Los Angeles Department of Water and Power 2016 Annual Owens Valley Report

Los Angeles Department of Water & Power

- Annual Owens Valley Operations Plan for the 2016-17 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

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EXECUTIVE SUMMARY

This report includes Los Angeles Department of Water and Power's (LADWP) proposed Owens Valley operations plan for the first six months of the 2016-17 runoff year, an update on Owens Valley conditions, the current status of LADWP's environmental mitigation projects, and the status of other studies, projects, and activities.

Preface

The Owens Valley is in the midst of an extreme prolonged drought. The four years prior to this year were the four lowest consecutive years on record, with runoffs of 57%, 54%, 52%, and 48% of normal, respectively. LADWP plans to export approximately 114,000 acre-feet (AF) of water to Los Angeles in the 2016-17 runoff year. This is approximately only half of what is delivered in a normal year.

Uses in the Owens Valley on Los Angeles City owned lands are planned to be 93,300 AF, of which 45,000 AF is planned for irrigation. This amount of irrigation water is the estimated physical maximum based on existing and anticipated conditions. LADWP intends to pursue a reduction in irrigation pursuant to the terms 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) with Standing Committee approval. If a reduction is applied, the total in-valley uses will be reduced accordingly.

Owens Valley Annual Operations Plan Summary

For the period of April 1, 2016, to March 31, 2017, the forecast Eastern Sierra runoff for the Owens River Basin is 293,800 AF or 71% of normal. Forecast of Eastern Sierra runoff between April 1, 2016, and September 30, 2016, is 203,100 AF or 67% of normal. Average year April through September runoff is 303,903 AF.

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.)*

Accordingly, LADWP has prepared a proposed six month operations plan and pumping program for the period beginning April 1, 2016.

LADWP groundwater pumping in the Owens Valley is governed by the ON/OFF provisions of the Water Agreement. According to the well ON/OFF provisions of the Water Agreement, approximately 121,550 AF of water is available for groundwater

pumping from Owens Valley well fields. In addition to the ON/OFF provisions of the Water Agreement, LADWP considers Owens Valley conditions, projected runoff, and operational practicalities when determining its planned pumping. LADWP's groundwater pumping for the first six months of the 2015-16 runoff year is planned to range between 46,160 and 51,510 AF, contingent on environmental conditions and water needs. The lower end of this range is commensurate with non-discretionary pumping requirements including fish hatchery supply, town supply, irrigation, and other required uses. The upper range is in keeping with dry year conservative pumping plans supported by the Inyo County/Los Angeles Standing Committee during the drought recovery period of the early 1990s. For the entire 2015-16 runoff year, LADWP anticipates pumping to be approximately 75,000 AF.

Owens Valley Conditions

Forecast runoff to the Owens River Basin during the 2016-17 runoff year is 293,800 AF or 71% of normal. The overall Eastern Sierra snowpack in watersheds contributing to the Los Angeles Aqueduct (LAA) was estimated to be 63% of normal as of April 1, 2016. Precipitation on the Owens Valley floor during the 2016-17 runoff year averaged 4.3 inches and was below the long-term average of 5.9 inches. Owens Valley groundwater levels are relatively stable in most areas.

During the 2015-16 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.

Enhancement/Mitigation Project Status

The enhancement/mitigation projects discussed in Section 4 were identified in the *1991 Environmental Impact Report on Water From the Owens Valley to Supply the Second Los Angeles Aqueduct* (1991 EIR) as mitigation for impacts due to LADWP's water gathering activities. There are 26 projects identified as enhancement/mitigation measures; all 26 of these projects have been fully implemented. Four of these projects are complete with no additional action needed, and 22 are implemented and ongoing, meaning that they are fully operational with ongoing water commitments or monitoring and reporting requirements. Refer to Section 4 for more information.

1991 EIR Mitigation Project Status

There are 53 mitigation projects identified for environmental impacts in the 1991 EIR. One of these projects is complete with no additional action needed and 44 are implemented and ongoing, meaning that they are fully operational and are attaining goals but have ongoing water commitments or additional monitoring and reporting requirements. One additional project is fully implemented but is not currently attaining goals, and 7 are in progress. Refer to Section 5 for more information.

Status of Other Mitigation Projects

Implementation status of provisions in the Inyo/Los Angeles Water Agreement (Water Agreement) and the *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) have also been updated. Refer to Section 7 for more information.

Inyo County and LADWP continue to jointly work toward the completion of the Green Book revisions. Status updates of the Green Book revision effort are given at Technical Group and Standing Committee meetings.

1. INTRODUCTION

1. INTRODUCTION

This document is intended to satisfy the Los Angeles Department of Water and Power's (LADWP) annual reporting obligations pursuant to 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); and the *August 2004 Amended Stipulation and Order in Case No. S1CVCV01-29768* (Stip/Order).

1.1 Water Agreement

The Water Agreement requires periodic evaluations of enhancement/mitigation projects to be made by the Inyo County/Los Angeles Technical Group. As required by the Water Agreement, all existing enhancement/mitigation projects will continue unless the Inyo County Board of Supervisors and LADWP agree to modify or discontinue a project. Section 4 of this report provides an update on LADWP enhancement/mitigation project status.

1.2 Annual Operations Plan

The Water Agreement provides that "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 forecast 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 proposed plan and pumping program and any subsequent modifications to it shall be consistent with these goals and principles.

1. A proposed plan shall include, but is not limited to, the following:

    - Owens Valley Runoff estimate (annual)

    - Projected groundwater production by wellfield (monthly)

    - Projected total aqueduct reservoir storage levels (monthly)

    - Projected aqueduct deliveries to Los Angeles (monthly)

    - Projected water uses in the Owens Valley (monthly)

    - Water balance projections at each monitoring site

2. The County through its Technical Group representatives shall review the Department's proposed plan of operations and provide comments to the Department within ten (10) days of receipt of the plan.

3. The Department shall meet with the County's Technical Group representatives within ten (10) days of the receipt of the County's comments, and attempt to resolve concerns of the County relating to the proposed pumping program.

4. The Department shall determine appropriate revisions to the plan, provide the revised plan to the County within ten (10) days after the meeting, and implement the plan.

5. The April 1st pumping program may be modified by the Department during the period covered by the plan to meet changing conditions. The Department shall notify the County's Technical Group representatives in advance of any planned significant modifications. The County shall have the opportunity to comment on any such modifications.

6. Information and records pertaining to the Department's operations and runoff conditions shall be reported to the County's Technical Group representatives throughout the year."

Section 2 of this report is LADWP's Operations Plan for the first six months of Runoff Year 2016-17.

1.3 1997 MOU

In accordance with the 1997 MOU Section III.H, LADWP and Inyo County are required to prepare an annual report describing environmental conditions in the Owens Valley and the associated studies, projects, and activities conducted under the Water Agreement and the 1997 MOU. Sections 3 through 7 of this report are intended to fulfill that requirement.

1.4 1991 EIR Monitoring Program

The 1991 EIR requires that LADWP submit an annual report to the Los Angeles Board of Water and Power Commissioners containing a description of each mitigation effort, its goals, strategies, and actions; its status (completed activities, ongoing activities); the overall effectiveness of each mitigation effort; and status of each mitigation plan for the following year. Section 5 of this report provides the required information.

Mitigation plans for each of the mitigation measures are developed by the Technical Group as set forth in Section I.C.2 of the Green Book, the technical appendix to the Water Agreement. The Green Book states: "as part of each mitigation plan, the Technical Group shall develop a reporting and monitoring program. At least once per year, the Technical Group shall report, in writing to the Standing Committee, on the

effectiveness of the mitigation plan in achieving its goal." Section 5 of this report is intended to complete that annual obligation.

1.5 2004 Amended Stipulation and Order

The Stip/Order, Section 11, 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 is intended to fulfill that requirement.

2. OWENS VALLEY OPERATIONS PLAN FOR RUNOFF YEAR 2016-2017

2. OWENS VALLEY OPERATIONS PLAN FOR RUNOFF YEAR 2016-17

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.)*

2.1. Eastern Sierra Runoff Forecast

The Eastern Sierra Runoff Forecast for the 2016-17 runoff year (Table 2.1) 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 2016-17 runoff year is 293,800 acre-feet, or about 71% of the 1961-2010 long-term average annual runoff value of 412,284 acre-feet. This is following the driest year for the period of record and together with the low runoff during the previous four years, the driest five-year runoff period for the period of record in the Owens Valley.

The forecast runoff for the period between April 1, 2016 through September 30, 2016, is 203,100 acre-feet for the Owens River Basin, which is 67% of the long-term average. The long-term average Owens Valley runoff between April1 and September 30 based on 1961-2010 data is 303,903 acre-feet per year.

Figure 2.1 summarizes Owens Valley runoff and groundwater pumping by LADWP since the 1971 runoff year. This figure demonstrates this year's runoff compared to the past runoff in the Owens Valley.

Table 2.1 - Owens Valley Runoff Forecast for 2016-17 Runoff Year

2016 EASTERN SIERRA
RUNOFF FORECAST
April 1, 2016

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 (1961 - 2010) (Acre-feet)
MONO BASIN:	73,000	71%	83%	58%	103,522
OWENS RIVER BASIN:	203,100	67%	80%	54%	303,903

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 (1961 - 2010) (Acre-feet)
MONO BASIN:	90,100	74%	87%	60%	122,333
OWENS RIVER BASIN:	293,800	71%	84%	59%	412,284

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.

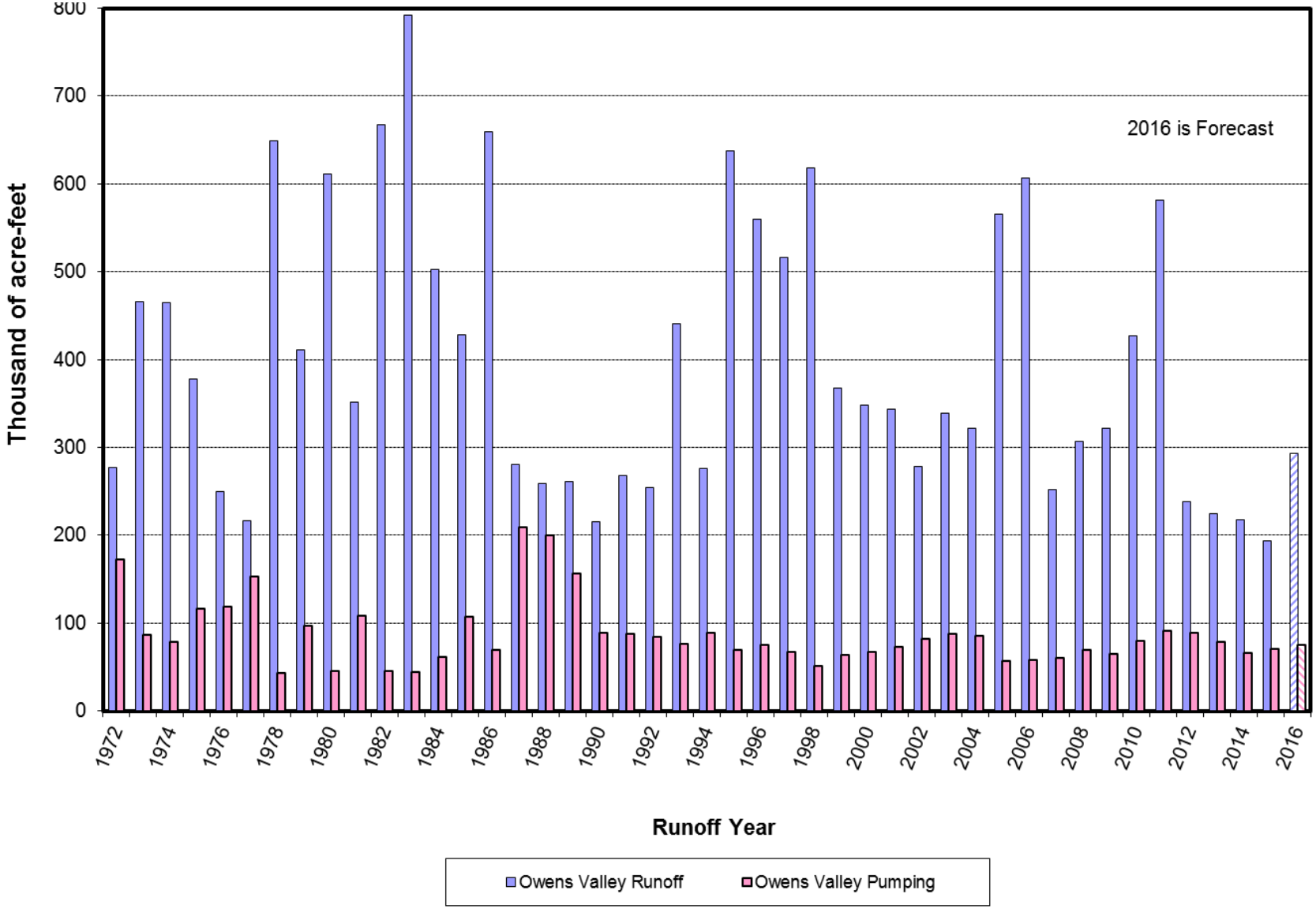


Figure 2.1 - Owens Valley Runoff and Groundwater Pumping

2.2. Owens Valley Groundwater Production

LADWP has prepared its 2016-17 Annual Owens Valley Operations Plan based on the goals and principles of the Water Agreement. The 2016-17 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.

Under the terms of the Water Agreement, the acceptable 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 2.2 lists the ON/OFF status of the monitoring sites within the Owens Valley as of April 2016. 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 2.3 provides a breakdown of the available annual pumping capacity and planned groundwater pumping for the first six months of the 2016-17 runoff year by wellfield. Pursuant to Water Agreement Section V.D, LADWP shall submit a plan for the second six months of the runoff year on or about October 20, 2016. Table 2.3 also shows the monitoring sites in ON status as of April 2016, the wells associated with the ON status monitoring sites, and the exempt wells in each wellfield. Approximately 121,550 acre-feet of water is available for groundwater pumping from Owens Valley wellfields under the terms of the Water Agreement during the 2016-17 runoff year. LADWP plans to pump between approximately 46,160 and 51,510 acre-feet during the first six months of the 2016-17 runoff year. Groundwater pumping during the first six months of the 2016-17 runoff year will provide water for Owens Valley uses. For the entire 2016-17 runoff year, LADWP anticipates pumping to be approximately 75,000 AF.

Working both independently and with the Inyo/Los Angeles Technical Group, LADWP will monitor Owens Valley environmental conditions to assess if further changes to the planned pumping are needed. LADWP's 2016-17 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. While LADWP plans to pump considerably less groundwater than made available under Water Agreement Section V.

Figure 2.2 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 2016-17 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 2016-17 pumping program considers the

groundwater mining provisions of the Green Book. Table 2.4 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 2016-17 runoff year.

Table 2.5 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 2.6 details planned groundwater pumping for the first six months of the 2016-17 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 2016-17 runoff year is consistent with the provisions of the Water Agreement. 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 2016-17. 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 2.3, 2.4, and 2.6 through 2.10 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 2.2 - Soil/Vegetation Water Balance Calculations for April 2016 According to Section III of the Green Book

Site	October 2015 Soil Available Water Content (AWC)	30% Annual Precipitation	Projected Soil AWC	October 2015 Vegetation Water Required/ Water Required for Well Turn-On	October 2015 Status	April 2016 Soil AWC	April 2016 Status	Soil AWC Required for Well Turn-on
	(cm)	(cm)	(cm)	(cm)		(cm)		(cm)
L1	1.6	NA	1.6	3.8/15.6	OFF	2.8	OFF	15.6, OFF 7-10
L2	7.3	4.7	12.0	7.0/NA	ON	7.5	ON	NA
L3	7.5	NA	7.5	12.4/25.2	OFF	12.6	OFF	25.2, OFF 10-11
BP1	0.9	NA	0.9	2.1/22.9	OFF	1.6	OFF	22.9†, OFF 10-97
BP2	1.3	NA	1.3	4.9/28.4	OFF	3.9	OFF	28.4, OFF 7-98
BP3	2.6	NA	2.6	4.2/10.6	OFF	5.6	OFF	10.6, OFF 7-12
BP4	35.3	4.9	40.2	7.5/NA	ON	37.9	ON	NA
TA3	6.3	NA	6.3	14.2/26.0	OFF	8.7	OFF	26.0, OFF 10-11
TA4	13.4	NA	13.4	8.8/23.3	OFF	17.6	OFF	23.3, OFF 10-11
TA5	21.4	4.9	26.3	3.9/NA	ON	22.9	ON	NA
TA6	8.8	NA	8.8	10.7/17.6	OFF	13.4	OFF	17.6, OFF 10-11
TS1	1.3	NA	1.3	3.1/20.4	OFF	4.5	OFF	20.4†, OFF 10-96
TS2	6.0	4.4	10.4	9.1/NA	ON	9.9	ON	NA
TS3	16.5	NA	16.5	12.8/32.9	OFF	22.8	OFF	32.9, OFF 10-12
TS4	33.2	NA	33.2	27.7/55.9	OFF	47.9	OFF	55.9, OFF 10-11
IO1	11.1	NA	11.1	35.0/42.2	OFF	13.5	OFF	42.2, OFF 10-98
IO2	4.5	NA	4.5	3.4/18.9	OFF	3.7	OFF	18.9, OFF 7-11
SS1	11.7	3.9	15.6	4.8/NA	ON	10.1	ON	NA
SS2	2.9	NA	2.9	1.5/25.6	OFF	4.0	OFF	25.6, OFF 7-11
SS3	18.9	NA	18.9	5.9/33.8	OFF	20.1	OFF	33.8, OFF 10-11
SS4	4.8	NA	4.8	4.8/15.9	OFF	4.9	OFF	15.9, OFF 7-05
BG2	23.0	4.0	27.0	1.7/NA	ON	23.5	ON	NA

†: These values of soil water required for well turn-on were derived using calculations based on %cover that were routinely performed in the past. The values have not been updated to conform to the Green Book equations in section III.D.2, p. 57-59.

Table 2.3 - Annual Pumping Capacity According to Monitoring Sites with ON Status and Planned Pumping for the First Six Months of Runoff Year 2016-17

Wellfield	Monitoring	Associated Production Wells	Available Capacity (AF/year)	Planned Pumping (AF)
Laws	L2	236, 239, 243, 244	7,240	
	L5*	245, 387, 388	8,980	
	Exempt	236, 354, 422, 413	2,100	
	Wellfield Pumpage		**18,320**	**6,600**
Bishop**				
	All wells	140, 371, 406, 407, 408, 410, 411, 412	17,810	
	Wellfield Pumpage		**17,810**	**9,000**
Big Pine				
	BP4	331	7,530	
	Exempt	218, 219, 330, 332, 341, 352, 375, 415	25,750	
	Wellfield Pumpage		**33,280**	**10,995-12,345**
Taboose Aberdeen	TA5	349	12,130	
	Exempt	118, 355	2,620	
	Wellfield Pumpage		**14,750**	**2,500-6,500**
Thibaut Sawmill	TS2	155	940	
	Exempt	351, 356	8,000	
	Wellfield Pumpage		**8,940**	**4,380**
Indep. - Oak				
	Exempt	59, 60, 61, 65, 357, 383EM, 384EM, 401	15,710	
	Wellfield Pumpage		**15,710**	**6,910**
Symmes Shepherd	SS1	69, 392, 393	7,780	
	Exempt	402EM	1,200	
	Wellfield Pumpage		**8,980**	**3,975**
Bairs Georges	BG2	76, 343, 348, 403	2,860	
	Exempt	343	500	
	Wellfield Pumpage		**2,860**	**960**
Lone Pine	Exempt	344, 346, 425	900	
	Wellfield Pumpage		**900**	**840**
	Total Owens Valley		**121,550**	**46,160-51,510**

* Monitoring site has yet to be located.

** Pumping is subject to the Hillside Decree

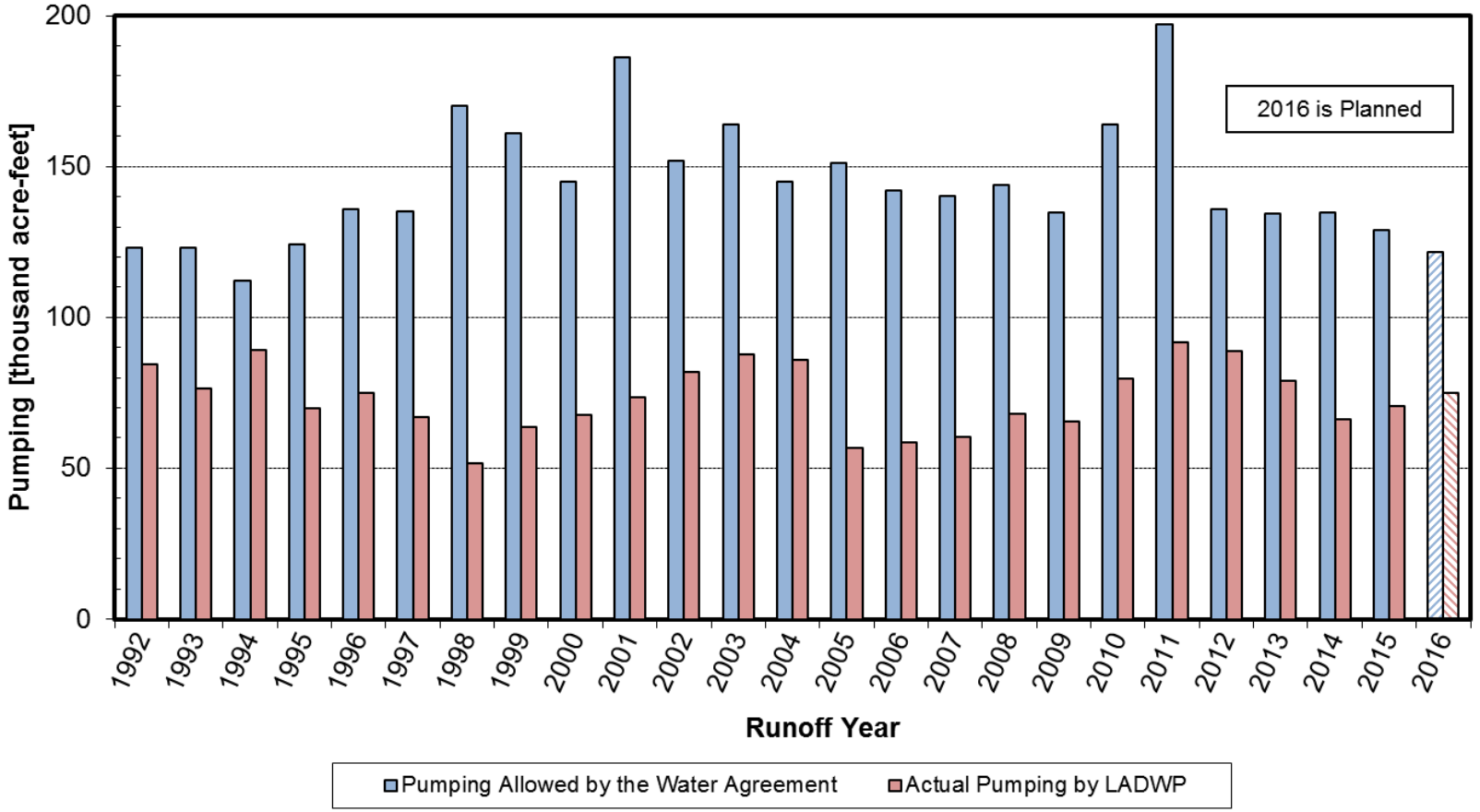


Figure 2.2 Owens Valley Pumping – Provided by Water Agreement and Actual Since Inyo/Los Angeles Water Agreement

Table 2.4 - Summary of Recharge and Pumping for Water Year 1994 - 2015 and Estimated Pumping Limit for Apr-Sep 2016 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
1997	125%	15,237	8,349	49,949	9,606	33,474	24,002	42,837	21,774	52,100	9,461	19,962	1,128	213,559	74,320
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	11,284	8,960	946	109,297	67,704
2015	43%	10,103	5,824	30,668	10,521	15,380	19,939	18,671	15,563	18,695	11,801	8,029	925	101,546	64,573
2016 (a)	67%	10,620	133	34,971	1,938	19,612	10,568	24,380	9,718	26,724	7,240	10,862	146	127,169	29,743
(b) TOTAL		287,040	104,250	809,907	192,443	498,939	455,252	624,016	390,058	702,443	234,041	274,570	21,645	3,196,915	1,397,689
Estimated Apr-Sep 2016 Pumping Limit			182,790		617,464		43,687		233,958		468,402		252,925		1,799,226

(a) Estimated Recharge for the 2016 Water Year; Approximate Pumping for First Half of Water year 2016 (Oct-Mar).

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

Table 2. 5 - LADWP Groundwater Pumping Wells Exempt from ON/OFF Provisions of Water Agreement

Revised: May 6, 2016

Well Number	Well Field	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 2.6 - Planned Owens Valley Pumping for the First Six Months of 2016-17 Runoff Year (acre-feet)

Month	Laws	Bishop	Big Pine	Taboose-Aberdeen	Thibaut-Sawmill	Indep.-Oak	Symmes-Shepherd	Bairs-Georges	Lone Pine	TOTAL
April	1,100	1,500	1,965	1,250	730	1,200	765	170	140	8,820
May	1,100	1,500	1,965	250-1,250	730	1,200	765	170	140	7,820-8,820
June	1,100	1,500	1,965	250-1,250	730	1,200	765	170	140	7,820-8,820
July	1,100	1,500	1,700-2,150	250-1,250	730	1,200	765	170	140	7,555-9,005
August	1,100	1,500	1,700-2,150	250-1,250	730	1,200	765	170	140	7,555-9,005
September	1,100	1,500	1,700-2,150	250	730	910	150	110	140	6,885-7,330
Total	6,600	9,000	10,995-12,345	2,500-6,500	4,380	6,910	3,975	960	840	46,160-51,510

Laws Wellfield (Figure 2.3)

Monitoring site L2 is in ON status. Production wells controlled by this monitoring site have an available production capacity of 7,240 acre-feet. 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 first half of the runoff year in the Laws Wellfield is approximately 6,600 acre-feet, contingent on 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 screen 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 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 2.5 cfs with a similar test that was conducted in 1993-94 (combined pumping rate of W385 and W386 at 16.5 cfs). LADWP plans to prepare appropriate California Environmental Quality Act (CEQA) documentation prior to the proposed two-months 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.

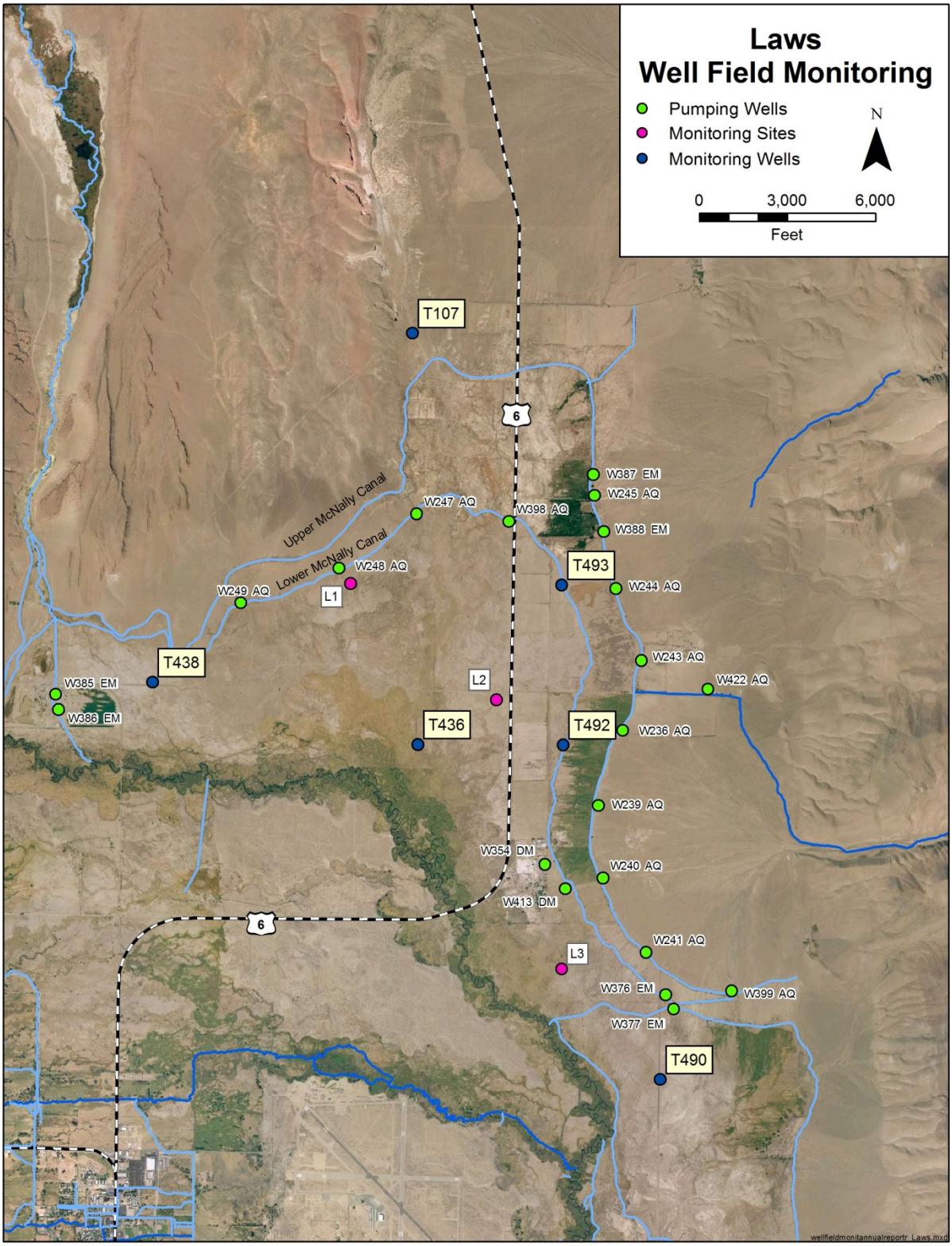


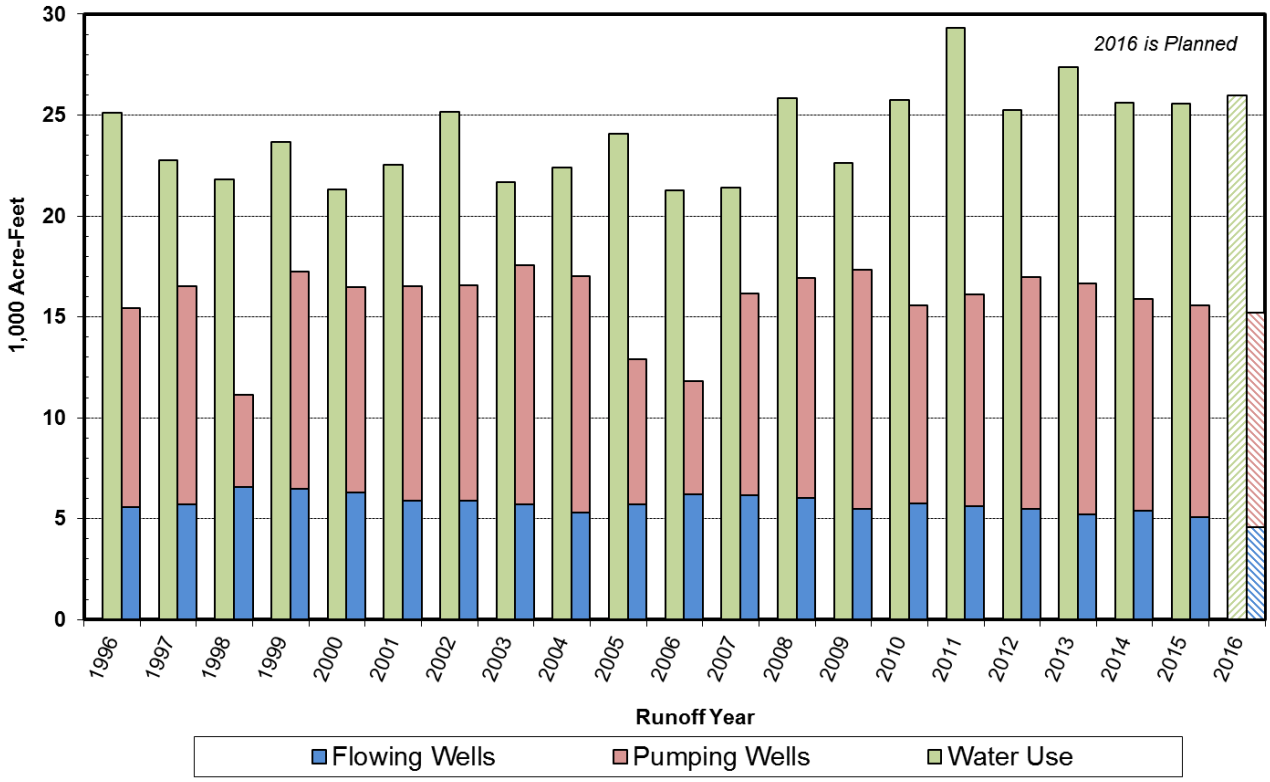
Figure 2.3 - Laws Wellfield

Bishop Wellfield (Figure 2.4)

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). Under the current audit protocols, recent total water used on City lands within the Bishop Cone area has been approximately 24,000 acre-feet per year. In the 2016-17 Runoff Year, the total water used is likely to be reduced to approximately 18,000 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 9,000 acre-feet for the first half of the 2016-17 runoff year, contingent on water needs and environmental conditions.

Figure 2.5 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.

The current Bishop Cone Audit does not include a number of known uses and losses, including some uses that are currently being measured. These unaccounted for uses should be added to the total Bishop Cone Audit and the audit protocols should be revised to more accurately reflect actual uses and losses.



**According to the Hillside Decree, total groundwater extraction cannot be more than water use on City-owned land on the Bishop Cone. The above graph reflects only those uses included in the Bishop Cone Audit and does not include conveyance or stockwater losses.*

Figure 2.4 - Groundwater Extraction (flowing & pumping) and Water Use on City of Los Angeles Land in Bishop Cone

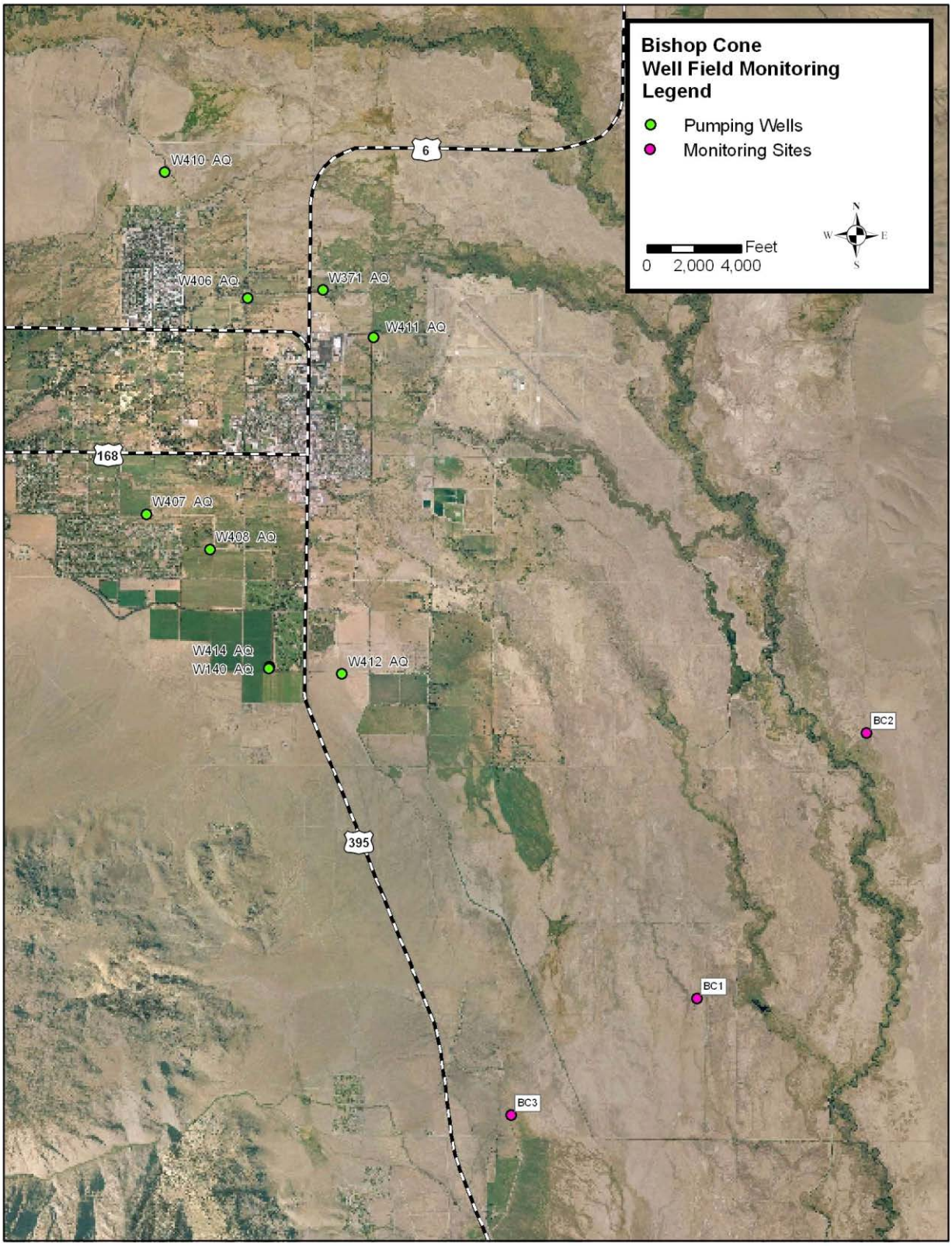


Figure 2.5 - Bishop Wellfield

Big Pine Wellfield (Figure 2.6)

Monitoring site BP4 is in ON status. Production Well 331, managed in conjunction with monitoring site BP4, has a production capacity of 7,530 acre-feet. Exempt wells including Well 218, Well 219, town supply wells, and Fish Springs Fish Hatchery wells in the Big Pine Wellfield have a combined capacity of 25,750 acre-feet. The total available capacity in the Big Pine Wellfield is 33,280 acre-feet. The total planned pumping in the Big Pine Wellfield is for the first half of the 2016-17 runoff year is between approximately 10,995 acre-feet and 12,345 acre-feet, contingent on water needs and environmental conditions.

Taboose-Aberdeen Wellfield (Figure 2.7)

Monitoring site TA5 is in ON status. Production Well 349 is controlled by monitoring site TA5 and has an available pumping capacity of approximately 12,130 acre-feet. Exempt Well 118 in the Taboose-Aberdeen Wellfield has a capacity of 2,380 acre-feet . Exempt well W355 pumps approximately 240 acre-feet to supply the Hines Spring project. The total available groundwater pumping capacity in the Taboose-Aberdeen Wellfield is 14,750 acre-feet. The planned groundwater pumping in the Taboose-Aberdeen Wellfield for the first half of the 2016-17 runoff year will range between approximately 2,500 acre-feet and 6,500 acre-feet, contingent on water needs and prevailing environmental conditions.

Thibaut-Sawmill Wellfield (Figure 2.8)

Monitoring site TS2 is in ON status. Production well W155, controlled by monitoring site TS2 has a production capacity of 940 acre-feet and can supply water for irrigation to Eight-Mile Ranch to supplement surface water for the ranch. 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 2016-17 runoff year is approximately 8,940 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 will be limited to approximately 8,000 acre-feet per year. Total planned pumping in the Thibaut-Sawmill Wellfield for the first half of the 2016-17 runoff year is planned to be approximately 4,380 acre-feet, subject to hatchery demands, water supply needs, and environmental conditions.

Independence-Oak Wellfield (Figure 2.8)

None of the monitoring sites in the Independence-Oak Wellfield are in ON status. Independence-Oak exempt wells have a combined capacity of 15,710 acre-feet. The total available pumping capacity in the Independence-Oak Wellfield is 15,710 acre-feet. The anticipated groundwater pumping in the Independence-Oak Wellfield for the first six months of the 2016-17 runoff year is approximately 6,910 acre-feet, which includes water for irrigation, town water system, and E/M project supply.

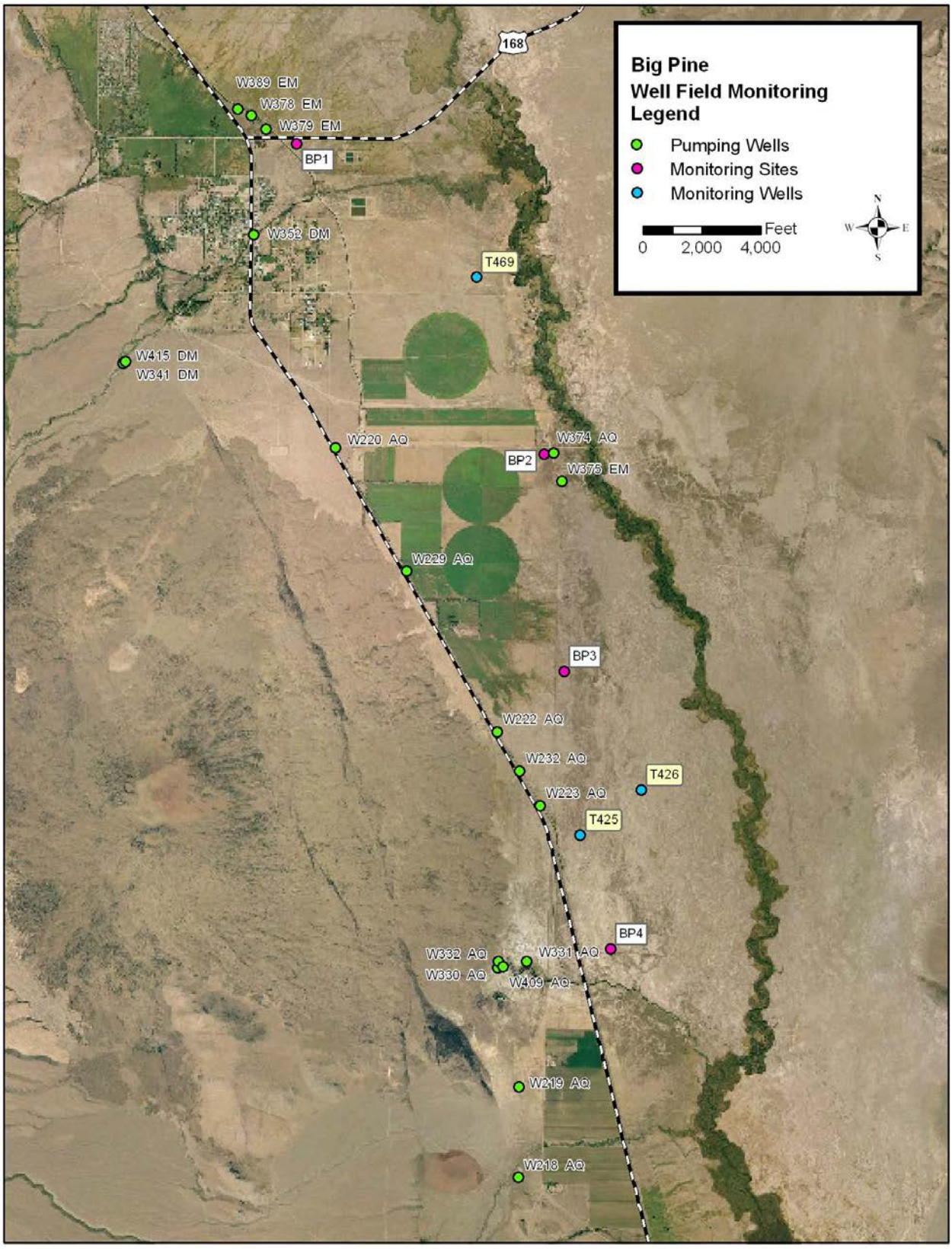


Figure 2.6 - Big Pine Wellfield

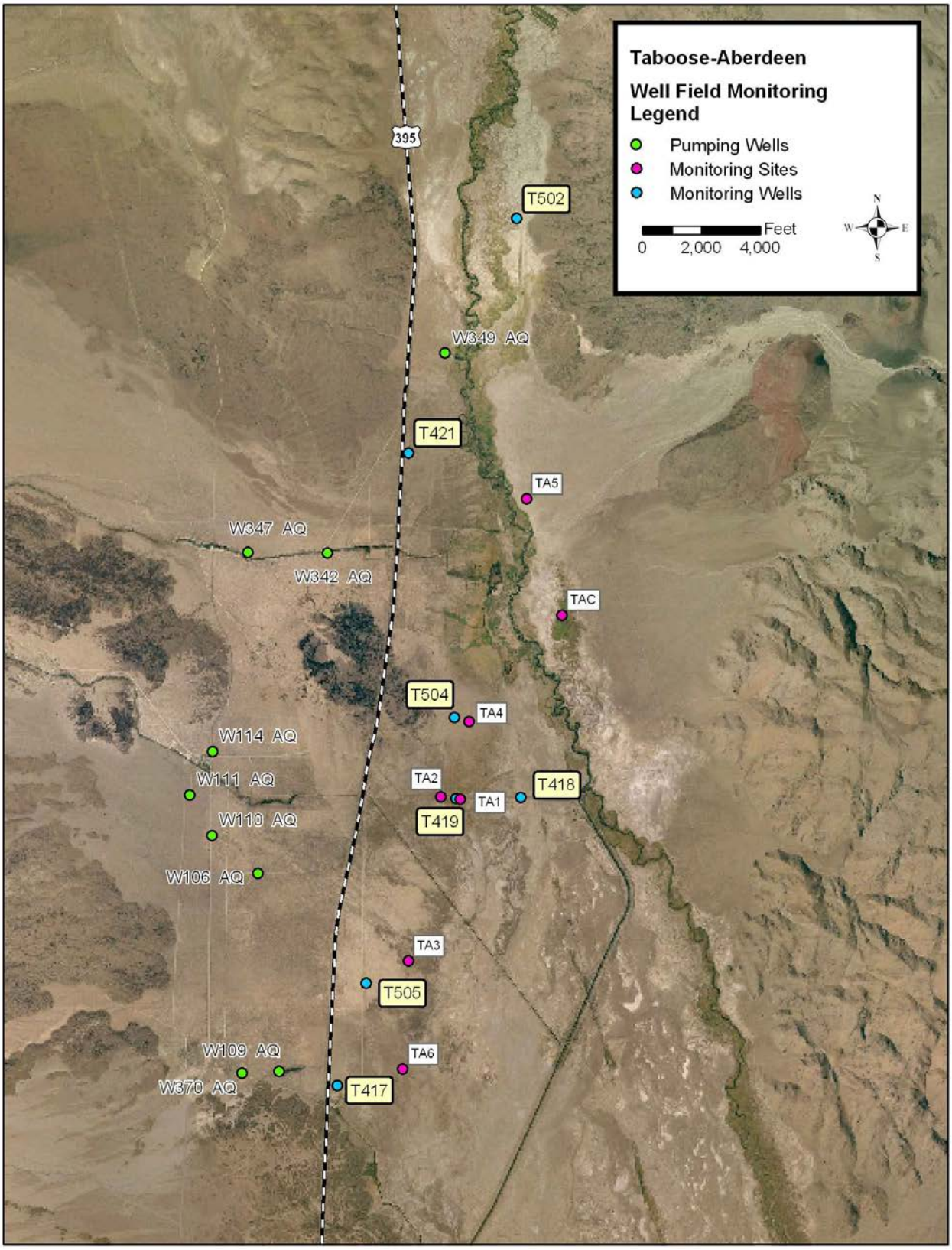


Figure 2.7 - Taboose-Aberdeen Wellfield

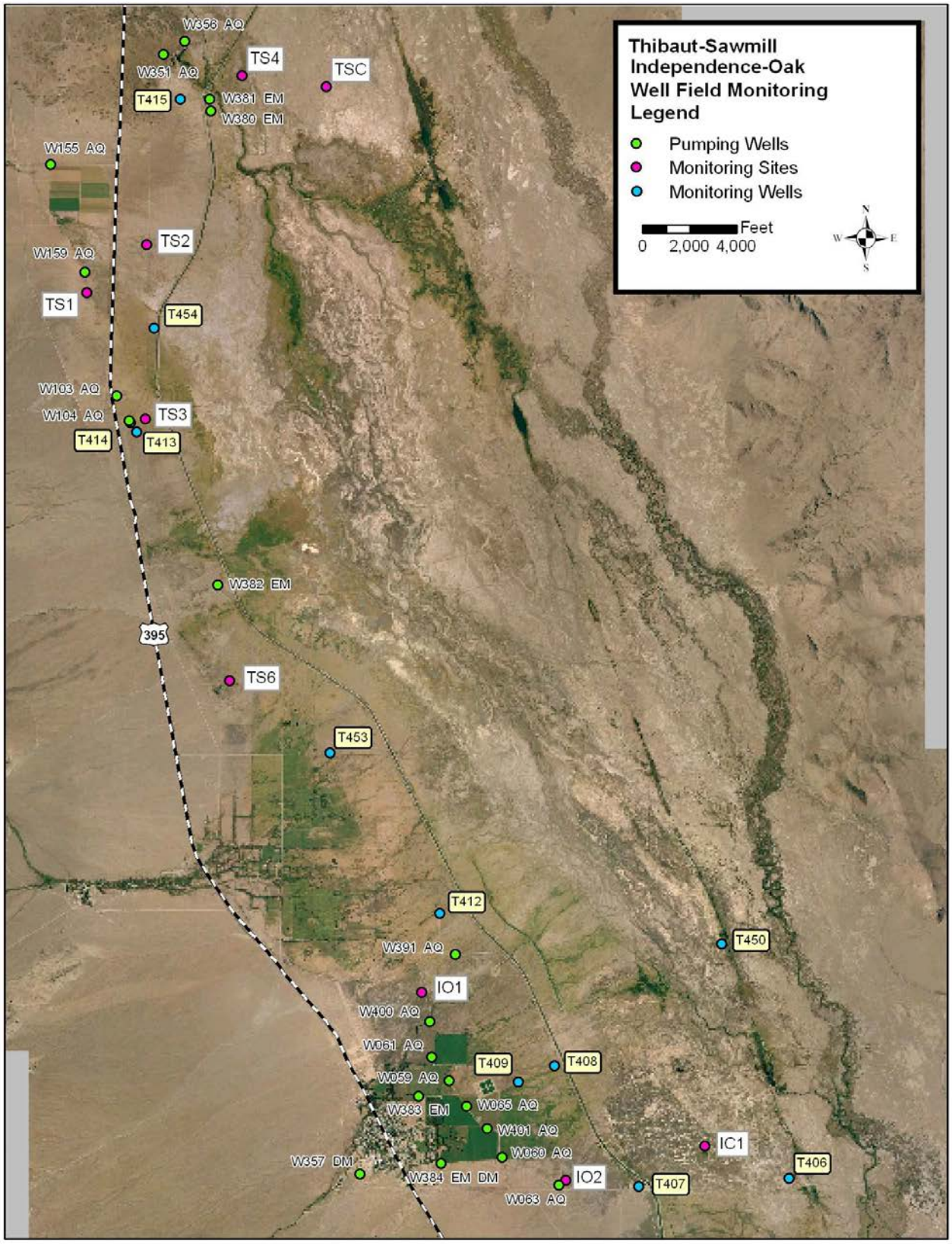


Figure 2.8 - Thibaut-Sawmill and Independence-Oak Wellfields

Symmes-Shepherd Wellfield (Figure 2.9)

Monitoring site SS1 is in ON status. Monitoring site SS1 has an annual capacity of 7,780 acre-feet. Exempt Well 402 has a capacity of about 1,200 acre-feet. Total available capacity in the Symmes-Shepherd Wellfield for the 2016-17 runoff year is approximately 8,980 acre-feet. The total pumping in the Symmes-Shepherd Wellfield for the first six months of the 2016-17 runoff year is planned to be approximately 3,975 acre-feet, contingent on water needs and environmental conditions.

Bairs-Georges Wellfield (Figure 2.9)

Vegetation monitoring site BG2 is in ON status. The wells managed under this site have a combined annual capacity of approximately 2,860 acre-feet. Well 343 is exempted 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 2016-17 runoff year is approximately 2,860 acre-feet. Groundwater pumping in the Bairs-Georges Wellfield for the first six months of the 2016-17 runoff year is planned to be approximately 960 acre-feet, contingent on water needs and environmental conditions.

Lone Pine Wellfield (Figure 2.10)

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 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 2016-17 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 first six months of the 2016-17 runoff year is approximately 840 acre-feet, contingent on water supply needs and environmental conditions.

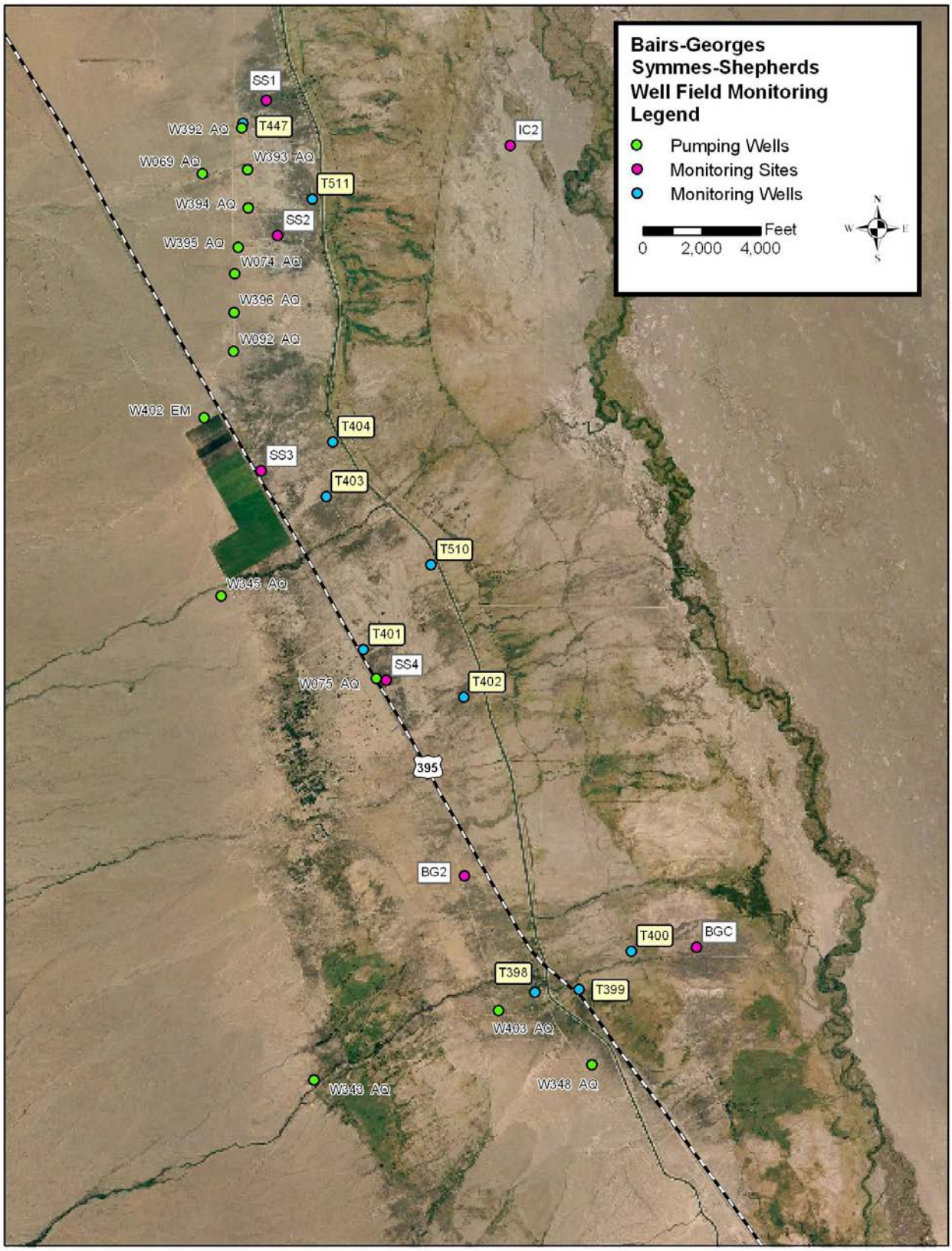


Figure 2.9 - Symmes-Sheperds and Bairs-Georges Wellfields

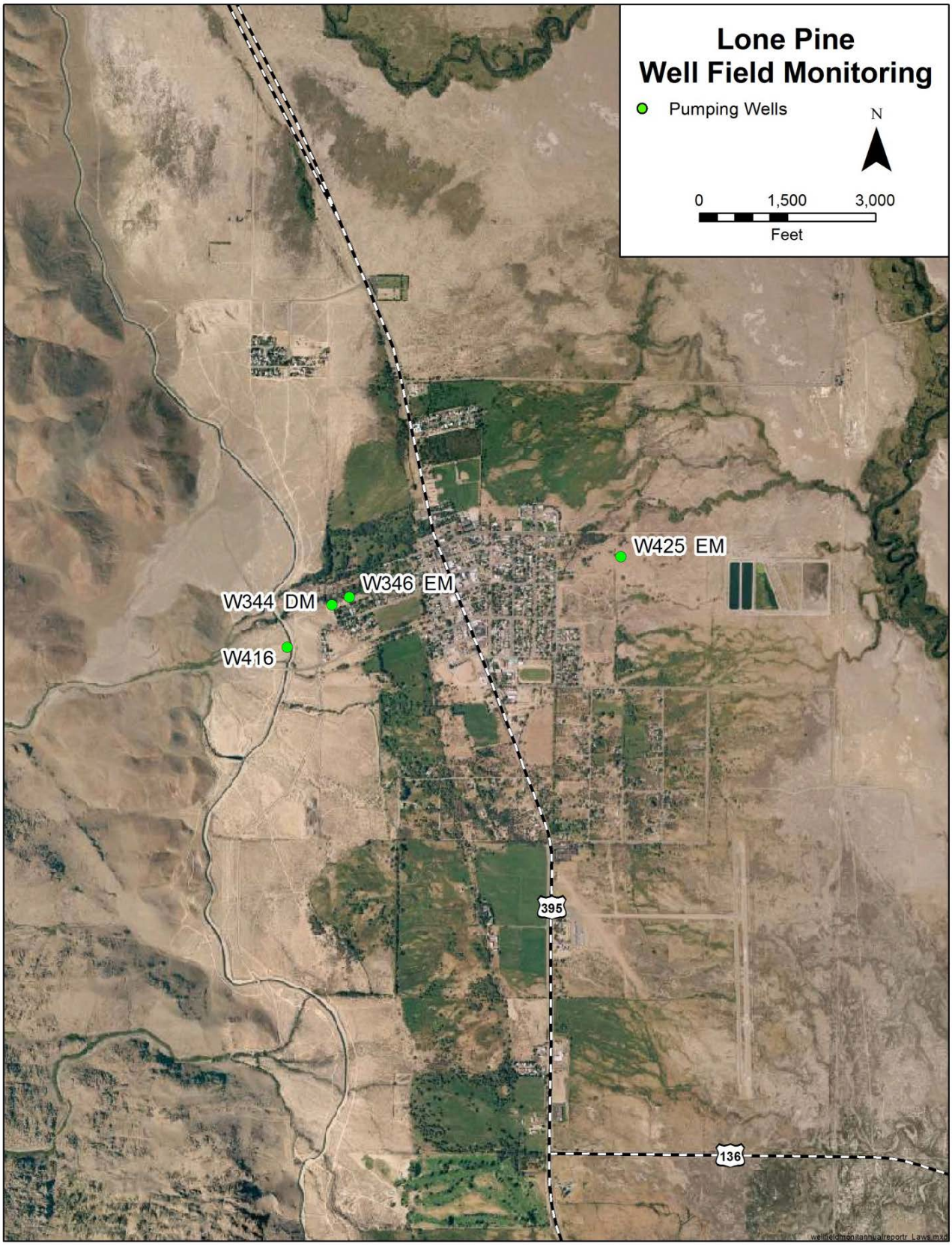


Figure 2.10 - Lone Pine Wellfield

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

Table 2.7 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 2.7 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 2.7 and Figure 2.11, LADWP plans to provide approximately 93,300 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 2.6 shows projected 2016-17 water use by the Lower Owens River Project on a monthly basis, totaling 17,700 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 2.7 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 2016-17 runoff year. E/M project water demands during the 2016-17 runoff year are expected to be approximately 3,450 acre-feet greater than E/M groundwater pumping. The cumulative E/M water supply shortfall is estimated to be approximately 198,000 acre-feet by the end of the runoff year.

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 2.7 - Water Uses on City of Los Angeles Owned Lands in Owens Valley – Actual Use in 1981-82 and Planned Use in 2016-17 Runoff Year (acre-feet)

Use	April		May		June		July		August		September		TOTAL Apr-Sep	
	1981	2016	1981	2016	1981	2016	1981	2016	1981	2016	1981	2016	1981	2016
Irrigation	3,980	5,000	7,958	7,700	10,373	8,600	9,476	8,700	8,295	8,700	6,321	6,000	46,403	44,700
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	1,320	0	1,680	0	1,640	0	1,710	0	1,300	0	1,100	0	8,750
LORP	0	800	0	1,500	0	2,700	0	3,200	0	3,400	0	2,700	0	14,300
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*	*8,805*	*10,081*	*12,971*	*12,777*	*15,106*	*12,176*	*15,917*	*10,895*	*15,374*	*9,046*	*11,715*	*60,475*	*79,888*

Use	October		November		December		January		February		March		TOTAL Oct-Mar		TOTAL Apr-Mar	
	1981	2016	1981	2016	1981	2016	1982	2017	1982	2017	1982	2017	81-82	15-16	81-82	16-17
Irrigation	263	200	0	0	0	0	0	0	0	0	14	100	277	300	46,680	45,000
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	250	0	100	0	100	0	100	0	100	0	100	0	750	0	9,500
LORP	0	1,200	0	800	0	300	0	250	0	250	0	600	0	3,400	0	17,700
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*	*3,465*	*1,758*	*2,515*	*1,615*	*1,855*	*1,485*	*1,797*	*1,352*	*1,685*	*1,559*	*2,095*	*9,878*	*13,412*	*70,353*	*93,300*

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

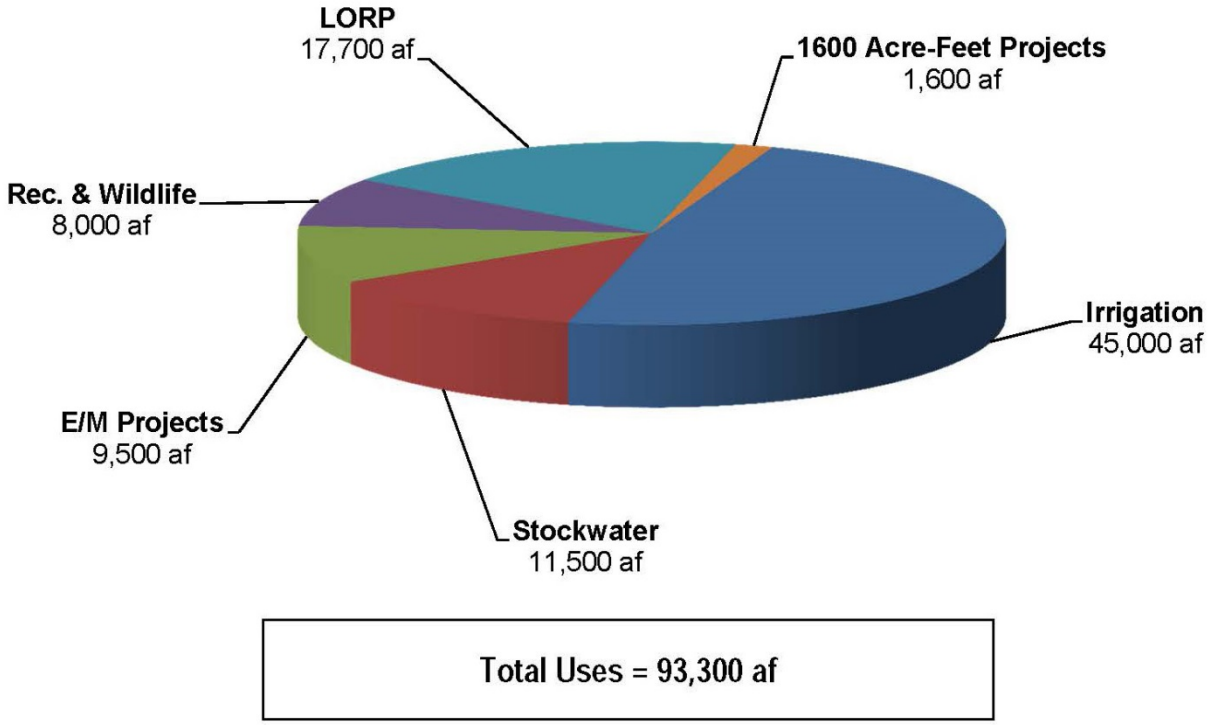


Figure 2.11 - Distribution of Planned Owens Valley Water Use on City Owned Lands for 2016-17 Runoff Year

Table 2.8 - Owens Valley Groundwater Pumping and E/M Water Use (1984-85 through 2016-17 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
1984-85	122	61,981	61,981	0	0		0
1985-86	103	107,718	107,718	0	109		0
1986-87	158	69,887	69,887	0	12,696	(3)	0
1987-88	68	209,394	179,884	29,510	29,360		0
1988-89	62	200,443	171,012	29,431	30,872		0
1989-90	63	155,972	133,409	22,563	23,330		0
1990-91	52	88,904	70,817	18,087	17,949		0
1991-92	64	87,310	71,520	15,790	20,517	-4,727	-4,727
1992-93	61	84,453	70,688	13,765	18,357	-4,592	-9,319
1993-94	105	76,329	67,338	8,991	19,310	-10,319	-19,638
1994-95	66	89,219	78,209	11,010	20,812	-9,802	-29,440
1995-96	153	69,752	57,180	12,572	22,943	-10,342	-39,782
1996-97	135	74,904	57,981	16,923	23,949	-7,026	-46,808
1997-98	124	66,914	52,760	14,154	21,608	-7,346	-54,154
1998-99	149	51,574	47,353	4,221	19,672	(3)	-54,154
1999-00	89	63,675	59,342	4,333	24,452	-20,117	-74,271
2000-01	84	67,795	61,456	6,339	20,782	-14,272	-88,543
2001-02	83	73,349	70,055	3,294	21,815	-18,521	-107,064
2002-03	66	81,979	76,059	5,920	21,394	-15,474	-122,538
2003-04	81	87,732	80,734	6,998	21,116	-14,118	-136,656
2004-05	77	85,820	78,110	7,710	18,918	-10,617	-147,273
2005-06	136	56,766	51,695	5,071	20,032	-14,285	-161,558
2006-07	146	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	74	68,971	61,053	7,918	10,646	-2,728	-168,926
2009-10	77	64,138	57,946	6,192	10,697	-4,505	-173,431
2010-11	103	78,248	71,233	7,015	10,407	-3,392	-176,823
2011-12	140	91,699	84,365	7,334	11,462	-4,128	-180,951
2012-13	57	*88,689*	*83,034*	*5,655*	*9,257*	*-3,602*	*-184,553*
2013-14	54	78,809	73,678	5,131	8,222	-3,091	-187,644
2014-15	52	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 (2)	*71*	*75,000*	*68,950*	*6,050*	*9,500*	*-3,450*	*-198,003*

(1) Based on 1961-2010 average. Includes some runoff contribution to the Laws Wellfield from the White Mountains.
(2) Planned April-September pumping range is 36,250-47,830 acre-feet
(3) surface water was available

2.4- Aqueduct Operations

Table 2.8 shows planned LAA reservoir storage levels and monthly deliveries to Los Angeles. Based on this plan, approximately 114,000 acre-feet will be exported from Inyo and Mono Counties to the City during the 2016-17 runoff year. This is approximately only half of the LAA delivery to the city that would occur in a normal year.

Table 2.9 - Planned Los Angeles Aqueduct Operations for 2016-17 Runoff Year

Month	Owens Valley-Bouquet Reservoir Storage 1st of month Storage (acre-feet)	Aqueduct Delivery to Los Angeles (acre-feet)
April, 2016	179,827	11,008
May	174,296	9,223
June	167,761	11,901
July	170,311	16,909
August	166,137	18,447
September	148,155	16,364
October	124,284	0
November	129,205	0
December	143,792	7,686
January, 2017	153,850	7,686
February	163,525	6,942
March	170,462	7,686
TOTAL	***-9,365***	***113,853***

2.5- Water Exports to Los Angeles

Figure 2.12 provides a record of water exports from the Eastern Sierra to Los Angeles since 1970. Figure 2.13 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 480,200 acre-feet of water during the 2016-17 runoff year. It is anticipated that water from the Eastern Sierra will make up about 24% of the 2016-17 supply. Water purchases from the Metropolitan Water District of Southern California will provide about 53% of the City's supply, groundwater from Los Angeles area aquifers will provide about 21%, and recycled water will supply about 2% of the City's water needs.

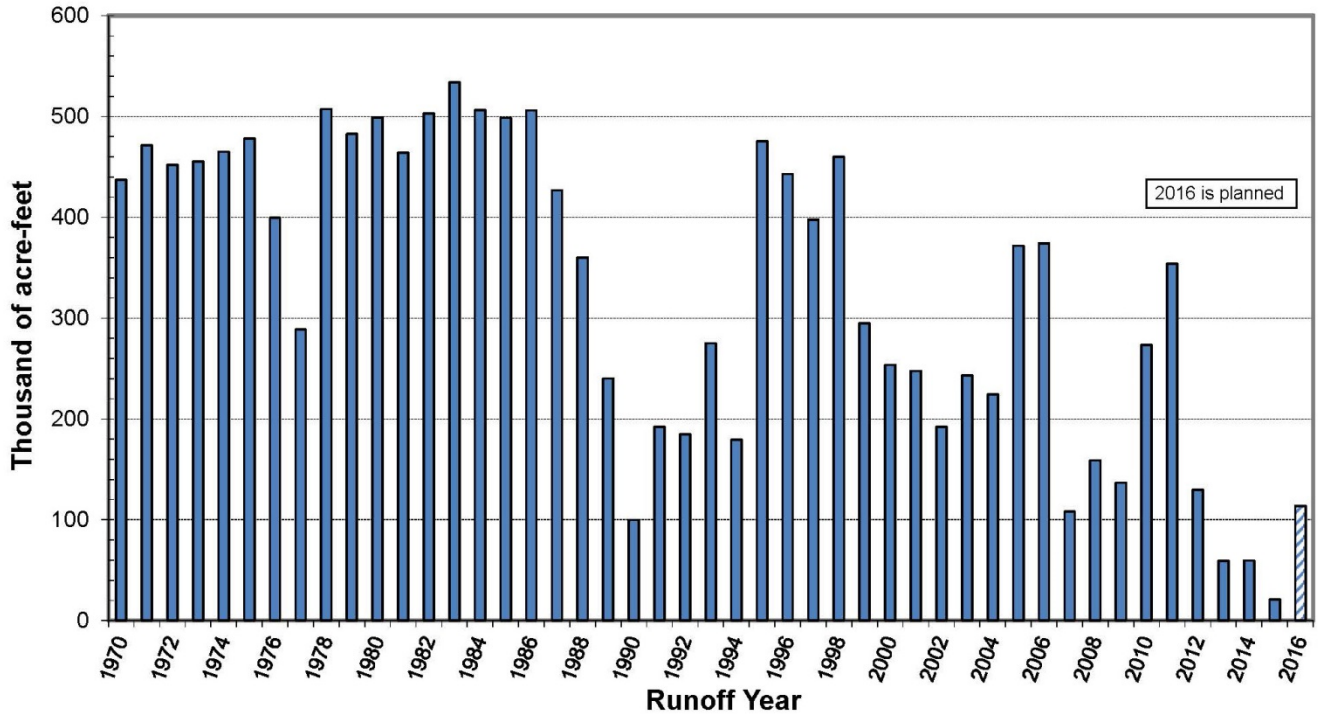


Figure 2.12 - Water Export from Eastern Sierra to Los Angeles

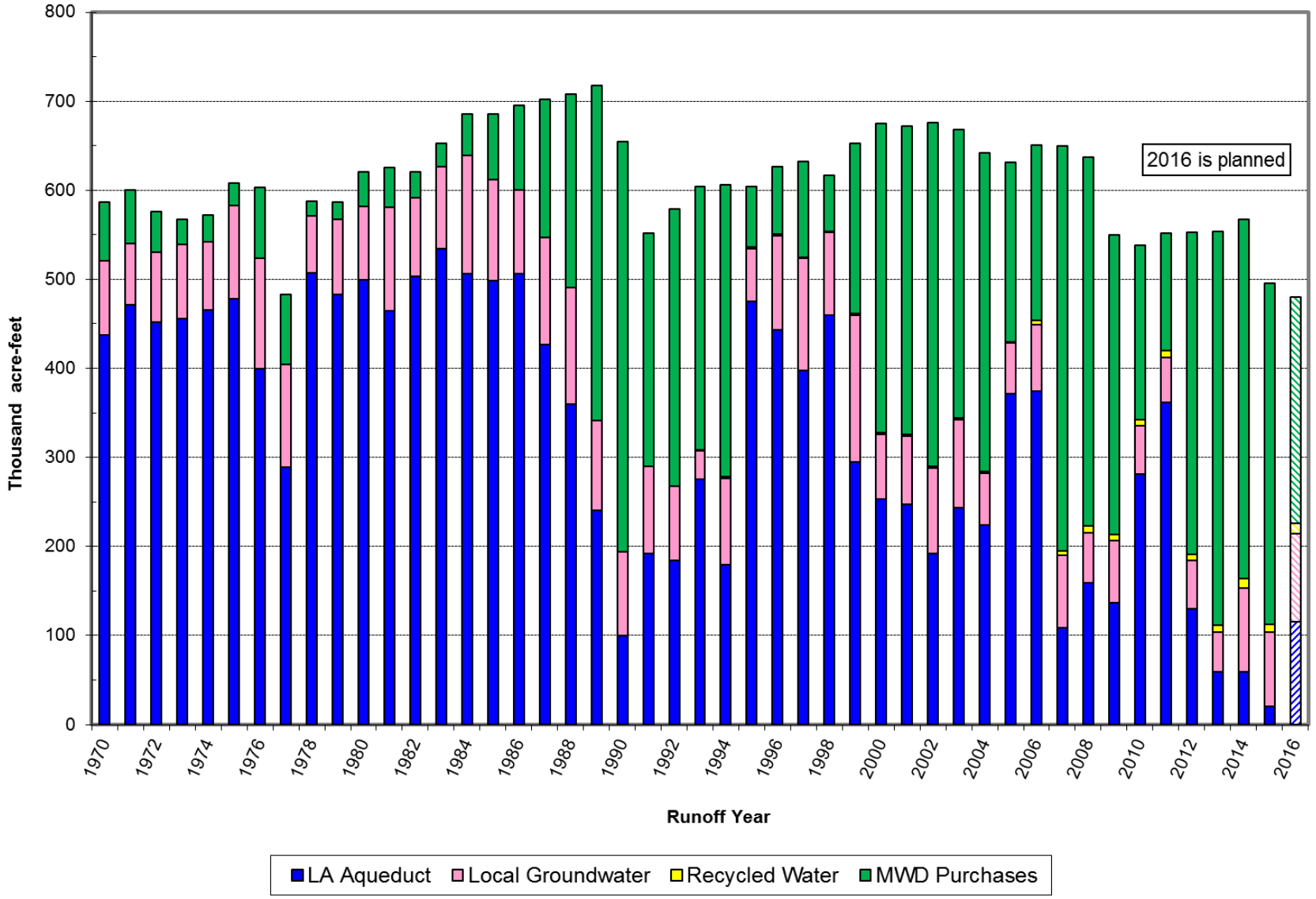


Figure 2.13 - Sources of Water for the City of Los Angeles

3. CONDITIONS IN THE OWENS VALLEY

3 CONDITIONS IN THE OWENS VALLEY

As of April 1, 2016, the Eastern Sierra overall snowpack was measured to be 63% of normal (Tables 3.2). Owens Valley runoff during the 2016-17 runoff year is forecast to be 293,800 acre-feet or approximately 71% of normal (Table 2.1). Owens Valley floor precipitation during the 2015-16 runoff year was about 74% of average (Table 3.3). 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 3.1. Groundwater levels are generally stable in most areas of the valley based on depth-to-water in selected monitoring wells in each of LADWP's nine wellfields, as shown Figure 3.2 through Figure 3.10.

3.1 *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 3.1 provides a listing of Owens Valley monitoring site ON/OFF status as of April 2016, 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 Table 2.5.

3.2 *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 3.2 through 3.10 illustrate hydrographs of selected monitoring wells in Owens Valley wellfields. As shown in Figures 3.2-3.10, groundwater levels are generally stable in most areas of the valley considering that hydrographs show groundwater levels following the four driest consecutive years since LADWP began keeping record of flows in Owens Valley.

LADWP uses regression models to forecast change in depth to water. Groundwater pumping for the first six months of the 2016-17 runoff year will be contingent on environmental conditions and water needs assessed during the year. The range of

planned pumping by wellfield is included in Table 2.3 (Section 2). Based upon the planned groundwater pumping in each wellfields during the 2016-17 runoff year, the forecast depth to water changes between April 1, 2016, and April 1, 2017, in each Owens Valley wellfields utilizing selected monitoring wells are as follows:

- Groundwater levels in the Laws Wellfield are forecasted to change approximately between an increase of 0.2 feet and a decrease of 0.6 feet .
- Groundwater levels in the Big Pine Wellfield are forecasted to remain the same or increase approximately 0.1 feet during runoff year 2016-17.
- Groundwater levels in the Taboose-Aberdeen Wellfield are forecasted to decrease approximately between 0.1 and 0.9 feet.
- Groundwater levels in the Thibaut-Sawmill Wellfield are forecasted to increase approximately between 0.1 feet and 0.4 feet.
- Groundwater levels in the Independence-Oak Wellfield are forecasted to remain the same or decrease approximately 0.4 feet.
- Groundwater levels in the Symmes-Shepherd Wellfield are forecasted to decrease approximately between 0.1 feet and 0.8 feet.
- Groundwater levels in the Bairs-Georges Wellfield are forecasted to decrease approximately between 0.2 feet and 1.0 feet.

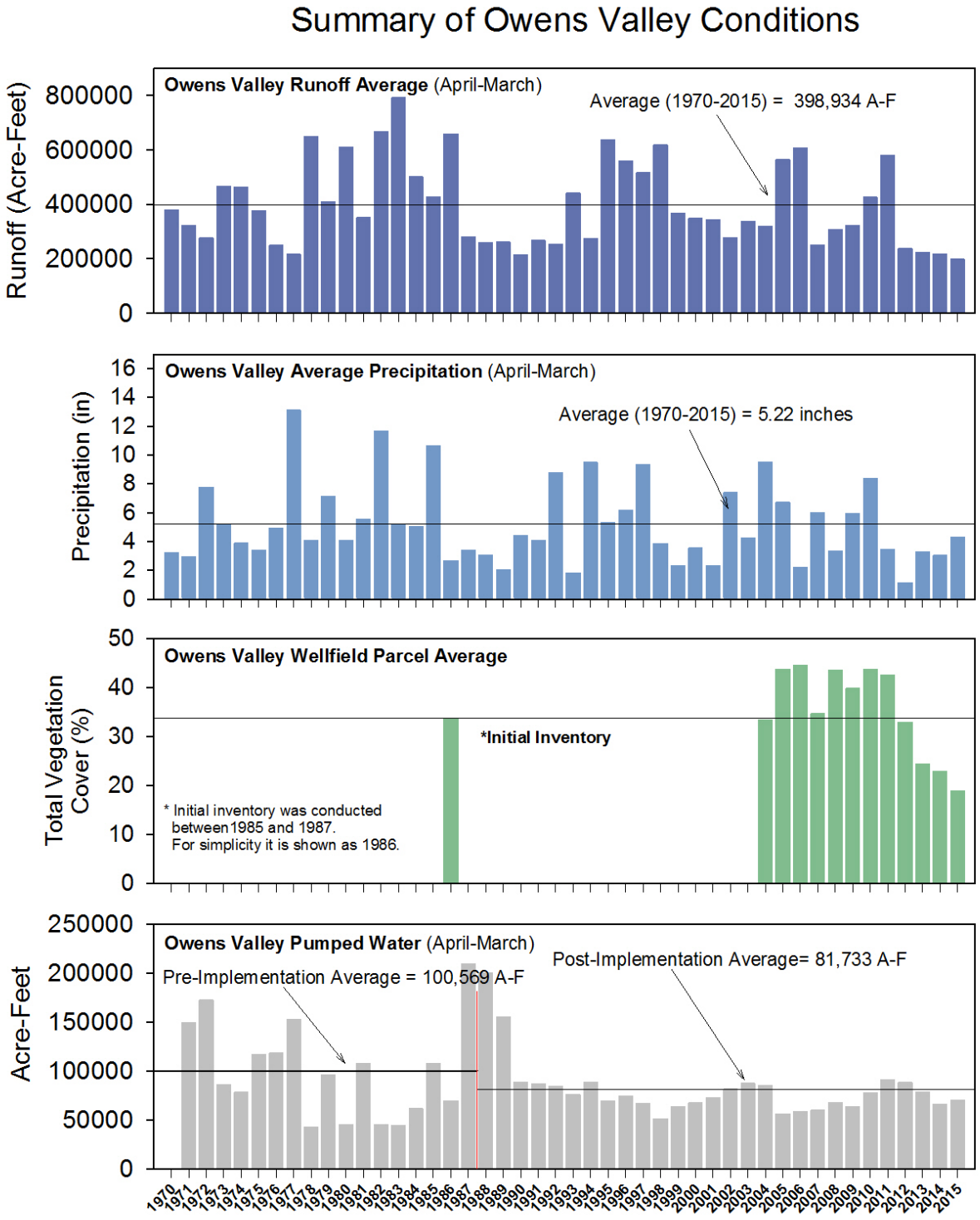


Figure 3. 1 - Summary of Owens Valley Conditions

Table 3. 1 Owens Valley Monitoring Site Status (ON/OFF) as of April 2016

Wellfield	Monitoring Site	Monitoring Well	Pumping Wells	E/M Wells	ON/OFF Status
Laws	L1	795T	247, 248, 249, 398		OFF
	L2	USGS 1	236*, 239, 243, 244		ON
	L3		240, 241, 242	376, 377	OFF
	L4a, L4b			385, 386	na
	L5[2]		245	387, 388	na
	Exempt		236*, 354, 365[3], 413		Exempt
Bishop	All wells		140, 411, 410, 371		na
			406, 407, 408, 412		na
Big Pine	BP1	798T	210, 352	378, 379, 389	OFF
	BP2	799T	220, 229, 374	375	OFF
	BP3	567T	222, 223, 231, 232		OFF
	BP4	800T	331		ON
	Exempt		218, 219, 330, 332, 341, 352, 415		Exempt
Taboose-Aberdeen	TA3	505T	106, 110, 111, 114		OFF
	TA4	586T	342, 347		OFF
	TA5	801T	349		ON
	TA6	803T	109, 370		OFF
	Exempt		118		Exempt
Thibaut-Sawmill	TS1	807T	159		OFF
	TS2	T806	155		ON
	TS3	454T	103, 104	382	OFF
	TS4	804T		380, 381	OFF
	Exempt		351, 356		Exempt
Independence-Oak	IO1	809T	391, 400		OFF
	IO2	548T	63		OFF
	Exempt		59, 60, 61, 65, 401, 357, 384[1], 423	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[1], 348, 403		ON
	Exempt		343 [1]		na
Lone Pine	Exempt		344, 346	390 [3]	Exempt
	Other		416		na

1 dual use

2 Monitoring site has not yet been located.

3 Recently replaced.

4 W423 is supplying Independende Eastside Regreening Project

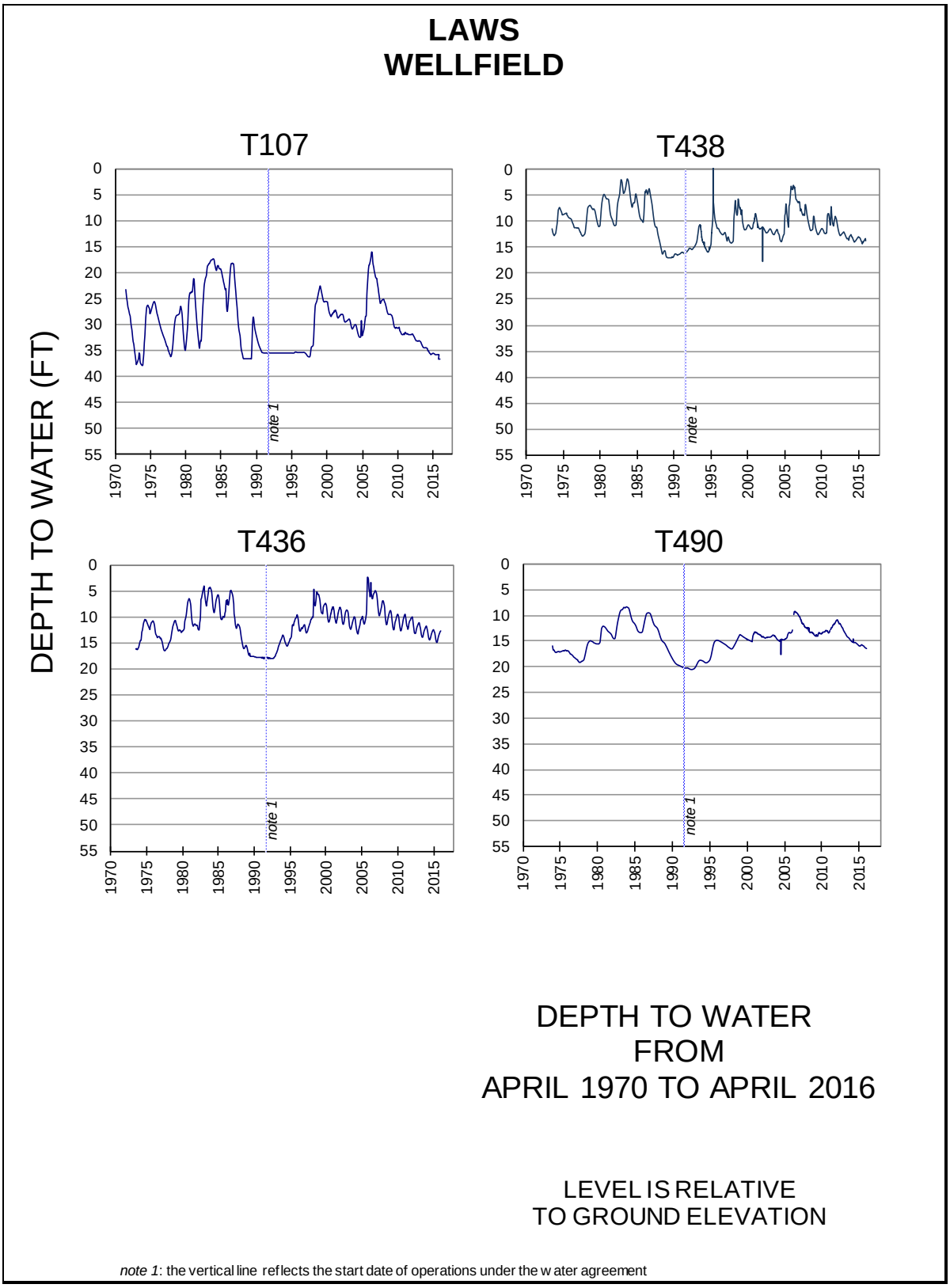


Figure 3. 2 Depth to Water Hydrographs for Laws Wellfield

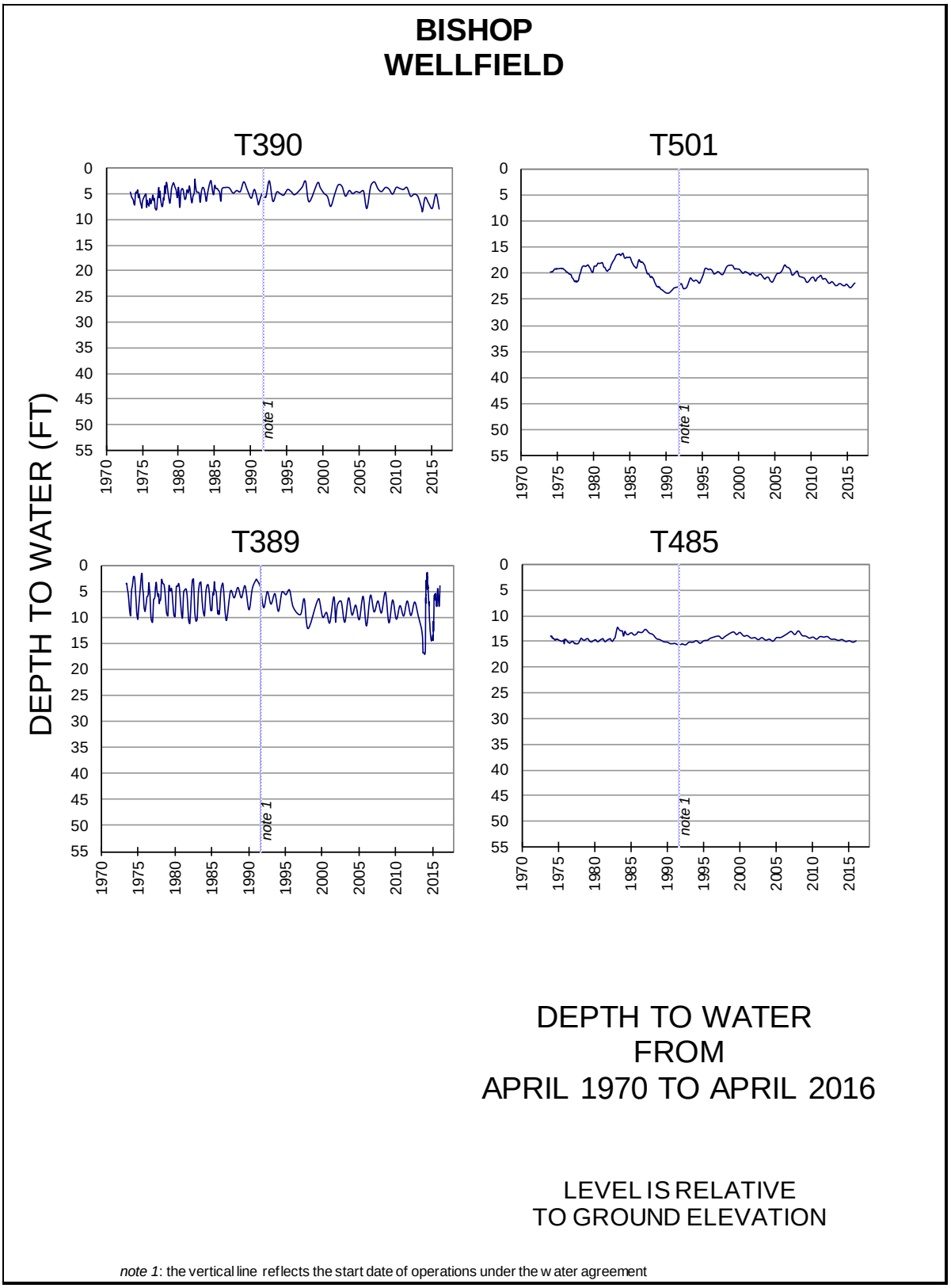


Figure 3. 3 Depth to Water Hydrographs for Bishop Wellfield

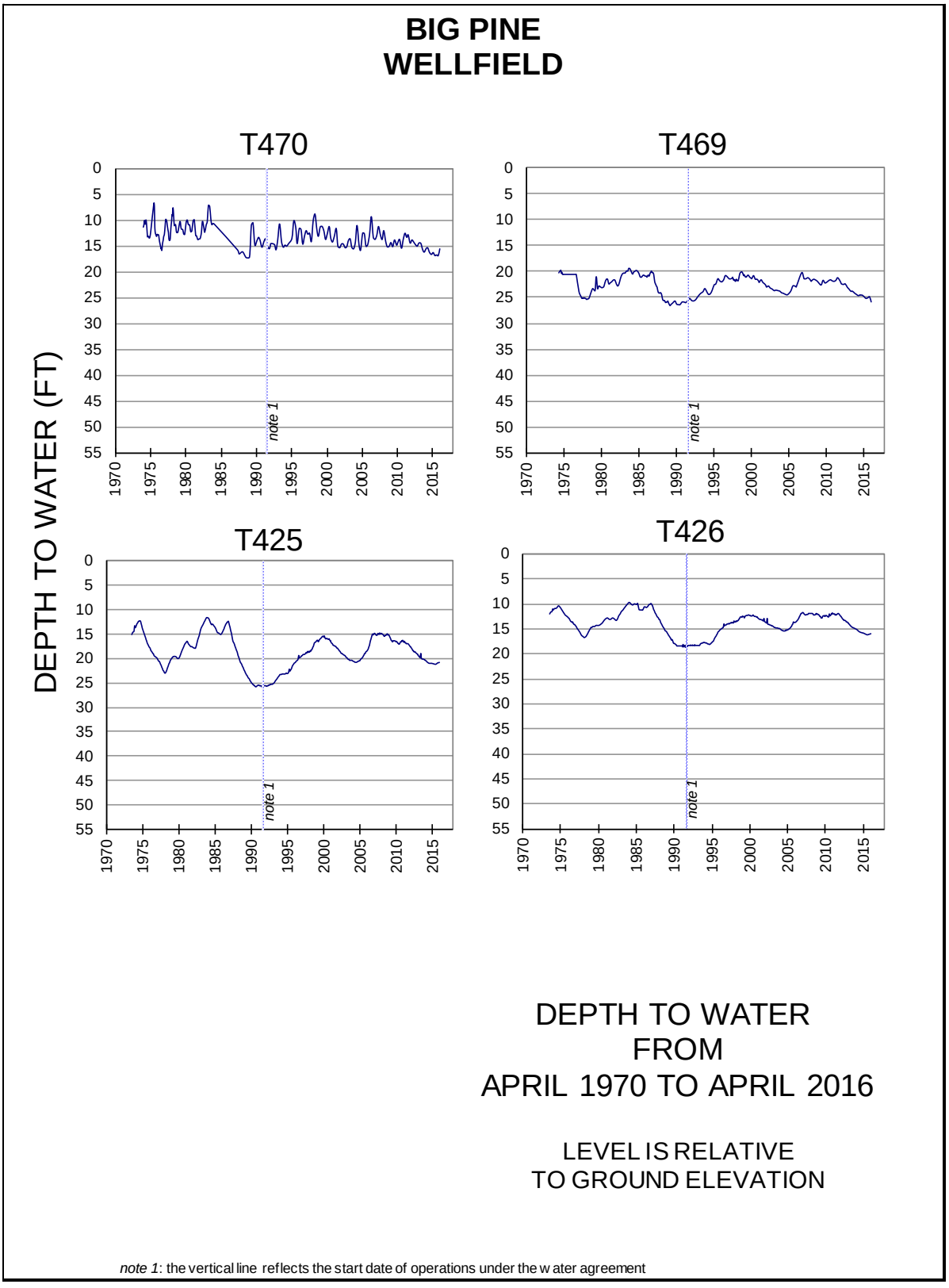


Figure 3. 4 Depth to Water Hydrographs for Big Pine Wellfield

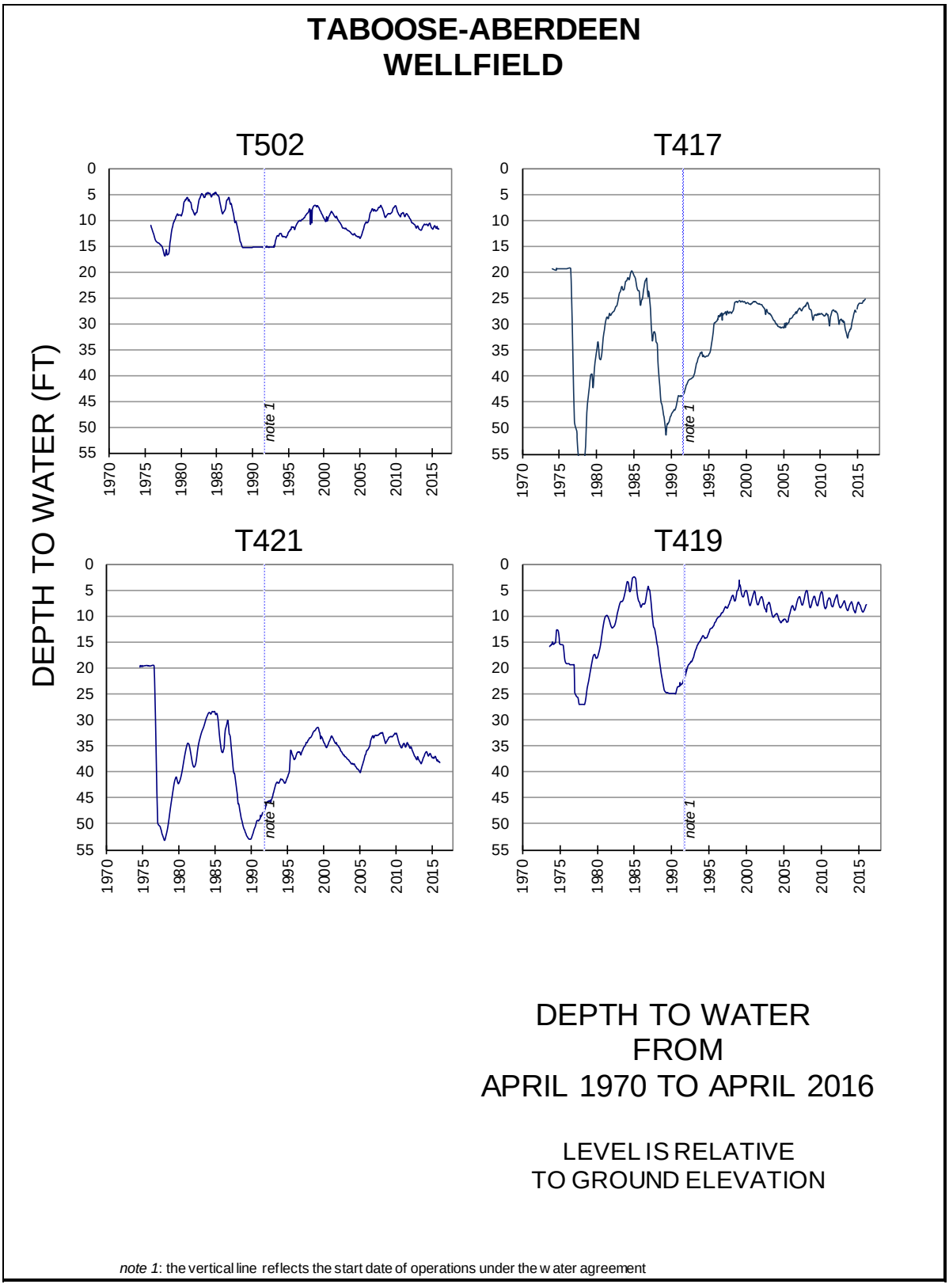


Figure 3. 5 Depth to Water Hydrographs for Taboose-Aberdeen Wellfield

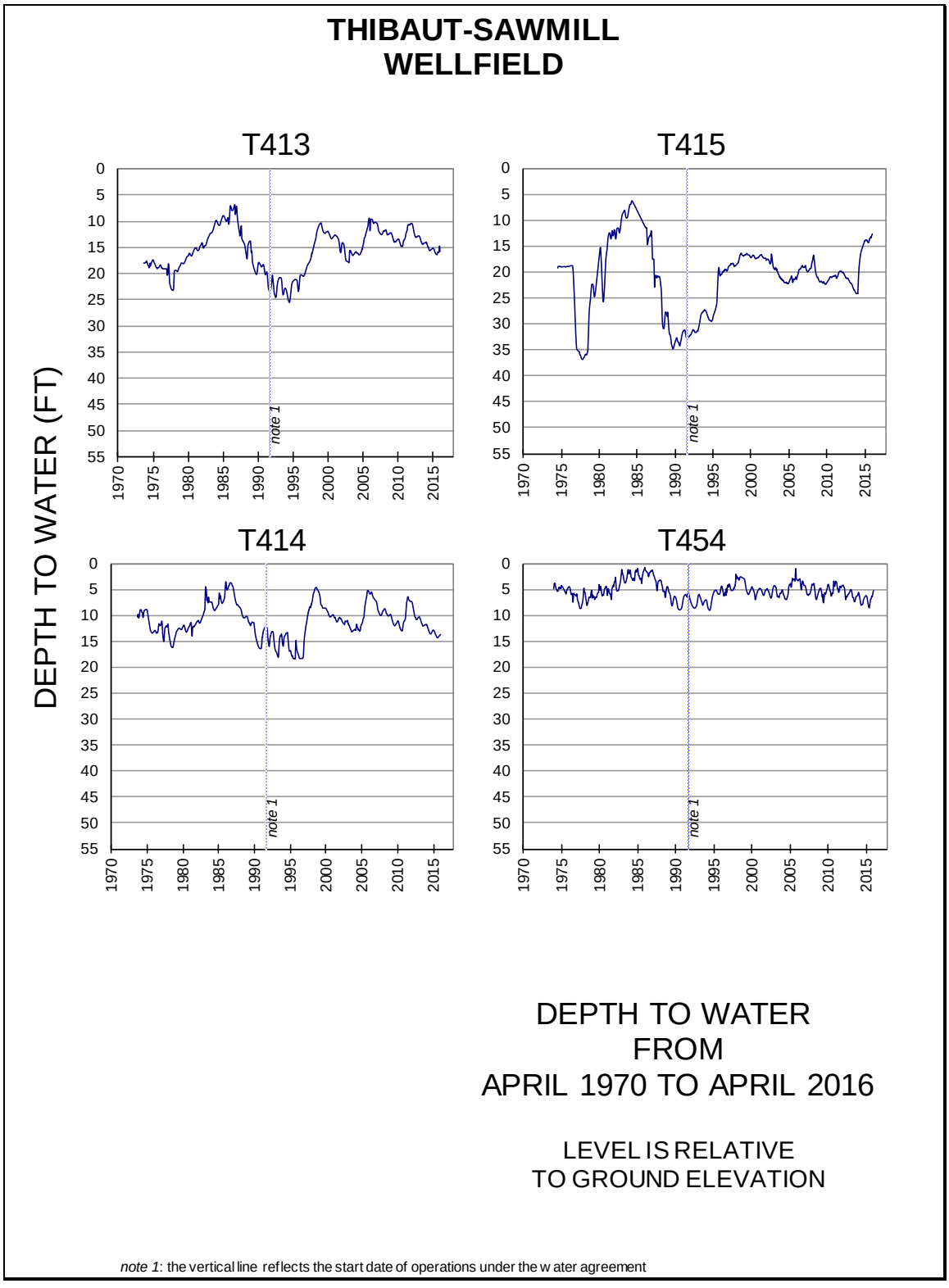


Figure 3. 6 Depth to Water Hydrographs for Thibaut-Sawmill Wellfield

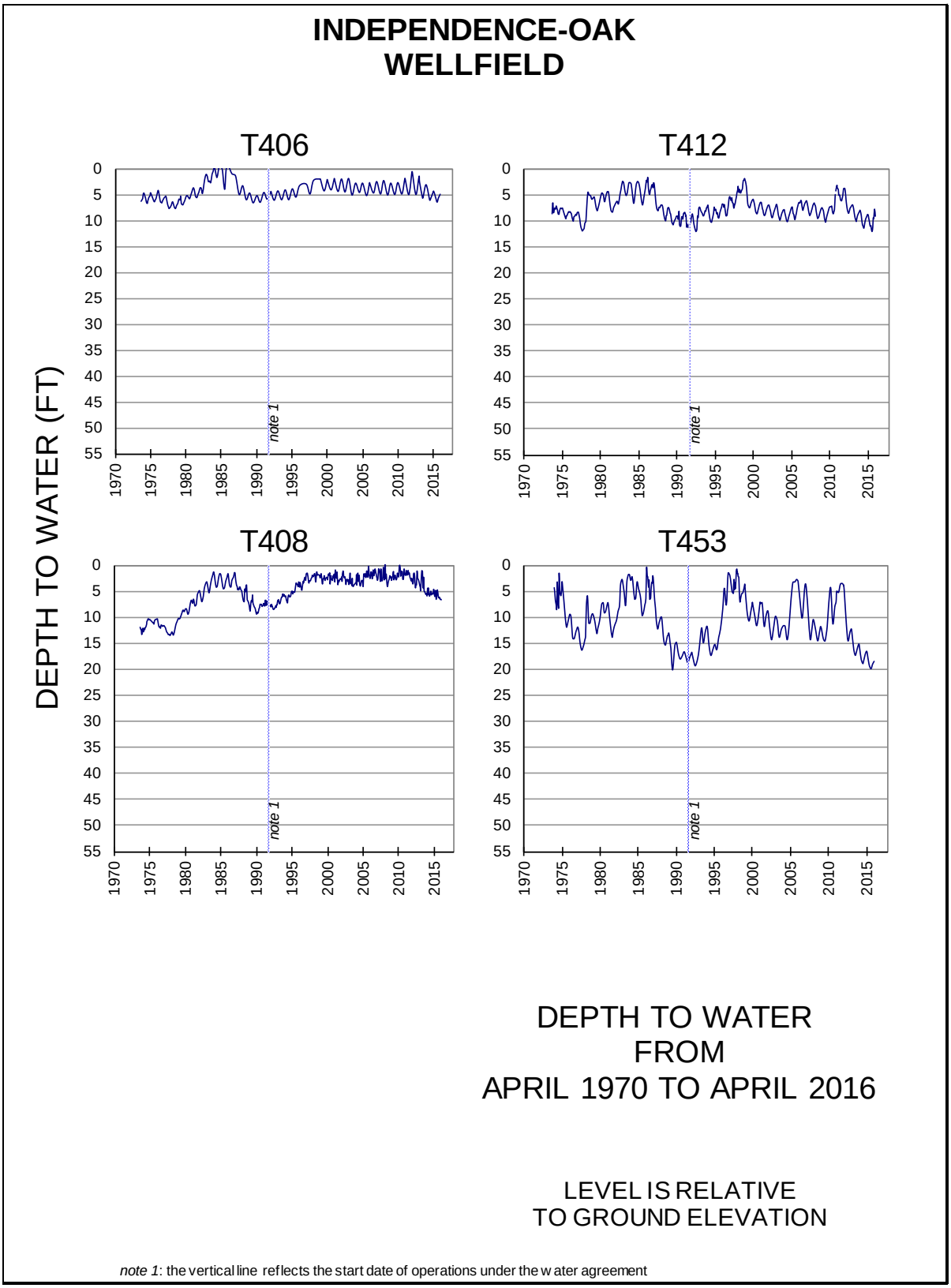


Figure 3. 7 Depth to Water Hydrographs for Independence-Oak Wellfield

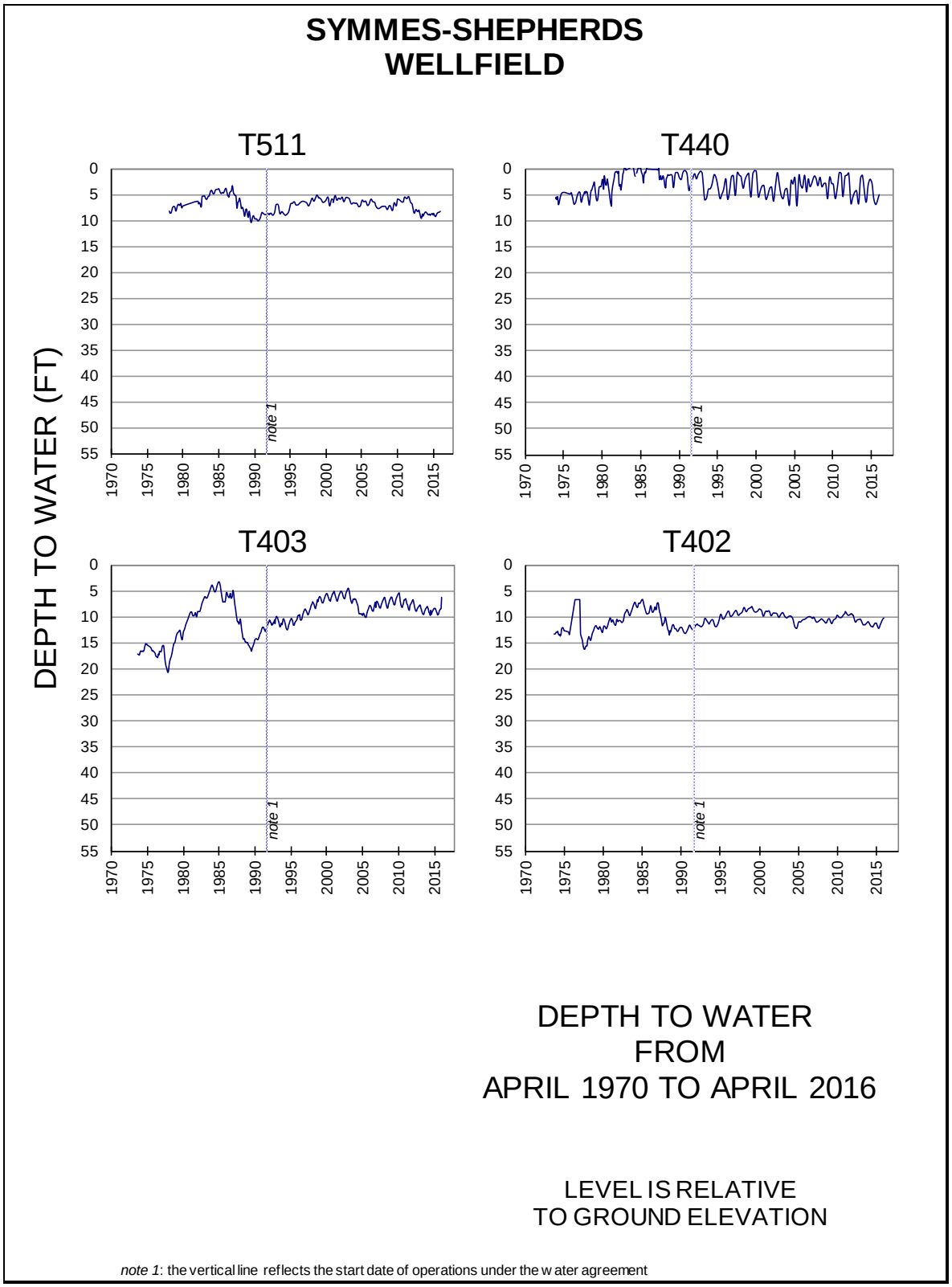


Figure 3. 8 Depth to Water Hydrographs for Symmes-Shepard Wellfield

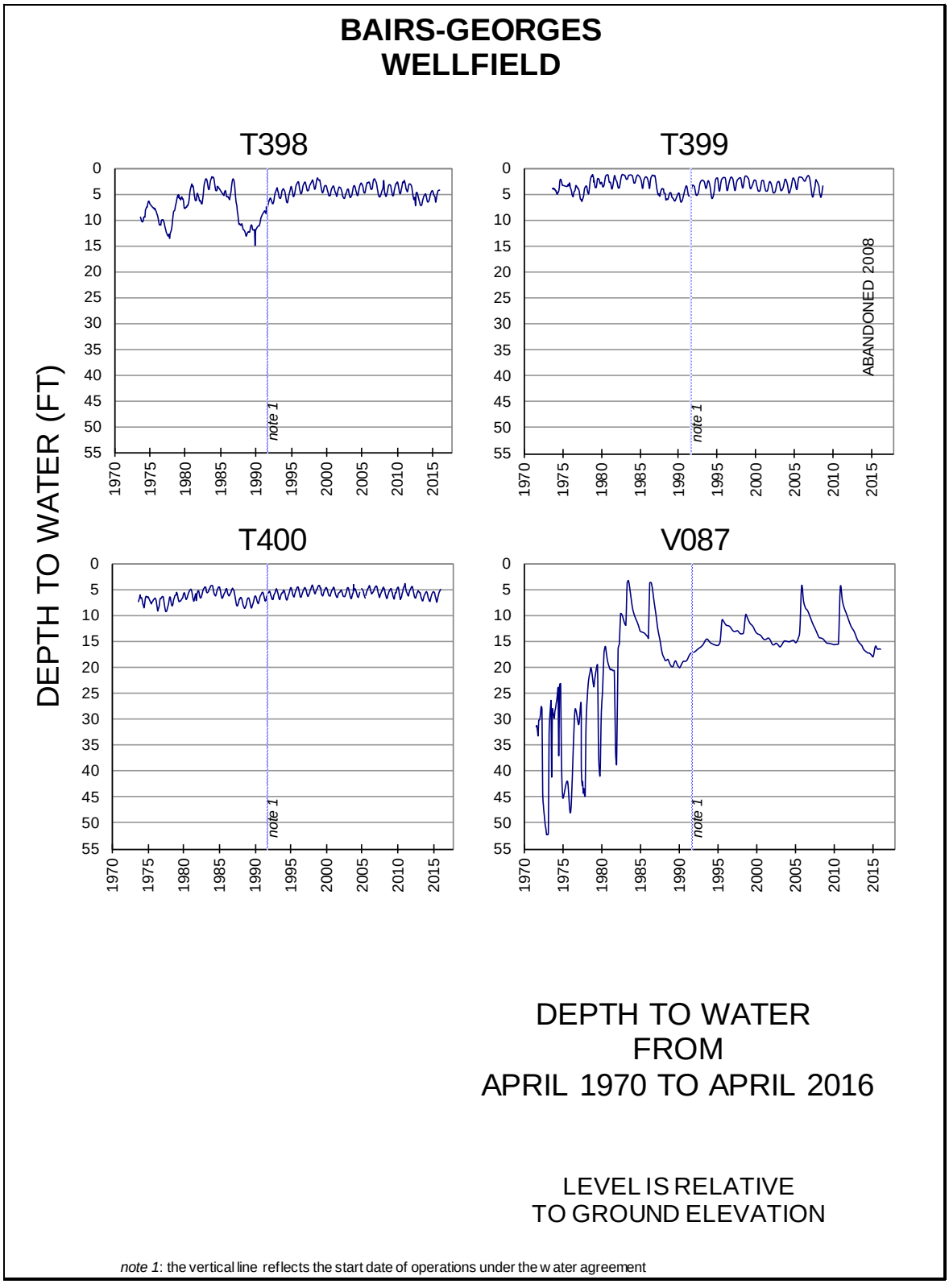


Figure 3. 9 Depth to Water Hydrographs for Bairs-Georges Wellfield

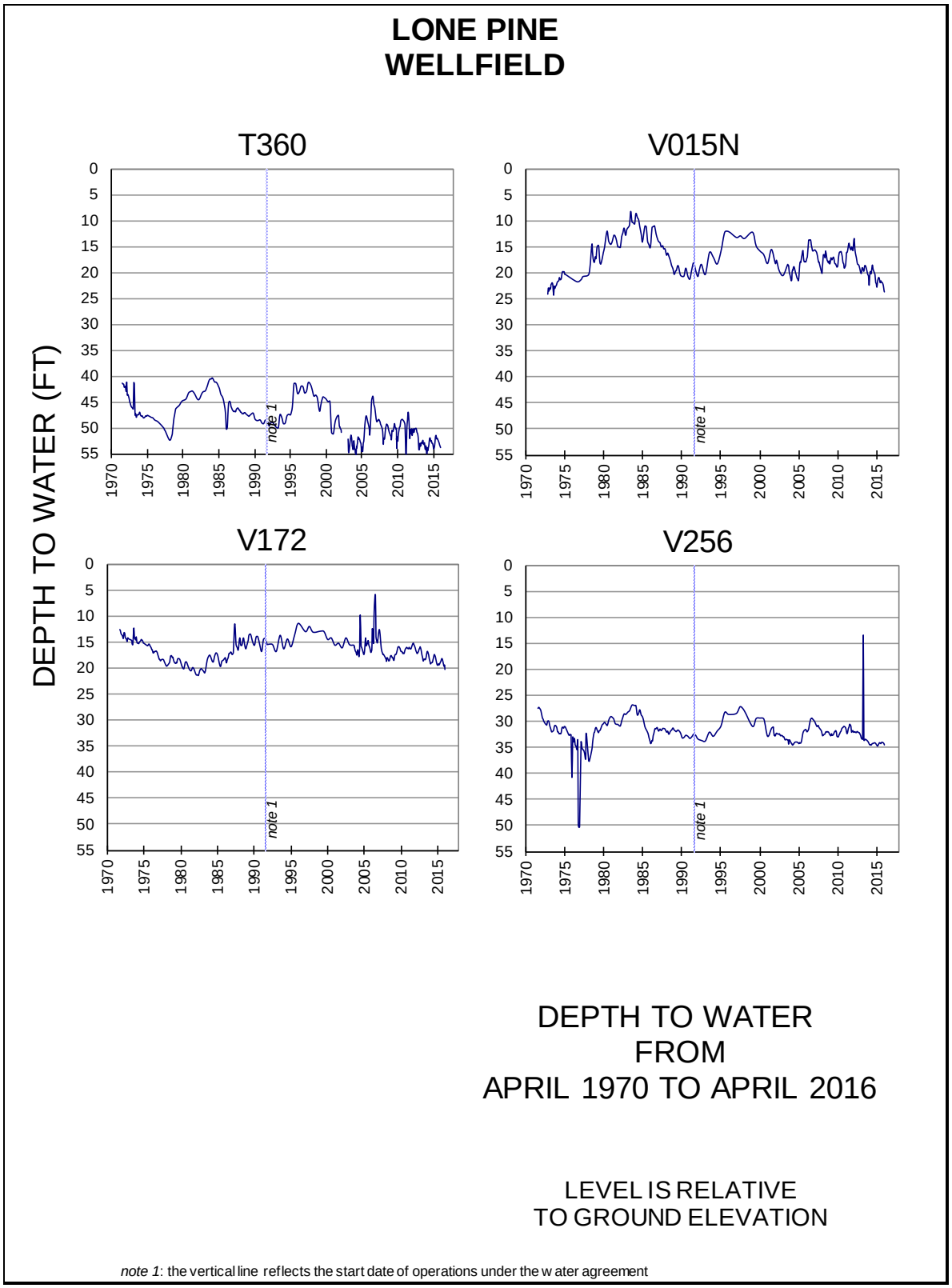


Figure 3. 10 Depth to Water Hydrographs for Lone Pine Wellfield

3.3 *Precipitation Record and Runoff Forecast*

The Eastern Sierra snowpack as of April 1, 2016 was 80% of normal in the Mammoth Lakes area, 47% of normal in the Rock Creek area, 68% of normal in the Bishop area, 34% of normal in the Big Pine area, and 45% of normal in the Cottonwood Lakes area. The Eastern Sierra overall snowpack, weighted by contribution to Owens River runoff was calculated to be 63% of the normal snowpack as of April 1, 2016 (Table 3.2).

The Eastern Sierra runoff forecast for the 2016-17 runoff year is 293,800 acre-feet or 71% of normal (Table 2.1). Figure 3.11 provides a comparison of the forecasted runoff for the 2016-17 year to previous runoff years.

Average precipitation on the valley floor for the 2015-16 year was 4.3 inches, which is 74% of the average precipitation of 5.9 inches. Table 3.2 details monthly annual precipitation totals for the 2015-16 runoff year as well as the long-term averages throughout the Owens Valley.

Table 3.2 - Eastern Sierra April 1, 2016 Snow Survey Results

EASTERN SIERRA SNOW SURVEY RESULTS
April 1, 2016

MAMMOTH LAKES AREA (Contributes 25% of Owens River Basin runoff)

Course	Water Content	April 1 Normal	Percent of Normal
Mammoth Pass	40.4	43.5	93%
Mammoth Lakes	12.5	21.1	59%
Minarets 2	22.9	30.1	76%
Mammoth Lakes Area Average:	**25.3**	**31.5**	**80%**

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

Course	Water Content	April 1 Normal	Percent of Normal
Rock Creek 1	1.9	7.4	26%
Rock Creek 2	5.7	10.5	54%
Rock Creek 3	7.6	14.4	53%
Rock Creek Area Average:	**5.1**	**10.8**	**47%**

BISHOP AREA (Contributes 20% of Owens River Basin runoff)

Course	Water Content	April 1 Normal	Percent of Normal
Sawmill*	13.5	19.7	68%
Bishop Area Average:	**13.5**	**19.7**	**68%**

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

Course	Water Content	April 1 Normal	Percent of Normal
Big Pine Creek 2	3.4	13.9	25%
Big Pine Creek 3	7.7	18.6	42%
Big Pine Creek Area Average:	**5.6**	**16.3**	**34%**

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

Course	Water Content	April 1 Normal	Percent of Normal
Cottonwood Lakes 1	6.3	13.0	48%
Trailhead**	5.8	13.7	43%
Cottonwood Area Average:	**6.0**	**13.3**	**45%**

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
	12.2	**19.2**	**63%**

Normals are based on the 1961-2010 period.
* Measured by Dept of Water Resources
** Trailhead has only been measured since 1982, so the normal is estimated.

PSS 4/4/2016

Table 3.3 - Owens Valley Precipitation During Runoff Year 2015-16 in Inches

Month	Bishop	Big Pine	Tinemaha Reservoir	LAA Intake	Indep. Yard	Alabama Gates	Lone Pine	Cotton-wood	South Haiwee	Average Owens Valley
April, 2015	0.04	0.13	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.03
May	0.93	0.48	0.98	0.46	0.75	0.56	0.39	0.17	0.44	0.57
June	0.33	0.03	0.34	0.06	0.07	0.04	0.00	0.16	0.04	0.12
July	0.42	0.26	0.23	0.47	0.40	1.34	0.90	0.78	0.81	0.62
August	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
September	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.09	0.01
October	0.88	0.81	0.34	0.64	0.86	1.44	1.12	1.45	1.19	0.97
November	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
December	0.02	0.26	0.05	0.04	0.07	0.00	0.00	0.12	0.04	0.07
January, 2016	0.73	1.26	1.33	2.11	1.73	1.64	0.80	2.03	1.54	1.46
February	0.11	1.39	1.02	0.06	0.08	0.06	0.07	0.09	0.00	0.32
March	0.07	0.02	0.11	0.06	0.22	0.47	0.11	0.26	0.01	0.15
2015-16 Total	*3.5*	*4.8*	*4.4*	*4.0*	*4.2*	*5.6*	*3.4*	*5.1*	*4.2*	*4.3*
Average*	6.4	6.5	6.8	5.8	5.5	4.0	4.0	6.9	7.3	5.9
% of Average	55%	74%	65%	70%	77%	138%	85%	73%	57%	74%

* Average for 1960 to 2010 runoff year

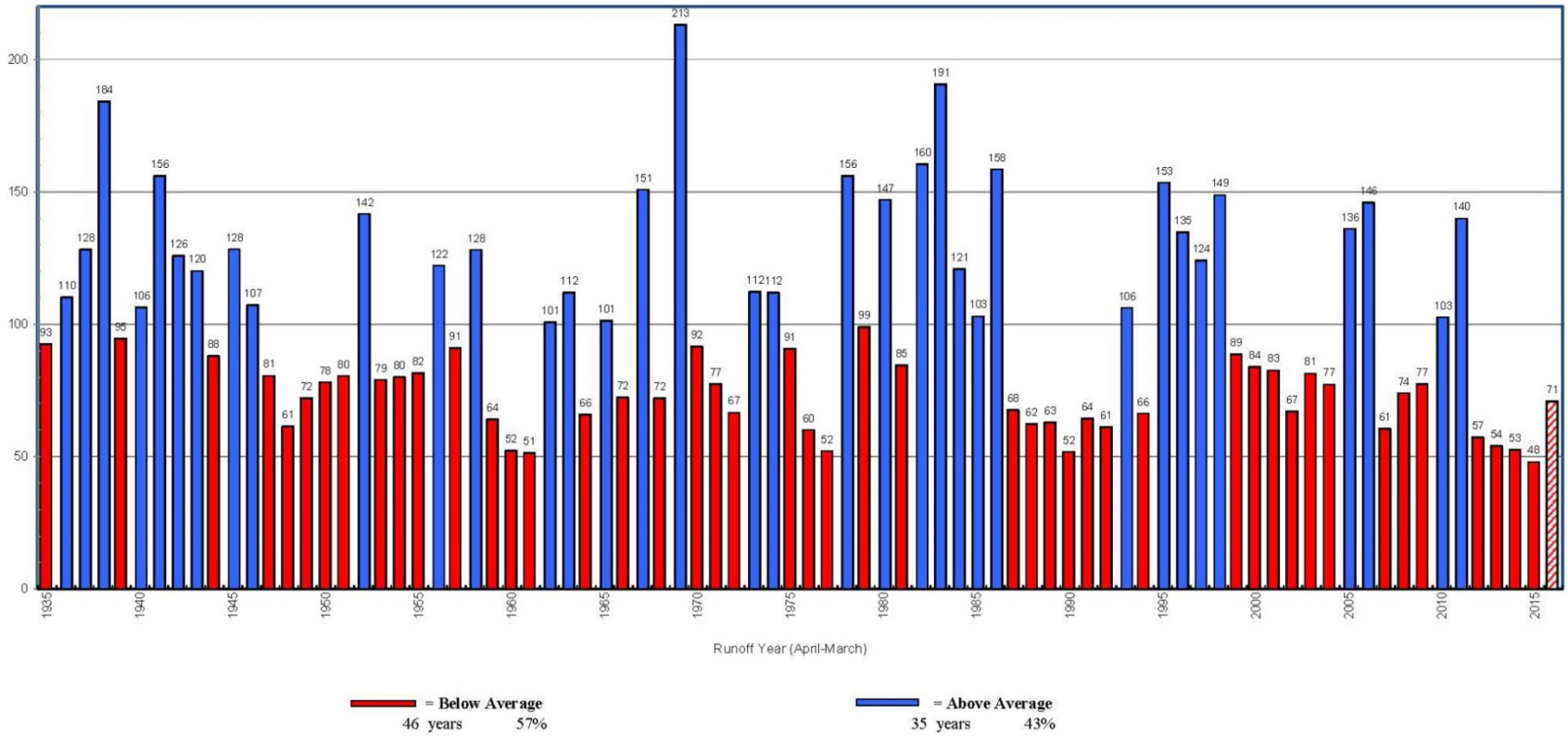


Figure 3. 11 Owens Valley Runoff – Percent of Normal

3.4 *Owens Valley Water Supply Use*

Table 3.4 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 2014-15 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 (surface water flow, flowing wells, and pumped groundwater) has remained about the same over time, 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 3.12. 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 3.13.

Table 3.5 provides a breakdown of Owens Valley water uses from 1985 to the present and planned water uses for the 2016-17 runoff year. While much of Table 3.5 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 3.6 lists a breakdown of water supplied to E/M projects during the 2015-16 runoff year.

Table 3.4 - 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 2015-2016	Actual Post Water Agreement Averages (1992-2015)
Owens Valley Water Supply				
Runoff (Owens Valley & Round Valley)	292	310[1]	143	281
Flowing Wells	44	15	30	33
Pumped Groundwater	10	110[2]	70	73
Total	346	435	243	387
In-Valley Uses & Losses				
Water Used on City Lands in O.V.				
Irrigated Lands [3]	62	46	40	48
Stockwater, Wildlife, and Rec. Uses [4]	20	23	20	22
Post 1985 E/M Projects [5]	0	12	8	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	87	100
Other O.V. Uses and Losses [9]	134	135	163	177
Total	216	245	250	277
Components of Aqueduct Export				
Owens Valley Contribution to Export	130	190	-(7)	110
Long Valley Contribution to Export	134	135	39	134
Mono Basin Contribution to Export [10]	58	30	4	12
Total	322	355	36	256

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.

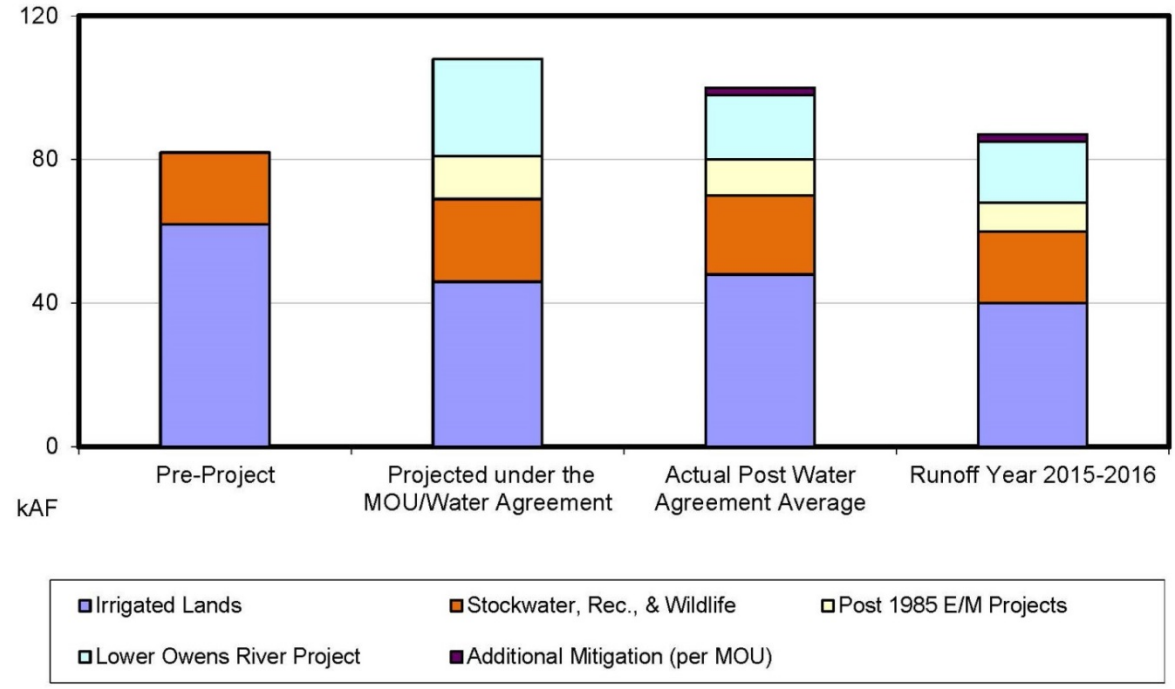


Figure 3. 12 - Owens Valley Water Uses

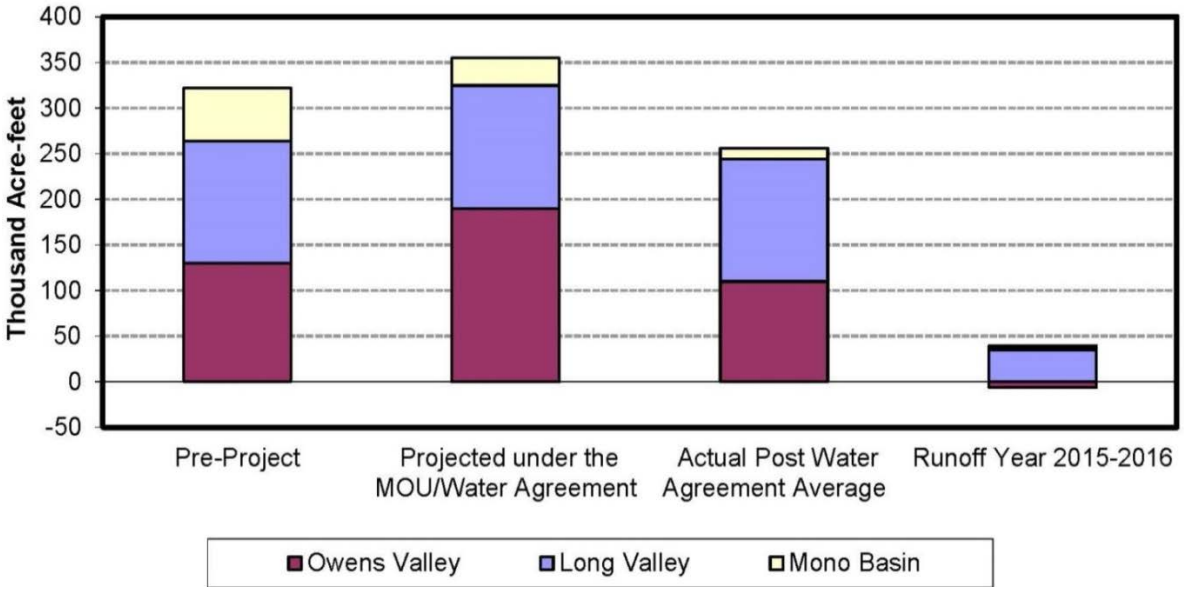


Figure 3. 13 Components of the Eastern Sierra Water Exports

Table 3.5 - Water Uses for 1985-86 through 2015-16 and Planned Uses for the 2016-17 Runoff Year (acre-feet)

(1) Runoff Year	(2) Owens Valley Runoff %	(3) Owens Valley Pumping (1000 af)	(4) Irrigation	(5) Stock Water	(6) E/M	(7) Rec. & Wildlife	(8) Indian Land Uses	(9) LORP	(10) 1600 AF Projects	(11) In-Valley Uses (sum of 4+5+6+7+8+9+10)	Groundwater Recharge (13a) Big Pine & Independence Spreading	Groundwater Recharge (13b) Laws Spreading	(14) Operations	(15) All Uses (sum of 12+13+14)
1985-86	103	108	47,390	15,394	109	9,205	4,248	4,191		80,537	4,822	4,068	13,712	103,139
1986-87	158	70	47,884	15,125	1,610	9,735	3,873	11,806		90,033	67,251	20,429	72,387	250,100
1987-88	68	209	48,679	15,443	13,818	6,420	3,902	15,542		103,804	0	0	7,499	111,303
1988-89	62	200	46,463	14,381	17,102	8,429	5,299	13,856		105,530	0	0	6,705	112,235
1989-90	63	156	48,232	13,922	15,261	8,669	5,460	7,896		99,440	0	0	8,935	108,375
1990-91	52	89	46,424	14,360	9,242	9,983	5,445	8,657		94,111	0	0	5,312	99,423
1991-92	64	87	42,112	14,662	8,301	9,143	5,938	10,254		90,410	0	0	9,923	100,333
1992-93	61	84	37,131	17,828	9,088	7,725	5,211	9,269		86,252	0	0	12,179	98,431
1993-94	105	76	47,798	17,230	13,443	8,676	5,270	5,867		98,284	14,512	10,640	12,433	135,869
1994-95	66	89	37,790	17,178	9,132	8,116	5,641	11,638		89,495	0	56	12,102	101,653
1995-96	153	70	57,748	20,919	11,162	12,479	5,170	11,636		119,114	30,126	21,148	13,561	183,949
1996-97	135	75	46,171	19,757	10,989	9,438	5,540	13,031		104,926	4,606	0	21,125	130,657
1997-98	124	67	47,114	16,422	8,114	8,022	5,548	13,069		98,289	4,113	4,106	13,874	120,382
1998-99	149	52	45,445	13,654	9,075	8,691	4,589	11,192		92,646	24,970	31,077	23,016	171,709
1999-00	89	64	49,529	14,461	8,836	7,470	4,232	15,973		100,501	0	0	11,263	111,764
2000-01	84	68	49,327	13,442	7,989	7,263	5,792	12,090		95,903	0	790	12,517	109,210
2001-02	83	73	43,296	12,759	9,401	7,487	4,931	12,485		90,359	0	230	12,973	103,562
2002-03	66	82	43,929	12,291	11,442	7,377	4,922	9,690		89,651	0	0	8,431	98,082
2003-04	81	88	45,974	11,620	10,926	6,853	5,293	10,243		90,909	0	0	8,787	99,696
2004-05	77	86	50,311	11,546	9,915	6,866	4,739	8,910		92,287	243	695	9,536	102,761
2005-06	136	57	53,832	11,355	11,587	7,807	3,281	7,566		95,428	16,212	24,187	14,814	150,641
2006-07	146	59	50,968	12,041	11,551	7,849	3,315	11,700		97,424	29,457	16,855	38,937	182,673
2007-08	61	60	47,699	12,161	11,565	10,122	2,931	22,501		106,979	0	0	5,631	112,610
2008-09	74	69	56,130	11,435	10,646	8,479	3,527	20,957		111,174	1,342	0	7,651	120,167
2009-10	77	65	52,933	11,450	10,695	10,398	4,142	15,708		105,326	0	0	8,453	113,779
2010-11	103	80	52,983	12,275	10,807	12,106	3,703	17,020		108,894	2,993	1,973	14,280	128,140
2011-12	140	92	62,391	11,566	11,847	9,702	3,156	19,556		118,218	13,231	4,119	8,785	144,353
2012-13	57	89	48,763	10,961	9,257	9,254	2,690	20,927	1,612	103,464	0	0	4,081	107,545
2013-14	*54*	79	44,160	11,161	8,222	8,022	3,333	17,845	1,625	94,368	0	0	1,926	96,294
2014-15	52	66	45,491	11,582	9,520	*7,615*	3,233	12,681	*1,600*	*91,722*	*8,742*	*0*	1,423	*101,887*
2015-16	48	70	*39,598*	11,752	8,412	7,934	3,215	16,828	*1,600*	*89,339*	434	*0*	1,255	91,028
2016-17	*71*		*45,000*	*11,500*	*9,500*	*8,000*	*3,200*	*17,700*	*1,600*	*96,500*	*0*	*0*	*1,000*	*97,500*
AVG.	90	86	47,861	13,875	9,970	8,624	4,438	12,922	1,609	97,897	7,195	4,528	13,016	122,637

NOTES:
PLANNED PUMPING FOR THE FIRST SIX MONTHS OF THE 2016-17 RUNOFF YEAR IS ON TABLE 2.6. PUMPING 1987 TO PRESENT INCLUDES E/M PUMPING.
2016-17 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 2,360 AF IS INCLUDED IN REC & WILDLIFE.
TOTAL INDIAN LAND USES INCLUDE THE SUM OF LADWP-SUPPLIED SURFACE WATER, TRIBAL SURFACE WATER DIVERSIONS, AND PUMPING BY THE BISHOP, BIG PINE, AND LONE PINE RESERVATIONS. HOWEVER, COLUMN (8) REPRESENTS ONLY LADWP SUPPLIED SURFACE WATER.

Table 3.6 - Water Supplied to Enhancement/Mitigation Projects During 2015-16

Project	Water Supplied (acre-feet)
McNally Canals Conveyance Losses	158
McNally/Laws/Poleta Native Pasture Lands	1,259
McNally Ponds	0
Laws Historical Museum	101
Klondike Lake	1,411
Big Pine Regreening	75
Lower Owens River Rewatering	0
Independence Pasture Lands	1,731
Independence Springfield	1,569
Independence Ditch System	65
Independence Woodlot	64
Independence Regreening	71
Shepherd Creek Alfalfa Lands	872
Lone Pine Park/Richards Field	344
Lone Pine Woodlot	55
Lone Pine Van Norman Field	426
Lone Pine Regreening	211
Total E/M Uses	8,412

3.5 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 well fields. 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 3.6 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.

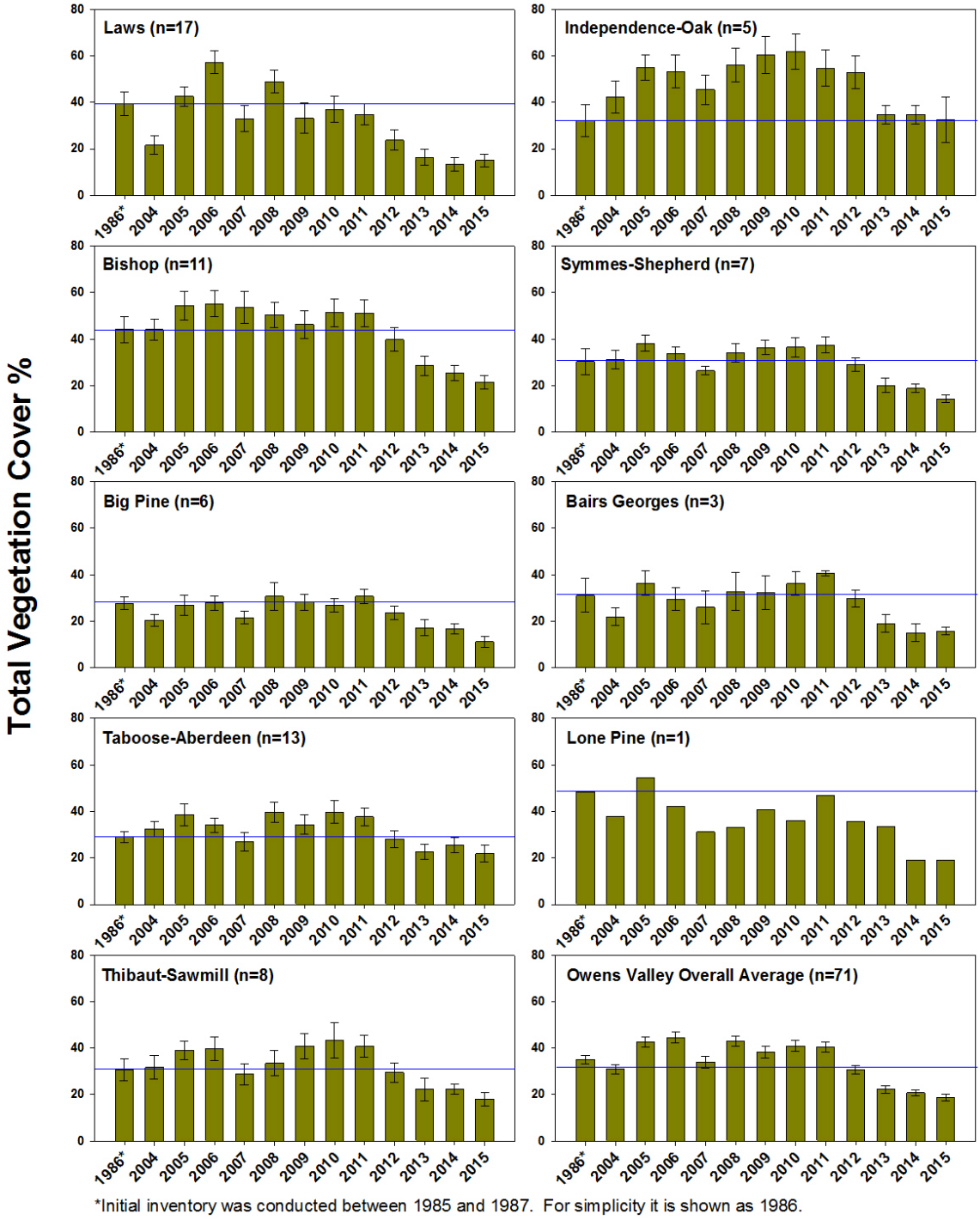


Figure 3. 14 Owens Valley Vegetation Condition for Wellfields (data Collected by LADWP)

3.6 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 2.5, LADWP has historically pumped much less than allowed under the terms of the Hillside Decree. In the 2015-16 runoff year LADWP pumped about 10,300 acre-feet of water from the Bishop Cone area, less than half of that identified as being allowed using the current audit procedures.

Currently, the annual Bishop Cone audit does not provide an accurate accounting of ditch losses and stockwater uses on the Bishop Cone and existing audit protocols should be revised to better reflect a true accounting of water supplied.

3.7 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 3.7 shows daily flow values for Reinhackle Spring. Over the 2015-16 runoff year, Reinhackle Spring had an average daily flow of about 1.6 cfs.

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

Flow Characterization Report and Operations Plan was sent to the Inyo County Water Department for review in November 2012.

Table 3.7 - Reinhackle Spring Flow in cfs During 2015-16 Runoff Year

Day of Month	April	May	June	July	August	September	October	November	December	January	February	March	Annual
1	1.03	1.03	0.97	0.98	1.02	0.88	1.36	2.15	2.28	2.22	2.27	2.22	
2	1.03	1.03	0.96	0.96	0.99	0.90	1.41	2.16	2.27	2.22	2.27	2.22	
3	1.03	1.03	0.96	0.96	0.97	0.87	1.47	2.17	2.27	2.25	2.27	2.22	
4	1.04	1.03	0.96	0.96	0.95	0.81	1.52	2.17	2.27	2.29	2.27	2.22	
5	1.03	1.02	0.97	0.96	0.92	0.81	1.53	2.17	2.23	2.27	2.24	2.22	
6	1.07	1.02	0.96	0.94	0.92	0.81	1.56	2.17	2.22	2.27	2.22	2.27	
7	1.07	1.02	0.96	0.94	0.91	0.82	1.60	2.18	2.22	2.27	2.18	2.28	
8	1.07	1.03	0.96	0.94	0.90	0.82	1.62	2.18	2.22	2.27	2.17	2.28	
9	1.07	1.03	0.96	0.96	0.90	0.81	1.68	2.18	2.20	2.27	2.17	2.27	
10	1.06	1.00	0.96	0.96	0.90	0.81	1.70	2.24	2.16	2.29	2.14	2.27	
11	1.02	0.99	0.96	0.96	0.88	0.80	1.71	2.27	2.12	2.32	2.12	2.27	
12	1.00	0.99	0.96	0.97	0.88	0.79	1.74	2.27	2.14	2.32	2.12	2.27	
13	1.00	0.98	0.98	0.97	0.87	0.78	1.74	2.27	2.17	2.32	2.12	2.27	
14	1.02	0.99	0.98	0.96	0.87	0.78	1.78	2.27	2.17	2.32	2.12	2.27	
15	1.03	0.99	0.98	0.96	0.87	0.81	1.79	2.27	2.17	2.35	2.12	2.31	
16	1.03	0.98	0.99	0.96	0.87	0.81	1.81	2.27	2.17	2.38	2.12	2.32	
17	1.03	0.99	0.97	0.96	0.87	0.82	1.84	2.27	2.19	2.40	2.12	2.33	
18	1.03	0.99	0.96	0.97	0.86	0.85	1.87	2.27	2.19	2.42	2.12	2.32	
19	1.03	0.99	0.96	0.99	0.85	0.85	1.88	2.28	2.22	2.38	2.12	2.32	
20	1.03	1.01	0.96	1.03	0.85	0.88	1.89	2.32	2.22	2.37	2.12	2.32	
21	1.03	0.99	0.99	1.03	0.85	0.90	1.93	2.32	2.22	2.31	2.17	2.36	
22	1.03	0.99	0.98	1.01	0.85	0.92	1.98	2.32	2.22	2.27	2.17	2.37	
23	1.03	0.99	0.97	1.00	0.81	0.96	1.99	2.32	2.22	2.27	2.17	2.37	
24	1.03	1.00	0.96	0.98	0.79	1.01	2.03	2.32	2.22	2.27	2.17	2.37	
25	1.04	0.99	0.99	0.98	0.79	1.06	2.07	2.32	2.22	2.27	2.16	2.37	
26	1.04	0.99	0.98	0.99	0.81	1.11	2.07	2.32	2.22	2.27	2.17	2.37	
27	1.05	0.99	0.96	0.99	0.81	1.18	2.07	2.32	2.22	2.27	2.17	2.37	
28	1.07	0.98	0.96	1.01	0.83	1.23	2.07	2.32	2.22	2.27	2.17	2.37	
29	1.07	0.98	0.98	1.03	0.85	1.27	2.08	2.32	2.22	2.27	2.19	2.37	
30	1.03	0.99	0.96	1.03	0.85	1.31	2.12	2.31	2.22	2.27		2.37	
31		0.99		1.03	0.87		2.12			2.27		2.37	
Average	1.04	1.00	0.97	0.98	0.88	0.91	1.81	2.26	2.21	2.30	2.17	2.31	1.57

3.8 Water Spreading in the Owens Valley

The April 1, 2015, Eastern Sierra overall snowpack was estimated to be 36% of normal and Owens Valley runoff was about 47% of normal during the 2015-16 runoff year. 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. This year, due to an aqueduct shutdown for repairs, LADWP spread 434 acre-feet of water during January and February of 2016 in the Big Pine Area.

Overall estimated snowpack as of April 1, 2016, is about 63% of normal and forecasted runoff for the Owens River Basin is about 293,800 acre-feet or 71% of long-term average. Water spreading is not anticipated during the 2016-17 runoff year; however, depending on the prevailing temperature, precipitation, and available LAA capacity in the upcoming year, some limited water spreading may occur for operational reasons.

4. ENHANCEMENT/MITIGATION (E/M) PROJECT STATUS

Table 4.1 provides the current status of Owens Valley Enhancement/Mitigation Projects identified in the 1991 EIR.

Table 4. 1 E/M Project Status

ENHANCEMENT/MITIGATION PROJECT STATUS			
1991 EIR Source	**PROVISION**	**PROGRESS TO DATE**	**STATUS**
E/M Projects (EIR Table 5-3), 1985-1990	Big Pine Northeast Regreening (30 acres)	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. This project was fully implemented by LADWP in 2014. The project is implemented and ongoing with water supplied annually to the project.	Implemented and ongoing.
E/M Projects (EIR Table 5-3), 1985-1990	Eastern California Museum	This project enhanced the appearance of the Eastern California Museum grounds in Independence. It consists of a small pond, trees, expanded lawn areas, and of an irrigation system.	Implemented and ongoing.
E/M Projects, imp./committed 1970-1990 (EIR Table 4-3)	Independence Ditch System	Implemented in 1987. Ongoing commitments include water supplied annually to the project.	Implemented and ongoing.
E/M Projects, 1985-1990 (EIR Table 5-3), Impact 10-11	Independence East Side Regreening Project (23 acres)	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. This project was fully implemented by LADWP in 2014. The project is implemented and ongoing with water supplied annually to the project.	Implemented and ongoing.

1991 EIR Source	PROVISION	PROGRESS TO DATE	STATUS
E/M Projects, 1985-1990 (EIR Table 5-3), Impact 10-16	Independence Pasture Lands and Native Pasture Lands (610 acres)	This project revegetated approximately 910 acres of abandoned croplands and sparsely vegetated land to create native pasture lands and provides water to native vegetation lands (including Independence Springfield, ~300 acres, below). This involved the conversion of sparsely vegetated land east of Independence to productive native pasture land by flood irrigation. The project mitigated a source of blowing dust and stabilized soil previously affected by severe wind erosion. Currently, approximately 520 acres are incorporated into the project. The project was evaluated in 2008 to determine if additional acreage should be irrigated. Figure 12-2 in the 1991 EIR for the project (1991 EIR) was scanned and rubber sheeted onto a quad sheet for acreage calculations in GIS. The Independence pasturelands acreage in this image was actually 522 acres. Therefore, LADWP has implemented the acreage designated in the figure presented in the 1991 EIR.	Implemented and ongoing.
E/M Projects (EIR Table 5-3), 1985-1990	Independence Roadside Rest Area (0.5 acres)	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.	Implemented and ongoing.
E/M Projects, 1985-1990 (EIR Table 5-3), Impact 10-11	Independence Springfield (286 acres)	This project revegetated approximately 910 acres of abandoned croplands and sparsely vegetated land to create native pasture lands and provides water to native vegetation lands (including Independence Pasturelands, 610 acres, above). This involved the conversion of sparsely vegetated land east of Independence to productive native pasture land by flood irrigation. The project mitigated a source of blowing dust and stabilized soil previously affected by severe wind erosion. The Independence Springfield has achieved its goal by irrigating over 280 acres.	Implemented and ongoing.
E/M Projects, imp./committed 1970-1990 (EIR Table 4-3), Impact 10-11	Independence Wood Lot (20 acres)	The Independence Wood Lot was initially planted in the late 1980s and has been achieving its goals (Figure 4.2). In 2015-2016, 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. See Section 4.1 for more information.	Implemented and ongoing.

1991 EIR Source	PROVISION	PROGRESS TO DATE	STATUS
E/M Projects, 1985-1990 (EIR Table 5-3), Impact 11-1	Klondike Lake Aquatic Habitat (160 acres)	The Klondike Lake Project sustains a year round water supply in this 160-acre formerly seasonal lakebed area providing nesting and feeding areas for waterfowl, and permitting water skiing and other water sports in summer months. The estimated water usage for the project was reduced 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 (Figure 4.3). A new diversion was installed and implementation of the releases for waterfowl habitat south of the lake began in May 2005. Delivery 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. The low hydraulic gradient also made accurate flow measurement difficult. Sand accumulations have periodically been cleared from the conveyance pipe inlet and vegetation removed from the pipe outflow area to facilitate flow. An alternate water release location was utilized starting in 2012. LADWP continued to flood the area during the growing season through 2014. However, cumulative effects of flooding during the growing season for multiple years resulted in extensive tule growth within the SSHA, limiting the amount of open water available for birds. As a consequence, LADWP disked the tules within the habitat area in March 2015 to increase the area for shallow flooding for waterfowl. The area was flooded early in the 2015 season (April 2015) to benefit migrants and to prevent regrowth of tules. Additionally, water supply in the Owens Valley was severely limited in 2015 due to extreme drought conditions. Consequently, LADWP released 8 AF to the project in 2015 and flooded approximately 14 acres. See Section 4.2 for image showing flooded extent following LADWP's 2015 tule reduction effort and flow release.	Implemented and ongoing.

1991 EIR Source	PROVISION	PROGRESS TO DATE	STATUS
E/M Projects, 1985-1990, Impact 10-18	Laws Historical Museum Pasturelands (21+15 acres)	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. Implemented and ongoing.	Implemented and ongoing.
E/M Projects, 1985-1990 (EIR Table 5-3), Impact 10-18	Laws/Poleta Native Pasture (216 acres)	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. Implemented and ongoing.	Implemented and ongoing.

1991 EIR Source	PROVISION	PROGRESS TO DATE	STATUS
E/M Projects, 1985-1990 (EIR Table 5-3), Impact 10-16	Lone Pine East Side Regreening (11 acres)	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. Implemented and ongoing.	Implemented and ongoing.
E/M Projects (EIR Table 5-3), 1985-1990	Lone Pine Riparian Park (320 acres)	This project has reestablished abandoned pastureland and provides water to approximately 320 acres of native vegetation lands and increases livestock grazing capabilities.	Implemented and ongoing.
E/M Projects (EIR Table 5-3), 1985-1990	Lone Pine Sports Complex	This project converted vacant City property to an outdoor sports complex consisting of baseball fields, soccer fields, parking, picnic, and park areas.	Complete.
E/M Projects, 1985-1990 (EIR Table 5-3), Impact 10-16	Lone Pine West Side Regreening (8 acres)	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. Implemented and ongoing.	Implemented and ongoing.
E/M Projects, imp./committed 1970-1990 (EIR Table 4-3), Impact 10-16	Lone Pine Wood Lot (12 acres)	The Lone Pine Wood Lot was initially planted in the late 1980s and has been achieving its goals. In 2015-2016, 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. See Section 4.1 for more information (Figure 4.1).	Implemented and ongoing.

1991 EIR Source	PROVISION	PROGRESS TO DATE	STATUS
E/M Projects, 1985-1990 (EIR Table 5-3), Impact 10-14	Lower Owens River Rewatering Project (18,000 AFY)	This project was to provide a continuous flow of water in a 50-mile, previously dry (1913-1986) portion of the river channel creating a warm water fishery and wildlife habitat in the southern Owens Valley. The project also supplies water to five small lakes along the river route providing improved waterfowl habitat in the region. The new fishery supports such warm water species as largemouth bass; and the project's lakes provide breeding and feeding grounds for waterfowl and shorebirds. The LORP is also governed by the 1997 MOU and subsequent Stipulations and Orders. The project was implemented in 2006 and is ongoing with extensive monitoring and reporting by LADWP and Inyo County Water Department. For more information on management of the LORP and current conditions, please reference LADWP and Inyo County's LORP Annual Report. Project is implemented and ongoing.	Implemented and ongoing.
--	Manzanar Tree Pruning		Complete.
E/M Projects, 1985-1990 (EIR Table 5-3), Impact 10-18	McNally Ponds and Native Pasturelands (360 acres)	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. 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 the Department (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.	Implemented and ongoing.

1991 EIR Source	PROVISION	PROGRESS TO DATE	STATUS
E/M Projects, 1985-1990 (EIR Table 5-3)	Millpond Recreation Area (18 acres irrigated pond)	Since 1985, funds have been provided to purchase energy to operate the recreation area's sprinkler system that water's 18 acres of the community park including two softball fields. Implemented and ongoing.	Implemented and ongoing.
E/M Projects, imp./committed 1970-1990 (EIR Table 4-3)	North Lone Pine Cleanup	Implemented in 1989. Complete.	Complete.
E/M Projects, imp./committed 1970-1990 (EIR Table 4-3), Impact 10-16	Richards Fields (160 acres)	The goals for this project are being met. Implemented and ongoing.	Implemented and ongoing.
E/M Projects, 1985-1990 (EIR Table 5-3), Impact 10-11	Shepherd Creek Alfalfa Field (198 acres)	This 198-acre area was abandoned cropland that had sparse vegetation and was a source of blowing dust. It has since been revegetated with alfalfa that is sprinkler irrigated and wind break trees. The Shepherd Creek Alfalfa Field Project is complete and has achieved its goals. Implemented and ongoing with water supplied annually to the project.	Implemented and ongoing.
Impact 10-11	Shepherd Creek Potential (60 acres)	The Shepherd Creek Potential Project was evaluated and natural increases in the density of native cover have occurred that are comparable to baseline conditions in adjacent undisturbed parcels. Therefore, the goals for this potential project, as stated in the EIR, have been met.	Complete.
E/M Projects, imp./committed 1970-1990 (EIR Table 4-3)	Tree Planting Along Public Roads	Implemented in 1988. Planting complete. Irrigation ongoing.	Implemented and ongoing.

1991 EIR Source	PROVISION	PROGRESS TO DATE	STATUS
E/M Projects, imp./committed 1970-1990 (EIR Table 4-3), Impact 10-16	Van Norman Fields (170 acres)	A portion of the project could not be irrigated because of topography. This area was evaluated jointly by LADWP and Inyo County; a decision was made that this high area could not be modified to increase irrigation efficiency and that the project goals were being fulfilled. Additionally the project supply well designated for this project, Well 390, has reached the end of its service life and replacement well W425 was drilled in October 2012. 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 is currently being supplied to the project during irrigation season. Implemented and ongoing.	Implemented and ongoing.

4.1. Lone Pine and Independence Wood Lot Locust Thinning Effort

In the Fall/Winter of 2015-16, LADWP and CAL Fire Crews completed an extensive thinning project of the locust tree portions of both the Lone Pine and Independence Wood Lots. The trees were initially planted in 1985-1989 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.

For thinning, the same prescription was used in each wood lot where all dead trees were removed and tree spacing was increased from 6 to 12 feet. As part of the prescription, all non-locust trees within the locust portions were also removed, as well as trees from the irrigation furrows, to ease future maintenance. The thinning will increase available light and water for the remaining trees and allow increased growth rates.

In 2016, approximately 130 cords of hardwood were harvested from the two wood lots. The Lone Pine Future Farmers of America (FFA) manages the wood lots under use permit and also manages distribution of the wood. Maintenance of the wood lots continues as needed. Replanting efforts of the harvested portions of the wood lots will tentatively begin in 2016-2017.

Figure 4. 1 Lone Pine Wood Lot Following Thinning Project (December 2015)

Figure 4. 2 Independence Wood Lot Following Thinning Project (January 2016)

4.2. Klondike South Shore Habitat Area Flooded Extent

As indicated in Table 4.1, the following image shows the Klondike South Shore Habitat Area flooded extent in April 2015 following LADWP's tule reduction efforts and an early water release. These tule reduction efforts maximized the shallow flooded area and associated wildlife benefit for the project, even with less water available due to drought. The total flooded extent was 14 acres.

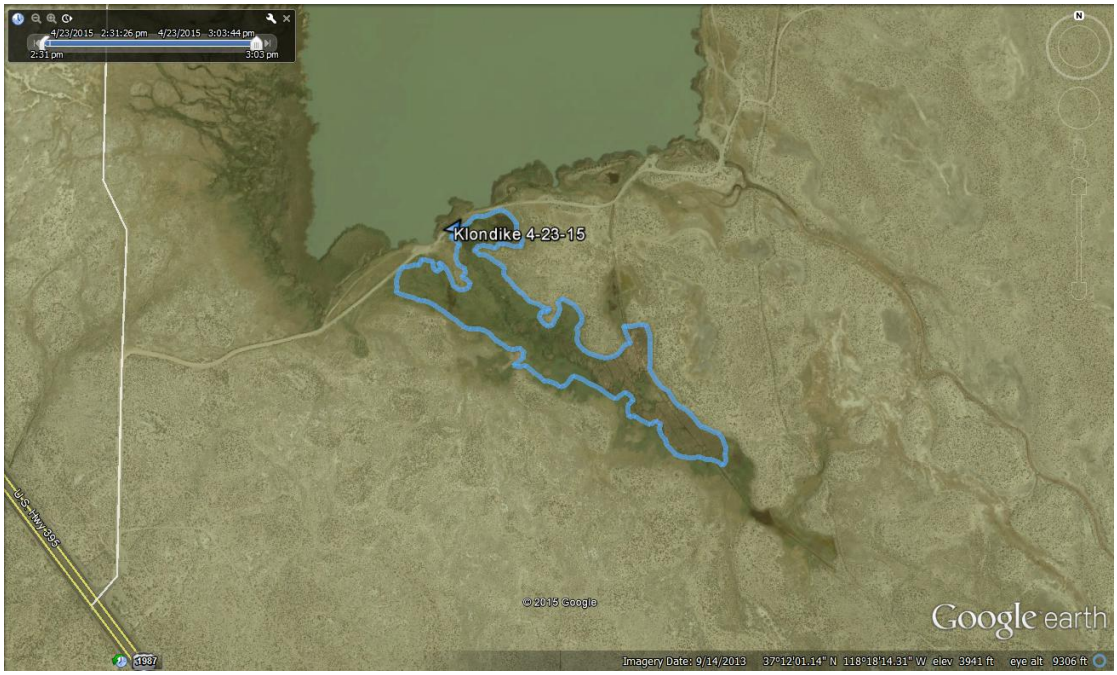


Figure 4. 3 Klondike South Shore Habitat Area

5. 1991 OWENS VALLEY ENVIRONMENTAL IMPACT REPORT (1991 EIR) MITIGATION MEASURE STATUS

5. 1991 OWENS VALLEY ENVIRONMENTAL IMPACT REPORT (1991 EIR) MITIGATION MEASURE STATUS

This section contains a progress and status update on the LADWP's mitigation measures from the 1991 EIR (Table 5.1).

Table 5. 1 1991 EIR Mitigation Measures

1991 OWENS VALLEY GROUNDWATER PUMPING EIR- IMPACTS WITH REQUIRED MITIGATION					
IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
9-14	Steward Ranch	Los Angeles Department of Water and Power (LADWP) pumping between 1970 and 1990 in the Big Pine area contributed to lowered water levels in the wells of Steward Ranch and resulted in an adverse economic effect. It is expected that LADWP will continue to pump from this area in the future. The proposed mitigation measure would reduce this impact to less-than significant.	Because groundwater pumping in the Big Pine well field was contributing to a lowering of groundwater levels at Steward Ranch, one of two wells became inoperable. LADWP reached agreement with the ranch owners to permanently mitigate the lowered groundwater levels that have existed since 1972.	The mitigation efforts are complete. LADWP continues to compensate the ranch owners for added power costs of pumping water from a greater depth.	Implemented and ongoing. LADWP continues to compensate lessee for power costs.
9-15	Management of Water Resources through Water Agreement	The increased fluctuations in groundwater levels observed between 1970 and 1990, and the extensive drawdown over extended periods of time, have reduced the amount of water that moves from the groundwater system to the vadose zone as compared to pre-project conditions.	Under terms of the Agreement, groundwater pumping would be managed to avoid causing significant decreases or changes in vegetation.	LADWP and Inyo County continue to manage water resources in the Owens Valley through the Water Agreement.	Ongoing.
10-6	Saltcedar Eradication Control Program	Between 1970 and 1990, LADWP continued to spread surplus water in wet years in the spreading areas created by the dikes east of Independence between the aqueduct and the river. This activity increased soil moisture and water tables, but also fostered conditions favorable to the spread of saltcedar, which was established prior to 1970.	A saltcedar eradication and control program has been implemented as described in Chapter 5 of the 1991 EIR.	The control efforts are continuing with payments from LADWP to the Inyo County Water Department (ICWD) and with outside funding. Control of Owens River saltcedar populations from Tinemaha Reservoir into the Delta has occurred along the main channel of the Owens River. Control efforts are continuing.	Implemented and ongoing.

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IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
10-11	Independence Springfield (286 acres), Independence Woodlot (20 acres),	Fluctuations in water tables due to groundwater pumping have caused approximately 655 acres of groundwater dependent vegetation to die off. Loss of vegetation cover has occurred on these lands.	As part of the Independence Springfield and Woodlot enhancement/mitigation projects, approximately 317 acres of barren or near-barren ground have been revegetated with either native pasture or alfalfa. This area was affected by groundwater pumping and surface diversions of water.	The Independence Springfield has achieved its goal over 180 acres. The Independence Wood Lot was initially planted in the late 1980's and has been achieving its goals. In 2015-2016, 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. See Section 4.1 for more information.	Implemented and ongoing.
10-11	Independence East Side Regreening Project (23 acres),	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.	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.	The well for this project was drilled in September 2012. Construction of the irrigation system for this project occurred during the winter of 2013-2014. The Independence East Side Regreening Project was fully implemented in Spring 2014. Implemented and ongoing.	Implemented and ongoing.
10-11	Big Pine Northeast Regreening (30 acres)	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.	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.	The technical group exempted well W375 an November 6, 2013, for project make-up water in order to make this project feasible. Installation of the irrigation system for this project occurred in the winter of 2013-2014. The Big Pine Northeast Regreening was fully implemented in Spring 2014. Implemented and ongoing.	Implemented and ongoing.

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IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
10-11	Shepherd Creek Alfalfa Field (198 acres)	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.	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 Alfalfa Field Project is complete and has achieved its goals. Implemented and ongoing with water supplied annually to the project.	Implemented and ongoing.
10-11	Shepherd Creek Potential (60 acres)	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.	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.	Complete.

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IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
10-11	Taboose/ Hines Springs/ Blackrock Areas Revegetation Project (80 acres)	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.	Tinemaha 54 - The 0.4 acre area has been fenced, planted with 108 grass plants and drip irrigated between 1999 and 2004 to get the plants established. Transects were run by LADWP and ICWD in August of 2012. The parcel has achieved 2.1% total perennial cover. Hines Spring S - The Revegetation Plan for Hines Spring S 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. Project implemented and ongoing. Blackrock 16E (7.5acres) - Permanent transects were run in 2010 and the parcel has attained the cover and composition goals (31% cover consisting of 5 perennial species) delineated in the revegetation plan. Exclusionary fencing has been removed.	In progress. Tinemaha 54 and Hines Spring S are implemented but have not attained goals. Blackrock 16E complete.

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IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
10-12	Five Bridges Area Revegetation Project (300 acres)	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; and 90% cover with 4 perennial species in riparian scrub. At transect L4 in 2015, perennial cover was 3.6%, composed of three native species. Perennial cover at transect L5 in 2015 was 18.3%, composed of six native species. Both of these transects are located in alkali meadow areas. Vegetation cover has declined in recent years due to successive dry years, pepperweed invasion, and subsequent weed treatment. Established photo points continue to be monitored annually. In 2015 due to extreme drought conditions, LADWP was unable to release the mitigation flows during the growing season as in years' past. However, following irrigation season, water was available and was supplied to the Five Bridges Mitigation Project in October and November 2015. 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. Review of this plan is pending at the time of this report. Additionally, LADWP drill seeded 5.3 acres of low cover alkali meadow with native grass species in February 2016. See Section 5.1 for more information.	Implemented and ongoing.

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10-13	Symmes-Shepherd Well field Area Revegetation Project (60 acres)(The area is comprised of Independence 105, Independence 131, andIndependence 123)	Increased groundwater pumping has significantly adversely affected approximately 60 acres of vegetation in the Symmes Shepherd well field area.	A revegetation program will be implemented for these effected areas utilizing native vegetation of the type that has died off. Water may be spread as necessary in these areas to accomplish the revegetation.	While 60 acres was identified in the EIR, 115 acres were fenced for these three projects. Independence 105 (13.4acres): Site was fenced to reduce disturbance. Permanent vegetation transects have been established. As of 2006, site has attained the goals for cover and composition (15.3% cover and 3 perennial species). Independence 131 (74.6acres): Site was fenced to reduce disturbance. Permanent vegetation transects have been established. SAIC and MWH conducted dryland revegetation studies using various irrigation methods and planting techniques. 25 acres were drill seeded with locally collected seeds in the spring of 2011. As of 2012, IND131N has achieved the revegetation goals with 15.7% live cover composed of five perennial species. As of 2012, IND131S contains 6.2% perennial cover (Goal is 15.3% cover, 3 perennial species), so has not yet met the site specific goal. Approximately 8.3 acres was drill seeded at 10lbs/acre using native shrub seed mix during the winter of 2015/2016. See Section 5.1 for more information. Independence 123 (28.5acres): Site was fenced to reduce disturbance. Permanent vegetation transects have been established. As of 2006, site has attained the goals for cover and composition (15.3% cover and 3 perennial species).	Fully Implemented but have not all attained goals. IND105, IND131N, and IND123 have attained goals. IND 131S has not yet attained goals.

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IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
10-14	Fish Springs Hatchery, Blackrock Spring Hatchery	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, the CDFG fish hatcheries at these locations serve as mitigation of a compensatory nature by producing fish that are stocked throughout Inyo County.	Hatchery operations are continuing.	Ongoing.
10-14	Big and Little Seely Springs (1 acre pond adjacent to Well W349)	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. Implemented and ongoing.	Implemented and ongoing.

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10-14	Hines Spring (1 to 2 acres)	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 Hines Spring vent and its surroundings will receive on site mitigation. Water will be supplied to the area from an existing, but unused, LADWP well at the site. As a result, approximately one to two acres will either have ponded water or riparian vegetation. Hines Spring will serve as a research project on how to re-establish a damaged aquatic habitat and surrounding marshland. Riparian trees and a selection of riparian herbaceous species will be planted on the banks. The area will be fenced. 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. Projects recommended by these studies and evaluations will be presented to the Board of Water and Power Commissioners for approval and implementation. The mitigation measures are to be implemented by LADWP and maintained by LADWP and/or the County. The measures were to be implemented within 36 months of the discharge of the writ.	This project was also identified in the 1997 MOU and the subject of 2004 and 2010 Stipulations and Orders. Consultants developed draft plans for this project. The Parties to the 1997 MOU 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 describes a series of eight mitigation projects to satisfy this mitigation of the 1600 AF commitment of the 1997 MOU and was completed and agreed to by the Parties. CEQA analysis was conducted in the spring of 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 were fully implemented by March 2012. Projects are further described in Section 7. Implemented and ongoing.	Implemented and ongoing.

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10-14	Reinhackle Spring, Little Blackrock Springs	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. 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 (see below) and contained in the Water Agreement and the Green Book, will be applied equally to Reinhackle Spring.	Little Blackrock Spring: This project is complete and the project functions as described. 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.	Implemented and ongoing.

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10-14	LORP Project (60 miles, perhaps more than 1,000 acres)	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. For more information on the monitoring and management of the LORP, refer to LADWP and ICWD's LORP Annual Report.	Implemented and ongoing.
10-14	Springs Vegetation (general)	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 addition, vegetation dependent upon a supply of water from a spring (primarily management type D) will be maintained in order to avoid a significant change or decrease as provided in the Water Agreement and the Green Book.	Ongoing.	Ongoing.

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IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
10-15	Springs and Seeps	Under the provisions of the Water Agreement and the Green Book, spring flows and vegetation dependent upon such flows will be carefully monitored by the Technical Group.	Under the provisions of the Agreement and the Green Book, spring flows and vegetation dependent upon such flows will be carefully monitored by the Technical Group. The Green Book contains procedures for determining the effects of groundwater pumping and surface water management practices on spring flow. Groundwater pumping from existing and new wells will be managed to avoid reductions in spring flows that would cause significant decreases or changes in spring-associated vegetation. If, despite such management, significant decreases in spring flows occur that could cause significant decreases or changes in vegetation dependent upon such flows, management of groundwater pumping from wells affecting flow from the spring will be modified so that adequate spring flow resumes to supply the vegetation. Also, the Technical Group would determine an appropriate course of action which might include: (a) temporarily supplying surface water or groundwater of a quality that would restore and sustain the vegetation until adequate spring flow resumes; (b) revegetating the affected area if necessary.	Ongoing.	Ongoing.

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IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
10-16	Independence Pasturelands and Native Pasturelands (610 acres), Van Norman Fields (170 acres), Richards Fields (160 acres), and Lone Pine Woodlot (12 acres)	Approximately 1,080 acres of formerly irrigated lands had not successfully revegetated following the abandonment of agriculture. This was a significant adverse impact because these lands had a loss of vegetation and were the source of blowing dust.	As part of the enhancement/mitigation projects implemented by LADWP and Inyo County since 1985, approximately 942 acres of these abandoned agricultural lands have been revegetated with irrigated pasture or alfalfa. These areas are the Independence Pasture and native pasture lands, the Van Norman and Richards Fields, and the Lone Pine Woodlot adjacent to Lone Pine.	Independence Pasturelands/Native Pastures approximately 520 acres are incorporated into the project. Figure 12-2 in the 1991 EIR was scanned and rubber sheeted onto a quad sheet for acreage calculations in GIS. The Independence Pasturelands acreage in this image was 522 acres. Therefore, LADWP has implemented the acreage designated in the figure presented in the 1991 EIR. The other projects noted above are complete and the goals for the projects have been met. Van Norman Fields: 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 is currently available to the project. Lone Pine Woodlot: The Lone Pine Wood Lot was initially planted in the late 1980's and has been achieving its goals. In 2015-2016, 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. See Section 4.1 for more information.	Implemented and ongoing.

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10-16	Lone Pine East Side Regreening (11 acres), Lone Pine West Side Regreening (8 acres)	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.	Project implementation is complete and the goals for these projects are being met. Implemented and ongoing.	Implemented and ongoing.
10-16	Bishop Area Revegetation Project (120 acres)	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.	In addition, 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. Permanent transects were established in this parcel. MWH Americas, Inc. conducted studies on dryland revegetation techniques using native seed and various treatments in 2003/2004. 35 acres were drill seeded with locally collected seeds in spring 2011 and a buried drip system was installed on 16 acres in this area. As of 2012, the parcel has achieved 4.8% native perennial cover (13.5% cover goal, 9 perennial species). Outplanting at this parcel will begin upon the completion of planting for Type E Transfer obligations. Approximately 11 acres between shrubs (interspaces) was drill seeded at 10lbs/acre using native shrub seed mix during the winter of 2015/2016. See Section 5.1 for more information. Recruitment of native species is naturally occurring in this parcel.	In progress.

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10-16	Irrigated Lands in the Owens Valley Since 1981-82	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.	Irrigated lands in Owens Valley (including the Olancha-Cartago area) in existence during the 1981-82 runoff year or that have been irrigated since then, will continue to be irrigated in the future, except perhaps in very dry years. (Reductions in very dry years must be agreed upon in advance by LADWP and the Inyo County Board of Supervisors).	Irrigation is ongoing.	Ongoing.
10-17	Meadow/ Riparian Vegetation Dependent upon Agricultural Tailwater	Meadow and riparian vegetation that were supplied by tailwater from formerly irrigated lands has been impacted.	The loss of meadow or riparian vegetation that was dependent on tailwater from formerly irrigated fields will be mitigated in the form of compensation by the restoration of meadow and riparian vegetation by the Lower Owens River Project.	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.	Implemented and ongoing.

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10-18	Laws Area Revegetation Project (140 acres)	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. Dryland revegetation studies examining various planting and watering techniques were conducted in a portion of LAWS 118 by SAIC and MWH Americas. Permanent transects have been established. In the spring of 2011 approximately 18 acres were seeded with locally collected seeds. As of August 2012, parcel has achieved 2% native cover (10% cover goal, 8 perennial species). In January of 2013, a new fence was installed between the western portion of LAWS 118 and the Cashbaugh Lease. Planting at this parcel will begin upon the completion of planting for Type E Transfer obligations. A seed farm has been initiated per the Laws Type E Transfer for seed harvest to 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. Approximately 46 acres between shrubs (interspaces) was drill seeded at 10lbs/acre using native shrub seed mix during the winter of 2015/2016. See Section 5.1 for more information.	In progress.

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10-18	Farmers Pond	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 1970s, LADWP started the Farmer's Pond environmental project.	Implemented and ongoing.	Implemented and ongoing.
10-18	Laws/Poleta Native Pasture (216 acres),Laws Historical Museum Pasturelands (21+15 acres),and McNally Ponds and Native Pasturelands (360 acres)	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 totalling approximately 541 acres of pasture land.	The project is complete and the goals for the project are being met. 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. There was no operational need to run the McNalley Canals in 2015-2016 and nearby wells that otherwise would supply the project are in off status.	Implemented and ongoing.
10-18	Groundwater Monitoring/ Pumping Reductions in the Laws Area	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.	The area where it is suspected that groundwater pumping during the recent drought has caused decreases or changes in vegetation is being monitored by Inyo County and LADWP. Groundwater pumping has been reduced in the area. Should it be determined that any significant decreases or changes have occurred, the area will be mitigated under the Water Agreement.	Implemented and ongoing.	Implemented and ongoing.

1991 OWENS VALLEY GROUNDWATER PUMPING EIR- IMPACTS WITH REQUIRED MITIGATION					
IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
10-19	Big Pine Area Revegetation Project (160 acres)	Water management practices in a portion of the Big Pine Well Field have resulted in a significant adverse change and decrease of plant cover.	A revegetation program will be implemented for approximately 160 acres within the Big Pine area, which have lost all or part of its vegetation cover due to increased groundwater pumping or to abandonment of irrigation as part of operations to supply the second aqueduct, will be revegetated.	Site was fenced to reduce disturbance. Permanent vegetation transects have been established in this parcel. 20 acres were drill seeded in spring 2011 with locally collected seed. As of 2012, the parcel contained 3% native perennial vegetation (16% goal, 9 perennial species). In February 2014, LADWP crews seeded approximately 28 acres of this parcel with a native seed mix, timed with a precipitation event. LADWP is in the process of developing a drip irrigation system for this site. However, a water source must be determined for this site. Potential water sources are currently being evaluated for this site. Approximately 154 acres was drill seeded (within interspaces) at 10lbs/acre using native shrub seed mix during the winter of 2015/2016 and prior to that in Fall 2015 with *Ericameria nauseosus.* See Section 5.1 for more information. Additionally, some natural recruitment is occurring along the perimeter of the site.	In progress.
10-19	Big Pine Northeast Regreening (30 acres)	Water management practices in a portion of the Big Pine Well Field have resulted in significant adverse change and decrease of plant cover.	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 Technical Group exempted Well W375 on November 6, 2013, for project make-up water in order to make this project feasible. Installation of the irrigation system for this project occurred in the Winter of 2013-2014. As of April 2014, implementation of this project by LADWP was complete. Implemented and ongoing.	Implemented and ongoing.

1991 OWENS VALLEY GROUNDWATER PUMPING EIR- IMPACTS WITH REQUIRED MITIGATION					
IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
10-19	Big Pine Area Revegetation Project (20 acres)	Water management practices in a portion of the Big Pine Well Field have resulted in significant adverse change and decrease of plant cover.	An area of approximately 20 acres directly to the east of Big Pine that is poorly vegetated as a result of pre project activities and activities which are not a part of the project will be evaluated as a potential enhancement/mitigation project. If, in planning this project, it is determined that it is not feasible to permanently irrigate this area, a revegetation program will be implemented.	Site was fenced to reduce disturbance and promote reestablishment in 2007. In February 2014, LADWP crews seeded approximately 3.2 acres of this area with a native seed mix in conjunction with the adjacent BGP160 parcel. The seeding was scheduled with a storm event and the areas seeded received around 1.35" of rain during and directly after seeding. Approximately 18 acres was drill seeded within interspaces at 10lbs/acre using native shrub seed mix during the winter of 2015/2016. See Section 5.1 for more information. Additionally, some natural recruitment is occurring at this site.	In progress.
10-20	Thibaut/ Sawmill Marsh Habitat, LORP Project	A significant loss and reduction of marsh vegetation has occurred in the Thibaut-Sawmill area primarily due to surface water diversion, but also due to lowered groundwater from increased groundwater pumping.	Portions of the Lower Owens River Project, including Thibaut Ponds, are in this area. Thus, portions of the impacted area will be mitigated directly; however, for much of the impacted area, mitigation will be in the form of compensation through the Lower Owens River Project's restoration of wetland, meadow, and riparian vegetation. Any significant decreases in vegetation cover or changes in vegetation composition due to groundwater pumping during the recent drought period will be mitigated under the Water Agreement.	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. Refer to LORP Annual Report for more information.	Implemented and ongoing.

1991 OWENS VALLEY GROUNDWATER PUMPING EIR- IMPACTS WITH REQUIRED MITIGATION					
IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
11-1	Aquatic Habitat	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.	Ongoing. In addition to the LORP, Klondike Lake, Farmers Ponds, Buckley Ponds, Billy Lake, and Lone Pine Pond are fully implemented and functioning as specified in the goals.	Ongoing.
11-2	Protection of native vegetation, fish and wildlife habitat	The Agreement would protect native vegetation, improve fish and wildlife habitat, and result in beneficial impacts.	None required; however, LADWP would continue to conduct its program of on-going wildlife inventories, monthly wildlife censuses, raptor surveys, habitat assessments, breeding bird surveys, and other ecological studies.	Ongoing.	Ongoing.
12-1	Independence Springfield (286 acres), Independence East Side Regreening (23 acres),Shepherds Creek Alfalfa Field (approx. 198 acres), and Revegetation Project East of Independence (part of Independence Springfield,approximately 40 acres)	Significant impacts on air quality resulting from groundwater pumping during the period of 1970 to 1990 have occurred due to vegetation losses.	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. Approximately 40 acres remain barren and will be revegetated with native pasture. Under the Shepherd Creek enhancement/mitigation project, approximately 200 acres of poorly vegetated land has been converted to alfalfa.	Independence Springfield has achieved its goal of irrigating over approximately 280 acres. The Independence East Side Regreening Project was fully implemented in spring 2014. 23 acres of irrigated pasture were seeded and are being irrigated by the lessee in April 2014. The Shepherd Creek Alfalfa Field Project (198 acres) is complete and has achieved its goals.	Implemented and ongoing.

1991 OWENS VALLEY GROUNDWATER PUMPING EIR- IMPACTS WITH REQUIRED MITIGATION					
IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
12-2	Elevated PM_{10} Levels	Increased groundwater pumping could result in elevated PM_{10} levels due to vegetation losses.	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. Approximately 40 acres remain barren and will be revegetated with native pasture. Under the Shepherd Creek enhancement/mitigation project, approximately 200 acres of poorly vegetated land has been converted to alfalfa.	Independence Springfield has achieved its goal of irrigating over approximately 280 acres. The Independence East Side Regreening Project was fully implemented in spring 2014. 23 acres of irrigated pasture were seeded and are being irrigated by the lessee in April 2014. The Shepherd Creek Alfalfa Field Project (198 acres) is 100% complete and has achieved its goals.	Implemented and ongoing.
12-3	Air Quality Impacts from Loss of Vegetation	Significant impacts to air quality have resulted from the abandonment of irrigated lands to supply the second aqueduct.	Approximately 1,240 acres of formerly irrigated agricultural lands that had not successfully revegetated have been planted with pasture or alfalfa.	Mitigated under vegetation impacts. Implemented and ongoing.	Implemented and ongoing.
16-1	Vegetation Loss from Construction Activities	The construction phase of the addition of new recharge facilities could result in vegetation decrease or change.	Provisions of the Agreement will be met. No further mitigation measures are required.	Provisions of the Agreement continue to be met. Ongoing.	Ongoing.
16-3	Air Quality Effects from Construction Activities	Air quality could be adversely affected by the construction of recharge facilities.	All disturbed areas would be wetted during construction to minimize generation of fugitive dust.	Ongoing as necessary.	Ongoing as necessary.

1991 OWENS VALLEY GROUNDWATER PUMPING EIR- IMPACTS WITH REQUIRED MITIGATION					
IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
16-5	Archaeological Disturbance from Construction Activities	Construction of proposed recharge projects could disturb subsurface archaeological resources, with possible significant impact.	16-5(a) The proposed recharge facility project locations would be surveyed for cultural resources prior to the initiation of any ground-disturbing project activities associated with the construction of any culverts, ditches, or trenches, once the exact locations of these features are determined. The significance of any site recorded during the survey would be determined through the use of subsurface testing, as appropriate.	Ongoing as necessary.	Ongoing as necessary.
16-5	Compliance with Archaeological and Preservation Act of 1974	Construction of proposed recharge projects could disturb subsurface archaeological resources, with possible significant impact.	16-5(b) In accordance with the requirements of 36 CFR 800.11, should a previously unidentified National Register or eligible property be discovered during construction on any and all parts of the project, LADWP would comply with the provisions of the Archaeological and Historic Preservation Act of 1974 by evaluating the resources and implementing mitigation measures as warranted.	Ongoing as necessary.	Ongoing as necessary.
16-6	Monitoring wells for private wells on Bishop Cone	It is not expected that water quality or quantity in private wells on the Bishop Cone would be adversely impacted due to a lowering of the water table associated with pumping the new wells on the Cone.	Monitoring wells will be installed and monitored in accordance with the Agreement to monitor water levels near private wells	Ongoing as necessary.	Ongoing as necessary.

1991 OWENS VALLEY GROUNDWATER PUMPING EIR- IMPACTS WITH REQUIRED MITIGATION					
IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
16-7	Water Quantity Impacts from New Wells in Big Pine Area	New wells in the Big Pine area would lower groundwater levels, and could result in significant impacts to local private wells.	Monitoring will be conducted as provided in the Agreement and the Green Book. If pumping of the new production well is shown to cause a significant adverse impact to any private well, the impact will be mitigated as described in the Agreement and in Section 4 of the Green Book.	Ongoing as necessary.	Ongoing as necessary.
16-8	Operation of new wells	New wells in the five areas described above would result in fluctuations in groundwater levels, but would not result in significant impacts.	All new wells would be operated in accordance with provisions of the Agreement so as to avoid creating significant impacts to vegetation and to the environment.	Ongoing as necessary.	Ongoing as necessary.
16-9	Water Quantity Impacts to Artesian Wells in Laws Area from Operation of Two New Wells	Operation of the two new wells in the Laws area could cause flow in artesian wells to stop or diminish to a degree that impacts the vegetation dependent on such flow would result.	Existing and new monitoring wells will be used to monitor water levels and vegetation as provided in the Water Agreement and the Green Book. Groundwater pumping will be managed to avoid causing reductions in the amount of water flowing from these wells such that significant decreases and changes to vegetation would result. If it is projected that such decreases and changes could occur, water will be supplied to avoid such vegetation decreases or changes.	Ongoing as necessary.	Ongoing as necessary.

1991 OWENS VALLEY GROUNDWATER PUMPING EIR- IMPACTS WITH REQUIRED MITIGATION					
IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
16-10	Type D Vegetation Impacts Along Fault Zone West of Big Pine from Pumping Big Pine Well BP-1	Pumping of the Big Pine well BP-1 may impact Type D vegetation along the fault zone west of Big Pine.	As provided in the Water Agreement and the Green Book, existing and new monitoring sites would be utilized to monitor vegetation, water levels, and soil water. Groundwater pumping would be managed to avoid significant decreases and changes in vegetation.	Ongoing as necessary.	Ongoing as necessary.
16-11	Reduction or Elimination of Flow from Reinhackle Spring and Subsequent Loss of Vegetation from New Wells in the Independence-Symmes-Bairs Area	New wells in the Independence Symmes-Bairs area may reduce or eliminate the flow from Reinhackle Spring and impact vegetation dependent upon flow from the spring.	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.	Ongoing as necessary.	Ongoing as necessary.
16-12	Operation of new well in Lone Pine	Operation of the proposed new well in the Lone Pine area would result in fluctuations in groundwater levels.	Mitigated under vegetation impacts	Projects implemented and ongoing.	Implemented and ongoing.

1991 OWENS VALLEY GROUNDWATER PUMPING EIR- IMPACTS WITH REQUIRED MITIGATION					
IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
16-13	Air Quality Impacts from Construction and Maintenance of New Wells	Air quality could be adversely affected by the construction and maintenance of new wells.	All areas disturbed during construction of the new wells would be wetted during construction to minimize generation of fugitive dust.	Ongoing as necessary.	Ongoing as necessary.
16-16	Archaeological Disturbance from Construction of 15 New Wells	Construction of 15 new wells could disturb subsurface archaeological resources, with possible significant impact.	16-16(a) Construction activity at the LP-1, BP-1, and BP-2 sites will be monitored. If subsurface prehistoric archaeological resource evidence is found, excavation or other construction activity in the area will cease and an archaeological consultant would be retained to evaluate findings in accordance with standard practice and applicable regulations. Data/artifact recover, if deemed appropriate, would be conducted during the period when construction activities are on hold.	Ongoing as necessary.	Ongoing as necessary.
16-16	Notification of Proper Authorities (Native American Representatives, Coroner) if Remains are Discovered	Construction of 15 new wells could disturb subsurface archaeological resources, with possible significant impact.	16-16(b) An appropriate representative of Native American Indian groups and the County Coroner would be informed and consulted if remains are discovered, as required by State law.	Ongoing as necessary.	Ongoing as necessary.

1991 OWENS VALLEY GROUNDWATER PUMPING EIR- IMPACTS WITH REQUIRED MITIGATION					
IMPACT NUMBER	**TITLE**	**IMPACT**	**MITIGATION MEASURE**	**PROGRESS TO DATE**	**STATUS**
16-17		Increased pumping on the Bishop Cone could cause increased fluctuation in groundwater levels but would not result in significant impacts to water resources or to the quality or quantity of water in private wells in the Bishop area.	Existing and new monitoring wells installed in accordance with the Water Agreement would be used to monitor changes in water levels and to avoid impacts on private wells. Any significant impacts due to pumping would be promptly mitigated as required by the Water Agreement.	Ongoing.	Ongoing.
16-18	Discharge Rates Could Be Affected in Flowing Wellson Bishop Cone from Increased Pumping	Increased pumping on the Bishop Cone could affect the rate of discharge from flowing wells.	Changes in flow rates from flowing wells will be monitored along with vegetation dependent upon flows from such wells. Groundwater pumping will be managed to avoid significant decreases or changes in vegetation dependent upon water from flowing wells. Water will be provided if necessary to avoid such decreases and changes in vegetation if flows from such wells are diminished due to groundwater pumping.	Ongoing.	Ongoing.
16-19	Bishop Cone Pumping Effects on Vegetation	Increased pumping on the Bishop Cone could adversely affect vegetation due to lowered water levels or reduced flows from flowing wells.	As provided in the Water Agreement, existing and new monitoring sites would be utilized to monitor vegetation, water levels, and soil water. Groundwater pumping would be managed to avoid significant decrease and change to vegetation and other significant effects on the environment.	Ongoing.	Ongoing.

5.1 Native Seeding Effort in LADWP's Revegetation Projects, Winter 2015/2016

During Winter 2015/2016, LADWP conducted a considerable seeding effort across LADWP's revegetation parcels that had not yet attained desired cover and composition, including revegetation parcels identified in both the 1991 EIR and Laws Type E Transfer. These seeding efforts were timed accordingly in anticipation of El Nino rains. Additional information regarding annual outplanting efforts for the Laws Type E Transfer can be found in Section 6.

In fall 2015 LADWP purchased premixed native seed to seed drill into remaining low cover areas in LADWP's revegetation parcels. The seed mix included *Atriplex polycarpa, Atriplex canescens, Atriplex confertifolia, Ambrosia dumosa, and Psorothamnus arborescens.* Parcels were drill seeded at 10 pounds/acre from December 2015-February 2016, often timed prior to significant precipitation events. Seeding efforts focused on low cover areas of revegetation parcels that do not have buried drip irrigation in place and/or other outplanting efforts occurring. However, road margins and fencelines within the parcels with irrigation systems were seeded to achieve native cover along these gaps.

Table 5.1 shows acres drill seeded with native species during the Winter 2015/2016. Additionally, 5.2 acres were drill seeded within the Five Bridges Mitigation Area (Multiple Completion Meadow) in early February 2016 prior to a rain event. The seed mix used at Five Bridges included *Sporobolus airoides, Distichlis spicata, and Leymus triticoides*. Figures 5.1-5.11, spatially depict areas seeded within each parcel during Winter 2015-2016. Figures 5.12 and 5.17 are photos showing some of these seeded areas.

Table 5. 2 Acres Drill Seeded with Native Species during Winter 2015/2016

PARCEL	ACRES DRILL SEEDED
LAW027	2.0
LAW090	11.5
LAW094	14.9
LAW095	13.5
LAW118W	18.4
LAW118E	27.9
LAW129	4.0
BIS097	11.3
BGP160E *(BGP160)*	154.9*
BGP160W *(East Big Pine)*	17.5*
IND125 *(IND131S)*	8.2
IND131	0.1

**Acreage at BGP160 included seeding in interspaces around existing vegetation. A portion of BGP160 was also seeded with Ericameria nauseousus in November 2015 prior to the new seed mix being received.*

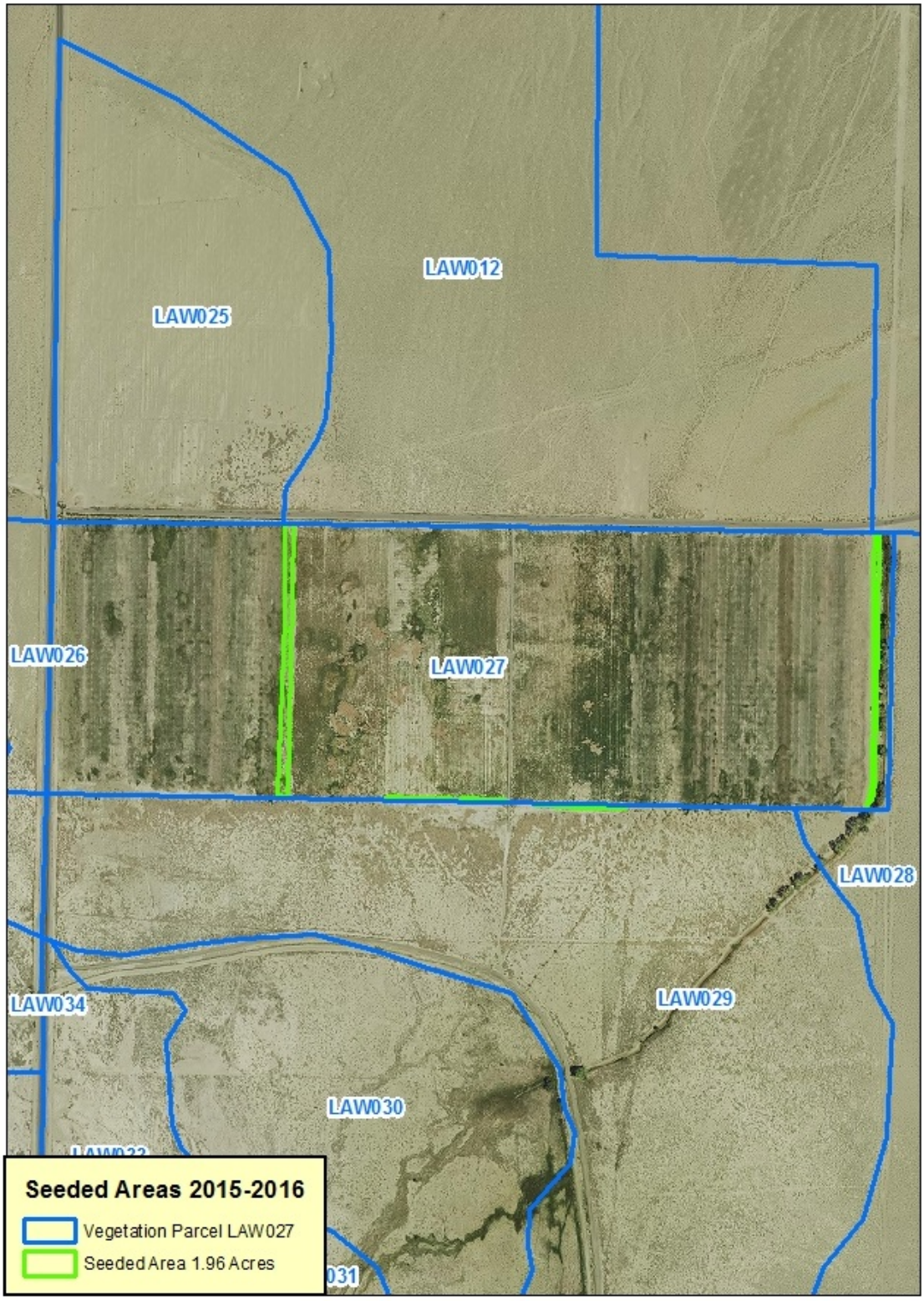

Figure 5. 1 Revegetation Parcels Seeded in Winter 2015/2016, LAW027 *(Laws Native Seed Farm, Laws Type E Transfer Commitment)*

Figure 5. 2 Revegetation Parcels Seeded in Winter 2015/2016, LAW090 (Laws Type E Transfer Commitment)

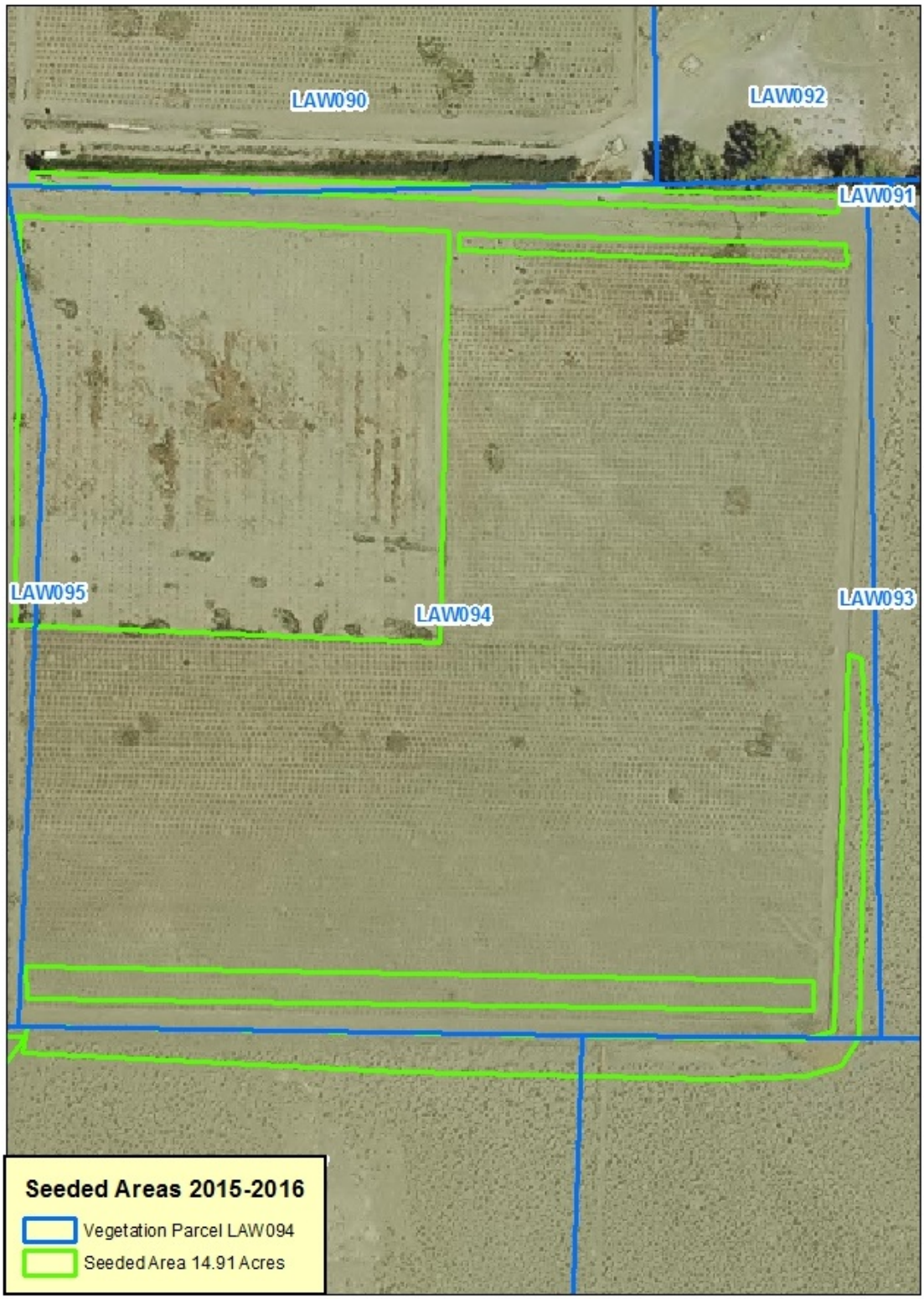

Figure 5. 3 Revegetation Parcels Seeded in Winter 2015/2016, LAW094 *(Laws Type E Transfer Commitment)*

Figure 5. 4 Revegetation Parcels Seeded in Winter 2015/2016, LAW095 *(Laws Type E Transfer Commitment)*

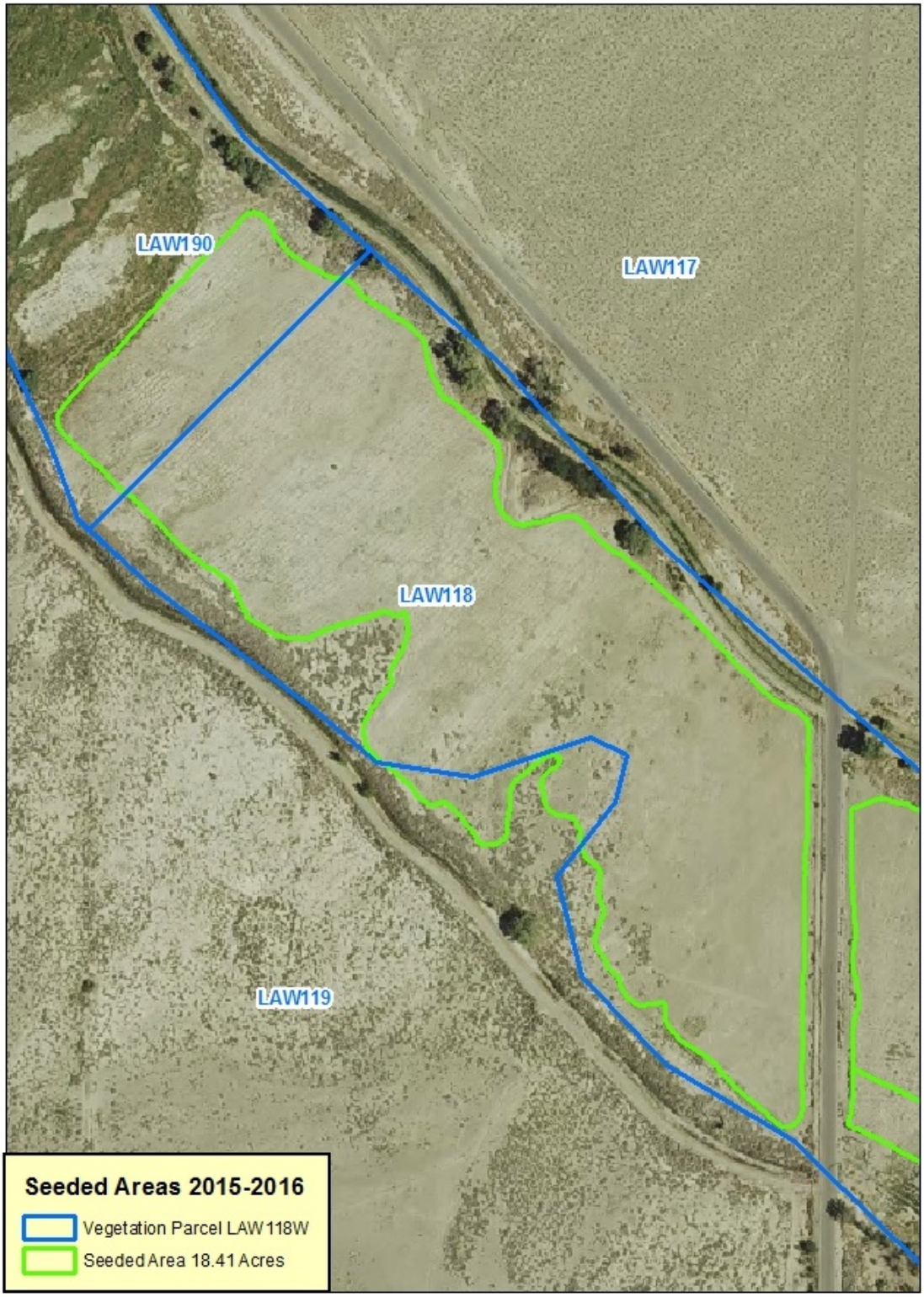

Figure 5. 5 Revegetation Parcels Seeded in Winter 2015/2016, LAW118 (West of Laws Poleta Road) *(1991 EIR Commitment*)

Seeding of sparse area in adjacent LAW190 parcel included.

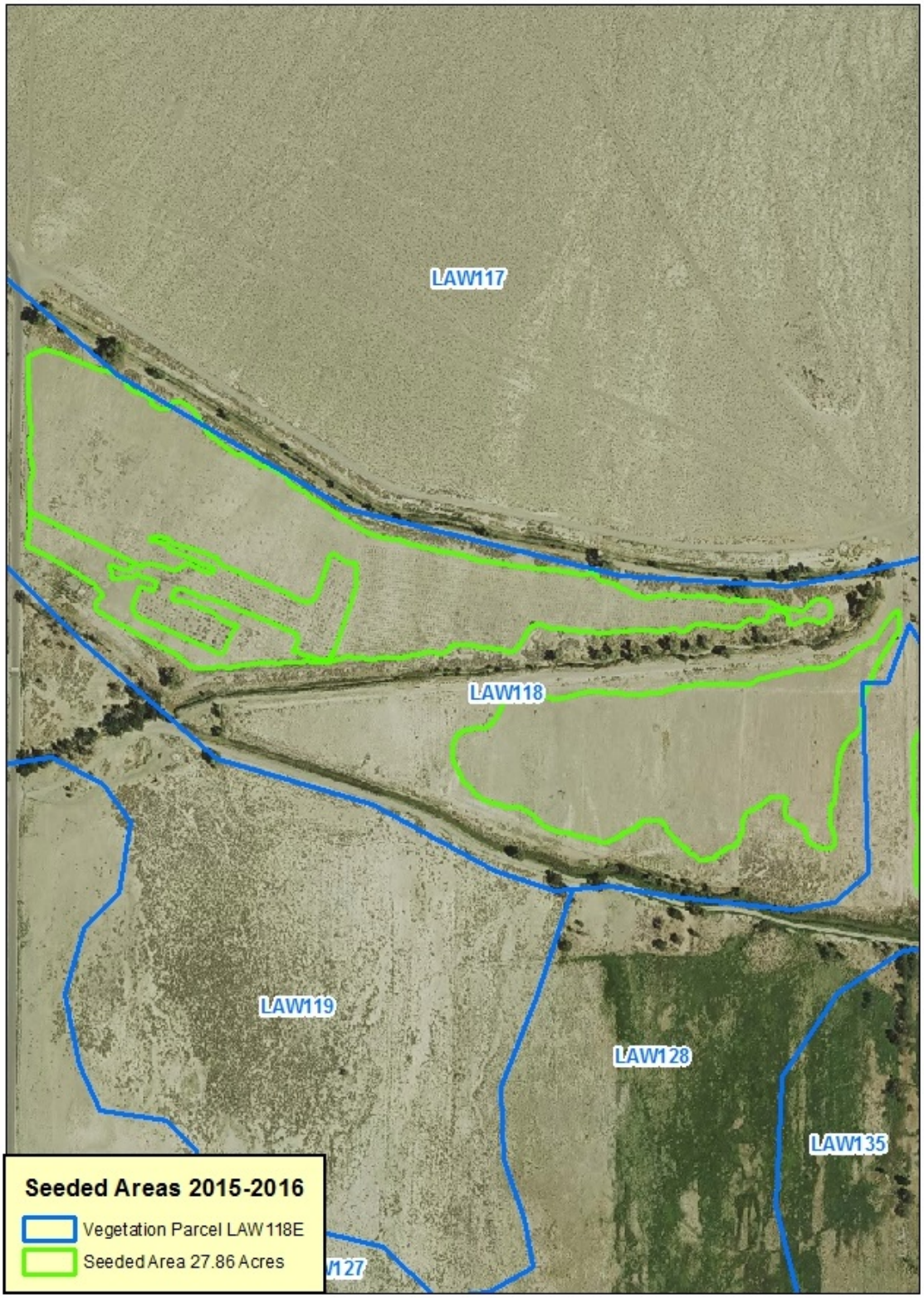

Figure 5. 6 Revegetation Parcels Seeded in Winter 2015/2016, LAW118 (East of Laws Poleta Road) *(1991 EIR Commitment)*

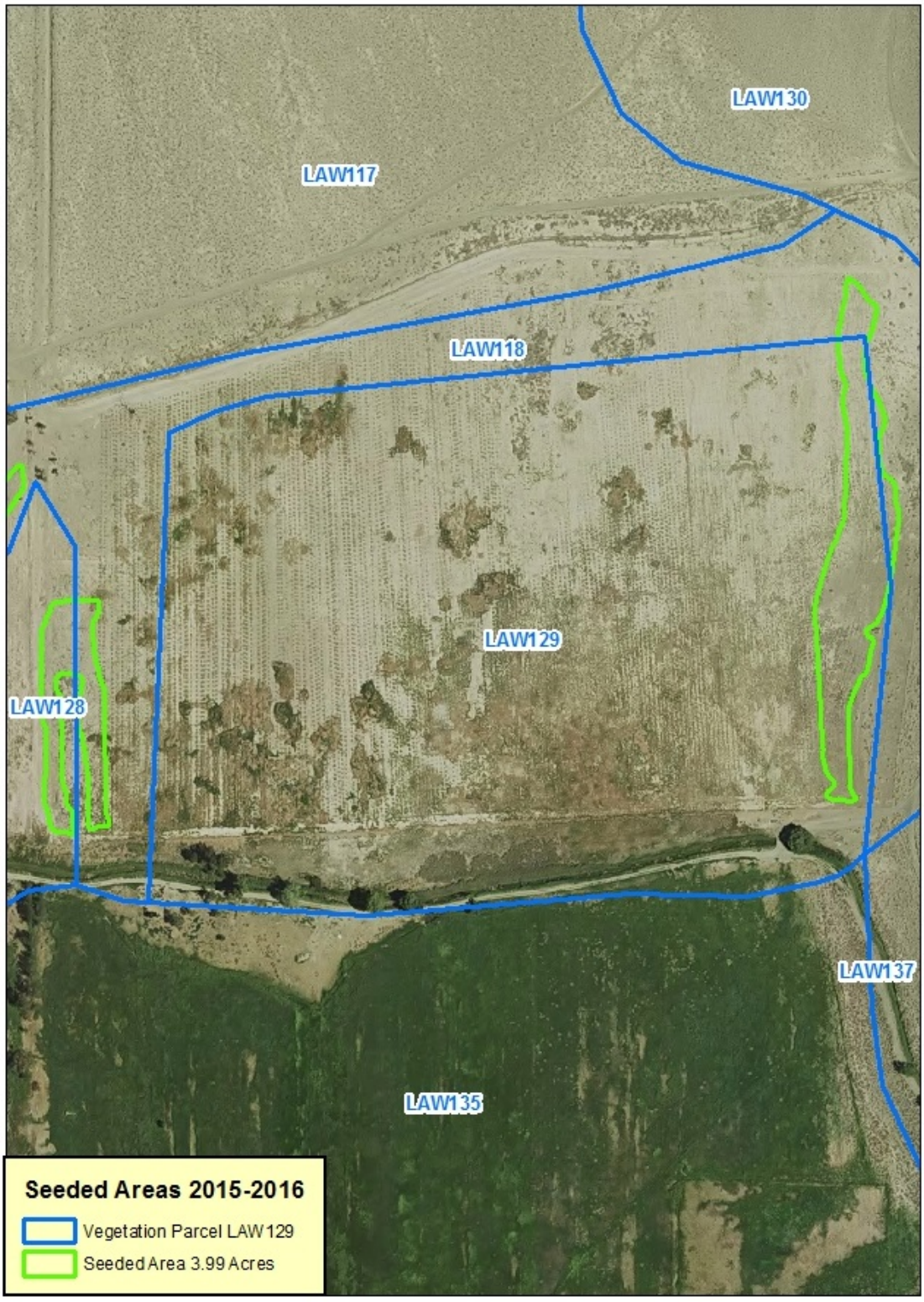

Figure 5. 7 Revegetation Parcels Seeded in Winter 2015/2016, LAW129 and portion of LAW118 *(Laws Type E Transfer Commitment)*

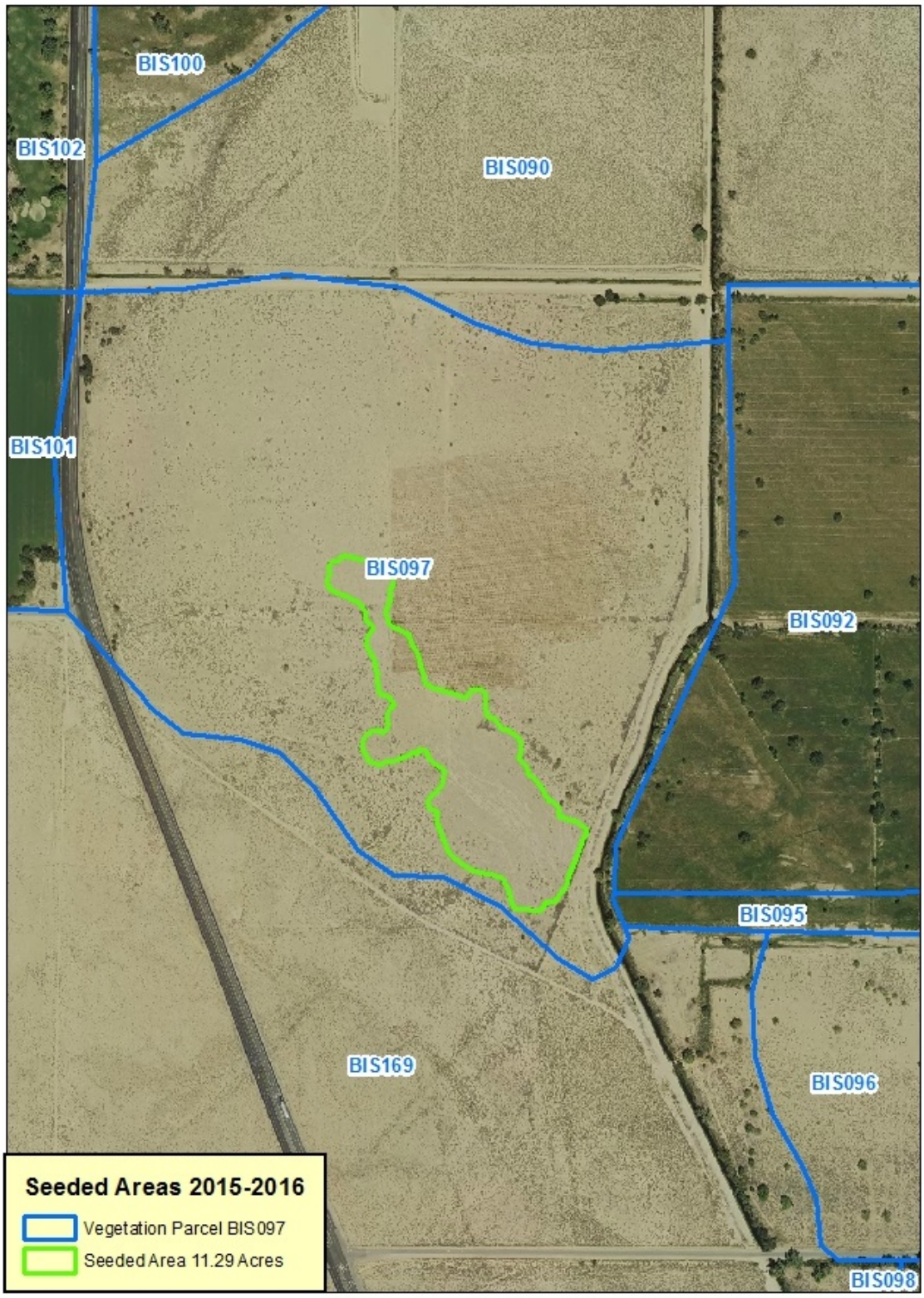

Figure 5. 8 Revegetation Parcels Seeded in Winter 2015/2016, BIS097 *(Beacon Curve) (1991 EIR Commitment)*

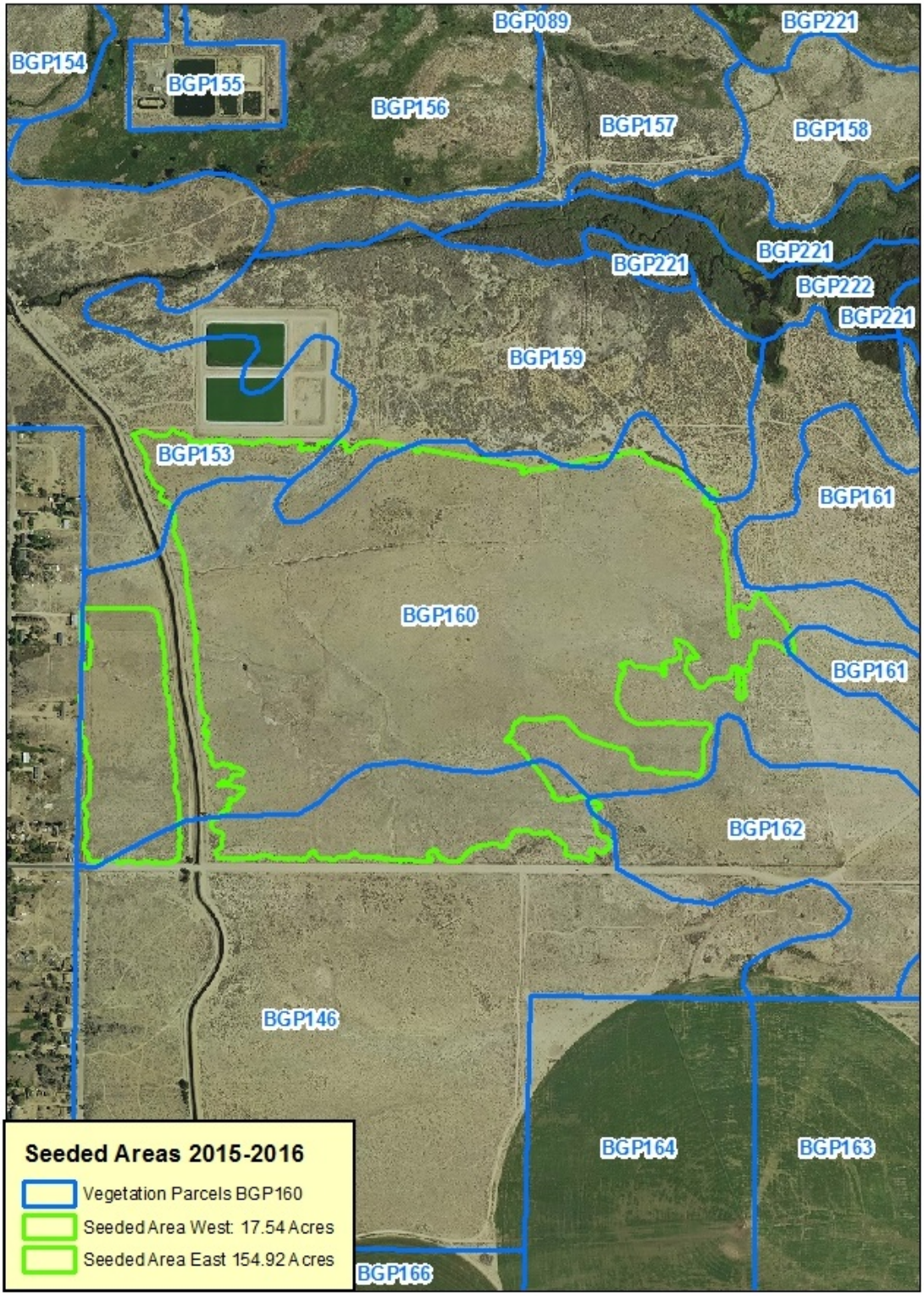

Figure 5. 9 Revegetation Parcels Seeded in Winter 2015/2016, East Big Pine and BGP160

(Area west of Big Pine Canal is also known as East Big Pine (20 Acres), 1991 EIR Commitments.)

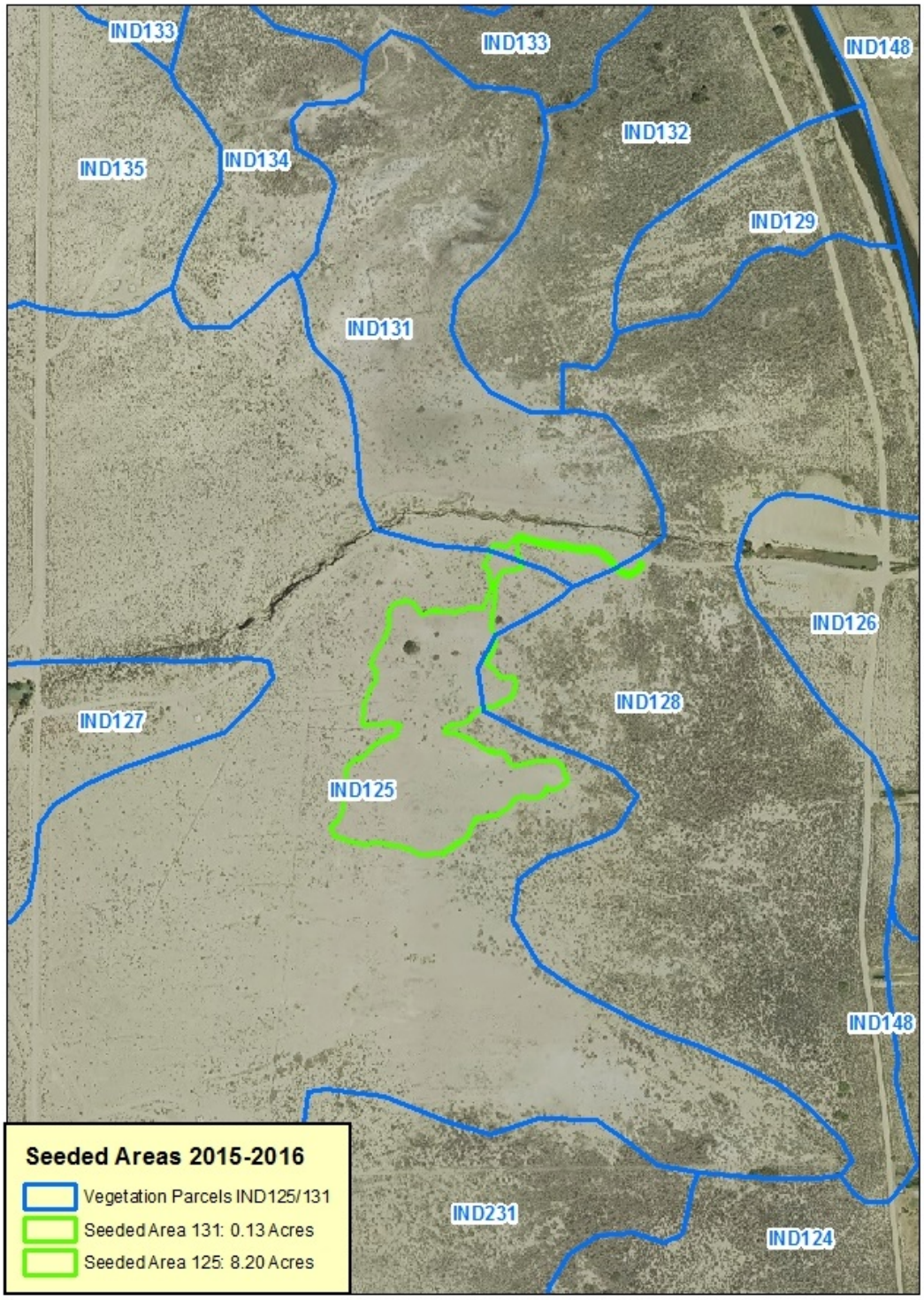

Figure 5. 10. Revegetation Parcels Seeded in Winter 2015/2016, Independence 131S

(Area noted as 131S in the 1999 Revegetation Plan actually falls within a portion of the IND125 vegetation parcel. Figure above denotes acreage seeded within each respective vegetation parcel.)(1991 EIR Commitment)

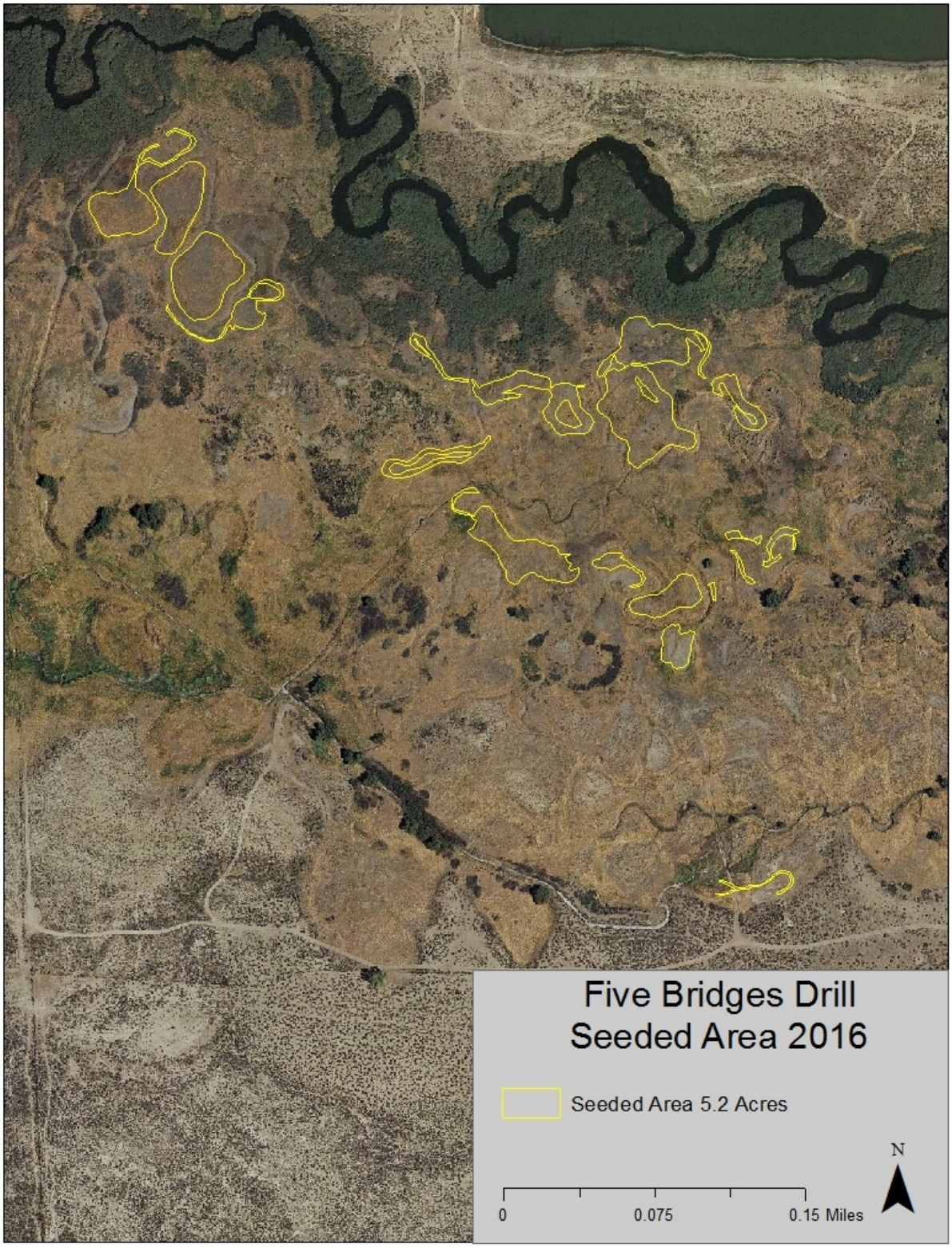

Figure 5. 11 Five Bridges Mitigation Area Native Seeding Effort Winter 2015/2016 *(1991 EIR Commitment)*

Figure 5. 12 Furrows at LAW094 from January 2016 seeding effort (looking east)

Figure 5. 13 Furrows at LAW095 from January 2016 seeding effort (looking west)

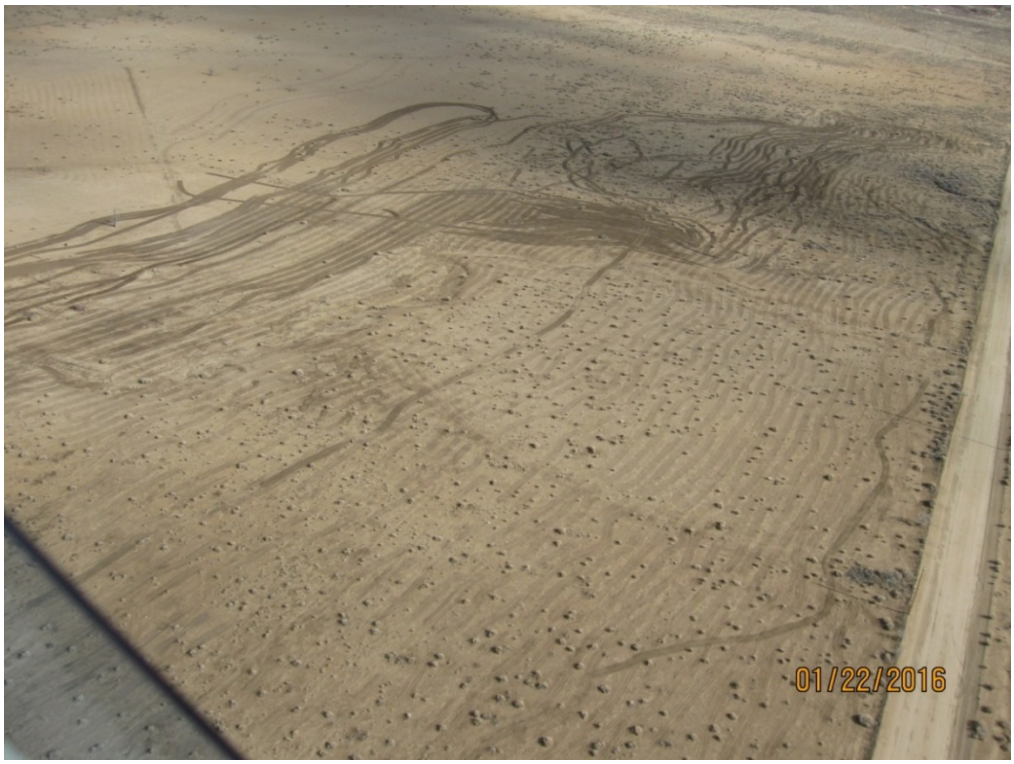

Figure 5. 14 Aerial photo (northeast) showing furrows and seeded areas at BGP160

Figure 5. 15 Furrows at East Big Pine Site from November 2015 seeding effort

Figure 5. 16 Photo of February 2016 seeding effort at Five Bridges (1/2)

Figure 5. 17 Photo of February 2016 seeding effort at Five Bridges (2/2)

6. STATUS OF OTHER STUDIES, PROJECTS, AND ACTIVITIES

6. STATUS OF OTHER STUDIES, PROJECTS, AND ACTIVITIES

The following describes the status of studies, projects, and activities conducted under 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). A description of current Cooperative Studies between Inyo County and Los Angeles is also provided in this section. Finally, mitigation and monitoring efforts in the Laws and Big Pine areas are described in this section and an overview of invasive species treatment measures taken on City lands in the last year.

6.1. Water Agreement Provisions

Table 6.1 Water Agreement Provisions

INYO/LA LONG TERM WATER AGREEMENT			
TITLE	**PROVISION**	**PROGRESS TO DATE**	**STATUS**
Groundwater Management	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.	Implemented and ongoing
New Wells & Production Capacity	In order to provide for increased operational flexibility and to facilitate rotational pumping, LADWP may replace existing wells and construct new wells in areas where hydrogeologic conditions are favorable and where operation of such wells will not cause a change in vegetation that would be inconsistent with the agreement.	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. There were 13 wells previously replaced that have been abandoned or converted to monitoring wells	In progress

TITLE	PROVISION	PROGRESS TO DATE	STATUS
Groundwater Pumping on the Bishop Cone	Before LADWP may increase groundwater pumping on the Bishop Cone, or construct new wells on the Cone, Inyo and LADWP are to develop an audit procedure for determining the exact amount of water annually used on Los Angeles-owned land on the Cone. LADWP pumping on the Cone must be in strict adherence to the provisions of the "Hillside Decree."	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. Current audits do not account for stockwater use and ditch losses on the Bishop Cone. Audit protocols should be updated to properly reflect these sources of water supplied to the Bishop Cone.	Ongoing
Groundwater Recharge Facilities	LADWP may construct groundwater banking and groundwater recharge facilities in the County. The EIR describes certain groundwater recharge facilities in Laws, Big Pine, and Rose Valley.	LADWP has not proposed construction of groundwater recharge facilities in Laws, Big Pine, or Rose Valley.	Not proposed at this time
Cooperative Studies	LADWP may provide funding for the costs of conducting studies related to the effects of groundwater pumping on the environment of the Owens Valley.	Studies approved by the Standing Committee are underway.	Ongoing
Enhancement/ Mitigation Projects	All existing E/M projects will be maintained, unless the Standing Committee agrees to modify or discontinue a project, and new projects may be implemented if approved by the Standing Committee. The agreement provides that E/M projects will continue to be supplied by E/M wells unless otherwise agreed.	All Enhancement Mitigation Projects defined in the 1991 EIR are complete or have been implemented and are ongoing. See Enhancement Mitigation table for more information.	Implemented and ongoing.

TITLE	PROVISION	PROGRESS TO DATE	STATUS
Town Water Systems	LADWP will transfer to Inyo County, or another Owens Valley public entity or entities, ownership of the water systems in the communities of Lone Pine, Independence, and Laws. 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. LADWP will provide free water, up to specified amounts for each town.	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.	Complete
Lower Owens River (financial commitment)	Project description is contained under MOU provisions below. Los Angeles will pay the costs of implementing the project. Inyo County will repay Los Angeles one half of the project costs up to maximum of $3.75 million. Any funds provided for the project from sources other than Los Angeles will be an off-set against Inyo County's repayment obligation. Los Angeles will pay the annual costs of operating the pumpback system. Inyo County and Los Angeles will each pay one half of the other costs of the project.	As part of a negotiated agreement with Inyo County to not pursue funding from the USEPA, LADWP has credited Inyo County $5.1 million to cover Inyo County's $3.75 million obligation for LORP implementation with the remaining $1.35 million to be used by Inyo County towards post implementation costs. LADWP and Inyo County continue to share costs of operations and maintenance of the LORP per the LORP Post Implementation Agreement.	Implemented and ongoing
Haiwee Reservoir	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. CEQA documentation (Negative Declaration) was filed to close Haiwee Reservoir on December 16, 2004. The facility was officially closed to the public in 2005.	Complete

TITLE	PROVISION	PROGRESS TO DATE	STATUS
Saltcedar Control	LADWP is to provide funding to Inyo County to implement a Saltcedar Control Program: $750,000 during the first three years of the program; thereafter, $50,000 per year (adjusted upward or downward in accordance with the consumer price index).	LADWP initiated payments and ICWD initiated the Saltcedar Control Program in 1997. In 2015, LADWP paid ICWD $71,442 for this work. LADWP has paid Inyo County $1,748,683 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. 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. A third grant for $600,000 from the WCB was received by ICWD in November 2007.	Implemented and ongoing.

TITLE	PROVISION	PROGRESS TO DATE	STATUS
Park Rehabilitation, Development, & Maintenance	During the 10-year period following entry of the Stipulation and Order, LADWP is to provide up to $2 million to Inyo to rehabilitate existing County parks and campgrounds and to develop new recreational facilities. LADWP is to make an annual payment of $100,000 (adjusted upward or downward in accordance with the consumer's price index) to Inyo to maintain existing and new recreational facilities.	The remainder of the money available for parks rehabilitation and maintenance is $21,954. In addition, LADWP has provided annual payments to Inyo County for parks operation and maintenance activities including a payment in 2015 of $152,513 for a total of $2,446,062. LADWP has paid Inyo County $4,277,976 since 1997 under this provision of the Agreement.	Implemented and ongoing.
Owens River Recreational Use Plan	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.	In progress.
Financial Assistance for Water Related Activities	LADWP is to make an annual payment to Inyo to assist the County in funding water and environmentally related activities. The annual payment is to be adjusted upward or downward each year in accordance with the consumer's price index.	Los Angeles has provided annual payments to Inyo County, and provided $1,421,610 in July 2015. Funds provided by Los Angeles have been expended to fund Inyo County Water Department. LADWP has paid Inyo County over $29 million since 1988 for this purpose.	Implemented and ongoing.

TITLE	PROVISION	PROGRESS TO DATE	STATUS
General Financial Assistance to the County	LADWP is to make an annual payment to Inyo to assist the County in providing services to its citizens. The annual payment 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 annual payments to Inyo County, and provided $3,520,291 in 2015. 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 $55 million since 1991 for this purpose.	Implemented and ongoing.
Big Pine Ditch System	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 make up 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.	In progress.

TITLE	PROVISION	PROGRESS TO DATE	STATUS
Park & Environmental Assistance to City of Bishop	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 consumers' price index. 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 $190,642 in 2015. LADWP has paid the City of Bishop $3,131,437 since 1997 for this purpose. Inyo County has made its required payment under this section of the agreement.	Implemented and ongoing.
Release of City Owned Lands	For the orderly development of the communities, LADWP has agreed to (1) offer for sale 26 acres of City land located within the Bishop city limits, (2) offer for sale 75 acres of City land located in Inyo County (County) as noted in Exhibit B of the Water Agreement,	LADWP has fulfilled its commitments to the first two items—offer for sale of 26 acres located within Bishop city limits (in 1995) and offer for sale 75 acres located within Inyo County (2011).1	Complete.

[1] LADWP sold 5.54 acres of property prior to 2002, offered for sale 24.38 acres in 2008, and offered for sale 56.63 acres on March 23, 2011, all at public auction.

TITLE	PROVISION	PROGRESS TO DATE	STATUS
Additional Sales of City-Owned Lands	For the orderly development of the communities, LADWP has agreed to negotiate in good faith for the sale at public auction of additional City land located in communities.	2011: LADWP sold to Caltrans land located in Independence for expansion of their maintenance yard and granted to the City of Bishop two easements for road purposes. 2012: No sales 2013: LADWP sold 2.82 acres to a private party located in the City of Bishop. 2014: LADWP sold seven easements (4.46 acres) to Caltrans for projects 2016: LADWP sold 51.5 acres to Mono County for Pumice Landfill Negotiating: • sale of 1.02 acres to the Big Pine Fire Department • sale of 3.48 acres to City of Bishop for affordable housing • sale of an easement to Inyo County for Butcher Lane • sale of four easement to Caltrans for road projects • sale of an easement to Inyo County for Veteran's Walking Path • Sale of an easement to Inyo County for Whitney Portal Road • Sale of property to Round Valley School District	Implemented and ongoing.

TITLE	PROVISION	PROGRESS TO DATE	STATUS
Lands for Public Purposes	Los Angeles will 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.	2012: LADWP entered into leases for: two leases for parks with the County of Inyo, one lease for a continuation school with Bishop Union High School, one lease for a campground with the Superintendent of Schools, one lease for a Landfill with the County of Mono, two leases for volunteer fire departments with the City of Bishop, two leases for public parking with the City of Bishop, one lease for the Sierra Nevada Aquatic Research Laboratory with the Regents of California, two license agreements for monitoring sites at sewer treatment facilities for the City of Bishop and Eastern Sierra Community Service District, one license for telecommunication with the Red Cross, and one permit for a community garden with Metabolic Studio. 2013: LADWP entered into leases with Inyo County: • BL-1468 – A borrow material site • LA-821 – Inyo County Sheriff Mazourka Canyon Telecommunication Site • BL-1520 – Independence Little League Field 2014: LADWP entered into agreements for the use of City property with: • Lone Pine Unified School District for use by the Future Farmers of America and Inyo County for a borrow pit 2015: No agreements processed	Implemented and ongoing.

TITLE	PROVISION	PROGRESS TO DATE	STATUS
Lands for Public Purposes, continued		2016: LADWP has negotiated the follow agreements with Inyo County: • BL 0813 Schober Lane Campground • BL 1494 Diaz Lake Recreational Facility • BL 1377 Glacier View Campground • BL 0814 Millpond Recreation Facility • BL 1387 Lone Pine Landfill lease • BL 1385 Independence Landfill lease LOP for Adventure Trails Project	
Legislative Coordination	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.	Ongoing.
Exchange of Data	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.	The County and LADWP are exchanging data and information.	Ongoing.
Dispute Resolution	The agreement provides a process for resolving disputes between Inyo and LA regarding issues related to the agreement or the Green Book.	Issues concerning annual pumping programs and operation of the McNally Canals have been resolved utilizing the dispute resolution procedures outlined in the Water Agreement.	Ongoing.

6.2. Cooperative Studies

6.2.1. Green Book Revision Cooperative Study Status

ICWD and LADWP have been working on cooperative studies intended to facilitate improvements to the Green Book since 2007. Most recently, ICWD and LADWP are exploring methods of improving the current vegetation monitoring program in the Owens Valley.

Inyo County and the City of Los Angeles were instructed to enter a facilitated process with the Ecological Society of America (ESA) "to develop and implement vegetation monitoring procedures and detailed procedures for determining if a measurable change in vegetation has occurred, is occurring, or will occur" as a part of the Blackrock 094 Dispute Settlement Agreement. ESA agreed to facilitate the process in December 2014 and formed a team of three experts in vegetation monitoring and data analysis to achieve the above mentioned goal of the Settlement.

A workshop was hosted by ICWD and LADWP staff in Bishop July 21-23, 2015, to provide the ESA panel of experts with necessary background information for the project. Included in this workshop was the legal framework for the vegetation monitoring program, discussion of baseline conditions, monitoring efforts conducted by both agencies, joint monitoring programs, and existing monitoring resources. Also included was field time to familiarize the panel with Owens Valley vegetation types and current monitoring methodologies.

The ESA team was tasked with producing a report that provides a comprehensive professional review of existing monitoring and analytical methods as well as opportunities for updating these methods. The draft report was submitted to ICWD and LADWP on November 3, 2015; ICWD and LADWP submitted comments on the draft on November 20. Review of Methods for Vegetation Monitoring and Analysis in the Owens Valley, California (final report) was submitted to both agencies on February 22, 2016. LADWP and ICWD Staffs have reviewed the final report and are meeting collaboratively to move forward with a joint vegetation monitoring program.

6.3. Irrigation Project in the Laws Area

6.3.1. 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 100,000 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.

2015 Planting Efforts

In March 2015, a total of 10,000 containerized plants were planted at LAWS 129. Species included *Atriplex polycarpa* (ATPO), *Krascheninnikovia lanata* (KRLA), *Ericameria nauseosa* (ERNA10), and *Atriplex canescens* (ATCA2).

Number of plants by species planted at LAWS 129 in March 2015

SPECIES	**TOTAL**
ATPO	500
KRLA	1500
ERNA10	4500
ATCA2	3500
TOTAL	**10000**

In October 2015, an additional 8,000 containerized plants were planted at LAWS 129. Species included *Atriplex polycarpa* (ATPO), *Krascheninnikovia lanata* (KRLA), and *Ericameria nauseosa* (ERNA10).

Number of plants by species planted at LAWS 129, October 2015

SPECIES	**TOTAL**
ERNA10	4000
KRLA	2400
ATPO	1600
TOTAL	**8000**

In addition to the fall planting effort, approximately 20,000 emitter basins were hand seeded with ERNA10 at LAW027 and 6,500 emitter basins were hand seeded with ATCO/ATPO mix at BIS097. In the winter of 2015/2016 drill seeding took place at all parcels using a native shrub seed mix at a rate of approximately 10 lbs/acre. The focus of the drill seeding effort occurred along edges of fields where drip irrigation was not installed. Two acres were seeded at LAW027, four acres were seeded at LAW129, and

40 acres were seeded at LAW090/94/95. (See Section 5.1 for more information of this seeding effort, as it is summarized along with efforts at LADWP's other revegetation projects in the Owens Valley.)

Planting Schedule

LADWP originally out-planted 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.

Below is the tentative schedule for planting in 2016. 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 in 2016 will begin to be replanted as necessary or treated with alternative methods as they become available to achieve goals. Overplanting efforts will begin at Laws 90.

Parcels	Anticipated Acres to be Overplanted	% Currently Planted	Proposed Schedule for Overplanting
Laws 90	30	100%	Spring 2016
Laws 90	30	100%	Fall 2016
Laws 94	30	100%	Spring 2017
Laws 95	30	100%	Fall 2017
Laws 129	30	100%	Spring 2018

Additionally, LADWP will continue with planting the remainder of the Laws Native Seed Farm (Laws 27) following overplanting, or sooner if possible within the next five years. 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: twice a month for 7-8 hours 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 hours 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 hours 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. Results will be presented in the 2017 report.

Table 6. 2 Laws Revegetation Plan

LAWS REVEGETATION PLAN (2003)			
TITLE	**PROVISON**	**PROGRESS TO DATE**	**STATUS**
LAWS 90	Native revegetation of 101 acres of abandoned agriculture land with 10% cover, ten native species (Including one native grass).	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.	Initial planting across all 101 acres is 100% complete, but has not yet achieved success criteria.
LAWS 94	Native revegetation of 40 acres of abandoned agriculture land with 10% cover, ten native species (Including one native grass).	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 100% complete, but has not yet achieved success criteria.
LAWS 95	Native revegetation of 46 acres of abandoned agriculture land with 10% cover, ten native species (Including one native grass).	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.

TITLE	PROVISON	PROGRESS TO DATE	STATUS
LAWS 118 (19 acre portion)	Native revegetation of 19-acre portion of LAWS 118 (in addition to 139 acres required under 1999 Revegetation Plan above) with 10% cover, eight native species (including one native grass).	The 19-acre portion of Laws 118 covered in the Laws 2003 Plan has a complete irrigation system installed. Initial planting is approximately 100% complete. Approximately 8,000 plants were planted in this parcel from 2008 to 2015.	Initial planting is approximately 100% complete; has not yet achieved success criteria. Planting in this parcel ongoing.
LAWS 129	Native revegetation of 47 acres of abandoned agriculture land with 10% cover, eight native species (Including one native grass).	Drip irrigation system fully installed. Initial planting in this parcel is 100% complete. Approximately 20,000 plants were planted in this parcel from 2008 to 2015. Initial planting was completed in fall of 2015.	Initial planting is 100% complete; has not yet achieved success criteria. Planting in this parcel ongoing.
LAWS 27 (Native Seed Farm)	Initiate a native seed farm 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 seeds 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 *Ericameria nauseosa* and 2 acres of land without irrigation was drill seeded with a native upland scrub mix in winter of 2015.	Planting approximately 85% complete.

6.3.2. Mitigation Monitoring Report for the Irrigation Project in the Laws Area

Table 6. 3 Mitigation and Monitoring 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

6.3.3. 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).

Table 6.4 illustrates the vegetation cover in vegetation parcels within the Laws Wellfield as determined by LADWP. Data from the baseline period 1985 to 1987 (depicted as 1986 for simplicity) indicates estimates of vegetation cover in the parcels prior to implementation of the irrigation project in the Laws area. Data since 2004 are estimates of vegetation cover after implementation of the irrigation project in the Laws area.

Table 6.5 illustrates the depth to water in the Laws area test holes prior to, and after implementation of the irrigation project in the Laws area.

Table 6. 4. 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
LAW030	23	26	31	50	40	39	36	32	35	22	24	12	13
LAW035	33	3	14	17	11	13	3	12	17	4	2	1	1
LAW043	61	5	13	10	16	21	8	11	20	7	3	3	6
LAW052	28	5	14	11	9	15	15	6	16	8	4	4	4
LAW062	21	5	11	14	16	22	12	12	17	10	5	4	2
LAW063	11	9	17	14	19	26	14	15	25	12	6	6	4
LAW065	10	7	8	11	12	18	12	10	20	7	5	4	3
LAW070	59	6	8	17	20	21	14	20	23	10	6	3	4
LAW072	64										10	6	6
LAW078	52	36	49	54	59	67	69	65	53	35	27	23	23
LAW082	17	4	5	10	6	9	8	12	10	8	6	5	4
LAW085	30	7	13	21	26	35	29	31	14	15	6	5	4
LAW105	26	35	49	48	44	68	41	58	43	43	27	19	26
LAW107	47	46	68	71	79	80	90	81	65	54	45	31	35
LAW112	20	17	37	33	38	49	40	31	33	33	14	11	8
LAW120	26	33	41	47	48	48	50	52	47	35	39	26	30
LAW122	60	64	73	78	75	70	78	68	77	60	45	42	30
LAW137-PLC210	22	19	33	32	24	27	20	27	28	21	17	14	14

Table 6. 5 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
T107	30.1	31.9	18.6	21.1	25.2	28.0	31.0	31.8	32.75	33.12	35.29	36.38
T436	10.1	10.2	4.8	5.3	7.1	8.8	9.5	9.5	11.26	11.14	12.99	13.67
T438	11.6	8.9	3.8	6.3	8.2	9.1	11.4	8.6	12.61	12.03	15.75	16.19
T490	14.6	14.7	13.3	10.2	12.6	13.8	13.5	13.3	12.49	13.17	16.64	17.49
T492	32.1	31.5	24.4	23.0	26.8	29.1	30.8	31.7	34.14	32.75	35.61	36.35

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%. The next scheduled evaluation is in 2016.

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. Photos points were replicated during the 2010 growing season and will be replicated during the 2016 growing season.

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. Photo points have been established along the ditch and were replicated during the 2010 growing season and will be replicated during the 2016 growing season.

Mitigation Measure M-7

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

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

Surveys were conducted on the irrigation project in the Laws area for noxious weeds during the 2012 growing season. No A or B listed noxious weeds were found. Weed control was conducted in the 2011 season for other weedy species. The lessee treated weeds through a combination of grazing and burning.

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.

6.4. Irrigation Project in the Big Pine Area

Table 6. 6 Mitigation and Monitoring Program for the Irrigation Project in the Big Pine Area

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

6.5. Invasive Species Treatment and Removal

Background

The LADWP noxious weed treatment program began in 1994 when pepperweed (*Lepidium latifolium*) was initially found in the Owens Valley. LADWP along with many other agencies i.e. Inyo and Mono Counties Agricultural Commissioner's office, Inyo and Mono Counties Cattlemen Association, Caltrans, Inyo National Forest, Bishop Bureau of Land Management, CDFA, Bishop Tribe, Inyo Mono Resource Conservation District, National Resource Conservation Service, Humboldt Toiyabe National Forest, Inyo County Water Department, Cal Fire, Cal State Parks formed the Eastern Sierra Weed Management Group in 1999. The group was formed to work together to treat weeds in the Eastern Sierra. The primary goal of LADWP's on-going weed control efforts are to treat rated noxious weeds on City lands in Inyo and Mono Counties.

Weed treatments on City lands were provided by Inyo County personnel beyond what was treated by the LADWP crews and contractors. Between 2006 and 2012, LADWP provided $200,000 per year to Inyo County for weed control. This money was used as matching funds for grants to treat weeds in Inyo and Mono Counties.

In June 2012, LADWP assumed control for weed treatments on City property in both Inyo and Mono counties, with the exception of the Lower Owens River Project (LORP). For the LORP, a combination of funds from LADWP and Inyo County fund a program that is administered by the Inyo and Mono Counties Agricultural Commissioner's Office.

During the spring of 2012, LADWP began preparing for the transition of responsibilities and a total of five LADWP personnel were assigned to weed management beginning in July 2013. Additional equipment was also dedicated to the project, including two 4-wheel drive pick-up trucks, three quad all-terrain vehicles, and one side by side all-terrain vehicle, all equipped with weed spraying equipment.

Since August 2013, LADWP staff has been retreating all sites previously treated by both LADWP and Inyo County. These sites include the Owens River from Pleasant Valley to the Los Angeles Aqueduct Intake (46 miles), the unlined section of the Los Angeles Aqueduct (26 miles), as well as outlying areas where pepperweed is known to occur. For areas inaccessible by land, LADWP utilized a contractor with a boat to treat weed infestations along waterways.

In 2015, approximately 7,500 acres were covered while treating weeds. Weed treatment focused predominately on pepperweed and to a lesser extent halogeton (*Halogeton glomeratus*) and knapweed (*Centaurea nigra.*) With respect to pepperweed, LADWP treated the majority of the Owens River flood plain/terrace from Pleasant Valley Reservoir to Tinemaha Reservoir. In the LORP, Inyo County treated approximately three dozen pepperweed sites along the river. 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, 2

sites in Long Valley, and 9 sites on Owens Lake. Finally, small populations of both halogenton and knapweed were treated in the Laws area.

At Owens Lake, LADWP staff have surveyed and treated 45 square miles, which included hand removal of saltcedar seedlings where appropriate.

During the 2015 field season, LADWP worked approximately 2,500 worker hours treating weeds in both the Owens and Long Valley. Every known weed site was treated at least once and many sites were treated multiple times during the growing season. LADWP staff continues to utilize a five person crew that treats rated herbaceous weeds from April through October. Additionally, staff treats saltcedar and Russian Olive from October through March. Because of the drought conditions and the area-wide ban on burning, no slash piles that were created from these treatments in 2013-14 were burned in the past 2 years.

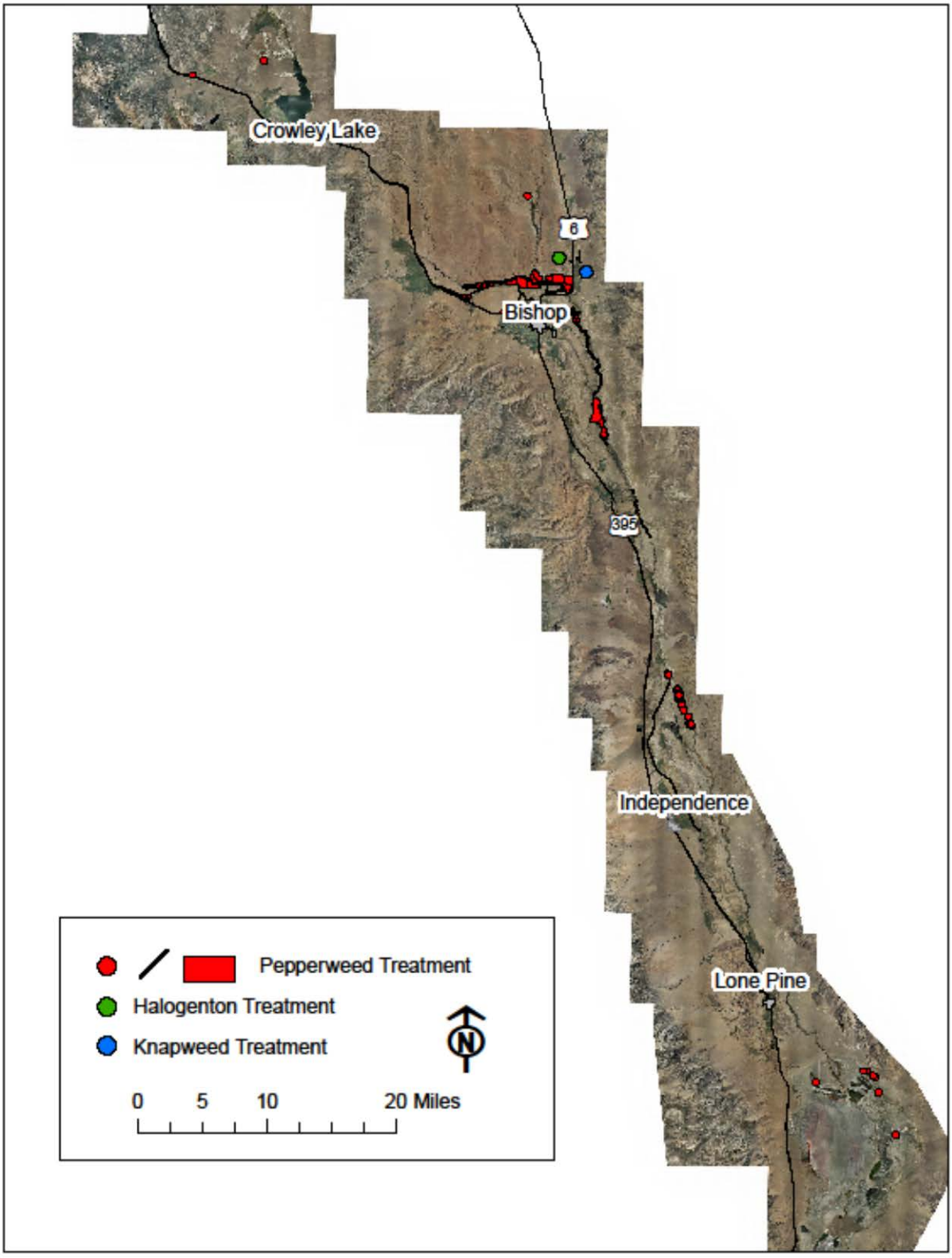

Figure 6. 1 Pepperweed Treatment 2015

7. STATUS OF PROJECTS DEFINED IN THE 1997 MOU

7. STATUS OF PROJECTS DEFINED IN THE 1997 MOU

The following describes the status of projects and activities conducted under 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). This section provides updates on the Yellow-billed Cuckoo Habitat Enhancement Plan, the Additional Mitigation Projects Developed by the MOU Ad Hoc Group (Additional Mitigation Projects), Inventory of Plants and Animals at springs and seeps, and the Owens Valley Land Management Plan (OVLMP). A more thorough description of the current status and direction of the Lower Owens River Project, which is a requirement of both the 1991 EIR and 1997 MOU, can be found in LADWP and Inyo County's Lower Owens River Project Annual Report.

Table 7. 1 1997 MOU Provisions

	1997 MOU		
	Provision	**Progress to Date**	**Status**
MOU Reference	**Section II-Lower Owens River Project**		
Lower Owens River Project (LORP)	A project to rewater approximately 60 miles of the Owens River channel below the aqueduct intake, the enhancement of several environmental features along and near the river, and the return of water to the aqueduct by means of a pumpback facility near the Owens River Delta. The LORP is also identified in the 1991 EIR as compensatory mitigation for impacts that occurred between 1970 and 1990 that were considered difficult to quantify or mitigate directly. The LORP, as described in the Water Agreement and the 1991 EIR, is augmented by the provisions of the MOU.	Project was implemented in 2006 and project base flows were achieved in 2007. This project is currently being operated and is adaptively managed based on ongoing monitoring. For more information, refer to LADWP's and Inyo County Water Department's Annual LORP Reports.	Implemented and ongoing. Monitoring and Adaptive Management ongoing.
A. LORP PLAN	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.	Ecosystem Sciences (ES) has prepared a draft management plan for the project. These plans are listed as draft as the project is based on adaptive management and adjustments may be made in the future. Thus the term "final plan" is not used.	Complete.

			Provision	Progress to Date	Status
MOU Reference			**Section II-Lower Owens River Project**		
	C. Physical Environmental Features	1. The Lower Owens River Riverine-Riparian System	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 wil 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.	Project was implemented in 2006 and project base flows were achieved in 2007. Seasonal habitat flows are released annually according to the guidelines provided in the LORP EIR.	Implemented and ongoing.
		2. The Owens River Delta Habitat Area	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 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.	Implemented and ongoing.

MOU Reference			Provision	Progress to Date	Status
MOU Reference			**Section II-Lower Owens River Project**		
	C. Physical Environmental Features	3. Off River Lakes and Ponds	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.	This component of the project is ongoing.	Implemented and ongoing.
		4. The 1500-Acre Blackrock Waterfowl Habitat Area	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 has been completed. The Blackrock Waterfowl Habitat Area is managed in accordance with the LORP EIR.	Implemented and ongoing.
D. Agency Consultation and Public Involvement			Consultation with the Parties, agencies, DWP ranch lessees, and the public converned with the development of the LORP Plan will occur throughout the development and implementation of the LORP Plan.	Ecosystem Sciences prepared a draft management plan for the LORP. The MOU Parties, agencies, LADWP ranch lessees, and the public were consulted.	Complete.

	Provision	Progress to Date	Status
MOU Reference	**Section II-Lower Owens River Project**		
E. Monitoring and Reporting Plan - Adaptive Management	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.	The LORP Monitoring and Adaptive Management Plan (MAMP) was complete in 2008. Monitoring follows that prescribed in this plan and LADWP generates an annual report each year with monitoring results.	Monitoring and Reporting Plan Complete. Monitoring and Adaptive Management ongoing.
F. LORP EIR	LADWP as the lead agency and the County as responsible agency will jointly prepare an EIR on the LORP. A draft EIR was to be released by June of 2000, but the deadline has been extended by the 1997 MOU Parties. A final EIR will be completed as soon as possible following release of the draft.	The Draft EIR 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.	Complete.
G. Pumpback System	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 system was constructed prior to project implementation. The project was implemented in December 2006.	Complete.

	Provision	Progress to Date	Status
MOU Reference	**Section II-Lower Owens River Project**		
H. Implementation	The baseflow in the river channel will be commenced not later than June 2003 unless circumstances beyond LADWP's control prevent the completion of the pumpback system and/or the commencement of baseflow. Implementation of the other features of the LORP will commence upon certification of the LORP EIR.	The Draft EIR 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 releases started 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.	Complete.
I. Permits, Approvals, Licenses	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: State Water Resources control Board, California Department of Fish and Game, California State Lands Commission, US Army Corps. of Engineers, Caltrans, and the Bureau of Land Management.	Complete.

1997 MOU, SECTION III - ADDITIONAL COMMITMENTS					
	A. Studies, Evaluations, and Commitments	1. Yellow-Billed Cuckoo Habitat	Under the direction of LADWP and the County, Ecosystem Sciences will evaluate Yellow-billed Cuckoo habitat in riparian woodland areas of Hogback and Baker Creeks. Based on the evaluation, if deemed warranted, habitat enhancement plans for these areas will be developed by Ecosystem Sciences, in consultation with LADWP, the lessee for the area and the parties to the 1997 MOU. The evaluations were to be completed within 36 months of the discharge of the writ, but the deadline has been extended by the 1997 MOU Parties. Actions or projects recommended by this evaluation will be presented to the Board of Water and Power Commissioners for approval and implementation. If approved by the Board of Water and Power Commissioners, habitat enhancement plans will be implemented as expeditiously as feasible.	Ecosystem Sciences completed a Yellow-billed Cuckoo (YBC) Habitat Plan in April 2005. LADWP released a Draft EIR in January 2006. The 1997 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 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. Additional replacement plantings will be pursued where necessary to achieve project goals by 2016-2018.	Implemented in full. Success criteria not yet met. Monitoring is ongoing and replanting occurs as necessary to reach project goals.

1997 MOU, SECTION III - ADDITIONAL COMMITMENTS					
	A. Studies, Evaluations, and Commitments	2. Inventories of Plants and Animals at Springs and Seeps (LORP Planning Area)	Within 36 months of the discharge of the writ, an inventory of plants and animals at wetlands associated with springs and seeps was to be conducted by Ecosystem Sciences.	The deadline for completion of the inventories was extended to December 2000 and then to July 2001 by the MOU Parties. No further extensions have been granted. Ecosystem Sciences completed and submitted results of its inventory to the MOU Parties in June 2001.	Complete.
		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. Projects recommended by these studies and evaluations will be presented to the Board of Water and Power Commissioners for approval and implementation. The mitigation measures are to be implemented by LADWP and maintained by LADWP and/or the County. The measures were to be implemented within 36 months of the discharge of the writ.	The Second Amendment of Amended Stipulation and Order (Case No. S1CVCV01- 29768) regarding the Additional Mitigation Projects Developed by the MOU Ad Hoc Group was executed on March 8, 2010 by Inyo County Superior Court. This Amendment accepts the Additional Mitigation Projects as mitigation for the 1600 AF provision and establishes a two year timeline for implementation of the projects. The Additional Mitigation Projects were approved by the Board of Water and Power Commissioners following CEQA evaluation in June 2010. LADWP began implementing the eight projects shortly thereafter and all projects were implemented by the March 8, 2012 court deadline. See text in this section for more information on these projects.	Implemented and ongoing; currently attaining goals.

1997 MOU, SECTION III - ADDITIONAL COMMITMENTS			
B. Owens Valley Management Plans	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, working with Ecosystem Sciences, will commence the planning effort within 5 years, and plans are to be completed within approximately 10 years. Each plan will contain an implementation schedule and will be implemented in compliance with CEQA. As plans become final, they will be presented to the Board of Water and Power Commissioners for approval and implementation.	LADWP has completed the Owens Valley Land Management Plan (OVLMP) which describes management actions for City-owned lands in Inyo County per the MOU. A Mitigated Negative Declaration was prepared and circulated in 2010 and was adopted by the Board of Water and Power Commissioners in June 2010. Implementation of fencing and recreational management measures were completed in early 2011. City lands outside the LORP Planning Area are currently being managed under this plan. LADWP finalized 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 the Los Angeles Department of Water and Power's operations, maintenance, and management activities on its 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 completing responses to comments and develop the final HCP.	Implemented and ongoing.

1997 MOU, SECTION III - ADDITIONAL COMMITMENTS			
C. Inventory of Plants and Animals at Springs and Seeps (outside LORP Planning Area)	Within 36 months of the discharge of the writ, an inventory of plants and animals at wetlands associated with springs and seeps was to be conducted jointly by LADWP and the County 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 has completed data collection for spring and seep discharge. LADWP had Ecosystem Sciences completed the inventory of plants and animals.	Complete.
D. Type E Vegetation	By 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.	Complete.
E. Aerial Photo Analysis	By June 2000, LADWP, the County, and experts in aerial photography interpretation were to 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., the consultant conducting the study, completed reports addressing the 1997 MOU requirements.	Complete.

1997 MOU, SECTION III - ADDITIONAL COMMITMENTS			
F. Mitigation Plans for Impacts Identified in the 1991 EIR and the Water Agreement	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.	The Technical Group fulfilled this obligation.	Ongoing.
1997 MOU, SECTION III - ADDITIONAL COMMITMENTS			
G. Technical Group Meetings	Technical Group meetings are to be open to the public.	Scheduled Technical Group meetings were opened to the public beginning October 15, 1997.	Ongoing.
H. Annual Report on the Owens Valley and I. Reports	LADWP and the County are to prepare annual reports describing environmental conditions in the Owens Valley, and describing studies, projects and activities conducted under the long-term agreement and the MOU. The report will be released on or about May 1 of each year.	Inyo County has prepared annual reports since 1991. LADWP has released annual reports since 2001.	Ongoing.
SECTION IV - FISH SLOUGH			
Fish Slough	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.	Ongoing.

SECTION VI - DISPUTE RESOLUTION			
Dispute Resolution and Litigation	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.	Ongoing.
SECTION VI -FINANCIAL PROVISIONS			
Financial Assistance	The County will pay the sum of $53,000 to the Sierra Club and the sum of $30,000 to the Owens Valley Committee for professional services in the development and preparation of the 1997 MOU.	The specified amounts have been paid by the County to the identified parties.	Complete.

7.1. Yellow-billed Cuckoo Annual Report: Progress of Habitat Enhancement at Baker and Hogback Creeks

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 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 2014, it was determined that groundwater levels dropped in all five of the areas tested and that all five of the planting areas were unsuitable for replanting in 2015. Therefore, no replanting efforts took place in 2015.

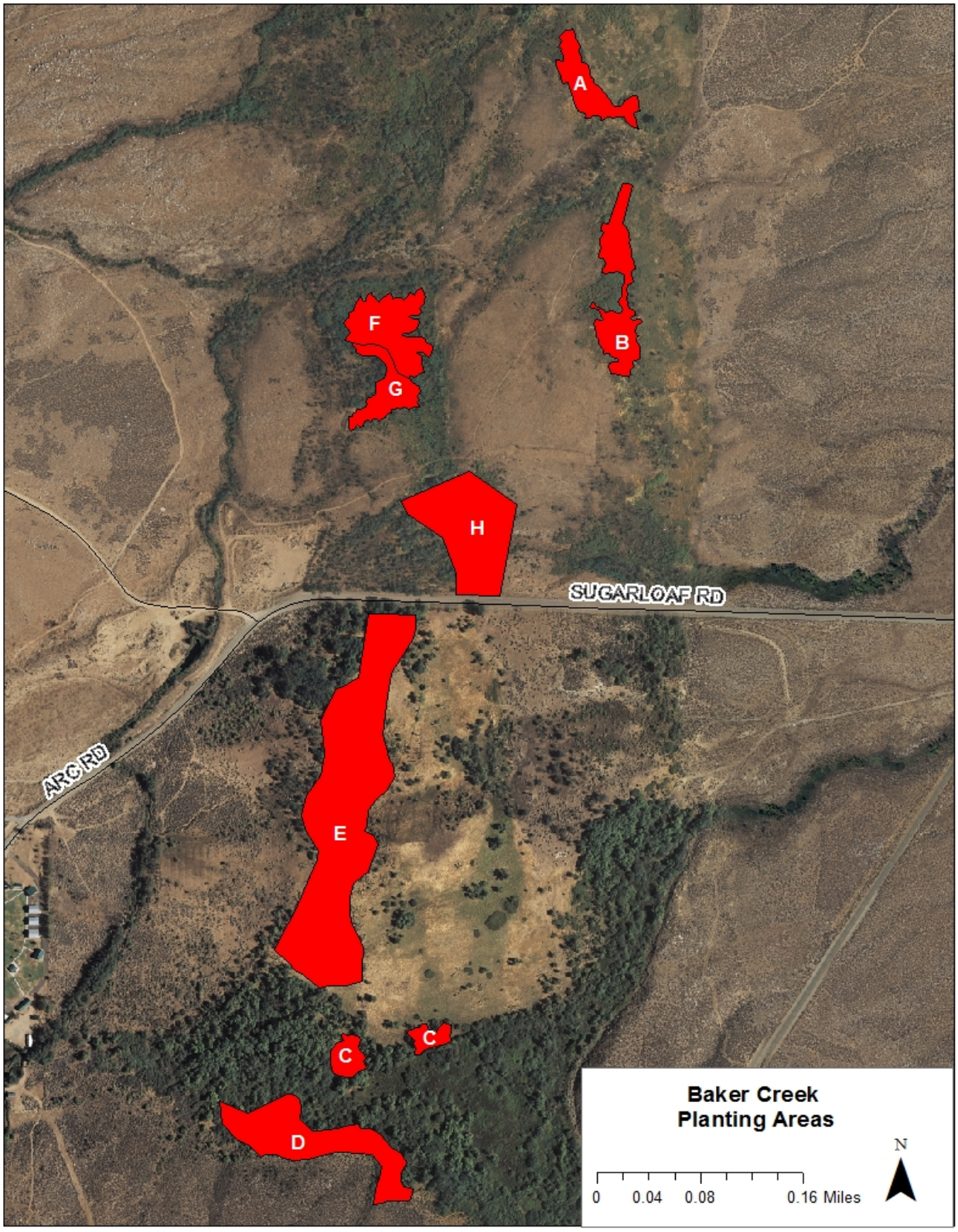

Figure 7. 1 Overview of Pole Planting Areas in the Baker Creek Watershed

As-Built Plans

Based on groundwater analysis in 2014 all five of the planting areas were unsuitable for replanting in 2015. Therefore, no as-built plans were produced since replanting did not occur.

Nonnative Species Control

Black Locust (*Robinia pseudoacacia*)

Based on low cover values in data collected in 2014 for upper canopy (nonnative), it was unnecessary to treat black locust in 2015. All cover values were at or below the criterion for upper canopy nonnative values.

Canada Thistle (*Cirsium arvense*)

In 2013, there was an outbreak of Canada thistle in the western polygon of planting Area C. Percent absolute cover values jumped from 14% in 2012 to 32% in 2013 and 24% in 2014. In an effort to control the spread and hopefully eradicate Canada thistle in Area C, LADWP crews used herbicide to treat the nonnative species in September 2014. In 2015, the absolute cover value dropped to 6%, indicating successful treatment. The area was not retreated in 2015.

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, 10 transects for Area F&G, and 12 transects for Area H. Transects within these areas were sampled from June 27 through July 12, 2015. Since initial planting was phased over three years, this year was the fifth year that line point sampling was conducted for planting Areas A, B, F & G, the fourth year for planting Areas C, D, and H, and the third 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 7.1.

Since the initial planting conducted in 2010, planting Area F&G has been treated as one planting area. However, Area F is held to an upper and mid canopy cover value of 50% while planting Area G is held to a higher upper and mid canopy cover value of 65%. As a consequence, year 6 approaches planting Area F & G will be divided into two separate planting areas to determine if each area has met its individual success criteria. To split the F & G polygon into two individual polygons, the line point shapefile was overlaid on the original F & G shapefile. Five lines were selected to represent Area F (lines 1, 2, 3, 4 and 7) and five lines to represent Area G (lines 5, 6, 8, 9 and 10) based on location (Figure 7.2). Once F&G were segmented, data collected starting in 2011, was reevaluated and is reported according to Area F or G independently, rather than collectively as in years' past. These values are shown in Table 7.1.

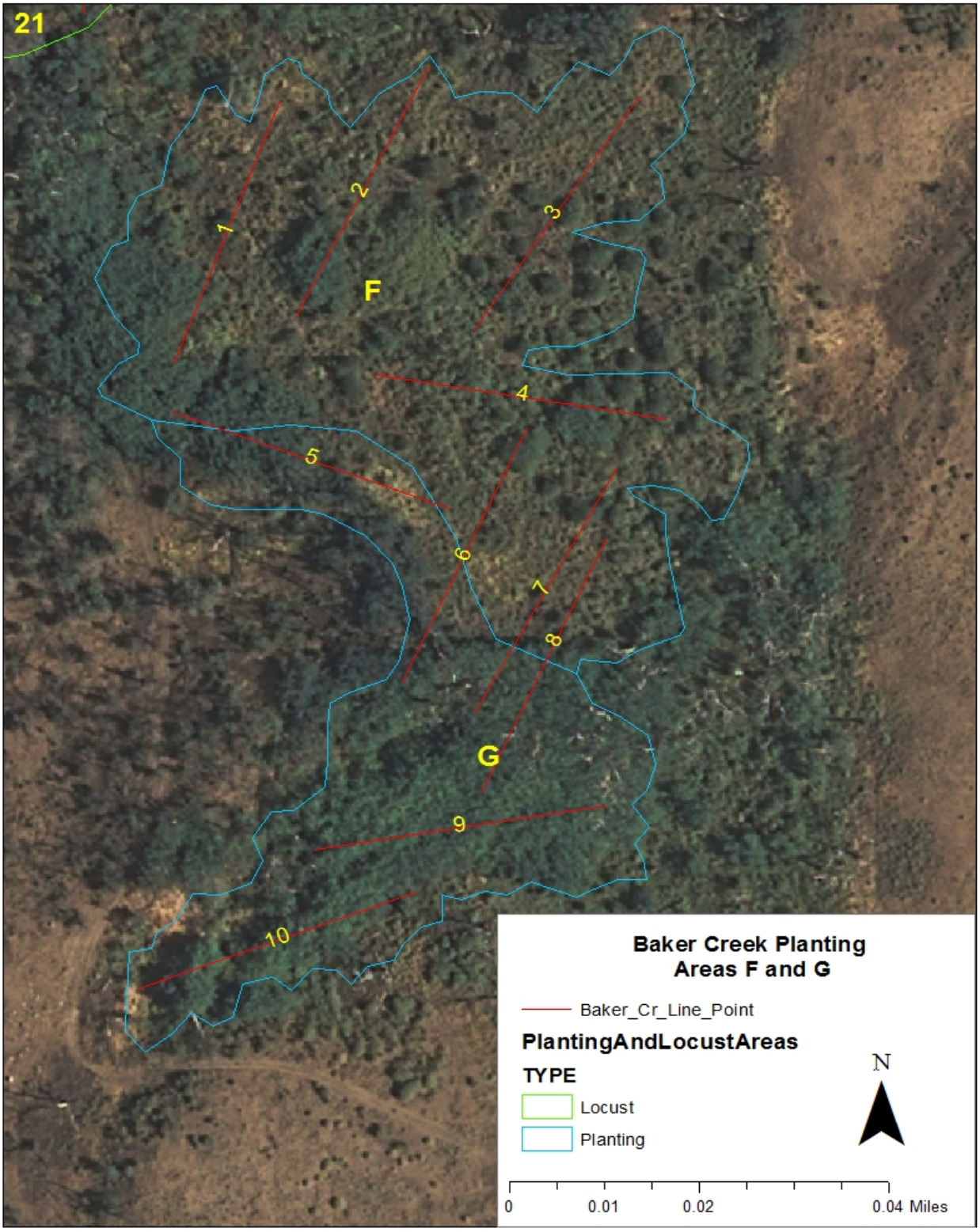

Figure 7. 2 Overview of Transects and Pole Planting Areas F and G in the Baker Creek Yellow-billed Cuckoo Project

Table 7. 2 Percent Absolute Cover Values for 2011-2015 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	
Upper Canopy NonNative	2011	0*	0*	T*					1*		
	2012	0*	0*	2*	0*	0*			4*	1*	
	2013	0*	0*	1*	0*	0*	6	<5	T*	T*	<5
	2014	0*	0*	T*	0*	0*	5*		T*	T*	
	2015	0*	0*	T*	0*	0*	7		T*	1*	
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	
Upper & Mid Canopy	2011	51*	27	32					21		
	2012	62*	17	46	13	46			20	42	
	2013	36	17	44	20	51*	12	≥50	41	45	≥65
	2014	61*	30	38	12	57*	15		34	48	
	2015	73*	29	52*	23	67*	17		34	55	
Understory & Shrub Native	2011	37	64*	56*					48		
	2012	34	74*	41	70*	39			41	48	
	2013	39	63*	30	43	21	24	≥50	37	34	≥50
	2014	29	55*	35	68*	25	19		46	29	
	2015	19	31	18	62*	24	30		23	23	
Understory NonNative	2011	1*	7*	11*					13*		
	2012	T*	5*	11*	14*	3*			13*	4*	
	2013	3*	9*	10*	32	T*	7*	<25	7*	9*	<25
	2014	3*	8*	2*	24*	2*	2*		6*	7*	
	2015	5*	10*	2*	6*	2*	4*		1*	6*	

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

In 2015, upper and mid canopy cover in planting Area A was 73%, which was 12% higher than the 2014 cover value. Area A has met the enhancement plan's criterion for upper and mid canopy cover in 2011, 2012, 2014 and 2015. Native understory cover values have decreased from a high of 37% in 2011 to a low of 19% in 2015. Native understory has yet to meet the enhancement plan's criterion of ≥50%. Both the nonnative canopy cover (<5%) and nonnative understory (<25%) values have met the enhancement plan's criteria for Area A.

Upper and mid canopy cover in planting Area B in 2015 remained the same as the 2014 cover value of 29%. Area B has yet to meet the upper and mid canopy criterion of ≥50% in any year and has only had a high cover value of 29%. Native understory cover values decreased from 55% in 2014 to 31% in 2015. For the first time post implementation, Area B in 2015 did not meet the native understory cover criterion. Both the nonnative canopy cover and understory cover values have remained below the enhancement plan's criteria of >5% and >25%, respectively, and continue to meet goals.

Upper and mid canopy cover increased in Area C from the 2014 value of 12% to the 2015 cover value of 23%. Area C has yet to meet the upper and mid canopy criterion of ≥50% in any year. Native understory decreased from 68% in 2014 to 62% in 2015. The area has once again met the native understory criterion of 50%. Nonnative canopy cover remained at 0% in 2015, nonnative understory cover decreased from 24% in 2014 to 6% in 2015 which is well below the enhancement plan's criteria of 25% and therefore continue to meet goals.

Upper and mid canopy cover in Area D increased from 57% in 2014 to 67% in 2015. At 67% upper and mid canopy cover in Area D met the criterion stated in the enhancement plan. Area D has also met the criterion of nonnative canopy cover with 0% cover. Native understory decreased by 1% from the 2014 cover value of 25% to 24% in 2015 and was still below the 50% criterion. Nonnative understory cover values in 2015 remained the same as they were in 2014 at 2%, which was still well below the 25% criterion value stated in the plan and therefore continue to meet goals.

Area E had an upper and mid canopy cover value of 17% in 2015, an increase of 2% from the 2014 cover value. Nonnative canopy cover for 2015 has increased to 7% which is 2% above the criterion value stated in the plan. In the 2013 annual report, it was stated that mature stands of black locust in the planting area should not be removed because they may not be able to be replaced with willows and cottonwoods. These stands of mature black locust are the reason why Area E is 2% higher than the criterion stated in the plan. Native understory cover value in 2015 is 30% which is 20% below the target cover value specified in the plan. Nonnative understory cover in 2015 was 4% which is below the 25% criterion and continues to meet goals.

In 2015, Area F had an upper and mid canopy cover value of 52%, an increase of 14% from the 2014 cover value. For the first time since 2011, Area F has met the 50% criterion as stated in the plan. Nonnative canopy cover value in 2015 remained at a

trace well below the criterion. Native understory cover decreased from 35% in 2014 to 18% in 2015. Nonnative understory in 2015 remained at 2% and is below the plan's criterion of 25%, therefore continuing to meet goals.

In 2015 upper and mid canopy cover in planting Area G was 34%, which was the same as the 2014 cover value. Area G has yet to meet the upper and mid canopy criterion of ≥65% in any year. Native understory decreased from 46% in 2014 to 23% in 2015. Nonnative canopy cover remained at a trace in 2015, nonnative understory cover decreased from 6% in 2014 to 1% in 2015, which is well below the enhancement plan's criteria of 25%. Nonnative cover continues to meet goals.

Area H had an upper and mid canopy cover value of 55% in 2015. Area H is still 10% below the higher enhancement plan's criterion (65%) and has yet to meet it in any year. Nonnative canopy cover has increased from a trace to 1% and is below the 5% criterion. Native understory decreased for a fourth straight year from a high of 48% in 2012 to 23% in 2015. Nonnative understory cover has decreased from 7% in 2014 to 6% in 2015.

Competition

As stated in previous years' reports, competition due to shading by the upper and mid canopy as well as competition for nutrients and water could lead to a decrease in understory cover values. Examining Table 7.1, planting Area D illustrates this competition when examining past years data. Upper and mid canopy values had a low value in 2012 of 46% and increased to a high value of 67% in 2015. At the same time the native understory and shrub values were highest in 2012 at 39% and have decreased to a low of 24% in 2015. The same is true for planting Areas A, B, F, G and H as well. Planting Areas C and E do not at this time have enough canopy cover to affect the understory cover values.

Depth to Groundwater

Following a fourth consecutive dry year in 2015, LADWP repeated the depth to ground water analysis that started in 2013 (Figure 7.3 and 7.4). Based on this analysis it was determined that groundwater levels were still unsuitable for replanting in 2016 in all five of the areas tested. Therefore, no replanting efforts are planned in 2016 until conditions improve.

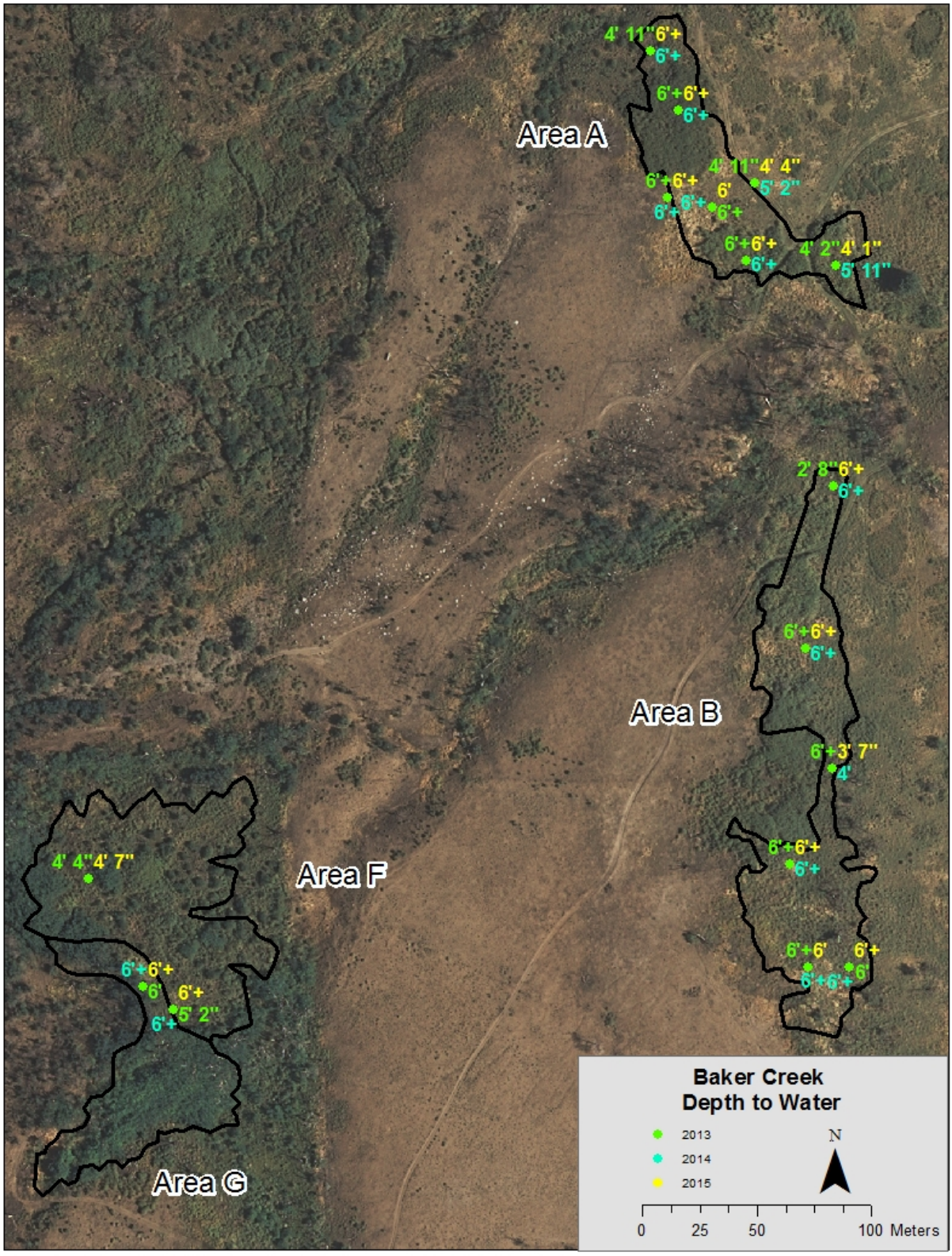

Figure 7. 3 Depths to Groundwater in Planting Areas A, B, F & G for 2013-2015

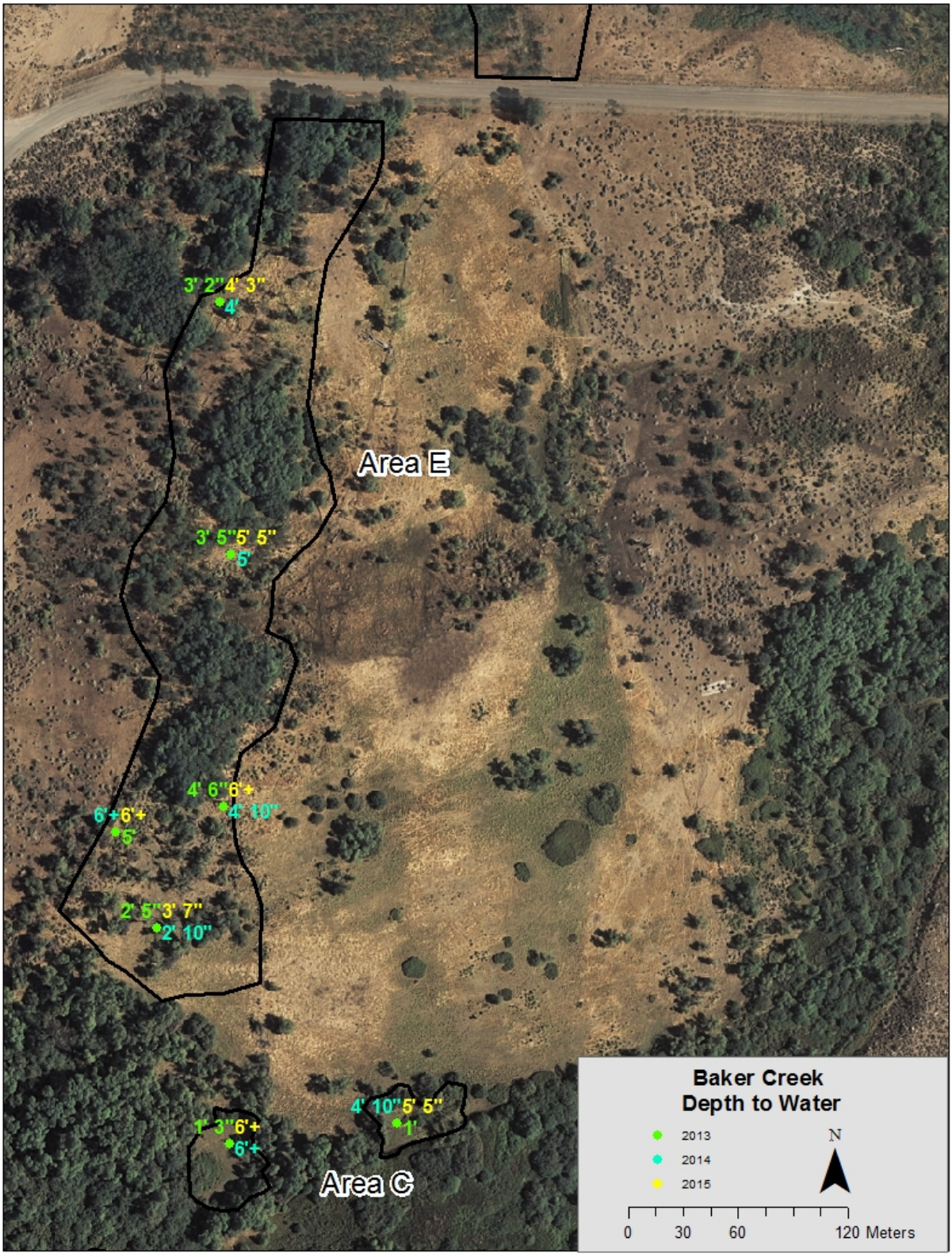

Figure 7. 4 Depths to Groundwater in Planting Areas C & E for 2013-2015

Activities Scheduled for 2016-2017

Nonnative Species Control

Black locust control will continue in planting Areas E, F, G, and H during the winter of 2016-2017 to control re-sprouts if needed. Thistle control in and around planting Area C will continue if needed using herbicide.

Depth to Groundwater

Repeat groundwater analysis to determine if groundwater levels are suitable for replacement pole plantings in 2017.

Planting of Pole Cuttings

If groundwater levels are suitable for pole plantings, cuttings will be harvested during the winter and planted when conditions permit in the spring of 2017. No planting efforts are scheduled during 2016 due to current groundwater depths below the rooting zone due to drought conditions.

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

7.2.1. 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.

7.2.2. 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 specified in the Stipulation and Order.

7.2.3. Monitoring and Reporting per the Additional Mitigation Projects Document

The Additional Mitigation Projects document defines a five-year monitoring framework for the projects that includes flow monitoring, rapid assessment surveys, photopoint monitoring, and mapping requirements. Table 7.2 shows flow data recorded for each of the Additional Mitigation Projects from April 1, 2015, through March 31, 2016. Additionally, on July 2, 7, and 24, 2015 LADWP conducted photo point monitoring, woody recruitment surveys and assessment of fence condition (where applicable) and has generated recommendations for the projects where necessary.

Table 7. 3 Additional Mitigation Projects Developed by the MOU Ad Hoc Group, Annual Accounting in Acre Feet (April 1, 2015-March 31, 2016).

Additional Mitigation Projects Developed by the MOU Ad Hoc Group
Annual Accounting in Acre Feet (April 1, 2015-March 31, 2016)

	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	17	11	7	2	6	18	12	0	94
May	19	0	18	12	7	2	7	18	13	0	96
June	14	0	17	11	7	2	6	18	12	52	139
July	13	0	17	8	7	3	6	18	13	88	174
August	10	0	17	0	7	2	7	18	13	52	126
September	13	2	16	0	6	2	6	17	12	0	75
October	22	180	17	0	7	2	7	16	13	0	263
November	22	59	16	0	7	2	6	15	12	0	140
December	23	99	17	2	7	2	6	17	13	0	187
January	23	0	17	8	7	2	7	16	13	0	93
February	18	0	16	11	6	2	6	15	12	0	87
March	18	24	17	14	7	2	6	15	12	25	141
Total					*81*	*29*	*77*	*201*			*1614*
Project Total	*215*	*364*	*203*	*76*	*110*		*278*		*150*	*217*	
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.*

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 is at CDFW's discretion. To date, no data or recommendations have been submitted to LADWP from CDFW.

Inyo County Water Department (ICWD) conducted rapid assessment surveys and vegetation mapping for the Additional Mitigation Projects during the peak of the growing season. These maps are provided in this section by project site. Table 7.3 shows the difference in acreages of vegetation types between 2014 and 2015 for each of the sites.

Table 7. 4 Acreage of Vegetation Types Among Additional Mitigation Project Sites

	Freeman Creek		Warren Lake		Hines Spring	
	2014	2015	2014	2015	2014	2015
Wetted Extent	1.08	0.54	150.7	122.4	1.8	0.64
Wetland	1.8	1.8	0.16	0.16	1.8	1.8
Phreatophytic Shrub	9.5	9.5	12.4	12.5	15.7	15.7
Meadow	5.1	5.3	204.3	204.2	14.1	22.4
Shrub Meadow	9.8	9.8	127.9	127.9	68.9	68.9
Xeric Scrub	180.7	181.3	9.9	9.9	2.4	2.4
Barren	0	0	48.7	48.7	0.02	0.2
Disturbed	10.8	10.8	2.3	2.3	8.1	8.1

	North Mazourka		Homestead		Well 368	
	2014	2015	2014	2015	2014	2015
Wetted Extent	9.4	6.3	10.7	7.4	1.5	1.1
Wetland	4.9	4.9	9.7	9.7	0.8	0.8
Phreatophytic Shrub	5.5	4.5	24.2	24.2	4.7	4.7
Meadow	26.2	26.2	63.0	63.0	1.0	1.0
Shrub Meadow	69	78.1	72.5	72.6	0.2	0.2
Xeric Scrub	0	0	23.5	23.5	13.0	13.0
Barren	0.1	0.1	1.2	1.2	0.1	0.1
Disturbed	1.1	1.4	13.4	13.4	0.8	0.8

7.2.4. Freeman Creek

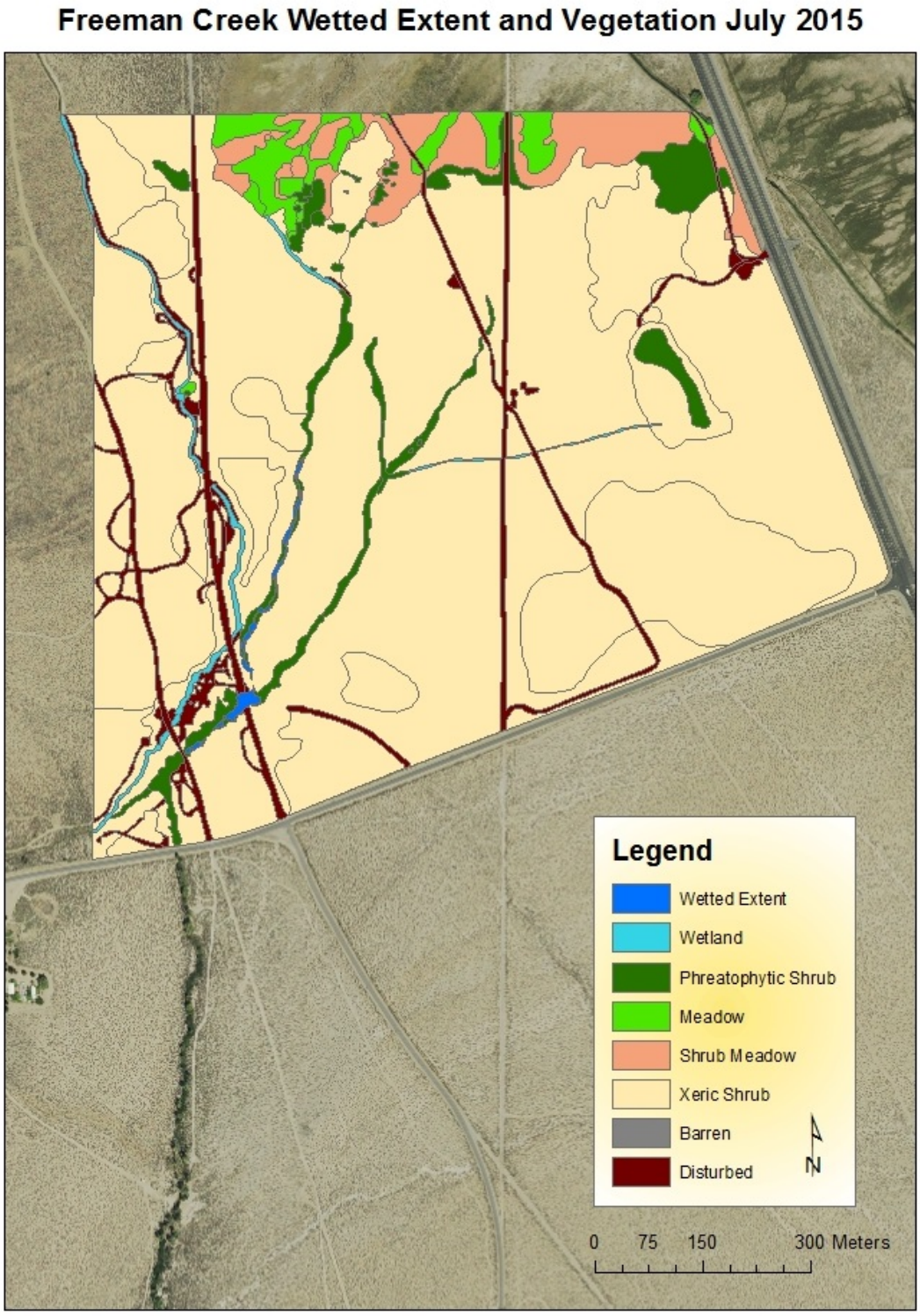

Figure 7. 5 Freeman Creek Wetted Extent and Vegetation July 2015

Flow Monitoring

The annual water allotment for this project is 215 AF/year, which was based on long term averages for Freeman Creek. This year, LADWP recorded 165 AF of water being used for the project during the 2015-2016 water year.

Photo Point Monitoring

Photo points were established in April 2011 and were recaptured at the peak of the growing seasons in 2012-2015. These photos can be made available upon request. The narrowleaf willows at the Freeman creek culvert crossing look healthy and vigorous. The vegetation in the meadow near the canal is exhibiting more green growth compared to 2014. The saltbush/sagebrush scrub also appears greener and healthier than in 2014.

Woody Recruitment

Woody recruitment is thriving between dry wash one and two. Twenty red willows (*Salix laevigata*) and 15 Fremont cottonwoods (*Populus fremontii*) are healthy and well established from 2013-2014 and range between one and two feet tall. Additional seedling recruitment emerged over the 2015 growing season, including seven red willows and 17 Fremont cottonwoods.

Freeman Creek Dry Wash One, Healthy Willow and Cottonwood Recruitment, July 2015

Fourteen Fremont cottonwood and 25 red willow seedlings observed in 2013 and 2014 in dry wash two are alive and healthy, ranging from 1-4 feet tall. Additional seedling recruitment was also noted including two Fremont cottonwoods and one red willow.

Freeman Creek Dry Wash Two, Established 2-year Willow and Cottonwood Recruitment, July 2015

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

In 2013 some narrowleaf willows *(Salix exigua)* 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 growing season, the narrowleaf willows at the culvert crossing appear to have overcome the willow cankers and are once again thriving.

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, in 2014, new healthy sprouts emerged out of the trunks of five individuals (refer to the photo below). In 2015 healthy sprouts continue to grow from these willows.

Freeman Creek Willow Die-Back, New Emerging Sprouts July, 2015

Fence Condition

Not applicable.

Recommendations

Due to a fourth year of consecutive drought and the driest year on record, flows were lower than long term averages for Freeman creek. The new data logger installed at the flume to automate data collection and monitor the volume of water that is going to the project has been successful.

No additional planting or seeding are necessary at this time, as recruitment of desirable species is naturally occurring. Monitoring for saltcedar seedlings and resprouts will continue and will be removed from the project site as resources are available.

7.2.5. Warren Lake

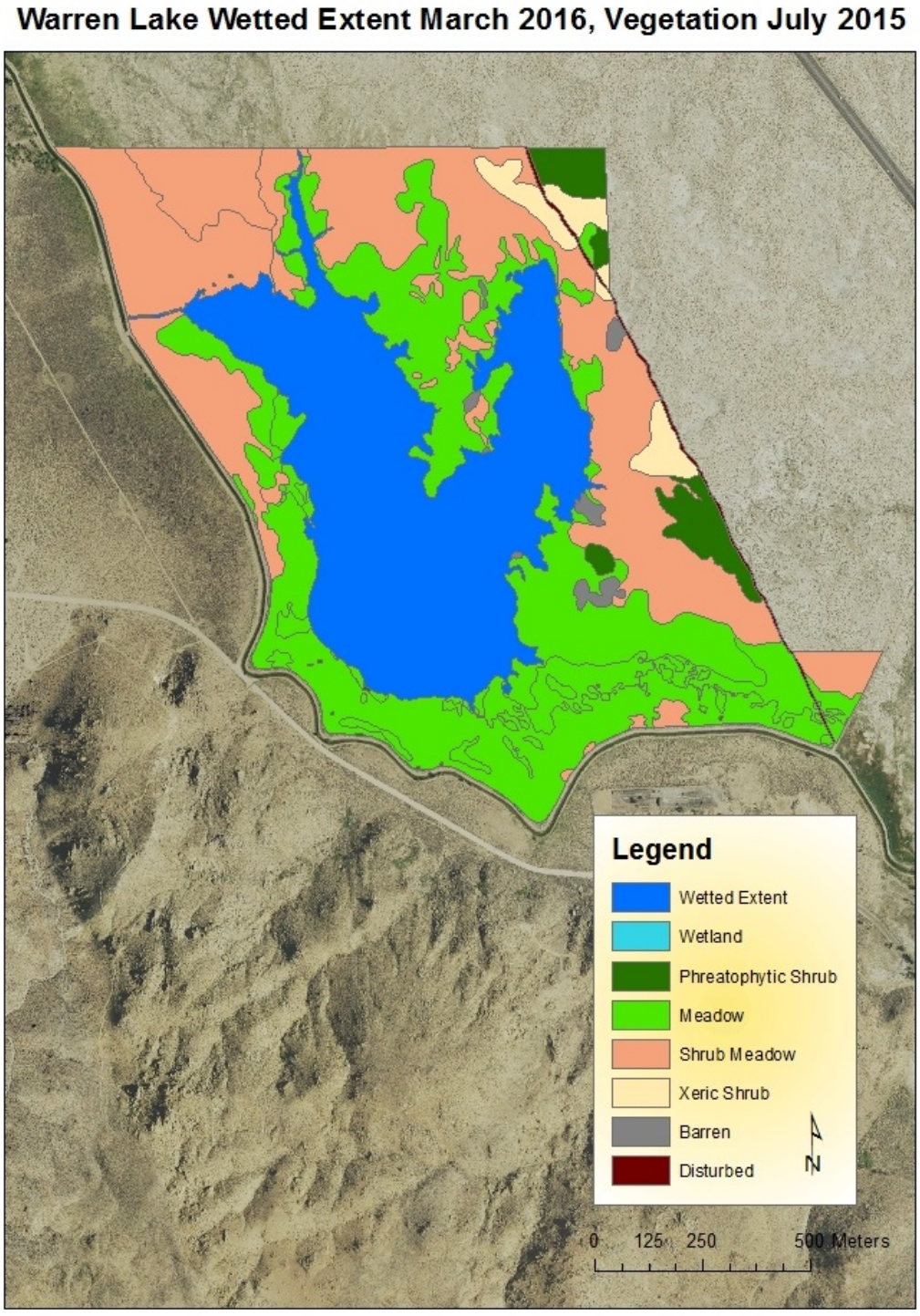

Figure 7. 6 Warren Lake Wetted Extent March 2016, Vegetation July 2015

Flow Monitoring

LADWP released water to Warren Lake from October 2015 - March 2016 to fulfill the remaining balance of the 1600 AF water commitment. The total volume of water that was released to the project was 364 AF. This volume is considerably more than contemplated during the development of the projects. However, LADWP was able to fulfill the mitigation requirements even under extreme drought conditions.

Woody Recruitment

There are three Fremont cottonwood saplings 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, 10 feet tall.

Fence Condition

Not applicable.

Recommendations

The project is operating as necessary. The check wall structure constructed in the Big Pine Canal in February 2014 has improved the facilitation of flows into Warren Lake and has reduced the erosion along the banks of the canal caused by the old concrete blocks.

7.2.6. Hines Spring Well 355

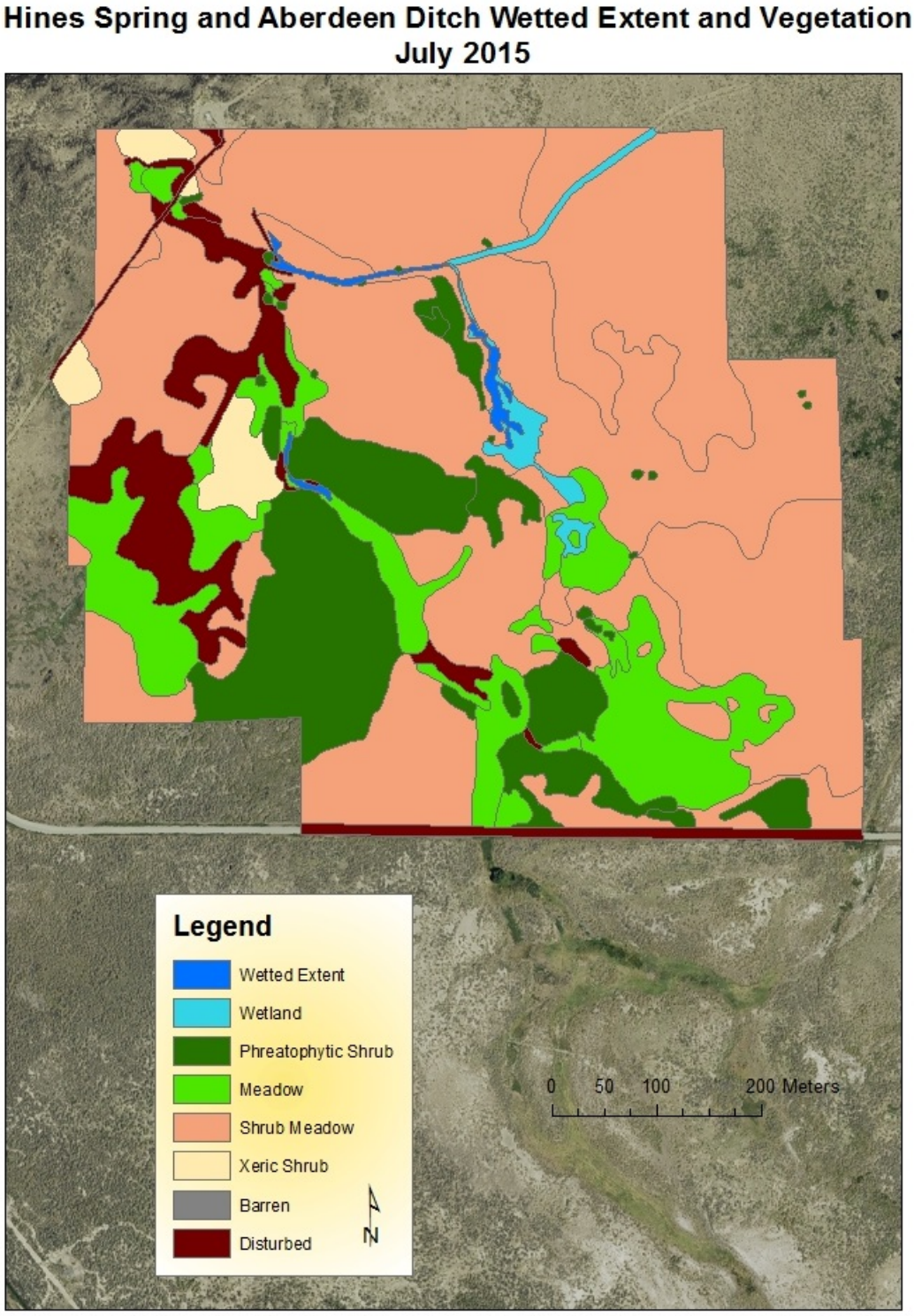

Figure 7. 7 Hines Spring and Aberdeen Ditch Wetted Extent and Vegetation, July 2015

Flow Monitoring

The annual water allotment for this Hines Spring Well 355 Project is 240 AF/year. 203 AF was released to the project this year.

Photo Point Monitoring

Photo points were established in March 2012 and were recaptured at the peak of the growing seasons in 2012-2015. 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 (*Bassia hyssopifolia*) and Russian thistle *(salsola tragus)* have encroached around the pipe outfall, and are particularly abundant to the north. Cattails (*Typha latifolia)* are grazed by horses and mules in the main spring channel; however, encroachment of cattails progresses seasonally, choking the spring channel and ponded areas and causing water to back up behind the 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 appears to have been successful, as there is minimal seepage through the barrier to the south (see photo below).

Hines Well 355, Berm, Near Pipe Outfall, Healthy Red Willow, No Ponding, July 2015

Woody Recruitment

There are three red willow seedlings established near the pipe outfall. There is also abundant recruitment of desirable non-woody species throughout the project area. The main spring channel banks below the pipe outfall are exhibiting healthy and 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)* (see photo below).

Hines Well 355 Main Spring Channel Below Pipe Outfall, July 2015

Additionally, baltic rush (*Juncus balticus),* bulrush (*schoenoplectus spp*.), and monkeyflower *(Mimulus guttatus)* are healthy and abundant in the spring channel and ponded areas (see photo below).

Hines Well 355 Ponded Area, Desirable Non-Woody Vegetation Growth, July 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. These meadows also appear to be greener compared to 2014 (see photo below).

Meadow Around Pond Area Three, July 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 will exclude horse grazing but will allow elk and deer passage (see photos below). 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 is in good condition.

Hines Well 355 Fence Exclosure Around Ponded Area Showing Cowboy Gate and Looking Northwest, July 2015

Hines Well 355 Fence Exclosure Around Ponded Area, East, July 2015

Recommendations

No additional planting or seeding is necessary at this time, as recruitment of desirable species is vigorous, healthy, and diverse at the project site (particularly non-woody species). There were a few individuals of broadleaved pepperweed (*Lepidium latifolium*) observed in the meadow south of the fence exclosure. Hand treatment with a backpack sprayer occurred on July 20, 2015, to eradicate the population before it propagated. Monitoring for this species will continue to occur. The main spring channel downstream of the pipe outfall was redirected around the large red willow located directly south of the outfall via a rock and earthen berm. This berm will be monitored to ensure survival of the willow. The new fenced exclosure will be monitored to examine the potential effects of domestic grazing in response to vegetation recruitment inside and outside of the exclosure. Monitoring will also examine whether comparative grazing effects occur by ungulates such as elk and deer utilizing the area when domestic grazing pressures are absent.

7.2.7. Aberdeen Ditch Project

Refer to Hines Spring map above for wetted and vegetated extent

Flow Monitoring

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 only able to release 76 AF to this project during the 2015-2016 water year. Water was not released to the Aberdeen Ditch from August through November due to low flows from consecutive dry years in addition to prior water commitments for fishery flows to the aqueduct in Aberdeen Ditch, and flows to Blackrock Fish Hatchery. By December 2015 flows were resumed to the project.

Continuous problems with sinkholes have also occurred. To alleviate this issue, LADWP extended a pipe down the Aberdeen 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 (see photos below). Unfortunately, sinkholes continue to be problematic for this channel. During 2015 monitoring the ditch pipe was observed to be disjointed, releasing water at two locations. However, this may prove to be beneficial as there was presence of standing water in a majority of the channel. Additionally, there has been substantial growth of beardless wildrye, replacing what used to be bare channel and prickly Russian thistle.

Aberdeen Channel, July 2015

Aberdeen Channel Extended Outfall, July 2015

Photo Point Monitoring

Photo points were established in March 2011 and were recaptured at the peak of the growing seasons in 2012-2015. 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 (see photo below). American pondweed (*Elodea canadensis*) has filled the concrete lined portion of the channel at the Intake structure. This section of the channel should be cleaned this year.

Aberdeen Intake, Woody and Non-Woody Species Recruitment, July 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. Because sinkholes continue to be problematic in the spring channel, a small temporary fence exclosure was constructed until a permanent pipe outfall location can be determined to be effective. To date, it is uncertain where the permanent pipe outfall location will be placed.

Recommendations

Monitoring will continue to determine the effectiveness of the extended pipeline and whether static conditions are attained to construct a permanent fence exclosure for monitoring future grazing effects. LADWP will continue monitoring the establishment of woody recruitment and recruitment of desirable non-woody species. American pondweed has filled the concrete lined portion of the intake channel and will be cleaned as resources become available.

7.2.8. North of Mazourka Canyon Road

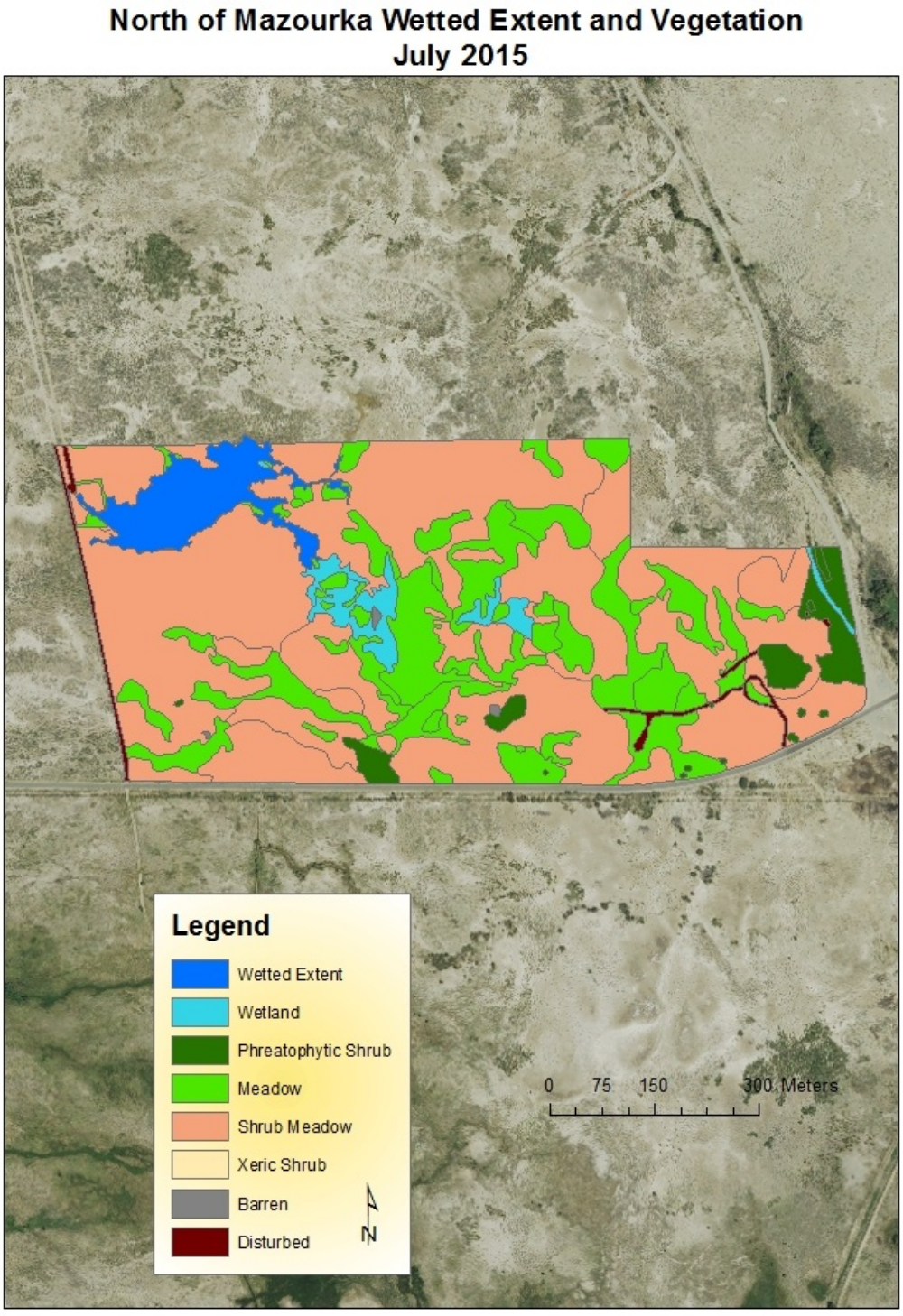

Figure 7. 8 North of Mazourka Wetted Extent and Vegetation July 2015

Flow Monitoring

The annual water allotment for this project is 300 AF/year from two artesian well sources. These wells produced 110 AF during the 2015-2016 water year. Due to another extreme drought year and the driest year on record, less water was available for delivery to the project area. Additionally, more water was required to saturate the soil prior to reaching the designated pond and flooded area. These areas were notably dry during the 2014 and 2015 monitoring years.

Photo Point Monitoring

Photo points were established in March 2012 and were recaptured at the peak of the growing seasons in 2012-2015. These photos can be made available upon request.

Woody Recruitment

There are several saltcedar that have established and are growing along the pipeline to 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 is needed 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 2015 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. 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.

North of Mazourka Pipe Outfall Facing East, July 2015

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.

Recommendations

Although there is some native species recruitment establishing along the F418 pipeline berm, a majority of the berm remains compacted and barren. It is recommended that this area be tilled and seeded during the winter months. Additional saltcedar treatment is needed in areas of resprouts throughout the project area, particularly established plants along the F418 pipeline, seedlings in the ditch from the prior flooded area to the pond, and a few individuals near the pipe outfall. Eradication will be conducted as resources are available and monitoring will occur for resprouts.

7.2.9. Homestead

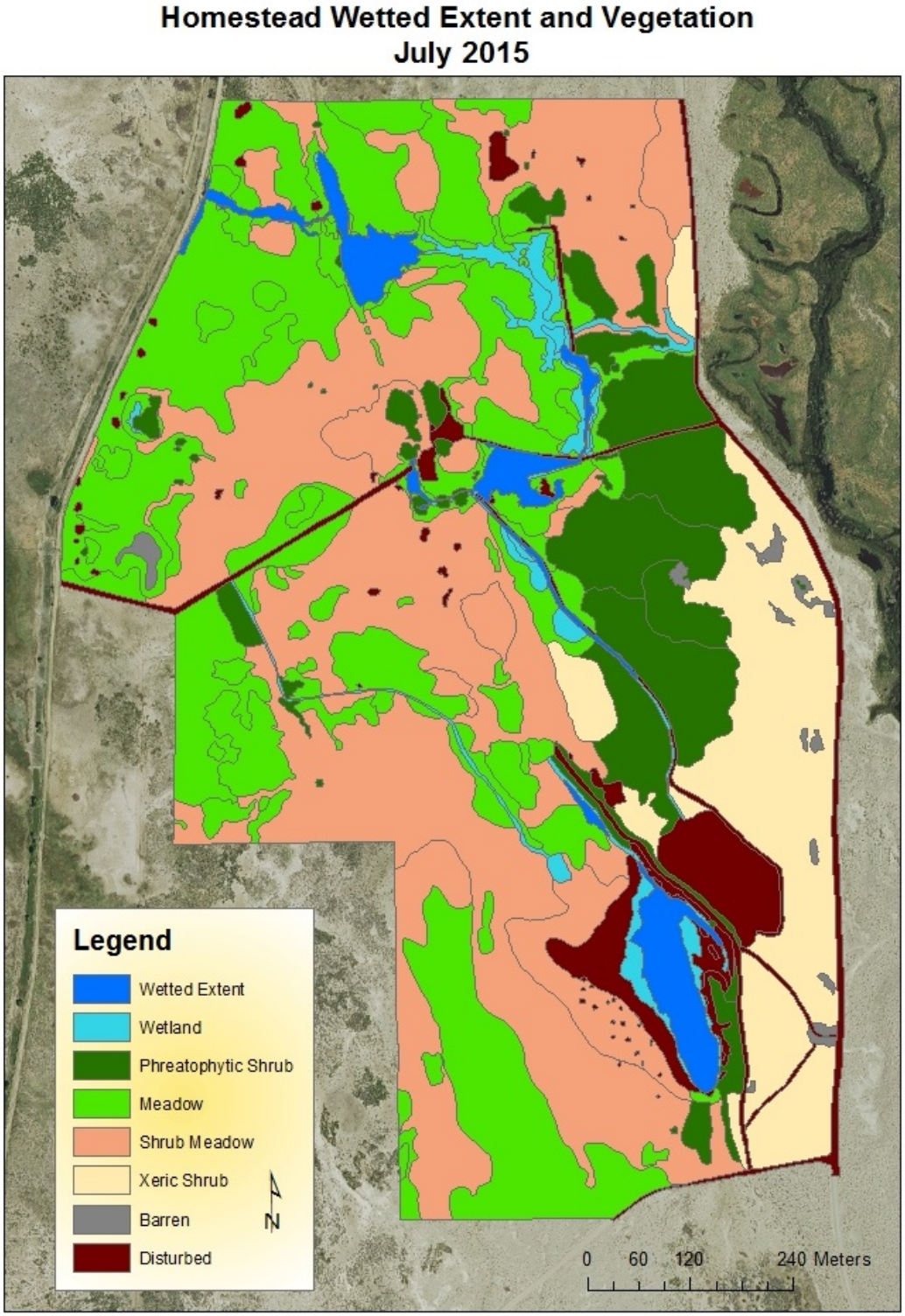

Figure 7. 9 Homestead Wetted Extent and Vegetation July 2015

Flow Monitoring

The annual water allotment for this project is 300 AF/year from two artesian well sources. These wells produced 278 AF for the project during the 2015-2016 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 tee and ditch maintain the majority of flow west of the fault by capturing it in an existing depression and creating an 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 2012-2015. These photos can be made available upon request.

A new unauthorized road was created some time during the spring of 2015, making a loop from the parking area to the main road (see photo below). LADWP installed a restoration sign at the parking lot to deter through traffic into the ingress of the unauthorized road. An additional sign should be placed at the egress of this road that joins the main road.

Homestead Unauthorized Road Facing Southwest, July 2015

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 dominated the channel in 2013, thereby opening the channel to allow for wetland obligate species to establish (see photos below). However, the outflow channel to the fault is choked with cattails, backing up water into the ditch along the road.

Homestead Main Spring Channel Dominated by Cattails, July 2013

Homestead Main Spring Channel, July 2015

Woody 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, 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 winter months.

On July 7, 2015 the Homestead pond was dry. Changes were made immediately at the diversion to send all flows east to the pond. The surface area of the pond continues to be dominated by cattails; however, non-woody vegetation is well established and healthy. There are three healthy 4-foot tall red willows growing amongst the cattails on the pond shoreline (see photo below). Following the shoreline south there is additional recruitment of 15 red and narrowleaf willows noted in 2014 that are healthy ranging between 1 and 2 feet tall. Where the berm meets the road there is also a 4-foot tall Fremont cottonwood observed in 2014 that is thriving. Saltgrass recruitment has increased and continues to fill in bare gaps on the berm along the east side of the pond. A saltcedar tree was noted with sprouts approximately 150 feet from the road heading north on the berm that should be treated. There are also presence of saltcedar resprouts along Steven's Ditch and in the dried pond near the cattle guard.

Homestead Pond, Red Willow Recruitment, July 2015

The tee-ditch terminus has some non-woody vegetation recruitment, but saltcedar resprouts have established vigorously throughout the area. Eradication treatment should become a priority at this location.

Fence Condition

Not applicable.

Recommendations

Although recruitment of non-woody desirable species is naturally occurring throughout the project area, the eastern third of the pipeline berm remains largely barren and should be tilled and seeded during the winter months. LADWP will continue managing flows as necessary for this project to ensure that flows to the pond continue and that there is no connectivity to the Owens River. The tee-ditch terminus will be a priority for additional treatment of saltcedar. Steven's Ditch and the dry pond near the cattle guard will also be treated and monitoring for resprouts throughout the project area will continue to occur.

7.2.10. Well 368

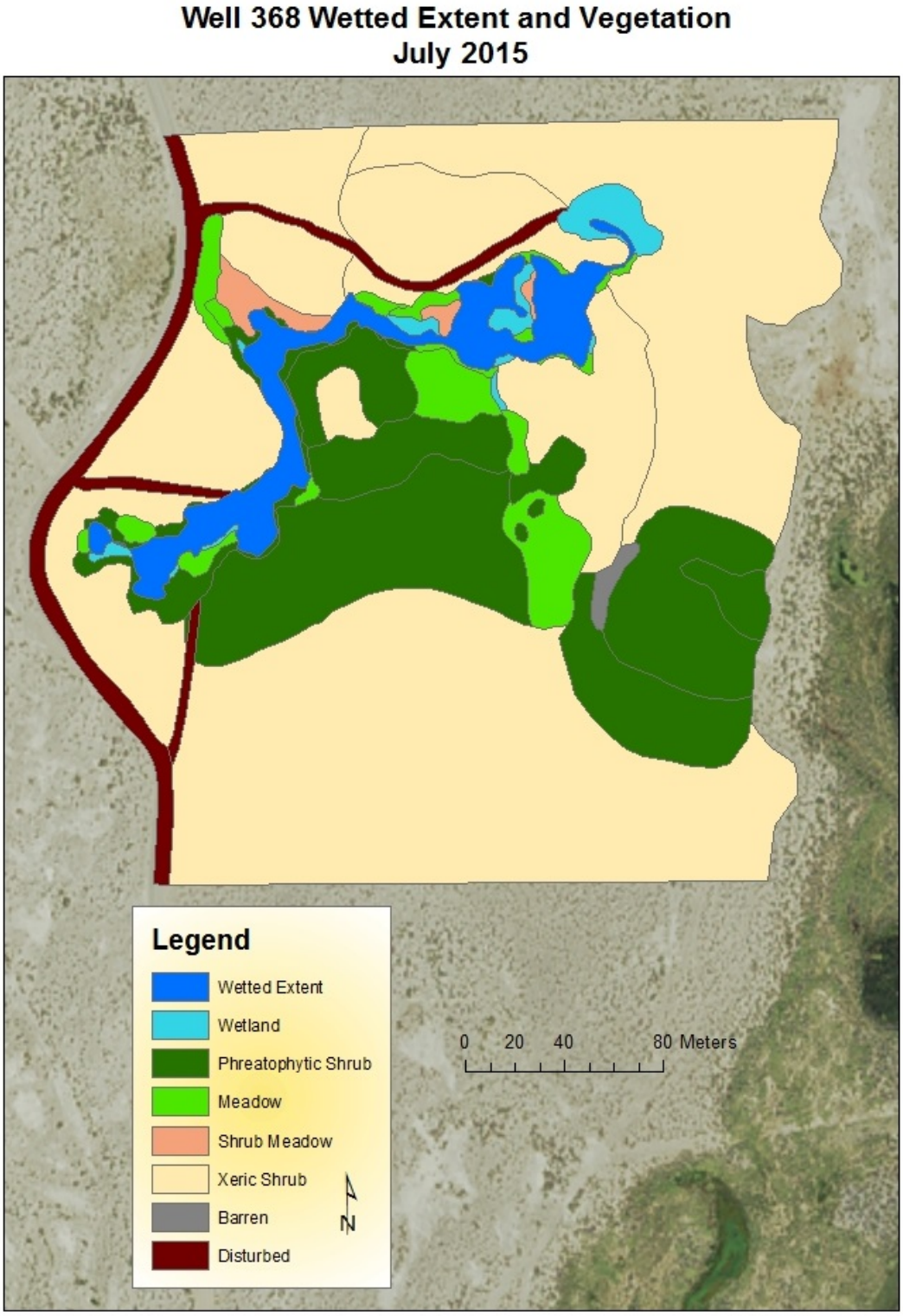

Figure 7. 10 Well 368 Wetted Extent and Vegetation July 2015

Flow Monitoring

The annual water allotment for this project is 150 AF/year. LADWP released the full 150 AF to this project during the 2015-2016 water year. Owens Valley pupfish (*Cyprinodon radiosus*) remain abundant throughout the extended habitat area.

Photo Point Monitoring

Photo points were established in March 2012 and were recaptured at the peak of the growing seasons in 2012-2015. These photos can be made available upon request.

Vegetation along the eastern berm remains patchy but scratchgrass *(Muhlenbergia asperifolia)*, saltgrass and salt heliotrope are comparable to last year and remain healthy. The rest of the pipeline should be tilled and seeded in the winter months to promote recruitment in barren areas. 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 photos below).

Well 368 Eastern Berm, July 2015

Well 368 Pupfish Marsh, July 2015

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. The lower pond area is dry but riparian vegetation is still thriving and new narrowleaf willow recruitment is establishing throughout this area. 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 2015 showed healthier plants with no sign of leaf curl and lesions caused by the willow cankers. Although the cankers caused some dieback in 2014, significant new growth is occurring off each plant with no signs of stress.

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 (see photos below). One year later, this area is saltcedar free with the establishment of many red and narrowleaf willows and non-woody native plant species.

Well 368 Post Saltcedar Seedling Removal at Road Depression, Healthy Willow Recruitment, July 2015

Fence Condition

Not applicable.

Recommendations

There is recruitment of desirable woody and non-woody species occurring throughout the newly flooded project area; however, additional tilling and seeding should be implemented along the eastern berm during winter months. Monitoring will continue for saltcedar seedlings in the project area and will be eradicated as resources are available.

The narrowleaf willows that exhibited willow cankers near the pipe outfall in 2014 appear to be healthier this year and have resprouted healthy shoots. It is possible that canker may come back in the resprouts. If this occurs, they should be cut back to reduce the spread of infection. Monitoring in this area will continue to occur.

LADWP and CDFW will collaborate on implementing a habitat improvement plan to clear cattails at the pupfish marsh to improve pupfish habitat. LADWP biologists may assist CDFW crews to implement such activities.

7.2.11. Diaz Lake

Flow Monitoring

250 AF of water is allotted for this project. LADWP released 217 AF to the project during the 2015-2016 water year based on the Diaz Lake area capacity curve. No other monitoring occurred at Diaz Lake this past year.

7.3. Annual Report on the 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 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.

7.3.1. OVLMP Grazing Management

Introduction

The land use component of the Owens Valley Annual Report 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 Owens Valley Land Management Plan (OVLMP) goals. There are 40 leases contained in the Owens Valley Report; the ST Ranch Lease (RLI-483), 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), Home Place 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 Owens Valley Land Management Plan (2010).

7.3.1.1. Utilization

The *Owens Valley Land Management Plan* 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 *Owens Valley Land Management Plan* (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.

7.3.1.2. 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 and end-of-season utilization results for each year. During that time the lessee is provided with next year's target utilization stubble heights for riparian and upland management areas. 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 and distributed to each lessee, to allow compliance with the set utilization standards. 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. The target stubble height information is provided to the lessees so that they may monitor utilization on their lease throughout the grazing season.

7.3.1.3. Range Trend

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 and 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, cover, and shrub age classification 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 will reduce shrub cover on terraces 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. The nested frequency transects are sensitive enough to detect vegetation responses to climatic variation by tracking the increase or decrease of annual forbs and grasses on sites.

7.3.1.4. Range Trend in 2015

A third of all the range trend transects in the Owens Valley were read in August of 2015. The leases visited were the Cashbaugh Lease (RLI-411), the Independence Ranch Lease (RLI-454, RLI-416, RLI-455), Aberdeen Ranch Lease (RLI-479), Coloseum Ranch Lease (RLI-407), Twin Lakes Ranch Lease (RLI-491), Lone Pine Ranch (RLI-456) and the Fish Slough Ranch Lease (RLM-488). Previous range trend transects were read August 2014 on the Reinhackle Lease (RLI-492), S-T Ranch Lease (RLI-461), Round Valley Lease (RLI-483), Thibaut Lease (RLI-430), and the Islands Lease (RLI-489). All results from all leases are located in Section 7 Range Trend Appendix B. Significant changes on particular leases will be discussed in this chapter. Owens Valley from 2012 to 2015 has experienced an extreme drought. In 2015, significant decreases in plant frequencies for graminoids occurred on 45% (n=12) of the moist floodplain sites sampled (n=13). Graminoids increased on 17% of the moist floodplain sites (n=4) and 14% of the sites were static. The majority of declining plant frequencies were saltgrass followed by alkali sacaton.

On the eleven saline bottom sites, graminoids were equally distributed between significant increases, decreases, and static frequency values. Significant precipitation amounts in May and June of 2015 may have served to dampen impacts from the drought as these sites are influenced by precipitation *and* groundwater compared to moist floodplain and saline meadow sites which are heavily dependent upon shallow groundwater.

On the seven Saline Meadow sites more than half (n=4) of the transects indicated a significant decrease in graminoid frequencies, while on two other sites graminoid frequencies increased. One site remained static.

Results for all Transects, 2015

Results for all transects sampled in 2015, indicating species where a significant change occurred compared to previous sampling event (p>0.1)

Transect	Ecological Site	Species	Class	Change	Utiliz. (%)
4J_02	Moist Floodplain		static	static	40
4J_03	Saline Bottom	DISP	graminoid	decrease	35
4J_04	Moist Floodplain		static	static	25
ABERDEEN_30	Sodic Fan	SPAI	graminoid	decrease	35
ABERDEEN_30	Sodic Fan	ATTO	shrub	decrease	35
ABERDEEN_33	Saline Bottom	SPAI	graminoid	increase	14
CASHBA_02	Saline Meadow	DISP	graminoid	decrease	7
CASHBA_03	Moist Floodplain	GLLE3	Forb	decrease	45
CASHBA_03	Moist Floodplain	DISP	graminoid	decrease	45
CASHBA_03	Moist Floodplain	LETR5	graminoid	decrease	45
CASHBA_03	Moist Floodplain	SPAI	graminoid	increase	45
CASHBA_03	Moist Floodplain	BAHY	invasive	decrease	45
CASHBA_04	Saline Meadow	JUBA	graminoid	decrease	0
CASHBA_04	Saline Meadow	LETR5	graminoid	increase	0
CASHBA_05	Saline Meadow		static	static	12
CASHBA_06	Moist Floodplain	DISP	graminoid	decrease	7
CASHBA_07	Saline Bottom		static	static	19
CASHBA_08	Saline Meadow	DISP	graminoid	decrease	17
CASHBA_08	Saline Meadow	JUBA	graminoid	decrease	17
CASHBA_08	Saline Meadow	SPAI	graminoid	increase	17
CASHBA_09	Moist Floodplain	DISP	graminoid	decrease	46
CASHBA_10	Moist Floodplain		static	static	60
CASHBA_12	Moist Floodplain	DISP	graminoid	decrease	37
CASHBA_12	Moist Floodplain	BAHY	invasiv	decrease	37
CASHBA_14	Saline Bottom	DISP	graminoid	decrease	9
CASHBA_15	Moist Floodplain		static	static	20
CASHBA_16	Saline Bottom	DISP	graminoid	increase	30
CASHBA_17	Saline Bottom	SPAI	graminoid	decrease	24
CASHBA_17	Saline Bottom	DISP	graminoid	increase	24
CASHBA_18	Saline Bottom		static	static	50
CASHBA_20	Saline Bottom		static	static	0
CASHBA_23	Moist Floodplain	DISP	graminoid	decrease	28
CASHBA_24	Moist Floodplain	DISP	graminoid	decrease	15
CASHBA_24	Moist Floodplain	SPAI	graminoid	decrease	15
CASHBA_25	Saline Bottom		static	static	0
INDEP_65	Sodic Fan		static	static	60
INTAKE_01	Moist Floodplain	DISP	graminoid	decrease	10
LONEPINE_01	Moist Floodplain		static	static	42

Transect	Ecological Site	Species	Class	Change	Utiliz. (%)
LONEPINE_02	Moist Floodplain	DISP	graminoid	decrease	35
LONEPINE_02	Moist Floodplain	SPAI	graminoid	decrease	35
LONEPINE_03	Moist Floodplain	DISP	graminoid	increase	49
LONEPINE_04	Moist Floodplain		static	static	40
LONEPINE_05	Moist Floodplain	SPAI	graminoid	decrease	0
LONEPINE_05	Sodic Fan	DISP	graminoid	decrease	0
LONEPINE_06	Moist Floodplain	SPAI	graminoid	increase	0
LONEPINE_07	Moist Floodplain	DISP	graminoid	increase	19
LONEPINE_08	Moist Floodplain	SCAM6	graminoid	increase	21
TWINLAKES_02	Saline Bottom	SPAI	graminoid	decrease	7
TWINLAKES_03	Moist Floodplain		static	static	2
TWINLAKES_04	Moist Floodplain		static	static	0
TWINLAKES_06	Moist Floodplain		static	static	0

7.3.1.5. Irrigated Pastures

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 2013. Pastures that scored 80% or below were evaluated in 2014. Persisting drought conditions through 2014 have affected water availability and delivery. Some irrigated pasture conditions have decreased regardless of management efforts. This has been taken under consideration and no management changes have been made to these leases. *Irrigated pasture evaluations will resume when an above normal or normal water year occurs to allow irrigated pastures to recover from drought.*

7.3.2. 2015 Grazing Management Monitoring Data

7.3.2.1. 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.

Table 7. 5 Grazing Utilization, ST Ranch Lease, RLI-461, 2007-15

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

****Riparian Utilization, 40%***

Table 7.4 Grazing Utilization, ST Ranch Lease, RLI-461, 2007-15

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

****Riparian Utilization, 40%***

Summary of Utilization

Riparian

Utilization in the riparian pastures in 2015 was moderate with the Calvert Slough, Charles Butte, Southeast and Southwest McCumber Riparian exceeding the 40% grazing standard. Watershed Resources staff attribute the overutilization to the persisting drought conditions, with decreased forage production due to lack of precipitation and normal spring runoff. Although the drought is amplifying grazing pressure the mandatory off date of May 1 has been more of an issue. The *Conservation Strategy for the Southwestern Willow Flycatcher* mandates that all

livestock must be removed from habitat areas by May 1 annually. The lessee of the ST Ranch has missed this date for the past two years. As a result, if livestock are not removed on May 1, 2016, grazing will be suspended in the Pleasant Valley portion of the lease for a year.

Upland

The uplands on the lease are comprised of abandoned agriculture and shrub dominated vegetation communities. The utilization in these areas generally occurs in the spring is relegated to annuals and shrubs.

Range Trend

Range trend transects were sampled in 2014, please refer to last year's report for discussion of results.

Irrigated Pastures

The following table shows Irrigated Pasture Condition Scores. As mentioned previously, no irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 6 Irrigated Pasture Condition Scores ST Ranch 2007-15

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

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

In 2009, a 4.5-mile fence was constructed in Pleasant Valley on the south side of the Owens River. Included as part of this fence were two cross fences that helped create six riparian pastures. In 2010, a 1-mile of fence was constructed on the east end of the existing Pleasant Valley fence that is located on the north side of the Owens River. All fence was constructed as part of the *Conservation Strategy for the Southwestern Willow Western Flycatcher,* and to protect riparian habitat as it recovered from a wildfire that occurred in 2007.

Salt and Supplement Sites

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

7.3.2.2. 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. As mentioned previously, no irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 7 Irrigated Pasture Condition Scores 3V Ranch Lease RLI-435, 2007-15

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

X indicates no evaluation made

Summary of Irrigated Pastures

Irrigated pasture scores on the 3V Ranch lease had been consistently high since 2007. In 2010 a new manager and irrigation schedule was implemented that measured irrigation water allotments more accurately. As a result any excess water that was received previously, was no longer available. Drought conditions have decreased irrigation water delivery, and consequently irrigated pasture scores have also decreased.

Stockwater Sites

Stockwater is provided by irrigation diversions on the lease.

Fencing

There has been no new fencing on the lease, and there is none planned for the future beyond normal maintenance.

Salt and Supplement Sites

Cattle are fed hay and protein supplement during the winter.

7.3.2.3. 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. As mentioned previously, no irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 8 Irrigated Pasture Condition Scores Reata Ranch Lease RLI-453, 2007-15

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

X indicates no evaluation made

Summary of Irrigated Pastures

All of the irrigated pastures have maintained healthy condition since 2007 and no management changes have been recommended.

Stockwater Sites

Stockwater is provided by irrigation diversions and Bishop Creek.

Fencing

No new fencing has been constructed on the lease, nor is any planned for the future beyond normal maintenance.

Salt and Supplement Sites

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

7.3.2.4. 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. As mentioned previously, no irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 9 Irrigated Pasture Condition Scores Horseshoe Bar Ranch Lease RLI-462, 2007-15

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

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 was attributed to 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. However, weed infestation is still an issue lowering scores.

Stockwater Sites

All stockwater is provided by irrigation diversions.

Fencing

There has been no new fencing constructed on the lease, and there are no planned fencing projects beyond normal maintenance.

Salt and Supplement Sites

Cattle are supplemented with protein tubs during the winter.

7.3.2.5. 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 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 to start 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. As mentioned previously, no irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 10 Irrigated Pasture Condition Scores Rainbow Pack Outfit Ranch Lease RLI-460 2007-15

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

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 2015.

Stockwater Sites

Stockwater is provided by irrigation diversions.

Fencing

A temporary fence was constructed by the lessee in the Wye Road Field in 2008 to prevent livestock from crossing to the south end of the field. This was done to utilize available forage on the north end of the pasture, which had not yet met the utilization stubble height of 2 inches. Since then, the lessee has been maintaining the fence.

Salt and Supplement Sites

A large supplement area had been established on the west side of the Wye Road field. This site became degraded, harming vegetation and it was in close proximity to a stream so the lessee was asked to move the site. The lessee moved the site to the north end of the field where there is a large disturbed area. This has now become the new supplement site.

7.3.2.6. 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 (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. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 11 Irrigated Pasture Condition Scores Rockin C Ranch RLI- 493, 2007-15

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

X indicates no evaluation made

Summary of Irrigated Pastures

The irrigated pastures located on the lease have not been rated for the past four years. This is due to a change of management in 2007 that lead to the reseeding and construction of a new irrigation system. Both pastures were rated in 2013 and the pastures rated above the minimum score of 80.

Stockwater Sites

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

Fencing

There are no new fencing projects proposed for the lease. In 2007 management changed on the lease and new corrals and fencing were constructed by the lessee.

Salt and Supplement Sites

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

7.3.2.7. 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 Parcel and on the Bishop Parcel.

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. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 12 Irrigated Pasture Condition Scores Rafter DD Ranch Lease RLI-439, 2007-15

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

X indicates no evaluation made

Summary of Irrigated Pastures

The irrigated pasture condition scores for the lease have been consistently above the minimum required score of 80% since 2007. Pasture 2 is the only pasture that has not met the minimum score of 80%. A rain gun sprinkler system was installed in Pasture 2 with plans to plant the field to pasture. However, cost of running the pumps and poor irrigation uniformity has hampered the ability of the lessee to establish the pasture. Currently the lessee is researching new techniques to establish the pasture.

The Round Valley portion of the lease is in good condition and no management changes are required.

Stockwater Sites

All stockwater is provided by irrigated diversions or troughs.

Fencing

All fencing activities on the lease will consist of normal maintenance.

Salt and Supplement Sites

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

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

The Quarter Circle B Ranch (1,143 acres) lies west of Bishop. The Quarter Circle B Ranch 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 consists of shrubs and annuals.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 13 Irrigated Pasture Condition Scores Quarter Circle B Ranch RLI-404 and 413, 2007-15

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

X indicates no evaluation made

Summary of Irrigated Pastures

Since 2010 pasture condition scores have been below or at the minimum standard of 80%. These pastures rate continually low, due to a lack of consistent irrigation and weed control. Sucker elm trees located in the pasture are also bringing the overall score down. The lessee has been working on removing the elms trees and spraying 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 on the lease.

Stockwater Sites

Stockwater is provided by irrigation ditches when livestock are present.

Fencing

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

7.3.2.9. 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 that is located 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. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 14 Irrigated Pasture Condition Scores CT Ranch RLI-451, 2007-15

Pasture	2007	2008	2009	2010	2011	2012	2013	2014	2015
Upper Pond Pasture	92	X	X	82	X	X	88	X	X
Locust Pasture	94	X	X	86	X	X	86	X	X
Iron Gate Pasture	94	X	X	88	X	X	86	X	X
80 Pasture 1	96	X	X	90	X	X	86	X	X
80 Pasture 2	94	X	X	88	X	X	86	X	X
Below Hay Stack	90	X	X	88	X	X	86	X	X
Hay Stack Pasture	86	X	X	88	X	X	86	X	X
Rock Pasture	86	X	X	90	X	X	86	X	X
Holding Pasture	86	X	X	90	X	X	86	X	X
Pasture Below House	94	X	X	92	X	X	92	X	X
Stink Ant Pasture	88	X	X	94	X	X	86	X	X
Pasture #4	94	X	X	84	X	X	96	X	X
Derick Pasture	90	X	X	92	X	X	88	X	X
Pond Pasture	96	X	X	92	X	X	96	X	X
Lowest South Pasture	94	X	X	96	X	X	96	X	X
Lower Middle Pasture	92	X	X	100	X	X	92	X	X
Wahlene Pasture	94	X	X	98	X	X	92	X	X
Second Pasture	96	X	X	86	X	X	88	X	X
Iris Pasture	94	X	X	96	X	X	92	X	X
Long Pasture	88	X	X	94	X	X	84	X	X
Horse Pasture	88	X	X	86	X	X	88	X	X
Front Pasture	92	X	X	94	X	X	96	X	X
Alfalfa Pasture	94	X	X	86	X	X	98	X	X

Pine Cr Road Pasture	92	X	X	94	X	X	94	X	X
Four Pasture	90	X	X	90	X	X	94	X	X
A Pasture	94	X	X	94	X	X	98	X	X
B Pasture	94	X	X	90	X	X	96	X	X
40 Acre Pasture	92	X	X	90	X	X	96	X	X
F Pasture	92	X	X	94	X	X	96	X	X
Lou's Pasture	98	X	X	92	X	X	94	X	X
Highway Pasture	94	X	X	90	X	X	94	X	X
Bull Pasture	90	X	X	82	90	X	94	X	X
Orchard Pasture	90	X	X	86	X	X	90	X	X
G Pasture	84	X	X	90	X	X	96	X	X
E Pasture	84	X	X	82	94	X	98	X	X

X indicates no evaluation made

Table 7. 15 Irrigated Pasture Condition Scores CT Ranch RLI-500, 2007-15

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

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 lessee's 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

A wildfire occurred on the Round Valley portion of the lease on February 6, 2015. As a result large portions of fence and working corrals were destroyed. The lessee will be in the process of replacing fence and corrals throughout the spring and summer of 2015.

Salt and Supplement Sites

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

7.3.2.10. 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, and utilization monitoring is not required.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 16 Irrigated Pasture Condition Scores Mandich Ranch RLI-424, 2007-15

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

X indicates no evaluation made

Summary of Irrigated Pastures

All irrigated pastures on the lease have been well above the minimum score of 80%. The lessee has just finished replacing old irrigation diversions on the lease. There are no management changes recommended.

Stockwater Sites

All water is provided by irrigation diversions.

Fencing

The lessee is currently replacing all the perimeter fences on the lease.

Salt and Supplement Sites

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

7.3.2.11. 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, utilization monitoring is not required.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 17 Irrigated Pasture Condition Scores LI-Bar Ranch Lease RLI-487, 2007-15

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

X indicates no evaluation made

Summary of Irrigated Pastures

All irrigated pastures on the lease have consistently been in good condition since 2007. No management changes are recommended for the lease.

Stockwater Sites

All stockwater is provided by irrigation diversions.

Fencing

There is no fencing projects planned for the lease beyond normal maintenance.

Salt and Supplement Sites

Cattle are supplemented with hay pellets and protein tubs.

7.3.2.12. 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. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 18 Irrigated Pasture Condition Scores U Bar Ranch RLI-402, 2007-15

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

X indicates no evaluation made

Summary of Irrigated Pastures

Irrigated pasture condition scores dropped in 2013 in the North and South Highway pastures, caused by inconsistent water delivery due to drought conditions. The drought conditions are temporary so no management changes are planned for the lease.

Stockwater Sites

Stockwater is provided by irrigation diversions.

Fencing

No fencing projects are planned for the lease beyond general 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.

7.3.2.13. 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, Zurich Riparian all of which are located in the Big Pine portion of the lease.

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

Table 7. 19 Grazing Utilization for Fields/Pastures on the Round Valley Lease, RLI-483, 2007-15

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

Table 7. 20 Grazing Utilization for Transects on the Round Valley Lease, RLI-483, 2007-15

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

****Riparian Utilization, 40%***

Summary of Utilization

In 2009, a new ranch manager took over managing the lease for the lessee, and has consistently worked with Watershed Resources staff to decrease utilization. In 2010, the Hole Pasture was the only pasture over the riparian utilization standard. Since that time the duration of grazing in the Hole Pasture has been decreased to only 5 days or it isn't grazed at all.

The completion of the new riparian fencing north of Highway 168, has allowed the manager to control grazing intensity and cattle distribution more effectively. In turn, utilization scores have decreased and are expected to remain within the current riparian standard of 40%. No management changes are recommended for the lease.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 21 Irrigated Pasture Condition Scores Round Valley Ranch, RLI-483, 2007-15

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

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, please refer to last year's report for discussion of results.

Stockwater Sites

One new stockwater well will be drilled in 2015 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

A new 4.5 mile long riparian fence was constructed in March of 2011. The fence begins just north of Highway 168, and ties into the existing fence line boundary for the Big Pine canal and Round Valley Ranch leases. This fence will allow the lessee to better control cattle movement and improve grazing uniformity. It will also create two new riparian pastures along the Owens River.

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.

7.3.2.14. 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 Flat Parcel (357 acres) includes three fields north of Baker Creek that are surrounded by Forest Service land. The livestock operation is a cow/calf operation.

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

Table 7. 22 Grazing Utilization for Fields on the Big Pine Canal Lease, RLI-438, 2007-15

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

****Riparian Utilization, 40%***

Table 7. 23 Grazing Utilization for Transects on the Big Pine Canal Lease, RLI-438, 2007-15

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

****Riparian Utilization, 40%***

Summary of Utilization

Since 2007 the lessee has been working to lower grazing utilization in both the North and South 40 fields. Each grazing season has improved except for the North 40 in 2009. Utilization was high at YRIB_04 because a temporary exclosure was built directly next to the transect. This created a fence effect that increased utilization. In 2010 YRIB_04 was moved to a new location, also an additional transect in the North 40 Field was added YRIB_6. Utilization was high in the North 40 field in 2015, the lessee is working on using supplement in 2015-16 grazing season to distribute cattle better.

Range Trend

Range trend transects were sampled in 2014, please refer to last year's report for discussion of results.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 24 Irrigated Pasture Condition Scores Big Pine Canal Ranch RLI-438, 2007-15

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

X indicates no evaluation made

Summary of Irrigated Pastures

All irrigated pastures on the lease have rated well. Sanger and Cow Creek meadows were not rated in 2013 due to drought conditions. 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 production has decreased reducing available water. 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 and Horse Fields.

Fencing

No new fencing projects are planned for the lease besides normal maintenance.

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.

7.3.2.15. 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 the transects in each field.

Table 7. 25 Grazing Utilization for Fields on the Cashbaugh Ranch Lease, RLI-411, 2007-15

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

Table 7. 26 Grazing Utilization, Cashbaugh Ranch Lease, RLI-411, 2007-15

Fields	Transect	2007	2008	2009	2010	2011	2012	2013	2014	2015
***Bishop Creek Field**	CASHBA_02	14%	20%	2%	0%	11%	11%	10%	1%	7%
	CASHBA_04	0%	75%	59%	51%	37%	53%	81%	74%	0%
	CASHBA_05	44%	47%	1%	13%	0%	14%	27%	10%	12%
	CASHBA_06	41%	46%	21%	12%	0%	14%	12%	41%	7%
	CASHBA_09	10%	16%	33%	20%	26%	16%	17%	0%	46%
***Ears Field**	CASHBA_19	0%	2%	0%	0%	0%	0%	0%	0%	0%
	CASHBA_20	0%	7%	0%	0%	0%	0%	0%	0%	0%
	CASHBA_21	0%	5%	4%	0%	0%	15%	0%	0%	0%
	CASHBA_22	0%	0%	0%	0%	0%	0%	0%	0%	0%
	CAHSBA_25	0%	0%	0%	0%	0%	0%	16%	0%	0%
***East of the River Field**	CASHBA_16	59%	0%	21%	21%	24%	28%	20%	7%	30%
	CASHBA_24	67%	0%	31%	10%	43%	38%	49%	62%	15%
***Laws River Field**	CASHBA_01	16%	14%	8%	12%	22%	44%	50%	31%	37%
	CASHBA_03	66%	15%	46%	44%	49%	66%	56%	48%	45%
	CASHBA_07	27%	33%	0%	0%	15%	47%	31%	6%	19%
	CASHBA_08	36%	16%	5%	9%	14%	31%	43%	14%	17%
***Slough Field**	CASHBA_17	38%	15%	42%	0%	20%	19%	25%	31%	24%
	CASHBA_18	32%	6%	34%	17%	25%	39%	15%	12%	50%
	CASHBA_23	35%	11%	27%	0%	32%	30%	6%	15%	28%
***Warm Spring Holding**	CASHBA_15	81%	60%	76%	50%	77%	55%	5%	32%	20%
***White Mountain Field**	CASHBA_12	53%	50%	17	26%	0%	55%	64%	53%	37%
	CASHBA_14	24%	50%	15%	15%	18%	29%	21%	24%	9%

****Riparian Utilization***

Summary of Utilization

Utilization on the Cashbaugh Ranch has been moderate and within riparian standards. The Laws River Field has increased in overall utilization during the past few years of drought at CASHBA_3. Watershed Resources staff have been working with the lessee to relieve grazing pressure by moving livestock earlier and reducing numbers. The lessee has tried to improve production by dragging/fertilizing the meadows adjacent to the river and placing supplement further away from the Owens River.

Range Trend

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

Laws River Field

CASHBA_03 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the Laws River Field. Saltgrass frequency increased substantially in 2012 but has significantly decreased along with beardless wildrye and alkali sacaton in 2015. These decreases still remain within the previously observed range of variability.

CASHBA_08 is located on a Torrifluvents, 0-2% slopes soil unit, on a Saline Meadow ecological site in the Laws River Field. Frequency was static during the past three sampling events. However in 2015 saltgrass dropped well beyond its historical range of variability as well as wiregrass. At the same time sacaton significantly increased in frequency.

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

Bishop Creek Field

CASHBA_02 is located on a Torrifluvents, 0-2% slopes soil unit, on a Saline Meadow ecological site in the Bishop Creek Field. Plant frequencies remained static over the past four sampling events. In 2015 saltgrass significantly declined outside previously observed parameters.

CASHBA_06 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the Bishop Creek Field. This site had also remained static until 2015 where saltgrass declined significantly.

CASHBA_04 is located on a Torrifluvents, 0-2% slopes soil unit, on a Saline Meadow ecological site in the Bishop Creek Field. Saltgrass increased significantly in 2012 compared to prior sampling periods, and did not change in 2015. Beardless wildrye increased significantly and wiregrass decreased significantly- both well beyond historic ranges observed on the transect.

CASHBA_05 is located on a Torrifluvents, 0-2% slopes soil unit, on a Saline Meadow ecological site in the Bishop Creek Field. Saltgrass significantly dropped in 2012 while alkali sacaton remained high when compared to the first sampling event. The 2015 values were static.

CASHBA_09 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the Bishop Creek Field. In 2012 saltgrass increased to its highest levels while sacaton decreased to levels similar to what was observed in 2007. Saltgrass decreased in 2015, to a historic low for the transect.

White Mountain Field

CASHBA_14 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the White Mountain Field. Plant trends have remained static on the site. Saltgrass has significantly declined but remains at similar levels to what was observed in 2007 and 2010.

CASHBA_12 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the White Mountain Field. Saltgrass increased in 2012 but remains within previously sampled parameters. In 2015 saltgrass declined but was still within historic parameters for the transect.

Warm Springs Holding Field

CASHBA_15 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the Warm Springs Holding Field. Saltgrass decreased in 2015.

Slough Pasture

CASHBA_18 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the Slough Pasture. Two key forage species, Saltgrass and Alkali sacaton declined dramatically in 2012 and have not improved in 2015.

CASHBA_23 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the Slough Pasture. Saltgrass declined in 2015.

CASHBA_17 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the Slough Pasture. Saltgrass frequency increased and alkali sacaton decreased in 2015, both levels are within previous parameters observed on the transect.

East of the River Field

CASHBA_16 is located on the NUMU Loam, 0-2% slopes soil series which corresponds to a Saline Bottom ecological site in the East of the River Field. Saltgrass increased from 2012.

CASHBA_24 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the East of the River Field. Saltgrass significantly increased in 2012, while the remaining plants were static. However in 2015, both saltgrass and alkali sacaton exited historic parameters with numbers declining well below previous values. This site is located on a cut off oxbow and declining frequency values are a result of low flows along the Middle Owens river.

Warm Springs Pasture

CASHBA_25 is located on the NUMU Loam, 0-2% slopes soil series which corresponds to a Saline Bottom ecological site in the Warm Springs Pasture. In 2010, 2012, and 2015 Alkali sacaton remained lower than frequency levels observed in 2009. All other species have been stable, aside from annuals increasing during the wet year of 2010.

Ears Field

CASHBA_19 is located on the NUMU Loam, 0-2% slopes soil series which corresponds to a Saline Bottom ecological site in the Ears Field. The site was retired because the transect has remained stable and is close proximity to CASHBA_20.

CASHBA_20 is located on the NUMU Loam, 0-2% slopes soil series which corresponds to a Saline Bottom ecological site in the Ears Field. Continuing into 2015, all species have been stable, aside from annuals increasing during the wet year of 2010.

CASHBA_21 is located on the NUMU Loam, 0-2% slopes soil series which corresponds to a Saline Bottom ecological site in the Ears Field. The site was retired because the transect has remained stable and is close proximity to CASHBA_20.

CASHBA_22 is located on the NUMU Loam, 0-2% slopes soil series which corresponds to a Saline Bottom ecological site in the Ears Field. Species have been static over the last four sampling periods. The site was retired because the transect has remained stable and is close proximity to CASHBA_20.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Table 7. 27. Irrigated Pasture Condition Scores Cashbaugh Ranch 2007-15

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

X indicates no evaluation made

Summary of Irrigated Pastures

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

Stockwater Sites

Three stockwater wells were drilled in 2011. One well site is located east of the Owens River off of Warm Springs Road in the East of the River Field. The second well site is located east of Laws Poleta Road in the Corral Field and the third well was drilled east of the river in the Ears Field. All wells have been equipped with troughs and are being used. The Poleta Well is being augmented by a new well that was drilled in the Simons mitigation parcel. This well was drilled in 2015 and the lessee has installed troughs.

Fencing

A cross fence was repaired and two cattle guards were installed on the lease in 2011. No other fencing projects are scheduled for the lease beyond general 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.

7.3.2.16. 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 the transects in each field.

Table 7. 28 Grazing Utilization for Fields/Pastures on the Warm Springs Lease, RLI-497, 2007-15

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

Table 7. 29 Grazing Utilization for Transects on the Warm Springs Ranch Lease, RLI-497, 2007-15

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

Summary of Utilization

Utilization for the River Field has been minimal every year except for 2013. Use increased mostly due to drought conditions. The lessee has since destocked as a result of the persisting drought in 2015. There are currently no plans to change management.

Range Trend

Range trend transects were sampled in 2014, please refer to last year's report for discussion of results.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 30 Irrigated Pasture Condition Scores Warm Springs Ranch Lease RLI-497, 2007-15

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

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. Improvements were due to repaired irrigation diversions on the lease that allowed for more efficient water use by the lessee.

Stockwater Sites

One new stockwater well has been drilled in 2014; it is located east of Warm Springs Road ,on the uplands. It should help pull livestock away from the riparian areas in the spring months. A stockwater well was drilled in 2015, in the Simons mitigation filled.

Fencing

There is no fencing projects planned for the lease beyond general maintenance.

Salt and Supplement Sites

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

7.3.2.17. 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.

Table 7. 31 Grazing Utilization for Fields/Pastures on the Reinhackle Ranch Lease, RLI-492, 2007-15

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

Table 7. 32 Grazing Utilization for Transects on the Reinhackle Ranch Lease, RLI-492 ,2007-15

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

Range trend transects were sampled in 2013, please refer to the 2013 report for discussion of results. Transects will be read again on this lease in August, 2016.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 33 Irrigated Pasture Condition Scores Reinhackle Ranch 2007-15

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

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 2014, with a normal irrigation season it should improve more.

Stockwater Sites

Two stockwater wells were drilled in 2011. The wells are located in the Laws area one supplying 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.

7.3.2.18. 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.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 34 Irrigated Pasture Condition Scores Four J Cattle Ranch 2007-15

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

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 and Triangle 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, Big Pine Canal or troughs.

Fencing

No fencing is planned on the lease beyond general maintenance.

Salt and Supplement Sites

Hay and liquid supplement are used during the winter.

7.3.2.19. 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 the transects in each field.

Table 7. 35 Grazing Utilization for Independence Ranch Lease, RLI-454, 2007-15

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

Table 7. 36 Grazing Utilization for Transects on the Independence Ranch Lease, RLI-454, 2007-15

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

Summary of Utilization

Utilization has increase 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 2014 utilization in the South River Field of 14%, and all livestock have been moved for the rest of the grazing season. There will be no further management changes.

Range Trend

South River Field

4J_02 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the South River Field. Trends across the five sampling events appear static.

4J_03 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the South River Field. Saltgrass decreased significantly in 2015, extending the boundary for the site.

4J_04 is on a Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, moist flood plain ecological site, situated in the South River Field. Saltgrass increased significantly between 2010 and 2012. In 2015, all values have remained static.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 37 Irrigated Pasture Condition Scores Independence Ranch 2007-15

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

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 fencing projects are planned beyond normal maintenance.

Salt and Supplement Sites

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

7.3.2.20. 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 LADWP portion of the ranch is located on the south side of the Baker Creek Road and is comprised of irrigated pasture and dry grazing all located within the same pasture.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 38 Irrigated Pasture Condition Scores Rockin DM Ranch 2007-15

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

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. Along with drought conditions, the lessee has decrease cattle numbers.

7.3.2.21. 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 Mountain's 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 the transects in each field.

Table 7. 39 Grazing Utilization on the Baker Road Ranch Lease, RLI-475, 2007-15

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

Table 7. 40 Grazing Utilization for Transects on the Baker Road Ranch Lease, RLI-475, 2007-15

Fields/Pastures	Transects	2007	2008	2009	2010	2011	2012	2013	2014	2015
***Intake Field**	Stewart_01	15%	0%	20%	20%	28%	0%	0%	10%	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. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 41 Irrigated Pasture Condition Scores Baker Road Ranch 2007-15

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

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 has not been rated for several years due to lack of irrigation 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 general maintenance.

Salt and Supplement

No salt supplements are used by the lessee.

7.3.2.22. 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 the transects in each field.

Table 7. 42 Grazing Utilization for Fields/Pastures on the Aberdeen Ranch Lease, RLI-479, 2007-15

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

Riparian Utilization, 40%

Table 7. 43 Grazing Utilization for Transects on the Aberdeen Ranch Lease, RLI-479, 2007-15

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

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 mitigation project. The increase 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).

Hines Spring Exclosure

ABERDEEN_30 is situated on the Winnedumah Silt Loam 0-2% slopes, which corresponds to a Sodic Fan ecological site. Trends across the seven years appeared fairly static until 2015 where alkali sacaton and Nevada saltbush frequency decreased significantly.

Pipeline Field

ABERDEEN_33 is on the Pokonahbe Loamy fine Sand, 0-2% slopes which corresponds to the Saline Bottom ecological site. Trends across the seven years appear static, until 2015 where alkali sacaton increased to the highest level seen on the transect.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 44 Irrigated Pasture Condition Scores Aberdeen Ranch Lease RLI-479, 2007-15

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

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

Stock have begun to use the water that is coming from the Hines Spring mitigation project for the past few years. Stock do not have to travel to Aberdeen Ditch in order to get water.

Fencing

An exclosure fence was constructed in 2015 for the Hines Spring mitigation project.

Salt and Supplement Sites

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

7.3.2.23. 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 on 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 the transects in each field.

Table 7. 45 Grazing Utilization for Fields on the Coloseum Ranch Lease, RLI-407, 2007-15

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

Table 7. 46 Grazing Utilization for Transects on the Coloseum Ranch Lease, RLI-407, 2007-15

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

Riparian Utilization, 40%

Summary of Utilization

Utilization on the Coloseum 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 2014-15 seasons for the lease will not be monitored because the lessee has sold all of his livestock.

Range Trend

South East Pasture

Coloseum _38 is located on the Shondow Loam 0-2% slopes soil unit, on a Saline Meadow. The transect is in the South East Pasture in the Sawmill parcels of RLI-407. Trends across the seven-year period appear static.

Movie Field

Coloseum_02 is located in the Movie Filed on the Mt. Whitney Parcels of RLI-407. The transect is on a Dehy-Conway-Lubkin association, 0-9% slopes. The site most closely corresponds to a Saline Meadow ecological site. Trends across the six sampling periods have been static.

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 normal maintenance.

Salt and Supplement Sites

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

7.3.2.24. 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 consist entirely of 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 Sage Brush, Nevada Salt Bush 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 2014 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.

7.3.2.25. 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 stock yard complete the lease.

Summary of Utilization

There is 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. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 47 Irrigated Pasture Condition Scores Eight Mile Ranch, 2007-15

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

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

Hay is fed to livestock when needed during the winter months.

7.3.2.26. 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. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 48 Irrigated Pasture Condition Scores Fort Independence 2007-15

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

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 giving variable options for high quality forage for livestock. There will be no management changes recommended for this lease.

Stockwater Sites

Stockwater is provided by irrigation ditches and diversions.

Fencing

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

Salt and Supplement Sites

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

7.3.2.27. 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 the transects in each field.

Table 7. 49 Grazing Utilization for Fields/Pastures on the Georges Creek Parcel, RLI-489, 2007-15

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

Table 7. 50 Grazing Utilization for Transects on the Georges Creek Parcel, RLI-489, 2007-15

Fields/Pastures	Transects	2007	2008	2009	2010	2011	2012	2013	2014	2015
South Field	ISLAND_02	40%	15%	8%	0%	24%	19%	10%	0%	0%
	ISLAND_59	74%	47%	18%	0%	23%	10%	14%	0%	0%
	SOUTHFIELD_02	0%	0%	3%	7%	0%	0%	0%	0%	0%
	SOUTHFIELD_03	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. If precipitation increases this spring grazing utilization could increase utilization.

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 abain in 2017.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 51 Irrigated Pasture Condition Scores Georges Creek Parcel 2007-15

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

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. Scores dropped in 2013, due to the drought conditions which affected the water supply to the pastures from Georges Creek. Conditions should improve when a normal irrigation season occurs. Grazing on the irrigated pastures was minimal due to the lack of forage production.

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 general maintenance.

Salt and Supplement Sites

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

7.3.2.28. 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. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 52 Irrigated Pasture Condition Scores JR Ranch 2007-15

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

X indicates no evaluation made

Summary of Irrigated Pastures

The irrigated pastures on this lease have had trouble maintaining the minimum score of 80% for several years. The main reason for the low scores is a lack of irrigation management. For the past few years the lessee has made some changes and the scores have increased above the minimum. This lease will continue to be monitored annually until the scores become stable.

Stockwater Sites

Stockwater is provided by irrigation diversions and troughs.

Fencing

No fencing is planned beyond general maintenance.

Salt and Supplement Sites

Hay is fed during the winter if needed in designated areas.

7.3.2.29. 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 comprised entirely by irrigated pastures no utilization is measured on the lease.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 53 Irrigated Pasture Condition Scores Lone Pine Dairy Lease 2007-15

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

X indicates no evaluation made

Summary of Irrigated Pastures

Pastures on the lease are in excellent condition and have never decreased in score since monitoring has started. There are no management changes recommended for the lease.

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.

7.3.2.30. 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 the transects in each field.

Table 7. 54 Grazing Utilization, Tuttle Field, Mount Whitney Pack Lease, RLI-495, 2007-15

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

Table 7. 55 Grazing Utilization for Transects on the Mount Whitney Pack Lease, RLI-495, 2007-15

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

Summary of Utilization

The Tuttle Field is rarely grazed. Most use typically occurs from wildlife. Monitoring will continue regardless if grazing occurs or not.

Range Trend

Tuttle Field

TUTTLE_01 is located in the Tuttle Field on a Dehy-Conway-Lubkin-Association, 0-9% slopes. Because of the complexity of different soil units in ecological sites associated with the unit vary from Wet Meadow, Saline Meadow, to Gravelly Loamy Sand. The actual site appears to be a xeric oriented Saline Meadow transitioning to a Gravelly Loamy Sand site. Trends across the five-year period appear static.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 56 Irrigated Pasture Condition Scores Mount Whitney Pack Lease 2007-15

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

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 over grazing. 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.

7.3.2.31. 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. Charcoal Kiln Pond, near the border of the parcel, contains 5 acres of standing water and could support pupfish and/or Tui chubs. The pond is completely isolated from all other fish species. Remnants of old charcoal production kilns occur within the parcel that may have significant historic value. The remains of an old railroad bed, with tracks and ties removed runs south to north through the parcel.

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 rolling 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 about 10,000 feet in elevation.

Horseshoe and Round Valley Creeks flow through City lands and merge downstream with Cottonwood Creek. The Golden Trout Wilderness, created under the Endangered American Wilderness Act, surrounds City lands.

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

7.3.2.32. 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 their own 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. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 57 Irrigated Pasture Condition Scores Archie Adjunct 2007-15

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

X indicates no evaluation made

Summary of Irrigated Pastures

Irrigated pastures on this lease have always rated well since 2007. Irrigation water on the lease is managed well by the lessees. The pastures have good species composition and are not over grazed. The Lake Fields score dropped in 2013 due to drought conditions. The continued drought in 2015 did not allow the field to improve. Field conditions are expected to improve when the drought subsides. 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.

7.3.2.33. 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 shrub land.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 58 Irrigated Pasture Condition Scores Olancha Creek Adjunct, 2007-15

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

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 and shrub encroachment. The pastures are sandy and require a lot of water. Over the past several years irrigation management has improved and some 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 general 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.

7.3.2.34. 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 inadequate 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. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 59 Irrigated Pasture Condition Scores Home Place Adjunct, 2007-15

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

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 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 general maintenance.

Salt and Supplement Sites

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

7.3.2.35. 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.

Table 7. 60 Grazing Utilization, Blackrock Ranch Lease, RLI-428, 2007-15

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

Table 7. 61 Grazing Utilization, Blackrock Ranch Lease, RLI-428, 2007-15

Fields/Pastures	Transect	2007	2008	2009	2010	2011	2012	2013	2014	2015
Horse Holding	BLKROC_9	67%	13%	1%	36%	29%	31%	0%	0%	0%
Locust Field	BLKROC_06	68%	15%	14%	34%	13%	32%	32%	53%	18%
***North Riparian**	BLKROC_12	0%	67%	6%	16%	0%	0%	0%	Flooded	Flooded
	BLKROC_22	72%	36%	36%	43%	31%	31%	35%	39%	20%
Reservation	BLKROC_02	69%	31%	0%	36%	0%	18%	35%	0%	17%
	BLKROC_03	81%	44%	54%	46%	53%	27%	33%	12%	13%
	BLKROC_44	72%	37%	49%	45%	0%	28%	40%	22%	43%
	BLKROC_49	41%	10%	12%	16%	0%	11%	0%	0%	0%
	BLKROC_51	80%	46%	48%	33%	41%	39%	44%	15%	30%
	RESERV_06	0%	0%	29%	48%	23%	34%	30%	18%	15%
Robinson Field	BLKROC_04	76%	58%	14%	22%	8%	38%	24%	18%	9%
	ROBNSON_2	0%	52%	15%	23%	4%	18%	25%	16%	6%
Russell Field	BLKROC_05	85%	43%	19%	48%	13%	24%	22%	2%	2%
	RUSSELL_02	0%	55%	12%	31%	0%	28%	31%	0%	1%
***South Riparian**	BLKROC_13	45%	29%	28%	10%	31%	23%	15%	15%	15%
	BLKROC_23	25%	8%	43%	20%	22%	0%	0%	0%	27%
	SOUTHRIP_3		39%	5%	33%	19%	10%	10%	8%	12%
	SOUTHRIP_4					20%	36%	31%	2%	2%
	SOUTHRIP_5						0%	18%	10%	5%
White Meadow	BLKROC_01	7%	2%	4%	4%	0%	9%	18%	0%	0%
	BLKROC_39	0%	4%	0%	0%	0%	0%	0%	0%	0%
	WMEAD_03	0%	15%	37%	12%		29%	43%	0%	10%
	WMEAD_04	0%	7%	0%	0%	0%	3%	0%	5%	Burned
	WMEAD_05	05	17%	52%	34%	36%	54%	32%	29%	Burned
***White Meadow Riparian**	BLKROC_11	0%	0%	75%	0%	68%	55%	30%	16%	27%
	BLKROC_14	87%	0%							0%
	BLKROC_26					45%		6%	18%	18%
	WMRIP_T5						23%	29%	29%	15%
	WMRIP_T4						23%	21%	21%	20%
	WMRIP_T1						26%	0%	0%	0%
Wrinkle Field	BLKROC_07	51%	28%	26%	40%		7%	28%	6%	7%
	WRINKL_03		37%	28%	48%	24%	34%	17%	35%	0%
***Wrinkle Riparian**	BLKROC_18	30%	21%	43%	46%	48%		30%	20%	3%
	BLKROC_19	0%	10%	12%	26%	8%	15%	28%	20%	10%
	BLKROC_20	0%	11%	34%	53%	12%	33%	38%	34%	28%
	BLKROC_21	0%	9%	28%	38%	6%		21%	40%	15%
West Field	WRINKLE_2				22%	38%	41%	36%	18%	39%
***Riparian Utilization, 40%**										

Summary of Utilization

Riparian

Utilization on the Blackrock lease has shown a steady decline in utilization in the riparian pastures on the lease since 2007. This has been due to the implementation of the Lower Owens River Project (LORP) and the 40% grazing utilization standard. Since the beginning of the project there has been a need to add or drop transects in the riparian pastures, this can be seen in the tables above. There have also been some grazing trials conducted using animal impacts to remove shrubs and annual weeds in 2010-2011. During these times utilization was waived in the pastures. These trials have had some beneficial effects on the riparian meadow habitat but the overall benefit to the riparian pastures has been the reintroduction of flows to the river channel.

Summary of Range Trend Data and Condition Blackrock Lease

Range trend transects were sampled in 2013. Please refer to the 2013 report for discussion of results. This lease will be sampled again 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 Mazurka well was drilled on BLM property and is going to be removed and a new well will be drilled south of the current location. The lessee will be responsible for water troughs and 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 Project” will provide stockwater in the Reservation Field and the “Well 368/Homestead Project” will provide stockwater in the Little Robinson Field and East Robinson Field.

Fencing

There was no new fencing constructed on the lease beyond general 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.

7.3.2.36. 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.

Table 7. 62 Grazing Utilization, Twin Lakes Lease, RLI-491, 2007-15

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

Table 7. 63 Grazing Utilization, Twin Lakes Lease, RLI-491, 2007-15

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

Summary of Utilization

The Twin Lakes lease has also decreased utilization overall since the implementation of the LORP. The only years utilization was high was in 2007 and 2012. In 2007, this was the first year of adhering to the new riparian utilization standard of 40% and there was a three year grace period post project implementation to become compliant for the lessees. Over grazing in 2012, was a result of drought and the lessee failing to move livestock to the Lower Blackrock Field earlier in the season. In 2013, a range burn was conducted in the Upper and Lower Blackrock Riparian fields. The burn had good result improving the native meadow habitat.

Summary of Range Trend Data and Conditions

Upper Blackrock Field

INTAKE_01 is located in the Upper Blackrock Field. The soils are mapped as Torrifluvents-Fluvaquentic Endoaquolls Complex; but the majority of the study plot is located on the adjacent soil unit, Torrifluvents, 0-2% slopes, which is associated with the Saline Meadow ecological site. Site similarity to the potential ranged during the baseline monitoring period between 71-77%, placing the site in high ecological condition. Frequency for saltgrass significantly increased in 2009 when compared to 2007 and subsequently decreased in 2010, and then rose again to the highest level for the site in 2012. In 2015 saltgrass decreased but remained within historic range.

Lower Blackrock Field

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

The transect was burned in mid-February 2009. Shrub cover prior to the burn was moderate which resulted in a cooler burn when compared to similar areas further south in Drew Slough. Because of the cool fire, a decrease in shrub frequency, shrub cover, and shrub recruitment were observed in 2009 and 2010. Alkali cordgrass (*Spartina gracilis)* significantly increased in 2010 and continued to increase in 2012. Alkali sacaton (SPAI) also increased markedly in 2012 but has subsequently decreased in 2015.

TWINLAKES_05 is located in Lower Blackrock Field on the Manzanar-Division Association, 0-2% slopes soil unit which corresponds to the Saline Meadow ecological site. The transect was burned in late January 2009 and was subsequently submerged when the Drew Unit of the BWMA was flooded. Because of this, range trend sampling and utilization estimates are currently not available.

Lower Blackrock Riparian Field

TWINLAKES_03 is located in the Lower Blackrock Riparian Field. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, which corresponds to the Moist Floodplain ecological site. The similarity index during baseline period ranged between 63%-65%, placing it in good ecological condition, explained by the dominance of saltgrass on the site. Nevada saltbush is much greater than the described potential for the site. The site also lacks in diversity of perennial grasses. Frequency for saltgrass and Nevada saltbush increased between 2009-07. Saltgrass frequency was significantly higher than all previous sampling events in 2009 while in 2010 saltgrass decreased to its lowest value since monitoring has begun on the site and in 2012 rose to one of the highest levels for the transect. This transect was burned in the spring of 2013. The transect was essentially a monoculture of saltgrass and with the fire has all but eliminatedall other plant species. Nevada saltbush cover dropped from 8.6 m to 0 m in 2015.

TWINLAKES_04 is located in the Lower Blackrock Riparian Field in the former dry reach. The soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, which corresponds to the Moist Floodplain ecological site. The similarity index is poor, ranging between 4-5%. Unlike TWINLAKES_03, which has historically benefitted from a shallow water table, TWINLAKES_04 has yet to respond favorably from returned flows into the Lower Owens River. The site is predominantly Nevada saltbush, inkweed, and

fivehorn smotherweed. Frequency significantly increased for bassia and inkweed in 2009 and 2010 when compared to 2007 and disappeared in 2012. Inkweed frequency in 2009 and 2010 was greater than baseline parameters (2002-04 and 2007) but dropped significantly in 2012. Inkweed cover has also substantially increased from trace amounts prior to returning flows to the river to over 37 m of canopy along the transect in 2010 and then dropping to 12.5m in 2012. Inkweed in 2015 remained at 2014 levels. No utilization estimates exist for the site due to the absence of key forage species. Nevada saltbush cover has increased to 2009 levels.

TWINLAKES_06 is located in the Lower Blackrock Riparian Field. Soils are Torrifluvents-Fluvaquentic Endoaquolls Complex, which corresponds to the Moist Floodplain ecological site. Similarity index to the site's potential was 19% between 2006-07. As with TWINLAKES_04, the site is dominated by shrubs, invasive annual forbs, and a scant amount of perennial grasses as the understory. Because of this, and the fact that the area is inaccessible to livestock, utilization is not estimated on this site. Plant frequency in 2009 indicated a significant increase in Nevada saltbush and bassia. In 2010, saltgrass decreased to its lowest level for the site but in 2014, saltgrass rose to one of the highest levels seen on the transect. Shrub cover for Nevada saltbush continues to increase on the site rising from 5.4m in 2006 to 66.6m in 2010. In 2012, there was a slight decrease in Nevada saltbush cover which continued to decline rapidly in 2014 to 35.88m. Nevada saltbush cover rose again in 2015. At the same time Mojave seablite has steadily decreased on the site.

Fencing

There was no new fencing constructed on the lease in 2015.

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, California Department of Forestry (CDF) 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.

7.3.2.37. Intake Lease (RLI-475)

The Intake Lease is used to graze horses and mules employed in a commercial packer operation. 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.

Table 7. 64 End of Grazing Season Utilization, Intake Lease, RLI-475, 2015

Field	Utilization	Transect	Utilization
Intake Field*	0%	*STEWART_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

STEWART_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.

7.3.2.38. 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.

Table 7. 65 Grazing Utilization, Thibaut Lease, RLI-430, 2007-15

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

Table 7. 66 Grazing Utilization, Thibaut Lease, RLI-430, 2007-15

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

***Riparian Utilization, 40%**

Summary of Utilization

Utilization on the Thibaut lease has been within the upland standard of 65% in the Thibaut Field. There has 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 feeding 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, please refer to last year's report for discussion of results.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores.

Irrigated Pasture Condition Scores 2011-15

Pasture	2011	2012	2013	2014	2015
Thibaut Field	82%	81%	78%	X	X
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 2015.

Rare Plant Management Area Thibaut

This pasture contains both Owens valley Checkerbloom and Inyo County star tulip populations. Trend plots for Rare Plant Management Area 1 and Rare Plant Management Area 4 are within an exclosure that is restricted from grazing from early March through early October per the LORP EIR during the rare plants' flowering, fruiting, and seeding period. The pasture was grazed with end-of-season utilization at 38%.

Table 7. 67 Rare Plant Management Area, Thibaut Lease

Plot Number	Year	Species	Seedling	Juvenile	Mature	Total
Rare Plant Management Area 1	2009	Owens Valley checkerbloom	N/A	N/A	N/A	N/A
	2010		1	0	24	25
	2011		15	5	32	52
	2012		34	0	42	76
	2013		45	0	52	97
	2014		35	0	35	70
Rare Plant Management Area 2	2009	Inyo County star-tulip	N/A	N/A	N/A	N/A
	2010		0	0	12	12
	2011		0	0	4	4
	2012		2	0	7	9
	2013		4	0	8	12
	2014		24	0	25	49
Rare Plant Management Area 4	2009	Owens Valley checkerbloom	N/A	N/A	N/A	N/A
	2010		3	0	38	41
	2011		9	12	40	61
	2012		31	0	44	75
	2013		28	0	45	73
	2014		22	0	52	74
Rare Plant Management Area 4	2009	Inyo County star-tulip	N/A	N/A	N/A	N/A
	2010		0	0	4	4
	2011		0	0	2	2
	2012		0	0	1	1
	2013		0	0	3	3
	2014		1	0	4	5

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.

7.3.2.39. 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.

There are eight pastures located within the LORP boundary of the Islands Lease:

- Bull Field
- Reinhackle Field
- Bull Pasture
- Carasco North Field
- Carasco South Field
- Carasco Riparian Field
- Depot Riparian Field
- River Field

Summary of Utilization

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

Table 7. 68 Grazing Utilization for Fields/Pastures on the Islands Lease, RLI-489, 2007-15

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

Table 7. 69 Grazing Utilization for Transects on the Islands Lease, RLI-489, 2007-15

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

****Riparian Utilization, 40%***

Summary or Utilization

The Depot Riparian Field and River Field had exceeded utilization rates in the 2011-12 grazing season. In 2012-13 they 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. The Depot Riparian Field was over allowable utilization in 2015. If utilization is over the allowable 40% in 2016 a proposed riparian fence will be constructed to control livestock.

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, please refer to last year's report for discussion of results.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 70 Irrigated Pasture Condition Scores Islands Lease RLI-489, 2007-15

Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015
B Pasture	96	X	X	90	X	X	90%	X	X
D Pasture	96	X	X	94	X	X	90%	X	X

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 not yet installed the water troughs at the wells.

Fencing

There was no new fence constructed on the lease. An old section of fence located on the east side of the Owens River across from the Carasco Riparian Field was removed by the lessee during the winter of 2013.

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.

7.3.2.40. 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.

There are 11 pastures on the Lone Pine Lease located within the LORP project boundary:

- East Side Pasture
- Edwards Pasture
- Richards Pasture
- Richards Field
- Johnson Pasture
- Smith Pasture
- Airport Field
- Miller Pasture
- Van Norman Pasture
- Dump Pasture
- River Pasture

Summary of Utilization

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

Table 7. 71 Grazing Utilization for Fields/Pastures on the Lone Pine Lease, RLI-456, 2007-15

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015
Johnson Field	44%	0%	34%	63%	14%	0%	WAIVED	79%	0%
River Field	77%	49%	55%	36%	32%	37%	BURNED	37%	34%
Riparian Utilization, 40%									

Table 7. 72 Grazing Utilization for Transects on the Lone Pine Lease, RLI-456, 2007-15

Fields/Pastures	Transect	2007	2008	2009	2010	2011	2012	2013	2014	2015
Johnson Field	LONEPINE_5	44%	0%	34%	63%	14%	0%	WAIVED	79%	0%
***River Field**	LONEPINE_1	80%	45%	61%	49%	28%	22%	BURNED	38%	42%
	LONEPINE_2	79%	47%	48%	25%	30%	32%	BURNED	30%	35%
	LONEPINE_3	81%	49%	70%	37%	52%	63%	BURNED	64%	49%
	LONEPINE_4	67%	55%	47%	32%	45%	45%	BURNED	20%	40%
	LONEPINE_7		52%	51%	38%	8%	21%	BURNED	17%	19%
	LONEPINE_8						42%	BURNED	52%	21%
****Riparian Utilization, 40%***										

Summary of Utilization

Utilization was waived in the Johnson Pasture during the 2012-13 grazing season to provide the lessee a location to move livestock following the Lone Pine Fire that burned the River Pasture at the end of February. Livestock entered the River Riparian pasture a few weeks prior to the fire. By doing this, much of the summer's production had not yet been harvested by the cattle. This provided a large fuel source for the fire which burned extremely hot and fast. Over 90% (525 acres) of the River Field was burned with a loss of several cattle and much of the riparian forest. Overall utilization on the lease has decreased over time and no management changes are needed.

Overall utilization has been bellow 40% and the River Field has recovered well from the fire. There was some loss of riparian vegetation but it is slowly recovering, the native meadow is also doing very good.

Summary of Range Trend Data

There was a decrease in saltgrass on LONEPINE_06, but this decrease was still within ranges observed previously on the transect. Saltgrass significantly increased on LONEPINE_02 and LONEPINE_03. Plant frequencies for saltgrass and alkali sacaton on LONEPINE_05 in the Johnson Pasture declined significantly in 2015.

River Pasture

LONEPINE_01 is in a riparian management area on the west side of the Owens River, just north of Lone Pine Creek in the River Pasture. The soil series associated with the transect is Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, and is on a Moist Floodplain ecological site. During the baseline period from 2002-07, similarity index has ranged between 76% and 79%. Annual aboveground production at this riparian site has exceeded typical quantities found in the Moist Floodplain ecological site description. This site supports four perennial graminoid species and is dominated by saltgrass (Distichlis spicata [DISP]). The overall biomass of shrubs is typical for a Moist Floodplain ecological site. No nonnative species were detected at the site. Creeping wildrye (LETR) significantly increased in 2009 and continues to remain stable. All other

plant frequencies did not statistically vary when compared to 2009. Shrub cover appears to be decreasing on this site.

LONEPINE_02 is in a riparian management area on the west side of the Owens River, east of the Lone Pine Dump in the River Pasture. The soil series is Torrifluvents-Fuvaquentic Endoaquolls complex, 0 2% slopes, and is on a Moist Floodplain ecological site. The similarity index ranged between 65% and 87% from 2002 to 2007. The site is in excellent condition. The site is grass dominated with saltgrass comprising the bulk of the biomass. Saltgrass frequency significantly increased in 2009, outside its historic range from 2002-07 and in 2010-12 returned to levels typically observed on the site. Saltgrass again increased in 2015. No nonnative species were detected at the site.

LONEPINE_03 is in a riparian management area on the west side of the Owens River in the River Pasture. The soil series is Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes, and is on a Moist Floodplain ecological site. The similarity index has ranged between 74% and 87% during sampling periods between 2002-07, indicating the site is in excellent condition. Site production has exceeded expectations based on the ecological site description in all years of sampling. The site is grass dominated with saltgrass comprising the bulk of the biomass and creeping wildrye closely reaching the potential described for the site at 13% in 2007. Saltgrass significantly increased to its greatest value on the site in 2015. Overall shrub cover is minimal. No nonnative species were detected at the site. This site, based on the ecological site description and frequency trends, is stable and in excellent ecological condition.

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

The similarity index has ranged widely between 59% and 73% from 2002-07. Site production has generally been less than potential based on the ecological site description for a Moist Floodplain site. When compared to the Moist Floodplain ecological site description, the site has less than the expected biomass of forage species such as creeping wild rye and Baltic rush (Juncus balticus [JUBA]). This is explained by the transition from mesic conditions on the Moist Floodplain to more xeric conditions of the uplands which results in a decreasing abundance of creeping wildrye, Baltic rush, and riparian trees and the disproportionate amount of alkali sacaton which can better thrive in both the mesic and xeric transitional zones. The site is grass-dominated with saltgrass and alkali sacaton comprising the bulk of the biomass. The shrub component of the site is dominated by rubber rabbitbrush (*Ericameria nauseosa* [ERNA10]). As flows on the Lower Owens continue, soil moisture may rise toward the upland zone of the transect and future changes in species composition may

be observed. However, frequency data indicates that there is an inverse trend, with decreasing saltgrass, and increasing alkali sacaton which is typical for gradient in zones moving from wet to dry areas. No nonnative species were detected at the site. The site remained static in 2015.

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

The similarity index has ranged between 66% and 84% between 2003 and 2007. Site production has varied during the baseline period from above to below the expected based on the ecological site description. Compared to the potential outlined in the ecological site description, this site lacks the forb and woody riparian species component. The forage base is dominated by saltgrass and alkali sacaton. Other forage species such as creeping wild rye and Baltic rush are lacking at this site. One nonnative species, Bassia, has been detected at the site. Frequency results in 2010 indicated that trend continues to be static. There was a significant decrease in salt grass in 2012. The exclosure was completed in February 2009. Alkali sacaton, following the 2013 fire was at its all-time low while in 2015 both alkali sacaton and saltgrass have increased to its highest level seen.

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

The similarity index was 60% in 2007. Site production was similar to that expected based on the ecological site description. There is a low diversity of perennial graminoids as the only species detected was saltgrass while other forage species such as alkali sacaton and creeping wild rye are lacking on the transect but are present in the area. The biomass of forbs and riparian woody species is less than expected as compared to the desired plant community. No nonnative species were detected at the site. Baseline utilization is not available for this site since it was not established until the summer of 2007. Between 2007 and 2015 frequency has not changed significantly on the site.

LONEPINE_08 is in a riparian management area on the east side of the Owens River in the River Pasture. This site was first established in the summer of 2011. The soil series is Torrifluvents-Fluvaquentic Endoaquolls complex, 0-2% slopes on a Moist Floodplain ecological site. The only change which has occurred has been an increase in Scirpus americanus.

Johnson Pasture

LONEPINE_05 is in an upland management area in the Winnedumah fine sandy loam, 0-2% slopes soil series which is associated with a Sodic Fan ecological site, just east of the Lone Pine Airport in the Johnson Pasture. In 2004, the site flooded and was not sampled. An increase from 0 to 14 juvenile Salix exigua species in 2007 is evidence of this flooding.

The similarity index has ranged between 69% and 77% between 2002-07. Nevada saltbush (*Atriplex torreyi* [ATTO]) has trended down over time. Frequency of saltgrass significantly increased in 2009 and decreased in 2010 to similar levels to that seen during the baseline period. In 2015, alkali sacaton and saltgrass have dramatically declined. Shrub cover has also decreased significantly in 2015. This site was flooded between 2004-05. The subsequent decline in plant frequency and cover is a result of the area drying out.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 73 Irrigated Pasture Condition Scores Lone Pine Lease RLI-456, 2007-15

Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015
Edwards	80	80	80	90	X	X	84	X	X
Richards	64	82	82	84	X	X	84	X	X
Van Norm	X	X	X	80	X	X	84	X	X
Old Place	86	X	X	90	X	X	84	X	X
Smith	88	X	X	96	X	X	84	X	X
Miller	94	X	X	86	X	X	86	X	X

X indicates no evaluation made

Summary Irrigated Pastures

The irrigated pastures within the LORP project area for the Lone Pine Lease are the Edwards, Richards, Smith, Old Place, Miller and Van Norman 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.

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 2015-16.

Fencing

There was no new fencing constructed on the lease. 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.

7.3.2.41. 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.

Table 7. 74 Grazing Utilization for Fields/Pastures on the Delta Lease, RLI-490, 2007-15

Fields/Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bolin Field						65%	26%	16%	0%
Main Delta	58%	58%	53%	51%	38%	43%	31%	37%	41%
***Riparian Utilization, 40%**									

Table 7. 75 Grazing Utilization for Transects on the Delta Lease, RLI-490, 2007-15

Fields/Pastures	Transect	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bolin Field	BOLIN_1						0%	25%	16%	0%
	BOLIN_2						65%	26%		0%
***Main Delta Field**	DELTA_1	58%	56%	59%	70%	38%	30%	19%	39%	35%
	DELTA_3	72%	60%	54%	71%	12%	45%	26%	50%	8%
	DELTA_4	83%	50%	55%	62%	33%	44%	38%	30%	11%
	DELTA_5	50%	73%	54%	29%	50%	42%	40%	22%	60%
	DELTA_6	26%	50%	35%	23%	42%	41%	26%	30%	66%
	DELTA_7	60%	65%	61%	49%	51%	58%	36%	49%	63%
***Riparian Utilization, 40%**										

Summary of Utilization

Utilization in the Main Delta was has tended to be 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 41% for 2015.

Summary of Range Trend Data and Conditions

Range trend transects on the Delta Lease were read in 2013 and will be revisited again in August 2016.

Irrigated Pastures

The following table shows Irrigated Pasture Condition scores. No irrigated pasture scoring was conducted in 2015 due to extreme drought conditions.

Table 7. 76 Irrigated Pasture Condition Scores Delta Lease RLI-490, 2007-15

Pastures	2007	2008	2009	2010	2011	2012	2013	2014	2015
Lake Field	92	X	X	84	X	X	74	X	X

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

There was no new fencing on the lease for lease planned beyond general maintenance.

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.

7.4. Section 7 Appendix Range Trend

Transect	YRIB_01				
Frequency	Species	2007	2009	2010	2013
Annual Forb	ATPH	0	0	6	0
	CLOB	0	0	1	0
Perennial Forb	MACA2	0	0	3	0
Perennial Graminoid	DISP	77	75	92	67
	JUBA	7	5	2	1
	SPAI	53	45	51	52
Shrubs	ATTO	2	1	0	2
	ERNA10	10	4	5	13
	MACA17	3	0	0	0
	MACAI3	0	2	0	0

Shrub Cover (m)	2007	2009	2010	2013
ATTO	0	0	1.2	1.21
ERNA10	2.9	3.6	6.45	3.42
SAVE4	0.3	0.25	0.25	0
Total	3.2	3.85	7.9	4.63

Transect	YRIB_02			
Frequency	Species	2007	2009	2010
Annual Forb	ATRIP	3	0	0
	ATSES	8	0	0
	COMAC	0	0	5
	HEAN3	53	50	12
	MEAL6	0	5	0
Perennial Forb	CALI4	2	5	0
	PYRA	9	7	2
Perennial Graminoid	CAREX	48	47	40
	DISP	46	49	77
	ELEL5	0	0	0
	HOJU	28	16	9
	JUBA	25	63	62
	LETR5	54	70	106
	MUAS	7	10	0
	POSE	7	3	0
Shrubs	ERNA10	4	0	0
Nonnative Species	BAHY	13	18	23
	CADR	11	22	13
	LELA2	50	22	0
	LOCO6	0	7	0
	MEOF	2	0	0
	POMO5	20	41	3

Shrub Cover (m)	2010
ERNA10	1.6

Transect	YRIB_03			
Frequency	Species	2007	2009	2013
Perennial Graminoid	DISP	116	144	132
	SPAI	5	10	9
Shrubs	ATTO	2	3	3
	ERNA10	4	6	5

Shrub Cover (m)	2007	2009	2013
ATTO	0.3	6.12	0.37
SAVE4	0	0.6	0
Total	0.3	6.72	0.37

Transect	YRIB_04	North 40		
Frequency	Species	2007	2010	2013
Annual Forb	ATPH	0	11	0
	COMAC	0	21	0
	CORA5	0	5	0
Perennial Forb	GLLE3	0	3	0
	PYRA	5	7	4
Perennial Graminoid	CAREX	0	14	0
	DISP	102	99	103
	JUBA	34	34	19
	LETR5	11	0	0
	SPAI	37	21	21
	SPGR	0	5	0
Shrubs	ERNA10	0	7	18

Shrub Cover (m)	2007	2010	2013
ERNA10	0.3	15.06	11.88

Transect	YRIB_05			
Frequency	Species	2009	2010	2013
Annual Forb	ATPH	0	43	0
	CLOB	0	10	0
	COMAC	0	2	0
Perennial Forb	GLLE3	3	0	0
	PYRA	17	0	0
Perennial Graminoid	CAREX	16	0	0
	DISP	93	112	102
	JUBA	28	0	0
	SPAI	21	12	11
Shrubs	ATTO	0	17	8
	ERNA10	14	0	0

Shrub Cover (m)	2009	2010	2013
ATTO	0	2.04	1.61
ERNA10	17.95	1.47	1.07
SAVE4	0	0.51	0.22
Total	17.95	4.02	2.9

Transect	YRIB_06	North 40
Frequency	Species	2013
Perennial Graminoid	DISP	49
	JUBA	1
	SPAI	64
Shrubs	ATTO	3
	ERNA10	9

Shrub Cover (m)	2013
ERNA10	4.92
Total	4.92

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	FISHSL_01	Lake Field
Frequency	Species	2015
Perennial Forb	APCA	6
Perennial Graminoid	CAREX	67
	DISP	63
	JUBA	102
	MUAS	51
Nonnative Species	POMO5	3

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

Transect	FISHSL_02	South Bench Field
Frequency	Species	2015
Perennial Forb	GLLE3	45
	PYRA	7
Perennial Graminoid	DISP	117
	JUBA	14
	LETR5	4
	SPAI	130
	SPGR	24
Shrubs	ALOC2	6
Nonnative Species	PHAU7	10

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

Transect	FISHSL_03	Exclosure Pasture
Frequency	Species	2015
Perennial Forb	GLLE3	5
	PYRA	1
Perennial Graminoid	DISP	33
	JUBA	11
	SPAI	81
	SPGR	43
Shrubs	ALOC2	5

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

Transect	FISHSL_04	North Bench Field
Frequency	Species	2015
Perennial Forb	GLLE3	4
	PYRA	26
Perennial Graminoid	DISP	16
	JUBA	19
	SPAI	87
	SPGR	17
Shrubs	ALOC2	14
Nonnative Species	PHAU7	2

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

Transect	FISHSL_05	Calochortus
Frequency	Species	2015
Perennial Forb	PYRA	23
Perennial Graminoid	CAREX	5
	DISP	45
	JUBA	104
	POSE	17
	SPGR	88

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

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		
Frequency			
Life Forms	Species	2007	2013
Annual Forb	ATTR	1	0
	COMAC	5	0
Perennial Forb	GLLE3	8	9
Perennial Graminoid	DISP	135	102
	JUBA	50	30
	LETR5	27	9
	SPAI	9	12
Shrubs	ATTO	3	8
	ERNA10	1	1
Nonnative Species	BAHY	20	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	Triangle Field		
Frequency				
Life Forms	Species	2007	2009	2013
Perennial Forb	GLLE3	0	4	0
	NIOC2	0	0	1
	PYRA	0	0	0
Perennial Graminoid	DISP	144	133	104
	JUBA	41	25	17
	LETR5	25	22	25
	SPAI	55	40	64
Shrubs	ATTO	0	0	3
	ERNA10	6	3	3

Shrub Cover (m)			
Species code	2007	2009	2013
ATTO	0	0	0.02
ERNA10	0.25	0.2	1.2
Total	0.25	0.2	1.22

Transect	LACEY_03			
Frequency				
Life Forms	Species	2007	2009	2013
Perennial Graminoid	DISP	139	157	75
	JUBA	3	2	0
	LETR5	42	26	17
	SPAI	31	5	1
Shrubs	ALOC2	0	5	8

Shrub Cover (m)		
Species code	2009	2013
ALOC2	4.65	0
ATTO	1.2	3.34
Total	5.85	3.34

Transect	LACEY_04			
Frequency				
Life Forms	Species	2007	2009	2013
Perennial Graminoid	DISP	24	18	23
	JUBA	11	17	19
	SPAI	96	113	65
Shrubs	ATTO	3	1	3
	ERNA10	14	9	13

Shrub Cover (m)			
Species code	2007	2009	2013
ATCO	0	0.7	0
ATTO	1.75	0.95	0.97
ERNA10	10.95	15.7	18.07
SAVE4	1.25	1.1	0
Total	13.95	18.45	19.04

Frequency	LACEY_05			
Life Forms	Species	2007	2009	2013
Perennial Forb	GLLE3	22	0	19
Perennial Graminoid	DISP	73	91	81
	JUBA	34	4	35
	LETR5	66	113	70
	SPAI	82	0	78
Shrubs	ALOC2	8	0	3
	ATTO	8	0	5
	ERNA10	3	0	2
Nonnative Species	BAHY	0	3	0

Shrub Cover (m)

Species code	2007	2013
ALOC2	1.3	0
ATTO	5.85	5.66
ERNA10	1.4	3.88
Total	8.55	9.54

Transect	LACEY_06			
Frequency				
Life Forms	Species	2007	2009	2013
Perennial Graminoid	DISP	100	100	106
	SPAI	83	83	79
Shrubs	ATTO	17	6	6
Nonnative Species	BAHY	0	1	0

Shrub Cover (m)

Species code	2007	2009	2013
ATTO	6.95	7.45	3.76
Total	6.95	7.45	3.76

Transect	LACEY_07		
Frequency			
Life Forms	Species	2009	2013
Perennial Forb	GLLE3	44	53
	NIOC2	2	4
	PYRA	0	5
Perennial Graminoid	DISP	101	93
	JUBA	21	30
	LETR5	27	35
	SPAI	72	55

Transect	Lacey_08		Laws Holding Riparian
Frequency			
Life Forms	Species	2013	
Annual Forb	HEAN3	3	
Perennial Forb	ANCA10	27	
	GLLE3	12	
Perennial Graminoid	DISP	85	
	JUBA	22	
	LETR5	131	
Nonnative Species	BAHY	1	

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							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Perennial Forb	HECU3	6.8	4	8	2	16	10	4
	MALE3	20.4	26	21	26	21	13	6
	PYRA	0	3	2	1	0	0	0
	SEVE2	0	0	0	0	16	0	0
Perennial Graminoid	DISP	39.1	59	69	52	57	49	53
	JUBA	27.2	39	35	24	21	18	20
	SPAI	0	4	3	4	4	4	4
Shrubs	ATTO	28.9	36	35	36	13	17	12
	ERNA10	64.6	61	57	53	52	47	32

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
ATTO	12.6	3.46	12.15	3.81	4.55	2.95
ERNA10	26.1	11.35	20.6	10.52	13.15	12.7
Total	38.7	14.81	32.75	14.33	17.7	15.65

Transect	BLKROC_02							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ATTR	0	3	0	0	0	0	0
Perennial Forb	GLLE3	6.8	2	5	4	7	8	7
Perennial Graminoid	DISP	52.7	49	55	49	55	48	57
	JUBA	3.4	11	6	6	4	8	6
	LECI4	0	4	1	2	2	3	3
	SPAI	71.4	95	92	91	86	78	82
Shrubs	ATTO	42.5	35	41	30	27	20	26
	ERNA10	11.9	27	13	16	22	19	13
Nonnative Species	BAHY	0	5	0	0	0	0	0
	SATR12	0	0	1	0	0	0	0

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
ATTO	22.3	10.3	13.4	9.69	8.3	9.16
ERNA10	6	25.05	3.45	6.4	5.4	4.92
Total	28.3	35.35	16.85	16.09	13.7	14.08

Transect	BLKROC_03							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Annual Forb	CHHI	0	18	6	0	0	0	0
Perennial Forb	GLLE3	0	0	0	0	1	0	0
Perennial Graminoid	ARPU9	0	0	0	2	0	0	0
	DISP	52.7	47	59	42	36	18	14
	JUBA	0	0	0	0	2	0	0
	SPAI	100.3	112	117	122	128	122	124
Shrubs	ATTO	0	0	0	1	2	2	0
	ERNA10	0	6	7	4	17	8	13
Nonnative Species	LASE	0	3	3	0	0	0	0
	POMO5	0	2	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**
ATTO	0	0	0.25	0	0	0
ERNA10	1.52	1.3	5.35	9.54	9.85	16.35
Total	1.52	1.3	5.6	9.54	9.85	16.35

Transect	BLKROC_04							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Annual Forb	CHHI	0	2	0	0	0	0	0
	COMAC	0	23	0	0	0	3	0
	HEAN3	0	8	0	4	6	12	0
Perennial Forb	ANCA10	11.9	18	17	22	22	16	21
	HECU3	0	0	0	1	3	0	0
	MALE3	13.6	3	8	10	1	0	1
	PYRA	40.8	50	44	23	28	15	18
Perennial Graminoid	CADO2	5.1	18	0	5	0	0	0
	CAREX	0	0	0	0	14	1	12
	DISP	83.3	77	70	76	62	62	65
	JUBA	88.4	113	93	73	95	89	98
	LETR5	27.2	65	43	48	70	26	35
	SPAI	69.7	30	73	59	27	56	42
	SPGR	0	0	0	0	0	0	1
Shrubs	ALOC2	5.1	0	0	0	2	1	1
	ATTO	0	5	0	0	4	3	0
	ERNA10	0	3	2	2	3	2	6
Nonnative Species	BAHY	0	12	6	0	20	30	1
	POMO5	0	2	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**
ALOC2	0	0	0	0	0.4	0
ATTO	0.25	0	0	0.7	0.15	0
ERNA10	3.38	2.75	5.55	7.9	2.35	5.82
Total	3.63	2.75	5.55	8.6	2.9	5.82

Transect	BLKROC_05							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ATPH	0	3	0	0	0	0	0
	ATSES	0	11	0	2	0	0	0
	CLEOM2	0	16	0	0	0	0	0
	COMAC	0	17	0	3	0	0	0
	HEAN3	3.4	11	0	6	0	2	0
Perennial Forb	GLLE3	0	0	0	0	0	0	4
	PYRA	32.3	45	37	5	8	3	10
	SICO2	0	2	0	0	0	0	0
Perennial Graminoid	DISP	49.3	63	49	49	78	52	55
	JUBA	6.8	14	14	10	10	6	9
	LECI4	0	0	0	0	4	0	0
	LETR5	0	0	0	0	0	4	4
	SPAI	124.1	125	115	123	111	131	124
Shrubs	ATTO	0	2	0	0	0	4	0
	ERNA10	6.8	4	1	0	1	0	0
Nonnative Species	BAHY	0	0	0	11	3	0	0
	POMO5	0	4	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**
ERNA10	7.6	6.3	2.1	0.8	0.5	0.25
Total	7.6	6.3	2.1	0.8	0.5	0.25

Transect	BLKROC_06							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ATPH	0	30	0	0	0	19	0
	CHHI	0	8	0	0	0	0	0
	CLEOM2	0	3	0	0	0	0	0
	COMAC	0	26	0	0	0	5	0
Perennial Forb	ANCA10	5.1	4	4	2	4	2	2
	PYRA	18.7	4	0	2	1	0	0
Perennial Graminoid	DISP	73.1	80	75	77	66	70	69
	JUBA	17	26	37	27	13	9	16
	SPAI	95.2	78	71	76	76	85	80
Shrubs	ATTO	0	8	9	4	10	6	2
	ERNA10	20.4	19	6	8	9	14	9
	SAEX	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**	**2013**
ATTO	3.33	0.75	1	2.1	1.3	3.1
ERNA10	17.31	9.15	9.9	9.55	9.75	6.9
SAEX	2.33	7.5	3.3	0.65	0.1	0.45
SALIX	0	0.6	0	0	0	0
Total	22.97	18	14.2	12.3	11.15	10.45

Transect	BLKROC_07							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Annual Forb	2FORB	0	0	0	0	0	0	6
	ATPH	0	32	0	0	0	18	0
	CLOB	0	9	0	0	0	6	0
	ERPR4	0	0	0	3	0	0	0
Perennial Forb	SUMO	0	0	0	0	3	0	0
Perennial Graminoid	DISP	69.7	59	71	61	75	73	78
	JUBA	17	6	12	1	4	6	1
	SPAI	91.8	68	64	76	84	67	76
Shrubs	ATTO	5.1	0	0	0	0	2	1
	ERNA10	5.1	4	3	3	4	5	4
Nonnative Species	POMO5	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**	**2013**
ATTO	0	0	0.5	0.15	0.3	0
ERNA10	3.58	2.85	3	1.85	1.55	2.55
SUMO	0	0.35	0.7	0.25	0	0
Total	3.58	3.2	4.2	2.25	1.85	2.55

Transect	BLKROC_09						
Frequency	**Species**	**2002**	**2003**	**2007**	**2009**	**2010**	**2013**
Annual Forb	2FORB	0	2	0	0	0	0
	COMAC	0	2	0	0	0	0
	ERAM2	0	0	2	0	0	0
Perennial Forb	APCA	0	0	4	0	0	3
	ASTER	0	0	0	0	0	0
	GLLE3	1.7	7	1	4	2	1
	STEPH	0	0	0	0	0	0
Perennial Graminoid	DISP	113.9	102	85	99	104	124
	JUBA	56.1	55	57	65	65	59
	LECI4	0	0	4	0	0	0
	LETR5	5.1	5	7	10	9	5
	SPAI	86.7	66	80	68	69	74
Shrubs	ATTO	34	46	16	24	15	9
	ERNA10	25.5	36	39	44	36	44
	MACA17	0	0	4	1	0	0
	PSAR4	0	3	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**
ATTO	25.22	9.15	8.86	2.9	0.65
ERNA10	10.07	9.55	10.302	8.8	8.77
Total	35.29	18.7	19.162	11.7	9.42

Transect	BLKROC_10										
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2013**	**2014**	**2015**
Annual Forb	ATTR	0	4	0	0	0	0	0	0	0	0
	CHBR	0	2	3	0	0	0	0	0	0	0
	CHIN2	0	14	28	0	0	0	0	0	0	0
	MENTZ	0	14	0	0	0	0	0	0	0	0
Perennial Forb	HECU3	0	0	0	0	0	0	0	0	0	0
	MALE3	0	3	7	11	21	20	27	18	17	16
	SUMO	0	0	0	0	10	0	0	0	0	0
	STPI	0	0	4	0	0	0	0	0	0	0
Perennial Graminoid	DISP	0	3	0	0	0	0	2	7	9	10
	LETR5	0	0	0	0	0	0	9	12	19	21
	SPAI	0	12	18	18	21	22	17	18	22	21
Shrubs	ARTRW8	0	0	0	0	0	0	0	0	0	0
	ATTO	1.7	6	14	25	92	74	74	65	64	49
	SAVE4	0	0	0	0	0	3	0	0	0	0
	ARTR2	0	2	0	2	2	3	0	0	0	0
Nonnative Species	AMARA	0	6	0	0	3	0	0	0	0	0
	BAHY	0	3	64	0	47	24	2	4	2	0
	DESO2	0	0	1	0	4	0	0	0	0	0
	SATR12	0	0	48	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**
ARTR2	1.17	1.25	1.95	2.5	0	0	0	0	0
ATTO	2.78	5.25	16.39	52.85	59.7	51.82	46.17	37.33	39.25
ATTR	0	0	0	0	2.25	0	0	0	0
ERNA10	0.95	0.8	0	0	0	0	0	0	0
Total	4.9	7.3	18.34	55.35	61.95	51.82	46.17	37.33	39.25

Transect	BLKROC_11										
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2013**	**2014**	**2015**
Annual Forb	ATPH	0	0	2	0	0	0	0	0	0	0
	ATSES	0	5	0	0	0	0	0	0	0	0
	ATTR	0	19	7	0	2	0	0	0	0	0
	CHENO	0	1	0	0	0	0	0	0	0	0
	CHIN2	0	0	3	0	0	0	0	0	0	0
	GILIA	0	9	0	0	0	0	0	0	0	0
	MENTZ	0	2	0	0	0	0	0	0	0	0
Perennial Forb	MALE3	0	3	4	4	0	0	0	0	0	0
	SUMO	32.3	28	42	49	76	66	20	10	16	15
Perennial Graminoid	DISP	113.9	107	112	103	110	110	105	106	101	106
	SPAI	22.1	39	41	36	42	40	29	33	32	28
Shrubs	ATTO	37.4	95	101	53	70	72	21	22	16	11
	ERNA10	3.4	10	16	8	5	6	0	0	0	0
Nonnative Species	BAHY	0	42	38	0	59	44	0	0	2	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**
ATTO	13.56	16.5	18.25	18.9	18.7	28.323	27.57	16.77	0
ATTOD	0	0	0	0	0	0	0	17.6	0
ERNA10	3.2	5	8.05	3.1	2.6	1.55	1.1	0.7	0.3
SUMO	10.49	4.85	13.35	16.16	6.06	2.27	0	4.35	5.9
Total	27.25	26.35	39.65	38.16	27.36	32.143	28.67	39.42	6.1

Transect	BLKROC_13							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Annual Forb	HEAN3	0	0	0	1	2	7	3
Perennial Forb	ANCA10	6.8	5	11	13	13	16	14
	GLLE3	0	0	0	0	0	0	1
Perennial Graminoid	DISP	129.2	139	128	128	121	120	103
	JUBA	22.1	6	13	22	19	19	0
	LETR5	6.8	0	0	14	20	23	30
	SPAI	34	40	36	37	34	28	23
Shrubs	ATTO	0	12	5	8	1	5	3
	ERNA10	0	0	4	3	0	0	3

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
ATTO	4.04	3.1	8.65	7.63	8.05	5.98
ERNA10	0	0.4	2.4	2.5	2.8	4.18
Total	4.04	3.5	11.05	10.13	10.85	10.16

Transect	BLKROC_14										
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2012**	**2013**	**2014**	**2015**
Annual Forb	ATTR	0	0	5	0	0	0	0	0	0	0
	CHENO	0	0	0	0	0	0	0	0	0	0
	CHIN2	0	3	3	0	0	0	0	0	0	0
Perennial Forb	HECU3	0	5	0	0	0	0	0	0	0	0
	MALE3	0	4	4	6	7	0	7	10	8	13
	SUMO	0	0	0	0	4	0	0	0	0	0
Perennial Graminoid	DISP	13.6	21	14	10	0	0	7	13	20	22
Shrubs	ATTO	0	4	8	11	24	27	24	24	36	5
Nonnative Species	BAHY	0	14	67	0	2	71	3	4	12	0
	DESO2	0	0	2	0	0	0	0	0	0	0
	SATR12	0	20	90	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**
ATTO	8.76	0.35	10.05	27.25	34.41	42.77	31.25	31.55	12.3

Transect	BLKROC_15							
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ATTR	0	0	16	0	0	0	0
	CHIN2	14	4	29	0	0	0	0
	ERAM2	0	0	5	0	0	0	0
	GITR	0	0	4	0	0	0	0
	LEFL2	0	0	3	0	0	0	0
	MEAL6	0	0	21	0	0	0	0
	NADE	0	0	1	0	0	0	0
Perennial Forb	SUMO	15	18	39	31	32	37	18
Perennial Graminoid	DISP	25	21	19	14	3	11	24
Shrubs	ATTO	48	35	80	29	47	58	39
	SAVE4	2	9	2	6	5	8	13
Nonnative Species	BAHY	6	2	17	0	23	35	0
	DESO2	0	3	10	0	0	0	0
	SATR12	0	1	2	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**
ATTO	25.4	15.1	19.25	32.9	34.81	39.85	54.74
SAVE4	10.07	8	6.6	7.6	9.1	9.84	4.65
SUMO	1.82	1.2	0.9	20.3	23.65	32.2	0
Total	37.29	24.3	26.75	60.8	67.56	81.89	59.39

Transect	BLKROC_16							
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ATSES	4	0	0	0	0	2	0
	ATTR	0	0	18	0	0	0	0
	CHIN2	13	16	37	0	0	0	0
	CRYPT	0	0	3	0	0	0	0
	ERAM2	0	0	0	0	0	0	0
	ERIOG	10	0	0	0	0	0	0
	ERMA2	0	11	23	0	0	0	0
	GITR	0	0	20	0	0	0	0
Perennial Forb	MACA2	0	0	59	0	0	0	0
	SUMO	0	0	7	0	0	1	0
Shrubs	ATCO	7	0	3	4	9	8	9
	ATTO	19	23	33	31	39	55	51
	SAVE4	5	12	6	8	11	6	15
Nonnative Species	BAHY	3	7	4	0	17	40	0
	SATR12	11	41	44	0	0	8	0

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

Shrub Cover (m)	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**
ATCO	0.41	0.55	0	0	0.35	3.8	0
ATTO	6.45	2.9	5.2	16.8	44.18	44.45	46.25
SAVE4	11.02	10.35	9.8	13.3	12.35	14.91	0
SUMO	0	0	0	0	0.05	0	0
Total	17.88	13.8	15	30.1	56.93	63.16	46.25

Transect	BLKROC_17							
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ATSES	12	0	8	0	0	5	0
	ATTR	3	0	31	0	0	0	0
	CHIN2	13	10	40	0	0	0	0
	CHLE4	0	0	1	0	0	0	0
	CRCI2	0	0	4	0	0	0	0
	ERIOG	0	0	0	0	0	3	0
	ERWI	0	0	7	0	0	0	0
	GITR	0	0	32	0	0	0	0
	LEFL2	0	0	54	0	0	0	0
	MEAL6	0	0	29	0	0	0	0
Perennial Forb	HECU3	0	0	0	0	0	0	2
Perennial Graminoid	HOJU	0	0	2	0	0	0	0
Shrubs	ATTO	70	34	74	45	49	54	52
Nonnative Species	BAHY	0	0	0	0	0	5	0
	DESO2	0	0	6	0	0	0	0
	SATR12	9	10	6	0	3	5	0

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

Shrub Cover (m)	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**
ATTO	37.52	5.65	5.6	28	37.7	69.3	66.06
Total	37.52	5.65	5.6	28	37.7	69.3	66.06

Transect	BLKROC_18							
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ATSES	3	0	0	0	0	0	0
	ATTR	0	0	0	0	0	0	0
	CHLE4	0	0	5	0	0	0	0
	GITR	0	0	4	0	0	0	0
Perennial Forb	GLLE3	3	6	9	4	1	4	0
Perennial Graminoid	DISP	119	104	114	118	102	86	120
	SCAM6	0	0	0	0	0	0	8
	SPAI	4	16	20	12	21	37	17
	TYLA	0	0	0	0	3	3	0
Shrubs	ATTO	33	12	24	19	20	13	6
	ERNA10	1	2	10	1	0	5	2
Nonnative Species	BAHY	14	10	45	0	0	0	0
	SATR12	0	0	3	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**	
ATTO	17.04	3.5	5.45	29.09	15.2	11.05	3.79	
ERNA10	4.85	2.85	3.5	5.7	4	5.5	6.56	
Total	21.89	6.35	8.95	34.79	19.2	16.55	10.35	

Transect	BLKROC_19							
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ATSES	4	0	0	0	0	0	0
	ATTR	0	0	2	0	0	0	0
	CHLE4	0	0	6	0	0	0	0
	GITR	0	0	5	0	0	0	0
Perennial Graminoid	DISP	139	147	139	127	143	132	122
	JUBA	13	20	6	26	21	14	24
	LETR5	3	0	1	0	0	0	0
	SPAI	9	8	12	10	10	26	9
Shrubs	ATTO	0	6	31	24	18	12	15
	ERNA10	0	3	5	0	3	3	0
		indicates a significant difference, α≤0.1 between 2014 and prior sampling event						
Shrub Cover (m)	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	
ATPO	0.7	0	0	0	0	0	0	
ATTO	3.63	1.5	2.9	8.8	13.59	11.75	8.08	
ERNA10	2	2.1	0.9	1.75	3.07	4.5	3.16	
Total	6.33	3.6	3.8	10.55	16.66	16.25	11.24	

Transect	BLKROC_20							
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ATTR	0	0	7	0	0	0	0
Perennial Graminoid	DISP	127	147	143	126	123	123	118
	LETR5	18	29	30	31	59	70	27
	SPAI	5	4	5	5	5	0	1
Shrubs	ATTO	6	2	27	19	18	15	9
	ERNA10	0	1	1	0	3	1	1
Nonnative Species	BAHY	5	0	6	0	16	33	0
		indicates a significant difference, α≤0.1 between 2014 and prior sampling event						
Shrub Cover (m)	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	
ATTO	8.8	6.85	17	27.1	30.26	27.88	9.63	
ERNA10	8.6	8.3	6.4	6.45	6.35	11.81	7.221	
SAVE4	0	0.1	0	0.25	0.65	0.42	1.26	
SUMO	0.05	0	0	0	0	0	0	
Total	17.45	15.25	23.4	33.8	37.26	40.11	18.111	

Transect	BLKROC_21							
Frequency	**Species**	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ATSES	3	0	0	0	0	0	0
	ATTR	0	0	2	0	0	0	0
Perennial Forb	SUMO	4	0	3	0	0	0	0
Perennial Graminoid	DISP	135	133	142	136	130	131	126
	LETR5	0	2	5	5	8	6	66
	SPAI	1	4	3	1	4	3	0
Shrubs	ATTO	23	13	42	10	10	3	7
	ERNA10	3	1	0	1	0	0	6
		indicates a significant difference, α≤0.1 between 2014 and prior sampling event						
Shrub Cover (m)	**2003**	**2004**	**2005**	**2007**	**2009**	**2010**	**2013**	
ATTO	29	20	29	24	17	16	11	
ERNA10	2	4	3	8	1	0	1	
SUMO	2	0	0	0	0	0	0	
Total	34	25	32	32	18	16	12	

Transect	BLKROC_22					
Frequency	**Species**	**2006**	**2007**	**2009**	**2010**	**2013**
Perennial Forb	SUMO	3	6	2	5	3
Perennial Graminoid	DISP	124	111	125	128	123
	SPAI	4	4	3	2	5
Shrubs	ALOC2	4	4	10	9	8
	ATTO	21	7	19	20	7
	ERNA10	5	4	11	8	2
Nonnative Species	BAHY	11	0	9	1	0

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

Shrub Cover (m)	**2006**	**2007**	**2009**	**2010**	**2013**
ALOC2	3.35	2.35	0	5	0
ATTO	11.35	9.9	9.64	5.5	9.13
ERNA10	8	9.1	6.86	6.95	3.85
SUMO	0.9	0.55	0.57	0.15	0
Total	23.6	21.9	17.07	17.6	12.98

Transect	BLKROC_23					
Frequency	**Species**	**2006**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ATSES	18	0	0	0	3
Perennial Graminoid	DISP	139	133	139	135	127
	SPAI	25	28	28	24	35
Shrubs	ATTO	0	0	0	32	1
Nonnative Species	BAHY	4	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**
ATTO	0.95	0.85	0.59	1.61	1.33
ERNA10	0	0	0	0	0.19
Total	0.95	0.85	0.59	1.61	1.52

Transect	BLKROC_25					
Frequency	**Species**	**2011**	**2012**	**2013**	**2014**	**2015**
Perennial Forb	SUMO	26	25	35	2	0
Perennial Graminoid	DISP	107	102	121	116	105
Shrubs	ATTO	3	4	2	1	0
Nonnative Species	BAHY	39	3	0	0	0

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

Shrub Cover (m)	**2011**	**2012**	**2013**	**2014**	**2015**
ATTO	1.2	5.83	8.04	6.4	9.39
ATTOD	0	0	0	6.2	0
SUMO	0	27.95	0	0.2	1.72
Total	1.2	33.78	8.04	6.6	11.11

Transect	BLKROC_39							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Perennial Forb	NIOC2	0	0	3	0	4	6	0
	SUMO	6.8	12	5	8	4	6	4
Perennial Graminoid	DISP	103.7	94	88	87	98	95	85
	JUBA	6.8	0	0	0	0	0	0
Shrubs	ALOC2	5.1	8	11	13	13	12	14
	ATCO	3.4	9	3	9	13	8	0
	ATTO	17	3	3	3	0	0	4
	ERNA10	0	4	0	1	0	0	0
	SAVE4	3.4	0	4	4	3	5	5
Nonnative Species	BAHY	0	2	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**
ALOC2	0.1	0.2	0	0	1	0
ATCO	0.15	0.45	0.35	1.75	6.35	0
ATTO	3.35	1.9	2.4	1.28	0	0.6
ERNA10	0.12	0	0.25	0	0.3	0.3
SAVE4	1.4	0	0.1	0	1.2	0.7
SUMO	0.2	0.4	0.5	0.44	0.6	0
Total	5.32	2.95	3.6	3.47	9.45	1.6

Transect	BLKROC_44							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ATPH	0	1	0	0	0	0	0
	ATSES	0	35	0	0	0	0	0
	CORA5	0	1	0	0	0	0	0
Perennial Forb	SUMO	3.4	7	7	8	15	15	9
Perennial Graminoid	DISP	103.7	96	104	113	114	102	108
	JUBA	20.4	14	16	7	11	0	0
	SPAI	79.9	87	83	83	82	82	93
Shrubs	ATTO	32.3	70	83	28	35	20	20
	ERNA10	17	30	32	10	24	32	30
Nonnative Species	BAHY	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**
ATTO	19.39	11.85	10.65	10.7	9.62	9.04
ERNA10	7.71	6	11.4	10.1	8.75	10.37
SUMO	1.44	0.9	1.8	0.15	0.6	0
Total	28.54	18.75	23.85	20.95	18.97	19.41

Transect	BLKROC_49							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ERIAS	0	3	0	0	0	0	0
	PSRA	0	0	2	0	1	0	0
Perennial Forb	MACA2	0	0	0	0	0	3	0
	OENOT	0	3	0	0	0	0	0
	STEPH	5.1	2	17	0	0	0	0
	STPA4	0	0	0	6	3	0	0
Perennial Graminoid	DISP	78.2	56	63	53	52	45	57
	SPAI	28.9	24	25	27	29	31	22
Shrubs	ATCO	20.4	15	19	21	30	24	19
	ATPA3	3.4	4	1	0	1	6	5
	ATTO	0	0	0	0	0	0	0
	ERNA10	13.6	10	7	4	10	16	15
	SAVE4	3.4	0	4	2	4	0	0

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
ATCO	0.38	0	0.2	0.72	0.2	0.55
ERNA10	1.12	1.05	2.3	1.7	0.6	1.35
MACA2	0	0.65	0	0	0	0
SAVE4	1.01	0.55	1.9	1.36	1.2	1
Total	2.51	2.25	4.4	3.78	2	2.9

Transect	BLKROC_51							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Perennial Forb	GLLE3	32.3	2	12	27	8	5	7
	SUMO	0	0	0	2	0	0	0
Perennial Graminoid	DISP	100.3	85	70	114	73	58	51
	SPAI	34	21	27	45	18	43	36
Shrubs	ALOC2	0	0	0	1	0	0	3
	ATTO	15.3	56	42	38	8	3	4
	ERNA10	8.5	2	0	11	1	5	4
	SAVE4	0	0	0	0	0	0	2

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
ATTO	25.86	6.21	11.75	7.85	4.6	5.35
ERNA10	2.1	0.55	4.15	4.15	3.25	5.25
SAVE4	0	0	0.4	0.3	0	0
Total	27.96	6.76	16.3	12.3	7.85	10.6

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							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Annual Forb	CORA5	0	0	0	0	0	0	2
Perennial Forb	ANCA10	5.1	12	5	7	11	9	10
	NIOC2	10.2	5	7	4	3	8	5
	SUMO	6.8	0	1	0	0	0	0
Perennial Graminoid	DISP	156.4	152	149	152	155	151	150
	JUBA	0	7	11	10	9	6	6
	LETR5	0	1	0	0	0	0	0
	SPAI	3.4	0	13	11	16	11	10
Shrubs	ATTO	1.7	5	1	5	0	0	0
Nonnative Species	BAHY	0	0	2	0	2	1	0

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
ATTO	3.14	1.8	3.85	1.05	0.25	0.11
SUMO	0.87	0.85	0.25	0.1	0	0
Total	4.01	2.65	4.1	1.15	0.25	0.11

Transect	DELTA_02							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Perennial Graminoid	DISP	108.8	118	131	103	115	114	89
Shrubs	ATTO	10.2	13	0	0	4	8	8
	ERNA10	10.2	9	12	0	1	4	3
Nonnative Species	BAHY	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**	**2007**	**2009**	**2010**	**2013**
ATTO	16.25	9.75	10.05	8.25	3.85	11.58
ERNA10	15.98	12.25	11.7	10.75	8.9	6.55
SUMO	0.37	0	0	0	0	0
Total	32.6	22	21.75	19	12.75	18.13

Transect	DELTA_03							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Perennial Forb	SUMO	15.3	15	19	0	15	22	12
Perennial Graminoid	DISP	113.9	118	129	104	119	112	122
	SPAI	5.1	0	0	1	0	0	2
Shrubs	ATTO	11.9	13	8	0	8	8	2
	ERNA10	0	0	0	0	2	0	0
	SAVE4	0	0	10	0	0	0	1
Nonnative Species	BAHY	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**
ATTO	10.99	7.75	10.9	7.25	4.75	5.23
ERNA10	0.7	0.4	1.15	0.75	0.8	0.4
SAVE4	6.55	6.3	5.9	5.85	5.1	3.99
SUMO	17.19	5.2	3.7	9.55	11.25	5.1
Total	35.43	19.65	21.65	23.4	21.9	14.72

Transect	DELTA_04							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ATPH	0	7	0	0	4	4	0
Perennial Forb	SUMO	0	7	0	0	1	0	5
Perennial Graminoid	DISP	139.4	128	150	103	115	124	116
	SPAI	0	5	6	0	0	0	0
Shrubs	ATTO	3.4	2	6	0	0	4	0
	SAVE4	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**
ATTO	3.62	2.25	3.1	5.32	6.05	1.67
SAVE4	0.29	0.65	0.2	0.2	0.9	0.02
SUMO	1.94	0.9	1.75	2.55	1.4	1.32
Total	5.85	3.8	5.05	8.07	8.35	3.01

Transect	DELTA_05							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Annual Forb	HEAN3	0	2	0	0	0	0	0
Perennial Forb	ANCA10	0	0	1	3	8	4	7
	NIOC2	6.8	0	2	0	0	2	6
	SUMO	13.6	2	23	19	16	20	11
Perennial Graminoid	CADO2	0	2	5	0	0	0	0
	CAREX	0	0	0	0	4	0	0
	DISP	154.7	146	163	135	144	142	135
	JUBA	8.5	9	12	13	23	23	13
	SCAM6	0	0	0	0	0	5	3
Shrubs	ATTO	0	6	5	0	1	0	0
Nonnative Species	BAHY	0	1	3	0	1	0	0
	LASE	0	10	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**
ATTO	6.54	3.4	4.77	5.9	6.13	2.56
ERNA10	0	0	0.6	1.15	1.04	0
SUMO	12.67	7.15	6.85	6.7	9.43	3.21
Total	19.21	10.55	12.22	13.75	16.6	5.77

Transect	DELTA_06							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Annual Forb	ATPH	0	0	0	0	5	0	0
Perennial Forb	ANCA10	8.5	5	5	7	6	10	7
	HECU3	8.5	7	8	2	0	0	0
	NIOC2	0	0	0	0	0	1	3
	SUMO	15.3	14	27	6	18	17	18
Perennial Graminoid	DISP	122.4	94	120	125	120	105	101
	JUBA	17	12	14	12	11	9	5
Shrubs	ATTO	3.4	4	0	2	2	0	1
	ERNA10	0	3	0	0	0	0	0
	SAVE4	0	1	15	0	4	3	2
Nonnative Species	BAHY	0	5	0	0	0	0	0
	XAST	0	2	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**
ATTO	8.17	4.5	5.9	4.87	4	1.03
ERNA10	0.4	0.55	0.6	0	0	0
SAVE4	8.26	6.61	6.5	8.67	8	7.66
SUMO	9.39	3.9	10.6	7.02	7.6	7.85
Total	26.22	15.56	23.6	20.56	19.6	16.54

Transect	DELTA_07							
Frequency	**Species**	**2002**	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
Perennial Forb	SUMO	32.3	16	15	12	15	18	9
Perennial Graminoid	DISP	113.9	93	116	102	121	121	107

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

Shrub Cover (m)	**2003**	**2004**	**2007**	**2009**	**2010**	**2013**
SUMO	25.09	10.25	27	32.8	33.11	17.93

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	INTAKE_01							
Frequency	Species	2002	2003	2004	2007	2009	2010	2012
Annual Forb	2FORB	0	0	1	0	0	0	0
	ATPH	0	18	5	0	0	0	0
	ATTR	0	0	2	0	0	0	0
	CHST	0	2	0	0	0	0	0
	CLEOM2	0	2	0	0	0	0	0
	CLOB	0	3	0	0	0	0	0
	CRCI2	0	0	7	0	0	0	0
	ERIAS	0	23	0	0	0	0	0
	ERIOG	0	5	0	0	0	0	0
	ERMA2	0	0	2	0	0	0	0
	MEAL6	0	0	10	0	0	0	0
	CLPL2	0	0	0	0	0	5	0
Perennial Forb	MACA2	17	0	0	0	0	11	0
	MALAC3	0	2	1	0	0	0	0
	STEPH	0	18	16	0	0	0	0
	SUMO	3.4	4	4	2	2	2	0
Perennial Graminoid	DISP	59.5	54	67	52	82	59	92
	JUBA	13.6	19	15	11	11	8	14
	SPAI	96.9	117	103	105	109	117	115
Shrubs	ATCO	23.8	15	23	19	25	11	25
	ATPA3	0	0	0	1	1	2	0
	ATTO	0	10	8	6	3	11	3
	ERNA10	8.5	22	27	26	28	17	12
	MACA17	0	0	0	14	18	0	10
Nonnative Species	BAHY	0	0	0	0	10	10	0
	BRTE	0	0	1	0	0	0	0
	POMO5	0	3	0	0	0	0	0
	BRRU2	0	0	0	0	1	0	0

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

Shrub Cover (m)	2003	2004	2007	2009	2010	2012
ATCO	1.15	0.85	0.95	0.75	0.75	1.52
ATTO	0.76	1.35	1.6	1	2.35	1.07
ERNA10	1.16	3.6	3.5	4.5	2.55	2.45
SAVE4	0	0	0.25	0.15	0	0
SUMO	0	0	0	0.1	0	0.18
Total	3.07	5.8	6.3	6.5	5.65	5.22

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	LUBKIN_01			
Frequency	**Species**	**2006**	**2007**	**2009**
Annual Forb	ATPH	10	0	2
	CLPA4	12	0	0
Perennial Forb	NIOC2	0	1	0
	STPA4	7	6	0
Perennial Graminoid	DISP	69	60	25
	JUBA	75	53	45
	LECI4	0	0	0
	POSE	17	21	0
	SPAI	101	97	106
Shrubs	ALOC2	5	0	0
	MACA17	0	0	1
	SAVE4	0	1	0
Nonnative Species	SCAR	0	0	9

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

Shrub Cover (m)	**2006**	**2007**	**2009**
ERNA10	4.65	5.15	3.85
SAVE4	1.9	1.25	0
Total	6.55	6.4	3.85

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
Annual Forb	ATTR	0	0	15	0	0	0	0	0	0	NA
	CHHI	0	7	5	0	0	0	0	0	0	NA
Perennial Forb	HECU3	0	0	0	0	0	0	0	0	4	NA
	MALE3	0	0	5	0	0	0	0	0	0	NA
Perennial Graminoid	DISP	0	0	0	0	0	0	0	1	0	NA
Shrubs	ATTO	9	13	19	37	43	48	16	38	13	NA
Nonnative Species	BAHY	0	2	30	0	0	58	0	0	10	NA
	SATR12	0	10	15	0	0	0	0	0	0	NA

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
ATTO	10.2	6.7	34.6	46.8	48.1	25.4	22.9	26.9	43
Total	10.2	6.7	34.6	46.8	48.1	25.4	22.9	26.9	43

Transect	THIBAUT_05										
		Frequency									
Life Forms	Species	2002	2003	2004	2005	2007	2009	2010	2012	2013	2014
Annual Forb	CHHI	0	0	0	1	0	0	0	0	0	0
	CHIN2	0	6	3	0	0	0	0	0	0	0
	LACO13	0	0	0	0	0	0	0	0	0	4
	COCA5	0	0	0	0	0	0	0	0	0	4
Perennial Forb	HECU3	0	0	0	2	2	24	37	89	103	68
	MALE3	0	0	0	0	0	10	28	38	38	52
Perennial Graminoid	DISP	0	0	0	0	4	3	0	0	0	0
Shrubs	ATTO	0	7	3	4	2	1	0	0	0	0
Nonnative Species	AMAL	0	0	0	2	0	0	0	0	0	0
	BAHY	0	19	9	42	0	2	29	6	0	16
	DESO2	0	0	16	6	0	0	0	0	0	0
	TARA	0	0	3	0	0	0	0	0	0	0
	SATR12	0	16	24	19	0	0	0	0	0	4

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

Shrub Cover (m)	Year				
Plant Species	2003	2004	2005	2007	
ATTO	0.5	0.5	0.3	1.4	
TARA	0.0	0.0	0.4	0.0	
Total	0.5	0.5	0.7	1.4	

Transect	THIBAUT_06										
		Frequency									
Life Forms	Species	2003	2004	2005	2007	2009	2010	2012	2013	2014	2015
Annual Forb	ATRIP	0	0	1	0	0	0	0	0	0	0
	ATSES	0	3	9	0	0	0	0	0	7	0
	ATTR	5	1	3	0	0	0	0	0	0	0
	CHENO	2	0	0	0	0	0	0	0	0	0
	CHHI	0	0	4	0	0	0	0	0	0	0
	CHIN2	0	0	3	0	0	0	0	0	0	0
	GITR	0	0	5	0	0	0	0	0	0	0
	LACO13	0	0	0	0	0	0	0	0	9	0
	MEAL6	0	14	72	0	0	0	0	0	0	0
Perennial Forb	HECU3	1	0	0	0	51	46	69	47	38	14
Perennial Graminoid	DISP	2	2	2	3	15	14	28	39	38	38
	SPAI	2	3	3	5	4	2	1	6	5	5
Shrubs	ATTO	11	8	9	3	0	1	2	0	2	1
Nonnative Species	BAHY	0	2	1	0	10	88	16	0	65	0
	DESO2	0	19	3	0	0	0	0	0	0	0
	SATR12	17	60	52	0	6	0	5	0	34	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
ATTO	0.7	1.1	1.8	11.1	1.7	2.4	4.3	4.5	2.5	7

Transect	THIBAUT_07									
		Frequency								
Life Forms	Species	2003	2004	2005	2007	2009	2010	2012	2013	2014	2015
Annual Forb	2FORB	0	1	0	0	0	0	0	0	0	0
	ATSES	2	24	81	0	0	0	0	0	3	0
	ATTR	26	15	49	0	0	0	0	0	0	0
	GITR	0	0	3	0	0	0	0	0	0	0
Perennial Forb	HECU3	1	0	1	0	0	0	0	0	0	0
	MALE3	7	2	0	9	2	0	6	12	46	50
Perennial Graminoid	DISP	3	3	0	4	0	0	0	0	0	0
Shrubs	ATTO	7	16	20	8	18	17	7	1	1	0
Nonnative Species	BAHY	12	34	37	0	0	92	3	0	23	0
	DESO2	0	15	34	0	0	0	0	0	0	0
	SATR12	16	47	45	0	0	0	3	0	6	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	17	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, $\alpha \leq 0.1$ 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**
Annual Forb	ATTR	0	0	9	0	0	0	0	0	0
	CHIN2	0	0	2	0	0	0	0	0	0
	CRCI2	0	0	3	0	0	0	0	0	0
Perennial Forb	SUMO	1.7	0	1	9	24	33	4	3	3
Perennial Graminoid	DISP	17	4	12	0	0	0	0	0	0
	LETR5	0	0	0	0	0	0	0	0	4
Shrubs	ATTO	5.1	8	27	18	13	9	3	0	0
Nonnative Species	BAHY	0	6	41	0	15	24	0	0	0
	DESO2	0	0	7	0	0	0	0	0	0
	SATR12	0	4	82	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**
ATTO	13.6	22.4	11.15	17.85	15.7	12.49	13.55	17.75
SUMO	0	0	20	27.25	37.2	12.49	8.15	8.71
Total	13.6	22.4	31.15	45.1	52.9	24.98	21.7	26.46

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**
Perennial Forb	HECU3	0	0	8	8	11	8	1
	SUMO	48	30	29	16	10	9	6
Perennial Graminoid	DISP	57	38	32	13	30	53	43
	SPAI	0	0	10	0	0	0	2
Shrubs	ATTO	23	20	63	71	51	36	27
Nonnative Species	BAHY	0	0	22	29	0	0	0
	SATR12	11	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**
ATTO	5.4	11.3	50.15	66.55	62.75	35.88	51.79
SUMO	30.5	44.75	14.85	13.4	3.4	2.42	2.3
Total	35.9	56.05	65	79.95	66.15	38.3	54.09

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

APPENDIX A

THE BISHOP CONE AUDIT FOR 2014-2015 RUNOFF YEAR

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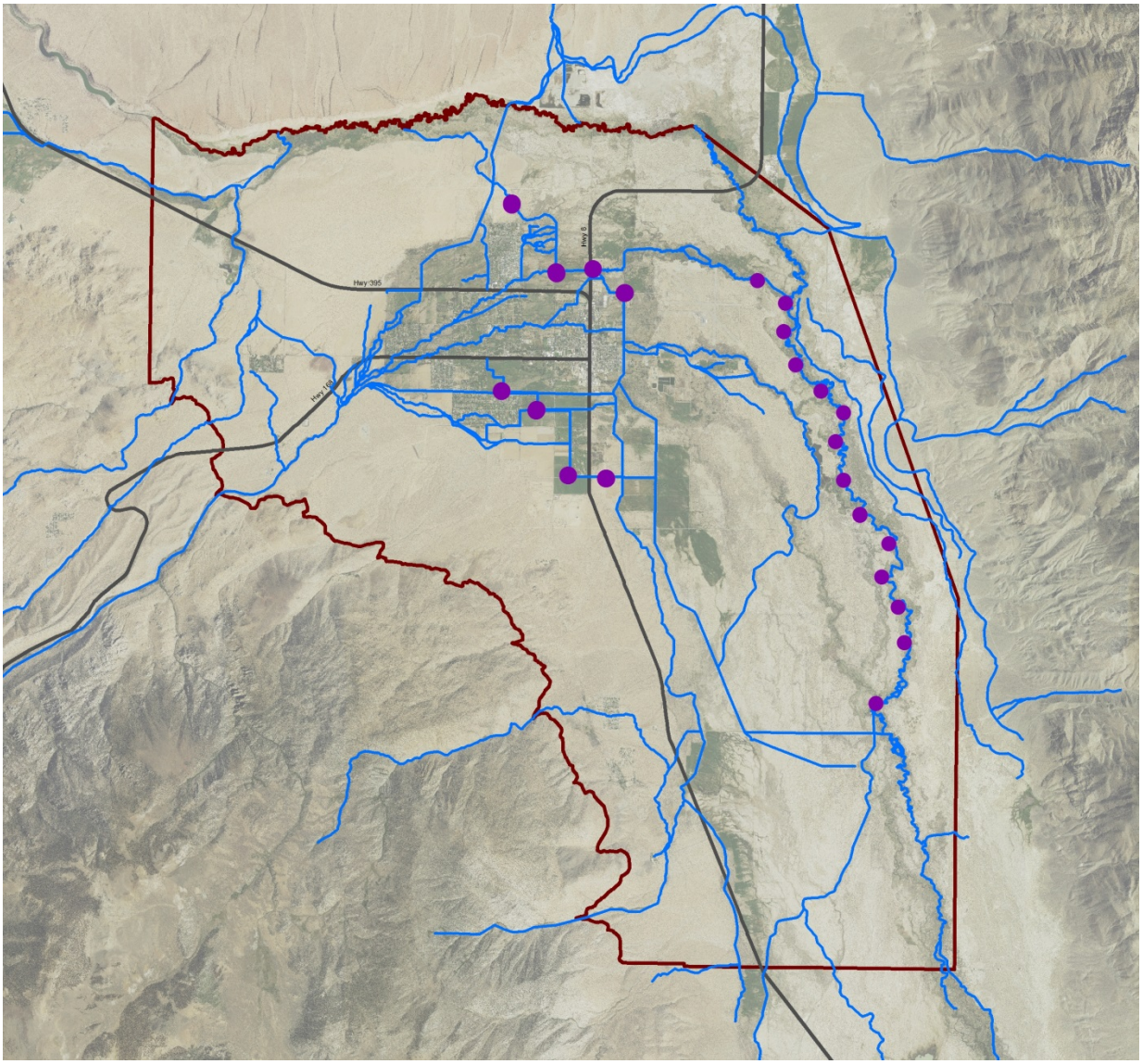
THE BISHOP CONE AUDIT
FOR THE 2014-15 RUNOFF YEAR



Keith Rainville
Hydrologist

Inyo County Water Department
Report 2014-15
January 15, 2016

THE BISHOP CONE AUDIT
FOR THE 2014-15 RUNOFF YEAR

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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*

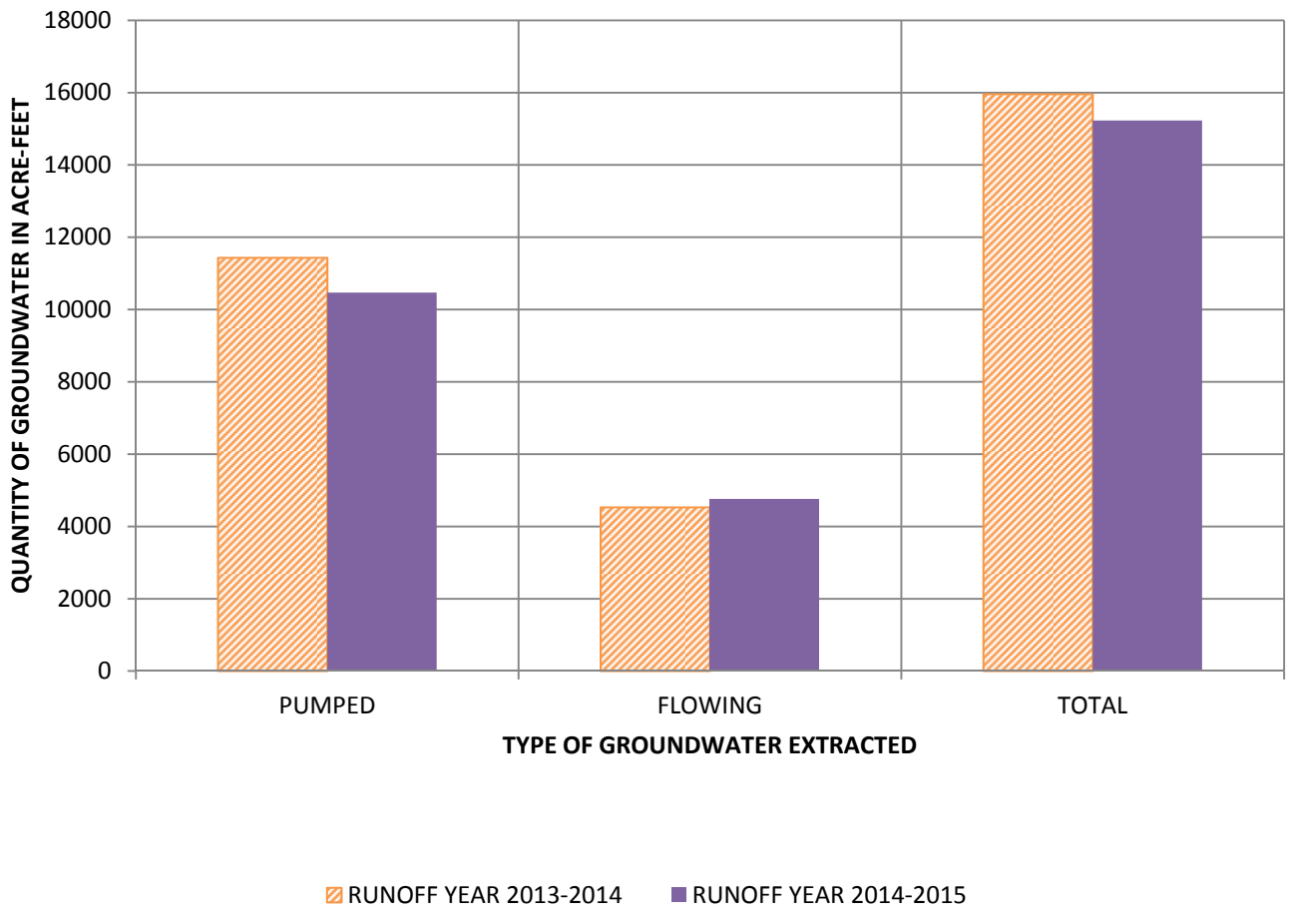
amount of artesian water that flowed out of LADWP uncapped wells on the Bishop Cone during the runoff year." (Appendix B)

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

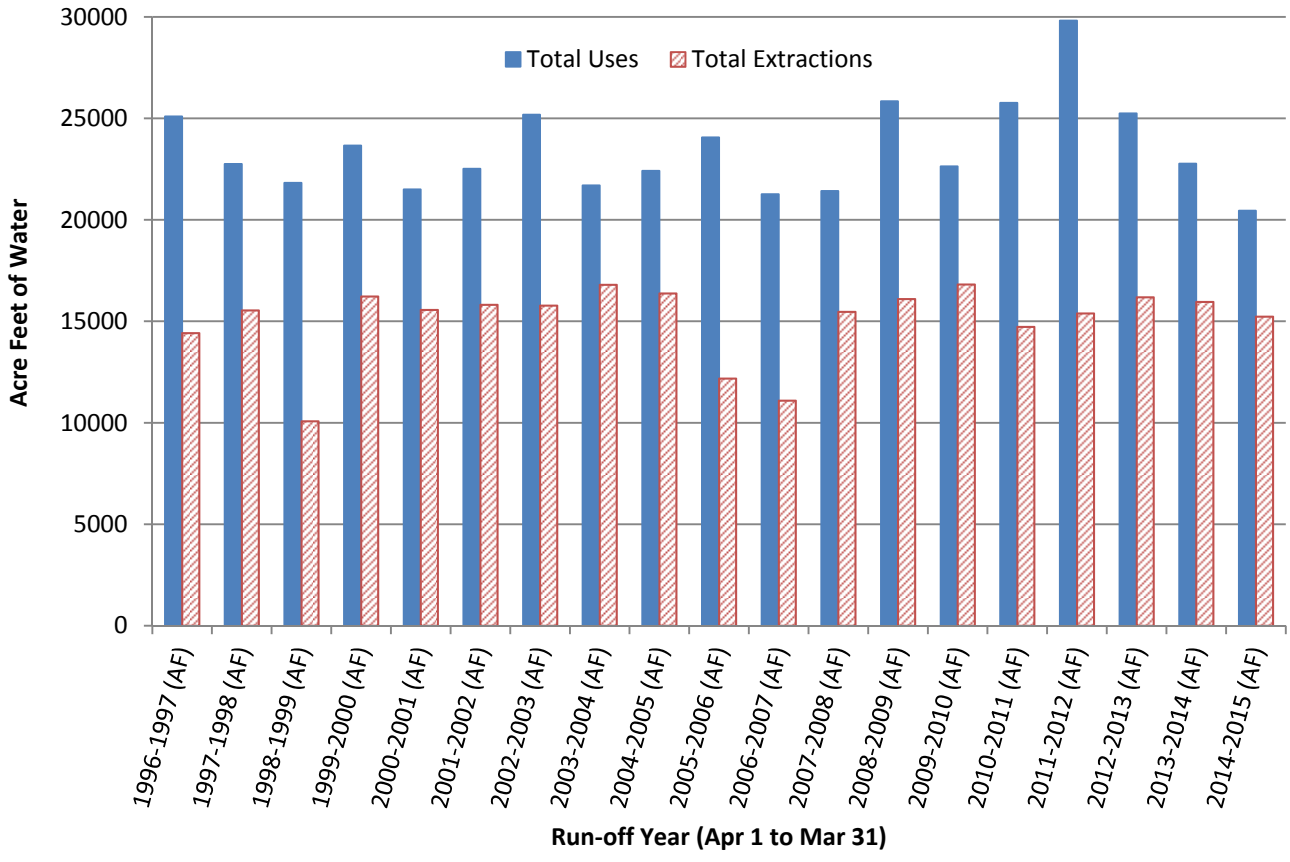
The Water Agreement provides that, during any runoff year, total groundwater extraction by LADWP on the Bishop Cone shall not exceed water usage on Los Angeles-owned land on the Cone. Table 3, below, shows that LADWP was in compliance with the above provision for runoff years 2013-14 and 2014-15 as the 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

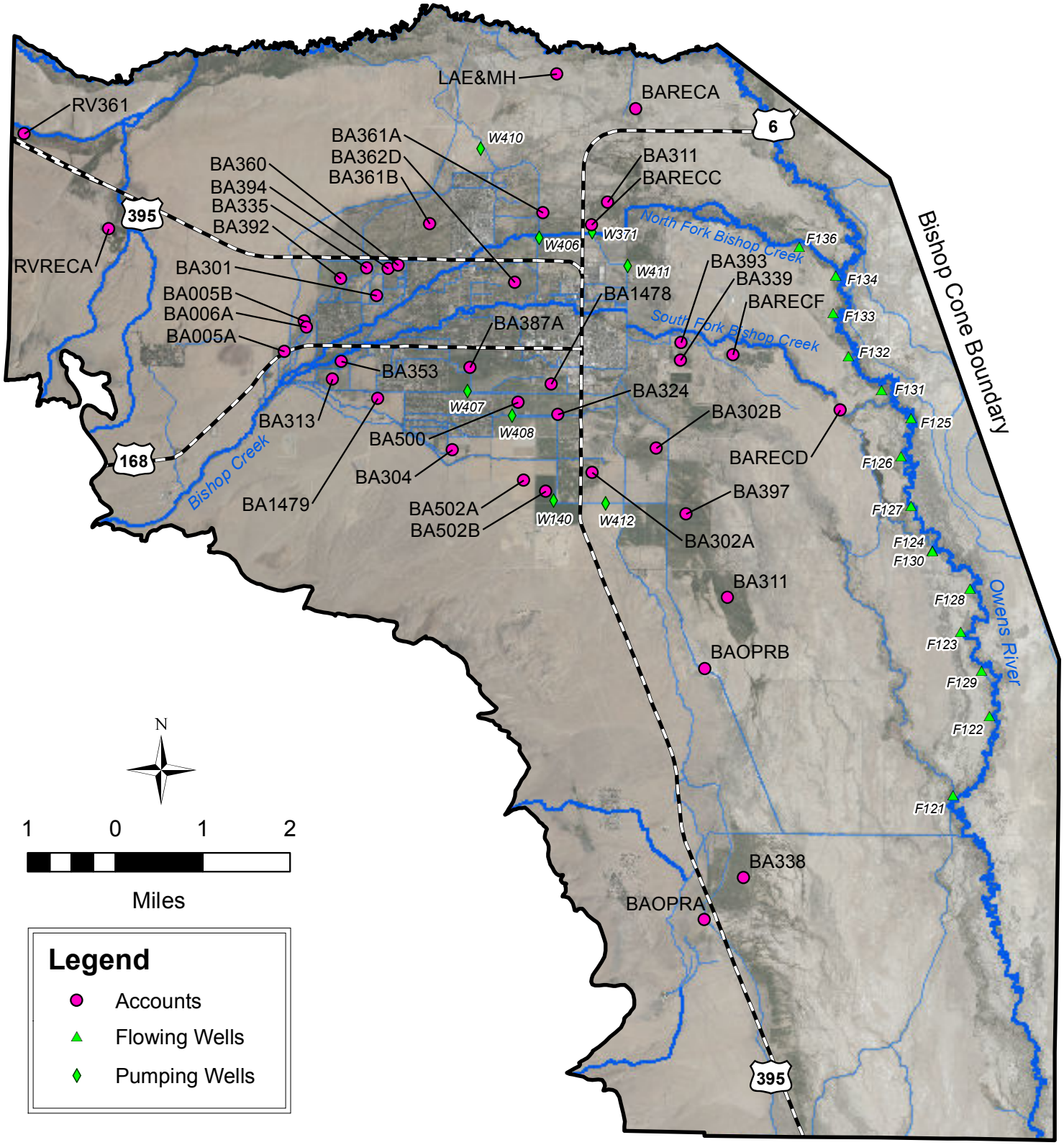
	RUNOFF YEAR 2013-14 (AF)	RUNOFF YEAR 2014-15 (AF)
TOTAL USES	22,765	20,452
TOTAL GROUNDWATER EXTRACTION	15,960	15,229
USES MINUS EXTRACTIONS	6,805	5,223
IN COMPLAINCE?	YES	YES

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.

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.

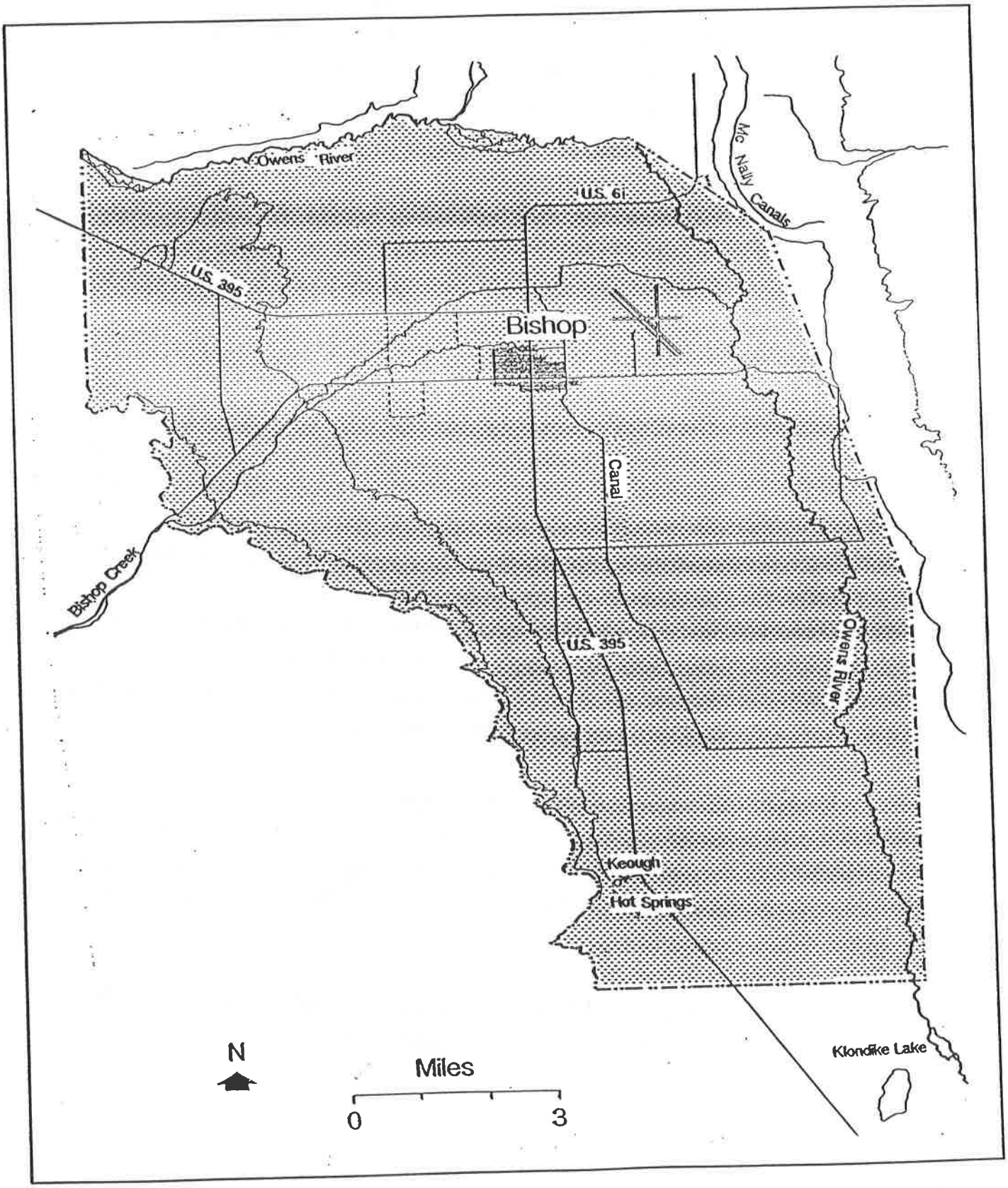
1. Procedures for Conducting the Bishop Cone Audit

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)

ACCOUNTS & STATIONS		ACRE-FEET PERIOD	MAR M-T-D	SINCE 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

ACCOUNTS & STATIONS					ACRE-FEET PERIOD	MAR M-T-D	SINCE 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

ACCOUNTS & STATIONS		ACRE-FEET PERIOD	MAR M-T-D	SINCE 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

A C C O U N T S & S T A T I O N S		A C R E - F E E T PERIOD	MAR M-T-D	SINCE 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

A C C O U N T S & S T A T I O N S		ACRE-FEET PERIOD	MAR M-T-D	SINCE 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

ACCOUNTS & STATIONS		ACRE-FEET PERIOD	MAR M-T-D	SINCE 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

ACCOUNTS & STATIONS		ACRE-FEET PERIOD	MAR M-T-D	SINCE 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

ACCOUNTS & STATIONS		ACRE-FEET PERIOD	MAR M-T-D	SINCE 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