Los Angeles Department of Water and Power 2017 Annual Owens Valley Report

DRAFT

LA
DWP
Los Angeles
Department of
Water & Power

- Annual Owens Valley Operations Plan for the 2017-18 Runoff Year
- Conditions in the Owens Valley
- Enhancement and Mitigation Project Status
- 1991 Environmental Impact Report
- Mitigation Measure Status
- Status of Other Studies, Projects, and Activities

TABLE OF CONTENTS

FIGURES AND TABLES

EXECUTIVE SUMMARY

This report includes Los Angeles Department of Water and Power's (LADWP) proposed Owens Valley Operations Plan for the 2017-2018 Runoff Year, an update on Owens Valley conditions, and the current status of LADWP's environmental mitigation projects and other legal obligations under 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* (Water Agreement); *the 1991 Environmental Impact Report Water from the Owens Valley to Supply the Second Los Angeles Aqueduct, 1970 to 1990, 1990 Onward, Pursuant to a Long Term Groundwater Management Plan* (1991 EIR); the Laws Type E transfer; the *1997 Memorandum of Understanding between the City of Los Angeles Department of Water and Power, County of Inyo, the California Department of Fish and Game, the California State Lands Commission, the Sierra Club, and the Owens Valley Committee* (1997 MOU), the *August 2004* and *March 2010 Amended Stipulations and Orders in Case No. S1CVCV01-29768.*

The Water Agreement provides that by April 20th each year, LADWP will 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. Additionally, Section 11 of the 2004 Stipulation and Order requires that on or about May 1 of each year LADWP shall complete and release an annual report that is 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 Inyo-Los Angeles Water Agreement and the 1997 MOU.

This report is intended to fulfill these requirements.

1. Owens Valley Operations Plan for Runoff Year 2017-2018

Section 1 of this report contains LADWP's Annual Operations Plan for Runoff Year 2017-18. 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 the second largest snow season in the winter of 2016-17, following an extreme prolonged drought. The resulting runoff forecast is calling for 801,900 acre-feet of runoff this year, or 197% of normal. LADWP plans to export approximately 460,200 acre-feet (AF) of water to Los Angeles in the 2017-18 runoff year.

Uses in the Owens Valley on Los Angeles City owned lands are planned to be 104,600 AF, of which 55,000 AF is planned for irrigation. LADWP also plans to spread water extensively in the Laws and Big Pine spreading grounds and operationally release additional water in anticipation of and during the extremely high runoff expected to exceed aqueduct capacity.

LADWP groundwater pumping in the Owens Valley is governed by the ON/OFF provisions of the *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). According to the well ON/OFF provisions of the Water Agreement, approximately 191,947 acre-feet of water is available for groundwater pumping from Owens Valley wellfields, but LADWP anticipates pumping to be approximately in the low 50,000 acre-feet range for the entire 2017-18 runoff year.

2. Conditions in the Owens Valley

The overall Eastern Sierra snowpack in watersheds contributing to the Los Angeles Aqueduct (LAA) was estimated to be 203% of normal as of April 1, 2017. Precipitation on the Owens Valley floor during the 2016-17 runoff year averaged 11.2 inches and was 195% of the long-term average of 5.8 inches. Owens Valley groundwater levels are relatively stable.

During the 2016-17 runoff year, the Lower Owens River was in full operational status with a minimum average flows of 40 cubic feet per second (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 Lower Owens River Project (LORP) uses were approximately 16,828 AF for the year. The releases at the Los Angeles Aqueduct (LAA) Intake were augmented by additional releases at selected LAA spill gates to maintain an average continuous flow of at least 40 cfs in the river channel.

3. LADWP Environmental Mitigation Projects and Other Legal Obligations

Section 3 of this report provides information on all of the Los Angeles Department of Water and Power's (LADWP) Mitigation Projects and other obligations 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. The quick reference tables were jointly developed by the Inyo/Los Angeles Technical Group and were presented to the Inyo/LA Standing Committee February 22, 2017. These tables show mitigation status of these projects/obligations according to both LADWP and Inyo County Water Department (ICWD).

For reference, 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:*** 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:*** 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 48 other obligations, LADWP reports:

- 19 are complete,
- 6 are ongoing as necessary or required,
- 20 are implemented and ongoing,
- 0 are fully implemented and not meeting goals, and
- 3 are not fully implemented

More detailed information regarding each of these projects and other obligations is provided in Section 3. Additionally, comprehensive monitoring reports are found for the Additional Mitigation Projects Developed by the MOU Ad Hoc Group, the Yellow Billed Cuckoo Habitat Enhancement Plans, and the Owens Valley Land Management Plan (OVLMP).

OWENS VALLEY OPERATIONS PLAN FOR RUNOFF YEAR 2017-2018

1.0 Owens Valley Operations Plan For Runoff Year 2017-18

This year's annual operations plan and pumping program is consistent with the management strategy of the Water Agreement between the County of Inyo (County) and the City of Los Angeles (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 Los Angeles Department of Water and Power's (LADWP) 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.)*

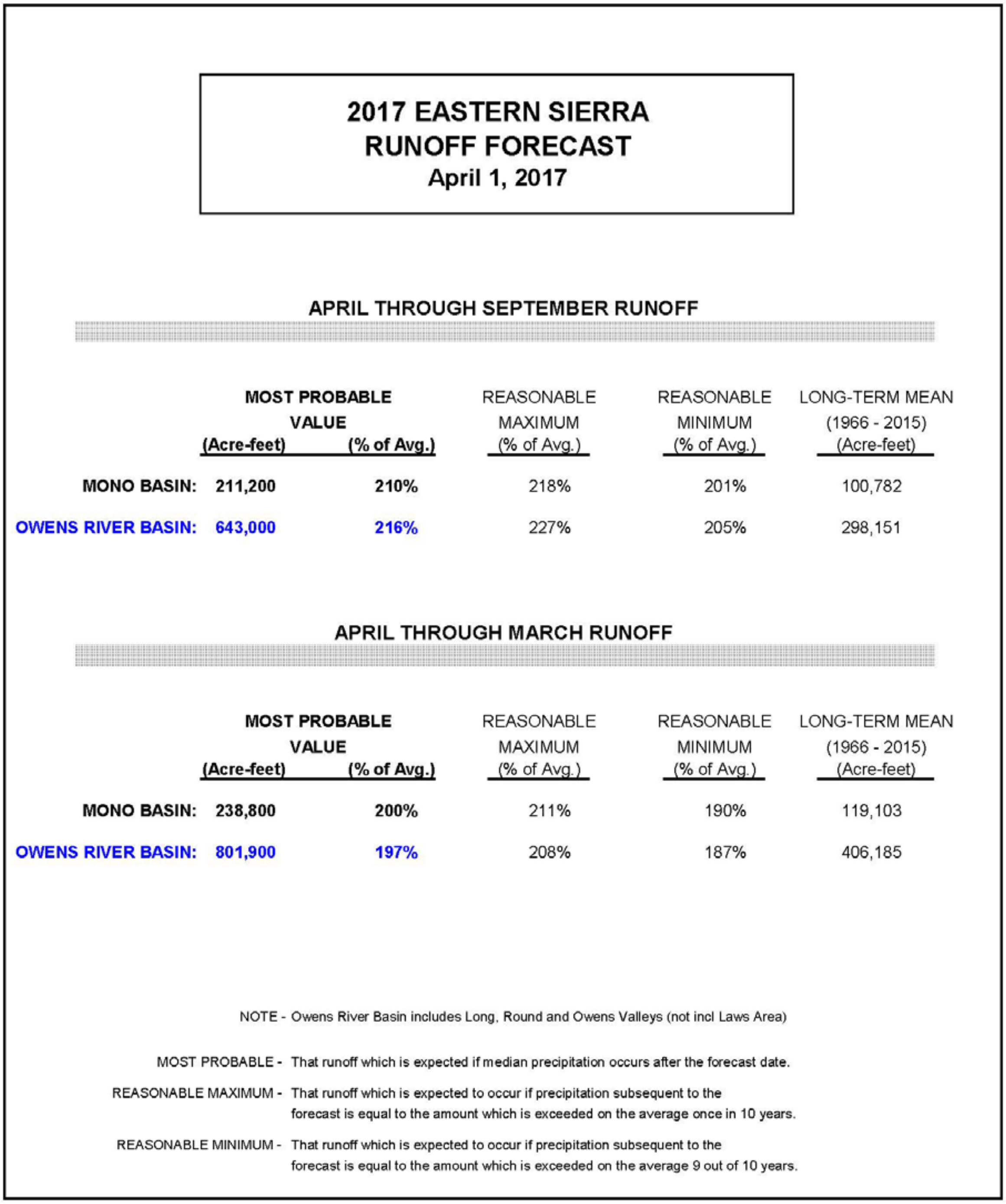
1.1. Eastern Sierra Runoff Forecast

The Eastern Sierra Runoff Forecast for the 2017-18 runoff year (Table 1.1) is based on snow surveys of key Eastern Sierra watersheds in Inyo and Mono counties that contribute the majority of runoff water into the Owens Valley. The Eastern Sierra Runoff Forecast is used for planning aqueduct operations. The April 1 forecast Eastern Sierra runoff for 2017-18 runoff year is 801,900 acre-feet, or about 197% of the 50-year (1966-2015) average annual runoff value of 406,185 acre-feet, which should be the second largest runoff on record. This follows the driest five-year runoff for the period of record in the Owens Valley.

The forecast runoff for the period between April 1, 2017 through September 30, 2017, is 643,000 acre-feet for the Owens River Basin, which is 216% of the 50-year average. The 50-year average Owens Valley runoff between April 1 and September 30, based on 1966-2015 data is 298,151 acre-feet.

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

Table 1. 1. Owens Valley Runoff Forecast for 2017-18 Runoff Year



2017 EASTERN SIERRA
RUNOFF FORECAST
April 1, 2017

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 (1966 - 2015) (Acre-feet)
MONO BASIN:	**211,200**	**210%**	218%	201%	100,782
OWENS RIVER BASIN:	**643,000**	**216%**	227%	205%	298,151

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 (1966 - 2015) (Acre-feet)
MONO BASIN:	**238,800**	**200%**	211%	190%	119,103
OWENS RIVER BASIN:	**801,900**	**197%**	208%	187%	406,185

NOTE - Owens River Basin includes Long, Round and Owens Valleys (not incl Laws Area)

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.

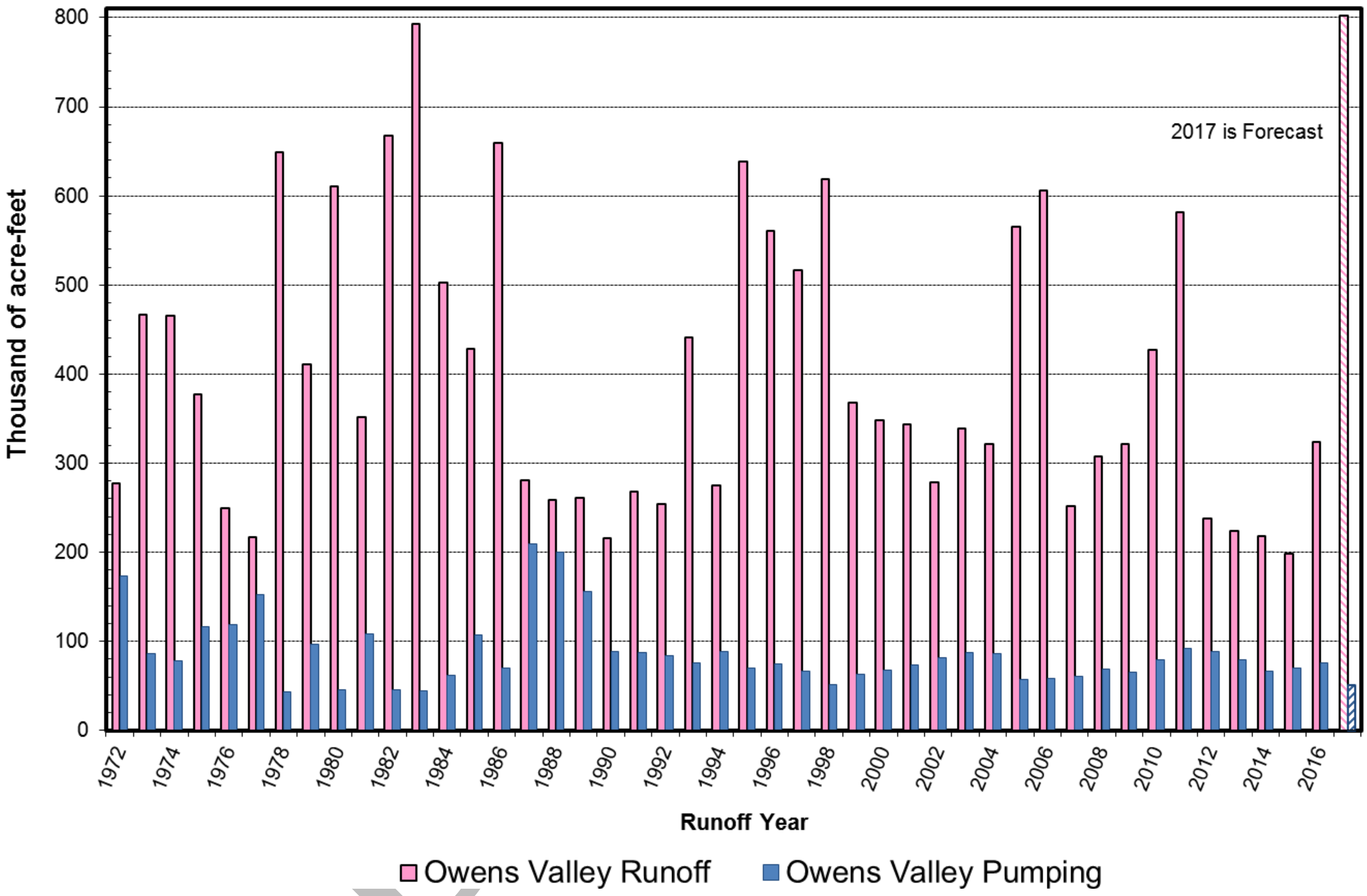


Figure 1. 1. Owens Valley Runoff and Groundwater Pumping

1.2. Owens Valley Groundwater Production

LADWP has prepared its 2017-18 Annual Owens Valley Operations Plan based on the goals and principles of the Water Agreement. The 2017-18 Annual Owens Valley Operations Plan is designed to avoid adverse impacts to the environment while providing a reliable supply of water for in-valley uses and export to Los Angeles for municipal use. Additional consideration has been the management of exceptionally large volume of runoff forecasted as a result of near record snowfall during the winter of 2017 in the Eastern Sierra.

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 2017, when the status of eleven monitoring sites changes from OFF to ON. The Water Agreement or Technical Group has designated certain town supply wells, irrigation supply wells, fish hatchery supply wells, enhancement/mitigation (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 2017-18 runoff year by wellfield. Table 1.3 also shows the monitoring sites in ON status as of April 2017, the wells associated with the ON status monitoring sites, and the exempt wells in each wellfield. Accordingly, approximately 192,000 acre-feet of water is available for groundwater pumping from Owens Valley wellfields under the terms of the Water Agreement during the 2017-18 runoff year. LADWP plans to pump between approximately 47,450 and 56,936 acre-feet during the 2017-18 runoff year, which is only 25 to 30 percent of the amount allowed under the terms of Water Agreement. Groundwater pumping during the 2017-18 runoff year will, for the most part, provide water for Owens Valley uses where surface water is not available or appropriate for the use.

Working both 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. LADWP's 2017-18 groundwater management approach is substantially more conservative than the environmentally conservative pumping plans advocated by the Standing Committee during the dry years of the early 1990s. Given the near record forecasted runoff in Owens Valley, LADWP plans to pump considerably less groundwater than made available under Water Agreement Section V, providing exceptional opportunity for recharge of the groundwater aquifer following the previous record five–year drought.

Figure 1.2 compares the amount of Owens Valley groundwater pumping provided by the provisions of Water Agreement and the actual groundwater pumping by LADWP for each runoff year since 1992 (available pumping was not calculated prior to 1992). LADWP's anticipated pumping for the 2017-18 runoff year 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 2017-18 pumping program considers 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 2017-18 runoff year.

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. The table includes a list of wells by well number, 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 planned groundwater pumping for the 2017-18 runoff year on a month-to-month basis for each wellfield. Pumping for town water systems, fish hatcheries, and enhancement/mitigation (E/M) projects is included in the pumping distribution. Owens Valley groundwater production for the 2017-18 runoff year is consistent with the provisions of the Water Agreement. As shown in Table 1.6, LADWP is considering a range of pumping amounts for most of the wellfields. This is mainly because of the uncertainty in timing of the peak runoff and of conditions after the peak runoff has subsided or how much runoff actually occurs. No additional testing of wells subject to the Water Agreement is included in this year's planned pumping total and if performed, it will be in addition to the planned pumping for 2017-18. Planned pumping may also be increased to provide freeze protection for the Los Angeles Aqueduct (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, monitoring wells, and vegetation monitoring sites in each area.

Table 1. 2. Soil/Vegetation Water Balance Calculations for April 2017 According to Section III of the Green Book

Site	Oct 2016 soil AWC	30% Annual Precip.	Proj. soil AWC	October 2015 Veg Water Req./ Water Req. for well turn-on	Oct 2016 Status	April 2017 soil AWC	April 2017 Status	Soil AWC req. for well turn-on
	(cm)	(cm)	(cm)	(cm)		(cm)		(cm)
L1	1.3	NA	1.3	8.7/15.6	OFF	24.3	ON	NA
L2	4.5	4.7	9.2	5.8/NA	ON	18.7	ON	NA
L3	7.0	NA	7.0	10.1/25.2	OFF	22.7	OFF	25.2, OFF on 10-11
BP1	1.0	NA	1.0	3.1/22.9	OFF	24.5	ON	NA
BP2	1.1	NA	1.1	13.9/28.4	OFF	20.1	OFF	28.4, OFF on 7-98
BP3	2.7	NA	2.7	12.4/10.6	OFF	25.9	ON	NA
BP4	33.2	4.9	38.1	9.6/NA	ON	55.8	ON	NA
TA3	6.4	NA	6.4	25.9/26.0	OFF	32.8	ON	NA
TA4	12.1	NA	12.1	14.4/23.3	OFF	22.9	ON	NA
TA5	20.4	4.9	25.3	3.8/NA	ON	34.7	ON	NA
TA6	8.7	NA	8.7	15.4/17.6	OFF	37.1	ON	NA
TS1	1.5	NA	1.5	17.6/20.4	OFF	22.7	ON	NA
TS2	6.2	4.4	10.6	8.5/NA	ON	30.4	ON	NA
TS3	15.5	NA	15.5	14.8/32.9	OFF	35.4	ON	NA
TS4	38.9	NA	38.9	41.8/55.9	OFF	66.7	ON	NA
IO1	9.2	NA	9.2	48.3/42.2	OFF	29.3	OFF	42.2, OFF 10-98
IO2	3.8	NA	3.8	3.2/18.9	OFF	17.6	ON	NA
SS1	8.9	3.9	12.8	15.2/15.2	OFF	20.5	ON	NA
SS2	3.3	NA	3.3	2.5/25.6	OFF	19.2	OFF	25.6, OFF 7-11
SS3	14.3	NA	14.3	20.7/33.8	OFF	28.7	OFF	33.8, OFF 10-11
SS4	3.4	NA	3.4	11.7/15.9	OFF	11.6	OFF	15.9, OFF 7-05
BG2	18.9	4.0	22.9	9.5/NA	ON	29.5	ON	NA

†: These values of soil erquired for well turn-on were derived using calcualtions based on %cover that were routinly perfoprmed in the past.
The values have not been updated to comform to the Greenbook equations in Section III.D.2, p. 57-59.

Table 1. 3. Annual Pumping Capacity According to Monitoring Sites with ON Status and Planned Pumping for 2017-18 Runoff Year

Wellfield	Monitoring	Associated Production Wells	Available Capacity (AF/year)	Planned Pumping (AF)
Laws	L1	398, 247, 248, 249	12,236	
	L2	236, 239, 243, 244	7,240	
	L5*	245, 387, 388	8,980	
	Exempt	236, 354, 422, 413	2,100	
	Wellfield Pumpage		**30,556**	**4,380-5,520**
Bishop**	All wells	140, 371, 406, 407, 408, 410, 411, 412	17,810	
	Wellfield Pumpage		**17,810**	**6,120**
Big Pine	BP1	378, 379, 389, 352	10,593	
	BP3	222, 223,232	4,851	
	BP4	331	7,530	
	Exempt	218, 219, 330, 332, 341, 352, 375, 415	25,750	
	Wellfield Pumpage		**48,724**	**20,400-21,160**
Taboose	TA3	106, 110, 111, 114	11,005	
	TA4	342, 347	19,838	
Aberdeen	TA5	349	12,130	
	TA6	109, 370	5,502	
	Exempt	118, 355	2,620	
	Wellfield Pumpage		**51,095**	**840-3,270**
Thibaut	TS1	159	1,014	
Sawmill	TS2	155	940	
	TS3	103, 104, 382	1,014	
	TS4	380, 381	2,244	
	Exempt	351, 356	8,000	
	Wellfield Pumpage		**13,212**	**8000-8,466**
Indep. - Oak	IO2	63	2,100	
	Exempt	59, 60, 61, 65, 357, 383EM, 384EM, 401	15,710	
	Wellfield Pumpage		**17,810**	**5,880-8,880**
Symmes				
Shepherd	SS1	69, 392, 393	7,780	
	Exempt	402EM	1,200	
	Wellfield Pumpage		**8,980**	**960-2,400**
Bairs	BG2	76, 343, 348, 403	2,860	
Georges	Exempt	343	500	
	Wellfield Pumpage		**2,860**	**0-250**
Lone Pine	Exempt	344, 346, 425	900	
	Wellfield Pumpage		**900**	**870**
	Total Owens Valley		**191,947**	**47,450-56,936**

* Monitoring site has yet to be located.

** Pumping is subject to the Hillside Decree

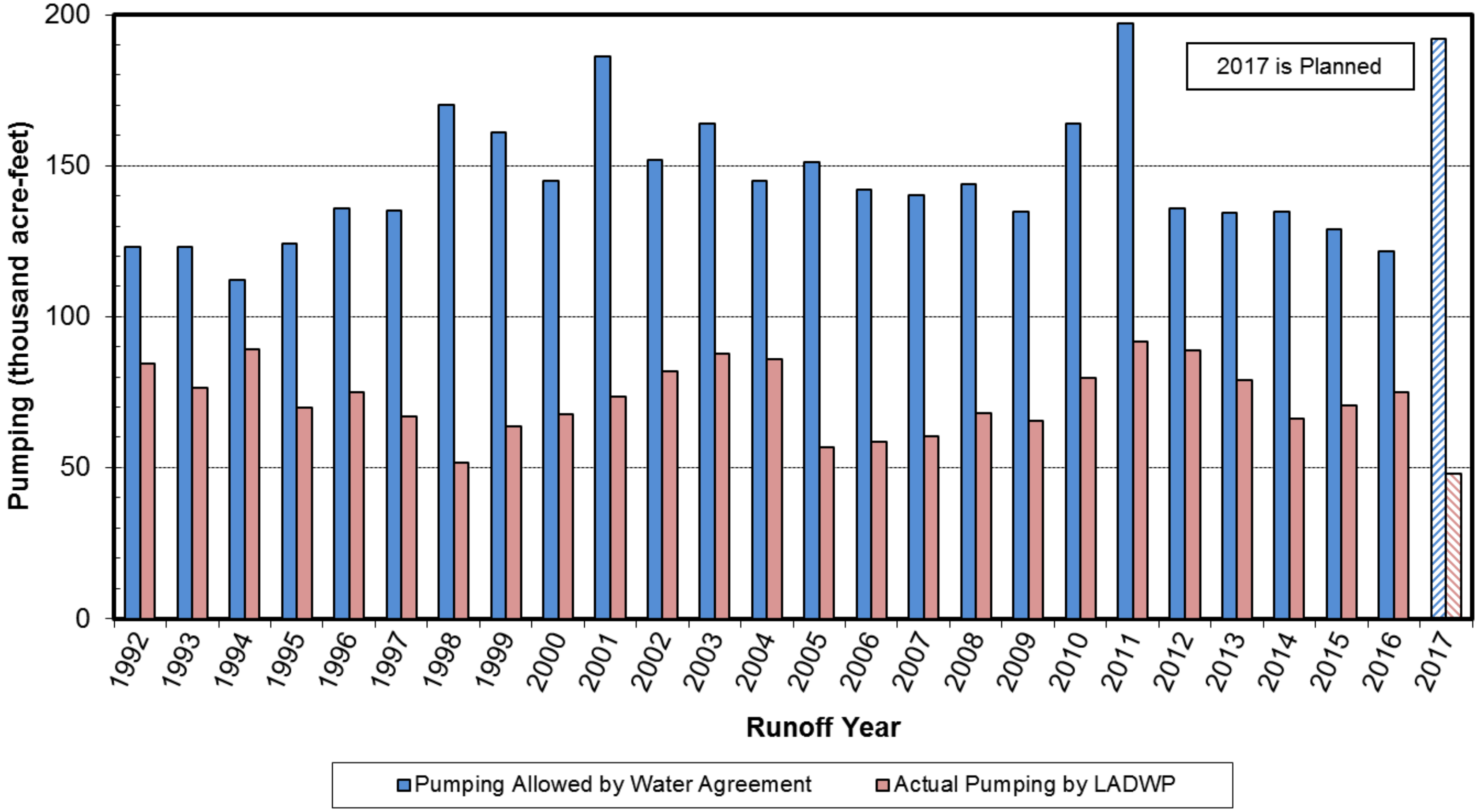


Figure 1. 2. Owens Valley Pumping – Provided by Water Agreement and Actual Since Inyo/Los Angeles Water Agreement

Table 1. 4. Summary of Recharge and Pumping for Water Year 1997 - 2016 and Estimated Pumping Limit for Apr-Sep 2017 in Acre-Feet

Water	**OWENS VALLEY**	LAWS		BISHOP		BIG PINE		TABOOSE-THIBAUT		IND-SYM-BAIRS		LONE PINE		**OWENS VALLEY**	
Year	Runoff Percent	Recharge	Pumping	Recharge	Pumping	Recharge	Pumping	Recharge	Pumping	Recharge	Pumping	Recharge	Pumping	Recharge	Pumping
1998	139%	28,195	470	55,309	7,159	40,065	23,729	46,845	16,496	55,605	7,946	20,341	1,365	246,361	57,165
1999	95%	18,546	1,697	42,388	8,672	28,013	21,832	32,426	16,700	41,090	8,424	15,481	2,141	177,944	59,466
2000	80%	11,102	3,974	39,539	10,804	23,213	20,212	27,567	23,143	37,015	8,497	14,344	1,036	152,780	67,666
2001	77%	12,259	2,295	38,772	10,176	22,695	26,785	27,960	17,247	33,469	8,685	13,520	1,942	148,674	67,130
2002	63%	11,184	3,480	35,514	10,839	19,715	26,885	22,495	25,288	28,820	10,599	12,103	1,345	129,831	78,436
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	65%	10,429	6,038	35,296	10,842	19,960	22,797	26,257	20,642	26,050	18,899	10,532	984	128,524	80,202
2017 (a)	176%	32,889	114	65,600	1,086	50,568	11,366	61,658	8,633	64,547	3,594	22,852	161	298,114	24,954
(b) TOTAL		304,501	101,920	825,882	192,827	516,382	454,845	644,713	387,841	714,217	239,969	277,097	21,516	3,282,791	1,398,918
Estimated Apr-Sep 2017 Pumping Limit			202,581		633,055		61,537		256,872		474,248		255,581		1,883,874

(a) Estimated Recharge for the 2017 Water Year, Approximate Pumping for First Half of Water year 2017 (Oct-Mar).

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

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 acre-feet 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 Enhancement/Mitigation (E/M) supply and backup for town domestic supply.
2. Well 422 designated as primary and Well 236 designated as backup irrigation supply.
3. Currently not in operation.
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 runoff years to supplement flow in Georges Creek for irrigation and stock water supply

Table 1. 6. Planned Owens Valley Pumping for the 2017-18 Runoff Year (acre-feet)

Month	Laws	Bishop	Big Pine	Taboose-Aberdeen	Thibaut-Sawmill	Indep.-Oak	Symmes-Shepherd	Bairs-Georges	Lone Pine	TOTAL
April	700	720	1,700	70	667	880	160	0	120	5,017
May	700	720	1,700	70	667	880	160	0	120	5,017
June	700	720	1,700	70	667	880	160	0	120	5,017
July	700	720	1,700	70	667	880	160	0	120	5,017
August	700	720	1,700	70	667	880	160	0	120	5,017
September	700	720	1,700	70	667	880	160	0	120	5,017
October	30-140	300	1,700-1,940	70-750	666-850	100-600	0-240	0-110	25	2,891-5,005
November	30-140	300	1,700	70-250	667	100-600	0-240	0	25	2,892-4,005
December	30-140	300	1,700-1,980	70-600	666-760	100-600	0-240	0-60	25	2,891-4,835
January	30-140	300	1,700	70-250	667	100-600	0-240	0	25	2,891-4,002
February	30-140	300	1,700-1,940	70-750	666-850	100-600	0-240	0-80	25	2,892-4,985
March	30-140	300	1,700	70-250	667	100-600	0-240	0	25	2,891-4,002
TOTAL	4,380-5,520	6,120	20,400-21,160	840-3,270	8,000-8,466	5880-8,880	960-2,400	0-250	870	47,450-56,936

Laws Wellfield (Figure 1.3)

Monitoring sites L1 and L2 are in ON status. Production wells controlled by these monitoring sites have available production capacities of 12,236 acre-feet and 7,240 acre-feet, respectively. Wells linked to monitoring site L5 have a capacity of 8,980 acre-feet. Exempt wells within the Laws Wellfield have a capacity of 2,100 acre-feet. The total available pumping capacity in the Laws Wellfield is 18,320 acre-feet. Well 236, associated with monitoring site L2, is used as a backup along with Well 422 as an exempt well irrigation water supply.

Planned groundwater pumping for the runoff year 2017-18 in the Laws Wellfield is between 4,380 and 5,520 acre-feet, contingent on runoff condition, water needs, and environmental conditions. Groundwater pumping is planned to supply Owens Valley demands including the town water system, E/M projects, and irrigated lands.

LADWP recently modified production wells W385 and W386 associated with monitoring site L4 by sealing the screened zone within the shallow aquifer. As a result, modified wells will now be drawing water only from the deeper portion of the aquifer and should have minimal, if any, effect on groundwater levels in the shallow aquifer. Responding to the concerns on the effect of pumping these wells on nearby resources, LADWP has reclassified these as new wells (now numbered W385R and W386R) to allow for further evaluation before long-term operation.

Well W385R has been pump-equipped and LADWP is planning to conduct a two-month pumping test to determine potential effects on nearby resources. Results of this test should allow a comparison of the response of groundwater table to pumping W385R at a rate of 2.8 cfs with a similar test that was conducted in 1993-94 (combined pumping rate of W385 and W386 at 16.5 cfs). LADWP is preparing appropriate California Environmental Quality Act (CEQA) documentation prior to the proposed two-month pumping test of W385R. Data collected and analysis conducted from the proposed two-month pumping test will be used for the CEQA documentation for activating wells W385R and W386R.

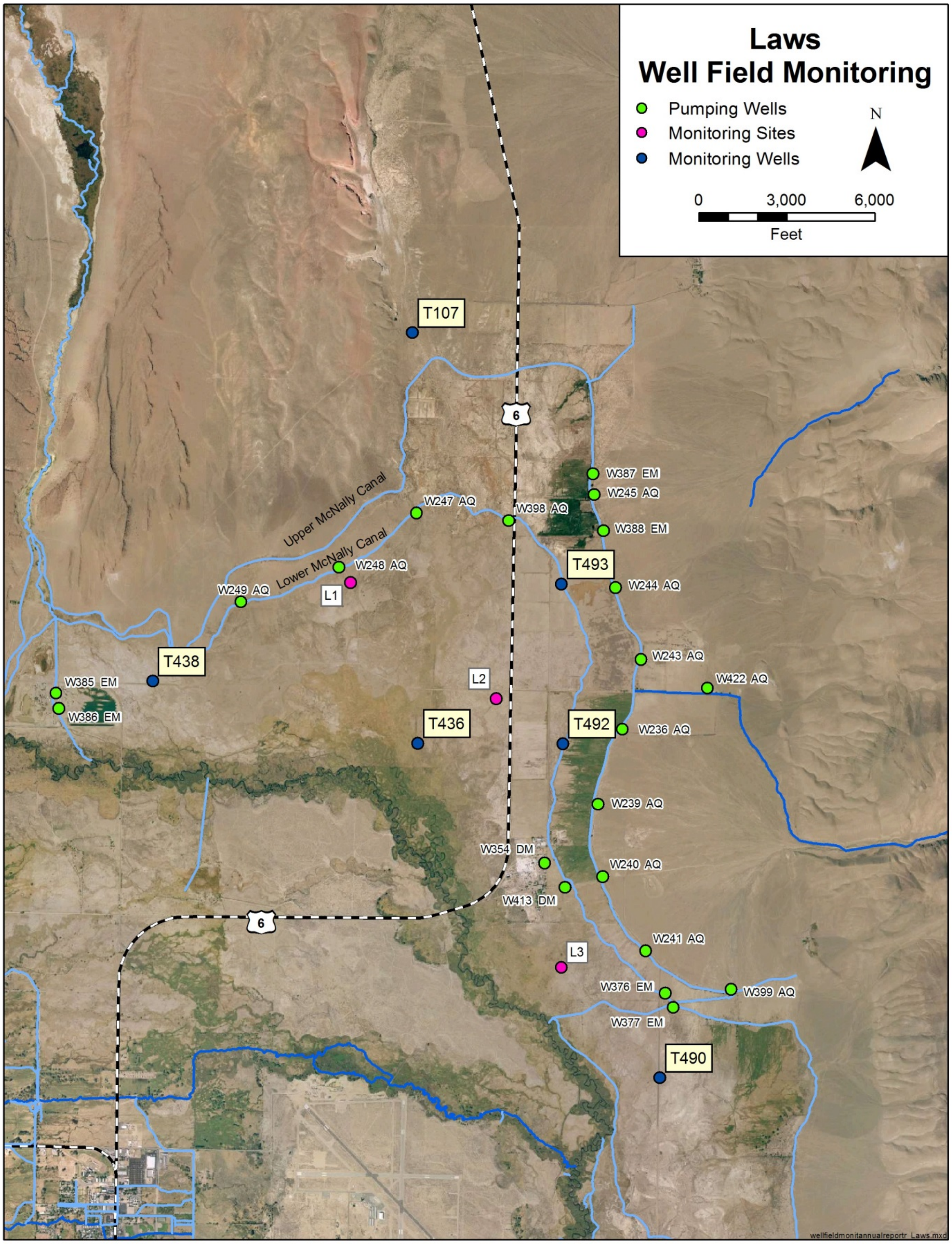
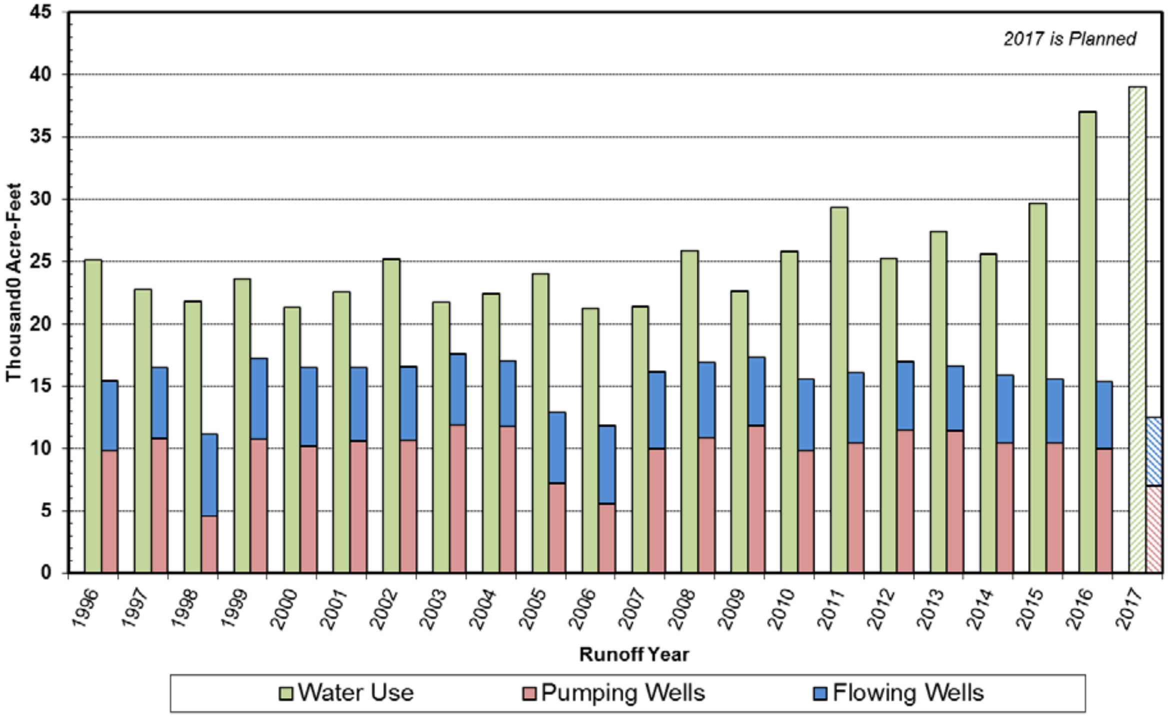


Figure 1. 3. Laws Wellfield

Bishop Wellfield (Figure 1.4)

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 the Bishop Cone to an amount commensurate with the total amount of water used on City lands on the Bishop Cone (including conveyance and other losses). For the 2015-16 Runoff Year the audit water account methods were modified to analyze each areas inflows and outflows to calculate total water use. Under the modified audit protocols, recent total water used on City lands within the Bishop Cone area has been approximately 33,000 acre-feet per year. In the 2017-18 Runoff Year, the total water used is likely to be increased to approximately 39,000 acre-feet. The current total available groundwater extraction capacity in the Bishop Wellfield is approximately 17,810 acre-feet. The planned groundwater pumping from the Bishop Wellfield is approximately 6,120 acre-feet for the 2017-18 runoff year, contingent on runoff condition, water needs, and environmental conditions.

Figure 1.4 shows water use on City lands on Bishop Cone in comparison with the groundwater extractions (flowing and pumping wells) for runoff years 1996 to present.



**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 of Los Angeles Land in Bishop Cone

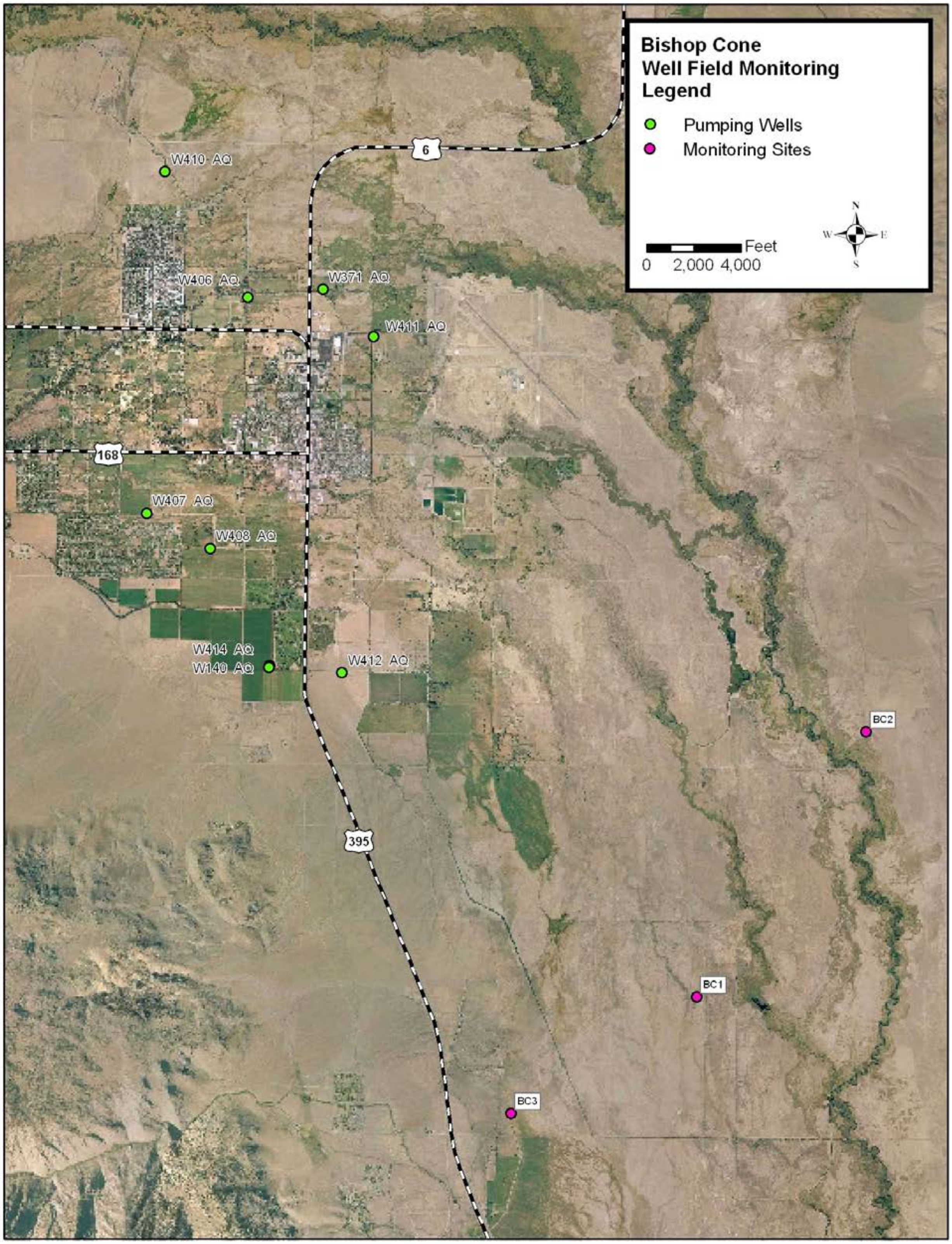


Figure 1. 5. Bishop Wellfield

Big Pine Wellfield (Figure 1.6)

Monitoring sites BP1, BP3, and BP4 are in ON status. Production wells controlled by monitoring site BP1 have 10,593 acre-feet pumping capacity, production wells controlled by monitoring site BP3 have 4,851 acre-feet pumping capacity, and production Well 331, managed in conjunction with monitoring site BP4, has 7,530 acre-feet 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 25,750 acre-feet pumping capacity. The total available pumping capacity in the Big Pine Wellfield is 48,724 acre-feet. The total planned pumping in the Big Pine Wellfield for 2017-18 runoff year is between 20,400 acre-feet and 21,160 acre-feet, contingent on runoff conditions, water needs, and environmental conditions.

Taboose-Aberdeen Wellfield (Figure 1.7)

All monitoring sites in Taboose-Aberdeen Wellfield are in ON status. Production wells controlled by monitoring site TA3 have 11,005 acre-feet pumping capacity, production wells controlled by monitoring site TA4 have 19,838 acre-feet pumping capacity, production well W349, controlled by monitoring site TA5 has 12,130 acre-feet pumping capacity, production wells associated with monitoring site TA6 have 5,502 acre-feet pumping capacity, and exempt wells W118 and W355 have an available pumping capacity of 2,620 acre-feet. The total available groundwater pumping capacity in the Taboose-Aberdeen Wellfield is 51,095 acre-feet. The planned groundwater pumping in the Taboose-Aberdeen Wellfield for 2017-18 runoff year will range between approximately 840 acre-feet and 3,270 acre-feet, contingent on runoff conditions, water needs, and environmental conditions.

Thibaut-Sawmill Wellfield (Figure 1.8)

All monitoring sites in Thibaut-Sawmill Wellfield are in ON status. Production well W156, controlled by monitoring site TS1, has 1,014 acre-feet pumping capacity, production well W155, controlled by monitoring site TS2, has 940 acre-feet pumping capacity, production wells associated with monitoring site TS3 have 1,014 acre-feet pumping capacity, production wells associated monitoring site TS4 have 2,244 acre-feet pumping capacity. Exempt Blackrock Fish Hatchery supply wells W351 and W356 have capacities of 13,200 acre-feet and 8,000 acre-feet, respectively. The total available pumping capacity in the Thibaut-Sawmill Wellfield for the 2017-18 runoff year is approximately 13,212 acre-feet.

Based on the resolution of a dispute between Inyo County and LADWP regarding the conditions of the vegetation parcel BLK94, located west of the wellfield, the groundwater pumping to supply Blackrock Hatchery is now limited to approximately 8,000 acre-feet per year. Total planned pumping in the Thibaut-Sawmill Wellfield for the 2017-18 runoff year is between 8,000 acre-feet and 8,466 acre-feet subject to hatchery demands, runoff conditions, water supply needs, and environmental conditions.

Independence-Oak Wellfield (Figure 1.8)

Monitoring site IO2 in the Independence-Oak Wellfield is in ON status. Exempt wells Independence-Oak Wellfield have a combined capacity of 15,710 acre-feet. The total available pumping capacity in the Independence-Oak Wellfield is 17,810 acre-feet. The planned groundwater pumping in the Independence-Oak Wellfield for the 2017-18 runoff year is between 5,880 acre-feet and 8,880 acre-feet, subject to runoff conditions and irrigation, town water system, and E/M project water demand.

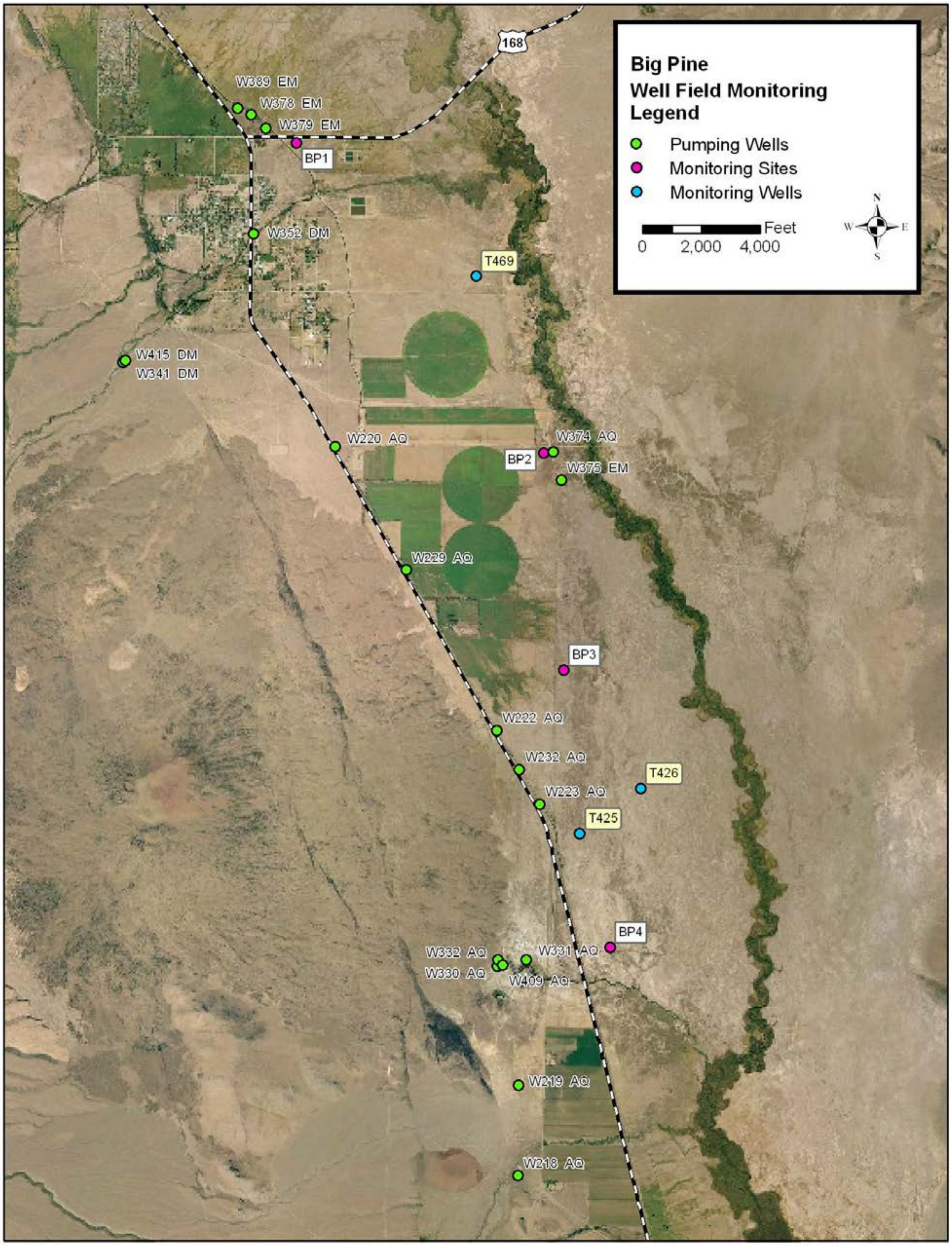


Figure 1. 6. Big Pine Wellfield

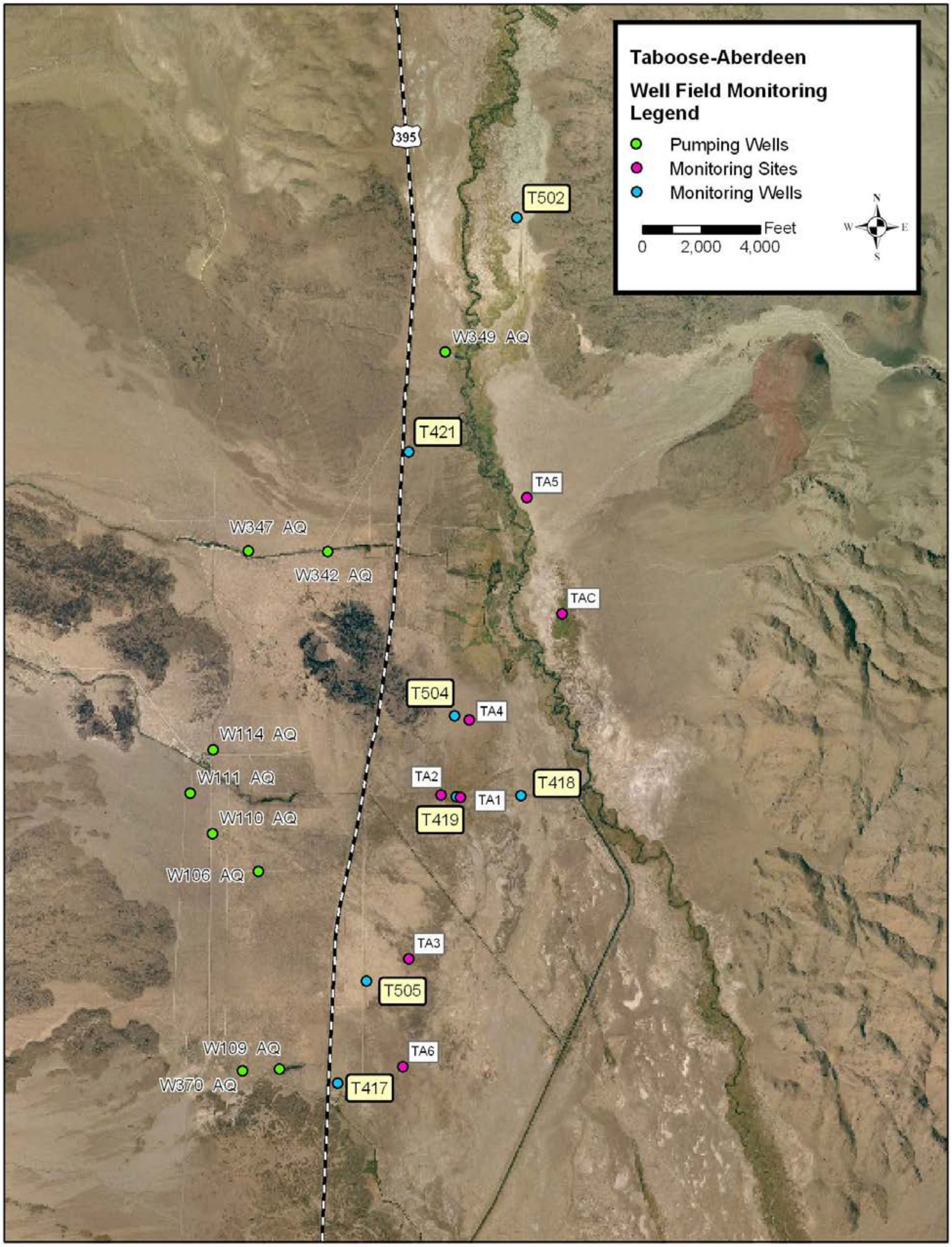


Figure 1. 7. Taboose-Aberdeen Wellfield

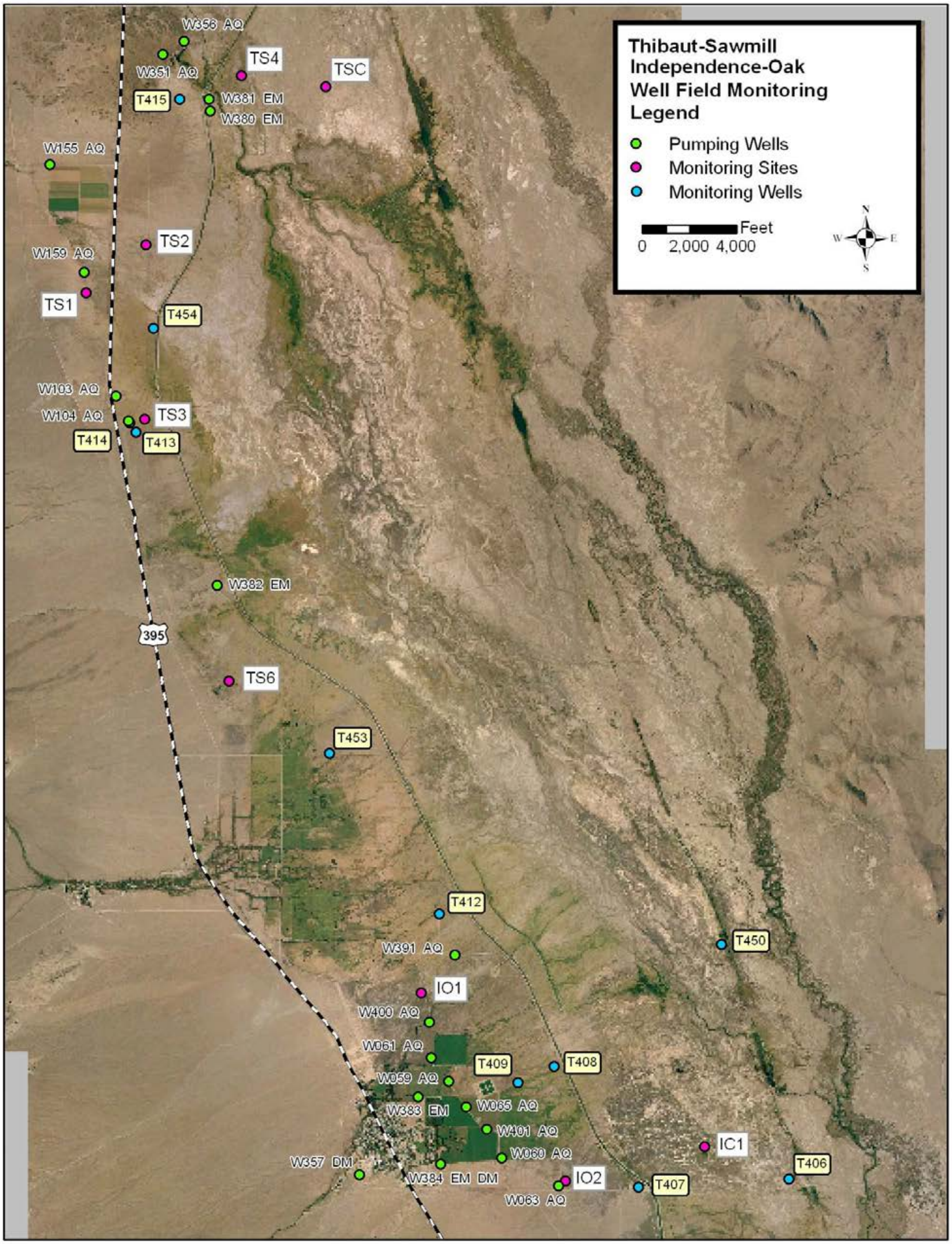


Figure 1. 8. Thibaut-Sawmill and Independence-Oak Wellfields

Symmes-Shepherd Wellfield (Figure 1.9)

Monitoring site SS1 is in ON status. Production wells controlled by monitoring site SS1 have a pumping capacity of 7,780 acre-feet. Exempt Well 402 has a capacity of about 1,200 acre-feet. Total available pumping capacity in the Symmes-Shepherd Wellfield for the 2017-18 runoff year is approximately 8,980 acre-feet. The planned pumping in the Symmes-Shepherd Wellfield for the 2017-18 runoff year is between 960 acre-feet and 2,400 acre-feet contingent on runoff conditions, water needs, and environmental conditions.

Bairs-Georges Wellfield (Figure 1.9)

Vegetation monitoring site BG2 is in ON status. The wells controlled by this monitoring site have a combined 2,860 acre-feet pumping capacity. Well 343 is exempt for pumping approximately 500 acre-feet (based upon a six-month exemption period in dry years). The current total available capacity in the Bairs-Georges Wellfield for the 2017-18 runoff year is approximately 2,860 acre-feet. Planned groundwater pumping in the Bairs-Georges Wellfield for the 2017-18 runoff year is between zero and 250 acre-feet, contingent on runoff conditions, water needs, and environmental conditions.

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 900 acre-feet.

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 2009-10 runoff year. This well was modified in 2014 to seal the screen portion of the aquifer within the shallow aquifer. LADWP is planning to equip and conduct the initial operation of this well. If initial operation is performed during 2017-18 runoff year, it will be in addition to the currently planned pumping from Lone Pine Wellfield. The Technical Group has been requested to designate a monitoring site for this well.

The planned groundwater pumping from the Lone Pine Wellfield during the 2017-18 runoff year is approximately 870 acre-feet, contingent on runoff conditions, water supply needs, and environmental conditions.

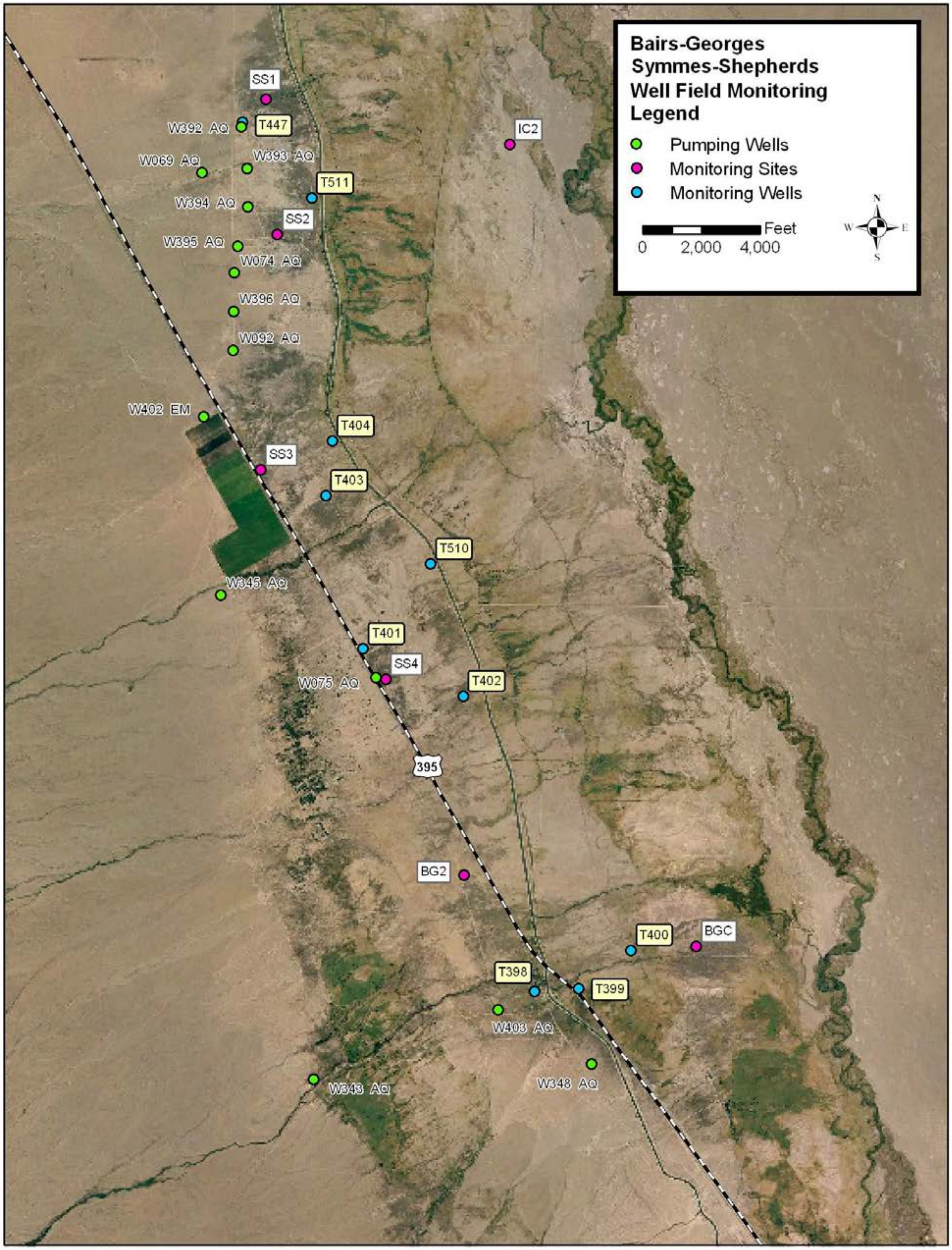


Figure 1. 9. Symmes-Sheperds and Bairs-Georges Wellfields

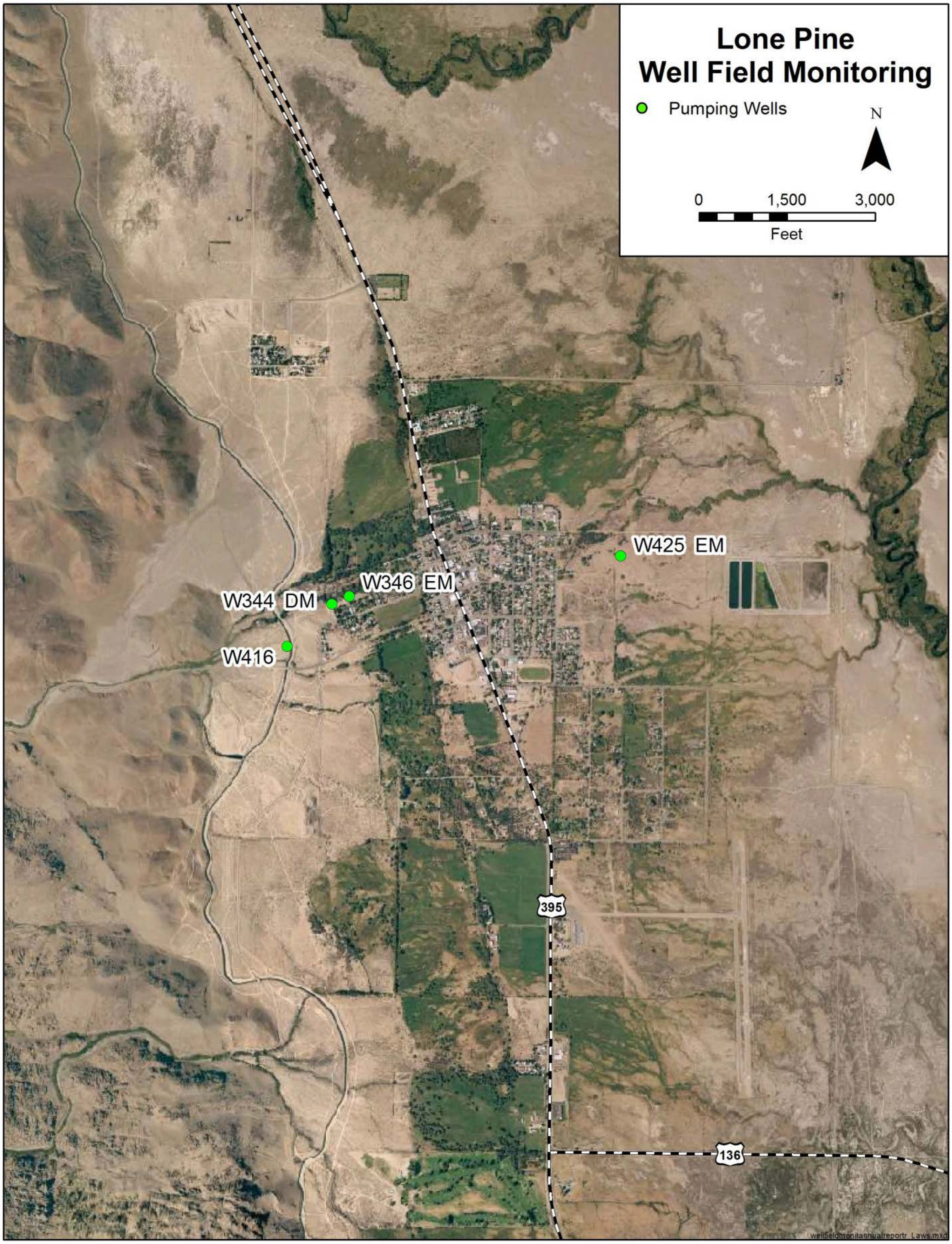


Figure 1. 10. Lone Pine Wellfield

1.3. Owens Valley Uses (Including Enhancement/Mitigation Projects)

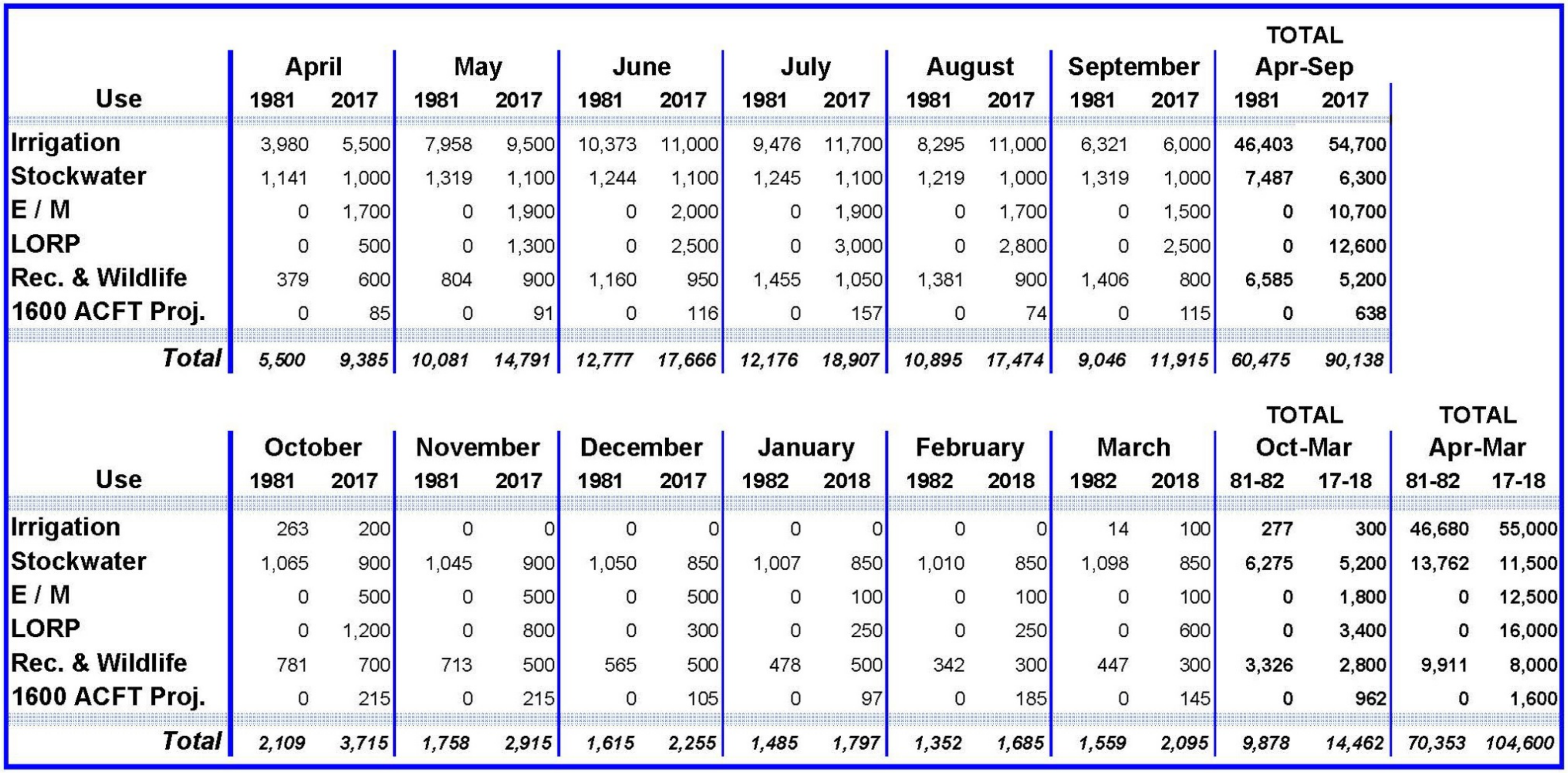
Table 1.7 shows the historic (1981-82) uses and the planned monthly uses on Los Angeles City owned lands within the Owens Valley for 2016-17. The in-valley uses shown on Table 1.7 consist of irrigation, stockwater, recreation and wildlife projects, E/M supply, Lower Owens River Project (LORP) usage, and 1600 Acre-Feet Projects. As shown in Table 1.7 and Figure 1.11, LADWP plans to provide approximately 104,600 acre-feet for in-valley uses this runoff year.

Releases to the LORP from the LAA Intake facility began on December 6, 2006. An average flow of over 40 cubic feet per second (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 a continuous flow of at least 40 cfs in the river channel. Table 1.7 shows projected 2016-17 water use by the Lower Owens River Project on a monthly basis, totaling 16,000 acre-feet. Total LORP uses include the Lower Owens River, Owens Delta, Blackrock Waterfowl Management Area, and project associated losses.

The Water Agreement provides that "... *enhancement/mitigation projects shall continue to be supplied by enhancement/mitigation 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. LADWP has chosen to supply certain E/M projects from surface water sources in the past. Future E/M allotments may be influenced by the availability of E/M wells and operational demands. Table 1.8 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 2017-18 runoff year. E/M project water demands during the 2017-18 runoff year are expected to be approximately 6,230 acre-feet greater than E/M groundwater pumping. However, because water supply is anticipated to be available the deficit will not be accumulated for this runoff year. The cumulative E/M water supply shortfall will remain the same as it was at the end of 2016-17 at approximately 197,000 acre-feet.

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 appropriate action necessary to ensure water supplied to E/M projects is in conformance with the provisions of the Water Agreement.

Table 1. 7. Water Uses on City of Los Angeles Owned Lands in Owens Valley – Actual Use in 1981-82 and Planned Use in 2017-18 Runoff Year (acre-feet)



Use	April		May		June		July		August		September		TOTAL Apr-Sep	
	1981	2017	1981	2017	1981	2017	1981	2017	1981	2017	1981	2017	1981	2017
Irrigation	3,980	5,500	7,958	9,500	10,373	11,000	9,476	11,700	8,295	11,000	6,321	6,000	**46,403**	**54,700**
Stockwater	1,141	1,000	1,319	1,100	1,244	1,100	1,245	1,100	1,219	1,000	1,319	1,000	**7,487**	**6,300**
E / M	0	1,700	0	1,900	0	2,000	0	1,900	0	1,700	0	1,500	**0**	**10,700**
LORP	0	500	0	1,300	0	2,500	0	3,000	0	2,800	0	2,500	**0**	**12,600**
Rec. & Wildlife	379	600	804	900	1,160	950	1,455	1,050	1,381	900	1,406	800	**6,585**	**5,200**
1600 ACFT Proj.	0	85	0	91	0	116	0	157	0	74	0	115	**0**	**638**
Total	***5,500***	***9,385***	***10,081***	***14,791***	***12,777***	***17,666***	***12,176***	***18,907***	***10,895***	***17,474***	***9,046***	***11,915***	***60,475***	***90,138***

Use	October		November		December		January		February		March		TOTAL Oct-Mar		TOTAL Apr-Mar	
	1981	2017	1981	2017	1981	2017	1982	2018	1982	2018	1982	2018	81-82	17-18	81-82	17-18
Irrigation	263	200	0	0	0	0	0	0	0	0	14	100	**277**	**300**	**46,680**	**55,000**
Stockwater	1,065	900	1,045	900	1,050	850	1,007	850	1,010	850	1,098	850	**6,275**	**5,200**	**13,762**	**11,500**
E / M	0	500	0	500	0	500	0	100	0	100	0	100	**0**	**1,800**	**0**	**12,500**
LORP	0	1,200	0	800	0	300	0	250	0	250	0	600	**0**	**3,400**	**0**	**16,000**
Rec. & Wildlife	781	700	713	500	565	500	478	500	342	300	447	300	**3,326**	**2,800**	**9,911**	**8,000**
1600 ACFT Proj.	0	215	0	215	0	105	0	97	0	185	0	145	**0**	**962**	**0**	**1,600**
Total	***2,109***	***3,715***	***1,758***	***2,915***	***1,615***	***2,255***	***1,485***	***1,797***	***1,352***	***1,685***	***1,559***	***2,095***	***9,878***	***14,462***	***70,353***	***104,600***

NOTE: Rec & Wildlife includes LORP off-river lakes and ponds water use

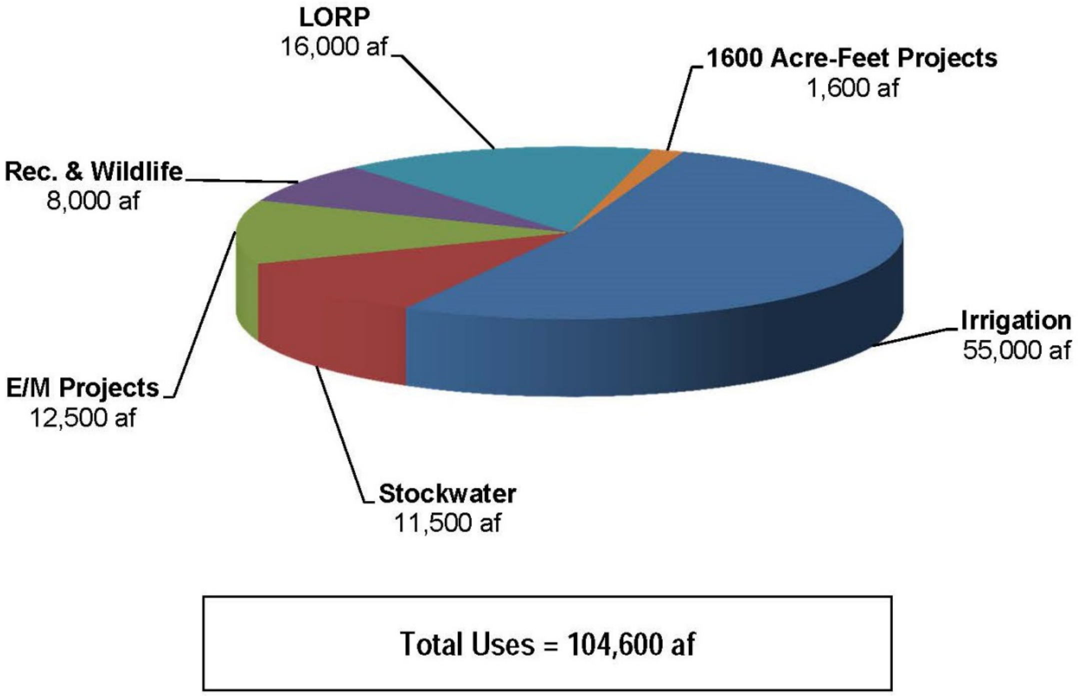
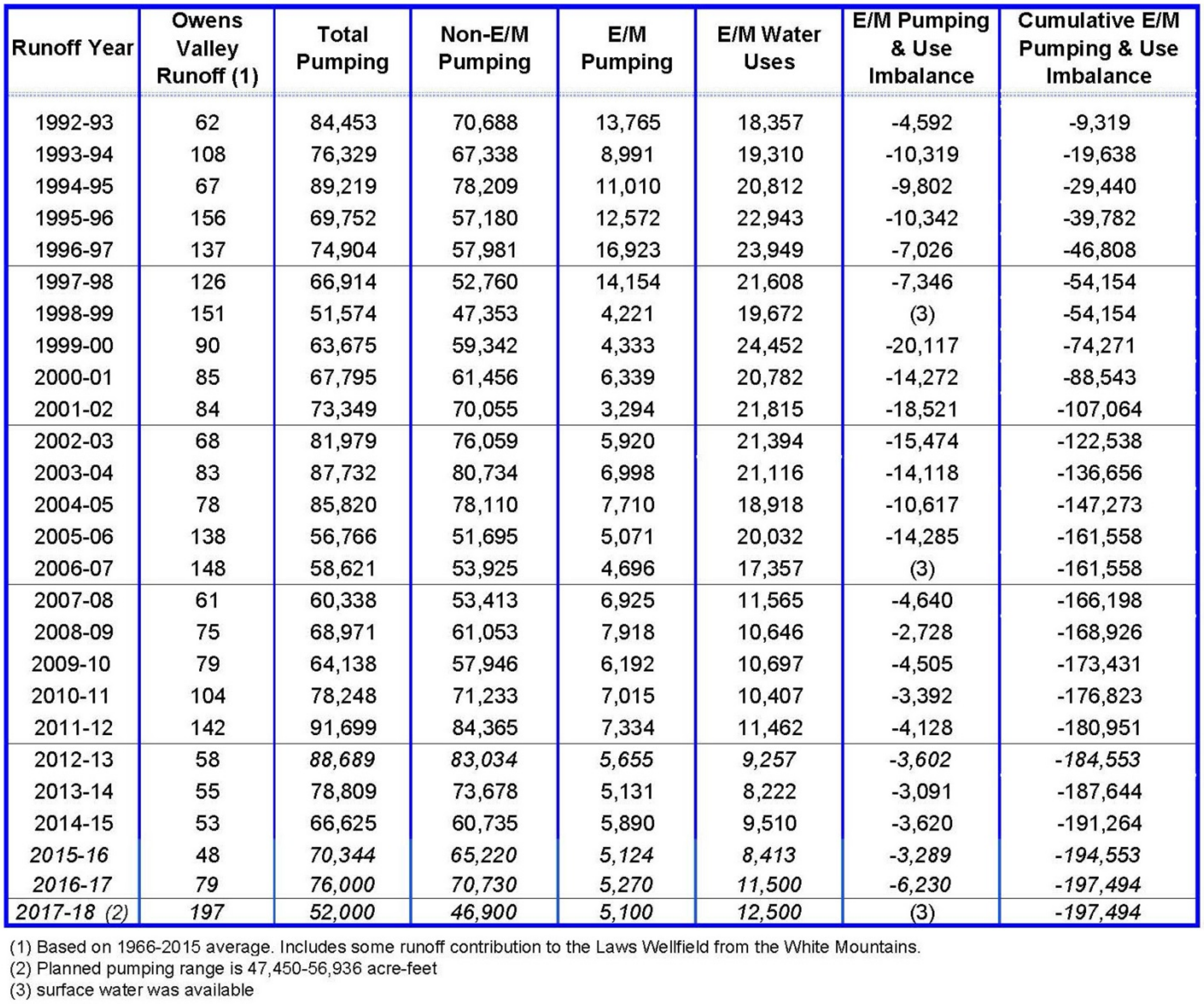


Figure 1. 11. Distribution of Planned Owens Valley Water Use on City Owned Lands for 2017-18 Runoff Year

Table 1. 8. Owens Valley Groundwater Pumping and E/M Water Use (1984-85 through 2017-18 Runoff Year (acre-feet))



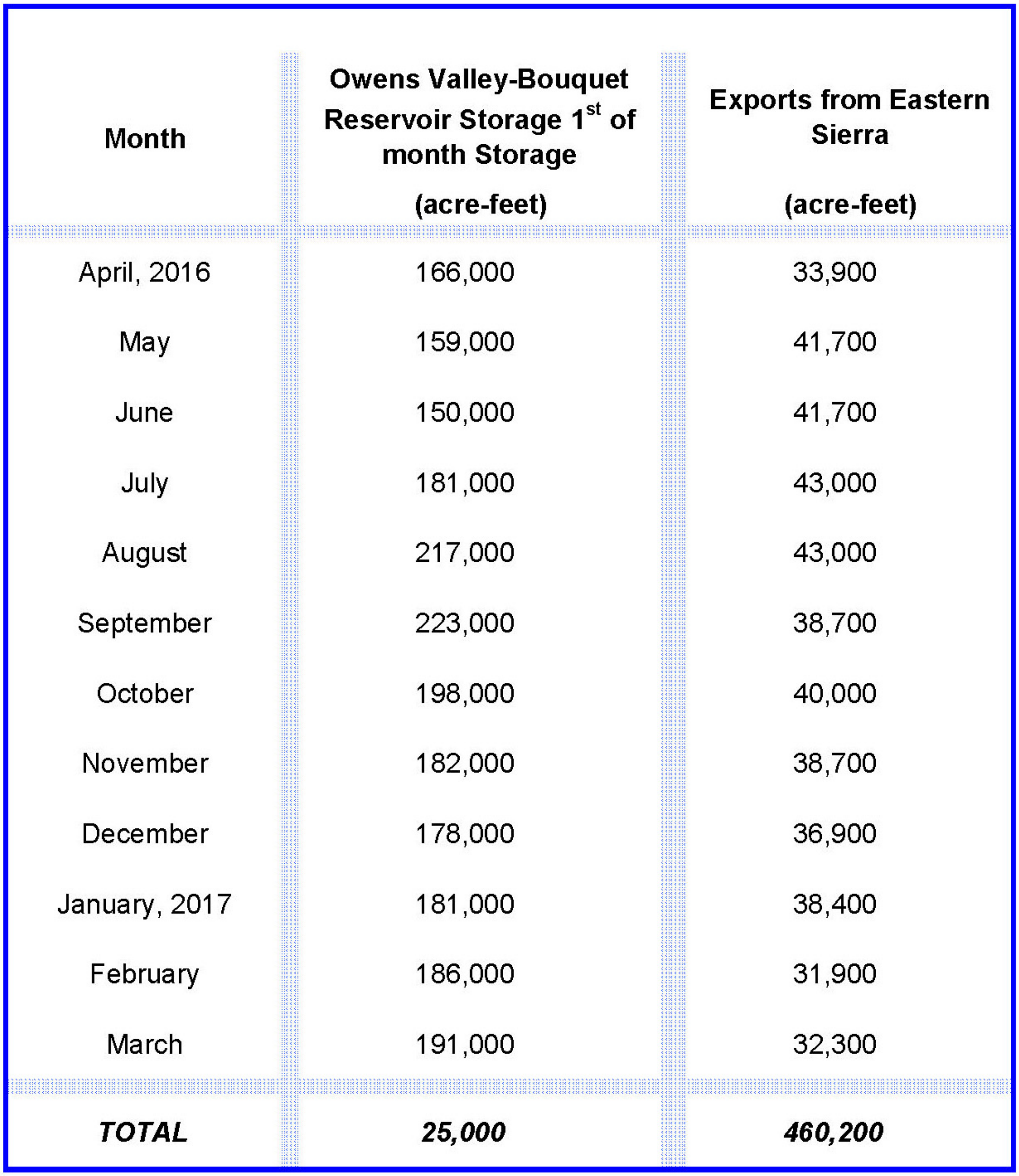
Runoff Year	Owens Valley Runoff (1)	Total Pumping	Non-E/M Pumping	E/M Pumping	E/M Water Uses	E/M Pumping & Use Imbalance	Cumulative E/M Pumping & Use Imbalance
1992-93	62	84,453	70,688	13,765	18,357	-4,592	-9,319
1993-94	108	76,329	67,338	8,991	19,310	-10,319	-19,638
1994-95	67	89,219	78,209	11,010	20,812	-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	78	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	*79*	*76,000*	*70,730*	*5,270*	*11,500*	*-6,230*	*-197,494*
2017-18 (2)	*197*	*52,000*	*46,900*	*5,100*	*12,500*	(3)	*-197,494*

(1) Based on 1966-2015 average. Includes some runoff contribution to the Laws Wellfield from the White Mountains.
(2) Planned pumping range is 47,450-56,936 acre-feet
(3) surface water was available

1.4. Aqueduct Operations

Table 1.9 shows planned LAA reservoir storage levels and monthly deliveries to Los Angeles. Based on this plan, approximately 460,200 acre-feet will be exported from Inyo and Mono Counties to the City during the 2017-18 runoff year. A portion of aqueduct exports from the Eastern Sierra is planned to be released between the California Aqueduct and the City of Los Angeles.

Table 1. 9. Planned Los Angeles Aqueduct Operations for 2017-18 Runoff Year



Month	Owens Valley-Bouquet Reservoir Storage 1st of month Storage (acre-feet)	Exports from Eastern Sierra (acre-feet)
April, 2016	166,000	33,900
May	159,000	41,700
June	150,000	41,700
July	181,000	43,000
August	217,000	43,000
September	223,000	38,700
October	198,000	40,000
November	182,000	38,700
December	178,000	36,900
January, 2017	181,000	38,400
February	186,000	31,900
March	191,000	32,300
TOTAL	***25,000***	***460,200***

1.5. Water Exports to Los Angeles

Figure 1.12 provides a record of water exports from the Eastern Sierra to Los Angeles since 1970. Figure 1.13 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 Los Angeles will require about 486,300 acre-feet of water during the 2016-17 runoff year. It is anticipated that water from the Eastern Sierra will make up about 79% of the 2017-18 supply. Water purchases from the Metropolitan Water District of Southern California will provide about 14% of the City's supply, groundwater from Los Angeles area aquifers will provide about 5%, and recycled water will supply about 2% of the City's water needs.

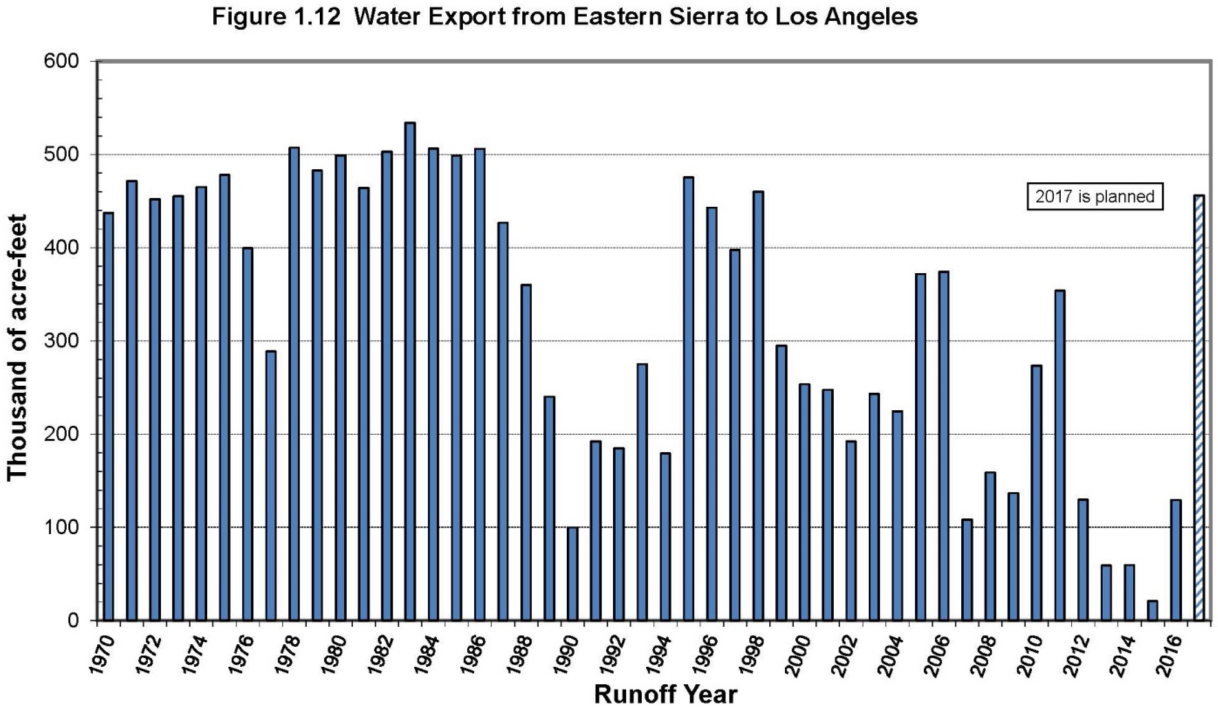


Figure 1. 12. Water Export from Eastern Sierra to Los Angeles

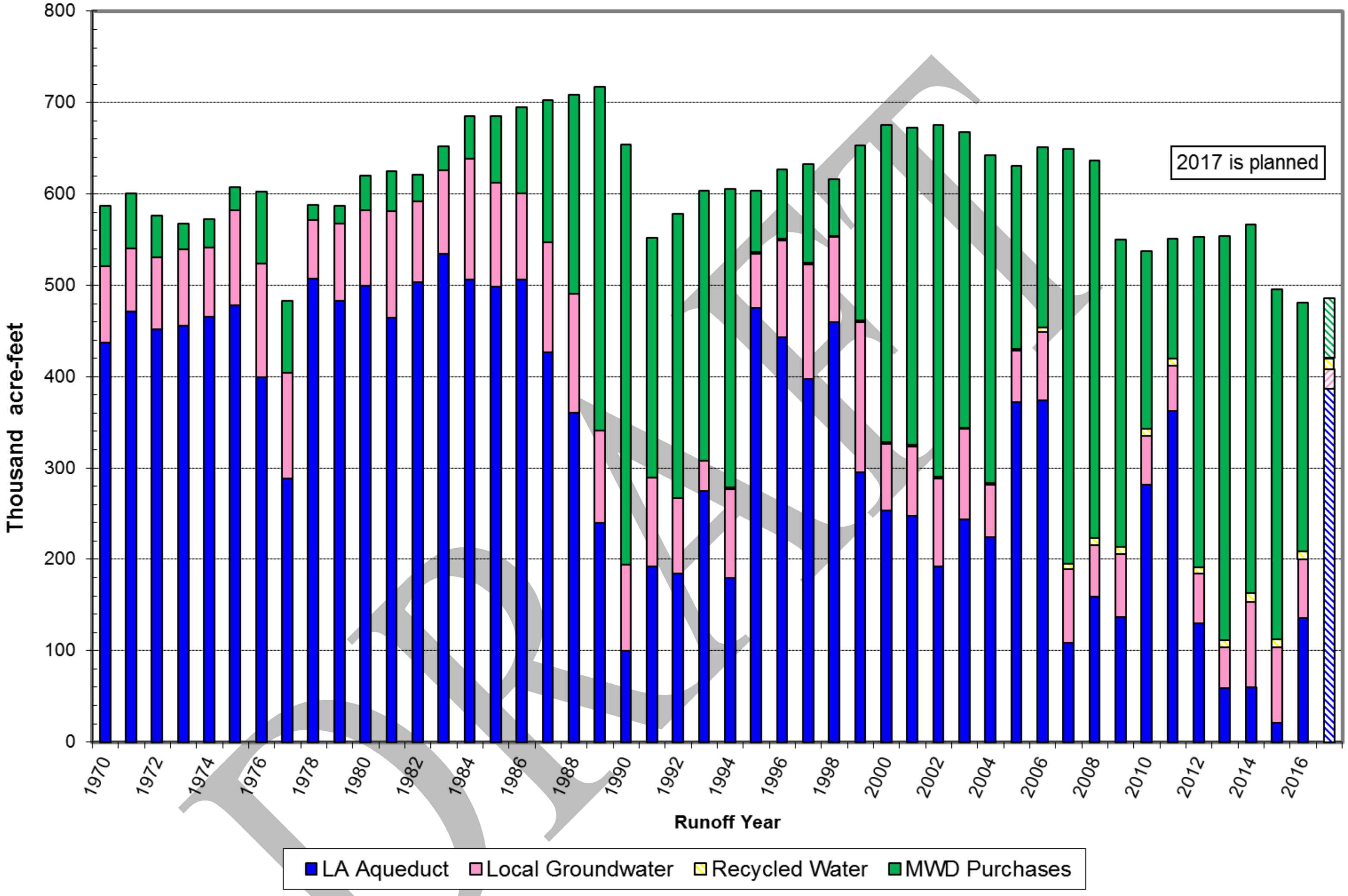


Figure 1. 13. Sources of Water for the City of Los Angeles

CONDITIONS IN THE OWENS VALLEY

2.0 CONDITIONS IN THE OWENS VALLEY

As of April 1, 2017, the Eastern Sierra overall snowpack was measured to be 203% of normal (Tables 2.2). Owens Valley runoff during the 2017-18 runoff year is forecast to be 801,900 acre-feet or approximately 197% of normal (Section 1, Table 1.1). Owens Valley floor precipitation during the 2016-17 runoff year was about 195% 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, even after five consecutive years of extreme drought, 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 2017, 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 Inyo County and the Los Angeles Department of Water and Power (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.

2.2. Groundwater Level Hydrographs

LADWP hydrographers monitor groundwater levels in over 700 monitoring wells throughout the Owens Valley. Groundwater levels are considered when evaluating the overall condition of the basin and are utilized for calibrating groundwater models. Hydrographs are used to observe the changes in groundwater levels over time. Figures 2.2 through 2.10 illustrate hydrographs of selected monitoring wells in Owens Valley wellfields. As shown in Figures 2.2-2.10, groundwater levels are generally stable in most areas of the valley considering that hydrographs show groundwater levels following the five driest consecutive years since LADWP began keeping record of flows in Owens Valley.

LADWP uses regression models to forecast the approximate changes in depth to water in the shallow aquifer. Groundwater pumping for the 2017-18 runoff year will be contingent on environmental conditions, runoff conditions, and water needs assessed during the year. The range of planned pumping by wellfield is included in Table 1.3 (Section 1). Based upon the planned groundwater pumping in each wellfields during the 2017-18 runoff year, the forecast depth to water changes between April 1, 2017, and April 1, 2018, in each Owens Valley wellfields utilizing selected monitoring wells are as follows:

- Groundwater levels in the Laws Wellfield are forecasted to rise approximately between 5.7 feet and 6.0 feet.
- Groundwater levels in the Big Pine Wellfield are forecasted to rise approximately between 3.5 feet and 3.7 feet.
- Groundwater levels in the Taboose-Aberdeen Wellfield are forecasted to rise approximately between 3.8 feet and 4.2 feet.
- Groundwater levels in the Thibaut-Sawmill Wellfield are forecasted to rise approximately between 4.7 feet and 5.0 feet.
- Groundwater levels in the Independence-Oak Wellfield are forecasted to rise approximately 2.5 feet and 3.5 feet.
- Groundwater levels in the Symmes-Shepherd Wellfield are forecasted to rise approximately between 3.6 feet and 4.1 feet.
- Groundwater levels in the Bairs-Georges Wellfield are forecasted to rise approximately between 0.9 feet and 1.1 feet.

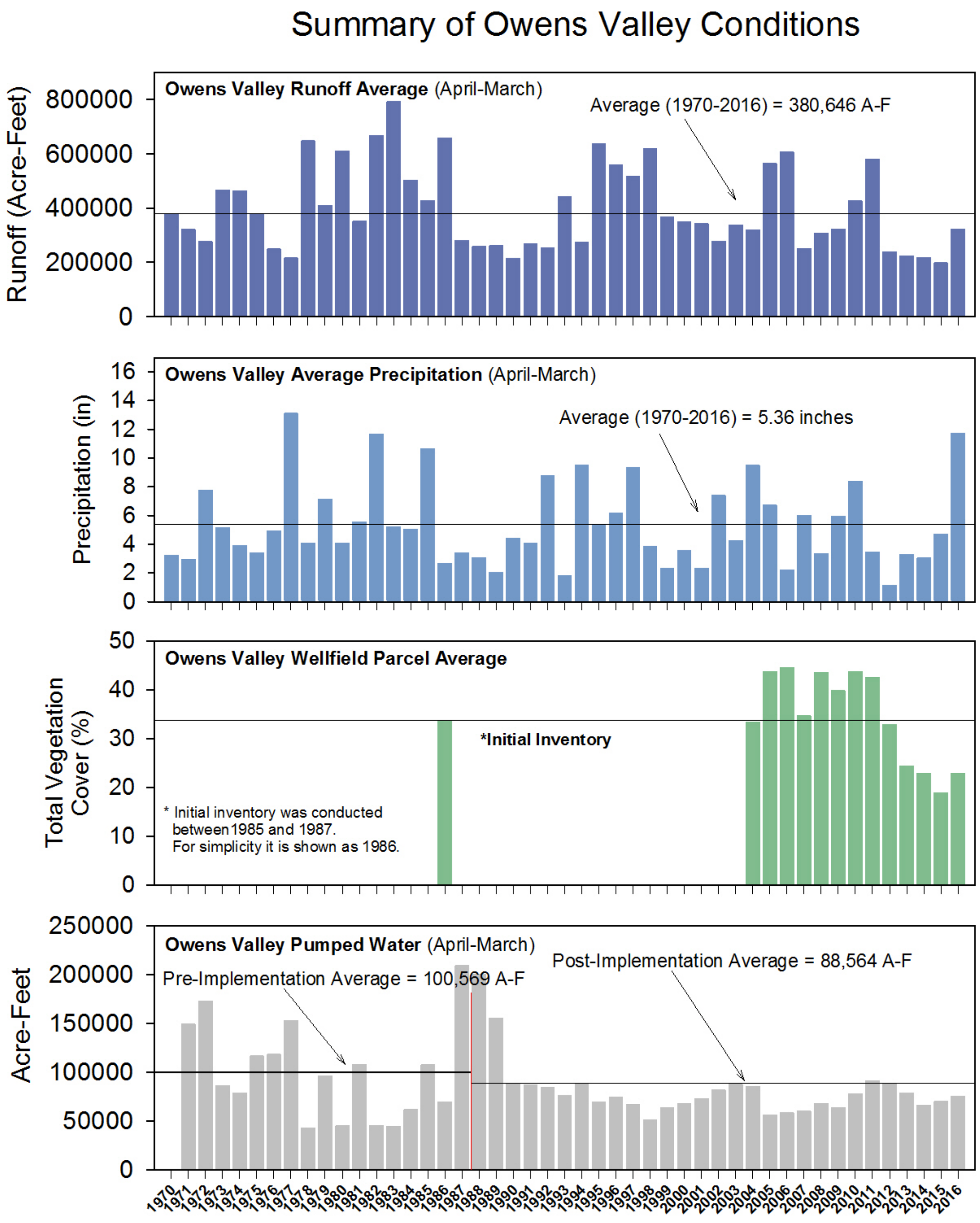


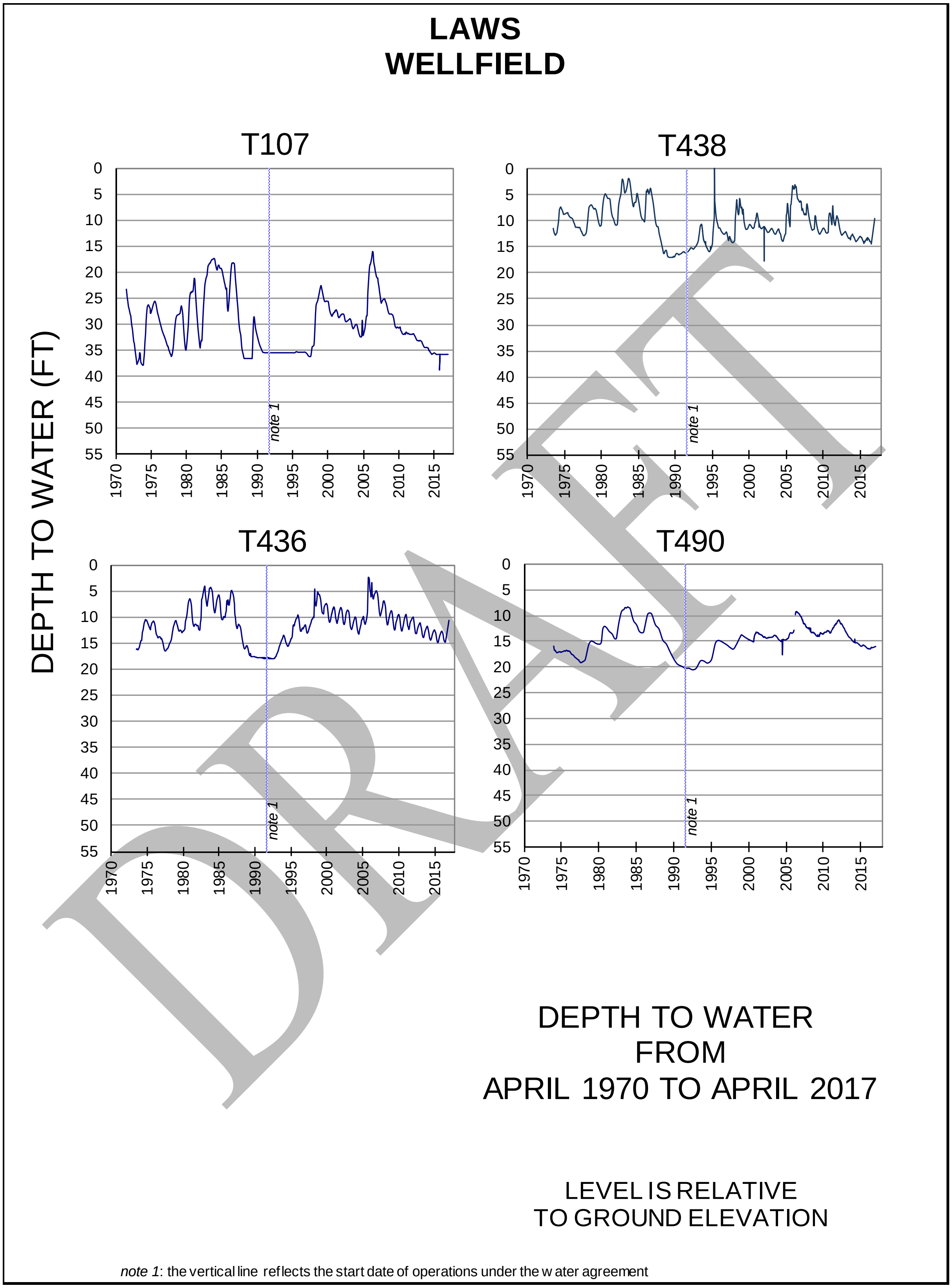
Figure 2. 1. Summary of Owens Valley Conditions

Table 2. 1. Owens Valley Monitoring Site Status (ON/OFF) as of April 2017

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	OFF
	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		ON
	TA4	586T	342, 347		ON
	TA5	801T	349		ON
	TA6	803T	109, 370		ON
	Exempt		118		Exempt
Thibaut-Sawmill	TS1	807T	159		ON
	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		ON
	Exempt		59, 60, 61, 65, 401, 357, 384*	383, 384	Exempt
Symmes-Shepherd	SS1	USGS 9G	69, 392, 393		ON
	SS2	646T	74, 394, 395		OFF
	SS3	561T	92, 396		OFF
	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

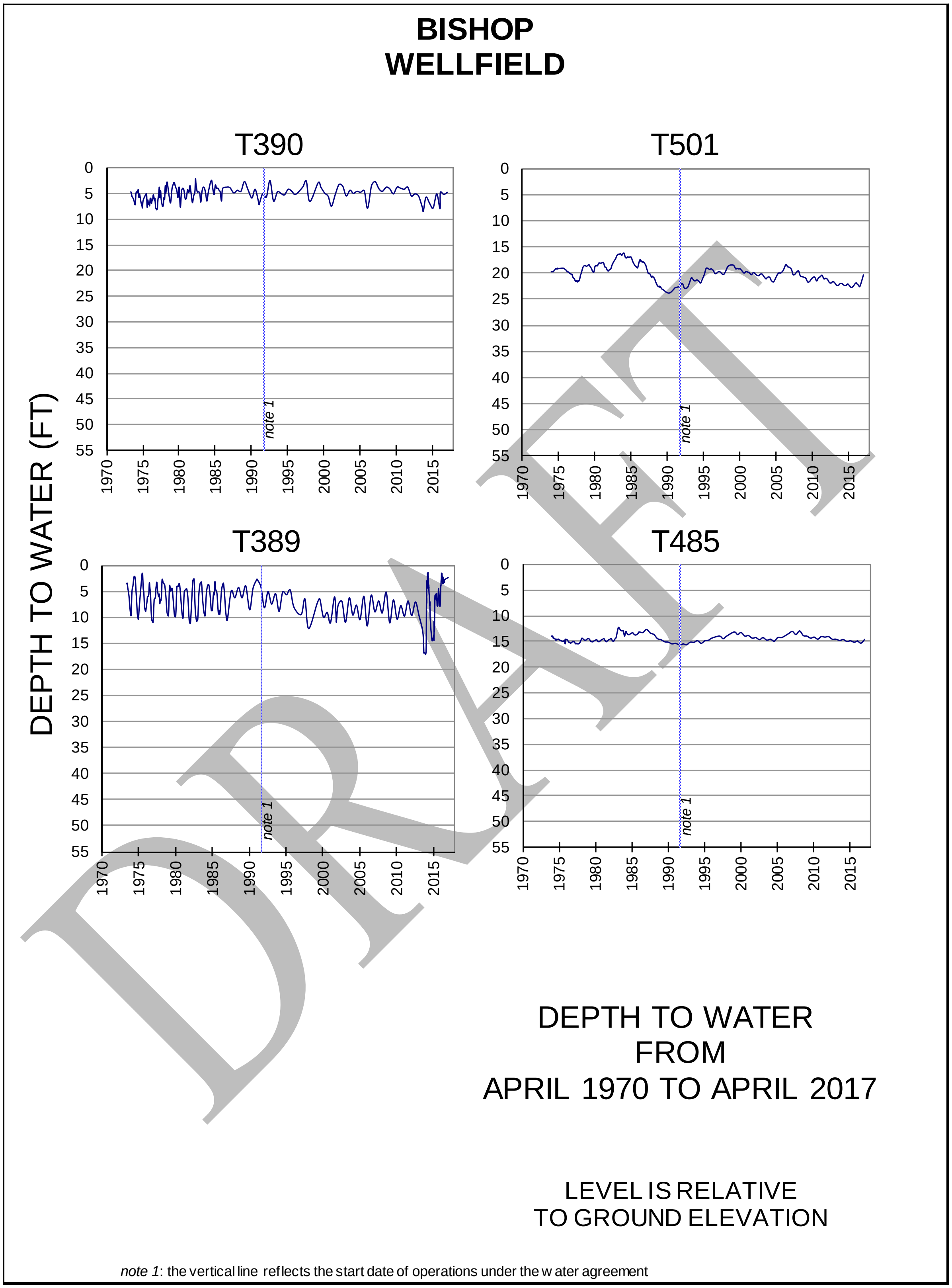
*dual use

** Monitoring site has not yet been located.



note 1: the vertical line reflects the start date of operations under the water agreement

Figure 2. 2. Depth to Water Hydrographs for Laws Wellfield



note 1: the vertical line reflects the start date of operations under the w ater agreement

Figure 2. 3. Depth to Water Hydrographs for Bishop Wellfield

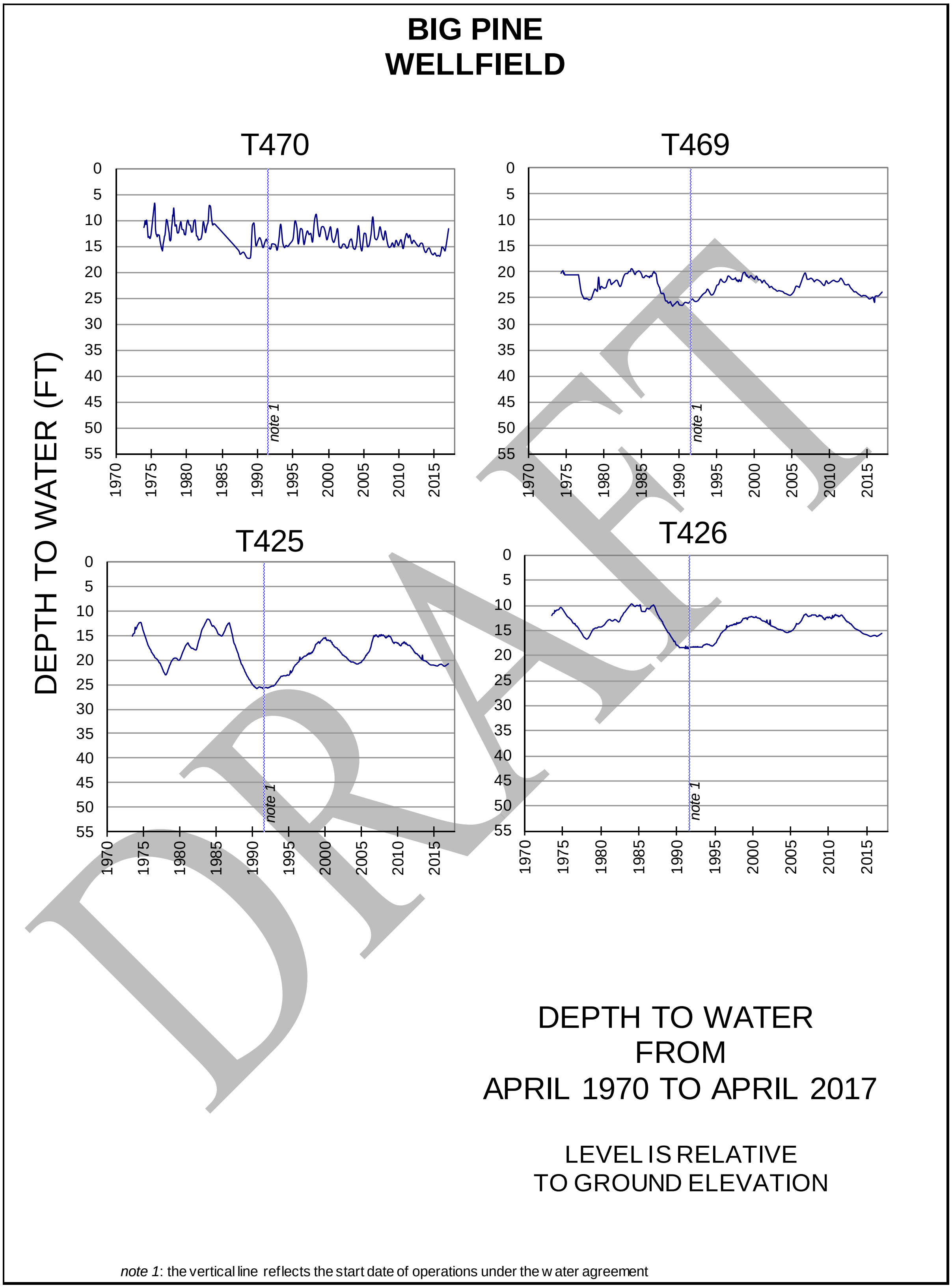
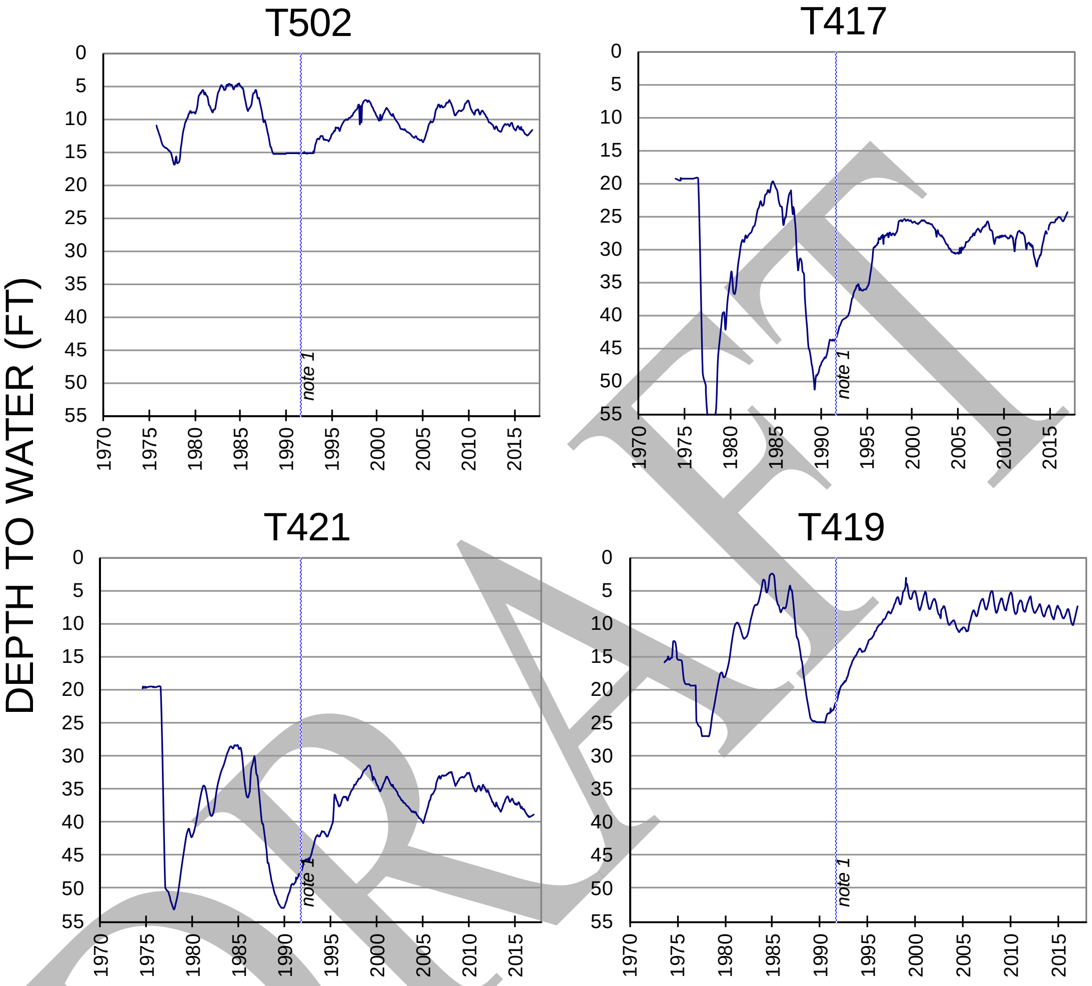


Figure 2. 4. Depth to Water Hydrographs for Big Pine Wellfield

TABOOSE-ABERDEEN WELLFIELD



DEPTH TO WATER
FROM
APRIL 1970 TO APRIL 2017

LEVEL IS RELATIVE
TO GROUND ELEVATION

note 1: the vertical line reflects the start date of operations under the water agreement

Figure 2. 5. Depth to Water Hydrographs for Taboose-Aberdeen Wellfield

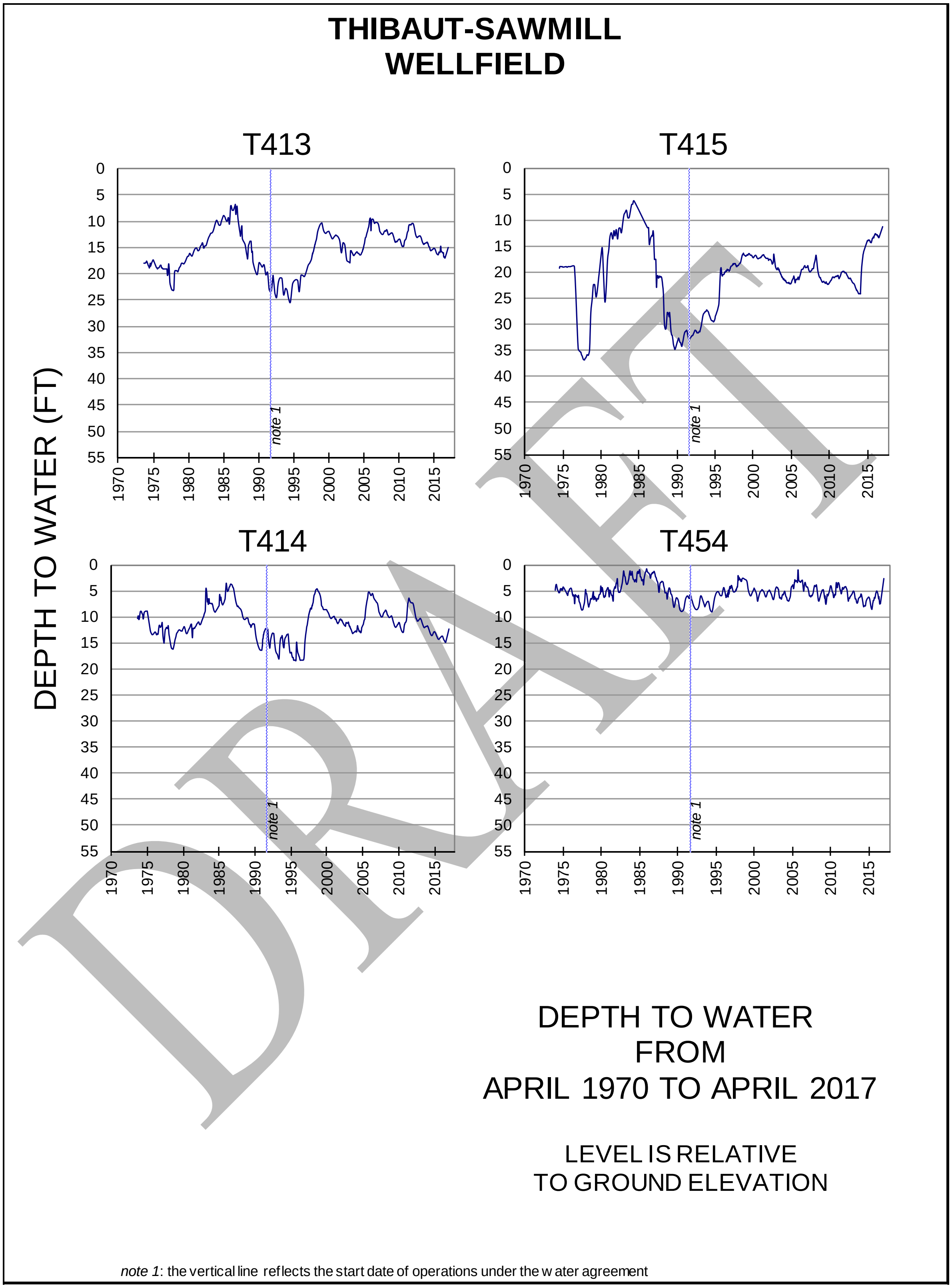
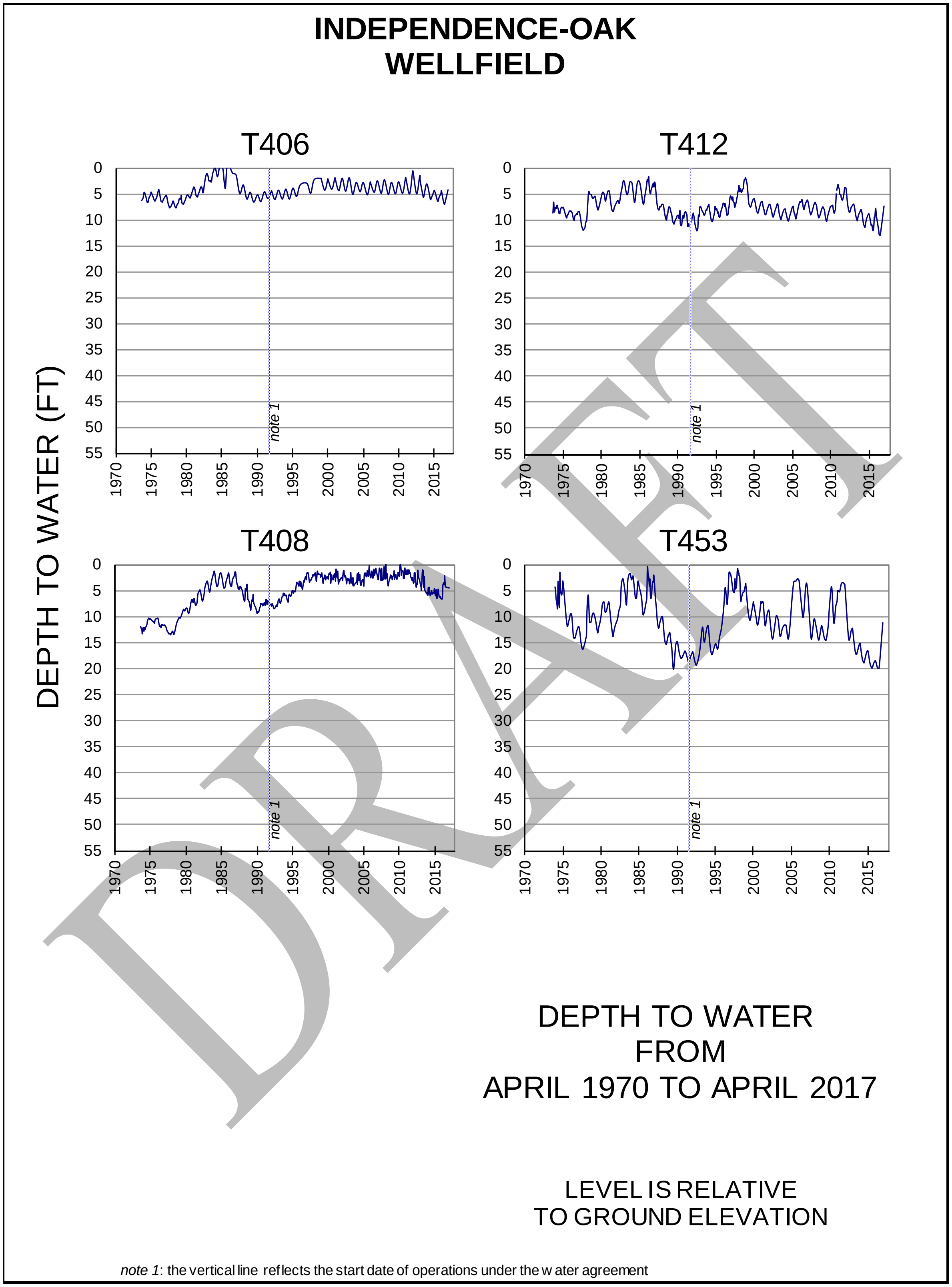
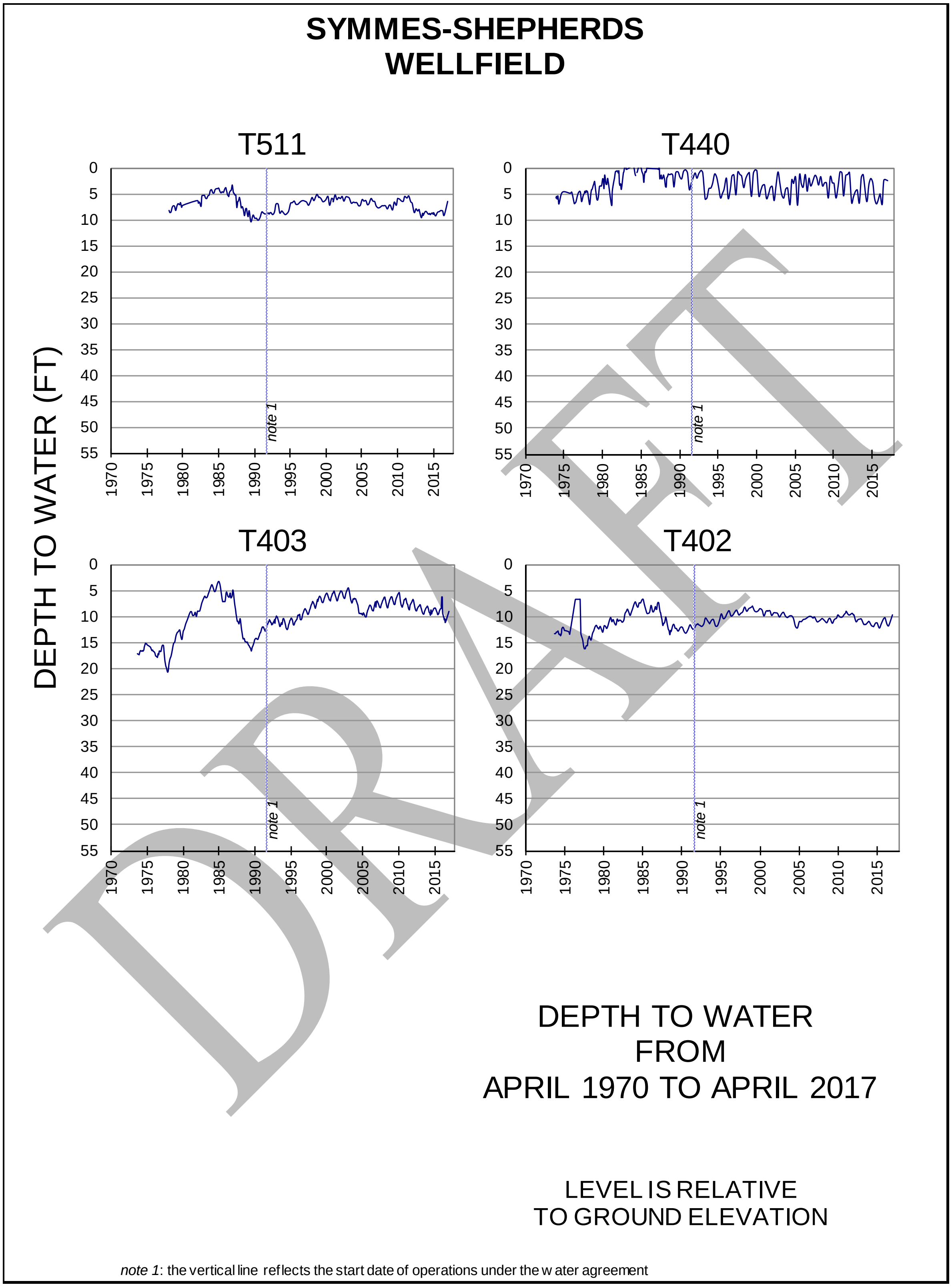


Figure 2. 6. Depth to Water Hydrographs for Thibaut-Sawmill Wellfield



note 1: the vertical line reflects the start date of operations under the water agreement

Figure 2. 7. Depth to Water Hydrographs for Independence-Oak Wellfield



note 1: the vertical line reflects the start date of operations under the water agreement

Figure 2. 8. Depth to Water Hydrographs for Symmes-Shepard Wellfield

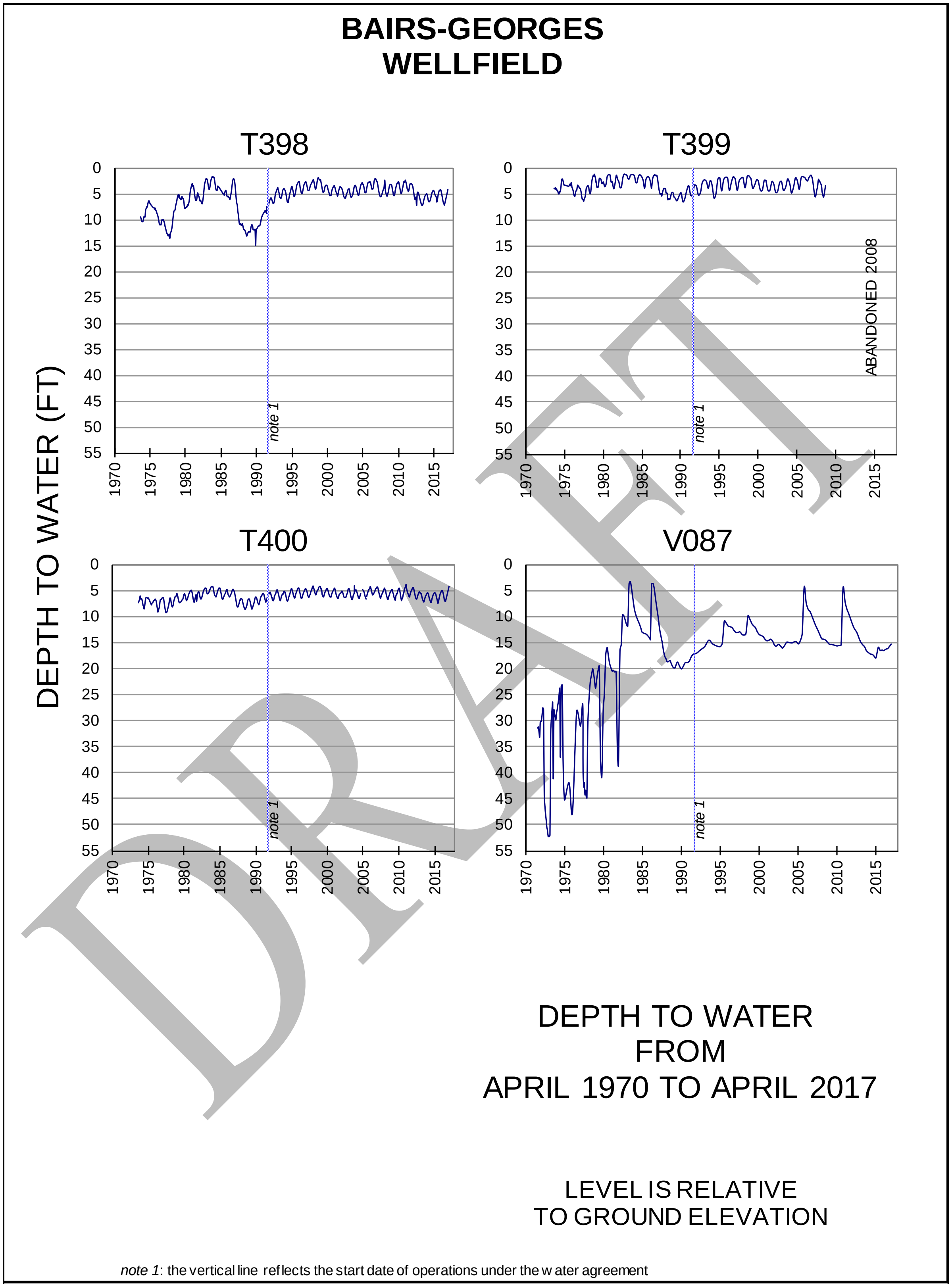
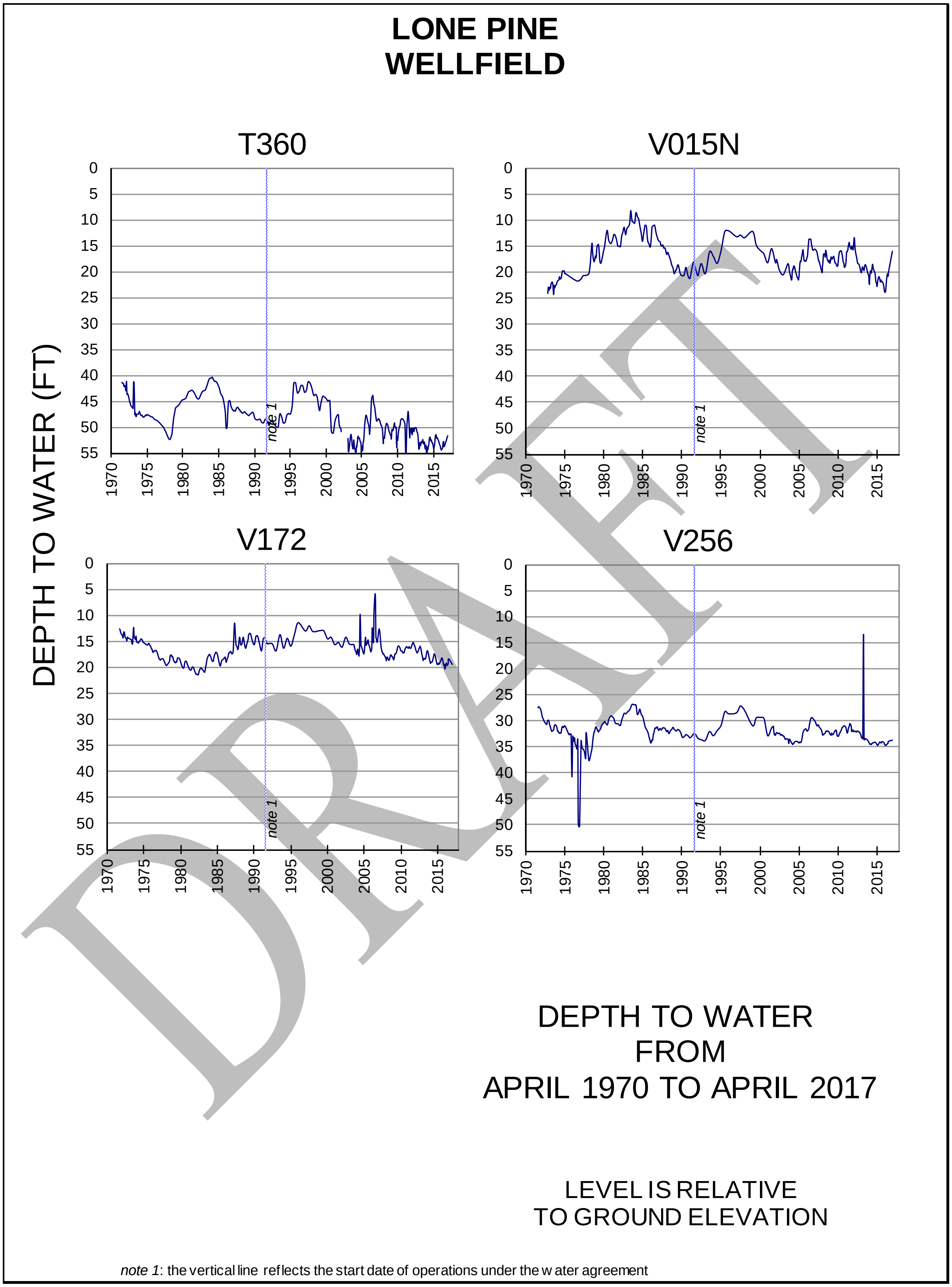


Figure 2. 9. Depth to Water Hydrographs for Bairs-Georges Wellfield



DEPTH TO WATER
FROM
APRIL 1970 TO APRIL 2017

LEVEL IS RELATIVE
TO GROUND ELEVATION

note 1: the vertical line reflects the start date of operations under the water agreement

Figure 2. 10. Depth to Water Hydrographs for Lone Pine Wellfield

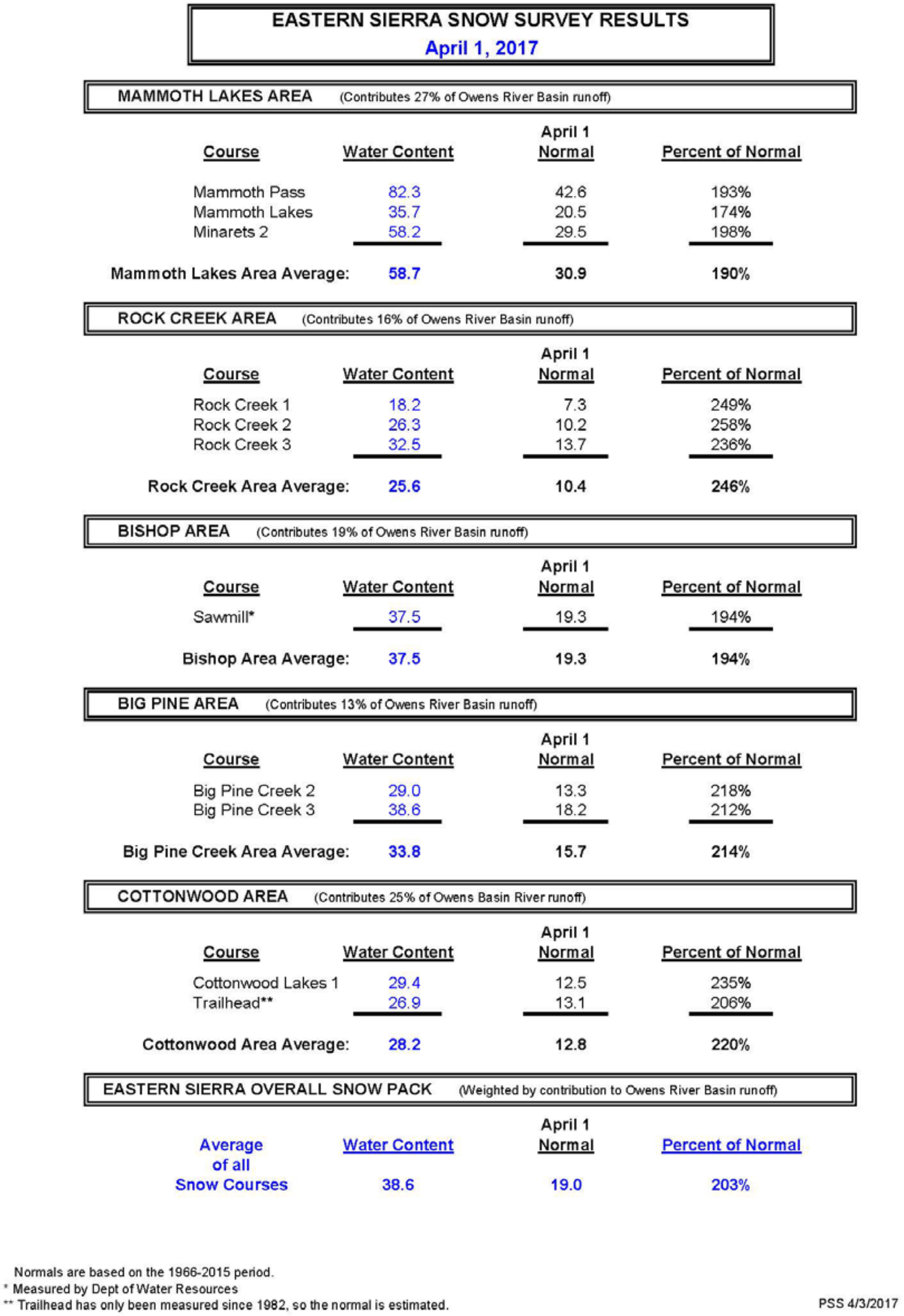
2.3. Precipitation Record and Runoff Forecast

The Eastern Sierra snowpack as of April 1, 2017 was 190% of normal in the Mammoth Lakes area, 246% of normal in the Rock Creek area, 194% of normal in the Bishop area, 214% of normal in the Big Pine area, and 220% of normal in the Cottonwood Lakes area. The Eastern Sierra overall snowpack, weighted by contribution to Owens River watershed runoff was calculated to be 203% of the 50-year (1966-2015) average snowpack as of April 1, 2017 (Table 2.2).

The Eastern Sierra runoff forecast for the 2017-18 runoff year is 801,900 acre-feet or 197% of 50-year average (Section 1, Table 1.1). Figure 2.3 provides a comparison of the forecasted runoff for the 2017-18 year to previous runoff years.

Average precipitation on the valley floor for the 2016-17 year was 11.2 inches, which is 195% of the 50-year average precipitation of 5.8 inches. Table 2.3 details monthly annual precipitation totals for the 2016-17 runoff year as well as the long-term averages at representative precipitation gauges throughout the Owens Valley.

Table 2. 2. Eastern Sierra April 1, 2017 Snow Survey Results



EASTERN SIERRA SNOW SURVEY RESULTS
April 1, 2017

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

Course	Water Content	April 1 Normal	Percent of Normal
Mammoth Pass	82.3	42.6	193%
Mammoth Lakes	35.7	20.5	174%
Minarets 2	58.2	29.5	198%
Mammoth Lakes Area Average:	**58.7**	**30.9**	**190%**

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

Course	Water Content	April 1 Normal	Percent of Normal
Rock Creek 1	18.2	7.3	249%
Rock Creek 2	26.3	10.2	258%
Rock Creek 3	32.5	13.7	236%
Rock Creek Area Average:	**25.6**	**10.4**	**246%**

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

Course	Water Content	April 1 Normal	Percent of Normal
Sawmill*	37.5	19.3	194%
Bishop Area Average:	**37.5**	**19.3**	**194%**

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

Course	Water Content	April 1 Normal	Percent of Normal
Big Pine Creek 2	29.0	13.3	218%
Big Pine Creek 3	38.6	18.2	212%
Big Pine Creek Area Average:	**33.8**	**15.7**	**214%**

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

Course	Water Content	April 1 Normal	Percent of Normal
Cottonwood Lakes 1	29.4	12.5	235%
Trailhead**	26.9	13.1	206%
Cottonwood Area Average:	**28.2**	**12.8**	**220%**

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

Average of all Snow Courses	Water Content	April 1 Normal	Percent of Normal
	38.6	**19.0**	**203%**

Normals are based on the 1966-2015 period.
* Measured by Dept of Water Resources
** Trailhead has only been measured since 1982, so the normal is estimated.

PSS 4/3/2017

Table 2. 3. - Owens Valley Precipitation During Runoff Year 2016-17 in Inches

Month	Bishop	Big Pine	Tinemaha Reservoir	LAA Intake	Indep. Yard	Alabama Gates	Lone Pine	Cotton-wood	South Haiwee	Average Owens Valley
April, 2016	0.88	0.75	0.63	0.26	0.29	0.59	0.28	0.51	0.25	0.49
May	0.29	0.30	0.13	0.23	0.10	0.05	0.02	0.10	0.32	0.17
June	0.83	0.74	0.48	0.32	0.51	0.78	0.45	0.61	0.09	0.53
July	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
August	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.03	0.01	0.01
September	0.01	0.00	0.00	0.06	0.00	0.00	0.00	0.01	0.00	0.01
October	0.11	0.12	0.08	0.02	0.09	0.01	0.00	0.10	0.16	0.08
November	0.05	0.14	0.14	0.18	0.19	0.32	0.20	0.05	0.43	0.19
December	0.54	0.75	0.61	0.40	0.64	0.65	0.72	2.09	1.31	0.86
January, 2017	5.70	8.62	7.35	6.39	7.76	4.24	3.12	7.41	5.96	6.28
February	2.45	2.49	2.94	2.31	2.57	2.04	1.87	3.09	3.28	2.56
March	0.11	0.13	0.07	0.06	0.00	0.00	0.00	0.01	0.01	0.04
2016-17 Total	*11.1*	*14.0*	*12.4*	*10.2*	*12.2*	*8.7*	*6.7*	*14.0*	*11.8*	*11.2*
Average*	6.2	6.2	6.6	5.6	5.5	4.0	3.9	6.8	7.1	5.8
% of Average	179%	226%	189%	183%	223%	216%	170%	207%	168%	195%

* Average for 1966 to 2015 runoff year

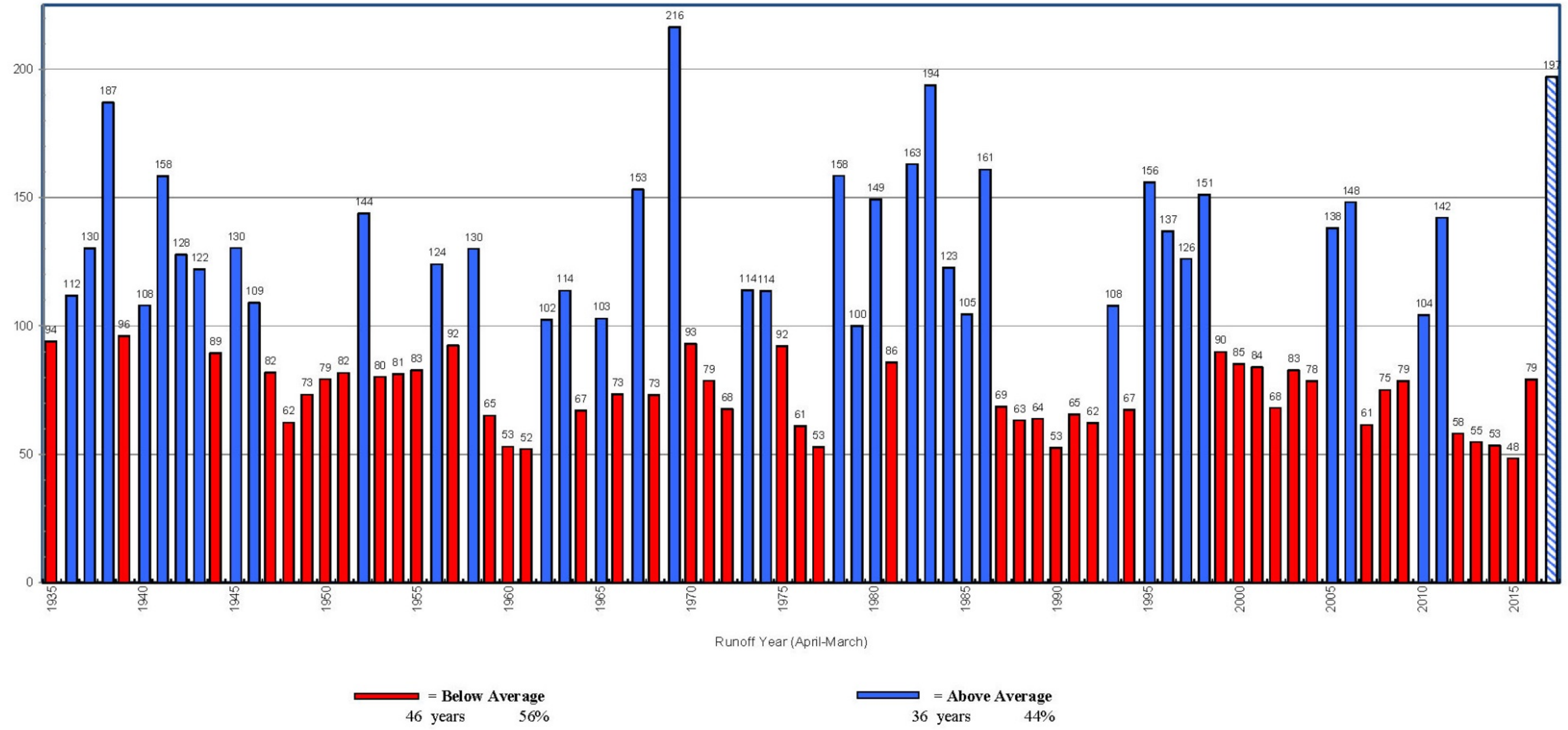


FIGURE 2.3 - Owens Valley Runoff – Percent of Normal

2.4. Owens Valley Water Supply Use

Table 2.4 provides an overview of the Owens Valley water supply, in-valley uses and losses, and Los Angeles Aqueduct (LAA) exports for the post-Water Agreement period (1992-93 through 2016-17 runoff years) as compared to the pre-project average (pre-Second Los Angeles Aqueduct) 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 municipal water supply are increased 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 2.4. 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 2.5.

Table 2.5 provides a breakdown of Owens Valley water uses from 1985 to the present and planned water uses for the 2017-18 runoff year. While much of Table 2.5 is self-explanatory, the following items bear additional explanation:

- Enhancement/mitigation (E/M) water supply is the water supplied to E/M projects referenced in the 1991 EIR,
- LORP is water supplied to the Lower Owens River Project,
- Operations is water used for operational reasons.

Table 2.6 lists a breakdown of water supplied to E/M projects during the 2016-17 runoff year.

Table 2. 4. Owens Valley Water Supply and Uses

(Amounts in Thousands of Acre-Feet/Year)

	Pre-Project (1945-70)	Projected per MOU/ Agreement	Actual Data for Runoff Year 2016-2017	Actual Post Water Agreement Averages (1992-2017)
Owens Valley Water Supply				
Runoff (Owens Valley & Round Valley)	292	310[1]	222	278
Flowing Wells	44	15	42	33
Pumped Groundwater	10	110[2]	76	73
Total	346	435	340	384
In-Valley Uses & Losses				
Water Used on City Lands in O.V.				
Irrigated Lands (3)	62	46	49	48
Stockwater, Wildlife, and Rec. Uses (4)	20	23	19	21
Post 1985 E/M Projects (5)	0	12	12	10
Lower Owens River (6)	0	27(7)	17	18(8)
Additional Mitigation (1,600 af from MOU)	0	0	2	2(8)
Sub-Total	82	110	99	99
Other O.V. Uses and Losses (9)	134	135	231	179
Total	216	245	330	278
Components of Aqueduct Export				
Owens Valley Contribution to Export	130	190	10	106
Long Valley Contribution to Export	134	135	127	134
Mono Basin Contribution to Export (10)	58	30	4	12
Total	322	355	141	252

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.

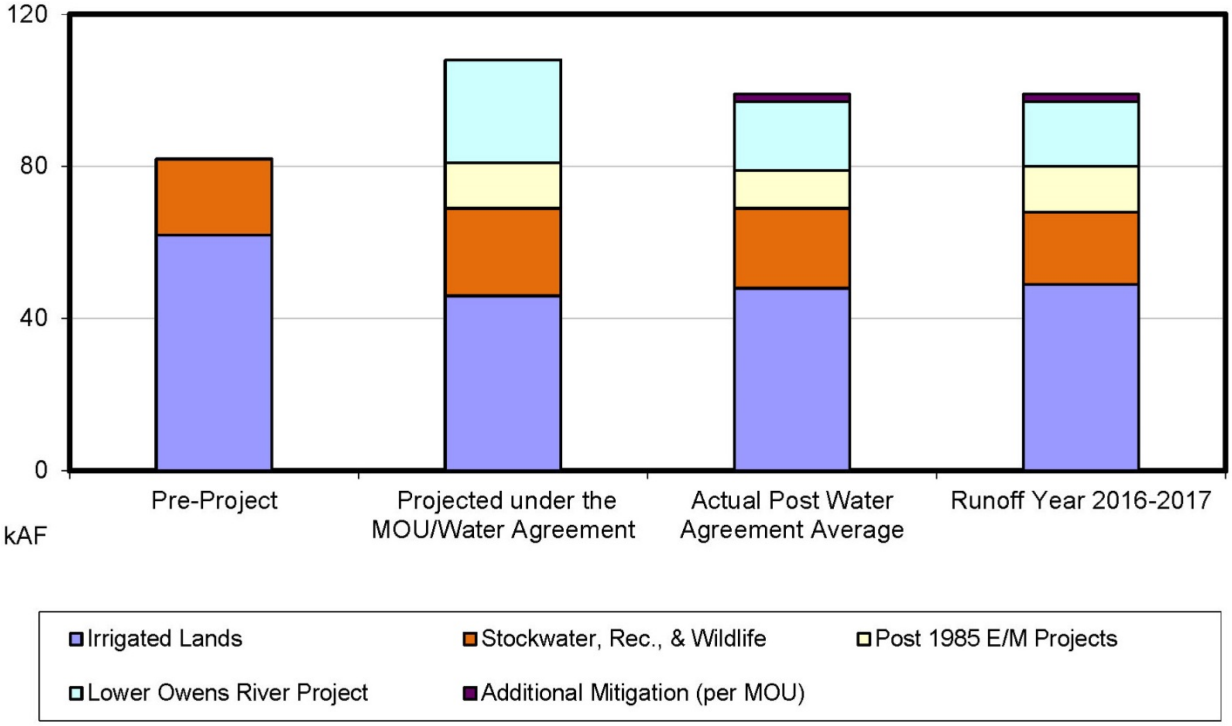


Figure 2.4 - Owens Valley Water Uses

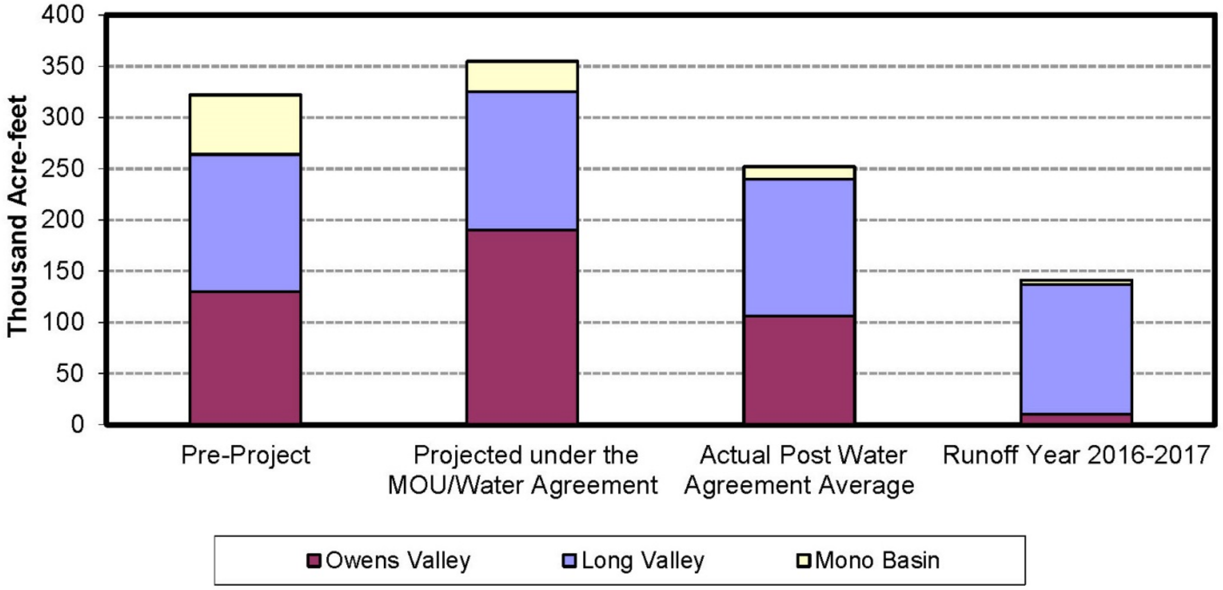


Figure 2.5 - Components of the Eastern Sierra Water Exports

Table 2. 5. Water Uses for 1992-93 through 2016-17 and Planned Uses for the 2017-18 Runoff Year (acre-feet)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	Groundwater Recharge		(13)	(14)
Runoff Year	Owens Valley Runoff %	Owens Valley Pumping (1000 af)	Irrigation	Stock Water	E/M	Rec. & Wildlife	LORP	1600 AF Projects	In-Valley Uses (sum of 4+5+6+7+8+9)	(11) Big Pine & Independence Spreading	(12) Laws Spreading	Operations	All Uses (sum of 10+11+12+13)
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	78	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
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	79	76	48,900	11,000	11,500	*7,800*	16,600	*1,702*	*97,502*	*4,200*	*7,500*	17,000	*126,202*
2017-18	*197*		*55,000*	*11,500*	*12,500*	*8,000*	*16,000*	*1,600*	*104,600*	*67,000*	*55,000*	*103,000*	*329,600*
AVG.	97	86	48,109	13,716	10,093	8,580	13,127	1,626	93,920	8,917	6,148	15,864	124,849

NOTES: PLANNED PUMPING FOR THE 2017-18 RUNOFF YEAR IS ON TABLE 1.6. PUMPING 1992 TO PRESENT INCLUDES E/M PUMPING.
2017-18 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
LORP OFF-RIVER LAKES & PONDS USE OF 2,500 AF IS INCLUDED IN REC & WILDLIFE.

Table 2. 6. Water Supplied to Enhancement/Mitigation Projects During 2016-17

Project	Water Supplied (acre-feet)
McNally Canals Conveyance Losses	600
McNally/Laws/Poleta Native Pasture Lands	1,530
McNally Ponds	1,500
Laws Historical Museum	113
Klondike Lake	1,496
Big Pine Regreening	110
Lower Owens River Rewatering	0
Independence Pasture Lands	1,900
Independence Springfield	1,476
Independence Ditch System	260
Independence Woodlot	110
Independence Regreening	70
Shepherd Creek Alfalfa Lands	920
Lone Pine Park/Richards Field	644
Lone Pine Woodlot	60
Lone Pine Van Norman Field	481
Lone Pine Regreening	230
Total E/M Uses	11,500

2.5. Owens Valley Vegetation Conditions

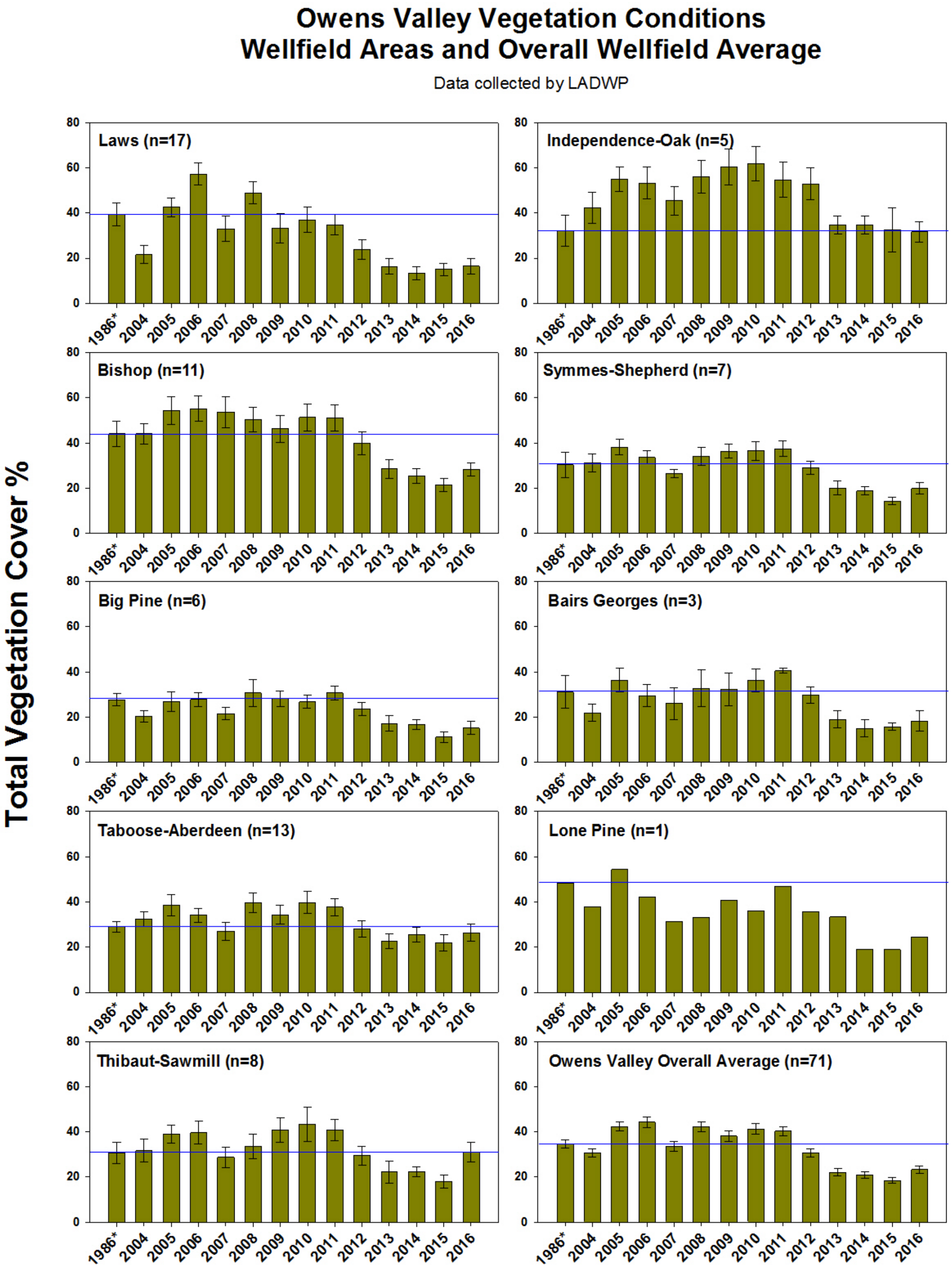
Vegetation conditions within the Owens Valley are monitored using vegetation transects as well as other methods. The Green Book describes the methodology and purposes of vegetation transects. As stated in the Green Book: “Vegetation transects are included within the Green Book to serve two purposes: 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 2.6 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.



*Initial inventory was conducted between 1985 and 1987. For simplicity it is shown as 1986.

Figure 2.6 - Owens Valley Vegetation Condition for Wellfields (data Collected by LADWP)

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 of Los Angeles, 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 of Los Angeles (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 Inyo County Water Department (ICWD) performs an annual audit of LADWP water uses and groundwater extractions by LADWP on the Bishop Cone. The Appendices contain a draft copy of the most recent audit dated January 15, 2016. As shown in Figure 1.5, LADWP has historically pumped much less than allowed under the terms of the Hillside Decree. Beginning in the 2015-16 runoff year, the audit water account methods were modified to analyze each areas inflows and outflows to calculate total water use. In the 2016-17 runoff year LADWP pumped about 10,000 acre-feet of water from the Bishop Cone area, less than a third of that identified as being allowed using the current audit procedures.

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 2.7 shows daily flow values for Reinhackle Spring. Over the 2016-17 runoff year, Reinhackle Spring had an average daily flow of about 2.5 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 Inyo County Water Department for review in November 2012.

Table 2. 7. Reinhackle Spring Flow in cfs During 2016-17 Runoff Year

Day of Month	April	May	June	July	August	September	October	November	December	January	February	March	Annual
1	2.37	2.52	2.69	2.96	2.96	2.87	2.69	2.37	2.27	2.12	2.27	2.22	
2	2.37	2.51	2.74	2.96	2.96	2.85	2.69	2.37	2.27	2.12	2.27	2.22	
3	2.37	2.48	2.74	2.96	2.96	2.85	2.69	2.37	2.27	2.09	2.27	2.22	
4	2.37	2.49	2.75	2.96	2.93	2.84	2.69	2.36	2.27	2.13	2.27	2.22	
5	2.37	2.53	2.74	2.96	2.90	2.80	2.69	2.32	2.27	2.13	2.24	2.22	
6	2.42	2.53	2.74	2.99	2.90	2.80	2.69	2.32	2.41	2.12	2.22	2.27	
7	2.43	2.53	2.76	2.99	2.90	2.80	2.69	2.32	2.49	2.13	2.18	2.28	
8	2.43	2.53	2.77	3.02	2.90	2.80	2.69	2.32	2.24	2.13	2.17	2.28	
9	2.43	2.54	2.77	3.02	2.90	2.80	2.69	2.30	2.23	2.15	2.17	2.27	
10	2.45	2.51	2.78	3.02	2.90	2.80	2.67	2.27	2.23	2.12	2.14	2.27	
11	2.48	2.48	2.81	3.02	2.90	2.80	2.63	2.27	2.23	2.13	2.12	2.27	
12	2.48	2.48	2.85	3.02	2.90	2.77	2.63	2.27	2.22	2.12	2.12	2.27	
13	2.48	2.49	2.86	3.02	2.90	2.76	2.63	2.27	2.22	2.12	2.12	2.27	
14	2.48	2.52	2.88	3.07	2.90	2.74	2.61	2.27	2.22	2.13	2.12	2.27	
15	2.48	2.53	2.90	3.07	2.90	2.74	2.58	2.27	2.23	2.12	2.12	2.31	
16	2.48	2.55	2.90	3.07	2.90	2.74	2.55	2.27	2.24	2.12	2.12	2.32	
17	2.48	2.58	2.96	3.07	2.90	2.74	2.53	2.22	2.22	2.12	2.12	2.33	
18	2.48	2.58	2.96	3.07	2.87	2.74	2.53	2.22	2.19	2.12	2.12	2.32	
19	2.48	2.58	2.96	3.07	2.85	2.74	2.53	2.22	2.17	2.12	2.12	2.32	
20	2.48	2.59	2.96	3.07	2.85	2.74	2.53	2.22	2.17	2.12	2.12	2.32	
21	2.48	2.58	2.93	3.07	2.84	2.76	2.53	2.23	2.17	2.08	2.17	2.36	
22	2.48	2.58	2.92	3.07	2.81	2.80	2.53	2.22	2.17	2.14	2.17	2.37	
23	2.48	2.58	2.93	3.07	2.85	2.80	2.48	2.22	2.17	2.12	2.17	2.37	
24	2.48	2.58	2.90	3.05	2.85	2.80	2.48	2.22	2.17	2.12	2.17	2.37	
25	2.48	2.64	2.90	3.02	2.85	2.76	2.48	2.25	2.17	2.12	2.16	2.37	
26	2.51	2.69	2.96	3.02	2.85	2.74	2.47	2.27	2.17	2.12	2.17	2.37	
27	2.50	2.69	2.96	3.02	2.85	2.74	2.43	2.27	2.17	2.12	2.17	2.37	
28	2.48	2.71	2.96	3.02	2.85	2.73	2.43	2.26	2.12	2.12	2.17	2.37	
29	2.48	2.69	2.96	3.02	2.83	2.74	2.42	2.23	2.12	2.12	2.19	2.37	
30	2.48	2.69	3.01	3.00	2.85	2.69	2.41	2.25	2.12	2.12		2.37	
31		2.69		2.96	2.85		2.37			2.12		2.37	
Average	2.45	2.57	2.87	3.02	2.88	2.77	2.57	2.28	2.22	2.12	2.17	2.31	2.52

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. During January and February of the winter of 2017 Eastern Sierra received a near record amount of snowfall. In anticipation of excessive amount of runoff and to protection the dust mitigation infrastructure at Owens Lake, LADWP spread approximately 11,700 acre-feet of water in runoff year 2016-17 in the areas of Laws and Big Pine.

Overall estimated snowpack as of April 1, 2017, is about 203% of normal and forecasted runoff for the Owens River Basin is about 801,900 acre-feet or 197% of the 50-year average. Due to extreme winter snowfall and forecasted runoff, LADWP is anticipating the need for water spreading and operational releases of water during the 2017-18 runoff year, the extent of which will depend on the prevailing temperature, precipitation, and available LAA capacity in the upcoming year.

LADWP ENVIRONMENTAL MITIGATION PROJECTS AND OTHER LEGAL OBLIGATIONS

3.0 LADWP ENVIRONMENTAL MITIGATION PROJECTS AND OTHER LEGAL OBLIGATIONS

3.1. Introduction

Section 3 provides information on all of the Los Angeles Department of Water and Power's (LADWP) Mitigation Projects and other obligations 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. The quick reference tables were jointly developed by the Inyo/Los Angeles Technical Group and were presented to the Inyo/LA Standing Committee February 22, 2017. Projects/obligations are listed alphabetically in Tables 3.1 and 3.2 and have a corresponding number in the left column for reporting purposes only. These tables show mitigation status of these projects/obligations according to both LADWP and Inyo County Water Department (ICWD). Red text shows areas of disagreement between LADWP and ICWD. Three of the projects have changed status since this table was presented to the Standing Committee.

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

6. *Complete*: Project has no additional commitments required (no water allotment or other financial or environmental mitigation; no continual monitoring and reporting),
7. *Ongoing as necessary/required:* These measures are only applied when necessary (monitoring and reporting for mitigation measures for new projects, construction, etc.),
8. *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,
9. *Fully implemented but not meeting goals:* Project is fully implemented but has not yet met prescribed goals or success criteria,
10. *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,
- 13 are fully implemented but not meeting goals,
- 0 are not fully implemented

Of the 48 other obligations, LADWP reports:

- 19 are complete,
- 6 are ongoing as necessary or required,
- 20 are implemented and ongoing,
- 0 are fully implemented and not meeting goals, and
- 3 are not fully implemented

More detailed information regarding each of these projects and other obligations is provided in tabular format later in this chapter, and where relevant, more detailed text. Reporting numbers from Tables 3.1 and 3.2 are cross referenced to Tables 3.3. and 3.4.

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

Table 3. 1. LADWP Mitigation Commitments

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU	**Table 3.1** **LADWP MITIGATION PROJECT COMMITMENTS**	Complete[1]	Ongoing as Necessary/ Required[2]	Implemented and Ongoing[3]	Fully Implemented but not meeting goals[4]	Not fully implementd[5]
1					X	Aberdeen Ditch Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			X		
2	X	X				Big and Little Seely Springs (1 acre pond near Well W349; EIR Impact 10-14, EIR Table 5-2)			X		
3	X			X		Big Pine Area Revegetation Project (160 acres; EIR Impact 10-19)				X	
4	X			X		Big Pine Area Revegetation Project (20 acres; EIR Impact 10-19)				X	
5	X					Big Pine Ditch System (EIR Impact 10-19)			X		
6	X		X	X		Big Pine Northeast Regreening (30 acres; EIR Impact 10-11, EIR Table 5-3)			X		
7	X			X		Bishop Area Revegetation Project (120 acres; EIR Impact 10-16)				X	
8	X			X		Blackrock 16E Revegetation Project (7.5 acres, EIR Impact 10-11)	X				
9	X					Blackrock Hatchery (EIR Impact 10-14)			X		
10	X	X				Buckley Ponds (EIR Impact 10-5 and 11-1, EIR Table 5-2)			X		
11	X	X				Calvert Slough (EIR Impact 10-5, EIR Table 5-2)			X		
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))			X		
13	X		X			Eastern California Museum (EIR Tables 4-3 and 5-3)			X		
14	X	X				Farmers Pond (EIR Impact 10-5, 10-18, 11-1, EIR Table 5-2)			X		
15	X					Fish Springs Hatchery (EIR Impact 10-14)			X		
16	X			X		Five Bridges Area Revegetation Project (300 acres; EIR Impact 10-12)				X	
17					X	Freeman Creek Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			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)			X		
19	X			X		Hines Spring South (EIR Impact 10-11)				X	
20					X	Hines Spring Well 355 Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			X		
21					X	Homestead Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			X		
22	X			X		Independence 105 Revegetation Project (14 acres, EIR Impact 10-13)	X				
23	X			X		Independence 123 Revegetation Project (28 acres, EIR Impact 10-13)	X				
24	X			X		Independence 131 Revegetation Project (23 acres, EIR Impact 10-13)	LA			IC	
25	X		X			Independence Ditch System (EIR Table 4-3)			X		
26	X		X	X		Independence East Side Regreening Project (23 acres; EIR Impact 10-11, 12-1, EIR Table 5-3)			X		
27	X		X			Independence Pasturelands and Native Pasturelands (610 acres; EIR Impact 12-1, EIR Tables 4-3 and 5-3)			X		
28	X		X			Independence Roadside Rest Area (0.5 acres; EIR Tables 4-3 and 5-3)			X		
29	X		X			Independence Springfield (286 acres; EIR Impact 10-11, 12-1, EIR Tables 4-3 and 5-3)			X		
30	X		X			Independence Woodlot (20 acres; EIR Impact 10-11, EIR Table 4-3)			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)			X		
32						Klondike SSHA (Big Pine Ditch System MND)			X		
33				X		LAWS 118 Revegetation Project (19 acre portion, Laws Type E Transfer MND)				X	
34				X		LAWS 129 (47 acres, Laws Type E Transfer MND/2003 Laws Revegetation Plan)				X	
35				X		LAWS 27 (Native Seed Farm) (Laws Type E Transfer MND)				X	
36				X		LAWS 90 (101 acres, Laws Type E Transfer MND/2003 Laws Revegetation Plan)				X	
37				X		LAWS 94 (40 acres, Laws Type E Transfer MND/2003 Laws Revegetation Plan)				X	
38				X		LAWS 95 (46 acres, Laws Type E Transfer MND/2003 Laws Revegetation Plan)				X	
39	X			X		Laws Area Revegetation Project (140 acres; EIR Impact 10-18)				X	
40	X		X			Laws Historical Museum Pasturelands (21+15 acres; EIR Impact 10-18, EIR Table 5-3)			X		
41	X		X			Laws/Poleta Native Pasture (216 acres; EIR Impact 10-18, EIR Tables 4-3 and 5-3)			X		
42	X	X				Little Blackrock Springs (EIR Impact 10-14, EIR Table 5-2)			X		
43	X		X			Lone Pine East Side Regreening (11 acres; EIR Impact 10-16, EIR Table 5-3)			X		
44	X		X			Lone Pine-North Lone Pine Clean Up (EIR Table 4-3)	X				
45	X		X			Lone Pine Riparian Park (320 acres, EIR Tables 4-3 and 5-3)			X		
46	X		X			Lone Pine Sports Complex (EIR Table 5-3)	X				
47	X		X			Lone Pine West Side Regreening (8 acres; EIR Impact 10-16, EIR Tables 4-3 and 5-3)			X		
48	X		X			Lone Pine Woodlot (12 acres; EIR Impact 10-11, EIR Table 4-3)			X		
49	X	X	X		X	LORP Project (60 miles, perhaps more than 1,000 acres)/ Lower Owens Rewatering Project)			LA	IC[6]	
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)			LA	IC	
51	X	X	X			Millpond Recreation Area (EIR Impact 10-5, EIR Table 5-2 and 5-3)			X		
52					X	North of Mazourka Canyon Road Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			X		
53	X					Reinhackle Spring (EIR Impact 10-14)			X		
54	X		X			Richards Fields (160 acres; EIR Impact 10-16, EIR Table 4-3)			X		
55	X	X				Saunders Pond (EIR Impact 10-5, EIR Table 5-2)			X		
56	X		X			Shepherd Creek Alfalfa Field (198 acres; EIR Impact 10-11, EIR Tables 4-3 and 5-3)			X		
57	X		X			Shepherd Creek Potential (60 acres; EIR Impact 10-11, EIR Table 5-3)	X				
58	X					Steward Ranch (EIR Impact 9-14)	X				
59	X			X		Tinemaha 54 Revegetation Project (EIR Impact 10-11)				X	
60	X		X			Tree Planting along Roadways (EIR Table 4-3)			X		
61	X	X				Tule Elk Field (EIR Table 5-2)			X		
62	X		X			Van Norman Fields (170 acres; EIR Impact 10-16, EIR Table 4-3)			X		
63					X	Warren Lake Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			X		
64					X	Well 368 Project (Additional Mitigation Projects Developed by the MOU Ad Hoc Group (MOU Section III.A.3))			X		
64 TOTAL MITIGATION COMMITMENTS						**LADWP Totals**	**8**	**0**	**43**	**13**	**0**
						Inyo County Totals	**7**	**0**	**41**	**16**	**0**

Table 3. 2. LADWP Other Obligations

Reporting No.	Inyo/LA Water Agreement	1991 EIR	1997 MOU	Table 3.2 LADWP OTHER OBLIGATIONS	Complete[1]	Ongoing as Necessary/ Required[2]	Implemented and Ongoing[3]	Fully Implemented but not meeting goals[4]	Not fully implementd[5]
1			X	Aerial Photo Analysis (MOU Section III.E)	X				
2			X	Annual Report on the Owens Valley (MOU Section III.H)			X		
3	X			Cooperative Studies (Water Agreement Section IX)			X		
4	X			Dispute Resolution (Water Agreement Section XXVI)		X			
5			X	Dispute Resolution and Litigation (MOU Section VI)		X			
6	X			Enhancement/ Mitigation Projects (Water Agreement Section X)			X		
7	X			Exchange of Information and Access (Water Agreement Section XVII)			X		
8	X			Financial Assistance- Big Pine Ditch System (Water Agreement Section XIV.E)			X		
9	X			Financial Assistance- General Financial Assistance to the County (Water Agreement Section XIV.D)			X		
10	X			Financial Assistance- Park & Environmental Assistance to City of Bishop (Water Agreement Section XIV.F)	X				
11	X			Financial Assistance- Park Rehabilitation, Development, & Maintenance (Water Agreement Section XIV.B)			X		
12	X			Financial Assistance- Salt Cedar Control (Water Agreement Section XIV.A)			X		
13	X			Financial Assistance- Water and Environmental Activities (Water Agreement Section XIV.C)			X		
14			X	Financial Provisions (MOU Section IX)	X				
15			X	Fish Slough (MOU Section IV)			X		
16	X			Groundwater Management (Water Agreement Section II)			X		
17	X			Groundwater Pumping on the Bishop Cone (Water Agreement Section VII)			X		
18	X			Groundwater Recharge Facilities (Water Agreement Section VIII)		X			
19			X	Habitat Conservation Plan (MOU Section III.B)	X				
20	X			Haiwee Reservoir (Water Agreement Section XIII)	LA	IC			
21			X	Inventory of Plants and Animals at Spring and Seeps (outside LORP Planning Area) (MOU Section III.C)	X				
22		X		Laws Area Potential Mitigation-Consideration by Standing Committee (640 acres; EIR Impact 10-18)		X			
23	X			Legislative Coordination (Water Agreement Section XVI)			X		
24			X	LORP Agency Consultation and Public Involvement (MOU Section II.D)	X				
25			X	LORP EIR (MOU Section II.F)	X				
26			X	LORP Implementation (MOU Section II.H)	X				
27			X	LORP Monitoring and Adaptive Management Plan (MOU Section II.E)			X		
28			X	LORP Permits Approvals and Licenses (MOU Section II.I)	X				
29			X	LORP Plan (MOU Section II.A)	X				
30			X	LORP Planning Area- Inventory of Plants and Animals at Spring and Seeps (MOU Section III.A.2)	X				
31			X	LORP Pumpback System (MOU Section II.G)	X				
32			X	Lower Owens Off River Lakes and Ponds (MOU Section II.C.3)			X		
33	X			Lower Owens River (financial commitment) (Water Agreement Section XII)			X		
34			X	Lower Owens River Delta Habitat Area (MOU Section II.C.2)			X		
35			X	Lower Owens River Project 1500-Acre Blackrock Waterfowl Habitat Area (MOU Section II.C.4)			X		
36			X	Lower Owens River Riverine- Riparian System (MOU Section II.C.1)			X		
37			X	Mitigation Plans for Impacts Identified in the 1991 EIR and the Water Agreement (MOU Section III.F)					X
38	X			New Wells & Production Capacity (Water Agreement Section VI)					X
39	X			Owens River Recreational Use Plan (Water Agreement XIV.B)					X[6]
40			X	Owens Valley Land Management Plans (MOU Section III.B)			X		
41	X			Release of City Owned Lands - Lands for Public Purposes (Water Agreement Section XV.D)		X			
42	X			Release of City Owned Lands- Bishop (Water Agreement Section XV.B)	X				
43	X			Release of City Owned Lands- Inyo County (Water Agreement Section XV.A)	LA				IC
44	X			Release of City-owned lands- Additional Sales (Water Agreement Section XV.C)	X				
45			X	Technical Group Meetings (MOU Section III.G)		X			
46	X			Town Water Systems (Water Agreement Section XI)	X				
47			X	Type E Vegetation Inventory (MOU Section III.D)	X				
48			X	Yellow-billed Cuckoo Habitat (MOU Section III.A.1)			X		
48 TOTAL OTHER OBLIGATIONS				LADWP Totals	19	6	20	0	3
				Inyo County Totals	16	7	21	0	4

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:

For reference, 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:* 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:* Project is fully implemented but has not yet met prescribed goals or success criteria,
5. *Not fully implemented:* Project under development or under construction, but not fully implemented

Following Table 3.3, there is an annual monitoring report and five year evaluation 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 Project Commitments

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 PROJECT COMMITMENTS				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 on these projects. 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. 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 Wellfield 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 most recently in Fall/Winter 2015/2016 (154 acres). At that time, approximately 154 acres were drill seeded (within interspaces) at 10lbs/acre using native shrub seed mix. Seed germination from the 2015/2016 seeding efforts was largely successful at this site. Persistence of these seedlings will be followed. Additionally, some natural recruitment is occurring along the perimeter of the site. As of 2016, the parcel contained 2% native perennial vegetation cover.				X	
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 Wellfield 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 was drill seeded within interspaces 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. Persistence of these seedlings will be followed. Additionally, some natural recruitment is occurring at this site.				X	

Table 3.3
LADWP MITIGATION PROJECT COMMITMENTS, continued

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU					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				
5	**X**					Big Pine Ditch System (EIR Impact 10-19)	10-19: Water management practices in a portion of the Big Pine Wellfield 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 be augmented from the proposed Bell Canyon Well. The project will be constructed, operated and maintained by the Big Pine Irrigation and Improvement Association.	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. LADWP submitted a monitoring program for W415 on November 6, 2013. ICWD replied with comments on November 21, 2013, however this monitoring program has not been finalized. 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.			**X**		
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 Wellfield 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 in favor of LADWP. 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 PROJECT COMMITMENTS, continued

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
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 approximately 11.3 acres were drill seeded at the south end of the site. Permanent vegetation transects were run in 2016 and the site had achieved 6% cover with 4 native species. Project implementation is complete. Water continues to be provided annually to this project through a drip irrigation system. Natural recruitment is occurring at this site but has not attained success over the entire parcel.				**X**	
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, CDFG 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 PROJECT COMMITMENTS, continued

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		
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		

Table 3.3
LADWP MITIGATION PROJECT COMMITMENTS, continued

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU					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				
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 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.	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**		
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.	Success criteria for vegetation is 60% cover with 4 perennial species in alkali meadow. Perennial cover at transect L4 in 2016, was 7%, composed of two native species. Perennial cover at transect L5 in 2016, was 35%, composed of six native species. Both of these transects are located in alkali meadow areas. Vegetation cover has been static for the last 5 years but is still lower than 2012 when cover began to decline. The decline can be attributed to successive dry years, pepperweed infestation, and subsequent weed treatment. Established photo points continue to be monitored annually. Water was supplied to the project 3 times during the 2016 growing season. Additionally, LADWP drill seeded 5.3 acres of low cover alkali meadow in the Multiple Completion Meadow with native grass species in February 2016. LADWP drafted the 2016 Five Bridges Mitigation Plan and submitted it to ICWD for review in February 2016. This plan outlines alternative management practices that could better achieve project goals than current practice. ICWD submitted comments on the revised plan, but this mitigation plan has not been finalized to date. This project is fully implemented but is not attaining goals.				**X**	

Table 3.3
LADWP MITIGATION PROJECT COMMITMENTS, continued

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
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 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.	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 ad hoc 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. Monitoring will be ongoing through 2019, at which time the plan will be reevaluated if success criteria is not yet met. Initial response to exclusion of this area is positive as demonstrated by prolific native grasses. Project is implemented but success criteria has not yet been met.				X	

Table 3.3
LADWP MITIGATION PROJECT COMMITMENTS, continued

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
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 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		
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 wellfield 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 2006, this site had attained the goals 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 wellfield 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 the goals for cover and composition (17% cover and 4 perennial species). Project is complete.	X				
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 wellfield 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 23-acre site was fenced to reduce disturbance in 1999 and 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, IND131 had achieved the revegetation goals with 16% live cover composed of 5 perennial species. Project is complete.	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. Project is implemented and ongoing.			X		

Table 3.3
LADWP MITIGATION PROJECT COMMITMENTS, continued

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU					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				
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 Wood Lot 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 continues to be provided to the project for irrigation. Project is implemented and ongoing.			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 Wood Lot 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 over 280 acres. Water continues to be provided annually to the project for irrigation. Project is implemented and ongoing.			X		
30	X		X			Independence Wood Lot (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 Wood Lot 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 wood lot 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		

Table 3.3
LADWP MITIGATION PROJECT COMMITMENTS, continued

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU					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				
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		
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. The SSHA was flooded early in April 2016 and had a flooded extent of 11.5 acres open water. LADWP also flooded the SSHA in the fall and documented a flooded extent of 19 acres in October 2016. These tule reduction efforts maximized the shallow flooded area and associated wildlife benefit for the project, even with less water available due to drought. 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 2015. Initial planting is 100% complete but the area has not yet achieved success criteria. Overplanting in this parcel is ongoing. Project is fully implemented but has not yet attained goals.				X	

Table 3.3
LADWP MITIGATION PROJECT COMMITMENTS, continued

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU					Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
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 20,000 plants were planted in this parcel from 2008 to 2015. Initial planting in this parcel was 100% completed by fall 2015, however this area has not yet achieved success criteria. Overplanting in this parcel is ongoing. Project is fully implemented but has not yet attained goals.				**X**	
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 has been initiated for seed harvest. 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 out up to 18,000 plants biannually for the seed farm and other revegetation efforts. The Laws Native Seed Farm has a combination of sprinkler irrigation, buried driplines, and above ground drip irrigation. Portions of the Native Seed Farm are currently well established and are producing viable seed for LADWP's revegetation projects in Laws and throughout the Owens Valley as originally planned. Approximately 40 acres of drip irrigation was hand seeded with rabbitbrush (*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. Project is fully implemented but has not yet achieved goals.				**X**	
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.	Drip irrigation system is fully installed. Initial planting in this large parcel is 100% complete. Approximately 45,000 plants were planted in this parcel from 2008 to 2015. 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. These techniques have not been attempted at Laws, in combination with other treatments, or were attempted at a different scale. Knowledge gained from these demonstration projects may help guide future revegetation efforts in the Laws area. All of Laws 90 was over planted in 2016 with approximately 26,400 additional plants filling in all emitter basins with either new or established live plants. Initial planting across all 101 acres is 100% complete, but has not yet achieved success criteria. Project is fully implemented but has not yet attained goals.				**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 PROJECT COMMITMENTS, continued				Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
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.	LAWS 94/95 currently have a combination of buried and aboveground drip across both parcels; the above ground drip will be converted to a buried drip at a later date but has been initially planted. Approximately 17,000 plants were planted in this parcel from 2008 to 2015. The initial planting for the entire parcel was completed in Fall 2013. Initial planting across all 40 acres is 100% complete, but has not yet achieved success criteria. LADWP overplanted an additional 6,000 native plants at this site in Spring 2017. Project is fully implemented but has not yet attained goals.				X	
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.	LAWS 94/95 currently have a combination of buried and aboveground drip across both parcels; the above ground drip will be converted to a buried drip at a later date but has been initially planted. Approximately 20,000 plants were planted in this parcel from 2008 to 2015. The initial planting for the entire parcel was completed in Fall 2013. Initial planting across all 46 acres 100% complete, but has not yet achieved success criteria. 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. 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 between shrubs (interspaces) was drill seeded at 10lbs/acre using native shrub seed mix during Winter 2015/2016. As of August 2016, this parcel had achieved 3% native cover (10% cover goal, 8 perennial species). This project is fully implemented but has not yet attained goals. Outplanting of this parcel will begin upon the completion of planting for Type E Transfer obligations if seed germination is not successful across the site.				X	

Table 3.3
LADWP MITIGATION PROJECT COMMITMENTS, continued

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU					Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
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		
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. 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 re-established ditch running through Lone Pine Town Park and then easterly to the Lone Pine Wood Lot Project. Water not used by this project or the Wood Lot 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 has reestablished abandoned pastureland and provides water to approximately 320 acres of native vegetation lands and increases livestock grazing capabilities. Water continues to be provided annually to this project for irrigation. 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 PROJECT COMMITMENTS, continued

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU					Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
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 Wood Lot (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 Wood Lot 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 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. Water is supplied annually to the project for irrigation. Project is implemented and ongoing.			X		
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		

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 PROJECT COMMITMENTS, continued				Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
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. There was no operational need to run the McNally Canals in 2015-2016 and nearby wells that otherwise would supply the project are in off status so no water was supplied to the project in 2016. 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.			X		
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		

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 PROJECT COMMITMENTS, continued**				Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
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**		
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 Wood Lot 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 PROJECT COMMITMENTS, continued

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU					Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	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				
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 wellfield 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 complete.	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 plant establishment. Transects were run by LADWP and ICWD in August of 2016. The parcel has achieved 1% total perennial cover. Although this site has been previously planted in the late 1990s, LADWP will continue to plant additional species in 2017. Site has not attained success over the entire parcel.				X	

Table 3.3
LADWP MITIGATION PROJECT COMMITMENTS, continued

Reporting No.	1991 EIR	1991 EIR Environmental Project (1970-1984)	1991 EIR E/M Project (1985-present)	Revegetation Project	1997 MOU					Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implemented
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.	This project was implemented as an LADWP Enhancement/Mitigation Project in 1988. Planting is complete but irrigation is ongoing. Project is implemented and ongoing.			**X**		
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 US Highway 395 and Tinemaha Reservoir.	This project was implemented as and LADWP Environmental Project in the 1970's. 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 Wood Lot 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. 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.

CEQA Process for the Additional Mitigation Projects

In accordance with CEQA, LADWP completed an Initial Study for the Additional Mitigation Projects and prepared a Mitigated Negative Declaration (MND). The document was released for review March 23 - April 26, 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 Additional Mitigation Projects would not have a significant impact on the environment. 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.

Monitoring and Reporting per the Additional Mitigation Projects Document

3.2.1.1. Additional Mitigation Projects 2016 Annual Monitoring Report

The Additional Mitigation Projects document defines a five-year monitoring framework for the eight identified project locations to be provided 1600 acre-feet of water per year. These projects were initiated in 2012 and monitored through 2016. The monitoring framework includes flow monitoring, rapid assessment surveys, photo point monitoring, and mapping requirements to be conducted annually.

Table 3.4 shows flow data recorded for each of the Additional Mitigation Projects from April 1, 2016 through March 31, 2017. Additionally, on July 25 and 27, 2016, LADWP conducted photo point monitoring, woody recruitment surveys, and assessment of fence condition (where applicable).

The Additional Mitigation Projects Monitoring Framework also defines that the California Department of Fish and Wildlife (CDFW) will annually survey for spring/seep obligates for five years post-implementation and recommend measures to improve spring/seep obligates at each project location. Timing of these surveys was at CDFW’s discretion. During this five year monitoring program, CDFW has not participated in conducting surveys, submitting data or providing recommendations to LADWP.

Inyo County Water Department (ICWD) conducted rapid assessment surveys and vegetation mapping for the Additional Mitigation Projects during the peak of the growing season in 2017. These maps are provided in this section by project site. In doing so, ICWD mapped the wetted extent for each project by walking one-meter outside of the wetted perimeter using a Garmin GPS map 76CSx GPS unit in NAD83. After downloading raw line files, polygons of the wetted areas were digitized in ArcGIS, and a one-meter buffer was added. Vegetation was mapped within a liberal area surrounding the wetted perimeter because there are no fixed boundaries for each Mitigation Project. Polygons of similar vegetation cover and composition were delineated based on visible boundaries between vegetation types identified in the field. General habitat types were mapped as wetland (based on vegetation community only; not necessarily jurisdictional), meadow, shrub meadow, phreatophytic shrub, xeric scrub, and miscellaneous areas noted as barren and disturbed. Each general habitat type was subdivided into vegetation types where differences in composition could be delineated in the field. This additional detail may be beneficial for tracking the evolution of specific plant populations following project implementation. However, for the purpose of this report, only general habitat types have been mapped for the vegetated extent of each project. Therefore, some polygons depicted within each of the general habitat types are representative of sub-habitat types.

Species for each project in are listed by sub-habitat types in order of dominance. Meadow vegetation types ranged from areas dominated by grasses with few shrubs or woody species to shrub meadows with a relatively high proportion of shrub or woody species, similar to units defined in the Green Book. Scrub habitats were composed of more than 80% of shrub species. The woodland habitats are dominated by woody riparian species. Wetland habitats include open water, standing vegetation in ponded areas, and areas dominated by a variety of marsh species. These habitat types are further described below.

Meadow:

- Alkali Meadow - meadow with a low proportion of shrub species and a mixture of meadow species. No particular grass or forb species was predominant. This category was subdivided where possible into the categories below.
    - Alkali Meadow, flooded – seasonally wet meadow with no shrubs and a mixture of meadow species
    - Alkali Meadow, sparse - open meadow with a low proportion of shrub species and a mixture of meadow species. Cover below approximately 20%
    - Alkali Meadow with dead shrubs - meadow with diverse mix of standing dead shrubs
    - Saltgrass Meadow - nearly a monoculture of saltgrass along with minor amounts of other meadow species
        - Saltgrass Meadow with dead shrubs - nearly a monoculture of saltgrass with dead standing shrubs
        - Saltgrass/Rush Meadow - meadow with a high proportion of saltgrass and rushes
    - Alkali Sacaton Meadow, sparse - nearly a monoculture of sparse alkali sacaton
    - Anemopsis Meadow - meadow with a high proportion of *Anemopsis californica*,
    - Weedy Alkali Meadow - meadow with a high proportion of weedy species
    - Glycyrhiza Meadow - meadow with a high proportion of *Glycyrhiza*
- Rush/Sedge Meadow - meadow with a high proportion of rushes & sedges
- Wild Rye Meadow - meadow with a high proportion of creeping wild rye and some weedy species

Shrub Meadow: areas of shrubs with a grass understory

- Alkali Meadow with shrubs - alkali meadow with equal proportions of grasses and a mixture of greasewood, rabbitbrush, and Nevada saltbush
- Rabbitbrush Meadow - meadow with a high proportion of rabbitbrush
    - Dead Rabbitbrush Meadow - meadow with a high proportion of dead standing rabbitbrush
    - Dry Rabbitbrush Meadow - open meadow with a high proportion of rabbitbrush (Warren Lake only)
- Greasewood Meadow - meadow with a high proportion of greasewood
- Nevada Saltbush Meadow - meadow with a high proportion of Nevada saltbush

- Sagebrush Meadow - meadow with a high proportion of sagebrush
- Willow/Saltgrass/Alkali Sacaton - meadow consisting of narrowleaf willow, saltgrass and alkali sacaton with few other species

Xeric Scrub: areas of shrubs with little grass

- Blackbrush Scrub - shrub habitat with a high proportion of blackbrush
- Dalea Scrub - Nearly a monoculture of dotted dalea
- Four-winged Saltbush Scrub - Shrub habitat with a high proportion of four-winged saltbush
- Greasewood Scrub - Shrub habitat with a high proportion of greasewood
    - Greasewood/Shadscale Scrub - shrub habitat with an equal proportion of greasewood and shadscale
- Shadscale Scrub - shrub habitat with a high proportion of Shadscale
- Mojave Mixed Scrub - Mojave shrub habitat with approximately equal proportions of species
- Cottonwood/Sagebrush - open habitat with equal proportions of cottonwood & sagebrush interspersed with other species
- Sagebrush Scrub - shrub habitat with a high proportion of sagebrush along with other xeric adapted species and few annual species where water has been spread
- Sagebrush & Weeds - disturbed sagebrush scrub with many exotic and native weeds
- Mixed Xeric Scrub - shrub habitat with several species of shrubs adapted to very deep water tables, few grasses

Phreatophytic Shrub Habitat:

- Allenrolfia Scrub - shrub habitat with a high proportion of *Allenrolfia*
- Cottonwood Tree – patch or individual *Populus fremontii*
- Cottonwood, Willow & Mesquite - woodland of mixed tree species
- Desert Olive - patch or individual *Forestiera pubescens*
- Greasewood Scrub - Shrub habitat with a high proportion of greasewood
    - Greasewood/Parry Saltbush Scrub - shrub habitat with an equal proportion of greasewood and Parry saltbush
- Nevada Saltbush Scrub - shrub habitat with a high proportion of Nevada saltbush. Other groundwater dependent shrubs also present.
- Parry Saltbush Scrub - shrub dominated habitat with a high proportion of Parry saltbush

- Rabbitbrush Scrub - shrub dominated habitat with a high proportion of rabbitbrush. Other groundwater dependent shrubs also present.
- Riparian Woodland - woodland habitat adjacent to creek with a high proportion of woody riparian species along with riparian forbs and graminoides
- Rose Patch - stand of *Rosa woodsii*
- Screwbean Mesquite – stand of *Prosopis pubescens*
- Willow Tree - individuals or patch of tree willows
- Willow Tree & Desert Olive - mix of tree willow species and desert olive
- Willow Scrub – stand of willow
- Wash – variety of groundwater dependent species ranging from woody riparian to annuals

Wetland Habitat:

- Pond - open water
- Dried Pond - pond bottom with species from adjacent habitats
- Bullrush - wetland habitat with a dominant proportion of Bullrush
- Phragmites - wetland habitat with a dominant proportion of *Phragmites*
- Cattail - wetland habitat with a high proportion of cattail species
    - Cattail, dry - wetland habitat with a high proportion of cattail species without ponded water
- Ditch - wet conveyance with various wetland adapted species
    - Dry Ditch - formerly used conveyance with species similar to adjacent habitats and some wetland species
- Tule/Cattail - wetland habitat with a mix of tule and cattail species
    - Tule/Cattail, dry - wetland habitat with mix of tule and cattail species, but with no ponded water
- Tule/Cattail/Saltgrass – transition between wetland and saltgrass meadow

Miscellaneous areas: Disturbed or Barren where noted

- Alkali Heliotrope Stand - previously disturbed area dominated by alkali heliotrope
- Barren - previously impacted area with little or no perennial vegetation, few species and in very low numbers
- Berm – previously constructed berm with sparse vegetation
- Cleared – unvegetated. Vegetation removed apparently for slash disposal in the Freeman Creek Project.

- Dead - dead standing vegetation on flooded edge of south ponds at the Homestead project
- Dead Bassia – stand of dead bassia, unvegetated
- Disturbed – construction disturbance that has sparse vegetation
- Feed Supplement Site - unvegetated
- Fence Clearing - disturbed area cleared for installation of fences; species composition similar to adjacent habitat
- Old saltcedar, cut – areas of cut tamarisk with a mixture of species at the Homestead project.
- Playa – unvegetated
- Pullout/Staging Area – unvegetated vehicle parking area
- Road – unvegetated
- Slash Pile – unvegetated
- Weeds – patch of live exotic and native weeds in a disturbed area.

Table 3. 4. Additional Mitigation Projects Developed by the MOU Ad Hoc Group

Annual Water Accounting in Acre Feet (April 1, 2016-March 31, 2017)

Additional Mitigation Projects Developed by the MOU Ad Hoc Group
Annual Accounting in Acre Feet (April 1, 2016-March 31, 2017)

2016-2017	**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	16	12	7	2	6	14	14	0	92
May	19	0	15	12	7	2	7	14	14	0	90
June	14	0	16	10	7	2	6	13	13	0	81
July	13	0	17	12	7	3	7	13	13	0	84
August	10	48	17	12	7	3	7	13	12	117	246
September	13	171	16	4	7	2	6	12	11	0	242
October	22	56	16	5	7	3	7	13	12	96	236
November	22	0	10	8	7	2	6	14	13	0	83
December	23	0	11	9	7	3	6	15	13	0	86
January	23	0	15	9	7	3	7	15	14	0	92
February	18	0	17	10	6	2	6	15	14	0	87
March	18	0	18	11	7	2	6	17	16	188	283
Total					*80*	*29*	*77*	*168*			*1702*
Project Total	*215*	*275*	*184*	*115*	*110*		*245*		*157*	*401*	
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.*

Freeman Creek Project

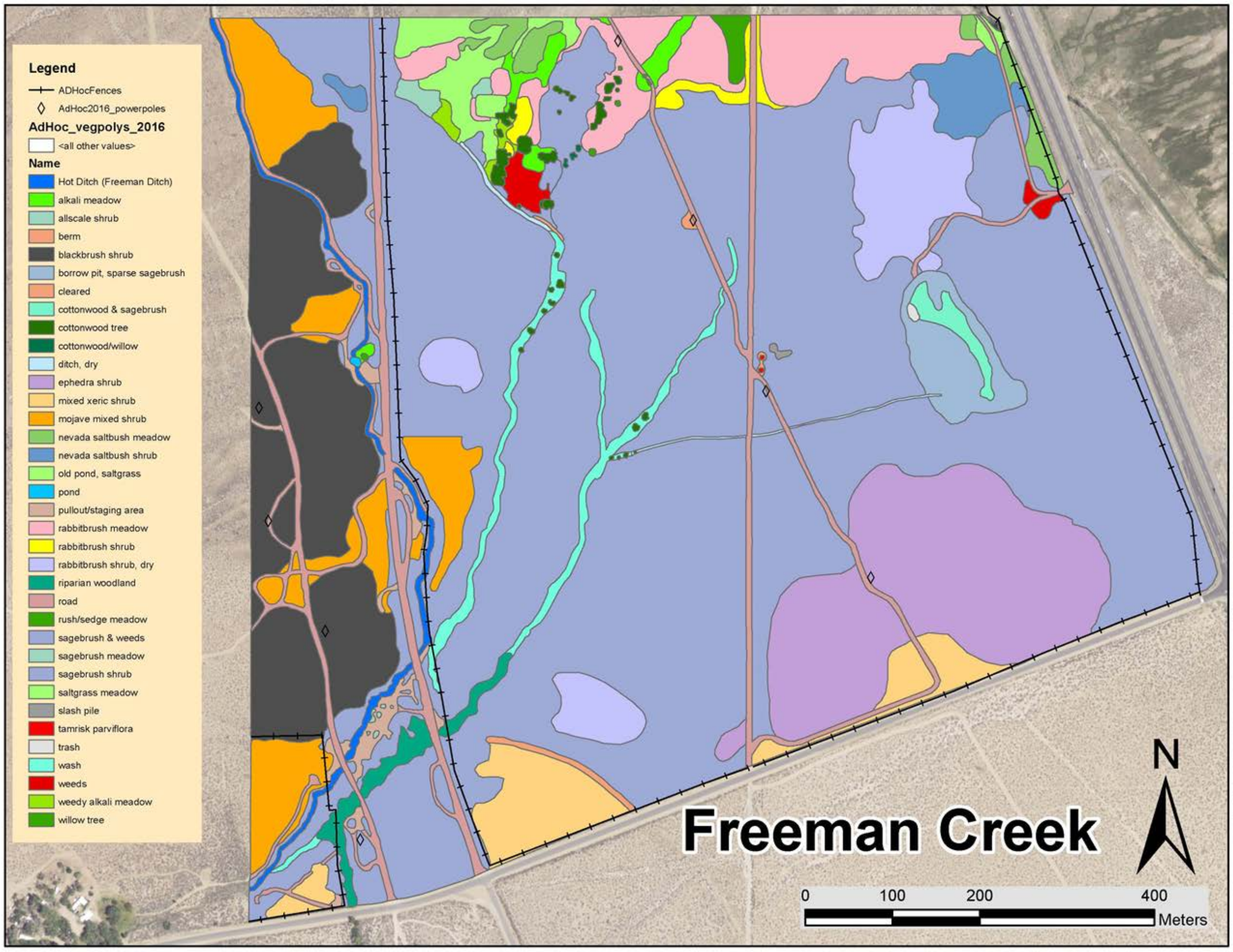


Figure 3. 1. Freeman Creek Wetted Extent and Vegetation, July 2016 (ICWD)

Flow Monitoring

The annual water allotment for this project is 215 AF/year, which is based on long term averages for Freeman Creek.

Photo Point Monitoring

Photo points were established in April 2011 and were recaptured at the peak of the growing seasons from 2012-2016. These photos can be made available upon request. In 2016, narrowleaf willows (*Salix exigua*), red willows (*Salix laevigata*) and arroyo willows (*Salix lasiolepis*) at the Freeman Creek culvert crossing looked healthy and vigorous. However, the creek was dry during the July survey due to drought conditions and some annuals along the bank were exhibiting yellowing leaves. New seedling emergence was observed in the dry wash reaches of Freeman Creek, including narrowleaf willow, red willow and Fremont cottonwoods (*Populus fremontii*).

Freeman Creek Meadow, Southwest, July 2016

The vegetation in the meadow near the canal, including the saltbush/sagebrush scrub, is exhibiting more green growth compared to 2015. Bare ground near the road has continued to fill in with vegetation. Saltgrass (*Distichlis spicata*) and Poverty weed (*Iva axillaris*) are the dominant meadow species. There is also an abundance of young healthy Torrey's saltbush (*Atiplex torreyi*) shrubs establishing in the northwest side of the meadow. Fivehorn smotherweed (*Bassia hyssopifolia*) and Russian thistle (*salsola tragus*) are scattered throughout the area but are more prevalent near the road.

Woody Recruitment

Although some of the seedlings established over the last two years did not survive, woody recruitment continues to thrive between Dry Wash 1 and 2.

Along dry wash one, there was one new red willow and four new Fremont cottonwood seedlings observed. Additionally, there were 30 red willows and 17 Fremont cottonwoods well established from 2013-2014. These young recruits range between one and two feet tall and are continuing to thrive.

Freeman Creek Dry Wash 1, July 2016
Healthy Willow and Cottonwood Recruitment

Along dry wash two there were 31 well established red willows, one narrowleaf willow and four Fremont cottonwoods from 2013-2014. There were also small patches of baltic rush (*Juncus balticus)* and field mint (*Mentha arvensis)* in the upper reach of the wash where soil moisture was present.

Three saltcedar (*Tamarix ramosissima*) were observed along the upper reach of dry wash two and will be removed as resources are available.

Freeman Creek Dry Wash 2, July 2016
3-Year Willow and Cottonwood Recruitment

Along Freeman Creek there is a short reach of nine red willows that died back in 2013. The cause of this die-back is unknown; however, from 2014 to 2015, new healthy sprouts emerged out of the trunks of five individuals. By 2016 only one willow was observed to be alive.

Fence Condition

Not applicable

.

Freeman Creek Willow Die-Back July, 2016.

Warren Lake Project

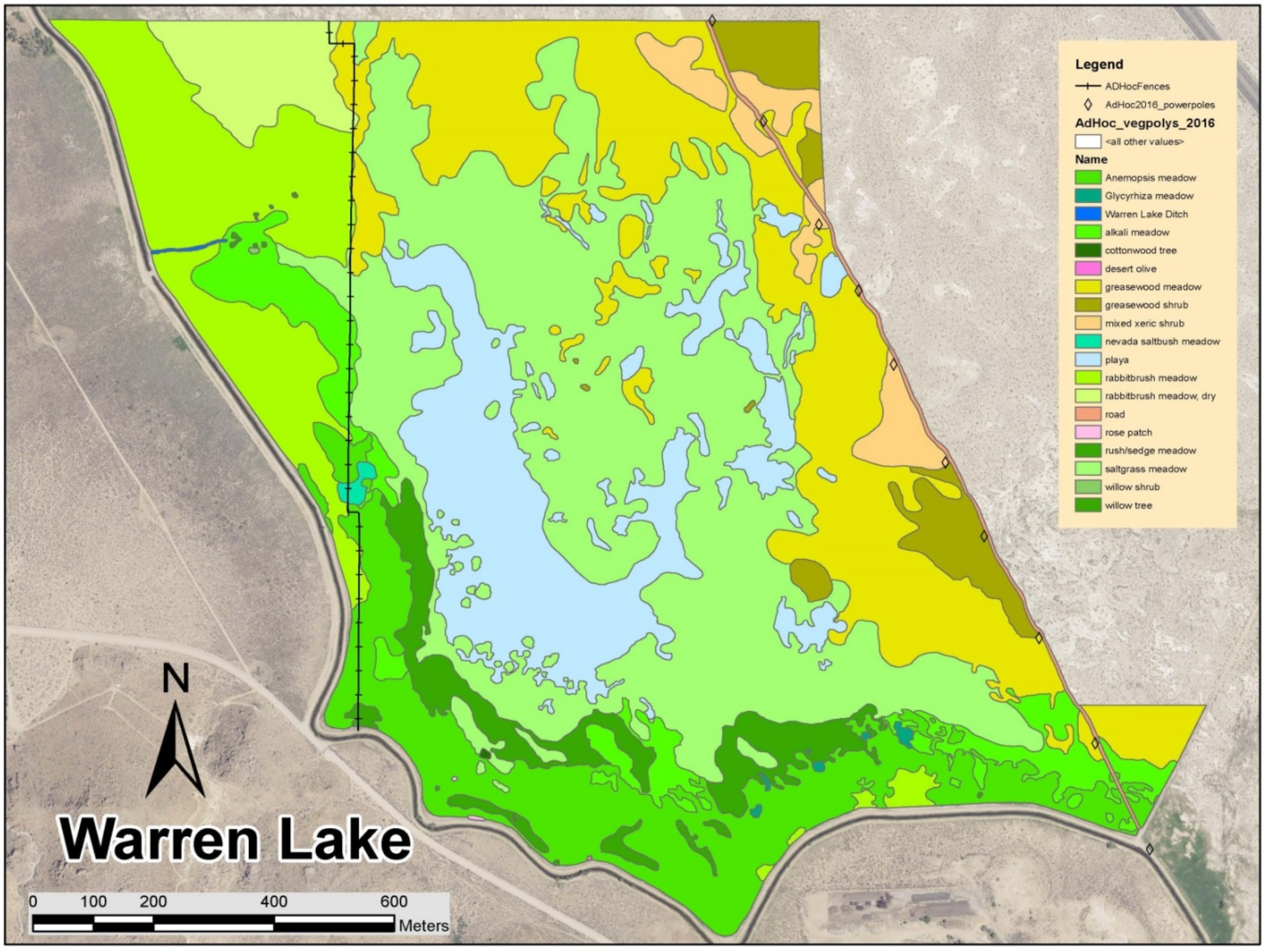


Figure 3. 2. Warren Lake Vegetation, July 2016 (ICWD)

No wetted extent was recorded in March 2017 due to flooding

Flow Monitoring

LADWP released water to Warren Lake from August 2016 - October 2016. Project flows commenced in August in anticipation of considerable water needed to balance the other projects for the third consecutive year and to coincide with operational needs during the Los Angeles Aqueduct shut-off and reline project. The total volume of water that was released to the project was 275 AF. LADWP was unable to deliver the entire remaining water balance this year due to high winter precipitation and associated flooding. Due to these conditions, Warren Lake was at capacity; LADWP fulfilled the water balance by sending additional flow to Diaz Lake to make up the balance.

Woody Recruitment

There are three Fremont cottonwood seedlings along the floodplain of Warren Lake west from the canal that were identified in 2012. These trees remain healthy, are vigorously growing and are on average, 15 feet tall.

Fence Condition

Not applicable.

Warren Lake, July 2016, South From Canal Road Three Cottonwood Seedlings

Hines Spring Well 355 Project

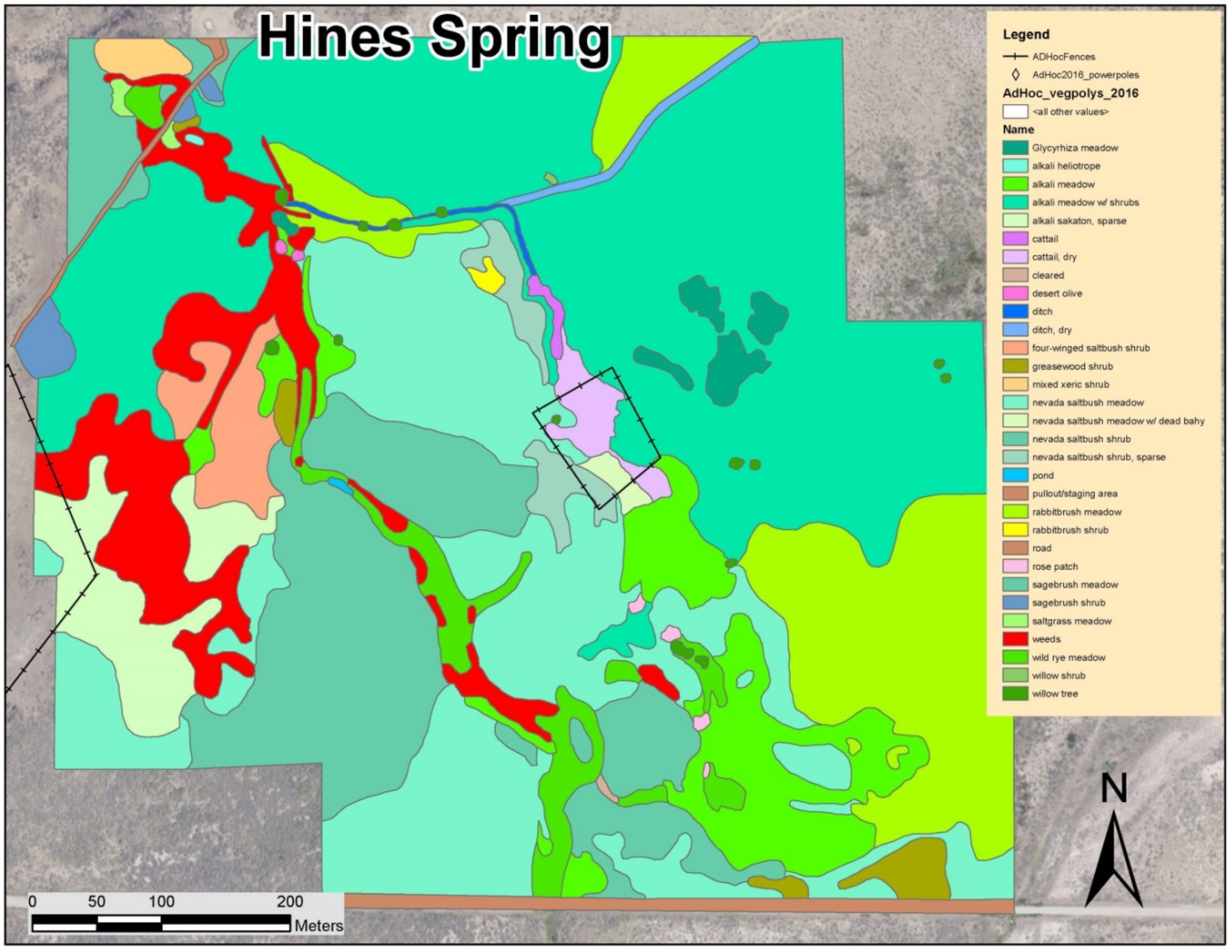


Figure 3. 3. Hines Spring Well 355 and Aberdeen Ditch Project, July 2016 (ICWD)

Wetted Extent and Vegetation

Flow Monitoring

The annual water allotment for this Hines Spring Well 355 Project is 240 AF/year. 184 AF was released to the project during the 2016-2017 year.

Photo Point Monitoring

Photo points were established in March 2012 and were recaptured at the peak of the growing seasons in 2012-2016. These photos can be made available upon request.

The flooded extent of this area varies greatly from winter to summer, based on rates of evapotranspiration. Fivehorn smotherweed and Russian thistle have encroached around the pipe outfall, and are particularly abundant to the north along the pipeline berm. Narrowleaf willows are growing along the northern extent of the berm. Cattails (*Typha latifolia)* are grazed by horses and mules in the main ditch channel; however, encroachment of cattails progresses seasonally, choking the ditch channel and ponded areas and causing water to back up behind the pipe outfall.

Hines Spring Berm, July 2016
South Towards Pipe Outfall

Multiple berms have been constructed between the large red willow and the pipe outfall to attempt to direct flows around the tree to reduce ponding and ensure the trees' survival. Most constructed berms failed; however, the most recent construction of the rock and earthen berm in late summer of 2014 was successful, as there was minimal seepage observed through the barrier to the south and the red willow was observed to be healthy and thriving.

Hines Springs Well 355, July 2016
South to West of Pipe Outfall
Healthy Red Willow

Woody Recruitment


07/25/2016 12:59

Hines Well 355, July 2016
West Along Ditch to Pipe Outfall

There are three red willow seedlings that have established near the pipe outfall. There is also abundant recruitment of desirable non-woody herbaceous species throughout the project area. The banks of the main ditch channel below the pipe outfall were exhibiting healthy and vigorous growth of alkali sacaton (*Sporobolus airoides*), saltgrass (*Distichlis spicata*), salt heliotrope (*Heliotropium curassavicum)*, beardless wildrye (*Leymus triticoides),* rabbitfoot grass *(Polypogon monspeliensis)* and showy milkweed *(Asclepias speciosa).*


07/26/2016 14:16

Hines Well 355, July 2016
Meadow Around Pond Area Three

Additionally, baltic rush (*Juncus balticus),* bulrush (*schoenoplectus spp*.), and monkeyflower *(Mimulus guttatus)* were abundant in the spring channel. Bulrush and cattails continued to dominate the ponded areas. Pond one had surface water with healthy vegetative growth and was comparable to 2015. Ponds two and three had no surface water in 2016, possibly due to sinkholes in the volcanic soils. Vegetation was significantly drier compared to 2015.

The meadows between the ponded areas have a high diversity of grass species and have established well over patches of habitat that were barren ground prior to project implementation. However, these meadows were much drier compared to 2015.

Fence Condition

To satisfy conditions under the Additional Mitigation Projects document, LADWP constructed a fence around the Hines Well 355 and Aberdeen Ditch Projects in March 2014. A fence exclosure was constructed around the largest ponded portion of Hines Spring that would exclude horse grazing but would also allow elk and deer passage. The fence exclosure was designed with three corner braces, two H-braces, and a cowboy gate, and runs approximately 1,110 feet in length. There are four wire strands including a smooth top wire to allow safe passage for elk and deer. This fence was observed to be in good condition.

Hines Well 355, July 2016
Fence Exclosure Around Ponded Area
Looking Northwest

Aberdeen Ditch Project

Refer to Hines Spring Well 355 map in the figure above for wetted and vegetated extent.

<u>Flow Monitoring</u>

The annual water allotment for this project is 145 AF/year. Due to the fourth consecutive drought year and competing uses of this limited surface water, LADWP was able to release 115 AF to this project during the 2016-2017 water year. Reductions in surface flows in Goodale Creek due to drought conditions have continued to be problematic in delivering full project flows, as well as silt clogging the intake structure. Additionally, there are ongoing problems with sinkholes along the spring channel where flows are directed.

To alleviate the sinkhole issue, LADWP extended a pipe down the Aberdeen Ditch Project spring channel into different soil types and locations from 2012-2014 and monitored the pipe outfall, anticipating soil conditions would stabilize for surface water to flow downstream. Unfortunately, sinkholes continue to be problematic for this channel. During 2015 monitoring, the ditch pipe was observed to be disjointed approximately 165 feet down the channel, releasing water at two locations. However, this has proved to be beneficial as in 2016 there was presence of standing water approximately 520 feet down the channel, which is significantly more than prior monitoring years. Additionally, there has been substantial growth of beardless wildrye, replacing what was previously a bare channel and prickly Russian thistle.

Aberdeen Ditch, July 2016
Northwest

Aberdeen Ditch, July 2016
East Beyond the Extended Outfall

Photo Point Monitoring

Photo points were established in March 2011 and were recaptured at the peak of the growing seasons in 2012-2016. These photos can be made available upon request.

Woody Recruitment

Established narrowleaf willows are healthy and growing vigorously. Russian thistle and fivehorn smotherweed are growing outside of the channel banks and are beginning to encroach in the channel; however, recruitment of desirable non-woody species are establishing throughout the project area, such as American licorice (*Glycyrrhiza lepidota)*, monkeyflower, sedges (*Carex spp.)* and beardless wildrye. These species are increasing along the Aberdeen Ditch intake structure, filling in prior barren gaps. American pondweed (*Elodea canadensis*) with an algal mat layer has filled the concrete- lined portion of the channel at the Intake structure. This section of the channel should be cleaned periodically.

Aberdeen Intake, July 2016

Fence Condition

To satisfy conditions under the Additional Mitigation Projects document, LADWP constructed a small exclosure fence in the Aberdeen Ditch spring channel in March 2014. This fence is in good condition.

North of Mazourka Canyon Road Project

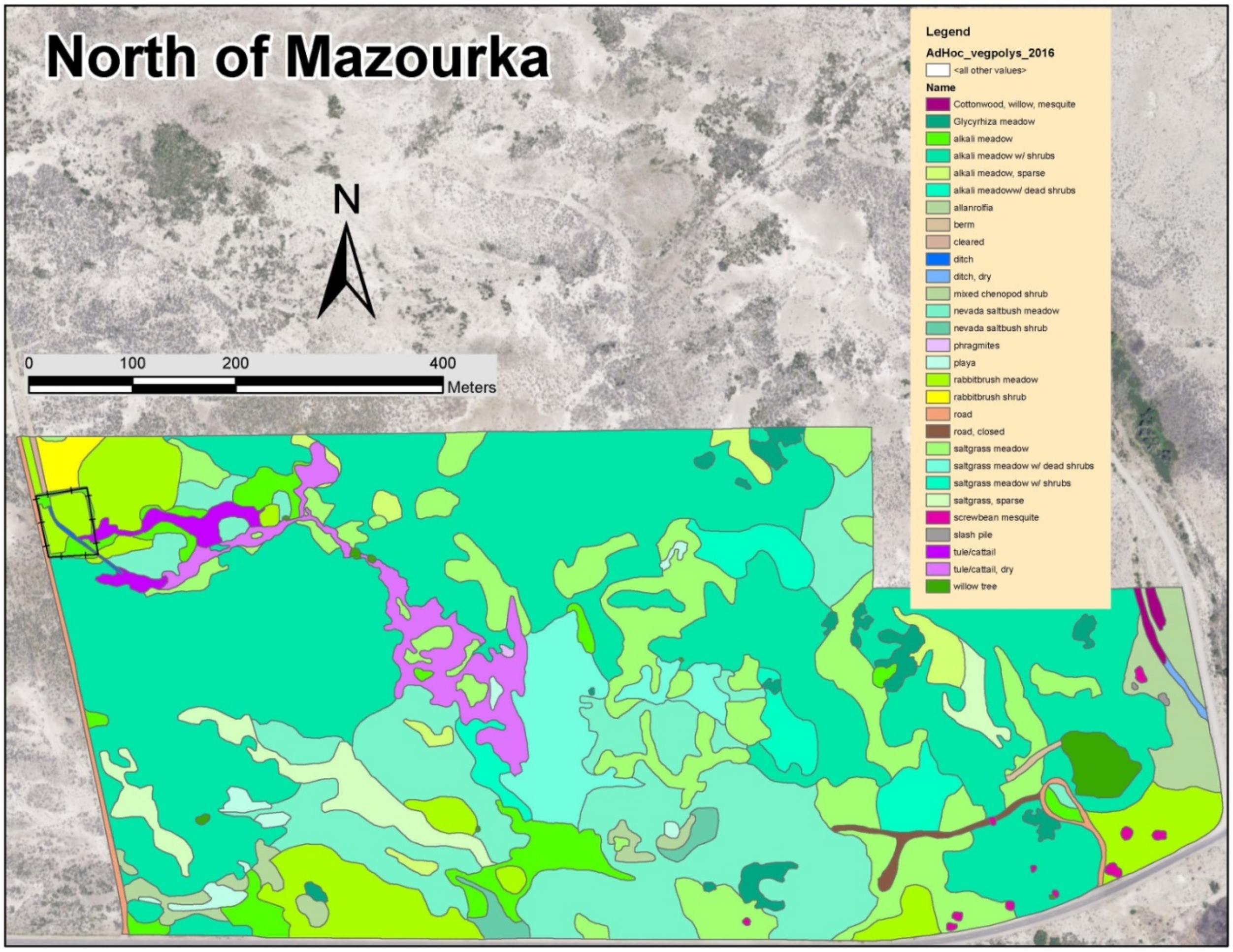


Figure 3. 4. North of Mazourka Wetted Extent and Vegetation, July 2016 (ICWD)

Flow Monitoring

The annual water allotment for this project is 300 AF/year from two artesian well sources. Due to multiple drought years and a lack of groundwater recharge, these wells produced 110 AF during the 2016-2017 water year. More water was available in the first two years post implementation and had saturated much of the meadow and the eastern pond. These areas were notably dry during the 2014 through 2016 monitoring years during the worst of the drought.

Photo Point Monitoring

Photo points were established in March 2012 and were recaptured at the peak of the growing seasons in 2012-2016. These photos can be made available upon request.

Woody Recruitment

Mazourka, July 2016
Pipe Outfall, East

There are several saltcedars that have established and are growing along the pipeline to the F418 well. To date, a majority of the berm over this pipeline remains compacted and barren and the invasive common reed (*Phragmites australis*) is establishing in some sections. Saltcedars have established in the ditch of the “flooded area” photo point. Saltcedar seedlings were also found present in the channel approximately 15 feet downstream of the pipe outfall in the exclosure. Eradication treatment should continue in these areas. On the east side of the project area, control of saltcedar treatment has been successful.

No new native woody recruitment was noted during 2016 project monitoring. However, there is abundant recruitment of desirable native non-woody species in/near the exclosure and pipe outfall extending east into the project area. Saltgrass and American licorice are particularly abundant in this area and have filled in areas around the outfall that were barren in 2014 (see photo below). Some native species, although patchy, are also beginning to establish along the pipeline berm leading to the outfall. These include salt heliotrope, sacred datura (*Datura wrightii*), and Torrey’s saltbush (*Atriplex torreyi).* Even though areas of this project, particularly the pond and flooded areas, are drier than they were following initial project implementation, existing woody vegetation and non-woody vegetation remains healthy.

Fence Condition

During project implementation, an exclosure was established around the location of water release at the pipe outfall. This fence is currently in good condition.

Homestead Project

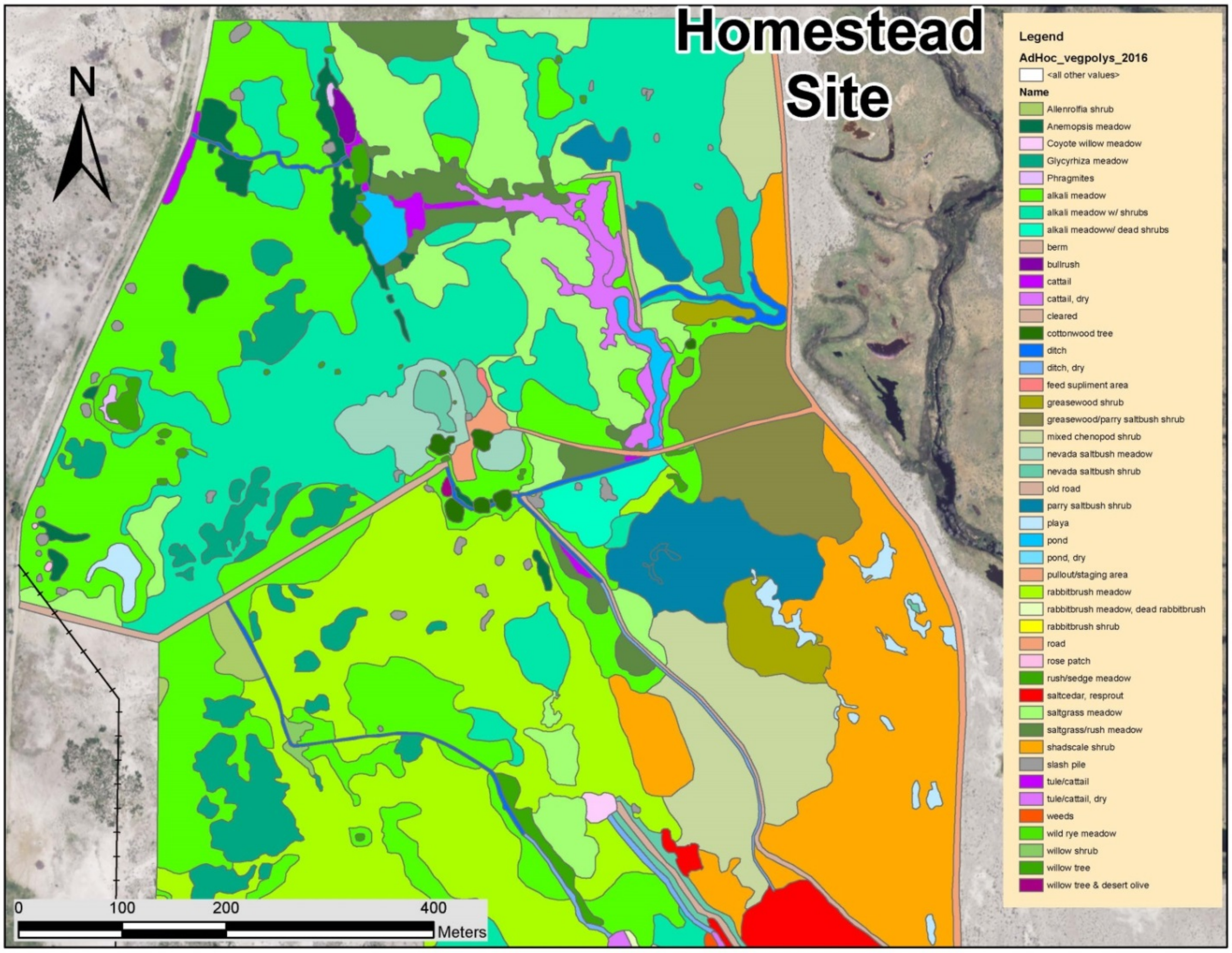


Figure 3. 5. Homestead Wetted Extent and Vegetation, July 2016

Flow Monitoring

The annual water allotment for this project is 300 AF/year from two artesian well sources. These wells produced 245 AF for the project during the 2016-2017 water year. Flows exiting the pond via the north and south spring channels continue to be managed to prevent connectivity to the Owens River.

Much of the flow from Well 419 continues to be sent south via the tee and old irrigation ditch that was reestablished in 2013. LADWP began using this ditch to support required project flows that would otherwise connect with the river if released to the east as originally proposed. This maintain the majority of flow west of the fault by capturing it in an existing depression and creating additional open water habitat.

Photo Point Monitoring

Photo points were established in March 2012 and were recaptured at the peak of the growing seasons in 2012-2016. These photos can be made available upon request.

Homestead Main Spring, July 2016
Channel, East

The non-woody vegetation along the main spring channel is well established. Cattle grazing appears to have positively influenced the spring channel by reducing cattails that once dominated the channel in 2013, thereby opening the channel to allow for wetland obligate species to establish (see photo below). However, the outflow channel to the fault downstream is choked with cattails, causing water to back up and pond outside the ditch along the road.

Woody Recruitment

The surface area of the Homestead pond continues to be dominated by cattails; however, non-woody vegetation is well established and healthy. There are three red willows (4-5 feet tall) thriving amongst the cattails around the pond shoreline (see photo below). Following the shoreline south an additional recruitment of 17 red willows and nine narrowleaf willows were observed, ranging between 1 and 3 feet tall. Where the berm meets the road there are also two 4-5 foot tall Fremont cottonwoods that were observed. Saltgrass recruitment has increased and continues to fill in bare gaps on the berm along the east side of the pond.

Homestead Pond, July 2016
Red Willow Recruitment

Natural recruitment of native non-woody species has occurred on approximately two-thirds of the pipeline berm and is comparable to last year. These species include saltgrass, alkali sacaton, salt heliotrope, American licorice, iodine bush (*Allenrolfea occidentalis*), and boraxweed (*Nitrophila occidentalis).* However, there are a few saltcedar seedlings growing near the tee at the pipeline as well as two along the south spring channel. A few fivehorn smotherweed plants have established in this area as well. The eastern third of the pipeline remains largely barren and should be tilled and seeded during the late winter/early spring months.

A few Russian olives (*Elaeagnus angustifolia*) and a well-established saltcedar with seedlings were noted approximately 150 feet from the road heading north on the berm near the Homestead Pond. There was also presence of saltcedar resprouts along Steven's Ditch and in the depression near the cattle guard. The tee-ditch terminus has some desirable non-woody vegetation recruitment, but saltcedar resprouts have established vigorously throughout the area. Eradication treatment should become a priority at this location.

Homestead Tee Ditch Terminus, July 2016
Saltcedar Establishment

A new unauthorized road was created during the spring of 2015, making a loop from the parking area back to the main road. LADWP installed a restoration sign at the parking lot to deter through traffic into the ingress of the unauthorized road. An additional sign was placed at the egress of this road that joins the main road. Since these signs were placed, the tire tracks have grown in with native vegetation. No additional off-road tracks have been observed in the project area.

Fence Condition

Not applicable.

Well 368 Project

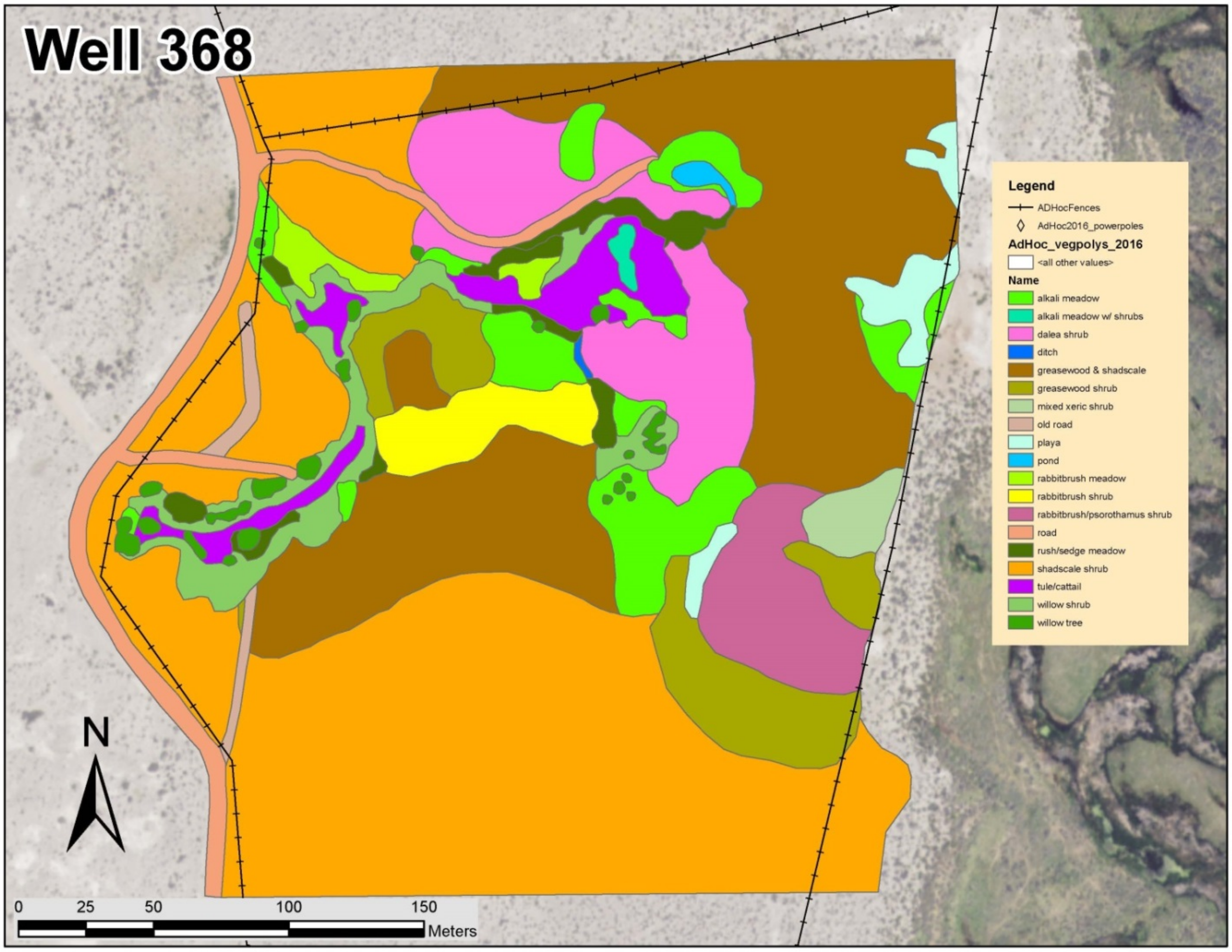


Figure 3. 6. Well 368 Wetted Extent and Vegetation, July 2016

Flow Monitoring

The annual water allotment for the Well 368 Project is 150 AF/year. LADWP was able to release 157 AF to this project during the 2016-2017 water year. Owens Valley pupfish (*Cyprinodon radiosus*) remain abundant throughout the extended habitat area.

Photo Point Monitoring

Well 368, July 2016
Eastern Berm, Looking Southwest

Photo points were established in March 2012 and were recaptured at the peak of the growing seasons in 2012-2016. These photos can be made available upon request.

Bare patches along the eastern berm have continued to fill in with vegetation with species such as scratchgrass *(Muhlenbergia asperifolia)*, iodine bush, saltgrass and salt heliotrope. However, the pipeline berm to the northwest of the project is mostly barren and should be tilled and seeded in the late winter/early spring. Native riparian vegetation on the banks of the pupfish marsh is dense and vigorous; however, open water within this marsh continues to be inundated with cattails and is choking out pupfish habitat.

Pupfish were observed in the northern pond, but cattails have significantly increased within the project area since monitoring was established in 2012 (see Well 368 photos taken in July, 2016).

Well 368, July 2016
Pupfish Marsh, North

Woody Recruitment

Narrowleaf willow recruitment is occurring throughout the project area, particularly south of the pipe outfall and in the road depression that receives overflow from the pupfish pond.

Well 368, July 2016
Healthy Narrowleaf Willows

In 2014, one concentrated section of narrowleaf willows to the west of the pipe outfall experienced a dieback pattern, which included a leaf curl and damage to the outer bark. These symptoms were determined to be caused by willow cankers, which are a fungal disease caused by stress from drought, frost, and nitrogen deficiencies.

The cankers develop at wound sites made by insects, such as scale bugs that were attacking this particular section of willows. Observations made of these willows in 2016 showed healthier plants with only some of the older top branches exhibiting remnant signs of the leaf curl, caused by the willow cankers.

Well 368 Pipe Outfall, July 2016
Willow Recovery

Although the cankers caused some dieback in 2014, significant new growth has occurred over the last two growing seasons, resulting in healthy plants.

The lower pond area was dry but riparian vegetation is still thriving and new narrowleaf willow recruitment has established throughout this area. Twenty red willows, nine narrowleaf willows and two Fremont cottonwoods were observed. Additionally, there are Russian olive and saltcedar present around the ponded area that should be treated. The southern section of the pipe outfall was drier compared to 2015. Some of the narrowleaf willows in this area were showing some signs of stress from yellowing leaves.

The road depression that receives overflow from the pupfish pond became inundated with saltcedar seedlings throughout the summer months of 2014. In September 2014, LADWP biologists manually removed an estimated 700 seedlings from this area. Two years later, this area remains saltcedar free with the establishment of many red and narrowleaf willows and native non-woody plant species.

Well 368, July 2016
Post Saltcedar Removal at Road Depression
Healthy Willow and Herbaceous Recruitment

Fence Condition

Not applicable.

Diaz Lake

The Diaz Lake project has provided a secure water supply for Diaz Lake. The primary benefit of this project has been a reduced pumping requirement by Inyo County in the Bairs-George Wellfield to supply a constant water supply to Diaz Lake. Due to high winter precipitation and associated flooding, LADWP could not release the entire remaining water balance to Warren Lake in 2016-2017. This water balance was made up at Diaz Lake, releasing 401 AF in total to Diaz Lake this year. Although the total was in excess of 250 AF as described in the plan, LADWP did not pump makeup water for this excess since it was necessary to fulfill the 1600 AF requirement. No monitoring beyond flow monitoring was conducted at Diaz Lake this year.

3.2.1.2. Additional Mitigation Projects Five-Year Evaluation

A five-year evaluation of each project is provided below as required in the Five Year Monitoring Framework for the Additional Mitigation Projects (Additional Mitigation Projects Developed by the MOU Ad Hoc Group 2008). Project goals outlined in that document are presented below, as well as progress to date and summary of current conditions, project photos, and recommendations if relevant. For more specific information on current conditions, please refer to the previous section describing annual monitoring for these projects conducted in 2016.

It is recommended that annual vegetation mapping, photo point monitoring, and rapid assessment monitoring be discontinued for all of these projects. These projects will be monitored periodically as resources allow and adaptive management actions will be implemented if necessary. Monthly flow monitoring will continue and will be summarized in LADWP's Annual Owens Valley Report.

Freeman Creek Project

Project Goal(s)

The goal for the Freeman Creek project is to divert the creek into ancestral channels to create riparian habitat. These channels include Freeman Creek Wash and a small portion of Keough's Wash east of old Highway 395. Water reaching the lower end of the channels will be managed to benefit irrigated pasture and meadows and to prevent return flows into the LADWP aqueduct system.

The project objectives for Freeman Creek were to:

1. Divert Freeman Creek into ancestral washes to create a diverse riparian corridor;
2. Provide water to the lessee to increase pasture forage and expand the existing pasture; and
3. Manage the project to comply with existing agreements, minimize invasive species, control mosquitoes and prevent return flows to the LADWP aqueduct system.

Progress to Date/Current Condition

All construction required to implement and operate the project as proposed was complete by July 2010. During implementation, LADWP constructed the required berm to divert all flow to Freeman Creek, installed a culvert to improve a road crossing and deter further recreational damage, and removed all saltcedar from the project area. Water was released to the project beginning in July 2010.

The water allotment for this project is 215 AF based on a long term average of creek flows, therefore, project flows were recorded as 215 AF annually regardless of varying flow reads over the five-year monitoring period. A new data logger was installed at the flume in 2014 to automate data collection and monitor the volume of water to the project.

The riparian area along Freeman Creek consists of a narrow strip of riparian scrub with an abrupt boundary of upland big sagebrush scrub. The riparian corridors supplied with water by this project has recruited desirable woody species, primarily that of red and narrowleaf willow with some Fremont cottonwood and a few herbaceous forbs. However, a diverse riparian corridor has not established throughout the dry washes or downstream reaches of Freeman Creek in five years post implementation. This could possibly be due to the extreme drought conditions experienced in the Owens Valley in the past several years and associated reduced flows in Freeman Creek. However, project flows have been sufficient to enhance and expand the irrigated pasture for the lessee as proposed.

In 2013 some narrowleaf willows along the culvert and powerline road appeared to be stressed, with a brown leaf curl and cracked bark. However, in 2014 these willows exhibited less leaf curl and spotting and appeared healthier than the prior year. This dieback pattern was determined to be a result of willow cankers, which are a fungal disease caused by stress, such as drought, frost, and nitrogen deficiencies. During the 2015 and 2016 growing seasons, the narrowleaf willows at the culvert crossing appeared to have overcome the willow cankers and are once again thriving.

A limited number of saltcedar seedlings are still present in the project area. These should be removed as resources are available.

<u>Project Photos</u>

Freeman Creek, June 2010
Road Crossing Before Culvert Installation

Freeman Creek, June 2010
Road Crossing After Culvert Installation

Dry Wash 2, July 2013
Cottonwood Recruitment

Dry Wash 2, July 2016
Persisting Cottonwood Recruits

Recommendations

Monitoring and treatment for saltcedar will continue as resources are available. Flow monitoring will continue monthly and will be reported in LADWP's Annual Owens Valley Report. LADWP has no further recommendations for this project.

Warren Lake Project

Project Goal(s)

The Warren Lake Project was designed to serve to balance the annual 1600AF water commitment from the other 7 Additional Mitigation Projects. It was not intended to be used in all years. When in operation, the goal for the Warren lake project is to increase shorebird, waterfowl and wildlife habitat by providing additional water to the site. Depending on the water supplied on a given year, there is an increase in wet meadow and seasonal wetland habitats.

Progress to Date/Current Conditions

All construction required to implement and operate the project as proposed was complete by April 2011. During implementation, LADWP installed a new Parshall Flume and flow meter and removed all saltcedar from the project area.

Since implementation, the Warren Lake Project has been used in all years due to other Additional Mitigation Projects not supplying water that was anticipated (e.g., creek flows were low due to drought, artesian well projects did not supply full water allotment to projects). In the first two years post implementation, LADWP temporarily used concrete blocks in the Big Pine Canal to back up flow in the canal to divert the required water balance to the project. This was not a permanent solution and began causing significant erosion in the Big Pine Canal. Subsequently, LADWP constructed a concrete check wall structure and road crossing over the Big Pine Canal to better facilitate flows to the Warren Lake Project. This structure has been effective in reducing erosion along the banks of the canal and results in more efficient delivery of flows to the project when needed.

Since implementation of all of the Additional Mitigation Projects in 2012, LADWP has annually delivered 14-23% (221 AF-364 AF) of the entire 1600 AF to the Warren Lake Project (table below), which was intended to only be used moderately in some years. LADWP diverted 275 AF of water to Warren Lake in the fall of 2016 in anticipation of considerable water needed to balance the other projects for the third consecutive year. Winter precipitation flooded this area such that no additional water could be supplied to for the water balance by March 31, 2017 without returning flows to Klondike Lake. In this instance, LADWP supplied the remaining balance to Diaz Lake.

Warren Lake Total Acre Feet Supplied Annually Over Five Year Monitoring Period (2012-2017)

Year	**Warren Lake Total AF**
2012-2013	221
2013-2014	265
2014-2015	325
2015-2016	364
2016-2017	275
Annual Target	**0**

Periodic weed treatment has occurred since implementation of this project. Currently, no weeds are noted at this site. The extensive flooded acreage has been problematic for the lessee at the site annually as it has taken away good forage for winter grazing.

Although waterfowl and shorebird habitat is a goal of this project, avian use was not part of the Five Year Monitoring Framework for this project. LADWP has no data on avian use of Warren Lake following project implementation.

Project Photos

Warren Lake Project April 2011
New Parshall Flume, Flow Meter Installed,

Warren Lake, July 2014
New Check Wall, Road Crossing

Warren Lake, Flooded, March 2017 (photo courtesy of ICWD)

Recommendations

Since implementation, the Warren Lake Project has been utilized far more than anticipated to fulfill the water balance for the other Additional Mitigation Projects. The value as shorebird and waterfowl habitat is questionable, particularly with Klondike Lake and its South Shore Habitat Area is directly to the east of this project area. In drought years when water is scarce, surface water could be better utilized to maintain other LADWP mitigation projects in the Owens Valley. Other locations for this water balance (or water balance beyond 200 AF) should be considered.

Flow monitoring will continue monthly and will be reported in LADWP's Annual Owens Valley Report. LADWP has no further recommendations for this project. Unless changed formally by the MOU Parties, the project will continue functioning as described to provide the remaining water balance for all of the other Additional Mitigation Projects.

Hines Spring Well 355 Project

Project Goal(s)

The goal of the Hines Spring Well 355 Project is to create a minimum of one to two acres of ponded water or wetland/riparian vegetation in order to meet the 1991 EIR mitigation goal. The project is intended to restore flows to a portion of the spring channel system and an adjacent playa like area which would facilitate the re-establishment of riparian, aquatic, and spring habitats, as well as sub-irrigation of pasture/meadow. There will be no surface water connection to the adjacent Aberdeen Ditch Project.

Progress to Date/Current Condition

All construction required to implement and operate the project as proposed was complete by January 2012. During implementation, LADWP improved Well 355, installed a new powerline to properly power the well, installed a new pipeline, a new check structure, and built and reinforced a berm around the pipe outfall. Water was released to this project in January 2012.

Since implementation, multiple berms have been constructed near the pipe outfall to prevent flooding to the west, and to reduce ponding around the willow tree to ensure its survival. Most constructed berms failed; however, the most recent construction of the rock and earthen berm in late summer of 2014 has been successful. Additional construction following implementation included a new fenced exclosure in 2014 which will be used to demonstrate the potential effects of domestic grazing on vegetation recruitment in and outside of the exclosure.

The following table depicts water supplied to the Hines Spring Well 355 Project over five years. Although the project did not meet the annual water target every year during the five year monitoring period, the project has achieved the EIR mitigation goal (1-2 acres of ponded water and wetland/riparian vegetation). During the peak of the growing season Inyo County conducted rapid assessment surveys and vegetation mapping of the project. These surveys resulted in 1.85 acres of wetland and 14.04 acres of meadow habitat (refer to table below). The irrigated acreage is presently less than past years likely due to sinkholes in the volcanic soils and drought conditions. Additional planting or seeding throughout the majority of the project area is not necessary, as recruitment of desirable species is vigorous, healthy, and diverse (particularly non-woody herbaceous species).

Hines Spring Annual Target and AF Supplied Over Five Monitoring Years from 2012 to 2017

Year	Hines Well 355 Total AF
2012-2013	240
2013-2014	235
2014-2015	207
2015-2016	203
2016-2017	184
Annual Target	**240**

Hines Spring Total Acreage of Wetland and Meadow Habitat During 2016 Rapid Assessment Surveys

Wetland Habitat	
Sub-Habitat	**Acreage**
Ditch	0.17
Marsh	1.03
Pond	0.03
Riparian Shrubs	0.19
Riparian Trees	0.43
Total Acreage	**1.85**

Meadow Habitat	
Sub-Habitat	**Acreage**
alkali meadow	6.77
alkali sacaton, sparse	3.7
Glycyrrhiza meadow	0.77
saltgrass meadow	0.13
wild rye meadow	2.67
Total Acreage	**14.04**

Notable recruitment of red willow seedlings and native herbaceous vegetation has established near the pipe outfall and the ditch. These areas are marked with healthy, vigorous growth of alkali sacaton (*Sporobolus airoides*), saltgrass (*Distichlis spicata*), salt heliotrope (*Heliotropium curassavicum)*, beardless wildrye (*Leymus triticoides),* rabbit-foot grass *(Polypogon monspeliensis)* and showy milkweed *(Asclepias speciosa).* Additionally, baltic rush (*Juncus balticus),* bulrush (*schoenoplectus spp*.), and monkeyflower *(Mimulus guttatus)* are abundant in the ditch channel. Bulrush and cattails continue to dominate the ponded areas. Meadows between the ponded areas have a high diversity of grass species and are well-established over patches that were barren prior to project implementation.

Broadleaved pepperweed (*Lepidium latifolium*) was observed in the meadow south of the fence exclosure in 2015 and was hand treated with a backpack sprayer to eradicate the population before it propagated. This species was not observed in 2016.

Project Photos

Hines Spring Well 355, November 2011
LADWP Erecting Powerline to Power Well

Improved Hines Spring Well 355, January 2012

Hines Spring Well 355 Meadow Vegetation Near Exclosure, July 2015

Hines Spring Well 355 Project, July 2016
Looking West Along Ditch, Willow Tree at Pipe Outfall

Recommendations

Monitoring for weed populations will continue as resources allow and treatment will follow if necessary. Flow monitoring will continue monthly and will be reported in LADWP's Annual Owens Valley Report. LADWP has no further recommendations for this project. The project will continue functioning as described with the water allotment for the project remaining at 240 AF annually.

Aberdeen Ditch Project

Project Goal(s)

The goal of the Aberdeen Ditch project is to develop riparian, aquatic, and spring habitats, along with sub-irrigation of pasture/meadow as described in the Hines Spring Well 355 project.

Progress to Date/Current Condition

All construction required to implement and operate the project as proposed was complete by April 2011. During implementation, LADWP constructed a concrete diversion with a fish barrier and installed the necessary pipeline. Water was released to the project in April 2011.

The following table depicts water supplied to the Aberdeen Ditch Project over five years. This project has not yet received the full water allotment of 145 AF/year due to highly variable creek flows from drought and competing water commitments for fishery flows to the aqueduct in Aberdeen Ditch and flows to Blackrock Fish Hatchery.

Additionally, there are ongoing problems with sinkholes along the ditch where flows are directed. Since implementation, LADWP has experienced numerous sinkholes in the historic spring channel and has filled these sinkholes with Bentonite clay and extended the pipeline overground several times to convey water to a different location downstream. All of these attempts have failed. The overland pipe has become disconnected and has been repaired multiple times. It is currently disjointed again, yet releasing water in two locations. Despite all of these setbacks, water continues to flow to the project and the site is clearly benefitting from irrigation from the two locations. Native grasses (beardless wildrye) dominate the spring channel. Additional planting or seeding throughout the area is not necessary, as recruitment of desirable species is vigorous, healthy, and diverse at the project site (particularly non-woody herbaceous species).

Aberdeen Ditch Annual Target and AF Supplied Over Five Monitoring Years, From 2012 to 2017

Year	Aberdeen Ditch Total AF
2012-2013	86
2013-2014	105
2014-2015	64
2015-2016	76
2016-2017	115
Annual Target	**145**

American pondweed (*Potamogeton epihydrus*)and an algal mat layer have filled the concrete lined portion of the intake channel and will be cleaned as resources become available.

The 0.2 acres of the drainage fed by the Aberdeen Ditch Project in the Hines Springs South Revegetation Plan has naturally revegetated with an estimated 90% cover of diverse woody and non-woody species.

Project Photos

Aberdeen Ditch Project, March 2011
Concrete Diversion Structure Which Contains a Fish Barrier

Aberdeen Ditch, July 2013
Extended Pipe Outfall

Aberdeen Ditch, July 2016
Extended Pipe Outfall Increased Native Grass Cover

Aberdeen Ditch, July 2011
Spring Channel at Road Crossing

Aberdeen Ditch, July 2016
Spring Channel at Road Crossing, Increased Native Grass and Herbaceous Vegetation

Recommendations

Flow monitoring will continue monthly and will be reported in LADWP's Annual Owens Valley Report. LADWP has no further recommendations for this project. The project will continue functioning as described with the water allotment for the project remaining at 145 AF annually.

North of Mazourka Canyon Road Project

Project Goal(s)

The goals for the North of Mazourka Canyon Road project are to create a functional spring habitat at an artesian well source; create a spring outflow channel and riparian habitat based on available water flow; create channel outflow into ponded habitat at F045A, construct a stock watering location via a solar pump at a monitoring well immediately north of Well V008, and maintain and monitor outflow channel habitat for proper functioning condition and sustainability. This project has a water allotment of 300 AF from two artesian well sources.

Progress to Date/Current Condition

All construction required to implement and operate the project as proposed was complete by December 2011. During implementation, LADWP drilled a new artesian well, developed existing artesian Well V008, installed two pipelines and a stockwater trough, and removed saltcedar and Russian Olive from the project area.

The following table depicts water supplied to the North of Mazourka Canyon Road Project over five years. Due to multiple years of extreme drought conditions and a continual lack of groundwater recharge over the course of project monitoring, the target AF has not been achieved since implementation.

North of Mazourka Canyon Road Annual Target and AF Supplied Over Five Monitoring Years, from 2012 to 2017

Year	North of Mazourka Total AF
2012-2013	232
2013-2014	183
2014-2015	147
2015-2016	110
2016-2017	110
Annual Target	**300**

Vegetation is diverse, healthy and thriving at the created spring habitat around the artesian pipe outfall and along the banks of the outflow channel leading towards the pond F045A. However, this channel dissipates into wetland and meadow vegetation and then disappears before it reaches the pond. The pond was inundated initially with implementation but has been dry during the last three of five monitoring years.

Some native recruitment is establishing along the F418 pipeline berm, however much of it is barren or with saltcedar resprouts. Saltcedar eradication efforts should continue at this site as resources are available.

Project Photos


02/16/2012

North of Mazourka Canyon Road Project, February 2012
Installed Stockwater Trough


12/08/2011

North of Mazourka Canyon Road Project,
December 2011
Pipe Outfall (convergence of both pipelines)
Within Exclosure During Implementation


08/06/2012

North of Mazourka Canyon Road Project,
August 2012
Pipe Outfall (convergence of both pipelines)
Within Exclosure, Post Implementation

Recommendations

It is recommended that monitoring and treatment for saltcedar continue for this project as resources are available. Flow monitoring will continue monthly and will be reported in LADWP’s Annual Owens Valley Report. As groundwater tables recover from drought conditions, it is anticipated that the artesian wells will begin producing more water supply for the project. LADWP has no further recommendations for this project. The project will continue functioning as described with the water allotment for the project remaining at 300 AF annually.

Homestead Project

Project Goal(s)

The goal for this project is to utilize water from a new artesian well installed near artesian Well 044A and from existing multiple completion artesian Wells T774-T777 to create spring like habitat at the old Homestead site. The spring habitat will increase the amount and diversity of vegetation cover, along with increasing the amount of wildlife and waterfowl in the area while providing the lessee with a consistent source of stock water.

Progress to Date/Current Condition

All construction required to implement and operate the project as proposed was complete by February 2012. During implementation, LADWP capped and piped flow from T774-T777, installed a stockwater trough, and began releasing water from the T774-T775 pipeline in October 2011. Additionally, LADWP drilled a new artesian well, installed a second pipeline from the new well, constructed a diversion on the main spring channel, and cut and burned saltcedar and Russian olive within the project area. Flow was released to the project from the second well and pipeline in February 2012.

Since implementation, preventing flows from reaching the Owens River has been continually problematic, as the project as designed sends too much water into the lower pond from both well sources. As a consequence, LADWP re-established an old irrigation ditch west of the fault and began sending much of the flow from the new artesian well south into an existing natural depression via a tee in the pipeline. This modification expanded the project’s flooded acreage and open water habitat considerably and alleviates the pressure on the original lower pond and spring channels that abut the Owens River Road. Presently, flows exiting the pond via the north and south spring channels continue to be managed to prevent connectivity to the Owens River.

The following table depicts water supplied to the Homestead project over five years. Due to ongoing drought and a lack of groundwater recharge over the course of project monitoring, the target AF for Homestead was not fully supplied in most years. However, even with less AF of water going to the project, the goals of the project were met. The habitat within the main spring channel area is green, lush spring-like habitat. There is diverse riparian vegetation within the spring channel as well as along the channel banks. The pond downstream of this area is well established and has created suitable habitat for waterfowl which have been observed on numerous occasions utilizing the area.

Homestead Project Annual Target and AF Supplied Over Five Monitoring Years from 2012 to 2017

Year	Homestead Total AF
2012-2013	314
2013-2014	258
2014-2015	274
2015-2016	278
2016-2017	245
Annual Target	**300**

Cattails are choking out the channel downstream of the main spring area along the road as well as the large ponded area. Ditch maintenance will be necessary periodically to remove obstructions from the channels to improve conveyance and to prevent connectivity to the Owens River.

Recruitment of non-woody desirable species is naturally occurring throughout the project area, yet the eastern third of the pipeline berm remains largely barren. This should be reseeded if resources allow. Saltcedar should continue to be monitored and treated as resources are available, particularly at the tee in the pipeline and along Stevens Ditch along the west side of the project.

Project Photos

Homestead Project, January 2012
Following Russian Olive and Saltcedar Eradication Burn

Homestead Project, August 2012
Burn Area Revegetated with Native Grasses

Homestead Project, March 2012
Main Spring Channel Following Initial Flow Release

Homestead Project, July 2016
Main Spring Channel Five Years Post Implementation

Homestead Project Main Pond, July 2015

Recommendations

Monitoring and treatment for saltcedar and Russian olive will continue for this project as resources allow. LADWP may adaptively manage the timing of flows to this project in the future to deter cattail and tule encroachment in the spring channels and ponds. This will help to retain open water and reduce the need for regular maintenance.

Flow monitoring will continue monthly and will be reported in LADWP's Annual Owens Valley Report. LADWP has no further recommendations for this project. The project will continue functioning as described above (utilizing the additional southern pond) with the water allotment for the project remaining at 300 AF annually.

Well 368 Project

Project Goal(s)

The goal of this project is to create and enhance spring and riparian habitat, while maintaining or improving conditions for an existing population of endangered Owens pupfish. Another complementary goal is to provide redundancy in water supply to the existing habitat in the event that Well 368 was to fail. This project will also create a stock watering area in the vicinity to allow more flexible livestock management by Lacey Livestock (lessee).

Progress to Date/Current Condition

All construction required to implement and operate the project as proposed was complete by February 2012. During implementation, LADWP drilled a new artesian well, and installed a pipeline and stockwater trough. Water was released to the project in February 2012.

The table below depicts water supplied to the Well 368 project over five years, which was lower in some years due to drought conditions.

Well 368 Project Annual Target and AF Supplied Over Five Monitoring Years From 2012 to 2017

Year	Well 368 Total AF
2012-2013	133
2013-2014	124
2014-2015	124
2015-2016	150
2016-2017	157
Annual Target	**150**

There is diverse riparian vegetation around the pipe outfall and down the channel of the Well 368 project. Some narrowleaf willows in the project area exhibited willow cankers for a few years during project monitoring but appear to have overcome them and are showing significant new growth over the last two growing seasons. The pupfish marsh has provided suitable spring habitat and continues to harbor a population of Owens pupfish; however, cattails are choking out this ponded area.

The lower pond downstream of the pupfish marsh expands in the winter and dries back in the summer with evapotranspiration. It has well established and diverse riparian woody and herbaceous species but maintains open water habitat for pupfish in the winter months.

Saltcedar has been problematic for this area but is not currently present. In September 2014, LADWP Watershed Resources Staff pulled approximately 700 saltcedar seedlings from the lower pond area.

Project Photos

Well 368 Project, July 2013
Narrowleaf Willows Exhibiting Stress from Willow Cankers (brown discoloration), Willows at the Project Site have Since Recovered

Well 368, September 2014
Lower Pond Area Before Saltcedar Removal

Well 368, September 2014
Lower Pond Area After Saltcedar Removal

Well 368 Lower Pond, March 2017
Flooded Area Expands in the Winter and Dries Back in the Summer with Evapotranspiration

Recommendations

Monitoring and treatment for saltcedar will continue for this project as resources are available. Flow monitoring will continue monthly and will be reported in LADWP's Annual Owens Valley Report. LADWP may assist CDFW in removing cattails at the pupfish marsh to reestablish open water and improve pupfish habitat if pursued by CDFW. LADWP has no further recommendations for this project. The project will continue functioning as described with the water allotment for the project remaining at 150 AF annually.

Diaz Lake Project

Project Goal(s)

The Diaz Lake project will provide a secure water supply for Diaz Lake and reduce the dependence on pumping conducted by Inyo County to supply the lake. LADWP will provide up to 250 AFY from the Los Angeles Aqueduct to Diaz Lake. The primary benefit of this project is reduced pumping by Inyo County in the Bairs-George Wellfield to provide water for Diaz Lake.

Progress to Date/Current Condition

No additional infrastructure was necessary for this project as it is a water accounting project to provide an alternative supply for a project that was already in operation. The following table depicts water supplied to the Diaz Lake Project over the past five years. Other than measuring the lake stage and maintaining water releases no other monitoring for this project was required under the Additional Mitigation Projects Developed by the MOU Ad Hoc Group 2008 document.

Diaz Lake Project Annual Target and AF Supplied over Five Monitoring Years from 2012 to 2017

Year	**Diaz Lake Total AF**
2012-2013	185
2013-2014	240
2014-2015	248
2015-2016	217
2016-2017	401*
Annual Target	**250**

**Due to high winter precipitation and associated flooding, LADWP could not release the entire remaining water balance to Warren Lake in 2016-2017. This water balance was made up at Diaz Lake. Although the total was in excess of 250 AF as described in the plan, LADWP did not pump makeup water for this excess since it was necessary to complete the remaining water balance.*

Recommendations

LADWP recommends that the Diaz Lake project be used to fill the water balance if necessary in years when Warren Lake is at capacity (as in 2016-2017). In those instances, LADWP will not pump back makeup water as originally described in the Additional Mitigation Projects document. Otherwise, the project will continue functioning as described with the water allotment for the project remaining at 250 AF annually.

Flow monitoring will continue monthly and will be reported in LADWP's Annual Owens Valley Report. LADWP has no further recommendations for this project.

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 (Laws 2003 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. In this Plan, conditions, goals, schedules, and monitoring protocols were prescribed. Goals and species lists in the Plan were developed from National Resources Conservation Service Ecological Site Descriptions and a subset of nearby parcels extracted from LADWP's 1984-1987 vegetation inventory data. 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.

Early years spent on the Laws revegetation effort were focused on studies of approaches that could be applied on a more comprehensive scale (LADWP and MWH 2004, SAIC 2003) given the extensive scope of the project. Most treatments in these early studies failed, including drill seeding with no additional treatments or irrigation, mulch and manure application in seeded areas, canal spoils treatment, polymer treatments, furrowing, wind breaks, water harvesting, and hand watering.

Broadcast and drill seeding were attempted in some sections of the parcels but have been met with little success. LADWP also purchased and planted greenhouse-propagated plants from third party vendors to assist in reaching mitigation goals, but received many plants without well-established root systems that could not persist once placed in the natural elements. As a consequence, LADWP has since purchased and operates two greenhouses that are capable of producing up to 18,000 native plants twice a year for summer and fall plantings. Generating the plants from seed in-house has resulted in a much more robust product that can withstand the harsh environmental elements at Laws and has proven to be the most successful method of dryland revegetation used to date at this location.

Since 2003, LADWP has explored different forms of irrigation to aid in revegetation and jumpstart natural recruitment within these parcels (e.g., above ground drip irrigation, hand watering, buried driplines, water cannons, etc.). Buried drip has proven to be the most effective watering technique used thus far. Since 2008, LADWP has installed nearly 190 miles of drip lines with approximately 122,000 emitters at Laws 90, 94, 95, 129, 118, and the Laws Native Seed Farm (Laws 27). Timing and frequency of watering has varied in response to plant needs and climatic conditions.

Rodent herbivory has continued to be a challenge across all parcels, and LADWP now installs protective cages around plantings to promote early establishment. Other challenges include the management of and competition from tumbleweeds (*Salsola tragus*), and ongoing soil movement, dunal formation, and dust emissivity from high valley winds.

Despite these challenges, LADWP has acted in good faith and has planted approximately 233 acres of the 253 acres across Laws 90, 94, 95, 118, and 129, as well as 92 acres at the Laws Native Seed Farm to date. These efforts totaled nearly 130,000 greenhouse-propagated plants and thousands of pounds of seed. Additionally, LADWP has all 253 total acres in the Laws 2003 Plan plumbed with irrigation systems supplying water to existing plants (or ready to supply future plantings) within these parcels. However, success criteria specified in the 2003 Plan are not being met and likely won't be for some time due to many factors. These include the extensive scope of the project, volume limitations of the two existing greenhouses, ongoing operation and maintenance of an expansive irrigation system, extensive rodent herbivory, consecutive drought years, and shear from strong seasonal winds.

2016 Planting Efforts

In April 2016, approximately 13,000 containerized plants were planted at LAWS 90. Species included *Atriplex polycarpa* (ATPO), *Krascheninnikovia lanata* (KRLA), *Atriplex torreyi* (ATTO), and Atriplex canescens (ATCA2).

Number of plants by species planted at LAWS 90 in April 2016

SPECIES	**TOTAL**
ATPO	3,400
KRLA	2,700
ATTO	3,500
ATCA2	3,400
TOTAL	**13,000**

In October 2016, an additional 13,400 containerized plants were planted at LAWS 90. Species included *Atriplex polycarpa* (ATPO), *Krascheninnikovia lanata* (KRLA), *Atriplex torreyi* (ATTO), and Atriplex canescens (ATCA2).

Number of plants by species planted at LAWS 90, October 2016

SPECIES	**TOTAL**
ATPO	5,230
KRLA	1,750
ATTO	2,200
ATCA2	4,220
TOTAL	**13,400**

2017 Planting Efforts

The Spring planting effort was conducted from April 3 through April 11, with Friday cancelled due to rain. Storm totals were approximately one inch of precipitation depending on the location on the Valley floor. A total of 16,500 native plants were planted at Laws 94 and Laws 27. The planting areas in both parcels were focused on those lands with previously installed drip irrigation. In Laws 94, 24 acres were planted with approximately 6,000 native plants. In Laws 27, another 24 acres were planted with approximately 10,500 native plants. (See table and photos below). Species included *Atriplex polycarpa* (ATPO), *Krascheninnikovia lanata* (KRLA), *Atriplex torreyi* (ATTO), *Atriplex canescens* (ATCA2), and *Ambrosia dumosa* (AMDU2).

Number of Plants Per Site

SPECIES	NUMBER PLANTED	LAWS 94	LAWS 27
KRLA	1,350	486	864
ATCA2	4,875	1,755	3,120
ATPO	5,175	1,863	3,312
ATTO	4,575	1,647	2,928
AMDU2	500	180	320

Planted Area Laws 94

Planted Area Laws 27

Planting Schedule

LADWP originally outplanted dispersed sections in each parcel to encourage natural recruitment to fill in adjacent open areas. This unassisted recruitment has not occurred at a rate that will meet the 2003 Plan's goals. As a consequence, LADWP has proceeded in recent years with planting out each parcel entirely one time before returning to replant areas within the same parcel.

The following table is the tentative schedule for planting for the next two years. To date, all Type-E Transfer parcels have been initially planted utilizing buried drip irrigation with the exception of 20 acres in Laws 94/95 (these parcels have been initially planted but with above ground drip irrigation). However, no parcels have yet met success criteria. Parcels will continue to be replanted as necessary or treated with alternative methods as they become available to achieve goals.

Tentative Planting Schedule Through Spring 2019

Parcels	Anticipated Acres to be Overplanted	% Currently Planted	Proposed Schedule for Overplanting
Laws 94	30	100%	Spring 2017
Laws 95	30	100%	Fall 2017
Laws 27	30	100%	Spring 2017
Laws 129	30	100%	Fall 2018
Laws 129	30	100%	Spring 2019

Portions of the Native Seed Farm are currently well established and are producing viable seeds for LADWP's revegetation projects in Laws and throughout the Owens Valley as originally planned.

This proposed schedule is based on a maximum number of plants successfully propagated in both greenhouses, twice a year and does not account for unforeseen circumstances (e.g., pests, unviable seed, etc.).

Operations

Laws 90 and 129 have fully installed buried drip irrigation systems. LAWS 94/95 currently have a combination of buried and aboveground drip across both parcels; the above ground drip will be converted to a buried drip at a later date but has been initially planted. The 19-acre portion of Laws 118 covered in the Laws 2003 Plan has a complete irrigation system installed. The Laws Native Seed Farm has a combination of sprinkler irrigation, buried driplines, and above ground drip irrigation.

The current irrigation schedule being utilized within the planted portions of the parcels includes:

- Fall: seven to eight hours daily for 4 to 6 weeks
- Winter: once a month for 7-8 hours for established sections; new plants may get additional water if they appear dry
- Spring: seven to eight hours daily for 4 to 6 weeks
- Summer: One week per month for 7-8 hours per day for established sections; new plants may get additional water if they appear dry

In the spring of 2015 LADWP adopted a new watering regime to promote deeper rooted plants and reduce tumbleweed growth. Under this new regime all plants will receive deep set irrigation for a period of four to six weeks occurring in late winter/early spring and again in late summer/early fall. During these two irrigation events water will be cycled daily at a duration of approximately eight hours on and 16 hrs off. A daily pulse as opposed to leaving the water on around the clock will prevent pooling at the surface and runoff. Newly planted plants will receive water every two to three days (8 hrs per), maintaining shallow soil moisture, throughout the growing season. All other age plants will receive additional irrigation as visually needed.

Water cannons, water trucks, and irrigation systems also provide supplemental water as necessary for dust control.

Maintenance

Current maintenance of existing irrigation systems includes: monitoring system for leaks or other obvious problems such as broken lines or piping, broken risers to sprinkler lines, automatic valves not operating correctly, and filters getting clogged. Additionally, mowing and clearing of tumbleweeds occur as equipment and manpower is available.

Demonstration Projects

Demonstration projects in 2015 included two fenced 100-foot by 100-foot planting areas at LAW129. Fencing was buried 12 inches into the ground and extended four feet above ground. Chicken wire fence material was used to prevent rodent entry. Approximately 70, one gallon plants were planted within each area. Soils were top dressed with ditch spoils and wood chips. The intent of these areas is to promote growth of larger plants that will reach reproductive maturity earlier providing a seed source for the site.

The demonstration project for 2016 includes use of the Cocoon planting system developed by the Land Life Company. This system is not reliant on external irrigation and is designed to support a seedling through its critical first year. In the summer of 2016 twenty seven Cocoons were planted at a revegetation site near Charlie’s Butte to test if the system would be a viable option. As of February 2017 all 27 plants were alive without any additional water other than what was added during the initial planting. Although these results are interesting too short a time period has elapsed to determine efficacy of this product. Testing of this product will continue through 2017.

Please refer to Table 3.3 for status on each of these revegetation projects.

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 2006 was conducted utilizing the Truax No-till drill seeder. Water was applied before initiating seeding and following seeding to control dust emissions.

Mitigation Measure M-2 and M-3

Impact: Groundwater 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 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.

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

Vegetation Cover in Selected Parcels within the Laws Wellfield

Vegetation Parcel	Percent Perennial Cover													
	1986	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
LAW030	23	26	31	50	40	39	36	32	35	22	24	12	13	17
LAW035	33	3	14	17	11	13	3	12	17	4	2	1	1	1
LAW043	61	5	13	10	16	21	8	11	20	7	3	3	6	4
LAW052	28	5	14	11	9	15	15	6	16	8	4	4	4	3
LAW062	21	5	11	14	16	22	12	12	17	10	5	4	2	2
LAW063	11	9	17	14	19	26	14	15	25	12	6	6	4	5
LAW065	10	7	8	11	12	18	12	10	20	7	5	4	3	2
LAW070	59	6	8	17	20	21	14	20	23	10	6	3	4	3
LAW072	64										10	6	6	4
LAW078	52	36	49	54	59	67	69	65	53	35	27	23	23	16
LAW082	17	4	5	10	6	9	8	12	10	8	6	5	4	6
LAW085	30	7	13	21	26	35	29	31	14	15	6	5	4	6
LAW105	26	35	49	48	44	68	41	58	43	43	27	19	26	21
LAW107	47	46	68	71	79	80	90	81	65	54	45	31	35	47
LAW109-FSL048	18												8	8
LAW112	20	17	37	33	38	49	40	31	33	33	14	11	8	10
LAW120	26	33	41	47	48	48	50	52	47	35	39	26	30	21
LAW122	60	64	73	78	75	70	78	68	77	60	45	42	30	32
LAW137-PLC210	22	19	33	32	24	27	20	27	28	21	17	14	14	16

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

WELL	April 2004	April 2005	April 2006	April 2007	April 2008	April 2009	April 2010	April 2011	April 2012	April 2013	April 2014	April 2015	April 2016
T107	30.1	31.9	18.6	21.1	25.2	28	31	31.8	32.8	33.1	35.3	36.4	36.7
T436	10.1	10.2	4.8	5.3	7.1	8.8	9.5	9.5	11.3	11.1	13.0	13.7	14.0
T438	11.6	8.9	3.8	6.3	8.2	9.1	11.4	8.6	12.6	12.0	15.8	16.2	16.4
T490	14.6	14.7	13.3	10.2	12.6	13.8	13.5	13.3	12.5	13.2	16.6	17.5	18.1
T492	32.1	31.5	24.4	23	26.8	29.1	30.8	31.7	34.1	32.8	35.6	36.4	37.9

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 and the Laws Ranch lease jointly determined irrigated field, pasture, or area vegetation condition using the Natural Resource Conservation Service Pasture Condition Assessment. This protocol, once followed, is designed to optimize plant and livestock productivity while minimizing detrimental effects to soil or water resources.

Pasture condition scoring involves the visual evaluation of 10 indicators each having five environmental conditions (Cosgrove et al. 1991). Each indicator is rated separately and the scores are combined into an overall score for the pasture. The overall score for a pasture can then be divided by the total possible score to give a percent rating ({overall score ÷ total possible score} × 100 = percent rating). Not all 10 indicators may be appropriate for use in every pasture. In this case, using less than 10 indicators will reduce the possible score, but the percent rating will still be comparable. Irrigated pastures on the Laws Ranch lease will be evaluated after the area has been seeded and irrigated for at least three growing seasons in order to allow the seeded pasture mix to become fully established. The average pasture score for the Laws Ranch lease during the 2013 growing season was 95%. These pastures were most recently evaluated in 2016. The average pasture score for the 2016 growing season was 88%.

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.

Periodic examinations were conducted along the ditch throughout the growing season. These examinations did not indicate any signs of vegetation stress. Photo points have been established along the ditch.

Diversions for irrigation from Coldwater Canyon Ditch for the Laws Seed Farm continued in 2012. 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 2012. Periodic examinations were conducted along the ditch throughout the growing season. These examinations did not indicate any signs of vegetation stress.

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

As of spring 2017, Well 415 has been drilled and equipped but is not yet in operation. The Bell Canyon Well has not yet been drilled. LADWP submitted a monitoring program for W415 on November 6, 2013. ICWD replied with comments on November 21, 2013, however this monitoring program has not been finalized.

3.3. LADWP OTHER OBLIGATIONS

Table 3.5 provides title, legal reference, provision, progress to date, and current status (according to LADWP) on each of LADWP's other obligations listed on table 3.5.

Again, categories describing status are:

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:* 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:* Project is fully implemented but has not yet met prescribed goals or success criteria,
5. *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). The OVLMP section includes a current monitoring report for grazing and recreation management.

Table 3. 5. LADWP Other Obligations

Reporting No.	Table 3.5 LADWP OTHER OBLIGATIONS				Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implementd
	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 agencies due to timing constraints; LADWP must issue their annual report in conjunction with their Annual Operations Plan near May 1 each year. ICWD does not meet this timeline for their report. However, LADWP and ICWD jointly developed the LADWP Mitigation Project Commitments and Other Obligations Tables 3.1 and 3.2.			X		
3	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. Inyo County and Los Angeles have worked on cooperative studies to facilitate improvements to the Green Book since 2007. ICWD and LADWP entered into a facilitated process with the Ecological Society of America (ESA) in 2015 to analyze the vegetation monitoring program used by both agencies. ESA concluded that the current vegetation monitoring and analysis methods used by ICWD and LADWP are widely used and accepted by the scientific community. Minor modifications were made to the interim joint monitoring program that ICWD and LADWP were implementing and associated revisions to the Green Book vegetation monitoring program (Box I.C.l.a.ii) were adopted by the Standing Committee February 22, 2017. 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		
4	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. There are no current issues under dispute.		X			
5	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 parties to the 1997 MOU, called the "MOU Signatory Group," have met regularly on an as needed basis.		X			
6	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 have been implemented and are ongoing.			X		
7	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 pre the Water Agreement.			X		
8	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 Standing Committee approved procedures and guidelines for implementing the project in 1998. A Mitigated Negative Declaration has been completed. The Inyo/Los Angeles Water Agreement has been modified to provide a reliable water supply of 300 AF for the project. 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		

Table 3.5 LADWP OTHER OBLIGATIONS, continued

Reporting No.	Commitment	Legal Reference	Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully Implemented but not meeting goals	Not fully implementd
					Status				
9	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 $3,704,402 in 2016. 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 $58 million since 1991 for this purpose.			X		
10	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 $194,455 in 2016. LADWP has paid the City of Bishop $3,325,892 since 1997 for this purpose. Inyo County has made its required payment under this section of the agreement.	X				
11	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 consumers 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 2016 of $155,563 for a total of $2,601,625. 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 $4,433,539 since 1997 under this provision of the Agreement.			X		
12	Financial Assistance-Saltcedar 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 saltcedar 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 2016, LADWP paid ICWD $72,871 for this work. LADWP has paid Inyo County $1,821,554 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. Approval for 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. In addition to the monies provided under the Water Agreement for Saltcedar control, LADWP committed, as part of the 2004 Stipulation and Order, to match the amount of grant monies the ICWD received up to $1.5 million for additional Saltcedar control in the LORP area. Under Item 6 of the Stipulation and Order, LADWP has paid Inyo County a total of $1,500,000 as of May 2016, leaving a $0 balance per the Stipulation and Order.			X		
13	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 $1,450,042 in July 2016. Funds provided by Los Angeles have been expended to fund Inyo County Water Department. LADWP has paid Inyo County over $30 million since 1988 for this purpose.			X		

Table 3.5 LADWP OTHER OBLIGATIONS, continued

Reporting No.	Commitment	Legal Reference	Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully implemented but not meeting goals	Not fully implementd
					Status				
14	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				
15	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		
16	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		
17	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 has adopted the Bishop Cone audit procedure. 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. Past audits did not account for stockwater use and ditch losses on the Bishop Cone. Audit methods beginning with the 2015-16 Runoff Year will reflect all sources of water supplied to the Bishop Cone.			X		
18	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			
19	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 are currently working on completed responses to comments and developed the final HCP. Complete as of April 2017.	X				
20	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				
21	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.	X				
22	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			

Table 3.5 LADWP OTHER OBLIGATIONS, continued

Reporting No.	Commitment	Legal Reference	Provision	Progress to Date	Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully implemented but not meeting goals	Not fully implementd
					Status				
23	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		
24	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				
25	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				
26	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 physically 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				
27	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		
28	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				
29	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				
30	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				
31	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				
32	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		
33	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 $1.22 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		
34	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		

Table 3.5 LADWP OTHER OBLIGATIONS, continued

Reporting No.					Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully implemented but not meeting goals	Not fully implementd
	Commitment	**Legal Reference**	**Provision**	**Progress to Date**	Status				
35	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 is managed in accordance with the LORP EIR. In 2016, the Winterton and Thibaut Units were flooded for a combined acreage of 355 acres based on a 71% runoff year.			X		
36	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		
37	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, various mitigation/revegetation plans have been written and implemented (in part or in full) to fulfill the City's obligations under the 1991 EIR and Water Agreement. Following a thorough assessment of status of the City's mitigation commitments, LADWP submitted a Draft *Revegetation/Mitigation Plan for Remaining Areas Impacted by LADWP's Water Gathering Activities Originally Identified in the 1991 EIR* to ICWD for review in December 2016. This plan outlines remaining mitigation commitments at present under the 1991 EIR and presents a course of action for reaching the legally defined goals. Comments from ICWD are pending.					X
38	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. Currently, LADWP is planning to construct 2 new wells on the Bishop Cone. The preconstruction evaluations required under the Water Agreement for two new in west Bishop (B2 and B5) were approved by the Technical Group on February 9, 2017. Also approved at that Technical Group meeting was the preconstruction evaluation for W243, a replacement well in the Laws Wellfield.					X
39	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.					X[6]
40	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 complete 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. Section 3.3.2 contains updates to the Recreation Management portion of the original OVLMP.			X		

Table 3.5 LADWP OTHER OBLIGATIONS, continued

Reporting No.					Complete	Ongoing as Necessary/Required	Implemented and Ongoing	Fully implemented but not meeting goals	Not fully implementd
	Commitment	**Legal Reference**	**Provision**	**Progress to Date**	Status				
41	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, 16 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 to these requests upon request by Inyo County.		X			
42	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				
43	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				
44	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 entered escrow with the Big Pine Fire Department for the sale of 1.02 acres. • LADWP sold a road easement to Inyo County for Butcher Lane to correct an encroachment upon LADWP property. • LADWP is negotiating with Inyo County for the development of a Veteran's Walking Path **City of Bishop Area** • LADWP closed escrow on the sale of Bishop Nursery--a leased property. • LADWP and the City of Bishop are in negotiations for the sale of 3.48 acres of property for disabled and affordable housing purposes. • LADWP and the City of Bishop are in negotiations for the sale of property for a multi-use path for the Seibu to School Project. • LADWP and the Forest Service are in negotiations for the sale of 1.4 acres for the expansion of its facility. • LADWP is participating in a strategic development plan with Inyo County, City of Bishop, and Bishop Tribe to analyze the feasibility of changing land uses along N. Sierra Highway for future commercial development. • LADWP is negotiating with Caltrans for the sale of property to expand its Bishop Maintenance Yard facility and to complete its Bishop ADA Compliance Project. • CHP has approached LADWP looking for property to build a new headquarters facility. **Lone Pine Area** • LADWP is selling easements to Inyo County for the widening of Whitney Portal Road. • LADWP is negotiating with the Lone Pine Tribe for an easement to relocate its domestic water reservoir. **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				
45	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			
46	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				
47	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				

Table 3.5 LADWP OTHER OBLIGATIONS, continued

Reporting No.	Commitment	Legal Reference	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 implementd
48	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 complete as of 2011.

Baker Creek Planting

All planting areas (Figure 1) within Baker Creek have received their initial plantings and replacement pole plantings based on the first growing season monitoring.

Replanting at Baker Creek

Based on ground water analysis conducted in 2015, it was determined that groundwater levels in all five of the areas tested were unsuitable for replanting in 2016. Therefore, no replanting efforts took place in 2016.

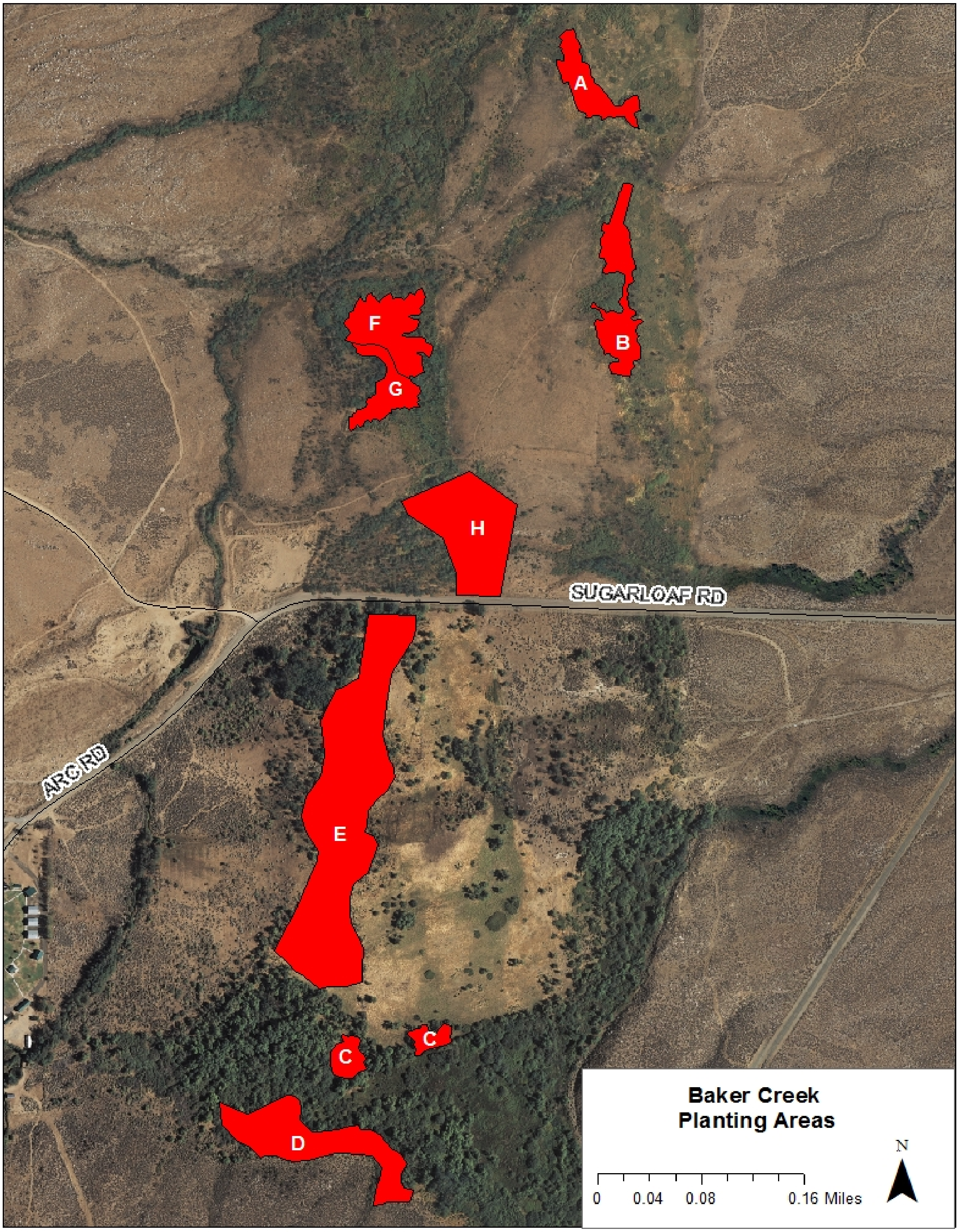


Figure 3. 7. Overview of Pole Planting Areas in the Baker Creek Watershed

As-Built Plans

Since replanting did not occur, as-built plans were not produced in 2016.

Nonnative Species Control

Black Locust (*Robinia pseudoacacia*)

Based on low cover values in data collected in 2015 for upper canopy (nonnative), it was unnecessary to treat black locust in 2016. All cover values were at or 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 as stated in Section 2.1.7.1 of the Enhancement Plan reads:

> *Planting areas A, B, C, D, E, and F – Cover of target upper and mid canopy species is at least 50 percent.*
>
> *Planting areas G and H - Cover of target upper and mid canopy species is equal to 65 percent.*
>
> *Native species understory cover will be at least 50 percent in all planting areas.*
>
> *Black locust cover will be no more than five percent in all the planting areas.*
>
> *Cover of other nonnative species in the understory will be less than 25 percent in all planting areas.*

Transects and bearings were randomly located using GIS for each of the planting areas. A total of six transects were generated for Area A, eight transects for Area B, three transects for Area C, 10 transects for Area D, 28 transects for Area E, 5 transects for Area F, 5 transects for area G, and 12 transects for Area H. Transects within these areas were sampled from July 26 through August 1, 2016. Since initial planting was phased over three years, 2016 was the sixth year that line point sampling was conducted for planting Areas A, B, F & G, the fifth year for planting Areas C, D, and H, and the fourth year for planting Area E. Using line point data collected, absolute cover values were then calculated for each planting area and are summarized in Table 3.6.

Table 3. 6. Percent Absolute Cover Values for 2011-2016 within Planting Areas A, B, C, D, E, F, G and H

		Planting Area A	Planting Area B	Planting Area F	Planting Area C	Planting Area D	Planting Area E	Criteria for Areas A,B,C,D, E and F	Planting Area G	Planting Area H	Criteria for Area G and H
Upper Canopy Native	2011	T	1	1					6		
	2012	T	T	1	3	2			5	7	
	2013	0	T	2	10	3	7		15	8	
	2014	0	1	2	3	2	8		13	4	
	2015	T	T	3	7	5	11		3	8	
	2016	T	1	2	5	8	9		17	5	
Upper Canopy Nonnative	2011	0*	0*	T*				<5	1*		<5
	2012	0*	0*	2*	0*	0*			4*	1*	
	2013	0*	0*	1*	0*	0*	6		T*	T*	
	2014	0*	0*	T*	0*	0*	5*		T*	T*	
	2015	0*	0*	T*	0*	0*	7		T*	1*	
	2016	0*	0*	1*	0*	0*	11		13	T*	
Mid-Canopy	2011	51	25	30					15		
	2012	62	17	45	10	45			15	35	
	2013	36	16	42	10	48	6		26	37	
	2014	61	29	36	24	55	6		21	46	
	2015	73	29	50	17	62	6		31	47	
	2016	47	29	46	8	59	8		27	48	
Upper & Mid-Canopy	2011	51*	27	32				≥50	21		≥65
	2012	62*	17	46	13	46			20	42	
	2013	36	17	44	20	51*	12		41	45	
	2014	61*	30	38	12	57*	15		34	48	
	2015	73*	29	52*	23	67*	17		34	55	
	2016	47	30	48	13	67*	17		44	53	
Understory & Shrub Native	2011	37	64*	56*				≥50	48		≥50
	2012	34	74*	41	70*	39			41	48	
	2013	39	63*	30	43	21	24		37	34	
	2014	29	55*	35	68*	25	19		46	29	
	2015	19	31	18	62*	24	30		23	23	
	2016	38	53*	33	64*	19	19		43	24	
Understory Nonnative	2011	1*	7*	11*				<25	13*		<25
	2012	T*	5*	11*	14*	3*			13*	4*	
	2013	3*	9*	10*	32	T*	7*		7*	9*	
	2014	3*	8*	2*	24*	2*	2*		6*	7*	
	2015	5*	10*	2*	6*	2*	4*		1*	6*	
	2016	4*	7*	2*	16*	3*	17*		11*	11*	

**Has met criteria as stated above. T=Trace<1%*

Planting Area A

Pre-existing conditions

Planting Area A is approximately 1.7 acres in size. Prior to the 2007 Inyo Complex Fire the vegetation was dominated by narrowleaf willow (*Salix exigua*) stands and meadow type vegetation. Located nearby but not with in the planting area, Goodding's willow (*Salix gooddingii*), Red willow (*Salix laevigata*), Fremont cottonwood (*Populus fremontii*), and Black cottonwood (*Populus trichocarpa*) can be found. As of 2008, all vegetation has resprouted and is recovering from the Inyo Complex Fire. Soils consist of loam in the near surface horizons with clay and sand at depth.

Desired condition

Total estimated number of pole plantings required by the Enhancement Plan for Area A was 593 poles based on 12-foot spacing from each other and existing canopy cover. If pole plantings are successful, they would create a more continuous belt of forest habitat along the easternmost fault line of the Baker Creek area, with riparian corridors connecting the planting area to the dense riparian area located within the Apple Orchard Exclosure. Based on the Yellow-billed Cuckoo (YBC) habitat suitability analysis for Baker Creek (Ecosystem Sciences 2004) the pre-fire habitat suitability for this area was classified as low. The desired YBC habitat suitability condition post enhancement (6-10 years) should improve to medium suitability.

Implementation Efforts

The initial pole planting for this area was implemented in 2010. A total of 322 of the recommended 593 poles were planted (Table 3.7). The Enhancement Plan called for replacement pole plantings when mortality within an individual planting area in the first season is greater than 50% for cottonwood and greater than 20% for willows. In 2011, 150 of the original 322 pole plantings were replanted. In 2013, while not required by the Enhancement Plan, Area A was replanted with an additional 468 pole plantings to try and achieve the target canopy cover goals by year six. By the end of 2013, Area A received a total of 940 pole plantings over three years.

Table 3. 7. Total Number of Pole Plantings Planted by Planting Area

Year	Area A	Area B	Area C	Area D	Area E	Area F&G	Area H	Total Per Year
2010	322	397				589		1,308
2011	150	203	209	701		371	404	2,038
2012			36	135	1205		61	1,437
2013	468	485	73		222	55		1,303
2014			45		260	130	60	495
2015								0
2016								0
Total	940	1,085	363	836	1,687	1,145	525	6,581

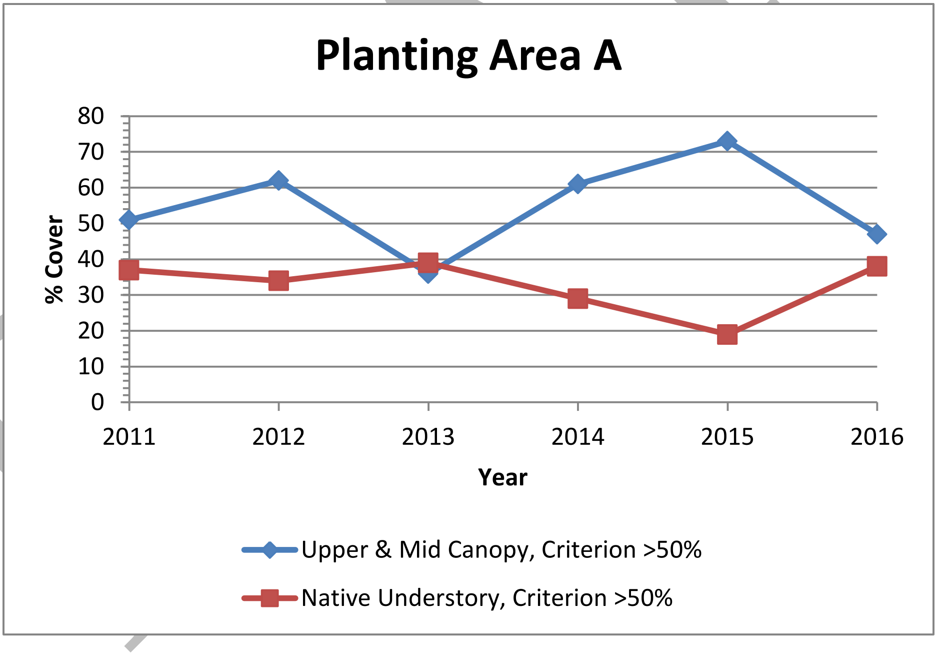
<u>Current conditions</u>

Year 2016 marks the sixth year since the initial planting of Area A. Upper and mid-canopy cover and native understory cover should be ≥50% this year. The nonnative canopy cover should be <5% and the nonnative understory cover should be <25% this year.

In the six years since the initial planting, Area A has met the criterion for upper and mid-canopy cover in four of those years (figure below). Upper and mid-canopy cover dropped from a high of 73% in 2015 to 47% in 2016. While it seems like Area A is close to meeting the criterion of 50%, narrowleaf willow comprises 46% of the total 47% of upper and mid canopy cover. Without the upper canopy cover of the tree willows or cottonwoods the narrowleaf willow alone provides little benefit to the YBC.

Native understory cover has increased from 19% in 2015 the lowest measured value in the six years to 38% in 2016. While 2016 was the second highest value of the six years, it is only one percent higher than when the project was implemented (figure below).

Both the nonnative canopy cover (<5%) and nonnative understory (<25%) values have met the enhancement plan's criteria for Area A (Table 3.6).



Percent Absolute Cover Values for 2011-2016 for Area A

Planting Area B

Pre-existing conditions

Planting Area B is approximately 1.3 acres in size. This area was burned during the 2007 Inyo Complex Fire. Vegetation prior to the fire was dominated by narrowleaf willow stands and meadow type vegetation. Tree willows as well as shrub willow Arroyo willow (*Salix lasiolepis*) can be found nearby. As with planting Area A, the vegetation in Area B is recovering from the Inyo Complex Fire. Soils in this planting area are the same as Area A with loam near the surface horizons and clay and sand at depth.

Desired condition

The Enhancement Plan estimated a total number of 397 poles for planting Area B based on 12-foot spacing from other poles and existing cover. If successful, Area A and Area B would create a more continuous belt of native forest habitat for YBC along the easternmost fault line of the Baker Creek area, with riparian corridors connecting these planting areas to the dense riparian area located within the Apple Orchard Exclosure. Habitat suitability analysis for Area B classified the pre-fire habitat suitability as low-medium for this area. The desired YBC habitat suitability condition post enhancement should improve to medium suitability within 6-10 years.

Implementation Efforts

Initial pole planting was implemented in 2010 in planting Area B (Table 3.7). Of the recommended 397 poles a total of 405 poles were planted in Area B. Of the original 405 pole plantings, 203 needed to be replanted in 2011. While not required by the Enhancement Plan, LADWP planted an additional 485 poles in 2013 to achieve the target canopy cover goals by the sixth year following the initial planting. By the end of 2013 planting Area B received a total of 1,085 pole plantings.

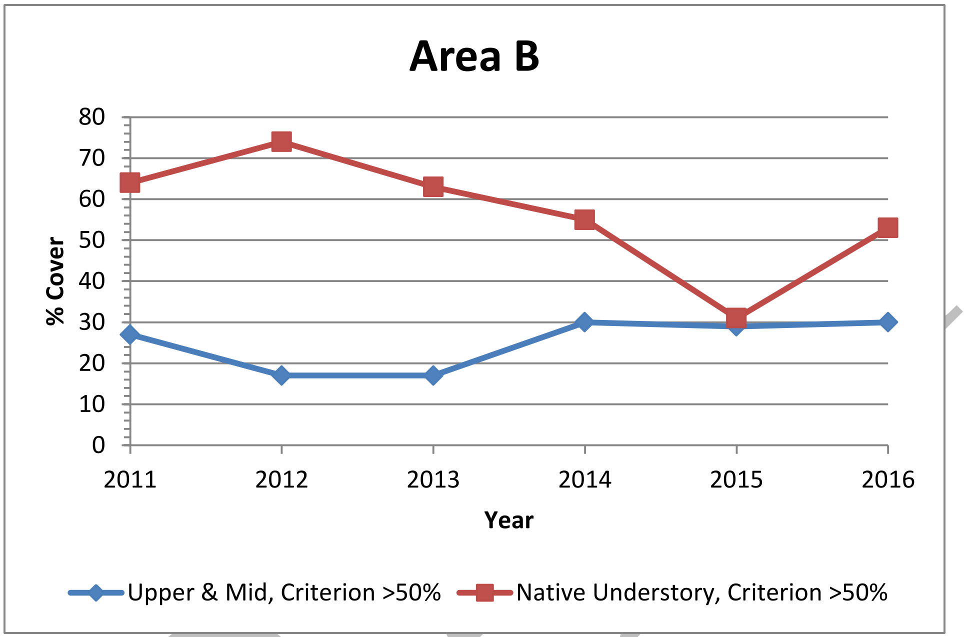
Current conditions

Planting of Area B is also in the sixth year since the initial planting. Like Area A, planting Area B should have an upper and mid-canopy cover and native understory cover ≥50% this year. The nonnative canopy cover should be <5% and the nonnative understory cover should be <25% this year.

Upper and mid-canopy cover in 2016 was 30%, a 1% increase from the 2015 cover value of 29%. In the six years since the initial planting, Area B’s upper and mid-canopy cover values have never been higher than 30% (figure below). As with Area A, narrowleaf willow comprises the majority of the upper and mid-canopy cover at 27% of the total 29% canopy cover. One thousand eighty-five pole plantings and 6 years later, upper and mid-canopy cover has only increased 3% since the implementation of this planting area.

Native understory cover increased from 31% in 2015 (lowest recorded value) to 53% in 2016 (figure below). At 53% Area B has met the Enhancement Plan's criterion of ≥50% for native understory. While 2016 met the native understory criterion, it was still 11% lower than a year after the project was implemented.

Both the nonnative canopy cover and nonnative understory values have met the enhancement plan's criteria of for Area B (Table 3.6).



Percent Absolute Cover Values for 2011-2016 for Area B

Planting Area C

Pre-existing conditions

Area C consists of two planting areas in the Brown Pasture exclosure totaling approximately 0.7 acres. The two small areas are dominated by meadow type vegetation with both tree and shrub willow nearby. While this area was spared during the Inyo Complex Fire in 2007 it ultimately burned during the Center Fire in 2011. Soils in these two polygons consist of loam in the surface horizons with sandy loam and clay at depth.

Desired condition

Based on its acreage it was estimated that Planting Area C required 244 pole plantings to achieve the goals. If successful, Area C combined with the existing native forest would slightly increase the acreage of habitat for YBC. Habitat suitability analysis for Area C was classified as non-use. After 6 to 10 years the desired condition is expected to increase to medium suitability.

Implementation Efforts

In 2011, initial pole planting was implemented in planting Areas C (Table 3.7). The Enhancement Plan called for a total of 244 pole plantings, but due to 12-foot spacing from existing canopy a total of 209 pole plantings were planted in area C. In 2012, the planting area received the replacement pole plantings as required by the Enhancement Plan in 2012. Thirty six of the original 209 pole plantings were replanted in 2012. While not required, Area C was again replanted with 73 poles in 2013 in an attempt to achieve the target canopy cover goals by the sixth year, following the initial planting. In 2014 this planting area again received an additional 45 pole plantings in an attempt to achieve target canopy cover. A total of 363 pole plantings were planted over 4 years in Area C.

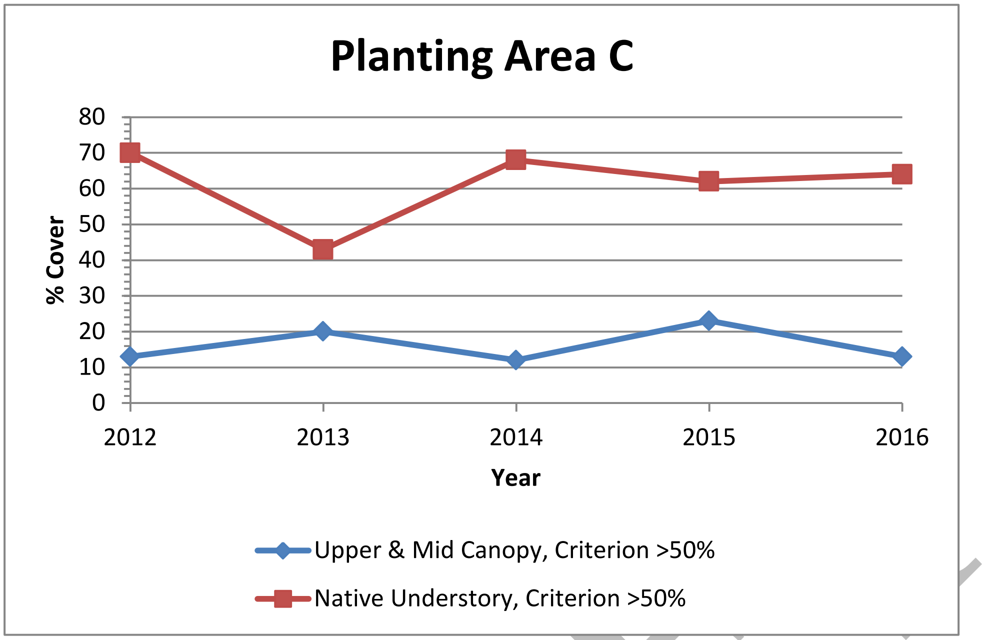
Current conditions

Planting of Area C is in its fifth year since the initial planting. The cover criteria for this planting area should be met in 2017 according to the Enhancement Plan. Upper and mid canopy cover requirement is ≥50% for this planting area. Native understory cover values should be ≥50%. The nonnative canopy cover should be <5% and the nonnative understory cover should be <25% this year.

Upper and mid-canopy cover for Area C has remained relatively constant over the last five years (figure below). When the project was implemented in 2011 the cover value was 13%. The following year the cover value increased to 20% then dropped in 2014 to its lowest cover value of 12%. In 2015, Area C reached its highest cover value for upper and mid-canopy at 23%. By 2016, the canopy cover once again dropped to the starting cover value of 13%. At 13% cover this planting area is still 37% away from meeting the criterion laid out in the Enhancement Plan.

Native understory cover has increased from 62% in 2015, to 64% in 2016. The highest cover value for this area was recorded in 2012 at 70%. The lowest cover value was measured in 2013 at 43%. In the five years since the initial planting, this planting area has met the criterion in four of the five years (figure below).

Both the nonnative canopy cover and nonnative understory values have met the enhancement plan’s criteria of for Area C (Table 3.6).



Percent Absolute Cover Values for 2012-2016 for Area C

Planting Area D

Pre-existing conditions

Planting Area D is approximately 2.9 acres in size and is located in the southern end of the Brown Pasture exclosure. Vegetation in the area consists of dense mixed stands of narrowleaf and arroyo willows. Other species include wiregrass (*Juncus balticus*), wild rose (*Rosa woodsii*) rubber rabbit brush (*Ericameria nauseosa*), and sedge (*Carex sp*.). While this area did not burn in the Inyo Complex Fire in 2007, it was completely burned during the 2011 Center Fire. Soils in planting Area D consist of sandy loam.

Desired condition

The Enhancement Plan recommends 768 pole plantings in Area D. If the pole plantings are successful, and combined with the existing forest just to the north, the planting area would increase the acreage of habitat for YBC in the Brown Exclosure. Pre-fire habitat suitability for Area D was classified as low, medium with a desired suitability condition in 6 to 10 years of medium.

Implementation Efforts

In 2011, initial pole planting was implemented in planting Area D (Table 3.7). Area D's recommended number of pole plantings was 768, due to 12 foot spacing only 701 pole plantings were planted. Planting Area D received replacement pole plantings as required by the Enhancement Plan in 2012. Of the original 701 plantings 135 needed to be replanted. A total of 836 pole plantings were planted in area D.

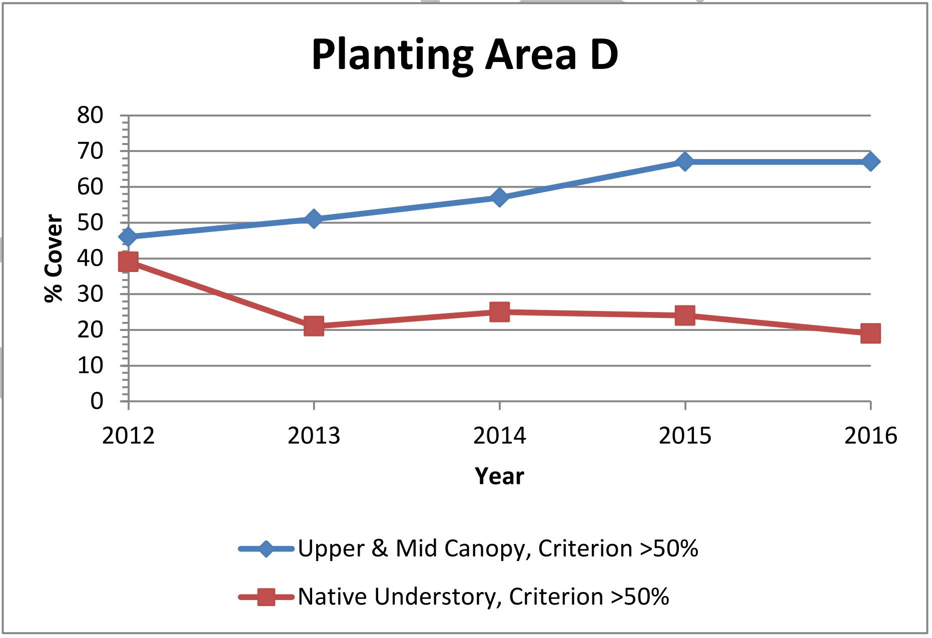
Current conditions

Planting of Area D is in its fifth year since the initial planting. According to the Enhancement Plan, upper and mid canopy cover requirement is ≥50% for this planting area. Native understory cover values should be ≥50%. The nonnative canopy cover should be <5% and the nonnative understory cover should be <25% this year. The cover criteria for this planting area should be met in 2017 according to the Enhancement Plan.

Upper and mid canopy cover for Area D has been trending upward since the implementation of the project (figure below). The lowest cover value measured was in 2012 at 46% while the highest measured cover value was 67% in 2015 and 2016. At this time, Area D has met the Enhancement Plan's criterion of 50% for upper and mid canopy cover in four of the five years.

Native understory cover has been decreasing since the implementation of this planting area most likely due to the shading from the canopy and the drought. The planting area started at a high of 39% and has decreased to 19% in 2016. The 2016 cover value of 19% was a 5% decrease from the 2015 cover value. At 19% Area D is 31% from meeting the Enhancement Plan's criterion of ≥50% for native understory.

Both the nonnative canopy cover and nonnative understory values have met the enhancement plan's criteria of for Area H (Table 3.6).



Percent Absolute Cover Values for 2012-2016 for Area D

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 for Area D 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 (Table 3.7). 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.

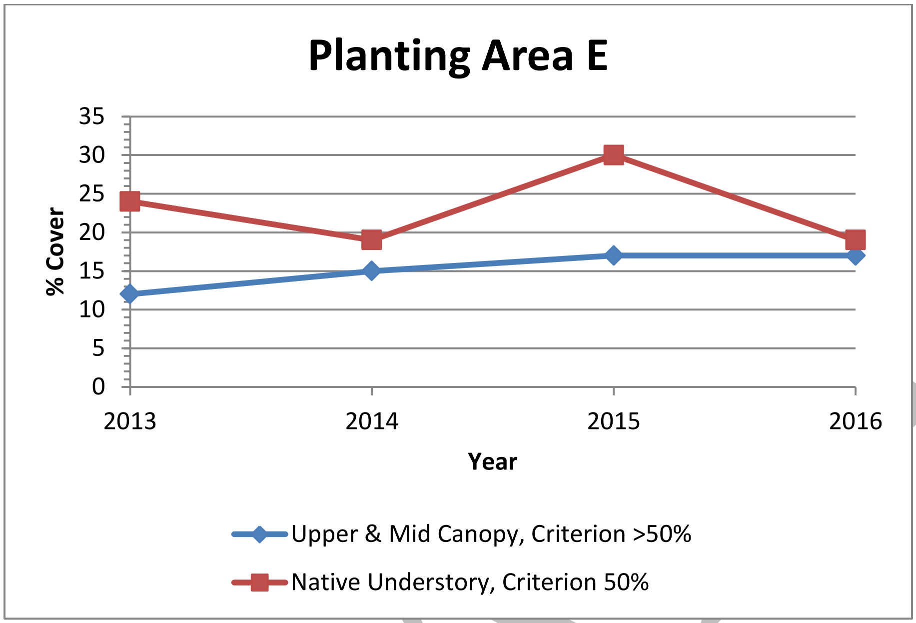
Current conditions

Planting of Area E is in the fourth year since the initial planting and should meet cover criteria by 2018. According to the Enhancement Plan, upper and mid canopy cover and native understory cover should be ≥50%. Nonnative canopy cover should be < 5% and nonnative understory should be <25%.

Upper and mid canopy cover has slowly been trending upward since the implementation of the project (figure below). Upper and mid canopy cover increased from 12% in 2013 to 17% in 2015 and 2016. At 17% this planting area is 33% from meeting the enhancement criterion of ≥50%.

Native understory cover values decreased from 30% in 2015 to 19% in 2016 (figure below). The highest cover value was measured in 2015 at 30%. At 19% cover this area is still 31% away from meeting the Enhancement Plan’s criterion for native understory.

The nonnative canopy cover in 2016 was measured at 11%. As reported in past 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. Nonnative understory values have met the enhancement plan's criteria for Area B (Table 3.6).



Percent Absolute Cover Values for 2013-2016 for Area E

Planting Area F

Pre-existing conditions

Planting Area F is located in the Apple Orchard exclosure and is approximately 2.1 acres in size. Vegetation in Area F was dominated by narrowleaf willow, creeping wildrye (*Leymus triticoides*), rubber rabbit brush, and black locust. Planting Area F burned during the Inyo Complex Fire in 2007 and like planting Areas A and B Area F has resprouted and is recovering. Soils in the area consist of loam to sandy loam in the near surface horizons.

Desired condition

Enhancement Plan recommends 733 pole plantings for Area F. If planting in Area F is successful, the planting area combined with the existing habitat to the north and south would increase the acreage of habitat in the Apple Orchard Exclosure. Pre-fire habitat suitability for Area F is classified as low with a desired condition in 6 to 10 years of medium suitability.

Implementation Efforts

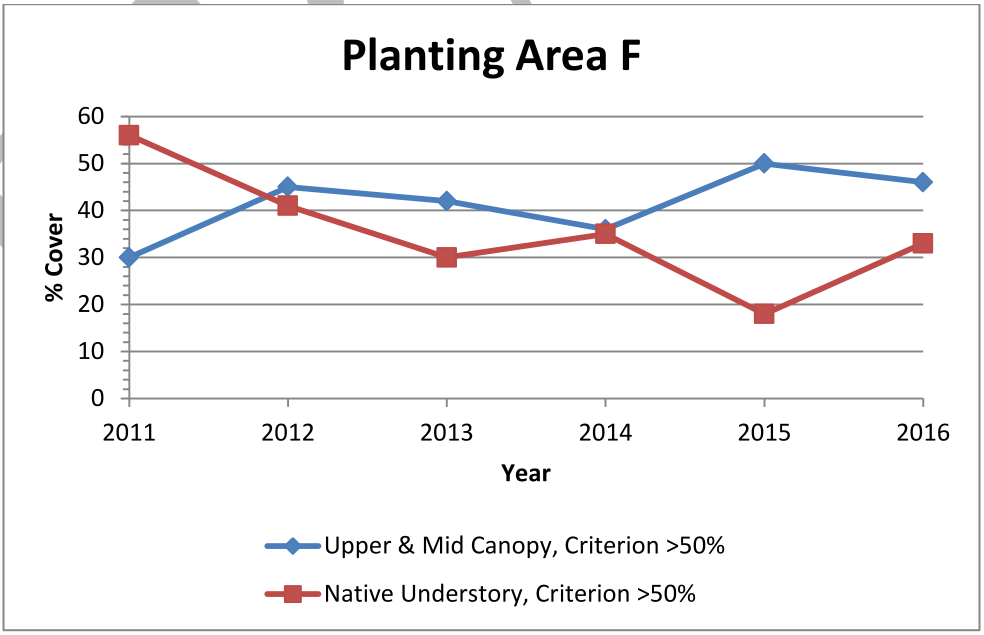
In 2010, the initial pole planting was implemented in planting Area F (Table 3.7). Area F and G were planted as one planting area due to their proximity with each other and received 589 of the recommended 995 due to the 12 foot spacing from existing canopy. In 2011 Areas F and G received the replacement 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 F is in the sixth year since the initial planting. According to the Enhancement Plan, upper and mid canopy cover and native understory cover should be ≥50%. Nonnative canopy cover should be <5% and nonnative understory should be <25%.

When this site was first measured in 2011 upper and mid canopy cover was 32% (figure below). By 2016, upper and mid cover value increased to 48%. In the six years since the area was implemented Area F has only met the Enhancement Plan's criterion in 2015 with a cover value of 52%.

Native understory cover increased from 18% in 2015 (lowest recorded value) to 33% in 2016 (figure below). The highest cover value of 56% occurred in 2011 and is the only time this area has met the cover criterion for native understory cover. Both the nonnative canopy cover and nonnative understory values have met the enhancement plan's criteria of for Area F (Table 3.6).



Percent Absolute Cover Values for 2011-2016 for Area F

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 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 is 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. See language above for numbers of pole plantings implemented in Areas F and G.

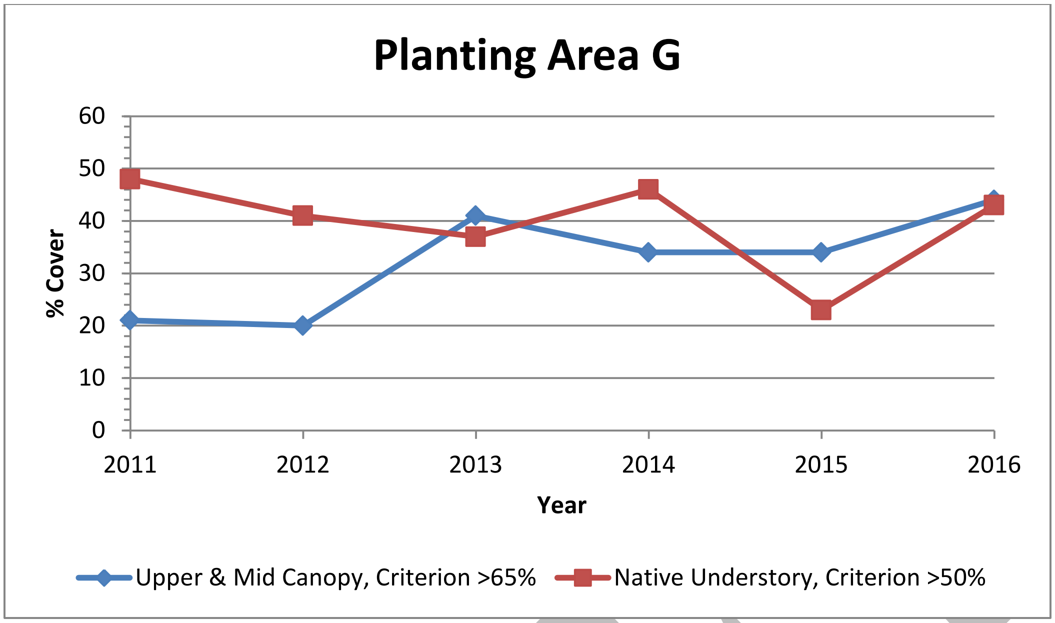
Current conditions

Planting of Area G is in the sixth year since the initial planting. According to the Enhancement Plan, upper and mid canopy cover requirement is higher for this planting area at ≥65% and native understory cover should be ≥50%. Nonnative canopy cover should be < 5% and nonnative understory should be <25%.

Upper and mid canopy cover increased from 34% in 2015 to 44% in 2016 the highest measured value since the implementation of the project (figure below). At the start of the project in 2011, canopy cover was 21% and decreased the following year to 20%the lowest measured value. This planting area has yet to meet the Enhancement Plan's criterion of ≥65% in any year.

Native understory cover has decreased from a high of 48% in 2011 to a low of 23% in 2015. In 2016, the native understory cover increased to 43% (figure below). At 43% Area B is still 7% from meet the Enhancement Plan's criterion of ≥50% for native understory.

For the first time in 6 years nonnative canopy cover was above the 5% criterion stated in the Enhancement Plan. This area will be treated during the winter of 2016/2017. Nonnative understory had a cover value of 11% and has met the Enhancement Plan's criteria (Table 3.6).



Percent Absolute Cover Values for 2011-2016 for Area G

Planting Area H

Pre-existing conditions

Planting Area H is located in the Apple Orchard area of Baker Creek and is approximately 3.3 acres in size. Tree and shrub willows make up the majority of the canopy cover with black locust dominating in some areas. Understory cover is comprised of creeping wildrye, sedge, licorice (*Glycyrrhiza lepidota*), and nettle (*Urtica dioica*) and other like species. No soil description was given for planting Area H.

Desired condition

Area H has an estimated 903 pole plantings recommend for this area. If the pole plantings in Area H are successful, the planting area when combine with existing habitat located to the north and south would increase the acreage of suitable habitat in the Apple Orchard Exclosure for YBC. Prefire suitability was classified for Area H as medium, with a desired condition in 6 to 10 years of high suitability.

Implementation Efforts

In 2011, initial pole planting was implemented in planting Areas H (Table 3.7). The Enhancement Plan called for 903 pole plantings in Area H, due to 12-foot spacing and depth to water 404 pole plantings were planted. As required by the Enhancement Plan, 61 of the 404 pole plantings were replaced in 2012. An additional 60 pole plantings were replanted in 2014. A total of 525 pole plantings were planted in Area H.

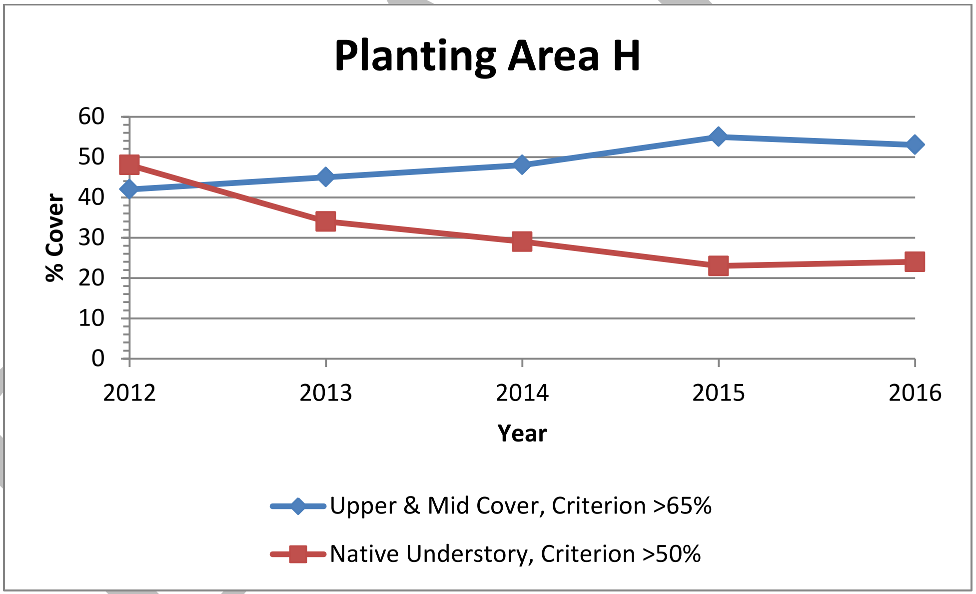
Current conditions

Planting of Area H is in its fifth year since the initial planting. According to the Enhancement Plan, upper and mid-canopy cover requirement is ≥65% for this planting area. Native understory cover values should be ≥50%. Nonnative canopy cover should be < 5% and nonnative understory should be <25%.

Upper and mid canopy cover for Area H has slowly been trending upward since the implementation of the project (figure below). The lowest cover value was measured in 2012 at 42%. Upper and mid-canopy cover peaked in 2015 at 55%, yet dropped to 53% in 2016. At 53% Area H is 12% from meeting the cover criterion in the Enhancement Plan for this area.

Native understory cover has decreased from a high of 48% in 2012 to a low of 23% in 2015. In 2016, the native understory cover slightly increased to 24% (figure below). At 24%, Area B is still 26% from meeting the Enhancement Plan's criterion of ≥50% for native understory.

Both the nonnative canopy cover and nonnative understory values have met the enhancement plan's criteria of for Area H (Table 3.6).



Percent Absolute Cover Values for 2012-2016 for Area H

Discussion and Recommendations

Section 2.1.9. Adaptive Management of the Enhancement Plan states:

> *"The goal of the planting plan is to increase suitable habitat for YBC. The project will integrate monitoring results to guide management of the habitat to achieve the goal. Management changes may need to be made throughout*

> *implementation of the project. The following adaptive management outline will be used to guide management of the planting areas and the black locust removal. These management guidelines will be incorporated into the larger Baker Creek Yellow-Billed Cuckoo Enhancement Plan."*

Section 2.1.9.1 Willows and Cottonwood Planting Areas states:

"Planting areas will be evaluated based on the performance monitoring.

- *If planting areas do not achieve performance standards within 6 years of the initial planting, each area will be revaluated for suitability, and if warranted, abandoned as a planting area.*
- *Methods to enhance riparian areas not specified in the plan may be utilized in the future if they show promise for success.*
- *Areas that show great success may be expanded, if warranted.*
- *If herbivory is problematic and limiting success, cages or small temporary exclosures will be used in conjunction with planting. This determination will be made on a site-by-site basis."*

Laymon and Williams (1999) reports the largest individual riparian-habitat patch in the Enhancement Area is along Baker Creek. This area is approximately 69 acres in extent and is approximately 1,000 feet in width and approximately 3,000 feet in length. Laymon and Williams considered this area as suitable habitat. The next largest riparian habitat patch is south of Sugarloaf Road and is approximately 700 feet in width and 2000 feet in length. This area is approximately 33 acres in size and was considered marginal habitat.

Laymon and Halterman (1989) ten years earlier had classified the acreages and widths of willow-cottonwood habitat for YBC. According to Laymon and Halterman the large area along Baker Creek that is approximately 69 acres in size would be considered as marginal habitat and not suitable due to the acreage; it would need to contain >101 acres to be considered suitable habitat. The smaller area south of Sugarloaf Road would be classified as unsuitable habitat at 33 acres. Areas greater than 37 acres but less than 101 acres would be considered marginal habitat. Both of these areas have since burned (Inyo Complex Fire, 2007 and the Center Fire, 2011) and most likely contain less habitat presently now than previously, in 1999.

When looking at individual planting areas and surrounding canopy habitat, it is highly unlikely that planting Areas A and B would ever achieve a habitat suitability classification higher than unsuitable, given that they are isolated on the eastern side of the Baker Creek project (figure below) without surrounding canopy habitat. Areas A and B fit the width requirement of unsuitable habitat of <100 meters (figures below). Additionally, with no surrounding canopy acreage, these two areas combined only equal 3 acres, which is far below the marginal habitat threshold of 37 acres.

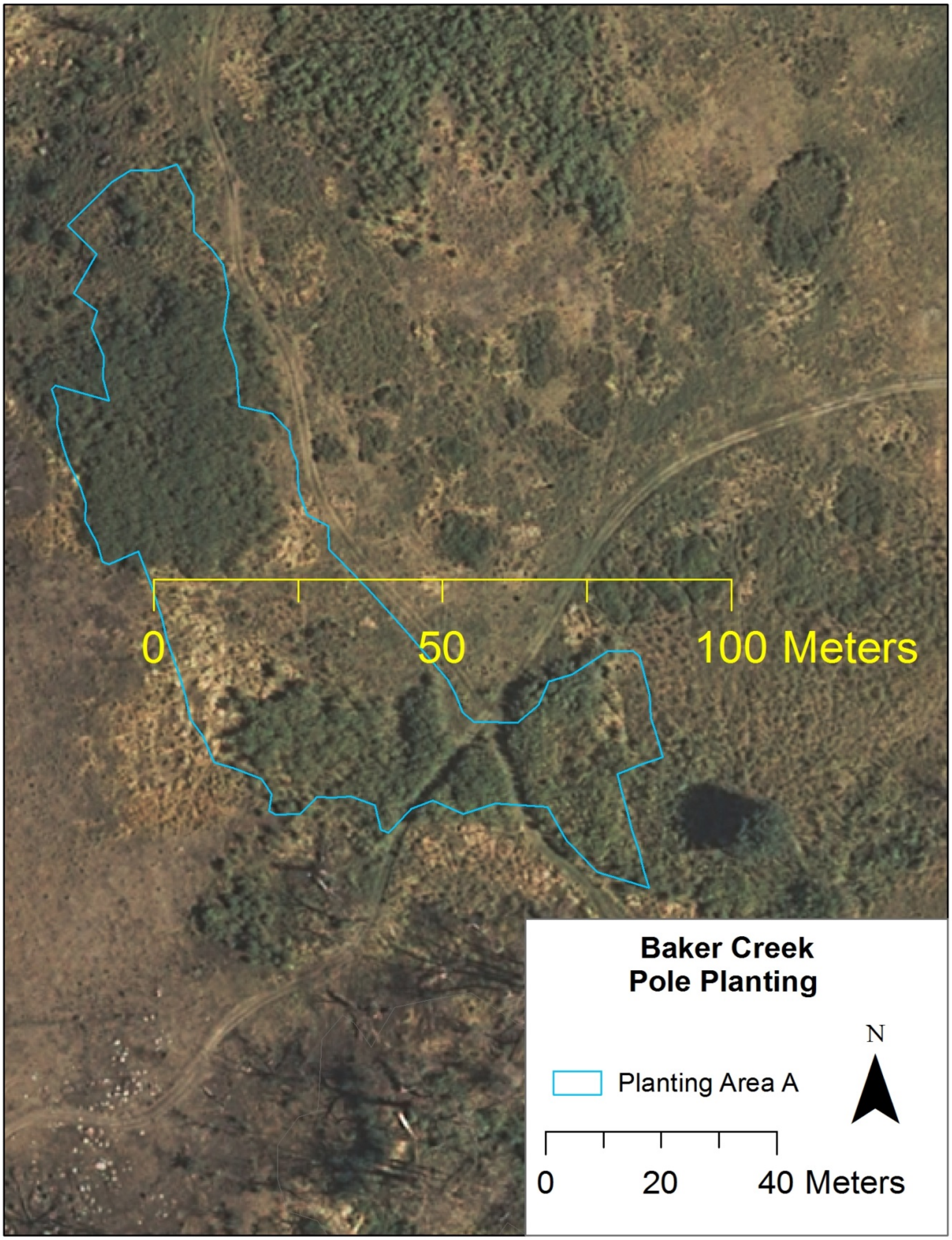


Figure 3. 8. At <100 meters in Width, Planting Area A Fits the Criteria of Unsuitable Habitat

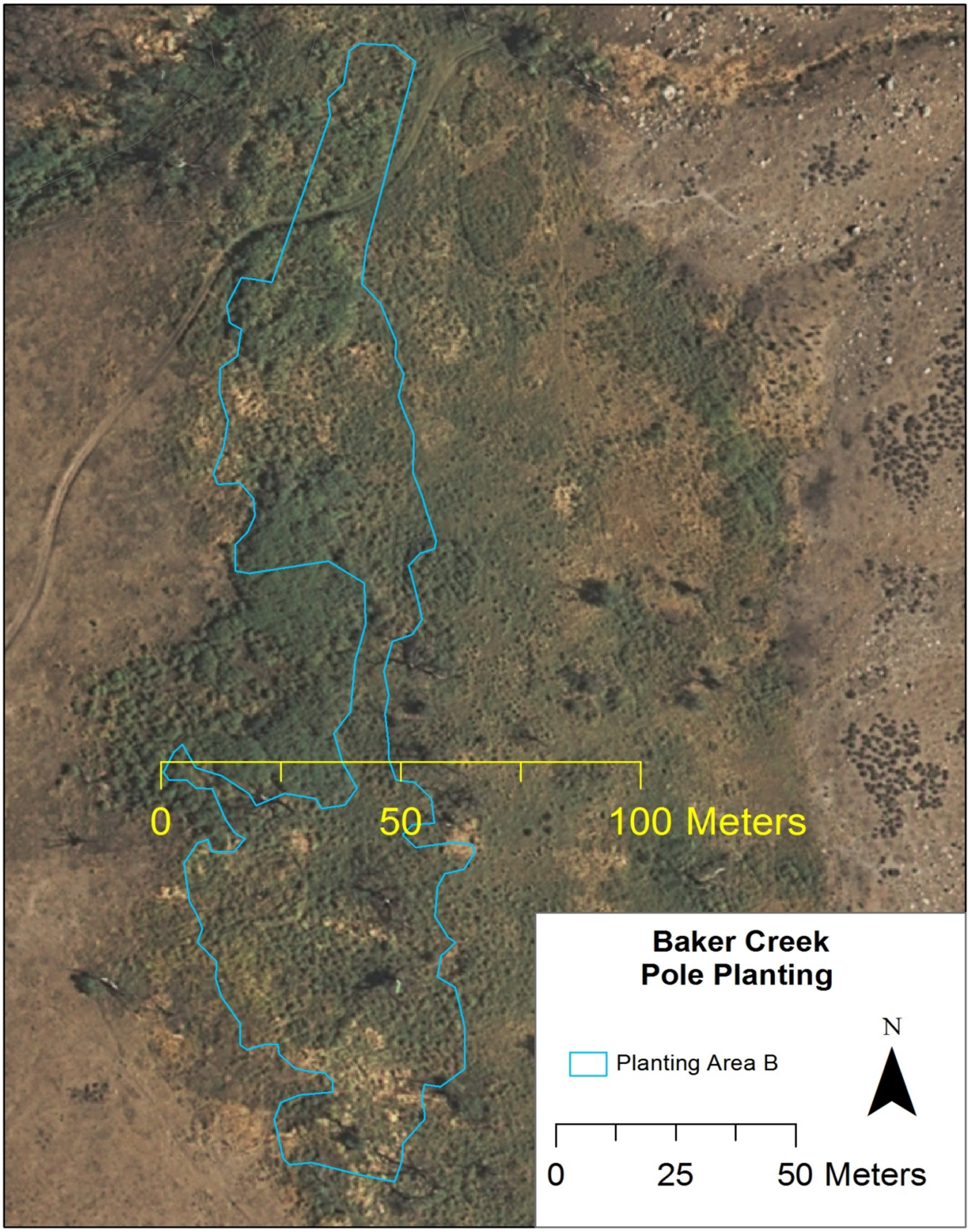


Figure 3. 9. At <100 Meters in Width, Planting Area B Fits the Criteria of Unsuitable Habitat

Year 2016 marks the sixth-year since the initial planting in Areas A and B. According to the Enhancement Plan, upper and mid-canopy should have reached 50%. While Area A quantitatively appears close to meeting the criteria on paper at 47% cover, 98% of which is narrowleaf willow which alone provides little benefit to YBC. Area B in 2016 has an upper and mid-canopy cover of 29% with narrowleaf willow making up 27% of the total cover. With 2,025 pole plantings planted between the two areas, more than 3% canopy cover would be expected after six years.

Planting Area C (0.7 acres) while not required to meet the criteria until 2017, is having little success from the pole plantings as with Areas A and B. A total of 363 pole plantings were planted in this area over 4 years, yet upper and mid-canopy cover in 2012 (first year measured) and 2016 was 8%.

One characteristic that is common to the three planting areas (A, B, and C) that are struggling to meet criteria is that they have clay in the soil profile. As mentioned in the pre-existing conditions for each planting area, these three planting areas did not have existing trees or shrubs present before the project was implemented. All the other planting areas had existing trees and are having success. It is a possibility that the clay soil in these areas is a limiting factor in the establishment of pole cuttings in these areas. It does not appear that land management activities such as livestock grazing or recreation are impacting these planting areas and impacts from the drought in recent years should be shown across all sites, though in varying degrees. 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.

Recommendations

Using Adaptive Management Sections 2.1.9. and 2.1.9.1 of the Enhancement Plan, LADWP recommends that planting areas A, B, and C be abandoned based on little success after six years for Areas A and B and five years for Area C.

LADWP also recommends that the native understory cover criterion of 50% be eliminated. As the upper and mid-canopy cover increases, the native understory has shown to be negatively impacted due to competition for sunlight, water, and nutrients. This situation is demonstrated in Planting Areas D and H (figures above). Drought and groundwater levels in the Baker Creek area have also negatively impacted the native understory cover. These issues are beyond LADWP's control. Furthermore, a literature search failed to produce any evidence that a 50% native understory criterion is critical to YBC habitat success.

LADWP will continue monitoring each remaining planting area through year 6 as described in the Enhancement Plan (Planting Areas D, E, and H in 2017; Planting Area E in 2018). LADWP will report on conditions of each planting area in its annual report and will present a final summary in their 2019 annual report. These recommendations will be provided to the MOU Parties via LADWP's 2017 Annual Report and Operations Plan.

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.

Grazing management plans developed modified grazing practices in riparian and upland areas on Los Angeles Department of Water and Power (LADWP) leases in order to support OVLMP goals. There are 40 leases contained in the Owens Valley Report; the ST Ranch Lease (RLI-483), Brockman Ranch Lease (RLI-401) 3V Ranch Lease (RLI-435), Reata Ranch Lease (RLI-453), Horseshoe Bar Ranch Lease (RLI-462), Rainbow Pack Outfit Lease (RLI-460), Rockin C Ranch Lease (RLI-493), Rafter DD Ranch Lease (RLI-439), Quarter Circle B Ranch Lease (RLI-404, 413), CT Ranch Lease (RLI-451,500), Mandich Ranch Lease (RLI-424), LI Bar Ranch Lease (RLI-487), U Bar Ranch Lease (RLI-402), Round Valley Ranch Lease (RLI-483), Big Pine Canal Lease (RLI-438), Cashbaugh Ranch Lease (RLI-411), Warm Springs Ranch Lease (RLI-497), Reinhackle Ranch Lease (RLI-492), Four J Cattle Ranch Lease (RLI-491 and 499), Rockin DM Ranch Lease (RLI-420), Baker Road Ranch Lease (RLI-475), Aberdeen Pack Lease (RLI-479), Coloseum Ranch Lease (RLI-407), Three Corner Round Ranch Lease (RLI-464), Eight Mile Ranch Lease (RLI-408), Fort Independence Ranch Lease (RLI-406,489), Georges Creek Parcel (RLI-489), JR Ranch Lease (RLI-436), Lone Pine Dairy Lease (RLI-452), Mount Whitney Pack Lease (RLI-495), Horse Shoe Ranch Lease (RLI-480), Olancha Creek Adjunct (RLI-427), Homeplace Adjunct (RLI-428A), Archie Adjunct (RLI-489), Blackrock Ranch (RLI-428), Intake Ranch Lease (RLI-475), Island Ranch Lease (RLI-489), Delta Ranch Lease (RLI-490), Lone Pine Ranch Lease (RLI-456), Thibaut Ranch Lease (RLI-430), Twin Lakes Ranch Lease (RLI-491). Maps detailing the locations of each of these leases can be found in the OVLMP (2010).

Utilization

The OVLMP identifies grazing utilization standards for upland and riparian areas. Utilization is defined as the percentage of the current year’s herbage production consumed or destroyed by herbivores. Grazing utilization standards identify the maximum amount of biomass that can be removed by grazing animals during specified grazing periods. LADWP has developed height-weight relationship curves for native grass and grass-like forage species in the Owens Valley using locally-collected plants. These height-weight curves are used to relate the percent of plant height removed with the percent of biomass removed by grazing animals. Land managers can use this data to document the percent of biomass removed by grazing animals and determine whether or not grazing utilization standards are being exceeded. Utilization data collected on a seasonal basis (mid- and end-points of a grazing period) will determine compliance with grazing utilization standards, while long-term utilization data will aid in the interpretation of range trend data and will help guide future grazing management decisions.

The calculation of utilization (by transect and pasture) is based on a weighted average. Therefore, species that only comprise a small part of available forage contribute proportionally less to the overall use value than more abundant species.

Riparian and Upland Utilization Rates and Grazing Periods

Under the OVLMP, livestock are allowed to graze in riparian pastures during the grazing periods prescribed for each lease (see Sections 3.4.1 through 3.4.50 OVLMP). Livestock are to be removed from riparian pastures when the utilization rate reaches 40%, at the end of the grazing period, or before May 1 from pastures along the Owens River that are within the boundaries of the Southwestern Willow Flycatcher recovery zone. The beginning and ending dates of the lease-specific grazing periods may vary from year-to-year depending on conditions such as climate and weather, but the duration remains approximately the same. The grazing periods and utilization rates are designed to facilitate the recruitment and establishment of riparian shrubs and trees.

In upland pastures, the maximum utilization allowed on herbaceous vegetation is 65% annually if grazing occurs only during the plant dormancy period. Once 65% is reached all pastures must receive 60 continuous days of rest for the area during the plant “active growth period” to allow seed set between June and September. If livestock graze in upland pastures during the active growth period (that period when plants are “active” in putting on green growth and seed), maximum allowable utilization on herbaceous vegetation is 50%. The utilization rates and grazing periods for upland pastures are designed to sustain livestock grazing and productive wildlife habitat through efficient use of forage. Riparian pastures may also contain upland habitat. If significant amounts of upland vegetation occur within a riparian pasture or field, upland grazing utilization standards will also apply to these upland habitat types. Livestock will be removed from a riparian pasture when either the riparian or the upland grazing utilization standards are met. Typically riparian utilization rate of 40% is reached before 65% use in the uplands occurs. Because of this pattern, utilization is not quantitatively sampled in adjacent upland areas, but use is assessed based on professional judgment. If utilization appears greater than 50% then utilization estimates using height weight curves will be implemented on the upland areas in the riparian field.

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 was 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 Tinemeha 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 but if repeat monitoring is available for the site (as it is for most LADWP leases) changes over time (trend), when compared to baseline data collected at the same location, is a more effective approach to assessing the trend of that particular key area 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 an 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 2016

A third of all the range trend transects in the Owens Valley were read in late July to early August of 2016. The leases monitored were the Big Pine Canal Lease (RLI-438), Reinhackle Lease (RLI-492), Delta Lease (RLI-490), and Blackrock Lease (RLI-428). The remaining two-thirds of the leases were monitored in either 2015 or 2016. Results for Range Trend from all leases are located in Appendix B. Significant changes on particular leases will be discussed in this chapter.

Owens Valley has experienced an extreme drought from 2012 to 2016. In 2016, significant decreases in plant frequencies for graminoids occurred on 50% (n=9) of the moist floodplain sites sampled (n=24). Graminoids increased on 33% of the moist floodplain sites (n=6) and 8% of the sites were static (n=2). The majority of declining plant frequencies were saltgrass followed by alkali sacaton and beardless wildrye. On Saline Meadow sites (n=13), 38% of the transects (n=5) indicated a significant decrease in graminoid frequencies, while only one site showed an increase in alkali sacaton.

A single saline bottom site was sampled in 2016. Results were static compared to the previous sampling period in 2013.

Nine statistically significant decreases in graminoid frequency occurred on moist floodplain transects. Seven of those decreases were on the Reinhackle Lease located along the Middle Owens River. Six statistically significant increases in frequency of graminoids on moist floodplains occurred in 2016, five of those significant increases were on the moist floodplain sites on LORP and one was on the Reinhackle Lease. Four of the increases in graminoids were on the Blackrock Lease. The Reinhackle transects are all situated on a floodplain that historically had a relatively shallow water table but five years of drought and decreased flows along the Owens River below Pleasant Valley have led to the gradual decrease in mesic graminoids. Nearby monitoring wells within 1,000 ft. of these transects all show a drop in the water table ranging from 3.5 ft-8 ft.

The Reinhackle and Blackrock Leases are managed by the same lessee, and use has been within the 40% standard for most transects. Use has always occurred during the dormant season on both leases and all pastures have been rested during the entire growing season. It is doubtful that grazing contributed to the declining trends on the Reinhackle Lease. For example on the Delta Lease in 2016, the only significant increase in graminoids occurred on a transect experiencing 63% use that previous spring and the only Delta transect that had a significant decrease in graminoids was only grazed to 20% the prior spring. The key difference between the Reinhackle and the Blackrock floodplain sites is that flows in the Middle Owens reflect the regional drought impacts over the past five years.

Though flow rates are managed based on operational needs and do not attempt to follow a natural hydrograph, overall volume of water has decreased during the last five years and contributed to the drying out of the Reinhackle floodplains. On the Blackrock Lease, where floodplain sites are adjacent to the LORP, flows have remained constant with a steady rise to 70-90 cfs during the summer and a constant 40 cfs in the winter. These steady flows have masked any effects from the historical drought which has impacted the area and actually contribute to upward trends in herbaceous plant species on the floodplains (Figure below).

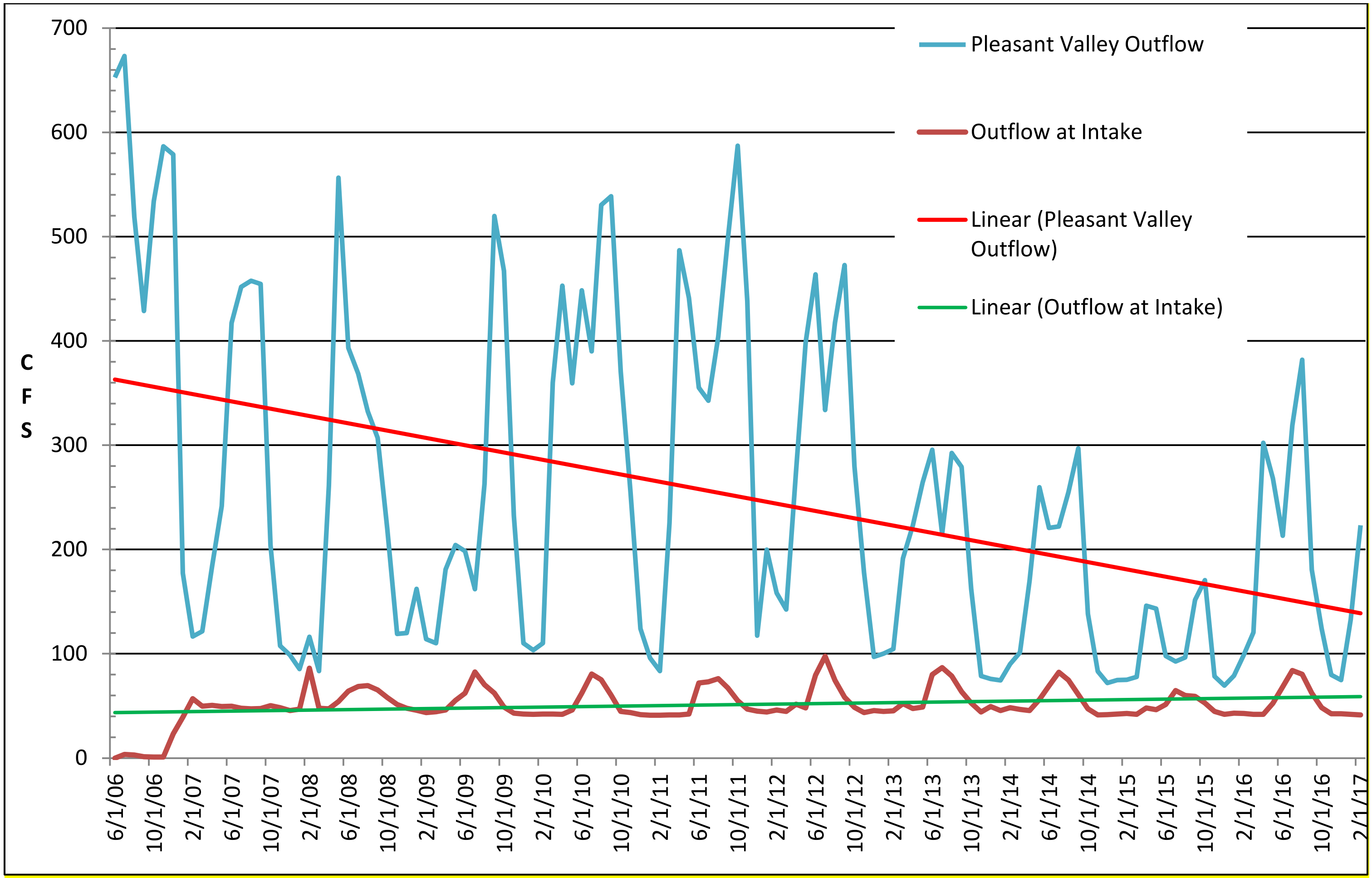


Figure 3. 10. Monthly mean flows (CFS) from the LORP Intake and Pleasant Valley Outflow, June 2006-December 2016

Table 3. 8. Range Trend Results for all Transects, 2016

Frequency results for all transects sampled in 2016 where a significant change occurred compared to previous sampling event (p>0.1)

Transect	Ecological Site	Species	Class	Change	Utilization (%)
BLKROC_15	Moist Floodplain	SUMO	forb	decrease	0%
BLKROC_18	Moist Floodplain	DISP	graminoid	decrease	10%
BLKROC_23	Moist Floodplain	SPAI	graminoid	decrease	0%
DELTA_07	Moist Floodplain	DISP	graminoid	decrease	20%
LACEY_02	Moist Floodplain	LETR5	graminoid	decrease	34%
LACEY_05	Moist Floodplain	LETR5	graminoid	decrease	58%
LACEY_05	Moist Floodplain	SPAI	graminoid	decrease	58%
LACEY_08	Moist Floodplain	DISP	graminoid	decrease	42%
LACEY_08	Moist Floodplain	JUBA	graminoid	decrease	42%
LACEY_08	Moist Floodplain	LETR5	graminoid	decrease	42%
BLKROC_15	Moist Floodplain	ATTO	shrub	decrease	0%
BLKROC_17	Moist Floodplain	ATTO	shrub	decrease	0%
BLKROC_15	Moist Floodplain	DISP	graminoid	increase	0%
BLKROC_19	Moist Floodplain	DISP	graminoid	increase	18%
BLKROC_20	Moist Floodplain	LETR5	graminoid	increase	15%
BLKROC_22	Moist Floodplain	DISP	graminoid	increase	23%
DELTA_04	Moist Floodplain	DISP	graminoid	increase	63%
LACEY_03	Moist Floodplain	DISP	graminoid	increase	44%
LACEY_07	Saline Meadow	GLLE3	forb	decrease	39%
BLKROC_04	Saline Meadow	DISP	graminoid	decrease	1%
BLKROC_04	Saline Meadow	JUBA	graminoid	decrease	1%
BLKROC_04	Saline Meadow	LETR5	graminoid	decrease	1%
BLKROC_05	Saline Meadow	DISP	graminoid	decrease	13%
LACEY_06	Saline Meadow	DISP	graminoid	decrease	4%
BLKROC_03	Saline Meadow	SPAI	graminoid	increase	13%
BLKROC_09	Sodic Fan	DISP	graminoid	decrease	1%
BLKROC_51	Sodic Fan	DISP	graminoid	decrease	16%
BLKROC_09	Sodic Fan	ERNA10	shrub	decrease	1%

Irrigated Pasture Monitoring

Monitoring of irrigated pastures consisted of Irrigated Pasture Condition Scoring following 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 irrigated pastures were evaluated in 2016 following two years of non-scoring due to extreme drought conditions.

3.3.2.1.1. 2016 Grazing Management Monitoring Data

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 and also it raises and sells quarter horses.

The following tables present the summarized utilization data for each pasture/field, and each transect within the pasture.

Grazing Utilization for Fields, ST Ranch (RLI-461), 2007-2016

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
***Calvert Slough Pasture**	56%	43%	52%	51%	25%	28%	15%	46%	44%	20%
***Charlie Butte Field**	57%	72%	62%	0%	24%	29%	15%	60%	51%	49%
***East River Field**	73%	52%	59%	22%	19%	28%	26%	30%	26%	20%
***North Horton Slough Riparian**	25%	23%	13%	13%	0%	21%	0%	17%	0%	5%
***Northeast McCumber Riparian**	9%	15%	20%	0%	12%	45%	0%	3%	0%	8%
***Northwest McCumber Riparian**	34%	0%	74%	0%	0%	59%	21%	11%	8%	7%
***South Horton Slough Riparian**	68%	60%	68%	31%	0%	28%	0%	52%	31%	15%
***Southeast McCumber Riparian**	24%	27%	59%	25%	28%	14%	77%	45%	57%	49%
***Southwest McCumber Riparian**	55%	35%	90%	40%	66%	72%	0%	31%	54%	23%
***West River Field**	53%	58%	44%	0%	66%	34%	8%	46%	37%	29%

Riparian Utilization, 40%

Grazing Utilization for Transects, ST Ranch (RLI-461), 2007-2016

Fields/Pastures	Transect	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
***Calvert Slough Pasture**	CALVERT_02	0%	50%	0%	55%	18%	0%	0%	0%	0%	0%
	CALVERT_03	0%	45%	62%	39%	0%	0%	0%	55%	7%	27%
	CALVERT_04	0%	0%	34%	5%	26%	0%	0%	35%	5%	9%
	TATUM_11	94%	70%	77%	64%	37%	69%	71%	86%	85%	0%
	TATUM_13	37%	22%	34%	37%	13%	42%	20%	28%	31%	28%
	TATUM_29	51%	46%	63%	75%	55%	0%	0%	29%	35%	14%
***Charlie Butte Field**	TATUM_10	57%	71%	62%	0%	24%	29%	15%	60%	51%	49%
***East River Field**	TATUM_07	74%	69%	67%	0%	0%	16%	31%	26%	41%	13%
	TATUM_08	67%	34%	65%	10%	11%	28%	28%	28%	10%	32%
	TATUM_09	86%	82%	77%	48%	61%	49%	30%	59%	45%	0%
	TATUM_12	70%	28%	39%	23%	14%	28%	22%	5%	6%	19%
	TATUM_14	73%	0%	47%	28%	11%	17%	17%	28%	29%	16%
***North Horton Slough Riparian**	TATUM_02	25%	23%	13%	13%	0%	21%	0%	17%	0%	5%
***Northeast McCumber Riparian**	TATUM_01	9%	14%	20%	0%	12%	45%	0%	3%	0%	8%
***Northwest McCumber Riparian**	TATUM_04	34%	0%	74%	0%	0%	59%	21%	11%	8%	7%
***South Horton Slough Riparian**	TATUM_06	68%	60%	68%	28%	0%	28%	0%	52%	31%	15%
***Southeast McCumber Riparian**	TATUM_03	24%	27%	59%	25%	28%	14%	77%	45%	57%	49%
***Southwest McCumber Riparian**	TATUM_05	55%	35%	90%	40%	66%	72%	0%	31%	54%	23%
***West River Field**	TATUM_15	53%	58%	44%	57%	66%	34%	8%	46%	37%	29%

Riparian Utilization, 40%

Summary of Utilization

Utilization on the Aberdeen portion of the lease was below the allowable utilization prescription of 40%. Efforts to reduce the stocking rate in the Calvert Slough Field and repairing the northern fence has resulted in the adherence of the allowable utilization standard.

The Charlie Butte Field has only one transect, TATUM_10 (49%), which was over 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 was below the utilization prescription of 40% except for the Southeast McCumber Riparian (49%). The Southeast McCumber was grazed heavily around the transect location but the remainder of the field had significantly less utilization. If supplemental feeding was occurring at the transect locations, LADWP Watershed Resources staff recommends moving supplemental feeding locations to help distribute livestock better. The remainder of the Pleasant Valley portion of the lease had little to no utilization.

In April 2016, LADWP constructed a 23-acre exclosure on City of Los Angeles (City) property along Horton Creek within the lease. This fenced exclosure was constructed as mitigation for a regulatory violation that LADWP received from the California Department of Fish and Wildlife. As a consequence, this area will be excluded from livestock grazing in perpetuity.

Range Trend

Range trend transects were sampled in 2014 and will be sampled again in the summer of 2017.

Irrigated Pastures

The following table shows Irrigated Pasture Condition Scores.

Irrigated Pasture Condition Scores, ST Ranch (RLI-461), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
N Highland Pasture	86	X	78	88	X	X	82	X	X	84
S Highland Pasture	74	78	70	86	X	X	82	X	X	84
N Y Road Pasture	X	X	70	84	X	X	80	X	X	86
S Y Road Pasture	86	X	74	86	X	X	80	X	X	86
Bogie Field	X	X	66	84	X	X	84	X	X	86
StewardPasture	84	X	82	84	X	X	84	X	X	82
North Horse	X	X	X	82	86	X	84	X	X	88
West Horse	84	X	X	82	88	X	82	X	X	88
Wonocott	82	X	78	84	X	X	84	X	X	82
Horse Trap	94	94	86	94	X	X	92	X	X	94
Mare Pasture	90	90	84	92	X	X	86	X	X	80
Front Pasture	80	80	86	90	X	X	86	X	X	82
Swamp Pasture	80	80	82	88	X	X	86	X	X	82
Castaway Pasture	X	X	74	86	X	X	80	X	X	86
Calvert Slough	X	X	X	84	X	X	80	X	X	78

X indicates no evaluation made

Summary of 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

No new fencing projects occurred in 2016.

Salt and Supplement Sites

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

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.

All pastures on the lease are irrigated so there is no utilization monitoring.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, 3V Ranch (RLI-435), 2007-2016

Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Swamp	96	X	X	90	X	X	72	70	X	78
Front	96	X	X	94	X	X	88	X	X	78
Horse	96	X	X	94	X	X	84	X	X	78
Little	96	X	X	94	X	X	82	X	X	78

X indicates no evaluation made

Summary of Irrigated Pastures

Irrigated pasture scores on the 3V Ranch Lease has been consistently high since 2007. Under new management in 2010 an irrigation schedule was implemented that allowed irrigation water to be measured more accurately. As a result any excess water that was received previously, is no longer available. Drought conditions have decreased irrigation water delivery, and consequently irrigated pasture scores have also decreased. It may take several years for the pastures to recover from drought conditions. No management changes are recommended.

Stockwater Sites

Stockwater is provided by irrigation diversions on the lease.

Fencing

No new fencing projects occurred in 2016.

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.

Since the Fish Slough Parcel is in nonuse and the remaining pastures on the lease are irrigated, utilization is not monitored.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Reata Ranch (RLI-453), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
North Reata	86	X	X	90	X	X	90	X	X	84
South Mummy	86	X	X	88	X	X	84	X	X	84
Bishop Creek	86	X	X	92	X	X	90	X	X	84
South Reata	92	X	X	90	X	X	90	X	X	84
North Mummy	84	X	X	84	X	X	84	X	X	84

X indicates no evaluation made

Summary of Irrigated Pastures

All irrigated pastures are in good condition and no management changes have been recommended.

Stockwater Sites

Stockwater is provided by irrigation diversions and Bishop Creek.

Fencing

An existing riparian fence will be repaired in 2017 to control livestock from crossing Bishop Creek.

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 (336 acres) is a cow/calf operation that consists of two separate parcels: the 141-acre Sewer Parcel, which lies to the east of Bishop; and the 195-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 monitoring is not needed on this lease because the lease is solely comprised of irrigated pastures.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Horseshoe Bar Ranch (RLI-462), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
West Pasture	82	X	X	90	X	X	84	X	X	82
Front Pasture	82	X	X	92	X	X	84	X	X	84
Sewer Pasture	82	X	X	88	X	X	88	X	X	82

X indicates no evaluation made

Summary of Irrigated Pastures

The irrigated pasture condition scores were low but within the irrigated pasture condition minimum score of 80% in 2007. Low pasture condition scores were attributed to an old irrigation diversion which did not convey water effectively. Since that time new head gates have been constructed and the lessee has been able to irrigate more effectively. Scores remain within the allowable ranges.

Stockwater Sites

All stockwater is provided by irrigation diversions.

Fencing

No new fencing projects occurred in 2016.

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.

Summary of 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 rare plants Owens Valley checkerbloom (*Sidalcea covillei*) begin growing. When either one of these criteria are met livestock are moved from the field.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Rainbow Pack Outfit (RLI-460), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Brockman	X	72	82	80	82	80	80	X	X	81

X indicates no evaluation made

Summary of 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. Since 2008, conditions of the pasture have increased 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. Annual monitoring of this pasture will continue until a consistent upward trend in scores is achieved.

Summary Wye Road Field

Since 2011, the Wye Road field has not been grazed. Horses and mules that normally use this field have been moved to different grazing areas. No monitoring was needed for the Wye Road Field in 2016.

Stockwater Sites

Stockwater is provided by irrigation diversions.

Fencing

No new fencing projects occurred in 2016.

Salt and Supplement Sites

Supplements are placed in a previously disturbed location at the north end of the 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).

Currently there is no utilization monitoring occurring on the lease. Grazing occurs on the Sewer Farm Pasture, Holding Pasture, and Little Horse Pasture which are irrigated pastures.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Rockin C Ranch (RLI-493), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Little Horse Pasture	X	X	X	X	X	X	84	X	X	84
Rain Gun Pasture	X	X	X	X	X	X	84	X	X	84

X indicates no evaluation made

Summary of Irrigated Pastures

A change of management occurred in 2007 that lead to the reseeding and construction of a new irrigation system. Both pastures were rated in 2016 and the pastures rated above the minimum score of 80.

Stockwater Sites

There are no new stockwater sites selected for the lease. Stockwater is provided by irrigation diversions and the Kingsley Ditch.

Fencing

No new fencing projects occurred in 2016.

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 (240 acres) consists of two parcels: the Round Valley Parcel (160 acres), north of Bishop and the Bishop Parcel (80 acres), east of Bishop. The Rafter DD Ranch Lease is a commercial pack operation (Frontier Packers), grazing horses and mules on the Round Valley and Bishop Parcels.

The Bishop Parcel consists of irrigated pastures and some dry grazing located in the Desert Field. Utilization is not monitored on the lease because the Desert Field is abandoned agriculture land, comprised of shrubs and annuals. The Round Valley portion of the lease consists of all irrigated pastures that are grazed during the winter by pack stock.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Rafter DD Ranch (RLI-439), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Mare Pasture	84	X	X	86	X	X	86	X	X	92
Pasture 1	86	X	X	92	X	X	82	X	X	92
Pasture 2	X	X	X	X	X	X	X	X	X	X
Archy	92	X	X	92	X	X	92	X	X	92
Corral Holding	84	X	X	86	X	X	88	X	X	88
South Archy	94	X	X	94	X	X	88	X	X	88
Schober	88	X	X	90	X	X	96	X	X	88
South Schober	88	X	X	88	X	X	88	X	X	80

X indicates no evaluation made

Summary of Irrigated Pastures

Irrigation scores were at 80% and above in 2017.

Stockwater Sites

All stockwater is provided by irrigated diversions or troughs.

Fencing

No new fencing projects occurred in 2016.

Salt and Supplement Sites

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

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

The Quarter Circle B Ranch (1,143 acres) lies west of Bishop and is a cow/calf operation. The RLI-404 portion of the lease produces alfalfa or grass hay and grazes the stubble with cattle or horses.

The lease is comprised of irrigated pastures and dry grazing. Utilization monitoring is not required because the fields consist of shrubs and annuals.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Quarter Circle B Ranch (RLI-404 and 413), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Riata Pasture	76	76	76	74	70	80	78	72	X	78
Mummy Pasture	78	76	76	72	70	80	78	72	X	78
Otey Pasture	80	72	76	76	76	78	81	X	X	78

X indicates no evaluation made

Summary of 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. Site locations are in good condition at this time.

CT Ranch Lease (RLI-451,500)

The C-T Ranch (6,055 acres) consists of several different leases. The Chance Ranch Parcels RLI-451 (1,040 acres) are located in Round Valley. The first parcel (569 acres) is 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.

All of the CT Ranch within Inyo County is comprised of irrigated pastures and there is no utilization monitoring needed.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, CT Ranch (RLI-451), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Upper Pond Pasture	92	X	X	82	X	X	88	X	X	92
Locust Pasture	94	X	X	86	X	X	86	X	X	92
Iron Gate Pasture	94	X	X	88	X	X	86	X	X	92
80 Pasture 1	96	X	X	90	X	X	86	X	X	92
80 Pasture 2	94	X	X	88	X	X	86	X	X	92
Below Hay Stack	90	X	X	88	X	X	86	X	X	92
Hay Stack Pasture	86	X	X	88	X	X	86	X	X	90
Rock Pasture	86	X	X	90	X	X	86	X	X	90
Holding Pasture	86	X	X	90	X	X	86	X	X	90
Pasture Below House	94	X	X	92	X	X	92	X	X	92
Stink Ant Pasture	88	X	X	94	X	X	86	X	X	92
Pasture #4	94	X	X	84	X	X	96	X	X	92
Derick Pasture	90	X	X	92	X	X	88	X	X	92
Pond Pasture	96	X	X	92	X	X	96	X	X	92
Lowest South Pasture	94	X	X	96	X	X	96	X	X	92
Lower Middle Pasture	92	X	X	100	X	X	92	X	X	92
Wahlene Pasture	94	X	X	98	X	X	92	X	X	92
Second Pasture	96	X	X	86	X	X	88	X	X	92
Iris Pasture	94	X	X	96	X	X	92	X	X	92
Long Pasture	88	X	X	94	X	X	84	X	X	92
Horse Pasture	88	X	X	86	X	X	88	X	X	92
Front Pasture	92	X	X	94	X	X	96	X	X	90
Alfalfa Pasture	94	X	X	86	X	X	98	X	X	92
Pine Cr Road Pasture	92	X	X	94	X	X	94	X	X	90
Four Pasture	90	X	X	90	X	X	94	X	X	92
A Pasture	94	X	X	94	X	X	98	X	X	90
B Pasture	94	X	X	90	X	X	96	X	X	88
40 Acre Pasture	92	X	X	90	X	X	96	X	X	92
F Pasture	92	X	X	94	X	X	96	X	X	92
Lou's Pasture	98	X	X	92	X	X	94	X	X	92
Highway Pasture	94	X	X	90	X	X	94	X	X	92
Bull Pasture	90	X	X	82	90	X	94	X	X	92
Orchard Pasture	90	X	X	86	X	X	90	X	X	92
G Pasture	84	X	X	90	X	X	96	X	X	92
E Pasture	84	X	X	82	94	X	98	X	X	92

X indicates no evaluation made

Irrigated Pasture Condition Scores CT Ranch (RLI-500), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
South 80	84	X	X	92	X	X	82	X	X	86
North 40	86	X	X	96	X	X	86	X	X	86
Trailer Park	86	X	X	94	X	X	86	X	X	92

X indicates no evaluation made

Summary of Irrigated Pastures

All of the pastures on the CT Ranch have been well above the required irrigated pasture condition score of 80%. The lessees are currently working on removing a nonnative ornamental perennial bunch grass by burning and spraying herbicides. There are no recommended management changes for the lease.

Stockwater Sites

There are no stockwater sites planned for the lease. All stockwater is provided by irrigation diversions or perennial streams.

Fencing

No new fencing projects occurred in 2016.

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 (165 acres) southwest of Bishop is a cow/calf operation.

The entire Mandich Ranch Lease is comprised of irrigated pastures, thus utilization monitoring is not required.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Mandich Ranch (RLI-424), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
West Schober	86	X	X	96	X	X	88	X	X	88
East Schober	86	X	X	90	X	X	88	X	X	88
North Horse	90	X	X	86	X	X	90	X	X	88
South Horse	86	X	X	86	X	X	90	X	X	88
Heifer Pasture	88	X	X	94	X	X	90	X	X	88
Jack In The Box	84	X	X	90	X	X	88	X	X	88
Sheep Pasture	90	X	X	86	X	X	90	X	X	88
East 80	88	X	X	92	X	X	90	X	X	88
West 80	88	X	X	90	X	X	90	X	X	88

X indicates no evaluation made

Summary of Irrigated Pastures

All irrigated pastures on the lease have been well above the minimum score of 80%.

Stockwater Sites

All water is provided by irrigation diversions.

Fencing

No new fencing projects occurred in 2016.

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 and is a commercial cow/calf operation.

The entire LI Bar Ranch lease is comprised of irrigated pastures, thus utilization monitoring is not required.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, LI-Bar Ranch (RLI-487), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Sheep/Horse Pasture	89	X	X	92	X	X	88	X	X	80
Hess Pasture	86	X	X	94	X	X	88	X	X	80
West Line	92	X	X	94	X	X	94	X	X	80

X indicates no evaluation made

Summary of Irrigated Pastures

All irrigated pastures on the lease have consistently been at or above 80% since 2007.

Stockwater Sites

All stockwater is provided by irrigation diversions.

Fencing

There were no new fencing projects in 2016 beyond regular maintenance.

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 some dry abandoned agriculture.

The abandoned agriculture on the U-Bar Ranch is comprised of shrubs and annuals. There are no native perennial grasses present to measure utilization.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, U-Bar Ranch (RLI-402), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Highway North	88	X	X	92	X	X	80	X	X	86
Highway South	88	X	X	92	X	X	80	X	X	86
Upper North 40	88	X	X	90	X	X	86	X	X	88
Upper Middle	88	X	X	88	X	X	92	X	X	88
Lower Middle	92	X	X	94	X	X	92	X	X	88
Bull	88	X	X	90	X	X	92	X	X	84

X indicates no evaluation made

Summary of Irrigated Pastures

Irrigated pasture condition scores remain above 80% on the lease.

Stockwater Sites

Stockwater is provided by irrigation diversions.

Fencing

There were no new fencing projects in 2016 beyond regular maintenance.

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.

The following tables present the summarized utilization data for each field/pasture and transects in each field.

Grazing Utilization for Fields/Pastures, Round Valley Ranch (RLI-483), 2007-2016

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
***East Side Riparian**	85%	51%	76%	17%	14%	28%	0%	5%	56%	68%
***East Side River Field**	75%	30%	46%	17%	44%	30%	14%	0%	25%	49%
***Hole Pasture**	25%	65%	79%	63%	61%	56%	47%	0%	11%	30%
***River Riparian**	60%	32%	72%	29%	16%	20%	17%	19%	35%	16%
***Zurich Riparian**	56%	51%	27%	20%	6%	18%	16%	31%	61%	31%
****Riparian Utilization, 40%***										

Grazing Utilization for Transects, Round Valley Ranch (RLI-483), 2007-2016

Fields/Pastures	Transect	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
***East Side Riparian**	MEND_04	67%	68%	75%	19%	14%	28%	0%	5%	56%	68%
***East Side River Field**	MEND_05	96%	43%	76%	17%	0%	0%	0%	0%	33%	64%
	MEND_06	77%	27%	73%	20%	46%	62%	29%	0%	34%	39%
	MEND_07	72%	52%	52%	15%	40%	12%	26%	0%	33%	57%
	MEND_08	75%	16%	15%	0%	47%	17%	0%	0%	0%	35%
***Hole Pasture**	MEND_12	25%	65%	67%	50%	61%	56%	47%	0%	11%	30%
***River Riparian**	MEND_03	68%	72%	79%	33%	53%	51%	28%	30%	36%	26%
	MEND_09	0%	9%	10%	0%	0%	2%	6%	6%	17%	5%
	MEND_10	0%	14%	41%	0%	3%	0%	33%	15%	5%	15%
	MEND_11	67%	42%	94%	29%	15%	25%	0%	24%	82%	19%
***Zurich Riparian**	MEND_04	56%	51%	27%	20%	33%	18%	16%	31%	61%	31%
****Riparian Utilization, 40%***											

Summary of Utilization

The end-of-season utilization for RLI-483 was well below the allowable 40% standard in all pastures and fields except the East Side Riparian and East Side River Field. Use in the River Riparian Field was below 40%, with cattle leaving early to graze spring green up. The stocking rate was decreased in the Zurich Riparian and increased in the East Side River Field in order to anticipate cattle movement across the Owens River. However, cattle did not cross the Owens River from the East Side River Field in 2016 due to improved forage conditions sustained by winter and spring precipitation. The results had an inverse effect causing utilization to increase in the East Side River Field and East Side Riparian. This situation was explained by the lessee to Watershed Resources staff and no management changes are recommended. The lessee also explained the stocking rates will be adjusted accordingly for the next grazing season to eliminate any overgrazing.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Round Valley Ranch (RLI-483), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Big Stockley	80	86	92	88	X	X	90	X	X	92
Heifer	82	X	94	92	X	X	88	X	X	92
Little Stockley	82	X	94	86	X	X	90	X	X	92
Outside	82	X	90	88	X	X	90	X	X	92
Sheep	90	X	94	92	X	X	92	X	X	92
Bull	88	X	92	88	X	X	90	X	X	92
Horse	88	X	90	70	X	X	94	X	X	92
Triangle	86	X	92	90	X	X	90	X	X	92
Georges	86	X	96	86	X	X	90	X	X	92
40 Acre	82	88	88	90	X	X	88	X	X	92
Freeway	84	84	94	88	X	X	90	X	X	92
Tonys	88	X	86	86	X	X	94	X	X	92
Rock House	82	X	90	90	X	X	94	X	X	92
Steer	86	X	90	92	X	X	90	X	X	80
Canal Pasture	X	X	X	82	X	X	88	X	X	80
Hole Pasture	X	X	X	82	X	X	88	X	X	80
Little Pasture	X	X	X	78	X	X	88	X	X	80
Wells Pasture	80	X	X	86	X	X	90	X	X	80
McGee Pasture	81	X	X	88	X	X	90	X	X	80
Birch Pasture	80	X	X	88	X	X	88	X	X	80
Horse Pasture	80	X	X	86	X	X	88	X	X	80

X indicates no evaluation made

Summary of Irrigated Pastures

All irrigated pastures on the lease have rated well above 80%. There are no management changes recommended for the lease.

Range Trend

Range trend transects were sampled in 2014, this lease will be sampled in the summer of 2017.

Stockwater Sites

One new stockwater well will be drilled in 2017 in the East Side River Field. This well will help improve livestock distribution and relieve grazing pressure from the riparian area during the spring months. All other stockwater on the lease is provided by the Owens River, creeks or irrigation ditches.

Fencing

No new fencing was constructed in 2016.

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.

The following tables present the summarized utilization data for each field/pasture and transects in each field.

Grazing Utilization for Fields, Big Pine Canal Ranch (RLI-438), 2007-2016

Fields	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
***North 40**	85%	41%	52%	24%	24%	37%	29%	30%	53%	25%
***South 40**	75%	25%	25%	17%	0%	19%	17%	17%	21%	16%

***Riparian Utilization, 40%**

Grazing Utilization for Transects, Big Pine Canal Ranch (RLI-438), 2007-2016

Fields	Transect	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
***North 40**	YRIB_03	84%	41%	52%	34%	37%	28%	23%	33%	49%	18%
	YRIB_04	91%	36%	62%	47%	0%	0%	33%	23%	69%	49%
	YRIB_06					10%	46%	30%	30%	40%	10%
***South 40**	YRIB_01	65%	13%	20%	11%	0%	28%	26%	26%	22%	8%
	YRIB_02	76%	32%	59%	69%	0%	10%	9%	9%	26%	5%
	YRIB_05	0%	0%	0%	14%	0%	0%	17%	17%	15%	16%

***Riparian Utilization, 40%**

Summary of Utilization

As the utilization data shows, grazing was moderate throughout both fields with higher use on YRIB_4 (49%).

Range Trend

North 40 Pasture

YRIB_04 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the North 40 Pasture. Trends remained stable on the site.

YRIB_06 is located on a Torrifluvents, 0-2% slopes soil unit, on a Saline Meadow ecological site in the North 40 Pasture. Trends remained stable on the site.

South 40 Pasture

YRIB_03 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site. The site remains stable with no changes in vegetation trends.

YRIB_05 is located on a Torrifluvents, 0-2% slopes soil unit, on a Saline Meadow ecological site. The site continues to remain relatively static.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Big Pine Canal Ranch (RLI-438), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Alfalfa 2	96	X	X	96	X	X	78	X	X	82
Alfalfa 1	94	X	X	96	X	X	91	X	X	82
Alfalfa 3	92	X	X	94	X	X	91	X	X	82
Heifer	94	X	X	98	X	X	94	X	X	94
South Meadow	90	X	X	100	X	X	96	X	X	92
Horse Pasture	94	X	X	94	X	X	90	X	X	82
4C	96	X	X	96	X	X	98	X	X	94
Canal	100	X	X	98	X	X	94	X	X	86
Baker	X	98	96	X	X	X	80	X	X	X
Sanger Meadow	X	98	96	X	X	X	X	X	X	X
Cow Creek	X	98	96	X	X	X	X	X	X	X

X indicates no evaluation made

Summary of 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. Due to drought conditions, spring output decreased enough to prevent irrigation in 2016. Therefore the pastures did not get rated. No management changes are planned for the lease.

Stockwater Sites

One stockwater well is located in the Horse Field and provides water for the Old Bull, North 40 Pasture , and Horse Fields.

Fencing

No new fencing was constructed in 2016.

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.

The following tables present the summarized utilization data for each field/pasture and transects in each field.

Grazing Utilization for Fields, Cashbaugh Ranch (RLI-411), 2007-2016

Fields	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
***Bishop Creek Field**	26%	37%	23%	23	15%	22%	29%	25%	14%	16%
***Ears Field**	0%	4%	1%	0%	0%	4%	4%	0%	0%	37%
***East of River Field**	63%	0%	26%	15	25%	38%	54%	23%	23%	23%
***Laws River Field**	34%	18%	18	20%	25%	47%	45%	25%	30%	33%
***Slough Field**	35%	10%	35%	15%	25%	29%	15%	19%	34%	18%
***Warm Springs Holding Field**	81%	60%	76%	50%	77%	55%	5%	32%	20%	44%
***White Mountain Field**	41%	50%	16%	21%	18%	42%	42%	39%	23%	43%
****Riparian Utilization, 40%***										

Table 7. 1 Grazing Utilization for Transects, Cashbaugh Ranch Lease (RLI-411), 2007-2016

Fields	Transect	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
***Bishop Creek Field**	CASHBA_02	14%	20%	2%	0%	11%	11%	10%	1%	7%	12%
	CASHBA_04	0%	75%	59%	51%	37%	53%	81%	74%	0%	12%
	CASHBA_05	44%	47%	1%	13%	0%	14%	27%	10%	12%	30%
	CASHBA_06	41%	46%	21%	12%	0%	14%	12%	41%	7%	2%
	CASHBA_09	10%	16%	33%	20%	26%	16%	17%	0%	46%	22%
***Ears Field**	CASHBA_19	0%	2%	0%	0%	0%	0%	0%	0%	0%	50%
	CASHBA_20	0%	7%	0%	0%	0%	0%	0%	0%	0%	60%
	CASHBA_21	0%	5%	4%	0%	0%	15%	0%	0%	0%	41%
	CASHBA_22	0%	0%	0%	0%	0%	0%	0%	0%	0%	14%
	CAHSBA_25	0%	0%	0%	0%	0%	0%	16%	0%	0%	20%
***East of the River Field**	CASHBA_16	59%	0%	21%	21%	24%	28%	20%	7%	30%	8%
	CASHBA_24	67%	0%	31%	10%	43%	38%	49%	62%	15%	18%
***Laws River Field**	CASHBA_01	16%	14%	8%	12%	22%	44%	50%	31%	37%	46%
	CASHBA_03	66%	15%	46%	44%	49%	66%	56%	48%	45%	35%
	CASHBA_07	27%	33%	0%	0%	15%	47%	31%	6%	19%	32%
	CASHBA_08	36%	16%	5%	9%	14%	31%	43%	14%	17%	22%
***Slough Field**	CASHBA_17	38%	15%	42%	0%	20%	19%	25%	31%	24%	22%
	CASHBA_18	32%	6%	34%	17%	25%	39%	15%	12%	50%	17%
	CASHBA_23	35%	11%	27%	0%	32%	30%	6%	15%	28%	17%
***Warm Spring Holding**	CASHBA_15	81%	60%	76%	50%	77%	55%	5%	32%	20%	44%
****Riparian Utilization***											

Summary of Utilization

Utilization was below or at the allowable 40% standard in 2016 with the Laws River Field (33%), White Mountain Field (43%), and East of the River Field (23%). 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.

The Bishop Creek Field was not over the allowable utilization rate of 40%. However, utilization at CASHBA_04 was high in 2013 and 2014. In the past, the transect location for CASHBA_4 was used for supplemental feeding; however, the lessee's effort to move the supplement has reduced utilization significantly at CASHBA_4 and the surrounding area. Utilization on RLI-497, Warm Springs Ranch, was below the allowable utilization of 40%.

Range Trend

Transects on the Cashbaugh Ranch were sampled in 2007, 2009, 2010, 2012, and 2015.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Cashbaugh Ranch (RLI-411), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bull Pasture	92	X	X	96	X	X	94	X	X	88
Horse Pasture	80	X	X	96	X	X	94	X	X	88
Old Bull Pasture	92	X	X	90	X	X	96	X	X	88
Lower Pasture	90	X	X	98	X	X	94	X	X	88
Middle Pasture	92	X	X	98	X	X	94	X	X	88
Upper Pasture	92	X	X	96	X	X	94	X	X	88
Sheep Pasture	86	X	X	92	X	X	84	X	X	86
Winter Pasture	82	X	X	82	X	X	80	X	X	80
Lake Pasture	86	X	X	86	X	X	80	X	X	84
Williams Pasture	82	X	X	88	X	X	84	X	X	80
Symons Pasture	X	X	90	86	X	X	96	X	X	86

X indicates no evaluation made

Summary of Irrigated Pastures

All irrigated pastures on the lease have consistently rated well. No management changes are planned for the lease.

Stockwater Sites

No additional stockwater sites are planned for RLI-411.

Fencing

No other fencing projects are scheduled for the lease beyond regular maintenance.

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.

The following tables present the summarized utilization data for each field/pasture and transects in each field.

Grazing Utilization for Fields/Pastures, Warm Springs Ranch (RLI-497), 2007-2016

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
River Field	22%	23%	12%	0%	11%	29%	37%	30%	30%	37%
White Mountain Field	38%	50%	16%	21%	18%	42%	43%	39%	23%	43%
****Riparian Utilization, 40%***										

Grazing Utilization for Transects, Warm Springs Ranch (RLI-497), 2007-2016

Fields/Pastures	Transects	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
River Field	CASHBA_10	0%	23%	14%	0%	25%	32%	48%	53%	60%	44%
	CASHBA_11	16%	33%	5%	0%	0%	21%	22%	6%	11%	18%
	CASHBA_13	7%	15%	20%	0%	7%	34%	41%	30%	18%	50%
White Mountain Field	CASHBA_12	53%	50%	17%	26%	0%	55%	64%	53%	37%	54%
	CASHBA_14	24%	50%	15%	15%	18%	29%	21%	24%	9%	32%
***Riparian Utilization, 40%**											

Summary of Utilization

Utilization for the River Field has increased, though on average has remained less than 40%. CASHBA_10 and CASHBA_13 will be closely watched in 2017

.

Range Trend

Range trend transects were sampled in 2014 and will be sampled again in 2017.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Warm Springs Ranch (RLI-497), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Watterson North	90	X	X	94	X	X	96	X	X	92
Watterson South	86	X	X	84	X	X	96	X	X	92
Calving Pasture	86	X	78	X	X	X	86	X	X	80
New Alfalfa	X	80	70	X	X	X	82	X	X	80
Old Alfalfa	X	80	78	X	X	X	82	X	X	80

X indicates no evaluation made

Summary of Irrigated Pastures

The Watterson North and South pastures have rated well since 2007. The Calving, New Alfalfa, and Old Alfalfa pastures were rated low but have improved due to repaired irrigation diversions that allowed for more efficient water use by the lessee.

Stockwater Sites

No additional stockwater wells are planned for the lease.

Fencing

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

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 (5,947 acres) consists of three separate parcels: the Reinhackle Place, 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.

The following tables present the summarized utilization data for each pasture, for the transects in each field.

Grazing Utilization for Fields/Pastures, Reinhackle Ranch (RLI-492), 2007-2016

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Laws Holding Field	33%	34%	35%	45%	25%	39%	33%	49%	32%	50%
Laws Holding Riparian*					8%	19%	38%	26%	18%	42%
Triangle Field*	32%	14%	36%	34%	37%	46%	43%	20%	29%	21%
Riparian Utilization, 40%										

Table 7. 2 Grazing Utilization for Transects, Reinhackle Ranch (RLI-492), 2007-2016

Fields/Pastures	Transects	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Laws Holding Field	LACEY_03	0%	0%	32%	37%	5%	34%	27%	41%	19%	44%
	LACEY_05	27%	45%	40%	52%	62%	65%	35%	79%	45%	58%
Laws Holding Riparian*	LACEY_08					8%	19%	38%	26%	18%	42%
Triangle Field*	LACEY_01	23%	4%	56%	33%	41%	79%	56%	38%	58%	29%
	LACEY_02	24%	16%	50%	33%	19%	35%	41%	0%	3%	34%
	LACEY_04	0%	13%	17%	0%	34%	21%	0%	0%	21%	0%
	LACEY_06	48%	19%	25%	0%	26%	62%	50%	29%	29%	4%
	LACEY_07	0%	0%	41%	39%	65%	31%	65%	23%	33%	39%

Riparian Utilization,40%

Summary of Utilization

A new riparian fence was constructed in 2010, creating the Laws Holding Riparian Field. Utilization in the Laws Holding Riparian Field has been below the allowable utilization standard of 40%. The Triangle Field has steadily increased utilization and exceeded 40% over the years. This is mostly due to livestock crossing the river from the north, a result of low water flows on the river. Supplement and change in field rotation will be implemented to lower the utilization in the Triangle Field.

Range Trend

Triangle Field

LACEY_01 in the Triangle Field on a saline meadow ecological site. When compared to the previous sampling period in 2013 the site remains stable. However compared to baseline results in 2007 the site is on a downward trend with a steady decline in saltgrass.

LACEY_02 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site. This site is in decline with a general trend of significant decreases in saltgrass, Baltic rush, and beardless wildrye. The site is situated along cutoff oxbows which on above average years are inundated.

LACEY_04 is on a Torrifluvents 0-2% slopes, saline meadow ecological site. The site is off the floodplain and not directly affected by flow levels on the river. There were no significant changes in 2016 compared to 2013 but there is a general downward trend for the site. The site is increasing in shrub cover and decreasing in grass abundance.

LACEY_06 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site. Saltgrass declined on the site when compared to 2013 but is still inside historic parameters from sampling events in 2007, 2009, 2013, and 2016.

LACEY_07 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site. The site remains stable over the past three sampling periods.

Laws Holding Riparian Field

LACEY_08 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site. This site is also in decline. Saltgrass, beardless wildrye, and Baltic rush all significantly declined in 2016. This site is also within a complex network of upraised oxbows that fill when the river is at or past capacity. The low steady flows over the past four years has resulted in the steady desiccation of many of these sites.

Laws Holding Field

LACEY_03 is on a Torrifluvents 0-2% slopes, saline meadow ecological site, situated in the Laws Holding Field. The site points towards a drying trend with an increase in saltgrass and a steady drop in the more mesic beardless wildrye. Similar to other areas, drought impacts are evident in this area.

LACEY_05 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site. The site has shown a significant decline in beardless wildrye and alkali sacaton.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Reinhackle Ranch (RLI-492), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
South Pasture	80	74	74	92	X	X	86	X	X	88
West Pasture	86	74	X	90	X	X	86	X	X	88
East Pasture	80	X	X	94	X	X	86	X	X	88
Horse Pasture	82	X	66	86	X	X	72	74	X	82

X indicates no evaluation made

Summary of Irrigated Pastures

Irrigation on the lease has improved due to a new irrigation schedule. However, the Horse Pasture has remained consistently low due to invasive weeds and overgrazing. The lessee is in the process of making management changes to improve the condition of the Horse Pasture. A small improvement was seen in the Horse Pasture condition in 2016; with a normal irrigation season it should improve more.

Stockwater Sites

Two stockwater wells were drilled in 2011 in the Laws area. One supplies the Holding Field and the other just north of the Lower McNally Canal to supply water for spring grazing and to remove grazing pressure from the Owens River.

Fencing

There are no fence projects planned for the lease other than general maintenance.

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 and 499)

The 4-J Ranch Lease consists of two different ranches. The Big Pine Ranch (RLI-491) contains approximately 10,764 acres, (9,567 acres are covered by this plan) 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.

All grazing on the lease occurs on irrigated pastures or federal grazing allotments so no utilization data is collected. The Twin Lakes portion of the lease is part of the LORP and all grazing monitoring results are contained in the LORP Annual Report.

<u>Irrigated Pastures</u>

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Four J Cattle Ranch (RLI-491 and RLI-499), 2007-2016

RLI- 491 Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Front Pasture	81	86	X	90	X	X	80	X	X	92
Triangle Pasture	84	X	X	88	X	X	72	68	X	62
Holding Pasture	90	X	X	98	X	X	90	X	X	92
Hessian Pasture	84	X	X	84	X	X	76	70	X	62
Fish Springs	86	X	X	90	X	X	94	X	X	80
Tinemaha Pasture	86	X	X	84	X	X	94	X	X	X
Baker Meadow	98	X	X	94	X	X	90	X	X	78
Cottonwood Meadow	86	X	X	90	X	X	94	X	X	92
Silver Canyon Pasture	86	X	X	86	X	X	94	X	X	92
Middle Pasture	90	X	X	88	X	X	94	X	X	94
Jean Blank Pasture	84	X	X	88	X	X	96	X	X	92
RLI- 499 Pastures	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Wiper Pivots Pasture	94	X	X	98	X	X	96	X	X	92
Full North Pivot	88	X	X	90	X	X	96	X	X	82
Full South Pivot	88	X	X	86	X	X	96	X	X	78
Mitigation Pasture	84	X	X	86	X	X	96	X	X	98

X indicates no evaluation made

Summary of Irrigated Pastures

Irrigated pastures on the lease have scored well in the past. However, drought conditions have decreased the amount irrigation water provided by Big Pine and Baker Creeks and as a consequence, Hessian, Triangle, and Baker Meadow pastures have declined in condition. With normal irrigation the pastures should improve condition. No management changes are recommended for the lease.

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 was constructed in 2016.

Salt and Supplement Sites

Hay and liquid supplement are used during the winter.

Independence Ranch Lease (RLI-454)

The Independence Lease (5,437 acres) consists of the Big Pine, Springfields, and Shepherds Creek Parcels. The Big Pine Parcel (5,087 acres) consists of 12 irrigated pastures, 4 of which are used for hay production. The Springfields 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 Shepherds 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.

The following tables present the summarized utilization data for each field/pasture and transects in each field.

Grazing Utilization for Fields, Independence Ranch (RLI-454), 2007-2016

Field	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
***South River Field**	0%	14%	17%	15%	46%	30%	46%	14%	33%	37%
****Riparian Utilization, 40%***										

Grazing Utilization for Transects, Independence Ranch (RLI-454), 2007-2016

Field	Transect	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
***South River Field**	4J_02	0%	18%	25%	15%	0%	61%	0%	26%	40%	68%
	4J_03	0%	10%	9%	0%	31%	6%	28%	7%	35%	10%
	4J_04	0%	10%	17%	16%	61%	24%	64%	9%	25%	34%
****Riparian Utilization, 40%***											

Summary of 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 utilization 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 2016 utilization in the South River Field of 37%.

Range Trend

Range trend was read in 2015 and can be found in last year's report.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Independence Ranch (RLI-454), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Pasture 1	84	X	X	96	X	X	86	X	X	86
Pasture 2	84	X	X	92	X	X	86	X	X	94
Pasture 3	96	X	X	84	X	X	84	X	X	94
South Pasture	88	X	X	94	X	X	94	X	X	94
Horse Field	90	X	X	90	X	X	94	X	X	94
Elk Field	82	X	X	90	X	X	86	X	X	94
North Feedlot	84	X	X	98	X	X	94	X	X	94
NW Feedlot	90	X	X	92	X	X	94	X	X	94
Steward Wiper	X	Planted	X	92	X	X	100	X	X	94

X indicates no evaluation made

Summary Irrigated Pastures

All irrigated pastures on the lease are doing well regardless of drought conditions. This is the result of irrigation water that is provided by the Big Pine Canal. Not having to rely on perennial stream flow for irrigation has helped maintain good conditions on these pastures.

Stockwater Sites

Stockwater is provided by irrigation diversions or the Owens River.

Fencing

No new fencing was constructed in 2016.

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 in Big Pine. Only a portion of the grazing for the entire ranch occurs on City property. This part of the ranch is irrigated and is the location of the ranch headquarters. The City portion of the ranch is located on the south side of the Baker Creek Road and is one pasture comprised of irrigated pasture and dry grazing.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Rockin DM Ranch (RLI-420), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Whistler	70	82	X	86	X	X	80	X	X	10%

X indicates no evaluation made

Summary of Irrigated Pastures

The irrigated pasture on the lease has improved slightly since 2007. Lack of forage on the Inyo County portion of the ranch has increased grazing pressure on the Whistler Pasture for the last year. Because of drought conditions, the lessee has decreased cattle numbers. The Whistler Pasture was in such poor condition that irrigation water in 2016 wasn't enough for it to recover. It will likely take several years of irrigation for the pasture to recover.

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 (680 acres) is comprised of four irrigated pastures and two mountain meadows. 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. The remaining 495-acre Baker Road Ranch portion is located in Big Pine, Fuller, and Saulk Meadows. The Big Pine portion of the lease is comprised of five irrigated pastures that are grazed during the winter months. The Fuller and Saulk 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 following tables present the summarized utilization data for each field/pasture and transects in each field.

Grazing Utilization for Fields, Baker Road Ranch (RLI-475), 2007-2016

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
***Intake Field**	15%	0%	20%	20%	28%	0%	0%	10%	0%	0%
****Riparian Utilization, 40%***										

Grazing Utilization for Transects, Baker Road Ranch, (RLI-475), 2007-2016

Fields/Pastures	Transects	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
***Intake Field**	Steward_01	15%	0%	20%	20%	28%	0%	0%	10%	0%	0%
****Riparian Utilization, 40%***											

Summary of Utilization

Utilization on the Intake portion of the Baker Road Ranch has been well below the allowable riparian utilization standard of 40%. There will be no management changes on the lease.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Baker Road Ranch (RLI-475), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
North H Way	88	X	X	84	X	X	88	X	X	80
South H Way	88	X	X	88	X	X	88	X	X	80
West County	80	X	X	92	X	X	88	X	X	80
East County	80	X	X	98	X	X	88	X	X	80
West Poplar	80	X	X	92	X	X	88	X	X	80
East Poplar	78	X	X	90	X	X	88	X	X	80
Fuller Meadow	92	X	X	86	X	X	94	X	X	86
Saulk Meadow	X	X	X	X	X	X	X	X	X	86

X indicates no evaluation made

Summary of Irrigated Pastures

All irrigated pastures on the lease have remained in good condition since 2007. The Saulk Meadow was not rated for several years due to drought conditions. Improved precipitation in the future will allow for more spring output and better irrigation. There are no management changes recommended for the lease.

Stockwater

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

Fencing

No fencing projects are scheduled for the lease beyond regular maintenance.

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 (3,314 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 two 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 parcel.

The following tables present the summarized utilization data for each field/pasture and transects in each field.

Grazing Utilization for Fields and Pastures, Aberdeen Ranch (RLI-479), 2007-2016

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Hines Spring Exclosure	63%	75%	45%	31%	41%	35%	34%	41%	18%	36%
Pipeline Field	4%	19%	19%	14%	26%	39%	50%	21%	15%	30%

Riparian Utilization, 40%

Grazing Utilization for Transects on the Aberdeen Ranch (RLI-479), 2007-2016

Fields/Pastures	Transects	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Hines Spring Exclosure	ABERDEEN_30	63%	75%	48%	49%	44%	66%	66%	39%	35%	36%
	HINES_SPRING_02	0%	0%	44%	27%	45%	20%	35%	28%	11%	30%
	HINES_SPRING_03	0%	35%	44%	5%	33%	20%	32%	57%	9%	41%
Pipeline Field	ABERDEEN_33	5%	22%	29%	26%	5%	57%	40%	10%	14%	31%
	PIPELINE_02	0%	14%	19%	7%	19%	35%	50%	37%	11%	26%
	PIPELINE_03	0%	14%	23%	0%	13%	26%	51%	15%	20%	33%

Riparian Utilization, 40%

Summary of Utilization

Utilization on the Aberdeen lease has been maintained at an allowable level since 2007. The only year utilization was over the 65% was 2008. Since that time utilization has been low, with livestock distribution being affected by water spreading from the Hines Spring Well 355 Mitigation project. The increased water spreading has produced more forage for the pack stock and changed the location where they are grazing. Future monitoring may include the addition of several new utilization transects in the new grazing areas if needed.

Range Trend

Range trend transects were read on the Aberdeen Lease seven times (2002-04, 2007, 2009-10, 2012, 2015). Please read last year’s report for a full discussion of results.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Aberdeen Ranch (RLI-479), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
One Acre	80	76	84	82	76	90	88	X	X	82
North	80	82	X	86	X	X	88	X	X	82
Middle	84	92	X	84	X	X	80	X	X	82
South	84	96	X	70	X	X	80	X	X	82
Hay Stack	84	92	X	86	X	X	88	X	X	82

X indicates no evaluation made

Summary of Irrigated Pastures

The irrigated pastures on the Aberdeen lease have varied throughout the years with the scores ranging above and below the allowable standard of 80%. However, for the past several years better management has maintained scores. The 2013 scores dropped due to drought conditions. No management changes are recommended for this lease.

Stockwater Sites

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

Fencing

No additional fencing projects are planned.

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.

The following tables present the summarized utilization data for each field/pasture and transects in each field.

Grazing Utilization for Fields, Coloseum Ranch (RLI-407), 2007-2016

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Movie Field	70%	12%	16%	0%	0%	3%	0%	0%	0%	41%
South East Field	77%	0%	36%	54%	44%	72%	0%	0%	0%	0%
North East Field	72%	7%	29%	38%	32%	48%	40%	0%	0%	0%
****Riparian Utilization, 40%***										

Grazing Utilization for Transects, Coloseum Ranch (RLI-407), 2007-2016

Fields/Pastures	Transects	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Movie Field	COLOSEUM_01	65%	8%	14%	0%	0%	0%	0%	0%	0%	41%
	COLOSEUM_02	70%	0%	19%	0%	0%	0%	40%	0%	0%	0%
	COLOSEUM_03	74%	29%	16%	0%	0%	0%	0%	0%	0%	0%
South East Field	COLOSEUM_38	77%	0%	9%	0%	0%	70%	0%	0%	0%	0%
	COLOSEUM_T1			20%	42%	42%	40%	0%	0%	0%	0%
	COLOSEUM_T2			69%	40%	58%	74%	0%	0%	0%	0%
	COLOSEUM_T3			32%	39%	25%	79%	0%	0%	0%	0%
	COLOSEUM_T4			45%	62%	57%	64%	0%	0%	0%	0%
	COLOSEUM_T5			39%	85%	51%	0%	0%	0%	0%	0%
North East Field	NORTHEAST_01	72%	7%	29%	38%	32%	48%	0%	0%	0%	0%

Riparian Utilization, 40%

Summary of Utilization

Utilization on the Coloseum Lease has been below the allowable standard of 65% for the past seven years. However for the past few years use has increased in the North and South East Fields due to drought conditions that have decreased forage production on the lessees federal grazing allotments. The lessee has been bringing cattle sooner and leaving them longer, increasing utilization. In 2013, cattle arrived during the growing season before ungrazed plant heights where collected. Watershed Resources staff had to estimate utilization for the growing season. The 2014-16 seasons for the lease were not monitored because the lessee sold all of his livestock.

Range Trend

Range trend was read in 2015. Please refer to last year's report for the most current results.

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 is planned for the lease beyond regular maintenance.

Salt and Supplement Sites

Hay is fed during the winter, no other supplement is 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.

Summary of 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 condition was evaluated in 2016 and was found to be in good condition with current stocking rates.

Fencing

The lessee had a private contractor replace the western boundary fence in 2010. No other fence projects are planned for the lease.

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 a small partially irrigated field (Tree Lot), two small fields (Yearling and Feed Lot) and five large fields (Upper North, Lower North, West, South and Willow Fields) that are not irrigated. A corral and a stockyard complete the lease.

Summary of 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 the this field, which has perennial grass components and monitoring is planned once grazing resumes.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Eight Mile Ranch (RLI-408), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
House	84	X	X	80	86	X	84	X	X	82

X indicates no evaluation made

Summary of Irrigated Pasture

The House pasture has rated at or just above the allowable standard of 80%. The scores on the pasture could be improved if it was replanted.

Fencing

All of the boundary fences to the west of the lease were burned in 2007. They have been replaced, and no other new fencing projects are planned.

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, 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.

The Fort Independence lease is comprised entirely of irrigated pastures and has no grazing utilization transects. The lease is monitored using the irrigated pasture condition scoring.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Fort Independence (RLI-406 and RLI-489), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Zucco	96	X	X	98	X	X	92	X	X	82
D&D	96	X	X	96	X	X	92	X	X	82
Bardoff	94	X	X	96	X	X	92	X	X	82
Plot	100	X	X	100	X	X	96	X	X	82
Heifer Heaven	96	X	X	96	X	X	90	X	X	82
Garden	94	X	X	96	X	X	90	X	X	82
Orchard	100	X	X	100	X	X	82	X	X	82
Pampa	96	X	X	100	X	X	90	X	X	82
Cane	100	X	X	100	X	X	92	X	X	82
L&L	100	X	X	100	X	X	90	X	X	82
Willow	94	X	X	100	X	X	84	X	X	82
Clover	94	X	X	96	X	X	92	X	X	82
Horse Heaven	90	X	X	94	X	X	84	X	X	88
Hectare	92	X	X	96	X	X	90	X	X	82
Dessert	94	X	X	96	X	X	96	X	X	82

X indicates no evaluation made

Summary of Irrigated Pastures

All of the pastures in the Fort Independence Lease are above the minimum irrigated pasture condition score of 80%. The pastures are managed well; the lessee actively sprays and mows weeds and shrubs during the growing season. The species composition of the pastures is high. No management changes are recommended for this lease.

Stockwater Sites

Stockwater is provided by irrigation ditches and diversions.

Fencing

No new fencing is planned for this lease beyond regular maintenance.

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.

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 only in conjunction 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 around the irrigated pasture in the center and western edge of the parcel. A small corral near Georges Creek along the west boundary of the parcel is used to work cattle.

The following tables present the summarized utilization data for each field/pasture and transects in each field.

Grazing Utilization for Fields and Pastures, Georges Creek Parcel (RLI-489), 2007-2016

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
South Field	43%	26%	6%	6%	12%	7%	6%	0%	0%	26%
Riparian Utilization, 40%										

Grazing Utilization for Transects, Georges Creek Parcel (RLI-489), 2007-2016

Fields/Pastures	Transects	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
South Field	ISLAND_02	40%	15%	8%	0%	24%	19%	10%	0%	0%	14%
	ISLAND_59	74%	47%	18%	0%	23%	10%	14%	0%	0%	29%
	SOUTHFIELD_02	0%	0%	3%	7%	0%	0%	0%	0%	0%	36%
	SOUTHFIELD_03	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
***Riparian Utilization, 40%**											

Summary of Utilization

Utilization on the Georges Creek Parcel has been within the upland standard of 65%. As the tables above show grazing has been moderate to light for the past eight years with no changes being recommended in management.

Range Trend

Range trend transects were sampled in 2014, please refer to last year's report for discussion of results. The lease will be sampled again in 2017.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Georges Creek Parcel (RLI-489), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Olive	88	X	X	88	X	X	82	X	X	88
Georges	84	X	X	90	X	X	82	X	X	88

X indicates no evaluation made

Summary of Irrigated Pastures

The irrigated pastures on this parcel have been above the minimum score of 80% since the monitoring has started.

Stockwater Sites

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

Fencing

There is no fencing planned for the lease beyond regular maintenance.

Salt and Supplement Sites

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

JR Ranch Lease (RLI-436)

The JR Ranch Lease (976 acres) lies to the north and west of Lone Pine. Until 2001, the lessee grazed 25 cow/calf pairs on the lease. Now the lessee grazes only horses.

Summary of Utilization

The upland grazing on the lease is currently in non-use; no utilization data is collected.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, JR Ranch (RLI-436), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
EM	84	80	68	68	70	90	86	X	X	80
Olivia	78	68	62	62	82	88	86	X	X	78
Lone Pine	84	78	68	68	74	92	88	X	X	78

X indicates no evaluation made

Summary of Irrigated Pastures

The irrigated pastures on this lease are no longer controlled by an active lessee as of 2016. LADWP will be irrigating the field to remain in compliance with Type E Irrigation requirements. No livestock are present and the EM pasture is no mowed by LADWP construction crews to remove the available forage. This solution will work on a temporary basis, due to thatch build up. In several years the pasture will cease to be productive if the thatch is not removed from the pasture.

Stockwater Sites

Stockwater is provided by irrigation diversions and troughs.

Fencing

No fencing is planned beyond regular maintenance.

Salt and Supplement Sites

No supplements are needed because the lease is vacant.

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 between 35 and 45 purebred Red Angus cows.

Summary of Utilization

The Lone Pine Dairy lease is entirely irrigated pastures; no utilization is measured on the lease.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Lone Pine Dairy Lease (RLI-452), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Calving	84	X	X	98	X	X	96	X	X	82
Oystye	84	X	X	98	X	X	96	X	X	82
Golf Field	96	X	X	96	X	X	98	X	X	90
Middle Back	96	X	X	96	X	X	96	X	X	90
North Back	96	X	X	94	X	X	98	X	X	90

X indicates no evaluation made

Summary of Irrigated Pastures

Pastures on the lease have been in excellent condition but have decreased in drought conditions. There are no management changes recommended for the lease. With regular irrigation all pastures are expected to recover.

Stockwater Sites

There were no stockwater sites implemented on the Lone Pine Lease. Stockwater is provided by irrigation diversion and water troughs.

Fencing

There was no new fencing, nor are there any plans to construct any new fences 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.

The following tables present the summarized utilization data for each field/pasture and transects in each field.

Grazing Utilization, Mount Whitney Pack Lease (RLI-495), 2006-2016

Field	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Tuttle Field	61%	0%	0%	0%	0%	27%	0%	0%	0%	0%
Riparian Utilization, 40%										

Grazing Utilization for Transects, Mount Whitney Pack (RLI-495), 2007-2016

Fields/Pastures	Transects	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Tuttle Field	TUTTLE_01	61%	0%	0%	0%	0%	27%	0%	0%	0%	0%
Riparian Utilization, 40%											

<u>Summary of Utilization</u>

The Tuttle Field is rarely grazed. Most use typically occurs from wildlife. Monitoring will continue regardless of grazing frequency.

<u>Range Trend</u>

No range trend transects were read on the lease in 2016.

<u>Irrigated Pastures</u>

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Mount Whitney Pack (RLI-495), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
East Diaz	80	80	78	80	82	88	88	X	X	86
West Diaz	80	80	72	80	78	88	82	X	X	86

X indicates no evaluation made

Summary of Irrigated Pastures

In 2007 the Diaz irrigated pastures were at the minimum with conditions looking as though it would decline the next year. This was due to the presence of weeds and overgrazing. Over the past seven years the lessee has worked to reduce the amount of weeds and reduce the grazing intensity on the pasture. This has helped to improve the condition of the pastures and increase the scores.

Stockwater Sites

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

Fencing

There is no new fencing, nor are there any plans to construct any new fences on the lease.

Salt and Supplement Sites

All salt and supplemental feeding is in designated areas.

Horse Shoe Ranch Lease (RLI-480)

The 2,966-acre Horseshoe Grazing Lease (RLI-480) contains 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. Most 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 east 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 1,011 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 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.

Archie Adjunct (RLI-489)

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 just north of Olancha, lying on both sides of U.S. Highway 395 and is 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.

The Archie Adjunct is comprised primarily of irrigated pastures and has no utilization transects.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Archie Adjunct (RLI-489), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Lake Field	84	X	X	90	X	X	74	X	X	88
Bolin	84	X	X	X	X	X	90	X	X	88
Archie	82	X	X	88	X	X	90	X	X	88

X indicates no evaluation made

Summary of Irrigated Pastures

Irrigated pastures on this lease have consistently rated well since 2007. Irrigation water on the lease is managed well by the lessees. The pastures have good species composition and are not overgrazed. The Lake Fields score dropped in 2013 due to drought conditions but had improved by 2016. There are no recommended changes for this lease.

Stockwater Sites

There are no new stockwater sites planned for the lease.

Fencing

No new fencing is planned for the lease beyond general maintenance.

Salt and Supplement Sites

Supplement is used in designated sites and is composed of cake tubs.

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.

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.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Olancha Creek Adjunct (RLI-427), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Esta 1	84	X	X	88	X	X	92	X	X	86
Esta 2	92	X	X	90	X	X	92	X	X	86
Esta 3	X	X	X	88	X	X	92	X	X	86
Esta 4	X	X	X	88	X	X	86	X	X	86
Oesta 1	72	84	78	82	80	86	86	X	X	86
Oesta 2	58	74	78	82	80	86	86	X	X	86

X indicates no evaluation made

Summary of Irrigated Pastures

The irrigated pastures on the Olancha Creek lease have rated well for the past seven years except the Oesta 1 and 2 pastures. These pastures have continual trouble with irrigation water because of sandy substrates and shrub encroachment. Over the past several years irrigation management has improved and all of the shrubs have been removed, which has increased the pastures scores.

Stockwater Sites

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

Fencing

There are no fencing projects planned for this lease other than regular maintenance.

Salt and Supplement Sites

Cake mineral and protein tubs are put out during the winter. The locations of these tubs are rotated around in the pastures.

Homeplace Adjunct (RLI-428A)

The Homeplace Adjunct Lease is just north of Olancha, between the Olancha Creek Lease to the south and the Archie Lease to the north. The lease consists of 11 pastures and fields (Table 1). 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 (199 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 some other grazing property.

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

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 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. This 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 this 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.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Home Place Adjunct (RLI-428A), 2007-2016

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
L Pasture	80	88	X	94	X	X	94	X	X	92
Hay	80	90	X	94	X	X	94	X	X	92
East Stud	92	X	X	96	X	X	96	X	X	92
West Stud	80	88	X	96	X	X	94	X	X	92
Store	80	90	X	92	X	X	98	X	X	92
Woven	80	90	X	94	X	X	80	X	X	92

X indicates no evaluation made

Summary Irrigated Pastures

For the past seven years the irrigated pastures on the Home Place portion of RLI-428 have rated well, maintaining good pasture condition. There are no recommended management changes for this lease.

Stockwater Sites

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

Fencing

In 2014, the main corrals were re-built. No fencing projects are planned for this lease other than regular maintenance.

Salt and Supplement Sites

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

Blackrock Lease (RLI-428)

The Blackrock Lease is a cow/calf operation consisting of 32,674 acres divided into 24 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 twenty pastures on the Blackrock Lakes lease within the LORP boundary: South Blackrock Holding, White Meadow Field, White Meadow Riparian Field, Reservation Field, Reservation Riparian Field, Little Robinson Field, Robinson Field, East Robinson Field, North Riparian Field, Russell Field, Locust Field, East Russell Field, South Riparian Field, West Field, Wrinkle Field, Wrinkle Riparian Field, Spring Field, Wrinkle Holding, Horse Holding, and North Blackrock Holding. Twelve of these pastures are monitored using range trend and utilization. The other eight pastures are holding pastures for cattle processing or parts of the actual operating facilities.

Summary of Utilization

The following tables present the summarized utilization data for each pasture/field, and each transect within the pasture.

Grazing Utilization for Fields and Pastures, Blackrock Ranch (RLI-428), 2007-2016

Fields/Pastures	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Horse Holding	67%	13%	1%	36%	29%	31%	0%	0%	0%	0%
Locust Field	68%	15%	14%	34%	15%	32%	32%	53%	18%	32%
***North Riparian**	72%	51%	21%	29%	31%	10%	35%	39%	20%	23%
Reservation Field	68%	34%	38%	37%	29%	26%	30%	11%	20%	10%
Robinson Field	76%	55%	14%	23%	6%	28%	25%	17%	8%	4%
Russell	85%	49%	15%	39%	6%	26%	26%	1%	1%	8%
***South Riparian Field**	35%	25%	26%	21%	23%	23%	19%	8%	12%	0%
Springer Field	77%	43%								0%
White Meadow Field	3%	9%	19%	10%	9%	19%	19%	7%	3%	12%
***White Meadow Riparian**	87%	0%	75%	0%	57%	32%	21%	15%	15%	16%
Wrinkle Field	51%	33%	27%	44%	24%	20%	22%	21%	3%	8%
***Wrinkle Riparian Field**	8%	13%	29%	41%	18%	24%	29%	28%	14%	16%
West Field				22%	38%	41%	36%	18%	39%	7%
****Riparian Utilization, 40%***										

Grazing Utilization for Transects, Blackrock Ranch (RLI-428), 2007-2016

Fields/Pastures	Transect	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Horse Holding	BLKROC_9	67%	13%	1%	36%	29%	31%	0%	0%	0%	0%
Locust Field	BLKROC_06	68%	15%	14%	34%	13%	32%	32%	53%	18%	32%
***North Riparian**	BLKROC_12	0%	67%	6%	16%	0%	0%	0%	Flooded	Flooded	Flooded
	BLKROC_22	72%	36%	36%	43%	31%	31%	35%	39%	20%	23%
Reservation	BLKROC_02	69%	31%	0%	36%	0%	18%	35%	0%	17%	11%
	BLKROC_03	81%	44%	54%	46%	53%	27%	33%	12%	13%	13%
	BLKROC_44	72%	37%	49%	45%	0%	28%	40%	22%	43%	10%
	BLKROC_49	41%	10%	12%	16%	0%	11%	0%	0%	0%	0%
	BLKROC_51	80%	46%	48%	33%	41%	39%	44%	15%	30%	16%
	RESERV_06	0%	0%	29%	48%	23%	34%	30%	18%	15%	13%
Robinson Field	BLKROC_04	76%	58%	14%	22%	8%	38%	24%	18%	9%	1%
	ROBNSON_2	0%	52%	15%	23%	4%	18%	25%	16%	6%	7%
Russell Field	BLKROC_05	85%	43%	19%	48%	13%	24%	22%	2%	2%	13%
	RUSSELL_02	0%	55%	12%	31%	0%	28%	31%	0%	1%	4%
***South Riparian**	BLKROC_13	45%	29%	28%	10%	31%	23%	15%	15%	15%	0%
	BLKROC_23	25%	8%	43%	20%	22%	0%	0%	0%	27%	0%
	SOUTHRIP_3		39%	5%	33%	19%	10%	10%	8%	12%	0%
	SOUTHRIP_4					20%	36%	31%	2%	2%	0%
	SOUTHRIP_5						0%	18%	10%	5%	0%
White Meadow	BLKROC_01	7%	2%	4%	4%	0%	9%	18%	0%	0%	7%
	BLKROC_39	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%
	WMEAD_03	0%	15%	37%	12%		29%	43%	0%	10%	19%
	WMEAD_04	0%	7%	0%	0%	0%	3%	0%	5%	Burned	0%
	WMEAD_05	05	17%	52%	34%	36%	54%	32%	29%	Burned	35%

Grazing Utilization for Transects, Blackrock Ranch (RLI-428), 2007-2016 – Continued

Fields/Pastures	**Transect**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
***White Meadow Riparian**	BLKROC_11	0%	0%	75%	0%	68%	55%	30%	16%	27%	26%
	BLKROC_14	87%	0%							0%	0%
	BLKROC_26					45%		6%	18%	18%	0%
	WMRIP_T5						23%	29%	29%	15%	11%
	WMRIP_T4						23%	21%	21%	20%	44%
	WMRIP_T1						26%	0%	0%	0%	12%
Wrinkle Field	BLKROC_07	51%	28%	26%	40%		7%	28%	6%	7%	16%
	WRINKL_03		37%	28%	48%	24%	34%	17%	35%	0%	0%
***Wrinkle Riparian**	BLKROC_18	30%	21%	43%	46%	48%		30%	20%	3%	10%
	BLKROC_19	0%	10%	12%	26%	8%	15%	28%	20%	10%	18%
	BLKROC_20	0%	11%	34%	53%	12%	33%	38%	34%	28%	15%
	BLKROC_21	0%	9%	28%	38%	6%		21%	40%	15%	19%
West Field	WRINKLE_2				22%	38%	41%	36%	18%	39%	7%
****Riparian Utilization, 40%***											

Summary of 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, which can be seen in the tables above. If current management of the LORP continues there will be a substantial loss of meadow habitat to wetlands. This will remove much of the grazing from the Blackrock lease portion of the LORP. It will also continue to hinder the establishment of woody recruitment.

Summary of Range Trend Data and Condition Blackrock Lease

White Meadow Riparian Field

BLKROC_10 is located in the White Meadow Riparian Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. The transect is located within the historical dry reach of the river. Because livestock cannot access the area no utilization estimates occur at this location. An increase in Nevada saltbush and bassia frequency outside baseline parameters were detected during the monitoring year 2009 but in 2010 frequency for both species decreased. Nevada saltbush continues to have a high frequency when compared to 2002-2007, which coincided with the pre-watering years. As waters rise, saturating the soil profile along the floodplain, Nevada saltbush has responded with only 2.8 m of canopy cover in 2003 to 59.7 m of cover in 2010 and is now beginning to decline again because of excess water. Nevada saltbush density has also declined. The site has begun to show an increase in beardless wildrye (LETR) and saltgrass while alkali sacaton has remained stable as well as the perennial forb, mallow (MALE3). Fire would not improve the site, because of the negligible perennial grass component in the area.

BLKROC_11 is located in a riparian management area in the White Meadow Riparian Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. Trends were static in 2016. The transect is located within the historical dry reach of the river. Inkweed, Nevada saltbush, and bassia frequency increased in 2009 and have subsequently stabilized with the exception of inkweed which did decrease in 2010 but remained within levels typically seen for the site. Perennial grass frequency have remained stable during the last 14 years. Nevada saltbush remains higher than pre-implementation of LORP flows.

BLKROC_25 is located in a riparian management area in the White Meadow Riparian Field. The transect is situated inside a grazing exclosure and runs perpendicular to BLKROC_11 with the key difference between the two sites being the area has not been grazed since 2010. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. The transect is located within the historical dry reach of the river. Frequency remains static and Nevada saltbush cover increased dramatically in 2016 from 9% to 24% cover.

BLKROC_14 is located within the historical dry reach of the Owens River in the White Meadow Riparian Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. The site is in poor condition when compared to its corresponding ecological site description. Nevada saltbush significantly increased in 2009 and saltgrass significantly decreased to 0 in 2009 and remained so in 2010, in 2013 saltgrass frequency began to increase again and continued in 2016. Nevada saltbush is increasing on the site with canopy cover increasing from 8.8 m to 31.3 m. These increases are likely a result from rewatering this portion of the Owens River. With the permanently raised water table, shrub cover declined after 2014 and continued to decline in 2015 and 2016. In 2010, frequency for bassia was at its highest recorded on the site since 2004 (prior to the 2008 burn) but has subsequently dropped. There were no significant changes in trend in 2016. Utilization was not sampled on this transect due to the lack of measurable forage.

White Meadow Field

BLKROC_01 is located on an upland site in the White Meadow Field. The soils are mapped as the Division-Numu Complex, 0-2% slopes soil series, which corresponds to a Saline Meadow ecological site. Herbaceous production for the site is much lower than potential, while shrub production is much higher than typical for a Saline Meadow site at its potential. In 1968-69, this entire area was scraped to store runoff. This type of activity significantly altered the area's ability to resemble a Saline Meadow in high ecological condition. Frequency trend was static in 2016 when compared to baseline years.

BLKROC_39 is located on an upland site in the White Meadow Field. The soils are Division-Numu Complex, 0 to 2% slopes, which corresponds to the Saline Meadow ecological site. Production is far less than typical for a Saline Bottom site. The site was scraped during the wet winter of 1968-69. The loss of the "A horizon" during this period has likely contributed to the poor productivity of the site.

Reservation Field

BLKROC_02 is located in the Reservation Field, which is designated as an upland pasture. The soils are mapped as Manzanar-Winnedumah Association, 0-2% slopes soil series, which corresponds to the Saline Meadow ecological site. The similarity index has varied widely during the baseline period ranging between 28-55%, largely because of fluctuations in alkali sacaton production. The site is dominated by shrubs and may not be able to reach site potential unless shrub densities are reduced. There was no significant change in frequency in 2016 when compared to 2013. The general trend for the area is static. Cover has remained static since 2003.

BLKROC_03 is located in the Reservation Field on the Shondow Loam 0-2% slopes soil series. The transect is on a Saline Meadow ecological site in an upland pasture. The area in good to excellent condition with regards to its similarity to reference sites for

Saline Meadows. The site produces large quantities of alkali sacaton. Frequency results indicate the site has been relatively stable over the past five monitoring periods with the exception of an increase in rubber rabbitbrush cover. Saltgrass has decreased steadily over all years. Increases in frequency, cover, and density for rubber rabbitbrush have markedly risen during the past three sampling periods. As mentioned in 2009, because this site is experiencing an increase in shrub abundance while maintaining high grass cover, this area should be considered a candidate for a prescribed burn in the near future before sacaton cover starts to be replaced by even greater amounts of rubber rabbitbrush.

BLKROC_51 is located in an upland site in the Reservation Field. The soils are Winnedumah Silt Loam, 0-2% slopes, which corresponds to the Sodic Fan ecological site. The site has a higher grass component and lower shrub component than expected for Sodic Fan site. One significant change in frequency was Saltgrass exhibiting a downward trend on the site.

Reservation Riparian Field

BLKROC_15 is in a riparian management area, located in the Reservation Riparian Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. The site is located on the historical ‘dry reach’ of the Owens and has only begun to show signs of recovery since the return of flows in December 2006 with a significant upsurge in saltgrass. The similarity index is poor for the site. Tamarisk slash was burned at the site in the winter months of 2008 and subsequently invaded by bassia in 2010 with frequency at its highest seen on the site. There is a disappearance of all annual forbs that is a result of the increased canopy cover of Nevada saltbush and bassia. Shrub cover has more than doubled on the site in 2013 but is now declining in 2016.

BLKROC_17 is located in a riparian management area on the Reservation Riparian Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. Similar to other sites on the historical ‘dry reach’ of the Owens River, BLKROC_17 has not begun to respond to returned river flows. The site is shrub dominated (Nevada saltbush) with little to no perennial grass component. Frequency did not differ between 2010 and 2013. Canopy cover of Nevada saltbush increased substantially in 2010 and decreased slightly in 2013 and continues to decrease in 2016 there is a corresponding frequency trend for Nevada saltbush in 2016.

Robinson Field

BLKROC_04 is located on an upland site within the Robinson Pasture. The soil series is Manzanar Silt Loam, 0-2% slopes and is a Saline Meadow ecological site. The site has a high diversity of perennial grasses and low shrub composition. In 2009, Baltic rush and creeping wildrye frequency significantly increased while alkali sacaton significantly decreased when compared to 2007, neither of these changes were significantly different from baseline sampling ranges (2002-2004). However, these increases were short-lived and in 2010 creeping wildrye and Baltic rush decreased to levels typically observed for the site and continued to increase again in 2013. Alkali sacaton frequency decreased while saltgrass remained static on the site. The site has dried out again in 2016, particularly for key grass species. Rabbitbrush cover continues to increase on the site. The site is exposed to inconsistent runoff from upslope stockwater sources. This variability in surface water is the principle driver for the decline in perennial graminoids on the site.

North Riparian Field

BLKROC_22 is located in a riparian management area in the North Riparian Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. With the exception of saltgrass there were no significant departures in frequency when compared to previous years and the site remains static.

South Riparian Field

BLKROC_13 is in a riparian management area located in the South Riparian Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. The site is in excellent condition as it related to reference sites for moist floodplain ecological sites. The relative abundance of creeping wildrye when compared to the total plant community is still minor with cover for the grass ranging from trace to 4%. Shrub cover is steadily increasing on the meadow.

BLKROC_23 is in a riparian management area located in the South Riparian Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. The site is in excellent condition with a minimal shrub component. Frequency values have not varied significantly over the six sampling periods with the exception of Nevada saltbush in 2010 and a decrease in alkali sacaton in 2016.

Russell Field

BLKROC_05 is located on an upland site in the Russell Field. The soil series is Manzanar Silt Loam, 0-2% slopes. The site is a Saline Meadow ecological site. The site is in excellent condition. Frequency results appear static with the exception of saltgrass which has declined to its lowest frequency value observed since monitoring began in 2002. Shrub cover (rubber rabbitbrush) and density at the study plot continues to show a gradual decline.

Wrinkle Field

BLKROC_07 is located on an upland site in the Wrinkle Field. The soil series is Manzanar Silt Loam, 0-2% slopes and is a Saline Meadow ecological site. The site is in excellent condition. Frequency values remain static. Shrub cover and density appear to be stable on the site.

Locust Field

BLKROC_06 is located on an upland site in the Locust Field. The soil series is Manzanar Silt Loam, 0-2% slopes and the ecological site is a Saline Meadow. The site is in excellent condition. Frequency values have remained static.

Wrinkle Riparian Field

BLKROC_18 is a riparian management area located in the Wrinkle Riparian Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. Saltgrass frequency decreased significantly between 2007 and 2009 and continued to drop in 2010 to a level beyond what has been seen on the site previously, in 2013 values rose to the highest seen on the site but have decreased significantly in 2016.

BLKROC_19 is located in a riparian management area in the Wrinkle Riparian Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. The site is in good condition as it relates to the corresponding ecological site. Plant frequencies are static.

BLKROC_20 is located in the Wrinkle Riparian Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. The site is in good condition. Creeping wildrye continued to increase beyond baseline parameters in 2010 but then dropped significantly in 2013 and then increased in 2016. Nevada saltbush cover and density have steadily increased since 2005 until 2013 where a decrease in cover occurred but subsequently risen in 2016.

Horse Holding Field

BLKROC_09 is located on an upland site in the Horse Holding Field, on the Winnedumah Fine Sandy Loam 0-2% slopes soil unit. The transect is located on a Sodic Fan ecological site, and was in good condition during the baseline period. Trends remain static in 2016.

Irrigated Pastures

There are no irrigated pastures on the Blackrock Lease.

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 in 2017. 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

There was no new fencing constructed on the lease in 2016 and no fencing planned beyond regular maintenance.

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 4,912-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 4,912 acres, approximately 4,200 acres are used as pastures for grazing; the other 712 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. Range Trend transects were last read on this lease in 2012.

Summary of Utilization

The following tables present the summarized utilization data for each pasture/field, and each transect within the pasture.

Grazing Utilization for Fields, Twin Lakes Ranch (RLI-491), 2007-2016

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Lower Blackrock Field	40%	14%	0%	0%	1%	5%	9%	7%	3%	1%
*Lower Blackrock Riparian	89%	44%	37%	6%	38%	54%	BURN	6%	1%	1%
*Upper Blackrock Field	45%	41%	43%	17%	26%	61%	BURN	20%	14%	20%
**Riparian Utilization, 40%*										

Grazing Utilization for Transects, Twin Lakes Ranch (RLI-491), 2007-2016

Fields/Pastures	**Transect**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Lower Blackrock	BLKROC_37	40%	9%	0%	0%	0%	5%	15%	15%	2%	2%
	BLKROC_F_4		10%		0%	0%		23%	2%	1%	1%
	TWNLAKE_02	16%	17%	BURN	0%	4%		0%	6%	7%	0%
	TWNLAKE_05	65%	23%	BURN	0%	0%		0%	0%	0%	0%
***Lower Blackrock**	BLKROC_RIP_7		61%	53%		34%	72%	BURN	10%	0%	0%
	TWNLAKE_03	82%	28%	21%	6%	42%	36%	BURN	2%	2%	2%
	TWNLAKE_04	85%						BURN	0%	0%	2%
	TWNLAKE_06	87%						BURN	0%	0%	0%
***Upper Blackrock**	BLKROC_RIP_5			52%	21%	25%	51%	BURN	9%	0%	10%
	BLKROC_RIP_6			53%	19%	29%	74%	BURN	10%	0%	0%
	BLKROC_RIP_9		41%	42%	17%	18%	70%	BURN	50%	43%	69%
	INTAKE_01	45%		25%	13%	30%	49%	BURN	10%	10%	2%
****Riparian Utilization, 40%***											

Summary of Utilization

Utilization in the Lower Blackrock Riparian and Upper Blackrock Fields was below the allowable utilization for the grazing season. Much of the grazing occurred around Drew Slough. The lessee grazed this area longer to save the riparian pastures for the spring to coincide with spring green-up. The burned area on the river is in good condition and utilization was low. There are no recommended management changes.

Summary of Range Trend Data and Conditions

Range trend transects were read in 2015 and will be revisited in 2018.

Fencing

There was no new fencing constructed on the lease in 2016.

Salt and Supplement Sites

Supplement is composed of a liquid mix that is put in large tubs with rollers that the cattle consume. These tubs are placed in established supplement sites and are used every year.

Burning

A range burn was conducted in 2013, resulting in 190 acres of riparian pasture being burned. The purpose of the burn was to remove existing saltcedar slash piles and shrubs that had encroached in to existing perennial grass meadows. Prior to the burn, Cal Fire and LADWP prepared fire breaks and created buffers around existing riparian vegetation, resulting in complete fire containment, with very little loss to riparian vegetation. Overall the burn resulted in the improvement of the meadow habitat on the Twin Lakes Lease.

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 (approximately 102 acres). The Intake Field contains riparian vegetation and an associate range trend transect. The Big Meadow Field contains upland and riparian vegetation; however, it is not within the LORP project boundaries. 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. The Big Meadow and Intake Fields were not used by livestock during the construction of the Intake structure, which lasted until the 2008-09 grazing season. There are no irrigated pastures on the Intake Lease. There are no identified water sites needed for this pasture and no riparian exclosures planned due to the limited amount of riparian area within the both pastures.

The following table presents the summarized utilization data for each field for the current year.

End of Grazing Season Utilization for Fields, Intake Lease (RLI-475), 2016

Field	Utilization	Transect	Utilization
Intake Field*	0%	*STEWARD_01	0%
**Riparian Utilization, 40%*			

Summary of Utilization

Utilization for the Intake Lease is well below the allowable 40% utilization standard.

Summary of Range Trend Data and Conditions

STEWARD_01 is located in the riparian Intake Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, which corresponds to the Moist Floodplain ecological site. The site was sampled for the first time in 2009. The site appears stable with both alkali sacaton (SPAI) and Saltgrass (DISP) abundant on the site. Nevada saltbush (ATTO) frequency decreased slightly yet canopy cover for the same species has doubled. Bassia was not present on the plot in 2013. Because of the small area this transect has been retired.

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 irrigated pasture portion located in Thibaut Field was assessed using irrigated pasture condition scoring and the upland portions of the field were evaluated using range trend and utilization transects. The Rare Plant Management Area is evaluated using range trend and utilization transects. The Riparian Exclosure has been excluded from grazing for 11 years.

Summary of Utilization

The following tables present the summarized utilization data for each pasture/field, and each transect within the pasture.

Grazing Utilization, Thibaut Lease (RLI-430), 2007-2016

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Rare Plant Management	87%	46%	61%	2%	38%	39%	20%	27%	11%	25%
Thibaut Field	85%	37%	22%	17%	25%	12%	4%	10%	2%	19%
Waterfowl Management	57%	OFS	FLOOD	19%	38%	BURN	0%	46%	32%	8%
Riparian Utilization, 40%										

Table 7. 3 Grazing Utilization, Thibaut Lease (RLI-430), 2007-2016

Fields/Pastures	Transect	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Rare Plant Management	RAREPLANT_2	76%	32%	77%	0%	48%					
	RAREPLANT_3	98%	52%	58%	7%	46%	45%	4%	25%	8%	13%
	THIBAUT_2	88%	55%	49%	0%	19%	34%	36%	29%	13%	34%
Thibaut Field	THIBAUT_3	89%	65%	36%	65%	74%	15%	20%	40%	6%	56%
	THIBAUT_8		15%	8%	4%	0%	14%	0%	0%	0%	7%
	THIBAUT_9		3%	6%	0%	0%	0%	0%	0%	0%	0%
	THIBFIELD_2	81%	64%	62%	31%	76%	30%	0%	22%	1%	44%
	THIBFIELD_3			13%	3%	0%		5%	0%	0%	2%
	THIBFIELD_4			6%	0%	0%	0%	0%	0%	0%	7%
Waterfowl Management	THIBAUT_1	80%	0%	FLOOD	3%		BURN	0%	50%	40%	3%
	WATERFOWL_2	15%	0%	FLOOD	40%	30%	BURN	0%	56%	30%	16%
	WATERFOWL_3		0%	FLOOD	21%	33%	BURN	0%	33%	25%	4%
	WATERFOWL_4	57%	0%	FLOOD	11%	51%	BURN	0%			
	WATERFOWL_5	77%	0%	FLOOD		39%	BURN	0%			
Riparian Utilization, 40%											

Summary of Utilization

Utilization on the Thibaut Lease has been within the upland standard of 65% in the Thibaut Field. There been some problems in the Rare Plant Field and Waterfowl Management Area due to the special grazing parameters that have been placed on the fields. These issues have been resolved by adjusting stocking rates and timing in the fields. Other management changes have been to feed livestock in different locations and the use of a stockwater well to help better distribute livestock in the Thibaut Field. There are no planned management changes for the lease.

Summary of Range Trend Data and Conditions

Range trend transects were sampled in 2014 and will be revisited in the summer of 2017.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Thibaut Ranch (RLI-430), 2011-2016

Pasture	2011	2012	2013	2014	2015	2016
Thibaut Field	82%	81%	78%	X	X	80
X Indicates no evaluation made						

The northern portion of the Thibaut Pasture (85 acres) comprises the area managed as irrigated pasture for the Thibaut Lease. A result of the completion of the waterfowl management area to the north and the rare plant field to the south is a grazing corridor, which puts heavy pressure on the irrigated pasture. Grazing prescriptions were reinstated for the waterfowl management area this year. This put pressure on the irrigated portion of the lease decreasing its irrigated pasture condition rating to 78%.

LADWP Watershed Resources staff recommends that livestock be moved out of the area periodically during the grazing season to allow the area to rest. This may be achieved by supplemental feeding further south in the Thibaut Field, electric fencing, or turning the livestock out in the southern end of Thibaut Field instead of the corral area.

Stockwater Sites

There is one developed water site in the Thibaut Field, which consists of a flowing well that has a stockwater well drilled next to it, located in the uplands east of the irrigated pastures in the Thibaut Field. Currently, the flowing well is still creating a small puddle area for livestock and wildlife. The lessee has also installed a trough near the well.

Fencing

There was no new fence constructed on the lease in 2016.

Salt and Supplement Sites

Hay is spread in locations of the lessees choosing using a truck or a trailer pulled by a truck. Feeding areas had been changed during the 2012-13 grazing season resulting in decreased utilization in the Thibaut Field.

Islands Lease (RLI-489)

The Islands Lease is an 18,970-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.

Summary of Utilization

The following tables present the summarized utilization data for each pasture/field, and each transect within the pasture.

Grazing Utilization for Fields and Pastures, Islands Lease (RLI-489), 2007-2016

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
***Carasco Riparian South**	28%	18%	11%	0%	0%	26%	21%	9%	5%	41%
***Depot Riparian**	82%	29%	30%	30%	20%	53%	43%	45%	56%	41%
Lubkin	48%	0%	14%	0%	0%	5%	6%	3%	16%	34%
***River Field**	42%	11%	27%	4%	15%	50%	17%	27%	20%	15%
South Field	52%	31%	8%	3%	23%	10%	0%	0%	0%	26%
****Riparian Utilization, 40%***										

Grazing Utilization for Transects, Islands Lease (RLI-489), 2007-2016

Fields/Pastures	Transect	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
***Carasco Riparian South**	ISLAND_6	28%	18%	11%	0%	0%	26%	21%	9%	5%	41%
***Depot Riparian Field**	ISLAND_8	72%	18%	12%	20%	0%	68%	27%	31%	23%	25%
	ISLAND_9	92%	40%	49%	49%	25%	67%	39%	91%	71%	48%
	RIVERF_7				26%	29%	52%	47%	19%	60%	61%
	RIVERF_9				9%	8%	9%		51%	31%	15%
	RIVERF_12				44%	41%	71%	58%	38%	63%	53%
Lubkin	Lubkin_1	48%	0%	14%	0%	0%	5%	6%	3%	16%	34%
***River Field**	ISLAND_7	63%		46%	0%	0%		0%	0%	0%	0%
	ISLAND_10	63%	16%	3%	28%	0%	40%	44%	68%	25%	40%
	ISLAND_11	0%	6%	22%		11%	6%	0%	0%	7%	0%
	ISLAND_12			25%	0%	34%	31%	0%	52%	28%	28%
	RIVERF_8			47%	3%	0%	71%	52%	46%	34%	0%
	RIVERF_11				0%	58%	89%	0%	0%	20%	20%
	RIVERF_6				0%	0%	31%		0%	0%	0%
	ISLAND_14						81%	20%	48%		67%
South Field	ISLAND_2	31%	15%	8%	0%	23%	0%	0%	0%	0%	14%
	ISLAND_59	74%	47%	18%	0%	0%	0%	0%	0%	0%	29%
	SOUTHF_2			3%	7%	24%	19%	0%	0%	0%	36%
****Riparian Utilization, 40%***											

Summary or Utilization

The Depot Riparian Field and River Field were below the allowable standard of 40%. The use on the west side of the river, specifically the Islands was low. The Carasco Riparian Field and South Field were well below the utilization standards. Supplement was observed in a few locations on the floodplain in the Depot Riparian and River Fields. Overall, supplement has been moved off of the floodplains in all fields, having a direct result in the decreased utilization in the River Field.

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 will result in the loss of meadow habitat and the creation of marsh.

Summary of Range Trend Data in Islands

Range trend transects were sampled in 2014. These sites will be resampled again in 2017.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Islands Lease (RLI-489), 2007-2016

Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
B Pasture	96	X	X	90	X	X	90%	X	X	88
D Pasture	96	X	X	94	X	X	90%	X	X	88

X indicates no evaluation made

Summary of Irrigated Pastures

The B and D Pastures located near Reinhackle Spring were rated in 2013 and received an irrigated pasture condition score of 90%.

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

There were no new fences constructed 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 an 8,274-acre cow/calf operation divided into 11 pastures and adjacent to a private ranch land. Grazing on the lease occurs from January 1 to March 30 and then 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.

Summary of Utilization

The following tables present the summarized utilization data for each pasture/field, and each transect within the pasture.

Grazing Utilization for Fields and Pastures, Lone Pine Lease (RLI-456), 2007-2016

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Johnson Field	44%	0%	34%	63%	14%	0%	WAIVED	79%	0%	21%
River Field	77%	49%	55%	36%	32%	37%	BURNED	37%	34%	30%
****Riparian Utilization, 40%***										

Grazing Utilization for Transects, Lone Pine Ranch (RLI-456), 2007-2016

Fields/Pastures	Transect	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Johnson Field	LONEPINE_5	44%	0%	34%	63%	14%	0%	WAIVED	79%	0%	21%
***River Field**	LONEPINE_1	80%	45%	61%	49%	28%	22%	BURNED	38%	42%	26%
	LONEPINE_2	79%	47%	48%	25%	30%	32%	BURNED	30%	35%	29%
	LONEPINE_3	81%	49%	70%	37%	52%	63%	BURNED	64%	49%	45%
	LONEPINE_4	67%	55%	47%	32%	45%	45%	BURNED	20%	40%	29%
	LONEPINE_7		52%	51%	38%	8%	21%	BURNED	17%	19%	25%
	LONEPINE_8						42%	BURNED	52%	21%	24%
****Riparian Utilization, 40%***											

Summary of Utilization

The Johnson Pasture had a utilization of 21%; grazing only occurred for a limited duration due to annual spring green up east of the Owens River and along the Los Angeles Aqueduct south of Lone Pine. The River Field utilization was 30%, grazing was even throughout the field with the highest utilization on LONEPINE_03.

Summary of Range Trend Data

Range trend transects were not read in 2016.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Lone Pine Ranch (RLI-456), 2007-2016

Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Edwards	80	80	80	90	X	X	84	X	X	84
Richards	64	82	82	84	X	X	84	X	X	84
Van Norm	X	X	X	80	X	X	84	X	X	84
Old Place	86	X	X	90	X	X	84	X	X	76
Smith	88	X	X	96	X	X	84	X	X	84
Miller	94	X	X	86	X	X	86	X	X	84

X indicates no evaluation made

Summary Irrigated Pastures

All of the pastures were rated in 2013 and were above the required minimum irrigated pasture condition score of 80%, despite a dry year and lack of irrigation water. In 2016 pastures remained above the allowable standard and with current precipitation in 2017 they should recover.

Stockwater Sites

One stockwater well was drilled on the Lone Pine Lease located in the River Pasture uplands. The approximate location is 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. Watershed Resources staff and pump mechanics have assessed the condition of the well and it has been determined that the well is not operable. A new well location has been selected and a new well will be drilled in 2015-17.

Fencing

There was no new fence constructed on the lease in 2016. Repairs have been made to the existing exclosure due to the fire in February of 2013.

Salt and Supplement Site:

All supplement tubs were situated outside of the floodplain.

Delta Lease (RLI-490)

The Delta Lease is a cow/calf operation and consists of 7,110 acres divided into four pastures. There are four fields located with the LORP project boundary: Lake Field, Bolin Field, Main Delta Field, and the East Field. 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 with state lands leases.

Grazing utilization is currently only conducted in the Main Delta Field which contains the Owens River. The Lake Field is evaluated using irrigated pasture condition scoring. The East Field, located on the upland of Owens Lake, supports little in the way of forage and has no stockwater.

Summary of Utilization

The following tables present the summarized utilization data for each pasture/field, and each transect within the pasture.

Grazing Utilization for Fields/Pastures, Delta Lease (RLI-490), 2007-2016

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bolin Field						65%	26%	16%	0%	0%
Main Delta	58%	58%	53%	51%	38%	43%	31%	37%	41%	49%
***Riparian Utilization, 40%**										

Grazing Utilization for Transects, Delta Lease (RLI-490), 2007-2016

Fields/Pastures	Transect	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bolin Field	BOLIN_1						0%	25%	16%	0%	0%
	BOLIN_2						65%	26%		0%	0%
***Main Delta Field**	DELTA_1	58%	56%	59%	70%	38%	30%	19%	39%	35%	53%
	DELTA_3	72%	60%	54%	71%	12%	45%	26%	50%	8%	59%
	DELTA_4	83%	50%	55%	62%	33%	44%	38%	30%	11%	63%
	DELTA_5	50%	73%	54%	29%	50%	42%	40%	22%	60%	43%
	DELTA_6	26%	50%	35%	23%	42%	41%	26%	30%	66%	55%
	DELTA_7	60%	65%	61%	49%	51%	58%	36%	49%	63%	20%
***Riparian Utilization, 40%**											

Summary of Utilization

Utilization in the Main Delta was has been high over the years. The data at the transect level shows, that use is usually higher in the western and southern portions of Main Delta Field. However, since the construction of the drift fence west of the Pumpback Station in 2010, cattle are now put on the Owens Lake Delta at the beginning of the season. With the construction of the drift fence, this has kept cattle from drifting to the main Delta until later in the grazing season. Since the implementation of the LORP, forage production in the Owens Lake Delta has increased substantially allowing livestock to remain on the Delta for a longer period of the grazing season. Even with the heavy utilization on Delta 5,6,and 7 utilization overall was 49% for 2016.

The 2017 grazing season will be required to adhere to a 30% utilization standard on the Main Delta, as a result of exceeding utilization in 2016.

Summary of Range Trend Data and Conditions

Delta Field

DELTA_01 is located in the Delta Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. The site is dominated by saltgrass with a small alkali sacaton component. The site has remained static during all eight sampling periods. DELTA_02 is located in a grazing exclosure in the Delta Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes which corresponds to the Moist Floodplain ecological site. Plant frequencies in 2016 did not change when compared to 2013. However saltgrass remains at a low level during the past two sampling periods (2013 and 2016). Rubber rabbitbrush cover appears to be trending downwards. Because the transect is now within an exclosure, utilization was not sampled after 2008.

DELTA_04 is located in the Delta Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. The site has remained relatively stable since vegetative sampling began, saltgrass did increase in 2016. Utilization was 63% the winter prior to 2016 sampling.

DELTA_05 is located in the Delta Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes, which corresponds to the Moist Floodplain ecological site. The site has remained relatively stable since vegetative sampling began and there were no significant changes in frequency values in 2016.

DELTA_07 is located in the Delta Field, soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, 0-2% slopes which corresponds to the Moist Floodplain ecological site. This site has remained static until 2016 where a significant saltgrass decrease occurred. Utilization prior to sampling was 20%.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Delta Lease (RLI-490), 2007-2016

Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Lake Field	92	X	X	84	X	X	74	X	X	74

X indicates no evaluation made

The Lake Field is located west of U.S. Highway 395 north of Diaz Lake. This irrigated pasture was evaluated in 2013 and received a score of 74%. This is below the allowable score of 80%. The reason for the decreased condition of this pasture is due to drought conditions that impeded water distribution over the field. LADWP Watershed Resources Staff do not believe that changes are necessary at this time.

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. The resulting analysis has stockwater being supplied from a diversion that runs from the LAA. The status of this stockwater situation has not changed in 2014.

Fencing

No new fencing projects occurred in 2016.

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 is a cow/calf operation that produces registered Red Angus cows.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores, Brockman Lease (RLI-401), 2007-2016

Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1	Dry	Dry	Dry	68	78	Dry	72	60	60	Dry
2	88	X	X	90	X	X	89	68	68	82
3	88	X	X	92	X	X	76	68	68	82
4	92	X	X	98	X	X	88	96	96	86
5	84	X	X	94	X	X	84	82	82	86
6	86	X	X	96	X	X	94	96	96	90
7	86	X	82	96	X	X	90	86	86	90
8	86	X	Dry	Dry	X	X	78	80	80	82
9	86	X	X	96	X	X	94	94	8094	90

X indicates no evaluation made

Summary 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.

Stockwater Sites

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

Fencing

No new fencing projects occurred in 2016.

Salt and Supplement Site:

Hay and mineral are supplied for supplementing feeding.

3.3.2.2. OVLMP Recreation Management 2016 Monitoring Report

OVLMP Recreation Management Component

Chapter 4 of the OVLMP describes LADWP's goals, objectives, policies, and guidelines for future management with respect to recreation in the project area. Section 4.4 of that chapter outlines several projects to address areas of specific concern that had experienced resource damage as a result of recreational use. These projects are described below with a status update provided.

Monitoring

Monitoring for this project includes a series of photo points that were established prior to project implementation. Reporting for this project will be based on photo point documentation of changes over time, and reports include photos from monitoring locations, general information on noted changes, and any further information regarding modification to management prescription, if applicable. Monitoring and reporting for this project is conducted by periodic patrols by Watershed Resources Staff in their daily tasks. Goals in monitoring include notification of vandalism and success of the management measures in the field.

The OVLMP recreation sites were visited by LADWP Staff on July 25-26, 2016. LADWP conducted photo point monitoring and assessed fence and signage condition (where applicable) and has generated recommendations for the project locations where necessary. Photo points were established in April 2011 and were recaptured at the peak of the growing seasons from 2011-2016. These photos can be made available upon request.

Owens River: Pleasant Valley Reservoir to Highway 6

Description: LADWP implemented a riparian fencing project between Pleasant Valley Reservoir and Highway 6 to improve the riparian health along the Owens River. Fencing was installed parallel to Chalk Bluffs Road. Boulders were used in lieu of fencing where the river is adjacent to the road. Designated parking areas, walkthrough access points (handicap and otherwise), and informational signs were also established along the new fence line. The size of the parking areas varied depending on the location. Walkthrough and/or other handicap access was provided at each parking area, and at supplemental locations along Chalk Bluffs Road. This project has been coordinated in conjunction with LADWP's Grazing Management Plans to meet grazing management and recreational use goals along the river. This project will also benefit species protection efforts under LADWP's Conservation Strategy for the Southwestern Willow Flycatcher.

Pleasant Valley (Former Boat Ramp)

Photo Point Monitoring: LADWP installed fencing along this section of the river in 2008. Parking areas outside the riparian corridor were established and walkthroughs were installed. The photos below show conditions following implementation of riparian fencing compared to the past growing season (both locations shown below are now fenced off from vehicular access). Saltgrass *(Distichlis spicata)* and Baltic rush (*Juncus balticus)* recruitment looks healthy and has established in the disturbed road areas.

Pleasant Valley #1, April 2011

Pleasant Valley #1, July 2016

Pleasant Valley #2, April 2011

Pleasant Valley #2, July 2016

Fence and Sign Condition: The fence and signs are in good condition. During the time of the site visit, the gate was found open and vehicles had been accessing the river. The gate was closed and locked and the lessee was notified to keep it closed.

Recommendations: None. This project is performing as intended. Annual photo point monitoring will be discontinued. This project will continue to be monitored through periodic patrols and maintenance will occur as necessary.

Pleasant Valley (Handicap Access 1 & 2)

Photo Point Monitoring: Saltgrass and alkali sacaton (*Sporobolus airoides)* recruitment looks healthy and has established well over the old road at handicap access area 1. No photo points have been established at handicap access area 2. However, native recruitment at this area is also well established and healthy.


04/11/2011

Pleasant Valley Handicap Access April 2011


2014/07/22

Pleasant Valley Handicap Access July 2016

Fence and Sign Condition: The fence and signs are in good condition at both Handicap access areas.

Recommendations: None. This project is performing as intended. Annual photo point monitoring will be discontinued. This project will continue to be monitored through periodic patrols and maintenance will occur as necessary.

Pleasant Valley (Bank by Burned Cottonwood)

Photo Point Monitoring: Saltgrass and alkali sacaton recruitment looks healthy and has established well over disturbed areas. As depicted below, narrowleaf willows (*salix exigua)* on the right bank have matured and extended further out into the channel. Cattails (*Typha sp*.) on the left bank have matured and are extended into the channel.

Pleasant Valley Cottonwood April 2011

Pleasant Valley Cottonwood July 2016

Fence and Sign Condition: The fence and signs are in good condition.

Recommendations: None. This project is performing as intended. Annual photo point monitoring will be discontinued. This project will continue to be monitored through periodic patrols and maintenance will occur as necessary.

Pleasant Valley (bank/pasture-access from boulder lot)

Photo Point Monitoring: Saltgrass recruitment is occurring at this location. Due to the lack of recruitment from exclusion alone, LADWP tilled the compacted soil in the fall of 2013 to promote growth.

Pleasant Valley Boulder Lot, April 2011

Pleasant Valley Boulder Lot, July 2016

Fence and Sign Condition: The fence and signs are in good condition.

Recommendations: None. This project is performing as intended. Annual photo point monitoring will be discontinued. This project will continue to be monitored through periodic patrols and maintenance will occur as necessary.

Owens River: Highway 6 to Tinemaha Reservoir

The Owens River between Highway 6 and Tinemaha Reservoir have several areas that have incurred resource damage due to high levels of recreational use. These problem areas occur where the river intersects Highway 6, East Line Street, Warm Springs Road, and Highway 168.

LADWP placed boulders and may use other barrier devices if necessary, to obstruct direct vehicular access to the banks of the river. LADWP may also install designated parking areas with walkthrough access points as well as signage in key locations where appropriate.

Highway 6 and the Owens River

Description: LADWP installed boulders to restrict vehicular access to the banks of the Owens River and to define parking areas in 2010. The photos below show conditions over the past four growing seasons from the Highway 6 bridge.

Photo Point Monitoring: Vegetation at this photo point looks healthy. This area is popular for fishing and other recreational activities. Some trash was found throughout the area but there were no signs of vandalism.

Fence and Sign Condition: N/A

Recommendations: None. This project is performing as intended. Annual photo point monitoring will be discontinued. This project will continue to be monitored through periodic patrols and maintenance will occur as necessary.

Hwy 6 (from bridge), April 2011

Hwy 6 (from bridge), July 2016

Highway 6 and the Owens River (North Parking Area)

<u>*Photo Point Monitoring:*</u> Broadleaf pepperweed (*Lepidium latifolium*) is an invasive and prolific plant and is present on the right bank. By the time the photo points were reoccupied in 2016 the pepperweed had been treated with herbicide. Fivehorn smotherweed (*Bassia hyssopifolia)* was still present but had not increased in abundance in the disturbed area. Torrey's saltbush *(Atriplex Torreyi) and* rubber rabbitbrush *(Ericameria nauseosa*) are abundant and healthy throughout the site. No signs of vandalism were observed.

Hwy 6 & Owens River North Parking, April 2011

Hwy 6 & Owens River North Parking, July 2016

<u>*Fence and Sign Condition:*</u> N/A

<u>*Recommendations*</u>: None. This project is performing as intended. Annual photo point monitoring will be discontinued. This project will continue to be monitored through periodic patrols and maintenance and weed treatment will occur as necessary.

Highway 6 and the Owens River (South Parking Area)

Photo Point Monitoring: Torrey's saltbush and American licorice have established where fivehorn smotherweed was previously abundant. The road and parking area are barely recognizable in 2016 due to the establishment of native shrubs. No signs of vandalism were present.

Hwy 6 & Owens River South Parking, April 2011

Hwy 6 & Owens River South Parking, July 2016

Fence and Sign Condition: N/A

Recommendations: None. This project is performing as intended. Annual photo point monitoring will be discontinued. This project will continue to be monitored through periodic patrols and maintenance will occur as necessary.

East Line Street and the Owens River

Description: LADWP installed boulders to restrict vehicular access to the banks of the Owens River and to define a parking area in 2010.

Photo Point Monitoring: The photos below show conditions following the placement of boulders at East Line Street as well as conditions this past growing season. Overall vegetation looks healthy. Willows along right bank appear to be healthy and growing Boulders remain in good condition and are keeping vehicles off the bank. This area continues to be popular for river floats and fishing. At the time of the photo point monitoring, trash was scattered throughout the area. Due to the amount of trash, LADWP sent personnel the following week for cleanup in this area. No other signs of vandalism were present.

East Line Street, April 2011

East Line Street, July 2016

Fence and Sign Condition: The fence and signs are in good condition.

Recommendations: None. This project is performing as intended. Annual photo point monitoring will be discontinued. This project will continue to be monitored through periodic patrols and maintenance and cleanup will occur as necessary.

East Line Street and the Owens River (Bank)

Photo Point Monitoring: Two to three feet of the right bank has collapsed into the river since 2011. The narrowleaf willow near the bridge has increased in size and a new stand has established in the foreground. No signs of vandalism were present beyond the trash mentioned above.

East Line & Owens River Bank, April 2011

East Line & Owens River Bank, July 2016

<u>Fence and Sign Condition:</u> The fence and sign are in good condition.

<u>Recommendations</u>: None. This project is performing as intended. Annual photo point monitoring will be discontinued. This project will continue to be monitored through periodic patrols and maintenance and cleanup will occur as necessary.

Warm Springs Road and the Owens River

<u>Description:</u> LADWP installed fencing and pedestrian walkthroughs to control access to this location that had endured heavy recreational use.

<u>Photo Point Monitoring:</u> The photos below were taken inside the area that has been restricted from vehicular use following placement of controls. The road has been reclaimed by the native vegetation. The photo on the right depicts vegetation recruitment from the past five growing seasons. There were no signs of vandalism and the site has not been impacted any further by cattle or humans.

Warm Springs (toward river), April 2011

Warm Springs (toward river), July 2016

<u>Fence and Sign Condition:</u> The fence is in good condition.

<u>Recommendations</u>: None. This project is performing as intended. Annual photo point monitoring will be discontinued. This project will continue to be monitored through periodic patrols and maintenance will occur as necessary.

Highway 168 and the Owens River

<u>Description:</u> LADWP installed boulders and telephone poles to restrict vehicular access to the banks of the Owens River and to define a parking area in 2010 where the river intersects Highway 168.

Photo Point Monitoring: The photos below are taken from the designated parking area after vehicular controls were installed. Telephone poles have been effective at keeping vehicles off of the riverbank since implementation and vegetation has reestablished these areas. Some trash was present when the photo points were taken in 2016.

Hwy 168 & the Owens River, April 2011

Hwy 168 & the Owens River, July 2016

Fence Sign and Area Condition: The restoration sign is in good condition as well as the telephone poles and boulders. A hill climb has formed between the parking area and Highway 168 as shown in the photo below. This activity not only impacts the vegetation in the area it also leads to erosion that could possibly enter the river.

Hwy 168 & the Owens River, July 2016

Recommendations: Boulders will be placed in the area of the hill climb to prevent direct access from Highway 168. Otherwise, this project is performing as intended. Annual photo point monitoring will be discontinued. This project will continue to be monitored through periodic patrols and maintenance will occur as necessary.

Highway 168 and the Owens River (Bank)

Photo Point Monitoring: The photos below depict the Owens River bank after telephone poles were installed to restrict vehicular access to a designated parking area. The photo on the right depicts vegetation recruitment from the past five growing seasons. Native vegetation such as saltgrass and narrowleaf willow is becoming reestablished along the bank.

Hwy 168 & Owens River Bank, April 2011

Hwy 168 & Owens River Bank, July 2016

Fence and Sign Condition: The wood posts are present and in good condition.

Recommendations: None. This project is performing as intended. Annual photo point monitoring will be discontinued. This project will continue to be monitored through periodic patrols and maintenance will occur as necessary.

Steward Lane and the Owens River

Status: Bank condition and riparian vegetation have improved at Steward Lane since the OVLMP was written, thus treatment in this area has been deemed unnecessary.

Owens River: Tinemaha Reservoir to Los Angeles Aqueduct Intake

Description: The section of the Owens River directly south of Tinemaha Reservoir receives high use for fishing and other types of recreation. Currently, there is a parking area just below the dam that accommodates a number of vehicles and allows walking access to the river upstream of this location. There is also a network of roads along the river banks, which receives heavy recreational use.

To manage for current and future uses in this area, LADWP considered installing boulders or railroad ties along the north and east side of the existing parking area to discourage vehicles from driving directly up to the stream banks. However, from 2013-2016 resource impacts appeared to be reduced compared to prior years. There was some trash, but overall the site was not heavily impacted.

Recommendations: Resource impacts appear to be reduced from past use; therefore LADWP is not proposing any additional controls at this time. Use in this area will continue to be monitored and vehicle restrictions will be implemented as necessary if resource concerns arise. Placing signage in this area may also help reduce future impacts.

Motocross Use Off of Reata Lane:

Description: City land southwest of Bishop off of Reata Lane is a popular location for motocross. This area is not currently leased and is used by OHV enthusiasts at their own risk. LADWP will sign the area as City property to notify users of restrictions and that LADWP will not assume liability for this use of the area. LADWP will remain open to leasing this area to private entities as it has in the past, with the understanding that interested parties can provide a proposal along with the appropriate insurance to cover activities conducted on City lands. For special motocross events, LADWP will make the area available with the understanding that interested parties must submit their request in writing to use the area and a letter of permission will be granted if approved by the appropriate LADWP staff. All requests for use must be made in writing and have proof of insurance. This strategy promotes the use of this area by OHV enthusiasts over in order to curtail the impacts to more sensitive resource areas in other locations.

Status: This area is signed as City property. While some entities have expressed interest, there have been no formal requests to host motocross events on City lands in the Reata area.

Recommendations: None.

Buttermilk

Description: LADWP will continue to coordinate with the Inyo National Forest (INF) and the Bureau of Land Management (BLM) to discourage dispersed camping on City lands.

If necessary, boulders or other barrier devices will be placed to prevent vehicle access to the waterways and prevent unauthorized camping. LADWP will increase signage in the area to educate visitors about the camping policies on City property and proper use of the land. Fire rings will be removed, as fires are only allowed in the Department's thirteen designated campgrounds. LADWP will also place a permanent informational kiosk in the Buttermilk Country to educate the public about recreation policies as well as property boundaries between private (LADWP) and public (INF and BLM) lands. LADWP will work jointly with these agencies on the content of the information provided at the kiosk and explore cost sharing opportunities.

Status: The INF installed a kiosk in the Buttermilk that shows access roads and camping/campfire policies on federal lands.

Due to consecutive drought years, in combination with an increase in unauthorized camping and campfires throughout the buttermilk area on City lands, fire danger is extremely high. LADWP installed signage in Spring 2012 at the beginning and end of City property on Buttermilk Road and other access roads. However, recreationists utilizing the area continue to ignore this signage. The number of fire rings, as well as the amount of trash and broken bottles has significantly increased since 2013. Fire rings are periodically removed from City land when noted in patrols. Cal Fire assists in this activity.

Vandalism to Signage in the Buttermilk Area, April 2016

Trash and Illegal Fire in Buttermilk Area, April 2016

Recommendations: LADWP will continue to remove fire rings and replace signage as necessary to control use in this area. LADWP may also close roads in this area as necessary if access poses significant resource damage or fire risk.

Klondike Lake

Description: The Klondike Lake Project is an Enhancement/Mitigation Project that was adopted in 1986 to enhance an alkali sink north of Big Pine that was intermittently filled with water throughout the year. The project used water management to provide and enhance nesting and feeding habitat for waterfowl, while maintaining a lake level to support a variety of recreational activities such as boating, water skiing, swimming, and other water sports.

LADWP will coordinate with Inyo County to explore options for waste management at Klondike Lake and may pursue trash and toilet facilities (operation and maintenance would be the responsibility of Inyo County).

Status: To date, there has been no progress on improving sanitation facilities in this area through Inyo County.

Beginning in 2010, LADWP began requiring inspections of watercraft to prevent the infestation of quagga and zebra mussels LADWP facilities. As a consequence, watercraft access to Klondike Lake is permitted each summer from Memorial Day to Labor Day and is regulated by LADWP. Vehicles without watercraft can still access the lake unrestricted year-round.

Recommendations: Klondike will continue to be monitored through periodic patrols. LADWP may pursue use of trash facilities to manage public use in the future.

Projects Applicable to the Entire Management Area

Description: Many roads are in need of repair, closing and/or rerouting on City lands were multiple roads lead to the same destination. LADWP will implement changes in road networks on City lands that are financially feasible and can be conducted with current Watershed Resources and Construction personnel. In some cases, ripping and seeding reclaimed road surfaces is recommended in order to achieve particular goals; in other cases, simply blocking access to a road is more appropriate. These changes will be implemented on a priority basis, and will be monitored periodically by LADWP personnel.

Status: In progress. Road closures have been/will be completed on an as-needed basis.

Additional Recreation Work on City of Los Angeles Lands

Rawson Ponds #1, #2, and #3 and Saunders Ponds

Since the implementation of the 2010 OVLMP, LADWP has actively maintained Rawson Ponds #1, #2, and #3, as well as Saunders Pond (all east of Bishop). These ponds are part of LADWP's Buckley Ponds and Saunders Ponds Enhancement Mitigation Projects but are also mentioned here due to their popularity for recreational use. These ponds are very popular for fishermen, and recreationists also use the surrounding area for walking, jogging, hunting, bird watching, and photography. These ponds were cleared of aquatic vegetation to improve the recreational fishing in the area. Handicap accessible docks were constructed at each pond by the local Lion's Club. Work on Rawson Ponds occurred 2011-2014 and on Saunders Pond 2015-2016. Similar work may commence at Duck Pond in the future if resources allow and it would be beneficial for LADWP operations and local recreation.

LADWP will maintain these ponds as needed (and as resources allow) with assistance from CDFW. These areas will be patrolled and monitored regularly and problems will be addressed accordingly. Additional changes in management will be discussed in LADWP's Annual Owens Valley Report.

The following describes work performed at each pond and photo documentation of 2016 conditions.

Rawson Pond #3

Starting in December 2011 and concluding in March 2012, LADWP, Cal Fire, and a group of local volunteers burned, cleaned, and removed aquatic vegetation from Rawson Pond #3. The local Lion's Club built a handicap accessible fishing platform on the southeast side of the pond. LADWP rebuilt the outlet structure on the southeast end of the pond. The photos below depict the 2016 condition of the pond.


Rawson Pond #3, July 2016


Rawson Pond #3, July 2016

Rawson Pond #1

The winter of 2012/2013, LADWP, Cal Fire, and a group of local volunteers burned, cleaned, and removed aquatic vegetation in the pond. At the same time the pond was being cleaned the outlet structure was rebuilt and the local Lion's Club installed handicap accessible fishing platform. The photos below depict the 2016 condition of the pond.

Rawson Pond #1, July 2016

Rawson Pond #1, July 2016

Rawson Pond #2

Starting in January and finishing in April of 2014, LADWP, Cal Fire, and a group of local volunteers burned, cleaned and removed the aquatic vegetation from Rawson Pond #2. Pond #2 has a small island on the south east side with a bridge connecting it to the main shore. Southern California Edison volunteered to rehabilitate the bridge that was in need of repair. The local Lion's Club built a handicap accessible fishing platform on the island. LADWP rebuilt the outlet structure on the south end of the pond. The photos below depict the 2016 condition of the pond.

Rawson Pond #2, July 2016

Rawson Pond #2, July 2016

Saunders Pond

During the winter of 2015/2016, LADWP and Cal Fire conducted a controlled burn on Saunders Pond. Following this, LADWP cleaned and removed the remaining aquatic vegetation from the pond. The outlet structure for Saunders Pond was rebuilt and the local Lion's Club installed a handicap accessible fishing platform. The photos below depict July 2016 conditions pre-water but freshly cleaned, and October 2016 following rewatering.

Saunders Pond, July 2016

Saunders Pond, October 2016

3.3.3. 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 having a class "A" rating. Stipulated by the *California Department of Food and Agriculture,* this class of weeds must be eradicated or contained because of their high potential to cause either economic or environmental detriment. Currently there are three weeds found on City of Los Angeles lands in the Owens Valley that possess this rating. These weeds are: pepperweed, halogeton (*Halogeton glomeratus*) and Russian knapweed (*Rhaponticum repens*). Control of these weeds has been primarily accomplished with the use of herbicides. However, several integrated-pest management projects have been implemented in the past year and are currently being evaluated for their effectiveness. Figure 3.11 illustrates the locations of invasive species treated on City lands in 2016.

2016 Treatment Efforts

During 2016, all known pepperweed populations were treated with herbicide and most populations twice. Specifically, pepperweed along the Owens River floodplain/terrace was jointly treated between LADWP and Inyo County Department of Agriculture. The County treated from Pleasant Valley Reservoir downstream to Warm Springs Road (with exception to the Multiple Completion Field in the Five Bridges Area) and approximately three dozen pepperweed sites along the Lower Owens River. Downstream of Warm Springs Road to Tinemaha Reservoir was treated by LADWP along with the Multiple Completion Field. Additionally, LADWP treated pepperweed along most of the major ditches/canals in Bishop and a significant portion of the Big Pine Canal. LADWP also treated pepperweed at a site in Fish Slough, 1 site in Long Valley, and 8 sites on Owens Lake. Finally, populations of halogeton in the Laws area and knapweed near Big Pine were also treated.

The use of herbicide has been and continues to be the primary treatment option in controlling weeds in the Owens Valley. Applying herbicides at optimal times based on the weed's phenology has readily reduced and in some instances eradicated small infestations. However, in areas of dense infestation, the standalone effectiveness of using only herbicide is limited. This is particularly relevant to pepperweed and knapweed. In dense stands, these species develop extensive underground stems (rhizomes) which can radiate up to a horizontal distance of 10 feet from an individual plant. Additionally, these stems store ample energy reserves allowing them to develop new plants along these lateral branching stems. Among established populations of either pepperweed or knapweed, herbicide must be transported along the entire length of the rhizome to kill it; if not, the plant is able to re-grow and thus the difficulty of entirely eradicating these species using just herbicides.

To combat dense infestation of pepperweed and knapweed, several test plots were developed last year to evaluate using weed control strategies that don't rely solely on pesticides. In particular, these looked at mowing and tilling followed by herbicide application. After either mowing or tilling, a plant must expend a significant portion of its energy reserves to regrow, thus the plant is less like to regrow along its rhizomes. To test this concept, 2 individual treatments were established in the Multiple Completion Field: 1). mowing and 2). tilling. Following these treatments, herbicide was applied to the re-growth. To account for variabilities in topography, soils, depth to groundwater and both the density of existing pepperweed and native vegetation, 25 10x10 ft^2 plots were developed across 20-acres. Monitoring in late spring will evaluate the effectiveness of these treatments.

Additionally, a ¼-acre plot of pepperweed was mowed in mid-summer. This larger plot was developed to minimize the effect of neighboring pepperweed encroaching upon the treatment site. Results from late-fall monitoring showed the mowed plot had an average of less than 1 plant/m^2 compared to a neighboring site (which was sprayed twice, but not cut) that had 4 plants/m^2. Later this spring, repeat monitoring will validate if this results hold constant at the start of the growing season.

A similar treatment was performed on knapweed near Big Pine in a rare plant exclosure. Because of the presence of rare plants within a dense infestation of knapweed, the use of pesticides is limited. To control this population, knapweed was cut in late summer and the cuttings along with the underlying thatch were removed. The removal of this material, which is thought to chemically inhibit other plants from growing, by leaching zinc into the soil, should allow native grasses to slowly recolonize the site. To accelerate the recolonization, grass plugs will be planted later in the spring.

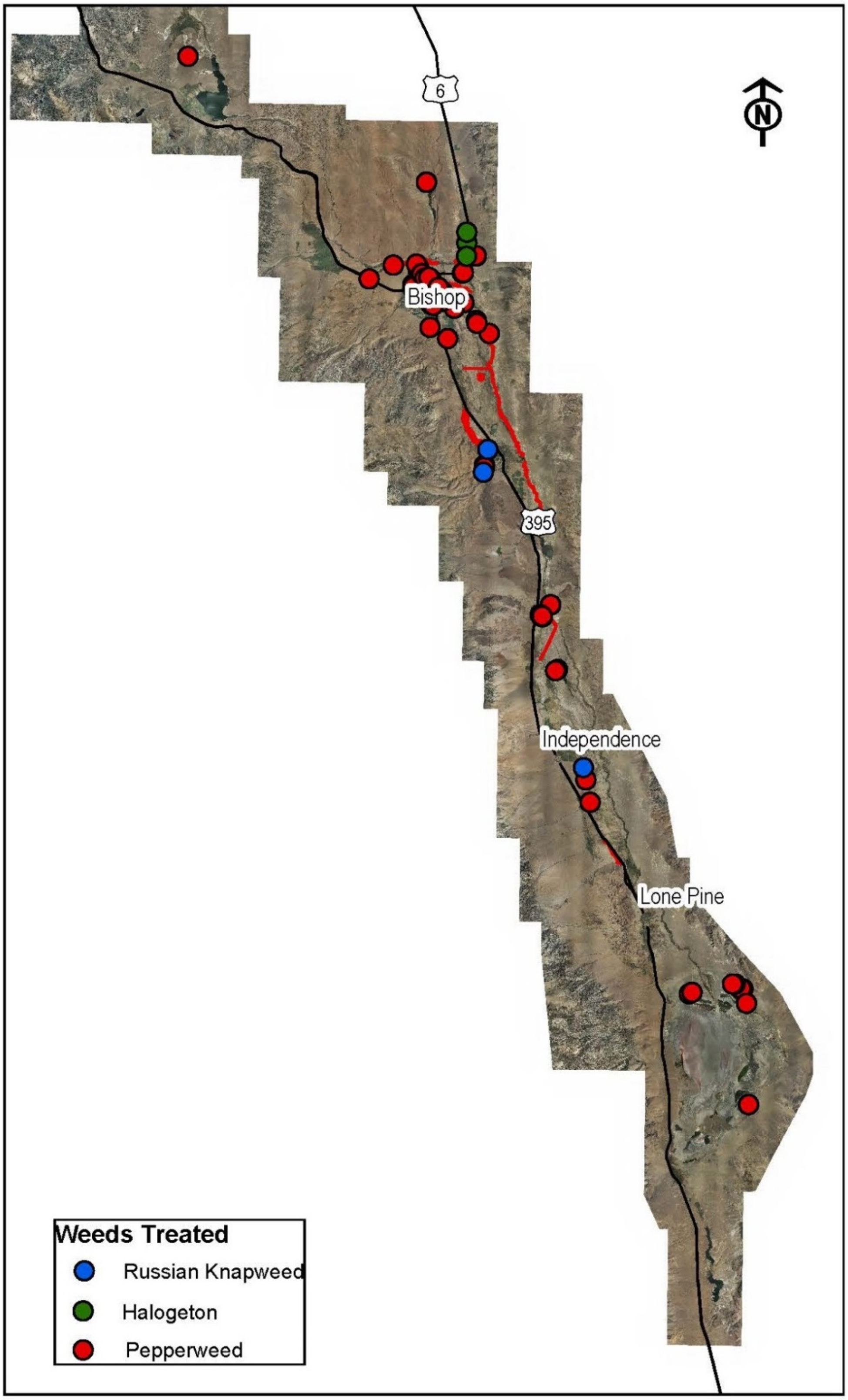


Figure 3. 11. Locations of Invasive Species Treated on City Lands in 2016

3.4. References

City of Los Angeles Department of Water and Power (LADWP), the County of Inyo, the California Department of Fish and Game, the California State Lands Commission, the Sierra Club, the Owens Valley Committee. 1997. *Memorandum of Understanding between the City of Los Angeles Department of Water and Power the County of Inyo, the California Department of Fish and Game, the California State Lands Commission, the Sierra Club, the Owens Valley Committee. Los Angeles Department of Water and Power, Bishop, California.*

City of Los Angeles Department of Water and Power (LADWP) and Ecosystem Sciences. *2010. Final Owens Valley Land Management Plan.* City of Los Angeles Department of Water and Power, Bishop, CA.

City of Los Angeles Department of Water and Power (LADWP). 2010. *Initial Study and Mitigated Negative Declaration for Owens Valley Land Management Plan.* Environmental Document prepared for CEQA compliance. Los Angeles, California, March 2010.

Garcia and Associates. 2010. Final Report. *Paleontological Identification and Evaluation Report and Recommended Mitigation Measures for the Los Angeles Department of Water and Power's Stockwater Wells Installation for the Owens Valley Land Management Plan, Inyo County, California.* Prepared for the Los Angeles Department of Water and Power by Garcia and Associates, subcontractor of MWH. San Anselmo, CA. March 2010.

McCombs Archaeology. 2006. Class III Heritage Resources Survey for the Riparian Corridor of the Middle Owens River Project. McCombs Archaeology, Taylorsville, CA.

Ecosystem Sciences 2004. *Yellow Billed Cuckoo Enhancement: Methodology For Yellow-Billed Cuckoo Micro-Habitat Suitability*. Prepared for Los Angeles Department of Water and Power in association with Dr. Steve Laymon

Los Angeles Department of Water and Power. 2009. Final Ad Hoc Yellow-billed Cuckoo Enhancement Plan. Bishop, CA.

Laymon, S. A. and M. D. Halterman. 1989. *A proposed habitat management plan for Yellow-billed Cuckoos in California*. USDA Forest Service Gen. Tech. Rep. PSW-110 p 272-277

Laymon, S. A. and P. L. Williams. 1999. *Yellow-billed Cuckoo in the Owens Valley*. In: Tech Memo #21, Appendix1. Ecosystem Sciences, Boise ID.

4.0 Appendices

APPENDIX A

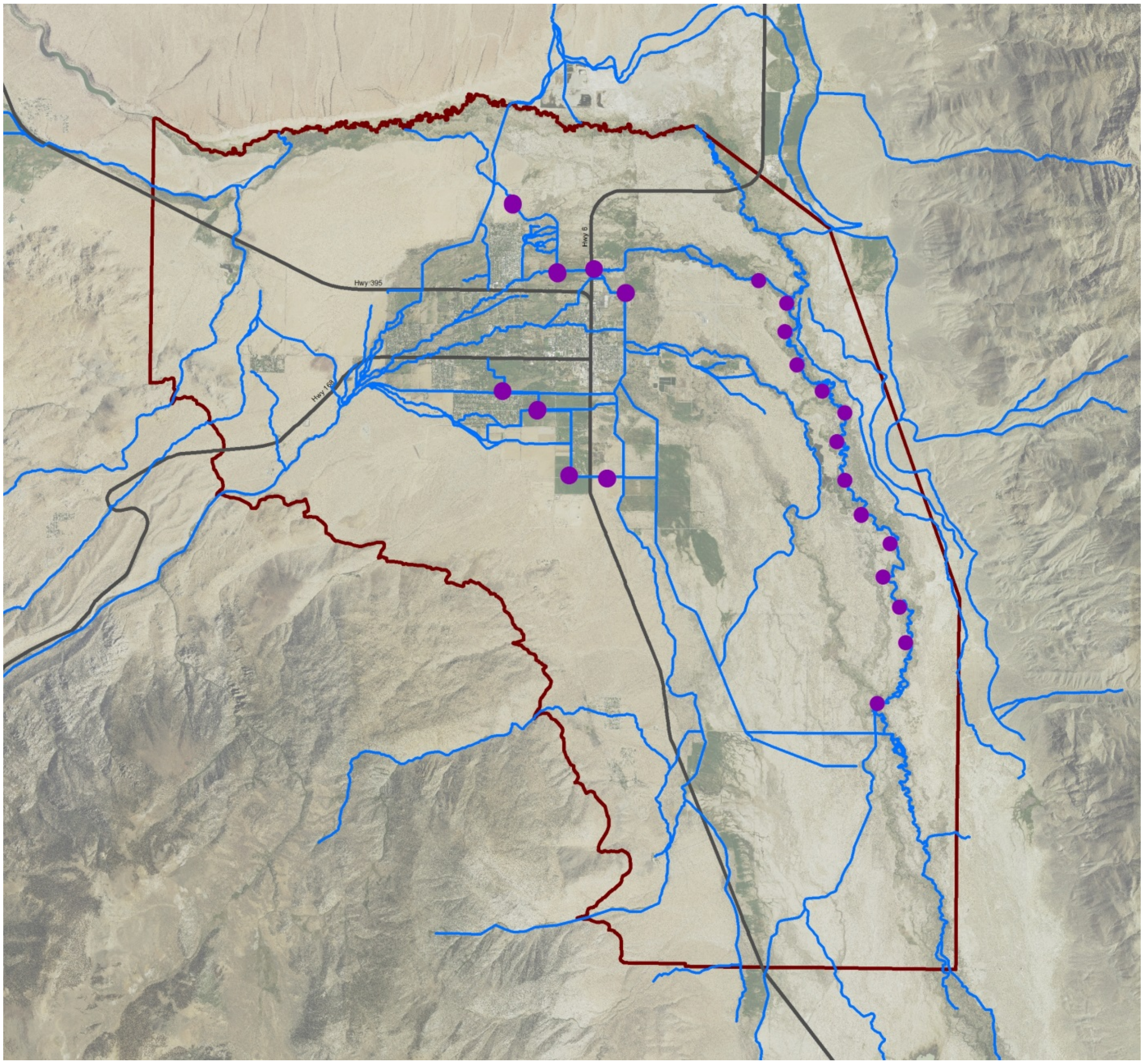
THE BISHOP CONE AUDIT FOR 2014-2015 RUNOFF YEAR

APPENDIX A

THE BISHOP CONE AUDIT FOR 2014-2015 RUNOFF YEAR

DRAFT

THE BISHOP CONE AUDIT
FOR THE 2014-15 RUNOFF YEAR



Keith Rainville
Hydrologist

Inyo County Water Department
Report 2014-15
January 15, 2016

THE BISHOP CONE AUDIT
FOR THE 2014-15 RUNOFF YEAR

TABLE OF CONTENTS

TABLES

FIGURES & MAP

APPENDICES

THE BISHOP CONE AUDIT
FOR THE 2014-15 RUNOFF YEAR

1.0 INTRODUCTION

The Bishop Cone Audit (Audit) is an annual comparison between Los Angeles Department of Water and Power's (LADWP) water usage on Los Angeles-owned lands on the Bishop Cone and the amount of groundwater extraction from wells on the Bishop Cone. The Bishop Cone Audit is required by the Inyo County/Los Angeles Long-term Groundwater Management Agreement (Water Agreement). The "Bishop Cone" is a reference to the legally defined area in the 1940 Hillside Decree which incorporates most of the Bishop Creek alluvial fan along with a portion of the northern Owens Valley from Bishop south towards Big Pine (Map 1). The Water Agreement and the Green Book (the technical appendix to the Water Agreement) define the terms, conditions, and procedures of the Bishop Cone Audit. Inyo County Water Department (ICWD) staff compiles the Bishop Cone Audit from data provided by LADWP. The Audit sums pumping and flowing well amounts and compares those totals to water use on Los Angeles-owned land during a given runoff year (April 1 to March 31) to determine whether LADWP's groundwater extractions exceed its surface water uses on the Bishop Cone.

2.0 BACKGROUND

The City of Los Angeles owns prior appropriative surface water rights in the Bishop area. Los Angeles also owns groundwater rights on the Bishop Cone as a consequence of its ownership of overlying land. A system of ditches and canals exist to convey both surface water from Bishop Creek and the Owens River and also groundwater pumped from LADWP wells to irrigated land throughout the Bishop Cone with some water exiting the Cone. In 1930 and 1931, Los Angeles extracted groundwater from wells on the Bishop Cone for the purpose of export to Los Angeles. This export of groundwater was challenged by local residents, and in the 1940 Hillside Decree, Los Angeles agreed not to pump any groundwater for the purpose of export off the Bishop Cone.

Relevant language of the 1940 Hillside Decree is presented below (a link of the entire decree can be found at the Inyo County Water Department's website at www.inyowater.org/documents/hillside-decree-1940/):

XI

That the defendants [LADWP], *their servants agents, employees, and assigns, and each of them, be, and they are hereby, enjoined, prohibited, and restrained from in any manner whatsoever pumping, extracting, taking, or transporting out of the Bishop Cone area any subterranean waters from beneath said area: provided, however, that nothing in this judgment contained shall in any manner enjoin, prohibit, or restrain the defendants, their servants, agents, employees, assigns, or any of them, from maintaining or operating their presently–existing drainage ditches to the full extent of their present normal capacity, or from taking artesian water that may arise to the surface of said area outside the casings of any of defendants' capped wells, or from pumping, extracting, taking, or using any such water as may be reasonably necessary for beneficial use upon any lands belonging to the defendants, …..*

In 1972, Inyo County filed a California Environmental Quality Act suit claiming that increased groundwater pumping by LADWP was harming the environment of the Owens Valley and demanding that an Environmental Impact Report (EIR) be completed to analyze the effects of this increased pumping. After numerous legal challenges and negotiations, in 1991 an EIR was approved for LADWP's groundwater pumping and a long term groundwater management plan was agreed upon by Inyo County and LADWP. Section VII.A of the 1991 Water Agreement addresses the Bishop Cone and provides that: "*Before the Department* [LADWP] *may increase groundwater pumping above present levels, or construct any new wells on the* [Bishop] *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. The Department'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*." (Appendix A)

At its October 17, 1995 meeting, the Technical Group agreed to recommend to the Inyo County/Los Angeles Standing Committee the description of a Bishop Cone Audit procedure to be incorporated into the Green Book. The Standing Committee adopted the agreed-upon Bishop Cone Audit procedure on November 7, 1996 as Section IV.D of the Green Book.

Section IV.D.1.a. of the Green Book states: *"For the purposes of the Bishop Cone audit, water usage on Los Angeles-owned land on the Bishop Cone is defined as the quantity of water supplied to such land, including conveyance losses, less any return flow to the aqueduct system. Water usage is documented on a runoff-year basis and is compiled by LADWP each May in the Bishop Area Water Use Report* [Bishop Cone Audit Uses Report]*."* (Appendix B)

In theory compliance with the Water Agreement and the Green Book is simple: LADWP can only extract groundwater to be used on its lands and leases on the Bishop Cone with no flow leaving the system. In a simplified hypothetical situation, LADWP would have groundwater extraction wells at the "top" of the cone which would provide surface water to ditches running downhill to its lands and leases. Upon reaching the "lowest" land, no surface water would leave. However, there are many practical factors that dictate and complicate how the Bishop Cone Audit accounts for LADWP extractions and uses. Some of these factors are: the Bishop Cone topography (generally sloping west to east in the Bishop area, and north to south from Bishop towards Big Pine), the location of LADWP-owned lands throughout the Bishop Cone area, the location of LADWP's groundwater extraction wells (in central Bishop), the location of LADWP's flowing wells (east of Bishop adjacent to the Owens River), the location of the various ditch and canal systems used to convey water in the Bishop Cone, and operational necessities for conveying surface water both on and off the Bishop Cone.

To illustrate further, the primary source of water available for use on LADWP lands in the topographically higher west Bishop area of the cone is LADWP-owned surface water from Bishop Creek that is diverted into various ditches for irrigation (use) on LADWP-owned land. Groundwater pumped from LADWP wells in central Bishop supplements the remaining Bishop Creek surface water. The now combined surface and groundwater flows east and south and is used on LADWP land in the central and southern portions of the Cone. Groundwater extracted from flowing wells provides water to the Owens River. Some mixture of surface and groundwater also leaves the Bishop Cone either in canals or the Owens River.

Prior to the adoption of the Water Agreement, several methods were researched to determine the best procedure for tracking LADWP's uses and extraction on the Bishop Cone. A final method was selected which compares the sum of pumped groundwater from production wells and flowing groundwater from artesian wells (extractions) to surface water applied to LADWP-owned lands on the Cone (uses). To determine the total uses, a lease-wise approach was selected which tracks the difference between water coming onto a given lease and the water (if any) that exits that lease to return to the conveyance system (ditch, canal, creek or river). LADWP supplies a listing of surface water uses by each individual lease account in its annual Bishop Cone Audit Uses Report. Credit for a use is granted on accounts that have been agreed to and inspected by ICWD staff. A combination of monitoring devices are used to track extractions and uses on the Bishop Cone, including flumes, weirs, and propeller meters. These devices are measured either manually or continuously using data-logging devices.

It is important to note that the Bishop Cone Audit does not attempt to compute a complete surface or groundwater budget. Its purpose is to monitor compliance with the dictates of the Water Agreement, the Green Book, and the legal interpretations of the Hillside Decree. The Audit compares LADWP's total water uses to groundwater extractions during a given runoff year.

3.0 WATER USES ON LADWP-OWNED LAND ON THE BISHOP CONE

The location of the Bishop Cone and the pumping and flowing wells on the Bishop Cone are shown in Map 1. Also shown on Map 1 are the general locations of the LADWP-owned lease accounts used in the Bishop Cone Audit Uses Report (Appendix C).

Table 1 (below) is a compilation of water usage by account number in acre-feet (AF) on LADWP-owned land on the Bishop Cone for the runoff years of 2013-14 and 2014-15. These water-usage amounts are a yearly total of the surface water coming onto a given lease minus the surface water leaving the lease and minus credits for stockwater, operations, and conveyance losses. Overall, there was a decrease in total water use on the Bishop Cone of 2,313 AF from 2013-14 to 2014-15.

Several accounts were not granted credit this runoff year and await inspections. As of this time, account BACL and the associated ditch loss measurements have not been explained to the ICWD by LADWP. Also, field inspections have not been conducted at BA006A and BA392. Stockwater accounting/monitoring has not been defined nor has inspection of the accounts taken place. Credit is therefore denied at these four accounts until the above work has taken place.

TABLE 1
WATER USES ON LOS ANGELES-OWNED LAND ON THE BISHOP CONE

LADWP ACCOUNT NUMBER	RUNOFF YEAR*[1] 2013-2014 (AF)	RUNOFF YEAR*[1] 2014-2015 (AF)
BA502B,BA354B or BA362B *4	555.00	739.00
BA302A	80.00	238.07
BA302B	657.63	522.36
BA311	3,308.83	2566.14
BA313	466.90	373.65
BA324 *3	743.49	883.92
BA324A	NO DATA	NO DATA
BA324C	NO DATA	NO DATA
BA387A	577.00	480.00
BARECF	44.43	136.84
BA339	192.91	197.66
BA342	NO DATA	NO DATA
BA362C	NO DATA	NO DATA
BA362D	377.31	635.26
BA304	73.00	54.00
BA324B	NO DATA	NO DATA
BA387B	NO DATA	NO DATA
BA397 (SAME AS BA387B-NEW LEASE HOLDER)	2,517.41	2648.94
BA361A	1,448.83	1188.40
BA361B	1,844.74	1223.24
BA502A,BA354A or 362A *4	712.00	59.00
BARECA	503.00	425.00
BARECC	0.00	0.00
BARECD	3,687.00	3307.00
BA338	2,047.57	2064.54
BAOPRA	0.00	0.00
BAOPRB	0.00	0.00
BAGWRA	NO DATA	NO DATA
RV361	24.55	33.31
RV361B	NO DATA	NO DATA

RVRECA	**917.00**	**1112.00**

LADWP ACCOUNT NUMBER	**RUNOFF YEAR[*1] 2013-14 (AF)**	**RUNOFF YEAR[*1] 2014-15 (AF)**
LARECB	**NO DATA**	**NO DATA**
LAE&MH	**292.00**	**0.00**
BAICR	**NO DATA**	**NO DATA**
BA1478 (SAME AS BAICR-NEW LEASE HOLDER**)**	**124.41**	**227.27**
BA353	**212.03**	**190.28**
BA393	**110.00**	**65.00**
BA500[*3]	**796.41**	**691.45**
BA005A[*3]	**16.89**	**18.24**
BA005B	**24.15**	**26.54**
BA006A[*2]	**72.24 (No Credit)[*5]**	**32.88 (No Credit)[*5]**
BA1479[*4]	**0.00**	**4.00**
BA392	**252.36 (No Credit)[*5]**	**489.05 (No Credit)[*5]**
BA301 (Aubrey and Moxley)	**282.00**	**263.35**
BA335 (Partridge and Johnson)	**128.75**	**78.02**
BA394 (Berner)	**NO DATA**	**NO DATA**
BA360 (Allen)	**NO DATA**	**NO DATA**
BCCL and BACL	**2,941.91 (No Credit)[*5]**	**2,894.28 (No Credit)[*5]**
TOTAL	**22,765.24**	**20,452.48**

*1 - A runoff year is defined as starting April 1st and ending March 31st of the following year.

*2 - Accounts were first listed in the 2002-2003 runoff year. The account BA006A is an active water use account, but in the past has been denied by Inyo for lack of measuring devices. Devices have not yet been installed at account BA006A.

*3 - New accounts in years past, field inspection performed and accounts credited.

*4 - Account BA1479 same as BA342. Account BA502B same as BA354B. Account BA502A same as BA354A.

*5 - Accounts need field inspection or explanation to establish credit.

NO DATA - The Account was not active, no data was reported.

0.00 - The account was active, no use was reported, data was 0.00 acre-feet.

4.0 TOTAL LADWP GROUNDWATER EXTRACTION ON LADWP-OWNED LAND ON THE BISHOP CONE FOR RUNOFF YEARS 2013-14 AND 2014-15

Section IV.D.1.d of the Green Book states: "*Total groundwater extraction by LADWP will be compared with corrected water usage on the Bishop Cone for the runoff year. Total groundwater extraction is defined as the sum of all groundwater pumped by LADWP plus the* *amount of artesian water that flowed out of LADWP uncapped wells on the Bishop Cone during the runoff year*." (Appendix B)

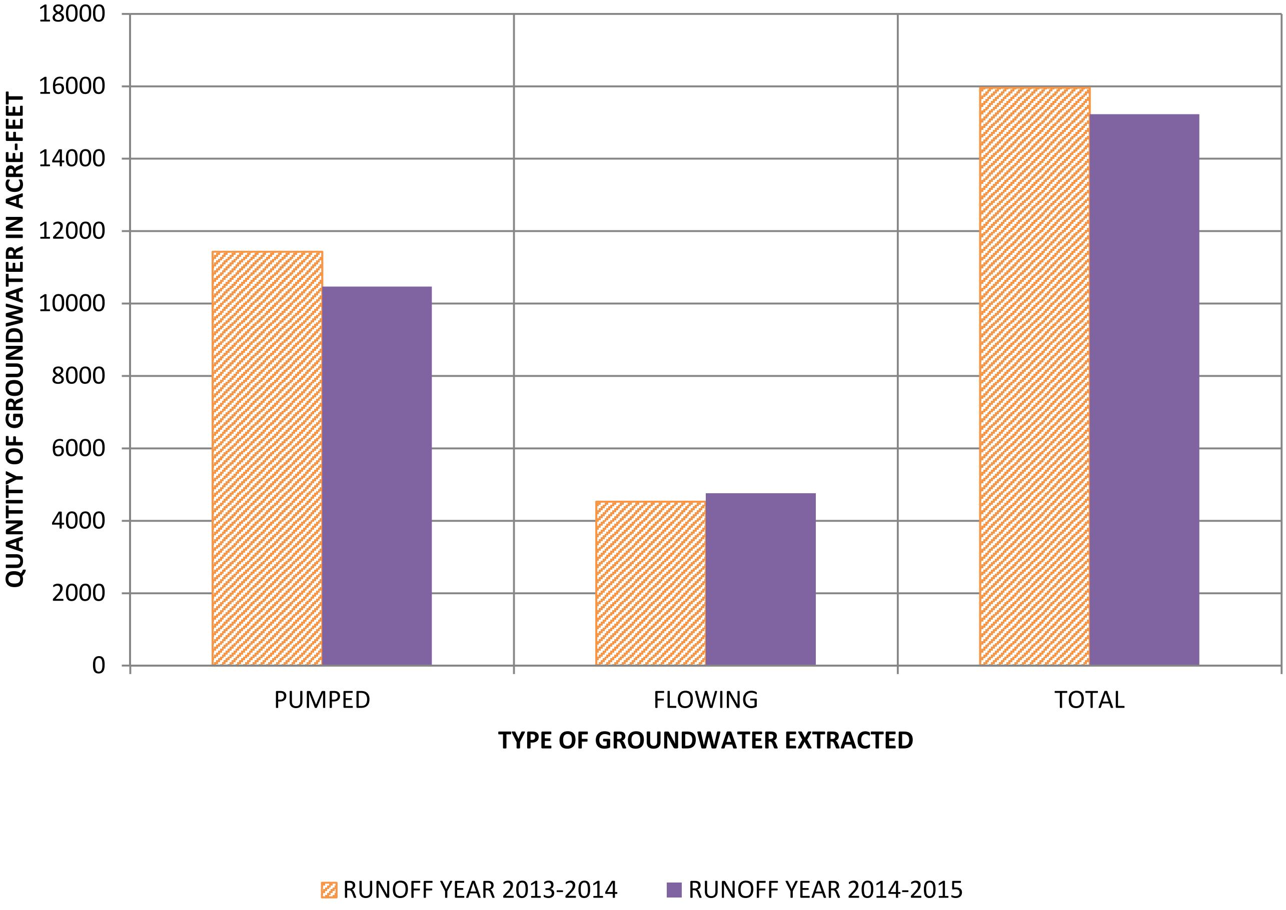
Figure 1 (below) presents the total amount LADWP groundwater extraction and the groundwater extraction classified as flowing and pumped groundwater on the Bishop Cone in acre-feet for runoff years of 2013-14 and 2014-15.

For runoff year 2013-14, LADWP extracted 15,960 AF of groundwater (11,433 AF from pumped wells and 4,527 from flowing wells). For runoff year 2014-15, LADWP extracted 15,299 AF of groundwater (10,468 AF from pumped wells and 4,761 AF from flowing wells).

LADWP groundwater extractions on the Bishop Cone for the 2014-15 runoff year decreased by 731 AF compared to the previous year.

FIGURE 1

TYPE AND TOTAL GROUNDWATER EXTRACTION ON THE BISHOP CONE FOR RUNOFF YEARS 2013-14 AND 2014-15



Flowing and pumped groundwater on the Bishop Cone are broken into detail by each well in Table 2.

TABLE 2
FLOWING AND PUMPED GROUNDWATER BY WELL ON THE BISHOP CONE IN RUNOFF YEAR 2014-15

WELL	FLOWING GROUNDWATER (AF)	PUMPED GROUNDWATER (AF)
F121	36	NA
F122	79	NA
F123	134	NA
F124	0	NA
F125	1043	NA
F126	293	NA
F127	458	NA
F128	266	NA
F129	104	NA
F130	334	NA
F131	672	NA
F132	346	NA
F133	344	NA
F134	595	NA
F136	57	NA
W410	NA	2586
W406	NA	1193
W371	NA	1016
W411	NA	1534
W407	NA	986
W408	NA	1046
W140	NA	1193
W412	NA	914
TOTAL	**4,761**	**10,468**

5.0 COMPLIANCE WITH THE INYO COUNTY/LOS ANGELES LONG-TERM GROUNDWATER MANAGEMENT AGREEMENT

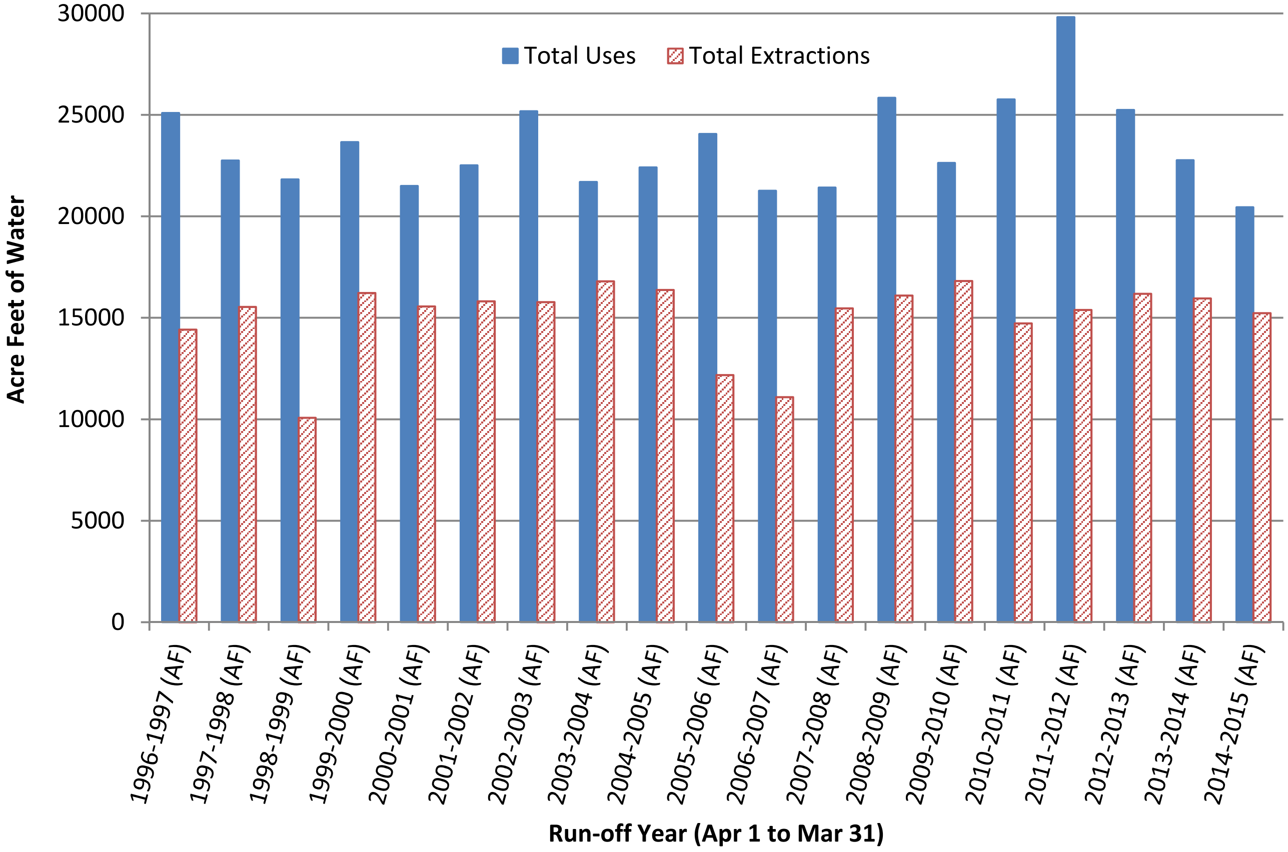
The Water Agreement provides that, during any runoff year, total groundwater extraction by LADWP on the Bishop Cone shall not exceed water usage on Los Angeles-owned land on the Cone. Table 3, below, shows that LADWP was in compliance with the above provision for runoff years 2013-14 and 2014-15 as the total uses on the Bishop Cone exceeded the total groundwater extraction for each year.

TABLE 3
LADWP USES IN COMPARISON TO LADWP GROUNDWATER EXTRACTION ON THE BISHOP CONE

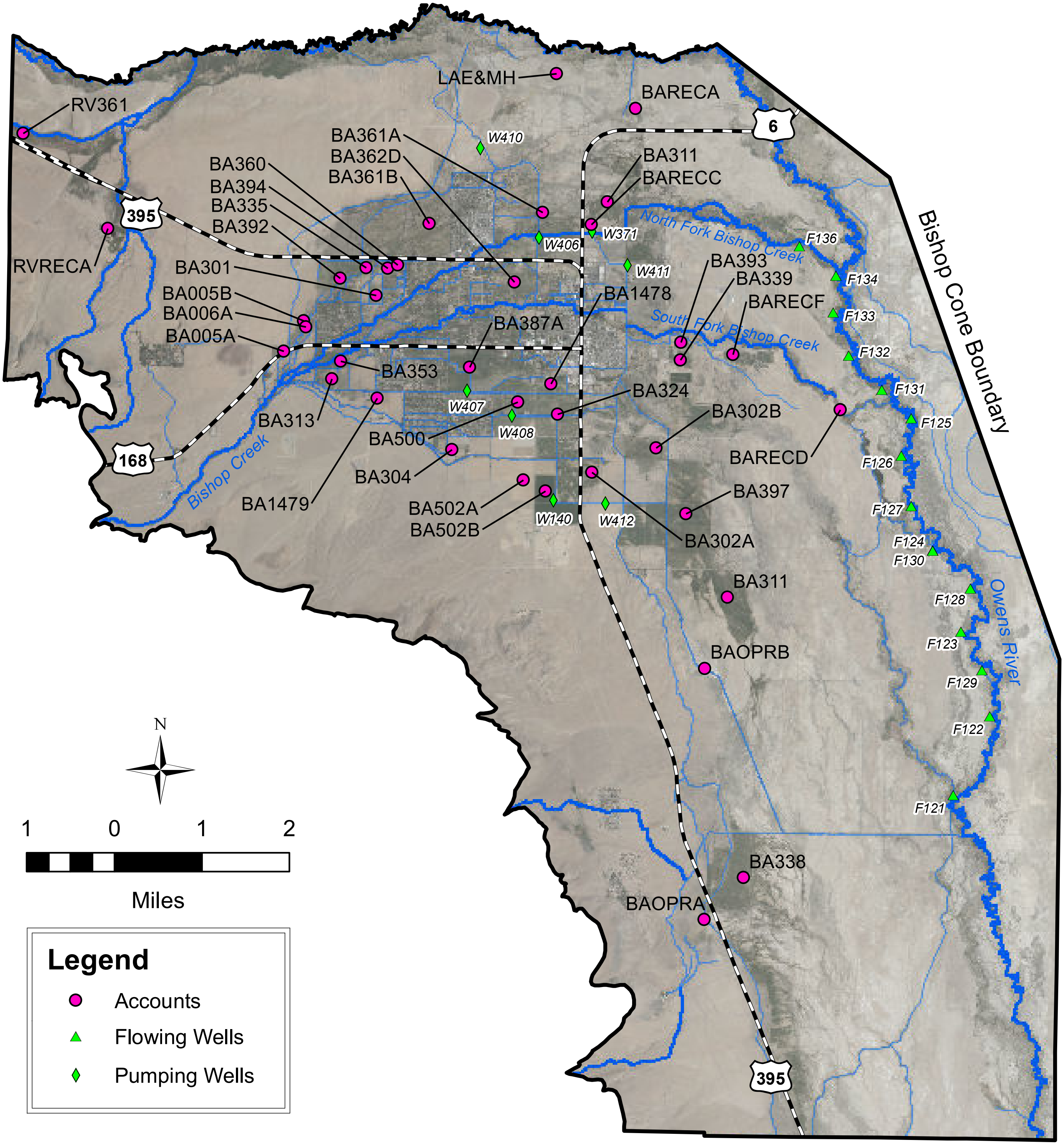
	RUNOFF YEAR 2013-14 (AF)	RUNOFF YEAR 2014-15 (AF)
TOTAL USES	**22,765**	**20,452**
TOTAL GROUNDWATER EXTRACTION	**15,960**	**15,229**
USES MINUS EXTRACTIONS	**6,805**	**5,223**
IN COMPLAINCE?	**YES**	**YES**

Figure 2 presents LADWP's water uses versus extractions since runoff year 1996-97. Uses have exceeded extractions throughout the data period; therefore, LADWP has been incompliance with Section IV.D.1.a. of the Green Book and the Water Agreement.

FIGURE 2
WATER USES VERSUS EXTRACTIONS ON THE BISHOP CONE



Map 1. Bishop Cone Audit Features



BACL Not Shown on Map

APPENDIX A

Section VII.A of the Inyo County/Los Angeles Long-Term Groundwater Management Agreement

Section VII of the Agreement

VII. GROUNDWATER PUMPING ON THE BISHOP CONE

A. Any groundwater pumping by the Department on the "Bishop Cone" (Cone) shall be in strict adherence to the provisions of the Stipulation and Order filed on the 26th day of August, 1940, in Inyo County Superior Court in the case of Hillside Water Company, a corporation, et al. vs. The City of Los Angeles, a Municipal Corporation, et al., ("Hillside Decree").

Before the Department may increase groundwater pumping above present levels, or construct any 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.

The Department'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. Annual groundwater extractions by the Department shall be the total of all groundwater pumped by the Department on the Cone, plus the amount of artesian water that flowed out of the casing of uncapped wells on the Cone during the year. Water used on Los Angeles-owned lands on the Cone, shall be the quantity of water supplied to such lands, including conveyance losses, less any return flow to the aqueduct system.

B. The overall management goals and principles and the specific goals and principles for each vegetation classification of this Stipulation and Order apply to vegetation on the Cone.

APPENDIX B

Section IV.D of the Green Book

COPY FOR YOUR
INFORMATION

AGENDA ITEM 4

MEMORANDUM

7 November 1996

TO: Inyo County/Los Angeles Standing Committee
FROM: Inyo County/Los Angeles Technical Group

CONSIDERATION OF GREEN BOOK SECTION DESCRIBING THE BISHOP CONE AUDIT

Background

Section VII.A of the Inyo County/Los Angeles long-term water management agreement provides that "before the Department may increase groundwater pumping above present levels, or construct any new wells on the [Bishop] 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."

At its 17 October 1995 meeting, the Technical Group agreed to recommend to the Inyo County/Los Angeles Standing Committee the attached description of a Bishop Cone audit to be incorporated into the Green Book (the technical appendix to the long-term agreement).

Request

The Technical Group requests that the Standing Committee adopt the attached description as section IV.D of the Green Book.

Attachment
AGENDA ITEM 4
7 November 1996

D. Bishop Cone Audit

This sub-section describes the procedures for conducting the Bishop Cone audit in accordance with Section VII.A of the Agreement. The Bishop Cone audit is an annual accounting of LADWP groundwater extraction and water usage on Los Angeles-owned land on the Bishop Cone. The Agreement provides that, during any runoff year, total groundwater extraction by LADWP on the Bishop Cone shall not exceed water usage on Los Angeles-owned land on the Cone. The area defined as the Bishop Cone is shown as Figure IV.D.1.

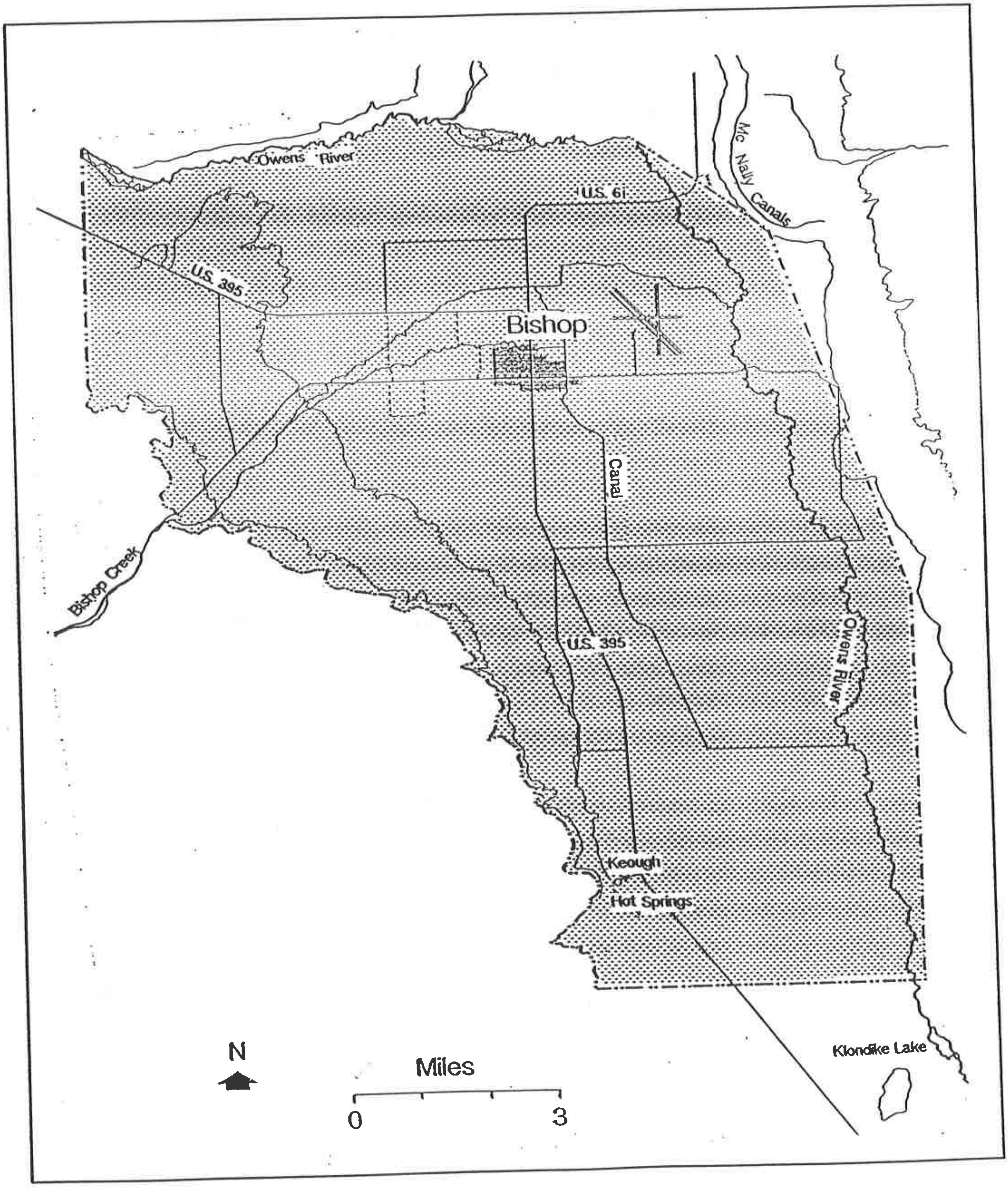
1. Procedures for Conducting the Bishop Cone Audit

a. For the purposes of the Bishop Cone audit, water usage on Los Angeles-owned land on the Bishop Cone is defined as the quantity of water supplied to such land, including conveyance losses, less any return flow to the aqueduct system. Water usage is documented on a runoff-year basis and is compiled by LADWP each May in the Bishop Area Water Use Report. At the conclusion of each runoff year, LADWP will forward the final water use report for the runoff year to Inyo County.

b. The final water use report will be compared for consistency with the previous year's report. If measuring stations have been added or removed from the water-use report during the year, or if a significant change in the pattern of water usage occurs (for example, an account that has not received water for one year receives a

FIGURE IV.D.1

Bishop Cone Boundary



considerable amount the next year), the location will be field-checked. The field-check will evaluate whether changes in water usage warrant the changes noted in the report. If a change is made in the method of delivery to or return from an account that results in an overestimation of uses on the Bishop Cone, water usage for that account will not be credited to the total uses for the audit.

c. Water usage for accounts BAIND (Bishop Indian Reservation), BA391 (outside of Bishop Cone boundary), and BAWEST (West Bishop private uses) will be subtracted from the total reported water usage.

d. Total groundwater extraction by LADWP will be compared with the corrected water usage on the Bishop Cone for the runoff year. Total groundwater extraction is defined as the sum of all groundwater pumped by LADWP plus the amount of artesian water that flowed out of uncapped wells on the Bishop Cone during the runoff year. During any runoff year, total groundwater extraction by LADWP on the Bishop Cone shall not exceed water usage on Los Angeles-owned land on the Cone.

e. A draft report summarizing the results of the Bishop Cone audit will be prepared annually as an Inyo County Water Department report and will be submitted to the Technical Group in June for a 30-day review.

f. A final Bishop Cone audit report will be submitted in July to the Technical Group, the Standing

Committee, the Inyo County Board of Supervisors, and the Inyo County Water Commission.

LADWP will notify Inyo County of any changes in the status, location, or operation of any measuring station used to conduct the Bishop Cone audit at the time the final Bishop Area Water Use Report is submitted to the County. LADWP will also notify the County of any changes in the boundaries of the accounts included in the audit.

Upon request by Inyo County, LADWP will provide measuring station data for accounts included in the audit to assist the County in verifying water usage for individual accounts.

APPENDIX C

Data on Uses and Total Groundwater Extracted on the Bishop Cone
(Supplied by LADWP)

```
(BCA    )    BISHOP CONE AUDIT                                        PAGE    1
 5/07/15     ----------------------------------------------------------
08:39                       FROM    3/01/15  TO    3/31/15
                                                       A C R E - F E E T
                                                                MAR      SINCE
 A C C O U N T S  &  S T A T I O N S                PERIOD    M-T-D     4/01/14
 - - - - - - - - - - - - - - - - - - - - - - - - -  ------    ------    ------

 BA502B  SMITH & STICKELLS
         A-1 DRAIN
  3031    A-1 DRAIN PUMP PLANT # 1 S/O HALL DITC      .00       .00        .00
  3032    A-1 DRAIN PUMP PLANT # 3 AT WELL # 140    42.00     42.00     739.00
 *TOTALS ACRES=    148   ALOT=    740   LEFT=     1   42.00     42.00     739.00

 BA302A  BOOTHE
         HALL DITCH
  3006    HALL DITCH @ GOLF COURSE RETURN             .00       .00      60.00
  B02A11  HALL DITCH @ BOOTHE                       25.00     25.00     359.54
  B02A21  STOCKWATER                                25.00-    25.00-    181.47-
  B02A32  OPERATIONS                                  .00       .00        .00
 *TOTALS ACRES=     47   ALOT=    235   LEFT=     3-    .00       .00     238.07

 BA302B  BOOTHE
         BISHOP CREEK CANAL
  3161    BISHOP CREEK CANAL #16                     9.94      9.94     131.29
  3162    BISHOP CREEK CANAL #17                      .00       .00     444.00
  3164    BISHOP CREEK CANAL #20                    12.00     12.00     320.00
  3165    BISHOP CREEK CANAL #21                      .00       .00        .00
  B02B21  STOCKWATER @ #16                           9.94-     9.94-    186.28-
  B02B22  STOCKWATER @ #20                          12.00-    12.00-    186.65-
  B02B41  DITCH MAKE                                  .00       .00        .00
  B02B31  OPERATIONS                                  .00       .00        .00
 *TOTALS ACRES=    120   ALOT=    600   LEFT=    77     .00       .00     522.36

 BA311   J.W. CASHBAUGH, ET AL
         BISHOP CREEK CANAL
  3166    BISHOP CREEK CANAL #5                       .00       .00     428.00
  3022    BISHOP CREEK CANAL #5A                      .00       .00     356.00
  3167    BISHOP CREEK CANAL #9                       .00       .00     359.00
  3168    BISHOP CREEK CANAL #30                    66.00     66.00    1947.00
  B11201  STOCKWATER @ #30                          66.00-    66.00-    523.86-
  3022    CREDIT FOR TATUM RETURN @ #5A               .00       .00        .00
  B11301  OPERATIONS                                  .00       .00        .00
 *TOTALS ACRES=    561   ALOT=   2805   LEFT=   238     .00       .00    2566.14

 BA313   BOYD & ONEY
         NORTH INDIAN DITCH
  3016    NORTH INDIAN ABOVE MUMY LANE #58E        200.00    200.00    4204.00
  3017    WONACOTT A-2                              25.00     25.00     401.00
  3015    WONACOTT A-1                              39.00-    39.00-    652.00-
  3054    WONACOTT A-3 RETURN                        1.00-     1.00-    141.00-
  3051    WONACOTT 58F                              23.00-    23.00-    277.00-
  3018    NORTH INDIAN B-2                         124.00-   124.00-   2663.00-
  B13401  NORTH INDIAN DITCH LOSS                   37.00-    37.00-    516.35-
  B13402  WONACOTT DITCH LOSS                        1.00-     1.00-      8.00-
  B13404  WONACOTT DITCH MAKE                         .00       .00      26.00
  B13301  OPERATIONS                                  .00       .00        .00
 *TOTALS ACRES=     84   ALOT=    420   LEFT=    46     .00       .00     373.65
```

```
                                                         A C R E - F E E T
                                                                 MAR       SINCE
 A C C O U N T S   &   S T A T I O N S                 PERIOD    M-T-D     4/01/14
 - - - - - - - - - - - - - - - - - - - - - - - - -     ------    ------    ------

 BA324   DANIELS, ROSSI, HANNON
         NORTH & SOUTH INDIAN DITCH
  3370    NORTH INDIAN DIVERSION W/O SUNLAND              .00       .00      23.00
  3270    SOUTH INDIAN D-3                              18.00     18.00    1489.00
  3005    SOUTH INDIAN DITCH D-4                        11.00-    11.00-    389.00-
  B244    DITCH LOSS                                     7.00-     7.00-    239.08-
  B2442   DITCH MAKE                                      .00       .00        .00
  B243    OPERATIONS                                      .00       .00        .00
 *TOTALS ACRES=    163   ALOT=    815   LEFT=     68-     .00       .00     883.92

 BA1478  INDIAN CREEK RANCH (BL-1478)
         GEORGE & N. INDIAN DITCH
  3002    GEORGE DITCH WEST OF SUNLAND AVENUE             .00       .00     303.00
  3068    GEORGE DITCH C-3                                .00       .00     194.00-
  BICR42  GEORGE DITCH LOSS                               .00       .00      68.80-
  BAICR4  DITCH MAKE                                      .00       .00        .00
  3264    NORTH INDIAN DITCH BELOW A-1 DRAIN B3A        72.00     72.00    1338.00
  3370    NORTH INDIAN DIVERSION W/O SUNLAND              .00       .00      23.00-
  3364    NORTH INDIAN DITCH W/O HWY 395                37.00-    37.00-    870.00-
  BICR43  NORTH INDIAN DITCH LOSS                       35.00-    35.00-    257.93-
  BAICR3  OPERATIONS                                      .00       .00        .00
 *TOTALS ACRES=     41   ALOT=    205   LEFT=     22-     .00       .00     227.27

 BA387A  GIACOMINI
         NORTH INDIAN DITCH
  3043    NORTH INDIAN DITCH B-3                          .00       .00     387.00
  3011    WEST LINE L-2                                   .00       .00      93.00
  B87A3   OPERATIONS                                      .00       .00        .00
 *TOTALS ACRES=    122   ALOT=    610   LEFT=    130      .00       .00     480.00

 BARECF  RECREATION FOREST SERVICE
         KINGSLEY DITCH
  3023    KINGSLEY DITCH C-4                            31.00     31.00     843.00
  3183    CEMETERY DITCH                                20.00-    20.00-    429.00-
  BRCF41  DITCH MAKE                                      .00       .00        .00
  BRCF42  DITCH LOSS                                    11.00-    11.00-    277.16-
 *TOTALS ACRES=     43   ALOT=    129   LEFT=      7-     .00       .00     136.84

 BA339   DOHNEL
         KINGSLEY DITCH
  3170    KINGSLEY DITCH C-1                            18.00     18.00     449.00
  B39201  STOCKWATER @ C-1                              18.00-    18.00-    251.34-
  B39301  OPERATIONS                                      .00       .00        .00
 *TOTALS ACRES=     39   ALOT=    195   LEFT=      2-     .00       .00     197.66

 BA393   CABALLERO
         KINGSLEY DITCH
  3061    KINGSLEY DITCH PUMP PLANT                       .00       .00      42.00
  3171    BISHOP CREEK DITCH # 11                         .00       .00      23.00
  BA933   OPERATIONS @ #11                                .00       .00        .00
 *TOTALS ACRES=     18   ALOT=     90   LEFT=     25      .00       .00      65.00
```

```
(BCA    )     BISHOP CONE AUDIT                                              PAGE    3
 5/07/15      -------------------------------------------------------
08:39                   FROM    3/01/15   TO    3/31/15
                                                          A C R E - F E E T
                                                                  MAR        SINCE
 A C C O U N T S   &   S T A T I O N S                PERIOD     M-T-D      4/01/14
 - - - - - - - - - - - - - - - - - - - - - - - - - -  ------     ------      ------

 BA362D  JJ TATUM, LJ TATUM
         DAIRY DITCH
  3388    INDIAN SOUTH RETURN ON SEE-VEE LANE            .00        .00      574.00
  3389    INDIAN MIDDLE RETURN ON SEE-VEE LANE           .00        .00        3.00
  3390    INDIAN NORTH RETURN ON SEE-VEE LANE            .00        .00      286.00
  B62D21  DAIRY STOCKWATER                               .00        .00      227.74-
  B62D31  OPERATIONS DAIRY DITCH                         .00        .00         .00
 *TOTALS ACRES=    182  ALOT=    578  LEFT=     57-     .00        .00      635.26

 BA304   ANDREW & DAN BOYD
         NEWLON DITCH
  3026    NEWLON DITCH BOYD PUMP PLANT                   .00        .00       54.00
 *TOTALS ACRES=     48  ALOT=    240  LEFT=    186      .00        .00       54.00

 BA500   TALBOT
         GEORGE & S. INDIAN DITCH
  3012    GEORGE DITCH C-1                               .00        .00      560.00
  3002    GEORGE DITCH WEST OF SUNLAND AVENUE            .00        .00      303.00-
  B24B41  BUHS STOCKWATER                                .00        .00         .00
  B24B44  DITCH LOSS                                     .00        .00       33.88-
  B24B04  DITCH MAKE                                     .00        .00         .00
  3365    PARK WEST RETURN S/O A-DRAIN                  1.00       1.00       66.00
  3047    4 X - 58D                                    26.00      26.00      726.00
  3366    SOUTH INDIAN DITCH DIVERSION # 1 N/O S         .00        .00       29.00
  3367    SOUTH INDIAN DITCH DIVERSION # 2 N/O S         .00        .00      283.00
  W408    WELL # 408                                     .00        .00     1045.00
  3046    SOUTH INDIAN RETURN AT A-1 DRAIN               .00        .00       13.00-
  3270    SOUTH INDIAN D-3                             18.00-     18.00-    1489.00-
  B004    DITCH LOSS                                    9.00-      9.00-     178.67-
  B0040   DITCH MAKE                                     .00        .00         .00
  B50B31  OPERATIONS                                     .00        .00         .00
 *TOTALS ACRES=    171  ALOT=    890  LEFT=    198      .00        .00      691.45

 BA397   GIACOMINI
         BISHOP CREEK CANAL
  3172    BISHOP CREEK DITCH # 16-A                      .00        .00         .00
  3163    BISHOP CREEK DITCH # 19                        .00        .00      438.00
  3173    BISHOP CREEK DITCH # 19-A                      .00        .00         .00
  3174    BISHOP CREEK DITCH # 22                        .00        .00      461.00
  3019    BISHOP CREEK CANAL DIVERSION # 24              .00        .00      633.00
  3020    BISHOP CREEK CANAL DIVERSION # 25              .00        .00      157.00
  3391    BISHOP CREEK CANAL DIVERSION 26A               .00        .00      935.00
  3024    BISHOP CREEK CANAL DIVERSION # 29            32.00      32.00      609.00
  3392    FORD RAWSON-DIV 1A                             .00        .00       28.00
  B9721   STOCKWATER @ #29                             32.00-     32.00-     388.59-
  B9722   BOOTHE STOCKWATER @ #19                        .00        .00       94.87-
  B9723   STOCKWATER @ #19 & #24                         .00        .00      128.60-
  B9731   OPERATIONS                                     .00        .00         .00
 *TOTALS ACRES=    482  ALOT=   2410  LEFT=    238-     .00        .00     2648.94
```

```
 5/07/15     -----------------------------------------------------------
08:39                  FROM    3/01/15   TO    3/31/15
                                                        A C R E - F E E T
                                                                  MAR        SINCE
 A C C O U N T S  &  S T A T I O N S                    PERIOD    M-T-D      4/01/14
 - - - - - - - - - - - - - - - - - - - - - - - - - - -  ------    ------     ------

 BA361A  ST RANCH
         NORTH FORK BISHOP CREEK
  3036    NORTH FORK BISHOP CREEK I-1                    39.00     39.00     796.00
  3004    NORTH FORK BISHOP CREEK I-2                      .00       .00     324.00
  3042    TATUM RETURN AT HIGHWAY 6                        .00       .00      80.00-
  3039    TATUM RETURN AT BISHOP CREEK CANAL             17.00-    17.00-    108.00-
  3022    BISHOP CREEK CANAL #5A                           .00       .00        .00
  B61A21  STOCKWATER @ I-1                               22.00-    22.00-    329.60-
  3316    WELL #406                                        .00       .00     586.00
  B61A41  DITCH MAKE                                       .00       .00        .00
  B61A31  OPERATIONS                                       .00       .00        .00
 *TOTALS ACRES=   262   ALOT=  1005   LEFT=    183-        .00       .00    1188.40

 BA361B  ST RANCH
         MATLICK DITCH
  3009    MATLICK DITCH F-10                             78.00     78.00    1278.00
  3040    MATLICK DITCH F-13 N                           27.00     27.00     591.00
  3008    MATLICK DITCH F-13 E                             .00       .00     135.00
  3007    MATLICK DITCH F-14                              4.00      4.00      63.00
  3035    MATLICK DITCH #154                             11.00     11.00     756.00
  3154    TATUM RETURN G-2                                4.00-     4.00-     20.00-
  3037    MATLICK DITCH #63A                             10.00-    10.00-    234.00-
  3038    TATUM RETURN H-1                                 .00       .00     160.00-
  3003    MATLICK DITCH RETURN @ B-1 DRAIN                1.00-     1.00-     31.00-
  3010    MATLICK RETURN @ C DRAIN                       73.00-    73.00-    338.00-
  B61B41  DITCH LOSS #154 TO RETURN @ B1                 10.00-    10.00-    285.67-
  B61B42  DITCH MAKE F-10 TO RETURN @ C DRAIN              .00       .00        .00
  B61B21  SPENCER STOCKWATER                             15.50-    15.50-    182.50-
  B61B22  STOCKWATER @ F-10                               6.50-     6.50-    348.59-
  B61B31  OPERATIONS                                       .00       .00        .00
 *TOTALS ACRES=   412   ALOT=  2365   LEFT=   1141         .00       .00    1223.24

 BA502A  SMITH & STICKELLS
         HALL DITCH
  3027    HALL DITCH PUMP PLANT # 2 @ DON TATUM            .00       .00        .00
  3028    HALL DITCH PUMP PLANT # 4 AT DON TATUM         59.00     59.00      59.00
 *TOTALS ACRES=   219   ALOT=  1095   LEFT=   1036       59.00     59.00      59.00

 BARECA  RECREATION FARMERS PONDS
         BISHOP CREEK CANAL
  3155    BISHOP CREEK CANAL #5B                           .00       .00     425.00
  BRCA31  OPERATIONS @ #5B                                 .00       .00        .00
 *TOTALS                                                   .00       .00     425.00

 BARECC  RECREATION SADDLE CLUB
         BISHOP CREEK CANAL
  3021    BISHOP CREEK CANAL #67                           .00       .00        .00
  BRECC3  OPERATIONS                                       .00       .00        .00
 *TOTALS                                                   .00       .00        .00
```

```
                             FROM    3/01/15   TO    3/31/15
                                                                  A C R E - F E E T
                                                                           MAR         SINCE
 A C C O U N T S  &  S T A T I O N S                       PERIOD       M-T-D       4/01/14
 - - - - - - - - - - - - - - - - - - - - - - - - - -       ------       ------      ------

 BARECD   RECREATION BUCKLEY PONDS
          SOUTH FORK BISHOP CREEK
  3194     S FORK BISHOP CR BELOW BISHOP CR CANAL         393.00       393.00     6079.00
  3193     SANDERS POND RETURN                             34.00-       34.00-     892.00-
  3066     RAWSON POND # 3 RETURN TO OWENS RIVER           71.00-       71.00-    1880.00-
  BRCD31   OPERATIONS                                        .00          .00         .00
 *TOTALS                                                  288.00       288.00     3307.00

 BA338    YRIBARREN
          FORD-RAWSON CANAL & KEOUGH
  2003     FORD RAWSON CANAL DIVERSION #2                  31.00        31.00      914.00
  2024     FORD RAWSON CANAL DIVERSION #3                    .00          .00     3023.00
  2004     FORD RAWSON CANAL DIVERSION #7                    .00          .00      742.00-
  2043     YRIBARREN RETURN #2                               .00          .00         .00
  B38402   FORD RAWSON CANAL LOSS                            .00          .00      723.63-
  B38201   STOCKWATER @ #2                                 31.00-       31.00-     406.83-
  B38401   FORD RAWSON CANAL DITCH MAKE                      .00          .00         .00
  3368     RAWSON & KEOUGH DITCH E/O HWY 395               92.00        92.00      533.00
  3369     RAWSON & KEOUGH DITCH RETURN AT A-DRAI          38.00-       38.00-     187.00-
  B38202   CASHBAUGH STOCKWATER                            12.40-       12.40-     128.24-
  B38403   KEOUGH DITCH LOSS                               41.60-       41.60-     217.76-
  B38301   OPERATIONS                                        .00          .00         .00
 *TOTALS ACRES=     427   ALOT=   2135   LEFT=       70      .00          .00     2064.54

 BAOPRA   OPERATION FORD-RAWSON CANAL
          FORD-RAWSON CANAL
  2026     FORD RAWSON CANAL BELOW BCC                       .00          .00         .00
  2024     FORD RAWSON CANAL DIVERSION #3                    .00          .00         .00
  BOPA31   OPERATIONS                                        .00          .00         .00
 *TOTALS                                                     .00          .00         .00

 BAOPRB   OPERATIONS A-DRAIN
          A-DRAIN
  2086     A-DRAIN DIVERSION TO ARKANSAS FLATS               .00          .00         .00
  BOPB31   OPERATIONS                                        .00          .00         .00
 *TOTALS                                                     .00          .00         .00

 RV361    ST RANCH
          HORTON CREEK
  BC361    HORTON CREEK E-7                                  .00          .00       33.31
  BC3613   OPERATIONS                                        .00          .00         .00
 *TOTALS ACRES=      26   ALOT=    130   LEFT=       96      .00          .00       33.31

 RVRECA   RECREATION MILL POND
          MCGEE CREEK
  3185     MCGEE CREEK @ ABELOUR RANCH                    171.00       171.00     1954.00
  3235     MILL POND RETURN                               108.00-      108.00-     842.00-
  RRCA41   DITCH MAKE                                        .00          .00         .00
 *TOTALS                                                   63.00        63.00     1112.00
```

```
                         FROM   3/01/15  TO   3/31/15
                                                    A C R E - F E E T
                                                              MAR      SINCE
 A C C O U N T S  &  S T A T I O N S           PERIOD      M-T-D    4/01/14
 - - - - - - - - - - - - - - - - - - - - - - - ------     ------     ------

 LAE&MH  FIVE BRIDGES RECHARGE
         BISHOP CREEK CANAL
  3242    BISHOP CREEK CANAL DIVERSION #2          .00        .00     410.00
  LEMGE5  MITIGATION WATER @ DIVERSION #4          .00        .00        .00
  3317    BISHOP CREEK CANAL DIVERSION #6        13.00      13.00     293.00
  LEMH2   STOCKWATER @ DIVERSION #2 & #6         13.00-     13.00-    292.00-
  LEMH3   OPERATIONS                               .00        .00     411.00-
 *TOTALS                                           .00        .00        .00

 BA353   HADELER & MILORADICH
         WONACOTT & SMITH DITCH
  3015    WONACOTT A-1                           39.00      39.00     652.00
  3053    TOMMY SMITH DITCH # 162-A                .00        .00      91.00
  3017    WONACOTT A-2                           25.00-     25.00-    401.00-
  BA3534  WONACOTT DITCH LOSS                    14.00-     14.00-    151.72-
  BA534   DITCH MAKE                               .00        .00        .00
  BA3533  OPERATIONS                               .00        .00        .00
 *TOTALS ACRES=    38  ALOT=   190  LEFT=     0    .00        .00     190.28

 BA005A  ONEY
         OTEY DITCH
  3049    # 161 OTEY                             41.00      41.00     666.00
  3377    OTEY DITCH RETURN AT MATLICK DITCH     39.00-     39.00-    635.00-
  B05A4   DITCH LOSS                              2.00-      2.00-     11.76-
  B05A42  DITCH MAKE                               .00        .00       1.00-
 *TOTALS ACRES=    13  ALOT=    39  LEFT=    20    .00        .00      18.24

 BA005B  SAFSTROM
         MATLICK DITCH
  3378    OTEY DITCH DIVERSION ABOVE MATLICK DIT   .00        .00      32.00
  B05B4   DITCH LOSS                               .00        .00       5.46-
 *TOTALS ACRES=    23  ALOT=    69  LEFT=    42    .00        .00      26.54

 BA006A  BARTON
         MATLICK DITCH
  3048    # 61-A FRANK ROUFF                     14.00      14.00     120.00
  B06A2   STOCKWATER                             14.00-     14.00-     87.72-
  B06A3   OPERATIONS                               .00        .00        .00
 *TOTALS ACRES=    12  ALOT=    36  LEFT=     3    .00        .00      32.28

 BA1479  HIDDEN CREEKS RANCH
         SOUTH INDIAN DITCH
  3025    SOUTH INDIAN DITCH DIVERSION # 3         .00        .00       4.00
  B14793  OPERATIONS                               .00        .00        .00
 *TOTALS ACRES=    27  ALOT=    81  LEFT=    77    .00        .00       4.00

 BA392   LACEY LIVESTOCK
         YOUNG & MATLICK DITCHES
  3387    MATLICK DITCH TO THE NORTH             36.00      36.00     862.00
  3398    MATLICK DITCH #1                       87.00      87.00    1866.00
  BA9242  DITCH LOSS                             16.00-     16.00-    228.95-
  3399    REINHACKLE #1                           2.00       2.00     259.00
```

```
                            FROM    3/01/15   TO    3/31/15
                                                        A C R E - F E E T
                                                                MAR      SINCE
 A C C O U N T S   &   S T A T I O N S                PERIOD    M-T-D    4/01/14
 - - - - - - - - - - - - - - - - - - - - - - - - -  ------    ------    ------
  3400     YOUNG DITCH #1                             14.00     14.00    348.00
  3401     YOUNG DITCH #2                             11.00-    11.00-   296.00-
  3406     C-DRAIN AT INTAKE                          34.00-    34.00-  1043.00-
  BA921    MATLICK DITCH F-10                         78.00-    78.00-  1278.00-
  BA924    DITCH MAKE                                   .00       .00       .00
  BA923    OPERATIONS                                   .00       .00       .00
 *TOTALS ACRES=    140   ALOT=    700   LEFT=     210     .00       .00    489.05

 BA301    AUBREY & MOXLEY
          NELLIGAN & YOUNG DITCHES
  3396     NELLIGAN DIV. #1                           25.00     25.00    574.00
  3397     NELLIGAN BELOW DIV. #1                     25.00     25.00    540.00
  3401     YOUNG DITCH #2                             11.00     11.00    296.00
  3050     HOLLAND # 63-B                             14.00-    14.00-   183.00-
  3404     NELLIGAN DITCH #2                          26.00-    26.00-   679.00-
  3402     YOUNG DITCH #3                             12.00-    12.00-   256.00-
  3407     YOUNG DITCH # 4                              .00       .00       .00
  3421     TOM KEY DITCH ABOVE DIVERSION              18.00     18.00    315.00
  3422     TOM KEY DITCH BELOW DIVERSION              17.00-    17.00-   283.00-
  BA014    DITCH LOSS                                 10.00-    10.00-    64.65-
  BA0144   DITCH MAKE                                   .00       .00      4.00
  BA013    OPERATIONS                                   .00       .00       .00
 *TOTALS ACRES=     99   ALOT=    495   LEFT=     231     .00       .00    263.35

 BA335    PARTRIDGE & JOHNSON
          YOUNG DITCH
  3402     YOUNG DITCH #3                             12.00     12.00    256.00
  3407     YOUNG DITCH # 4                              .00       .00       .00
  3403     YOUNG DITCH RETURN TO NELLIGAN              7.00-     7.00-    97.00-
  BA354    DITCH LOSS                                  5.00-     5.00-    80.98-
  BA353    OPERATIONS                                   .00       .00       .00
 *TOTALS ACRES=     30   ALOT=    150   LEFT=      71     .00       .00     78.02

 BACL     BISHOP CONE CONVEYANCE LOSS

  BCCL1    BA313 DITCH LOSS N INDIAN                  37.00     37.00    516.35
  BCCL2    BA313 DITCH LOSS WONACOTT                   1.00      1.00      4.00
  BCCL3    BA324 DITCH LOSS N & S INDIAN               7.00      7.00    239.08
  BCCL4    BA1478 DITCH LOSS GEORGE                     .00       .00     68.80
  BCCL5    BA1478 DITCH LOSS N INDIAN                 35.00     35.00    257.93
  BCCL6    BARECF DITCH LOSS KINGSLEY                 11.00     11.00    277.16
  BCCL7    BA500 DITCH LOSS GEORGE                      .00       .00     33.88
  BCCL8    BA500 DITCH LOSS S INDIAN                   9.00      9.00    178.67
  BCCL9    BA361B DITCH LOSS MATLICK                  10.00     10.00    285.67
  BCCL10   BA338 DITCH LOSS FORD RAWSON                 .00       .00    723.63
  BCCL11   BA353 DITCH LOSS WONACOTT                  14.00     14.00    151.72
  BCCL12   BA005A DITCH LOSS OTEY                      2.00      2.00     11.76
  BCCL13   BA301 DITCH LOSS NELLIGAN                  10.00     10.00     64.65
  BCCL14   BA335 DITCH LOSS YOUNG                      5.00      5.00     80.98
  BCCL15   TOTAL DITCH LOSS                          141.00-   141.00-  2894.28-
 *TOTALS                                                .00       .00       .00
```

```
                             FROM    3/01/15   TO    3/31/15
                                                         A C R E - F E E T
                                                                 MAR        SINCE
 A C C O U N T S  &  S T A T I O N S                   PERIOD   M-T-D      4/01/14
 - - - - - - - - - - - - - - - - - - - - - - - - -     ------   ------     ------

                                AREA SUMMARY    IRG    101.00    101.00   15992.97
                                                 SW    277.34    277.34    3944.88
                                               OPER       .00       .00     411.00
                                                E&M       .00       .00        .00
                                               GWRC       .00       .00        .00
                                                REC    351.00    351.00    4980.84
                                                IND       .00       .00        .00
                                                DOM       .00       .00        .00
                                               LORP       .00       .00        .00
                                TOTAL WATER USE        729.34    729.34   25329.69

    TOTAL IRG AC   3997      TOTAL ALOT   19452     DUTY TO DATE   4.0    AF/AC
```

2014/2015 RUNOFF YEAR BISHOP CONE PUMPING WELL TOTALS

(ACRE-FEET)

	2014									2015			
WELL	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	TOTAL
W140	202	158	142	257	202	190	0	0	0	0	0	42	1193
W207	0	0	0	0	0	0	0	0	0	0	0	0	0
W371	86	88	84	86	86	82	87	84	86	85	77	84	1016
W406	201	209	199	201	198	185	0	0	0	0	0	0	1193
W407	42	168	163	168	167	160	118	0	0	0	0	0	986
W408	59	204	197	202	199	184	0	0	0	0	0	0	1046
W410	214	221	213	220	220	213	220	212	219	219	197	218	2586
W411	248	259	255	262	260	251	0	0	0	0	0	0	1534
W412	213	172	164	144	102	112	0	1	0	0	4	2	914
TOTAL	1263	1480	1416	1541	1435	1378	425	297	305	304	277	346	10468

2014/2015 RUNOFF YEAR BISHOP CONE FLOWING WELL TOTALS

(ACRE-FEET)

	2014									2015			
WELL	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	TOTAL
F121	3	3	3	3	3	3	3	3	3	3	3	3	36
F122	11	12	11	7	4	4	4	4	5	5	5	5	79
F123	8	9	9	11	12	12	11	10	11	13	13	14	134
F124	0	0	0	0	0	0	0	0	0	0	0	0	0
F125	79	85	80	85	88	87	89	85	93	93	84	95	1043
F126	20	21	22	25	26	26	26	24	25	27	26	25	293
F127	30	31	32	34	64	65	37	31	32	33	31	35	458
F128	22	22	21	21	21	21	23	23	23	24	22	23	266
F129	9	11	12	10	9	9	9	8	7	7	6	7	104
F130	20	19	21	27	27	30	32	31	31	34	31	32	334
F131	65	65	62	56	55	52	53	51	53	54	50	56	672
F132	28	26	25	28	30	31	27	29	31	31	29	32	346
F133	29	28	24	23	26	29	29	31	33	33	29	31	344
F134	49	49	47	51	55	49	47	46	51	52	47	52	595
F136	8	8	9	3	0	1	3	4	5	5	5	6	57
TOTAL	382	389	379	384	422	420	394	379	402	413	380	417	4761

12/1/2015

APPENDIX B

RANGE TREND

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

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

Transect	CASHBA_02					
Frequency	Species	2007	2009	2010	2012	2015
Annual Forb	ATPH	0	0	6	0	0
	ATTR	0	0	28	0	0
	CLOB	0	0	7	0	0
Perennial Forb	ANCA10	0	18	0	0	0
	GLLE3	6	17	9	5	16
	PYRA	0	0	0	4	0
Perennial Graminoid	CAREX	0	4	0	0	0
	DISP	72	141	60	59	39
	JUBA	21	9	15	4	3
	LETR5	0	69	0	0	0
	SPAI	77	21	79	79	75
Shrubs	ATTO	0	0	1	0	2
	ERNA10	0	0	2	0	0
Nonnative Species	BAHY	0	11	3	2	0
	SATR12	0	0	1	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
Annual Forb	HEAN3				1
Perennial Forb	ANCA10	3	0	9	5
Perennial Graminoid	CAREX				3
	DISP	113	121	137	129
	JUBA	56	60	62	29
	LETR5	17	16	12	36
	PADI6	0	0	0	3
Shrubs	ATTO	2	0	5	3
	ERNA10				1
	SAEX				1
Nonnative Species	BAHY	0	0	1	0
	PHAU7	1	3	0	0

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

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

Transect	CASHBA_05			
Frequency	Species	2007	2010	2012
Annual Forb	ATPH	0	7	0
	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
Annual Forb	ATTR	0	0	4	0	0
	COMAC	0	0	9	0	0
Perennial Forb	GLLE3	15	13	12	6	3
	NIOC2	0	3	0	0	0
	PYRA	0	4	0	0	0
Perennial Graminoid	DISP	118	223	129	138	98
	JUBA	5	44	7	9	7
	LETR5	8	8	11	6	0
	SPAI	0	65	0	5	0
Shrubs	ATTO	3	7	9	9	0
	ERNA10	3	1	0	3	2
Nonnative Species	BAHY	0	0	69	9	0

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

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

Transect	CASHBA_07					
Frequency	Species	2007	2009	2010	2012	2015
Annual Forb	ATTR	0	0	17	0	0
	CORA5	0	0	6	0	0
Perennial Forb	GLLE3	16	12	20	13	24
	PYRA	1	0	0	0	0
Perennial Graminoid	JUBA	8	9	19	12	11
	LECI4	0	0	0	1	0
	SPAI	88	97	110	101	106
Shrubs	ALOC2	7	3	1	1	2
	ATTO	1	1	0	0	0
	ERNA10	4	6	4	5	5
Nonnative Species	BAHY	4	0	5	0	0
	🟥	indicates a significant difference, α≤0.1 between 2014 and prior sampling event				
Shrub Cover (m)	2007	2009	2010	2012	2015	
ALOC2	1.8	0.61	0	0	0	
ERNA10	1.75	1.93	2.65	2.77	3.9	
Total	3.55	2.54	2.65	2.77	3.9	

Transect	CASHBA_08				
Frequency	Species	2007	2010	2012	2015
Annual Forb	ATPH	0	0	6	0
	ATTR	0	40	0	0
	CORA5	0	11	0	0
Perennial Forb	GLLE3	13	22	6	7
Perennial Graminoid	DISP	96	93	96	75
	JUBA	24	24	26	8
	LETR5	9	10	3	3
	SPAI	58	73	56	74
Shrubs	ATTO	9	0	11	2
Nonnative Species	BAHY	0	15	0	0
	🟥	indicates a significant difference, α≤0.1 between 2014 and prior sampling event			
Shrub Cover (m)	2007	2010	2012	2015	
ATTO	1.8	1.1	0.5	0.4	
ERNA10	0	0.1	0	0.6	
Total	1.8	1.2	0.5	1	

Transect	CASHBA_09					
Frequency	Species	2007	2009	2010	2012	2015
Annual Forb	ATPH	0	0	1	0	0
	ATTR	0	0	3	0	0
	COMAC	0	0	13	0	0
	HEAN3	0	0	4	0	0
Perennial Forb	ASTER	0	0	10	0	0
	CIMO	0	0	11	0	0
	CIOC2	0	7	0	0	0
	CIRSI	13	0	0	0	0
	ERIGE2	0	0	0	0	0
	GLLE3	16	17	13	9	6
	PYRA	11	6	14	0	0
Perennial Graminoid	CAREX	21	44	0	0	2
	DISP	64	73	70	94	46
	JUBA	24	14	8	0	2
	LETR5	16	31	29	19	18
	POSE	2	0	25	0	0
	SPAI	78	86	96	73	75
Shrubs	ATTO	0	0	0	0	0
	ERNA10	5	2	5	2	3
	MACAI3	0	2	0	0	0

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

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

Transect	CASHBA_10				
Frequency	Species	2007	2009	2014	2015
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
Annual Forb	ATTR	0	0	20	0	0
	CORA5	0	0	4	0	0
Perennial Forb	GLLE3	1	2	0	3	2
Perennial Graminoid	DISP	90	58	67	104	89
	JUBA	0	0	2	0	0
	LETR5	0	0	0	3	0
	SPAI	104	115	115	112	115
	SPGR	0	0	3	0	0
Shrubs	ATTO	1	5	1	0	3
Nonnative Species	BAHY	0	1	19	10	0

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

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

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

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

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

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

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

Shrub Cover (m)	2007	2009	2010	2012	2015
ATTO	0.15	1.45	0.3	0.48	2.1
ERNA10	1.55	0.4	0.7	0.9	1.85
Total	1.7	1.85	1	1.38	3.95

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

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

Shrub Cover (m)					
Species	2007	2009	2010	2012	2015
ERNA10	2.13	4.35	2.65	3.55	2.5
Total	2.13	4.35	2.65	3.55	2.5

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	2015
Annual Forb	ATPH	0	0	5	0	
	CORA5	0	0	16	0	
	ERAM2	0	0	1	0	
Perennial Forb	GLLE3	5	6	10	4	
	HECU3	0	0	3	0	
	MACA2	0	0	4	0	
	NIOC2	0	2	1	0	
	STEPH	0	0	4	9	
	STPA4	6	7	0	0	
Perennial Graminoid	DISP	40	45	41	38	
	JUBA	3	5	4	2	
	SPAI	90	96	97	87	
Shrubs	ATCO	7	2	4	15	
	ATTO	15	11	15	0	
	ERNA10	17	15	17	15	
	MACA17	0	7	0	0	
	ROWO	0	0	0	2	

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

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

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	Revisited in 2018			
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
Annual Forb	ATPH	0	0	13	0	0
	CLEOM2	0	0	0	2	0
	COMAC	0	0	12	0	0
	CORA5	0	0	21	0	0
Perennial Forb	MACA2	0	0	6	0	0
	PYRA	6	7	5	6	8
	STPA4	0	0	0	9	0
	SUMO	0	5	0	0	0
Perennial Graminoid	DISP	118	144	125	125	110
	JUBA	4	0	3	0	1
	SPAI	18	145	30	23	17
Shrubs	ATCO	0	3	0	0	0
	ATTO	0	25	0	0	0
	ERNA10	0	2	0	0	0
	MACA17	6	0	0	0	4
	SAVE4	3	1	3	6	3
	MACAI3	0	4	0	0	0
Nonnative Species	BAHY	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	2015
ATTO	0.85	3.85	0.8	0.42	0.6
ERNA10	0	1.25	0.45	0.26	0.7
SAVE4	6.45	6.32	5.8	5.11	6.67
Total	7.3	11.42	7.05	5.79	7.97

Transect	CASHBA_24				
Frequency	Species	2007	2010	2012	2015
Annual Forb	ATPH	0	3	0	0
	COMAC	0	4	0	0
	CORA5	0	1	0	0
Perennial Forb	SUMO	6	5	3	5
Perennial Graminoid	DISP	24	35	49	15
	SPAI	120	132	128	92
Shrubs	ATCO	11	6	0	4
	ATTO	18	20	21	9
	ERNA10	7	2	3	6
Nonnative Species	BAHY	0	23	15	0

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

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

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

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

Shrub Cover (m)	2009	2010	2012	2015
ATPA3	0	0.02	0	0.4
ERNA10	0.25	1.12	1.76	2.5
SAVE4	0	0.12	0	0
Total	0.25	1.26	1.76	2.9

Transect	YRIB_01		Saline Meadow			
Frequency	Species	2007	2009	2010	2013	2016
Annual Forb	ATPH	0	0	6	0	na
	CLOB	0	0	1	0	na
Perennial Forb	MACA2	0	0	3	0	na
Perennial Graminoid	DISP	77	75	92	67	na
	JUBA	7	5	2	1	na
	SPAI	53	45	51	52	na
Shrubs	ATTO	2	1	0	2	na
	ERNA10	10	4	5	13	na
	MACA17	3	0	0	0	na
	MACAI3	0	2	0	0	na

Shrub Cover (m)	2007	2009	2010	2013	2016
ATTO	0	0	1.2	1.21	na
ERNA10	2.9	3.6	6.45	3.42	na
SAVE4	0.3	0.25	0.25	0	na
Total	3.2	3.85	7.9	4.63	na

Transect	YRIB_02		Saline Meadow		
Frequency	Species	2007	2009	2010	2016
Annual Forb	ATRIP	3	0	0	na
	ATSES	8	0	0	na
	COMAC	0	0	5	na
	HEAN3	53	50	12	na
	MEAL6	0	5	0	na
Perennial Forb	CALI4	2	5	0	na
	PYRA	9	7	2	na
Perennial Graminoid	CAREX	48	47	40	na
	DISP	46	49	77	na
	ELEL5	0	0	0	na
	HOJU	28	16	9	na
	JUBA	25	63	62	na
	LETR5	54	70	106	na
	MUAS	7	10	0	na
	POSE	7	3	0	na
Shrubs	ERNA10	4	0	0	na
Nonnative Species	BAHY	13	18	23	na
	CADR	11	22	13	na
	LELA2	50	22	0	na
	LOCO6	0	7	0	na
	MEOF	2	0	0	na
	POMO5	20	41	3	na

Shrub Cover (m)	2010	2016
ERNA10	1.6	na

Transect	YRIB_03		Moist Floodplain		South 40
Frequency	Species	2007	2009	2013	2016
Perennial Graminoid	DISP	116	144	132	133
	SPAI	5	10	9	6
Shrubs	ATTO	2	3	3	15
	ERNA10	4	6	5	4

Shrub Cover (m)	2007	2009	2013	2016
ATTO	0.3	6.12	0.37	1.1
ERNA10	0	0	0	1.6
SAVE4	0	0.6	0	0
Total	0.3	6.72	0.37	2.7

Transect	YRIB_04		Moist Floodplain		North 40
Frequency	Species	2007	2010	2013	2016
Annual Forb	ATPH	0	11	0	18
	COMAC	0	21	0	0
	CORA5	0	5	0	0
Perennial Forb	GLLE3	0	3	0	0
	PYRA	5	7	4	2
Perennial Graminoid	CADO	0	14	0	9
	DISP	102	99	103	115
	JUBA	34	34	19	25
	LETR5	11	0	0	3
	SPAI	37	21	21	21
	SPGR	0	5	0	0
Shrubs	ATTO	0	0	0	3
	ERNA10	0	7	18	6

Shrub Cover (m)	2007	2010	2013	2016
ERNA10	0.3	15.06	11.88	12.9

Transect	YRIB_05		Saline Meadow		South 40
Frequency	Species	2009	2010	2013	2016
Annual Forb	ATPH	0	43	0	22
	CLOB	0	10	0	6
	COMAC	0	2	0	0
Perennial Forb	GLLE3	3	0	0	0
	PYRA	17	0	0	0
Perennial Graminoid	CAREX	16	0	0	0
	DISP	93	112	102	109
	JUBA	28	0	0	0
	SPAI	21	12	11	15
Shrubs	ATTO	0	17	8	12
	ERNA10	14	0	0	0
	SAVE4	0	0	0	1

Shrub Cover (m)	2009	2010	2013	2016
ATTO	0	2.04	1.61	2.5
ERNA10	17.95	1.47	1.07	0.8
SAVE4	0	0.51	0.22	1.1
Total	17.95	4.02	2.9	4.4

Transect	YRIB_06		Saline Meadow		North 40
Frequency	Species	2013	2016		
Annual Forb	ATPH	0	9		
Perennial Graminoid	DISP	49	46		
	JUBA	1	3		
	SPAI	64	64		
Shrubs	ATTO	3	1		
	ERNA10	9	5		

Shrub Cover (m)	2013	2016
ATTO	0	0.7
ERNA10	4.92	9.4
Total	4.92	10.1

Transect	4J_02		South River Field			
Frequency	Species	2007	2009	2010	2012	2015
Perennial Forb	ARSP	0	1	0	0	0
	ASFA	4	3	3	0	1
	GLLE3	6	8	11	12	12
	ARDR4	0	1	1	0	0
Perennial Graminoid	DISP	69	83	57	45	55
	HOJU	0	0	0	1	0
	JUBA	65	51	66	61	75
	LETR5	33	40	50	53	50

	SPAI	90	65	79	66	74
Shrubs	ATTO	0	0	0	1	5
	ERNA10	0	0	0	0	1
Nonnative Species	BAHY	0	12	22	3	4
	DESO2	0	0	0	0	0
	LOCO6	2	0	0	3	1

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

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

Transect	4J_03		South River Field			
Frequency	Species	2007	2009	2010	2012	2015
Annual Forb	ATPH	0	0	2	0	0
	CLPA4	0	0	1	0	0
	CLPL2	0	0	25	0	0
Perennial Forb	STPA4	4	4	6	2	0
Perennial Graminoid	DISP	137	136	137	143	112
	SPAI	46	48	44	34	36
Shrubs	ATTO	3	0	0	3	0
	SAVE4	8	4	2	3	4

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

Shrub Cover (m)	2007	2009	2010	2012	2015
ATTO	0.2	0	0.75	0.3	0
SAVE4	0.5	1.55	2	2.15	1.2
Total	0.7	1.55	2.75	2.45	1.2

Transect	4J_04					
Frequency	Species	2007	2009	2010	2012	2015
Perennial Forb	GLLE3	3	0	0	3	0
	NIOC2	18	18	22	18	19
Perennial Graminoid	DISP	144	126	134	152	147
	LECI4	5	0	0	0	0
	LETR5	24	27	27	16	22
	SPAI	30	30	36	24	16
Shrubs	ATTO	0	2	0	0	0
	ERNA10	0	0	0	5	1

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

Shrub Cover (m)	2007	2009	2010	2012	2015
ATTO	1.4	2.1	8.42	1.51	1.4
ERNA10	1	0	0	0.64	1.4
Total	2.4	2.1	8.42	2.15	2.8

Transect	LACEY_01		Saline Meadow		Triangle Field
Frequency					
Life Forms	Species	2007	2013	2016	
Annual Forb	ATTR	1	0	3	
	COMAC	5	0	0	
Perennial Forb	GLLE3	8	9	13	
Perennial Graminoid	CADO	0	0	5	
	DISP	135	102	88	
	JUBA	50	30	30	
	LETR5	27	9	6	
	SPAI	9	12	13	
Shrubs	ATTO	3	8	2	
	ERNA10	1	1	1	
Nonnative Species	BAHY	20	0	0	

Shrub Cover (m)		
Species code	2007	2013
ATTO	0.45	4.83
ERNA10	4.85	2.3
Total	5.3	7.13

Transect	LACEY_02		Moist Floodplain		Trinagle Field
Frequency					
Life Forms	Species	2007	2009	2013	2016
Perennial Forb	ANCA2				2
	GLLE3	0	4	0	0
	NIOC2	0	0	1	0
	PYRA	0	0	0	0
	SUMO				1
Perennial Graminoid	DISP	144	133	104	88
	JUBA	41	25	17	7
	LETR5	25	22	25	11
	SPAI	55	40	64	53
Shrubs	ATTO	0	0	3	6
	ERNA10	6	3	3	3

Shrub Cover (m)				
Species code	2007	2009	2013	2016
ATTO	0	0	0.02	8.5
ERNA10	0.25	0.2	1.2	4.7
SUMO	0	0	0	0.2
Total	0.25	0.2	1.22	13.3

Transect	LACEY_03		Saline Meadow		
Frequency					
Life Forms	Species	2007	2009	2013	2016
Perennial Graminoid	DISP	139	157	75	117
	JUBA	3	2	0	2
	LETR5	42	26	17	3
	SPAI	31	5	1	4
Shrubs	ALOC2	0	5	8	6

Shrub Cover (m)			
Species code	2009	2013	2016
ALOC2	4.65	0	7.1
ATTO	1.2	3.34	3.8
Total	5.85	3.34	10.8

Transect	LACEY_04		Saline Meadow		
Frequency					
Life Forms	Species	2007	2009	2013	2016
Perennial Graminoid	DISP	24	18	23	6
	JUBA	11	17	19	15
	SPAI	96	113	65	56
Shrubs	ATTO	3	1	3	1
	ERNA10	14	9	13	6

Shrub Cover (m)				
Species code	2007	2009	2013	2016
ATCO	0	0.7	0	1.4
ATTO	1.75	0.95	0.97	3.9
ERNA10	10.95	15.7	18.07	21.3
SAVE4	1.25	1.1	0	0.8
Total	13.95	18.45	19.04	27.4

Frequency	LACEY_05		Moist Floodplain		
Life Forms	Species	2007	2009	2013	2016

Perennial Forb	GLLE3	22	0	19	11
Perennial Graminoid	DISP	73	91	81	65
	JUBA	34	4	35	25
	LETR5	66	113	70	54
	SPAI	82	0	78	57
Shrubs	ALOC2	8	0	3	2
	ATTO	8	0	5	5
	ERNA10	3	0	2	0
Nonnative Species	BAHY	0	3	0	0
	PHAU7				3

Shrub Cover (m)

Species code	2007	2013	2016
ALOC2	1.3	0	5.4
ATTO	5.85	5.66	10.1
ERNA10	1.4	3.88	4.2
Total	8.55	9.54	19.7

Transect LACEY_06 Moist Floodplain

Frequency

Life Forms	Species	2007	2009	2013	2016
Perennial Graminoid	DISP	100	100	106	90
	SPAI	83	83	79	69
Shrubs	ATTO	17	6	6	5
Nonnative Species	BAHY	0	1	0	3

Shrub Cover (m)

Species code	2007	2009	2013	2016
ATTO	6.95	7.45	3.76	8.2
Total	6.95	7.45	3.76	8.2

Transect LACEY_07 Saline Meadow

Frequency

Life Forms	Species	2009	2013	2016
Perennial Forb	GLLE3	44	53	34
	NIOC2	2	4	0
	PYRA	0	5	3
Perennial Graminoid	DISP	101	93	106
	JUBA	21	30	20
	LETR5	27	35	24
	SPAI	72	55	67

Transect Lacey_08 Moist Floodplain

Frequency

Life Forms	Species	2013	2016
Annual Forb	HEAN3	3	0
Perennial Forb	ANCA10	27	18
	GLLE3	12	10
Perennial Graminoid	DISP	85	44
	JUBA	22	6
	LETR5	131	115
Nonnative Species	BAHY	1	0

Transect MEND_02

Frequency

	Species	2007	2009	2014
Perennial Forb	PYRA	2	4	8
Perennial Graminoid	CAPR5	0	0	3
	DISP	137	143	130
	JUBA	25	34	32
	LETR5	14	18	19
	SPAI	45	35	54
Shrubs	ATTO	5	12	0
	ERNA10	2	0	6
	MACA17	4	0	6
	SAVE4	0	3	0
	MACAI3	0	5	0
Nonnative Species	BAHY	0	20	5
	MEOF	0	2	0
	PHAU7	1	0	1

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

Shrub Cover (m)

Species	2007	2009	2014
ERNA10	0.9	0.44	1.35
SAVE4	0	0.06	0.05
Total	0.9	0.5	1.4

Transect MEND_03

Frequency

	Species	2007	2009	2014
Perennial Forb	SUMO	15	5	19
Perennial Graminoid	DISP	139	151	151
Shrubs	ATTO	0	0	1
Nonnative Species	BAHY	0	9	5

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

Shrub Cover (m)

Species	2007	2009	2014
ATTO	0	0.05	0.25
SUMO	2.25	7.45	12.49
Total	2.25	7.5	12.74

Transect MEND_04

Frequency

	Species	2007	2009	2014
Perennial Forb	MALE3	0	1	0
Perennial Graminoid	DISP	157	152	152
	LETR5	17	26	5
Nonnative Species	BAHY	17	67	0

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

Transect MEND_05

Frequency

	Species	2007	2009	2014
Perennial Forb	GLLE3	4	0	5
Perennial Graminoid	DISP	124	108	73
	JUBA	1	4	9
	LETR5	2	2	0
	SPAI	66	63	70
Shrubs	ATTO	8	4	4
	ERNA10	16	15	17
Nonnative Species	BAHY	0	2	0

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

Shrub Cover (m)

Species	2007	2009
ATTO	4.19	3.9
ERNA10	4.75	6.85
Total	8.94	10.75

Transect MEND_06

Frequency

	Species	2007	2009	2014
Perennial Graminoid	DISP	130	131	135
	JUBA	13	19	18
	SPAI	26	38	40
Shrubs	ATTO	7	5	5
	ERNA10	3	1	1
	MACA17	0	1	0

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

Shrub Cover (m)

Species	2007	2009	2014
ATTO	2.7	3.1	1.2
ERNA10	1	2.4	1.25
Total	3.7	5.5	2.45

Transect	MEND_07			
Frequency				
	Species	2007	2009	2014
Annual Forb	HEAN3	5	0	0
Perennial Forb	SUMO	5	4	0
Perennial Graminoid	DISP	121	124	104
	JUBA	2	1	3
	SPAI	17	20	13
Shrubs	ATCO	3	2	0
	ATPA3	0	5	1
	MACA17	0	6	5
Nonnative Species	BAHY	3	2	0

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

Shrub Cover (m)			
Species	2007	2009	2014
ATPA3	0.45	0.36	0.55
ATTO	0.1	0	0
SAVE4	0.15	0	0
SUMO	0	0	0.1
Total	0.7	0.36	0.65

Transect	MEND_08			
Frequency				
	Species	2007	2009	2014
Annual Forb	ATPH	0	0	1
Perennial Forb	HECU3	6	4	4
	MALE3	6	7	7
Perennial Graminoid	DISP	109	100	108
	SPAI	48	47	49
Shrubs	ERNA10	3	4	2
Nonnative Species	BAHY	3	27	3

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

Shrub Cover (m)			
Species	2007	2009	2014
ATTO	0.05	0	0.5
ERNA10	4.3	5.3	4
Total	4.35	5.3	4.5

Transect	MEND_09		River Riparian	
Frequency				
	Species	2007	2009	2014
Perennial Forb	GLLE3	5	2	6
	NIOC2	6	1	0
	PYRA	32	21	1
Perennial Graminoid	CAREX	4	0	0
	DISP	138	133	123
	JUBA	69	67	30
	LETR5	21	28	16
	POSE	14	0	0
	SPAI	2	4	0
Nonnative Species	BAHY	4	0	0

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

Shrub Cover (m)			
Species	2007	2009	2014
ATTO	0.2	0	0.4
ERNA10	0	0.45	0.95
Total	0.2	0.45	1.35

Transect	MEND_10			
Frequency				
	Species	2007	2009	2014
Perennial Forb	SUMO	0	0	1
Perennial Graminoid	DISP	125	116	117
	LETR5	3	3	0
	SPAI	4	3	1
Shrubs	ATTO	22	7	7
	ERNA10	4	2	1
	MACA17	7	0	0
	MACAI3	0	5	0

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

Shrub Cover (m)			
Species	2007	2009	2014
ATTO	1.35	3.05	2.3
ERNA10	3.6	5.25	5.8
SAVE4	0.65	0.8	0.55
Total	5.6	9.1	8.65

Transect	MEND_11			
Frequency				
	Species	2007	2009	2014
Perennial Forb	SUMO	1	1	1
Perennial Graminoid	DISP	118	133	117
	SPAI	1	0	0
Shrubs	ATTO	14	9	9
	ERNA10	19	11	22
Nonnative Species	BAHY	0	2	9

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

Shrub Cover (m)

Species	2007	2009	2014
ATTO	3.05	6.35	6.4
ERNA10	10.2	13.1	12.55
SAVE4	0	0.1	0
SUMO	1.5	1.7	1.1
Total	14.75	21.25	20.05

Transect	MEND_12			
Frequency				
	Species	2007	2009	2014
Annual Forb	ATSES	0	0	3
Perennial Graminoid	DISP	163	148	139
	JUBA	9	0	0
	LETR5	12	3	7
	SPAI	6	3	15
Shrubs	ATTO	1	0	0
Nonnative Species	BAHY	2	40	1

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

Transect	TATUM_01		Northeast McCumber		
Frequency	Species	2007	2009	2010	2014
Annual Forb	ATPH	0	0	0	0
Perennial Forb	ASTER	0	0	0	0
	NIOC2	0	4	6	0
	PYRA	30	27	32	32
	CRRU3	0	0	31	0
Perennial Graminoid	CAREX	0	4	12	0
	DISP	109	106	116	115
	JUBA	65	74	57	49
	LETR5	4	0	4	0
	POSE	2	0	9	15
	SPAI	85	72	53	85
	SPGR	13	28	27	24
Nonnative Species	DESO2	0	0	4	0

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

Transect	TATUM_02		North Horton Slough		
Frequency					
Life Forms	**Species**	**2007**	2009	2010	2014
Perennial Forb	NIOC2	6	10	10	5
Perennial Graminoid	DISP	119	132	124	105
	JUBA	0	0	0	0
	PADI6	2	0	0	0
	SPAI	54	59	65	88

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

Transect	TATUM_03		Southeast McCumber Riparian		
Frequency	**Species**	**2007**	2009	2010	2014
Annual Forb	ATTR	0	0	1	0
	COMAC	0	0	0	0
	HEAN3	0	0	2	0
Perennial Forb	ASTER	0	0	1	0
	ERIGE2	5	0	0	0
	NIOC2	7	16	5	3
	PYRA	15	8	7	0
Perennial Graminoid	CADO2	4	0	0	0
	CAREX	0	0	0	14
	DISP	121	128	111	92
	JUBA	101	104	102	74
	LETR5	77	82	87	81
	SPAI	11	15	17	19
Shrubs	ATTO	14	12	0	11
Nonnative Species	BAHY	0	6	24	5
	LELA2	0	0	2	0

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

Shrub Cover (m)

Species code	2007	2009	2010	2014
ATTO	6.8	12.9	17.15	18.87
ERNA10	0.45	0.55	0	0.7
Total	7.25	13.45	17.15	19.57

Transect	TATUM_04	Northwest McCumber Riparian		
Frequency	**Species**	**2007**	**2009**	**2014**
Perennial Forb	GLLE3	0	1	0
	SUMO	0	0	1
Perennial Graminoid	DISP	11	18	29
	JUBA	17	24	2
	LETR5	2	2	0
	SPAI	107	119	124
Shrubs	ERNA10	10	3	3
Nonnative Species	BAHY	3	0	0

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

Shrub Cover (m)	**2007**	**2009**	**2014**
ATTO	0.15	0	0
ERNA10	4.35	0.95	1.44
SUMO	0.45	0	0.49
Total	4.95	0.95	1.93

Transect	TATUM_05	Southwest McCumber Riparian		
Frequency	**Species**	**2007**	**2009**	**2014**
Annual Forb	ATTR	0	0	11
Perennial Forb	GLLE3	9	1	3
Perennial Graminoid	DISP	130	143	142
	JUBA	73	66	51
	LETR5	79	78	51
	SPAI	0	2	0
Shrubs	ERNA10	0	0	5

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

Shrub Cover (m)	**2007**	**2009**	**2014**
ERNA10	0.4	0.8	2.94

Transect	TATUM_06	South Horton Slough		
Frequency	Species	2007	2009	2014
Perennial Forb	GLLE3	0	7	3
	NIOC2	80	94	88
	PYRA	3	0	3
Perennial Graminoid	DISP	141	165	145
	JUBA	34	34	29
	LETR5	0	92	93

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

Transect	TATUM_07	East River Field			
Frequency					
Life Forms	Species	2007	2009	2010	2014
Annual Forb	CORA5	0	0	2	0
Perennial Forb	SUMO	1	1	0	0
Perennial Graminoid	DISP	2	2	2	2
	SPAI	96	96	92	118
Shrubs	ATCO	22	21	22	21
	ATPA3	2	2	1	1
	SAVE4	8	5	12	6
	TEAX	2	1	1	0
	ARTR2	0	0	2	2
	PIDE4	12	14	0	0

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

Shrub Cover (m)				
Species code	2007	2009	2010	2014
ARSP	0	0	1.4	0
ARTR2	0.65	0.3	0	0.95
ATCO	2.5	2.45	2.3	3.23
PIDE4	0.1	0.9	0	0
SAVE4	4.4	4.3	14.75	4.23
TEAX	0.5	0.3	0	0.55
Total	8.15	8.25	18.45	8.96

Transect	TATUM_08		East River Field		
Frequency					
Life Forms	Species	2007	2009	2010	2014
Perennial Graminoid	DISP	84	86	94	90
	JUBA	9	8	1	11
	SPAI	74	99	79	69
	SPGR	0	0	1	0
Shrubs	ATTO	3	1	2	0
	ERNA10	20	19	9	15
Nonnative Species	BAHY	0	0	1	0

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

Shrub Cover (m)				
Species code	2007	2009	2010	2014
ATTO	0.85	0.94	1.1	0.06
ERNA10	11.5	17.89	11.8	19.69
Total	12.35	18.83	12.9	19.75

Transect	TATUM_09			
Frequency				
Life Forms	Species	2007	2009	2014
Perennial Forb	ANCA10	37	44	40
	GLLE3	0	3	0
	HECU3	1	1	2
	NIOC2	5	0	3
Perennial Graminoid	DISP	111	124	97
	JUBA	10	13	10
	LETR5	0	4	3
	SPAI	17	23	19
Shrubs	ATTO	2	8	6
	ERNA10	6	7	0
Nonnative Species	BAHY	2	31	9
	LELA2	0	0	1

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

Shrub Cover (m)			
Species code	2007	2009	2014
ATTO	10.7	14.65	10.2
ERNA10	6.6	6.7	2.55
Total	17.3	21.35	12.75

Transect	TATUM_10		Charlie Butte Field		
Frequency					
Life Forms	Species	2007	2009	2010	2014
Perennial Forb	CALI4	0	1	0	3
	STEPH	0	7	0	0
	STPA4	0	0	12	11
	CASTI2	0	0	2	0
Perennial Graminoid	DISP	0	14	12	18
	LECI4	0	1	0	0
	SPAI	78	85	88	76
Shrubs	ATTO	21	15	6	9
	ERNA10	2	11	13	14
	SAVE4	3	0	1	1
	ARTR2	2	0	0	0

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

Shrub Cover (m)				
Species code	2007	2009	2010	2014
ATTO	3.51	5.74	6.25	4.3
ERNA10	1.1	8.47	3.9	6.05
MACA17	0	0	0.2	0
SAVE4	1	1.16	1	0.55
Total	5.61	15.37	11.35	10.9

Transect TATUM_11 Calvert Slough Pasture

Frequency

Life Forms	Species	2007	2009	2010	2014
Annual Forb	ATPH	0	0	5	0
	CORA5	0	0	4	0
Perennial Forb	GLLE3	0	2	1	11
	HECU3	0	0	0	1
Perennial Graminoid	DISP	152	157	141	152
	JUBA	32	33	28	31
	LETR5	25	18	21	34
	SPAI	0	0	4	0
	SPGR	0	0	4	0
Shrubs	ATTO	3	8	10	2
Nonnative Species	BAHY	3	36	54	8

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

Shrub Cover (m)

Species code	2007	2009	2010	2014
ATTO	5.05	11.85	16.55	8.8
ERNA10	0	0.08	2.35	0.95
Total	5.05	11.93	18.9	9.75

Transect TATUM_12

Frequency

Life Forms	Species	2007	2009	2010	2014
Annual Forb	ATPH	0	0	8	0
Perennial Forb	NIOC2	0	3	2	1
	PYRA	0	0	0	1
	STEPH	0	0	0	0
Perennial Graminoid	DISP	140	159	146	148
	SPAI	7	11	8	8
Shrubs	ATTO	7	16	11	5
	ERNA10	0	0	0	4

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

Shrub Cover (m)

Species code	2007	2009	2010	2014
ATTO	3.2	3.46	3.1	4.14
ERNA10	0	0.04	0	1.61
Total	3.2	3.5	3.1	5.75

Transect TATUM_13 Calvert Slough Pasture

Frequency

Life Forms	Species	2007	2009	2010	2014
Annual Forb	CLPL2	0	0	6	1
Perennial Forb	NIOC2	0	5	0	0
Perennial Graminoid	DISP	88	79	79	90
	JUBA	5	13	4	5
	SPAI	64	57	51	63
	SPGR	0	0	3	0
Shrubs	ATTO	20	16	12	7
	ERNA10	0	3	0	0
Nonnative Species	BAHY	0	0	3	0

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

Shrub Cover (m)

Species code	2007	2009	2010	2014
ATTO	5.35	9.98	9.1	6
ERNA10	0.1	0.12	0	0.2
Total	5.45	10.1	9.1	6.2

Transect TATUM_14

Frequency

Life Forms	Species	2007	2009	2010	2014
Annual Forb	ATPH	0	0	12	1
	COMAC	0	0	13	0
Perennial Forb	ANCA10	4	5	2	6
	PYRA	1	1	0	0
	STPA4	0	3	0	0
	SUMO	0	0	0	2
Perennial Graminoid	DISP	103	124	103	111
	JUBA	19	21	20	42
	SPAI	37	37	22	48
Shrubs	ATTO	8	5	8	6
	ERNA10	3	13	10	0
Nonnative Species	BAHY	0	19	0	0

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

Shrub Cover (m)

Species code	2007	2009	2010	2014
ATTO	2.15	2.52	3.15	2.18
ERNA10	6.3	7.81	6.35	4.86
SUMO	0	0	0	0.13
Total	8.45	10.33	9.5	7.17

Transect TATUM_15 West River

Frequency

Life Forms	Species	2007	2009	2010	2014
Perennial Graminoid	DISP	7	7	6	8
	SPAI	92	102	97	95
	SPGR	0	0	1	0
Shrubs	ATCO	20	26	26	18
	ATTO	14	9	2	2
	ERNA10	15	3	2	6
	MACA17	0	3	0	0
	TEAX	3	2	2	3
Nonnative Species	SATR12	0	0	0	2
	BRRU2	0	0	3	0

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

Shrub Cover (m)

Species code	2007	2009	2010	2014
ATCO	1.75	0.85	0.35	1.5
ATTO	0.75	1	0.8	1.05
ERNA10	1.25	1.55	2.85	0.55
TEAX	0	0.3	0	0.4
Total	3.75	3.7	4	3.5

Transect TATUM_29 Calvert Slough

Frequency	**Species**	**2002**	**2003**	**2007**	**2009**	**2010**
Annual Forb	2FORB	6.8	0	0	0	0
	CLOB	0	3	0	0	0
	CORA5	0	13	0	0	64
	ERIAS	0	3	0	0	0
Perennial Forb	STEPH	0	1	0	0	0
	SUMO	0	1	0	0	0
Perennial Graminoid	DISP	11.9	6	8	2	4
	SPAI	120.7	107	109	123	115
Shrubs	ARTRW8	0	0	0	0	0
	ATCO	0	0	0	3	0
	ERNA10	0	9	0	5	0
	SAVE4	0	2	0	0	3
	ARTR2	8.5	20	14	30	21
Nonnative Species	SATR12	0	3	0	0	0

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

Shrub Cover (m)	**2003**	**2007**	**2009**	**2010**
ARTR2	1.6	3.05	3.11	3.92
ATCO	0	0.4	0.12	0
ATTO	0.5	0	0	0
ERNA10	0.48	1.15	1.24	0.8
SAVE4	0	1	1.68	2.2
Total	2.58	5.6	6.15	6.92

Transect CASHBA_10

Frequency

Life Forms	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

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

Transect CASHBA_11

Frequency

Life Forms	Species	2007	2009	2014
Annual Forb	ATPH	0	0	3
	ATTR	0	0	3
Perennial Forb	ASTRA	0	0	0
	CIOC2	0	4	0
	GLLE3	3	5	4
Perennial Graminoid	DISP	93	90	75
	JUBA	28	23	9
	LECI4	0	5	0
	LETR5	0	0	5
	SPAI	47	34	53
Shrubs	ATTO	0	1	4
	ERNA10	1	0	1
Nonnative Species	BAHY	0	0	1
	CADR	7	2	0

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

Shrub Cover (m)	2007	2009	2014
ATCO	0	0.45	0
ATTO	0.5	0.15	3.33
ERNA10	0	0.3	3.85
Total	0.5	0.9	7.18

Transect CASHBA_13

Frequency

Life Forms	Species	2007	2009	2014
Perennial Forb	GLLE3	1	0	0
	NIOC2	0	1	2
Perennial Graminoid	CAREX	2	0	0
	DISP	162	152	164
	LETR5	25	24	22
Shrubs	ERNA10	0	1	2

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

Shrub Cover (m)	2009	2014
ERNA10	0.2	1.35

Transect ABERDEEN_30

Frequency	Species	2002	2003	2004	2007	2009	2010	2012	2015
Annual Forb	2FORB	37.4	0	0	0	0	0	0	0
	ATPH	0	3	0	0	0	0	0	0
	ATTR	0	82	76	0	0	0	0	0
	CLOB	0	2	0	0	0	0	0	0
	GILIA	0	8	0	0	0	0	0	0
Perennial Forb	OENOT	0	12	4	0	0	0	0	0
Perennial Graminoid	SPAI	81.6	57	68	59	60	60	70	46
Shrubs	ATTO	8.5	51	51	34	64	58	48	29
	SAVE4	0	0	3	0	0	0	0	0
Nonnative Species	BAHY	0	3	3	0	0	0	0	0
	SCAR	0	58	3	0	0	0	0	0
	SATR12	6.8	122	127	0	0	4	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
ATCA	0	0	0.35	0.8	0.75	0.72	0.3
ATTO	2.6	6.35	37.3	40.75	46.65	42.12	46.7
SAVE4	6.2	7.3	6.85	5.3	8.85	5.47	3.8
Total	8.8	13.65	44.5	46.85	56.25	48.31	50.7

Transect_Name ABERDEEN_33

Frequency	Species	2002	2003	2004	2007	2009	2010	2012	2015
Annual Forb	2FORB	0	0	3	0	0	0	0	0
	ERIAS	0	3	18	0	0	0	0	0
	GILIA	0	0	6	0	0	0	0	0
Perennial Forb	STEPH	3.4	3	4	0	0	0	0	0
	STPA4	0	0	0	2	0	0	0	0
Perennial Graminoid	DISP	0	6	8	5	6	6	8	5
	ELEL5	0	8	4	0	0	0	0	0
	JUBA	0	0	0	0	0	0	0	0
	SPAI	103.7	111	111	111	103	90	96	120
Shrubs	ARTRW8	0	0	0	0	0	0	0	0
	ATCO	1.7	14	9	24	13	12	12	10
	ATTO	3.4	0	0	0	0	0	0	0
	EPNE	5.1	1	2	0	1	0	0	0
	ERNA10	0	5	3	5	2	0	0	0
	MACA17	0	0	0	0	2	0	0	0
	SAVE4	0	0	0	0	0	0	0	0
	ARTR2	37.4	45	36	34	35	29	26	25
Nonnative Species	BRTE	0	0	0	0	4	0	0	0
	BRRU2	0	0	0	0	2	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
ARTR2	17.34	7.5	13.55	13.85	14.2	12.1	10
ATCO	1.7	0.6	3.45	1.9	2.6	1.24	1.55
EPNE	0	0	0	0.4	0	0.2	0.3
EPVI	0.41	0	0	0	0	0	0
ERNA10	0.44	0	0	0	0	0	0
Total	19.89	8.1	17	16.15	16.8	13.54	11.85

Transect BLKROC_01 Saline Bottom

Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Perennial Forb	HECU3	6.8	4	8	2	16	10	4	0
	MALE3	20.4	26	21	26	21	13	6	1
	PYRA	0	3	2	1	0	0	0	0
	SEVE2	0	0	0	0	16	0	0	0
Perennial Graminoid	DISP	39.1	59	69	52	57	49	53	48
	JUBA	27.2	39	35	24	21	18	20	15
	SPAI	0	4	3	4	4	4	4	0
Shrubs	ATTO	28.9	36	35	36	13	17	12	9
	ERNA10	64.6	61	57	53	52	47	32	31

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
ATTO	12.6	3.46	12.15	3.81	4.55	2.95	4.7
ERNA10	26.1	11.35	20.6	10.52	13.15	12.7	15.2
Total	38.7	14.81	32.75	14.33	17.7	15.65	20

Transect BLKROC_02 Saline Meadow

Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ATTR	0	3	0	0	0	0	0	0
Perennial Forb	GLLE3	6.8	2	5	4	7	8	7	11
Perennial Graminoid	DISP	52.7	49	55	49	55	48	57	61
	JUBA	3.4	11	6	6	4	8	6	4
	LECI4	0	4	1	2	2	3	3	2
	SPAI	71.4	95	92	91	86	78	82	91
Shrubs	ATTO	42.5	35	41	30	27	20	26	20
	ERNA10	11.9	27	13	16	22	19	13	13
Nonnative Species	BAHY	0	5	0	0	0	0	0	0
	SATR12	0	0	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**	**2013**	**2016**
ATTO	22.3	10.3	13.4	9.7	8.3	9.2	7.6
ERNA10	6.0	25.1	3.4	6.4	5.4	4.9	4.2
Total	28.3	35.4	16.9	16.1	13.7	14.1	11.8

Transect	BLKROC_03		Saline Meadow						
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	CHHI	0	18	6	0	0	0	0	0
Perennial Forb	GLLE3	0	0	0	0	1	0	0	0
Perennial Graminoid	ARPU9	0	0	0	2	0	0	0	0
	DISP	52.7	47	59	42	36	18	14	16
	JUBA	0	0	0	0	2	0	0	0
	SPAI	100.3	112	117	122	128	122	124	214
Shrubs	ATTO	0	0	0	1	2	2	0	0
	ERNA10	0	6	7	4	17	8	13	36
Nonnative Species	LASE	0	3	3	0	0	0	0	0
	POMO5	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**	**2013**	**2016**
ATTO	0	0	0.25	0	0	0	0.6
ERNA10	1.52	1.3	5.35	9.54	9.85	16.35	17.3
Total	1.52	1.3	5.6	9.54	9.85	16.35	17.9

Transect	BLKROC_04		Saline Meadow						
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	CHHI	0	2	0	0	0	0	0	0
	COMAC	0	23	0	0	0	3	0	0
	HEAN3	0	8	0	4	6	12	0	0
Perennial Forb	ANCA10	11.9	18	17	22	22	16	21	16
	HECU3	0	0	0	1	3	0	0	0
	MALE3	13.6	3	8	10	1	0	1	0
	PYRA	40.8	50	44	23	28	15	18	16
Perennial Graminoid	CADO2	5.1	18	0	5	0	0	0	3
	CAREX	0	0	0	0	14	1	12	0
	DISP	83	77	70	76	62	62	65	48
	JUBA	88	113	93	73	95	89	98	70
	LETR5	27	65	43	48	70	26	35	16
	SPAI	70	30	73	59	27	56	42	39
	SPGR	0	0	0	0	0	0	1	0
Shrubs	ALOC2	5.1	0	0	0	2	1	1	2
	ATTO	0	5	0	0	4	3	0	0
	ERNA10	0	3	2	2	3	2	6	7
Nonnative Species	BAHY	0	12	6	0	20	30	1	0
	POMO5	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**	**2013**	**2016**
ALOC2	0.0	0.0	0.0	0.0	0.4	0.0	1.5
ATTO	0.3	0.0	0.0	0.7	0.1	0.0	0.0
ERNA10	3.4	2.8	5.6	7.9	2.3	5.8	8.1
Total	3.6	2.8	5.6	8.6	2.9	5.8	9.6

Transect	BLKROC_05		Saline Meadow						
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ATPH	0	3	0	0	0	0	0	1
	ATSES	0	11	0	2	0	0	0	0
	CLEOM2	0	16	0	0	0	0	0	0
	COMAC	0	17	0	3	0	0	0	3
	HEAN3	3.4	11	0	6	0	2	0	6
Perennial Forb	GLLE3	0	0	0	0	0	0	4	0
	PYRA	32.3	45	37	5	8	3	10	9
	SICO2	0	2	0	0	0	0	0	0
Perennial Graminoid	DISP	49.3	63	49	49	78	52	55	39
	JUBA	6.8	14	14	10	10	6	9	11
	LECI4	0	0	0	0	4	0	0	0
	LETR5	0	0	0	0	0	4	4	3
	SPAI	124.1	125	115	123	111	131	124	119
Shrubs	ATTO	0	2	0	0	0	4	0	0
	ERNA10	6.8	4	1	0	1	0	0	0
Nonnative Species	BAHY	0	0	0	11	3	0	0	0
	POMO5	0	4	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**	**2013**	**2016**
ERNA10	7.6	6.3	2.1	0.8	0.5	0.3	0.1
Total	7.6	6.3	2.1	0.8	0.5	0.25	0.1

Transect BLKROC_06 Saline Meadow

Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ATPH	0	30	0	0	0	19	0	3
	CHHI	0	8	0	0	0	0	0	0
	CLEOM2	0	3	0	0	0	0	0	0
	COMAC	0	26	0	0	0	5	0	0
Perennial Forb	ANCA10	5.1	4	4	2	4	2	2	2
	PYRA	18.7	4	0	2	1	0	0	1
Perennial Graminoid	DISP	73.1	80	75	77	66	70	69	65
	JUBA	17	26	37	27	13	9	16	7
	SPAI	95.2	78	71	76	76	85	80	73
Shrubs	ATTO	0	8	9	4	10	6	2	1
	ERNA10	20.4	19	6	8	9	14	9	7
	SAEX	0	0	0	2	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**	**2013**	**2016**
ATTO	3.3	0.7	1.0	2.1	1.3	3.1	4.6
ERNA10	17.3	9.1	9.9	9.5	9.8	6.9	8.9
SAEX	2.3	7.5	3.3	0.7	0.1	0.5	0.4
SAGO	0.0	0.0	0.0	0.0	0.0	0.0	0.7
SALIX	0.0	0.6	0.0	0.0	0.0	0.0	0.0
Total	23.0	18.0	14.2	12.3	11.2	10.5	14.5

Transect BLKROC_07 Saline Meadow

Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	2FORB	0	0	0	0	0	0	6	0
	ATPH	0	32	0	0	0	18	0	2
	CLOB	0	9	0	0	0	6	0	3
	ERPR4	0	0	0	3	0	0	0	0
Perennial Forb	SUMO	0	0	0	0	3	0	0	1
Perennial Graminoid	DISP	69.7	59	71	61	75	73	78	71
	JUBA	17	6	12	1	4	6	1	3
	SPAI	91.8	68	64	76	84	67	76	69
Shrubs	ATTO	5.1	0	0	0	0	2	1	0
	ERNA10	5.1	4	3	3	4	5	4	4
	MEOF	0	0	0	0	0	0	0	3
Nonnative Species	POMO5	0	0	0	9	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**	**2013**	**2016**
ATTO	0.0	0.0	0.5	0.2	0.3	0.0	0.0
ERNA10	3.6	2.9	3.0	1.9	1.6	2.6	1.6
SUMO	0.0	0.4	0.7	0.3	0.0	0.0	0.0
Total	3.6	3.2	4.2	2.3	1.9	2.6	1.6

Transect BLKROC_09 Sodic Fan

Frequency	**Species**	**2002**	**2003**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	2FORB	0	2	0	0	0	0	0
	COMAC	0	2	0	0	0	0	0
	ERAM2	0	0	2	0	0	0	0
Perennial Forb	APCA	0	0	4	0	0	3	0
	ASTER	0	0	0	0	0	0	0
	GLLE3	1.7	7	1	4	2	1	1
	STEPH	0	0	0	0	0	0	0
Perennial Graminoid	DISP	113.9	102	85	99	104	124	106
	JUBA	56.1	55	57	65	65	59	48
	LECI4	0	0	4	0	0	0	0
	LETR5	5.1	5	7	10	9	5	0.0
	SPAI	86.7	66	80	68	69	74	77
Shrubs	ATTO	34	46	16	24	15	9	7
	ERNA10	25.5	36	39	44	36	44	34
	MACA17	0	0	4	1	0	0	2
	PSAR4	0	3	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**	**2013**	**2016**
ATTO	25.2	9.1	8.9	2.9	0.6	3.1
ERNA10	10.1	9.5	10.3	8.8	8.8	10.2
Total	35.3	18.7	19.2	11.7	9.4	13.2

Transect BLKROC_10 Moist Floodplain

Frequency	Species	2002	2003	2004	2007	2009	2010	2012	2013	2014	2015	2016
Annual Forb	ATTR	0	4	0	0	0	0	0	0	0	0	0
	CHBR	0	2	3	0	0	0	0	0	0	0	0
	CHIN2	0	14	28	0	0	0	0	0	0	0	0
	MENTZ	0	14	0	0	0	0	0	0	0	0	0
Perennial Forb	HECU3	0	0	0	0	0	0	0	0	0	0	0
	MALE3	0	3	7	11	21	20	27	18	17	16	18
	SUMO	0	0	0	0	10	0	0	0	0	0	0
	STPI	0	0	4	0	0	0	0	0	0	0	0
Perennial Graminoid	DISP	0	3	0	0	0	0	2	7	9	10	13
	LETR5	0	0	0	0	0	0	9	12	19	21	20
	SPAI	0	12	18	18	21	22	17	18	22	21	22
Shrubs	ARTRW8	0	0	0	0	0	0	0	0	0	0	0
	ATTO	1.7	6	14	25	92	74	74	65	64	49	55
	SAVE4	0	0	0	0	0	3	0	0	0	0	0
	ARTR2	0	2	0	2	2	3	0	0	0	0	0
Nonnative Species	AMARA	0	6	0	0	3	0	0	0	0	0	0
	BAHY	0	3	64	0	47	24	2	4	2	0	0
	DESO2	0	0	1	0	4	0	0	0	0	0	0
	SATR12	0	0	48	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	2013	2014	2015	2016
ARTR2	1.2	1.3	2.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
ATTO	2.8	5.2	16.4	52.9	59.7	51.8	46.2	37.3	39.3	38.0
ATTR	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0
ERNA10	1.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	4.9	7.3	18.3	55.4	62.0	51.8	46.2	37.3	39.3	38.0

Transect BLKROC_11 Moist Floodplain

Frequency	Species	2002	2003	2004	2007	2009	2010	2012	2013	2014	2015	2016
Annual Forb	ATPH	0	0	2	0	0	0	0	0	0	0	0
	ATSES	0	5	0	0	0	0	0	0	0	0	0
	ATTR	0	19	7	0	2	0	0	0	0	0	0
	CHENO	0	1	0	0	0	0	0	0	0	0	0
	CHIN2	0	0	3	0	0	0	0	0	0	0	0
	GILIA	0	9	0	0	0	0	0	0	0	0	0
	MENTZ	0	2	0	0	0	0	0	0	0	0	0
Perennial Forb	MALE3	0	3	4	4	0	0	0	0	0	0	0
	SUMO	32.3	28	42	49	76	66	20	10	16	15	7
Perennial Graminoid	DISP	113.9	107	112	103	110	110	105	106	101	106	103
	SPAI	22.1	39	41	36	42	40	29	33	32	28	29
Shrubs	ATTO	37.4	95	101	53	70	72	21	22	16	11	10
	ERNA10	3.4	10	16	8	5	6	0	0	0	0	0
Nonnative Species	BAHY	0	42	38	0	59	44	0	0	2	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	2014	2015	2016
ATTO	13.6	16.5	18.3	18.9	18.7	28.3	27.6	16.8	12.0	16.7
ATTOD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.6	0.0	0.0
ERNA10	3.2	5.0	8.1	3.1	2.6	1.6	1.1	0.7	0.3	0.0
SUMO	10.5	4.9	13.4	16.2	6.1	2.3	0.0	4.4	5.9	6.7
Total	27.3	26.4	39.7	38.2	27.4	32.1	28.7	39.4	18.2	23.4

Transect BLKROC_13 Moist Floodplain

Frequency	Species	2002	2003	2004	2007	2009	2010	2013	2016
Annual Forb	HEAN3	0	0	0	1	2	7	3	0
Perennial Forb	ANCA10	6.8	5	11	13	13	16	14	11
	GLLE3	0	0	0	0	0	0	1	0
Perennial Graminoid	DISP	129.2	139	128	128	121	120	103	95
	JUBA	22.1	6	13	22	19	19	0	6
	LETR5	6.8	0	0	14	20	23	30	20
	SPAI	34	40	36	37	34	28	23	31
Shrubs	ATTO	0	12	5	8	1	5	3	4
	ERNA10	0	0	4	3	0	0	3	0

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

Shrub Cover (m)	2003	2004	2007	2009	2010	2013	2016
ATTO	4.0	3.1	8.7	7.6	8.1	6.0	16.9
ERNA10	0.0	0.4	2.4	2.5	2.8	4.2	6.3
Total	4.0	3.5	11.1	10.1	10.9	10.2	23.2

Transect	BLKROC_14	Moist Floodplain										
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2013**	**2014**	**2015**	**2016**
Annual Forb	ATTR	0	0	5	0	0	0	0	0	0	0	0
	CHENO	0	0	0	0	0	0	0	0	0	0	0
	CHIN2	0	3	3	0	0	0	0	0	0	0	0
Perennial Forb	HECU3	0	5	0	0	0	0	0	0	0	0	0
	MALE3	0	4	4	6	7	0	7	10	8	13	14
	SUMO	0	0	0	0	4	0	0	0	0	0	0
Perennial Graminoid	DISP	13.6	21	14	10	0	0	7	13	20	22	28
Shrubs	ATTO	0	4	8	11	24	27	24	24	36	5	3
Nonnative Species	BAHY	0	14	67	0	2	71	3	4	12	0	0
	DESO2	0	0	2	0	0	0	0	0	0	0	0
	SATR12	0	20	90	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**	**2013**	**2014**	**2015**	**2016**
ATTO	8.8	0.4	10.1	27.3	34.4	42.8	31.3	31.6	12.3	11.5

Transect	BLKROC_15	Moist Floodplain							
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ATTR	0	0	16	0	0	0	0	0
	CHIN2	14	4	29	0	0	0	0	0
	ERAM2	0	0	5	0	0	0	0	0
	GITR	0	0	4	0	0	0	0	0
	LEFL2	0	0	3	0	0	0	0	0
	MEAL6	0	0	21	0	0	0	0	0
	NADE	0	0	1	0	0	0	0	0
Perennial Forb	SUMO	15	18	39	31	32	37	18	6
Perennial Graminoid	DISP	25	21	19	14	3	11	24	71
Shrubs	ATTO	48	35	80	29	47	58	39	16
	SAVE4	2	9	2	6	5	8	13	17
Nonnative Species	BAHY	6	2	17	0	23	35	0	0
	DESO2	0	3	10	0	0	0	0	0
	SATR12	0	1	2	0	0	0	0	0

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

Shrub Cover (m)	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	**2016**
ATTO	25.4	15.1	19.3	32.9	34.8	39.9	54.7	39.0
SAVE4	10.1	8.0	6.6	7.6	9.1	9.8	4.7	14.0
SUMO	1.8	1.2	0.9	20.3	23.7	32.2	0.0	0.0
Total	37.3	24.3	26.8	60.8	67.6	81.9	59.4	53.0

Transect	BLKROC_16	Moist Floodplain							
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ATSES	4	0	0	0	0	2	0	na
	ATTR	0	0	18	0	0	0	0	na
	CHIN2	13	16	37	0	0	0	0	na
	CRYPT	0	0	3	0	0	0	0	na
	ERAM2	0	0	0	0	0	0	0	na
	ERIOG	10	0	0	0	0	0	0	na
	ERMA2	0	11	23	0	0	0	0	na
	GITR	0	0	20	0	0	0	0	na
Perennial Forb	MACA2	0	0	59	0	0	0	0	na
	SUMO	0	0	7	0	0	1	0	na
Shrubs	ATCO	7	0	3	4	9	8	9	na
	ATTO	19	23	33	31	39	55	51	na
	SAVE4	5	12	6	8	11	6	15	na
Nonnative Species	BAHY	3	7	4	0	17	40	0	na
	SATR12	11	41	44	0	0	8	0	na

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

Shrub Cover (m)	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	**2016**
ATCO	0.4	0.5	0.0	0.0	0.4	3.8	0.0	na
ATTO	6.5	2.9	5.2	16.8	44.2	44.5	46.3	na
SAVE4	11.0	10.4	9.8	13.3	12.4	14.9	0.0	na
SUMO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	na
Total	17.9	13.8	15.0	30.1	56.9	63.2	46.3	na

Transect	BLKROC_17		Moist Floodplain						
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ATSES	12	0	8	0	0	5	0	0
	ATTR	3	0	31	0	0	0	0	0
	CHIN2	13	10	40	0	0	0	0	0
	CHLE4	0	0	1	0	0	0	0	0
	CRCI2	0	0	4	0	0	0	0	0
	ERIOG	0	0	0	0	0	3	0	0
	ERWI	0	0	7	0	0	0	0	0
	GITR	0	0	32	0	0	0	0	0
	LEFL2	0	0	54	0	0	0	0	0
	MEAL6	0	0	29	0	0	0	0	0
Perennial Forb	HECU3	0	0	0	0	0	0	2	3
Perennial Graminoid	HOJU	0	0	2	0	0	0	0	0
Shrubs	ATTO	70	34	74	45	49	54	52	23
Nonnative Species	BAHY	0	0	0	0	0	5	0	0
	DESO2	0	0	6	0	0	0	0	0
	SATR12	9	10	6	0	3	5	0	0

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

Shrub Cover (m)	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	**2016**
ATTO	37.5	5.7	5.6	28.0	37.7	69.3	66.1	44.6
SAVE4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Total	37.5	5.7	5.6	28.0	37.7	69.3	66.1	45.0

Transect	BLKROC_18		Moist Floodplain						
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ATSES	3	0	0	0	0	0	0	0
	ATTR	0	0	0	0	0	0	0	0
	CHLE4	0	0	5	0	0	0	0	0
	GITR	0	0	4	0	0	0	0	0
Perennial Forb	GLLE3	3	6	9	4	1	4	0	0
Perennial Graminoid	DISP	119	104	114	118	102	86	120	104
	SCAM6	0	0	0	0	0	0	8	12
	SPAI	4	16	20	12	21	37	17	25
	TYLA	0	0	0	0	3	3	0	4
Shrubs	ATTO	33	12	24	19	20	13	6	0
	ERNA10	1	2	10	1	0	5	2	0
Nonnative Species	BAHY	14	10	45	0	0	0	0	0
	SATR12	0	0	3	0	0	0	0	0

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

Shrub Cover (m)	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	**2016**
ATTO	17.0	3.5	5.5	29.1	15.2	11.1	3.8	21.9
ERNA10	4.9	2.8	3.5	5.7	4.0	5.5	6.6	6.3
Total	21.9	6.3	9.0	34.8	19.2	16.6	10.4	28.2

Transect	BLKROC_19		Moist Floodplain						
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ATSES	4	0	0	0	0	0	0	0
	ATTR	0	0	2	0	0	0	0	0
	CHLE4	0	0	6	0	0	0	0	0
	GITR	0	0	5	0	0	0	0	0
Perennial Graminoid	DISP	139	147	139	127	143	132	122	136
	JUBA	13	20	6	26	21	14	24	15
	LETR5	3	0	1	0	0	0	0	0
	SPAI	9	8	12	10	10	26	9	13
Shrubs	ATTO	0	6	31	24	18	12	15	8
	ERNA10	0	3	5	0	3	3	0	1

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

Shrub Cover (m)	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	**2016**
ATPO	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ATTO	3.6	1.5	2.9	8.8	13.6	11.8	8.1	9.5
ERNA10	2.0	2.1	0.9	1.8	3.1	4.5	3.2	1.4
Total	6.3	3.6	3.8	10.6	16.7	16.3	11.2	10.9

Transect	BLKROC_20	Moist Floodplain							
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ATTR	0	0	7	0	0	0	0	0
Perennial Graminoid	DISP	127	147	143	126	123	123	118	122
	LETR5	18	29	30	31	59	70	27	52
	SPAI	5	4	5	5	5	0	1	2
Shrubs	ATTO	6	2	27	19	18	15	9	1
	ERNA10	0	1	1	0	3	1	1	0
Nonnative Species	BAHY	5	0	6	0	16	33	0	0

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

Shrub Cover (m)	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	**2016**
ATTO	8.8	6.8	17.0	27.1	30.3	27.9	9.6	14
ERNA10	8.6	8.3	6.4	6.5	6.4	11.8	7.2	5.9
SAVE4	0.0	0.1	0.0	0.3	0.7	0.4	1.3	0
SUMO	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0
Total	17.5	15.3	23.4	33.8	37.3	40.1	18.1	20

Transect	BLKROC_21	Moist Floodplain							
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ATSES	3	0	0	0	0	0	0	na
	ATTR	0	0	2	0	0	0	0	na
Perennial Forb	SUMO	4	0	3	0	0	0	0	na
Perennial Graminoid	DISP	135	133	142	136	130	131	126	na
	LETR5	0	2	5	5	8	6	66	na
	SPAI	1	4	3	1	4	3	0	na
Shrubs	ATTO	23	13	42	10	10	3	7	na
	ERNA10	3	1	0	1	0	0	6	na

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

Shrub Cover (m)	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	**2016**
ATTO	29	20	29	24	17	16	11	na
ERNA10	2	4	3	8	1	0	1	na
SUMO	2	0	0	0	0	0	0	na
Total	34	25	32	32	18	16	12	na

Transect	BLKROC_22	Moist Floodplain					
Frequency	**Species**	**2006**	**2007**	**2009**	**2010**	**2013**	**2016**
Perennial Forb	SUMO	3	6	2	5	3	4
Perennial Graminoid	DISP	124	111	125	128	123	141
	SPAI	4	4	3	2	5	4
Shrubs	ALOC2	4	4	10	9	8	7
	ATTO	21	7	19	20	7	9
	ERNA10	5	4	11	8	2	3
Nonnative Species	BAHY	11	0	9	1	0	0

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

Shrub Cover (m)	**2006**	**2007**	**2009**	**2010**	**2013**	**2016**
ALOC2	3.3	2.3	0.0	5.0	0.0	5.2
ATTO	11.4	9.9	9.6	5.5	9.1	8.8
ERNA10	8.0	9.1	6.9	7.0	3.9	3.8
SUMO	0.9	0.5	0.6	0.1	0.0	0.0
Total	23.6	21.9	17.1	17.6	13.0	17.8

Transect	BLKROC_23	Moist Floodplain					
Frequency	**Species**	**2006**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ATSES	18	0	0	0	3	0
Perennial Graminoid	DISP	139	133	139	135	127	121
	SPAI	25	28	28	24	35	17
Shrubs	ATTO	0	0	0	32	1	2
Nonnative Species	BAHY	4	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**	**2013**	**2016**
ATTO	1.0	0.8	0.6	1.6	1.3	1.5
ERNA10	0.0	0.0	0.0	0.0	0.2	0.6
Total	1.0	0.8	0.6	1.6	1.5	2.1

Transect	BLKROC_24	Moist Floodpain		
Frequency	**Species**	**2011**	**2013**	**2016**
Perennial Graminoid	DISP	102	104	110
	LETR5	15	24	14
	SPAI	0	0	2
Shrubs	ATTO	8	1	0
	ERNA10	8	5	0

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

Shrub Cover (m)	**2011**	**2013**	**2016**
ATTO	4.8	5.6	10.9
ERNA10	6.8	7.2	8.8
SAVE4	6.6	2.9	2.9
Total	18.1	15.7	22.6

Transect	BLKROC_25	Moist Floodplain					
Frequency	**Species**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Perennial Forb	SUMO	26	25	35	2	**0**	0
Perennial Graminoid	DISP	107	102	121	116	**105**	118
Shrubs	ATTO	3	4	2	1	**0**	0
Nonnative Species	BAHY	39	3	0	0	**0**	0

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

Shrub Cover (m)	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
ATTO	1.2	5.8	8.0	6.4	9.4	23.6
ATTOD	0.0	0.0	0.0	6.2	0.0	0.0
SUMO	0.0	28.0	0.0	0.2	1.7	1.9
Total	1.2	33.8	8.0	12.8	11.1	25.5

Transect	BLKROC_39	Saline Meadow							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Perennial Forb	NIOC2	0	0	3	0	4	6	0	0
	SUMO	6.8	12	5	8	4	6	4	4
Perennial Graminoid	DISP	103.7	94	88	87	98	95	85	93
	JUBA	6.8	0	0	0	0	0	0	0
Shrubs	ALOC2	5.1	8	11	13	13	12	14	10
	ATCO	3.4	9	3	9	13	8	0	0
	ATTO	17	3	3	3	0	0	4	5
	ERNA10	0	4	0	1	0	0	0	0
	SAVE4	3.4	0	4	4	3	5	5	6
Nonnative Species	BAHY	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**	**2013**	**2016**
ALOC2	0.1	0.2	0	0	1	0	1.7
ATCO	0.15	0.45	0.35	1.75	6.35	0	0.2
ATTO	3.35	1.9	2.4	1.28	0	0.6	1.2
ERNA10	0.12	0	0.25	0	0.3	0.3	0.8
SAVE4	1.4	0	0.1	0	1.2	0.7	1.2
SUMO	0.2	0.4	0.5	0.44	0.6	0	0.4
Total	5.32	2.95	3.6	3.47	9.45	1.6	5.4

Transect	BLKROC_44	Saline Meadow							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ATPH	0	1	0	0	0	0	0	na
	ATSES	0	35	0	0	0	0	0	na
	CORA5	0	1	0	0	0	0	0	na
Perennial Forb	SUMO	3.4	7	7	8	15	15	9	na
Perennial Graminoid	DISP	103.7	96	104	113	114	102	108	na
	JUBA	20.4	14	16	7	11	0	0	na
	SPAI	79.9	87	83	83	82	82	93	na
Shrubs	ATTO	32.3	70	83	28	35	20	20	na
	ERNA10	17	30	32	10	24	32	30	na
Nonnative Species	BAHY	0	1	0	0	0	0	0	na

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
ATTO	19.4	11.9	10.7	10.7	9.6	9.0	na
ERNA10	7.7	6.0	11.4	10.1	8.7	10.4	na
SUMO	1.4	0.9	1.8	0.2	0.6	0.0	na
Total	28.5	18.8	23.9	21.0	19.0	19.4	na

Transect	BLKROC_49		Sandy Terrace						
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ERIAS	0	3	0	0	0	0	0	na
	PSRA	0	0	2	0	1	0	0	na
Perennial Forb	MACA2	0	0	0	0	0	3	0	na
	OENOT	0	3	0	0	0	0	0	na
	STEPH	5.1	2	17	0	0	0	0	na
	STPA4	0	0	0	6	3	0	0	na
Perennial Graminoid	DISP	78.2	56	63	53	52	45	57	na
	SPAI	28.9	24	25	27	29	31	22	na
Shrubs	ATCO	20.4	15	19	21	30	24	19	na
	ATPA3	3.4	4	1	0	1	6	5	na
	ATTO	0	0	0	0	0	0	0	na
	ERNA10	13.6	10	7	4	10	16	15	na
	SAVE4	3.4	0	4	2	4	0	0	na

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
ATCO	0.38	0	0.2	0.72	0.2	0.55	na
ERNA10	1.12	1.05	2.3	1.7	0.6	1.35	na
MACA2	0	0.65	0	0	0	0	na
SAVE4	1.01	0.55	1.9	1.36	1.2	1	na
Total	2.51	2.25	4.4	3.78	2	2.9	na

Transect	BLKROC_51		Sodic Fan						
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Perennial Forb	GLLE3	32.3	2	12	27	8	5	7	6
	SUMO	0	0	0	2	0	0	0	0
Perennial Graminoid	DISP	100.3	85	70	114	73	58	51	33
	SPAI	34	21	27	45	18	43	36	38
Shrubs	ALOC2	0	0	0	1	0	0	3	3
	ATTO	15.3	56	42	38	8	3	4	4
	ERNA10	8.5	2	0	11	1	5	4	4
	SAVE4	0	0	0	0	0	0	2	2

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
ATTO	25.9	6.2	11.8	7.9	4.6	5.4	3.7
ERNA10	2.1	0.5	4.1	4.1	3.3	5.3	6.4
SAVE4	0.0	0.0	0.4	0.3	0.0	0.0	0.3
Total	28.0	6.8	16.3	12.3	7.9	10.6	10.4

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**
Annual Forb	2FORB	0	39	0	0	0	0	0	0
	ATPH	0	0	3	0	8	13	0	0
	CORA5	0	0	10	0	0	0	0	0
	ERIAS	0	21	15	0	0	0	0	0
	ERSP3	0	0	0	0	2	0	0	0
Perennial Forb	STEPH	17	11	16	0	0	0	0	0
	STPA4	0	0	0	0	3	12	10	2
	STEX	0	0	0	0	0	0	3	0
Perennial Graminoid	DISP	13.6	21	29	6	27	25	27	20
	SPAI	107.1	136	123	126	133	136	138	119
Shrubs	ARTRW8	0	0	0	0	0	0	0	0
	ATCO	0	5	2	0	0	0	0	0
	ATPA3	0	10	0	0	0	0	0	0
	ATTO	8.5	7	5	0	0	0	1	6
	ERNA10	10.2	13	21	5	19	3	2	4
	MACA17	0	0	0	0	3	0	3	1
	SAVE4	3.4	0	0	0	1	0	1	0
	ARTR2	42.5	30	31	5	0	0	1	3
Nonnative Species	FESTU	0	2	0	0	0	0	0	0
	SATR12	0	0	0	0	10	1	2	0
	BRRU2	0	0	0	0	9	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**
ARTR2	9.28	4.18	0	0	0	0.12	0.85
ATCO	0.1	0	0	0	0	0	0
ATTO	1.77	2.05	0	0.05	0	0.23	0.4
ERNA10	1.13	0.8	0.5	0.3	0	1.31	3.15
SAVE4	0	0	0	0.3	0.2	0.24	0.4
STPA4	0	0	0	0	1.65	0	0
Total	12.28	7.03	0.5	0.65	1.85	1.9	4.8

Transect	DELTA_01		Moist Floodplain						
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
	COMAC	0	0	0	0	0	0	0	4
Annual Forb	CORA5	0	0	0	0	0	0	2	0
	HEAN3	0	0	0	0	0	0	0	2
Perennial Forb	ANCA10	5	12	5	7	11	9	10	11
	NIOC2	10	5	7	4	3	8	5	7
	SUMO	7	0	1	0	0	0	0	0
Perennial Graminoid	DISP	156	152	149	152	155	151	150	143
	JUBA	0	7	11	10	9	6	6	9
	LETR5	0	1	0	0	0	0	0	0
	SPAI	3	0	13	11	16	11	10	6
Shrubs	ATTO	2	5	1	5	0	0	0	0
Nonnative Species	BAHY	0	0	2	0	2	1	0	0

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
ATTO	3	1.8	3.9	1.1	0.2	0.1	0.4
SUMO	1	0.8	0.2	0.1	0.0	0.0	0.0
Total	4	2.7	4.1	1.2	0.2	0.1	0.4

Transect	DELTA_02		Moist Floodplain						
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Perennial Graminoid	DISP	108	118	131	103	115	114	89	80
Shrubs	ATTO	10	13	0	0	4	8	8	6
	ERNA10	10	9	12	0	1	4	3	2
Nonnative Species	BAHY	0	3	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**	**2013**	**2016**
ATTO	16.3	9.7	10.1	8.3	3.8	11.6	6.7
ERNA10	16.0	12.3	11.7	10.8	8.9	6.6	9.7
SUMO	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Total	32.6	22.0	21.8	19.0	12.8	18.1	16.4

Transect	DELTA_03	Moist Floodplain							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Perennial Forb	SUMO	15	15	19	0	15	22	12	na
Perennial Graminoid	DISP	114	118	129	104	119	112	122	na
	SPAI	5	0	0	1	0	0	2	na
Shrubs	ATTO	12	13	8	0	8	8	2	na
	ERNA10	0	0	0	0	2	0	0	na
	SAVE4	0	0	10	0	0	0	1	na
Nonnative Species	BAHY	0	1	0	0	0	0	0	na

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
ATTO	11.0	7.7	10.9	7.3	4.8	5.2	na
ERNA10	0.7	0.4	1.1	0.8	0.8	0.4	na
SAVE4	6.6	6.3	5.9	5.9	5.1	4.0	na
SUMO	17.2	5.2	3.7	9.5	11.3	5.1	na
Total	35.4	19.7	21.7	23.4	21.9	14.7	na

Transect	DELTA_04	Moist Floodplain							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ATPH	0	7	0	0	4	4	0	0
Perennial Forb	SUMO	0	7	0	0	1	0	5	2
Perennial Graminoid	DISP	139	128	150	103	115	124	116	138
	SPAI	0	5	6	0	0	0	0	0
Shrubs	ATTO	3	2	6	0	0	4	0	0
	SAVE4	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**	**2013**	**2016**
ATTO	3.6	2.3	3.1	5.3	6.1	1.7	2.4
SAVE4	0.3	0.6	0.2	0.2	0.9	0.0	0.5
SUMO	1.9	0.9	1.8	2.6	1.4	1.3	0.0
Total	5.9	3.8	5.1	8.1	8.3	3.0	2.8

Transect	DELTA_05	Moist Floodplain							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	HEAN3	0	2	0	0	0	0	0	0
Perennial Forb	ANCA10	0	0	1	3	8	4	7	3
	NIOC2	7	0	2	0	0	2	6	2
	SUMO	14	2	23	19	16	20	11	7
Perennial Graminoid	CADO2	0	2	5	0	0	0	0	0
	CAREX	0	0	0	0	4	0	0	0
	DISP	155	146	163	135	144	142	135	132
	JUBA	9	9	12	13	23	23	13	7
	SCAM6	0	0	0	0	0	5	3	0
Shrubs	ATTO	0	6	5	0	1	0	0	0
Nonnative Species	BAHY	0	1	3	0	1	0	0	0
	LASE	0	10	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**	**2013**	**2016**
ATTO	6.5	3.4	4.8	5.9	6.1	2.6	0.5
ERNA10	0.0	0.0	0.6	1.2	1.0	0.0	0.0
SUMO	12.7	7.2	6.9	6.7	9.4	3.2	na
Total	19.2	10.6	12.2	13.8	16.6	5.8	0.5

Transect	DELTA_06	Moist Floodplain							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Annual Forb	ATPH	0	0	0	0	5	0	0	na
Perennial Forb	ANCA10	9	5	5	7	6	10	7	na
	HECU3	9	7	8	2	0	0	0	na
	NIOC2	0	0	0	0	0	1	3	na
	SUMO	15	14	27	6	18	17	18	na
Perennial Graminoid	DISP	122	94	120	125	120	105	101	na
	JUBA	17	12	14	12	11	9	5	na
Shrubs	ATTO	3	4	0	2	2	0	1	na
	ERNA10	0	3	0	0	0	0	0	na
	SAVE4	0	1	15	0	4	3	2	na
Nonnative Species	BAHY	0	5	0	0	0	0	0	na
	XAST	0	2	0	0	0	0	0	na

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
ATTO	8.2	4.5	5.9	4.9	4.0	1.0	na
ERNA10	0.4	0.6	0.6	0.0	0.0	0.0	na
SAVE4	8.3	6.6	6.5	8.7	8.0	7.7	na
SUMO	9.4	3.9	10.6	7.0	7.6	7.9	na
Total	26.2	15.6	23.6	20.6	19.6	16.5	na

Transect	DELTA_07	Moist Floodplain							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
Perennial Forb	SUMO	32	16	15	12	15	18	9	4
Perennial Graminoid	DISP	114	93	116	102	121	121	107	82

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**	**2016**
SUMO	25.1	10.3	27.0	32.8	33.1	17.9	ns

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

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

Transect	ISLAND_06								
		Frequency							
Life Forms	Species	2002	2003	2004	2007	2008	2009	2010	2014
Perennial Forb	GLLE3	0	4	0	1	0	0	0	4
	NIOC2	0	0	0	0	2	8	6	7
Perennial Graminoid	DISP	90	62	92	103	117	132	116	124
	JUBA	5	5	5	3	5	7	7	6
	LETR5	0	0	0	1	2	0	0	0
	SPAI	105	103	105	98	104	117	76	81
Shrubs	ATTO	19	9	19	7	11	7	4	3
	ERNA10	9	0	3	1	3	7	1	2

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

Shrub Cover (m)	Year					
Species	2003	2004	2007	2008	2009	2010	2014
ATTO	7.57	7.3	9.5	7.85	8.9	5.4	9.84
ERNA10	1.26	2.95	1.35	2.15	2.14	0.6	1.3
Total	8.83	10.25	10.85	10	11.04	6	11.14

Transect	ISLAND_08								
		Frequency							
Life Forms	Species	2002	2003	2004	2007	2008	2009	2010	2014
Annual Forb	2FORB	0	0	6	0	0	0	0	0
	ATTR	0	0	0	0	19	0	0	0
	LACO13	0	0	0	0	5	0	0	0
Perennial Forb	FRSA	0	0	0	0	0	0	0	5
	GLLE3	7	0	7	8	5	0	2	13
	HECU3	3	0	0	0	3	4	2	6
	MALE3	0	0	0	1	0	4	2	7
Perennial Graminoid	DISP	112	77	106	90	94	86	81	129
	JUBA	32	35	37	27	34	38	31	23
	LETR5	9	18	21	8	14	19	13	13
	SPAI	29	13	15	19	7	13	23	17
Shrubs	ATTO	19	4	7	10	28	47	24	0
	ERNA10	20	15	34	24	21	25	31	0
Nonnative Species	POMO5	0	0	0	0	2	0	0	0

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

Shrub Cover (m)	Year					
Species	2003	2004	2007	2008	2009	2010
ATTO	8.45	5.85	5.65	8.75	6	6.72
ERNA10	37.51	16	25.9	18.1	29.75	25.14
Total	45.96	21.85	31.55	26.85	35.75	31.86

Transect	ISLAND_09						
		Frequency					
Life Forms	Species	2006	2007	2008	2009	2010	2014
Annual Forb	ATPH	0	0	0	0	4	0
Perennial Forb	SUMO	9	1	4	1	5	1
Perennial Graminoid	DISP	144	140	152	140	143	140
Shrubs	ATTO	7	9	6	11	2	1
Nonnative Species	BAHY	2	0	3	0	5	0

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

Shrub Cover (m)	Year					
Species	2006	2007	2008	2009	2010	2014
ATTO	8.6	7.0	6.6	9.8	5.4	5.5
SUMO	0.0	0.5	0.0	1.8	2.0	2.2
Total	8.7	7.5	6.6	11.7	7.3	7.7

Transect	ISLAND_10						
		Frequency					
Life Forms	Species	2006	2007	2008	2009	2010	2014
Perennial Forb	CRTR5	23	18	31	30	31	25
	FRSA	22	11	5	17	25	31
Perennial Graminoid	DISP	132	124	139	149	152	149
	SPAI	4	2	2	2	1	1
Shrubs	ATTO	6	3	7	1	1	0

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

Shrub Cover (m)	Year					
						Burned
Species	2006	2007	2008	2009	2010	2014
ATTO	7.1	7.5	10.8	10.1	8.8	0
SUMO	0.0	0.2	0.0	0.1	0.8	0
Total	7.1	7.7	10.8	10.2	9.6	0

Transect	ISLAND_11						
		Frequency					
Life Forms	Species	2006	2007	2008	2009	2010	2014
Annual Forb	ATPH	0	0	7	4	11	0
	COMAC	0	0	9	5	41	10
Perennial Forb	ANCA10	22	23	23	18	8	21
	NIOC2	72	47	62	59	56	62
Perennial Graminoid	DISP	148	154	154	157	137	145
	JUBA	0	0	0	4	2	4
Nonnative Species	SATR12	0	0	0	3	0	0

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

Transect	LONEPINE_01									
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2013**	**2015**
Annual Forb	HEAN3	0	0	0	0	2	0	0	0	0
Perennial Forb	ANCA10	0	0	0	0	2	0	0	0	0
	GLLE3	0	0	0	0	0	0	0	0	0
	MALE3	0	0	0	0	0	0	0	0	0
	PYRA	0	0	0	0	0	0	3	0	3
	SUMO	3.4	0	0	0	0	0	0	0	0
Perennial Graminoid	DISP	142.8	133	155	147	136	139	135	150	155
	JUBA	5.1	4	0	25	13	16	18	10	19
	LETR5	11.9	29	18	32	50	47	48	49	48
	SPAI	10.2	13	17	19	14	15	10	12	14
Shrubs	ATTO	1.7	4	7	3	3	0	0	0	0
	ERNA10	0	0	4	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**
ATTO	7.13	5.2	4.7	1.8	2.95	3.19	2.85	2.8
ERNA10	2.24	2.6	2.05	0	0.1	0.65	0.63	0.8
SUMO	0.08	0	0.75	0	0	0	0	0.4
Total	9.45	7.8	7.5	1.8	3.05	3.84	3.48	4

Transect	LONEPINE_02									
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2013**	**2015**
Annual Forb	2FORB	0	0	0	0	0	0	0	0	0
	ATPH	0	0	0	0	0	0	0	0	0
Perennial Forb	ANCA10	0	0	0	0	0	0	0	0	0
	PYRA	0	0	0	0	0	0	4	2	0
	STEPH	0	0	0	0	0	0	0	0	0
Perennial Graminoid	DISP	146.2	125	142	143	164	141	152	132	160
	JUBA	8.5	13	20	17	14	15	15	14	0
	LETR5	0	0	0	3	0	1	4	1	0
	SPAI	64.6	78	65	64	52	65	69	48	0
Shrubs	ATTO	0	0	3	0	0	0	0	0	0
	ERNA10	0	1	4	3	1	2	3	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**
ATTO	2.23	2.15	0.6	0.85	0	0.95	0	0
ERNA10	2.05	3.35	1.8	2.45	2	3.35	0.05	0
Total	4.28	5.5	2.4	3.3	2	4.3	0.05	0

Transect	LONEPINE_03									
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2013**	**2015**
Annual Forb	2FORB	0	1	0	0	0	0	0	0	0
	HEAN3	0	2	1	0	0	0	5	0	0
Perennial Forb	ANCA10	0	0	0	3	0	7	10	7	7
	GLLE3	11.9	0	7	0	5	3	2	3	7
	HECU3	0	0	0	0	0	0	0	2	1
	MALE3	6.8	3	5	2	5	3	0	5	0
	PYRA	6.8	0	0	0	0	0	0	0	3
Perennial Graminoid	DISP	151.3	148	152	152	142	137	137	130	169
	JUBA	39.1	59	52	41	43	34	42	29	37
	LETR5	34	33	31	34	52	48	54	26	30
	SPAI	8.5	0	10	5	4	4	5	0	0
Shrubs	ATTO	13.6	2	13	0	1	3	0	0	0
	ERNA10	0	0	2	0	4	1	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
ATTO	13.51	13.4	6	0.8	4.85	5.6	0
ERNA10	1.99	2.7	0.55	2.75	0.6	0.2	0
SAVE4	0	0	0	3.6	0	0	0
Total	15.5	16.1	6.55	7.15	5.45	5.8	0

Transect	LONEPINE_04									
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2013**	**2015**
Annual Forb	2FORB	0	0	1	0	0	0	0	0	0
	ATPH	0	29	12	0	0	10	0	0	0
Perennial Forb	ANCA10	5.1	7	8	8	7	6	6	4	5
	MACA2	0	0	0	0	0	2	0	0	0
	NIOC2	3.4	0	0	2	2	0	0	0	2
	STEPH	5.1	0	11	0	5	0	0	0	0
	SUMO	3.4	4	6	2	3	0	0	0	3
Perennial Graminoid	DISP	105.4	101	114	97	88	77	87	88	99
	JUBA	15.3	18	25	11	15	15	23	14	4
	LETR5	0	0	0	0	0	0	0	0	2
	SPAI	47.6	63	56	69	79	84	72	60	59
Shrubs	ATCO	0	0	4	0	0	0	0	0	0
	ATTO	0	2	0	0	0	0	0	0	0
	ERNA10	0	2	0	0	0	0	0	0	0
	MACA17	0	0	0	4	0	0	0	1	0
Nonnative Species	BAHY	0	0	0	0	2	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
ATCO	0.14	0.55	0	0	0	0.4	0	0
ATTO	0	0	0	10	0.2	0	0	0
ERNA10	2.28	2.1	4.5	1.05	1	1.35	0	0
SUMO	12.41	1	0	0	1.25	1.86	0	0.8
Total	14.83	3.65	4.5	11.05	2.45	3.61	0	0.8

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**
Perennial Forb	ANCA10	0	0	0	5	3	0	0	0	0
Perennial Graminoid	DISP	124	136	132	149	145	147	130	145	154
	JUBA	0	0	0	0	0	0	0	0	12
	SPAI	25	28	29	16	20	16	16	3	42
Nonnative Species	BAHY	0	0	5	0	0	3	0	0	0

Shrub Cover (m)	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2012**	**2015**
ATTO	0.45	0.6	0.4	0.45	1.4	1.22	1.5	0
SUMO	0.09	0.25	0.2	0	0	0	0	0
Total	0.54	0.85	0.6	0.45	1.4	1.22	1.5	0

Transect	LONEPINE_07						
Frequency	**Species**	**2007**	**2009**	**2010**	**2012**	**2013**	**2015**
Perennial Graminoid	DISP	150	157	160	151	140	157

Transect	LONEPINE_08			
Life Forms	**Species**	**2012**	**2013**	**2015**
Annual Forb	2FORB	0	4	0
	HEAN3	0	7	0
Perennial Forb	ANCA10	3	83	74
	NIOC2	3	0	0
Perennial Graminoid	CADO2	0	1	0
	CAREX	0	0	5
	DISP	155	144	140
	JUBA	0	0	5
	SCAM6	0	22	37

Transect	**THIBAUT_01B**	
Frequency		
Life Forms	Species	2014
Annual Forb	ATSES	2
	ATTR	11
Perennial Forb	MALE3	2
Perennial Graminoid	DISP	3
	SCAM6	47
	TYLA	3
Nonnative Species	BAHY	11

Shrub Cover (m)	Year
Plant Species	2014
ATTO	0.4
ERNA10	0.1
Total	0.5

Transect	**THIBAUT_02**							
Frequency								
Life Forms	Species	2002	2003	2004	2007	2009	2010	2014
Annual Forb	ATPH	0	0	0	0	0	5	0
	ATSES	0	47	5	0	0	0	0
	CHENO	0	33	0	0	0	0	0
	CHHI	0	23	3	0	0	0	0
	COMAC	0	23	0	0	0	4	0
	CORA5	0	9	0	0	0	7	0
Perennial Forb	ASTRA	0	0	4	1	0	0	0
	GLLE3	0	7	9	3	2	2	0
	PYRA	5	10	3	12	8	5	0
	SUMO	0	1	0	0	0	0	0
Perennial Graminoid	DISP	155	153	154	159	151	161	117
	JUBA	14	15	9	16	1	9	2
	SPAI	139	132	137	140	139	136	110
Shrubs	ALOC2	0	0	0	0	0	5	0
	ATTO	0	2	10	2	3	26	2
	ERNA10	7	8	13	18	8	9	7
Nonnative Species	BAHY	0	16	39	0	3	8	2

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

Shrub Cover (m)	Year					
Plant Species	2003	2004	2007	2009	2010	2014
ALOC2	0.0	0.0	0.0	0.0	0.4	0.0
ATTO	0.0	0.4	0.0	0.6	0.2	0.0
ERNA10	4.9	0.3	1.1	0.0	1.1	3.3
Total	4.9	0.7	1.1	0.6	1.7	3.3

Transect	**THIBAUT_03**							
		Frequency						
Life Forms	Species	2002	2003	2004	2007	2009	2010	2014
Annual Forb	ATSES	0	17	0	0	0	0	0
	CHHI	0	2	0	0	0	0	0
	CORA5	0	15	2	0	0	8	0
Perennial Forb	GLLE3	51	26	37	34	26	28	8
	MACA2	0	0	0	0	0	8	0
	PYRA	0	0	0	0	2	0	0
	STEPH	3	7	13	0	0	0	0
Perennial Graminoid	DISP	128	147	139	121	149	146	122
	JUBA	15	14	5	11	9	16	1
	SPAI	136	141	149	133	140	137	97
Shrubs	ATTO	2	5	11	0	3	6	0
	ERNA10	12	16	36	10	5	6	0
	MACA17	0	0	0	7	5	0	0
	SAEX	0	0	0	5	0	0	0
Nonnative Species	BAHY	0	0	0	0	2	0	0
	SATR12	0	0	0	0	3	0	0

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

Shrub Cover (m)	Year					
Plant Species	2003	2004	2007	2009	2010	2014
ERNA10	6.5	3.1	2.7	2.2	1.3	1.6

Transect	**THIBAUT_04**											
		Frequency										
Life Forms	Species	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2013**	**2014**	**2015**	**2016**
Annual Forb	ATTR	0	0	15	0	0	0	0	0	0	NA	0
	CHHI	0	7	5	0	0	0	0	0	0	NA	0
Perennial Forb	HECU3	0	0	0	0	0	0	0	0	4	NA	6
	MALE3	0	0	5	0	0	0	0	0	0	NA	1
Perennial Graminoid	DISP	0	0	0	0	0	0	0	1	0	NA	0
Shrubs	ATTO	9	13	19	37	43	48	16	38	13	NA	17
Nonnative Species	BAHY	0	2	30	0	0	58	0	0	10	NA	2
	SATR12	0	10	15	0	0	0	0	0	0	NA	0

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

Shrub Cover (m)	Year									
Plant Species	2003	2004	2007	2009	2010	2012	2013	2014	2015	2016
ATTO	10.2	6.7	34.6	46.8	48.1	25.4	22.9	26.9	43	48.1

Transect	**THIBAUT_05**											
		Frequency										
Life Forms	Species	2002	2003	2004	2005	2007	2009	2010	2012	2013	2014	**2016**
Annual Forb	CHHI	0	0	0	1	0	0	0	0	0	0	0
	CHIN2	0	6	3	0	0	0	0	0	0	0	0
	LACO13	0	0	0	0	0	0	0	0	0	4	0
	COCA5	0	0	0	0	0	0	0	0	0	4	0
Perennial Forb	HECU3	0	0	0	2	2	24	37	89	103	68	41
	MALE3	0	0	0	0	0	10	28	38	38	52	84
Perennial Graminoid	DISP	0	0	0	0	4	3	0	0	0	0	0
Shrubs	ATTO	0	7	3	4	2	1	0	0	0	0	0
Nonnative Species	AMAL	0	0	0	2	0	0	0	0	0	0	0
	BAHY	0	19	9	42	0	2	29	6	0	16	9
	DESO2	0	0	16	6	0	0	0	0	0	0	0
	TARA	0	0	3	0	0	0	0	0	0	0	0
	SATR12	0	16	24	19	0	0	0	0	0	4	1

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

Shrub Cover (m)	Year									
Plant Species	2003	2004	2005	2007	2009	2010	2012	2013	2014	**2016**
ATTO	0.5	0.5	0.3	1.4	0	0	0	0	0	0
TARA	0.0	0.0	0.4	0.0	0	0	0	0	0	0
Total	0.5	0.5	0.7	1.4	0	0	0	0	0	0

Transect	**THIBAUT_06**											
		Frequency										
Life Forms	Species	2003	2004	2005	2007	2009	2010	2012	2013	2014	2015	**2016**
Annual Forb	ATRIP	0	0	1	0	0	0	0	0	0	0	0
	ATSES	0	3	9	0	0	0	0	0	7	0	3
	ATTR	5	1	3	0	0	0	0	0	0	0	0
	CHENO	2	0	0	0	0	0	0	0	0	0	0
	CHHI	0	0	4	0	0	0	0	0	0	0	0
	CHIN2	0	0	3	0	0	0	0	0	0	0	0
	GITR	0	0	5	0	0	0	0	0	0	0	0
	LACO13	0	0	0	0	0	0	0	0	9	0	0
	MEAL6	0	14	72	0	0	0	0	0	0	0	0
	COCA5	0	0	0	0	0	0	0	0	0	0	3
Perennial Forb	HECU3	1	0	0	0	51	46	69	47	38	14	20
	DISP	0	0	0	0	0	0	0	0	0	0	49
Perennial Graminoid	MUAS	2	2	2	3	15	14	28	39	38	38	6
	SPAI	2	3	3	5	4	2	1	6	5	5	6
	ATTO	0	0	0	0	0	0	0	0	0	0	10
Shrubs	BAHY	11	8	9	3	0	1	2	0	2	1	15
Nonnative Species	DESO2	0	2	1	0	10	88	16	0	65	0	0
	SATR12	17	60	52	0	6	0	5	0	34	0	0

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

Shrub Cover (m)	Year										
Plant Species	2003	2004	2005	2007	2009	2010	2012	2013	2014	2015	2016
ATTO	0.7	1.1	1.8	11.1	1.7	2.4	4.3	4.5	2.5	7	7.4

Transect	**THIBAUT_07**											
		Frequency										
Life Forms	Species	2003	2004	2005	2007	2009	2010	2012	2013	2014	2015	**2016**
Annual Forb	2FORB	0	1	0	0	0	0	0	0	0	0	0
	ATSES	2	24	81	0	0	0	0	0	3	0	0
	ATTR	26	15	49	0	0	0	0	0	0	0	0
	GITR	0	0	3	0	0	0	0	0	0	0	0
Perennial Forb	HECU3	1	0	1	0	0	0	0	0	0	0	0
	MALE3	7	2	0	9	2	0	6	12	46	50	46
Perennial Graminoid	DISP	3	3	0	4	0	0	0	0	0	0	0
Shrubs	ATTO	7	16	20	8	18	17	7	1	1	0	4
Nonnative Species	BAHY	12	34	37	0	0	92	3	0	23	0	9
	DESO2	0	15	34	0	0	0	0	0	0	0	0
	SATR12	16	47	45	0	0	0	3	0	6	0	0

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

Species code	2003	2004	2005	2007	2009	2010	2012	2013	2014	2015
ATTO	1.07	1	1	4.95	14.5	16.95	7.1	2.55	3.8	5.5

Thibaut_08 shelved

Thibaut_09 shelved

Transect	INTAKE_01								
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2015**
Annual Forb	2FORB	0	0	1	0	0	0	0	0
	ATPH	0	18	5	0	0	0	0	0
	ATTR	0	0	2	0	0	0	0	0
	CHST	0	2	0	0	0	0	0	0
	CLEOM2	0	2	0	0	0	0	0	0
	CLOB	0	3	0	0	0	0	0	0
	CRCI2	0	0	7	0	0	0	0	0
	ERIAS	0	23	0	0	0	0	0	0
	ERIOG	0	5	0	0	0	0	0	0
	ERMA2	0	0	2	0	0	0	0	0
	MEAL6	0	0	10	0	0	0	0	0
	CLPL2	0	0	0	0	0	5	0	0
Perennial Forb	MACA2	17	0	0	0	0	11	0	0
	MALAC3	0	2	1	0	0	0	0	0
	STEPH	0	18	16	0	0	0	0	0
	SUMO	3.4	4	4	2	2	2	0	0
Perennial Graminoid	DISP	59.5	54	67	52	82	59	92	77
	JUBA	13.6	19	15	11	11	8	14	15
	SPAI	96.9	117	103	105	109	117	115	101
Shrubs	ATCO	23.8	15	23	19	25	11	25	19
	ATPA3	0	0	0	1	1	2	0	0
	ATTO	0	10	8	6	3	11	3	5
	ERNA10	8.5	22	27	26	28	17	12	11
	MACA17	0	0	0	14	18	0	10	12
Nonnative Species	BAHY	0	0	0	0	10	10	0	0
	BRTE	0	0	1	0	0	0	0	0
	POMO5	0	3	0	0	0	0	0	0
	SATR12	0	0	0	0	0	0	0	3
	BRRU2	0	0	0	0	1	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**
ATCO	1.15	0.85	0.95	0.75	0.75	1.52	0.5
ATTO	0.76	1.35	1.6	1	2.35	1.07	0.05
ERNA10	1.16	3.6	3.5	4.5	2.55	2.45	0.71
SAVE4	0	0	0.25	0.15	0	0	0.28
SUMO	0	0	0	0.1	0	0.18	0
Total	3.07	5.8	6.3	6.5	5.65	5.22	1.54

Transect	TWINLAKES_02								
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2015**
Annual Forb	ATPH	0	2	1	0	0	2	0	0
	CHENO	0	2	0	0	0	0	0	0
	CHHI	0	0	2	0	0	0	0	0
	CLOB	0	8	3	0	0	0	0	0
	COMAC	0	0	0	0	0	1	0	0
Perennial Forb	NIOC2	3.4	4	2	3	5	15	14	11
	PYRA	0	6	2	7	9	12	2	2
	STEPH	0	3	0	0	0	0	0	0
Perennial Graminoid	DISP	74.8	61	65	60	73	80	81	89
	JUBA	73.1	96	103	78	72	72	76	79
	LECI4	0	4	16	0	0	1	0	4
	LETR5	3.4	4	0	0	0	0	0	0
	POSE	0	0	0	0	2	11	0	0
	SPAI	59.5	53	69	44	36	39	68	24
	SPGR	34	20	19	65	57	76	89	90
Shrubs	ATTO	0	6	5	5	0	0	0	0
	ERNA10	11.9	28	24	27	1	0	0	0
Nonnative Species	FESTU	0	3	1	0	0	0	0	0
	POA	0	0	0	11	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**
ATTO	6.4	5.9	4.3	0.32	1.05	1.17	0
ERNA10	18.3	15.85	13.52	0	0	0	0
Total	24.7	21.75	17.82	0.32	1.05	1.17	0

Transect	TWINLAKES_03								
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2015**
Perennial Forb	SUMO	0	0	5	11	15	2	14	0
Perennial Graminoid	DISP	144.5	144	141	153	163	127	158	150
	SPAI	0	1	5	1	2	0	0	0
Shrubs	ATTO	47.6	0	64	18	31	10	11	0
Nonnative Species	BAHY	0	37	27	0	26	38	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**

ATTO	16.95	16.95	6.45	8.4	12.1	8.58	0
SUMO	0	0.1	2.4	0.6	0.9	1.08	0.2
Total	16.95	17.05	8.85	9	13	9.66	0.2

Transect TWINLAKES_04

Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2014**	**2015**	**2016**
Annual Forb	ATTR	0	0	9	0	0	0	0	0	0	0
	CHIN2	0	0	2	0	0	0	0	0	0	0
	CRCI2	0	0	3	0	0	0	0	0	0	0
Perennial Forb	HECU3	0	0	0	0	0	0	0	0	0	1
	SUMO	1.7	0	1	9	24	33	4	3	3	0
Perennial Graminoid	DISP	17	4	12	0	0	0	0	0	0	0
	LETR5	0	0	0	0	0	0	0	0	4	6
Shrubs	ATTO	5.1	8	27	18	13	9	3	0	0	1
Nonnative Species	BAHY	0	6	41	0	15	24	0	0	0	1
	DESO2	0	0	7	0	0	0	0	0	0	0
	SATR12	0	4	82	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**
ATTO	13.6	22.4	11.15	17.85	15.7	12.49	13.55	17.75	20.5
SUMO	0	0	20	27.25	37.2	12.49	8.15	8.71	na
Total	13.6	22.4	31.15	45.1	52.9	24.98	21.7	26.46	20.5

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**
Perennial Forb	HECU3	0	0	8	8	11	8	1	3
	SUMO	48	30	29	16	10	9	6	3
Perennial Graminoid	DISP	57	38	32	13	30	53	43	20
	SPAI	0	0	10	0	0	0	2	0
Shrubs	ATTO	23	20	63	71	51	36	27	31
Nonnative Species	BAHY	0	0	22	29	0	0	0	0
	SATR12	11	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**
ATTO	5.4	11.3	50.15	66.55	62.75	35.88	51.79	55.5
SUMO	30.5	44.75	14.85	13.4	3.4	2.42	2.3	0
Total	35.9	56.05	65	79.95	66.15	38.3	54.09	55.5

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