

Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Annual Forb	ATTR	0	0	9	0	0	0	0	0	0	0	0	0	0
	CHIN2	0	0	2	0	0	0	0	0	0	0	0	0	0
	CRCI2	0	0	3	0	0	0	0	0	0	0	0	0	0
Perennial Forb	HECU3	0	0	0	0	0	0	0	0	0	1	0	68	23
	SUMO	1.7	0	1	9	24	33	4	3	3	0	0	0	1
Perennial Graminoid	DISP	17	4	12	0	0	0	0	0	0	0	10	0	0
	LETR5	0	0	0	0	0	0	0	0	4	6	58	12	8
Shrubs	ATTO	5.1	8	27	18	13	9	3	0	0	1	2	0	5

Nonnative Species	BAHY	0	6	41	0	15	24	0	0	0	1	104	6	66	
	DESO2	0	0	7	0	0	0	0	0	0	0	0	0	0	
	LELA2	0	0	0	0	0	0	0	0	0	0	0	0	3	
	SATR12	0	4	82	0	0	0	0	0	0	0	0	0	0	

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2021**
ATTO	13.6	22.4	11.15	17.85	15.7	12.49	13.6	17.8	20.5	0.5	7.1	11.6	4.9
Total	13.6	22.4	31.15	45.1	52.9	24.98	21.7	26.46	20.5	0.5	7.1	11.6	4.9

Transect	TWINLAKES_05				
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**
Annual Forb	ATTR	0	156	91	0
Perennial Forb	MALE3	49.3	60	66	61
Perennial Graminoid	DISP	88.4	101	87	70
	JUBA	0	6	8	2
	LETR5	5.1	11	0	0
	SPAI	0	0	6	0
Shrubs	ATTO	17	15	45	29
	ERNA10	11.9	30	16	18
Nonnative Species	BAHY	0	18	35	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	**2003**	**2004**	**2007**
ATTO	4.2	2.6	8.85
ERNA10	6.5	10.15	18.95
Total	10.7	12.75	27.8

Transect	TWINLAKES_06												
Frequency	**Species**	**2006**	**2007**	**2009**	**2010**	**2012**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2021**
Annual Forb	LACO13	0	0	0	0	0	0	0	0	0	11	0	0
Perennial Forb	HECU3	0	0	8	8	11	8	1	3	28	94	95	60
	MALE3	0	0	0	0	0	0	0	0	0	0	0	5
	SUMO	48	30	29	16	10	9	6	3	0	0	3	0
Perennial Graminoid	DISP	57	38	32	13	30	53	43	20	31	32	12	41

	SPAI	0	0	10	0	0	0	2	0	0	1	6	4	
Shrubs	ATTO	23	20	63	71	51	36	27	31	4	1	6	0	
Nonnative Species	BAHY	0	0	22	29	0	0	0	0	25	0	6	0	
	DESO2	0	0	0	0	0	0	**0**	0	8	0	0	0	
	LELA2	0	0	0	0	0	0	**0**	0	0	1	7	8	
	SATR12	11	0	0	0	0	0	0	0	0	0	0	0	

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	**2006**	**2007**	**2009**	**2010**	**2012**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2021**
ATTO	5.4	11.3	50.15	66.55	62.75	35.88	51.79	55.5	5.2	0	0	0
SUMO	30.5	44.75	14.85	13.4	3.4	2.42	2.3	0	0	0	0	0
Total	35.9	56.05	65	79.95	66.15	38.3	54.09	55.5	5.2	0	0	0

Transect	BLKROC_37						
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**
Annual Forb	2FORB	0	9	0	0	0	2
	ATPH	0	4	0	0	0	3
	CLEOM2	0	0	1	0	0	0
	CLPA4	0	0	0	0	0	0
	CLPL2	0	0	0	0	0	21
Perennial Forb	CRTR5	0	0	0	9	4	0
	HECU3	0	0	2	0	0	0
	MACA2	0	0	1	0	0	3
	STEPH	0	1	6	0	0	0
	STPA4	0	0	0	12	4	0
	SUMO	0	0	4	6	13	4
Perennial Graminoid	DISP	105.4	72	115	112	107	110
	JUBA	10.2	0	0	2	0	1
	SPAI	39.1	15	33	34	28	29
Shrubs	ATCO	0	0	11	5	7	7
	ATTO	22.1	23	39	26	27	20
	ERNA10	5.1	1	23	17	14	17
	MACA17	0	0	0	0	0	0
	SAVE4	1.7	0	0	0	1	0

Nonnative Species	BAHY	0	0	13	0	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2003	2004	2007	2009	2010
ALOC2	0	0.73	0.5	0	0.15
ATCO	0.1	1.15	0.1	1.39	0.4
ATPH	0	0	0	0	0.1
ATTO	5.6	6.15	2.86	2.38	2.35
ERNA10	3.8	2.9	2.85	3.28	6.55
SUMO	0.3	0.3	1.05	1.7	0.35
Total	9.8	11.23	7.36	8.75	9.9

Lone Pine Lease (RLI-456)

Transect LONEPINE_01

Frequency	Species	2002	2003	2004	2007	2009	2010	2012	2013	2015	2018	2021
Annual Forb	HEAN3	0	0	0	0	2	0	0	0	0	0	0
Perennial Forb	ANCA10	0	0	0	0	2	0	0	0	0	0	0
	GLLE3	0	0	0	0	0	0	0	0	0	0	0
	MALE3	0	0	0	0	0	0	0	0	0	0	0
	PYRA	0	0	0	0	0	0	3	0	3	0	0
	SUMO	3.4	0	0	0	0	0	0	0	0	0	0
Perennial Graminoid	DISP	142.8	133	155	147	136	139	135	150	155	138	158
	JUBA	5.1	4	0	25	13	16	18	10	19	26	14
	LETR5	11.9	29	18	32	50	47	48	49	48	25	44
	SPAI	10.2	13	17	19	14	15	10	12	14	11	11
Shrubs	ATTO	1.7	4	7	3	3	0	0	0	0	1	2
	ERNA10	0	0	4	0	0	0	0	0	0	1	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2003	2004	2007	2009	2010	2012	2013	2015	2018	2021
ATTO	7.13	5.2	4.7	1.8	2.95	3.19	2.85	2.8	1.1	0.4
ERNA10	2.24	2.6	2.05	0	0.1	0.65	0.63	0.8	0	0.4
SUMO	0.08	0	0.75	0	0	0	0	0.4	0	0
Total	9.45	7.8	7.5	1.8	3.05	3.84	3.48	4	1.1	0.8

Transect LONEPINE_02

Frequency	Species	2002	2003	2004	2007	2009	2010	2012	2013	2015	2018	2021
Annual Forb	2FORB	0	0	0	0	0	0	0	0	0	0	0
	ATPH	0	0	0	0	0	0	0	0	0	0	0
Perennial Forb	ANCA10	0	0	0	0	0	0	0	0	0	0	0
	PYRA	0	0	0	0	0	0	4	2	0	0	0
	STEPH	0	0	0	0	0	0	0	0	0	0	0
Perennial Graminoid	DISP	146.2	125	142	143	164	141	152	132	160	131	155
	JUBA	8.5	13	20	17	14	15	15	14	0	0	6
	LETR5	0	0	0	3	0	1	4	1	0	0	0
	SPAI	64.6	78	65	64	52	65	69	48	0	6	28
Shrubs	ATTO	0	0	3	0	0	0	0	0	0	0	0
	ERNA10	0	1	4	3	1	2	3	0	0	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2003	2004	2007	2009	2010	2012	2013	2015	2018	2021
ATTO	2.23	2.15	0.6	0.85	0	0.95	0	0	0	0
ERNA10	2.05	3.35	1.8	2.45	2	3.35	0.05	0	0	0
Total	4.28	5.5	2.4	3.3	2	4.3	0.05	0	0	0

Transect LONEPINE_03

Frequency	Species	2002	2003	2004	2007	2009	2010	2012	2013	2015	2018	2021
Annual Forb	2FORB	0	1	0	0	0	0	0	0	0	0	0
	HEAN3	0	2	1	0	0	0	5	0	0	0	0
Perennial Forb	ANCA10	0	0	0	3	0	7	10	7	7	7	11
	GLLE3	11.9	0	7	0	5	3	2	3	7	2	6
	HECU3	0	0	0	0	0	0	0	2	1	0	0
	MALE3	6.8	3	5	2	5	3	0	5	0	1	0
	NIOC2	0	0	0	0	0	0	0	0	0	0	5
	PYRA	6.8	0	0	0	0	0	0	0	3	0	0
Perennial Graminoid	DISP	151.3	148	152	152	142	137	137	130	169	165	161
	JUBA	39.1	59	52	41	43	34	42	29	37	47	29
	LETR5	34	33	31	34	52	48	54	26	30	37	32
	SPAI	8.5	0	10	5	4	4	5	0	0	4	8
Shrubs	ATTO	13.6	2	13	0	1	3	0	0	0	0	0

	ERNA10	0	0	2	0	4	1	0	0	0	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2003	2004	2007	2009	2010	2012	2015	2018	2021
ATTO	13.51	13.4	6	0.8	4.85	5.6	0	0	0
ERNA10	1.99	2.7	0.55	2.75	0.6	0.2	0	0	0
SAVE4	0	0	0	3.6	0	0	0	0	0
Total	15.5	16.1	6.55	7.15	5.45	5.8	0	0	0

Transect	LONEPINE_04											
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2013**	**2015**	**2018**	**2021**
Annual Forb	2FORB	0	0	1	0	0	0	0	0	0	0	0
	ATPH	0	29	12	0	0	10	0	0	0	0	0
Perennial Forb	ANCA10	5.1	7	8	8	7	6	6	4	5	2	3
	MACA2	0	0	0	0	0	2	0	0	0	0	0
	NIOC2	3.4	0	0	2	2	0	0	0	2	0	2
	STEPH	5.1	0	11	0	5	0	0	0	0	0	0
	SUMO	3.4	4	6	2	3	0	0	0	3	15	11
Perennial Graminoid	DISP	105.4	101	114	97	88	77	87	88	99	99	84
	JUBA	15.3	18	25	11	15	15	23	14	4	4	2
	LETR5	0	0	0	0	0	0	0	0	2	0	0
	SPAI	47.6	63	56	69	79	84	72	60	59	54	36
Shrubs	ATCO	0	0	4	0	0	0	0	0	0	3	2
	ATTO	0	2	0	0	0	0	0	0	0	0	0
	ERNA10	0	2	0	0	0	0	0	0	0	0	0
	MACA17	0	0	0	4	0	0	0	1	0	0	8
Nonnative Species	BAHY	0	0	0	0	2	0	0	0	0	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	2003	2004	2007	2009	2010	2012	2013	2015	2018	2021
ATCO	0.14	0.55	0	0	0	0.4	0	0	0	0
ATTO	0	0	0	10	0.2	0	0	0	0	0
ERNA10	2.28	2.1	4.5	1.05	1	1.35	0	0	0	0
SUMO	12.41	1	0	0	1.25	1.86	0	0.8	0	0
Total	14.83	3.65	4.5	11.05	2.45	3.61	0	0.8	0	0

Transect	LONEPINE_05						
Frequency	**Species**	**2002**	**2003**	**2007**	**2009**	**2010**	**2012**	**2015**
Annual Forb	ATSES	0	3	0	0	0	0	0
	ATTR	0	3	0	0	0	0	0
	ERPR4	0	0	3	0	0	0	0
	LACO13	0	0	5	0	0	0	0
	COCA5	0	0	0	0	0	4	0
Perennial Forb	ARLU	0	0	5	0	0	0	0
	GLLE3	35.7	26	49	29	37	43	40
	MALE3	15.3	11	16	8	0	7	1
Perennial Graminoid	ARPU9	0	0	5	0	0	0	0
	DISP	34	40	23	42	24	26	10
	JUBA	6.8	4	1	0	3	0	0
	SPAI	52.7	69	73	77	71	73	39
Shrubs	ATTO	42.5	40	24	21	13	9	8
	SAEX	3.4	0	16	8	4	9	9
	ARTR2	0	0	0	0	2	0	0
Nonnative Species	BAHY	0	16	0	0	0	0	0

indicates a significant difference, α≤0.1 between 2014 and prior sampling event

Shrub Cover (m)	**2003**	**2007**	**2009**	**2010**	**2012**	**2015**
ATTO	32.82	28.85	9.65	13.18	13.39	6.6
SAEX	1.54	14.45	21.1	1.52	4.04	1.9
Total	34.36	43.3	30.75	14.7	17.43	8.5

Transect	LONEPINE_06										
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2012**	**2013**	**2015**	**2018**	**2021**
Perennial Forb	ANCA10	0	0	0	5	3	0	0	0	0	0	0
	PYRA	0	0	0	0	0	0	0	0	0	2	0
	SUMO	0	0	0	0	0	0	0	0	0	15	0
Perennial Graminoid	DISP	124	136	132	149	145	147	130	145	154	139	155
	JUBA	0	0	0	0	0	0	0	0	12	12	0
	SPAI	25	28	29	16	20	16	16	3	42	54	0

Nonnative Species	BAHY	0	0	5	0	0	3	0	0	0	0	0

Shrub Cover (m)	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2012**	**2015**	**2018**	**2021**
ATTO	0.45	0.6	0.4	0.45	1.4	1.22	1.5	0	0	0
SUMO	0.09	0.25	0.2	0	0	0	0	0	0	0
Total	0.54	0.85	0.6	0.45	1.4	1.22	1.5	0	0	0

Transect	LONEPINE_07								
Frequency	**Species**	**2007**	**2009**	**2010**	**2012**	**2013**	**2015**	**2018**	**2021**
Perennial Graminoid	DISP	150	157	160	151	140	157	136	123

Transect	LONEPINE_08				
Life Forms	**Species**	**2012**	**2013**	**2015**	**2017**
Annual Forb	2FORB	0	4	0	0
	HEAN3	0	7	0	0
Perennial Forb	ANCA10	3	83	74	93
	NIOC2	3	0	0	0
Perennial Graminoid	CADO2	0	1	0	0
	CAREX	0	0	5	4
	DISP	155	144	140	142
	JUBA	0	0	5	5
	SCAM6	0	22	37	49

Land Management Appendix 3. Irrigated Pasture Scores (2009-2021)

Lease ID	Pasture	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Brockman RLI-401														
	# 8	Dry	Dry	X	X	78	80	80	82	80	80	88	X	X
	# 7	82	96	X	X	90	86	86	90	84	X	88	X	X
	# 5	X	94	X	X	84	82	82	86	88	X	92	X	X
	# 3	X	92	X	X	76	68	68	82	74	80	86	X	X
	# 2	X	90	X	X	89	68	68	82	82	X	92	X	X
	# 4	X	98	X	X	88	96	96	86	88	X	88	X	X
	# 1	Dry	68	78	Dry	72	60	60	Dry	78	78	86	X	X
	# 6	X	96	X	X	94	96	96	90	90	X	88	X	X
	# 9	X	96	X	X	94	94	94	90	90	X	92	X	X
U-Bar RLI- 402														
	Highway North	X	92	X	X	80	X	X	86	X	X	86	X	X
	Highway South	X	92	X	X	80	X	X	86	X	X	86	X	X
	Upper North 40	X	90	X	X	86	X	X	88	X	X	94	X	X
	Upper Middle	X	88	X	X	92	X	X	88	X	X	94	X	X
	Lower Middle	X	94	X	X	92	X	X	88	X	X	86	X	X
	Bull	X	90	X	X	92	X	X	84	X	X	86	X	X
Eight Mile RLI- 408														
	House Pasture	X	80	86	X	84	X	X	82	X	X	82	X	X
Cashbaugh RLI- 411														
	Bull Pasture	X	96	X	X	94	X	X	88	X	X	94	X	X
	Horse Pasture	X	96	X	X	94	X	X	88	X	X	94	X	X
	Old Bull Pasture	X	90	X	X	96	X	X	88	X	X	94	X	X
	Lower Pasture	X	98	X	X	94	X	X	88	X	X	94	X	X
	Middle Pasture	X	98	X	X	94	X	X	88	X	X	94	X	X
	Upper Pasture	X	96	X	X	94	X	X	88	X	X	94	X	X
	Sheep Pasture	X	92	X	X	84	X	X	86	X	X	86	X	X
	Winters	X	82	X	X	80	X	X	80	X	X	86	X	X
	Lake Pasture	X	86	X	X	80	X	X	84	X	X	X	X	X
	Williams Pasture	X	88	X	X	84	X	X	80	X	X	86	X	X
	Horse	X	82	X	X	70	56	56	76	76	72	84	X	X
	Symons	90	86	X	X	96	X	X	86	X	X	84	X	X

Lease ID	Pasture	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Quarter B RLI- 404,413														
	Riata Pasture	76	74	70	80	78	72	72	78	80	76	92	X	X
	Mummy West	76	72	70	80	78	72	72	78	80	76	84	X	X
	Otey Pasture	76	76	76	78	81	X	X	78	76	Dry	70	X	X
All Five RLI- 416														
	Spring Field	X	98	X	X	92	X	X	88	X	X	100	X	X
	Right & Left Hand	X	100	X	X	96	X	X	86	X	X	98	X	X
	Far	X	100	X	X	92	X	X	90	X	X	70	X	X
	Airport	X	92	X	X	96	X	X	80	X	X	82	X	X
	Arena	X	96	X	X	96	X	X	82	X	X	86	X	X
Rockin D-M RLI- 420														
	Whistler	X	86	X	X	80	X	X	X	76	76	84	X	X
Mandich RLI-424														
	West Schober	X	96	X	X	88	X	X	88	X	X	94	X	X
	East Schober	X	90	X	X	88	X	X	88	X	X	94	X	X
	North Horse	X	86	X	X	90	X	X	88	X	X	96	X	X
	South Horse	X	86	X	X	90	X	X	88	X	X	96	X	X
	Heifer Pasture	X	94	X	X	90	X	X	88	X	X	96	X	X
	Jack In The Box	X	90	X	X	88	X	X	88	X	X	86	X	X
	Sheep Pasture	X	86	X	X	90	X	X	88	X	X	96	X	X
	East 80	X	92	X	X	90	X	X	88	X	X	96	X	X
	West 80	X	90	X	X	90	X	X	88	X	X	94	X	X
Olancha Cr RLI-427														
	Esta 1	X	88	X	X	92	X	X	86	X	X	96	X	X
	Esta 2	X	90	X	X	92	X	X	86	X	X	98	X	X
	Esta 3	X	88	X	X	92	X	X	86	X	X	98	X	X
	Esta 4	X	88	X	X	86	X	X	86	X	X	98	X	X
	Oesta 1	78	82	80	86	86	X	X	86	X	X	76	80	X
	Oesta 2	78	82	80	86	86	X	X	86	X	X	86	X	X
Blackrock RLI-428														
	Robinson	X	X	X	X	X	X	X	X	X	X	X	X	X

Lease ID	Pasture	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Homeplace RLI-428	L Pasture	X	94	X	X	94	X	X	92	X	X	94	X	X
	Hay Pasture	X	94	X	X	94	X	X	92	X	X	98	X	X
	E Stud Pasture	X	96	X	X	96	X	X	92	X	X	96	X	X
	W Stud Pasture	X	96	X	X	94	X	X	92	X	X	98	X	X
	Store Pasture	X	92	X	X	98	X	X	92	X	X	96	X	X
	Woven Wire	X	94	X	X	80	X	X	92	X	X	96	X	X
Thibaut RLI-430														
	Water Fowl Area	X	68	82	81	78	78	78	80	X	X	72	80	X
3-V RLI- 435														
	Swamp	X	90	X	X	72	70	70	78	90	90	76	80	X
	Front	X	94	X	X	88	X	X	78	92	92	80	X	X
	Horse	X	94	X	X	84	X	X	78	92	92	80	X	X
	Little	X	94	X	X	82	X	X	78	92	92	80	X	X
Big Pine Canal RLI-438														
	Alfalfa 2	X	96	X	X	78	X	X	82	X	X	96	X	X
	Alfalfa 1	X	96	X	X	91	X	X	82	X	X	96	X	X
	Alfalfa 3	X	94	X	X	91	X	X	82	X	X	96	X	X
	Heifer	X	98	X	X	94	X	X	94	X	X	100	X	X
	South Meadow	X	100	X	X	96	X	X	92	X	X	98	X	X
	Horse Pasture	X	94	X	X	90	X	X	82	X	X	94	X	X
	4C	X	96	X	X	98	X	X	94	X	X	98	X	X
	Canal	X	98	X	X	94	X	X	86	X	X	98	X	X
	Baker	96	X	X	X	80	X	X	X	X	X	84	X	X
	Sanger Meadow	96	X	X	X	X	X	X	X	X	X	84	X	X
	Cow Creek	96	X	X	X	X	X	X	X	X	X	84	X	X
Rafter DD RLI - 439														
	Mare Pasture	X	86	X	X	86	X	X	92	X	X	86	X	X
	Pasture 1	X	92	X	X	82	X	X	92	X	X	80	X	X
	Pasture 2	X	92	X	X	82	X	X	92	X	X	68	X	X
	Archy	X	92	X	X	92	X	X	92	X	X	86	X	X
	Corral Holding	X	86	X	X	88	X	X	88	X	X	74	80	X
	South Archy	X	94	X	X	88	X	X	88	X	X	80	X	X

Lease ID	Pasture	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Schober	X	90	X	X	96	X	X	88	X	X	74	80	X
	South Schober	X	88	X	X	88	X	X	80	X	X	74	80	X
J-M RLI-445														
	#3 Pasture	X	90	X	X	84	X	X	88	X	X	84	X	X
	#2 Pasture	X	88	X	X	86	X	X	90	X	X	74	80	X
	#1 Pasture	X	92	X	X	86	X	X	90	X	X	84	X	X
	#4 Pasture	X	90	X	X	84	X	X	88	X	X	92	X	X
C-T RLI-451														
Chance	Upper Pond	X	82	X	X	88	X	X	92	X	X	88	X	X
	Locust	X	86	X	X	86	X	X	92	X	X	86	X	X
	Iron Gate	X	88	X	X	86	X	X	92	X	X	98	X	X
	80 Pasture	X	90	X	X	86	X	X	92	X	X	98	X	X
	80 Pasture	X	88	X	X	86	X	X	92	X	X	98	X	X
	Below Hay Stack	X	88	X	X	86	X	X	92	X	X	98	X	X
	Hay Stack	X	88	X	X	86	X	X	90	X	X	90	X	X
	Rock Pasture	X	90	X	X	86	X	X	90	X	X	90	X	X
	Holding Pasture	X	90	X	X	86	X	X	90	X	X	90	X	X
	Below House	X	92	X	X	92	X	X	92	X	X	90	X	X
	Stink Ant	X	94	X	X	86	X	X	92	X	X	90	X	X
	Pasture # 4	X	84	X	X	96	X	X	92	X	X	98	X	X
	Derick Pasture	X	92	X	X	88	X	X	92	X	X	98	X	X
	Pond Pasture	X	92	X	X	96	X	X	92	X	X	98	X	X
	Lowest South	X	96	X	X	96	X	X	92	X	X	98	X	X
	Lower Middle	X	100	X	X	92	X	X	92	X	X	98	X	X
	Wahlene Pasture	X	98	X	X	92	X	X	92	X	X	98	X	X
	2nd Pasture	X	86	X	X	88	X	X	92	X	X	98	X	X
	Iris Pasture	X	96	X	X	92	X	X	92	X	X	98	X	X
	Long Pasture	X	94	X	X	84	X	X	92	X	X	98	X	X
	Horse Pasture	X	86	X	X	88	X	X	92	X	X	90	X	X
Schober	Front Pasture	X	94	X	X	96	X	X	92	X	X	80	X	X
	Alfalfa Pasture	X	86	X	X	98	X	X	92	X	X	88	X	X
	Pine Cr Rd Post	X	94	X	X	94	X	X	92	X	X	88	X	X
	4 Pasture	X	90	X	X	94	X	X	92	X	X	88	X	X
	A Pasture	X	94	X	X	98	X	X	90	X	X	88	X	X
	B Pasture	X	90	X	X	96	X	X	88	X	X	88	X	X
	40 Acre Pasture	X	90	X	X	96	X	X	92	X	X	88	X	X
	F Pasture	X	94	X	X	96	X	X	92	X	X	88	X	X

Lease ID	Pasture	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Lou's Pasture	X	92	X	X	94	X	X	92	X	X	88	X	X
	Highway Pasture	X	90	X	X	94	X	X	92	X	X	88	X	X
	Bull Pasture	X	82	90	X	94	X	X	92	X	X	88	X	X
	Orchard Pasture	X	86	X	X	90	X	X	92	X	X	88	X	X
	G Pasture	X	90	X	X	96	X	X	92	X	X	88	X	X
	E Pasture	X	82	94	X	98	X	X	92	X	X	88	X	X
Dairy RLI- 452														
	Calving	X	98	X	X	96	X	X	82	X	X	90	X	X
	Oystye	X	98	X	X	96	X	X	82	X	X	92	X	X
	Golf Field	X	96	X	X	98	X	X	90	X	X	90	X	X
	Middle Back	X	96	X	X	96	X	X	90	X	X	90	X	X
	North Back	X	94	X	X	98	X	X	90	X	X	90	X	X
Reata RLI-453														
	North Riata	X	90	X	X	90	X	X	84	X	X	82	X	X
	South Mummy	X	88	X	X	84	X	X	84	X	X	82	X	X
	Bishop Creek	X	92	X	X	90	X	X	84	X	X	82	X	X
	South Reata	X	90	X	X	90	X	X	84	X	X	82	X	X
	North Mummy	X	84	X	X	84	X	X	84	X	X	82	X	X
All Five RLI- 455														
	Ranch Pasture 1	X	96	X	X	86	X	X	86	X	X	98	X	X
	Ranch Pasture 3	X	84	X	X	84	X	X	94	X	X	98	X	X
	Ranch Pasture 2	X	92	X	X	86	X	X	94	X	X	98	X	X
	South Pasture	X	94	X	X	94	X	X	94	X	X	98	X	X
	Horse Field	X	90	X	X	94	X	X	94	X	X	98	X	X
	Elk Field	X	90	X	X	86	X	X	94	X	X	92	X	X
	North Feedlot	X	98	X	X	94	X	X	94	X	X	98	X	X
	NW Feedlot	X	92	X	X	94	X	X	94	X	X	98	X	X
	Stuart Lane Wiper	X	92	X	X	100	X	X	94	X	X	98	X	X
Lone Pine RLI- 456														
	Edwards	94	90	X	X	84	X	X	84	X	X	80	X	X
	Richards	92	84	X	X	84	X	X	84	X	X	92	X	X
	Van Norman	X	80	X	X	84	X	X	84	X	X	84	X	X
	Old Place	X	90	X	X	84	X	X	76	86	86	96	X	X
	Smith	X	96	X	X	84	X	X	84	X	X	94	X	X
	Miller	X	86	X	X	86	X	X	84	X	X	90	X	X

Lease ID	Pasture	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Rainbow Pack RLI- 460														
	Brockman	82	80	82	80	80	X	X	81	84	84	82	X	X
S-T RLI- 461														
	N Highland	78	88	X	X	82	X	X	84	X	X	80	X	X
	S Highland	70	86	X	X	82	X	X	84	X	X	80	X	X
	N Y Road	70	84	X	X	80	X	X	86	X	X	80	X	X
	S Y Road	74	86	X	X	80	X	X	86	X	X	80	X	X
	Bogie Field	66	84	X	X	84	X	X	82	X	X	80	X	X
	Steward	82	84	X	X	84	X	X	82	X	X	74	X	X
	North Horse	X	82	86	X	84	X	X	88	X	X	84	X	X
	West Horse	X	82	88	X	82	X	X	88	X	X	82	X	X
	Wanacott	78	84	X	X	84	X	X	82	X	X	78	X	X
	Horse Trap	86	94	X	X	92	X	X	94	X	X	82	X	X
	Mare Pasture	84	92	X	X	86	X	X	80	X	X	80	X	X
	Front Pasture	86	90	X	X	86	X	X	82	X	X	82	X	X
	Swamp Pasture	82	88	X	X	86	X	X	82	X	X	72	X	X
	Castaway	74	86	X	X	80	X	X	86	X	X	80	X	X
	Calvert Slough	X	84	X	X	80	X	X	78	84	84	80	X	X
Horseshoe Bar RLI-462														
	West Pasture	X	90	X	X	84	X	X	84	X	74	70	80	X
	Front Pasture	X	92	X	X	84	X	X	82	X	78	70	80	X
	Sewer Farm	X	88	X	X	88	X	X	84	X	86	72	80	X
Intake RLI-475														
	North Highway	X	84	X	X	88	X	X	80	X	X	92	X	X
	South Highway	X	88	X	X	88	X	X	80	X	X	80	X	X
	West County	X	92	X	X	88	X	X	80	X	X	92	X	X
	East County	X	98	X	X	88	X	X	80	X	X	92	X	X
	West Poplar	X	92	X	X	88	X	X	80	X	X	92	X	X
	East Poplar	X	90	X	X	88	X	X	80	X	X	92	X	X
	Fuller Meadow	X	86	X	X	94	X	X	86	X	X	92	X	X
	Salk	X	X	X	X	X	X	X	86	X	X	92	X	X
Aberdeen RLI- 479														
	One Acre	84	82	76	90	88	X	X	82	X	X	80	X	X
	North	X	86	X	X	88	X	X	82	X	X	78	80	X
	Middle	X	84	X	X	80	X	X	82	X	X	78	80	X

Lease ID	Pasture	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	South	X	70	X	X	80	X	X	82	X	X	74	80	X
	Hay stack	X	86	X	X	88	X	X	82	X	X	84	X	X
Round Valley RLI-483														
	Big Stockley	92	88	X	X	90	X	X	92	X	X	96	X	X
	Heifer	94	92	X	X	88	X	X	92	X	X	96	X	X
	Little Stockley	94	86	X	X	90	X	X	92	X	X	90	X	X
	Outside	90	88	X	X	90	X	X	92	X	X	96	X	X
	Sheep	94	92	X	X	92	X	X	92	X	X	96	X	X
	Bull	92	88	X	X	90	X	X	92	X	X	96	X	X
	Horse	90	70	92	X	94	X	X	92	X	X	96	X	X
	Triangle	92	90	X	X	90	X	X	92	X	X	96	X	X
	Georges	96	86	X	X	90	X	X	92	X	X	94	X	X
	40 Acres	88	90	X	X	88	X	X	92	X	X	92	X	X
	Freeway	94	88	X	X	90	X	X	92	X	X	94	X	X
	Tonys	86	86	X	X	94	X	X	92	X	X	96	X	X
	Rock House	90	90	X	X	94	X	X	92	X	X	96	X	X
	Steer	90	92	X	X	90	X	X	80	X	X	96	X	X
	Canal Pasture	X	82	X	X	88	X	X	80	X	X	80	X	X
	Mitigation	X	X	X	X	X	X	X	80	80	80	88	X	X
	Little Pasture	X	78	X	X	88	X	X	80	X	X	82	X	X
	Wells Meadow	X	86	X	X	90	X	X	80	X	X	84	X	X
	McGee Pasture	X	88	X	X	90	X	X	80	X	X	X	X	X
	Birch Pasture	X	88	X	X	88	X	X	80	X	X	82	X	X
	Horse Pasture	X	86	X	X	88	X	X	80	X	X	82	X	X
L-I Bar RLI-487														
	Sheep/Horse	X	92	X	X	**88**	X	X	80	X	X	94	X	X
	Hess Pasture	X	94	X	X	88	X	X	80	X	X	92	X	X
	West Line	X	94	X	X	94	X	X	80	X	X	92	X	X
Islands RLI-489														
	Zucco	X	98	X	X	92	X	X	82	X	X	98	X	X
	D&D	X	96	X	X	92	X	X	82	X	X	88	X	X
	Bardoff	X	96	X	X	92	X	X	82	X	X	88	X	X
	Plot	X	100	X	X	96	X	X	82	X	X	88	X	X
	Heifer Heaven	X	96	X	X	90	X	X	82	X	X	96	X	X
	Garden	X	96	X	X	90	X	X	82	X	X	92	X	X

Lease ID	Pasture	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Orchard	X	100	X	X	82	X	X	82	X	X	92	X	X
	Pampa	X	100	X	X	90	X	X	82	X	X	88	X	X
	Cane	X	100	X	X	92	X	X	82	X	X	90	X	X
	L&L	X	100	X	X	90	X	X	82	X	X	88	X	X
	Willow	X	100	X	X	84	X	X	82	X	X	86	X	X
	Clover	X	96	X	X	92	X	X	82	X	X	92	X	X
	Horse Heaven	X	94	X	X	84	X	X	88	X	X	92	X	X
	Hectare	X	96	X	X	90	X	X	82	X	X	92	X	X
	Desert	X	96	X	X	96	X	X	82	X	X	92	X	X
	Olive Pasture	X	88	X	X	82	X	X	88	X	X	88	X	X
	Georges	X	90	X	X	82	X	X	88	X	X	92	X	X
	B and D	X	90	X	X	90	X	X	88	X	X	86	X	X
	Carasco North	X	86	X	X	90	X	X	88	X	X	86	X	X
	Lake Field	X	90	X	X	74	X	X	88	X	X	86	X	X
	Bolin	X	X	X	X	90	X	X	88	X	X	84	X	X
	Archie	X	88	X	X	90	X	X	88			86	X	X
Four J RLI- 491														
	Front Pasture	X	90	X	X	80	X	X	94	X	X	94	X	X
	Triangle	X	88	X	X	72	68	68	62	90	90	88	X	X
	West Holding	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	30	30	84	X	X
	Holding Field	X	98	X	X	90	X	X	94	X	X	88	X	X
	Hessian	X	84	X	X	76	70	70	62	92	92	94	X	X
	Fish Springs	X	90	X	X	94	X	X	80	X	X	78	X	X
	Tenemaha	X	84	X	X	94	X	X	X	X	X	88	X	X
	Main Meadow	X	94	X	X	90	X	X	78	94	94	94	X	X
	Main Meadow	X	90	X	X	94	X	X	92	X	X	84	X	X
Reinhackle RLI- 492														
	South Pasture	74	92	X	X	86	X	X	88	X	X	92	X	X
	West Pasture	X	90	X	X	86	X	X	88	X	X	86	X	X
	East Pasture	X	94	X	X	86	X	X	88	X	X	90	X	X
	Horse Pasture	66	86	X	X	72	74	74	82	X	X	84	X	X
Rockin C RLI-493														
	Rain Gun	X	X	X	X	84	X	X	84	X	X	80	X	X
	Little Horse	X	X	X	X	84	X	X	84	X	X	84	X	X
Pine Cr RLI-494														

Lease ID	Pasture	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Highway Pasture	78	78	82	80	86	X	X	88	X	X	82	X	X
Mount Whitney RLI- 495														
	ED Pasture	78	80	82	88	88	X	X	86	X	X	82	X	X
	WD Pasture	72	80	78	88	82	X	X	86	X	X	82	X	X
Warm Springs RLI- 497														
	Waterson North	X	94	X	X	96	X	X	92	X	X	94	X	X
	Waterson South	X	84	X	X	96	X	X	92	X	X	94	X	X
	Calving Pasture	78	X	X	X	86	X	X	80	X	X	90	X	X
	New Alfalfa	70	X	X	X	82	X	X	80	X	X	86	X	X
	Old Alfalfa	78	X	X	X	82	X	X	82	X	X	90	X	X
Pine Cr RLI-498														
	Pine Cr. Pasture	X	90	X	X	96	X	X	92	X	X	98	X	X
	Corral Pasture	X	94	X	X	96	X	X	92	X	X	96	X	X
	Triangle Pasture	X	96	X	X	94	X	X	92	X	X	96	X	X
	Little Trap	X	98	X	X	84	X	X	92	X	X	98	X	X
	Behind Corral	X	96	X	X	96	X	X	92	X	X	96	X	X
	40 Acres	X	94	X	X	96	X	X	92	X	X	96	X	X
	Horse Field	X	94	X	X	94	X	X	92	X	X	96	X	X
	Bull	X	98	X	X	94	X	X	92	X	X	98	X	X
	New Field	X	96	X	X	96	X	X	92	X	X	96	X	X
Laws RLI- 499														
	Silver Canyon	X	86	X	X	94	X	X	92	X	X	92	X	X
	Middle Pasture	X	88	X	X	94	X	X	94	X	X	98	X	X
	Jean Blank	X	88	X	X	96	X	X	92	X	X	100	X	X
	Wiper Pivots	X	98	X	X	96	X	X	92	X	X	88	X	X
	Full Pivot N	X	90	X	X	96	X	X	82	X	X	84	X	X
	Full Pivot S	X	86	X	X	96	X	X	78	96	96	92	X	X
	Mitigation	X	86	X	X	96	X	X	98	X	X	92	X	X
C-T RLI- 500														
	South 80	X	92	X	X	82	X	X	86	X	X	90	X	X
	North 40	X	96	X	X	86	X	X	86	X	X	92	X	X
	Trailer Park	X	94	X	X	86	X	X	92	X	X	92	X	X

3.4. LADWP Invasive Species Treatment and Removal

Background

The LADWP noxious-weed treatment program began in 1994 when perennial pepperweed (*Lepidium latifolium*) was initially found in the Owens Valley. Following this discovery, LADWP has focused on the control and eradication of weeds with high potential to cause either economic or environmental detriment. Pepperweed, Russian knapweed (*Acroptilon repens*) and invasive thistle (*Cirsium sp*.) are the primary species targeted. In addition to these species LADWP also treats saltcedar (*Tamarix ramosissima*). This introduced species is an aggressive colonizer throughout shorelines and riparian areas in the western states. Without control, native communities can be replaced by extensive monocultures of saltcedar resulting in decreased biodiversity, riparian process and function and overall habitat value.

2021 Pepperweed Treatment Efforts

In 2021, pepperweed treatment began in April and concluded October. Over this period a total of 5,402 acres were canvassed for treatment in 2021 by LADWP personnel (Figures 3-4a-3.4d).

Each season weed crews begin treatment south of Lone Pine along water conveyances, irrigated meadows, and water spreading areas. Treatment progression continues north throughout the season to the Laws and Owens River areas just below Pleasant Valley Reservoir. Selective broadleaf herbicides are used to treat pepperweed with application equipment consisting of backpack sprayers for small localized populations and either a tractor with a spray boom or ATV mounted hand-sprayers for larger populations.

Dense pepperweed populations in the Multi-Completion Mitigation Field in the Five Bridges area and the Dixon Lane area were again tractor-mowed during the growing season prior to herbicide application in the fall. This integrated methodology began in 2020. Results will continue to be monitored to assess efficacy.

Pepperweed treatment will resume beginning in April 2022 and will continue through mid-October 2022 using methods described above or similar.

The Inyo/Mono County Agricultural Commissioner's Office (CAC) annually conducts pepperweed control along the Owens River corridor from Pleasant Valley Reservoir dam south to Warm Springs Road (Five Bridges area excluded) and along the river within the Lower Owens River Project (LORP) boundaries. Treated acres and methodology are reported each year within the Owens Valley and LORP annual reports.

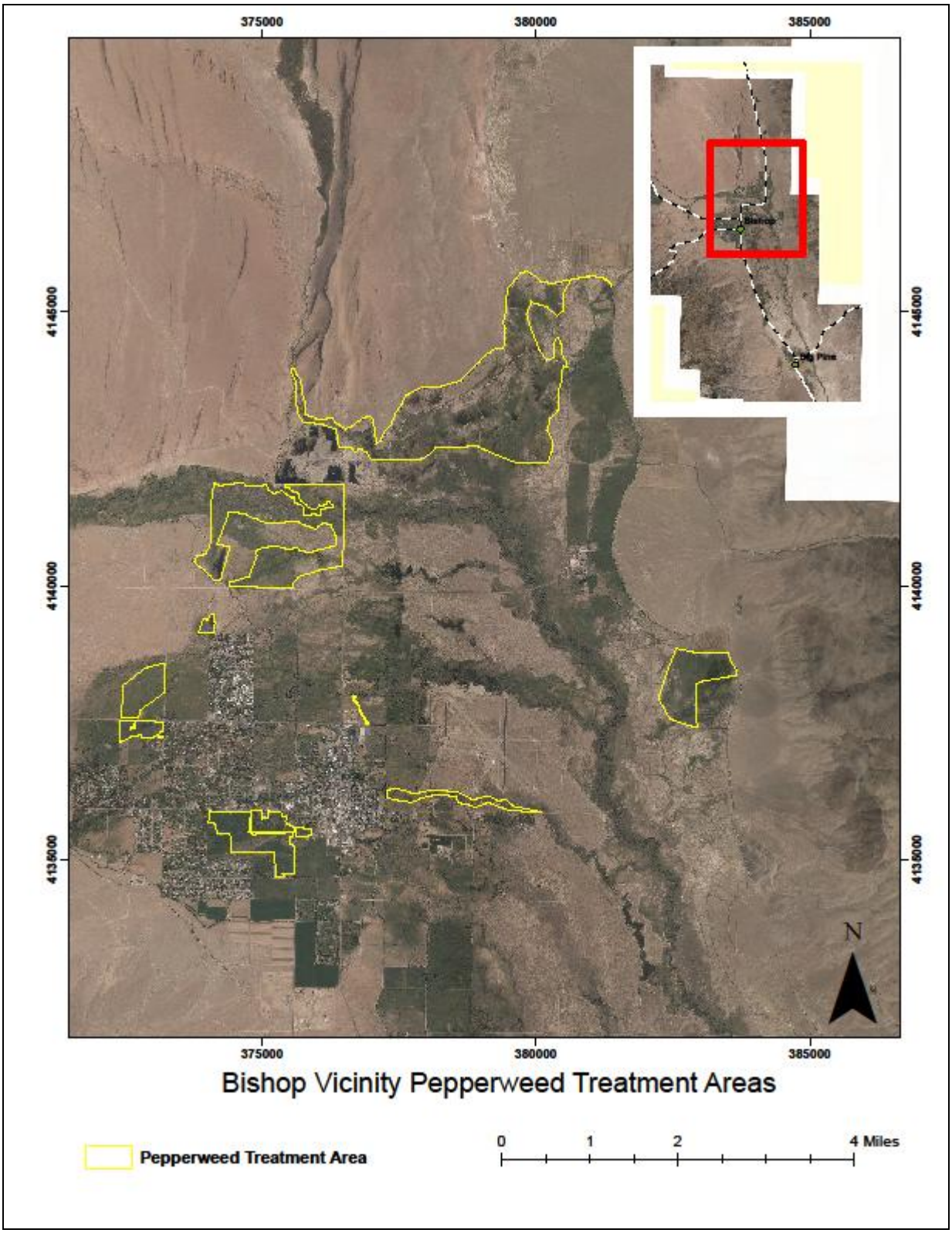


Figure 3.4a. Pepperweed Treated in Bishop Vicinity 2021

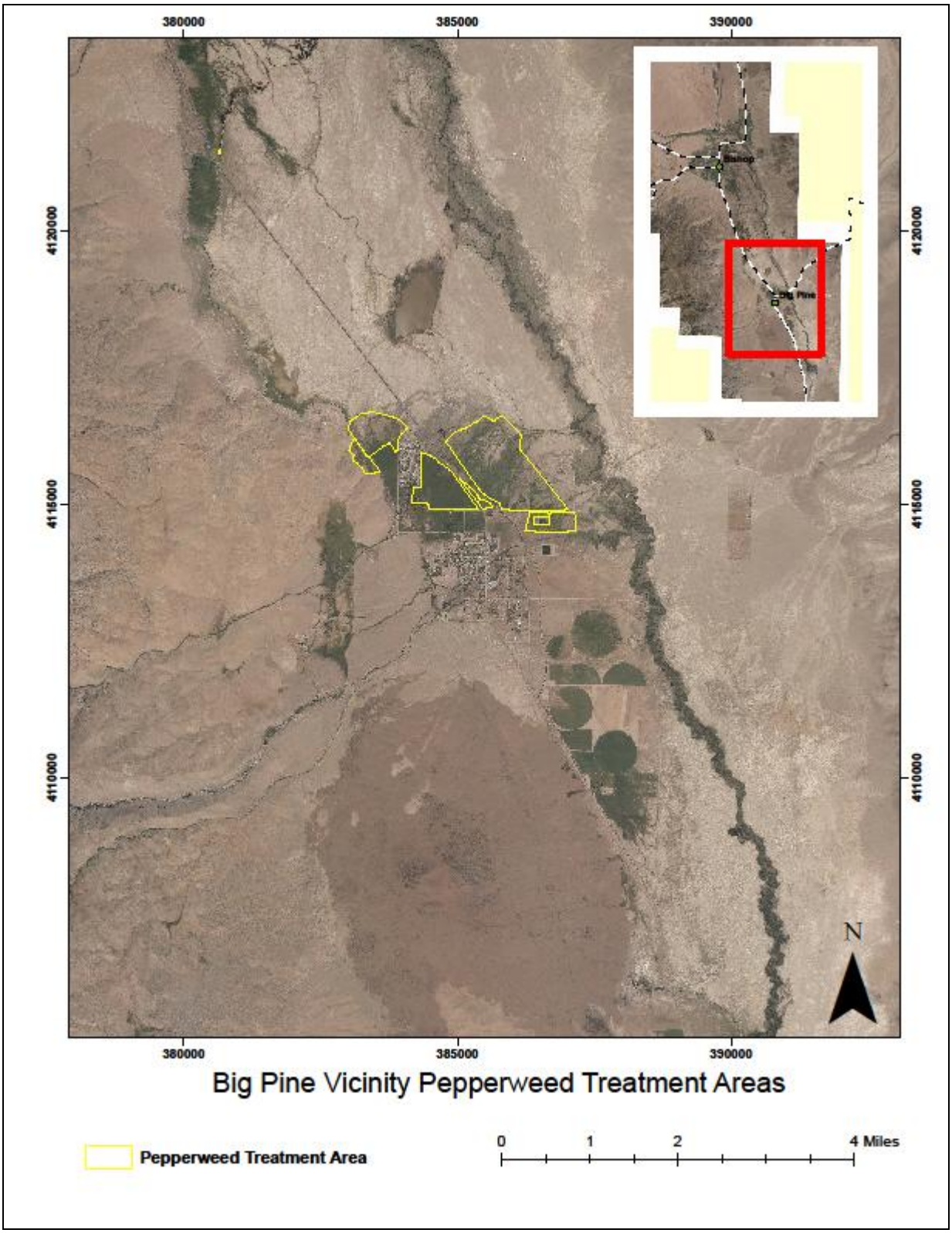


Figure 3.5b. Pepperweed Treated in Big Pine Vicinity 2021

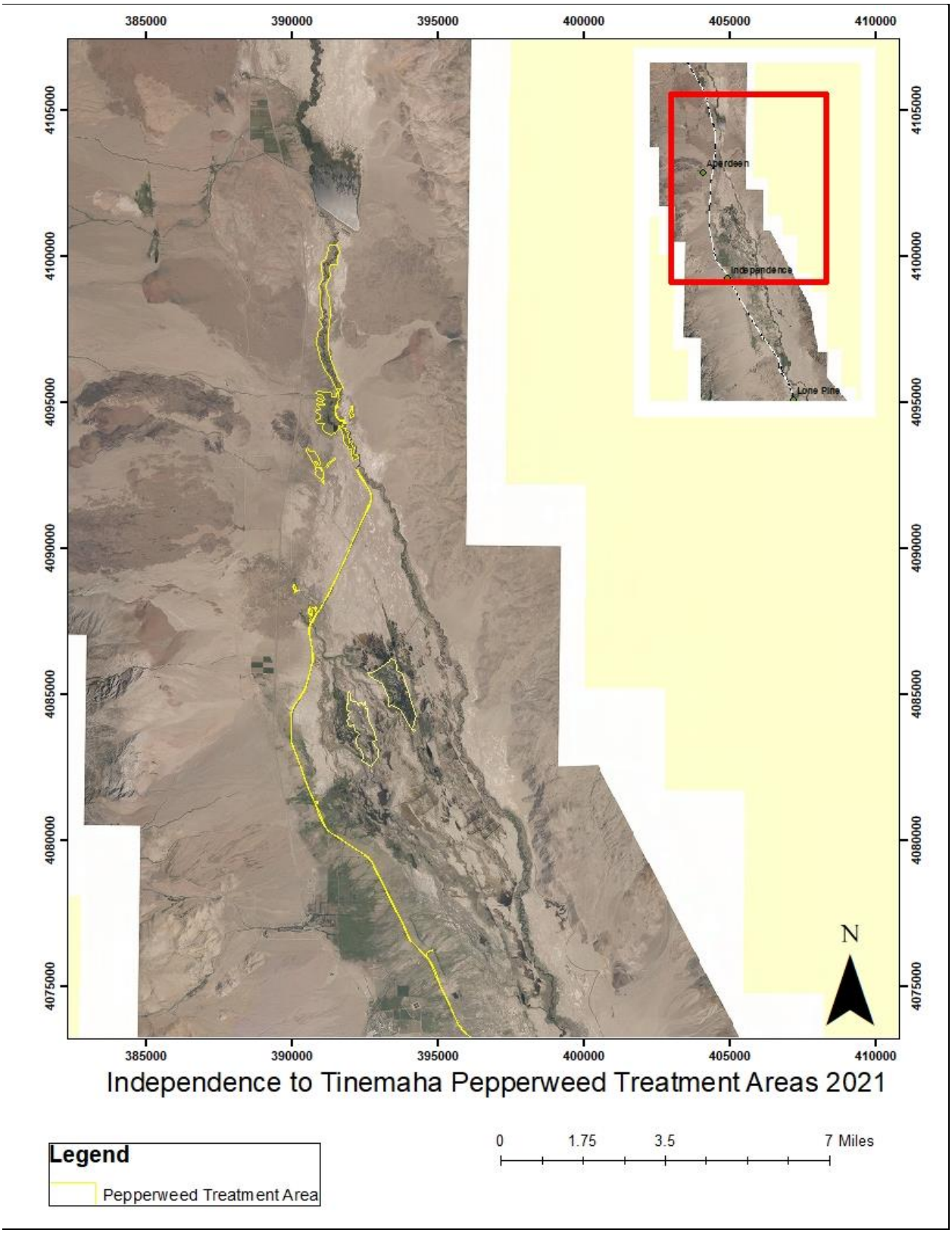


Figure 3.6c. Pepperweed Treated from Independence to Tinemaha 2021

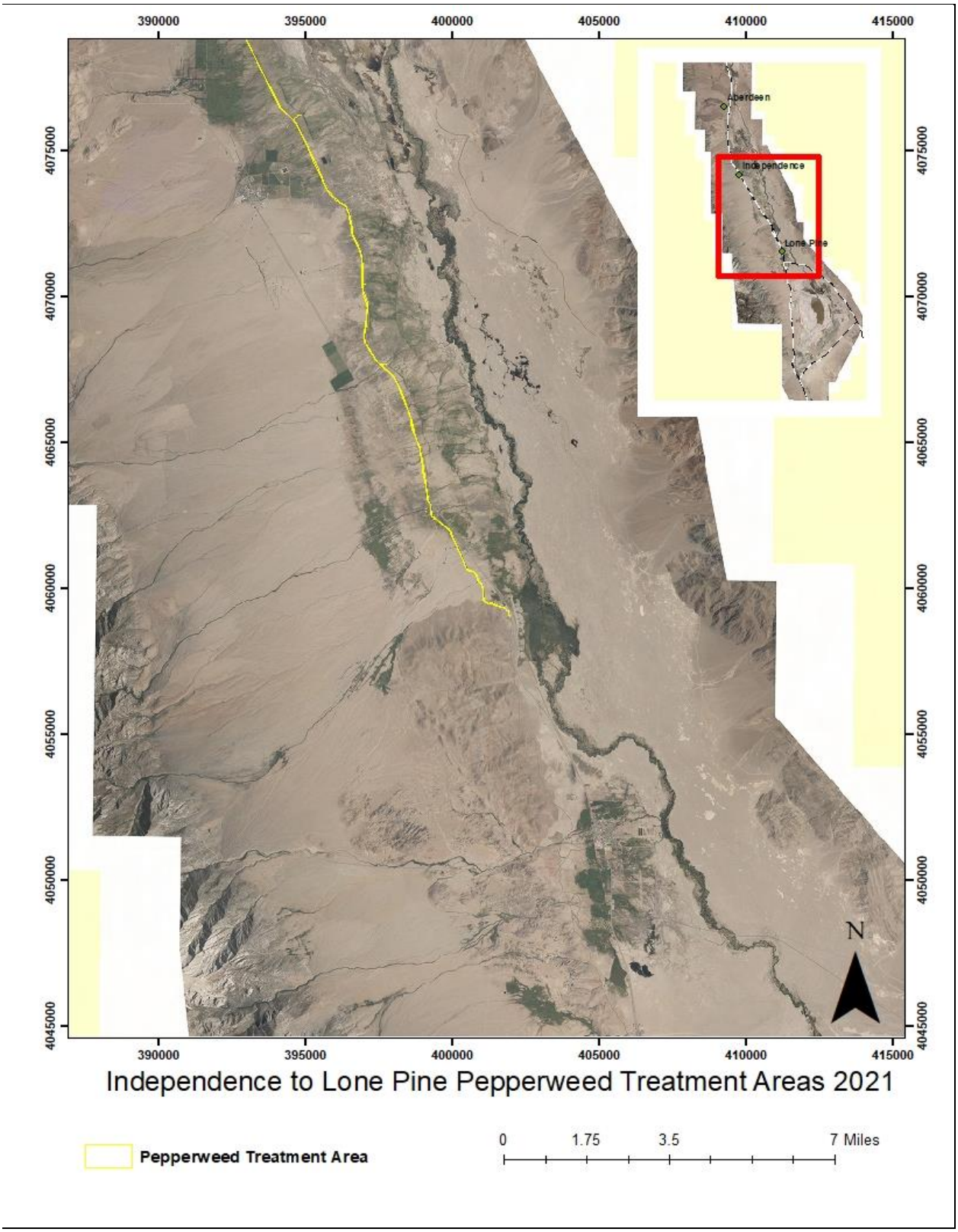


Figure 3.7d. Pepperweed Treatment Area from Independence to Lone Pine 2021

2021 Saltcedar Treatment Efforts

A total of 2,497 acres were canvassed for treatment in 2020-2021 (Figures 3.6a-3.6d). Saltcedar treatment was conducted north of Bishop in the McNally Canal and Laws-Poleta areas and east of Independence around the Homestead site, Upper and Lower Goose Lakes and Owens River:

- McNally Canals (1,675 treated acres)
- Laws-Poleta (549 treated acres)
- Homestead Site to Mazourka Canyon Rd (76 treated acres).
- Goose Lake vicinity (164 treated acres).
- Area immediately adjacent to Lower Owens River (33 treated acres).

The 2020-2021 control efforts consisted of cut stump treatment of larger diameter trees using a skid steer mounted turbo saw attachment, mowing of smaller diameter trees including saplings and seedlings, and hand cutting using chainsaws and pruners. Garlon 4-Ultra herbicide was applied to cut stumps using the turbo saw attachment, spray equipment mounted on side by side utility vehicles, and backpack sprayers.

A skid steer mounted turbo saw and grapple rake attachment was utilized to cut, gather and consolidate substantial volumes of slash into piles for burning. Approximately 200 piles measuring 10 ft. in diameter and 6 ft. tall were stacked in locations to be burned by Cal Fire. A Cal Fire Vegetation Management Plan (VMP) will be utilized to permit and coordinate burning activities.

A total of 1,675 acres were treated in the McNally Canals and Laws/Poleta area. The majority of work was accomplished using skid steer mounted equipment. Hand work was reserved for canal banks and meadow areas. Approximately 12 piles of slash were stacked in the McNally Canals area for burning at a later date.

During the 2020-2021 season, 164 acres of saltcedar were treated at the Goose Lake site. Saltcedar at this site consisted of dense stands of tamarisk of various sizes from seedlings to mature trees with 10-inch diameter trunks. This required higher intensity mowing and sawing per unit area, which resulted in numerous piles of saltcedar slash having to be moved to appropriate locations for subsequent burning.

Sporadic saltcedar seedlings and saplings occur linearly along the wetted edge of the Owens River. Larger patches are also present on the flood plain and oxbow cutoffs that are in close proximity to seed sources. Recent treatments have focused on cut stump methods using hand tools in areas not easily accessible by heavy equipment such as river banks and poor terrain. A total of 33 acres were treated in these areas.

Approximately 76 acres in and around the Homestead site were cleared of all size classes of saltcedar and olive trees. In addition, while gathering and stacking newly cut slash, older piles that had amassed over the years were also removed from the site. All slash was stacked at the southern end of the project polygon for subsequent burning.

Saltcedar treatment will resume beginning in October 2022 and will continue through mid-April 2023 using methods described above or similar.

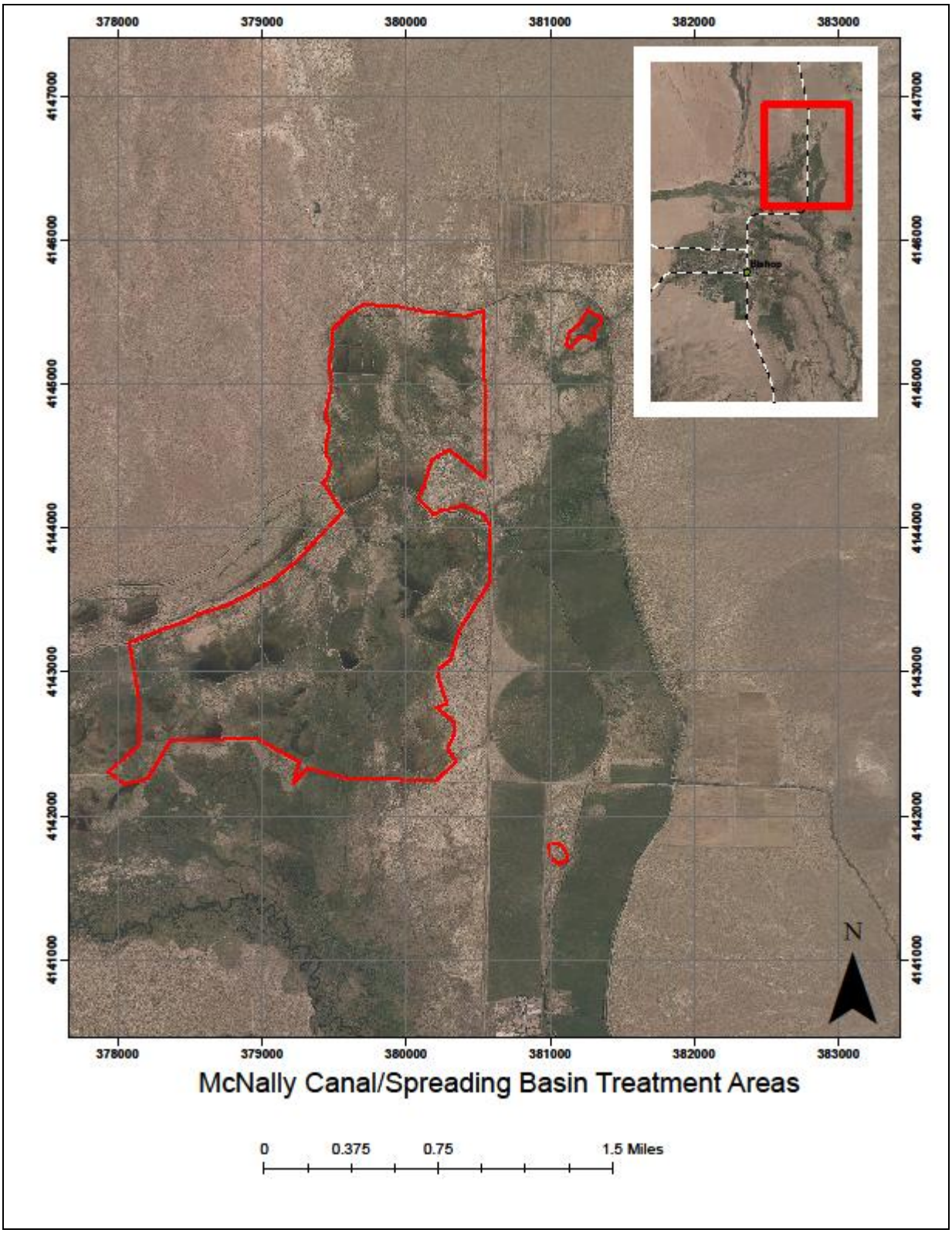


Figure 3.8a. Tamarisk Treatment in the McNally Canal Vicinity 2020-2021

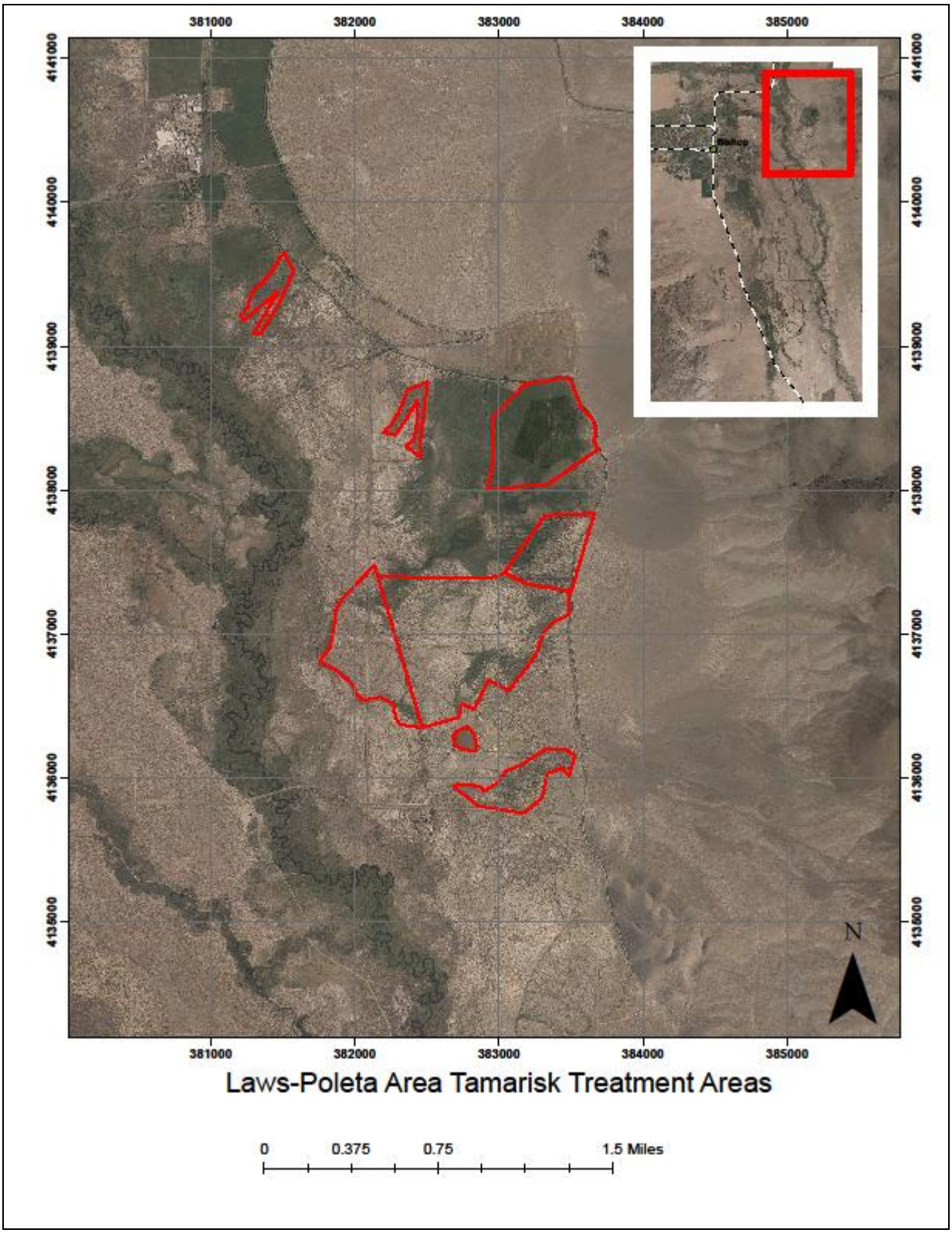


Figure 3.9b. Tamarisk Treatment in the Laws-Poleta Vicinity 2020-2021

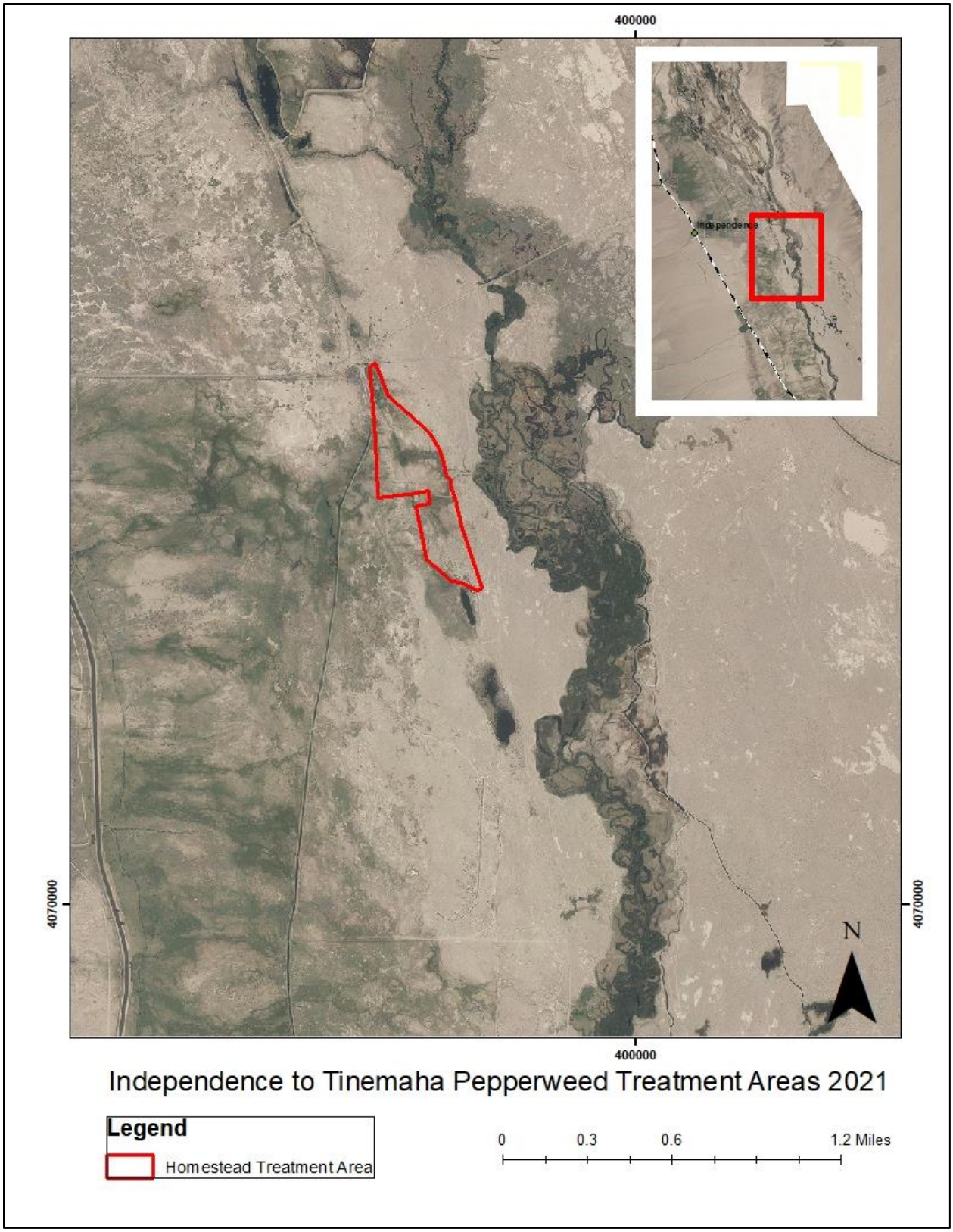


Figure 3.10c. Tamarisk Treatment in the Homestead Area 2020-2021

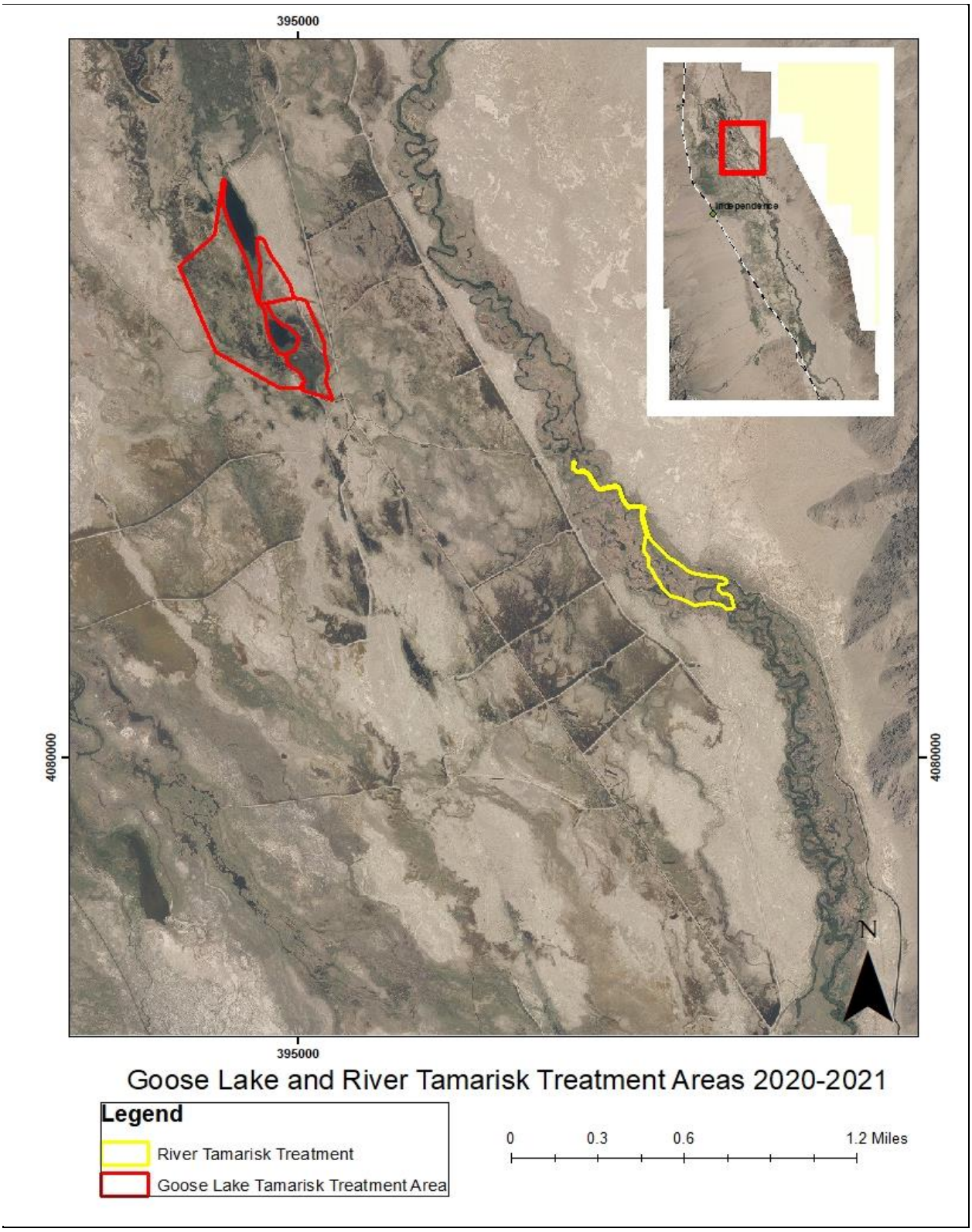


Figure 3.11d. Tamarisk Treatment in the Goose Lake Area 2020-2021

4.0 APPENDICES

4.1. APPENDIX A. BISHOP CONE AUDIT

4.2. APPENDIX B. GREENBOOK ANALYSIS OF IRRIGATION REDUCTION PROGRAM

The Agreement states that successive dry years could result in insufficient water supply to meet all needs. Section 1V.A of the Agreement provides:

"It is recognized that successive dry years could result in insufficient water to meet all needs. During periods of dry year water shortages, the Technical Group will evaluate existing conditions. A program providing for reasonable reductions in irrigation water supply for Los Angeles-owned lands in the Owens Valley and for E/M projects may be implemented if such a program is approved by the Inyo County Board of Supervisors and the Department, acting through the Standing Committee."

The Greenbook, which is the technical appendix to the Inyo/Los Angeles Water Agreement, further describes factors that are to be considered in Section I.B.4.a. stating:

"The Agreement recognizes that successive dry years could result in insufficient water supply to meet all needs. Section 1V.A of the Agreement provides that during periods of water shortages, a program to reduce the amount of irrigation water supply for Los Angeles-owned lands may be implemented if such a program is approved by the County Board of Supervisors and the Department. Factors that will be considered in determining if such a program is to be implemented include: 1) water use, supply, and conservation in Los Angeles; 2) flows in the LAA System; 3) surface water runoff conditions; 4) level of groundwater extractions; and 5) extent of well turn-offs implemented for purposes of environmental protection."

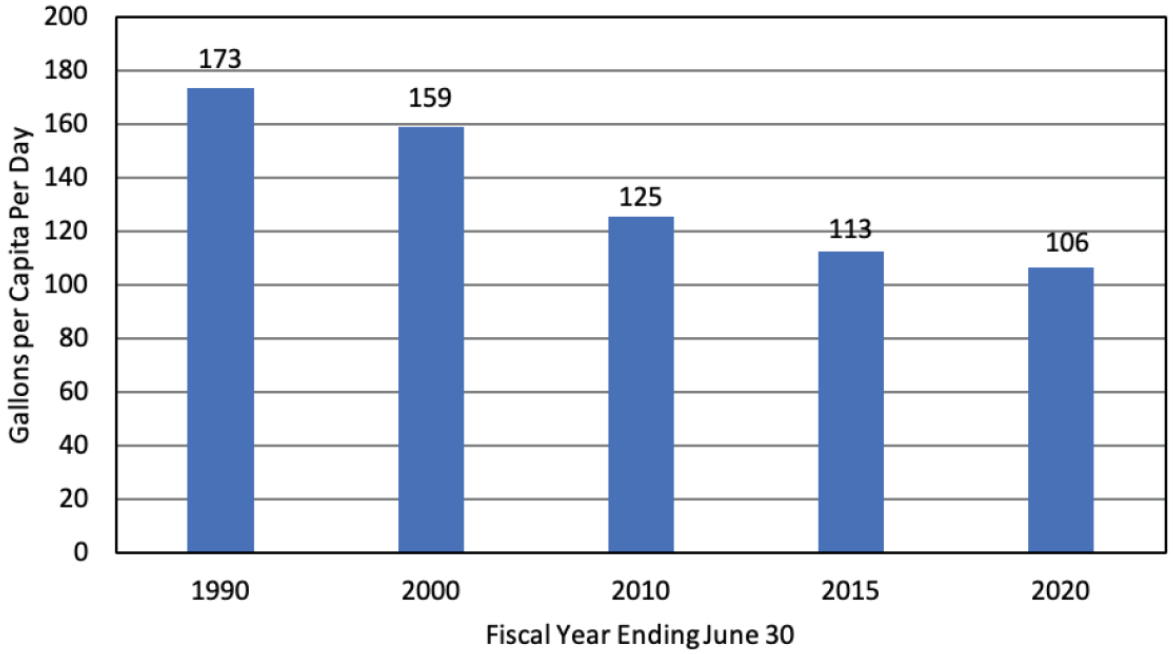
Summary of Green Book Factors for Consideration of Irrigation Reduction Program

The Green Book describes five factors that are to be considered during the determination of whether to implement a program to reduce the amount of irrigation water supply for Los Angeles-owned lands. At this time, for all five factors, consideration of implementing an irrigation reduction program appears warranted.

1. Water Use, Supply, and Conservation in Los Angeles

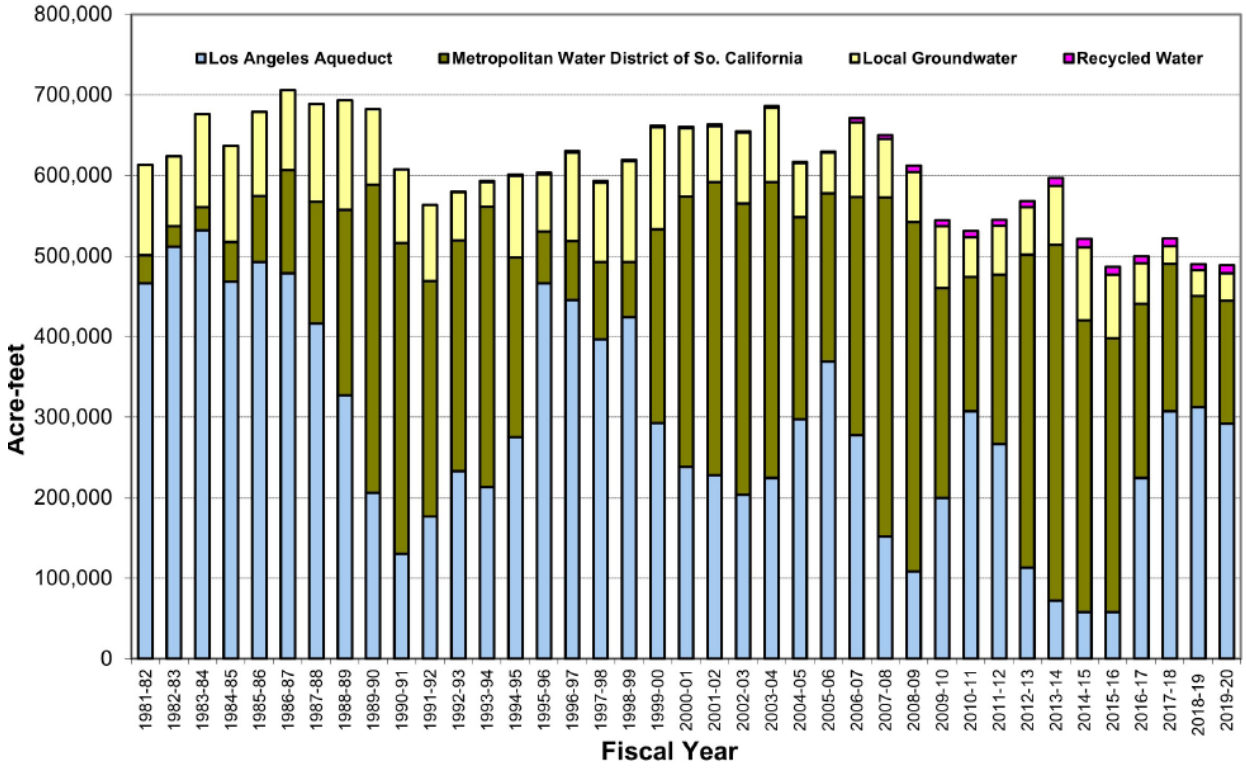
The first factor to be considered is water use, supply, and conservation in Los Angeles. Los Angeles has been a leader in conservation efforts as water use in Los Angeles is lower than it has been in 40 years while population has increased by over 1 million people. Since 1990, there has been a reduction of over 60% water use on a per capita basis reducing from 173 gallons per capita per day (gpcd) to 106 gpcd. Los Angeles now ranks among the most water efficient cities in the United States and has goals of reducing water usage to 100 gpcd by 2035. Water supply to Los Angeles has historically been provided by flows in the LAA, MWD water purchases, and local groundwater supply. Recently, LADWP has developed its water recycling and storm water capture programs to help reduce reliance on imported water supplies.

Historical Per Capita Water Use in LADWP's Service Area



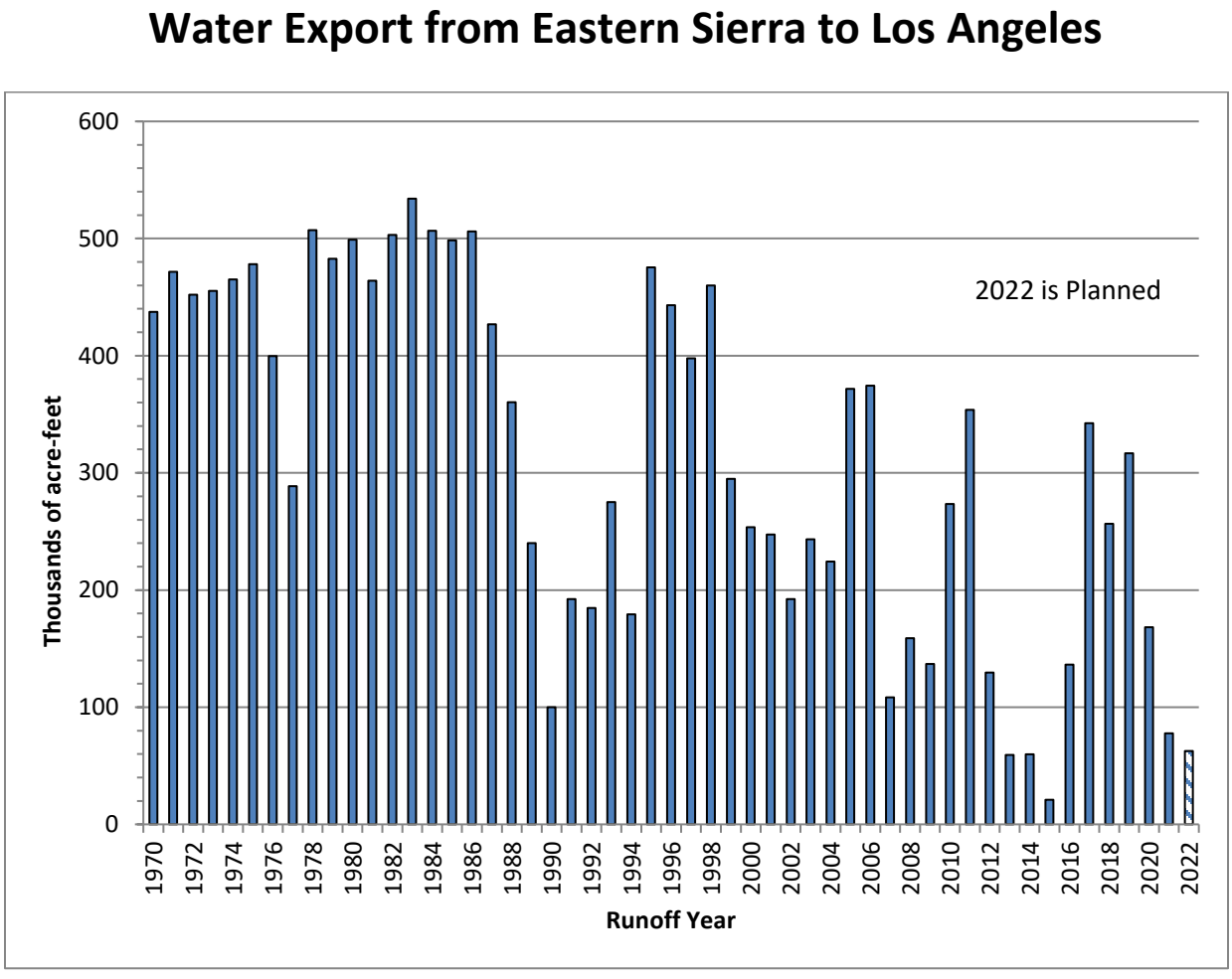
City Water Supply

LADWP Historical Water Supply Sources FY 1980/81 to 2019/20



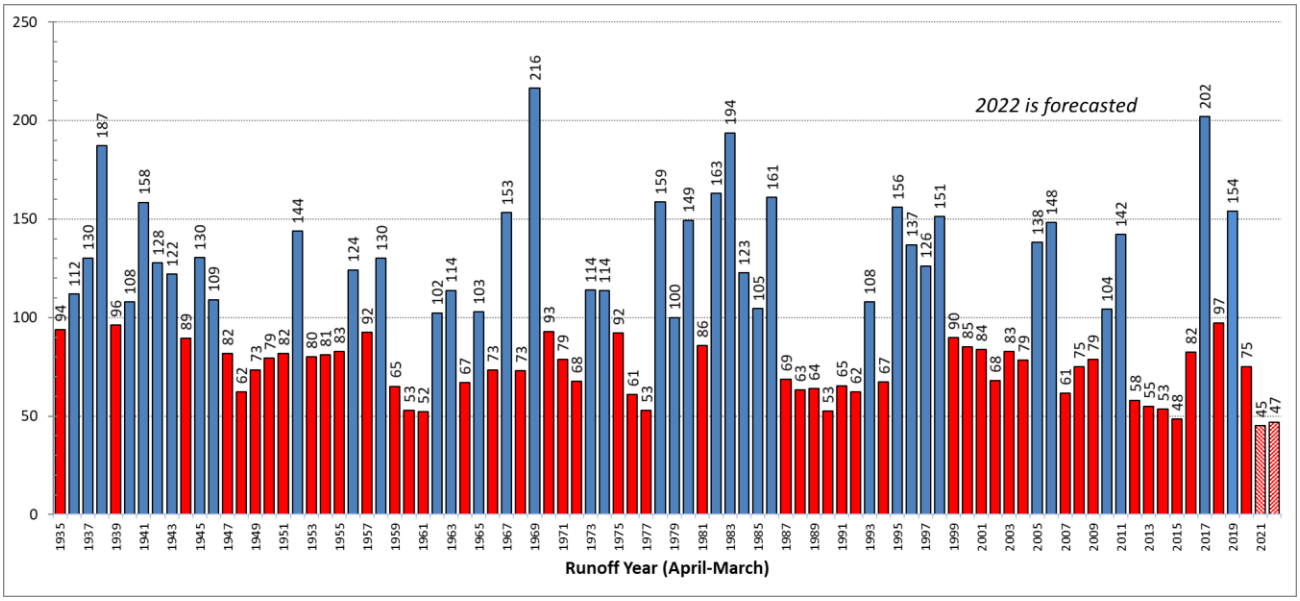
2) Flows in the LAA System

Flow in the LAA for water supply for the City ties in to the second factor identified in the Green Book. The current multi-year drought is impacting the entire State of California and deliveries from the State Water Project have been set at a 5% allocation. The LAA is expected to only provide 13% of the supply to the City of LA for the 2022-23 RY. This is only 35% of the recent average of LAA supplies. Water purchases from the Metropolitan Water District of Southern California, groundwater from the Los Angeles area aquifers, stormwater capture in the Los Angeles basin, and recycled water will supply the remainder of the City's water needs.



3) Surface Water Runoff Conditions

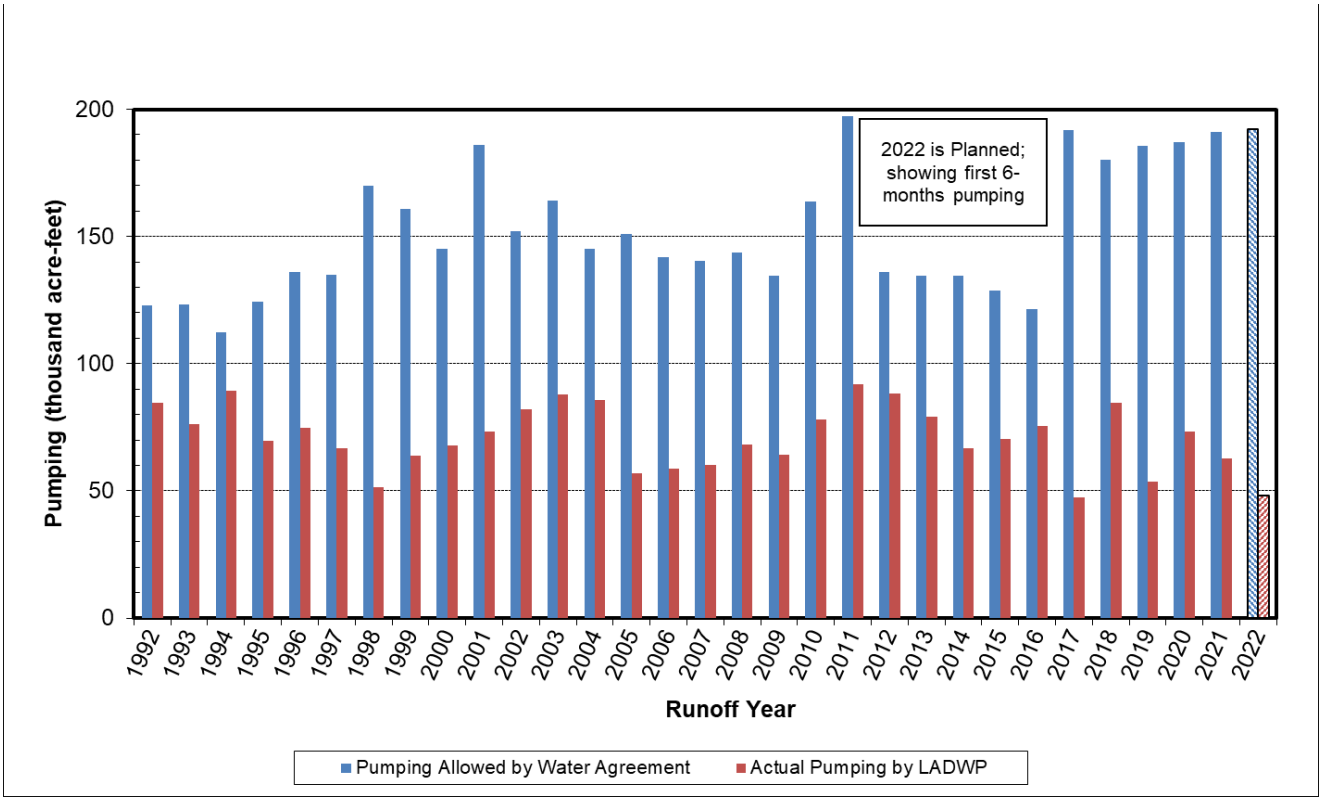
The third factor for consideration is the surface water runoff conditions. The April 1 forecast for Eastern Sierra runoff for 2022-23 RY is 47% long term average annual runoff value. This is following the driest year for the period of record and this year will be the third year of the drought.



4) Level of Groundwater Extractions

The level of groundwater extractions in the Owens Valley is the fourth factor to consider. Approximately 192,110 AF of water is available for groundwater pumping from Owens Valley wellfields under the terms of the Water Agreement during the 2022-23 RY, however, LADWP anticipates groundwater pumping will be less than 50% of this allowable capacity. The 1991 EIR called for 110,000 AF of pumping per year, and pumping even in the dire supply conditions experienced now will fall below that number. Groundwater extraction plans and practices since the early 1990's have been environmentally sensitive to avoid lowering groundwater tables and the pumping plan for this year will be consistent recent plans and practices.

Owens Valley Pumping - Provided by Water Agreement and Actual Since Inyo/Los Angeles Water Agreement



5) Extent of Well Turn-offs Implemented for Purposes of Environmental Protection

The fifth and last factor is the extent of well turn-offs for purposes of environmental protection. Currently, there are 19 wells turned off for environmental protection due to the provisions of the Green Book. LADWP has followed and will continue to follow the on-off provisions of the Green Book.

When considering each of these five factors laid out in the Green Book, this analysis shows proper conditions for the implementation of an irrigation reduction program.